

CQF-on-FHIR Connectathon 12 Track Report

The Clinical Quality Framework Initiative ([CQF Initiative](#)) is a collaborative community of public and private stakeholders focused on identifying, defining, and harmonizing standards that promote integration and reuse of Clinical Decision Support (CDS) and Clinical Quality Measurement (CQM) functionality.

In pursuit of this goal, the initiative has produced the [Clinical Quality Framework Implementation Guide](#) (CQF-on-FHIR IG), as well as several other related Implementation Guides that describe how to use HL7's Fast Healthcare Interoperability Resources (FHIR) to achieve the primary use cases of 1) Sharing quality improvement knowledge, and 2) Integrating the use of quality improvement knowledge into clinical workflows.

As part of the development and testing of these specifications, the CQF Initiative held a CQF-on-FHIR Track in Montreal in May of 2016 as part of FHIR Connectathon 12. This track focused on several distinct scenarios:

1. IHE Radiology Guidance Request Scenario
2. CDC Immunization Guidance Scenario
3. CQF-SOA Integration
4. Payer Extract

Each of these scenarios focused on different key aspects of the CQF Initiative challenge, providing valuable implementation experience and feedback to the CQF-on-FHIR resources and implementation guides.

Preparing for and running the connectathon involved coordination and effort from multiple participants, including:

- Cognitive Medical Systems
- Database Consulting Group
- Health Samurai
- Intermountain Healthcare
- OSIA Medical
- Partners Healthcare
- Regenstrief
- University of Utah

In addition, participants from the following organizations took part in the actual connectathon:

- Allscripts
- Blue Cross/Blue Shield

- Cognitive Medical Systems
- Database Consulting Group
- McKesson
- Optum
- OSIA Medical
- Regenstrief
- University of Utah

IHE Radiology Guidance Request Scenario

This scenario made use of the Guideline Appropriateness Ordering Implementation Guide that describes how to implement an appropriateness assessment as part of a clinical workflow. The initial specification was produced by IHE, and a subsequent HL7 FHIR Implementation Guide was produced that uses the CQF-on-FHIR resources to perform the assessment evaluation.

Partners Healthcare and the University of Utah both provided endpoints that could be used to run this scenario.

CDC Immunization Guidance Scenario

This scenario made use of the CQF-on-FHIR resources to expose a Centers for Disease Control (CDC) Immunization Guideline service call to determine immunization status and recommendations for a patient based on their current health record.

Partners Healthcare provided an endpoint that could be used to run this scenario, and Allscripts was able to successfully integrate this call as part of their clinical decision support infrastructure.

CQF-SOA Integration

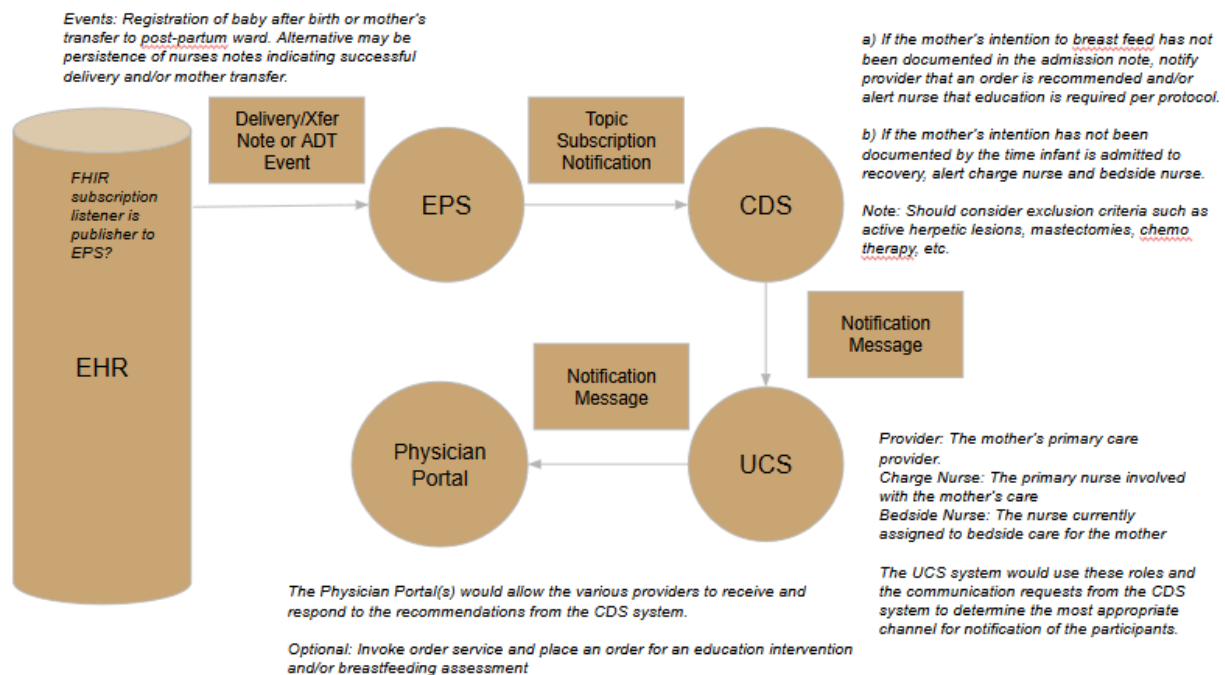
This scenario focused on enabling the clinical workflow for live birth to ensure that mothers receive appropriate education regarding the benefits of exclusive breastmilk feeding. Specifically, the scenario was concerned with orchestration among the components involved in an enterprise hospital health IT system using HL7 standards to describe the interfaces between components.

The scenario involved the following components and specifications:

- [Event Publish/Subscribe](#) (EPS)
- [Guidance Service](#) (CQF-on-FHIR)
- [Unified Communication System](#) (UCS)

The scenario is based on the CMS9v4 quality measure (Exclusive Breastmilk Feeding). For the connectathon, the measure was translated to Clinical Quality Language (CQL) using FHIR as the data model, and then several decision support artifacts were derived from the measure logic

and built to facilitate orders for appropriate education and potentially consultation referrals based on a live birth workflow:



Partners Healthcare implemented the decision support logic required at each of the decision points in the above workflow, and exposed the logic using the CQF-on-FHIR resources.

Cognitive Medical Systems built prototype implementations of the EPS and UCS components, and CareWeb by Regenstrief was used as a Mock EHR to initiate Admission/Discharge/Transfer (ADT) events as well as provide the agent logic necessary to link the various components together. The team also modified the HAPI FHIR JPA Server to support data events originating from a FHIR repository. During the Connectathon, these components were integrated to support the use case and we identified a number of 'next-steps' from this exercise:

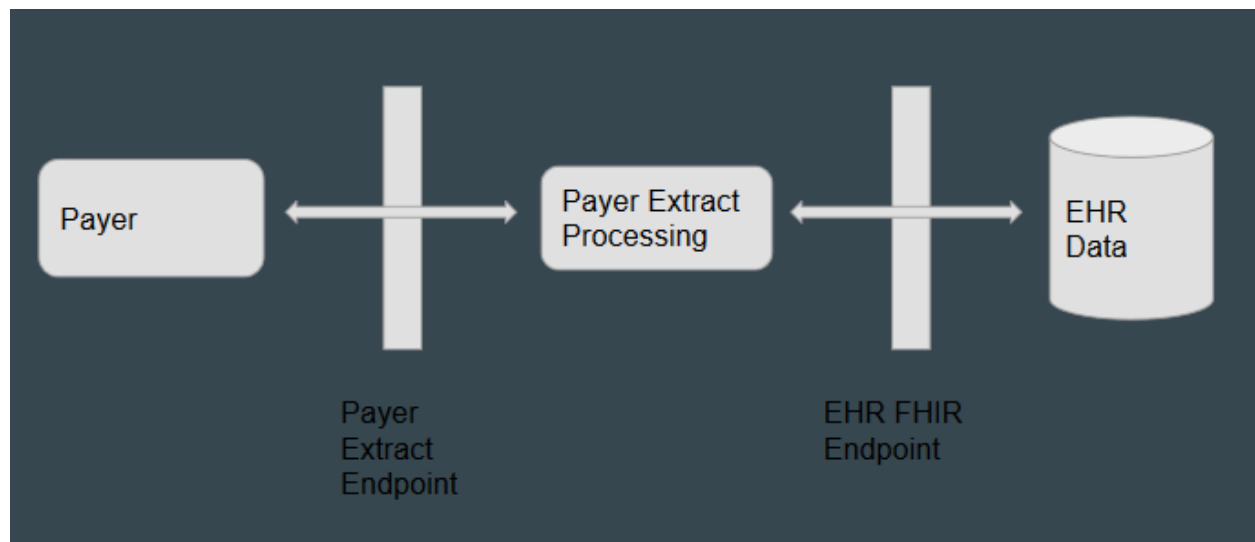
- While we handled data events in the JPA server using an interceptor, we hope to use the FHIR Subscription resource to achieve the same aim in the future.
- There are a number of possible system configurations that can impact how one invokes the \$evaluate operation (e.g., whether the \$evaluate operation is co-located on the FHIR repository or separate from it, how knowledge module data requirements are handled, etc...).
- The team was not sure how to represent ADT events in FHIR. It is an area that will require further exploration.
- We hard coded forms in CareWeb. Going forward, we hope to design a CareWeb interface that can load FHIR Questionnaires and represent them dynamically to end users.

OSIA Medical was able to integrate its Clinic Ally product into the scenario using the UCS interface to enable nurse practitioners and providers to receive notifications generated by the CDS component.

Resource constraints prevented a full implementation of the scenario during the connectathon, however the scenario was completed and demonstrated at the subsequent Work Group meeting.

Payer Extract

The Payer Extract scenario focused on making use of the quality measurement aspects of the CQF-on-FHIR IG to determine the feasibility of the CQF-Based approach to communicating the data elements required for calculating payer quality measures. Initially, six high-value measures were chosen and the data elements required to calculate them were identified. These data elements were expressed in Clinical Quality Language (CQL) and the CQF-on-FHIR resources as cohort definition measures. Using these definitions, a measure processing component was built that could translate the data requirements from CQL into standard FHIR queries that could be issued against existing FHIR test servers:



Test data for these measures was either developed and loaded into test servers, or identified within existing servers offered by vendors such as McKesson and Epic at the connectathon. Using these test data, we were able to demonstrate at the connectathon that the approach was viable using a machine local implementation of the measure processing component.

In addition, in the weeks that followed the connectathon, the measure processing component was integrated with a FHIR Server and deployed to the cloud, enabling further successful testing.

Next Steps

Each of these scenarios can be improved and moved closer to production ready. In the coming weeks the CQF Initiative will be preparing the next round of track submissions for the upcoming FHIR Connectathon in Baltimore.

Specifically, we would like to focus on:

- Security/Privacy - Real world implementations will require the use of robust, industry-standard security and privacy to ensure patient information is protected throughout the decision support and quality measurement lifecycle.
- Robust Data Description - Some scenarios so far have focused on laying the foundations for data interchange, relying on simplified definitions of patient data. We will be enhancing these definitions to describe more realistic patient information.
- Order Sets - The scenarios so far have not involved any use of the OrderSet resource. We would love to see a scenario that involves the distribution and/or placement of order sets using the OrderSet resource.

Overall it was a successful connectathon that provided valuable implementation feedback to the CQF-related resources and implementation guides. We sincerely appreciate the effort and input of the many track participants and hope to see you all again next time!