Connectathon 18

Clinical Reasoning Track

Welcome to the Clinical Reasoning Track at FHIR Connectathon 18. This document provides an overview of the scenarios and resources available to connectathon participants. The focus of the track is to exercise the resources of the FHIR Clinical Reasoning Module (previously CQF-on-FHIR). There are two main scenarios:

1. CDC Opioid Guidelines
2. Quality Measure Evaluation.

Each scenario is described below plus a general section describing the various resources available for use with the FHIR Clinical Reasoning module.

For a description of all the connectathon tracks, check here:
http://wiki.hl7.org/index.php?title=FHIR_Connectathon_18

For a detailed description of the Clinical Reasoning Track, see here:
http://wiki.hl7.org/index.php?title=201805_Clinical_Reasoning

Participants, please sign up on the Connectathon Tracking application here:
http://conman.fhir.org/connectathon.html?event=cologne2018

In particular, if you are bringing a server or client resource to the connectathon, please provide connectivity information in the tracking application above.

During the connectathon, we'll coordinate using Zulip on the Clinical Reasoning Track topic:
https://chat.fhir.org/#narrow/stream/connectathon.20mgmt/topic/Clinical.20Reasoning.20Track

In support of the track, we have a reference implementation FHIR server here:
http://measure.eval.kanvix.com/cqf-ruler/baseDstu3

In addition, this same server implements a CDS Hooks services endpoint:
http://measure.eval.kanvix.com/cqf-ruler/cds-services

CDC Opioid Prescribing Guidelines

For this scenario, clinical reasoning artifacts have been developed to describe the behavior involved in implementing Recommendation #5 of the CDC Opioid Prescribing guidelines:

When opioids are started, providers should prescribe the lowest effective dosage. **Providers should use caution when prescribing opioids at any dosage, should carefully reassess evidence of individual benefits and risks when considering increasing dosage to ≥50 morphine milligram equivalents (MME)/day, and should avoid increasing dosage to ≥90 MME/day or carefully justify a decision to titrate dosage to >90 MME/day** (recommendation category: A, evidence type: 3).
These artifacts are published in draft form as part of the CDC Opioid Prescribing Implementation Guide, here:

http://build.fhir.org/ig/cqframework/opioid-cds/

We have a server that runs these artifacts in response to a CDS Hooks request, and are coordinating this scenario with the CDS Hooks track. The steps are:

1. A patient is being prescribed a medication as part of an encounter.
2. The EHR invokes CDS Services registered for the “medication-prescribe” hook, passing the MedicationOrder in progress as payload.
3. The CDS Service receives the request and calculates the Milligram Morphine Equivalents for the new order, as well as the patient’s existing orders, retrieved from the EHR.
4. If the MME is over the threshold MME/day of 50, the service responds with 4 actions for consideration by the provider:
    a. Will reduce dosage
    b. Risk of overdose carefully considered and outweighed by benefit; snooze for 3 mo
    c. Acute pain; snooze for 1 mo
    d. N/A - See comment (will be reviewed by medical director); snooze for 3 mo
5. The EHR requires the provider to choose one of these actions, and then communicates the action chosen back to the CDS Service using the Analytics endpoint

CQF CDS Service: http://measure.eval.kanvix.com/cqf-ruler/cds-services

Zynx Health PlanDefinitions

For this scenario, Zynx Health has made two complete PlanDefinition resources available, the goal of the scenario is to ingest and demonstrate computability of the PlanDefinition resources. The Zynx FHIR API requires a bearer token to access it. This bearer token can be used by you and provided freely to others as part of the connectathon. This specific bearer token is limited to 50 requests per minute and is valid for the next 10 days. The header of the https request requires this:

API KEY (1 year bearer token): 68ba3b0a-bdc5-3bb0-86e7-6002a7777b89

Getting Started documentation:
https://github.com/zynxhealth/documentation/blob/master/README.md

Feedback/Questions form:
http://www.zynxhealth.com/news-resources/developer/developer-feedback/

Base API URL: https://api.zynx.com/t/zynx.com/connect/1.0.0/

The capability statement is available at the metadata endpoint now.
https://api.zynx.com/t/zynx.com/connect/1.0.0/metadata

As described in the capability statement, the PlanDefinition resource is the one resource we make available. You can also see our documentation on github for further details.

There are two complete PlanDefinitions available:

- **Asthma - Admission to ICU:**
https://api.zynx.com/t/zynx.com/connect/1.0.0/PlanDefinition/c6afff10-6cbf-4a19-b012-5344bfbf8080
- **Transition of Care – General:**
https://api.zynx.com/t/zynx.com/connect/1.0.0/PlanDefinition/00b6d5ce-ae02-4436-9311-12a238e4acbb

Zika Virus Management

For this scenario, the Centers for Disease Control and Prevention (CDC) have produced comprehensive guidance for the detection, management, and reporting of Zika Virus infections. The Clinical Quality Framework Initiative has been working with the University of Utah to formalize this guidance and integrate it in their hospital system. To do this, a set of FHIR Clinical Reasoning module resources has been produced to formally describe the guidance, and University of Utah has developed an integration using customization points in their Epic 2014 system as well as the OpenCDS decision support platform.

University of Utah plans to make the Epic-enabled middleware generally available to all Epic customers, and is working with other healthcare systems to provide similar integrations using the same FHIR Clinical Reasoning content.

Note that the content developed is based on a draft of the CDC Guidance, and that nothing in this scenario should be considered formally approved for use by CDC. The CQF Initiative is continuing to work with the CDC towards this goal.

The steps in this scenario are:

1) Pregnant Patient presents for care, launch the Zika Workflow
2) Request Zika Workflow Guidance using the $evalaute

Zika Guideline Implementation Artifacts:

http://measure.eval.kanvix.com/cql-measure-processor/baseDstu3/ValueSet/zika-affected-areas
http://measure.eval.kanvix.com/cql-measure-processor/baseDstu3/Questionnaire/zika-virus-exposure-assessment
http://measure.eval.kanvix.com/cql-measure-processor/baseDstu3/PlanDefinition/zika-virus-intervention
http://measure.eval.kanvix.com/cql-measure-processor/baseDstu3/Library/zika-virus-intervention-logic
http://measure.eval.kanvix.com/cql-measure-processor/baseDstu3/Library/fhir-model-definition
http://measure.eval.kanvix.com/cql-measure-processor/baseDstu3/Library/FHIRHelpers
http://measure.eval.kanvix.com/cql-measure-processor/baseDstu3/ActivityDefinition/provide-mosquito-prevention-advice
http://measure.eval.kanvix.com/cql-measure-processor/baseDstu3/ActivityDefinition/provide-contraception-advice
http://measure.eval.kanvix.com/cql-measure-processor/baseDstu3/ActivityDefinition/serum-zika-dengue-virus-igm
http://measure.eval.kanvix.com/cql-measure-processor/baseDstu3/ActivityDefinition/serum-urine-rrt-pcr-test
http://measure.eval.kanvix.com/cql-measure-processor/baseDstu3/ActivityDefinition/consider-igm-antibody-testing
http://measure.eval.kanvix.com/cql-measure-processor/baseDstu3/ActivityDefinition/administer-zika-virus-exposure-assessment

Dynamic Questionnaire Source Code:
https://bitbucket.org/opencds/questionnaire-on-fhir

Guidance Service:
http://tolven.chpc.utah.edu:8080/opencds-decision-support-service/fhir/DecisionSupportServiceModule/org.opencds.smartonfhir%5Ezikacds%5E1.0/$evaluate

Quality Measure Evaluation

For this scenario, the resources of the Clinical Reasoning module are used to coordinate requesting the data required to evaluate Payer Quality Measures from FHIR-enabled provider systems, streamlining the process of exporting patient information for provider-payer reporting.

This is the fourth time we have run this scenario at a connectathon, and this round we will focus on continuing to improve the content of the measures involved, as well as look at using the new FHIR Bulk Data API to support quality measure evaluation.

The National Committee for Quality Assurance has developed a FHIR-based HEDIS Implementation Guide that contains FHIR-based expressions of several HEDIS quality measures. In addition to the artifacts themselves, the Michigan Health Information Network has built test populations to support evaluating these measures at both the patient and population levels. We have also worked with Apelon to ensure we have accurate and complete terminology for evaluating the measures.

The HEDIS IG contains the artifact definitions, as well as descriptions of nominated test patients from the populations that provide a covering test deck for each measure.

NCQA HEDIS Implementation Guide:
http://build.fhir.org/ig/cqframework/hedis-ig/

Measure Source CQL: https://github.com/cqframework/payerextract/tree/master/pages/cql
Measure Calculation Service: http://measure.eval.kanvix.com/cqf-ruler/baseDstu3
Patient Resources (load scripts):
https://github.com/cqframework/payerextract/tree/master/resources
Terminology Service: http://fhir.ext.apelon.com/dtsserverws/fhir (dtsadminuser/dtsadmin)
Terminology Service: http://fhir.ext.apelon.com:7080/dtsserverws/fhir (dtsadminuser/Apelon123!)

Example patient-level evaluation call:
http://measure.eval.kanvix.com/cqf-ruler/baseDstu3/Measure/measure-col/$evaluate?patient=Patient-12214&startPeriod=2014-01&endPeriod=2014-12

Example population-level evaluation call
http://measure.eval.kanvix.com/cqf-ruler/baseDstu3/Measure/measure-col/$evaluate?startPeriod=2014-01&endPeriod=2014-12

General Resources

CQL-to-ELM Translator (v1.2 w/ FHIRPath support):

```
<dependency>
    <groupId>info.cqframework</groupId>
    <artifactId>cql-to-elm</artifactId>
    <version>1.2.18</version>
```

```
</dependency>
```

CQL Engine (v1.2 w/ FHIRPath support):

```
<dependency>
   <groupId>org.opencds.cqf</groupId>
   <artifactId>cql-engine-fhir</artifactId>
   <version>1.2.37-SNAPSHOT</version>
</dependency>
```

HAPI FHIR JPA Server w/ Embedded CQL 1.2/FHIRPath engine:

Source: https://github.com/DBCG/cqf-ruler

Open endpoint: http://measure.eval.kanvix.com/cql-measure-processor/baseDstu3

Docker container: https://hub.docker.com/r/polyakov/cql-measure-processor/
Docker instance: http://34.195.132.4:8081/cql-measure-processor/baseDstu3