Clinical Quality Framework

Background

The Clinical Quality Framework is a joint effort by the Clinical Decision Support and Clinical Quality Information Work Groups to identify, develop, and harmonize standards that promote integration and reuse between Clinical Decision Support (CDS) and Clinical Quality Measurement (CQM).

The effort began as a public-private initiative sponsored by the Centers for Medicare and Medicaid Services (CMS) and the Office of the National Coordinator of Health IT (ONC) and has since transitioned to a joint effort within HL7 as the stewards of the specifications involved. Archived information about the CQF Initiative (charter, members, pilots, and meetings) can be found on the ONC Tech Labs Clinical Quality Framework Initiative site.

The effort focuses on two primary use cases:

1. Representation and distribution of knowledge artifacts (rules, order sets, documentation templates, measures, etc)
2. Evaluation of knowledge

Community and Involvement

The Clinical Quality Framework github organization provides github repository support for tooling and content development projects related to Clinical Quality Framework:

Clinical Quality Framework (github.com)

Specifically, a directory of community projects is available here:

Community Projects - cqframework/clinical_quality_language Wiki (github.com)

In addition, the following recent webinar provides an introduction to and overview of a variety of current CQF-related projects:

https://alphora.atlassian.net/wiki/spaces/PUB/blog/2021/03/03/1367605264/CQL+for+CDS+Seminar+-+2+24+2021

Getting Started

A collection of resources to help getting started with using Clinical Quality Framework standards and approaches to develop computable quality improvement content:

Content IG Walkthrough: cqframework/content-ig-walkthrough: A walkthrough of building a FHIR content implementation guide (github.com)

FHIR IG Guidance: HL7.FHIR.UV.HOWTO/IG Home Page - FHIR v4.0.1

Sandbox

- Data Repository/Knowledge Repository/Receiving System
  - https://cqf-ruler.ecqm.icfcloud.com/fhir
  - https://cloud.alphora.com/sandbox/r4/cqm/fhir
- Reporting Client
  - https://test2.ecqm.icfcloud.com/
- Terminology Service
  - Support@apelon.com to request credentials
  - Value Set Authority Center (NLM VSAC)
    - Supports FHIR R4
    - Connection details on the Track Page
- Decision Support Service
  - https://cloud.alphora.com/sandbox/r4/cds/fhir

Representation

For the knowledge representation use case, artifacts such as rules, order sets, and quality measures are represented using three primary components:

1. Metadata - Structured information about the artifact such as description, usage, evidence, stewardship, and catalog information
2. Patient and Clinical Information - Data models used to represent patient and clinical information within the artifacts
3. Expression Logic - Formal representation of logic involved in the artifact such as rule conditions and quality measure population criteria

Metadata

Harmonized metadata requirements for decision support and quality measurement artifacts are described conceptually in Clinical Quality Common Metadata Conceptual Model.

These metadata are realized concretely in FHIR as the initial group of elements present on all the knowledge resources. For a representative example, see the PlanDefinition elements up to relatedArtifact.
**Patient and Clinical Information**

Harmonized information model requirements for decision support and quality measurement artifacts are described conceptually in *Health Quality Improvement* (also known as Quality Improvement Domain Analysis Model, QIDAM).

These conceptual requirements are then realized as a set of FHIR Profiles in *Quality Improvement Core (QI-Core)*.

For more information on model harmonization efforts, refer to the *Health Quality Information Models Activities* (Includes CMS Quality Data Model (QDM) mapping activities to QI Core).

**Expression Logic**

Harmonized expression logic requirements for decision support and quality measurement artifacts are described conceptually in *Harmonization of Health Quality Artifact Reasoning and Expression Logic*.

These conceptual requirements are realized in the *Clinical Quality Language* specification.

For more information on Clinical Quality Language, refer to the *Clinical Quality Language* project page.

**Artifact Representation**

Decision support and quality measurement artifacts can then be expressed using these components.

In FHIR, artifacts are expressed using the resources defined by the *Clinical Reasoning* module.

In addition, the *Clinical Decision Support Knowledge Artifact Specification (KAS)* can be used to define decision support artifacts, and the *Health Quality Measure Format (HQMF)* can be used to define quality measurement artifacts.

**Evaluation**

The *CDS Hooks* specification provides the basis for the evaluation use case. The CQF community participates in the CDS Hooks process in pursuit of decision support evaluation use cases.

**Current State**

The following table depicts standards currently used in the V3 and FHIR families for Clinical Decision Support:

<table>
<thead>
<tr>
<th>Component</th>
<th>V3-based</th>
<th>FHIR-based</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metadata and Structure</td>
<td>Clinical Decision Support Knowledge Artifact Specification (aka HeD, and sometimes KNART)</td>
<td>FHIR Clinical Reasoning FHIR Clinical Guidelines</td>
</tr>
<tr>
<td>Logic</td>
<td>Clinical Quality Language (CQL)</td>
<td>Clinical Quality Language (CQL)</td>
</tr>
<tr>
<td>Clinical Data</td>
<td>Virtual Medical Record (vMR)</td>
<td>QI-Core</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Decision Support Specification (DSS)</td>
<td>CDS Hooks</td>
</tr>
</tbody>
</table>

And the same table for Clinical Quality Measurement:

<table>
<thead>
<tr>
<th>Component</th>
<th>V3-based</th>
<th>FHIR-based</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metadata and Structure</td>
<td>Health Quality Measure Format (HQMF)</td>
<td>FHIR Clinical Reasoning FHIR Quality Measures</td>
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<tr>
<td>Clinical Data</td>
<td>Quality Data Model</td>
<td>QI-Core</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Quality Reporting Document Architecture (QRDA)</td>
<td>FHIR Clinical Reasoning FHIR Data Exchange for Quality Measures</td>
</tr>
</tbody>
</table>
Standards Evolution

The following diagram illustrates the overall evolution of quality improvement and related standards, focusing in particular on the standards that are the intended focus of the Clinical Quality Framework initiative: