Cooking with CQL Q&As

Session 53 - Thursday, April 22, 2021

# Queries in CQL

**Q:** For patients receiving immune checkpoint inhibitor (ICI) therapy for the treatment of cancer, and need thyroid-stimulating hormone (TSH) testing every eight weeks, how do you write an expression to capture appropriate TSH testing during ICI therapy administration where the first ICI treatment period starts within the measurement period? An ICI treatment period is defined as consecutive ICI administrations no more than eight weeks apart.

The example below illustrates a patient with three ICI treatment periods in the lines under the designation of the years: one beginning in the previous measurement year (2019), one beginning in the current measurement year (2020), and one beginning in the following year (2021). The 2nd treatment period is selected because it is the first treatment period that starts within the measurement period of 2020.

|  |
| --- |
| /\* |
|  | 2019 2020 2021 |
|  | |------------------------|---------------------|--------------------| |
|  | |--|--|--|---|---|---| |---|----|---|---|----| |---|---|--| |

**A:** To create the logic expression for the 2022 measurement period, scan across all the ICI therapies and find the first 8-week course interval that has an administration start date in the intended measurement period (August 2021). Exclude the 8-week course of therapy that was captured in the previous measurement period and that overlaps into the current measurement period (October 2020 – March 2021). The expression is:

define "ICI Therapy":

["Medication, Administered": "Immune Checkpoint Inhibitor"] ICI

define “ICI Starts Within 8 weeks Interval”:

|  |
| --- |
| { |
|  | First( |
|  | "ICI Therapy" Therapy |
|  | without "ICI Therapy" PriorTherapy |
|  | such that PriorTherapy.relevantPeriod starts 57 days or more before day of start of Therapy.relevantPeriod |
|  | where Therapy.relevantPeriod starts 1 year or less before start of "Measurement Period" |
|  | sort by start of relevantPeriod |
|  | ) |
|  | } |

**Q:** When writing an expression to capture thyroid-stimulating hormone (TSH) lab tests at the start of an 8-week course of immune checkpoint inhibitor (ICI) therapy, specifically dates that are in between measurement periods and you do not want to duplicate administration dates captured in a previous measurement period, is the statement where Therapy.relevantPeriod starts 1 year or less before start of "Measurement Period" in the logic expression redundant since this statement is the timing for the ICI therapy definition?

**A:**  The where Therapy.relevantPeriod starts 1 year or less before start of "Measurement Period" statement should remain within the logic expression since,in this case, we deleted it from the define "ICI Therapy": ["Medication, Administered": "Immune Checkpoint Inhibitor"] ICI, which then removed the limitation**.**

define "ICI Therapy":

["Medication, Administered": "Immune Checkpoint Inhibitor"] ICI

define “ICI Starts Within 8 weeks Interval”:

|  |
| --- |
| { |
|  | First( |
|  | "ICI Therapy" Therapy |
|  | without "ICI Therapy" PriorTherapy |
|  | such that PriorTherapy.relevantPeriod starts 57 days or more before day of start of Therapy.relevantPeriod |
|  | where Therapy.relevantPeriod starts 1 year or less before start of "Measurement Period" |
|  | sort by start of relevantPeriod |
|  | ) |
|  | } |

**Q:** When defining the immune checkpoint inhibitor (ICI) therapy Bins, the expand operator was used to create a list. Since the return point from X will return an integer, are we able to subtract since it is an integer and not a list anymore?

define "ICI Therapy Bins":

// expand Interval[1, "Required Bins"] // { 1, 2, 3, 4, 5 }

(expand { Interval[1, "Required Bins"] }) X

return point from X

**A:** The expand operator expression will always be used to create a list but it can be a list of integers or a list of integer intervals, depending on whether you pass it a single interval, or a list of intervals. The single interval option was introduced in CQL 1.5, so in 1.4, you need to use the syntax to 1) provide the Interval from 1 to Required Bins to the expand as a list (using the braces), and 2) return the result of each interval returned from the expand as a single point (using the return point from X):

define "ICI Therapy Bins":

// expand Interval[1, "Required Bins"] // { 1, 2, 3, 4, 5 }

(expand { Interval[1, "Required Bins"] }) X

return point from X

# **Q:** When using a library to illustrate patterns for accessing related Fast Healthcare Interoperability Resources® (FHIR®) through references, what does the highlighted term Medication refer to in the line of code below?

|  |
| --- |
| 1.5 Translator also supports related context retrieve usage: |
| \*/ |  |
| define TestMedicationRequest1B: |  |
| [MedicationRequest] MR |  |
| with [MR.medication -> Medication] M |  |
| such that M.code in "Aspirin" |  |

**A:** In this line of code, Medication references that a medication request can have as its medication element a codable concept or a reference to a medication resource, depending on the server. The example defines it as a reference to a medication resource.

General CQL

**Q:** Is the structure of Clinical Quality Language (CQL) in a similar format to the Fast Healthcare Interoperability Resources® (FHIR®) 4.0 nested structure?

**A:** Yes. The FHIR model information for CQL follows the same structure as in the FHIR documentation.The code, using FHIR version '4.0.1', tells the translator to bring FHIR into scope.

Additionally, the translator has built-in support for several versions of FHIR and the Quality Data Model (QDM) and now has support for dynamic loading of model information.