Using SNOMED CT in Detailed Clinical Modeling

ISC14078

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Objective

- Be able to describe interaction between SNOMED CT and Detailed Clinical Models,
- Identify potential for implementation of SNOMED CT based data models in electronic health record (EHR) systems and HL7 v3 messages,
- Illustrate how SNOMED CT and the DCM modeling approach together supports the various data management requirements.
Introduction

Despite the wide use of clinical terminologies, terminology is not enough for datamanagement in EHR, HL7 v3 data exchange methods, and the use of data for purposes as continuity of care, decision support, quality indicators, clinical research, and health management\(^2\).

One approach to combine terminology and information models for EHR and HL7 v3 is Detailed Clinical Models (DCM)\(^3\).
Context
Standards, so many to choose from
Blobels architecture cube
Model Driven Architecture

Conceptual

Logical

Implementable
Contents of DCM:

- Medical knowledge (target population, evidence, interpretation)
- Data elements specification
- Unique binding to 1-n codes (preferred Snomed CT, not exclusive)
- Meta information (authorship, version, verification, endorsement).
Business case DCM

C = N (N-1)

C = N-1

Results

Costs

Time
DCM creation & Snomed CT coding
### Online Browsers

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
<th>Link</th>
<th>Availability</th>
<th>Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>IHTSDO SNOMED CT Browser</td>
<td>Online browser</td>
<td>Beta version of an IHTSDO online, multilingual SNOMED CT Browser, being developed as part of the Open Tooling Framework. This is an evolving service which will change frequently for review. It is a BETA version, and should not be used in a production environment.</td>
<td><a href="http://browser.ihtsdo.org">http://browser.ihtsdo.org</a></td>
<td>Free service</td>
<td>IHTSDO</td>
</tr>
<tr>
<td>ITServer</td>
<td>Online browser</td>
<td>Online browser with fast searches, hierarchy filtering and various other interesting features.</td>
<td><a href="http://www.itserver.es/ITServer/Browser/snomedctbrowser.faces">http://www.itserver.es/ITServer/Browser/snomedctbrowser.faces</a></td>
<td>Free service</td>
<td>Indzen</td>
</tr>
<tr>
<td>Nictz Browser</td>
<td>Online browser</td>
<td>Online SNOMED CT browser fast searches, hierarchy filtering and a novel way to display definition of the concept selected.</td>
<td><a href="https://terminologie.nictz.nl/art-decor/snomed-ct">https://terminologie.nictz.nl/art-decor/snomed-ct</a></td>
<td>Free service</td>
<td>Nictz</td>
</tr>
<tr>
<td>NLM SNOMED CT Browser</td>
<td>Online browser</td>
<td>Search for and display SNOMED CT content, as included in UMLS® Metathesaurus®. Expands searches to include synonymous terms from over 100 Metathesaurus vocabulary sources.</td>
<td><a href="https://uts.nlm.nih.gov/">https://uts.nlm.nih.gov/</a></td>
<td>Free service</td>
<td>National Library of Medicine</td>
</tr>
<tr>
<td>NPEx Browser</td>
<td>Online browser</td>
<td>Online browser intended for use in UK NHS Data includes UK National Extension</td>
<td><a href="http://www.npexbrowser.com">http://www.npexbrowser.com</a></td>
<td>Free service</td>
<td>X-Lab</td>
</tr>
<tr>
<td>Snoflake Browser</td>
<td>Online browser</td>
<td>Online browser, with support for ICD-10 code search. Includes UK extensions, subset, suffix &amp; favourite filtering, user favourites, prefix searching.</td>
<td><a href="http://www.snoflake.co.uk">http://www.snoflake.co.uk</a></td>
<td>Free service</td>
<td>Dataline Software</td>
</tr>
<tr>
<td>Snolex</td>
<td>Online browser</td>
<td>Online browser with fast searches, hierarchy filtering, search counts per hierarchy and various other interesting features.</td>
<td><a href="https://snolex.com/">https://snolex.com/</a></td>
<td>Free service</td>
<td>Noesis Informatica</td>
</tr>
<tr>
<td>VTSL Terminology Browser</td>
<td>Online browser</td>
<td>Browser is designed to search and browse SNOMED CT International release as extended by VTSL to include the Veterinary Extension.</td>
<td><a href="http://vtlvetmed.vt.edu/browser">http://vtlvetmed.vt.edu/browser</a></td>
<td>Free service</td>
<td>Veterinary Terminology Services Lab at Virginia Tech</td>
</tr>
</tbody>
</table>

This page contains links to websites and applications that allow you to view the content of SNOMED Clinical Terms. These services are provided by the named third parties. IHTSDO makes no warranty, expressed or implied, about the accuracy or completeness of the information provided or the fitness for purpose of any of these services.
nl.HealthBase.Bloeddruk

Reviews

You can use a review to give an overall view, rather than contribute comments intended to help develop it.

Add a review.

Onderdruk

Description: Het minimum van de druk die optreedt tussen twee samentrekkingen van het hart in, als het hart zich weer met bloed vult.

Datatype: integer []

Cardinality: 1

Coding: SCT: 271650006 diastolic blood pressure
DCM Uses
Data needs & DCM use

- Primary process
- Continuity of care
- Q- indicator
- Management
- Clinical trial
- Epidemiology
- Financial
HL7 R-MIM voor Blood Pressure

R-MIM in MS Visio Approach stopped about 2006
R-MIMs fit HL7 v3 Care Record message & CDA

DCM specify message payload via transformation to clinical statements.
<?xml version="1.0" encoding="utf-8"?>

<REPC_MT000100UV01.Organizer xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:type="REPC_MT000100UV01.Organizer">
<code displayName="Bloodpressure" codeSystemName="DCMInternal">
<translation code="35094-2" displayName="Blood pressure panel" codeSystemName="LOINC" codeSystem="2.16.840.1.113883.6.1" />
<translation code="75367002" displayName="blood pressure" codeSystemName="SnomedCT" codeSystem="2.16.840.1.113883.6.96" />
</code>

<!-- several parts removed -->

<component typeCode="COMP">
<observation classCode="OBS" moodCode="DEF">
<code="271650006" displayName="diastolic blood pressure" codeSystemName="SnomedCT" codeSystem="2.16.840.1.113883.6.96" />
</code>
<repeatNumber>
<low value="1" /> 
<high value="1" />
</repeatNumber>
</observation>
</component>

</REPC_MT000100UV01.Organizer>
Source Systems: Various codes

Target Systems: unique codes

Secured Data Store & Semantics:
- Patients
- Professionals
- Organisations

Datamart anonymous
Datamart anonymous
Datamart + ID
Datamart - n

Research
Quality Indicator
Knowledge
Continuity of care

Standards, as DCM & Snomed CT

Based on: Goossen & Dille, 2013
DCM services
Governance: ISO TS 13972

DCM QMS Maintenance

DCM Governance

Stakeholder Participation

DCM Process Monitoring & Improvement

DCM Development Processes

DCMs

Clinical Requirements

Clinician Acceptance, Adoption & Usage

Results4Care
Repository DCM

DetailedClinicalModels / DCM-Verified-Implemented

These DCMs have been approved by minimum of one clinical community and have been used for at least one implementation in systems — Edit

- 11 commits
- 1 branch
- 0 releases
- 2 contributors

Moved Length to Files repository with annotation

- DetailedClinicalModels authored 4 days ago

<table>
<thead>
<tr>
<th>File</th>
<th>Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMO protocol</td>
<td>DMO protocol uploaded</td>
<td>21 days ago</td>
</tr>
<tr>
<td>Pain score - Pijlscore</td>
<td>Minor updates with pdf and one xml from other source</td>
<td>6 days ago</td>
</tr>
<tr>
<td>Pupil Reaction - Pupil reactie</td>
<td>Implemented DCMs</td>
<td>a month ago</td>
</tr>
<tr>
<td>SNAQ score</td>
<td>Minor updates with pdf and one xml from other source</td>
<td>6 days ago</td>
</tr>
<tr>
<td>Temperature-Temperatuur</td>
<td>Minor updates with pdf and one xml from other source</td>
<td>6 days ago</td>
</tr>
<tr>
<td>Weight-Gewicht</td>
<td>updates</td>
<td>27 days ago</td>
</tr>
<tr>
<td>van Wieringenschema</td>
<td>van Wieringens draft XML</td>
<td>29 days ago</td>
</tr>
<tr>
<td>.gitattributes</td>
<td>Added .gitattributes &amp; .gitignore files</td>
<td>a month ago</td>
</tr>
<tr>
<td>.gitignore</td>
<td>Added .gitattributes &amp; .gitignore files</td>
<td>a month ago</td>
</tr>
<tr>
<td>README.md</td>
<td>Create README.md</td>
<td>a month ago</td>
</tr>
</tbody>
</table>

info@results4care.nl
Context of terminology service and DCM service in architecture
Use DCM service
Conclusion

Detailed Clinical Models according ISO TS 13972, combined with SNOMED CT codes:

- Offer a rich way to collect, store and use terminology based data
- Fits with EHR / PHR’s based on consistent architectures
- Enhances systems flexibility allowing any clinical relevant composition and pathway with terminology and DCM
- Hence, allow many meaningful clinical data aggregations
- DCM and compositional services as addition to terminology services will facilitate clinical care, continuity and meaningful aggregations.
Thanks for your attention

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