

Päivi Hämäläinen  
Jarmo Reponen  
Ilkka Winblad  
Jarmo Kärki  
Maarit Laaksonen  
Hannele Hyppönen  
Mairit Kangas

# eHealth and eWelfare of Finland

## Checkpoint 2011

REPORT



**REPORT 5/2013**

Päivi Hämäläinen, Jarmo Reponen, Ilkka Winblad, Jarmo Kärki,  
Maarit Laaksonen, Hannele Hyppönen, Maarit Kangas

# **eHealth and eWelfare of Finland Checkpoint 2011**



UNIVERSITY of OULU  
OULUN YLIOPISTO



NATIONAL INSTITUTE  
FOR HEALTH AND WELFARE

Contact address for requests for additional information about health care:  
FinnTelemedicum c/o KTTYL, P.O. Box 5000, FI-90014 University of Oulu,  
Finland; Research Manager Jarmo Reponen, tel. +358 44 439 4820, E-mail:  
jarmo.reponen@oulu.fi

Contact address for requests for additional information about social care:  
National Institute for Health and Welfare (THL), Information Department, Informa-  
tion Structures and Classifications Unit, P.O. Box 30, FI-00271 Helsinki, Finland;  
Development Manager Jarmo Kärki, E-mail: jarmo.karki@thl.fi.

© Authors, FinnTelemedicum and National Institute for Health and Welfare

English language review for health care: Semantix Finland Oy and Anna Vuoltee-  
naho (Chapters 2,6,8,9)

ISBN 978-952-245-834-6 (printed)  
ISSN 1798-0070 (printed)  
ISBN 978-952-245-835-3 (online publication)  
ISSN 1798-0089 (online publication)

<http://urn.fi/URN:ISBN:978-952-245-835-3>

Juvenes Print – Finnish University Print Ltd  
Tampere, Finland 2013



## Abstract

Päivi Hämäläinen, Jarmo Reponen, Ilkka Winblad, Jarmo Kärki, Maarit Laaksonen, Hannele Hyppönen, Maarit Kangas. eHealth and eWelfare of Finland. Checkpoint 2011. National Institute for Health and Welfare (THL). 144 pages. Helsinki, Finland 2012. ISBN 978-952-245-834-6 (printed); ISBN 978-952-245-835-3 (online publication)

This eHealth and eWelfare report was produced by the National Institute for Health and Welfare (THL), Finland, and FinnTelemedicum, the Centre of Excellence for Telehealth at the University of Oulu, from the results of the national eHealth implementation survey and the national eWelfare survey. Reviews on the main results of two other surveys performed in Finland during the same time period are also included.

The national eHealth implementation survey describes the status and trends in health care information and communication technology (ICT) and eHealth usage in Finland in 2011, comparing the results with earlier surveys carried out in 2003, 2005 and 2007. This eHealth survey includes data from all the 21 public hospital districts delivering secondary or tertiary care and 140 public health care centres delivering primary care. A sample of private sector service providers is also included. In Finland, electronic patient records were first put into comprehensive use in local institutions. Now, electronic patient data is utilised at the regional level. Electronic patient record (EPR) distribution covers 100% of both specialised care (hospital districts) and primary care (health care centres). EPRs were used as the only source of patient narratives in more than 90% of all the primary health care centres, and in most of the hospitals. Filmless picture archiving and communication systems (PACS) are in use in all 21 hospital districts and in 94% of the primary health care centres. Electronic information exchange between organisations has progressed rapidly. Electronic referrals and electronic discharge letters and multilateral regional electronic patient data depositories are common. Fully interoperable patient data exchange is regionally in operational use in most of the health care institutions. The eHealth survey of 2011 shows an increase in the regional utilisation rate. The integration of the information systems has also become more advanced. New documentation is stored only electronically. All this development has been accompanied by the intake of structured core data, national classifications and coding systems. All hospital districts have started preparations for joining the national electronic patient record archive (“KanTa” eArchive). A large number of public health care providers have joined the national ePrescription service. The median of ICT costs in hospital districts in 2010 was 2.5% of their total budget. In primary health care centres this figure was 2%. Private service providers spent 2.7% of their budget on ICT.

The eWelfare survey was a national review of the electronic social services and social welfare client information systems currently available in Finland and of how

they function in the social services context. The respondents to this survey were 457 organisations providing social welfare services: 69 local authorities, 13 municipal federations (or similar bodies) and 373 private enterprises, associations or NGOs. Today, eSocial services are mostly developed at the local level. Providers of social welfare services generally have a website with information on their operations, and half of the local authorities and one fourth of the private service providers had online feedback functionalities. The survey demonstrates that the majority of providers of social welfare services in local government have a client information system, but that not all branches of social services have such systems. Private service providers make somewhat less use of client information systems than the local authorities. Information exchange between organisations is so far limited to read-only, and there is little exchange of information between information systems. Not all social welfare employees in the public or private sector have a personal workstation. The percentage of client information system investment costs out of total ICT costs varies greatly from one organisation to another.

According to the national eHealth and eWelfare plans, the implementation of nationwide online client service functions is to be promoted in both social welfare and health care. Since the 2007 survey, the provision of direct eHealth services for citizens has started to increase slowly now that the eHealth infrastructure is in place in most regions. One in four of the local authorities responding to the eWelfare survey reported that they offered online services for citizens such as applications for day care places or income support.

The respondents of the eHealth survey welcomed the possibility that the National Institute for Health and Welfare would provide more comprehensive guidance concerning ICT infrastructure and standardisation. The rapid pace of development also poses new challenges. The overall structural changes currently taking place in Finnish health and social care will also influence ICT construction. As shown by surveys addressed to health care professionals, the personnel call for improvements in software usability and the possibility to guide treatment processes with ICT. In this functional respect, the achieved ICT infrastructure will enable considerable improvements in the future. The eWelfare survey gives a good picture of the baseline situation before the implementation of nationwide social welfare information system services starts. The eHealth survey was conducted during the launch phase of the national eArchive (“KanTa”) and ePrescription services and can be used for benchmarking development in different parts of the country.

Keywords: information and communication technology, eHealth, health care services, social welfare, social care, social services, electronic patient record systems, telemedicine, regional patient data repositories, national patient data archive, ICT, electronic information management, client information systems, client information, health information system, classification, online services, survey, benchmarking

## Acknowledgements

The authors are very grateful to the members of the project coordinator group, namely Development Manager Anne Kallio and Ministerial Adviser Anna-Kaisa Iivari from the Ministry of Social Affairs and Health, Development Manager Marina Lindgren from the Social Insurance Institution of Finland (Kela) and Development Manager Sinikka Ripatti from the Association of Local and Regional Authorities (Kuntaliitto). Also many thanks belong to the secretariat of this project, Head of Unit Vesa Jormanainen and Development Manager Viveca Bergman, both from the National Institute for Health and Welfare. Leena Mäntysaari and Marika Wagelius from Market-Visio had an important role in collecting and preparing the material of the survey on ICT in the social sector. In addition, we wish to express our special thanks to all the social care and ICT experts who were involved in the design of the survey and supported the preparation of the report.

The authors wish to thank the survey participants for using their valuable working time when answering the questionnaires.

The authors would like to express their deep respect to one colleague, adjunct professor, medical counsellor Ilkka Winblad, who suddenly passed away in the middle of the editing process of this volume. His pioneering work has been instrumental for the series of health care information and communication technology implementation studies that have been carried out throughout the past eight years. We shall greatly miss his fresh ideas, incisive comments and especially his ability to combine research results with extensive clinical experience.

In Helsinki, 23.1. 2013

Päivi Hämäläinen,  
Jarmo Reponen,  
Jarmo Kärki,  
Maarit Laaksonen,  
Hannele Hyppönen,  
Mairit Kangas

## Suomalaiselle lukijalle (For the Finnish Readers)

Raportti kokoaa tulokset kahdesta suomenkielisestä raportista, joissa kuvataan Suomen sosiaali- ja terveydenhuollon tietoteknologian käyttöönoton tilannetta vuoden 2011 alussa. Tämä raportti on tarkoitettu erityisesti kansainväliselle lukijakunnalle, jota varten siihen on kerätty tuloksia myös muutamista muista keskeisistä samaa aihepiiriä käsitelleistä tutkimuksista sekä muuta yleistietoa.

Selvitys tieto- ja viestintäteknologian käytöstä terveydenhuollossa vuonna 2011 tehtiin sosiaali- ja terveysministeriön pyynnöstä Oulun yliopiston FinnTelemedicum ja THL:n yhteishankkeena. Se kuvaa tilannetta terveydenhuollossa kansallisen potilastietojen arkiston käyttöönoton kynnyksellä ja sähköisen reseptin käytön alkaessa. Kartoituksen tuloksia on mahdollista verrata kolmeen aiempaan selvitykseen vuosilta 2003, 2005 ja 2007 ja nähdä, mitä muutoksia on tapahtunut sairaanhoitopiireissä, terveyskeskuksissa ja yksityisten terveyspalvelujen tuottajien toiminnassa. Selvityksessä kartoitettiin myös toimijoiden osallistumista kansalliseen kehitystyöhön ja kentän näkemyksiä tietojärjestelmämuutosten ohjauksesta. (Winblad ym. 2012) Selvitys tieto- ja viestintäteknologian käytöstä sosiaalihuollossa vuonna 2011 tehtiin osana valtiovarainministeriön rahoittaman SADE-ohjelman sosiaali- ja terveydenhuollon palvelukokonaisuuksia. Tässä ohjelmassa kehitetään kansallisia sähköisiä ratkaisuja keskeisiin julkisiin palveluihin, mukaan lukien sosiaali- ja terveydenhuollon palvelut. Kartointu kattoi kunnat, kuntayhtymät, yksityiset ja järjestöjen sosiaalipalvelujen tuottajat. Selvityksessä muodostettiin kuvaa nykyisin käytössä olevista sähköisistä sosiaalipalveluista, sosiaalialan asiakastietojärjestelmistä ja niiden toimivuudesta sosiaalihuollon toimintaympäristössä. (Kärki ym. 2012)

Tästä raportista löytyvät englanninkielisinä myös keskeiset tulokset SADE-ohjelman sosiaali- ja terveydenhuollon valmistelun yhteydessä tehdystä selvityksestä sähköisiä palveluja valmistelleista kehityshankkeista, jotka olivat saaneet julkista rahoitusta vuonna 2007 tai sen jälkeen vuoteen 2010 asti. (Hyppönen, Iivari ym. 2011). Lääkäriliitto teki lääkäreille vuonna 2010 yhteistyössä THL:n, Oulun yliopiston FinTelemedicum ja Aalto yliopiston kanssa kyselytutkimuksen terveydenhuollon tietojärjestelmien käytettävyydestä. Tästä aineistoista on julkaistu useita artikkeleita ja raportteja (Vänskä ym. 2010, Winblad ja Hyppönen ym. 2010; Hyppönen ja Viitanen 2011, Viitanen ja Hyppönen ym. 2011; Viitanen ja Nieminen ym. 2011, Hyppönen ja Winblad ym. 2012). Näistä julkaisuista mukaan on tuotu terveydenhuollon tietoteknologiakartoituksen näkökulmasta keskeisiä tuloksia.

Kansainvälistä lukijakuntaa varten tähän raporttiin on kirjoitettu lyhyt kooste sosiaali- ja terveydenhuollon palvelujärjestelmästä ja keskeisistä sosiaali- ja terveyspolitiikan kysymyksistä sekä tietoa sosiaali- ja terveydenhuollon tietohallintoon liittyvästä politiikka-tasoisesta strategisesta päätöksenteosta, toimeenpanosta ja kansallisista kehittämishankkeista. Raportti sisältää lisäksi lyhyitä kuvauksia muutamista muista näkökulmista sähköisen sosiaali- ja terveydenhuollon asioihin Suomessa sekä

maamme suhteesta kansainväliseen terveydenhuollon tietoteknologian osoittimien kehitystyöhön.



## Abbreviations and Definitions

### Abbreviations

CDA	<i>clinical document architecture</i>
CIS	<i>client information record in social care</i>
DICOM	<i>digital imaging and communication in medicine</i>
EBM	<i>evidence-based medicine</i>
EBMDeS	<i>evidence-based medicine decision support system</i>
EDI	<i>electronic data interchange</i>
EDIFACT	<i>EDI for administration, commerce and transport</i>
EPR	<i>electronic patient record</i>
EHR	<i>electronic health record</i>
FinnTelemedicum	<i>Centre of Excellence for Telehealth at the University of Oulu</i>
GDP	<i>gross domestic product</i>
GPS	<i>global positioning system</i>
HL7	<i>a set of standards</i>
ICT	<i>information and communication technology</i>
ISO	<i>the International Organization for Standardization</i>
KanTa	<i>the short name of the Finnish National Health Information system</i>
KELA	<i>Social Insurance Institution in Finland</i>
NHIS	<i>national health information system</i>
OID	<i>code object identifier code</i>
PACS	<i>picture archiving and communication systems</i>
PKI	<i>public key infrastructure</i>
R&D	<i>research and development</i>
SADe programme	<i>the Finnish Government Programme for public e-services for citizens funded by the Ministry of Finance</i>
SITRA	<i>Finnish Innovation Fund</i>
SMS	<i>short message service</i>
SSL	<i>secure socket layer</i>
STAKES	<i>National Research and Development Centre for Welfare and Health</i>
TEKES	<i>National Technology Agency of Finland</i>
THL	<i>National Institute for Health and Welfare</i>
VPN	<i>virtual private network</i>
VRK	<i>Population Register Centre</i>
VTT	<i>Technical Research Centre of Finland</i>
XML	<i>extendible mark up language</i>

## **Definitions**

eHealth

*use of information and communication technology locally and at distance in health care*

eWelfare

*use of information and communication technology as well as electronic information management in social care*



## Table of Contents

Abstract.....	3
Acknowledgements.....	5
1" INTRODUCTION .....	15
1.1" The Background of This Report.....	15
1.2" The Finnish Health and Social Care System and an Overview of Health and "Social Care Policies in Finland .....	16
1.3" Finnish eHealth and eWelfare Policies .....	25
1.4" Policies and Plans for Citizen Involvement in eHealth and eWelfare .....	30
2" DEPLOYMENT OF THE 2003, 2005, 2007 AND 2010 EHEALTH SURVEYS.....	32
2.1" The Survey on Implementation and Usage of ICT and eHealth .....	32
2.2" The Questions on the New Role of THL as the Expert Office for the "National eHealth Services .....	34
3" ELECTRONIC PATIENT RECORDS IN FINLAND.....	35
3.1" The Development of the Structured EPR .....	35
3.2" The Availability and Usage of Electronic Patient Records .....	37
3.3" The Situation on the Structured EPR and Core Data Usage .....	40
4" INTRAORGANISATIONAL AUXILIARIES OF EPR.....	43
4.1 Wireless Usage and Speech Recognition .....	43
4.2 Picture Archiving and Communication Systems.....	44
4.3 Radiology and Laboratory Information Systems .....	45
4.4 Digital ECG.....	46
5 EXCHANGE OF ELECTRONIC PATIENT INFORMATION BETWEEN ORGANISATIONS.....	47
5.1 eReferral and eDischarge Letters .....	48
5.2 Electronic and Remote Consultations .....	51
5.3 Regional Data Exchange Systems.....	52
5.4 Teleradiology and Image Distribution through a Regional Archive.....	54
5.5 Telelaboratory .....	56
5.7 The Situation in the Development of National ePrescribing and eArchiving Systems.....	57
6 DATA SAFEGUARDING .....	62
6.1 Systems Supporting Data Security .....	62
6.2 Management of Informed Consent.....	63

6.3	Electronic Identification of Health Care Professionals .....	64
7	STANDARDS FOR DATA EXCHANGE BETWEEN ORGANISATIONS .....	65
8	INFORMATION EXCHANGE BETWEEN HEALTH CARE ORGANISATIONS AND PATIENTS .....	67
9	HUMAN AND MATERIAL RESOURCES .....	72
9.1	Professional Education and Training .....	72
9.2	Computer Skills of Health Care Personnel.....	72
9.3	Technical Support Availability for Users of the Patient Record System .....	73
9.4	Harnessing the User Skills of Physicians in the Development of IT Systems for Health Care.....	74
9.5	Costs for Systems of Information and Communication Technology in eHealth .....	74
10	SYSTEMS SUPPORTING THE QUALITY AND DELIVERY OF HEALTH CARE SERVICE.....	77
10.1	Decision Support Systems.....	77
10.2	Other Systems Supporting the Quality and Delivery of Health Care Service..	79
11	EXPECTATIONS ON THE NEW ROLE OF THL AS THE EXPERT OFFICE FOR THE NATIONAL EHEALTH SERVICES .....	81
12	STATUS OF INFORMATION AND COMMUNICATION TECHNOLOGY IN SOCIAL WELFARE IN FINLAND.....	84
12.1	Methods and Target Group of the e-Social Care Survey .....	84
12.2	Data of the e-Social Care Survey .....	85
12.3	E-services in Social Welfare .....	86
12.4	CIS in Social Welfare .....	86
12.5	CIS Contents in Social Welfare .....	88
12.6	Information Exchange in Social Welfare.....	89
12.7	Workstations and Identification in Social Welfare.....	90
12.8	Information Management in Social Welfare.....	91
12.9	E-tools Used in Social Welfare Services .....	92
12.10	Investments in ICT in Social Welfare.....	93
12.11	Discussion on the status of ICT in Social Welfare in Finland .....	93
13	EXCHANGE OF DATA BETWEEN THE HEALTH AND SOCIAL SECTORS	95
14	ADDITIONAL INFORMATION ON FINLAND AND EHEALTH AND EWELFARE.....	98
14.1	The eService Projects Survey .....	98

14.2 The EPR Usability Survey .....	98
14.3 Systems for Generating Evidence for eHealth Management .....	98
14.4 Research and Development Collaboration and Training in Health and Social Care Informatics .....	101
14.5 Professional Activities .....	103
14.6 International Collaboration .....	104
15 CONCLUSIONS AND FUTURE PROSPECTS .....	106
15.1 The Overall Development and Trends 2003 – 2011 .....	106
15.2 The Strengths and Weaknesses of the Study .....	113
15.3 Benchmarking Finnish eHealth .....	116
15.4 Future Prospects .....	118
REFERENCES .....	120
Appendix 1. The Questionnaires, Survey on the Use of ICT Systems in Health Care Services .....	125
Appendix 2. ....	144



# 1 INTRODUCTION

## 1.1 The Background of This Report

This eHealth and eWelfare report was produced by the National Institute for Health and Welfare (THL), Finland, and FinnTelemedicum, the Centre of Excellence for Telehealth at the University of Oulu, from the results of the national eHealth implementation survey that was commissioned by the Finnish Ministry of Social Affairs and Health and the eWelfare survey that was conducted as part of the SADe programme funded by the Ministry of Finance. The eWelfare survey was conducted by Market-Visio Oy and the report was written by THL researchers. Current information on Finnish eHealth and eWelfare policies and other Finnish eHealth activities has been included in this report. Reviews on the main results of two other surveys performed in Finland during the same time period are also included. These studies were the national electronic health record (EHR) usability survey, which was conducted for the first time in 2010 by the Finnish Medical Association, THL, Aalto University and University of Oulu, and the eService projects survey, which was conducted by THL in collaboration with the Ministry of Finance. The usability survey covered experiences of the usability of key functionalities of electronic patient records, health information exchange and communication with the patient.

The national eHealth implementation survey describes the status and trends in health care information and communication technology (ICT) and eHealth usage in Finland in 2011, comparing the results with earlier surveys carried out in 2003, 2005 and 2007 (Kiviaho et al. 2004b, Winblad et al. 2006, Winblad and Reponen et al. 2008, Winblad et al. 2012). The Finnish Ministry of Social Affairs and Health provided funding to all these national eHealth surveys in order to meet the needs of policy makers to follow national developments in the field of eHealth. The national eWelfare survey on eSocial services (Kärki et al. 2011) and also the eService projects survey (Hyppönen and Iivari et al. 2011) were conducted in the planning phase of the health and social care subprogramme of the national SADe programme in order to obtain information on needs and possibilities in the provision of new electronic services to clients of health care and social care services. The national electronic health record (EHR) usability survey (Vänskä et al. 2010, Winblad and Hyppönen et al. 2010, Hyppönen and Viitanen et al. 2011, Viitanen and Nieminen et al. 2011, Hyppönen et al. 2012) was mainly funded by the Finnish Medical Association to address the active national discussions on the experiences of physicians in the electronic management of patient information.

The reports mentioned above and the first articles on the electronic health records usability survey were published in Finnish with only short English summaries. This



report has been designed for an international readership. The report includes a short description of the Finnish health and social care system and current information on Finnish eHealth and eWelfare policies and other “e” activities. The aim of this report is to give international readers a comprehensive picture of the current eHealth and eWelfare situation in Finland and to promote international benchmarking activities by providing data on Finland for developers of international eHealth and eWelfare indicator sets.

## 1.2 The Finnish Health and Social Care System and an Overview of Health and Social Care Policies in Finland

Finland is a sparsely populated country of 5.4 million inhabitants (Statistics Finland 2012a) who live in an area of 303 893 square kilometres with an average population density of 17.77 persons/square kilometre (Statistics Finland 2012a). In the eastern and northern parts of the country the population density is especially low and distances are great. All people living in Finland are covered by the Finnish universal public health and social care system. The constitution states that public authorities shall promote the health of the population and guarantee for everyone, as provided in more detail by an Act of Parliament, adequate social, health and medical services (The Constitution of Finland 731/1999). Health and social services are mainly provided by the public sector and funded mainly by general tax revenues. However, the Finnish system is very decentralised and the overall funding of the system has many mixed features. (OECD 2012, Teperi et al. 2009.)

According to the European System of Integrated Social Protection Statistics (THL 2012a), overall social protection expenditure in Finland amounted to EUR 54.6 billion in 2010. Per capita expenditure is above the EU average (Finland: EUR 9,820 in 2009). Social protection expenditure equalled 30.4% of GDP in 2010. Services provided directly or reimbursements for the use of services account for 38% of the costs of social protection. The majority of the costs are due to cash benefits, which include items such as pensions, child benefits and social assistance. One third of the overall social protection expenditure is accounted for by cash benefits and services for the elderly, and this proportion is rising fast. The population of Finland is aging and these demographic changes pose the greatest threats to the sustainability of the Finnish social protection system.

The share of overall social protection expenditure accounted for by health care amounted EUR 16.0 billion in 2010. Finnish health expenditure as a proportion of GDP was 8.9% in 2010, below both the OECD and the EU average (THL 2012b). In 2010, the cost of secondary and tertiary care accounted for 34% of the total costs (EUR 5.5 billion) and the trend is rising. Primary care represented 17.8% of the total costs, medication 13.9%, dental health 5.9%, the private health care sector likewise

5.9%, institutional care of the elderly 5%, and occupational health and student health together 4.2%, among some other smaller groups of costs. The public sector covered 74.7% of the total health care expenditure in 2010 (THL2012b); 24.9% of this funding comes from the state, 35.1% from the municipalities (local authorities) and 14.6% from the National Social Security Institute. Private funding totalled 25.3%. Direct out-of-pocket money from households accounted for 19.3%. This figure is higher than the EU average. Service charges and the cost of medicines are the main out-of-pocket burden of the citizens, because the reimbursement cover of private services and medications is not high. The compulsory Act on Sickness Insurance (364/1963) provides daily allowances in case of sickness and also in the case of maternity, paternity or parental leave. It also refunds part of the costs of medicine and transportation, as well as part of the costs of private sector services. All residents are insured on an individual basis, even children.

### *The major challenges of the Finnish health and social care system*

Demographic change and globalisation of the economy are changing the operational environment of social protection, challenging established practices. Finland's population will age faster than that of most other countries in the near future. In Finland, as in other countries, chronic lifestyle illnesses will become more common. Population mobility, types of working life and forms of interaction between people are changing. Developments in information and communication technology and other technologies challenge the ways in which different functions are operated.

Finland also faces a number of specific major challenges. Demographic and regional diversification is increasing and the municipal and service structure is in a state of transition because the current structure cannot bear the challenges of the ongoing demographic changes in Finland with an aging population and urbanisation that is leaving local authorities outside the major cities without working-age taxpayers. (The Ministry of Social Affairs and Health 2011b, OECD 2012.)

### *The authorities in social and health care and the overall health and social care policies of Finland*

Municipalities have by law the primary responsibility to arrange social and health care services for their residents. These include all social services, and primary, secondary and tertiary health care. The duties of municipal authorities throughout Finland to arrange social and health care are stipulated by laws on social and health care planning and the central government transfers to local government. Public social and health services are mainly financed by the public authorities through tax revenue. Municipalities are primarily responsible for the financing of social and health care and having the right to collect taxes for it. The State participates by paying a general, not earmarked, subsidy to the municipalities. The subsidy payable to a

particular municipality is mostly dependent on the age structure of its residents. Other criteria taken into account are the unemployment rate, the number of pensions for the disabled (assesses the overall state of health) and the population density. Services are either produced by the municipalities themselves, provided in cooperation with other municipalities or purchased from private or public providers. There are 336 municipalities in Finland. More than half of the municipalities have less than 6000 inhabitants. (Suomen Kuntaliitto 2012.) Small municipalities cover about a half of the Finnish territory, but only 15% of the population live in these communities. The great amount of small municipalities with great responsibilities in providing services is a unique characteristic of the Finnish health and social service system.

The Ministry of Social Affairs and Health manages the preparation and implementation of Finland's social welfare and health care policy, gender equality policy and occupational safety and health policy. As part of the government, the Ministry puts the Government Programme into practice, determines development guidelines, drafts legislation and key reforms and guides their implementation. The Ministry of Social Affairs and Health has a broad mandate. It supervises several independent agencies and institutions that implement the social welfare and health care policy goals laid out by the Ministry and participate in Government Programme projects. (The Ministry of Social Affairs and Health 2011a.) The strategic purpose of social welfare and health care policy is to achieve a socially sustainable society, where every member is ensured equal treatment, social inclusion and promotion of health and functional capacity. A socially sustainable society treats all of its members fairly and equally, reinforces inclusion and a sense of community, promotes the health and functional capacity of the population, and provides the security and services required. Sustainable development consists of economic, social and ecological sustainability. (The Ministry of Social Affairs and Health 2011a.)

There are several independent agencies and institutions in the administrative branch of the Ministry of Social Affairs and Health that implement the social welfare and health care policy goals laid out by the Ministry and participate in Government Programme projects. There are six *Regional State Administrative Agencies* in Finland; they manage the duties of the former State Provincial Offices, environmental permit agencies, regional environmental centres and occupational safety and health directorates. The duties of the *Finnish Medicines Agency (Fimea)* include pharmaceutical licensing and monitoring duties, research and development (R&D) and producing and distributing pharmaceutical information to improve pharmaceutical services and the effectiveness of pharmacotherapy. *The National Supervisory Authority for Welfare and Health (Valvira)* is the permit and supervisory authority in the social welfare and health care sector, guiding the Regional State Administrative Agencies and local authorities in the implementation of legislation pertaining to the sector and monitoring compliance with that legislation. Valvira guides and monitors the activities of social welfare and health care professionals and NGOs and deals

with complaints in the sector in accordance with the division of duties with the Regional State Administrative Agencies. The duties of Valvira further include monitoring that health care equipment and devices comply with requirements and promoting their safe use. *The National Institute for Health and Welfare (THL)* is an R&D institution whose purpose is to promote the wellbeing and health of the population, to prevent diseases and social problems and to develop social welfare and health care services. The Institute serves decision-makers in central and local government, actors in the sector, NGOs, the research community and ordinary citizens. It is the official compiler of statistics in its sector and manages the collecting and leveraging of the information base in its domain. The Institute executes its remit through research, monitoring and evaluation, development, expert opinions, official duties and international cooperation. *The Finnish Institute of Occupational Health* is a multidisciplinary research and expert organisation that promotes occupational health and safety and the wellbeing of employees. (The Ministry of Social Affairs and Health 2011a.)

The strategic choices of the Finnish health and social care strategy include ensuring a strong foundation for welfare by including health and welfare in all policies, extending working careers through wellbeing at work, balancing the various areas of life and promoting sustainable social protection financing. The strategy also seeks to ensure access to welfare for all by reducing inequalities in welfare and health, providing customer-oriented services and promoting new service structures and operating practices, and by fostering a strong sense of social inclusion. Furthermore, the strategy includes promoting a healthy and safe living environment by strengthening the viability of the environment, and ensuring that society can continue to function under exceptional circumstances. (The Ministry of Social Affairs and Health 2011b.)

The National Development Plan for Social Welfare and Health Care called the Kaste Programme 2012–2015 (Ministry of Social Affairs and Health 2012a) is a strategic steering tool that is used to manage and reform social and health policy. It implements the Government Programme and the Strategy of the Ministry of Social Affairs and Health. The programme defines the key priority action areas for development activities and monitoring as well as essential legislation projects, guidelines and recommendations that enhance the realisation of the programme. The targets of the Kaste Programme are:

- Inequalities in wellbeing and health will be reduced. Risk groups' opportunities for inclusion, wellbeing and health will be improved. Preventive work and early support will be effective. Interpersonal and domestic violence will also be reduced.
- Social welfare and health care structures and services will be organised in a client-oriented way. Clients will rely on the quality and effectiveness of services. Well-functioning services and skilled wellbeing personnel will be secured through management. Service structures will be economically sustainable and function effectively.

The aim is that national, regional and local actors will work together to implement the reforms. Municipalities and joint municipal boards for social welfare and health care can apply for discretionary government transfers for creating and implementing good practices. An annual budget of EUR 17.5 billion has been allocated for the financing of development projects. (The Ministry of Social Affairs and Health 2012a.)

Prime Minister Jyrki Katainen's cabinet began its period in office in June 2011. The strategic focus of the health and social care sector as published by the Ministry of Social Affairs and Health is included in the Government Programme's welfare policy. The programme has a strong emphasis on the reformation of the municipalities and the reorganisation of the health and social care service structure. (Finnish Government 2011)

### *The primary, secondary and tertiary health care and social service systems*

Municipalities have by law the primary responsibility to arrange social and health care services for their residents. The municipalities have strong decision-making power when arranging services. One of the main targets of the ongoing health care system reform is to reorganise service providers to establish larger units or joint organisations of health and social care services and/or primary and secondary care providers. There is a strong will, backed by state funding, to encourage federations of municipalities or other kinds of new collaborative organisations to rearrange health centre services, social services and secondary care services. The Primary Health Care Act and the Specialised Medical Care Act were partially merged into a new Health Care Act, but the overall system structure of the provision of the services as functions of municipalities, health care centres and hospital districts still remains as stated in the original Primary Health Care Act and the Specialised Medical Care Act. Preparation of new legislation for the provision of health and social care is currently ongoing in the Ministry of Social Affairs and Health. At the same time the state secretariat is preparing new legislation on the responsibilities and formation of municipalities as a whole.

Currently, primary health care services are either produced by the municipalities themselves, provided in cooperation with other municipalities or purchased from private or public providers. The 336 municipalities of Finland have alone or jointly formed 161 health care centres. Primary health care is provided in these health care centres. (Figure 1.) They are not necessarily single buildings or single locations. A health care centre can be defined as a functional unit or as an organisation that provides primary curative, preventive and public health care services to its population. The municipalities are acquiring an increasing share of such services either from other municipalities or from the private sector. Also, vouchers can be used for some services. Some municipalities have contracted a company to organise all the services provided by the health care centre. (Teperi et al. 2009.)



**Figure 1.** Finnish somatic hospitals (ringed) and health care centres (dark dots) with beds. The shading in the background reflects population density (Päätaalo et al 2003).

Health care centres offer a wide variety of services: outpatient medical care, inpatient care, preventive services, dental care, maternity care, child health care, school health care, family planning, care for the elderly, physiotherapy and occupational health care. Legislation (Health Care Act 1326/2010, Primary Health Care Act 66/1972) states the responsibilities of health care centres, but does not define in great detail how the services should be provided, and in most cases this is left to the discretion of the municipalities. (Teperi et al. 2009.) The number and type of personnel in each health care centre depends on the size of the population it serves and on local circumstances. The staff consists of general practitioners, sometimes medical specialists, nurses, public health nurses, midwives, social workers, dentists, physiotherapists, psychologists, administrative personnel and so on. The inpatient department of a health care centre works in much the same way as the department of

a hospital. A typical health care centre has 30 to 60 beds. The number of inpatient departments within a health care centre varies – large centres have several. The majority of patients in these departments are the elderly and the chronically ill. However, in remote sparsely populated areas, health care centres provide rather comprehensive short-term curative inpatient services for the general population.

Municipalities provide long-term care in wards at health care centres and non-medical long-term care in institutions for the elderly. The latter is considered a part of social welfare services. Several different kinds of outpatient services have been established in order to enable the elderly to live in their own home as long as possible. These services include home-help services, home nursing, day hospitals and other daytime care centres, part-day nursing and assisted-living homes, where people live in their own apartments but are offered different kinds of services, such as meals, nursing and other help needed for daily living.

In the public health care service system patients need a referral to see a specialist except in case of emergency. Both *public outpatient and inpatient secondary care* are provided by hospital districts. Each municipality belongs to a particular hospital district that has a central hospital. Each municipality must be a member of a hospital district. Of the central hospitals, five are university hospitals that also provide *specialised tertiary levels of treatment*. Each hospital district organises and provides specialised hospital care for the population in its area. Hospital districts can purchase services for their population from other hospital districts, the private sector or abroad. Finland is divided into 20 hospital districts. In addition, the semi-autonomous province of Åland forms its own district (Ministry of Social Affairs and Health 2012b, Teperi et al. 2009). A hospital district is an administrative entity. In different hospital districts the central hospital may operate in more than one location and it may be supported by regional hospitals as well. The overall number of hospitals is about 70 (Figure 1). This includes the five university hospitals, 16 central hospitals and over 40 smaller specialised hospitals. The range of specialised care varies according to the type of hospital. Federations of municipalities, i.e. hospital districts, own all the public hospitals. The population of hospital districts varies between about 60,000 and 1,500,000 inhabitants (with the exception of Åland with 27,000 inhabitants). By law, hospital districts also have some administrative responsibilities. The provision of ambulance services has recently been changed from a responsibility of health care centres to a responsibility of the hospital districts. (Health Care Act 1326/2010, Act on Specialised Medical Care 1062/1989.)

The law on social welfare stipulates the *social services* that municipalities must produce. (Social Welfare Act 710/1982, Child Welfare Act 417/2007, Family Carer Act 312/1992.) Municipalities are entrusted with preventing social problems, maintaining social security and supporting people's independent living. The obligation to arrange social care services is mostly carried out by the municipalities alone. However, there are cases where services are arranged by federations of municipalities. Municipalities purchase several kinds of social services from private service provid-

ers. Special legislation covers child welfare, child day care, the treatment of substance abusers and the special care of people with intellectual disabilities, disability services, informal care support, family care and rehabilitation. In addition, there are laws dealing with ascertaining paternity, child maintenance and security, child care and implementing rights of access, adoption counselling and family conciliation matters.

Professional social workers provide guidance and advice as well as handle problems. Professionals arrange support measures on individual, family and community bases. Emergency social services in Finland are available round the clock for handling sudden and acute problems. Children urgently in need of care, problems facing young or older people or emergency help for substance abusers are typical instances where emergency social services are needed. Municipal social officials use standby plans for arranging rapid primary care and psychosocial support. Home services in Finland are provided when clients need help to cope with routine tasks at home due to difficulties caused by illness or reduced functional capacity. Support services are used to supplement home services, for instance to provide meals, home cleaning, bathing clients and transport. Short-term or periodic institutional care may supplement long-term care measures or provide relief to informal carers who enable clients to live and manage at home. Long-term institutional care is given to people for whom constant care cannot be arranged at home or in service accommodation. Family care is the arrangement of continual care for people outside their own homes in a private home. The most common form of family care is that provided as foster care under child welfare arrangements. Municipalities provide daycare, child welfare, adoption counselling, child rearing and family counselling, family conciliation, establishment of paternity, and child custody and rights of access. People with disabilities have services providing assisted-living devices, transport and interpretation. Preventive work is carried out to promote drug-free lifestyles and awareness raising. Services provide support, help, treatment and rehabilitation for problem users and their families. (Ministry of Social Affairs and Health 2012b) *Private social care* was provided by about 2900 private sector organisations in 2010. Of the providers, 73% sold more than 50% of their services to the public sector. 16% of providers operated with private funding alone. The most common private service was assisted-living accommodation for the elderly followed by home services for the elderly and the disabled. Foster care under child welfare arrangements and institutional childcare were also common private services. About 42 000 people are employed by the private social care sector, including private child daycare services. At least some private social services are operating in about 87% of the municipalities. (THL 2011.)

Alongside the municipal system, *private and occupational health services* also provide health care. Private health care in Finland mainly comprises general practice and specialised outpatient care, which are available mainly in the cities. Physiotherapy and dental services are also common. The most recent statistics available cover the year 2007. There are over 3,000 private health care companies in Finland and



they provide care in 6 800 units. The most typical private health care provider in Finland is a physiotherapy unit (1670 units). Physicians can run a practice within a private company or as a stand-alone practice. The number of units providing specialised outpatient care was 1560. The total number of private health care visits was 16.7 billions (1 billion = 1 000 000), of which 4.8 billion were visits to a specialist (THL 2010). The majority of doctors working in the private sector are specialists or GPs, whose full-time job is at a public hospital or at a health care centre. Patients do not need a referral to visit private specialists at private clinics. Physicians working at private clinics are allowed to send patients with a referral to either public or private hospitals. There are only a few private hospitals, providing less than 5% of the bed days in the country and mostly providing only beds reserved for short-stay surgery.

Over 20% of physicians work in the private sector (THL 2012c). Occupational health care services are provided to the employee by the employer. Legislation (Occupational Health Care Act 1383/2001) enforces only preventive occupation health services, but about 90% of employers also provide at least some curative services that are mostly purchased from the private sector, where occupational health accounts for about 15% of all physician visits. The National Social Security Fund provides partial reimbursement for these visits. (Teperi et al. 2009.)

Many of the performance indicators of the Finnish health and social care system are fairly good, mostly equal to or above OECD average (OECD 2011), but there is still room for improvement in several issues when compared to results in many European countries. In a recent evaluation OECD suggests that the trends in the development of health care performance are not as good as could be expected (OECD 2012). Finnish people are mainly satisfied with their healthcare services. However, the system has its problems. Politicians have identified inequalities in access to services (OECD 2012) and there is a shortage of personnel (Finnish Medical Association 2011). There are waiting times to see a doctor at a health care centre, and waiting lists for elective surgery. (Teperi et al. 2009, THL 2012d, THL 2012e.) The reform of access to non-urgent treatment has significantly decreased the number of patients waiting for secondary care (reduction from 66,000 to 1,400 patients on waiting lists for over six months between 2002-2012), but clear regional differences still exist (THL 2012d). Waiting time problems in primary health care have not significantly changed (THL 2012e). The customers of health care services have not had a possibility to choose their public care providers, but this will change in 2013 (Health Care Act 1326/2010). This option is still not available in social services. It is difficult to evaluate how social services will fare in dealing with the rising level of alcohol consumption and the needs of the growing population of elderly citizens in need of support in their daily living.

### 1.3 Finnish eHealth and eWelfare Policies

The first Finnish national strategy for applying information technology to health care and social welfare focused on developing and implementing ideas that would help answer the needs for efficient, accessible, affordable and high-quality health care. It was drawn up in 1996 by the Ministry of Social Affairs and Health, following the initiation of an information technology development programme during Prime Minister Lipponen's first term in office in 1995 (Finnish Government 1995, Ministry of Social Affairs and Health 1995). The strategy was built around the principle of citizen-centred and seamless service structures. One of the main targets of the strategy was the horizontal integration of services (social, primary and secondary care). Citizens and patients were envisioned as informed and participative actors in the healthcare delivery process. The strategy was updated in 1998, placing specific emphasis on the following targets: adoption of digital patient and client records in all levels of care, combined with nationwide interoperability between distributed legacy systems, and supported by a high level of security and privacy protection (Ministry of Social Affairs and Health 1998). The original strategic visions are still up to date; that said, during the past 15 years many plans and efforts have been made to take the visions closer to everyday routine health and social care performance. During this road of implementation the architecture of the solutions that have to be accomplished has become clearer.

“Seamless” was understood to mean a smooth care process when two or more responsible organisations are involved in the process. Privacy protection regulations, such as the Personal Data Act (523/1999) set conditions on the exchange of information (i.e. patient data) between different register controllers. There was a need to regulate the process and to define the client's or patient's role in it as an active partner in care. The legislation on Experiments with Seamless Service Chains in Social Welfare and Health Care Services was adopted in 2000 (Act 811/2000, Finnish Government 2003a). The main focus of the legislation was to build regional information service systems and adapters between existing legacy systems. The first project on the implementation of the experimental legislation was called “Makropilotti” (from November 1998 to June 2001) in the hospital district of Satakunta. In 2001 three new regions, Uusimaa, Pirkanmaa and Raahe, were also allowed to start pilot projects. Eighteen regional projects began during 2004. (Ohtonen 2002, Hämäläinen et al. 2005.)

The Decision-in-Principle by the Council of State on securing the future of health care was issued on 11 April 2002. The document states that “nationwide electronic patient records (EPR) will be introduced by the end of 2007” (Finnish Government 2002). During Prime Minister Lipponen's second term in office and during the implementation phase for the experimental legislation in the four regions mentioned above, this new initiative was started to improve the health care system of Finland.

The National Health Project Programme was launched and an electronic patient record project was included in the programme. The Ministry of Social Affairs and Health formed a working group (Ministry of Social Affairs and Health 2003a), which produced a definition of national electronic patient records and their implementation strategy. The working groups received funding during 2003-2007 to develop the National EPR (Ministry of Social Affairs and Health 2003a and 2004). Funding was also given for the implementation of the programme at the regional level during 2004 – 2007. In addition, hospital districts and municipalities co-funded these projects. The electronic patient records working group defined the first version of the common content and structure to be used in every EPR system in Finland. The work included a clinical consensus on core patient data, a national code server and several open standards for interoperability and national guidelines for the safeguarding of data. The basic elements of the architecture needed for the construction of a national data transfer system were also described. In addition, a new information society programme was launched (Finnish Government 2003b, Harjunhahto-Madetoja et al 2007). This included an e-welfare programme in order to develop ICT for social services (Sahala 2005). TEKES (the National Technology Agency of Finland) also started a technology programme that ran for five years (2004–2009) (Tekes 2005) and included eHealth development (FinnWell).

Prime Minister Vanhanen's government, in office 2007 – 2011, supported the previous work on eHealth. During his term of office, permanent legislation was laid down to regulate the use of electronic social and healthcare client and patient information. The new legislation came into effect in July 2007 (Act 159/2007). The legislation on handling electronic patient information covers centralised archive services for health care, encryption and certification services, and patients' access to data. The creation of a common national archiving system was expected to promote patient and client care, confidentiality and higher efficiency in healthcare services. The law made it mandatory for all public health care providers to integrate their operations with the electronic archiving system. Private health care units that did not use paper-based archives had this obligation also. (Ministry of Social Affairs and Health 2006a, Reponen et al. 2009.)

Legislation on the use of electronic prescriptions also came into effect in 2007 (Act 61/2007). Joining the national ePrescription system is obligatory for all except solo-practice physicians (Act 61/2007). The core of the Finnish ICT infrastructure for social and health care resides in a national digital archive for patient documents (eArchive) and a national ePrescription database. They are both hosted by the Social Insurance Institution (KELA). The eArchive and ePrescription use the same PKI system. Strong authentication and a smart ID card for professionals incorporating an e-signature are used. This architecture fully integrates the Finnish ePrescribing and eArchive solutions with the different local electronic patient record systems and the centralised receipt data depository and the central archive. (Reponen et al. 2009.)

The national electronic patient record archive and the ePrescription depository enable citizens to browse their personal information (eAccess). This includes prescribed medication, items such as reference information for the use of services, referral and discharge letters, certificates, statements and results of examinations. They can also access log data about visits to the personal patient record and also manage their consent. Today the Finnish National Health Information (NHIS) system is called KanTa. KanTa is a collective name for several national medical information systems. These are the electronic prescription (ePrescription) and the national Pharmaceutical Database, the electronic archive of patient records (eArchive), online access by citizens to their personal prescription and medical data (eAccess). (Reponen et al. 2009, Winblad and Hämäläinen et al. 2010.)

Currently the ePrescription system is in a rapid implementation phase; over 2 000 000 prescriptions were made by the end of August 2012. All pharmacies have to be connected by 2012, all public health care providers by 2013 and private health care providers by 2014. In terms of its technology, the National eArchive service system is ready for deployment. Testing and piloting in Kuopio, Eastern Finland, was carried out between November 2011 and February 2012. Actual deployment will start in early 2013. The service will start with the most essential document types from the viewpoint of clinical users. Additional document types will be added gradually later. The types of documents to be archived are stated in a ministerial act, which states that the first stage is scheduled for completion by 2014 and the next level by 2016 (11.4.2012/165).

The original act on the national use of electronic social care client and patient registries includes general statements on both the social care sector and health care. However, specific rules on eArchiving and patient access to data concern eHealth issues alone. Building a national social care information system was included in the plans of the e-welfare programme that was launched in 2004. The aim of this programme was to develop ICT for social services. The development measures were based on the need to harmonise electronic client information records and the information management systems in social welfare services. A National Project of ICT in Social Services (named Tikesos) was started in 2005 and ended in 2011. Tikesos was implemented by the National Institute for Health and Welfare, the East Finland Social and Welfare Centre of Expertise, the University of Eastern Finland and the Finnish Association of Municipalities. The aim of the national development project was to promote the utilisation and interoperability of ICT in social services. The development work was carried out in accordance with a joint enterprise architecture method recommended by the Ministry of Finance. First, the needs for information in social care production were collected and analysed. Then the general work flows and the processes of the different social services were modelled with Business Process Modelling Notation (BPMN). Finally a data model and technical specifications were built based on standards like XHTML and RDF/a as well as UN/CEFACT CCTS. The coherent data model for social care consists of core components, specifications

of client records and a concept model. Thus the conceptual bases for interoperability were created. In addition, a centralised data warehouse and nationally produced information system services for social care were analysed and planned. The digital data warehouse would enable state-of-the-art data management, information sharing for authorities, storing and centralised statistics. All the results and methods of the Tikesos project were published on the project homepage at [www.tikesos.fi](http://www.tikesos.fi). Since 2012 the national development of ICT in social welfare has been organised by the National Institute for Health and Welfare's Unit for the Operational Management of Health and Welfare Information. A national social welfare client information archive and other ICT services are under preparation. Legislative reforms enabling the implementation of such systems are set to begin in 2013. It is expected that the national client information archive will be ready for adoption after the year 2016.

The Ministry of Social Affairs and Health (STM) has responsibility for national eHealth and eWelfare decisions at the strategic level. This includes issues such as architecture, legislation and planning of state funding. Changes in the law on processing electronic information in social and health care gave the operational responsibility for eHealth and eWelfare development in Finland to the National Institute of Health and Welfare (THL) at the beginning of 2011. THL is in charge of the operational work, which includes planning, guidance, steering and follow-up of the development of Finnish eHealth. THL founded a new unit, the Unit for the Operational Management of Health and Welfare Information (OPER), in 2011. (Hyppönen and Viitanen et al. 2011.)

In the vision drafted in 2006 for the year 2015 (Ministry of Social Affairs and Health 2006b), the Ministry of Social Affairs and Health stated that information and communication technology can enable the efficient management of client information and process management using real-time data and improve the position of citizens by giving access to reliable information on health, welfare and the service system, and by offering citizens the option to manage their own information and to interact with the service system flexibly. These ideas were recognised in Prime Minister Vanhanen's programme. The Ministry of Health and Welfare issued its strategy in 2011. There is no specific eHealth and eWelfare strategy, but support for the implementation of the national eHealth and eWelfare architecture is mentioned and this general support was also included in Prime Minister Katainen's programme for 2011. (Ministry of Social Affairs and Health 2011b, Finnish Government 2011)

In addition to the Ministry of Social Affairs and Health's main national policy goal for eHealth and eSocial Services – implementing ICT in health and social care as set out in legislation – these issues are also considered at the level of national cross-sectoral information and communication policy. A nationwide eGovernment infrastructure (eService platform and account) is being developed in the national SADe programme (electronic services to citizens programme). In the health and welfare sector, the SADe project will provide new national-level eServices such as a health and welfare service provider catalogue, evaluated information on health and

illness, and the standardisation of electronic booking systems (see Chapter 1.3). There are also several other ongoing development programmes in Finland that will have an impact on the national health and social care information system. The Act on Information Management Governance in Public Administration (634/2011) is an enterprise architecture approach that enforces and promotes interoperability, standards, descriptions and definitions and the utilisation of common data. The aim of the legislation is to reinforce interoperability of products that are used in public health care (and other public services as well). The Act on Healthcare (1326/2010) gives the patient the possibility to choose their health care provider, and thus information needs to flow from provider to provider. The law also simplifies regional data sharing between public sector healthcare providers by facilitating consent management. However, legislation as yet does not provide support for data sharing between the health and social care sectors. This need was recognised in the programme of Prime Minister Katainen.

There are several challenges to be overcome during the implementation of the national health and social care information system. It is a technologically complex system that has to be implemented alongside the everyday service routines of health and social care. It can therefore only be realised step by step. At present, most of the transfer of patient data is being carried out by means of operative local and regional systems. In order for this to work on a nationwide level, the interoperability of the systems is crucial. In addition, the volumes of information transferred, for instance in radiology, may be very large and thus overload the data networks. For health care employees, the system requires the usage of an electronic signature and learning new ways to work, such as documenting patient information in a structured manner. Local-level politicians and authorities with their organisations such as the Association of Local Governments have an important role in supporting the implementation of the national health and social care information systems as well as maintaining an ongoing innovative discussion on practical questions between care organisers, providers and the state authorities.

In addition to engaging in national development, Finland participates in the common European epSOS initiative, which aims to develop technological solutions and operating principles for the exchange of patient records between EU Member States. The objective is to protect the rights of citizens as they move from one EU country to another. Increasing citizens' choice and ensuring the implementation of the EU Directive on Patients' Rights are other important goals. Finland also participates in the OECD's work on eHealth and together with other Nordic countries holds e-policy discussions and carries out projects under the umbrella of the Nordic Council.

## 1.4 Policies and Plans for Citizen Involvement in eHealth and eWelfare

The first Finnish national strategy for applying information technology to health care and welfare was built around the principle of citizen-centred, seamless service structures. This strategy was drawn up in 1996 during Prime Minister Lipponen's first term and many of its ideas have been implemented. That said, the weights assigned to the different visions in the strategy have changed during the long implementation period from the 1990s to 2010s. During the first 10 years of its implementation, the focus on technology strengthened; client-centredness, health promotion and client participation were left in the background. The idea of seamlessness survived, but was not implemented in practice. (Hämäläinen and Hyppönen 2006.)

The Ministry of Health has started several pilot projects since the unveiling of the 1996 strategy for future national eHealth services for citizens. One of these projects was started at the beginning of 2008 by the City of Oulu. It was a self-care project offering a wide range of eServices for citizens. These services comprised a web portal for general information on health-related issues and health services, exchange of laboratory results with patients, transferring home-made point-of-care measurements (blood glucose, blood pressure, etc.) from patients to professionals, question-answer services for the public, and building up and maintaining a personal health record file (Winblad and Reponen et al. 2008).

The ideas of the 1996 strategy were further picked up by legislation on eArchiving (159/2007), which includes an eService enabling citizens to access (eViewing) their personal patient data, prescriptions and log information. The realisation of the policy vision on offering citizens the option to manage their own information and to interact with the service system flexibly is becoming a reality via the National EPR Archive, which enables citizens to browse their selected personal health information – namely, reference information for the use of services with access to their electronic records, referrals and discharge letters, certificates, statements and results of examinations – and also access log data about the visits to the personal patient record (Reponen et al. 2008, Ruotsalainen 2008). Legislative amendments in 2011 further improved the system by including a patient summary in the eViewing system. Electronic identification of the patient was included in Act 159/2007. Patient access to ePrescriptions has also been built and is now operational. By 2013, the new Health Care Act will grant patients the right to choose their health care providers. Granting patients access to their own clinical information and enabling clinicians to share data are important tools for supporting safe navigating among the health care providers. This means that the implementation of the architecture of the national health information system is under time pressure.

A push towards citizen-centred orientation came also from cross-sectoral development that was accelerated at the end of the first decade of 2000. OECD's public

governance review from 2009 emphasised that Finland's traditional Nordic model was under increasing pressure by the end of the first decade of 2000, requiring further collaboration between public administration bodies across sectors and levels. The report suggested that to sustain the current structure of public services, Finland needs to achieve the strategic agility to respond to the current and future needs of its people. The report suggested changing the focus of public administration from connecting ministerial stovepipes and local government boundaries to focusing work around the needs of its citizens and businesses, as well as to strengthen e-government leadership and coordination in setting standards and assuring interoperability and in creating an enabling environment with technical and ICT assistance in order to improve implementation. (OECD 2010.)

Several steps towards the recommended direction have been taken. The Act on Information Management Governance in Public Administration (634/2011), which came into force on 9th June 2011 focuses on ensuring public sector IT-service interoperability. The Cabinet Committee on Economic Policy adopted the government communication dated 3th June 2009 on accelerating the development of the information society. On the basis of this communication the Ministry of Finance established the eServices and Democracy Acceleration programme (SADe programme) for the term 14 April 2009 – 28 February 2014 (extension to 2015 has been given). The aim of the programme is to ensure that all key public services will be available through multiple channels, easily found and support the life situations of citizens or enterprises. The programme includes common public infrastructure projects and sector-specific projects in different administrative areas. For the social and health care sector, national-level eServices for citizens will in the first phase include access to nationally coordinated, generic health and welfare information for citizens, self-health checks and risk tests, national service and provider database, and feedback services. A national system and information requirements will be drawn up for eBooking and eMessaging services. (Hyppönen 2012)



## 2 DEPLOYMENT OF THE 2003, 2005, 2007 AND 2010 EHEALTH SURVEYS

The Ministry of Social Affairs and Health in Finland has regularly instructed and followed the implementation of ICT or eHealth development in health care. More recently, a baseline survey was made on the implementation of ICT in social care, which is described in detail within chapter 13. There are also recent published surveys on eServices for citizen and on physicians' opinions on the usability of electronic patient records, which are briefly referenced in suitable chapters.

A comprehensive survey on the implementation and use of eHealth was conducted by the present authors for the first time in 2003 (Kiviaho et al. 2004), showing the situation prevailing right before the onset of the National Project for Securing the Future of Health Care. That survey was followed by a series of surveys including a second survey in 2005 showing what had happened halfway through the National project (Winblad et al. 2006) and a third survey (Winblad and Reponen et al. 2008) at the end of the National project. The current 2010/2011 survey is a continuation to the three previous surveys, and it describes the situation at the launching stage of the national eArchive ("KanTa") and ePrescription services.

The methodology involved in the survey comprised a web-based questionnaire. Because of the fast development of ICT in health care, some modifications have been made in the current 2010/2011 survey, but the questions have been kept as comparable as possible to the questions of the previous surveys. Now, changes in the past seven years are systemically measurable.

### 2.1 The Survey on Implementation and Usage of ICT and eHealth

The survey was conducted in a same manner as described in the reports of previously national eHealth surveys of Finland. (Hämäläinen et al. 2009). A structured web-based questionnaire was distributed by e-mail to all public health service providers or hospital districts and health care centres, and to a sample of private health care providers. Hospital districts described particularly the situation of their central hospitals. It is worth mentioning that the public sector covers about 85% of the health services in Finland.

The questionnaire comprised the following: the identification of the responding organisation and the respondent; questions about the adaptation of electronic patient records systems; systems or applications to transfer/exchange patient information between organisations during care processes and the standards in use for the migration of patient information; methods of authentication, identification, and informed consent of patients; the age of the application, the usage of different e-Education systems for staff education; the types of human and material resources needed; systems supporting quality control and service delivery; and the adaptation of different e-Services for patients. The questionnaire is available in Appendix 1.

The intensity of use of the main systems was also inquired. The intensity revealed the amount (%) of the action or function that was carried out by electronic means. For example, if a service provider used EPR for the documentation of patient data in half of the cases and a paper-based record for the rest, the intensity of use of the EPR was 50%. The questions for hospitals, health care centres and private health care providers differed to some extent, depending on the nature of the services they provided.

The questionnaire was emailed in December 2010 to all public service providers, including 21 hospital districts and 161 health care centres. The questionnaire was also emailed to a sample of 97 private health care service providers offering medical care. The contact information for private sector actors was obtained from the umbrella organisation of private health care providers and supplemented with those units that had taken part in the survey in 2007.

All organisations were asked to give their answers based on the situation on 1 January 2011. A full report in Finnish with a detailed description of the method and all the findings of the survey is published in April 2012 in Finnish (Winblad et al. 2012).

### *Coverage*

Responses to the questionnaire were obtained from all 21(100%) hospital districts (Åland included) and from 140 (87%) health centres. The latter figure covers 91% of the Finnish population at primary health care level. The response rate is comparable with the previous survey 2007 (Hämäläinen et al. 2009). The data obtained can be considered as representative and exceptionally comprehensive, which makes comparison with the previous reports reliable despite the lower coverage in 2003 and 2005.

Results were obtained from 31 private service providers giving a coverage of 32%. The sample of private service providers is a heterogeneous group including enterprises of various sizes, from conglomerates with hospitals and operative services to small part-time general practices. That is why the results concerning private providers can only be regarded as indicative.

## 2.2 The Questions on the New Role of THL as the Expert Office for the National eHealth Services

Questions on the new role of the National Institute for Health and Welfare (THL) as the expert office for the national eHealth services were asked as a part of this eHealth survey. THL is being assigned a new role in being responsible for national-level operations in information management in social and health care services as of 1 January 2011. The questionnaire included questions on health care organisations' involvement and needs in ICT infrastructure and standardization. Health care organisations were also asked how useful they considered different levels of duties of the THL on electronic processing of client information and ePrescription (Appendix 1.).

# 3 ELECTRONIC PATIENT RECORDS IN FINLAND

## 3.1 The Development of the Structured EPR

In the 1980s the Association of Local and Regional Authorities designed a set of paper-based health records, which would become widely used for primary care and specialised care. The municipalities have strong decision-making power in arranging services, including the utilisation of information and communication technology (ICT). When health care providers started adopting EPR, the municipalities and other organisations were using a variety of ICTs and EPR products, and the understanding of common health record structures diminished. Finland became a country where many organisations used different EPR designs. Furthermore, in general there was no interoperability to exchange EPR information between organisations. There was legislation on how to handle patient records (Ministerial Act Ministry of Social Affairs and Health 2001), but it was not detailed enough for the digital world.

Finnish electronic patient records still mostly use plain narrative texts despite the fact that the need for structured data in the records was already identified in the Finnish eHealth strategy documents in 1998. The Finnish government stated in 2002 in its decision on electronic patient records that “Nationwide electronic patient records will be introduced by the end of 2007” (Finnish Government 2002). The working group on EPR strategy (Ministry of Social Affairs and Health 2003a, 2004) defined the common semantic and technical structure that should be utilised in every EPR system in all organisations. This included core data and other codes delivered by a code server containing standards for semantic interoperability. The usage of open standards for interoperability, such as XML-based HL7 CDA R2 standards, was also suggested. The strategy also included national guidelines for the safeguarding of data (informed consent, secure archiving, e-Signature, identification of patients and professionals, documents and organisations with an ISO/OID standard and usage of PKI architecture).

The code server was built in 2003-2004 and has been providing the main codes since 2004<sup>1</sup>. In 2007, by law, the task of maintaining the technical code server application was given to the National Social Insurance Institution (KELA) and the task of providing code services (codes and classifications and other contents of the code server) was given to Stakes (1 January 2009, The National Institute for Health and

---

<sup>1</sup> [www.thl.fi/koodistopalvelu](http://www.thl.fi/koodistopalvelu)

Welfare, THL). ICD-10, Nordic codes for surgical procedures, national codes for laboratory tests and X-ray procedures, and some statistical codes are in production. In addition, a large list of other codes has been given out from the code server for both use and piloting purposes. The code server stores all the common (i.e. official) versions of different core data elements. Electronic patient record products acquire the codes for their own use from the server (one to two updates per year). Access to codes is free of charge.

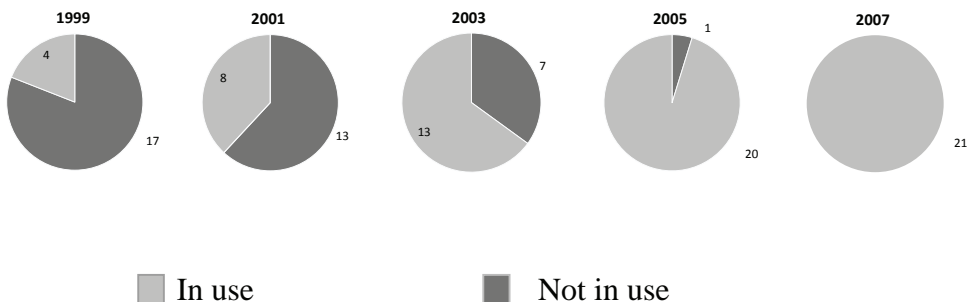
The project for the common structures of EPR began in 2003 and was funded by the ministry, and led by the Association of Local and Regional Authorities. The first “core data” were defined in cooperation with different interest groups (professionals, administration, software enterprises). They were publicly available to be commented on via the Internet and were later finalised and first published in 2004 and updated up to 2009. (Häyrynen et al. 2004, Hartikainen et al 2009). Both the legislation and the implementation of the data structure into the existing EPR systems have developed further since. First, the National Health Project organised a cluster project and a subproject for the implementation of structured core data for EPRs. The work was coordinated by the Association and the Ministry. Seven regional groups formed clusters with software enterprises. Eleven hospital districts and 17 health care centres participated (Nykänen et al. 2006). The Finnish HL7 Association was also active in defining EPR structures. The electronic patient records that will be archived in the national electronic patient record archive and the patient summary have to use standardised data structures. The standardisation work started in 2003 and is still ongoing, but changes in the legislation in 2011 gave THL authoritative power to implement the structures. In 2012, the Ministry of Social Affairs and Health stated, in a new piece of legislation, more precise regulations on which structures have to be used in a standardised form by a certain time. The first core data include the diagnosis, surgical procedures and laboratory results. These have to be adapted in 2014. During the time frame of this survey, the latest piece of legislation was not given and the results of this study reflect the level of standardisation that has been achieved with the support of the National Health Project and the State-funded cluster projects.

The work on structured electronic patient records has included work on nursing data. The target of the National Nursing Documentation project is to create nationally unified and standardised nursing data documentation for the management of the nursing process and for the integration of nursing documentation into the multiprofessional patient record. 13 out of 21 hospital districts (including three university hospitals), 17 health care centres, one regional hospital and one private hospital have been involved in piloting and adapting the structured nursing documentation (Tanttu 2006). A national working group has recently worked on a plan to implement the structures nationally (Nykänen and Junttila ed. 2012) However, these structures will not be a regulated part of the national EPR structures until a few years after 2016 (Ministerial Act 11.4. 2012/165).

### 3.2 The Availability and Usage of Electronic Patient Records

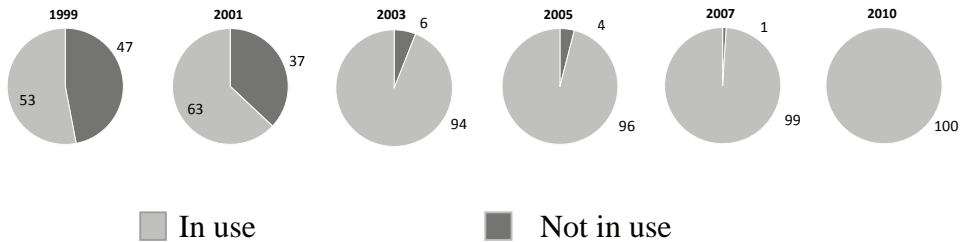
Today, the documentation of patient data in the Finnish health care system is carried out by electronic means. Health care centres made the transition from paper-based to electronic records in the late 1990s, and hospitals did so after the year 2000 (Figures 2 and 3). The progression towards the saturation point in the implementation of EPR can be assessed based on data from repeated surveys of the use of information and communication technology in Finnish health care (Hartikainen et al. 1999, 2002, Kiviaho et al. 2004b, Winblad et al. 2006, Hämäläinen et al. 2007, Winblad and Reponen et al. 2008, Hämäläinen et al. 2009, Winblad et al. 2012). Paper-based records presently serve mainly as an archive of historical data.

In public *specialised health care* an electronic patient record (EPR) for narrative texts and additional information was already in use in all of the 21 (100%) hospital districts in 2007 (Figure 2). Thus the saturation point was reached earlier and the results did not change in 2010. Compared to the earlier data from the 2001 and 2003 surveys, very strong progress was seen in the mid-2000s.



**Figure 2.** Progress in the implementation of EPR in the 21 hospital districts between 1999 and 2007. The results for 2010 were the same as for 2007. The numbers are shown as absolute numbers.

In *primary health care centres* EPR was in use in all the 140 health care centres that responded. They have also reached the saturation point for EPR implementation (Figure 3).

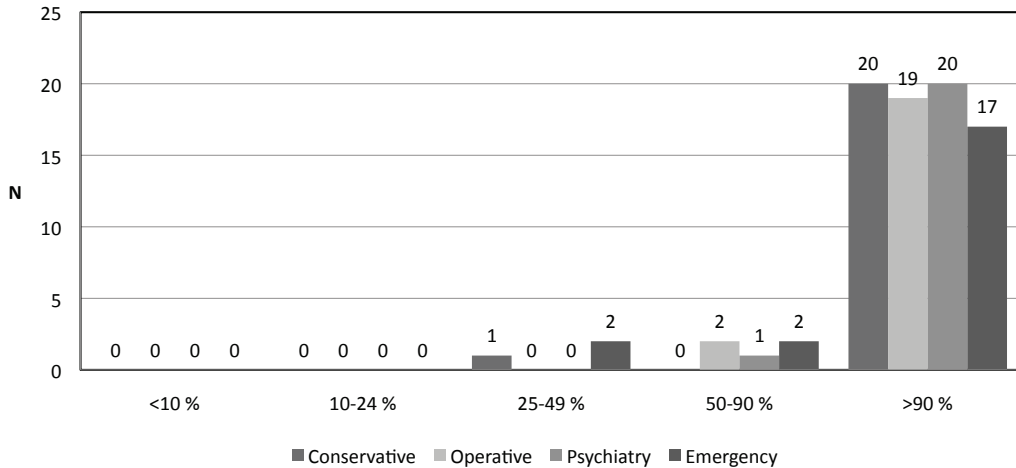


**Figure 3. Progress in the implementation of EPR in health care centres between 1999 and 2010. The numbers are shown as percentages.**

Among *private health care service providers*, all 31 respondents used EPR. The situation was the same for the 28 respondents in 2007, while in 2005 the percentage of use amongst those who responded was 89%. The results suggest that the deployment of EPR is close to the saturation point in private health care as well, but the quality of the material does not offer precise information.

The progress in hospitals was initially somewhat slower due to the more complex nature of the organisations and the huge amount of information systems that had to be connected before full utilisation of EPR could be realised. However, the saturation point was reached both at the primary and secondary care level before the end of the last decade and thus new indicators were needed.

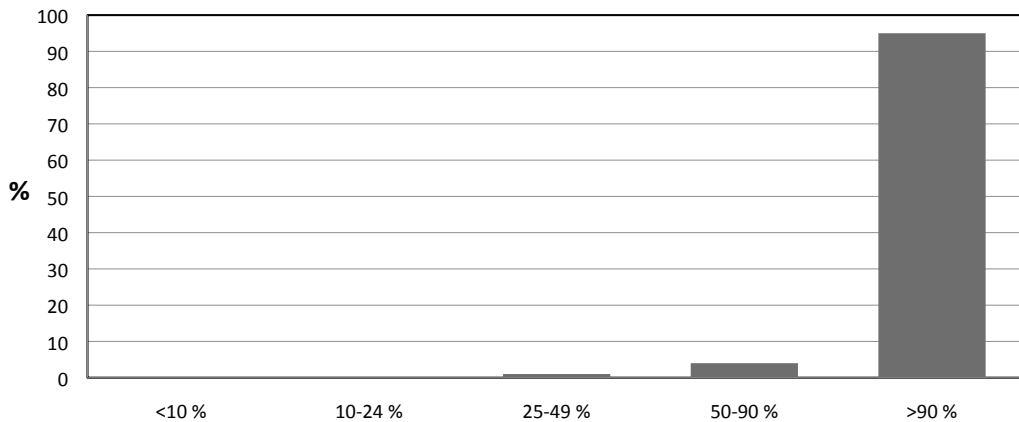
*The intensity of use* is an indicator that describes the amount of information that is actually utilised only in electronic form. Furthermore, because the stage of development varies between departments, an additional parameter gives us information on the situation in four main medical responsibility areas (conservative care, operative care, psychiatric care and emergency care). In 2010 the intensity of use in hospital districts was over 90% in the responsibility areas of conservative and emergency care in 20 hospital districts, in the area of operative care in 19 hospital districts and in the area of emergency care in 17 hospital districts. Figure 4 shows the distribution of the intensity of use of electronic patient records over the various responsibility areas in general. Compared to 2007, further progress has been made, while there are only few areas where the intensity of use for electronic data is less than 50%. Interestingly enough, emergency care seems to use less electronic-only information than the other areas.



**Figure 4.** The distribution of the 21 hospital districts according to the intensity of EPR usage in 2010 in the responsibility areas of operative, conservative, psychiatric and emergency care. The numbers are in absolute numbers for each area.

The transition from paper-based texts to electronic records took place earlier in primary health care centres than in secondary care hospitals. At the end of 2010 the median of life of the EPR system in a primary health care centre was 12 years, which also suggests that EPR was in use before the turn of the millennium in more than half of the health care centres. Due to the uniform nature of primary health care information systems, the intensity of use for electronic-only data was high, which means that 99.5% of the responding health care centres recorded the narrative text only electronically (Figure 5). Production usage was already at the same high level in the earlier 2005 and 2007 surveys.





**Figure 5.** The distribution (%) of the 140 health care centres that answered the question according to the intensity of EPR usage in 2010.

### 3.3 The Situation on the Structured EPR and Core Data Usage

In 2010, as also in 2007, all hospital districts used components of what became the basic nationally structured core data whilst in 2005 only five did so and 14 were in the testing or planning stage. The classifications included in the core data set have been available from the national code server since 2003. The classifications used by all hospital districts were the International Classification of Diseases (ICD-10), nomenclature of radiological procedures, nomenclature of surgical procedures and nomenclature of laboratory examinations. The 15 most commonly used health care classifications in hospital districts that are available in the national health care code server are listed in Table 1. All of these are used in at least 50% of the hospital districts.

Among health care centres, the International Classification of Diseases (ICD-10) was the most widely used system, altogether in 92% of the organisations. Moreover, the oral health procedure classification, classification of laboratory test codes, classification of radiological procedures and classification of therapeutic procedures were used in over 50% of the organisations (Table 1). Most of the 30 respondents among the private providers used ICD-10, a nomenclature of laboratory examinations and radiological examinations. The full list of the classifications and codes that were

included in the questionnaire can be seen in Appendix 1. A figure covering the usage of each classification/coding system can be seen in Appendix 2.

All of the 21 hospital districts reported that they used electronic nursing documentation. A total of 16 hospital districts reported that they used structured nursing documentation, whilst in 2005 only six did so. Nine hospital districts also used free text format. Most of the health centres (84% of the respondents) and many private service providers (42% of the respondents) reported that they used electronic nursing documentation. Among the health care centres, 56% of the respondents stated that their documentation is structured, so there has been an increase from the 16 health centres included in the initial pilot project (Tanttu 2006).

**Table 1. The most commonly used codes and classifications in Finnish health care (in use at 50% or more of the organisations)**

Codes/Classifications	Hospital districts	Health care centres	Private providers
ICD-10 classification of diseases	+	+	+
Radiology classification <sup>2</sup>	+	+	+
Procedure classification <sup>3</sup>	+	+	+
Laboratory test codes <sup>4</sup>	+	+	+
Oral health procedure classification <sup>5</sup>	+	+	-
ATC classification <sup>6</sup>	+	- (only in 40%)	- (only in 20%)
Assistive device classification <sup>7</sup>	+	- (only in 40%)	-
Nursing – Care need classification <sup>8</sup>	+	- (only in 30%)	- (only in 3%)
Register of social welfare and health care organisations, unique OID codes <sup>9</sup>	+	- (only in 25%)	-
Classification of Occupations <sup>10</sup>	+	- (only in 40%)	- (only in 3%)
ICPC-2 Basic health care classification <sup>11</sup>	-	- (only in 35%)	- (only in 5%)

<sup>2</sup> Association of Finnish Local and Regional Authorities – Radiology examination and procedure classification

<sup>3</sup> Nordic Classification of Surgical Procedures, Finnish version National Institute for Health and Welfare – Procedure classification (THL – Toimenpideluokitus)

<sup>4</sup> Association of Finnish Local and Regional Authorities – Laboratory test codes (Kuntaliitto – Laboratoriotutkimusnimikkeistö)

<sup>5</sup> National Institute for Health and Welfare – Oral health procedure classification (THL – Suun terveydenhuollon toimenpideluokitus)

<sup>6</sup> ATC classification, Finnish version, Fimea

<sup>7</sup> Finnish Standards Association / National Institute for Health and Welfare – Assistive device classification (SFS/THL – Apuvälineluokitus)

<sup>8</sup> Nursing – Care need classification SHTaL (Hoitotyö – Tarveluokitus (SHTaL))

<sup>9</sup> National Institute for Health and Welfare – Register of social welfare and health care organisations, unique identification codes (OID) for organisations (THL – SOTE-organisaatiorekisteri)

<sup>10</sup> Statistics Finland – Classification of Occupations (TK – Ammattiluokitus)

# 4 INTRAORGANISATIONAL AUXILIARIES OF EPR

## 4.1 Wireless Usage and Speech Recognition

The auxiliaries of EPR mean the various systems and functions that support data and information management by health care professionals. *The wireless use of EPR* refers to the mobile documenting and browsing of patient information, which make work in wards and emergency/casualty units smoother and more effective. All 21 hospital districts (100%) now had wireless access to EPR, while in 2007 this was possible in 19 (90%) of them. In seven hospital districts (33%), wireless access extended outside of the operational environment; one example is the use of a smartphone by doctors on call. In 84% of health care centres, bed wards had wireless access to EPR, while in 2007 this figure was 64%. In 31% of these centres, wireless usage was available also for doctors on call, while in 2007 the figure was only 9%. The number of hospitals and health centres with wireless usage of EPR has increased considerably compared to the situation three years earlier.

*A speech recognition system for digitally dictated doctor's notes* produces written documents almost instantly and enables the health care professional to immediately check whether the document is correct. The main benefit is the faster delivery of the test results or doctor's notes to other members of the care team.

The usage of speech recognition had become more widespread. Such systems were in use in nine (42%) hospital districts and in 9% of the health care centres whilst three years earlier they were in the piloting stage in seven hospital districts and in use in 6% of the health care centres. Speech recognition offers incontestable benefits, and can be expected to become more commonplace as it develops further. The prerequisite for speech recognition is that the dictation process itself can be transformed into a digital form, which was already the case in 52% of the hospital districts and 43% of the primary health care centres in 2005.

---

<sup>11</sup> Association of Finnish Local and Regional Authorities – Finnish version of ICPC-2 Basic health care classification (Kuntaliitto – ICPC-2 Perusterveydenhuollon luokitus)

Of the 31 *private health care service providers* that responded to the survey, three used EPR wirelessly.

## 4.2 Picture Archiving and Communication Systems

Picture Archiving and Communication Systems (PACS) started to develop in Finland after the implementation of the DICOM (Digital Imaging and Communication in Medicine) standard in 1995, and the first filmless hospitals began appearing around the year 2000 (Reponen 2004).

The adoption of PACS and teleradiology in everyday practice is high in Finland. Adoption started as early as 10 years ago, and the progress has been especially fast in the case of PACS, particularly in the last few years. By the end of 2006 all the hospital districts finally had a PACS in use. What is more important is the percentage of PACS usage in the daily production of radiological images. In 2005, 15 out of 21 hospital districts were already producing over 90% of their medical images only digitally. In 2007, all hospital districts were producing over 90% of their medical images only digitally. The target of a totally filmless environment has thus been achieved, which makes PACS a very real component of EPR. The saturation point was maintained in 2010 as well, with all Finnish hospital districts being filmless with 100% PACS coverage. The adoption of PACS by the hospital districts is important and forms a basis for regional and later for national archiving of medical images. The survey also revealed that the next challenge is to integrate PACS with workflow management and EPR software.

In the primary health care centres, the current trend is that a centre does not have a PACS of its own, but instead combines its efforts with a regional hospital or a hospital district. Many innovative solutions are available. For instance, in the northernmost hospital district all the primary health care centres are fully digitised and they store their images at the central hospital. Those images can be accessed directly from the physician's desktop. In some areas, small regional hospitals maintain a combined image archive and distribution with the primary health care centres.

According to the answers PACS was in use in 94% of the 140 primary health care centres that answered the survey. In the 2007 survey, 49% of the 220 health care centres stated that they had PACS in use. For the 2005 survey, we received information from PACS vendors about their customers at primary health care centres. According to the vendors, in 2005 their systems or system components were in use in 53% of 179 primary health care centres. For the 2003 survey, PACS usage information was obtained directly from the primary health care centres; at that time, 17% of these centres announced that they used PACS components. Even though the methodologies and sample sizes were different, all this information reveals that the

use of PACS at the primary health care level has increased in Finland in the past three years and has now reached the saturation point.

In the sample of private service providers, 16 of the 30 providers that answered this question had PACS in use. In 2007, the figure was nine out of 28, so one could estimate that the use of PACS has increased also in the private sector.

The growth rate of PACS usage in Finland has followed the general adoption of electronic patient record systems (EPR). This is only to be expected, because the full utilisation of PACS requires the distribution of images to the end users. This was not possible before the installation of EPR systems, at which time wards were equipped with enough computer terminals. The tight integration of images with narrative texts in EPR – and not only with RIS (radiological information systems) – has been one of the key aims of the development. In most cases, images are very successfully embedded into the EPR interface.

### 4.3 Radiology and Laboratory Information Systems

A *radiology information system (RIS)* is a software entity for controlling the functions of radiological units. RIS includes referral letters and appointment orders; it manages patient visits, transfers workflows and patient data to the radiological equipment, keeps a record of stored examinations and files radiologists' reports; it also manages the data for the statistical reports of the radiological unit. The complexity of various RIS solutions varies, as does their integration into the EPR.

RIS was in use in all of the 21 hospital districts for all their radiological examinations. Some of the hospital districts were already in the process of acquiring second-generation RIS in order to achieve seamless integration with EPR. This 100% coverage was already reached in the 2007 survey. Among the health centres 56% of those that answered the question reported that they had RIS in use, while the figure was 35% in 2007. The utilisation of RIS has thus increased in primary care. Further analyses showed that some of the health centres had RIS of their own, while some had RIS components of their own and relied partially on the RIS components of their hospital districts, and some relied entirely on the RIS of their hospital districts. From the point of view of the users of health centres, the end result was practically similar.

A *laboratory information system (LIS)* is a software entity controlling the process of ordering laboratory tests electronically, identifying the patients and controlling the equipment as well as sending the test results electronically back to the ordering physicians. The systems also give guidance for the usage of the tests and statistical information about the test usage and performance of the laboratories. Today, it is essential to link the systems seamlessly with EPR and present the results also through remote databases.

All of the 21 hospital districts (100%) used LIS, which was already the case in 2007. In primary health care centres, 12% announced that they had LIS in use. As far as health care centres are concerned, reliable figures from previous years are not available, owing to the problems of interpreting the term. At least some LIS components were in use earlier, but it remained unclear how many of these systems fulfilled all the criteria.

#### 4.4 Digital ECG

*Digital electrocardiogram (ECG)* is the most important biosignal data used in everyday medical practice. It is needed in local patient care in wards and outpatient clinics and in emergency rooms, and it carries important patient information when patients are transferred between institutions. For cardiac emergencies, ECG is necessary in order to initiate immediate treatment in ambulatory situations. Until recently, the lack of an agreement on a common standard has meant that many health care institutions have kept paper records of this information. The difficulty of transferring this data from ambulance cars to hospitals has been discussed in a previous paper (Winblad et al. 2007). However, compared to our earlier study in 2007, progress in digitalising ECG is now seen both in hospital districts and health care centres. There are still shortcomings in interoperability, as seen in Table 2:

**Table 2. The situation of digital ECG standards in hospital districts and health care centres in 2010.**

ECG/Standard	Health districts* (N)	Health care centres** (%)
DICOM-ECG	3	16
Another or manufacturer's standard	8	40
PDF format	2	6
Standard not specified	0	38
Electronic ECG not in use	11	31

\*N=21, multiple standards in organisations possible

\*\*N=140, multiple standards in organisations possible

# 5 EXCHANGE OF ELECTRONIC PATIENT INFORMATION BETWEEN ORGANISATIONS

When technical possibilities first emerged in the late 1990s, two different lines of development started to take place in the exchange of electronic patient information between organisations. Once technology enabled bilateral and regional networking, the organisations and regions started to define common structures for e-documents to enable exchange (teleradiology, PACS, e-Referral letter, e-Discharge letter, e-Laboratory results) at the local level. When the construction of information networks became technically viable, a government-supported project called “Makropilotti” established ways of reading EPRs kept by another organisation (with the patient’s consent) and lessened the need for a common structure (Ohtonen 2002).

The exchange of electronic patient information between providers of health services necessitates the use of networks with high data security, which can be actualised through different kinds of intranet solutions or secure internet connections. This interorganisational data exchange is increasing rapidly in Finland thanks to the fact that digital data depositories in individual health care institutions are in active clinical use, and protected data connections enable the communication of electronic patient information.

Some terms need to be defined before discussing the many different and yet at the same time partially overlapping forms of data exchange. Point-to-point *electronic referrals* are basically sent to another institution in order to transfer the responsibility for patient care. *Electronic discharge letters* are then returned to the sending institution once the patient’s treatment is finished. Instead of a referral, an institution may send an *electronic consultation letter*, if neither responsibility for the patient nor the actual patient is transferred, but professional advice for treatment is sought or professional opinions are given. There are special cases like *teleradiology* that can be used not only for consultation but also for information distribution; the same applies also to *telelaboratories*. *Regional patient data repositories* or *regional health information exchanges (RHIE)* can serve many purposes: they can provide a source of reference information for past treatment, a basis for current patient data distribution in a geographically distributed health care environment, as well as a data depository for consultation services and workload distribution. In many cases, RHIEs contain more than just one type of data. They can also provide citizens with a



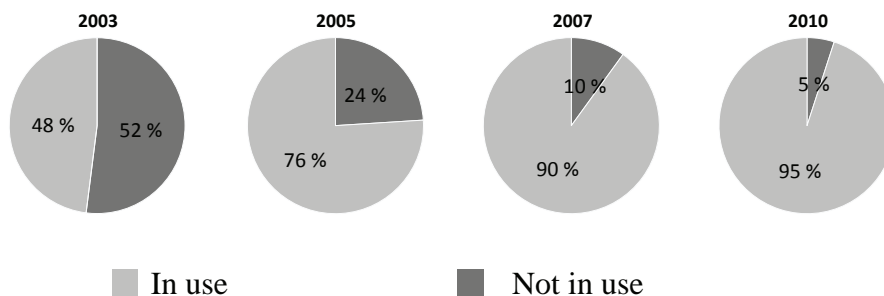
common access point to their health care data. In normal medical practice, all the various forms of data distribution described above complement each other.

For collaboration between primary and specialised health care, the most important messages in use today are still referral letters, consultation letters, and feedback or discharge letters. In addition to a narrative text, the letters can include the results of laboratory tests and radiological examinations.

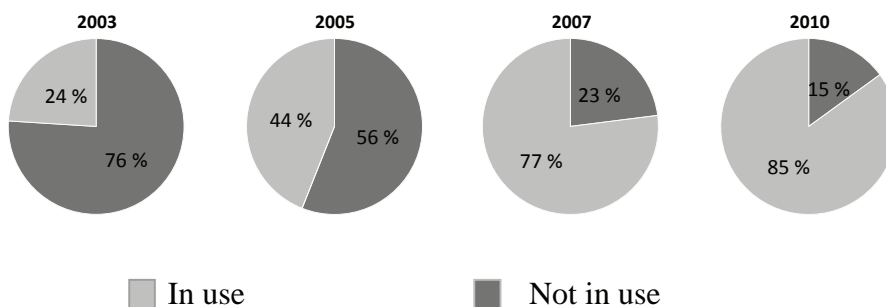
## 5.1 eReferral and eDischarge Letters

The e-Referral letter is a course of action by which the referring physician, usually a general practitioner, drafts a message with the intention of transferring a patient and the responsibility for care to a hospital. The role of hospitals in this kind of collaboration with health care centres is to receive referral letters, to provide a letter showing the treatment and to give feedback in a discharge letter.

This service is presently provided by 20 of the 21 hospital districts (95%), while in 2007 the number was 90%, in 2005 76% and in 2003 only 48% (Figure 6). Rapid progress was made during the last couple of years. A total of 85% of the health care centres were able to send electronic referral letters to specialised health care in 2010, while the figure was 77% in 2007, 44% in 2005 and 24% in 2003. The proportion almost doubled in the last five years (Figure 7).

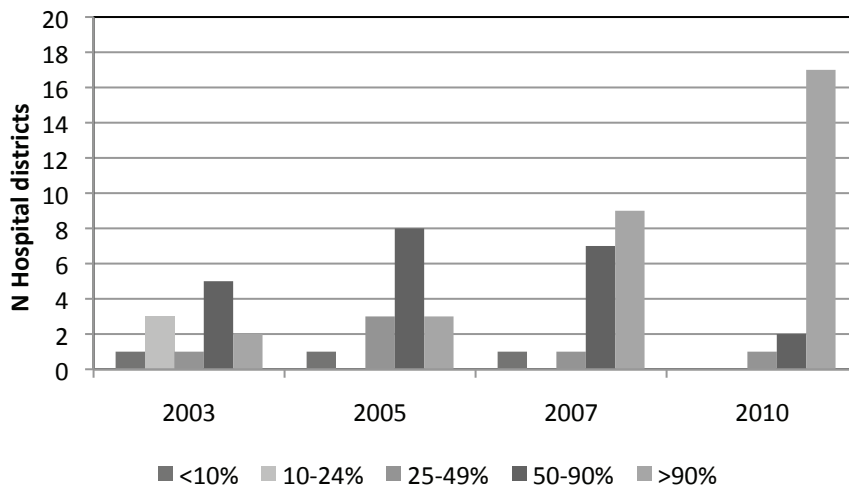


**Figure 6.** The percentage of the 21 hospital districts using electronic referral letters and electronic discharge letters in 2003, 2005, 2007 and 2010



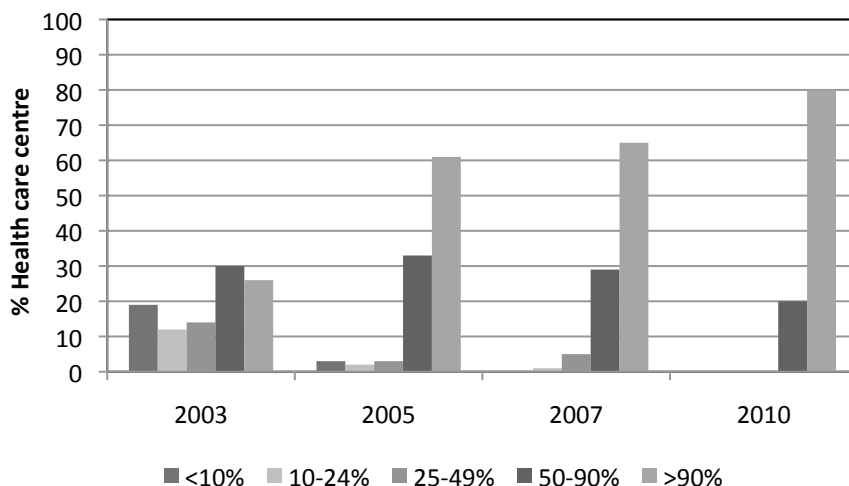
**Figure 7. The distribution (%) of health care centres using electronic referral letters and electronic discharge letters in 2003, 2005, 2007 and 2010**

In addition to the fact that the service was available in most of the districts, the intensity of use steadily increased since 2003 (Figure 8). In 2010, as many as 17 hospital districts informed that the intensity of use for electronic referral and discharge letters had exceeded 90%. The intensity of use was also investigated by the departments of different specialties (internal medicine, surgery, psychiatry, gynaecology, ophthalmology, etc.) of the hospitals. No prominent differences were found, except in psychiatry where intensity of use was somewhat lower than in other specialties.



**Figure 8. The intensity of use of electronic referral letters and discharge letters in the 21 hospital districts in 2003, 2005, 2007 and 2010**

Once a health care centre starts using electronic referrals, it seems to become the principal mode of action (Figure 9).



**Figure 9.** The distribution (%) of health care centres according to the intensity of use of electronic referral letters in 2003 (n = 43), 2005 (n = 69), 2007 (n = 143) and 2010 (n = 140). The numbers in parenthesis refer to the number of health care centres that answered the question

After a patient's visit at an outpatient department or bed ward, the hospital mails a *discharge letter* or a feedback letter to primary care to the health care centre concerned. A total of 90% of the hospital districts sent electronic discharge letters and 85% of the health centres (80% in 2007 and 53% in 2005) were capable of receiving them.

In the present survey, hospitals in secondary care had also adopted electronic referrals and electronic discharge letters in practice; they were used by 67% and 52% of the hospital districts, respectively.

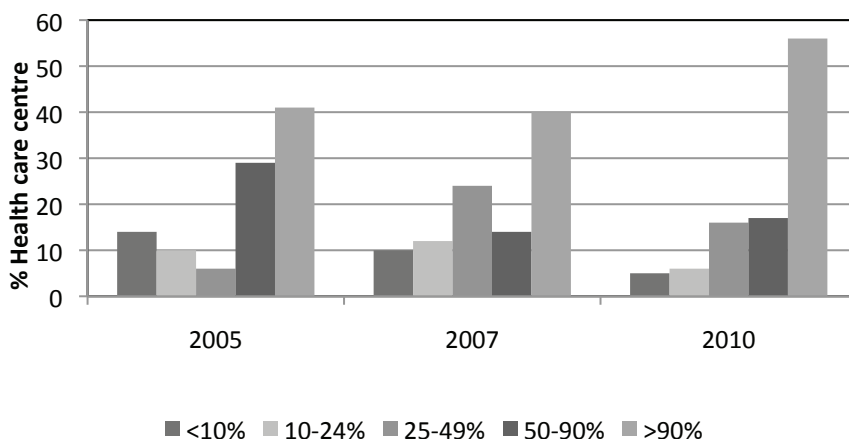
Eight of the *private health care service providers* used electronic referrals to send patients to another private unit and one to public specialised care. In this survey none of the private respondents received electronic referrals from public primary care while in 2007 four did so.

Treatment and care in a hospital bed ward can continue in the bed ward of a health care centre. In these kinds of cases a *document of nursing* is attached to the discharge letter. 43% of the hospital districts sent this nursing information electronically to primary care, while in 2007 29% did so.

## 5.2 Electronic and Remote Consultations

The *consultation letter* is a mode of action by which a physician, e.g. a general practitioner, drafts a letter with the intention of obtaining a specialist's advice or opinion concerning the treatment and care of a patient. The responsibility for care is not transferred to the consultant. The consultation letter is a more developed way of collaboration between primary and specialised care than conventional referral. This is because it better exploits the functionalities of electronic information exchange, such as flexible negotiations, between the physicians before decisions are made.

Electronic consultations were offered by 67% 14/21 of the hospital districts and the service had become more widespread since the previous surveys (52% in 2007 and 38% in 2005). This mode of action was in use at 91% of the 129 health care centres that answered this question. It had become more common in the space of two years, because in 2007 electronic consultation letters were used by 55% of the 199 health care centres and in 2005 by 34% of the 179 health centres that answered the question. While this mode of action had become more prevalent, the intensity of use among the users has now changed remarkably from 2007 (Figure 10).



**Figure 10.** The distribution (%) of the health centres that answered the question in 2005 (n = 49), in 2007 (n = 179) and in 2010 (n = 140) according to the intensity of use of electronic consultation letters

*Consultations by televideo conferencing* between health care centres and hospitals are held according to the following procedure: at the health care centre, the patient, the general practitioner and the nurse attend the video session. In the hospital a spe-

cialist accompanied by a nurse gives the consultation. The percentage of hospital districts using televideo conferencing has decreased to 52% from the peak figure of 67% in 2007. In 2005, these videoconsultations were given by 48% of the hospital districts. A total of 19% of health care centres use televideo consultations and this figure has remained more or less at the same level as before (17% in 2007 and 12% in 2005).

Similarly, during the period of the present survey four of the 31 *private health care service providers* maintained televideo consultation services, while in 2007 only one of the 28 private respondents did so.

Electronic referral letters, consultation letters and televideo conferencing are means of transferring patient-identifiable data. In addition to that, a primary care physician can consult a specialist *by e-mail about a patient's case without identification*. This function was in use in 2010 among 14% of the 21 hospital districts, while the figure was 38% in 2007. This decrease in the use of unidentified data was probably due to the greater use of electronic consultation letters with patient ID directly through the EPR systems. Among the 31 *private health care service providers*, two used *specialist consultations without patient identification*, while one respondent out of 28 used this type of service in 2007.

### 5.3 Regional Data Exchange Systems

Due to the well-developed public communications network, investing in creating a closed network dedicated to health care was not deemed necessary. The demands of health care telecommunication have been served through the use of commercial high-speed public data networks and virtual private network (VPN) tunnels over the public network.

Many Health care organisations and institutions make use of regional patient data repositories for exchanging data. According to this survey, 18 out of 21 hospital districts have a regional patient data repository in clinical use, showing significant progress since 2005 when the corresponding figure was nine (Figure 11).



**Figure 11. The geographical distribution and progress of the use of regional data repositories in the 21 hospital districts in 2005, 2007 and 2010**

In those hospital districts that had entered the clinical phase of regional data exchange systems, five different types could be identified:

1) The *master patient index model* was in use in three hospital districts. Each of them has a centralised reference database of available selected information archived by customer organisations. Authorised users can then use these references as a link to the original data and have access to those selections in the customer organisations. The contents of the original selected data include core narrative texts, digital x-rays and laboratory data.

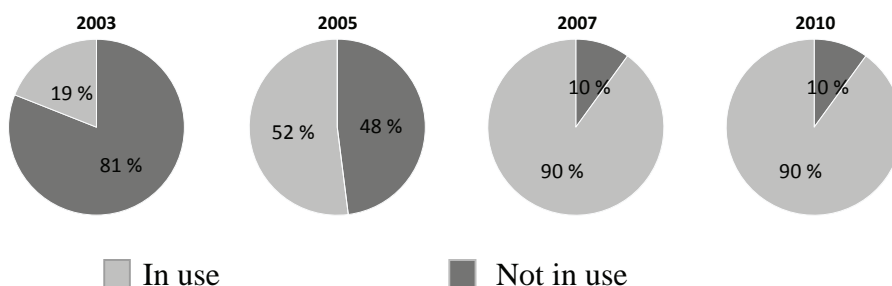
2) The *web distribution model* was used in three hospital districts. Authorised users can have full access to a web-based electronic record of patient data when situated in a secondary care unit. That includes all texts, images and laboratory data that a patient has authorised for the treating physician to see. As this data is distributed online, no special viewer is needed, only a secure connection.

3) *Regional sharing of integrated electronic patient data* was used in ten hospital districts. If the patient grants permission, the physician has direct access to the electronic patient record kept by another institution. That includes all the texts, images and laboratory data. In this case both the viewer and the provider use the same proprietary software.

4) A *mixed model of patient data sharing* was used in one hospital district where both primary and secondary care are provided by one authority. No extra viewing permission is needed, but because this district has two different electronic patient record software vendors, it uses a special solution with software adapters for its master patient index model.

5) *Regional sharing of data from different patient record systems* was in use in one hospital district.

While *regional patient data repositories* or *regional health information exchanges* can exchange many different types of patient data, from images to biosignals, the primary function is the transfer and *exchange of narrative texts* from different specialities. According to this survey, the regional exchange of narrative texts, including delivery, receiving and remote reading, was being set up in 86% of the hospital districts, that of laboratory results in 86%, images in 71% and image statements in 76%. The figures for 2007 were 76%, 71%, 75% and 62%, respectively. If all the means of exchanging narrative texts are counted, 90% of the hospital districts were capable of distributing data in their area. This summary situation was the same in 2007 (Figure 12).



**Figure 12. Regional electronic exchange of patient narratives in hospital districts with all means in 2003, 2005, 2007 and 2010**

A total of 68% of health care centres used part of the regional data exchange system for the exchange of narrative texts, while the corresponding figure in 2007 was 62%. The exchange of laboratory results was used by 71% of health care centres, images by 76% and image statements by 59%. The figures for 2007 were 87%, 66% and 58%, respectively.

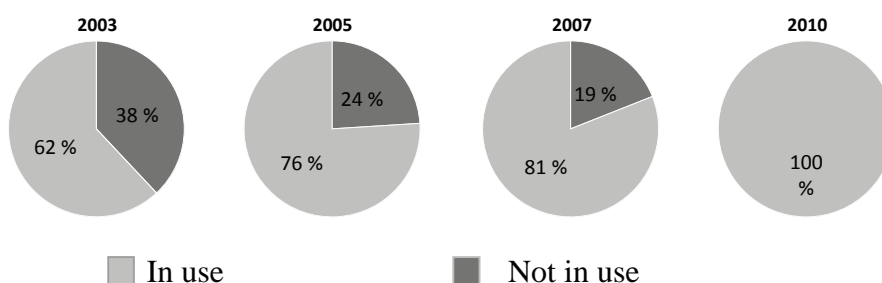
#### 5.4 Teleradiology and Image Distribution through a Regional Archive

Teleradiology was one of the first applications of telemedicine in Finland. The first experiments took place as early as 1969 (Reponen and Niinimäki 2006) and real implementation started at the beginning of the 1990s. In 1994, all five university hospitals had teleradiology services (Reponen 1996). Regular service started in the sparsely populated northern areas, but has since then spread all around the country (Reponen 2010).

The borderline between teleradiology and image distribution through a regional archive is gradually vanishing in the case of certain services. In the current survey, we investigated all the methods used for image transfer. For a regional service, the

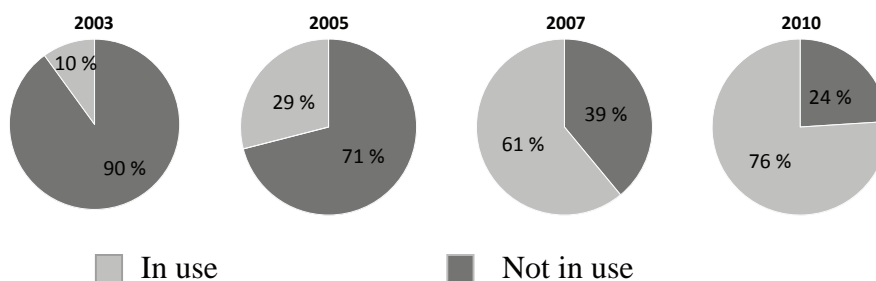
basic assumption was that a hospital should have a local PACS installed. Then, there could be differences in the technical infrastructure behind the implementation of regional image distribution. In some areas, image viewing relies on a regional reference database. In other areas there is a dedicated common regional radiological database ("regional PACS"). A third solution is to view images through regional access to an EPR archive that also contains images.

The results of the 2003, 2005, 2007 and 2010 surveys on teleradiology and regional image distribution/archive services by the 21 hospital districts are presented in Figure 13. Since teleradiology services could be independent of local PACS or a regional archive, this report presents a combined look at image transfer. The key fact is that in 2010, all of the 21 (100%) hospital districts provided some form of electronic distribution of radiological images.



**Figure 13.** The distribution of the 21 hospital districts by teleradiology and/or regional image distribution/image archive services in 2003, 2005, 2007 and 2010

A total of 76% of health care centres utilised some form of electronic distribution of radiological images, while in 2003 only 10% did so (Figure 14).



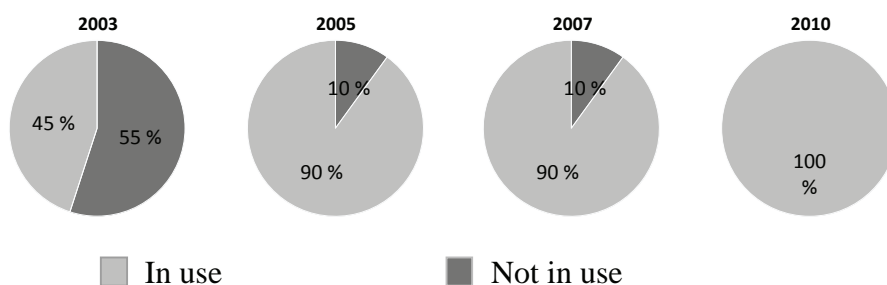
**Figure 14.** The distribution (%) of health care centres utilising teleradiology and/or regional image distribution/image archive services in 2003, 2005, 2007 and 2010



The results show that the use of teleradiology has increased strongly during the last years both in specialised and primary health care and that it is currently the principal method of transferring radiological images.

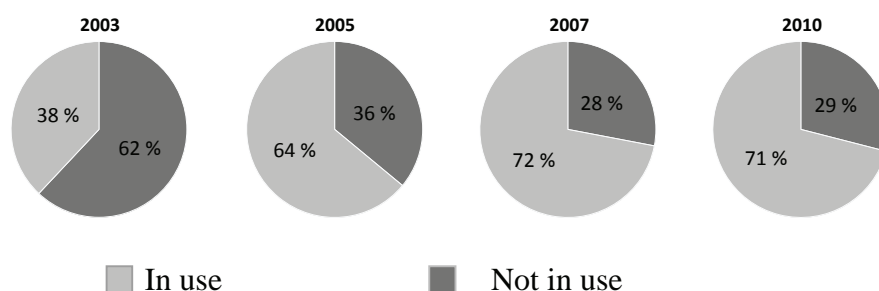
## 5.5 Telelaboratory

Regional distribution of laboratory results through a regional archive or by other means was utilised by all of the 21 (100%) Finnish hospital districts (Figure 15), and by 71% of the health care centres (Figure 16) in 2010.



**Figure 15.** The distribution of the 21 hospital districts by telelaboratory services through a regional archive or by other means in 2003, 2005, 2007 and 2010

The progress seen in the figures indicates that those dealing with primary care will accept new services like receiving telelaboratory data as soon as the hospital districts can provide it.



**Figure 16.** The distribution of (%) health care centres utilising telelaboratory services through a regional archive or by other means in 2003, 2005, 2007 and 2010

## 5.6 Clinicians' Experiences on the Usability of the Regional Patient Information Systems

The separate national-level usability survey of doctors in 2010 included questions related to the usability of health information exchange between organisations via regional information systems (Vänskä et al. 2010, Hyppönen et al. 2012, Viitanen and Hyppönen et al. 2011) The survey was timed so that it could provide a view of the baseline situation prior to eArchive and ePrescription implementation (see Chapter 5.7). According to the usability analysis of regional information systems (Hyppönen et al. 2012), patient information was not yet available to doctors everywhere in Finland via the regional systems. At the time of the study less than a fifth (16%) of all the respondents in the original survey of doctors (n=3929) were working in areas where the regional system was not yet in use. In some areas, the implementation of the regional system was not completed, and in other areas, all patient data were not included in the regional system or could only be viewed partially between primary and secondary care. Even if information from other organisations was available, it was not always used: 66% of primary care physicians used the regional information system for this purpose, but almost 70% of the hospital doctors used papers and fax, not the regional information system for exchanging patient information. The total utilisation rate of regional systems was 48%.

Problems with inter-organisational data exchange were among the most important information system challenges mentioned by the doctors. The means for searching for information were regarded as too laborious and time-consuming, and thus, in spite of the potential benefits, patient information was not sought. Satisfaction varied among respondents working in areas where different regional system types were in use. The keys to the success of inter-organisational information system services are, according to the results, ease of information retrieval and comprehensiveness of data, as well as those functionalities that doctors need in their everyday work. The survey results did not support the reference-based regional information system type (model 1), which was criticised more than an integrated solution (model 3).

## 5.7 The Situation in the Development of National ePrescribing and eArchiving Systems

### *ePrescribing*

All physicians have EPR applications and prescriptions that are produced electronically within the electronic patient record system. The technical solution to send them as ePrescriptions from the physician's surgery to the pharmacy is in the implementa-

tion phase. The mechanism whereby pharmacies can send reimbursement information on each prescription electronically to the Social Security Institution (KELA) has been in routine use for several years nationally. Finland carried out the first national ePrescribing pilot programme during 2002-2006. This pilot was stopped because the first system was not technically ready for implementation; however, all the experiences were evaluated and reported (Hyppönen et al. 2006) and have been exploited in the development of the permanent ePrescribing system.

The law on Permanent e-Prescription was passed by Parliament and it came into effect in April 2007. A national e-Prescription database hosted by the Social Insurance Institution (KELA) has been created and strong authentication and a smart ID card for professionals with an e-signature system and SSL-secured messages from health care providers and pharmacies to the database are used. Finnish ePrescribing is fully integrated with the different EPRs and a centralised receipt data file; this ensures that it covers all pharmacies and contains continuously updated knowledge about all the drugs prescribed to patients, all using highly secured networks (Reponen et al. 2008). The service started to run in the first organisation in 2010. In the Turku region, the health care centre of the City of Turku and regional pharmacies were the first to join the system. Other regions also started to prepare for its adoption. The next adopter was in the region of Kymenlaakso where the primary health care centre of the city of Kotka and pharmacies joined in. This survey collected data on the self-reported readiness of the hospital districts and primary health care centres to join the national ePrescribing system. Data about the readiness of pharmacies to join were not collected. However, all the pharmacies had joined the national ePrescription system by September 2012. The current legislation states that all public health care providers should have joined the system by 1 April 2013 and private health care providers by 1 April 2014. The new legislation on the schedule came into effect on 1 January 2011 when the survey questionnaire was out in the field.

The results of the survey show that all hospital districts – except Åland, which has no obligation to join in – were able to give an estimate of the time scale for joining the ePrescription system. Only 3/20 estimated that they would join the system in 2013. All the rest estimated that they would join it earlier. In September 2012 as many as 6/20 had already joined the system. During the time when the data of this survey were collected, not all of the health care centres had clear plans, but after the schedule was clarified by a change in the legislation, they prepared better plans and are now rapidly joining the system. During the time of the survey 8 health care centres had joined the system. In October 2012 the number was over 3,5 billion prescriptions (1 billion = 1 000 000)<sup>12</sup>. None of the private health care providers had joined the system by September 2012, but 2/3 of the providers that participated in

---

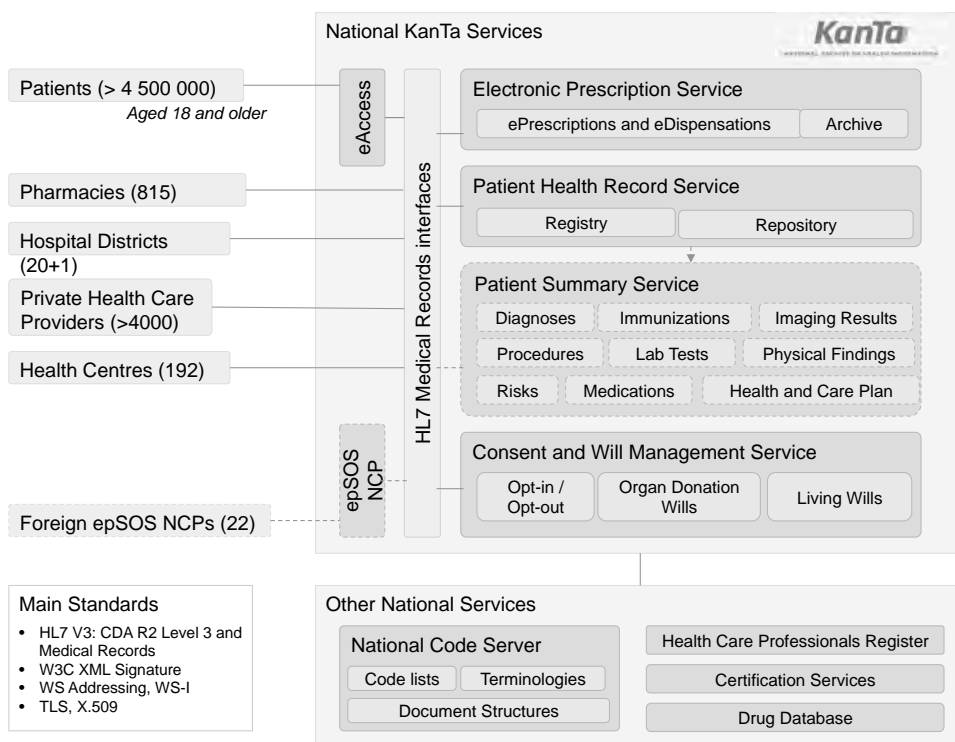
<sup>12</sup> [www.kanta.fi/ereseptin-kayttotilastot1](http://www.kanta.fi/ereseptin-kayttotilastot1)

the survey estimated that they would do so within the official schedule. The others were not able to give any estimates.

### *National Archiving Systems, the eArchive*

The Government has decided that for reasons of practicality and economy, the information management structure of Finland will be at least in part organised at the national, instead of the regional level. The core of the national Finnish ICT infrastructure for social and health care will reside in a *national digital archive for patient documents or eArchive* (Figure 17). Plans to provide a similar archive for electronic social care documents also exist (Laaksonen et al. 2008).

The national IT Architecture for Health Care is based on legislation in effect as of April 2007 and its implementation is mandatory by 9/2014 for all public health care providers. The private service providers using electronic documentation (Act 159/2007) have to join the eArchive by 9/2015. At the strategic level, steering is under the responsibility of the Ministry of Social Affairs and Health, and its operational steering and coordination is the responsibility of the National Institute for Health and Welfare (THL). The national architecture consists of local EPRs using common data structure and technical standards, the national eArchive in which all EPRs and a patient summary are made available online based on patients' consent, a national ePrescription database and an eView for citizens, which provides them with access to their own patient data and log data. Data between the central organisations and health care providers are transferred over the Internet via a VPN/SSL-secured connection.



**Figure 17. Scheme of the most important elements of the national ePrescription and eArchiving system (Hypponen K 2012)**

The main functional responsibility areas have been shared between national actors. The eArchive and the national ePrescription database are built and operated by the National Institute of Social Security (KELA). Cards for identification of professionals are provided by the Population Register Centre (VRK). Nationally standardised codes and classifications are managed by THL and delivered via a code server.

The primary health care centre of the City of Kuopio in eastern Finland joined the eArchive at the end of 2011. Because new elements such as the patient summary have been added to the architecture of the eArchiving system after this time, the City of Kuopio's adoption of the eArchive was considered to be a pilot of the earlier specifications of the system. A new schedule for joining the new version of the eArchiving system has been planned for a few organisations in eastern Finland at the beginning of 2013. According to this survey, 17/20 hospital districts had started their preparations to join the system. 3/20 were not able to estimate their schedule, while the others gave an answer that was within the timeframe stated in the legislation. Most of the primary health care centres had also started their preparations. Around 40%, however, were not able to specify a schedule. The clear majority of the private health care providers had plans to join the eArchiving system, although it is not

obligatory for private providers. In the answers to the open questions of the survey, the costs of this operation emerged as a common concern.

## 6 DATA SAFEGUARDING

The strategy of the working group *Steering the Implementation of Electronic Patient Record Systems* included national guidelines for the safeguarding of data (informed consent, secure archiving, e-signature, identification of patients, documents, professionals and organizations by ISO/OID-standard, and PKI architecture) (Ministry of Social Affairs and Health 2004). The main ideas of the working group were included in the legislation on the eArchive (Act 159/2007) and the ePrescription system (Act 61/2007). This legislation was updated in 2010 with a more precise implementation timetable. Also in 2010 a new law was passed (Act 1326/2010) which describes public health care units within one health region as a single registration authority and enables the use of the opt-out principle for patient consent. The effects of these updates are not yet seen in this survey.

### 6.1 Systems Supporting Data Security

Moving over to electronic documentation, archiving and transferring of data has meant that data security has become even more important. Legislation on data security in health care concerns different dimensions of the issue. Data security policy of the organisation should include aims and responsibilities for data security. The proportions of health service providers with a documented data security policy, plan and designated person in charge are shown in Table 3. When compared to 2007, the biggest progress in data security was seen on health care centre level. In addition, most of the organisations had now nominated persons in charge of data security while only 51-85 % had done so in the previous survey (Hämäläinen et al. 2009).

**Table 3. Proportions of health service providers with documented data security policy, plan and nominated person in charge**

Provider	Data security policy	Data security plan	Person in charge of data security
Hospital districts (n=20)	17	15	19
Health care centres (n=137)	69%	70%	98%
Private providers	15/26	18/30	28/30

## 6.2 Management of Informed Consent

Informed consent of the patient was needed for medical practitioners in order to access patient records in another health care organisation at the time of this survey. A completely electronic system using electronic signature of the patient was not in use anywhere in Finland. Table 4 outlines the currently used ways of managing the informed consent of a patient within the regional data systems by electronic and/or by paper means. Even though not all institutions answered to this question, it gives an example of the various ways currently used. New legislation on patient consent came in to effect in 2011 and will be fully implemented in to the new national eAchieving system. The management of the patient consent will be transformed from “opt in” to “opt out” in the new system. However, already prior to this reform electronic managing had become more common in health care organisations when compared to 2007 (Hämäläinen et al. 2009).

**Table 4. Managing a patient’s informed consent by electronic and/or paper means in the hospital districts, health care centres and private service providers**

	Paper	Electronic and paper	Electronic only
Hospital districts, number (n=15/21)	5	4	6
Health care centres, % (n=77/161)	36%	4%	60%
Private service providers (n=16/31)	5	4	7



### 6.3 Electronic Identification of Health Care Professionals

A smart card for strong electronic identification of health care professionals was in use in 9/21 hospital districts and in 8% of the health care centres. The situation is similar to 2007. However, the saturation point of using strong identification with smart cards should be achieved by 2013, at the time point when the national ePrescription services should be in use throughout the public Finnish health care system.

Based on earlier studies (Winblad and Reponen et al. 2008), in cases where strong electronic identification of health care professionals with smart cards is not available, the user name and password method is used for identification. In this eHealth survey in 2010, the identifiers including user names and passwords had been fixed to the unambiguous identity number of an employee in 13/21 of the hospital districts and 31% of the health care centres.

### 6.4 Electronic Identification of Patients

Health care organisations provide some services requiring identification of patients. Among hospital districts identification of patients was based on a national smart card in four, a commercial password method with a password list in six, and on user name and password in six. None of the hospital districts had mobile identification for patients. Among health centres a national smart card, a commercial password method with a password, user name and password, and mobile identifications were used in 35 (25%), 15 (11%), 20 (14%) and 2 (1%) of the organisations, respectively. Among 11 private service providers, national smart cards were used in four, commercial password method with a password list in two, user name and password in four and mobile identification in one of the organisations.

# 7 STANDARDS FOR DATA EXCHANGE BETWEEN ORGANISATIONS

Finnish registries use international classification systems such as ICD-10 and ICPC-2. The EPR Minimum Data Set will also be coded on the basis of these classification systems. In terms of communication and security, Finland has chosen to adopt international standards, such as Health Level 7 (HL7) and Digital Imaging and Communications in Medicine (DICOM), and the ISO 17799 standard for Information Security Management (based on the BS7799).

HL7 standards will serve as the base communication standard and the use of eXtensible Markup Language (XML) as a basis for the transfer of patient information between health care organisations. Clinical Document Architecture (CDA) is an XML-based clinical document architecture for the exchange of various types of documents. The DICOM standard enables users to retrieve images from digital imaging devices.

Electronic Data Interchange (EDI) was still in use in six of the hospital districts. In health care centres the use of the EDI standard decreased from 22% in 2007 (Hämäläinen et al. 2009) to 10% of organisations in 2010. Release 1 of the CDA was being used in 13/20 hospital districts and in 57% of the health care centres, the proportions being at the same level as in 2007 (Hämäläinen et al. 2009). The use of release 2 of the CDA had increased, being in use in 9/20 hospital districts, and in 35% of health care centres instead of 5/21 and 16% in 2007, respectively (Hämäläinen et al. 2009).

A total of 13 hospital districts and 58% of the health care centres announced that they used XML messaging. The DICOM standard was in use in all of the 21 hospital districts and in 40% of health care centres.

In the sample of 10 private service providers the proportion of usage was about 30- 50% for EDI, HL7CDAR1, HL7CDAR2, XML and DICOM.

Based on the survey questionnaire in 2010, 14 out of 19 hospital districts and 61% of health care centres mentioned they were using their own object identifier (OID) codes. In 2007, 11 hospital districts and 24% of the health care centres had OID codes (Hämäläinen et al. 2009). Among the sample of 31 private providers two

were using OID codes in 2010. However, based on the figures in the official health care organisation database maintained by THL<sup>13</sup>, 20 hospital districts (all except Åland) and 100 health care centres were listed for OID codes in September 2011, meaning that a saturation point is being gradually achieved.

Close collaboration between health care and social care is becoming more and more important. This is especially beneficial when arranging services for children, elderly citizens and people with chronic conditions, for instance. In Finland an increasing amount of information within social care is available electronically.

In four of the hospital districts (19%) it was possible to access patient information from a social care organisation with the permission of the patient, while eight allowed social care organisations to have access to health care information. At the health care centre level, 20% (n=137) had access to read social health care information with the permission of the patient and 31% allowed social care organisations to have access to health care patient information.

---

<sup>13</sup>[http://www.thl.fi/fi\\_FI/web/fi/tutkimus/palvelut/koodistopalvelu/koodistot/organisaatio](http://www.thl.fi/fi_FI/web/fi/tutkimus/palvelut/koodistopalvelu/koodistot/organisaatio)

# 8 INFORMATION EXCHANGE BETWEEN HEALTH CARE ORGANISATIONS AND PATIENTS

In the health care sector, existing electronic health services for patients have been mapped systematically as part of this survey and the previous eHealth surveys (Hämäläinen et al 2007, Hämäläinen et al. 2009, Winblad et al. 2006, Winblad and Reponen et al. 2008). The results of the 2011 survey are described below. A separate survey of existing electronic social care services (Kärki et al. 2012) was done within the SADe programme to complete the picture of the baseline situation and development trends. The results of this survey are described in Chapter 12. A survey of citizens' eService projects with public funding (Hyppönen and Iivari et al. 2011) was also carried out in 2010 within the SADe programme, also with a view to completing the picture of the baseline situation and development trends. Findings concerning the trends in the development of eHealth services are reported at the end of this chapter.

## 8.1 Availability of General Health Information and Exchange of Patient Identifiable Data

All public health care organisations and almost all of the private service providers maintained their own websites. A web-based anonymous question-answer service was being used in 3/21 hospital districts and in 11% of the health care centres. This compares with telephone-based anonymous question-answer service that was used in 6/21 hospital districts and in 51% of the health care centres.

Based on the questionnaire, online web-based question-answer service with patient authentication was available in none of the hospital districts, while 17% of health care centres and one private service provider did offer this service. However, telephone-based health, illness and service consultation with patient identification was more commonly in use; in 9/21 hospital districts, 104 (74%) health care centres, and 6/31 private service providers.

## 8.2 Electrical Appointment Booking Services

Online appointment booking means that a patient can reserve an appointment with a physician over the Internet. These services could potentially significantly save health care staff's time (Vähäkuopus et al. 2006) and increase service flexibility for the customers. In the context of making an appointment in Finland, the primary health care physicians have the role of gatekeeper into specialised health care. For this reason, primary health care and specialised health care differ when dealing with appointments.

In 2011, online appointment booking was in use in 13 hospital districts and in 15% of the health care centres in Finland. The service was mainly for laboratory appointments. The service has become more common; in 2007 the service was in use in 8 of the hospital districts and in 8% of the health care centres. In the sample of private service providers online appointment booking was available in 12/30 organisations.

Only a minor increase in the percentage of using e-mail to make an appointment was seen in health care organisations when compared to 2007 (Hämäläinen et al. 2009). E-mail appointment booking was not in use in hospital districts in 2007, but in 2010/2011 one of the districts provided this service and a few (3%) health centres offered it to patients. As for the private sector, an e-mail service for making an appointment was available for patients among 10 service providers.

SMS messaging for the purpose of making an appointment was available in six hospital districts, 8% of the health care centres, and 7/30 private service providers. There is an increase compared to 2007, when SMS booking was used in one hospital district, 5% of the health care centres and one private service provider.

## 8.3 Exchange of Information on Treatment and Care with the Patients

Information exchange with patients by using conventional *e-mail* protocol was in use in three hospital districts, 20% of health care centres and 7 of the private providers. None of the hospital districts used secured e-mail in information exchange, while seven health care centres and 17 private providers did use it. When compared to 2007 (Winblad and Reponen et al. 2008, Hämäläinen et al. 2009) the percentage of using secured e-mail in health care centres had increased.

*SMS messaging* for information exchange with patients was used by four hospital districts and by 19% of the health care centres. As for the sample of private providers, 13 out of those 30 answering the question offered the service. There was only a slight increase in this service compared to 2007.

*Remote browsing of EPR* by the patient was available in one health care centre. In one health care centre it was possible for patients to browse the laboratory results.

The forthcoming national eArchive will offer citizens a service enabling them to browse selected personal health information, namely, reference information for the use of services, referral and discharge letters, certificates, statements and results of examinations, and to access log data about visits to the personal patient record. This service will largely substitute the need for a local patient record available for patients.

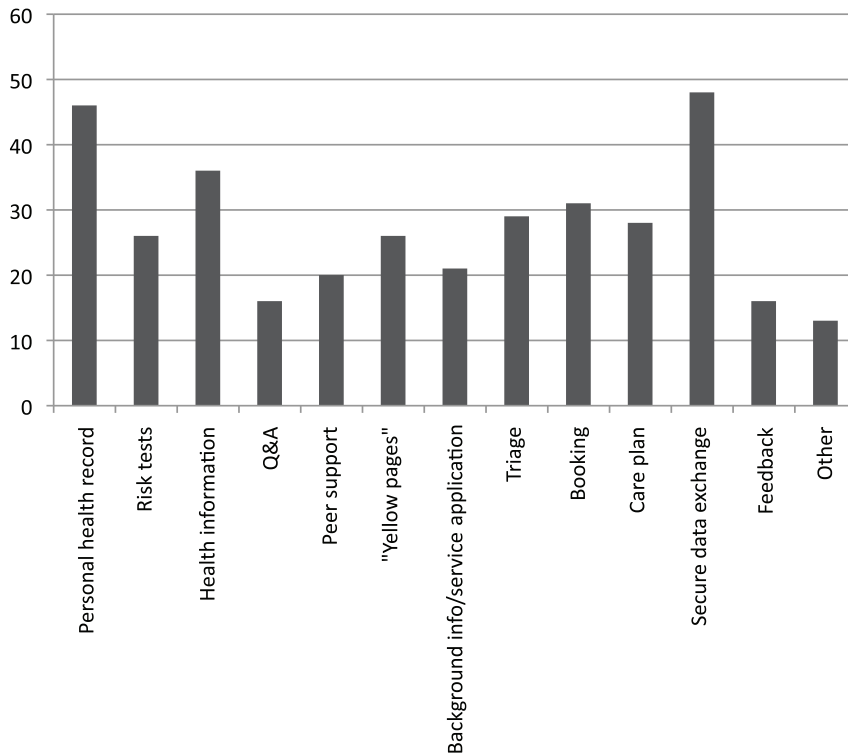
*Citizen initiated recording* means a function by which a patient can transfer personally conducted health status information into a health care system repository. The service was in use in 2 out of 21 hospital districts and in 2% of the health care centres.

*Teleconferencing* refers here to a situation where the physician is at one location, while the patient and the nurse are in a health care centre at another. The physician uses two monitors, one for the video and the other for the patient record. None of the hospital districts offered this service to health centres, while 2% of the health care centres received the service. In Finland, direct televideo-conferencing between the physician and the patient in their home has not been available so far.

## 8.4 Trends in the Development of eHealth Services for Citizens

The eHealth Service projects survey (Hyppönen and Iivari et al. 2011) compiled information from 75 different citizens' eHealth projects. Out of these, four were national, 13 covered several hospital districts, 35 were projects of a single hospital district, 15 of single municipalities and eight were other projects, not led by service providers. The funding basis was diverse, with the main public funding coming from the Ministry of Social Affairs and Health (21 projects), National Technology Agency – TEKES (20 projects), EU (EAKR, seven projects) and Finnish National Fund for Research and Development (SITRA, five projects).

The eHealth Services developed in different projects are illustrated in Figure 18. The projects identified several needs for national collaboration and development, including the need for a common eService infrastructure and standards as well as the need to develop legislation and learn how to engage in user-centred eHealth service development.



**Figure 18.** Number of projects developing different eHealth services for citizens (Hyppönen and Iivari et al. 2011)

The most immediate impact anticipated from the SADe project was savings in public service providers' IT costs due to collaboration and coordination of the development of eHealth services. The survey highlighted the need to coordinate public funding and a mechanism that would enable projects developing similar eServices to collaborate and learn from each other. The survey results have had an impact on the funding mechanism: for the first time, all public eHealth project funding regardless of the source will be coordinated by the Health and Welfare services development programme (Kaste) led by the Ministry of Social Affairs and Health, including the national eHealth and eWelfare services developed in the SADe programme (Ministry of Social Affairs and Health 2012a.).

For the social and health care sector, national-level eServices for citizens will by 2015 include generic health and welfare information and decision support for citizens, electronic health checks and risk tests with decision support for citizens, indexing for the national-level service and provider database ("yellow pages") and feedback services. National system and information requirements will be drawn up for

eBooking and eMessaging services. A central access point, the Suomi.fi website, will offer access to all central and local government services. A mechanism for collaboration and sharing information for regional projects will be established<sup>14</sup>.

---

<sup>14</sup> [http://www.thl.fi/fi\\_FI/web/fi/tutkimus/hankkeet/palvelukokonaisuudet](http://www.thl.fi/fi_FI/web/fi/tutkimus/hankkeet/palvelukokonaisuudet)



# 9 HUMAN AND MATERIAL RESOURCES

## 9.1 Professional Education and Training

Televideo-conferencing for education of personnel was maintained by 19 out of the 21 hospital districts, around 40% of the health centres and by only one private service provider.

## 9.2 Computer Skills of Health Care Personnel

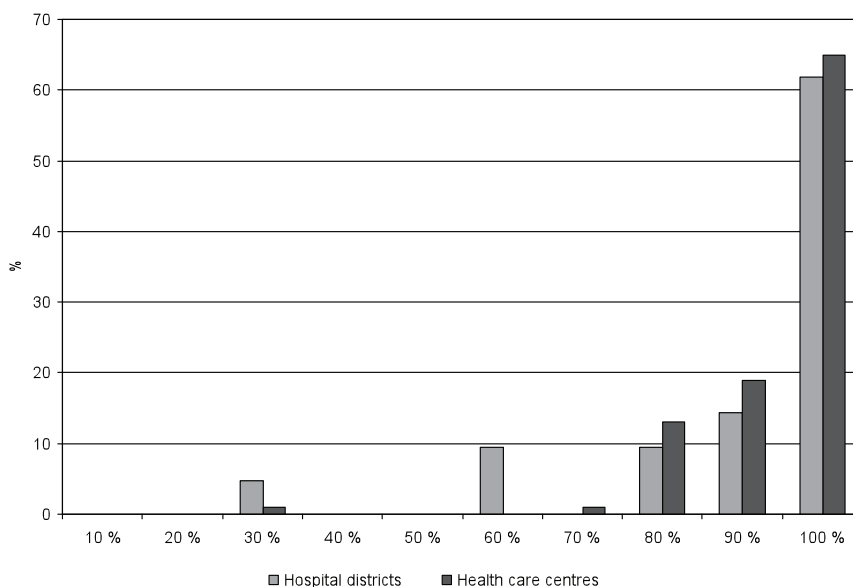
An investigation on the need for ICT training and teaching materials among social and health care professionals and on the challenges related to enhancing training was initiated by the Regional and Municipal Consulting group at STAKES in 2006 (Veikkolainen and Hämäläinen 2006). Based on that survey, half of the districts felt that the computer skills of their medical physicians were satisfactory, while about two thirds of the districts felt that their nursing staff had some or major deficiencies in their computer skills. Most health care organisations had organised basic ICT training, but privacy and data security training had been less than extensive, and the need for further training had been recognised in several units.

Hospital districts and units in the municipal social and health sectors perceived that they needed extensive support in order to be able to teach ICT skills to their personnel. In particular, the surveyed organisations needed financial support to organise ICT training. Support should be offered to hospital districts and municipalities for planning and organising training, and for the development of cooperation. (Veikkolainen and Hämäläinen 2006).

Based on the 2007 survey, the percentage of organisations where all personnel who documented or read patient information had computers was already 90% both for secondary and primary care. In a similar manner, in about 83% of the hospital districts and health care centres all the personnel involved in providing or reading patient information had access to the Internet. (Hämäläinen et al. 2009). Because of such a high saturation already in 2007, these questions were no longer included in the survey in 2010.

Based on this eHealth survey in 2010, the percentage of personnel documenting and reading patient information with computer skills is high in health care organisa-

tions. In over 70% of the hospital districts and around 80% of health care centres at least 90% of the personnel documenting and reading patient information had computer skills. The trend in this has been towards the 100% saturation point of computer skilled personnel (Figure 19). The private health care providers followed a similar trend.



**Figure 19. Distribution (%) of the hospital districts and health care centres based on the proportion (%) of the personnel with computer skills documenting and reading patient information**

Privacy training was received comprehensively by the personnel in 12 out of 21 hospital districts, to some extent in 8, and not at all in 1. In health care centres 97% of personnel had got at least some privacy training, half of which comprehensively. Among private sector samples, 16/30 organisations had provided comprehensive and 14/30 some privacy training.

### 9.3 Technical Support Availability for Users of the Patient Record System

The survey from 2010 looked at how comprehensively organisations had made technical support available for users of the EPR system. Around half of the hospital districts provided technical support during all the operating hours of the organisation

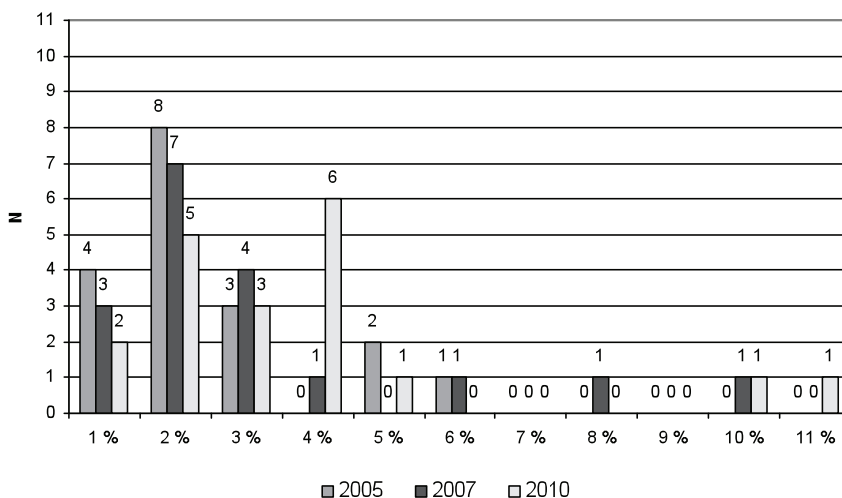
and 48% during normal office hours. Among health care centres, most (79%) of the organisations provided support during normal office hours, 15% at all times during operating hours, and 1% occasionally. Among private service providers, the service was most often provided during all operating hours (50%) or during office hours (30%), the rest providing support daily, but less than during office hours.

#### **9.4 Harnessing the User Skills of Physicians in the Development of IT Systems for Health Care**

The Usability Survey (Vänskä et al. 2010) included questions about user participation in eHealth development. The results were reported in an article entitled “Physicians’ experiences of participation in healthcare IT development in Finland: Willing but not able” (Martikainen et al. 2012). According to the results, the responding physicians’ experiences of the current methods of participation, or rather the lack of them, were quite negative. However, a very significant proportion of the respondents were willing to contribute to IT systems development, contrary to the common assumption that clinicians are disinterested. The respondents were quite cautious in envisioning future systems, focusing mainly on usability improvements to the current systems. The article concludes that major improvements are needed in the usability of the systems currently in use in Finland, which can be achieved by collaboration between end-users and developers. Furthermore, improved methods of participation need to be developed and applied, particularly for the procurement, deployment and ongoing development of commercial off-the-shelf applications.

#### **9.5 Costs for Systems of Information and Communication Technology in eHealth**

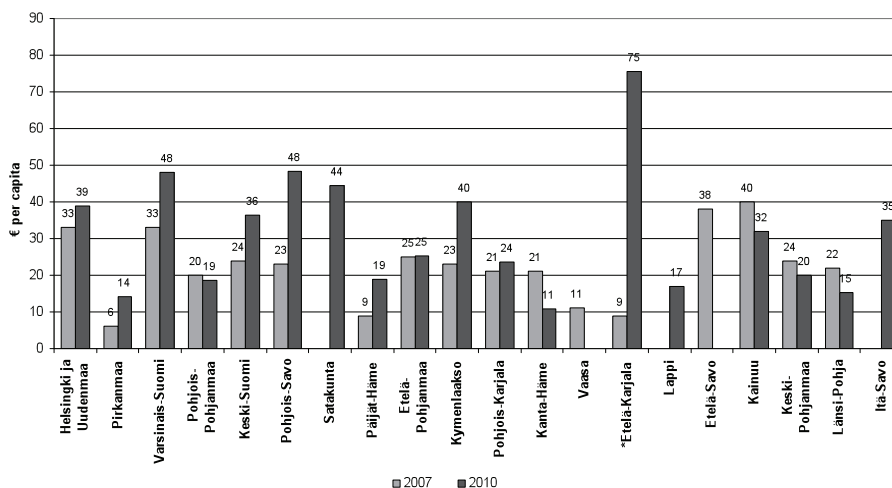
In the surveys on the implementation and usage of ICT, a question requested estimation of the proportion (%) of the sum of annual costs for purchasing, maintaining and developing information and communication technology and for training. In most of the hospital districts the proportion of the budget varied between 1-4%, similarly to the situation over the last five years (Figure 20). However, in 2010 the median value was 3%, as opposed to of 2% in 2007. The majority of health districts estimated that the percentage of their budget used for ICT systems in 2010 had remained the same (10/19) or gone up (8/19) when compared to 2009.



**Figure 20. Distribution of the amount by hospital districts, based on their estimations of the proportion (%) of ICT-related costs in the annual budgets in 2005, 2007 and 2010**

In the health care centres the ICT-related annual costs were typically estimated at 1-3%, which was the same as in the sample of private service providers. The majority of the health care centres estimated that the percentage of their budget used for ICT systems in 2010 had gone up (58%, n=116) or remained the same (35%, n=116) when compared to 2009. The majority of the private service providers participating in this survey estimated that the percentage of their ICT budget in 2010 had gone up (18/30) or remained unaltered (6/30) when compared to 2009.

Hospital districts' ICT-related costs in 2007 and 2010 are presented as Euro per capita in Figure 21. Per capita costs can be used, because in Finland everybody belongs to the population of a health care centre according to their residence, and a health centre has to belong to one of the 21 hospital districts. The medians of annual costs per capita in hospital districts were €14.7 in 2003 (from €9 to €24), €19.6 in 2005 (from €10 to €35), and €23.7 in 2007 (from €11 to €38)(Hämäläinen et al. 2009). In 2010 the median was €23.6 per capita (from €11 to €75).



**Figure 21.** Annual ICT related costs (€) per capita in the 20 hospital districts that answered the question in 2007 or 2010. \*In Etelä-Karjala data is not comparable because in between 2007 and 2010 previously separated primary, secondary and social care were fused into one organisation.

Based on the survey in 2007 the proportions of hardware, personnel and software were about 16%, 23%, and 61%, respectively, of the total ICT costs of hospital districts. The trend of growth was the strongest in software costs (Hämäläinen et al 2009). On health care centre level the medians of the annual ICT-related costs per capita in Euro increased from €12.9 in 2003 to €15.2 in 2007. The proportions of software costs seem to represent more than half of the costs (Hämäläinen et al. 2009).

If it is assumed that the medians per capita are representative for the whole country, and if the medians are multiplied by the population number of the country, the end result would be that the ICT related costs of hospital districts in 2010 were 127 m€ being at the same level as estimated for 2007. So, the estimated annual increase about 20% – 25% (Hämäläinen et al. 2009) in ICT related costs of hospital districts in 2007 has not continued in 2010. For the health care centres the costs in 2007 were 81 m€ and the preceding annual increase about 10% (Hämäläinen et al. 2009). For 2010 this data was not available.

# 10 SYSTEMS SUPPORTING THE QUALITY AND DELIVERY OF HEALTH CARE SERVICE

## 10.1 Decision Support Systems

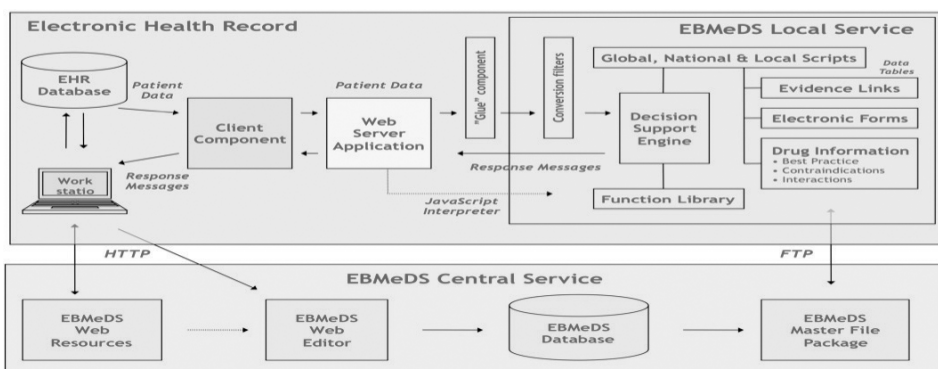
Decision support systems are information- or knowledge-based systems that support the decision-making process. The EPR systems that have been used thus far in Finland mostly include functions that warn about pathological laboratory results. In addition, some hospital districts and health care centres use EPR systems that include reminders that inform about drug interactions or whether a patient had been prepared properly for laboratory tests. EPR terminals also provide access to local, regional and national databases and guidelines with search engines. These databases can even be accessed with mobile devices.

Advanced electronic decision support systems, which could automatically give evidence-based medicine (EBM) guidelines covering a wide variety of clinical topics based on structured core data from the EPR system, have been developed by the Finnish Medical Society Duodecim<sup>15</sup> and its collaborators<sup>16</sup> and are now in the testing phase. The systems can give additional information or recommendations to health care professionals (Figure 22). This EBMDeS (evidence-based medicine decision support system) utilises data from various EPRs, which are compatible with the national EPR standards. With the help of an expert script language, EBMDeS brings context-sensitive information from a central server directly to the EPR of the patient. Databases for the decision support system have been designed for physicians, nurses and other health care professionals in primary and specialised health care. (Komulainen et al. 2006.)

---

<sup>15</sup> [www.duodecim.fi](http://www.duodecim.fi) including information in English

<sup>16</sup> [www.kaypahoito.fi](http://www.kaypahoito.fi)



**Figure 22. Scheme of the functional architecture of the evidence-based medicine decision support system of the Finnish Medical Society Duodecim (source: the Finnish Medical Society Duodecim)**

The Finnish Medical Society Duodecim maintains and updates the standalone online database “Terveysportti”<sup>17</sup>, which serves as a portal for databases dedicated to physicians (“Lääkäriin tietokanta”; in English: physician’s database) and for nurses (“Sairaanhoidajan tietokanta”; in English: nurse’s database).

In addition, the “Terveysportti” database is a portal for several databases concerning good clinical practice, evidence-based medicine guidelines, the Cochrane library, guide for interpreting electrocardiograms, medicines, drug interactions (e.g. “SFINX”), international classification of medicines, libraries of common chronic diseases, etc. This portal consists of a comprehensive set of guidelines and has become very popular; it was calculated in 2005 that every Finnish physician read 1 - 5 guidelines a day on average on the portal (Kunnamo 2006).

Integrated decision support systems are available for many EPR systems at different levels. This report classifies the decision support systems into four levels: 1) a standalone online database on the desktop; 2) an online database with access by navigating from EPR; 3) an automatic system that automatically displays selected items on the desktop and is integrated with EPR including a) reminders of examination results (e.g. completed laboratory results), incentives (e.g. diverging laboratory results are displayed with a colourful font), graphics (e.g. blood pressure as a bar graph), b) reminders of administrative items (e.g. the arrival of a referral), c) drug interaction system (e.g. SFINX) and d) other similar systems; and 4) systems for the automatic integration of EPR and a medical knowledge database that includes a) a drug interaction system, b) an intelligent system that compares the narrative EPR

<sup>17</sup> [www.terveysportti.fi](http://www.terveysportti.fi)

text of the patient to the evidence-based medicine decision support database and yields remarks and reminders on the screen and c) other similar systems.

A connection to decision support systems was available in all hospital districts and health care centres and most of the private service providers. As explained here, the status of integration differed, with a number of overlapping solutions being used. A standalone online database on the desktop was in use in 76% of the hospital districts, in 88% of the primary health care centres and in 87% of the private providers that responded to the survey. A database with access by navigating from EPR was in use in 38% of the hospital districts and in two thirds of the health care centres and one third of the private providers. Those displaying a selected item on the desktop (reminders and drug interaction systems) were the most common solutions. Automatic displays of selected items were in use in 20% of the hospital districts and in three fourths of the health care centres and one tenth of private providers. Systems for automatic integration of EPR and a medical knowledge database were in use in 24% of the hospital districts and in around one third of the health care centres and two of the private providers. The most common of these was the drug interactions system. Compared to the 2007 survey, the general availability of decision support systems was already at the same high level, but now the systems are more deeply integrated with the EPR.

## 10.2 Other Systems Supporting the Quality and Delivery of Health Care Service

Since 2008, public health care providers have been obligated to comply with the law to allow patient access to immediate treatment during office hours at a health care centre, or in the case of non-critical matters, an assessment for a course of treatment within three days. The law obligates hospitals to give the patient an assessment of the need for treatment within three weeks, and a course of treatment within six months. Electronic monitoring systems for this purpose were in use in 71% of the 21 hospital districts, but only in 39% of the primary health care centres. At hospitals, the availability of these systems has remained at the same level as in the 2007 and 2005 surveys, while in health centres the figure has increased since 2007. An electronic registry for various care-related adverse events has become more popular than in 2007. Now 90% of the hospital districts and 57% of the primary health care centres used such a register, while the figures in 2007 were 52% and 4%, respectively. (Table 5.)

Accurate process information concerning the performed processes and services related to resources is essential in governing health care enterprises. Electronic data warehouse systems were available for administrative purposes in 67% of the hospi-



tal districts, in 23% of the primary health care centres and in 4 of the 31 private service providers. These systems will become more common in the future.

**Table 5. Distribution (amounts and %) of health care organisations based on the use of some systems supporting service quality and delivery**

<b>Provider</b>	<b>Access to care follow-up</b>	<b>Registry for adverse events</b>	<b>Data warehouse</b>
<b>Hospital districts</b>	15/21	19/21	14
<b>Health care centres</b>	39%	57%	23
<b>Private providers</b>	2/31	2/31	4/31

*For registering treatment and care*, health care providers with beds are obligated to report the diagnosis, length of stay and possible surgical procedures to the national registry at the point of discharge from care. All of the hospital districts make the reports electronically. These reports are then collected and transferred to the registry. Also, ambulatory visits to specialised care are nationally registered. Health care centres with beds also send data to the hospital discharge register. Since 2011 the new AvoHilmo system has collected information on primary health care visits for the national health care register (Tuomola et al. 2012).

The loaning of adaptive home care medical equipment (e.g. wheelchairs, crutches, walkers) to patients is included in the services of the health care providers. All of the 21 hospital districts (100%), 84% of the health care centres and one of the private service providers maintained electronic registers of borrowed adaptive home care medical equipment.

# 11 EXPECTATIONS ON THE NEW ROLE OF THL AS THE EXPERT OFFICE FOR THE NATIONAL EHEALTH SERVICES

Changes in the Finnish law on processing electronic information in social and health care assigned the operational responsibility for eHealth and eWelfare development in Finland to the National Institute of Health and Welfare (THL) at the beginning of 2011. THL is in charge of the operational work, which includes planning, guidance, steering and follow-up of Finnish eHealth development. THL founded a new unit, the Unit for the Operational Management of Health and Welfare Information (OPER), in 2011. (Hyppönen 2011.) The mandate to lay down regulations on the structures of the electronic patient records that will be sent to the eArchive was given to THL. Both THL's role, in which it assumed operational leadership, and some of the regulatory powers, were new when the survey was conducted. For the new unit, OPER, it was important to know what the expectations of its new role were among the health care providers. Some questions on OPER were added to the 2011 eHealth questionnaire.

The hospital districts and the health care centres were asked how their experts had participated in defining the structures of the national electronic patient records. The answer choices were 1) participation in expert groups, 2) participation in expert work in virtual group work, 3) participation in workshops, 4) participation by replying to communications and 5) contacting authorities. In all hospital districts, experts had already participated in the work of defining national EPR structures and coding. Usually, they participated by joining workshops and by replying to communications and by contacting authorities (Table 6). Experts from primary health care centres had also participated, but their activity level was lower. Fewer than 40% of the health care centres had become involved (Table 6). The questions were also addressed to private health care providers. Some of them had participated as well, but their activity level was the lowest.

**Table 6. The activity (%) in the hospital districts (HD, n = 20 without Åland) and the health care centres (HCC, n=140) to participate in defining national EPR structures. (n= 140).**

	Participation in expert networks		Participation in workshops	Written replies to communications with the authorities	Direct contacts to with the authorities
	in physical expert groups	In electronic networking			
HD	100 %	50 %	100 %	95%	75 %
HCC	36%	16%	44%	35%	20%

In Finland, the common structures of the national health information system are defined by THL, but all health care providers have to comply and implement changes in their own patient record systems before they can join the national electronic patient record archiving system. The electronic patient records are daily tools of health care professionals and the structures of the records can also support clinical work. However, there is also a risk of making changes that will have a negative impact on the usability of the systems in daily routines. It is thus vital to have feedback and expertise from professionals. The fact that the prevailing attitudes towards participation in defining the structures of national health information systems were positive was an important finding for the operational authorities.

The attitude towards the new role of THL was asked by giving a list of the tasks of the organisations and the respondent was asked to evaluate how useful each task was. The Likert scale, from 1= very useful to 5= very harmful, was used. The role of THL as having national-level responsibility for planning, handling, follow-up and steering of electronic patient documentation operations was felt to be very useful or useful by 17/20 hospital districts; the feelings of two districts were neutral, and one felt that this was harmful. 70% of the health care centres also felt that this was very useful or useful, but around 10% felt that it was harmful; the rest were neutral or did not have any opinion. With regards to THL's responsibility for the planning, steering and implementation of the national electronic prescriptions system, both the hospital districts and the primary health care providers held very similar opinions. THL's tasks in defining the content and the structures of the national electronic patient documentation were experienced as useful or very useful by 18/20 hospital districts; one had neutral feelings and one felt that the task was harmful. In the case of the health care centres the task was experienced as being useful by around 70%; 20% were neutral or had no opinion, and around 10% felt that this was harmful. THL's responsibilities for the contents of the national code server were experienced in the most positive light. All hospital districts saw it as useful/very useful. In the

primary health care centres, around 60% felt the same, and only 5% felt that this task was harmful.

THL plays a strong role as an authority giving orders on the structures of national electronic patient records and national coding systems; no such authority has existed previously. However, the attitude towards this role was very positive. 18/20 hospital districts felt that this was useful or very useful, one was neutral and one considered that the role was harmful. In the primary health care centre group, once again, 70% experienced the task as useful/very useful and 10% as harmful. None of the hospital districts felt that THL's responsibilities in defining and standardising processes were harmful; one was neutral and 19/20 felt that this was useful/very useful. Also, the primary health care centres saw this role in the most positive light, with 80% finding it useful/very useful and only 6% as harmful. THL has been acting as the decision maker for state allowances to promote the construction of the national health information system at the regional or local level; one hospital district felt that this was harmful, one was neutral on the issue, and the rest, 18/20, felt that this was useful/very useful. In the primary health care centre side, the feelings were in line with the results of most of the other questions. The replies of primary health care providers to all of THL's tasks on the list were rather uniform. Over half felt that the tasks were useful and less than one fifth felt that they were harmful.

The respondents were highly willing to participate in future work on national electronic health record structures. All hospital districts felt that participation was important and the best way to engage in it was to be involved in expert groups and workshops. In the open questions, the respondents provided some feedback on the problem that participation in national expert work takes time away from clinical work. Also 88% of primary health care centres felt that participation was important and expert groups and workshops were the best way to be involved. Replies from private providers were split down the middle. Around half of those who replied to the questionnaire felt that participation was important and they had the will to do so, but one third had less interest in participation.

# 12 STATUS OF INFORMATION AND COMMUNICATION TECHNOLOGY IN SOCIAL WELFARE IN FINLAND

A survey on the use of information and communication technology in Finnish social services was conducted in 2010. This was the second time such a survey was carried out in Finland. The first national-level monitoring of ICT availability and use in social care in Finland was conducted a decade ago in 2001 (Hartikainen et al. 2002). Internationally, similar national surveys of social care ICT are rare; or, if such surveys have been carried out, the findings have not been published in English. The results of the national survey of electronic social services and social welfare client information systems currently available for key social services in Finland were first published as a Finnish report (Kärki et al. 2011).

The survey of e-social care was conducted as part of the Government Programme for public e-services for citizens (SADe programme) funded by the Ministry of Finance (Ministry of Finance 2012). The SADe programme is developing electronic service systems for different public services, including the social welfare and health care sector. The survey was commissioned by the National Institute for Health and Welfare and conducted by Market-Visio Oy in 2010 – 2011.

## 12.1 Methods and Target Group of the e-Social Care Survey

Data collection for the survey of e-social care was carried out as a semi-structured Webropol questionnaire at the end of 2010 and the beginning of 2011. The questionnaire was modified from the research instrument that has been used for mapping diffusion and use of eHealth as reported herein. This was done, in order to maintain comparability of the data between these two sectors.

The target group of the survey were the CIOs of the Finnish local government organisations providing social services, and private social service providers in Finland.

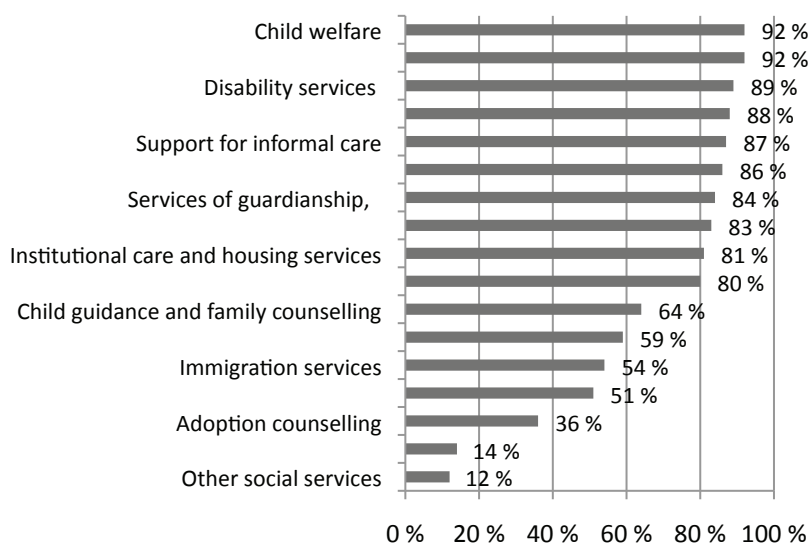
There were all in all 336 municipalities and 35 municipal federations in Finland at the time of the survey. In 2010 there were 2 922 NGOs, such as private organisations, associations or companies, providing social services. NGOs provide almost a third of all social services in Finland. Because of the lack of trustworthy and updated registers, not all of the organisations in the target group could be reached.

## 12.2 Data of the e-Social Care Survey

In the e-social care survey, 457 organisations providing social welfare services responded. Among the respondents were 69 local authorities, 13 municipal federations (or similar bodies) and 373 private enterprises, associations or NGOs.

The response rate reached 23%. It remained low despite the best efforts to acquire additional responses. Several reminder messages were sent. However, organisations of all sizes (as measured in terms of residents and employees) responded to the survey. Geographically the respondents represent the whole of Finland. As far as public social services go, the responses cover some 63% of the population of Finland.

The data include all the statutory social welfare service tasks, such as child protection, social work, disability services, substance abuse services and services for older people. The distribution of public social welfare services is presented in Figure 23. The responses from private service providers were mainly from organisations providing services for the elderly such as home services, housing services and institutional care.



**Figure 23.** The percentages of different social welfare services that are offered by public social service providers responding to the survey (% of respondents) n=82.

The limited data do not allow for meaningful statistical inference. Therefore, the descriptive statistical analysis of the results has been emphasised when reporting the findings of the survey. The results are interpreted as a sample of the target group.

## 12.3 E-services in Social Welfare

The survey asked what kind of public electronic services the respondents organise for citizens. With the exception of eight demographically small municipalities, all public service providers present information about social services on their websites (89%, when  $n = 74$ ). Providers of social welfare services generally have a website with information on their operations.

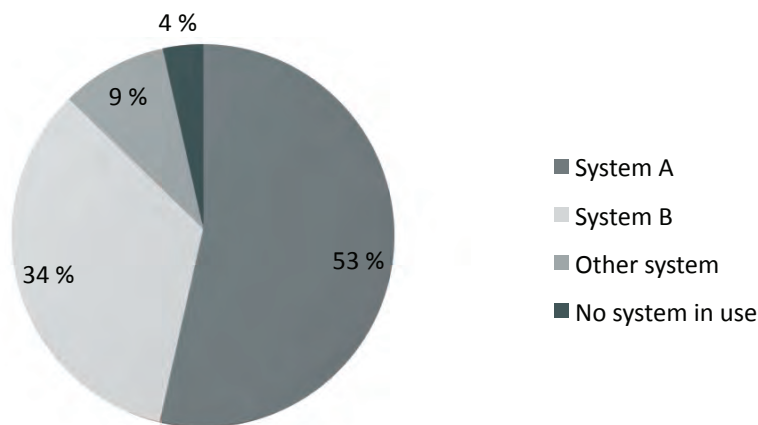
Electronic customer feedback is possible in about half of the municipal social welfare services (47%). One fourth of the private service providers had a facility for online feedback. Anonymous online counselling, in which the inhabitants do not need any client authentication, is available only in eight municipalities. One in four of the responding local authorities reported that they offered online services for citizens, such as applications for day-care places or income support. Some of the online services use a separate application designed for e-services, while other service providers still rely on standard e-mail. Seven local authorities have implemented an online application, from which the data are automatically transferred to a client information system used by employees. Approximately 10% of public social service providers offer an online risk self-assessment test to the citizens.

Three of the four private social care organisations maintain a website. A quarter of the private organisations can receive electronic customer feedback. Over a tenth of the respondents say that their private organisations offer general information about social well-being online. It is rare for private social service organisations to offer online counselling.

In cases where citizens were offered a facility for e-transactions, about half of the clients chose to manage their affairs with the service provider in some other way. However, more e-services for social welfare will be launched: online services are being developed in several projects around the country. Local actors would also like to have national solutions for e-services.

## 12.4 CIS in Social Welfare

The survey demonstrates that the majority of providers of social welfare services in local government have a client information system (CIS). Only two municipalities with a relatively low population did not mention that they use any CIS. Two applications dominate the Finnish market, as shown in Figure 24. Market shares appear to have remained unchanged since the IT survey in 2001 (Hartikainen et al. 2002). However, because of the limited number of respondents, definite conclusions on market share cannot be made.



**Figure 24.** The percentages of different client information systems used by public social service providers (% of respondents), n=89.

One-fifth of the public social welfare organisations use more than one CIS, having different CIS for different services. In this respect, there has been development over the past ten years, because the IT survey in 2001 showed that very few municipalities used more than one information system supplier (Hartikainen et al. 2002).

However, the possibilities for an employee in municipal social services to use these client information systems depends on the particular service and access rights of employees; not all of the branches of the social services have a client information system. All workers in the municipal home services and social lending services as well as institutional care and housing services for the elderly have access to a customer information system. Likewise, almost all of the local government's income support, child day-care and social work professionals document customer data using CIS. On the other hand, more than a quarter of those working in adoption counselling, services for the long-term unemployed or immigration services lack the opportunity to keep records with CIS.

Private service providers use client information systems somewhat less than local authorities, although there is great variation. Customer information systems seem to be most commonly used in mother and child homes and shelters as well as in institutions for persons with disabilities. In addition, workers in institutional and residential substance abuse services, institutional and housing services for old people as well as mental health rehabilitation services in the private sector can often keep records in a customer information system. On the other hand, small private enterprises generally do not have information systems at all.

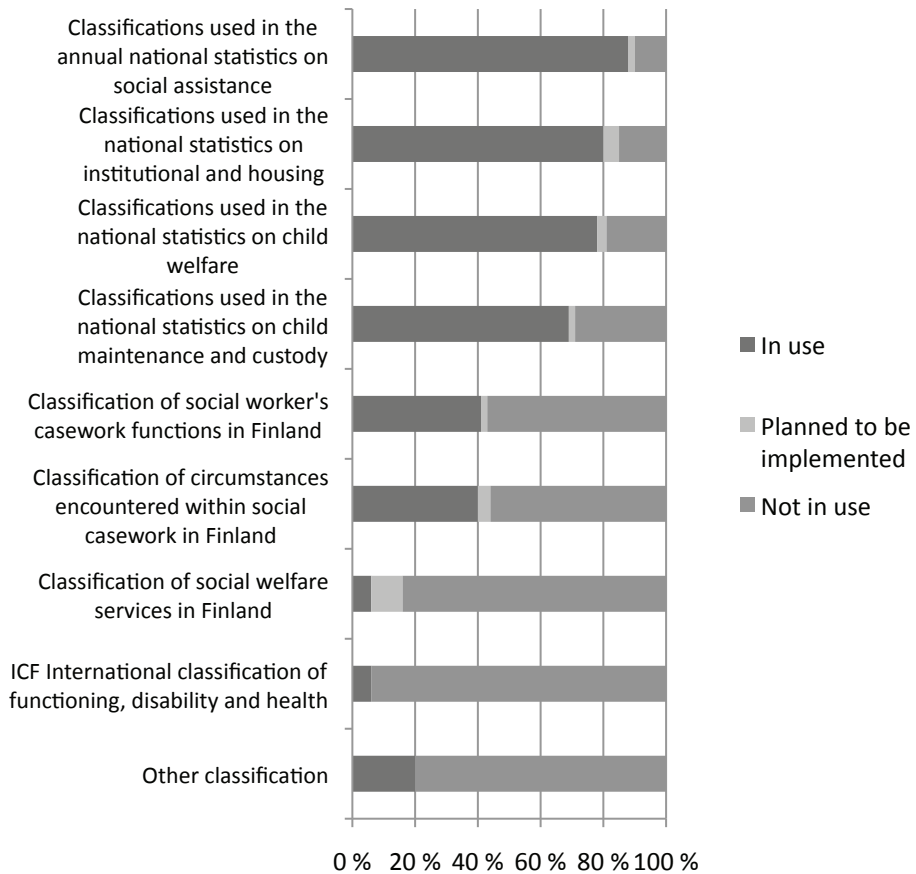


## 12.5 CIS Contents in Social Welfare

CIS contents, like classifications or data structures, vary depending on the software and organisation in question. Thus far, the requirements of the annual collection of national statistics are the only unifying element between the different systems.

The surveys reveal that local authorities commonly use the national classifications employed in compiling annual statistics for the National Institute for Health and Welfare, such as the statistical classifications in social services' institutional and housing services notifications, child welfare services' statistics classifications, and child support and maintenance statistics classifications.

Figure 25 presents the situation in the implementation of main classifications usable for social care. Private service providers only use the statistical classifications of care notifications.



**Figure 25.** The implementation of different classifications in the client information systems used by public social service providers (% of respondents).

## 12.6 Information Exchange in Social Welfare

To assess and support the processes of their clients, social workers may need information recorded in other data repositories than their own. Some local authorities have arranged for their employees to have limited access to the records of other organisations. The survey shows that information exchange between organisations is

so far limited to read-only, and there is little exchange of information between information systems. Only one of five public service providers reported that digital exchange of information is possible.

The results show that municipal social services have quite good access to the SOKY query system of the Social Insurance Institution (KELA) and the population register system of the Population Register Centre (VRK).

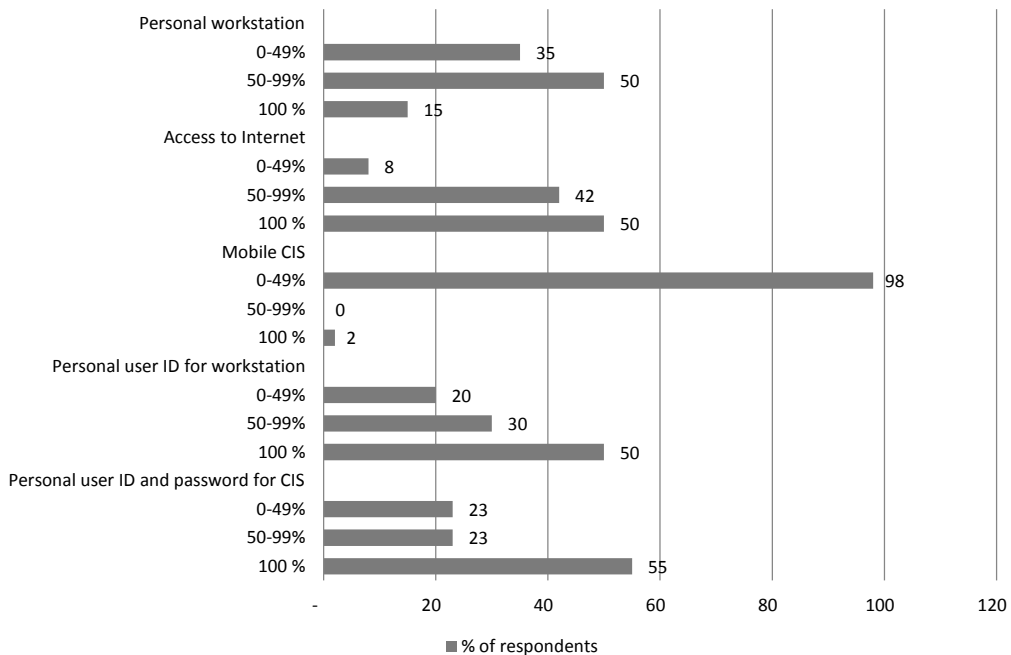
Nearly two of five public service providers have organised access to an electronic patient record of primary health care. Data access is granted particularly to workers in institutional care and housing services for old people and home care, but also to professionals supporting informal care and disabilities services. There are good reasons for sharing this information because people using these social services are often patients in health care, too.

Access to other information systems is considerably less common. Only a few social service professionals have an opportunity to digitally see or access the electronic data of another local social care authority. Also, access to client information in outside organisations is strictly limited to designated employees, especially those working in social assistance, social work and child protection.

In private organisations, employees rarely have access to outside information systems, and information exchange between systems is extremely rare.

## 12.7 Workstations and Identification in Social Welfare

Not all social welfare employees in the public or private sector have a personal workstation. Internet access is more commonly available. Almost half of the public social welfare organisations use mobile client information systems for some purposes, but the other half do not have similar capabilities. Private service providers, by contrast, have virtually no mobile client information systems. Social services professionals commonly use their own user ID and password to identify themselves. Only a few of the public-sector organisations that responded to the survey use an official e-transaction card, a health care certificate card or other ID device. More detailed data is presented in Figure 26.

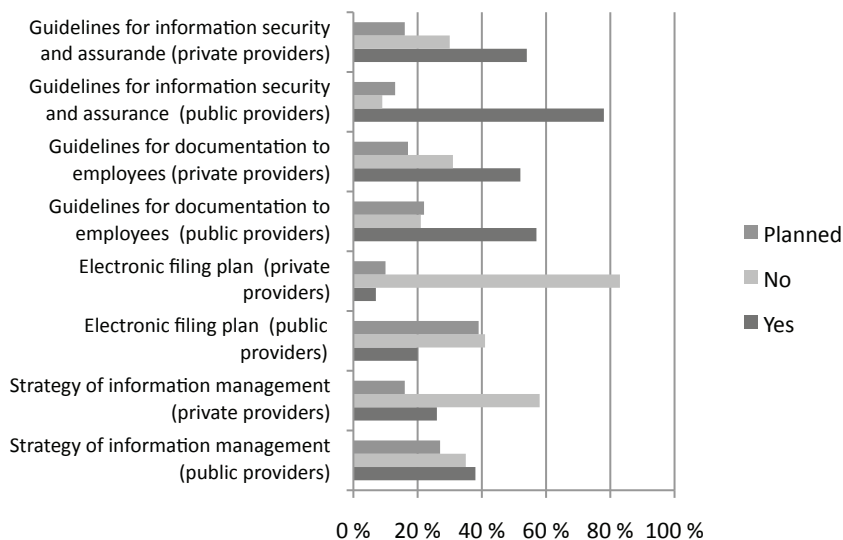


**Figure 26. Personal workstations, access to the Internet and personal user IDs of employees in public social service organisations (% of employees). The number of respondents by question: Personal workstation, n = 68, Access to the Internet, n = 67, Using a mobile-to-use customer information system, n = 63, Personal user ID for workstation, n = 65, and Personal user ID and password for customer information system, n = 64.**

## 12.8 Information Management in Social Welfare

Public service providers are more likely to have their own IT personnel than private service providers (68% vs. 38%). Similarly, public service providers are more likely to have an information management strategy, an electronic archive plan, client documentation instructions for employees or data protection or information security instructions than private service providers.

All in all there are significant deficiencies in social care information management in Finland. More detailed results concerning the indicators of information management are shown in Figure 27.



**Figure 27.** The percentages of responses to the questions concerning information management by public social service providers (municipalities and municipal federations) and private social service providers (% of respondents). The number of respondents by question: Guidelines for information security and assurance: public providers, n=64, and private providers, n=306; Guidelines for documentation to employees: public providers, n=63, and private providers, n=301; Electronic filing plan: public providers, n=61, and private providers, n=285; Strategy of information management: public providers, n=63, and private providers, n=293.

## 12.9 E-tools Used in Social Welfare Services

The survey indicates that the online professional tools most frequently used by social services employees are the Sosiaaliportti online portal<sup>18</sup>, which publishes professional information for Finnish social workers, and the intranets of their respective organisations.

One in five public organisations and one in ten private ones make use of online learning environments. About a half of the private social service organisations use their own intranet.

<sup>18</sup> [www.sosiaaliportti.fi](http://www.sosiaaliportti.fi)

## 12.10 Investments in ICT in Social Welfare

The percentage of client information system investment costs out of total ICT costs varies greatly from one organisation to another. Local authorities seem to make greater investments in ICT than private service providers.

Many respondents reported a percentage of less than 10%, but some more than 50%. The ICT costs of the public service providers totalled about 40-50 million euro in 2010 based on an estimation derived from the results. This sum represents about five per cent of the ICT costs of all municipalities in Finland.

The majority of the respondents estimated that their total ICT costs would increase between 2011 and 2013.

## 12.11 Discussion on the status of ICT in Social Welfare in Finland

E-government agendas, regulatory bodies and ICT companies are participating in shaping what has been called an 'electronic turn' in social work and social care (Garrett 2005). The EU, WHO, OECD and national authorities are increasingly interested in monitoring the success of this turn, but the focus has largely been on eHealth, not eWelfare (Global eHealth 2008, EU 2009).

The survey provides a national progress report concerning Finland's current operational e-social services, client information systems in social services and their functioning in the social care environment, covering a period of over a decade. The results show that the number of municipalities using more than one customer information system has increased during the last decade. CIS structures and the classifications used vary by systems. Not all of the local authorities have as yet built up full readiness to collect national statistics data automatically from CIS. Social workers' access to information stored by the Social Insurance Institution (KELA) and the Population Register Centre has improved markedly over the past decade. Social workers' access to the Internet and the electronic patient systems of primary health-care seems to have improved, too. In general, awareness of information security in social welfare seems to have improved over the past decade.

This study paints a partially fragmented and patchy picture of eWelfare implementation in Finland, with more ICT support available for certain social work areas than others. It is obviously not wrong to conclude that the client information systems do not yet support casework processes. Respondents of the survey reported that the substantial and functional development of CIS is the most important challenge in the near future.

The results need to be viewed against the needs of different stakeholders (clients, workers, administrators, statisticians, etc.) involved in electronic social care infor-

mation documentation and exchange. The results of the survey can be leveraged in further specifying the needs, potential and capacity for implementing nationwide online client service functions in social welfare and health care and for implementing nationwide social welfare information system services. The results may also be used when designing local and regional solutions.

As more and more e-government strategies are being implemented, the importance of monitoring their progress and impacts is growing for the evidence-based management of e-welfare services. The emerging software architecture and the greater use of centrally devised e-assessment templates attempt to map the structure of social work and construct new 'workflows'. It is important to ensure that this IT-mediated (re)construction will happen in a transparent way, with feedback being used to steer further development. Feedback needs to be collected to monitor not only the speed of policy implementation, but also its acceptance and the added value it provides to clients, workers and service providers (Garrett 2005).

The future development needs for this survey lie in closer integration with the eHealth survey to monitor integrated care, and in extending the data collection to cover the usability, user satisfaction and benefits of the IT-mediated services.

# 13 EXCHANGE OF DATA BETWEEN THE HEALTH AND SOCIAL SECTORS

The Act on Experiments with Seamless Service Chains in Social Welfare and Health Care Services (811/2000) has been a temporary, normative measure. The new Act 159/2007 states that the national eArchiving service for electronic patient records will be maintained by the Social Insurance Institution (KELA). Social services are mentioned in the general paragraphs of this law, but there is no legislation on archiving the documents of social service clients by KELA.

The social service sector was invited to participate in the first project on the implementation of the experimental legislation called “Makropilotti” (from November 1998 to June 2001). However, in practice, the participation of social care client register controllers was quite small and according to a study conducted in 2005 (Hämäläinen et al. 2005), no actual electronic client data had been exchanged between social services and health care services in the participating municipalities. However, a more in-depth analysis showed that the social sector did engage in some e-Welfare activities (Tenhunen et al. 2006). For example, in the administrative region of Kainuu, where health care and social care belong to the same organisation, both sectors are participating in the regional health and social care network. The regional exchange of data within social care was operational, but even here the different structures of data make it difficult to exchange information between the social and health care sectors. In some municipalities, some electronic data exchange takes place between the institutional care of the elderly and home care. The need for co-operation and shared data in social welfare and health care has been recognised and expressed in a number of studies, research reports and development projects. However, challenges concerning the actual exchange of information can be identified in both, namely the lack of defined joint data sets as well as issues concerning information systems. (Hyppönen et al. 2008.)

The survey of e-social care in 2011 shows that nearly two out of five public social welfare organisations have arranged access to primary health care patient information systems. This read-only-access has been arranged especially for institutional and housing services for the elderly as well as home-workers, and also disability services professionals. The clients of these social services often use health



services regularly, too. Access to medical data concerning secondary health care is much more limited. (Kärki et al. 2011.)

During 2003 the Ministry of Social Affairs and Health launched a project to develop the use of information technology in social services as a part of the wider Development Project for Social Services. The task of the Tikesos project has been to take into account the ICT development needs in social services and describe the measures that are required to promote the use of information technology in social services at the national, regional and local levels as well as the order in which the measures should be implemented. (Ministry of Social Affairs and Health 2003b, 2005.) The structures and contents of electronic client documentation in social care were described (Kortelainen and Kärki 2005), the national data architecture for the field of social welfare was planned, the data model was built and principles for the management of client data were modernised (Kärki 2008; Laaksonen et al. 2008). The technical standards used in electronic social records were designated, too. The local implementation of the specifications and models still lies ahead.

The second phase of the ICT in Social Welfare in Finland project (2005 – 2011) was funded and led by the Ministry of Social Affairs and Health. The task of continuing this work has been given to the National Institute of Health and Welfare as from the beginning of 2012. The work aims to modernise the management of social service client data. The main tasks are to define the national data architecture for the field of social welfare and to define the data sets (contents) and data structures needed in electronic social records and to harmonise the guidelines (legislation) for electronic records management in social care (Kärki 2008).

By the end of 2008 most of the social service data sets (contents) had been defined. The technical standard used in electronic social records has been designated. XML will be used. The definition of the data structures and guidelines for records management is in progress. The definition and modelling of data architecture have been started and discussions on national archiving have begun (Kärki 2008). The experts have recommended joining the national eArchive system for health care and a political decision to earmark funding for developing the system has been made, but in September 2012 we are still in a situation where no amendments have as yet been made to the current legislation in order to make it possible to nationally archive the electronic social service documents. The Ministry of Social Affairs and Health has informed that the legislative work will start during 2013.

Without existing legislation it is not possible to exchange patient and client data between the health and social care sectors at the national level. However, with patient/client consent this exchange of data is legally possible at the local level. Health care professionals and social care professionals discuss the problems of common clients during the care and social support processes, but they use traditional ways of communication, that is, joint meetings with the clients, telephone contacts and paper documents. Problems in the interoperability of the systems make it difficult to exchange electronic information, but some activity was found.

In 4/20 hospital districts it was possible, with patient consent, to see patient/client data in a social service ICT system and 2/20 hospital districts had made it possible for the social service providers, again with consent, to see the patient documentation in their EPR system. Out of the primary health care centres 20% were able, with consent, to see the electronic social care documentation and 30% had made it possible for the social care sector to see the medical electronic documentation.

More information on the access of social care professionals to health care data was collected in the survey on ICT in social care (Kärki et al. 2012). Social care professionals working in different fields of social services do not have the same access possibilities. According to the survey, public-sector professionals working in services for the elderly and the disabled had the best access to primary health care documentation. Some access by family and addiction workers was also found. Access to specialised care documentation was rarer, being restricted to those working in social services for the elderly.

# 14 ADDITIONAL INFORMATION ON FINLAND AND EHEALTH AND EWELFARE

## 14.1 The eService Projects Survey

The national-level eService projects survey (Hyppönen and Iivari et al. 2011) was conducted by THL in collaboration with the Ministry of Finance and Ministry of Social Affairs and Health as part of the national-level SADe programme. It was based on a Webropol survey carried out in summer 2010. It was directed at all social and health sector projects that had received public funding since 2007. The questionnaire was completed for 80 projects, with 5 duplicates. Key findings of this survey are summarised in Chapter 8.

## 14.2 The-EPR Usability Survey

The national-level electronic patient record (EPR) usability survey was conducted at the beginning of 2010 as a joint effort of the Finnish Medical Association, THL, FinnTelemedicum (Oulu University) and the Aalto University. It was targeted at all 14 411 Finnish physicians who were under 65 years of age and actively engaged in clinical work, privately, in health care centres or in public secondary and tertiary care hospitals. The survey results have been published in national and international papers, proceedings and reports (Vänskä et al. 2010, Winblad and Hyppönen et al. 2010, Hyppönen and Viitanen 2011, Viitanen and Hyppönen et al. 2011, Viitanen and Nieminen et al. 2011, Hyppönen and Winblad et al. 2012). The web-based questionnaire is available in both Finnish and English on the website of the Finnish Medical Association.<sup>19</sup> The questionnaire consisted of 38 items that measured the following areas of user experiences: information system quality (usability), information quality, information management, experienced benefits (including patient safety, clinical benefits and support for collaborative work), user-centred development of informa-

---

<sup>19</sup> [http://www.laakariliitto.fi/tilastot/tutkimuksia/tietojarjestelmat\\_tukemaan\\_potilaan\\_hoitoa.html](http://www.laakariliitto.fi/tilastot/tutkimuksia/tietojarjestelmat_tukemaan_potilaan_hoitoa.html)

tion systems and occupational health. Replies were received from 3929 doctors. Compared to the population, the sample was considered representative.

According to the results, physicians' assessments on the usability of Electronic Patient Record systems were very critical. Dissatisfaction with EPR systems was highest in the municipal sector and amongst young physicians and hospital physicians. One in four hospital doctors gave a school grade of five or less (on a scale from 4 = fail to 10 = excellent) to the system they use. In addition, one in three physicians estimated that malfunctions of the EPR system have jeopardised patient safety. (Vänskä et al. 2010.) There were clear differences between doctors' satisfaction on different legacy systems within various contexts of use. There were also some common findings irrespective of context. On average, doctors were relatively pleased with access to laboratory and radiology results. The ability to access the information in the EPR system of one's own organisation at any time and from any place was generally mentioned as a positive feature. In most of the systems slow response speed and unexpected technical problems were encountered. The respondents also reported that patient information had been accidentally lost. Amongst the common problems were usability problems in accessing patient information from other organisations. Key missing features were a proper patient overview chart (daily treatment chart) and an updated and informative list of current patient medication. (Winblad and Hyppönen et al. 2010, Hyppönen and Viitanen et al. 2011, Viitanen and Hyppönen et al. 2011.)

The EPR systems did not seem to sufficiently support collaboration between physicians and nurses within organisations. Key missing features in the communications were a proper patient overview chart (daily treatment chart) and an updated and informative list of current patient medication. Analysis of computer-supported collaboration between physicians and nurses showed that of all the respondents, less than half agreed with the statement on IT supporting physician-nurse collaboration, while only one third of the doctors found electronic nursing documentation easily accessible and readable. Physicians in healthcare centres were more satisfied than their colleagues in hospitals. The same applied to physicians working in outpatient clinics compared to their colleagues in wards. Also, only 7% said that IT systems help in the monitoring of receptions or orders and instructions given to nurses. Issues concerning the evolving practices used for electronic nursing documentation were often mentioned in the free-form comments, too. Many of the physicians had negative experiences with electronic nursing documentation systems and the national nursing documentation model (Viitanen and Hyppönen al. 2011).

The results of this survey have been used to improve the most urgent problems experienced by doctors in individual EPR systems, but also to highlight common and non-EPR-specific eHealth challenges that are to be tackled at the national level.

### 14.3 Systems for Generating Evidence for eHealth Management

Evidence-based management (EBMgt) is an emerging management strategy, where the best current evidence is sought for management decision-making. The idea of EBMgt is particularly relevant to large and complex systems like national health systems (Hyppönen and Viitanen et al. 2011). In Finland, a national framework was constructed in 2009 for providing national-level information to support implementation of the NHIS and monitor its success. The work was based on HTA information categories, and the national evaluation frameworks of the UK, Canada and Australia (Hyppönen et al. 2009, Hyppönen and Doupi et al. 2010). In summary, the resulting framework contained the following categories of information needed for monitoring eHealth progress and impacts (Hyppönen 2012):

- Context of use (incl. national objectives, intervention, its users and purpose of use) as background variables
- Intervention access and use
- Intervention quality (incl. system usability and user satisfaction, information quality)
- Intervention impacts on
  - care outcomes (incl. clinical effectiveness, patient safety, resource utilisation)
  - care processes (incl. adherence to guidelines, division of work, communication, patient participation)
  - care structures (incl. legal aspects, privacy, secondary use)

Measuring access and use has already been established with several consequent data collections, as reported in this publication. For social care the first measurement with a similar instrument was performed at the end of 2010 (see Chapter 12). Measurements of the usability of the eHealth tools from the viewpoint of doctors were conducted nationwide for the first time at the beginning of 2010 (Chapter 14.1).

A pilot study was conducted in 2009 where statistical data were extracted from a patient record system to measure the impacts of health information exchange between patients and carers on the number and types of visit, professional division of work, time spent per patient, types of procedures and health impacts (specific laboratory test results). The pilot showed how important this type of analysis can be to show the impacts of the implementation of IT tools, and how hard it is to get reliable, good quality national-level data from the statistics to serve as the basis of conclusions. (Hyppönen and Winblad et al. 2010.)

Nationally, there is a need to collate and harmonise data from separate surveys and other sources and a mechanism to process the data to provide regionally, nationally and internationally relevant information for monitoring and further improving

eHealth systems in Finland. A common eHealth indicator programme for this purpose is under development. Agreed objectives, methodology and resources to provide coherent evidence for informed decisions on different levels are under preparation.

The national usability survey will be repeated, harmonising the data collection with the eHealth availability and use survey, forming a core for systematic eHealth monitoring activities in Finland in the future. For the next data collection round, the eHealth policy will be analysed to identify key policy-related eHealth indicators for evidence-based eHealth management in the future.

#### **14.4 Research and Development Collaboration and Training in Health and Social Care Informatics**

Funding for research and development in health informatics originates primarily from the public sector. Much of the development is funded by the municipalities and private service providers themselves. External funding is provided nationally by the Ministry of Social Affairs and Health, Ministry of Finance, the Finnish Academy of Science, the Finnish National Fund for Research and Development (SITRA) and the semi-public sector (such as the National Technology Agency – TEKES). Also, resources provided by European Union projects or structural funds are used (Hypönen and Iivari et al. 2011). The allocated funds are primarily targeted at pilot projects, innovation and the promotion of eHealth applications, as well as at the further standardisation of existing tools. Additionally, there are funds available at the local level through the regional hospital districts' own development schemes for services as well as through some local technology centres. Also, several Centres of Excellence on Social Welfare have funded and participated in development projects for social informatics in Finland during the last decade.

Research on medical imaging and bio-signal processing and analysis is performed at the Helsinki University of Technology and the Tampere University of Technology. In addition, a health informatics laboratory operates as part of the VTT Technical Research Centre of Finland (VTT). Considerable research work at an international level is undertaken in the fields of bioinformatics and genomics. However, a direct connection to health informatics research has not been established. The National Institute for Health and Welfare (THL) is a research organisation of the state. It undertakes and coordinates research work in the area of eHealth and eWelfare with a focus on the impacts of the implementation of legislation and national policies. Research groups in several Finnish universities cover eHealth and eWelfare issues. The University of Eastern Finland has an active Healthcare Information Systems Research and Development Unit (HIS), focusing on applied research that serves the health and wellbeing domain in particular, but which can also be applied domain-independently. Its activities focus on areas such as electronic health records,

personal health information management, enterprise architectures and enterprise modelling, health IT standards, health informatics capacity development, medication management and large-scale public sector ICT initiatives. The unit also leads the research line “Information Technology and Information Management in Wellbeing Services” within the Kuopio Welfare Research Centre KWRC.

The University of Eastern Finland also has a social and health information technology research unit (SHIFTEC). The goal of the unit is to produce new high-level scientific information to support the activities of the service system within the social and health care sectors, and to provide a theoretical understanding of the effects of electronic systems on the management of information. The unit carries out research and development projects in its fields of research. The unit’s research primarily addresses the definition of the contents and structures of electronic patient files, evaluation and introduction of information systems, modelling of informatics in the health care sector, information security issues and studies addressing the skills of information system users. In 2005, the activities of the unit expanded from health care operating environments to cover cooperation with national development projects in the social sector.

FinnTelemedicum at the University of Oulu Faculty of Medicine is a research and development centre for telehealthcare that was established in 2003. Its main focus areas are the development and assessment of new telehealthcare models as well as the evaluation of eHealth applications. Its applied research of telehealthcare solutions focuses on the clinical point of view as part of the health care system.

The University of Tampere has a biomedical technology unit, BioMediTec, a cross-scientific research and educational unit operating in the intersection of biomedicine and technology, which is collaborating with the Tampere University of Technology. In addition, the Unit of Information Sciences (SIS) has a research group focusing on Medical Informatics research.

Operating under the University of Tampere is a research institution called the Tampere Research Centre for Information and Media (TRIM), which has also researched social informatics. A research project entitled Institutional Practices and Information Systems in the Production and Use of Information in Child Protection Processes (CHILDINFO) focuses on how the variation in institutional practices and client information systems (CIS) is associated with the acquisition, recording and use of information and clients’ narrative knowledge by social workers in the child protection process, and how clients contribute to this documentation process.

The Turku University Unit of Information Sciences started focusing on health information systems in 1997. Its focus has been on the assessment and evaluation of health information systems, with a special focus on business processes, revenue models and cost-benefit assessment.

Training in health informatics is currently not available as a standalone line of study, except at the University of Kuopio, which offers a Master’s degree programme in Health and Social Care Information Management. The curricula of

undergraduate studies in medicine do not include health informatics training. Rather, the emphasis has been on training healthcare practitioners to acquire the necessary IT skills. National representatives participated in a recent effort to define a health-care-specific application for the European Computer Driving License (ECDL). For detailed studies of practical implementation of eHealth and telemedicine the Open University in Oulu, in association with FinnTelemedicum, organises a web-course in a specific learning environment on the theme of “Basics of eHealth”. This course is also provided in English.

At the University of Lapland, the Faculty of Social Sciences has organised a Master’s degree programme in e-Competence in Social Work (SIMO), which combines the disciplines of social work and applied information technology. The aim of the programme is to understand and develop different ways of performing social work, and to utilise IT in social work practice. Students of the programme obtain dual competence: both in social work and in how to use applied IT in social work.

## 14.5 Professional Activities

There are two main professional organisations active in the field of health informatics in Finland. The first is the Finnish Society for Telemedicine and eHealth (FSTeH), which is a national member of the International Society for Telemedicine and eHealth (ISfTeH) and the Nordic Telemedicine Association. The second is the Finnish Social and Healthcare Informatics Association (FinnSHIA), which is a national member society of the International Medical Informatics Association (IMIA) and the European Federation for Medical Informatics (EFMI). For more than a decade, both associations have organised an annual national conference. In addition, they have hosted topic-specific seminars, workshops and international health informatics events regularly around the country. The Association of Finnish Local and Regional Authorities also has an active role in networking the Finnish health and social care providers around eHealth and eWelfare questions. For more than a decade, the association has organised an annual conference on these topics.

Finnish representatives participate in the activities and working groups of international health informatics organisations such as the European Federation for Health Informatics (EFMI), the International Medical Informatics Association (IMIA), the International Society for Telemedicine and eHealth (ISfTeH), the European Health Telematics Association (EHTEL) as well as the standardisation activities of ISO, CEN and HL7.



## 14.6 International Collaboration

At the Nordic level, Finnish representatives have participated in telemedicine surveys and projects supported by the Nordic Council of Ministers and the Nordic University Network (NordUNET) since the early 1990s. Finland was a founding member of the Nordic Telemedicine Association (NTA). The Nordic Council of Ministers has established several forums for collaboration. For example, the Nordic Telemedicine Collaboration Forum (Nordic Council 2007) operated during the years 2006–2007. This forum had up to two representatives from each Nordic country, including the autonomous areas of Greenland and the Faroe Islands. The representatives were from national ministries or other national bodies as well as the Nordic Telemedicine Association. The task of the forum was to investigate legal and other barriers to cross-border telemedicine between the Nordic countries. The final report of the group was published in 2007 (Nordic Council 2007). In 2011 the Nordic Council of Ministers gave a new mandate for an eHealth collaboration group. A Nordic Research Network was established as a subgroup of this group in the first quarter of 2012. The task of the research group is to compare the data collected in the Nordic countries regarding access to eHealth interventions and their use, quality and impacts to further improve the data collection tools and to work towards an international minimum dataset for assessing IS use and quality. The networks will closely follow ongoing eHealth indicator work in the OECD (Hyppönen 2012).

Finland has been actively involved at the European level in discussions and preparatory work on eHealth issues since the Health Telematics Working Group of the High Level Committee on Health, which presented its Final Report in 2003 (European Commission 2003). It has also participated in the implementation and coordination of the European eHealth Action Plan of April 2004 (European Commission 2004). Finland participated actively in the e2005 eHealth Working Group under the High Level Group on Health Services and Medical Care during (European Commission 2005). After launching the concept of the European eHealth Area in the strategic framework of i2010 – European Information Society 2010 – Finland actively participated in the i2010 sub-working group on eHealth and also in work on eInclusion. The Finnish national version of an eHealth roadmap was developed by a ministerial working group and published in January 2007 (Iivari and Ruotsalainen 2007). Finland has sent a ministerial delegation to all ministerial-level eHealth conferences since the first eHealth conference in Brussels in 2003. The results of the Finnish eHealth surveys have been presented at several European conferences.

Finland has also participated in EU projects aiming at bettering European eHealth coordination and interoperability. These projects have included projects such as ERA<sup>20</sup> (European Commission 2007), Netcards and Semantic Mining. The results of the eHealth ERA project confirmed the observation that interoperability issues have been high on the agenda of most eHealth strategies and roadmaps of member states. (Hämäläinen et al. 2008.)

At the beginning of 2011 Finland joined the epSOS project. It aims to go live with a pilot on cross-border ePrescriptions between Finland and Sweden.

Finland has also been an active participant in OECD work on developing eHealth indicators for international benchmarking.

---

<sup>20</sup> [www.ehealth-era.org](http://www.ehealth-era.org)

# 15 CONCLUSIONS AND FUTURE PROSPECTS

## 15.1 The Overall Development and Trends 2003 – 2011

Some major trends in the development of the Finnish ICT and eHealth and eSocial care infrastructure can be identified.

- 1) Infrastructure at the *local level* has changed from paper records to electronic documentation. Today, documentation of patient data in the Finnish health system is being realised by electronic means. Primary health care centres made the transition from paper-based to electronic patient records (EPR) in the late 1990s, and hospitals did so after 2000. The actual saturation point in the implementation of EPR was achieved about five years ago, by 2007. Electronic documentation is also common in social care. Finland has had local operational e-social services, client information systems in social services for over a decade. The number of municipalities using more than one customer information system has increased during the last decade.
- 2) Development of the infrastructure at the *regional level* is best shown in the transition from letters to electronic data exchange. Cross-enterprise electronic data exchange has increased rapidly and includes most (90%) of the health service providers. Digital data depositories in individual health care institutions are in active clinical use and protected data connections enable the communication of electronic patient information. However, regional-level data exchange has not been fully implemented yet. One tenth of both primary and secondary health care organisations are still without a regional infrastructure and there has been no change in the level of implementation between 2007 and 2011. In the social care sector, regional-level data exchange is still rare. However, social workers' access to information stored by the Social Insurance Institution (KELA) and the Population Register Centre has improved markedly over the past decade. Nearly two out of five public social welfare organisations have arranged access to primary health care patient information systems, but this mostly involves read-only-access, not an information exchange between the different systems

- 3) Implementation of a nationally standardised, structured electronic health record has been ongoing since 2004. Its development has been rather slow but several classifications, DICOM standard, the HL7 standards and the OID coding – have been well adopted and the organisations have expressed clear interest in a joint effort to define the national electronic health record structures. A national project has developed standardised data structures for social care, but they have not been implemented yet. Today, client information system structures and the classifications used vary according to the systems of different municipalities.
- 4) Developing infrastructure at the *national level*, “the eArchiving system” is a unique solution for a centralised EPR repository that enables data transfer, upon a patient’s permission, between health service providers and empowers patients to browse their own EPR. This represents progress from hierarchies to seamless information flow. This level of integration of the national health information system is under development. The implementation of the national ePrescription system is in an active phase and progressing fast. A national data depository for social care documentation is in a planning phase.
- 5) Information exchange infrastructure built for professional use is the backbone of versatile and qualified direct eHealth and eSocial services for citizens. Presently, personalised communication between professionals and citizens is still in an early stage of active development. High eLiteracy among citizens and health care professionals and the high coverage of computers and broadband networks provide fruitful soil for the development of high-quality eServices for prevention and care and thus rapid progress towards citizen-centred services.

The development of Finnish eHealth can also be reflected against the policy targets of the Finnish eHealth Road Map. 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 Road Map is a follow-up and continuation of a national strategy launched in the mid-1990s (Iivari and Ruotsalainen 2007, Ministry of Social Affairs and Health 2005). The purpose of the Finnish eHealth Road Map was to summarise the major national policy outlines and to chart future challenges, but it also presented Finland’s strategic outlines with regard to the European targets set by the Commission.

Finland’s strategic choices are to ensure the availability of information for patients undergoing treatment, regardless of time and place, in both public and private health

care and to enable the participation of citizens and patients, and ensure that citizens have access to high-quality health information and more information in general.

According to the Finnish eHealth Road Map the means to achieve this include:

- comprehensive digitisation of customer data,
- development of the semantic compatibility of electronic patient record systems for the entire content of patient records,
- development of the 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,
- maintaining online information to support decision-making,
- development of a citizens' health information portal,
- access for citizens to their own patient records, health information and log,
- development of e-services such as booking of appointments, e-discussion, e-document transfer and online consultation.

Table 7 compares the achievements in the health care sector against the targets of the Finnish eHealth Road Map.

**Table 7. Targets of the Finnish eHealth Road Map (Iivari and Ruotsalainen 2007) and how they have been achieved**

<b>Topic</b>	<b>Realisation at the level of definitions and national systems</b>	<b>Implementation situation in the information systems of service providers</b>
<b>Comprehensive digitisation of customer data</b>	Included in law (159/2007) as an obligatory rule for the public sector, which may be applied to the private sector as well.	Full implementation of the local systems.
<b>Development of the semantic compatibility of electronic patient record systems for the entire content of patient records (common data structures)</b>	Core data guide <sup>1</sup> Collaboration of stakeholder clusters since 2006, included in law 159/2007 and Ministerial Act 11.4.2012/165. Legal framework does not cover semantics for the entire content of EPR. Legislation includes code services.	Diagnosis codes, clinical procedure codes and several others in comprehensive use. The usage level has improved during 2007-2011. Digital service, the code server, for delivering classifications, glossaries and codes is functioning and in active use.
<b>Development of the technical compatibility of electronic patient record systems for the entire content of patient records</b>	Use of ISO-OID-codes included in the definitions of the eArchive <sup>4</sup> . XML/CDA R2 standard has been verified as the documenting standard of the eArchive <sup>3</sup> . Common protocol for describing and indexing data is included in the eArchive definitions <sup>3</sup> .	20/21 of hospital districts and 38% of health care centres have an OID code for their own organisation. OID codes are nationally available from the code server. 13/21 of hospital districts and 58% of health care centres use XML. 9/21 of hospital districts and 34% of health care centres use CDA-R2. DIACOM is used in all hospital districts and 40% of health care centres. A common protocol for describing and indexing data will be realised by implementing the eArchive.

<p><b>Development of the national health care infrastructure and information network solutions</b></p>	<p>Law 159/2007 lays down the structure of the health care infrastructure and information network solution in Finland. Data sharing in the regional-level infrastructures is included in the Health Care Act (30.12.2010/1326). Principles for managing the electronic sharing of electronic data are included in law (159/2007).</p>	<p>19/21 of hospital districts and 58% of health care centres use a regional data exchange system.</p> <p>The national infrastructure is under development. The ePrescription infrastructure is running. The infrastructure for patient summaries and health records has been piloted by one organisation.</p>
<p><b>Identification and authentication solutions</b></p>	<p>Strong electronic identification of professionals is included in law (159/2007). The infrastructure for strong electronic identification of professionals (cards) is in operation. A legally accepted national system for electronic identification of patients is available.</p>	<p>8/21 of hospital districts and 11% of health care centres use the strong electronic identification of professionals.</p> <p>Electronic identification of patients was in use in 8/21 hospital districts and 30% of primary health care centres.</p>
<p><b>Electronic signatures</b></p>	<p>Electronic signatures by professionals are included in law (159/2007). The system (which uses cards) is in operation. A legally accepted national system for electronic signing by patients is available.</p>	<p>Electronic signatures were in use in 2/21 hospital districts and eight health care centres. Electronic signatures by patients were not in use.</p>
<p><b>Maintaining online information to support decision-making.</b></p>	<p>A project for the development and implementation of a decision support system was carried out in 2005 – 2008.</p> <p>Health care providers are encouraged to use decision support systems, but there are no policy-level operations for implementation.</p>	<p>11/21 of hospital districts and 75% of health care centres had the capability to navigate to at least some kinds of decision support databases from EPR.</p>

<p><b>Development of a health information portal for the citizens</b></p>	<p>A national portal called “TerveSuomi.fi” was developed by the Ministry of Health and piloted, but not taken into use. A new project to develop and promote the availability of health information to citizens has started (2011-2015).</p>	<p>All public health care providers have internet sites that present general information on services. General question – answer services were available in 3/21 hospital districts and 11% of health care centres. 36 local or regional projects for developing health information portals can be identified since 2007. No national service was available in 2011.</p>
<p><b>Access for citizens to their own patient records, health information and log</b></p>	<p>Included in law (159/2007) for both the ePrescription system and the eArchive, including the patient summary.</p>	<p>The national technical solution is available for all citizens, but currently the “eView” only includes data on the ePrescriptions of the patient. The eArchive side has been piloted in one organisation. None of the hospital districts provide this service at the local level. One health care centre pilots a local service.</p>
<p><b>Development of e-services such as booking of appointments, e-discussion, e-document transfer, online consultation</b></p>	<p>The state is funding a national project (SADe 2011-2015) to promote eServices in the health and social care sector for the citizens. No specific legislation.</p>	<p>At the national level, results from the SADe project will be available by 2015. At the regional and local level some services are available. eBooking is available in 13/21 hospital districts and 15% of health care centres. Secure e-mails were in use in 5% of health care centres and none of the hospital districts. Patients were able to send pre-information prior to the appointment electronically in 2/21 hospital districts and 8% of the health care centres. Personal internet discussion services were available in 11/21 hospital districts and 86% of health care centres. Video consultation from home was given by three health care centres.</p>



Table 7. shows that the goals for electronic documentation and the basics of the infrastructure are well developed at the regional level, but the full implementation of the Finnish national health information system (NHIS) is still under construction. The first part, the ePrescription system, is being implemented at a brisk pace. When the survey was carried out in early 2011, the situation was very different than at the time of this report's publication. It can be expected that the implementation will cover all of the public sector providers during 2013 and the private providers in 2014. By 2015 the vast majority of prescriptions will be sent to pharmacies electronically. The implementation of the eArchiving system will start during 2013 and it is likely that it will continue for the next 10 years because not all of the electronic patient documentation is included in the first stage of implementation. Technical solutions have been developed for secure data management nationwide, including identification, authentication and signatures. The implementation will follow the timetable of the implementation of the ePrescription system, because these tools are needed when joining the system.

The implementation of standardised structures, both semantic and technical, has improved well between 2007 and 2011. Many of these structures are important in the local and regional systems, and also in the collection of national statistical data. For example, structured core data EPR enables the implementation of high-level automatic decision support systems. Integration of hospital, radiology, laboratory and other such information systems with patient record systems will facilitate the work of professionals. A developed EPR can be regarded as a portal for the better management of the processes of clinical work in accordance with best practices and better allocation of resources. These other needs have likely motivated the acceptance of the standardised structures in spite of the delays of the NHIS.

The development of eServices for citizens in the health care sector has been rather slow in Finland. At the local and regional level, several projects have been working on these services, but the number of services that are actually in production is still low. However, some progress has been made between 2007 and 2011. The new national project to enhance these developments, SAdE, has been launched and it is possible that its development will pick up the pace in the near future.

Finnish health care professionals are fully dependent on electronic tools in their work since a paper-based way of working is no longer possible in Finnish public and most private health care. This imposes strong pressure to ensure the good usability of the tools. In 2007, a select committee of the Finnish Medical Association assessed the usability of the EPR systems in use and identified several aspects that need to be improved (Lääveri et al. 2007). A study on the problem was launched. The results show big differences in the products of different vendors (Viitanen and Hyppönen et al. 2011).

The national strategic goals for the development of eSocial services can be found in a number of policy documents. The decision principle for the development of the

social services sector includes a statement on taking advantage of the possibilities of ICT in developing services. The project to develop the use of information technology in social services is part of the Development Project for Social Services (2003–2007). The first task was to compile an overall plan by the end of 2004, taking into account the development needs in social services and describing the measures that are required to promote the use of information technology in social services at the national, regional and local levels as well as the order in which the measures should be implemented (Sahala 2004). The plan focused on client service systems, electronic documentation combined with electronic archiving, professional skills, better access to information from social care professionals and a higher level of information usage, data confidentiality and safety, services to citizens/clients and improving national coordination in the development work. As part of the implementation of the plan, a National Project of IT in Social Services (Tikesos) was started in 2005. The project adopted the use of a joint enterprise architecture (EA) method. First the information needs of the social care service production were analysed. Social workers were committed to analysing the contents of client data needed in service production. Also, the processes of the social services were modelled. The project resulted in a client information model with approximately 240 different social care client records, 140 core components and 50 different classifications. The Tikesos project produced plenty of technological specifications for national information services for social services, such as the eArchive. One of the main objectives was to promote the compatibility of the client information systems and digital information sharing between organisations providing social services. Before its completion in 2011 the project published a road map for the implementation of the results.

In the municipalities, the current situation in the development of client information systems in social care is similar to the first local phase of the development of the eHealth system. ICT is available at the local level and professional skills in working with electronic tools have been improved, but information management at the regional level remains vague and national-level implementation exists only in plans and development projects. However, state funding for piloting nationally standardised documents will be allocated in 2013 and the legal framework for the national level infrastructure will be laid down during 2013 - 2014. By means of the experience gained in the health care sector and with the additional funding, it is possible that the construction of a national client data repository for social services could be started before 2020.

## 15.2 The Strengths and Weaknesses of the Study

The eHealth surveys targeted the whole public health service system comprising 85% of all Finnish health services. Because the response rates of *the implementation*

*and usage of ICT and eHealth surveys* have been high, the surveys offer comprehensive information about ICT and eHealth implementation in Finnish health care. The private medical service sector, which provides about 15% of health services, comprises many enterprises and standalone practising physicians. With regard to them we had to be satisfied with samples, focusing on the biggest enterprises.

Questionnaires were obtained from all hospital districts, thanks to which the response rate for specialised care was as high as 100%. This is highly comparable with the data from 2007-2008. The response rate from primary care was 87%, covering 98% of the Finnish population at the primary health care level. In the previous study the response rate was the same; however, the features of the primary health care system have changed. The overall number of independent health care centres has gone down from 229 during the earlier study to 161 at the beginning of the year 2011. During the survey in 2011 it was not possible to do additional telephone surveys of those health care centres that had not responded. Due to lack of professionals, several primary health care units are using temporary staff, which means that some respondents may have had insufficient knowledge of some of the questions. The data from primary health can be considered to be sufficient and valid, but it is somewhat weaker than the data collected during 2007-2008. The coverage among the private service providers is 32%. The sample of private service providers is a heterogeneous group and the results concerning private providers can only be regarded as indicative. The situation was the same in the study of 2007-2008. Despite the questions on the response rate mentioned above, the good response rate can be seen as a major strength of the eHealth study.

The response rate of the eWelfare (ICT in social care) study was not high (23%); however the population coverage of those municipalities that filled out the questionnaire was 63%. Private service providers were included in the same survey because municipalities commonly use purchased social care. For social care services, the best response rate was seen among private and non-profit providers (24%). However, the low response rate can be regarded as a weakness of the study. Many organisational changes are ongoing in the municipalities, impacting the willingness to participate in surveys. Also the eHealth survey that was ongoing at the same time resulted in some confusion in smaller communities where the same persons are responsible for IT in both sectors. This was the first eSocial care survey in a decade and no routines were in place for designing the questions and replying to them. However, this survey was a good first round for developing better validated surveys in the future. National surveys on eSocial care have not been conducted elsewhere. Obtaining survey results from this difficult area can be seen as a strength in itself.

An important strength of the eHealth survey is that the changes in the past years have been systematically monitored. The repeated eHealth surveys, four of them at the national (Kiviahio et al. 2004b, Winblad et al. 2006, Winblad and Reponen et al. 2008, Winblad et al. 2012) and one preceding them at the regional level (Kiviahio et al. 2004a), have enabled several updates to the questionnaires, according to the find-

ings and feedback of the respondents. For the sake of comparisons, many questions have been kept unchanged. The electronic web-based questionnaire proved to enable effective delivery of questionnaires, and was also useful for following up responses. Because of the fast development of ICT in health care, some modifications were made to the current 2010/2011 survey, but the questions have been kept as comparable as possible to the questions of the previous surveys. Changes in the past years are systematically measurable.

The structured eHealth questionnaires consisted of about 90 main questions, most of which had several sub-questions with multiple choices. The survey on eSocial Care also had a long list of questions. The surveys included questions that necessitated collaboration between different professionals in the responding organisation. Multi-professional responses can be seen as a strength; however, the in-depth expertise of the respondents varied from organisation to organisation, which means that the reliability level of the answers might not be consistent. The surveys have focused on the existence of applications and the reliability of this data can be expected to be good. However, the intensity of use is an estimate, not exact information. This could be monitored most reliably by asking users directly, or examining the log data. In addition, the results represent the situation at the main unit of each of the organisations, e.g. in the case of hospital districts, the central hospital, and in the case of health centres and social services, the head site; these main units are usually the best equipped. That is why the representativeness of the results may be questionable with regard to the subunits of organisations.

The rapid progress of the implementation of ICT applications, as shown by these surveys, means that the results refer to the past; one always has to take the time delays in the realisation of surveys into account. Creating other ways for up-to-date follow-up might be one solution to the problem. In the near future, when all health care providers – and later when all social care providers – have joined the national health and social care ICT infrastructure, part of the data can be extracted directly from administrative sources. For example, no survey data is required for the information on the coverage and usage level of the ePrescription system. However, the availability and contents of log data for research purposes need to be established.

Mapping the use of ICT systems and applications, as in the current surveys, satisfies the need for information from the viewpoint of one important indicator – availability. Other aspects, such as the quality, feasibility, effectiveness and cost effectiveness of the systems, are important but had to be left out of the scope of the eHealth and eWelfare surveys. The usability survey (Viitanen and Hyppönen et al. 2011) targeted at doctors covered system and information quality and benefits as experienced by doctors. Citizen or client surveys are still needed to cover the viewpoint of the key stakeholders mentioned in the eHealth strategy. In addition, timely statistical data can in the future provide an important source for monitoring eHealth impacts.

When discussing the results of surveys, one must keep in mind the general weaknesses of the survey (questionnaire) method: the questions might not measure what they are intended to measure, the respondent understands the question differently than intended, respondents do not answer truthfully or do not remember the correct answer, or answer in the wrong way, or the responses vary due to arbitrary factors (state of mind, time of day, etc.). The first two weaknesses have been tackled by repeating the research with feedback from respondents, and by the participation of the University of Oulu, where the researchers are also part-time practitioners in health care management, thus representing the respondent's view. The rest of the method-specific weaknesses can only be tackled by triangulation. That has not been conducted as part of this study.

The surveys possess several strengths, but also some weaknesses. They can, however, be regarded *en bloc* to offer versatile and up-to-date information for health authorities for administrative and benchmarking purposes. Moreover, they also represent an internationally unique storehouse of information.

### 15.3 Benchmarking Finnish eHealth

According to EU harmonised data, the Finnish population is above the EU average in using ICT. In spring 2012, 88% of Finnish households had a home computer and 88% had internet access from home. Of those in the age group 16-74, 90% used the internet and 78% of this age group used it daily. 49% of the population aged 16-74 has a smart phone. 45% of the population had used a mobile phone for accessing the internet. 26% of the population had booked appointments with a physician by using the internet. (Statistics Finland 2012b)

It is difficult to systematically benchmark the level of development in eHealth or eSocial care in health or social care provider organisations at a global, European or even Nordic level because the definitions and understanding of eHealth and eSocial care elements vary to a great extent among the policy makers, developers and researchers in different countries. The World Health Organisation (WHO), OECD and EU – and also the Nordic Council – have identified a need to develop eHealth indicators for the follow-up of change and for use as tools to evaluate the effects of eHealth on both the health care system and patients (WHO 2005, Nordic Council 2007, OECD 2010, European Commission 2010). The driving force for these indicators is the growing need of policy makers for decision support for their policy decisions. No systematic benchmarking of the global or European situation in the deployment of eSocial care has been carried out. However, the need to promote eSocial care has been identified (Rigby et al. 2011). The WHO's Global Observatory for eHealth has published several reports on different aspects of the global

situation and also country profiles, but they do not include systematic benchmarking with indicators (WHO 2011).

The European Commission has funded several studies on benchmarking eHealth. ICT use among general practitioners was studied in 2007 by Empirica (Dobrev et al. 2008). The European Commission has currently funded a new round of an eHealth survey covering general practitioners. This will be conducted during 2012 and new results will be expected in 2013. The latest available results cover the situation in the year 2007. This structured interview was addressed to individual physicians, not organisations. The results show that in Finland 100% of GPs were already using computers and the internet in 2007 (EU27 average 87% and 69%). In 2007, 100% of GPs in Finland already used computers during patient consultations and to store individual administrative patient data (EU27 average 80% and 78%). Decision support software was well (97%) available (EU27 average 62%). In 2007, 68% of GPs in Finland were connected to other GPs, 73% to hospitals, 11% to health authorities, 7% to insurance companies, 2% to patients' homes, 89% to laboratories and 3% to pharmacies. (Dobrev et al, 2008). These results support well the results of the Finnish national eHealth surveys. Connecting to health authorities is more common in the EU27 (17% in 2007) than in Finland, where the current system is based on regional systems built by hospital districts and municipalities and there is no administrative need to contact the national social security authorities. Since the ePrescription system in Finland was not running in 2007, connections to pharmacies were rare. Also, connecting with patients was rare in 2007. This situation seemed to be the same in all the other EU countries except in Denmark. (Dobrev et al. 2008)

The European Commission funded a survey to assess the use of eHealth in acute hospitals during 2010 (European Commission 2011). In this survey Chief Information Officers and Medical Directors from a random sample of hospitals answered the questions. The Finnish sample size was 15 hospitals; response rates varied from question to question and are not reported for countries as a whole. All hospitals were externally connected, used PACS, exchanged lab data with external providers and also had e-referrals. Finland was found to have high rates of using electronic records and other health information exchange, but negligible rates of ePrescribing. Finland was seen as being ahead of the EU+ average on 11/13 indicators (European Commission 2011). The results are similar to the results of this study.

The eHealth policies and the general eHealth deployment situations in the EU countries were analysed in a document-based study of the eHealth ERA project (European Commission 2007). In 2007 all EU Member States had a documented policy on eHealth defined at a government or ministry level. Finland and Denmark were the only EU countries where documented policy-level discussions on eHealth had started more than 10 years prior to 2007. In Norway the history was the same. (Hämäläinen et al. 2008) The most common aims set out for eHealth policies were identified as the reform of the health care system and improving health care system performance for greater efficiency and quality of care. Other common aims were

promoting quality of life and citizen-centeredness in care. Also, eHealth was expected to provide better data for system management and enable better communication among stakeholders (Hämäläinen et al. 2008). All these aims and expectations were included in every Finnish governmental- and ministerial-level eHealth strategy and programme during 1996-2007 (Hämäläinen and Hyppönen 2006). The Finnish eHealth policy documents have not been systematically analysed since; however they seem to have covered the same topics in recent years as well. Finland is the first country where eHealth developments are followed by “e”-developments in the social care sector such that an eWelfare or eSocial services policy and a national development programme are also in place for eSocial services. The main EU eHealth deployment areas were identified in the ERA project (Hämäläinen et al. 2008). The differences between the main EU trends and the Finnish eHealth deployment seem to be related to the features of the health care system structure. Since the system is based on the care being organised by the municipal authorities, there has been no strong need for developing e-cards, which are more typical in countries where the health care insurance organisations are important partners in the system. Finland has chosen not to develop a card that would store health information. Finland has been a forerunner in using electronic patient records and making them interoperable by structuring and coding the information in them. Finland has been slow in deploying the ePrescription, which according to the eHealth ERA study was identified to be in the production phase in nine countries. For example, in Sweden and Denmark ePrescription has been a routine practice for a long time. Using ePrescriptions was not common in 2011 in Finland either, but the implementation of the system is in a very active phase. The European Commission has continued to systematically follow up the policy and deployment situation in eHealth (Stroetmann et al. 2011). The detailed documentation of the eHealth policy areas has become more common in Europe. The follow-up study covers general changes at the European level and country-specific reports, but it does not produce any sets of indicator data for benchmarking.

## 15.4 Future Prospects

The backbone for electronic management of patient data in Finland can be considered to be ready. The implementation of the first national-level solution, the ePrescription, is well under way. The next major challenge is the implementation of the National EPR Archive. The task has not been a minor one as the solution is unique even from the international viewpoint. Changes in legislation, technology and ways of conducting daily tasks in health care have to be implemented. There are challenges in communication between local and regional systems and the national archive due to the need for changes in the software currently used in hospital districts and

health care centres. In addition, the ongoing implementation process challenges the human and material resources of health care service providers and, no doubt, those of the providers of technological solutions. The goal is worth every effort: increased access to personal electronic health records both for the physician and the patient at any time and from any place in the country. This goal is seen to be important for promoting quality of care and patient safety. Another sought-after goal is to ensure efficiency and keep rising health care costs in check.

The next challenge after the implementation of the eArchiving system will be the implementation of the national information structure for social services, possibly with a national-level information depository and a structure for information exchange between the health and social care sectors. This step will be an internationally unique exercise.

The national eHealth surveys show rapid progress during the last years. The contributing factors have been governmental strategies, regional activities and the general progress in available technology. Focused financial contributions towards technology implementation projects and the increasing collaboration of national strategies have worked in concert with published guidelines and new legislation to enhance the promotion of ICT technology. There is a definite need to continue to monitor in further surveys the progression and attainment of the targets of the national health and welfare projects. The targets of the National EPR Archive and the national information structures for social services are worth evaluating. The follow-up studies should not only assess availability and usage but also record the progress of unified core information, usability aspects and processes, output and outcome impacts of the new e-tools. Usability and benefits for medical and social service personnel and citizens to obtain data stored in different systems is a prerequisite to the success of the eHealth and eWelfare systems, and needs to be monitored regularly.



## REFERENCES

- Dobrev Alexander, Haesner Marten, Husing Tobias, Korte Werner B, Meyer Ingo. Benchmarking ICT use among general Practitioners in Europe. Final Report. European Commission, Empirica, Bonn 2008.
- European Commission. Health Telematics Working Group of the High Level Committee on Health - Final Report. Luxembourg, 04/2003, HLCH/2003/1/7
- European Commission. eHealth action plan part of COM(2004) 356(final): e-Health – making healthcare better for European citizens: An action plan for a European e-health area
- European Commission, Health & Consumer Protection Directorate-General: Work of the High Level Group on health services and medical care during 2005. Brussels, 18 November 2005, HLG/2005/16, p. 11
- European Commission (2007). eHealth priorities and strategies in European countries. eHealth ERA report March 2007 European Commission Information Society and Media <http://www.ehealth-era.org/documents/2007ehealth-era-countries.pdf> (read 17 Oct.2008)
- European Commission (2009). i2010 High Level Group. Benchmarking Digital Europe 2011-2015 a conceptual framework. ISSUE NO: 27, October, 2009. [http://ec.europa.eu/information\\_society/eeurope/i2010/docs/benchmarking/benchmarking\\_digital\\_europe\\_2011-2015.pdf](http://ec.europa.eu/information_society/eeurope/i2010/docs/benchmarking/benchmarking_digital_europe_2011-2015.pdf). (10.1.2012).
- European Commission, Information Society and Media (2010) European eHealth Interoperability Roadmap. Final European Progress Report. European Commission 2010.
- European Commission 2011. Information Society and Media Directorate-General, eHealth Benchmarking III. SMART 2009/0022. Final Report. Deloitte & Ipsos Belgium. 13<sup>th</sup> April 2011. [http://ec.europa.eu/information\\_society/eeurope/i2010/docs/benchmarking/ehealth\\_benchmarking\\_3\\_final\\_report.pdf](http://ec.europa.eu/information_society/eeurope/i2010/docs/benchmarking/ehealth_benchmarking_3_final_report.pdf)
- Finnish Government.(1995). Government of Paavo Lipponen. Government Programme 13.4.1995. ([www.valtioneuvosto.fi](http://www.valtioneuvosto.fi))
- Finnish Government. 2002. Government Decision in Principle by the council of state on securing the future health care. [cited 2006 Nov 30]. Available from: <http://pre20031103.stm.fi/english/eho/publicat/ehoccontents68.htm>
- Finnish Government. (2003a). Hallituksen esitys 96/2003. (Government Proposal 96/2003). Hallituksen esitys Eduskunnalle laiksi sosiaali- ja terveydenhuollon saumattoman palveluketjun ja sosiaaliturvakortin kokeilusta annetun lain muuttamisesta.
- Finnish Government (2003b). Prime Minister Matti Vanhanen's Government. Government Programme 24.6.2003. (Pääministeri Matti Vanhasen hallitusohjelma 24.6.2003) ([www.valtioneuvosto.fi](http://www.valtioneuvosto.fi))
- Finnish Government 2011 Prime Minister Jyrki Katainen's Programme 22.6. 2011. <http://valtioneuvosto.fi/hallitus/hallitusohjelma/pdf/fi.pdf> (read on 1. August 2012)
- Finnish Medical Association. Physicians in Finland. Statistics on physicians and the health care system. Finnish Medical Association 2011, Helsinki
- Garrett PN, Social work's electronic turn: notes on the deployment of information and communication technologies in social work with children and families, *Critical Social Policy* 25 (2005), 529 - 553
- Global eHealth (2008) – Measuring Outcomes: why, What and How. Bellagio, Italy, July 13-August 8, 2008. [http://www.ehealth-connection.org/files/conf-materials/Global%20eHealth%20-%20Measuring%20Outcomes\\_0.pdf](http://www.ehealth-connection.org/files/conf-materials/Global%20eHealth%20-%20Measuring%20Outcomes_0.pdf). (10.1.2012)
- Harjunhahto-Madetoja K, Ahonen V-V, Hyvärinen S, Teppana M. Suomalaista tietoyhteiskuntaa rakentamassa. Hallituksen tietoyhteiskuntaohjelma 2003-2007. Loppuraportti. Valtioneuvoston kanslian julkaisusarja 13/2007.
- Hartikainen K, Mattila M, Viitala J. [in Finnish] Terveystieteiden tietotekniikan käyttöselvitys. Osaavien keskusten verkoston julkaisuja 2/1999
- Hartikainen K, Kuusisto-Niemi S, Lehtonen E. [in Finnish] Sosiaali- ja terveydenhuollon tietojärjestelmäkartoitus 2001. Osaavien keskusten verkoston julkaisuja 1/2002, Stakesin monistamo, Helsinki 2002
- Hartikainen K, Häyrynen K, Luomala T, Komulainen J, Porrasmaa J ja Suhonen M (2009). Kansallisen sähköisen potilaskertomuksen vakioidut tietosisällöt. Opas ydintietojen, otsikoiden ja näkyvien sekä erikoisala- ja toimintokohtaisten rakenteisten tietojen toteuttaminen sähköisessä potilaskertomuksessa Versio 3.0. [https://www.kanta.fi/c/document\\_library/get\\_file?uuid=46b8b38a-3488-4c6e-81d2-ae8dceaf848&groupId=10206](https://www.kanta.fi/c/document_library/get_file?uuid=46b8b38a-3488-4c6e-81d2-ae8dceaf848&groupId=10206), read on 03.12. 2011.
- Hyppönen H, editor. (Abstract in English). Evaluation of the National Electronic Prescribing Pilot II (2005-2006). STAKES, Reports 11/2006. Helsinki, 2006
- Hyppönen H, Turunen T, Hämäläinen P, Kärki J, Palojoki S. (2008). Ammatillaisen tiedontarpeista sosiaali- ja terveydenhuollon rajalla. (Need for knowledge among professionals at the interface of social welfare and health care, abstract in English) Raportteja 32/2008. Stakes, Helsinki
- Hyppönen H, Doupi P., Hämäläinen H and Ruotsalainen P. Planning for National Health Information System evaluation. [Finnish with English summary]. THL Report 33/2009, Yliopistopaino, Helsinki, Finland

- Hyppönen H, Doupi P, Hämäläinen P, Komulainen J, Nykänen P, Suomi R. Towards a National Health Information System Evaluation". In: C. Safran et al. (Eds.) MEDINFO 2010, IOS Press, 2010, pp. 1216 - 1220.
- Hyppönen H, Winblad I, Reinikainen K, Angeria M, Hirvasniemi R. Kansalaisen sähköisen asiointin vaikutukset terveysaseman toimintaan [Impacts of citizen's eHealth services on usage of health centre services and care outcomes]. National Institute for Health and Welfare (THL), Report 25/2010. 88 pages. Helsinki 2010].
- Hyppönen H. eHealth in Finland: Experiences and Lessons Learned. In Schreier G, Hayn D, Ammenwerth E, editors. Tagungsband der eHealth 2011. 26.-27. Mai 2011; Wien. OCG; 2011.
- Hyppönen H, Iivari A, Ahopelto M. Sosiaali- ja terveydenhuollon sähköisen asiointin hankkeet Suomessa 2010. [Social welfare and health e-services projects in Finland, 2010.] National Institute for Health and Welfare (THL). Report 31/2011, Helsinki, Finland 2011]
- Hyppönen H, Viitanen J, Reponen J, Doupi P, Jormanainen V, Lääveri T, Vänskä J, Winblad I, Hämäläinen P. Large-scale eHealth systems: Providing information to support Evidence-based management. eTELEMED2011: The Third International Conference on eHealth, Telemedicine, and Social Medicine. February 23-28, 2011 - Gosier, Guadeloupe, France
- Hyppönen H, Winblad I, Reponen J, Lääveri T, Vänskä J. Doctors' experiences on regional exchange of patient information. THL Report 5/2012. Helsinki, Finland 2012 (Abstract in English <http://www.thl.fi>)
- Hyppönen, H. eHealth in Finland: Experiences and lessons learned. In: Schreier G, Hayn D, Hörbst A, Ammenwerth E, editors. Proceedings of the eHealth2012. 2012 Mai 10-11; Vienna, Austria. OCG; 2012.
- Hyppönen K. Scheme of the most important elements of the national ePrescription and eArchiving system. picture by Konstantin Hyppönen, unpublished for the author. Social Insurance Institution in Finland, 2012
- Hämäläinen P, Tenhunen E, Hyppönen H, Pajukoski M. Experiences on Implementation of the Act on Experiments with Seamless Service Chains in Social Welfare and Health Care Service. Discussion Papers 5/2005. Stakes. Helsinki, 2005
- Hämäläinen P, Hyppönen H. Sosiaali- ja terveydenhuollon tietoteknologian hyödyntämisstrategian pitkän aikavälin toimeenpano (The long term implementation of the eHealth and eWelfare strategy, in Finnish only). Sosiaalilääketieteen aikakauslehti 2006;43 p.111-123
- Hämäläinen P, Reponen J, Winblad I. eHealth of Finland, Check point 2006. Report 1/2007, Stakes, Helsinki 2007
- Hämäläinen Päivi, Doupi Persephone, Hyppönen Hannele. eHealth Policy and Deployment in the European Union. Review and Analysis of Progress. Raportteja, Rappporter, Reports 26/2008, Stakes, Helsinki.
- Hämäläinen P, Reponen J, Winblad I. (2009) eHealth of Finland, Check point 2008. Report 1/2009, THL, Helsinki 2009.
- Häyrinen K, Porrasmaa J, Komulainen J, Hartikainen K. Sähköisen potilaskertomuksen yhdenmukaiset rakenteiset ydintiedot – Loppuraportti 3.2.2004. osaavien keskusten verkoston julkaisuja 5/2004.
- Iivari A, Ruotsalainen P. eHealth Roadmap - Finland. Ministry of Social Affairs and Health. Reports 2007:15. Sosiaali- ja terveysministeriö, Helsinki.
- Kiviaho, K., Winblad, I., Reponen, J. [in Finnish] Terveydenhuollon informaatioteknologian käyttö Oulun yliopistollisen sairaalan erityisvastuualueella. Pohjois-Pohjanmaan sairaanhoitopiirin julkaisuja 1/2004. Northern Ostrobothnian Hospital District, Oulu, 2004a
- Kiviaho, K., Winblad, I., Reponen, J. [in Finnish] Terveydenhuollon toimintaprosesseja ja asiointia tukevat atk-sovellukset Suomessa—Kartoitus ja käyttöanalyysi. FinnTelemedicum. Osaavien keskusten verkoston julkaisuja 8/2004. STAKES, Helsinki, 2004b
- Komulainen J, Kunnamo I, Nyberg P, Kaila M, Mäntyranta T, Korhonen M (2006). Developing an Evidence Based Medicine Decision Support System Integrated with EPRs Utilizing Standard Data Elements. In: Ten Teije A, Miksch S, Lucas P, editors. Proceedings of the workshop AI Techniques in Healthcare: Evidence-based Guidelines and Protocols. Riva del Garda, Italy, 28 August - 1 September 2006
- Korttelainen, P, Kärki, J. [in Finnish]. Rakenteiset asiakasasiakirjat sosiaalihuollossa. In Jämsén, A. (ed.) Uudistuva Itä-Suomi - vahvistuva sosiaalityö. Itä-Suomen sosiaalialan osaamiskeskusten julkaisuja 1/2005
- Kunnamo I. Decision support and systematic reviews, presentation in Cochrane Colloquium, Dublin, 23.10.2006
- Kärki J (2008). Development of Electronic Records in Social Care in Finland. A presentation at the conference eChallenges e-2008, 22 -24. October 2008, Stockholm. Social Care Informatics 2008 24 th October 2008
- Kärki J, Laaksonen M, Hyppönen H, Tieto- ja viestintätieteologian käyttö sosiaalihuollossa vuonna 2011 [Use of technology in Finnish social welfare in 2011], Terveyden ja hyvinvoinnin laitos (THL), Raportti 2/2012, Helsinki, 2012.
- Laaksonen M, Lehmuskoski A, Mykkänen J, Paakkanen E, Silvennoinen R, Suhonen M (2008). Sosiaalihuollon asiakasasiakirjojen sähköinen arkistointi, esiselvitys. Project document, University of Kuopio and Itä-Suomen sosiaalialan osaamiskeskus ISO. Available in Finnish only at <http://www.sosiaaliportti.fi/Page/b5617081-d3f7-4dec-9283-08f63ee3793f.aspx>.

- Martikainen S, Viitanen J, Korpela M, Lääveri T. *International Journal of Medical Informatics* 81 (2012), 98–113].
- Ministry of Finance. Sähköisen asioinnin ja demokratian vauhdittamishjelma, SADe-ohjelma. [www.wm.fi/vm/fi/05\\_hankkeet/023-sade/index.jsp](http://www.wm.fi/vm/fi/05_hankkeet/023-sade/index.jsp) (read on 15th Aug 2012)
- Ministry of Social Affairs and Health (1995). Sosiaali- ja terveydenhuollon tietoteknologian hyödyntämistästrategia. Työryhmämuistioita 1995:27.
- Ministry of Social Affairs and Health (1998). Sosiaali- ja terveysministeriö. Sosiaali- ja terveydenhuollon tietoteknologian hyödyntäminen; saumaton hoito- ja palveluketju, asiakaskortti. Sosiaali- ja terveysministeriön työryhmämuistioita 1998:8, Helsinki.
- Ministry of Social Affairs and Health (Sosiaali- ja terveysministeriö) 2003a. [Abstract in English]. Sähköisen potilasasiakirjajärjestelmien valtakunnallinen määrittely ja toimeenpano. Sosiaali- ja terveysministeriön työryhmämuistioita 2003:38
- Ministry of Social Affairs and Health (Sosiaali- ja terveysministeriö) 2003b. Valtioneuvoston periaatepäätös sosiaalialan tulevaisuuden turvaamiseksi. Sosiaali- ja terveysministeriö, Esitteitä 2003:5.
- Ministry of Social Affairs and Health (Sosiaali- ja terveysministeriö) 2004. [Abstract in English]. Sähköisten potilasasiakirjajärjestelmien toteuttamista ohjaavan työryhmän loppuraportti. STM Työryhmämuistioita 2004:18. Sosiaali- ja terveysministeriö, Helsinki, 2004
- Ministry of Social Affairs and Health 2005 (Sosiaali- ja terveysministeriö) Tietoteknologian käytön edistäminen sosiaalihuollossa- hankesuunnitelma. Sosiaali- ja terveysministeriön monisteita 2005:1, Helsinki
- Ministry of Social Affairs and Health 2006a (Sosiaali- ja terveysministeriö). Terveydenhuollon valtakunnallisen tietojärjestelmäarkkitehtuurin periaatteet, Työryhmä, Selvityksiä 2006:8, Helsinki
- Ministry of Social Affairs and Health 2006b. Strategies for Social Protection 2015 (Publication 2006:16)
- Ministry of Social Affairs and Health 2011a. Ministry of Social Affairs and related authorities. Ministry of Social Affairs and Health, Brochures leng (2011). [www.stm.fi/en/publications](http://www.stm.fi/en/publications). ISBN 978-952-00-3323-1 (pdf).
- Ministry of Social Affairs and Health 2011b. Socially Sustainable Finland 2020. Strategy for social and health policy. Ministry of social affairs and health publications 2011:6. [www.stm.fi/en/publications](http://www.stm.fi/en/publications). (ISBN 978-952-00-3136-7 (pdf)
- Ministry of Social Affairs and Health 2012a. Kaste Programme will reduce inequality and reform social welfare and health care services. Brochures of the Ministry of Social Affairs and Health, 2011 (<http://urn.fi/URN:ISBN:978-952-00-3336-1>)
- Ministry of Social Affairs and Health 2012b Sosiaali- ja terveydenhuollon järjestelmä Suomessa, vastuut. Web pages [www.stm.fi/sosiaali\\_ja\\_terveyspalvelut/vastuutahot](http://www.stm.fi/sosiaali_ja_terveyspalvelut/vastuutahot) (read on 15th Aug 2012)
- Nordic Council. Rapport of thr Working Group on Telemedicin. E-helse over landegrensene i Norden – multigheter og barrier. Rapport fra Nordisk samarbeidsforum for telemedicin. ANP 2007:709. Mordisk Ministerråd, Köpenhavn 2007. ([www.norden.org](http://www.norden.org))
- Nykänen P, Hartikainen K, Hämäläinen P, Häyrynen K, Iivari A, Ikonen P, Korhonen M, Pakarinen V, Ruotsalainen P, Saranto K, Ensio A, Forsell M .(2006). [in Finnish]. Yhteenveto: Kansallisen terveysprojektin tietoteknologiahankkeiden katselmointi 2006, 30s. [www.terveyshanke.fi](http://www.terveyshanke.fi)
- Nykänen P, Junttila K (ed.) Final report of the expert group on developing nursing and multiprofessional documentation practices- recommendations and proposed measures (Abstract in English) Hoitotyön moniammatillisen kirjaamisen asiantuntijaryhmän loppuraportti: Suositukset ja toimenpideehdotukset hoitotyön ja moniammatillisen kirjaamisen kehittämiseksi. Raportti 40/2012, THL. ISBN 978-952-245-666-3 (pdf)
- OECD 2008, Health Committee/ Directorate for employment, labour and social affair. Monitoring and benchmarking. The use and adoption of Health ICTs. A review of strategies used in selected OECD countries. DELSA/HEA/ICT (2008)1
- OECD 2010a. Finland working together to sustain success. OECD Public Governance Reviews, OECD 2010.
- OECD 2010b. Improving Health Sector Efficiency. The role of information and communication technologies. OECD Health Policy Studies.OECD 2010.
- OECD 2011. Health at a Glance 2011: OECD Indicators, OECD Publishing doi: 10.1787/health-glance-2011-en
- OECD 2012. OECD Economic Surveys, Finland. OECD publishing February 2012.
- Ohtonen, J. (ed.) [in Finnish]. Satakunnan Makropi-lotti: Tulosten arviointi. FinOHTAn raportti 21/2002. STAKES/FinOHTA, Helsinki, 2002
- Parjo L, Sirkä T, Viherä M-L. Information and communication technology in everyday life. Interview results on ICT use in Finland 2007. Reviews 2008/3, Science, Technology and Information Society. Tilastokeskus, Helsinki, 2008.
- Päätalo M, Suorsa S, Hämäläinen P. (2003) .[in Finnish] Sosiaali- ja terveyspalvelujen vuoden 2002 valtakunnallinen peruspalvelujen arviointi. Sosiaali- ja terveysministeriön monisteita 2003:14.
- Rigby M, Hill P, Koch S, Keeling D. Social care informatics as an essential part of holistic health care: A call for action. *International Journal of Medical Informatics* 80 (2011), 544 -554
- Reponen J. *Teleradiologia Suomessa*. [in Finnish] *Suom Lääkäril* 1996; 51:1875-1878
- Reponen J, Niinimäki J. (2006) [in Finnish]. Digitaalinen radiologia – modaliteeteista tietoverkkoi-

- hin. In: Radiologia Suomessa. [Radiology in Finland]. Radiological Society of Finland, WSOY, p.76-81
- Reponen J. Telemedicine and eHealth Network in Northern Finland. *Int J Circumpolar Health* 2004; 63: 429-435
- Reponen, J. Finnish Society of Telemedicine. *Journal of Telemedicine and Telecare*, 11(1): 51-52 2005
- Reponen, J. (2010) Teleradiology – Changing Radiological Service Processes from Local to Regional, International and Mobile Environment. *Acta Universitatis Ouluensis D* 1077. ISBN 978-951-42-6372-9. Available at: <http://herkules.oulu.fi/isbn9789514263729/>
- Reponen J, Winblad I, Hämäläinen P. (2008) Current status of national eHealth and telemedicine development in Finland. In: Blobel B, Pharow P, Nerlich M (eds). *eHealth: Combining Health Telematics, Telemedicine, Biomedical Engineering and Bioinformatics to the Edge - Global Experts Summit Textbook. Studies in Health Technology and Informatics, Volume 134*, pp. 199 - 208, 2008, IOS Press
- Reponen J, Winblad I, Hämäläinen P. Status of eHealth Deployment and National Laws in Finland. *Finnish Journal of eHealth and eWelfare* 2009 1(1), 54-58
- Ruotsalainen P. Finnish strategy and implementation of citizens' access to health information ICMCC Event 2008. <http://www.icmcc.org/pdf/2008/2008ruotsalainen.pdf>, read 8th December 2008
- Sahala H. (2005). Tietoteknologian käytön edistäminen sosiaalihuollossa - hankesuunnitelma. [Abstract in English]. [Project plan for promoting the use of information technology in social services. Stencils of the Ministry of Social Affairs and Health 2005:1] Sosiaali- ja terveysministeriön monisteita 2005:1
- Statistics Finland 2012a. [http://tilastokeskus.fi/til/vaerak/2011/vaerak\\_2011\\_2012-03-16\\_tie\\_001\\_en.html](http://tilastokeskus.fi/til/vaerak/2011/vaerak_2011_2012-03-16_tie_001_en.html)
- Statistics Finland 2012b. [www.stat.fi/til/sutvi/2012/sutvi\\_2012\\_2012-11-07\\_tie\\_001\\_fin.html](http://www.stat.fi/til/sutvi/2012/sutvi_2012_2012-11-07_tie_001_fin.html)
- Stroetmann K, Artmann J, Stroetmann V, Protti D, Dumotier J, Giest S, Walossek U, Whitehouse D. European Countries on their Journey towards National eHealth Infrastructures. Final European Progress report. European Commission Information Society and Media (2011).
- Suomen Kuntaliitto 2012. Kunnat.net verkkopalvelu. [http://www.kunnat.net/fi/kunnat/toiminta/perustie\\_dot/Sivut/default.aspx](http://www.kunnat.net/fi/kunnat/toiminta/perustie_dot/Sivut/default.aspx) (Read at 1.8. 2012)
- Tantu K. Nursing Documentation Project in Finland :Nationally Standardized Electronic Nursing Documentation by the end of 2007. [cited 2006 Nov 30]. Available from: <http://www.vsshp.fi/fi/4519>
- Tekes (National Technology Agency of Finland) 2005. FinnWell-ohjelma. Innovaatioista hyvintä vointia—Painopisteet tulevaisuuden rakentamiseksi [cited 2006 Nov 30]. Available from: [www.tekes.fi](http://www.tekes.fi)
- Tenhunen E, Hämäläinen P, Kärki J, Väinälä A. [in Finnish] Sosiaaliala ja sosiaali- ja terveydenhuollon tietoteknologiakehitys. In Häyrynen K (toim.) *Sosiaali- ja terveydenhuollon tietotekniikan ja tiedonhallinnan tutkimuspäivät. Tutkimuspapereita* 2006. Työpapereita 18/2006, Stakes.
- Teperi J, Porter ME, Vuorenkoski L, Baron JF. The Finnish Health Care System: A Value-Based Perspective. *Sitra Reports* 82. Sitra, Helsinki 2009.
- THL 2010. Private health care services 2007 (in Finnish and Swedish only). Statistical report 17/2010.
- THL 2011. Privat social service 2010. Statistical report 25/2011.
- THL 2012a. Social Protection Expenditure and Financing 2010. Statistical report 4/2012.
- THL 2012b. Health Expenditure and Financing 2010. Statistical report 5/2012.
- THL 2012c . Sosiaali- ja terveyspalvelujen henkilöstö 2009. Statistical report 6/2012 (in Finnish only).
- THL 2012d. Hoitoonpääsy erikoissairaanhoidossa 31.8.2012. Tilastouutinen. [www.thl.fi/fi\\_FU/web/fi/tilastot/tiedonkeruut/erikoissairaanhoidon\\_hoitoonpääsy](http://www.thl.fi/fi_FU/web/fi/tilastot/tiedonkeruut/erikoissairaanhoidon_hoitoonpääsy) (read 23.10.2012)
- THL 2012e. Hoitoonpääsy perusterveydenhuollossa maaliskuussa 2012. Tilastouutinen. [www.thl.fi/fi\\_FU/web/fi/tilastot/tiedonkeruut/perusterveydenhuollon\\_hoitoonpääsy](http://www.thl.fi/fi_FU/web/fi/tilastot/tiedonkeruut/perusterveydenhuollon_hoitoonpääsy) (read 23.10.2012)
- Veikkolainen M, Hämäläinen P. [Abstract in English]. Sosiaali- ja terveydenhuollon henkilöstön tieto- ja viestintätieteiden koulutus- ja oppimateriaaliterve ja koulutuksen kehittämisen haasteet. Raportteja 9/2006. Stakes. Helsinki, 2006
- Viitanen J, Hyppönen H, Lääveri T, Vänskä J, Reponen J, Winblad I. National questionnaire study on clinical ICT systems proofs: Physicians suffer from poor usability. *International journal of medical informatics* 80 (2011) 708–725.
- Viitanen, J, Nieminen M, Hyppönen H, Lääveri T. Finnish physicians' experiences with computer-supported patient information exchange and communication in clinical work. *Int. J. Electronic Healthcare*, Vol. 6, Nos. 2/3/4, 2011.
- Winblad I, Reponen J, Hämäläinen P, Kangas M. [Abstract in English]. Informaatio- ja kommunikaatioteknologian käyttö Suomen terveydenhuollossa vuonna 2005. Tilanne ja kehityksen suunta. Raportteja 7/2006, Stakes, Helsinki 2006
- Winblad I, Reponen J, Hämäläinen P. Terveydenhuolto ei hyödynnä ambulanssien informaatioteknologiaa. *Suomen Lääkärilehti* 24/2007; 62:2393-2395.
- Winblad I, Hämäläinen P, Reponen J (2008). Targeting Finnish e-health. *Hospital Information Technology Europe* 2008; 1(3):41-43
- Winblad I, Reponen J, Hämäläinen P, Kangas M.(2008) [Abstract in English]. Informaatio- ja kommunikaatioteknologian käyttö Suomen ter-

- veydenhuollossa vuonna 2007 Tilanne ja kehityksen suunta. Raportteja 37/2008, Stakes, Helsinki 2008.
- Winblad I, Hyppönen H, Vänskä J, Reponen J, Viitanen J, Lääveri T. Patient information systems as tools for doctors 2010 - health centre systems and especially hospital systems require urgent development.. Finnish Medical Journal 50-52/17.12.2010, pp 4185-4194.]
- Winblad I, Hämäläinen P, Reponen J. Kansallinen terveystietokanta - vajaa vuosi aikaa liittymiseen. Osa I: Mistä uudessa tietojärjestelmässä on kyse? Suomen Lääkärilehti 13 -14 /2010 vsk 65, ss 1218 - 1222.
- Winblad I, Reponen J, Hämäläinen P. (2012) Tieto- ja viestintäteknologian käyttö sosiaali- ja terveydenhuollossa vuonna 2011. Tilanne ja kehityksen suunta terveydenhuollossa [Abstract in English] [Use of Information and Communication Technology in Finnish Social and Health Care in 2011. Status in Health Care]. Raportteja 5/2012. National Institute for Health and Welfare (THL). Helsinki 2012.
- Vähäkuopus M, Winblad I, Tähtinen T. [in Finnish] Mikset sä vastaa? Oulun seudun yhteyskeskuksen toiminnan määrittely- ja arviointitutkimus. Kunnallissalan kehittämissäätöön tiedotteita 2006. [cited 2006 Dec 15]. Available from: [http://www.polemiikki.fi/files/1124-CallCenter\\_loppuraporttiPDF-tiedostona.pdf](http://www.polemiikki.fi/files/1124-CallCenter_loppuraporttiPDF-tiedostona.pdf)
- World Health Organization. Resolutions and Decisions. WHA58.28 eHealth. Ninth plenary meeting 25 May 2005 – Committee A, seventh report.
- World Health Organization. Atlas, eHealth country profiles. Based on the findings of the second global survey on eHealth. Global Observatory for ehealth series – Volume I. WHO 2011.
- Vänskä J, Viitanen J, Hyppönen H, Elovainio M, Winblad I, Reponen J, Lääveri T. Doctors' view of patient information systems is critical. Finnish Medical Journal 50-52/17.12.2010, pp 4177-4173.
- Act 61/2007 Laki sähköisistä lääkemääräyksistä (in Finnish, only, legislation on ePrescribing)
- Act 634/2011 on Information Management Governance in Public Administration
- Ministerial Act 99/2001. Act on patient record documentation. Ministry of Social Affairs and Health (Sosiaali- ja terveystieteidenministeriö) [in Finnish]. Asetus potilasasiakirjojen laadimisesta sekä niiden ja muun hoitoon liittyvän materiaalin säilyttämisestä antaman asetuksen muuttamisesta.
- Ministerial Act 11.4. 2012/165. Ministerial Act, Ministry of Social Affairs and Health, on timing of the implementation of the eArchive. Sosiaali- ja terveystieteidenministeriön asetus terveydenhuollon valtakunnallisista tietojärjestelmäpalveluista

### *Legislation*

- The Constitution of Finland 731/1999
- Act on Primary Health care 66/1972
- Act on Social Welfare 710/1982 (Finlex)
- Act on Family Carer 312/1992 (Finlex)
- Act on Sickness Insurance 364/1963
- Act on Specialized Medical Care (1062/1989)
- Act, The Constitution of Finland 731/1999 (Finlex)
- Act on Personal Data (523/1999)
- Act on Experiments with Seamless Service Chains in Social Welfare and Health Care Services and with a Social Security Card (811/2000)
- Act on Occupational Health Care 1383/2001 (Finlex)
- Act on Child Welfare 417/2007 (Finlex)
- Act on Health Care 1326/2010
- Act 159/2007 Laki sosiaali- ja terveydenhuollon asiakirjojen sähköisestä käsittelystä (in Finnish, only, legislation on eArchiving))

## Appendix 1. The Questionnaires, Survey on the Use of ICT Systems in Health Care Services

Survey on the use of ICT systems in health care services commissioned by the Ministry of Social Affairs and Health by FinnTelemedicum and the National Institute for Health and Welfare.

### **Notes on the use of these metrics**

*The survey metrics consist of three sets of questions: one for public secondary care (hospital-based specialised medical care), one for public primary care (health care centres) and one for private care providers. Because the sets of questions were quite similar, only the master question set (for secondary care) is published here.*

*The differences in the primary care survey were:*

- a. Regarding the electronic patient record, the scope of production use was only asked about once overall. Respondents were also asked whether they use several different patient record systems or dental care systems and whether there are plans to standardise and use only one system.*
- b. There was a separate question for radiology systems regarding whether health centres still use film, and if so, for which purposes. There was also a question as to whether the PACS was the unit's own, the hospital district's own or otherwise provided.*
- c. Health centres were not asked about the use of PDAs or smart phones.*
- d. The unit or function division in questions concerning codes and regional exchange of information corresponds to the structure of health centres.*
- e. A question on Avo-Hilmo (outpatient care hospital discharge register) was added to the administrative system questions.*

*The differences in the private care provider survey were:*

- a. Regarding the electronic patient record, the scope of production use was only asked about once overall. Respondents were also asked whether they use several different patient record systems or dental care systems and whether there are plans to standardise and use only one system.*
- b. There was a separate question for radiology systems regarding*

*whether the unit still uses film, and if so, for which purposes. There was also a question as to whether the PACS was the unit's own or otherwise provided.*

- c. Private service providers were not asked about the use of wireless connections outside the unit.*
- d. Private service providers were not asked about the use of PDAs or smart phones.*
- e. Unit-level information was not requested in the questions about codes.*
- f. In questions regarding regional exchange of information, the titles of the sending and receiving unit were given from the point of view of a private service provider.*

Further information:

Research Manager Jarmo Reponen, e-mail: [jarmo.reponen@oulu.fi](mailto:jarmo.reponen@oulu.fi)

Head of Department Päivi Hämäläinen, e-mail: [paivi.hamalainen@thl.fi](mailto:paivi.hamalainen@thl.fi)

### **Instructions for responding to multiple-choice questions:**

All of the questions apply to information and communications technology (ICT) systems or applications unless otherwise specified in the question. First, we ask about the use of the system or application in your unit. *'In use'* means that you are using the system or application in service production or otherwise in an actual operating environment. In the context of paid services, *'in use'* usually means that a price has been determined for the service. Some questions are more specific about what stage you are at in introducing an application. In these questions, *'in use'* means the same as above, *'testing'* means that the system or application is being tried out or piloted at your unit, *'planned'* means that you intend to introduce the system or application in the next few years or are preparing to procure it, and *'no'* or *'no plans'* means that you are not using the system or application and have no plans to introduce it.

*Estimated intensity of production use: 'Production use' means the regular use of the application or information system in an actual operating environment.* In several questions concerning an ICT system or application, respondents are asked to estimate how large a percentage of the function for which it was introduced the system or application is being used for.

Example 1: if you estimate that eReferrals are used for about one third of all referrals, the estimated intensity of production use of the eReferral system is more than 25% but less than 50%; select *'< 50%'*. Or, if you estimate that more than half but not all of the patient records related to home care are transferred wirelessly, select *'< 90%'*.

Example 2. If the transfer of patient records in the regional information system represents about one third of all transfers of patient information between health care units in the region (the remainder involving sending papers by mail, etc.), select ‘< 50%’.

Answer similarly for laboratory results, imaging, etc.

*Function evaluation* means that the usability, effectiveness or cost-effectiveness of the system or application has been evaluated at your unit.

NB: In case of a health centre run by a municipal federation with several municipalities or a health centre run on the host model, respond according to the situation at the main health centre unless otherwise specified.



## Public specialist medical care

### 0. Background information on respondent (required fields)

Name

E-mail

Phone

Please enter the name of the unit(s) for which you are supplying information:

Your title or job duty at the unit (menu)

Other, please specify:

1. Electronic patient record systems
1.1. Do you use an electronic patient record (EPR) system? Product brand of the EPR system (principal system) answer box  a) conservative area yes/no Estimated intensity of production use (10%, 25%, 50%, 90%, 90+%) b) operative area yes/no Estimated intensity of production use (10%, 25%, 50%, 90%, 90+%) c) psychiatric area yes/no Estimated intensity of production use (10%, 25%, 50%, 90%, 90+%) d) emergency clinic area yes/no Estimated intensity of production use (10%, 25%, 50%, 90%, 90+%) If the product brand of the EPR system used in the emergency clinic is different from that of the principal system, please enter it here: answer box
1.2. Do you use a picture archiving and communication system (PACS)? YES/NO Estimated intensity of production use (10%, 25%, 50%, 90%, 90+%) Please enter the product brand of the picture archiving and communication system (PACS): answer box
1.3. Do you use a radiology information system (RIS)? YES/NO Estimated intensity of production use (10%, 25%, 50%, 90%, 90+%) Please enter the product brand of the radiology information system (RIS): answer box
1.4. Do you use a laboratory information system (LIS)? YES/NO Please enter the product brand of the laboratory information system (LIS): answer box

<p>1.5. Does your organisation use electronic EKG? YES/NO If you answered YES, is it (select one or more):</p> <ul style="list-style-type: none"><li>a) compliant with the DICOM standard</li><li>b) compliant with another standard or the manufacturer's own</li><li>c) a system that saves the EKG in PDF format</li></ul>
<p>1.6. Do you use electronic nursing documentation (this does not mean entering 'other information' in the EPR)? YES/NO</p> <ul style="list-style-type: none"><li>a) is this documentation structured? YES/NO</li><li>b) is this documentation freeform? YES/NO</li></ul>
<p>1.7. Do you have a dictation system (which converts dictation directly into text)? YES/NO</p>
<p>1.8. How large a percentage of your physicians have a PDA or smart phone that they can use to access medical databases and/or the EPR system?</p>
<p>1.9. Does your organisation have wireless access to the EPR system?</p> <ul style="list-style-type: none"><li>a) within the unit (e.g. ward rounds) YES/NO</li><li>b) outside the unit, for text-based information (e.g. backups, not related to patient transport)</li><li>c) outside the unit, for imaging information (e.g. backups)</li></ul>
<p>2. Questions related to the National Archive of Health Information</p> <p>2.1. Has your organisation begun to prepare for joining the National Archive of Health Information (KanTa)? YES/NO When do you estimate you will be ready to join KanTa?: 2011, 2012, 2013, 2014, don't know</p> <p>Please explain what, by your estimation, are the principal challenges in <b>your</b> organisation in joining KanTAA <i>answer box</i></p> <p>2.2. Have you already joined the ePrescription system? YES/NO If you answered NO, when do you estimate your organisation will be ready to introduce ePrescriptions? : 2011, 2012, 2013, 2014, don't know</p> <p>Please explain what, by your estimation, are the principal challenges in <b>your</b> organisation in joining the ePrescription system: <i>answer box</i></p>

2.6. Which of the following classifications available on the health care code server is used by your organisation in its patient record systems?

1.2.246.537.6.5 Association of Finnish Local and Regional Authorities – Physiotherapy codes (Kuntaliitto - Fysioterapianimikkeistö) YES/NO

1.2.246.537.6.3 Association of Finnish Local and Regional Authorities – Laboratory test codes (Kuntaliitto - Laboratoriotutkimusnimikkeistö) YES/NO

1.2.246.537.6.4 Association of Finnish Local and Regional Authorities – Radiology examination and procedure classification YES/NO

1.2.246.537.6.7 Association of Finnish Local and Regional Authorities – Occupational therapy codes (Kuntaliitto - Toimintaterapianimikkeistö) YES/NO

1.2.246.537.6.33 National Institute for Health and Welfare – Oral health procedure classification (THL - Suun terveydenhuollon toimenpideluokitus) YES/NO

1.2.246.537.6.1 ICD-10 classification of diseases (Finnish version) YES/NO

1.2.246.537.6.2 Nordic Classification of Surgical Procedures, Finnish version National Institute for Health and Welfare –Procedure classification (THL - Toimenpideluokitus) YES/NO

1.2.246.537.6.12.2002.3 Open access / form – personal information form (AR/LOMAKE - Henkilötietolomake (HEN))YES/NO

1.2.246.537.6.135 Open access /medication – Role of drug (AR/LÄÄKITYS - Lääkkeen rooli) YES/NO

1.2.246.537.5.165 Open access / medication – Drug administration type (AR/LÄÄKITYS - Lääkkeenantotapa) YES/NO

1.2.246.537.5.162 Open access / medication – Drug administration route (AR/LÄÄKITYS - Lääkkeenantoreitti) YES/NO

1.2.246.537.5.40005 Open access / core – Primacy of diagnosis or procedure (AR/YDIN - Diagnoosin /toimenpiteen ensisijaisuus) YES/NO

1.2.246.537.5.40007 Open access / core – Type of diagnosis (AR/YDIN - Diagnoosin tyyppi) YES/NO

1.2.246.537.6.13 Open access / core – Stage of care process (AR/YDIN - Hoitoprosessin vaihe) YES/NO

1.2.246.537.5.40003 Open access / core – Permanence (AR/YDIN - Pysyvyys) YES/NO

1.2.246.537.5.40031 Open access / core – Source of information (AR/YDIN - Tiedon lähde) YES/NO

1.2.246.537.5.40004 Open access / core – Certainty (AR/YDIN - Varmuusaste) YES/NO

1.2.246.537.6.32 ATC classification, Finnish version, Fimea YES/NO

1.2.246.537.6.96 FinLOINC – Physiological measurements (FinLOINC - Fysiologiset mittaukset) YES/NO

*Finnish Care Classification, combination of the following:*

1.2.246.537.6.77 Nursing – Care need classification SHTaL (Hoitotyö - Tarveluokitus (SHTaL) YES/NO

1.2.246.537.6.58 Nursing – Care procedure classification SHToL (Hoitotyö - Toimintoluokitus (SHToL)) YES/NO

1.2.246.537.6.78 Nursing – Care outcome classification SHTuL (Hoitotyö - Tuloslukitus (SHTuL)) YES/NO

1.2.246.537.6.31 Association of Finnish Local and Regional Authorities – Finnish version of ICPC-2 Basic health care classification ( Kuntaliitto – ICPC-2 Perusterveydenhuollon luokitus) YES/NO

1.2.246.537.6.46 Association of Finnish Local and Regional Authorities – ICPC-2 Process codes ( Kuntaliitto – ICPC-2 Prosessikoodit) YES/NO

*Psychologist service, combination of the following:*

1.2.246.537.6.172 Psychologist service – Service context (Psykologipalvelu - Palvelukonteksti) YES/NO

1.2.246.537.6.171 Psychologist service – Object of work (Psykologipalvelu - Työskentelykohde) YES/NO

1.2.246.537.6.170 Psychologist service – Form of work (Psykologipalvelu - Työskentelymuoto) YES/NO

1.2.246.537.6.173 Psychologist service – Stage of work (Psykologipalvelu - Työskentelyvaihe) YES/NO

1.2.246.537.6.174 Psychologist service – Purpose of influence  
(Psykologipalvelu - Vaikuttamisen tavoite) YES/NO

*Native language and transaction language*

1.2.246.537.5.40175 Finnish Standards Association – Language codes  
(SFS - Kielikoodisto) YES/NO

1.2.246.537.6.95 Standards Association / National Institute for Health and Welfare – Assistive device classification (SFS/THL - Apuvälineluokitus) YES/NO

1.2.246.537.6.300 Ministry of Social Affairs and Health – Health care functions classification (STM - Terveystieteiden tehtävälukitus) YES/NO

1.2.246.537.6.202 National Institute for Health and Welfare – Register of social welfare and health care organizations, unic identification codes (OID) for organisations (THL - SOTE-organisaatiorekisteri)  
YES/NO

1.2.246.537.6.30 National Institute for Health and Welfare – Health care service classification (THL - Terveystieteiden palveluluokitus) YES/NO

1.2.246.537.6.74 Statistics Finland – Classification of Occupations (TK - Ammattiluokitus)  
YES/NO

2.7. Which solutions are principally used in the ICT systems of your unit at the moment for information exchange between organisations in your region?

- a) OVT/EDI
- b) HL7 CDA R1
- c) HL7 CDA R2
- d) DICOM
- e) eReferral and eDischarge messages in XML

\*f) other, please specify:

*answer box*

### **3. Regional information exchange**

3.1. Have all service units at your hospital been assigned a unique ID (OID coding)?  
YES/NO

If you answered NO, have any of the following units been assigned IDs, in whole or in part?  
radiology YES/NO, laboratory YES/NO, outpatient clinics YES/NO, wards YES/NO, physiotherapy YES/NO, others YES/NO

3.2. Which Regional Information System model (ATJ) do you use? A 'regional information system' understood to mean an ICT system where one party is a hospital in the hospital district and another party a health centre, public-sector hospital or possibly a private service provider.	
a) Master patient index system, Fiale/Navitas model	Which components are in use? Patient record, Laboratory, Imaging, Imaging statements
b) Kunta-ESKO model	Which components are in use? Patient record, Laboratory, Imaging, Imaging statements
c) Alue-Effica	Which components are in use? Patient record, Laboratory, Imaging, Imaging statements
d) Alue-Pegasos	Which components are in use? Patient record, Laboratory, Imaging, Imaging statements
e) Alue-Mediatri	Which components are in use? Patient record, Laboratory, Imaging, Imaging statements
f) Kainuu Effica-Pegasos	Which components are in use? Patient record, Laboratory, Imaging, Imaging statements
g) Other model	Which components are in use? Patient record, Laboratory, Imaging, Imaging statements
h) No regional information system	
i) Co-operation to develop regional information exchange is being pursued in many regions. The new Act mentions the possibility of maintaining a joint database for regional information exchange. Is the information management project in progress in your region? YES/NO If you answered YES, please specify: <i>answer box</i>	

3.3. Is a regional information system, or regional information exchange otherwise, available to you in the following?

- a) sending/receiving patient record data and reading them YES/NO
- b) sending/receiving lab results and reading them YES/NO
- c) sending/receiving imaging examination results and reading them YES/NO
- d) sending/receiving imaging examination consultation responses and reading them YES/NO
- e) access to an image archive shared by several organisations YES/NO. If you answered YES, how long has this been available? ... years
- f) receiving an eReferral from basic health care (accepting care responsibility from the sender)
  - f1) somatic health care YES/NO, how long has this been in use? ... years. Estimated intensity of production use: Has this activity been evaluated? YES/NO
  - f2) psychiatric health care YES/NO, how long has this been in use? ... years. Estimated intensity of production use (10%, 25%, 50%, 90%, 90+%): Has this activity been evaluated? YES/NO

If eReferrals are not in use in certain specialist areas, please list them: *answer box*

- g) receiving a consultation eReferral from basic health care (with identification but care responsibility retained by the basic health care unit)
  - g1) somatic health care YES/NO, how long has this been in use? ... years. Estimated intensity of production use: (10%, 25%, 50%, 90%, 90+%) Has this activity been evaluated? YES/NO
  - g2) psychiatric health care YES/NO, how long has this been in use? ... years. Estimated intensity of production use: (10%, 25%, 50%, 90%, 90+%) Has this activity been evaluated? YES/NO

If consultation eReferrals are not in use in certain specialist areas, please list them:  
*answer box*

3.4. eReferral and eDischarge

- a) Can you receive eReferrals from basic health care? YES/NO Estimated intensity of production use (10%, 25%, 50%, 90%, 90+%). Has this activity been evaluated? YES/NO
- b) Can you send eReferrals to another specialist medical care unit? YES/NO Estimated intensity of production use (10%, 25%, 50%, 90%, 90+%). Has this activity been evaluated? YES/NO
- c) Can you send an eDischarge letter (epicrisis) to another unit?  
YES/NO Estimated intensity of production use (10%, 25%, 50%, 90%, 90+%).  
Has this activity been evaluated? YES/NO
- d) Can you receive an eDischarge letter (epicrisis) from another unit?  
YES/NO Estimated intensity of production use (10%, 25%, 50%, 90%, 90+%).  
Has this activity been evaluated? YES/NO

c) Can you send an electronic document of nursing to another unit?

YES/NO Estimated intensity of production use (10%, 25%, 50%, 90%, 90+%). Has this activity been evaluated? YES/NO

d) Can you receive an electronic document of nursing from another unit?

YES/NO Estimated intensity of production use (10%, 25%, 50%, 90%, 90+%). Has this activity been evaluated? YES/NO

g) Can you engage in an informal electronic consultation (between professionals) about a patient without supplying patient identification?

YES/NO Estimated intensity of production use (10%, 25%, 50%, 90%, 90+%). Has this activity been evaluated? YES/NO

h) Can you engage in a remote consultation with another unit by televideoconferencing?

YES/NO

in which specialist areas is this system used for consultations: psychiatry / child psychiatry / dermatology / ophthalmology / surgery / other,

please specify *answer box* Estimated intensity of production use (10%, 25%, 50%, 90%, 90+%). Has this activity been evaluated? YES/NO

i) Can you receive EKG telemetry data from ambulance units?

YES/NO Estimated intensity of production use (10%, 25%, 50%, 90%, 90+%). Has this activity been evaluated? YES/NO

j) Can your organisation access data on a patient in the social services client information system (with the patient's permission)? YES/NO

k) Can the social services organisation(s) in your region access data on a patient in your organisation's EPR system (with the patient's permission)? YES/NO

#### 4. Privacy and authentication systems

4.1. Do you use Electronic Identification for Health Care Professionals? YES/NO

a. Do you use a smart card for identifying professionals? YES/NO If you answered YES,

a1) is the smart card a Population Register card, Valvira card or TEO card?  
YES/NO

a2) is the smart card some other card? Please specify: *answer box*



<p>b. Do you use authentication of professionals by eSignature? YES/NO If you answered YES, please specify the eSignature technology used: <i>answer box</i></p>
<p>c. Are the IDs used in your unit connected to a personal ID number or similar unique identifier? YES/NO</p>
<p>4.2. Which authentication method(s) do you use for patients/clients? a) Population Register card YES/NO b) Tupas or online banking IDs YES/NO c) user ID and password YES/NO d) mobile authentication of client YES/NO</p>
<p>Does your organisation use authentication of patients/clients by eSignature? YES/NO</p>
<p>4.3. Please describe briefly how your organisation currently manages patient consent and prohibitions: <i>answer box</i></p>
<p>4.4. Does your unit have a written information security policy (defining objectives, responsibilities, management, etc.)? <a href="http://www.stakes.fi/verkkojulkaisut/raportit/Ra5-2005.pdf">http://www.stakes.fi/verkkojulkaisut/raportit/Ra5-2005.pdf</a> YES/NO</p>
<p>4.5. Does your unit have an information security plan? YES/NO</p>
<p>4.6. Does your unit have a designated privacy officer? YES/NO</p>
<p>5. Information exchange with patients relating to examinations and treatment</p>

<p>5.1. Does your organisation have a website with information on health care services?                  YES/NO</p> <p>What information and/or functions does the website offer?</p> <p>a) information on services provided by the organisation YES/NO</p> <p>b) information on the organisation's units (contact information, location) YES/NO</p> <p>c) search function for units or service providers providing various services in the region YES/NO</p> <p>d) services for self-assessment of health (risk tests, etc.) YES/NO</p> <p>e) entering patient-produced information into a health account (information on state of health, illnesses, their treatment, self-medication): in use, being planned, being tested, no</p> <p>f) function for sending preliminary data to the care facility online YES/NO</p> <p>g) function for correcting the user's own personal data (address changes, etc.) YES/NO</p> <p>h) function for sending patient feedback on the care YES/NO</p> <p>i) entering a living will YES/NO</p> <p>j) online Q&amp;A service, without authentication YES/NO</p> <p>k) online Q&amp;A service, with authentication YES/NO</p> <p>l) Other, please specify YES/NO</p>	
<p>5.2. Does your organisation provide general health, illness and service consultation by phone (without authentication)?</p> <p>a) at the level of your organisation (hospital district) YES/NO</p> <p>b) at the hospital level YES/NO</p> <p>c) other YES/NO</p>	
<p>5.3. Does your organisation provide consultation with authentication by phone (contact centre) for triage and referral to treatment?</p> <p>a) at the level of your organisation (hospital district) YES/NO</p> <p>b) at the hospital level YES/NO</p> <p>c) other YES/NO</p>	
<p>5.4. Further questions on electronic information exchange with patients</p>	
<p>a) direct online appointment booking (patient selects appointment time on his/her computer)</p>	<p>YES/NO; if you answered YES, please specify for which services this is in use <i>answer box</i>                  How large a percentage of appointments for this service(s) is made online? ...%</p>
<p>b) appointment booking and confirmation by e-mail</p>	<p>YES/NO; if you answered YES, please specify for which services this is in use <i>answer box</i>                  How large a percentage of appointments for this service(s) is made by e-mail? ...%</p>
<p>c) appointment booking and confirmation by text message</p>	<p>YES/NO; if you answered YES, please specify for which services this is in use <i>answer box</i>                  How large a percentage of appointments for this service(s) is made by text message? ...%</p>

How large a percentage of appointments overall is made online and/or by text message? ...%	
d) offering an appointment or a cancellation time to a patient in a queue by text message	YES/NO; if you answered YES, please specify for which services this is in use <i>answer box</i>
e) information exchange with patient using conventional e-mail YES/NO	
f) information exchange with patient using e-mail with encryption YES/NO	
g) information exchange with patient using text messages YES/NO	
h) online system where patients can read their EPRs YES/NO	
i) online system where patients can read their laboratory results YES/NO	
j) online system where patients can read their imaging examination statements YES/NO	
k) patient system where patients can enter self-performed measurement results in the health care system YES/NO	
l) televideoconferencing service for patients (this does not mean the patient's physician consulting another physician in the presence of the patient) YES/NO	

6. Administrative systems
6.1. Does your organisation have access to local or regional data warehouses of operating information? YES/NO
6.2. Does your organisation have access to an online system monitoring access to treatment? YES/NO
6.3. Does your organisation have access to an incident reporting system? YES/NO HaiPro? ( <a href="http://haipro.vtt.fi/">http://haipro.vtt.fi/</a> ) YES/NO Other? YES/NO, please specify <i>answer box</i>

<p>6.4. Does your organisation have a system for lending out assistive devices?                  YES/NO                  Brand of system: <i>answer box</i></p>
<p>6.5. Does your organisation use one or more ICT systems for operations, administration or other purposes (stand-alone systems) which was/were not referred to earlier in this survey and which may be of relevance in terms of interoperability considering connecting with national information system services (KanTa)?                  Please specify which system(s) and for what purpose they are used. <i>answer box</i></p>

<p>7. Electronic databases and systems for professional decision-making and training</p>	
<p>7.1. Decision-making support systems by level:</p>	
<p>a) database separate from the patient record system on the desktop</p>	<p>Terveysportti, GP manual and database (YKT), drug interactions system (e.g. SFINX), Nurse's handbook, regional care programmes, other (please specify)</p>
<p>b) navigation from the patient record system to the database</p>	<p>Terveysportti, GP manual and database (YKT), drug interactions system (e.g. SFINX), Nurse's handbook, regional care programmes, other (please specify) .....</p>
<p>c) automatic illustrations (graphics, reminders, alerts, e.g. unusual lab test results)</p>	<p>Terveysportti, GP manual and database (YKT), drug interactions system (e.g. SFINX), Nurse's handbook, regional care programmes, other (please specify)</p>
<p>d) automatic integration of patient record data and database data</p>	<p>Terveysportti, GP manual and database (YKT), drug interactions system (e.g. SFINX), Nurse's handbook, regional care programmes, other (please specify)</p>
<p>7.2. Televideoconferencing system for training</p> <p>If you answered YES, does your unit generally organise training by televideoconferencing at least once a week / 1–3 times a month / a few times a year / rarely / not at all?</p>	

8. Readiness and resources for using ICT services

8.1. How large a percentage (%) of the employees whose job includes entering and/or reading patient information is computer-literate (basic skills)? (menu: % 10 20 30 40 50 60 70 80 90 100)

8.2. How much privacy / information security training have your employees received?  
comprehensively, some, not at all

8.3. Do you use online training for your personnel training? YES/NO

If you answered YES, is it (select one or more):

- a) privacy / information security training
- b) operating model training
- c) other

8.4. How comprehensively has your organisation made technical support available for users of the patient record system?

- a) at all times during opening hours of the organisation, b) during normal office hours, c) daily, but for less than normal office hours, d) occasionally

8.5. How much of the budget for your unit in 2010 was used in all for the procurement, maintenance and development of ICT systems and for training employees in how to use them? EUR ..., or ...% of the budget)

menu: calculated, estimated

How would you estimate the percentage of your budget used for ICT systems in 2010 as compared to 2009? stayed the same, gone up, gone down

## 9. OPINIONS ON THE DUTIES OF THE NEW UNIT OF THE NATIONAL INSTITUTE FOR HEALTH AND WELFARE

In order to implement the new provisions in the legislation on the handling of EPRs and ePrescriptions, the information systems of health care service providers must be updated. National specifications are being drawn up for this purpose.

9.1. Have representatives of your organisation been involved in the selection and definition of national information structures:

- a) participating in preparatory work in expert groups YES/NO
- b) participating in online work YES/NO
- c) participating in workshops organised on the topic YES/NO
- d) submitting expert statements to the responsible authorities on request YES/NO
- e) having direct contact with the responsible authorities YES/NO

9.2. Do you think that health care professionals have a need to influence the quality, content and outcomes of these specifications?  
YES/NO

Please describe how you think health care professionals could best contribute to the aforementioned specifications. *answer box*

9.3. Information systems require continuous development. A common way of organising this is to collect development needs and ideas. Regular evaluation of the suggestions received ('annual clock') will help pinpoint development points for future software versions.

- a) please describe which criteria and procedures should be employed to achieve a consensus on development points  
*answer box*
- b) please describe how you think the expert work on the aforementioned specifications should be organised  
*answer box*
- c) how interested would you yourself be to comment on the contents of the various specifications before they are confirmed as national information structures, through statements or hearings?  
menu: extremely interested / rather interested / not interested / don't know
- d) would you be interested in participating in interest group co-operation (involving trade unions, patient organisations, etc.) contributing to the development of information system services and networks of expertise under the new organisation of the National Institute for Health and Welfare?

The Act on Electronic Processing of Client Information in Social Welfare and Health Care (159/2007), the Act on Electronic Prescriptions (61/2007) and the Act on the National Institute for Health and Welfare (668/2008) are being amended. The National Institute for Health and Welfare is being assigned a new task in being responsible for national-level operations in information management in social and health care services. A new unit has been set up for this purpose, beginning operations on 1 January 2011.

How useful would you consider, for your own work, the following duties of the new unit? (Likert scale from 1 to 5: 1 = very useful, 2 = useful, 3 = neither useful nor harmful, 4 = harmful, 5 = very harmful)

The National Institute for Health and Welfare is responsible for the following regarding electronic processing of client information in social and health care services:

- |               |   |   |   |   |   |
|---------------|---|---|---|---|---|
| a. planning   | 1 | 2 | 3 | 4 | 5 |
| b. steering   | 1 | 2 | 3 | 4 | 5 |
| c. monitoring | 1 | 2 | 3 | 4 | 5 |

The National Institute for Health and Welfare is responsible for the following regarding implementation of the ePrescription:

- |               |   |   |   |   |   |
|---------------|---|---|---|---|---|
| a. planning   | 1 | 2 | 3 | 4 | 5 |
| b. steering   | 1 | 2 | 3 | 4 | 5 |
| c. monitoring | 1 | 2 | 3 | 4 | 5 |

The National Institute for Health and Welfare is responsible for determining the following for the implementation of national information system services:

- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| a. information contents                                  | 1 | 2 | 3 | 4 | 5 |
| b. concept models  | 1 | 2 | 3 | 4 | 5 |
| c. information structures supporting operating processes | 1 | 2 | 3 | 4 | 5 |

The National Institute for Health and Welfare is responsible for the content of the code server

1	2	3	4	5
---	---	---	---	---

The National Institute for Health and Welfare may issue more detailed regulations on:

- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| a. information structures in patient information systems | 1 | 2 | 3 | 4 | 5 |
| b. information structures in patient documents           | 1 | 2 | 3 | 4 | 5 |
| c. information classification                            | 1 | 2 | 3 | 4 | 5 |

Central government transfers for enhancing local and regional information system infrastructure

1	2	3	4	5
---	---	---	---	---

Description of uniform operating models and harmonisation of operating models

1	2	3	4	5
---	---	---	---	---

Which themes and/or criteria should be observed in allocating central government transfers? Please specify: *answer box*

10. Are there any other issues that you would like to bring up? Please specify:  
*answer box*

*Finnish Oulu-THL metrics for eHealth implementation  
Further use prohibited without written permission from authors*

Copyright © FinnTelemedicum ja National Institute for Health and Welfare 2011/2012

**THIS WAS THE PUBLIC SPECIALIST MEDICAL CARE SERVICES SURVEY  
THANK YOU FOR YOUR TIME!**

**Send form**



## Appendix 2.

**Figure 28. The proportion (%) of hospital districts (n = 20 without Åland) and health care centres. (n= 140) using different classifications and codes.**

