Cooking with CQL Q&As

Session 50 - Thursday, January 21, 2021

# Date and Time Calculations

**Q:** In the example test expressions for collapse with null ending boundary, if you define a third test as successor maximum, would that throw an error?

|  |
| --- |
| define Test1: |
|  | collapse( |
|  | { |
|  | Interval[@2021-01-06, @2021-01-08], |
|  | Interval[@2021-01-08, null] |
|  | } |
|  | ) |

|  |
| --- |
| define Test2: |
|  | collapse( |
|  | { |
|  | Interval[@2021-01-06, @2021-01-08], |
|  | Interval[@2021-01-08, null], |
|  | Interval[@2021-01-15, @2021-01-18] |
|  | } |
|  | ) |

|  |
| --- |
| /\* |
|  | Results: |
|  | Test1=[Interval[2021-01-06, 9999-12-31]] |
|  | Test2=[Interval[2021-01-06, 9999-12-31]] |
|  | \*/ |

**A:** Yes. A third test, successor of maximum DateTime, does throw an error. The Java and Java Script implementations are mostly likely testing the boundary first. The eCQM Standards Team will confirm what the Java and Java Script implementations are testing. The pseudo code used to test this function is: http://build.fhir.org/ig/HL7/cql/09-b-cqlreference.html#collapse.

Define Test 3: successor of maximum DateTime – when tested presented an error

# Using Quality Data Model

**Q:** Using Quality Data Model (QDM) 5.5 and the RatioExample library, we want to calculate the number of inpatient falls with major injury per 1,000 patient days. We can represent the measure as an encounter-based ratio measure, but there is not a mechanism in the current Clinical Quality Language (CQL)-based Health Quality Measure Format (HQMF) to specify that the ratio should be “per 1,000 days.” How can we build this in CQL so we can express in the Measure Authoring Tool (MAT)?

**A:** When we try to express the measure as a continuous variable measure, it results in the calculation happening per case rather than at the population level, e.g., per 1,000 days. Therefore, it does not combine the fractions properly. This question is in reference to the measure Qualifying Encounters and Falls with Major Injury.

|  |  |
| --- | --- |
| define "Qualifying Encounters": | |
|  | ["Encounter, Performed": "Inpatient"] |

|  |  |
| --- | --- |
| define "Falls with Major Injury": | |
|  | ["Assessment, Performed": "Fall"] |

The Denominator Observation for an Encounter is the duration in hours of the Hospitalization Encounter divided by 24. The Numerator Observation is the count of Falls with Major Injury during that Encounter. You set this up as a ratio measure where the observation for the denominator uses Function 1 and the observation for the numerator uses Function 2.

Function 1:

|  |  |
| --- | --- |
| define function "Denominator Observation"(Encounter "Encounter, Performed"): | |
|  | duration in hours of Global.Hospitalization(Encounter) / 24 |

Function 2:

|  |  |
| --- | --- |
| define function "Numerator Observation"(Encounter "Encounter, Performed"): | |
|  | Count( |
|  | "Falls with Major Injury" Falls |
|  | where Falls.relevantDatetime during Encounter.relevantPeriod |
|  | or Falls.relevantPeriod during Encounter.relevantPeriod |
|  | ) |

We are able to express this ratio measure in the Measure Authoring Tool (MAT) and get a successful export, but the last piece of the performance rate is to express per 1,000 patient days. To allow the measure to express the “rate per 1000” requirement, we are proposing an extension to the Clinical Quality Language (CQL)-based Health Quality Measure Format (HQMF) Implementation Guide (IG) that serves as a post-production calculation in implementation:

Proposed Extension

|  |  |
| --- | --- |
| <component typeCode="COMP"> | |
|  | <cql-ext:measureValue nullFlavor="DER" xsi:type="PQ"> |
|  | <unit value="/1000d"/> |
|  | </cql-ext:measureValue> |
|  | </component> |

# Using Quality Data Model

**Q:** The example as seen below relates to Specifying an Individual Actor is a Member of an Organization. The expression defines an Organization as the Quality Data Model (QDM) Entity used for the encounter participant. Further, it indicates that the individual who orders an eye examination (Intervention, Order) using the QDM Entity Practitioner and that the practitioner identifier is within the organization identified as the performer of the qualifying encounter. The expression also assures the individual who performs the eye examination (Intervention, Performed) is also a practitioner whose identifier is within the organization identified as the performer of the qualifying encounter. Note that this is a hypothetical example. All the actor identification requirements are optional at the discretion of the measure developer and all require validation that seeking such detail is feasible for implementation.

define "Eye Exam Complete":

|  |
| --- |
| ["Intervention, Performed": "Diabetic Eye Exam"] EyeExam |
| with "Qualifying Encounters (4)" Encounter |
| such that exists ( |
| EyeExam.performer Performer |
| where Performer is Organization |
| and Performer.id in Encounter.participant.id |
| ) |
| and exists ( |
| EyeExam.performer Performer |
| where Performer is "Practitioner" |
| and Performer.specialty in "Ophthalmology" |
| ) |

In this example, will the expression work in Bonnie?

**A:** The solution will work in Bonnie FHIR (since it is using the latest version of the JavaScript engine that supports the is/as operators), but will not work in Bonnie QDM.