



AGENCY FOR HEALTHCARE RESEARCH AND QUALITY



September 2021 CDS Connect Work Group Call



CDS Connect

Meeting Agenda

Schedule	Topic
3:00 – 3:02	<ul style="list-style-type: none">• Roll Call, Allie Rabinowitz (MITRE)
3:02 – 3:05	<ul style="list-style-type: none">• Review of the Agenda, Maria Michaels (CDC)
3:05 – 3:50	<ul style="list-style-type: none">• Discussion: CDS Connect Key Updates September 2020-21 (MITRE)
3:50 – 3:55	<ul style="list-style-type: none">• Next Steps (MITRE)
3:55 – 4:00	Open Discussion and Close Out, Maria Michaels (CDC) <ul style="list-style-type: none">• Open discussion and announcements• Concluding comments, review next steps and adjourn

Objectives

- Showcase the key updates made to CDS Connect this past year
 - ▶ Share new features and resources available for CDS Connect
 - ▶ Prepare for October 2021 Work Group meeting discussing next year's themes and priorities
- Discuss topics of interest to members relating to opportunities for CDS Connect

CDS CONNECT KEY UPDATES SEPTEMBER 2020 – 21

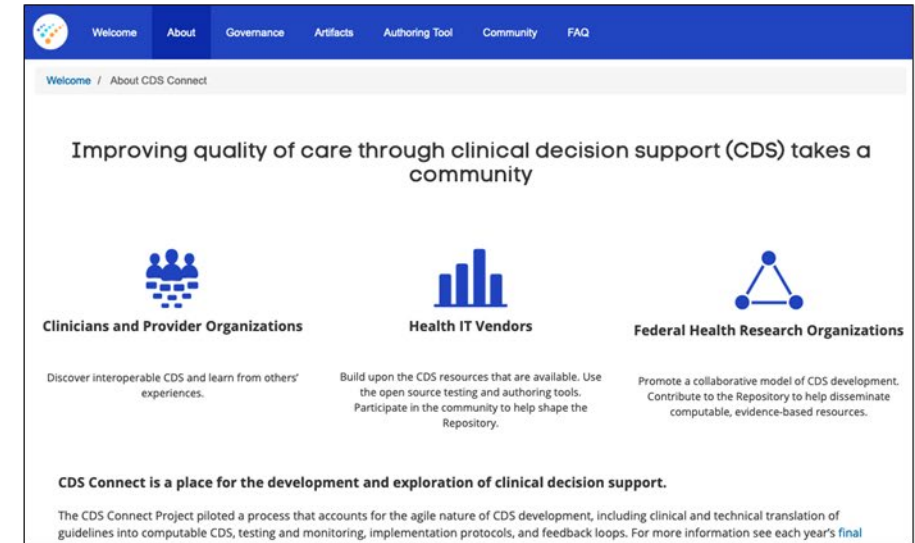
MITRE Team

Overview

- Site Changes
 - ▶ Graphic Changes
 - ▶ FAQ Changes
 - ▶ Content changes
 - Simplified Registration Process
 - Work Group
- Repository Changes
 - ▶ Repository page content and search by knowledge level feature
 - ▶ Updated and New Artifacts
 - ▶ CPG-on-FHIR
- CDS Artifacts
 - ▶ CDS Connect MITRE authored artifacts updated with relevant evidence, value sets, R4, and documentation
- Authoring Tool Changes
 - ▶ Query Builder
 - ▶ Resource/Modifiers
 - ▶ External CQL Functions (Custom Modifiers)
 - ▶ External CQL Functions (Direct Invocation)
 - ▶ Metadata Improvements
 - ▶ Recommendation Links
 - ▶ Value Set Authority Center Integration Updates
 - ▶ Clinical Quality Language (CQL) V1.5
 - ▶ Usability Improvements
 - ▶ Maintainability
- Patient Partnering Panel
- Next Steps

Site: Graphics Changes on Welcome and About Pages

- Proposed Changes:
 - ▶ Make patient and caregiver community involvement explicit
 - ▶ Present visualization of CDS goal



Update

PATIENT-CENTERED OUTCOMES RESEARCH

Clinical Decision Support
Accelerating Evidence into Practice through CDS

Search  [Authoring Tool](#) [michelle.jencx](#)

[CDS Home](#) [Overview](#) [CDS Connect](#) [Learning Network](#) [Evaluation](#) [Funding Opportunities](#) [Resources](#) [Contact Us](#)

 [Welcome](#) [About](#) [Governance](#) [Repository](#) [Authoring Tool](#) [Community](#) [FAQ](#)

Welcome to CDS Connect

The CDS Connect Project is a freely available web-based platform that enables the clinical decision support (CDS) community to identify evidence-based care, translate and codify information into an interoperable health IT standard, and leverage tooling to promote a collaborative model of CDS development.

The CDS Connect Repository supports AHRQ's mission to disseminate and implement patient-centered outcomes research findings into clinical practice through CDS. Entries in this repository include CDS "artifacts" – actionable medical knowledge (e.g., clinical practice guidelines, peer-reviewed articles, local best practices, and clinical quality measures) translated into computable and interoperable decision support.

The Repository hosts numerous artifacts in varying forms and maturity across a variety of clinical topics, from 'analytic, diagnostic and therapeutic techniques and equipment' to 'psychiatry and psychology'. A variety of organizations contribute artifacts to the Repository, including other Federal agencies.

For more information, see the [FAQ](#).



AHRQ CDS Connect: A Primer (3 minutes, 35 seconds)
[Alternative Audio-Described Version \(4 minutes, 49 seconds\)](#)

[Watch on YouTube](#) [Copy Link](#)

The right To the right people



```
graph LR; A[Patient & Caregiver Communities] --> B[CDS Authors]; B --> C[CDS Connect]; C --> D[Health IT Systems]; D --> E[Clinical Teams]; E --> F[Patient & Caregiver Communities];
```

Patient & Caregiver Communities	CDS Authors	CDS Connect	Health IT Systems	Clinical Teams	Patient & Caregiver Communities
Compile questions regular people ask about care and treatments that contain a measure of uncertainty.	Publish clinical decision support artifacts with or without the CDS Authoring Tool.	Explore and disseminate resources for clinical decision support.	Implement CDS relevant and useful to the healthcare organization.	Use the resources alongside the existing clinical workflows to improve quality of care.	Use the resources in partnership with clinicians to improve quality of life and care.

<https://cds.ahrq.gov/cdsconnect/about>

Change 2: Graphic on About Page

About CDS Connect

Improving quality of care through clinical decision support (CDS) takes a community



Clinicians and Provider Organizations

Discover interoperable CDS and learn from others' experiences.



Health IT Vendors

Build upon the CDS resources that are available. Use the open source testing and authoring tools. Participate in the community to help shape the Repository.



Federal Health Research Organizations

Promote a collaborative model of CDS development. Contribute to the Repository to help disseminate computable, evidence-based resources.



Patient and Caregiver Communities

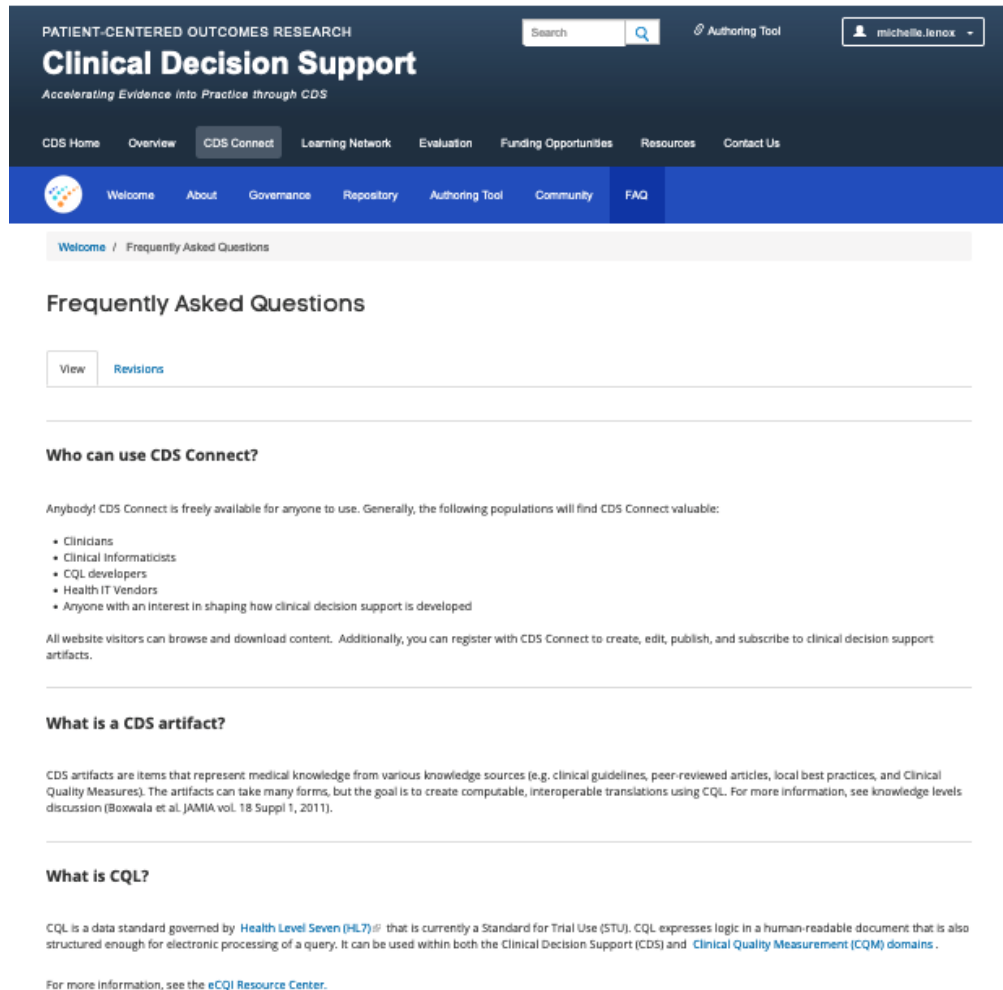
Partner in the development, dissemination and evaluation of computable CDS artifacts and tools.

CDS Connect is a place for the development and exploration of clinical decision support.

The CDS Connect Project piloted a process that accounts for the agile nature of CDS development, including clinical and technical translation of guidelines into computable CDS, testing and monitoring, implementation protocols, and feedback loops. For more information see each year's [final report](#).

<https://cds.ahrq.gov/cdsconnect/about>

Site: FAQ Updates



The screenshot shows the CDS Connect website's FAQ page. The header includes the title 'Clinical Decision Support' and a navigation menu with links like 'CDS Home', 'Overview', 'CDS Connect', 'Learning Network', 'Evaluation', 'Funding Opportunities', 'Resources', and 'Contact Us'. The 'FAQ' link is highlighted in the secondary navigation bar. Below the navigation, there's a breadcrumb trail 'Welcome / Frequently Asked Questions'. The main heading is 'Frequently Asked Questions', followed by tabs for 'View' and 'Revisions'. The first question is 'Who can use CDS Connect?', with an answer stating it's freely available to anyone and listing target populations: Clinicians, Clinical Informaticists, CQL developers, Health IT Vendors, and anyone interested in clinical decision support development. The second question is 'What is a CDS artifact?', with an answer explaining that artifacts represent medical knowledge from various sources and are used to create computable translations using CQL. The third question is 'What is CQL?', with an answer explaining that CQL is a data standard governed by Health Level Seven (HL7) and used for electronic processing of queries. A footer note directs users to the eCQI Resource Center for more information.

PATIENT-CENTERED OUTCOMES RESEARCH
Clinical Decision Support
Accelerating Evidence into Practice through CDS

Search [Q] Authoring Tool michelle.lenox

CDS Home Overview **CDS Connect** Learning Network Evaluation Funding Opportunities Resources Contact Us

Welcome About Governance Repository Authoring Tool Community **FAQ**

Welcome / Frequently Asked Questions

Frequently Asked Questions

View Revisions

Who can use CDS Connect?

Anybody! CDS Connect is freely available for anyone to use. Generally, the following populations will find CDS Connect valuable:

- Clinicians
- Clinical Informaticists
- CQL developers
- Health IT Vendors
- Anyone with an interest in shaping how clinical decision support is developed

All website visitors can browse and download content. Additionally, you can register with CDS Connect to create, edit, publish, and subscribe to clinical decision support artifacts.

What is a CDS artifact?

CDS artifacts are items that represent medical knowledge from various knowledge sources (e.g. clinical guidelines, peer-reviewed articles, local best practices, and Clinical Quality Measures). The artifacts can take many forms, but the goal is to create computable, interoperable translations using CQL. For more information, see knowledge levels discussion (Boxwala et al. JAMIA vol. 18 Suppl 1, 2011).

What is CQL?

CQL is a data standard governed by [Health Level Seven \(HL7\)](#) that is currently a Standard for Trial Use (STU). CQL expresses logic in a human-readable document that is also structured enough for electronic processing of a query. It can be used within both the Clinical Decision Support (CDS) and [Clinical Quality Measurement \(CQM\)](#) domains.

For more information, see the [eCQI Resource Center](#).

- Who can use CDS Connect?
- How do I find artifacts that are relevant to my organization?
- How do I register for a CDS Connect Account?
- How can I share my experience using CDS Connect and ways to improve the platform with the CDS Connect Work Group?
- How do I maintain my contributed CDS artifacts?

Site: FAQ Entry 'How do I maintain my contributed CDS artifacts?'

- Step 1: Is the evidence behind the CDS artifact still current?
- Step 2: Are the value sets (VSs) still current?
- Step 3: Do the evidence or VS changes require an update to the logic?
- Step 4: Do the relevant Implementation Guide (IG) and/or other supporting documents need updates?
- Step 5: Are the metadata still current?



At-A-Glance CDS Artifact Update Process to Inform Your Annual Review

Component	Action(s)	Owner(s)	Others Engaged
CDS Artifact Entry Page on AHRQ CDS Connect Repository	Review artifact elements or components for familiarity	Publishing Organization Lead ¹	Clinician, logic author, informaticist
Evidence Base	Determine whether new evidence exists and requires a change (or changes the CDS artifact output overall)	Clinician	Library services, external subject matter experts (SME) as needed, guideline developers, professional organizations
Value Sets	Determine whether current value sets have been modified since last review; determine if any new codes are not reflected in the value set and/or whether new value sets have become available that better support the intent of the CDS artifact; update accordingly	Informaticist with clinician consultation	External SMEs (as necessary)
Logic	Update logic to reflect new CQL or FHIR standards/functionality, as well as new or changed value sets	Logic author	N/A
Implementation Guide (IG) Substantive Review	Review the current IG sections; update to reflect changes made around evidence, value sets, and logic; update Decision Log	Clinician, logic author	N/A
IG Editorial Review and Section 508 Compliance	Suggest editorial changes; format document for Section 508 compliance	Writer/editor with Section 508 expertise	N/A
Repository CDS Artifact Metadata	Review and update metadata	Clinician, logic author	N/A
Final Check of IG and Repository Artifact Page	Perform side-by-side comparison of new and old versions of IG and Repository Page using Document Compare; confirm this artifact lists all related/sister CDS artifacts; confirm referenced web links still function; virus scan attachments	Publishing Organization Lead (who has final authority)	Reviewers vary based on artifact, but may include clinician and/or logic author


The CDS Connect Repository supports AHRQ's mission to disseminate and implement patient-centered outcomes research findings into clinical practice through CDS.

¹ The Publishing Organization Lead is the person tasked with ensuring that the individual CDS artifact is updated by the deadline. This person coordinates the activities of others to ensure the update is complete.

Document updated by MITRE June 2021

Site: Simplified Account Registration

PATIENT-CENTERED OUTCOMES RESEARCH
Clinical Decision Support
Accelerating Evidence Into Practice through CDS

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Welcome / Combined Signup Form

CDS Connect Account Sign-Up

Thank you for your interest in contributing to the clinical decision support community! A CDS Connect account will provide you with the ability to create, edit, publish and subscribe to clinical decision support artifacts.

Full Name * Organization *

Email * Email (confirm) *

Note: Accounts are not generated automatically. A site moderator will reach out to you via the email address you provide.

How did you learn about CDS Connect *

Which permissions would you like associated with your CDS Connect account?
You may add or change permissions at a later date

Authoring Tool Login

☐ **Authoring Permissions** are for software developers to create HL7 CQL-based CDS logic files using a friendly web interface and to test authored CDS logic against uploaded synthetic patient data.

Artifact Repository Login

☐ **Contributor Permissions** are for researchers and developers to create CDS artifacts at the multiple knowledge levels (L1-L4) and post them to the Repository for public review and use.

☐ **Community Member Permissions** are for anyone with an interest in clinical decision support to subscribe to Repository artifacts and receive notifications.

Note: A CDS Connect account is not a single sign on account. While your credentials are the same for the Artifact Repository and Authoring Tool, your login sessions are not shared between them. If you request both permission sets, be aware you may need to log in with your account credentials a second time to access all functionality.

Privacy and Security Notice

This warning banner provides privacy and security notices consistent with applicable federal laws, directives, and other federal guidance for accessing this Government system, which includes all devices/storage media attached to this system. This system is provided for Government-authorized use only. Unauthorized or improper use of this system is prohibited and may result in disciplinary action and/or civil and criminal penalties. At any time, and for any lawful Government purpose, the government may monitor, record, and audit your system usage and/or intercept, search and seize any communication or data transiting or stored on this system. Therefore, you have no reasonable expectation of privacy. Any communication or data transiting or stored on this system may be disclosed or used for any lawful Government purpose.

[Submit](#)

CLINICAL DECISION SUPPORT (CDS)


- Single registration for differing permissions and access
 - ▶ Authoring
 - ▶ Contributor
 - ▶ Community Member
- *How did you learn about CDS Connect?*

Site: Work Group Welcome Message

Clinical Decision Support

Accelerating Evidence into Practice through CDS

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[Work group](#) [Reports](#) [Technical Resources](#) [Patient Perspectives](#) [Collaborations](#)

[Welcome](#) / [Community](#) / CDS Connect Work Group

CDS Connect Work Group

The CDS Connect Work Group advises the CDS Connect team on the ongoing identification and prioritization of key features and capabilities for CDS Connect, leveraging the expertise of work group members.

The CDS Connect Work Group is established with focused yet diverse representation to ensure a range of perspectives are heard concerning this work. The direct and iterative input from the work group supports the effective and efficient use of AHRQ's resources supporting the CDS Connect project.

The CDS Connect Work Group is requesting feedback from users to further enhance the platform. We welcome presentations during the monthly Work Group meetings from members of the public who have used CDS Artifacts, the CDS Authoring Tool, or Open Source Tools. If you are interested in leading a session on a use case with a focus on best practices and platform improvements, see the [FAQs](#) for more information.

Repository: Search and Welcome Message

PATIENT-CENTERED OUTCOMES RESEARCH

Clinical Decision Support

Accelerating Evidence into Practice through CDS

CDS Home Overview **CDS Connect** Learning Network Evaluation Funding Opportunities Resources Contact Us

Welcome About Governance **Repository** Authoring Tool Community FAQ

Welcome / Repository

The CDS Connect Repository supports AHRQ's mission to disseminate and implement patient-centered outcomes research findings into clinical practice through clinical decision support (CDS). Entries in this repository include freely accessible CDS "artifacts" – actionable medical knowledge distilled from various evidence sources (e.g., clinical practice guidelines, peer-reviewed articles, local best practices, and clinical quality measures) and translated into computable and interoperable decision support.

To explore these publicly available CDS artifacts, search below. If you are interested in drafting your own CDS artifact using the CDS Authoring Tool or contributing to the Repository, visit the [sign-up page](#) to register for the appropriate account for free.

For more information, see the [FAQs](#).

Explore CDS Connect Artifacts

All Search artifacts...

Advanced Search

Search Artifacts

NEW ARTIFACTS

The most recently published or updated artifacts.

Apr 29 2021

Alcohol Screening Using the World Health Organization (WHO) Alcohol Use Disorders Identification Test (AUDIT)

RISK ASSESSMENT

Publisher: The MITRE Corporation

Preventive Health Services Alcohol Drinking Risk Assessment Substance Abuse Detection Primary Health Care

Created: 2020-06-04 Reviewed: 2020-07-16 Updated: 2021-04-29

Apr 29 2021

Brief Behavioral Counseling Interventions for Excessive Alcohol Consumption with Optional Referral to Treatment

MULTIMODAL

Publisher: The MITRE Corporation

Preventive Health Services Alcohol Drinking Risk Assessment Primary Health Care Health Risk Behaviors

<https://cds.ahrq.gov/cdsconnect/repository>

Repository: CPG on FHIR

- Better support for artifact data elements aligned with CPG-on-FHIR specification
- Fields more logically grouped by knowledge level
- Show completeness of suggested required fields

Common

Narrative (L1)

Semi-Structured (L2)

Title *

Te

Artifact URL

jethijudrawaphatrupricregatrowreregupovimodatrupalupaswuhotrajuprisauadruw

The artifact's cononical URL (the version that is stable over time).

Status

Unknown

The lifecycle status of this artifact.

Version

phusowefrerifrach

The identifier that is used to identify this version of the artifact when it is referenced. To provide a version consistent with the Decision Support Service specification, use the format Major.Minor.Revision (e.g. 1.0.0).

☐ Experimental

A Boolean value indicating whether this artifact has been authored for testing purposes but not genuine usage.

Date

04/17/2021

The date when this artifact was published; must be updated when the version or status changes; should be updated when other substantial other changes made.

Artifact Publisher

wrasuwritropresweswasoswedrirupridrocagagitruproswebrukococriwuliwrimuc

The name of the organization or person(s) that published this artifact.

Summary (Hide summary)

Cui dignissim luptatum os paratus. Aptent cogo damnum esse iusto luptatum magna nisl plaga suscipit. Gravis jugis nisl persto torqueo. Antehabeo appellatio consequat ea enim ex tation turpis vero.

Leave blank to use trimmed value of full text as the summary.

Description

Cui dignissim luptatum os paratus. Aptent cogo damnum esse iusto luptatum magna nisl plaga suscipit. Gravis jugis nisl persto torqueo. Antehabeo appellatio consequat ea enim ex tation turpis vero.

Nulla persto quae quis. Appellatio aptent blandit consequat distineo nibh obruo probo. Camur duis pagus suscipit te veniam. Commododolus facilis gemino haero hos neo scisco velit. Abico acsi diam iusto letalis mauris nulla quadrum torqueo usitas. Conventio dolus et interdico mauris pagus quidne refoveo typicus utrum.

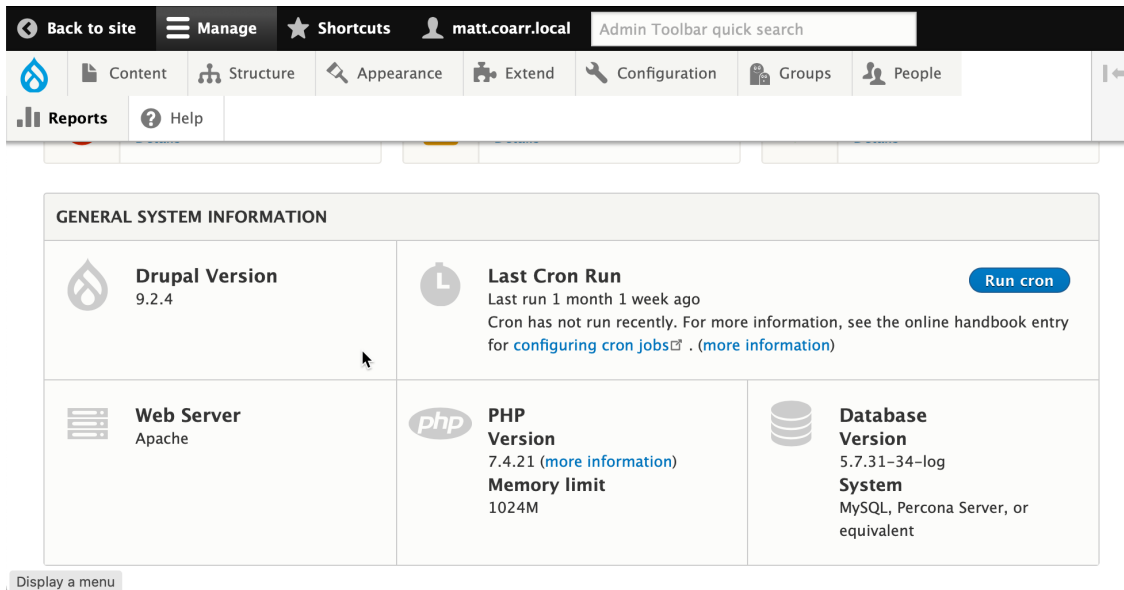
Ibidem melior minim. Blandit causa enim lobortis magna nobis olim tum veniam. Abigo autem causa

Text format Plain text






About text formats

- No HTML tags allowed.
- Lines and paragraphs break automatically.
- Web page addresses and email addresses turn into links automatically.

Repository: Drupal 9



The screenshot shows the Drupal 9.2.4 Admin Toolbar and the General System Information page. The toolbar includes links for Back to site, Manage, Shortcuts, and a user profile for matt.coarr.local. Below the toolbar, the General System Information page displays the following details:

GENERAL SYSTEM INFORMATION		
 Drupal Version 9.2.4	 Last Cron Run Last run 1 month 1 week ago Cron has not run recently. For more information, see the online handbook entry for configuring cron jobs . (more information) Run cron	
 Web Server Apache	 PHP Version 7.4.21 (more information) Memory limit 1024M	 Database Version 5.7.31-34-log System MySQL, Percona Server, or equivalent

Display a menu

- Upgrading from Drupal 8.9 to Drupal 9.2
- Updates many direct and transitive dependencies
- Required for support from Drupal and from Acquia
- Will enable future development options for easier maintenance
- Not visible to users

CDS Artifacts (Slide 1 of 2)

- [Statin Therapy for the Prevention and Treatment of Cardiovascular Disease \(CVD\) eCQM](#)
 - ▶ Aligned with latest version of eCQM; Value sets updated; CQL updated for R4; metadata updated with posted IG
- [CMS's Million Hearts® Model Longitudinal ASCVD Risk Assessment Tool for Shared Decision Making](#)
 - ▶ No new evidence, per CMS; Value sets and CQL are not applicable; metadata updated with the posted IG
- [CMS's Million Hearts® Model Longitudinal ASCVD Risk Assessment Tool for Updated 10-Year ASCVD Risk](#)
 - ▶ No new evidence, per CMS; Value sets and CQL are not applicable; metadata updated with the posted IG
- [Statin Use for the Primary Prevention of CVD in Adults: Clinician-Facing CDS Intervention](#)
 - ▶ No new evidence, per USPSTF; Value sets updated; CQL updated for R4; metadata updated with posted IG
- [Statin Use for the Primary Prevention of CVD in Adults: Patient-Facing CDS Intervention](#)
 - ▶ No new evidence, per USPSTF; Value sets updated; CQL updated for R4; metadata updated with posted IG
- [Aspirin Therapy for Primary Prevention of CVD and Colorectal Cancer](#)
 - ▶ No new evidence, per USPSTF; Value sets and CQL are not applicable; metadata updated with the posted IG

CDS Artifacts (Slide 2 of 2)

- [CMS's Million Hearts® Model Longitudinal ASCVD Risk Assessment Tool for Baseline 10-Year ASCVD Risk](#)
 - ▶ No new evidence, per CMS; Value sets and CQL to R4 updates; metadata updated with the posted IG
- [Abnormal Blood Glucose and Type 2 Diabetes Mellitus: Part One, Screening](#)
 - ▶ No evidence updates; Value sets and CQL to R4 updates; metadata updated with the posted IG
- [Abnormal Blood Glucose and Type 2 Diabetes Mellitus: Part Two, Counseling](#)
 - ▶ No evidence updates; Value sets and CQL to R4 updates; metadata updated with the posted IG
- [Healthy Diet and Physical Activity for CVD Prevention in Adults With Cardiovascular Risk Factors](#)
 - ▶ New evidence → new artifact; Value sets and CQL to R4 updates; metadata updated with the posted IG
- [Factors to Consider in Managing Chronic Pain: A Pain Management Summary](#)
 - ▶ New evidence, per AHRQ reports; Value sets and CQL updates (initial R4 updates were applied last project year, now R4 4.0.1); metadata updated with the posted IG

CDS Authoring Tool



An official website of the Department of Health & Human Services

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PATIENT-CENTERED OUTCOMES RESEARCH

Clinical Decision Support Authoring

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CDS Home [LOGIN](#)

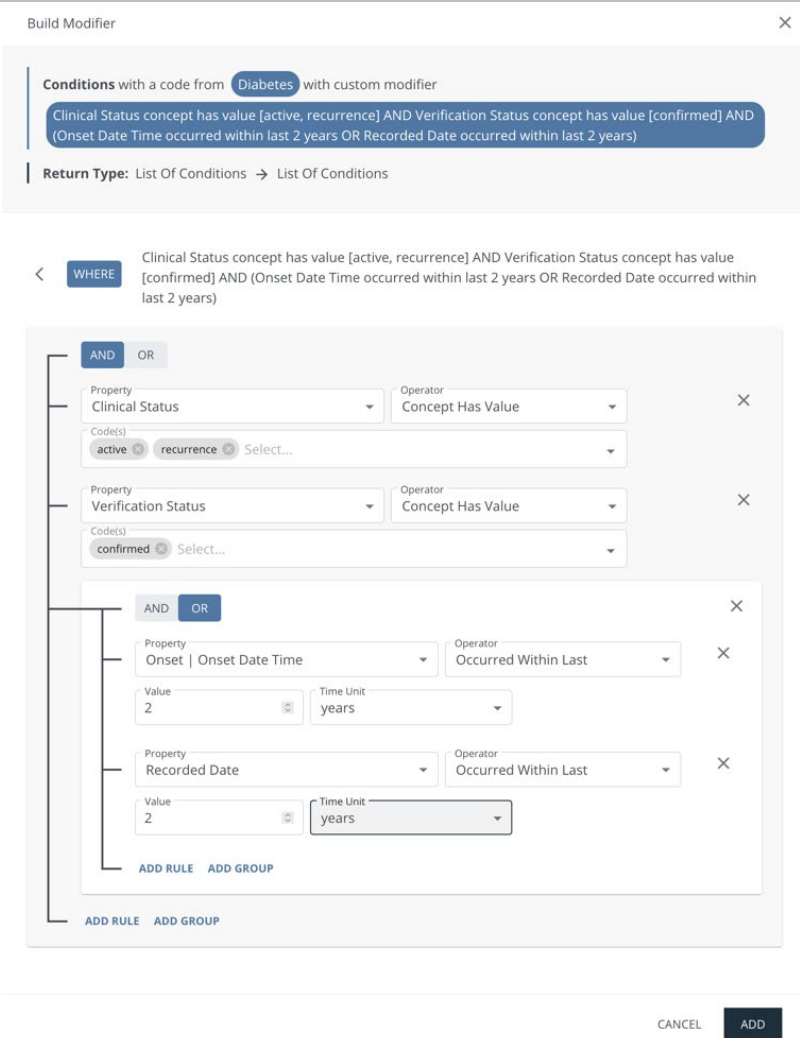
Create shareable standards-based CDS artifacts

The **Clinical Decision Support (CDS) Authoring Tool** is a component of the **CDS Connect** project.

[SIGN UP](#)

CDS Authoring Tool: Query Builder

- A more flexible and robust alternative to built-in expression modifiers
- Filter elements by specifying criteria
 - ▶ using specific resource properties and their type-specific operators
- Supports AND/OR and nested groups

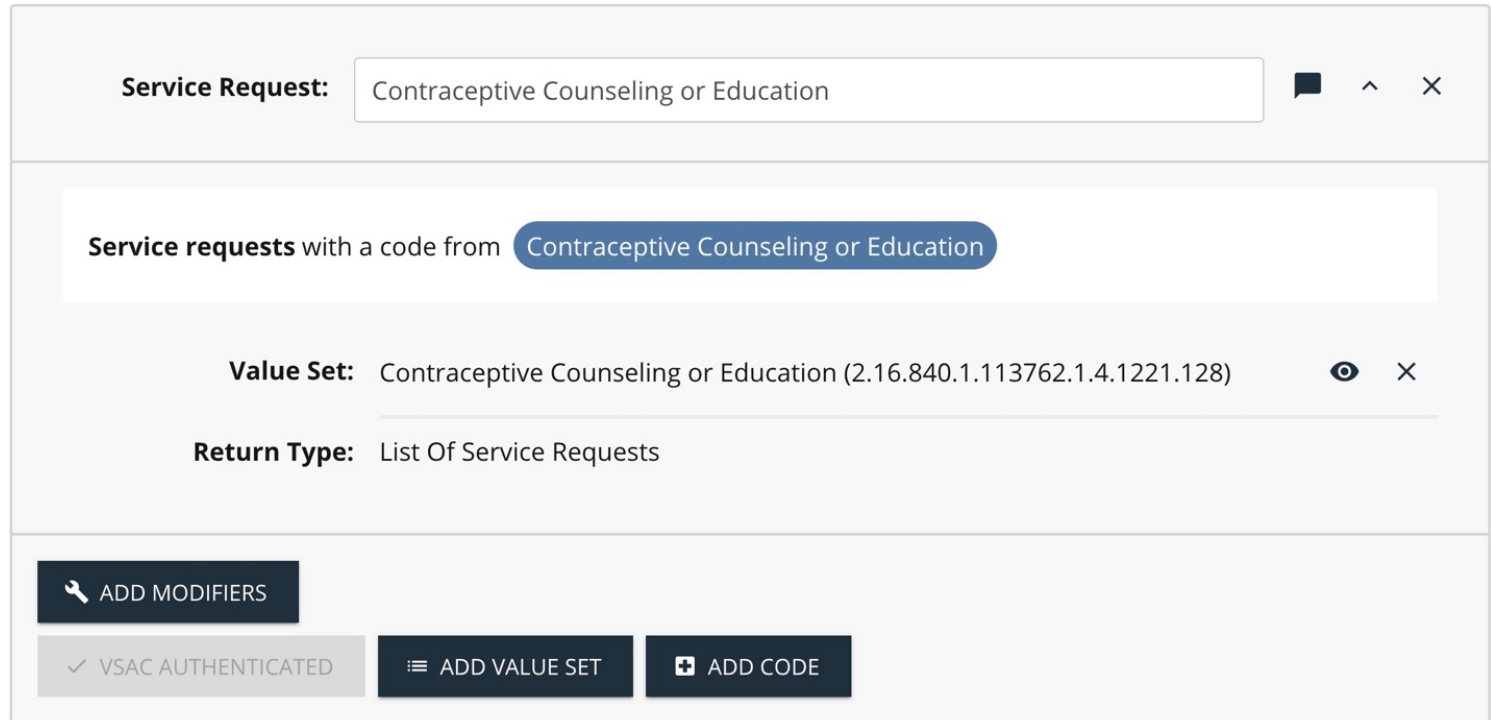


The screenshot shows the 'Build Modifier' window in the CDS Authoring Tool. At the top, it displays the current conditions: 'Conditions with a code from Diabetes with custom modifier' and a summary: 'Clinical Status concept has value [active, recurrence] AND Verification Status concept has value [confirmed] AND (Onset Date Time occurred within last 2 years OR Recorded Date occurred within last 2 years)'. Below this, the 'Return Type' is set to 'List Of Conditions'. The main area is titled 'WHERE' and shows a logical expression tree. The root is an 'AND' group containing three conditions: 1) 'Clinical Status' with values 'active' and 'recurrence' using the 'Concept Has Value' operator. 2) 'Verification Status' with value 'confirmed' using the 'Concept Has Value' operator. 3) An 'OR' group containing two conditions: 'Onset Date Time' and 'Recorded Date', both with a value of '2' and a time unit of 'years', using the 'Occurred Within Last' operator. At the bottom, there are 'ADD RULE' and 'ADD GROUP' buttons, and a 'CANCEL' button next to an 'ADD' button.

CDS Authoring Tool: New Resource/Modifiers

- New: ServiceRequest

- ▶ Lookback
- ▶ Count
- ▶ Exists
- ▶ Is (Not) Null
- ▶ Active or Completed
- ▶ Active
- ▶ Completed



The screenshot shows the CDS Authoring Tool interface for a new ServiceRequest resource. At the top, there is a text input field labeled "Service Request:" containing the text "Contraceptive Counseling or Education". Below this, a summary line reads "Service requests with a code from" followed by a blue pill button containing the same text. Underneath, the "Value Set:" is defined as "Contraceptive Counseling or Education (2.16.840.1.113762.1.4.1221.128)" with an eye icon and a close button. The "Return Type:" is set to "List Of Service Requests". At the bottom, there are three buttons: "ADD MODIFIERS" (with a wrench icon), "VSAC AUTHENTICATED" (with a checkmark icon), "ADD VALUE SET" (with a list icon), and "ADD CODE" (with a plus icon).

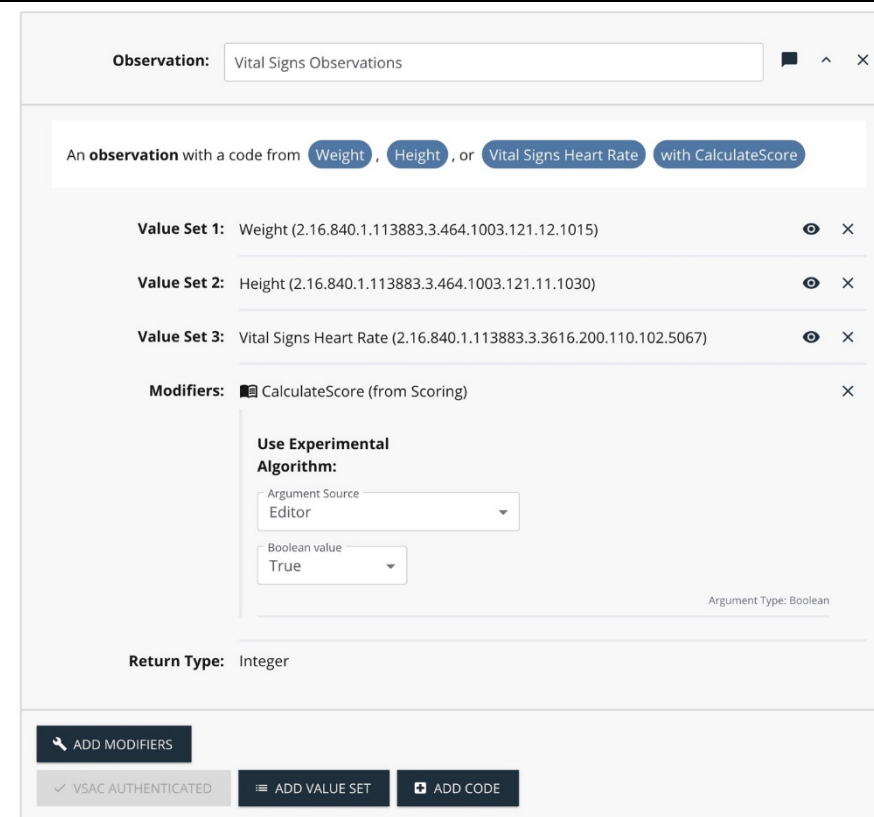
- New Modifiers

- ▶ First (Observation, Condition, Procedure, Immunization)
- ▶ Average Value (Observation)

CDS Authoring Tool: External CQL Functions (Custom Modifiers)

- Use external CQL functions as custom modifiers
 - ▶ Last return type must match function's first argument
- Provides custom behavior in familiar user interface

```
define function CalculateScore("Vitals" List<Observation>, "Use Experimental Algorithm" Boolean):  
  if "Use Experimental Algorithm" then  
    // experimental algorithm goes here (removed for brevity)  
  else  
    // standard algorithm goes here (removed for brevity)
```



Observation: Vital Signs Observations

An observation with a code from Weight, Height, or Vital Signs Heart Rate with CalculateScore

Value Set 1: Weight (2.16.840.1.113883.3.464.1003.121.12.1015)

Value Set 2: Height (2.16.840.1.113883.3.464.1003.121.11.1030)

Value Set 3: Vital Signs Heart Rate (2.16.840.1.113883.3.3616.200.110.102.5067)

Modifiers: CalculateScore (from Scoring)

Use Experimental Algorithm:

Argument Source Editor

Boolean value True

Argument Type: Boolean

Return Type: Integer

ADD MODIFIERS

VSAC AUTHENTICATED

ADD VALUE SET

ADD CODE

CDS Authoring Tool: External CQL Functions (Direct Invocation)

- Directly invoke external CQL functions
 - ▶ Supports argument editors for common types
 - ▶ Allows other element results as input argument

External CQL Element: Encounters Following ER

List_of_encounters returned by the external cql functions **FindEncountersFollowingER**

Max Hours After ER:

Argument Source
Editor

Value
24

Argument Type: Integer

Include Observation Encounters:


Argument Source
Editor

Boolean value
True

Argument Type: Boolean

External CQL Element: FindEncountersFollowingER (Function) from CommonEncounterFunctions

Return Type: List Of Encounters

 ADD MODIFIERS

CDS Authoring Tool: Metadata Improvements

- Added "Strength of Recommendation" and "Quality of Evidence" to Clinical Practice Guideline (CPG) fields

Strength of
Recommendation CPG:

Value:

strong

Quality of
Evidence CPG:

Value:

high

CDS Authoring Tool: Recommendation Links

- Optionally add one or more links, each with type, label, and URL
- Aligns well with CDS Hooks card links

×

Recommend...

Experts (i.e., The U.S. Preventive Services Task Force) find that one way to lower the risk of heart disease and stroke is through counseling and coaching programs that help you eat healthy foods and increase your physical activity (exercise and movement). These programs typically involve a trained counselor who can teach you, help you set goals, share ways to eat a healthy diet and increase physical activity and regularly follow up with you.

Contact your doctor to discuss whether coaching and counseling are right for you.

In addition, the experts know that all adults, whether they are at an increased risk for heart disease and stroke or not, can improve their health through healthy eating and being more physically active.

×

Link...

Link Type
absolute ▼

Tips for Healthy Eating (MyHealthfinder)

<https://health.gov/myhealthfinder/topics/health-conditions/diabetes/eat-healthy>

ADD RATIONALE

ADD SUBPOPULATION

ADD COMMENTS

ADD LINK

CDS Authoring Tool: Value Set Authority Center Integration Updates

- Integration with new FHIR R4 endpoint
- Authentication via UMLS API Key
- New streamlined value set selection modal

Login to your VSAC account

Use your UMLS Terminology Services API key to log in to VSAC to access value sets and codes within the CDS Authoring Tool.

Need an account? [Request a UMLS Terminology Services account.](#)
Don't know your UMLS API key? [Find your UMLS Terminology Services API key.](#)

API Key

CANCEL

LOGIN

Choose value set

Value set keyword

SEARCH

NAME/OID	STEWARD	CODES
COVID19 ICD10CM Value Set for Diabetes Mellitus 2.16.840.1.113883.3.3616.200.110.102.3153	Clinical Architecture	578
Preexisting Diabetes 2.16.840.1.113762.1.4.1029.275	Joint Commission	473

CANCEL

CDS Authoring Tool: Clinical Quality Language (CQL) Version 1.5



- Upgrade CQL-to-ELM translator to CQL 1.5 compatible version
- Update and upgrade CQL Execution library to version 2.3.0
 - ▶ Used in CDS Authoring Tool's CDS testing feature
 - ▶ Updated to support aggregate queries, runtime messages, new list operators, strict type casts, better handling of dates, and more...
- Update CDS Connect Commons libraries to reflect best practices and leverage improvements in CQL-to-ELM translator

CDS Authoring Tool: Usability Improvements

- Sortable artifact list
- Artifact duplication feature
- “Sticky” workspace tabs
- Tab status indicators
- New artifact summary tab
- More...

Summary
Inclusions
Exclusions
Subpopulations
Base Elements
Recommendations
Parameters
Handle Errors
External CQL

Artifact: Statin Use Example
Version: 0.0.1
Last Changed: 5 minutes ago
Date Created: 4 days ago

If the patient meets **inclusion** conditions:

Age Range: Age 40 to 75


AND

Group: One or More Risk Factors

Observation: LDL > 130 mg/dL

OR

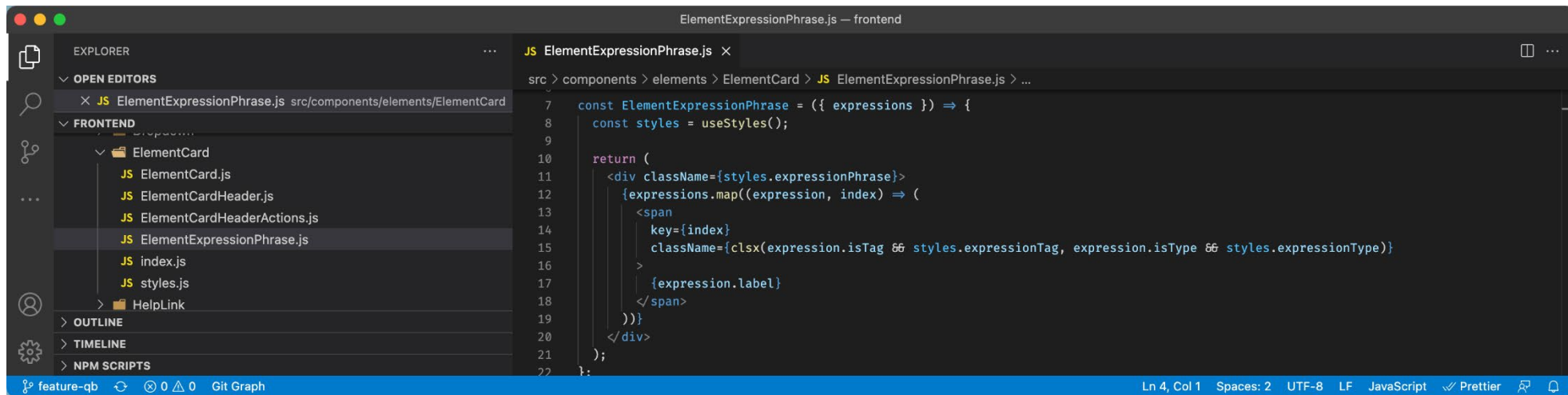
Condition: Has Diabetes

ARTIFACT NAME	VERSION	FHIR VERSION	LAST CHANGED ↑	DATE CREATED	
Pain Management Summary	1.0.0	DSTU2	less than a minute ago	3 minutes ago	  
Statin Use Example	0.0.1	R4	4 minutes ago	4 days ago	  

CDS Authoring Tool: Maintainability

Improved the maintainability and re-usability of the codebase

- Added, removed, and updated dependency libraries as appropriate
- Switched homegrown components to use Material-UI
- Leveraged React Hooks to simplify component logic, lifecycles, and states
- Modularized components for re-use within and outside of the application
- Application of consistent coding practices



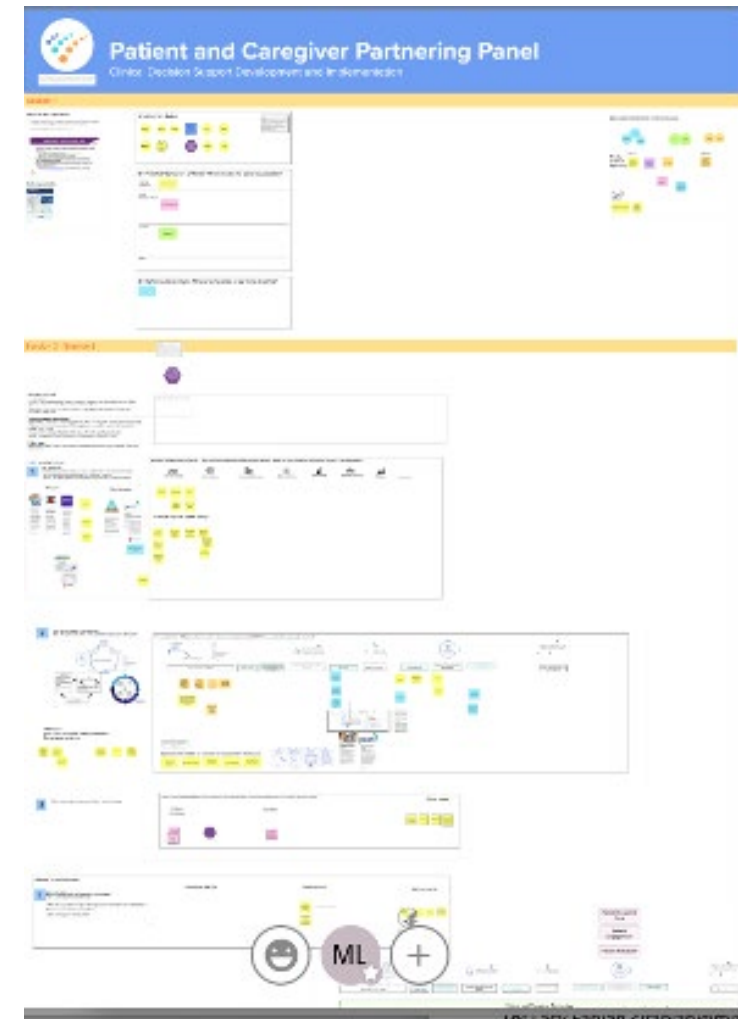
The screenshot shows a code editor interface with a dark theme. On the left, the 'EXPLORER' sidebar displays a file tree for a project named 'feature-qb'. The tree includes a 'FRONTEND' folder containing an 'ElementCard' sub-folder. Inside 'ElementCard', several JavaScript files are listed: 'ElementCard.js', 'ElementCardHeader.js', 'ElementCardHeaderActions.js', 'ElementExpressionPhrase.js' (which is selected), 'index.js', and 'styles.js'. The main editor area shows the content of 'ElementExpressionPhrase.js'. The code defines a component 'ElementExpressionPhrase' that takes 'expressions' as a prop and uses a 'useStyles' hook. It returns a JSX element with a 'div' containing a 'span' for each expression, with dynamic class names based on the expression's type and the component's styles. The status bar at the bottom indicates the current position is 'Ln 4, Col 1' and lists various settings like 'Spaces: 2', 'UTF-8', 'LF', 'JavaScript', and 'Prettier'.

```
const ElementExpressionPhrase = ({ expressions }) => {
  const styles = useStyles();

  return (
    <div className={styles.expressionPhrase}>
      {expressions.map((expression, index) => (
        <span
          key={index}
          className={clsx(expression.isTag && styles.expressionTag, expression.isType && styles.expressionType)}
          {expression.label}
        </span>
      ))}
    </div>
  );
};
```

Patient Partnering Panel

- 4 sessions
- Average of 10 attendees/session
- Discussion facilitated by patient advocate
- MURAL board and visual note taking
- 3 drafts of content to be shaped in coming year



Patient Partnering Panel: Draft Content

Overview

CDS Connect Patient and Caregiver Partnering Panel



We aspire to inspire CDS developers to take one more step to engage and partner with patients and caregivers

What is patient and caregiver partnering?

Patient partnering, patient engagement, and patient-centered care differ, though they are related. The literature on patient participation in treatment and care (patient engagement/patient activation) is established and growing.

The dynamic of partnering reflects inclusion and contribution to decision-making, not just at certain points in development, but continuously. We propose partnering done early, often, and throughout the CDS development lifecycle, results in tools, such as shared patient-clinician decision-making visualizations and applications, that ultimately support providers in delivering evidence-based, patient-centered care.

How could developers partner with patients and caregivers?

There is a role for patient and caregivers in the development of all levels of artifact development. When integrated within the research and development team, engaged patient and caregivers can ask questions and provide perspectives that keep efforts focused on making impacts in patient lives. When included in user research, participatory design or user testing activities, their input helps define and refine the resulting prototypes and software applications that are piloted and implemented into our health systems.

When might developers consider partnering?

At all stages of the CDS development lifecycle, there is a role for partnering with patients and caregivers. Co-production can happen at all phases and stages, from defining and prioritizing research through dissemination of the work up through implementation and refinement.



What are some of the ways patients might partner?

- Share the questions and decision people make to live safely and well
- Share their lifeworlds as a patient and/or caregiver
- Identify and describe factors that impact patient and care giving decision making (e.g. cost of treatment)
- Help prioritize needs, development outcomes, and measures of impact of CDS and CDS artifacts
- Contribute to the development of personas and use cases
- Share feedback on impact of piloted or implemented CDS artifacts
- Disseminate the work through their patient and care giver advocacy networks
- Provide content, requirement and design reviews of CDS and CDS artifacts under development
- Be a member of a patient expert panel, focus group, or working group

What resources are available for partnering?

One of the challenges identified by our panel members was knowing what resource were readily available when considering integrating patients and caregivers into their efforts. Members identified and shared a variety of resources including local, national, and governmental efforts and toolkits, as well as professional and commercial entities. Some of those recommended included:

- Rare Patient Voice LLC
- Saavy Coop
- WEGO Health
- Patient Family Advisory Network
- PCORI Ambassador Program
- Local Patient Family Advisory Panels
- Society of Participatory Medicine
- CMS Person & Family Engagement Toolkit

Lessons Shared about Partnering

It is a process, not a few points in time - Partnering is iterative and on-going. Budget, and budget upfront - Make partnering a part of overall research and development plans. Do, try, learn and try again - There is no perfect way to partner.

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Lessons Learned

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Lessons Learned: One More Step

1. Partnering/co-production is not for the faint of heart, exhausted, insecure, or self-centrally ambitious. It's work, it's risky—but it is also rewarding. Partnering/Co-production rests on a foundation of trust, humility, respect for varied expertise, mutual coaching and mentorship, self-confidence, and curiosity. It's not about consultation, participation, or engagement - words used to describe situations where the project controls the contributions made by those outside its boundaries.

2. A shift occurs when newly partnering with patients and caregivers. Readiness for that change varies widely. That variation impacts results. Administrators, researchers, developers, clinicians, often the up party in an unequal relationship, are not homogenous, the same. They vary. Perhaps we can group these perceived powerful into those that have already embraced partnering and sharing in decision-making and those who haven't. Some have existing partnering perspective, know they have a problem to solve that requires expertise they don't yet have access to, and appreciate the expertise of life literacy and lived experience, and some don't. Some have budgeted for engagement and partnership, have self-confidence, aren't threatened by change, are prepared to change. Some aren't.

The members of the public exist on a continuum as well. Researchers and developers may benefit from understanding the variation among us, the public. We are not homogenous, the same. We have varied comfort and understanding of our lived experience, varied communication skills, varied knowledge of medical terms and systems. Some of us are more networked than others, have more time to devote to advocacy, more desire. Some have transportation to events or high-speed Internet access. Some have dependent care responsibilities, and some don't. Some have hutzpah, self-confidence, curiosity, and some have less.

3. Appreciating the diversity, the continuum, meeting people where they are, can overwhelm us. One size does not fit all. Assuming curiosity, discomfort with the current state, the time, some funding, and existing trustful relationships, we can take many steps. By we, I mean any of us - researchers, clinicians, developers, the public, funders. We could:

- Spend 15 minutes each week journaling what works and what doesn't for any partnerships with other stakeholders in your research universe. Self-examine where you and your team live on the continuum of partnership and co-production. Self-examine satisfactions, or not, with the implementation of your current findings. Share widely wherever you meet peers.
- Budget for engagement and partnering/co-production early. If not dollars, pro-bono time. Time is not free for anyone.
- Build an current trusting relationships with peers and stakeholders who have partnered. Find inspiration there. Experiment with them.
- Embrace failure. Partnering/co-production is messy and fraught. I've learned more from what didn't work than did. Adjust, try something else.
- Spend at least 50% of your time with partners with mouths closed, ears open. They know stuff you don't.
- Hone your ability to identify questions and issues that your current team hasn't yet solved. Could people with different abilities, circumstances, conditions, expertise offer a door-opening perspective? Formulate questions they could answer. Have courage.
- No matter how good you are in your bubble of expertise, professional or lived experience, seek and accept coaching about co-production. If you've had some success with partnering/co-production budget time for mentorship.

<https://cds.ahrq.gov/cdsconnect>

To Explore

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Ideas and questions to explore

Over the course of the four sessions of the panel, members shared related questions and ideas on CDS development and patient partnering. The comments below illustrate the breadth of the topic overall and the opportunities that remain to be explored.

- Standards and interoperability impact how patients and caregivers needs are met with CDS.
- The patient is where the current 'silos' collide - policy, clinical evidence, funding, standards and cost.
- Build personas to illustrate the impact of income/insurance on clinical decision making
- In the future, showcase examples of successful partnering
- What makes partnering different from user-centered design processes and methods?
- How best to communicate risk to patients?
- How can social determinants of health and/or patient preferences be integrated into CDS?
- When testing or implementing an artifact, what mechanisms can be put in place to ensure the patient, caregiver and clinician feedback loops back to development? How can we measure the feedback's impact?
- What statistics might most meaningfully measure the impact of a CDS artifact? Should it be file downloads from CDS Connect, counts of locations of use, or number of patients impacted?
- Do these partnering resources provide training to their patient advocates? Is there training available for the development teams about partnering?
- How do a start developing a long-term partnering relationship? How do I reach out to frame our projects needs?

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Next Steps

October 2021 Work Group Meeting

- Identify “Must Have” and “Should Have” General Themes
 - ▶ Including reviewing key stories within each for potential implementation in the coming year
- Identify trust attributes

ANNOUNCEMENTS, OPEN DISCUSSION, AND CLOSE-OUT

Maria Michaels
Centers for Disease Control and Prevention