Cooking with CQL Q&As

Session 57 - Thursday, September 16, 2021

# Measure Logic in CQL

# **Q:** When calculating age and evaluating it against two integers using CumulativeMedicationsDuration version ‘0.3.000’ library in the Quality Data Model (QDM) version 5.6, can we use a closed bracket instead of an open parenthesis?

**A:** You can use a closed bracket. In Clinical Quality Language (CQL), a closed bracket is an inclusive boundary and the parenthesis is an open boundary.

Example with an open parenthesis - in this example, the bracket before 12 and parentheses after 20 indicates the interval is all values >= 12 and <20. 20 is not included.

|  |  |
| --- | --- |
| define "Stratification 3 (74) (Global v7)": | |
|  | AgeInYearsAt(date from start of "Measurement Period" ) in Interval[12, 20 ) | |
|  |  | |
|  | define "Initial Population (74)": | |
|  | exists ( ["Patient Characteristic Birthdate": "Birth date"] BirthDate | |
|  | where Global."CalendarAgeInMonthsAt" ( BirthDate.birthDatetime, start of "Measurement Period" ) >= 6 | |
|  | and Global."CalendarAgeInYearsAt" ( BirthDate.birthDatetime, start of "Measurement Period" ) < 20 | |
|  | ) | |
|  | and exists ( "Qualifying Encounters" ) | |

Example with a closed bracket - in this example, the bracket before 12 and bracket after 19 indicates the interval is all values >=12 and <=19.

|  |  |
| --- | --- |
| define "Stratification 3 (74) (Global v7)": | |
|  | AgeInYearsAt(date from start of "Measurement Period" ) in Interval[12, 19 ] | |
|  |  | |
|  | define "Initial Population (74)": | |
|  | exists ( ["Patient Characteristic Birthdate": "Birth date"] BirthDate | |
|  | where Global."CalendarAgeInMonthsAt" ( BirthDate.birthDatetime, start of "Measurement Period" ) >= 6 | |
|  | and Global."CalendarAgeInYearsAt" ( BirthDate.birthDatetime, start of "Measurement Period" ) <= 19 | |
|  | ) | |
|  | and exists ( "Qualifying Encounters" ) | |

# **Q:** Does the Quality Data Model (QDM) version 5.6 allow for combined or split doses when calculating CumulativeMedicationsDuration version ‘0.3.000’ library logic?

**A:** In QDM version 5.6, the medication order is not able to accommodate a combined or split dose. There is representation in Fast Healthcare Interoperability Resources® (FHIR) for ordering a split dose, but in FHIR-based calculations, currently there is a restriction to one dosage level, or unit dose, to align with the capability within QDM. This needs to be extended in the future.

# **Q:** When calculating CumulativeMedicationsDuration using version ‘0.3.000’ library in the Quality Data Model (QDM) version 5.6, should we use metric dosing (mg/dose) instead of tablets or capsules?

**A:** In QDM version 5.6, you can express the current dosage used for calculating CumulativeMedicationsDuration version ‘0.3.000’ library in metric or tablets/capsules as long as you express the supply and dosage in the same units.

**Q:** How does the CumulativeMedicationsDuration version ‘0.3.000’ library in the Quality Data Model (QDM) version 5.6 work with tapering medications?

**A:** Currently, the CumulativeMedicationsDuration version ‘0.3.000’ library does not handle tapering. The CumulativeMedicationsDuration version ‘0.3.000’ library provides cumulative medication duration calculation logic for use with QDM prescription, discharge, administration, and dispensing events and the logic assumes single-instruction dosing information. Since providers do not typically write tapers as multiple prescriptions with one dosing each, the taper needs multipledosage instructions and needs to be handled explicitly. Right now, we are hesitant to write the logic without understanding what the representation would be in Fast Healthcare Interoperability Resources® (FHIR). Examples of real-world, tapered prescription data would help us write the code because it would show how a tapered dose coming from an electronic health record would look in FHIR. Tapering is the next use case for development in the CumulativeMedicationsDuration version ‘0.3.000’ library.

# **Q:** In the CumulativeMedicationsDuration version ‘0.3.000’ library, is it important to return date/time as opposed to just date?

**A:** The HL7 Clinical Quality Information and Pharmacy Workgroups will discuss the use of date, rather than date/time at the HL7 Working Group Meeting session on Thursday, January 23, 2022. Prescription data is generally not at the time level so there would be no advantage to returning date/time. The only scenario where returning date/time that might be helpful is in inpatient scenarios where there is medication administration data. However, the intent of this logic is for use in outpatient prescription data where most use cases are oral medications.

# **Q:** If using the date instead of date/time when calculating CumulativeMedicationsDuration version ‘0.3.000’ library in the Quality Data Model (QDM) version 5.6, do you still have to add a quantity or can just the integer be used in the calculation?

**A:** You must include the quantity since the integer may be days, weeks, or months.

# **Q:** When calculating a CumulativeMedicationsDuration version ‘0.3.000’ library in the Quality Data Model (QDM) version 5.6, is the authorDatetime function the same as the date the provider writes the prescription?

**A:** In QDM, the authorDatetime is the time of entry of the data element into the clinical software. In Fast Healthcare Interoperability Resources® (FHIR), it is preferred to use the relevantPeriod, if it is present. The relevantPeriod is the time period the dispense is expected to cover. If the relevantPeriod is not present, then use the authorDatetime to calculate the start date and time for the prescription.

|  |
| --- |
|  |
| define function "MedicationOrderPeriod"(Order "Medication, Order" ): |

|  |  |  |
| --- | --- | --- |
|  | if Order.relevantPeriod.low is null and Order.authorDatetime is null then | |
|  | null | |
|  | else if Order.relevantPeriod.high is not null then | |
|  | Interval[date from Coalesce(Order.relevantPeriod.low, Order.authorDatetime), date from end of Order.relevantPeriod] | |
|  | else | |
|  | ( | |
|  | Coalesce( | |
|  | Order.daysSupplied, | |
|  | Order.supply.value / (Order.dosage.value \* ToDaily(Order.frequency)) | |
|  | ) \* (1 + Coalesce(Order.refills, 0)) | |
|  | ) durationInDays | |
|  | let startDate: date from Coalesce(Order.relevantPeriod.low, Order.authorDatetime) | |
|  | return | |
|  | if durationInDays is not null then | |
|  | Interval[startDate, startDate + Quantity { value: durationInDays, unit: 'day' }] | |
|  | else | |
|  | null | |
|  | |  |

**Q:** How does the MedicationOrderPeriod differ from the MedicationDispensePeriod when calculating CumulativeMedicationsDuration version ‘0.3.000’ library in the Quality Data Model (QDM) version 5.6?

**A:** From a QDM perspective, a medication order is a prescription event and a medication dispense is a dispense event. QDM considers these separate events.

# **Q:** In the MedicationOrderPeriod function in Clinical Quality Language (CQL), how does day versus days differ in the code?

**A:** In CQL, a natural language expression is allowed. The functions day and days are equivalent.

|  |  |
| --- | --- |
|  | |
| define function "MedicationOrderPeriod"(Order "Medication, Order" ): | |
|  | if Order.relevantPeriod.low is null and Order.authorDatetime is null then | |
|  | null | |
|  | else if Order.relevantPeriod.high is not null then | |
|  | Interval[date from Coalesce(Order.relevantPeriod.low, Order.authorDatetime), date from end of Order.relevantPeriod] | |
|  | else | |
|  | ( | |
|  | Coalesce( | |
|  | Order.daysSupplied, | |
|  | Order.supply.value / (Order.dosage.value \* ToDaily(Order.frequency)) | |
|  | ) \* (1 + Coalesce(Order.refills, 0)) | |
|  | ) durationInDays | |
|  | let startDate: date from Coalesce(Order.relevantPeriod.low, Order.authorDatetime) | |
|  | return | |
|  | if durationInDays is not null then | |
|  | Interval[startDate, startDate + Quantity { value: durationInDays, unit: 'day' }] | |
|  | else | |
|  | null | |
|  | |  |

# Using Fast Healthcare Interoperability Resources

**Q:** Is there a group that is working to harmonize the National Council for Prescription Drug Programs (NCDCP) and Fast Healthcare Interoperability Resources® (FHIR)?

**A:** Please email the Pharmacy Workgroup listserv at [pharmacy@lists.HL7.org](mailto:pharmacy@lists.HL7.org) to ask for more information regarding the group that is harmonizing NCDCP and FHIR. You can also subscribe to the Pharmacy Workgroup listserv here: <http://www.hl7.org/Special/committees/medication/listserv.cfm>. The Pharmacy Workgroup Confluence page can be found here: <https://confluence.hl7.org/display/PHAR>.

# General CQL

# **Q:** Where can I locate the example used in the discussion of $cql operation and test case representation/packaging?

**A:** Find the examples used in the discussion of $cql operation and test case representation/packaging on [GitHub](https://github.com/WorldHealthOrganization/smart-anc/tree/master/input/tests/library/ANCDT01/charity-with-danger-signs).