

NEN

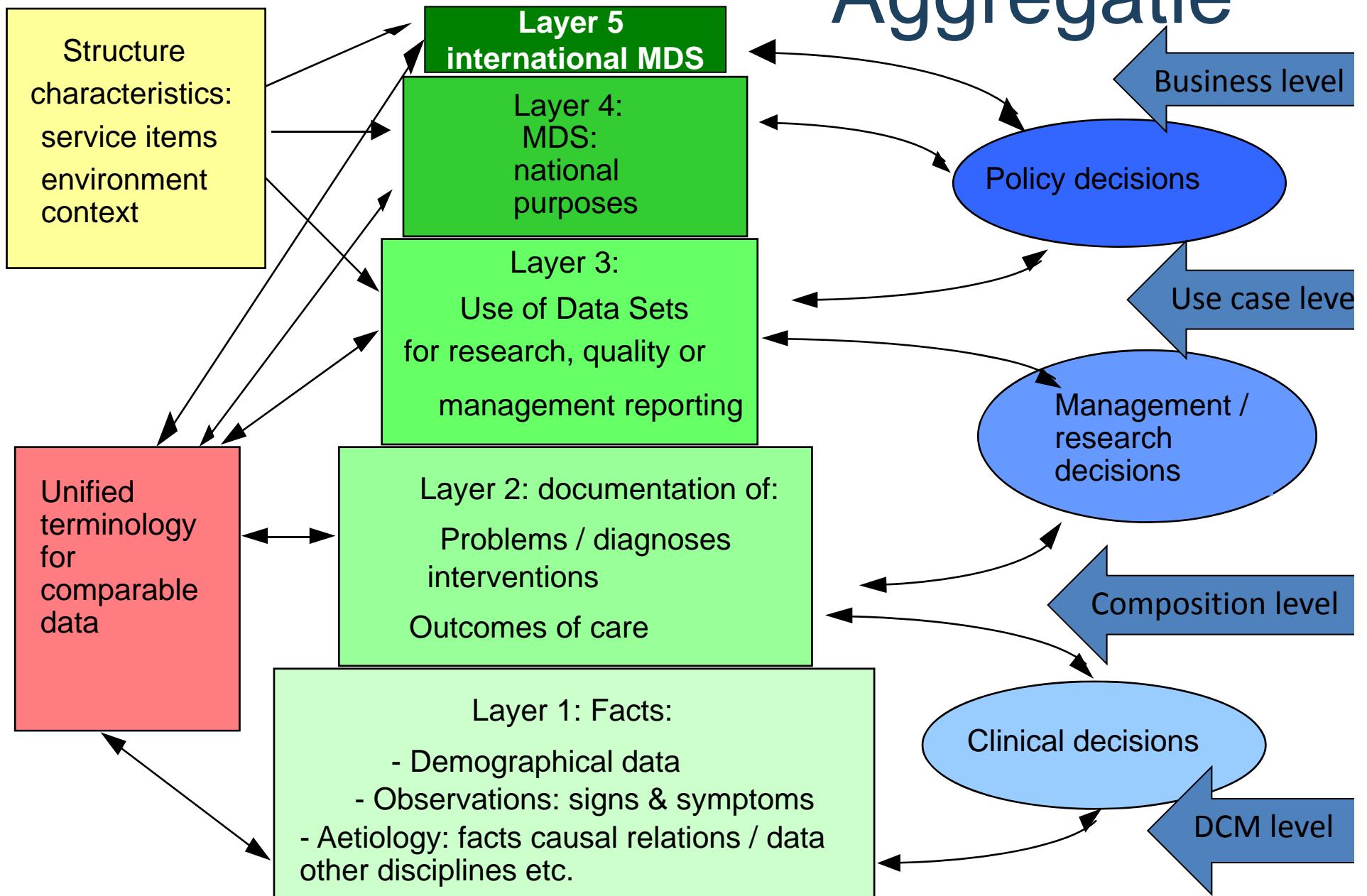
# Hoe zorginformatiebouwstenen de wereld veroveren

Dr. William Goossen  
Projectleider ISO 13972 DCM

# Overzicht

- Noodzaak voor generieke “reusable bits”
- 15 jaar waarde toevoegen aan klinische modellen
- Detailed Clinical Models als verzamelterm
- HL7 / ISO / CEN / JIC projecten
- Actuele projecten

# Aggregatie



(Goossen, 1996)

# Internationaal werk: '90

- Rector, Kay et al, 1992: two level modeling
- CEN 'general purpose information components' (GPICS)
- CEN 13606 – 2 'Archetypes'
- HL7 v3 CDA / messaging 'templates'

The screenshot shows a search result for a medical paper. At the top, the PubMed logo and search bar are visible. The search term used was "Rector AL". The results page displays the following details:

**Abstract** ▾ Send to: ▾

Methods Inf Med. 1993 Apr;32(2):109-19.

**A framework for modelling the electronic medical record.**

Rector AL<sup>1</sup>, Nowlan WA, Kay S, Goble CA, Howkins TJ.

**Author information**

**Abstract**

This paper presents a model for an electronic medical record which satisfies the requirements for a faithful and structured record of patient care set out in a previous paper in this series. The model underlies the PEN & PAD clinical workstation, and it provides for a permanent, completely

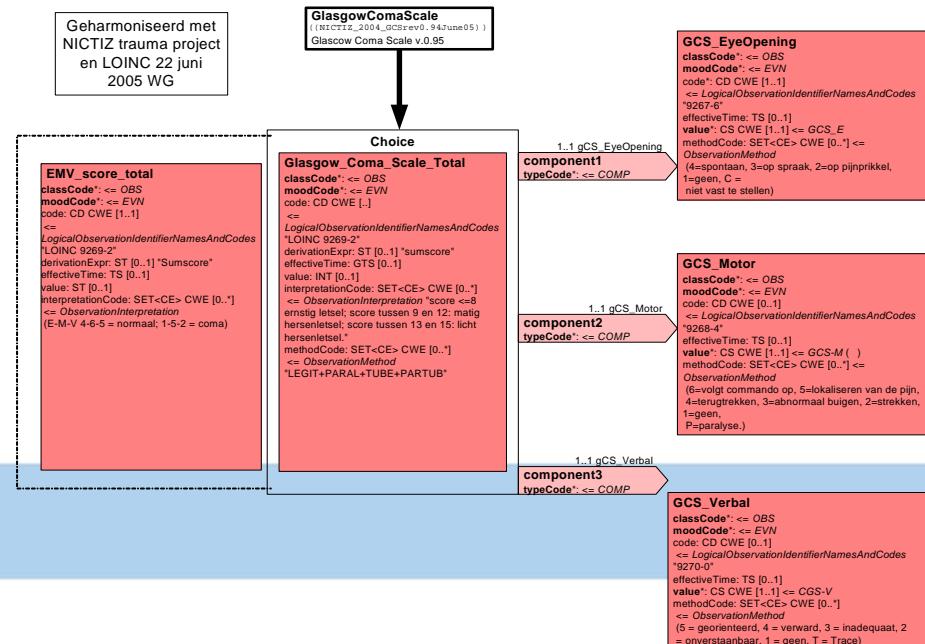
# Vroege 2000's

- Nictiz perinatologie R&D project 2000 – 2005
- HL7 v3 D-MIM Care Provision 2005 – 2007
- Dynamiek van zorgprocessen: real time
- R-MIM transfer request / acceptance
- R-MIM query
- R-MIM care record
- R-MIM subcomponenten
- Herbruikbare componenten als clinical statements 2005-2009 (CDA en v3 Care Record!)
- Structuren zoals assessment scales DSTU 2011-2014, naar normatief 2016?

# Nationaal hergebruik

- Voorbeelden Care Provision projecten
- Natuurlijk lengte, gewicht, hartslag, bloeddruk hergebruik van Nictiz perinatologie naar Nictiz CVA ketenzorg en ook cardiologie.
- Goedkoper, meer consistent, sneller project resultaten!

- CVA voorbeeld
- Glasgow Coma Scale (GCS)
- Geharmoniseerd met GCS Nictiz trauma project.



# Nictiz set van 100 zorginformatiemodellen

- 2003-2005 formaat van CEN/ISO 13606 archetypes, (meta informatie, evidentie, data elementen, logisch model).
- Maar gezien landelijk traject NL, logisch niet op archetypes gebaseerd maar HL7 v3
- Veel data elementen, granulair, afgestemd op evidence based richtlijnen en wetenschappelijke gevalideerde assessment schalen / score lijsten.

# Barthel index

The aim of the Barthel Index is to capture and follow, in a valid and reliable way, the daily activities of the patient, especially the level of depending on help (Mahoney & Barthel, 1965).



```
<!-- Total score on Barthel Index stroke service -->
- <Observation moodCode="EVN">
  <id />
  <code code=" Barthel-index "
    codeSystem="2.16.840.1.113883.2.6.15.1" />
  <statusCode code="completed" />
  <value xsi:type="INT" value="14" />
- <entryRelationship typeCode="COMP">
  - <!-- Bowels -->
- <Observation moodCode="EVN">
  <id />
  <code code="PREMBrtIB525"
    codeSystem="2.16.840.1.113883.2.6.15.1.ICFXXX" />
  <statusCode code="completed" />
  <value xsi:type="INT" value="2" />
  </Observation>
</entryRelationship>
- <entryRelationship typeCode="COMP">
```

(Physical or with words)

Independent / /

# 2006: Snomed CT? Yes, if..

- In opdracht van Nictiz CVA zorginformatiemodellen voorzien van Snomed CT codes

# Using SNOMED CT Codes for Coding Information in Electronic Health Records for Stroke Patients

Judith van der Kooij<sup>a,1</sup>, William T.F. Goossen<sup>a</sup>, Anneke T.M. Goossen-Baremans<sup>a</sup>, Marinka de Jong-Fintelman<sup>a</sup> and Lisanne van Beek<sup>a</sup>

**Abstract.** For a project on development of an Electronic Health Record (EHR) for stroke patients, medical information was organised in care information models (templates). All (medical) concepts in these templates need a unique code to make electronic information exchange between different EHR systems possible. When no unique code could be found in an existing coding system, a code was made up. In the study planned by the authors, we wanted to know if it was possible to find unique codes in SNOMED CT to replace the self made codes. This was done for all the concepts with self made codes. We wanted to know for how many of the (self made) codes we could find a SNOMED CT code. We were interested in a possible difference between templates with individual concepts and measurement instrument or scientific scales. Results of this study were that we could find a SNOMED CT code for 54.9% of the concepts with a self made code. When we look at the concepts with a self made code, 54.9% of these codes could be replaced by a SNOMED CT code. The difference could be detected between templates with individual concepts and measurement instrument. For 68% of the individual concepts a SNOMED CT code could be found. For 26% of the concepts with scientific scales only 26% of the concepts could get a SNOMED CT code. The percentage of concepts with a self made code that could get a SNOMED CT code found is lower than expected, we still think SNOMED CT codes are necessary for the continuity of care for stroke patients, and the inclusion of the fact that SNOMED CT has the option to request unique codes for individual concepts and measurement instrument or scientific scales representation.

Keywords: Controlled Vocabulary, Coding System, Medical Rec Informatics, SNOMED CT, Electronic Messages, HL7 v3

NCBI Resources How To

**PubMed.gov**  
US National Library of Medicine  
National Institutes of Health

PubMed Advanced Search

Abstract Send to:

[Stud Health Technol Inform](#), 2006;124:815-23.

## Using SNOMED CT codes for coding information in electronic health records for stroke patients.

van der Kooij J<sup>1</sup>, Goossen WT, Goossen-Baremans AT, de Jong-Fintelman M, van Beek L.

[Author information](#)

### Abstract

For a project on development of an Electronic Health Record (EHR) for stroke patients, medical information was organised in care information models (templates). All (medical) concepts in these templates need a unique code to make electronic information exchange between different EHR systems possible. When no unique code could be found in an existing coding system, a code was made up. In the study presented in this article we describe our search for unique codes in SNOMED CT to replace the self-made codes. This to enhance interoperability by using standardized

# 2006: Detailed Clinical Models workshop post HL7

- Georganizeerd door Intermountain Health (IMH)
- Geen “Dutch input”
- IMH voorbeelden ondersteunen enterprise system architecture (25% van alle NL zorg)
- Interesse in HL7 gemeenschap internationaal
- HL7 Keulen: Nictiz verzoekt om DCM projecten te starten in SDO's HL7 / CEN en ISO.

# 2007 HL7 & ISO projecten

- ISO TS 13972: hoe Detailed Clinical Models te maken, welke onderdelen, welke model eisen, patient veiligheid
- HL7 project 320: Top 10 of DCMs.
- Input Nictiz: 10 meest gebruikte zorginformatiemodellen / HL7 v3 berichten inhoud.

# 2009

- Nictiz set van 26 DCMs voor diabeteszorg
- HL7 v3 specificatie levert te veel schema's op
- Keuze: UML of OWL?
- Ivm tools en implementaties: UML
- Review DCM rond de wereld:

## Review Article

Healthc Inform Res. 2010 December;16(4):201-214.  
doi: 10.4258/hir.2010.16.4.201  
pISSN 2093-3681 • eISSN 2093-369X

**HIR**

Healthcare Informatics Research

## Detailed Clinical Models: A Review

William Goossen, RN, PhD<sup>1,2</sup>, Anneke Goossen-Baremans, RN, MSN<sup>2</sup>, Michael van der Zel, BSc<sup>2,3</sup>

<sup>1</sup>ICT Innovations in Healthcare, Christelijke Hogeschool Windesheim, Windesheim University, Zwolle; <sup>2</sup>Results 4 Care B.V., Amersfoort; <sup>3</sup>University Medical

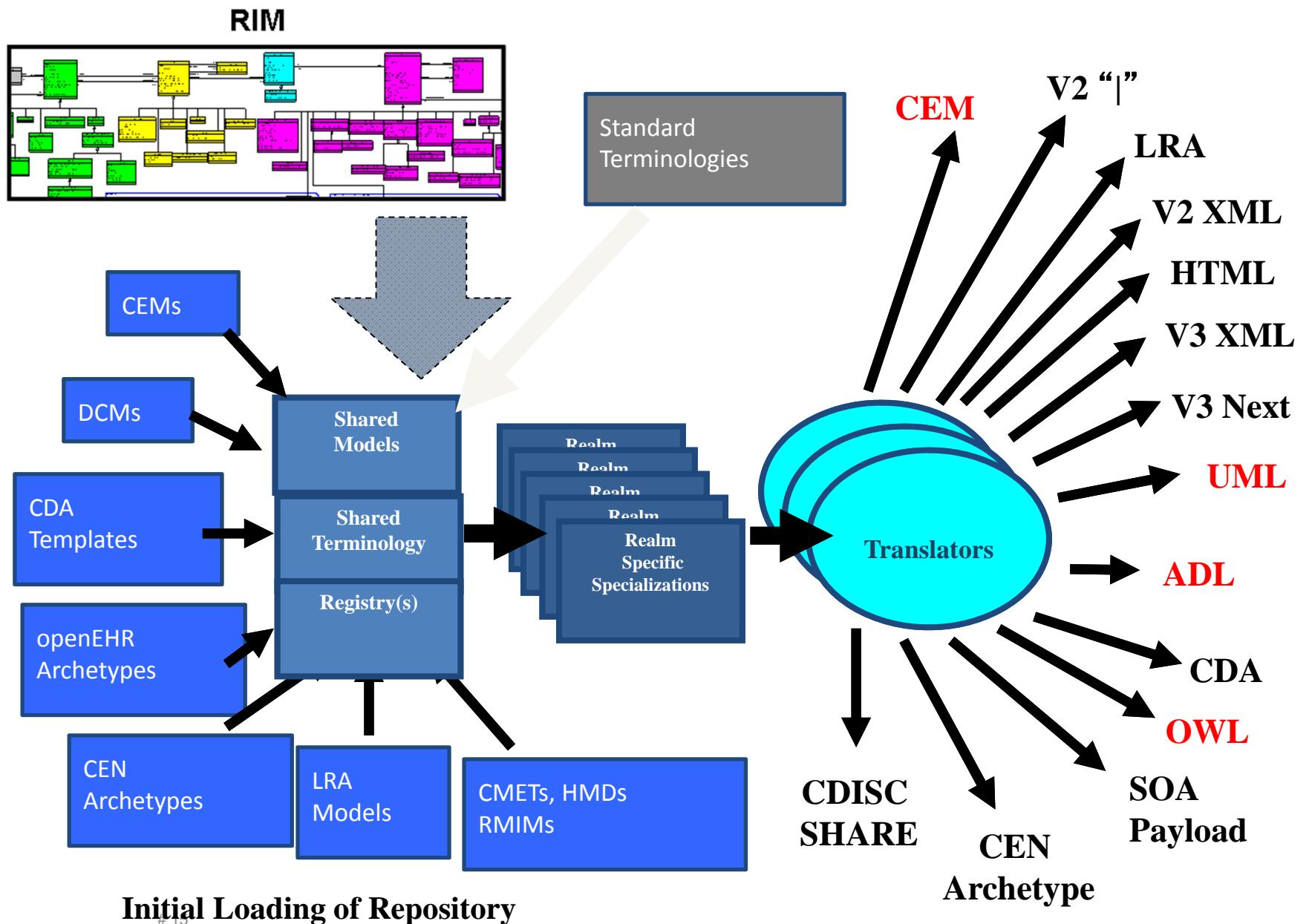
# 2008-2011

- JGZ: DCM van Wiechen, Oor, Oog, DMO, inhoud DD JGZ
- Parelsnoer 50 DCM, representeren research data, long term datagebruik
- SHB: 10 DCM huisarts: externe onderbouwing evidentie voor waarom van data collectie
- Perinatale registratie: HL7 v3 berichten maken (3 dagen ipv 3 maanden).

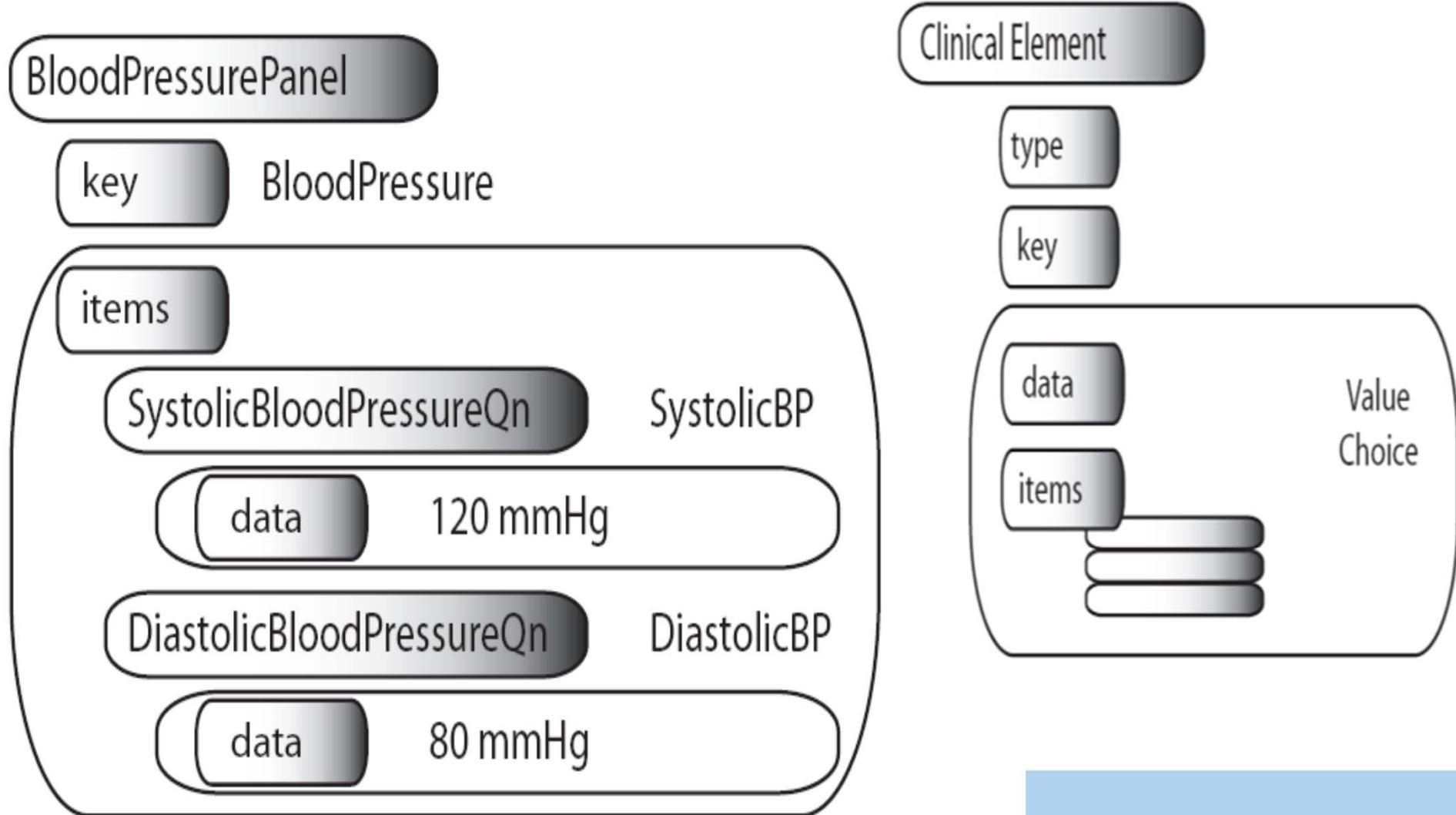
# Methode NEN normcommissie

- Bottom up analysis of data elements from information view only (Blobel, 2006, NEN, 2008)
  - Data type
  - Slot binding to code
  - Concepts
  - Relationships between concepts
- Not the full placement in existing reference information models
- Top 10 modeled in DCM - UML, HL7 template and OpenEHR archetype

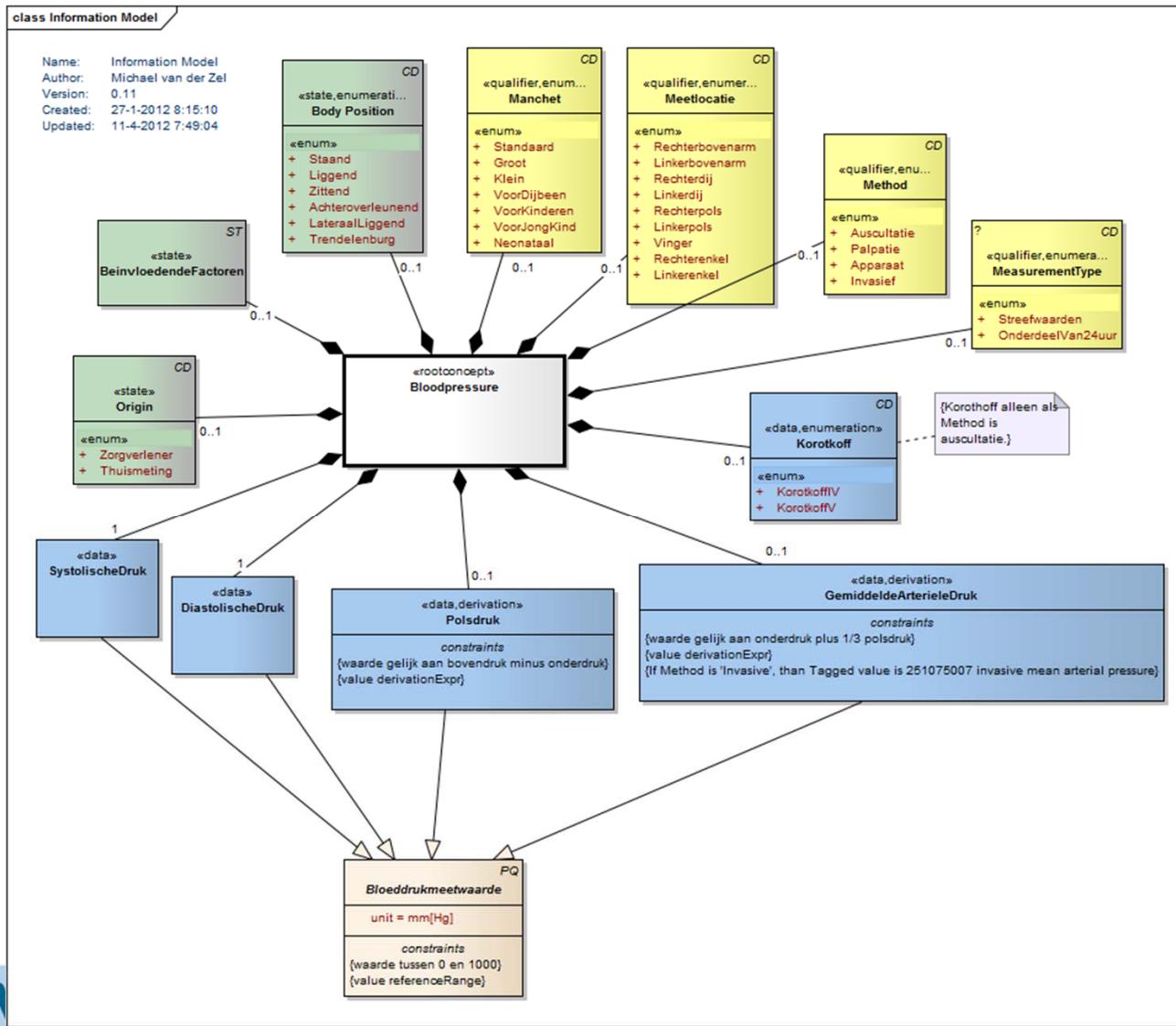
# 2012 CIMI



# Versimpeld DCM opbouw



# DCM voorbeeld



Kies alleen wat je nodig hebt  
 Maar gebruik de standaard data, data types, code en valueset

# DCM ISO TS 13972: 2015 core

1. Medical knowledge: concept, target population, evidence, instruction, interpretation

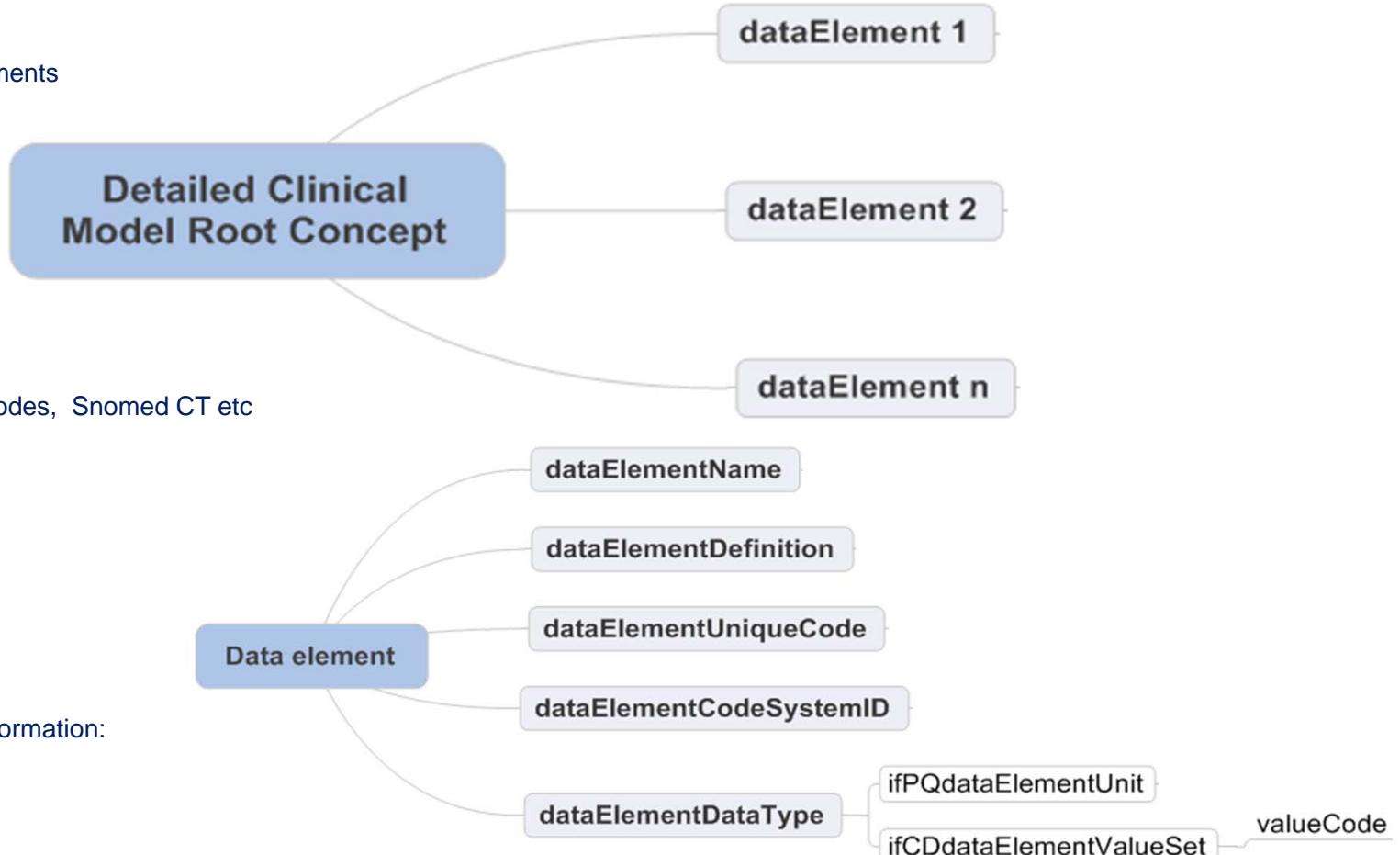
2. Data elements

3. Unique codes, Snomed CT etc

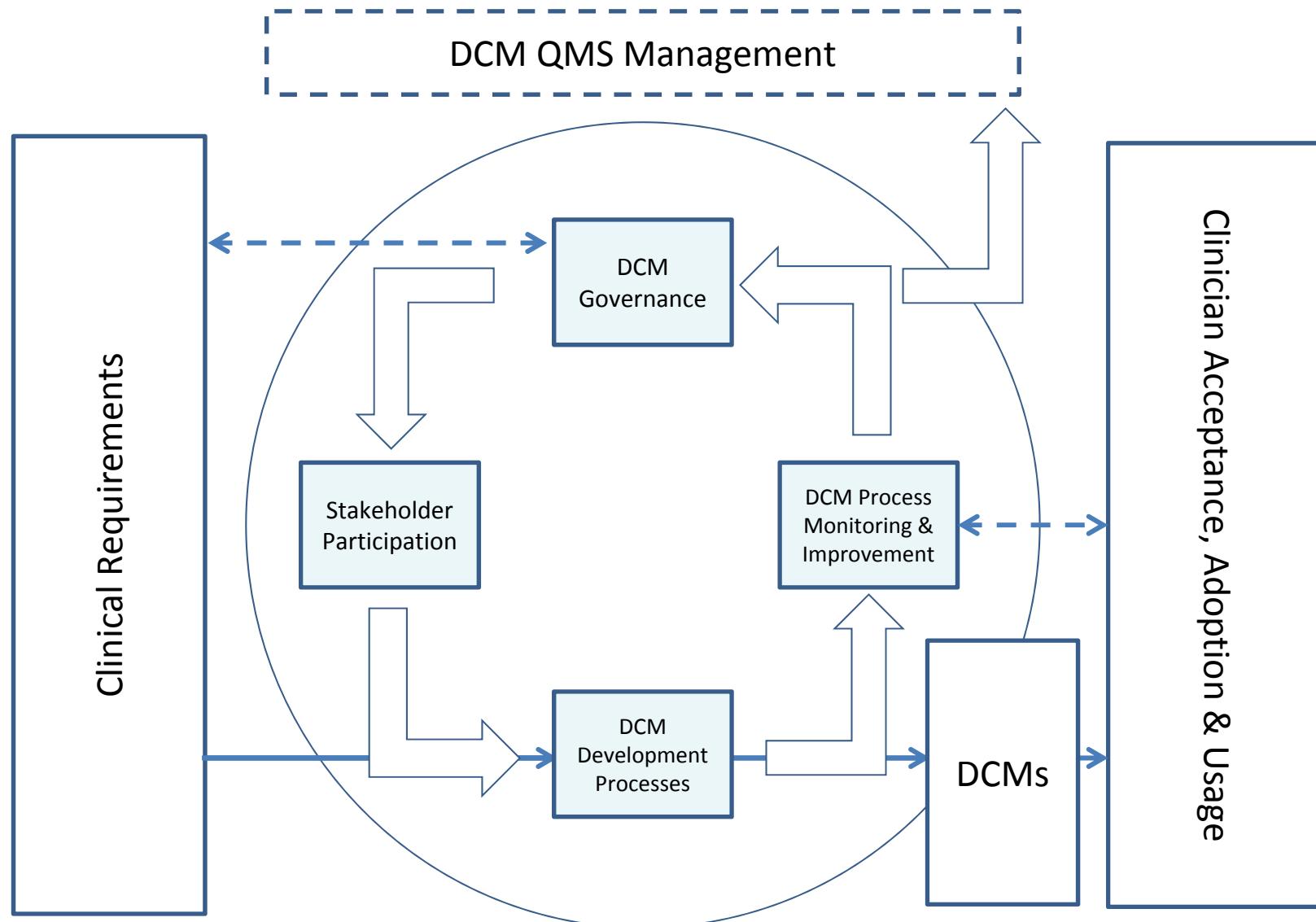
4. Meta information:

- Author
- Coder
- Versioning

5. Governance



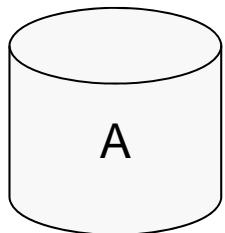
# DCM Management ISO TS 13972



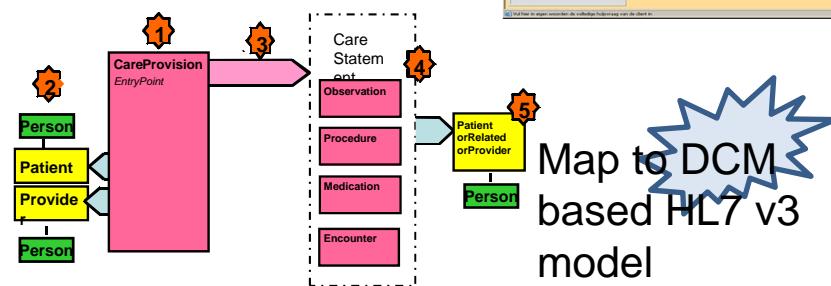
# 2011 DCM & PRN HL7 v3 bericht



DCM voor  
gegevens  
invoer systeem  
A



DCM:  
Opslag in  
systeem A



DCM  
input in  
XML  
Bericht  
Zender

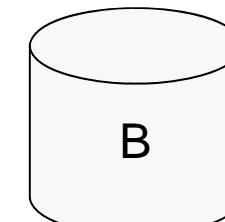
```
<subject>
<Patient>
  <id extension="213757"
    ...>16.840.1.113883.2.4.6.2.451.1
  </id>
  <addr use="P">
    <streetName>Maassingel </streetName>
    <houseNumber>82 </houseNumber>
    <postalCode>6678 IJ</postalCode>
    <city>DEURNE </city>
  </addr>
  <telecom use="HP" value="tel: 050-4536758
    ..."/>
  <statusCode code="active"/>
<Person>
  <name>
    <given qualifier="CL">M </given>
    <given qualifier="BR">P</given>
    <prefix qualifier="VVD">v </prefix>
    <family qualifier="SP">Vraagmaaraak
  </family>
  </name>
  <administrativeGenderCode code="M" />
</Patient>
```

DCM in Gegevenscommunicatie

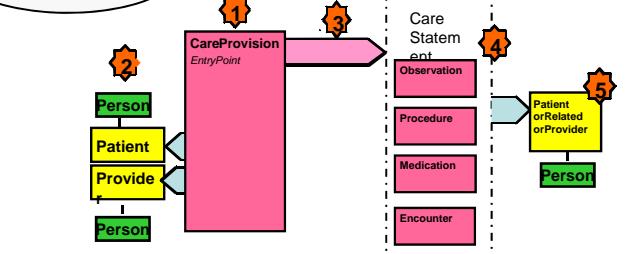
DCM based  
gegevens  
bekijken  
systeem B



Signalering  
Bericht  
Systeem B



DCM based  
opslag in  
systeem B



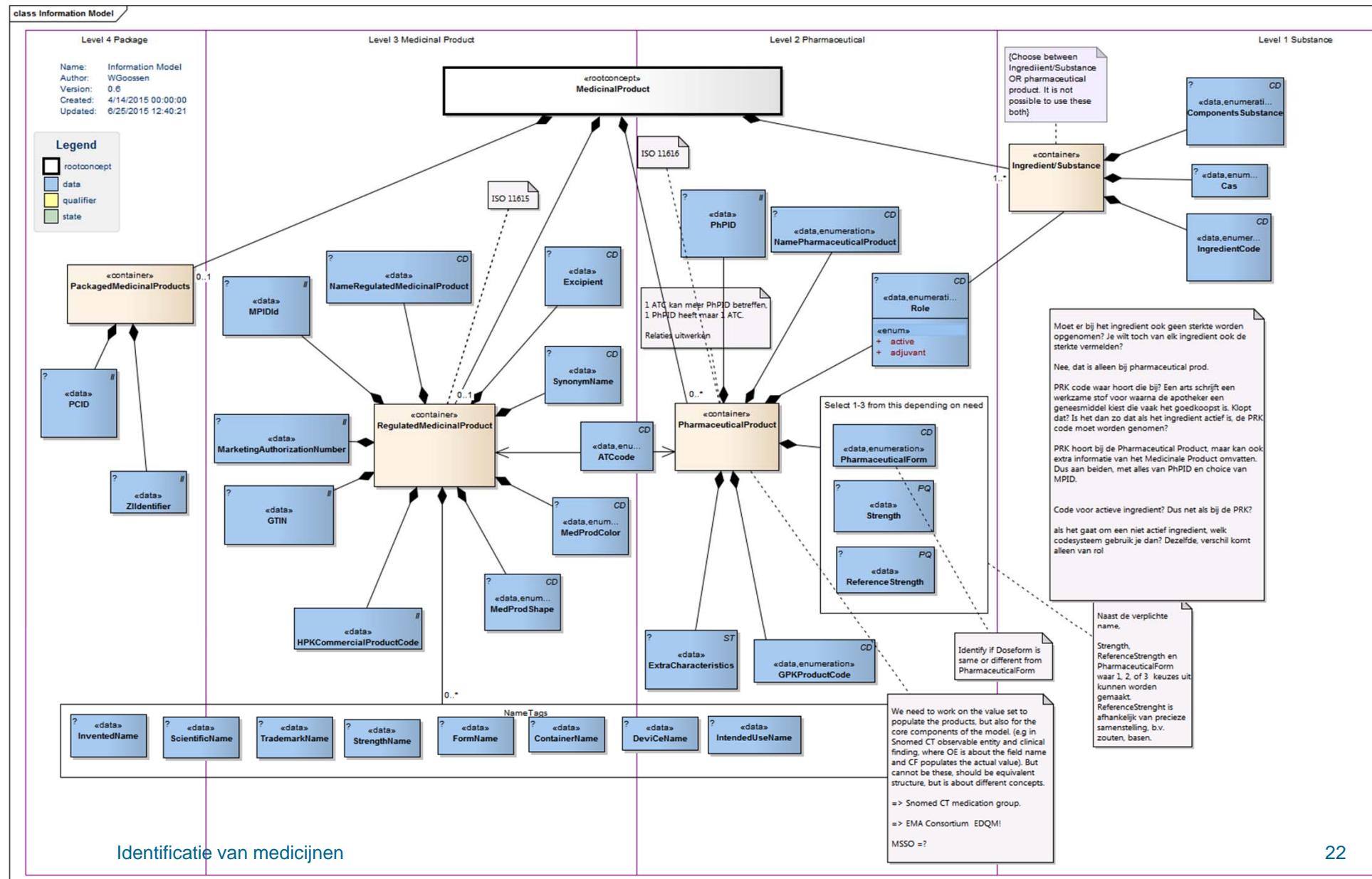
Translate via  
HL7 v3 model  
& DCM  
DCM in XML  
Bericht  
Ontvanger

```
<subject>
<Patient>
  <id extension="213757"
    ...>16.840.1.113883.2.4.6.2.451.1
  </id>
  <addr use="HP">
    <streetName>Maassingel </streetName>
    <houseNumber>82 </houseNumber>
    <postalCode>6678 IJ</postalCode>
    <city>DEURNE </city>
  </addr>
  <telecom use="HP" value="tel: 050-4536758
    ..."/>
  <statusCode code="active"/>
<Person>
  <name>
    <given qualifier="CL">M </given>
    <given qualifier="BR">P</given>
    <prefix qualifier="VVD">v </prefix>
    <family qualifier="SP">Vraagmaaraak
  </family>
  </name>
  <administrativeGenderCode code="M" />
</Patient>
```

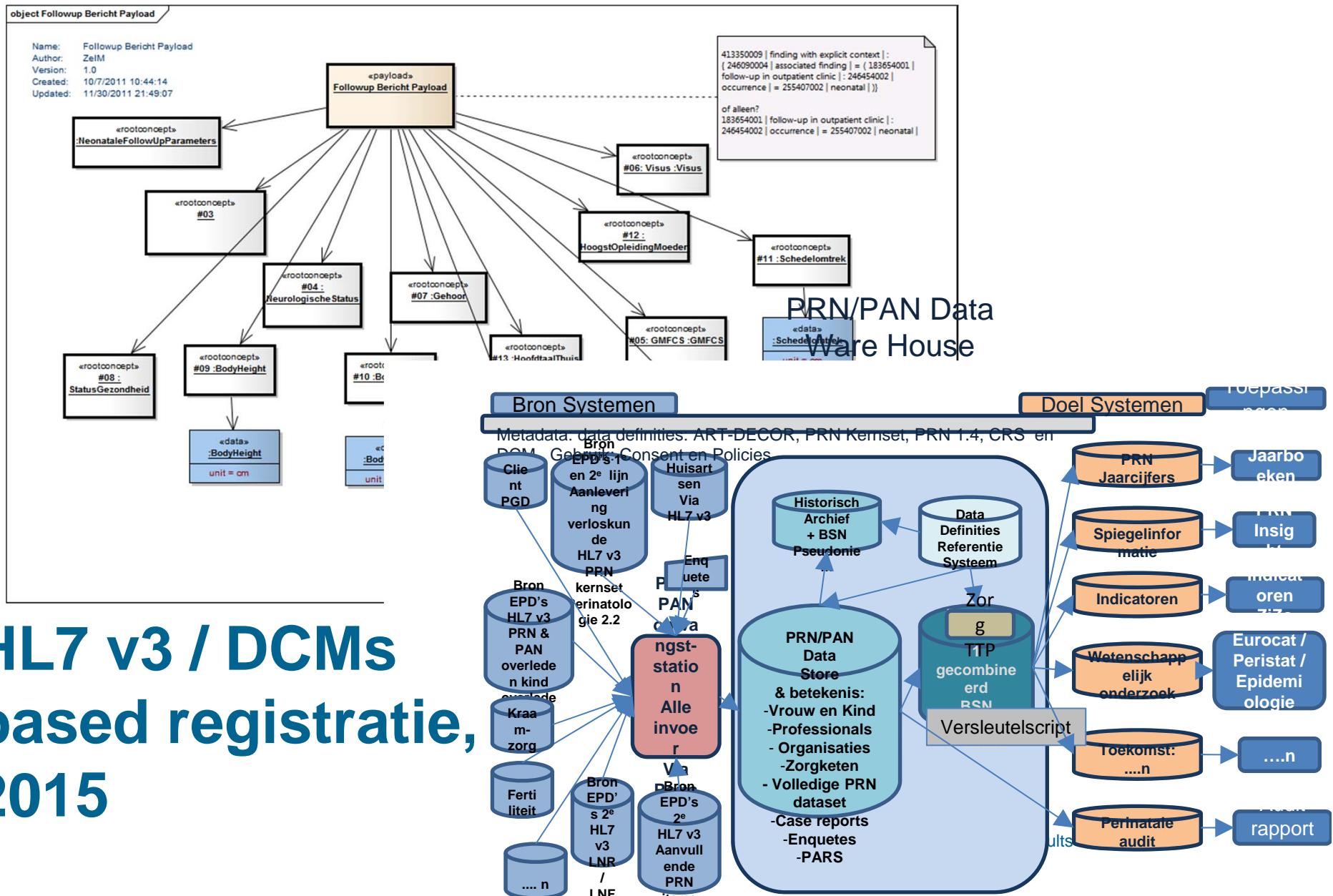
# DCM QC DCM gebruik voor Registratie en rapportage



# DCM medicinal product



# HL7 v3 payload DCMs: PRN, 2011



# Actuele situatie

- NFU / Nictiz project => vervolg lezing
- UMCG DCM gebruik in EPD en e-Measure
- NEN DCM QC: DCM repository& keurmerk
- ISO publicatie TS 13972: 2015 DCM
- Clinical Information Modeling Initiative onderdeel van HL7 Int
- Tool suite beschikbaar waarmee werk veel sneller en beter kan worden gedaan
- openMedicine DCM medicinal product
- Perined DWH en datamarts gebaseerd op DCM



**NEN**

# Hartelijk dank

Dr William Goossen, voorzitter NEN 303006

[wgoossen@results4care.nl](mailto:wgoossen@results4care.nl)