July 2020 CDS Connect Work Group Call
<table>
<thead>
<tr>
<th>Schedule</th>
<th>Topic</th>
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<tbody>
<tr>
<td>3:00 – 3:02</td>
<td>Roll Call, Michelle Lenox (MITRE)</td>
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<td>3:02 – 3:05</td>
<td>Review of the Agenda, Maria Michaels (CDC)</td>
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<td>3:05 – 3:45</td>
<td>Sharing Lessons Learned with CDS: Nancy Nurthen and Sai Simhadri, Digital Infuzion</td>
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<td>3:45– 3:50</td>
<td>What's New with CDS Connect This Month (MITRE)</td>
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<td>3:50 – 4:00</td>
<td>Open Discussion and Close Out, Maria Michaels (CDC)</td>
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<td></td>
<td>• Open discussion and announcements</td>
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<td></td>
<td>• Concluding comments, review next steps and adjourn</td>
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Objectives

• Share lessons learned for use of CDS Connect
• Share new features and resources available for CDS Connect
• Discuss topics of interest to members relating to opportunities for CDS Connect
SHARING LESSONS LEARNED WITH CDS:

Nancy Nurthern and Sai Simhadri, Digital Infuzion
What is the Clinical Environment? (1 of 11)

Common Data Model Harmonization

Data Partner Data in Cloud VPC

- Query Builder
- Query Agent
- CQL to ELM Converter
- ELM to FHIR Converter
- FHIR API Server
- Results Agent
- FHIR Repository at Cloud
- Secure data pipeline

Data Aggregator
- Data Repository

HHS Agencies
- CSV Export
- CSV
- FHIR Export
- JSON
- SDTM Export
- FDA
- FHIR to BRIDG (CDMH I)
- BRIDG to SDTM (CDMH I)

NCI, NCATS Terminology
Server:
CDM ↔ FHIR ↔ CDISC

Data Partner with EHR interface
Data Partner with CDM interface
Data Partner with FHIR interface
How is CDS relevant? (2 of 11)

Unified Query Builder

Data Partner Data in Cloud VPC

Common Data Model Harmonization

HHS Agencies

Data Aggregator

Data Repository

CSV Export

CSV

FHIR Export

JSON

SDTM Export

FDA

FHIR to BRIDG (CDMH I)

BRIDG to SDTM (CDMH I)

NCI, NCATS Terminology

Server:
CDM ↔ FHIR ↔ CDISC

Data Partner with EHR interface
Data Partner with CDM interface
Data Partner with FHIR interface
### CDS Authoring Tool as Unified Query Builder (3 of 11)

**Common Data Model Harmonization**

<table>
<thead>
<tr>
<th>QUERY NAME</th>
<th>VERSION</th>
<th>LAST UPDATED</th>
<th>SHORT DESCRIPTION</th>
<th>ACTIONS</th>
<th>STATUS</th>
<th>RESULTS</th>
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<tbody>
<tr>
<td>Untitled Query</td>
<td>1</td>
<td>5 days ago</td>
<td>test</td>
<td></td>
<td>Pending Results</td>
<td>![Submit to FDA]</td>
</tr>
<tr>
<td>Condition Test</td>
<td>1</td>
<td>6 days ago</td>
<td>Rectal Polypectomy procedure</td>
<td></td>
<td>Pending Results</td>
<td>![Submit to FDA]</td>
</tr>
<tr>
<td>Rectal polypectomy (procedure)</td>
<td>1</td>
<td>6 days ago</td>
<td>Demo Query</td>
<td></td>
<td>Pending Results</td>
<td>![Submit to FDA]</td>
</tr>
<tr>
<td>Test Query - Rectal polypectomy (procedure)</td>
<td>1</td>
<td>6 days ago</td>
<td>With NO FHIR profiles selected</td>
<td></td>
<td>Submitting</td>
<td>![Submit to FDA]</td>
</tr>
<tr>
<td>Tuple test</td>
<td>1</td>
<td>6 days ago</td>
<td>test</td>
<td></td>
<td>Pending Results</td>
<td>![Submit to FDA]</td>
</tr>
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CDS Authoring Tool as Unified Query Builder – cont. (4 of 11)

Query Builder Interface
CQL Editor Interface
Our main goal is to use the User Interface of CDS Connect Authoring tool as a portal for researchers who are new to the Clinical Quality Language (CQL)

- Provide researchers with simple User Interface (UI) to construct and build CQL queries
- Provide them with a portal for managing the lifecycle of queries through UI
- A dictionary service to provide users with the required code systems, codes and value sets i.e. NLM VSAC
- Validate the CQL queries developed through “CQL Editor” and the ability to fix syntax issues
- Download the generated CQL query to use as a starter template for “CQL Editor”
► Capability to build CQL queries in the population context
► Researchers can select FHIR profiles that needs to be included in the query results
► Enhance Query Manager functionality to manage CRUD functionalities like create, delete, edit and submit queries
► Ability to download the results in FHIR and CSV formats
► Display the status of the submitted queries to the researchers
► Re-purposed the cql2elm service to validate query for syntax/semantic errors and report them to users for correction and re-submission
► Modified templates to fit population context queries and our project goals
► Added Capability to submit the results to FDA Gateway in SDTM format
► Added the ability to add metadata for the queries
In CDMH Phase I, each of the Data Partners had their own flavor of relational databases at their site. We had to generate a different query for each Data Partner to run it in their environment.

To overcome this problem in Phase II, we started exploring the use of the Fast Healthcare Interoperability Resources (FHIR) standard to capture, integrate and exchange clinical data for research purposes and to enhance capabilities to share research data. FHIR provides the data model interoperability that lacks in current Common Data Models within the Health care systems.

CQL could work as a bridge between clinical researchers and FHIR APIs.

We started scouting for tools that could help build CQL queries which could then be translated to FHIR APIs for execution around May 2019.
Next Steps (10 of 11)

- Enhance CDS Connect by integrating with NCATS UNA which is a federated authentication system
- Replace NLM VSAC with NCI’s caDSR for fetching code systems, value sets and codes
- Update the code base to support latest FHIR version i.e. R4
- Build capability to submit SDTM results to FDA Gateway
Recommendations (11 of 11)

- Enable continuous updates to FHIR version in code base as new versions are introduced

- Tightly coupled to FHIR version in use (currently supports STU3 and DSTU2). Maintenance would have been easier if code dependencies related to FHIR version are modular

- Database migrations are required even after moving to the latest DB version

- Add FHIRSql capabilities when available
THANK YOU
WHAT’S NEW WITH CDS CONNECT

David Winters and Chris Moesel, MITRE
Updates and New Features

• Authoring Tool
  ► Common functions now embedded in primary CQL library
  ► Collapsible comments (defaulting to closed)
  ► Updated icons
  ► Support for Immunization data type
  ► Minor enhancements and bug fixes

• Repository
  ► Initial CPG Artifact changes are almost fully developed and will be undergoing testing and review with AHRQ.
  ► Changes update the profile, menu bar, login/logout, and the home tab are actively under development.
  ► Newly updated Governance page content

Link to CDS Connect: https://cds.ahrq.gov/cdsconnect
ANNOUNCEMENTS, OPEN DISCUSSION AND CLOSE-OUT

Maria Michaels
Office of Public Health Scientific Services
Centers for Disease Control and Prevention