Example-driven C-CDA-to-FHIR mapping weekly discussion minutes

This effort aims to compare the mapping outcomes between different vendors from the same CCD construct to align the best practice as recommendations for the industry. We created a track as part of the September 2022 Connectathon: 2022 - 09 C-CDA to FHIR Mapping, but also have done work before and after the event to give sufficient time to compare the mappings and discuss the differences. We host weekly meetings between Diameter Health, More Informatics, Google and MDIX and record the meeting agenda and minutes here.

The github repo that hosts the CCD input as well as the mapped outbound FHIR resources and bundle is https://github.com/chunli866/CDAtoFHIRSamples.

Participants: Chun Li (Diameter Health), John D’Amore (More Informatics), Sajjad Hussain (Google), Ken Lord (MDIX)

Notes:

- Chun will create a github repo to host the mapping inputs and outputs, which allows all the iterations to be kept and retrievable.
- Discrepancies that Google takes away and considers fix:
  - Map OID to the actual code system names. There is a required list that needs to be mapped: https://build.fhir.org/terminologies-systems.html. Concept map would be a nice idea to help with this as well
  - to update the onsetDateTime
- Discrepancies for DH to take away:
  - DH only maps the first identifier - should consider maps all if there are more than one in the same x-path
- Open questions:
  - Google maps the allergen to reaction.substance, and DH maps to code
  - Google maps the identifier from the act and DH maps from the observation
  - DH is doing context induction, where it maps the document-level of information (e.g., author) to the individual resource - there should be more discussion on whether this is appropriate and under what condition for the industry to follow

Participants: Chun Li (Diameter Health), John D’Amore (More Informatics), Sajjad Hussain (Google), Jay Lyle, (JP Systems / VA)

Notes:

- Logistics:
  - Make sure all collaborators are on github
  - Place to store meeting agenda and minutes - subpage of the project confluence page? https://confluence.hl7.org/display/CGP/C-CDA+to+and+from+US+Core+Mapping
  - Cerner has okayed produce FHIR resources based on the sample CCD
  - Topic for allergy section:
  - Check with Jay on mapping code in code or substance - Jay agreed that the allergen should be mapped to the code element (DH’s way)
  - Identifier: act id or observation id, or both [need to take both IDs] - landed on allergies and problems should use the observation ID (and ignore the act ID), and if null, just leave empty. The other clinical sections may not have such an issue, and if they have should be discussed case-by-case
  - Discussion between Sajjad and Jay on the format of the mapping spreadsheet:
    - Set up of the spreadsheet - need to be simpler, just the xpath and FHIR field, plus some comments. Also can link to other spreadsheet for generic info
    - Set up the meeting minutes at the confluence page
    - The spreadsheet is authored by Cerner, and Jay will review

Attendees

- John D’Amore, More Informatics
- Sajjad Hussain, Google
- Ken Lord, MDIX
- Jay Lyle, JP Systems / VA
- REGRETS: Chun Li, Diameter Health

Time: 1-2pm ET, Sept 1, 2022

Topics:

- Review of new script for standardizing JSON-formatted FHIR resources for use before differential
  - Script location: https://github.com/chunli866/CDAtoFHIRSamples/blob/main/Scripts/reorder_for_diff.js
  - Script required NodeJS to be installed and to install necessary packages (run npm i from Scripts directory)
  - Script will re-order the contents of FHIR formatted resources into the base property order from the FHIR
  - Script will make consistent JSON formatting (e.g. tabs and white spaces)
  - A new directory is created when it is run: https://github.com/chunli866/CDAtoFHIRSamples/tree/main/Reformatted
  - ACTION: Request to evaluate if script can also check for FHIR sample validity. John D. to investigate

- Review of Medication samples by Diameter Health and Google
  - Diameter produce a MedicationRequest from source C-CDA document: https://github.com/chunli866/CDAtoFHIRSamples/blob/main/Reformatted/Medication/DH_medicationsRequest.json
Google produced a MedicationStatement from source C-CDA document: https://github.com/chunli866/CDAtoFHIRSamples/blob/main/Reformatted/Medication/Google_medicationStatement.json

**ACTION**: Google to plan for adjustment to MedicationRequest since all US CORE medication lists use only MedicationRequest

**ACTION**: Jay asked that we bring this up for discussion at Connectathon and potential feedback to ONC / US CORE team on how to show mappings of both and ask the group for opinion

US CORE’s decision is for the easiness for EHR to implement, not possible for med statement to add info such as “not filled”.

- Review of discrepancy in coding (Diameter Health transformed to IN, Google keeps RxNorm code at SDC)
- Review of differences in whether inline coding is performed (MedicationCodeableConcept, done by Diameter Health) or reference to another resource (MedicationReference, done by Google)

**Discussion around which clinical sections should be prioritized for first work**

- Idea of using PAMI + Patients (5 resources) as potential for first work. This would leverage existing mappings for C-CDA to FHIR for AllergyIntolerance and Immunization

**ACTION**: Discuss this with Chun as lead for HL7 Connectathon track

**Review condition first condition example**

- Diameter Health produced a Condition resource with 1 id: https://github.com/chunli866/CDAtoFHIRSamples/blob/main/Reformatted/Problem/DH_problem1.json
- Google produced a Condition resource with 2 duplicate ids: https://github.com/chunli866/CDAtoFHIRSamples/blob/main/Reformatted/Problem/Google_problem1.json
  - We looked and the duplicate IDs were both in source, which explains Google approach: https://github.com/chunli866/CDAtoFHIRSamples/blob/main/Input/Myra%20Jones%20v2.xml#L258

**Discussion around status which Diameter Health and Google handled differently.**

**Discussion around recordedDate**

- Formatting of dates was different when going from day (“20120806” no time stamp in C-CDA)

**SOLUTION**: JDD/Chris: Can put just the date in FHIR (need to have dashes)- they are not using Javascript date but just a string. http://hl7.org/fhir/R4/datatypes.html#dateTime

**Discussion around provenance**

- Is contextConduction included? Ken brings up that this could be turned off in certain circumstances, although on by default in CDA documents
- Diameter Health does appear to have conducted the author from header into the Problem (C-CDA did not have author at entry level)

**Discussion around category coding**

- Diameter Health translated into FHIR terminology (e.g. problem-list-item)
- Google kept original SNOMED code from observation/code in problem entry

**Discuss next meeting (9/8 at 1pm) and also longer session scheduled for 9/9**

Chun Li was unable to attend this meeting due to an unscheduled issue that arose.

**Attendees**

- Chun Li, Diameter Health
- John D’Amore, More Informatics
- Sajjas Hussain, Google
- Ken Lord, MDIX
- Jay Lyle, JP Systems / VA
- Chris Vitale, Diameter Health
- Gargi Gajjar, MDIX

**Logistics:**

- check on availability for Friday’s block and update invite
- 12-2
- any left over items from medications and problems
- addressed
- expectation on mapping samples from Cerner and MDIX
- resend email to Natalee
- resend to Gargi
- any review done/ updates made to the excel spreadsheet (content, not format)?

**Jay’s demo of new mapping sheet**

- new spreadsheets
- Jay will work to convert the Pub version of the old spreadsheets to the new format, so that they can be used at the Connectathon

**NOT DISCUSSED**

- Review of sections of priority
  - demographics
  - allergies
  - immunizations
  - problems
  - medications
  - clinical notes
  - procedures
- results
- vital signs
- social history
- plan of treatment

- other
  - encounter/encompassingEncounter
  - provenance
  - CCD-header-related mapping
  - context conduction
  - composite-level mapping
  - handling dates without timestamps
  - discussion on the new format of the mapping

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- Ken Lord, MDIX
- Jay Lyle, JP Systems / VA
- Chris Vitale, Diameter Health
- Gargi Gajjar, MDIX
- Natalee, Cerner

- Immunization mapping
  - https://jira.hl7.org/browse/FHIR-37723
  - https://jira.hl7.org/browse/FHIR-37722
  - data absence reason: the flavor to use: unknown
  - lotNumber: DH has not mapped; Cerner mapped it : manufacturedProduct (identifier: urn:hl7ii:2.16.840.1.113883.10.20.22.4.54:2014-06-09)
  - identifier: DH mapped to identifier.system (needs to map to identifier. Value instead), Google doesn’t map it because it only has root and no extension
  - if only the root is present, root always goes to value; if there is an extension, extension should go to value and root goes to system
  - Google puts performer in performer; DH lost performer (data model not saving) but add entry level author and doc header author to it - DH needs to revise

- Patient
  - identifier
    - Patient external identifier? - from CPCDS and was removed from that spec
    - patientRole - DH mapped H to home, google doesn't, MDIX: https://terminology.hl7.org/CodeSystem-v3-AddressUse.html
    - generalPractitioner: DH only uses the actors in header that has functionCode = PCP, and Google is taking any performers
    - managingOrganization: google and MDIX use providerOrganization, DH is using assigningauthorName in the mrn collection
    - DH has a valueString for ethnicity and race, but should look to remove that

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- Procedures
  - performedPeriod: DH mapped to data absence reason per the cardinality in the 4.0.0 spec (4.0.1 has moved it to 0..1)
    - the source data doesn't have obsTime
• DH implemented in 4.0.0; Google and MDIX are using 4.0.1. Will be large efforts to upgrade to 4.0.1
• coding and translation: MDIX includes the translations in the coding, Google and DH are dropping the translation codes
• DH populate recorder and performer from the doc header,
• Jay: check provenance for populating the various practitioners
• context conduction: great to talk at the Connectathon.
• status: MDIX has active, need to map to the FHIR value set
  • results
• Google mapped "issued" of a "2009-08-07T06:05:04.321Z" date, DH would map from the results.author.time. Google is mapping because US Core demands it as required, (from author.time is available, otherwise from the current time)
• referenceRange: DH not populating, CV to double check as we have logic to populate
• Google structure the value and test in the component element, but DH doesn't have it. Chris's saying component is for blood pressure where 2 or more is expected. Most things should not use the component.
  • Value: can it multiple or just single? the former is the assumption that Google has, which is why they have it in the component - JDD