



# VUMC CQL Platform: CDS Bench to Bedside

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## Clinical Decision Support Implementation with SMART on FHIR and Clinical Quality Language (CQL)

HL7 - FHIR  
hl7.org/fhir

HL7 - CQL  
cql.hl7.org

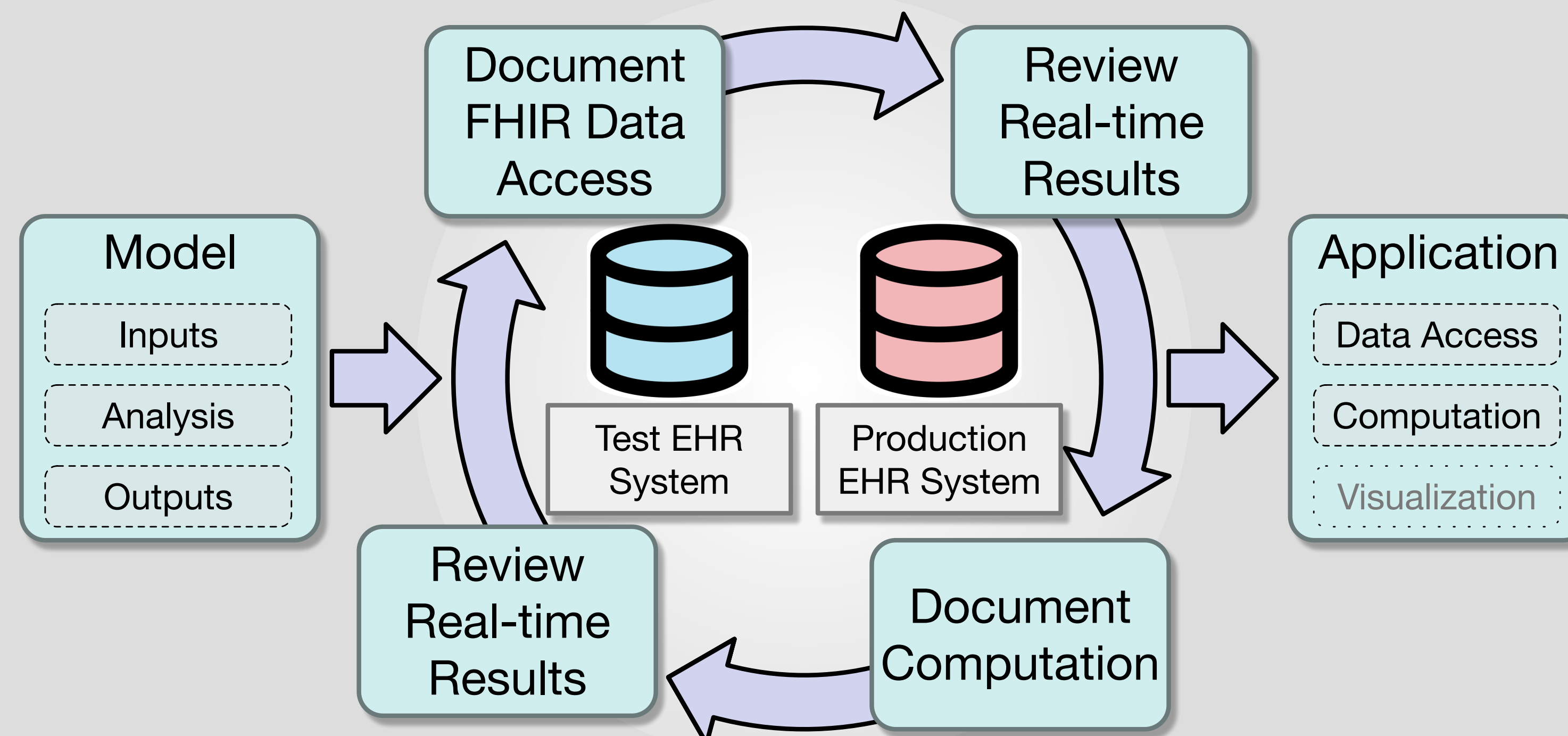
AHRQ - CDSConnect  
cds.ahrq.gov

NLM - ValueSets  
vsac.nlm.nih.gov

### Project Organization

One place to configure and re-use:

- ★ Authorization profiles
- ★ Sample Datasets
- ★ Data Dictionaries
- ★ CQL Libraries
- ★ ValueSets



### Development & Support

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### CQL Platform Sample Dataset

**Real-time EHR Data**

Source	TST R4	TST R4
Id	eZvf...4g3	euc3...uwg3
active	true	true
birthDate	1958-01-20	1997-02-07
communication		
deceasedBoolean	false	false
gender	female	male
generalPractitioner	Philip Ray Harrelson, MD	
identifier	VANRNSC1K9TVKBH	VAN6S489NPHNX2H
	E129839	E140696
	Z51941	Z62799
	Tm81f6FPyOxH7COsdVsaM-	TfllpJVQH5ODn0tekWVNZ9h-

### FHIR Data Search & Filtering

Define and re-use sets of patients, lab results, medications, or any other FHIR resource

- ★ Filter by any field supported by the vendor
- ★ Drill down to related resource sets
- ★ Explore any Test or approved Production data

### Real-time EHR Data

All functions of CQL Platform that define how to access EHR data display real-time EHR data

- ★ Always uses personal OAuth 2.0 authorization
- ★ Immediate feedback on the design process
- ★ Displays response time metrics

### CQL Platform ValueSet

```

    id: "ValueSet0nDialysis"
    resourceType: "ValueSet"
    name: "0nDialysis"
    title: "0n Dialysis (Condition)"
    date: "2023-05-05"
    publisher: "Vanderbilt University Medical Center"
    description: "Implementation of the STRATIFY R01 project"
    purpose: "Acute Heart Failure Risk Score Calculator"
    useContext: "Subdomain: Condition"
    expansion:
      contains:
        - 0:
            system: "urn:oid:2.16.840.1.113883.6.90"
            code: "R18.6"
            display: "End stage renal disease"
        - 1:
            system: "http://hl7.org/fhir/sid/icd-10-cm"
            code: "N18.6"
            display: "End stage renal disease"
        - 2:
            system: "urn:oid:2.16.840.1.113883.6.90"
            code: "Z99.2"
            display: "Dependence on renal dialysis"
        - 3:
            system: "http://hl7.org/fhir/sid/icd-10-cm"
            code: "Z99.2"
            display: "Dependence on renal dialysis"
  
```

### CQL Platform Data Dictionary

**Real-time EHR Data**

Source	TST R4	TST R4
Id	e6xS...VRA3	
category		Problem List Item
clinicalStatus		Active
code		Dependence on renal dialysis (CMS/HCC)
onsetPeriod		
recordedDate		2023-04-26
subject		Zzztest, Cdsfpmaaa
verificationStatus		Confirmed

### ValueSet-based Data Element Selection

A ValueSet collects codes for identifying a groups of resources that serve a common purpose

- ★ Shareable in a standard FHIR resource form
- ★ Identify medication categories, groups of conditions, laboratory results, etc.
- ★ Commonly composed of other ValueSets
- ★ Published shareable ValueSets available from **Value Set Authority Center (VSAC)** managed by National Library of Medicine (NLM)

### Clinical Quality Language (CQL)

Clinical Quality Language (CQL) is designed to simply represent dialysis data acquisition and computation in a form that is accessible to clinicians, developers, and quality assurance.

- ★ 100% Support for FHIR Data Model
- ★ Agency for Healthcare Research and Quality (AHRQ) provides CQL learning and tools via **CDSConnect**
- ★ Built-in operations on Value Sets
- ★ Get started with CDSConnect **CQL Authoring Tool**
- ★ Modular for site-by-site customization

### CQL Platform CQL Library

**Real-time EHR Data**

```

    valueset "0nDialysis": 'ValueSet0nDialysis'
    context Patient

    define DialysisRecorded:
      First( [Condition] 0N where 0N.code in 0nDialysis return 0N.recordedDate )
  
```

Source	TST R4	TST R4
Id	eZvf...4g3	euc3...uwg3
DialysisRecorded	"2023-04-26"	"2023-04-26"
HRN	"010003385"	"010017956"