eHealth in Norway

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Agenda

- About eHealth systems in Norway
- Personal connected health and ecosystem visions
- General architecture and standards discussion
The Norwegian Directorate of eHealth
The Government aims to ensure that everyone, irrespective of their personal finances and where they live, has access to good health and care services of equal standard.

GOVERNANCE

MINISTRY OF HEALTH AND CARE SERVICES ISSUES LAWS AND REGULATIONS, DRAFTS POLICIES AND FINANCES

DIRECTORATE OF HEALTH EXECUTES POLITICAL DECISIONS, ADVISE POLITICAL LEADERSHIP AND SECTOR AND OVERSEES LAWS

4 REGIONAL HEALTH AUTHORITIES RESPONSIBLE FOR SPECIALIST CARE

428 MUNICIPALITIES RESPONSIBLE FOR PRIMARY CARE, GPs, PUBLIC HEALTH, LONG TERM CARE AND REHABILITATION

Source: OECD 2010
The Norwegian Health Sector

Nasjonalt

Andre fagdirektører
Helsedirektoratet
Direktoratet for e-helse
norsk helsenett

Regionalt/lokal

HELT - HELSE MIDT-NORGE
HELS - HELSE NORD
HELSE - HELSE SØR-ØST
HELS - HELSE VEST
HELMET - HELSE NORD IKT
HELS - HELSE VEST IKT
HELS - SYKEHUSPARTNER
NASJONAL IKT

428 kommuner
4.700 Fastleger
Kommunale og interkommunale IKT-funksjoner

KommiT
Ca. 160 avtale-spesialister og institusjoner
Ca. 108 avtale-spesialister og institusjoner
Ca. 1.200 avtale-spesialister og institusjoner
Ca. 330 avtale-spesialister og institusjoner
THE COORDINATION REFORM

- A clearer role for the patient.
- A new and strengthened municipal role emphasizing prevention and early intervention efforts.
- Changing the funding system into municipal co-funding of the specialist health care services.
- Developing the specialist health care services to enable them to apply their specialised competences to a greater extent and to support the municipalities.
- Facilitating better defined priorities.
The Coordination reform established internet usage explodes

CHALLENGES
- The technological potential yet to be fully exploited
- Many independent organisations
- Many IT systems, lack of integration
Overall policy objective is articulated: «One citizen – One record»

The Directorate of Health has advised the Ministry of Health and Care Services that one shared, national solution for the health and care service should be the end state target and developmental direction for the realization of the aims surrounding «one citizen – one record.»

A shared national solution for the municipal health and care service should be the starting point for the developmental direction. The specialist health care sector should actively participate in the development of a national solution for the municipal health and care service and adapt to the demands that strengthen the integration of care between actors and contributes to the best socioeconomical realization of «one citizen – one record».

The recommended developmental direction and starting point is conditioned by strong national governance which puts forward clearly articulated expectation and demands for the ICT development in the enterprises.
Linking the health care enterprises and facilitates messaging by:

- Shared broadband service
- Address catalogue
- Access to national registries
- eID services
ePrescription

1. Rekvirering
2. Reseptformidling (RF)
3. Ekspedering
4. Mine resepter
5. Fest
PATIENTS ONLINE

- Key initiative for an informed and active health care citizen
- Quality approved information about health care services and rights
- Quality indicators
- My prescriptions
- My vaccines
- Access to summary care record
- Digital dialogue with GP
- Hospitals connecting their portals

www.helsenorge.no
- Directorate responsible for standards and terminology
  - 50 national standards for clinical content, like laboratory, clinical summary, prescriptions CEN
  - Coding schemes based on ICD-10, ICPC-2, NCSP, ICF, DRG
  - National EHR-standard for architecture, archiving and security (CONT SYS), some for clinical content (e.g. birth)
- No shared information model
- EHR data semi-structured
SECONDARY USE OF DATA
New patient record law
  – Revision to make legal framework up to date with the needs and challenges of the health care sector, including new work forms and electronic processes

New health registrer law
  – Use of health information for other purposes than providing health care
National strategy: One citizen one journal
mHealth and Personal Connected Health
Infrastruktur for deling av data mellom pasient og behandler
Data from the citizen should be shared
Remote monitoring chronic diseases

Citizen

Voice and video conversation

Measurements, forms and alerts

Staff who visit patient

Telehealth worker

Measurements forms and alerts

Discussions

Events and notes

Joint cooperation space about treatment of patient

E-consultation

Doctor

Remote monitoring chronic diseases
How to scale?

- In-house
- Cloud based
- Local
- National

Solution today

Direktoratet for e-helse
Why standardize?
Increase flexibility!

Create simple interfaces
To pilots in parallel

- Citizen portal
- Database
- Web-based health apps

- Own equipment
- Public equipment (Medical Devices)

- Municipality response center
- Database (raw data)
- General Practitioner
- Specialist
- Municipality
Tech at home

Secure storage

Secure storage

Electronic Health Record, applications and visualizations

IN

OUT

Tech at home

IN

OUT

PCD-01
HL7-FHIR
SCAIP

HL7-FHIR
App-platform

Direktoratet for e-helse
IN

Tech at home

OUT

Secure storage

Electronic Health Record, applications and visualizations
The flower pot...

- International market
- Simple and flexible standards
- Quick and secure login
- Access control for health workers and citizens
- Secure storage and sharing of data
- Different business models? Appstore?
- Testing and certification of applications?
- Integration with EMR
- Understandable requirements to security
- Law framework
- Developer support and testing

02.05.2016

Kilde: http://tinyurl.com/jp3aept
Installable third party applications

Installable apps

Secure storage
FHIR Server

Health clouds

Upload an HTML5 web app
SMART on FHIR – new eco system

Separates the platform and storage from the applications
• A: Bluetooth, ZigBee, USB etc.
• B: SCAIP for social care alarm
• B: PCD-01 og HL7-FHIR for medical measurements and forms
• C: HL7-FHIR for interaktiv aksess
• D: OAuth for tilgangstyring
• E: XDS for dokument-deling
Why these technologies?

- **Continua**
  - The only end-to-end perspective for personal connected health and social care – A good international arena

- **SCAIP**
  - Continua does not have location and voice. SCAIP has this and is standardized and in use in Sweden.

- **FHIR**
  - An HL7-based, developer friendly interface that can be the basis for an open ecosystem with apps supporting flexible and advanced visualization, adapted to each use case
Web-based dashboard

**Care plan activities**

<table>
<thead>
<tr>
<th>#</th>
<th>Description</th>
<th>Timing</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Have breakfast</td>
<td>1 times every 1 week(s)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Drink a glass of wine</td>
<td>2 times every 1 day(s)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Celebrate xmas</td>
<td>Dec 24, 2016</td>
<td></td>
</tr>
</tbody>
</table>

**Blood pressure**

- **Systolic**: 120 mmHg
- **Diastolic**: 80 mmHg

![Blood pressure graph](chart)

**Form responses**

<table>
<thead>
<tr>
<th>Legend QA:</th>
<th>Apr 5, 2016</th>
<th>How are you feeling today?: Green</th>
</tr>
</thead>
<tbody>
<tr>
<td>Todays feeling:</td>
<td>Mar 30, 2016</td>
<td>How are you feeling today?: Green</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fill in note: Better now</td>
</tr>
<tr>
<td>Todays feeling:</td>
<td>Mar 30, 2016</td>
<td>How are you feeling today?: Yellow</td>
</tr>
<tr>
<td>Migraine form:</td>
<td>Mar 30, 2016</td>
<td>Migraine severity (0-5): 1</td>
</tr>
</tbody>
</table>

**Weight**

- **Weight**: 90 kg

![Weight graph](chart)
Personal health app
Continua FHIR demo (health personnel)

https://bitbucket.org/ehelse/continuafhirdemo

5/2/2016

Tittel/ tema
**Migraine logging form**

**Migraine severity (0-5)**

Did you take a pill?

- 0mg
- 50mg
- 100mg
- 150mg
- 200mg

**Note**

Note

Submit

Success: Successfully created resource

```
*QuestionnaireResponse/873/_history/1* in 3.27s
```

Show debug info:

**Tittel/ tema**
Apple Health Client - https://github.com/ehelse/mhelse

Weight
70 kg

Height
177 cm

Pulse
60 bpm

Upload
Architecture and standards
we expect to produce a limited in scope v2.1 that addresses some known issues (workflow, financials) while holding the core stable for the community.

After that... we have no firm plans, but I think that 'normative' is a blunt hammer. The point of the maturity model is to identify particular pieces and move them towards being treated as if they are normative, while others are experimental. But the exact course is not yet laid out.

Graham
Conway’s Law

“organizations which design systems ... are constrained to produce designs which are copies of the communication structures of these organizations”

Melvin Conway, 1967
En silo per technology?
`How to share a silo?
Silos forever…
Service oriented architectures. Each project drives development of common components as well as their own needs?