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- ? 25 years of medical informatics
- ? EU-projects, standardisation (ISO TC37, CEN TC251, HL7)
- ? special interest on EHR systems based on data dictionaries
- ? during last 7 years informant of HL7 Finland (also web-site)
- ? during last 4 years project manager of national CDA-projects with co-operation of Ministry of Social Affairs and Health
- ? more information through www.hl7.fi

Organisational structure of health care

- ❑ Municipalities have, by law, a responsibility for arranging health and social services
- ❑ 440 municipalities (population varies between 100 - 560 000)
- ❑ The National Health Insurance scheme covers loss of income during illness, provides partial reimbursement for outpatient medication and costs of examinations and treatment by the private sector and provides rehabilitation
- ❑ Private health care in Finland comprises mainly outpatient care

(compliments to Mrs. Annakaisa.Iivari@stm.fi)

Finnish Health Care in Brief

- ❑ 5.200.000 Finns
- ❑ Public services provided by municipalities (448)
 - ❑ Primary Care
 - ❑ 200 HC stations
 - ❑ GP's 1:1488 inhabitants
 - ❑ Secondary Care
 - ❑ ~90 public hospitals
- ❑ Health: 7 % of GNP
- ❑ Private sector 20 %
 - ❑ Pharmacy system



➤ 251 health centres

health education, maternity and child clinics, school, student and occupational health services, primary medical care and rehabilitation, parts of mental health care bed wards, home nursing, oral health care, ambulance service

Specialized care

- ❑ Municipalities are obliged by law to arrange also specialised care
- ❑ Hospitals owned by joint municipal boards (hospital districts)
- ❑ Finland divided into 20 hospital districts (70 public hospitals)
- ❑ Each hospital district usually comprises 1-3 short-term hospitals and 1-2 psychiatric hospitals. Hospitals provide both inpatient and outpatient care. Long-term care is provided by the local health centre hospitals, that are not an administrative part of the hospital district.
- ❑ 5 university hospitals, 15 central hospitals and 40 district hospitals
- ❑ Just a few private hospitals (5 % of hospital days, 1400 beds) and 2 state owned psychiatric hospitals.

Electronic patient record in production

Primary health care

in 94 %

the intensity of use comprehensive

Specialized health care

in 67 %

the intensity of use 10 - >90 %

(in testing or planning phase in 43 %)

Private health care

in 82 %

Every health care organization/provider is responsible for administrating patient records register; patient data can be transferred between different registers mainly only by patient's consent

eReferral and eDischarge letter in production

Primary health care

in 24,2 %

the intensity of use low

in the planning or testing phase in 27 %

Specialized health care

in 48 %

the intensity of use low

in the planning or testing phase in 48 %

Private health care

in 5 %

PACS

Primary health care

in 18,5 %

the intensity of use poor

in the planning or testing phase in 20 %

Primary health care

in 57 %

the intensity of use 10 - >90 %

in the planning or testing phase in 34 %

Private health care

in 7 %

Health care professionals

Good access to Internet

Good access to medical data bases

30 - 50 % of the units use eSystems for decision making support

■ Direct custom eServices

Home pages

in 74,5 % of PHCs, in 86 % of SHCs, in 71 % of PrivateHC

Other

poor (2 - 5 % of the units in PHC and SCH) use of modern applications (as question-answer services, e-mails, mobile phone text messages)

Call centres

Televideo conferencing

In consultations between PHCs and SCH

in 13 % of PHCs (low intensity)

in 33 % of SCHs (low intensity)

in PrivateHC scanty

In administrative use

in 8 % of PHCs

in 48 % of SCHs

in PrivateHC scanty

In education and training

in 25 % of PHCs (low intensity)

in 86 % of SCHs (moderate high intensity)

in PrivateHC scanty

Principles for ICT in Health Care

- ❑ Towards an information society for all
- ❑ Overcoming organisational borders = towards a seamless service system
- ❑ Municipal responsibility for provision of services
- ❑ Empowering clients
- ❑ Better privacy protection and data security
- ❑ Interoperability and integration of information systems
- ❑ Skilled staff
- ❑ Increase R&D
- ❑ Well-being cluster

Government Decision in Principle on securing the future of health care

11.4.2002

Role of ICT in developing services / EHR

- » Interoperability
- » Common data structure
- » Common architecture
- » Electronic signature
- » Digital archiving
- » Electronic intelligent forms
- » Increasing role of the patient

IT Infrastructure Strategies

- ❑ Standards to be revised by 2005
 - ❑ National package for interoperability and data security
 - ❑ messaging (HL7 v 2.3) -> HL7 CDA/ XML and SOAP
 - ❑ medical terminology (FinMeSH, Dublin core ...)
- ❑ Codes, Classifications and Headers
 - ❑ Minimum Data Set - ICD-10, ICPC-2, ATC,....
 - ❑ National Directory Service ISO-OID codes
 - ❑ for patient records, organizations and professionals

Government programme for the information society

Social welfare and health

1. Continuity of care
2. Interoperability of electronic patient records
3. Electronic prescriptions and medication management
4. Promoting independent living with the help of ICT
5. New operating models in health care (e.g. digital imaging)
6. Providing citizens with reliable health information over the Internet
7. Extensive plan for the utilisation of ICTs in social services
8. Electronic certification service for health care personnel
9. Data security and privacy
10. Decision support systems for health care personnel

The main principles:

- ❑ Structural key/minimum data in all patient record systems
- ❑ National Code Server (terms, classifications and codes)
- ❑ Identification of organizations, documents etc. by ISO/OID code system
- ❑ Electronic verification of professionals; electronic signatures based on the national service (National Authority for Medicolegal Affairs)
- ❑ Implementation of national recommendations concerning data safeguarding
- ❑ Open standards for interoperability (CDA R2)
- ❑ Collecting electronically statistical data from patient records
- ❑ National ICT architecture for health
- ❑ The patient should have access to her/his personal health data; also the right to check log information concerning the use and transfer of patient data
- ❑ Support for regional implementation

Continuity of care

Regional and national networking

- » reference information model
 - supporting access in distributed architecture
- » centralised archiving and PACS-systems
- » teleconsultation, videocommunication
- » centralised emergency duty

Objectives of the Ministry 2004-7

- ❑ Fostering regional co-operation in service provision
- ❑ From local to regional and national implementation
- National services**
 - security policy / authentication / decision supports / codes & terminology / statistics
- ❑ Information for the public / National portal
- ❑ Ageing population, independent living

- ❑ National EHR by 2007 (project 2003-2007)
 - ❑ e-health records will be readily available to staff and 'for patients to help maintain the quality of information'
 - ❑ professionals are able to deliver effective, safe, seamless and high quality care
 - ❑ allow managers better planning of services and availability to better quality data

Why?

- **To improve the quality, continuity and cost-effectiveness of care**
- **The municipalities have a strong decision-making power in arranging services, which includes also the utilization of ICT**
- **Most hospitals still have paper-based journals (unified base)**
- **Legislation not detailed enough for the digital world**
- **EPR-systems differ between organizations, data transfer is difficult**
- **No common standards or guidelines for interoperability or data security**
- **The patient data is usually recorded in an unstructured way (text) and cannot be used effectively**

Strategy (Jan 2004):

How it all will be done by the year 2007?

- ❑ The common content and structure that should be used in every EPR system in all organizations
 - ❑ Clinical consensus concerning the patient data
 - ❑ National services (like the Code Server)
 - ❑ Open standards for interoperability
 - ❑ National guidelines for data safeguarding
 - ❑ Support for regional implementation

1. Clinical consensus: the structured data

- ? every EPR system should provide structured data "minimum data set"
- ? data structure and coding is decided in co-operation with different interest-groups (professionals, administration, software-enterprises), also publicly available for comments through internet
- ? implementation into existing EPR-systems in pilot organizations, specifications for certain specialities will be done 2004 - (occupational health care, psychiatry, dental care etc..)

Benefits

- ? finding the essential information is easier -> structured data works as a link to free text
- ? saves time -> data is available in different forms
- ? interoperability between different EPR systems -> continuity of care
- ? integration of decision-making support
- ? quality management, evaluation, benchmarking and statistics (pilot projects started)

The structured data (core elements) consists of

- ? patient identification data (name, social security number, etc..)
 - ? organizational identification data
 - ? episode of care
 - ? risk information
 - ? health related data (e.g. smoking)
 - ? physiological monitoring (e.g. length, blood pressure)
 - ? problems and diagnosis
 - ? the nursing minimum data set (e.g. diagnosis, interventions, outcomes, discharge summary)
 - ? elective procedure codes
 - ? test and examinations (e.g. laboratory, radiology)
 - ? medication etc.
 - ? statements
 - ? functionality
 - ? assistive devices (e.g. wheelchair)
 - ? organ testament
 - ? discharge summary
 - ? follow up care plan
 - ? informed consent
- > is the information that can be coded and has the most significance in making decisions about treatments



2. The Digital Code Server

www.stakes.fi/koodisto

Administered by STAKES (the National Research and Development Centre for Welfare and Health)

All codes, classifications and headers, including OID-codes, needed in EPR-systems will be delivered by an internet server

3. Standards for interoperability

- ❑ xml-based HL7 CDA R2-standards
- ❑ the open standard for EPR have been specificated in the national project and the software enterprises have been involved in this process
- ❑ data transferring between health care organizations, e.g. referrals, laboratory, medication list
- ❑ data transferring between health care organizations and the Social Insurance Institution
- ❑ data transferring between health care organizations and insurance groups
- ❑ digital archiving

4. National guidelines for safeguarding information

The guidelines for

- administrating patient's right to issue informed consent in a digital context
- secure digital archiving
- e-signature
- identification of documents
- identification of professionals and organizations by ISO/OID-standard
- implementing PKI architecture in health care.
- Also building a **national authority for administering digital identification of health care professionals.**

5. Implementation

- ❑ National level norms, rules and standards
- ❑ An open process, availability
- ❑ A common will, central steering
- ❑ Regional implementation projects
 - ❑ about 20 million euros/year 2004, 50 % funding by the ministry)
 - ❑ the funding will continue 2005-07

- ? Founded 1995 to "promote system integration", HL7 was selected
- ? In early years got some partial funding from Tekes (National Technology Agency of Finland, www.tekes.fi)
- ? Nowadays ~ 70 members, mostly software vendors who are funding the localisation projects
- ? During the last 3 years has become also the national actor to support the implementation MOSAH strategy 2003-7 (partial funding from Ministry), especially Finnish Electronic Patient Record and the role of CDA

- ❑ International HL7 Affiliate Status 1996 (5th affiliate)
 - ❑ now there are 30 affiliates or more
- ❑ Now 69 members in HL7 Finland
 - ❑ Providers (hospital districts)
 - ❑ Vendors
 - ❑ Consultants
 - ❑ Organisations
- ❑ SIGS: Laboratory (Active), Document (very active), PACS (dead => IHE ??), Common Services (Active)
- ❑ Technical Committee becoming as "the clearing house"
- ❑ HL7 is well known and has wide coverage

- ❑ Main target is to help in healthcare systems integration
- ❑ Main tool in that is to help with HL7 implementation, HL7 Finland has the HL7 mandate in Finland (as an affiliate organization)
- ❑ HL7 Finland is officially not restricted solely to HL7
- ❑ Our specifications must be good and implementable, not theoretically perfect (we want them out now)
- ❑ No official status (No official fights)
 - ❑ de facto standard
- ❑ Co-operation with
 - ❑ Kuntaliitto (Association of Finnish Local and Regional Authorities)
 - ❑ Stakes (National Research and Development Centre for Welfare and Health)
 - ❑ STM (Ministry of Social Affairs and Health)
 - ❑ Kuopion yliopisto (University of Kuopio), PlugIT-project, Common Services

Implementation support history

- ❑ Localisation of version 2.3 in 1997
- ❑ Implementation guides for v. 2.3 1998
- ❑ Localised messages and implementation guide for Laboratory (1998-2004)
- ❑ Localisation and implementation guide of CDA R1 2002 (1.10.2002)
- ❑ Implementation of CDA R1 in reference databases, "Open Adapters" 2002-2003 (3.2.2003)
- ❑ National Health projects (with MOSAH)
 - ❑ 2003 Open CDA
 - ❑ 2004 Implementation of CDA R2 for EHR
 - ❑ 2005 Help desk, technical support + further development, rules

- ❑ EHR CDA R2 implementation means much work, but other standardised interfaces and mechanisms are also needed
- ❑ Kuopio University is helping via our Common Services SIG and via new (TEKES) projects (www.uku.fi/tike/his)
- ❑ International influence via HL7 Finland
- ❑ more specifications to reach HL7 Finland status:
 - ❑ local interfaces for patient, user, authorization, code sets, clinical information: basic interfaces, mechanisms and semantic content, web services
 - ❑ Local software interfaces compared to traditional HL7 messaging: less content (but anyway HL7), but more functionality

HL7 and Finland in Future

- ❑ HL version 2.x will be in use for many years (don't want to replace it where it works)
- ❑ CDA R1 and **Context Management solutions (CCOW)** are in production
- ❑ First implementations of **CDA R2** (for EHR)
- ❑ **Common services specifications (-> International HL7)**



W3C solution - "A whole new alphabet soup"

stack	standards	purpose
Discovery	UDDI	<i>Locating services</i>
Description	RDF, WSDL	<i>Describing services</i>
Packaging	XML, SOAP	<i>Requesting / performing services</i>
Transport	HTTP, Jabber	<i>Transporting requests</i>
Network	TCP/IP	<i>Network</i>

Contents of Finnish Open CDA

- ❑ National project is defining the core components of Finnish EHR and coding needed
- ❑ HL7 Finland is defining the structure and technical coding needed in CDA R2
 - ❑ we try to learn also from international EHR projects
- ❑ Main (semantic) parts of open CDA will be
 - ❑ medication list, diagnosis list, procedure list, lab results, referral, discharge letter, summary of episode, care plan and electronic form of most common paper forms used in Finnish Healthcare
- ❑ Technical part contains signatures, consents, using of code servers (vocabulary), transfer methods between code servers and use of SOAP messaging

Continuation - some ideas

- ❑ Strengthen co-operation between European HL7 affiliates (6th framework programme, innovations + co-ordination)
 - ❑ "Facilitating the integration of open standards into the design of new products and services" and/or "Facilitating the integration of open standards into business practices".
 - ❑ proposal is based on an international interoperability standard "Clinical Document Architecture, CDA", which is finding its way into European health care organisations e.g. in England, Holland, Germany, Greece and Finland
- ❑ Strengthen co-operation between research institutes
- ❑ Use international standards, take part in development
- ❑ Ensure the funding for projects
- ❑ Need to co-operate with vendors and hospitals