Using Archetypes for Defining CDA Templates

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Introduction
Clinical models

• The complexity of the clinical domain requires a clear definition of clinical models that formally describe knowledge and information structures.
Introduction
HL7 CDA templates

• For example, HL7 CDA defines templates over a generic document reference model.
  – These templates are generally defined in textual implementation guides or complex formats for clinicians, such as Schematron.

<sch:assert flag="SHOULD" id="CONF-8662-branch"
test="count(cda:participant[@typeCode='VRF'
and count(cda:templateId[@root='2.16.840.1.1883.1'])=1
and count(cda:time)&lt;=1
and count(cda:participantRole)=1])&gt;=1"
The ISO 13606 standard uses archetypes for the definition of clinical models.

- An archetype is a computable definition of a clinical model, including both the constraints of the information structures and their binding to clinical terminologies.
We can use any generic reference model as the pieces to be used to build clinical concepts.

- This can be ISO 13606, openEHR… but also HL7 CDA!
The objectives of this work are:

- To investigate if archetypes can be directly used to the HL7 CDA reference model.
- To define a set of HL7 CDA archetypes for chronic kidney disease information.
- To use those archetypes to generate HL7 CDA documents from existing data.
Methodology

• We have used LinkEHR, a system that allows defining archetypes based on any reference model and use them to generate standard data from legacy data sources.

www.linkehr.com
We modeled and generated HL7 CDA documents to support the continuity of care of patients with **chronic kidney disease**.

They are being used to monitor the treatment received by over 500 patients in 8 external centers of the **Hospital Universitario Virgen del Rocío** (Spain).
• Several **archetypes** were defined.
  – Three main archetypes:
    • Referral document
    • Hemodialysis prescription
    • Hemodialysis monitoring
  – Four generic archetypes to be specialized in specific contexts later on:
    • HL7 CDA Header
    • HL7 CDA Observation
    • HL7 CDA Organizer
    • HL7 CDA Substance Administration
HL7 CDA archetypes in use

HL7 CDA archetype for a referral document

Available at www.en13606.org
LinkEHR allows mapping archetypes to legacy data source schemas.

- The tool automatically generates an XQuery script that transforms XML instances of legacy data into normalized HL7 CDA XML instances.

This script was deployed at the EHR system of the hospital and is executed each time a hemodialysis-related document is requested.
HL7 CDA archetypes in use

LinkEHR

Legacy data model → Archetype → Standard model

Follows

Legacy data

Transform script

Generates

Standard data

Follows

HL7 CDA archetypes
Conclusions

- HL7 CDA reference model (XML Schema) was successfully imported to the LinkEHR archetype editor.
- HL7 CDA archetypes were created in a clinical-friendly environment.
- HL7 CDA valid documents are being generated from those archetypes and existing legacy data.
Conclusions

• Benefits achieved
  – Successful application of the archetype approach to the HL7 CDA reference model.
  – Easier definition of CDA templates.
  – Faster development of CDA documents.
  – Improved consistence across entries and documents.
  – The archetype reusability ratio in our use case is more than 50%, saving development time.
Conclusions

• Problems detected
  – The complexity of the HL7 CDA reference model makes difficult working with it.
  – HL7 CDA is an document (XML) oriented model while archetypes work in an object oriented basis.
  • Some assumptions had to be made to support it.
Questions?

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HL7 CDA archetypes