Templated CDA, C-CDA, and the Care Plan and Trifolia Demo

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Outline

Templated CDA

- What is it?

- What are its benefits?

- Defining a template

Implementation Guides

- Why implementation guides (IGs)?

Consolidated CDA (C-CDA) and the Care Plan

- Evolution of C-CDA
- The new Care Plan document type

Trifolia Demo

What is a Template?

- Formal HL7 Definition of a Template:

  A template is an expression of a set of constraints on the RIM or a RIM-derived model that is used to apply additional constraints to a portion of an instance of data which is expressed in terms of some other Static Model. Templates are used to further define and refine these existing models to specify a narrower and more focused scope.

- In other words:

  A template is a layer of constraints applied to a more generic model to narrow the scope of that model for a specific use case or implementation.

- Example:

  Narrow the scope of the RIM, which can (theoretically) describe anything, to a single concept – Allergy.

What is Templated CDA?

- Set of constraints on either the base CDA model (CDA Refined Reference Information Model or R-MIM) or on another CDA template.
- Constraints can only be tightened, not loosened:
  - Can tighten 0..* to 1..1
  - Cannot loosen 1..1 to 0..1
  - Can tighten MAY to SHALL
  - Cannot loosen SHALL to SHOULD
- Constraints can also be applied to vocabulary – setting a codeSystem or a valueSet or a single value.
- Templates are usually at a fairly granular level – entry- or section-level.
- But they don't have to be – can also be document-level – a Discharge Summary is a template.

Templates are reusable and build on each other

Template B
- QRDA Medication Active
  - (moodCode="EVN", statusCode="active", etc.)

Template A
- C-CDA Medication Activity
  - (id [1..*], moodCode from valueSet, statusCode [1..1] from valueSet, etc.)
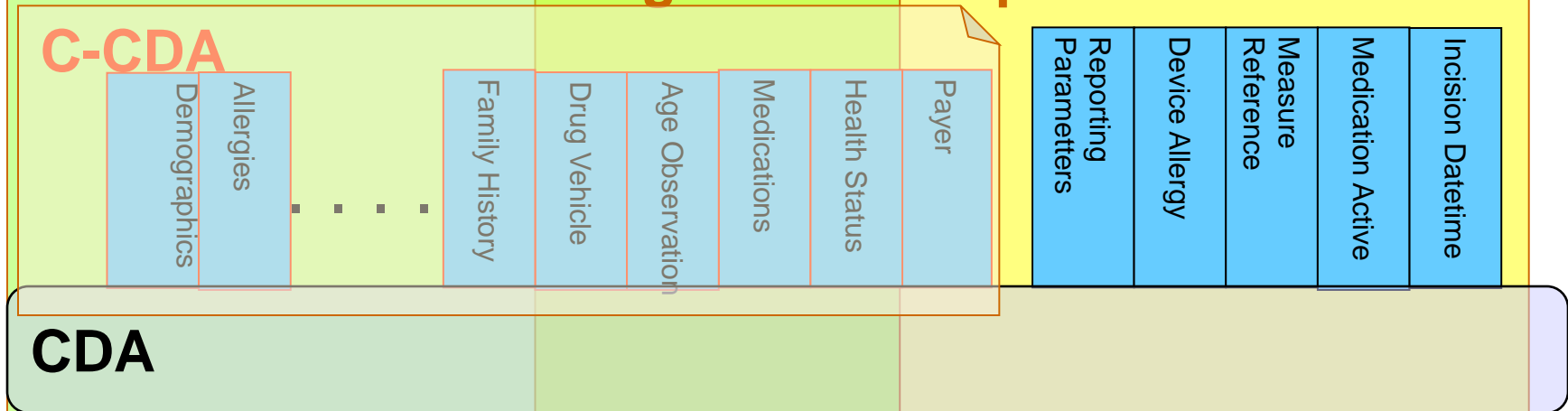
CDA R-MIM
- substanceAdministration
  - (id [0..*], moodCode from valueSet, statusCode [0..1], etc.)

Templated CDA

- Many different kinds of documents
- A bucket of reusable templates

QRDA CDA document using C-CDA templates

A CDA document using C-CDA templates

C-CDA

Demographics | Allergies | . . . . . | Family History | Drug Vehicle | Age Observation | Medications | Health Status | Payer | Reporting Parameters | Device Allergy | Measure Reference | Medication Active | Incision Datetime

CDA

Benefits of Templated CDA

- Streamlined standards development

  - Reusable building blocks

- Streamlined standards implementation

  - Implement once, deploy often

- Modular and reusable

  - Templates (e.g., blood pressure, discharge diagnosis) can be repackaged with other templates in any number of CDA IGs.

- Core component of CDA's "incremental interoperability" strategy:

  - Begin with simple CDA and add templates as they are prioritized.

Defining a Template

A template identifier (templateId) signals the imposition of a set of template-defined constraints.

Document-level Template

```
<ClinicalDocument>
    ...
  <!-- Conformant to a ClinicalDocument set of constraints -->
  <templateId root="2.16.840.1.113883.10.20.5.4"/>
    ...
  <section>
    <!-- Conformant to a ClinicalDocument section -->
    <templateId root="2.16.840.1.113883.10.20.5.5.6"/>
      ...
  </section>
  ...
</ClinicalDocument>
```

Development with Templates: Reusability

A template developed for one implementation can represent identical semantics and structure and be reused in additional implementations.

HL7 Consolidated CDA templates:

- Problem Observation (2.16.840.1.113883.10.20.22.4.4)

- Procedure Activity Observation (2.16.840.1.113883.10.20.22.4.3)

- Medications Administered (2.16.840.1.113883.10.20.22.2.38)

- Reaction Observation (2.16.840.1.113883.10.20.22.4.9)

...

- Consolidation templates are reused on a very regular basis: Hospital Acquired Infections (HAI), QRDA, Massachusetts Health Information Exchange (MASS HIE), etc.

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Development with Templates: Reusability

The C-CDA R2 IG (currently going through ballot at HL7) contains 13 document level templates that reuse the C-CDA section and entry templates interchangeably.

Development with Templates: Consistency

Using the same templates across document types

Document Type Preferred LOINC Code templateId	Required Sections:	Optional Sections:
Continuity of Care Document (CCD) (V2) 34133-9 "Summarization of Episode Note" 2.16.840.1.113883.10.20.22.1.2.2	Allergies Section (V2) Medications Section (V2) Problem Section (V2) Procedures Section (V2) Results Section (V2) Social History Section (V2) Vital Signs Section (V2)	Advance Directives Section (V2) Encounters Section (V2) Family History Section Functional Status Section (V2) Immunizations Section (V2) Medical Equipment Section (V2) Mental Status Section (NEW) Payers Section (V2) Plan of Treatment Section (V2)
Discharge Summary (V2) 18842-5 "Discharge Summarization Note" 2.16.840.1.113883.10.20.22.1.8.2	Allergies Section (V2) Hospital Course Section Hospital Discharge Diagnosis Section (V2) Plan of Treatment Section (V2)	Chief Complaint and Reason for Visit Section Chief Complaint Section Family History Section Functional Status Section (V2) Immunizations Section (V2) Problem Section (V2) Procedures Section (V2) Social History Section (V2) Vital Signs Section (V2) etc.

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Development with Templates: Consistency

- QRDA R2 Category I reuses C-CDA R1.1 templates and constrains them to meet quality reporting needs:

- C-CDA R1.1 Encounter Activities (2.16.840.1.113883.10.20.22.4.49)

  - QRDA Encounter Performed (2.16.840.1.113883.10.20.24.3.23)

    - The actStatus is constrained to "completed" and both a low and high effectiveTime are required.

- C-CDA R1.1 Medication Activity (2.16.840.1.113883.10.20.22.4.16)

  o QRDA Medication Active (2.16.840.1.113883.10.20.24.3.41)

    o A time/date stamp is required. ActStatus is constrained to "active" and moodCode is constrained to "EVN."

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Why Implementation Guides (IGs)?

- When a document is conformant to the CDA R2 standard, it does not necessarily satisfy any requirement other than it conforms to the CDA R2 standard.

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Why IGs?

IGs let us define additional constraints:

- What kind of documents can be exchanged?

- Which sections are mandatory, which are optional?

- What coded information and vocabularies should the sections contain (ICD-9 diagnostics, ACR codes, LOINC lab test codes, SNOMED CT clinical findings, etc.)?

- Which standardized Reference Information Model (RIM)-based structures should we use for each entry?

CDA and Consolidated CDA (C-CDA)

- The C-CDA IG contains a library of CDA templates, incorporating and harmonizing previous efforts from:

  - HL7

  - IHE

  - Health Information Technology Standards Panel (HITSP)

- It represents harmonization of the HL7 Health Story guides, HITSP C32, related components of IHE Patient Care Coordination (PCC), and CCD.

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Original Consolidation Project: C-CDA R1.1

1. HL7 Consult Note
2. HL7 Diagnostic Imaging Report
3. HL7 Discharge Summary
4. HL7 History and Physical (H&P)
5. HL7 Operative Note
6. HL7 Procedure Note
7. HL7 Unstructured Documents
8. HL7 Progress Notes
9. HL7 CCD
10. HITSP/C84 Consult and H&P Note Document
11. HITSP/C32 - Summary Documents Using HL7 CCD
12. HITSP/C48 Referral and Discharge Summary Document Constructs
13. HITSP/C62 Scanned Document

One master IG

Current Consolidation Project: C-CDA R2

- Developed and produced through the joint efforts of:

  - HL7

  - Two sub work groups of the USA Office of the National Coordinator (ONC) Longitudinal Care Coordination (LCC) Standards and Interoperability (S&I) Framework

    - Longitudinal Care Plan (LCP)

    - Long-Term Post-Acute Care (LTPAC) Transition

  - The Substitutable Medical Apps and Reusable Technologies (SMART) C-CDA collaborative hosted by ONC and Harvard Medical School

Current Consolidation Project: C-CDA R2

- C-CDA is split into two volumes

    - Volume 1 – Introductory Material (scope, purpose, etc.)

    - Volume 2 – Templates and Supporting Material

- One of the first HL7 Implementation Guides where the majority of the document is automatically generated by software - the entirety of Volume 2 is generated

- Software is called Trifolia and is available free of charge to HL7 members (will do a quick demo at the end of slides)

C-CDA R2: Changes from R1.1

- C-CDA R2 went to ballot in September

- Added new document types

  - Care Plan

  - Referral Note

  - Transfer Summary

  - Patient Generated Document

- Added new sections

- Added new entry level templates

- Many, many templates were modified/clarified

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C-CDA R2: Ballot process

- The C-CDA R2 IG received 1013 ballot comments (a new record?)

- These ballot comments are being worked through and resolved

- Along with the regular HL7 Structured Document Work Group weekly meeting, 3 extra hours of meetings per week have been setup to discuss comments and come to proposed resolutions

C-CDA R2 Document Types

1. Care Plan (NEW)
2. Consultation Note (V2)
3. Continuity of Care Document (CCD) (V2)
4. Diagnostic Imaging Report (V2)
5. Discharge Summary (V2)
6. History and Physical (V2)
7. Operative Note (V2)
8. Procedure Note (V2)
9. Progress Note (V2)
10. Referral Note (NEW)
11. Transfer Summary (NEW)
12. Unstructured Document (V2)
13. US Realm Header - Patient Generated Document (NEW)

C-CDA R2 Care Plan Overview

- Today we're going to take a quick look at one of the new document types in C-CDA R2 - the Care Plan document as it's a bit unique in design

- Care Plans originally started as a nursing teaching tool and have evolved from there

- A Care Plan is a consensus-driven dynamic plan that represents all of a patient's and Care Team Members' prioritized concerns, goals, and planned interventions. The CDA Care Plan is an **instance in time** of a dynamic Care Plan.

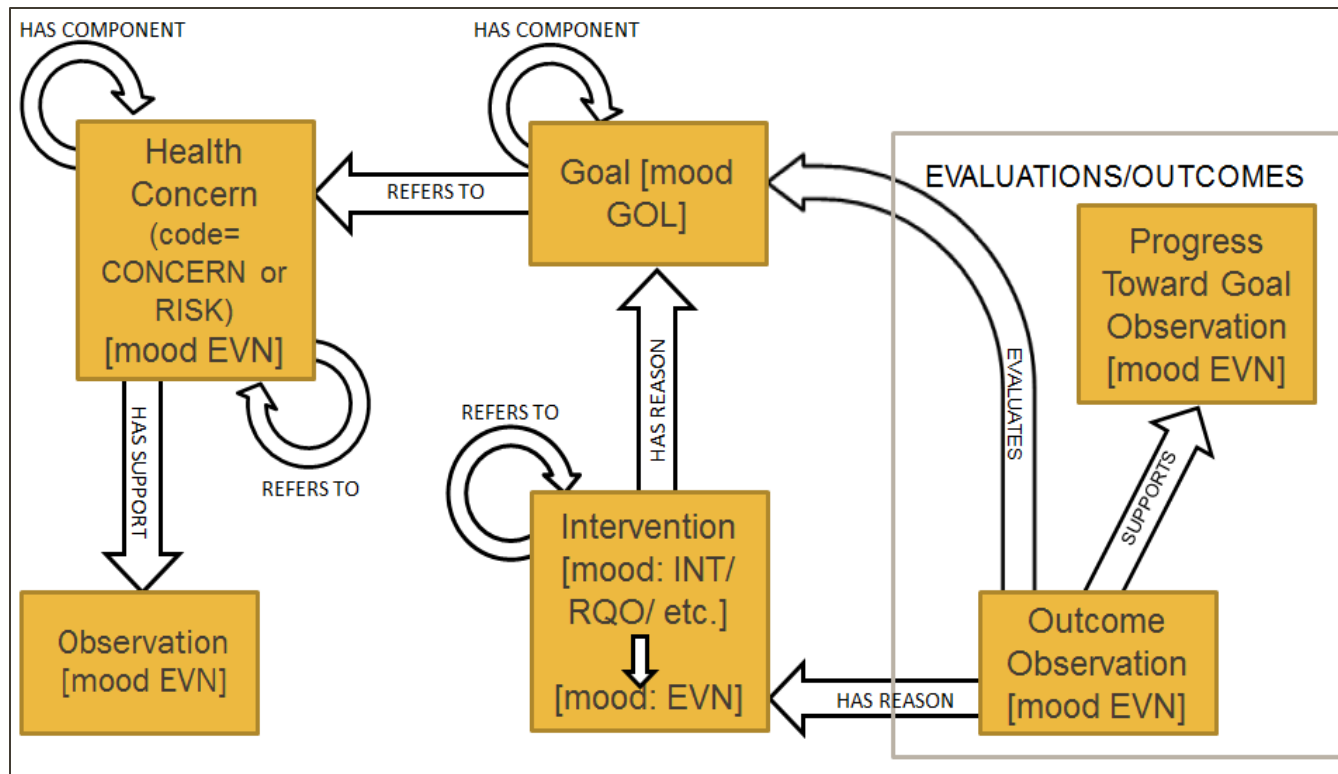# C-CDA R2 Care Plan Background

- In order properly to express the concepts in the CDA representation of the Care Plan many different stakeholders were involved:

  - the ONC LCC S&I Framework's Longitudinal Care Plan (LCP) Sub Work Group (SWG) defined the data elements and assisted in the design of the CDA templates

  - the LCP SWG worked with the HL7 Patient Care Work Group (PCWG) while the HL7 PCWG developed the HL7 Care Plan Domain Analysis Model (DAM) (this work is also currently going through the ballot process)

  - the IHE (Patient Care Coordination) PCC Work Group Care Plan products were also reviewed and many PCC work group members also participated in the S&I design sessions

C-CDA R2 Care Plan Design

- All of these works and group discussions created the design of the CDA Care Plan

- The HL7 RIM and CDA RMIM together with actRelationshipType codes and act moodCodes very effectively express the relationship between Care Plan components

C-CDA R2 Care Plan Design

- The following diagram shows the components of a Care Plan and the flow between them, expressed by HL7 moodCodes and actRelationship typeCodes.
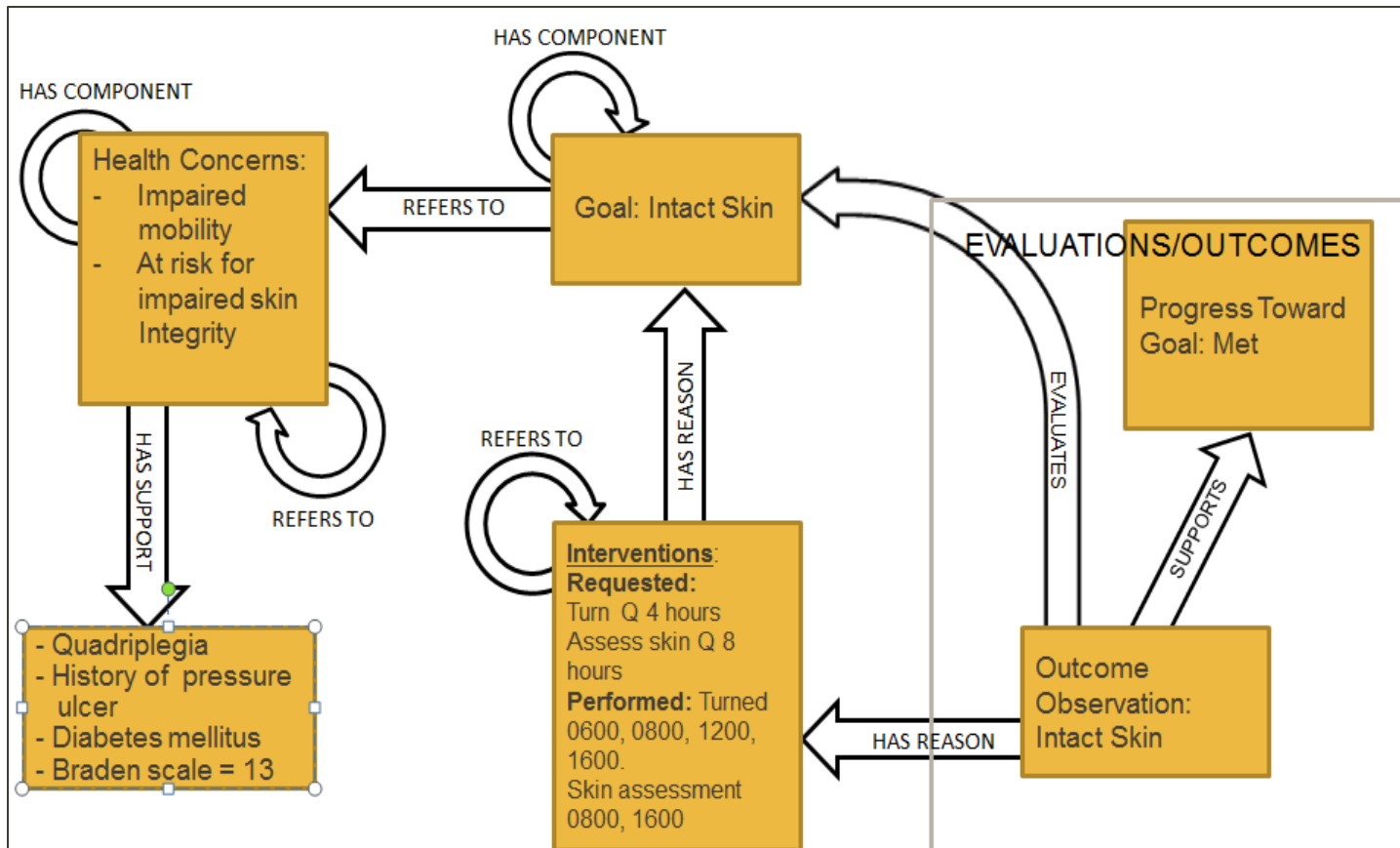
C-CDA R2 Care Plan - Example

- Joe is a 24 year-old male quadriplegic with diabetes mellitus.

- He is admitted to an inpatient unit from his home.

- During the admission assessment, the nurse notes that he has no sensation from the shoulders down.

- He is confined to a wheelchair and requires two-person assist.

- His skin is occasionally moist.

- Joe reports that he is a "good eater" and is on a diabetic diet.

- The nurse completes the Braden Skin Scale. The score is 13.

- Further assessment by the nurse reveals skin is intact with no pressure ulcers.

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C-CDA R2 Care Plan Design - Instantiated

- The following diagram shows the components of a Care Plan and the flow between them expressed using HL7 moodCodes and relationshipCodes

C-CDA R2 Care Plan

- Navigate through Care Plan in the C-CDA R2 IG

Trifolia Demo

- Trifolia Workbench: HL7 Web Edition: http://trifolia.lantanagroup.com/

- Structured Template Entry Tool: Design, review, manage, and document HL7 templates

- Template Versioning: Identify and track version changes in templates

- Value Set Support: New tools for reporting, managing, and navigating value sets

- Schematron Generation: Automatically generate partial Schematron files to test conformance statements

Trifolia Demo

- Generate basic XML samples for your templates

- Template Repository: A centralized database for template management

- Tool: Export templates as customized Word documents to share within and outside your organization

- Documentation: User Guides and Online Help

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