E-Health in The Netherlands

Van Cauwenberge Joris
Verhoyen Gregory

Course: Medical Informatics
Prof. M. Nyssen and Prof. F. Questier
Academic year 2013-2014
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INTRO: THE NETHERLANDS COMPARED TO BELGIUM
EU – study (2010)
• E-prescription
  • Already a few years

• Standards (IHTSDO)
  • HL7, Snomed CT, ICD9, ICD10, EN/ISO 13606

• Telemedicine
  • Patient-to-doctor
  • Doctor-to-doctor

• E-prescription
  • Started 2014

• Standards (IHTSDO)
  • KMEHR, SUMEHR, ATC, ICPC2, ICD-10, ICD-9-CM

• Telemedicine
  • Tele-monitoring
    • Elderly
    • Chronic diseases
  • Mobile monitoring
• Identification
  • Citizen service number (CSN/BSN)
  • DigID (not obligated)
  • UZI-register for healthcare professionals

• Identification
  • eID
NATION-WIDE ELECTRONIC HEALTH RECORDS
Development towards nation-wide EHR

1997
first ideas for nation-wide EHR

2002
foundation of NICTIZ → Start Aorta-project

2005
ministry of Health, Welfare and Sports (VWS) takes leading role

2008
Obligation Citizens Service Number (CSN/BSN) in healthcare

2009
Approval EHR-law by Dutch House of Representatives

2011
EHR-law rejected unanimously by Senate

2012
Push-through nation-wide EHR without governmental support. Foundation VZVZ

2013
National exchange EHR → Regional exchange EHR (except for hospitals)
Nation-wide EHR

**For Who?**
- GP’s, specialists and pharmacists that have a therapeutical relation with the patient
- Patients can request to look into their data and set authorisation.

**What can be exchanged?**
- Electronic Medication Record (EMR)
- Summary of GP’s records:
  - allergies,
  - health problems
  - ...
- Juvinile health records

**Future:**
- Maternal facilities
- Physiotherapists
- ...

**In development:**
- Lab results
- Prescriptions
Aorta and the LSP

Aorta = The national, standardized infrastructure for exchanging and consulting medical records.

Responsibility of:  
- NICTIZ (standards)  
- VZVZ (technical)

Goals:  
1. Facilitating the exchange of medical data.  
2. Make it possible for the patient to consult his/her medical records.

Providers of care:  
- Qualified Patient Portals  
- Qualified Healthcare Information system (QHIS)  
- National Switching Point (LSP)

Basic services:  
- UZI/BIG registry  
- PKIO  
- DigID  
- SBV-Z (CSN)

Patient services:  
- Qualified Client offices
Architecture LSP

decentralized storage of medical records (by law)

Metadata: locations of medical records.

Registers all consultations and adaptations.

National Healthcare information hub

Act Reference Registry (Verwijsindex)
Identification and authentication
Audit Log
Access Control (Authorisation)

Many additional components ...

UZI/BIG registry
PKIO
Basic services
DigID
SBV-Z (CSN)

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Standards

Two parts that need to be qualified:
1. Software on its own (by private providers)
2. Data communication network (DCN) that uses a private TCP/IP

Exchange of messages

<table>
<thead>
<tr>
<th>Terminology</th>
<th>Snomed CT, ISO 9999, LOINC, ATC, ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text</td>
<td>HL7 v3</td>
</tr>
<tr>
<td>Transport</td>
<td>SOAP and HTTP</td>
</tr>
<tr>
<td>Security</td>
<td>HTTPS</td>
</tr>
</tbody>
</table>

Qualified

- patient portal
- QHIS
- client office
Identification & authentication

**UZI – card**

= Smartcard for registered physicians, assistants or “businesses”

→ Public/private key infrastructure (UZI-register) : secure connection to LSP (TLS)

→ Sign documents

**DigID**

→ DigID low
  
  Login name and password.

→ DigID middle
  
  Login name, password and sms

Based on CSN, yet without public/private key infrastructure → insufficient for access!

Future prospects : the eNIK. (started 2004 ...)
Authorisation

Therapeutic relation obligated, yet technically not necessary!

Intelligent audit log

Authorisation-protocols: who can see what

Uses BIG-registry

Opting-out

Opting-in (each time)

www.ikgeeftoestemming.nl

Possibility to exclude or include medical personnel
### Summary nation-wide EHR

+ well-standardized technically OK

- security and privacy

Costs: € 30 million/year (NICTIZ)

no governmental support

HL7 v3

<table>
<thead>
<tr>
<th>Current use of the LSP for exchange of information (5th of may 2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute number</td>
</tr>
<tr>
<td>GP – practices</td>
</tr>
<tr>
<td>GP – posts</td>
</tr>
<tr>
<td>Pharmacists</td>
</tr>
<tr>
<td>Hospitals</td>
</tr>
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</table>

Patient-data: 3 614 090 unique CSN’s: 21.5%
E-PRESCRIPTION
E-preservation

• Safety

<table>
<thead>
<tr>
<th>Year</th>
<th>Medication-related acute hospitalization</th>
<th>avoidable</th>
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</thead>
<tbody>
<tr>
<td>2005</td>
<td>4.6%</td>
<td>20%</td>
</tr>
<tr>
<td>2008</td>
<td>3.9%</td>
<td>18%</td>
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</table>

→ 7000 to 8000 cases in the Netherlands

• Medication monitoring
  • Responsible care
  • Interactions medication
  • Allergies
  • Incorrect dosage
  • Double medication
  • Contra-indications and other patient characteristics
E-prescription

• In 2008 already 62% electronic prescriptions
• The only way of prescribing from January 1, 2015
• Possible to use different software platforms
  • Only qualified ICT-suppliers
  • “EMD plus” program
• EHR and EVS software platforms have different suppliers
  • Extra work physician to include records in both the systems
E-prescription

- Digital signature with UZI-pas (obligated july 2007)
  - Authenticity – integrity

- Exchange prescriptions
  - With AORTA via LSP
  - Without AORTA directly to pharmacy

- HL7v3 standard
  - Digital signature implemented
E-CONSULTATION
E-consultation

• Normal consultation
  • Time
    • Physician: 11 minutes
    • Patient: half day
  • Content poorly remembered

• E-consultation
  • More flexible
  • More efficient for both doctor and patient
  • Possible to reread content
  • Safe
  • New ICT-applications
E-consultation

![E-consultation Image]

<table>
<thead>
<tr>
<th>Patiëntnummer</th>
<th>Naam</th>
<th>Geb.datum</th>
<th>Laatste webcontact</th>
<th>Init.</th>
<th>Status</th>
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<tbody>
<tr>
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<td>--</td>
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<td>F. Nagel</td>
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<td>444</td>
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<td>001</td>
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<td>09-12-2009</td>
<td>P</td>
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</tbody>
</table>
E-consultation

- Results [www.webspreekuur.nl](http://www.webspreekuur.nl)
  - 86% satisfied
  - Consultation time from 11 to 4 minutes
  - Safe
  - Almost no waiting time
  - Low cost
CONCLUSIONS
Technically, the dutch E-health is quite advanced.

Yet legislation lags, and governmental issues persist, causing:
- difficulties for standardisation.
- decentralisation.
- privacy and safety concerns.
- fewer progression the last years compared to e.g. Belgium.
References

- Ministry of Health, welfare and sports: http://www.rijksoverheid.nl/ministeries/vws/organisatie
- Nictiz: https://www.nictiz.nl/
- Vzvz: https://www.vzvz.nl/
- WHO: http://www.who.int/en/
Thank you for your attention!