Clinical Decision Support (CDS) Connect Work Group (WG)

Meeting Summary

September 16, 2021

3:00-4:00 pm ET

Attendees: 33 people, including 4 phone dial-ins

Organization	**Attendees**
AHRQ Sponsors	Roland Gamache, Edward Lomotan, Mario Teran (3)
WG Members	Max Alexander, Randolph Barrows, Matthew Burton, Chris D'Autremont, Rina Dhopeshwarkar, Alison Kemp, Preston Lee, Mario Macedo, Mario Macedo, Dan Malone, Russ Mardon, Maria Michaels, Peter Muir, Ryan Mullins, Mary Nix, Neeraj Ojha, Mustafa Ozkaynak, Andrey Soares, Matt Storer, Michael Wittie (20) Call-ins (4)
MITRE CDS Connect Members	Noranda Brown, Matt Coarr, Susan Haas, Chris Moesel, Allie Rabinowitz, Mandeep Singh (6)

MEETING OBJECTIVES

- Welcome; Brief Review of Meeting Agenda and Objectives
- CDS Connect Key Updates September 2020 – 2021
- CDS Connect Future Directions and Next Steps
- Close

ACTION ITEM

MITRE will update the CDS Connect website to identify community members as "Health Research Organizations" in place of the current "Federal Health Research Organizations."

MEETING SUMMARY

Following roll call and review of the agenda, the MITRE team reviewed the key updates made to CDS Connect over the past year, including developments on the Repository, Authoring Tool, artifacts, and patient partnering panel. The October 2021 WG meeting will include a discussion on the themes observed in the past year, along with the development of strategies to further improve CDS Connect during the next year.

Welcome

MITRE started the meeting by welcoming participants and reviewing the names of WG members participating in the call. Maria Michaels then reviewed the agenda and facilitated the discussion that followed.

CDS Connect Key Updates September 2020 – 2021

MITRE reviewed its progress on developing CDS Connect over the past year, highlighting features and resources of the CDS Connect website, Repository, Authoring Tool, and available artifacts. Many of these revisions and updates responded to significant changes in the relevant technology available to the public, including the Health Level Seven International's (HL7) Clinical Quality Language (CQL), Fast Healthcare Interoperability Resources (FHIR), Application Programming Interface (API), Drupal, Clinical Practice Guidelines (CPG), the Value Set Authority Center (VSAC), and the Unified Medical Language System (UMLS).

CDS Connect Website

MITRE has undertaken efforts to better support user engagement with the platform. The website has been updated to highlight community involvement, including patient and caregiver participation in the CDS Connect workflow. Patient and caregiver communities are now incorporated within the graphics depicting stakeholder engagement on the "About CDS Connect" webpage, as well as the "Welcome to CDS Connect" homepage.

A WG member inquired why the listed stakeholders within the CDS community refers to "Federal Health Research Organizations," noting that CDS Connect community members include non-government health research organizations as well as those serving as part of the government. MITRE agreed with this observation and will update the webpage to reflect the broader category of Health Research Organization stakeholders.

MITRE also updated the CDS Connect webpage's Frequently Asked Questions (FAQ) to make messaging more user-friendly. The FAQs now address questions for new users, such as who can use CDS Connect, how users can find relevant artifacts, and how to register for a CDS Connect account. New FAQ entries address the needs of more-experienced CDS Connect users about how to share user experience feedback and participate in the CDS Connect WG to improve the platform. The FAQ page also now includes a table, called "At-A-Glance CDS Artifact Update Process to Inform Your Annual

Review," providing guidance on items for Repository contributors to consider during CDS artifact reviews. Those criteria include evaluating whether the evidence behind the CDS artifact in question is still current, whether the value sets are current, if any changes to the evidence or value sets require an update to the logic, if the Implementation Guide or other supporting documents need updates, and if the metadata require updates.

MITRE developed a unified signup form for users to register for an account. A user can submit a single registration form to create an account that can (1) access the Authoring Tool, (2) contribute artifacts to the Repository, and/or (3) simply stay informed about the platform as a community member. The signup form now also asks requestors to identify how they first learned about CDS Connect.

MITRE updated the WG page within the website's Community section, incorporating information on the WG, along with a link to FAQ entries on sharing experiences and developed artifacts. Slides and summaries for WG meetings will continue to be available on the CDS Connect WG page.

The welcome page now features a more instructive welcome message to orient users to the available search functions. The search function itself has also been further enhanced to expand the search by knowledge levels.

CDS Connect Repository

The Repository's artifact metadata fields will better align with the artifact data elements for CPG-on-FHIR specification. The Repository data elements represent a better field-level alignment with the fields in the CPG-on-FHIR specification—the Repository does not use the structure and containment of the CPG-on-FHIR specification, rather, it uses a flattened structure that maintains compatibility with the previous repository data model. The view of the artifact metadata fields is logically grouped by knowledge level and the view contains a progress bar to visualize the level of completeness of CPG-on-FHIR fields. In addition, the view highlights empty fields so the contributor can easily view suggested or required fields that have not been completed. Of note, it is the author's decision to complete any metadata fields; technically, an artifact can be submitted with only the title and version number. However, when MITRE reviews artifact submissions, the completion of these fields will improve turn-around time. AHRQ commented that it would make the most sense to only show the completeness score to authors and members of the artifact's group for their internal use and not display it to the general user viewing the artifact.

A WG member asked whether a section of the CDS site identifies standards for CPG-on-FHIR. Users may find it helpful to have this information (with links to the standards) to enhance their knowledge of the current health IT standards—even if an artifact does not have to comply with those standards. MITRE agreed that this suggestion could be incorporated in an FAQ entry or in a subpage within the metadata fields view.

A WG member asked whether CDS Connect's API has been updated. API changes are underway, and they correspond to the roll out of CPG-on-FHIR changes. MITRE will continue to update the WG on this progress and will provide the WG member with pointers to the API documentation.

MITRE upgraded the web content management system from Drupal 8.9 to Drupal 9.2. The upgrades run in parallel with updating the Aquia environment and removing Lightning (another component moving towards end-of-life concurrently with Drupal 8). MITRE plans to leverage new features within Drupal 9 (including upgraded user interface and maintainability) in upcoming activities. Because this change is mainly an upgrade of the underlying content management infrastructure, few (if any) changes will be visible to artifact authors or viewers.

CDS Connect Artifacts

MITRE continues its annual update of 11 artifacts that it authored and maintains. MITRE and AHRQ addressed these updates in two batches during the past year. The annual process involves reviewing the relevant evidence, value sets, logic, Implementation Guides, and metadata. Three of the artifacts had updates to the underlying evidence. Evidence updates that impact two artifacts were posted in late August, after the conclusion of the annual update, and thus they will be prioritized first for review next year. The CQL representation was also updated to use the HL7 FHIR Release 4 data model. All metadata on the Repository was updated; all documents posted to the website are 508 compliant.

CDS Connect Authoring Tool

The web-based Authoring Tool allows users to easily create CDS logic and to export artifacts into a standard format (i.e., CQL that uses a FHIR data model). MITRE recently developed and incorporated a new query building feature into this tool (referred to within the platform as the "build modifier" capability). This feature supports complex queries by defining rules with specific resource properties and comparison operators. These rules can be grouped together using "AND/OR" conjunctions, allowing for nested groups as well. This tool does not support the ability to filter by every property within each resource; MITRE nevertheless identified and included properties which are most applicable to CDS. MITRE encourages users to try the "build modifier" feature and provide feedback to CDS Connect.

MITRE developed support for new resources and modifiers within the Authoring Tool. This past year, MITRE added support for ServiceRequest expression modifiers [e.g., lookback, count, exists, is (not) null, active or completed, active, and completed]. MITRE also added new expression modifiers that allow users to get the first element in a list, as well as to get the average value of a set of quantitative observations.

MITRE also improved support for external CQL. Prior to this year, users could upload external CQL and use static definitions from it, but they could not use any functions from it. Now, the Authoring Tool allows authors to use some external CQL functions as custom modifiers. Authors can also directly invoke any external CQL functions for which the argument types are supported.

MITRE improved the CPG form by adding "Strength of Recommendation" and "Quality of Evidence" fields. Data that authors enter in these fields will be exported as part of the CPG library definition when they download the CQL for their artifact.

The Recommendation component of the Authoring Tool now offers the option to add one or more links, each with a type (absolute or smart), a label, and a Uniform Resource Locator (URL) address. This format allows the CQL to be more easily integrated into a CDS Hooks framework.

The Authoring Tool has been integrated with VSAC for many years, but MITRE made two important updates in the past year. The first supports the entry of a UMLS API key instead of a username and password; this change was necessary due to new requirements from the National Library of Medicine (NLM). The second integrates the new FHIR R4 terminology endpoint instead of the older FHIR interface.

MITRE also made several updates to better support CQL 1.5. The Authoring Tool's CQL-to-ELM translator has been upgraded to the latest CQL 1.5-compatible version. The CQL execution library was updated to better support CQL 1.5 (this library is used in the CDS Authoring Tool's testing feature, as well as the open-source CQL Testing and CQL Services tools). Last, the CDS Connect Commons libraries have been updated to reflect best practices, and to leverage improvements in the CQL-to-ELM 1.5 translator.

The Authoring Tool also underwent several usability improvements. Users can now sort their artifact list, as well as duplicate existing artifacts. The workspace tabs (e.g., Inclusions, Exclusions) have been modified so they always stay in view and so they indicate important information such as the presence of content and/or errors. A new summary tab provides a single high-level overview of the information contained within all the workspace tabs. MITRE also made smaller, less significant upgrades to the Authoring Tool's usability (e.g., contextual help with links).

One last noteworthy Authoring Tool development involves improving the maintainability and reusability of its codebase. MITRE added, removed, and updated dependency libraries as appropriate; replaced homegrown components with standardized components (where possible); leveraged new technologies such as React Hooks; modularized components for reuse within and outside of the application; and applied consistent coding practices.

Patient Partnering Panel

The March and April 2021 WG meetings discussed creating a Patient Partnering Panel to advise on the inclusion of patient stakeholders in the development of CDS Connect. Since then, the panel has

met four times, with the last session convening in late August 2021. An average of 10 participants attended each session, during which the patient advocate facilitated the discussion. The meeting products include a MURAL board that captures notes from the meeting and expresses the concepts visually. An overarching takeaway from these meetings is that the concept of patient partnering is still new to the CDS space; this panel was a positive first step in exploring how to better integrate patient input in content development. The panel drafted content to facilitate discussions on what patient partnering entails, the lessons learned, and topics for further exploration in the coming year.

CDS Connect Future Directions and Next Steps

The October WG meeting will discuss opportunities to further develop CDS Connect during the next year. The meeting goals will be to identify “must have” and “should have” general themes, and to determine strategies that will support those next steps. The WG will also review potential methods to improve the trust of CDS Connect users by providing transparency into development and maintenance processes and efforts. WG members requested an email prior to the meeting, containing either the presentation slides or a list of high-level agenda items, so that they can prepare for their participation.

Closing