CIVITAS
Networks for Health

FHIR DEEP DIVE WEBINAR SERIES

December 11, 2024

HOUSEKEEPING REMINDERS

- This is a Zoom webinar.
- Participants have been muted upon entry.
- Participants are welcome to utilize both the chat and Q&A features.
- For questions following the meeting, reach out to contact@civitasforhealth.org.

CIVITAS
Networks for Health

AGENDA

- Civitas Networks for Health Overview and Updates- *Demri Henderson, Associate Program Manager, Civitas Networks for Health*
- Setting the Stage: FHIR Deep Dive- *Demri Henderson*
- HL7 and FHIR Overview- *Dan Vreeman, Chief Standards Development Officer, HL7*
- Q&A
- Wrap-Up

CIVITAS
Networks for Health

WHO WE SERVE

APCDs & Health Data Repositories

HIEs & CIES

Business & Tech Partners

Community Health Improvement Organizations

Payers/plans

Medicaid & Public Health

Health care Workers

Data Collaborations & Associations

All people

CIVITAS Networks for Health

Health Systems

QIOs

CBOs

Safety Net Providers & Systems

CIVITAS Networks for Health

CIVITAS IS THE BRIDGE BETWEEN…

DATA

DOING

CIVITAS
Networks for Health

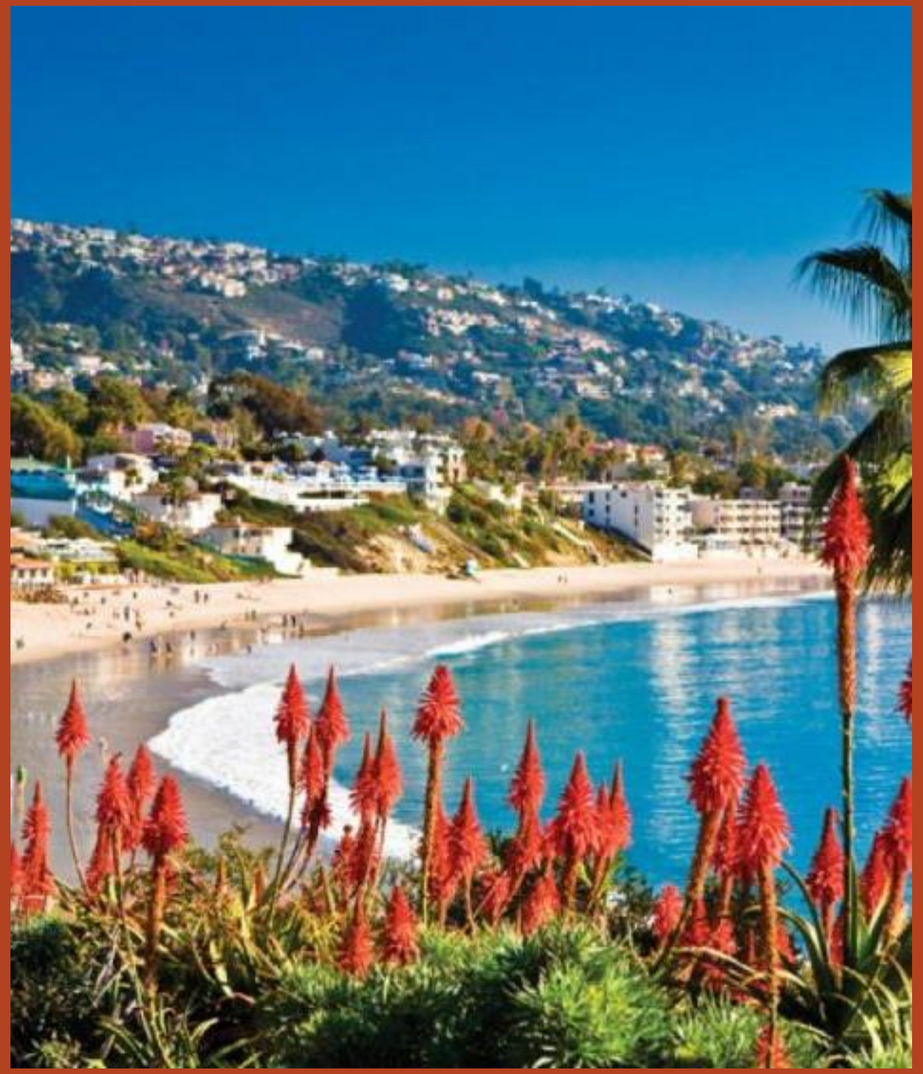
CIVITAS UPDATES

CIVITAS
Networks for Health

UPCOMING EVENTS

- Civitas Member Led Webinar | Going Beyond HIE: Bridging Data for Whole-Person Care Presented by 4medica – December 17, 1-2 p.m. ET.
- Collaboratives in Action: Localized Approaches to National Interoperability: How Public Health Agencies are Leveraging HIEs for Data Modernization, December 19, 2-3 pm ET
- **More to come in 2025!**

CIVITAS
Networks for Health



SAVE THE DATE
#Civitas2025
SEPTEMBER 28-30

In Anaheim, California – hosted with our Premier Partners 211 San Diego and Civitas' California members.

CIVITAS
Networks for Health

FHIR DEEP DIVE WEBINAR SERIES

CIVITAS
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FHIR DEEP DIVE WEBINAR SERIES

- Wednesday, December 11 1:00pm-2:00pm – HL7 and FHIR Overview
- Wednesday, January 8 1:00pm-2:00pm ET – Da Vinci FHIR Accelerator
- Wednesday, January 22 2:00pm-3:00pm ET – Gravity Project FHIR Accelerator
- Tuesday, January 28 4:00pm-5:00pm ET – FHIR at Scale Taskforce (FAST) FHIR Accelerator
- Wednesday, February 5 2:00pm-3:00pm ET – Helios FHIR Accelerator
- Register for the series here!

CIVITAS
Networks for Health

HL7® FHIR® DEEP DIVE

HL7 International

The home for FHIR® and your trusted forum for solving interoperability problems together

HL7:Civitas Webinar Series

2024 12 11

HL7® International

Daniel J. Vreeman, PT, DPT, MS, FACMI, FIAHSI, FHL7
Chief Standards Development Officer
HL7 International

Hi, I'm dan@hl7.org

Physiotherapist, biomedical informatician, interoperability aficionado

`Unusual, I know.`

Chief Standards Development Officer at HL7 International

President, Board of Directors at HL7 FHIR Foundation

At RTI International, I led interoperability projects

For 13+ years I led development of LOINC and other interoperability projects at the Regenstrief Institute

Conversation starter: *Style with a story*

THE POCKET SQUARE PROJECT

danielvreeman.com/about

Game plan for today

1. Why open standards?
2. Who's HL7?
3. FHIR overview: what digital health innovators need to know
4. Meet the extended FHIR family
5. Welcome to the global HL7 community
6. Resources and tools for using FHIR
7. Discussion

Open data standards:

Fuel for innovation

HL7® International

Organizational Profile

Not-for-profit (501c6)

Standards Development Organization

Founded in 1987

ANSI-accredited

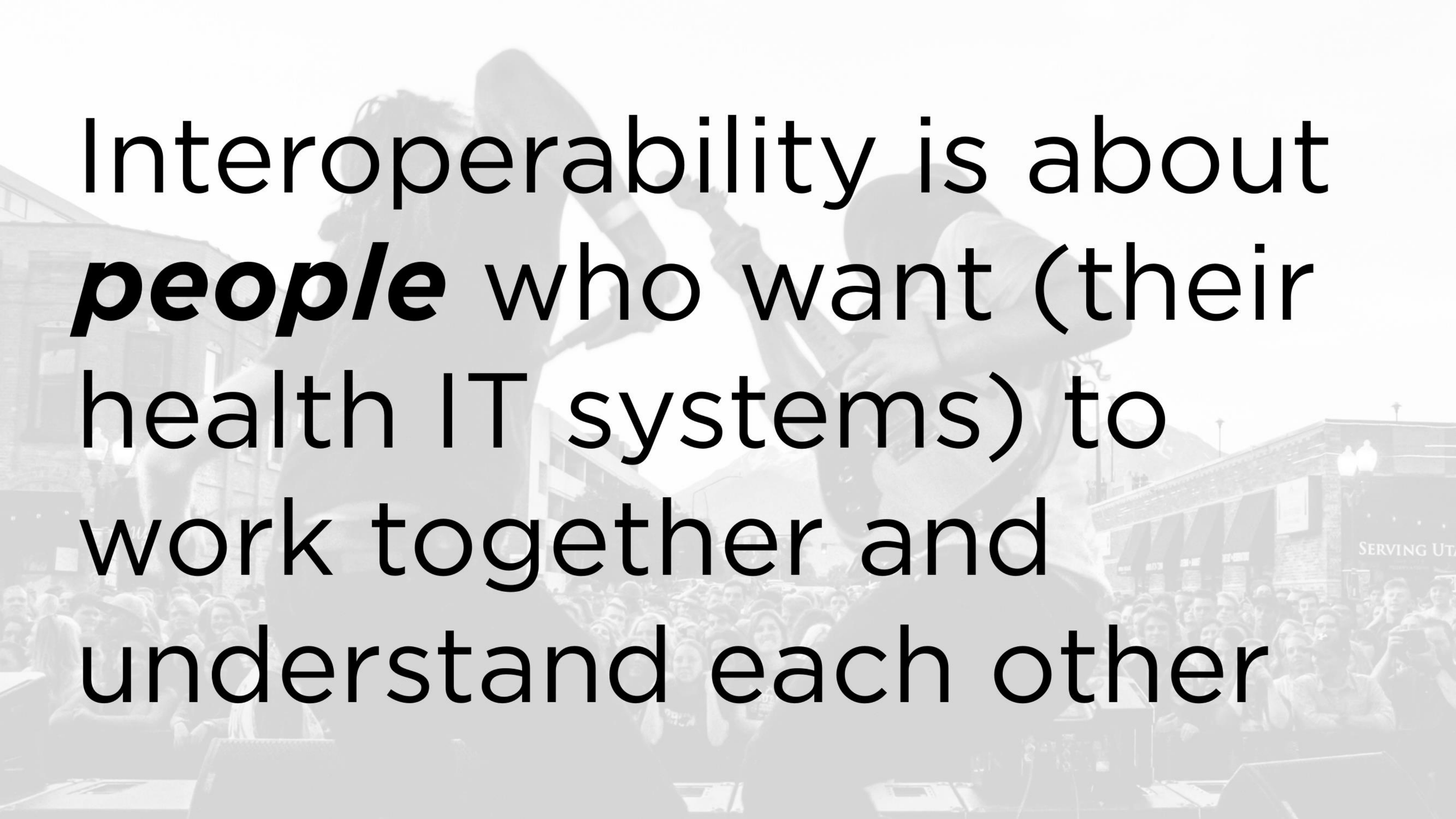
Globally trusted

Product Families

HL7® FHIR®

HL7® CDA®

HL7® V2™

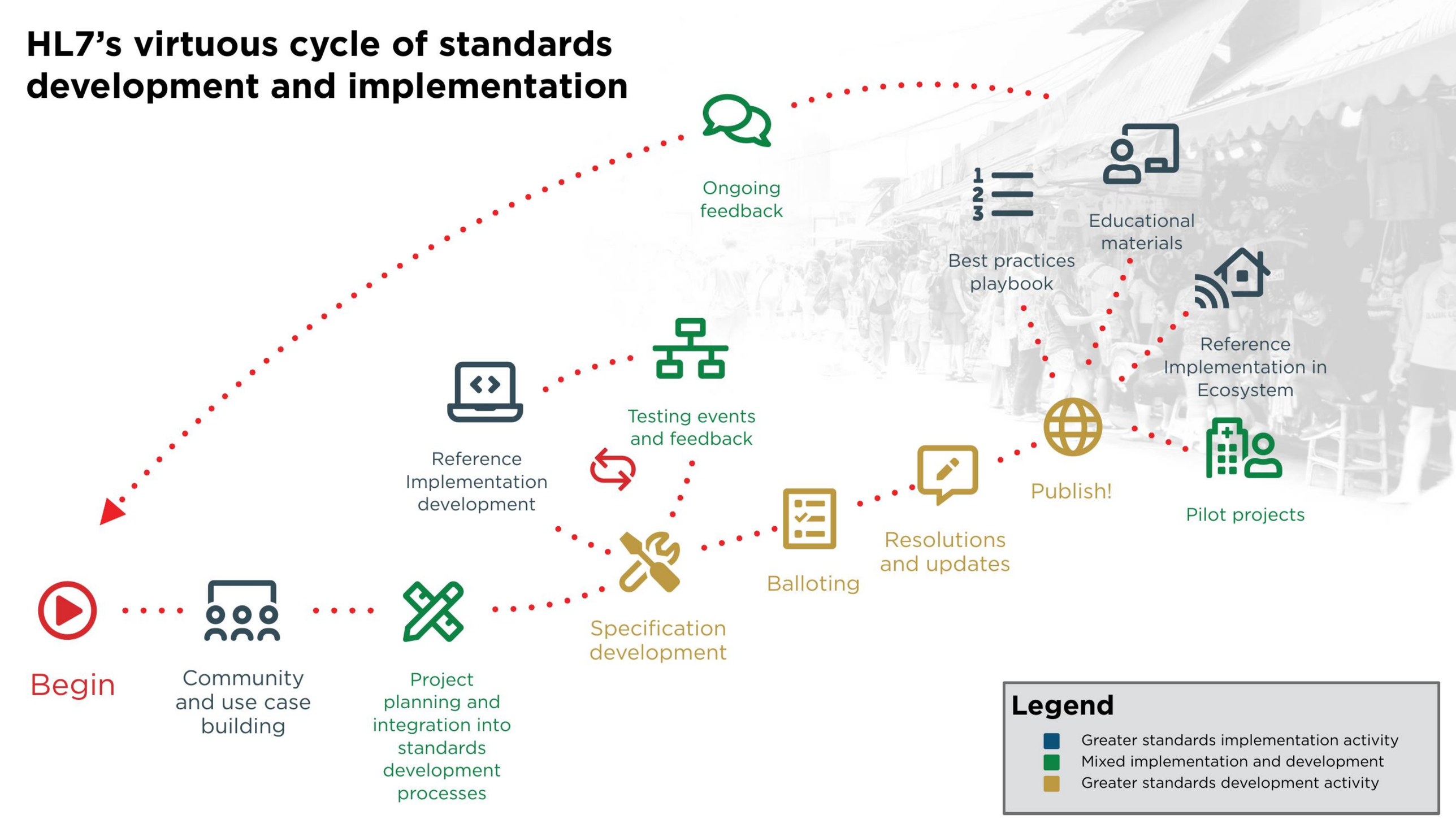


Interoperability is about ***people*** who want (their health IT systems) to work together and understand each other

Ideal Standards Process

1. Fosters consensus
2. Ensures content is fit for purpose
3. Ensures content is implementable
4. Establishes an implementer community
5. Ensures ongoing maintenance of the standard

HL7's virtuous cycle of standards development and implementation

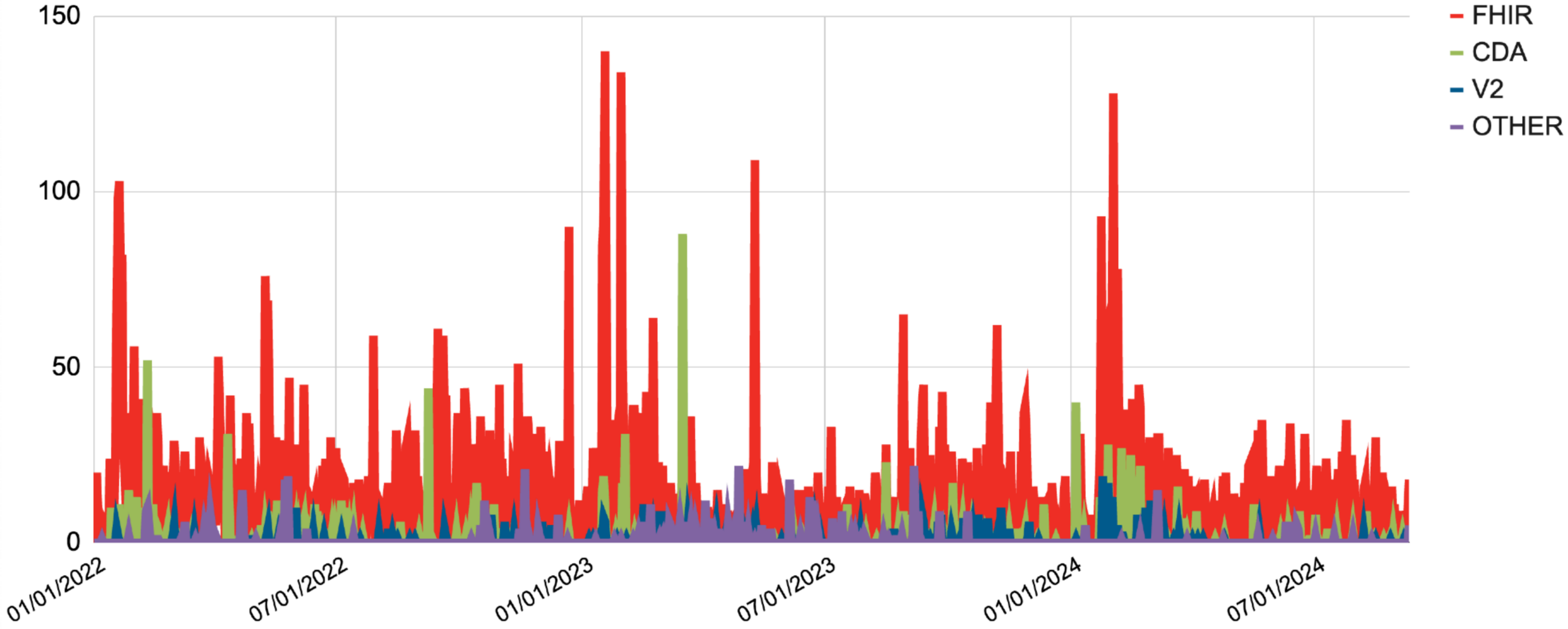


Legend

- Greater standards implementation activity
- Mixed implementation and development
- Greater standards development activity

Let’s talk first about HL7’s ***standards***

Standards aren’t stagnant



HL7® V2™

A *legendary* health data standard

Est. 1992 and the workhorse of much data exchange today

Messages are initiated by trigger events

Message segments have positionally defined fields for data elements

Works best when sender and receiver are tightly coupled

Ubiquitous

Example Functional Areas

Patient administration

Order entry

Patient accounting (billing)

Clinical observation reporting

Scheduling

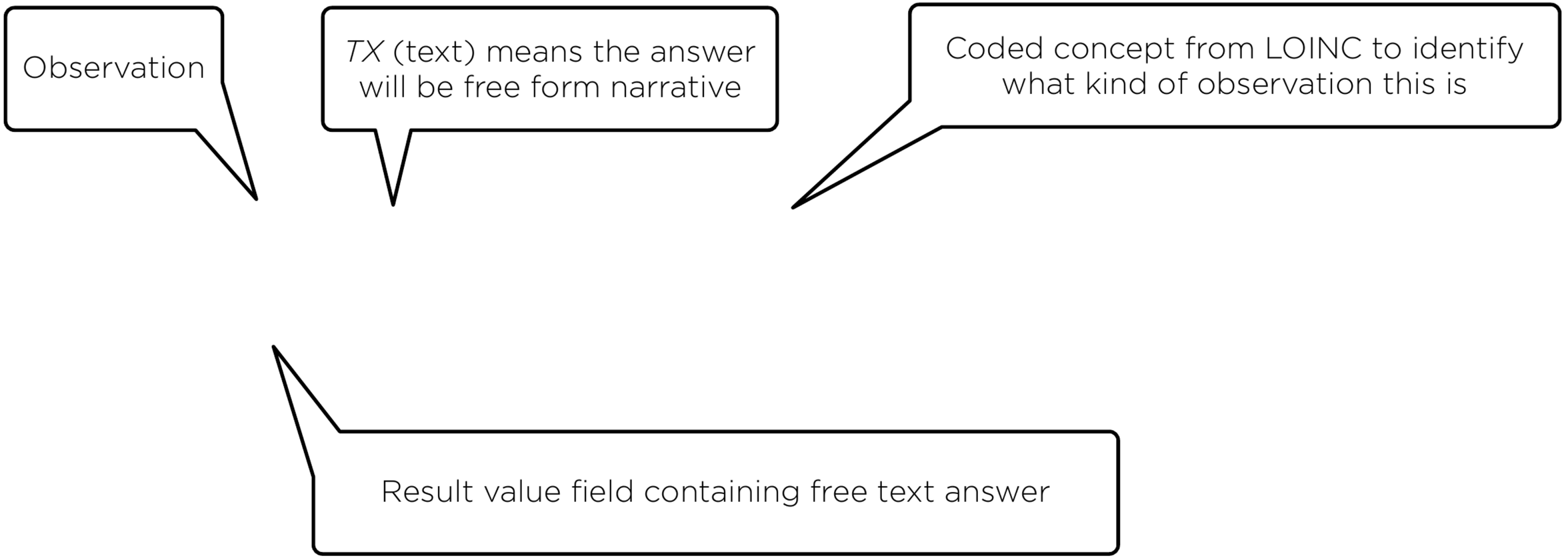
Referrals

Clinical lab automation

Personnel management

HL7® V2™

Specific data fields separated by delimiters (“|”)



HL7 CDA

Foundational standard for document exchange

Est. 2000 and flourishing in nationwide exchange

XML-based markup standard that specifies the structure and semantics of "clinical documents" for the purpose of exchange.

Defines a library of “stackable” of templates

- Document
- Section
- Entry

Does **NOT** specify the transport technique

```
<Clinical Document>
  <id><code><title><recordTarget>
    <patient>

<structuredBody>

 <section>
   <code>
   <title>Vital Signs</title>

 <text>Temp is 98.6°F</text>

 <entry>
   <observation><code>
     <statusCode>
     <effectiveTime>
     <value>
```

HL7 CDA

Key Uses

Information exchange across care continuum

Consolidated Clinical Document Architecture (C-CDA) Implementation Guide

International Patient Summary (IPS)

Reporting electronic Clinical Quality Measures

Quality Reporting Document Architecture (QRDA) Implementation Guide

C-CDA Document Types

Care Plan
Consultation Note
Continuity of Care Document (CCD)
Discharge Summary
History and Physical (H&P)
Operative Note
Procedure Note
Progress Note
Referral Note
Transfer Summary
Unstructured Document

HL7® FHIR®

An HL7 International Standard℠

Fast **H**ealthcare **I**nteroperability **R**esources (**FHIR**)

A transformative ***open API specification*** and ***data model*** for health information.

Now a decade+ old and a global phenomenon and public good

FHIR: the Web for health data

http://hl7.org/fhir

Why FHIR is special

Implementation focus

Foundation in modern web standards and API exchange

Open license - literally, public domain

Innovations in consensus-building and standards development

But, the biggest reason is that FHIR is also...

A vibrant, open, collaborative, respectful, and well-orchestrated ***community***

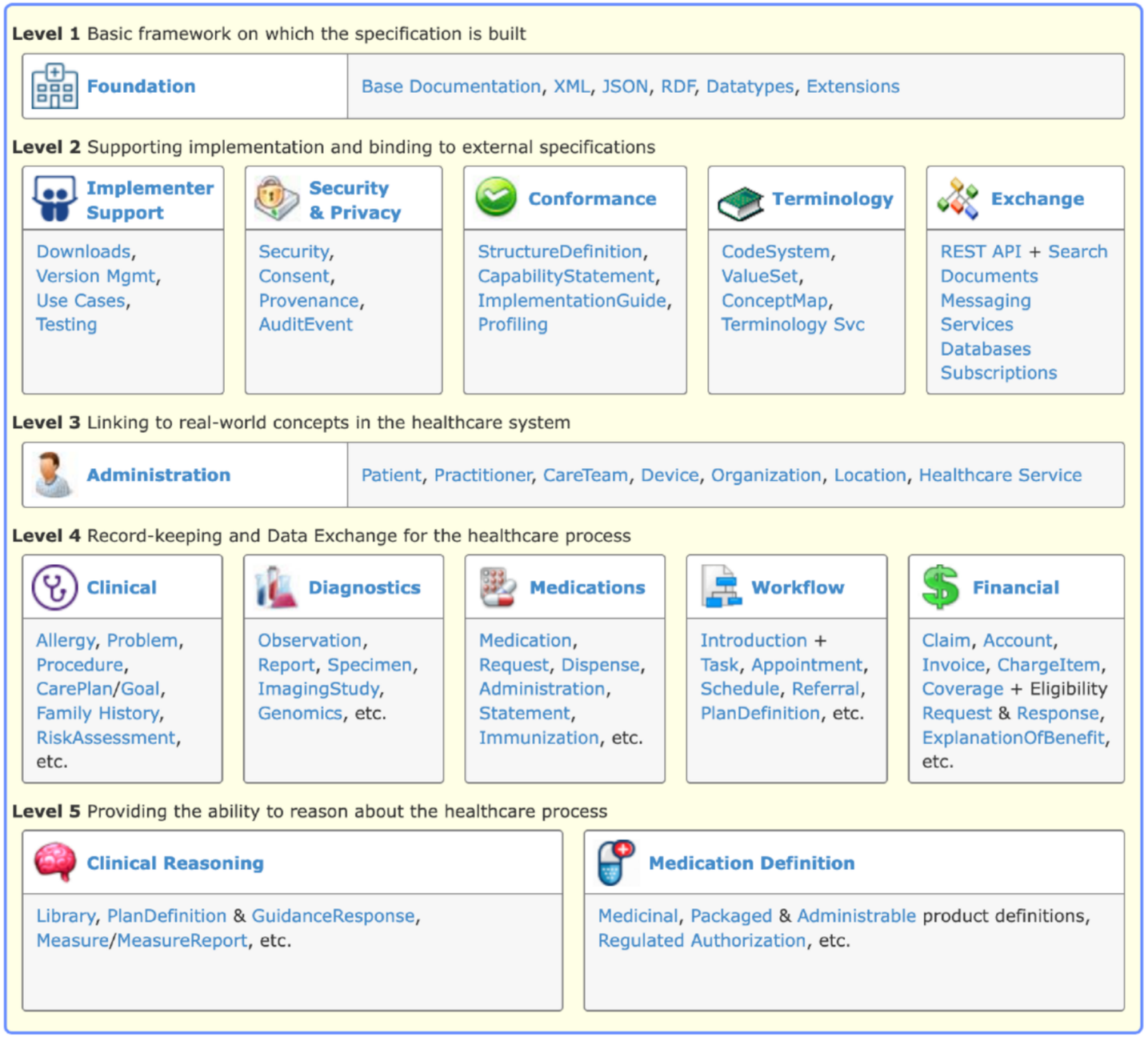

HL7® FHIR®
Freedom to
Harness global interoperability wisdom
Implement, inspect, and improve the specification
Redistribute refinements, helping others

Let’s dive a little deeper with ***FHIR***

The FHIR spec contains 157 modular data models called **Resources**.

Each defines exchangeable content.

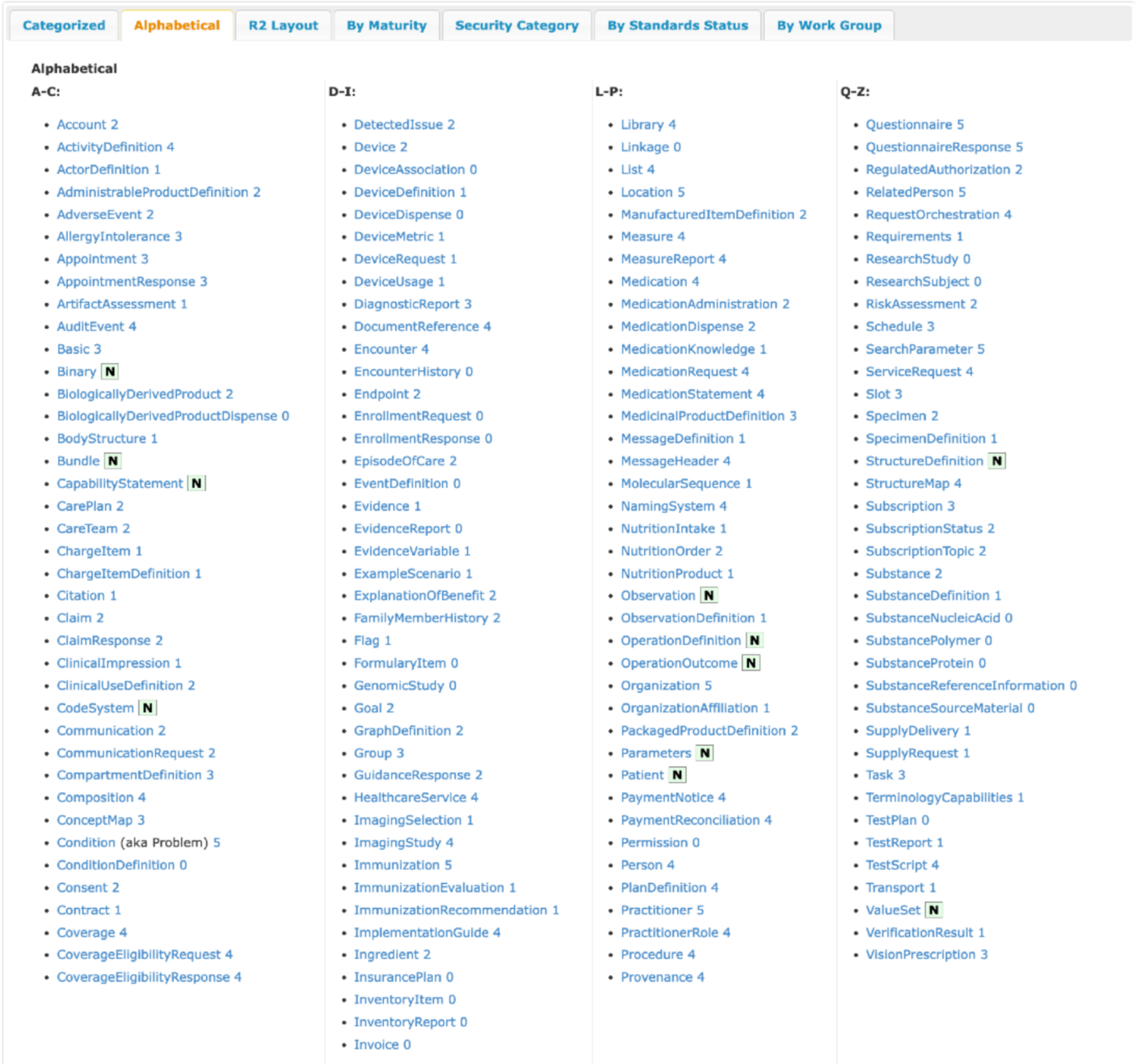
As a base platform standard, FHIR supports many use cases.



Woah. *That's a lot.*

You have homework. ☺

Let's use a Persona to illustrate a few.



Categorized | Alphabetical | R2 Layout | By Maturity | Security Category | By Standards Status | By Work Group

Alphabetical

A-C:

- Account 2
- ActivityDefinition 4
- ActorDefinition 1
- AdministrableProductDefinition 2
- AdverseEvent 2
- AllergyIntolerance 3
- Appointment 3
- AppointmentResponse 3
- ArtifactAssessment 1
- AuditEvent 4
- Basic 3
- Binary N
- BiologicallyDerivedProduct 2
- BiologicallyDerivedProductDispense 0
- BodyStructure 1
- Bundle N
- CapabilityStatement N
- CarePlan 2
- CareTeam 2
- ChargeItem 1
- ChargeItemDefinition 1
- Citation 1
- Claim 2
- ClaimResponse 2
- ClinicalImpression 1
- ClinicalUseDefinition 2
- CodeSystem N
- Communication 2
- CommunicationRequest 2
- CompartmentDefinition 3
- Composition 4
- ConceptMap 3
- Condition (aka Problem) 5
- ConditionDefinition 0
- Consent 2
- Contract 1
- Coverage 4
- CoverageEligibilityRequest 4
- CoverageEligibilityResponse 4

D-I:

- DetectedIssue 2
- Device 2
- DeviceAssociation 0
- DeviceDefinition 1
- DeviceDispense 0
- DeviceMetric 1
- DeviceRequest 1
- DeviceUsage 1
- DiagnosticReport 3
- DocumentReference 4
- Encounter 4
- EncounterHistory 0
- Endpoint 2
- EnrollmentRequest 0
- EnrollmentResponse 0
- EpisodeOfCare 2
- EventDefinition 0
- Evidence 1
- EvidenceReport 0
- EvidenceVariable 1
- ExampleScenario 1
- ExplanationOfBenefit 2
- FamilyMemberHistory 2
- Flag 1
- FormularyItem 0
- GenomicStudy 0
- Goal 2
- GraphDefinition 2
- Group 3
- GuidanceResponse 2
- HealthcareService 4
- ImagingSelection 1
- ImagingStudy 4
- Immunization 5
- ImmunizationEvaluation 1
- ImmunizationRecommendation 1
- ImplementationGuide 4
- Ingredient 2
- InsurancePlan 0
- InventoryItem 0
- InventoryReport 0
- Invoice 0

L-P:

- Library 4
- Linkage 0
- List 4
- Location 5
- ManufacturedItemDefinition 2
- Measure 4
- MeasureReport 4
- Medication 4
- MedicationAdministration 2
- MedicationDispense 2
- MedicationKnowledge 1
- MedicationRequest 4
- MedicationStatement 4
- MedicinalProductDefinition 3
- MessageDefinition 1
- MessageHeader 4
- MolecularSequence 1
- NamingSystem 4
- NutritionIntake 1
- NutritionOrder 2
- NutritionProduct 1
- Observation N
- ObservationDefinition 1
- OperationDefinition N
- OperationOutcome N
- Organization 5
- OrganizationAffiliation 1
- PackagedProductDefinition 2
- Parameters N
- Patient N
- PaymentNotice 4
- PaymentReconciliation 4
- Permission 0
- Person 4
- PlanDefinition 4
- Practitioner 5
- PractitionerRole 4
- Procedure 4
- Provenance 4

Q-Z:

- Questionnaire 5
- QuestionnaireResponse 5
- RegulatedAuthorization 2
- RelatedPerson 5
- RequestOrchestration 4
- Requirements 1
- ResearchStudy 0
- ResearchSubject 0
- RiskAssessment 2
- Schedule 3
- SearchParameter 5
- ServiceRequest 4
- Slot 3
- Specimen 2
- SpecimenDefinition 1
- StructureDefinition N
- StructureMap 4
- Subscription 3
- SubscriptionStatus 2
- SubscriptionTopic 2
- Substance 2
- SubstanceDefinition 1
- SubstanceNucleicAcid 0
- SubstancePolymer 0
- SubstanceProtein 0
- SubstanceReferenceInformation 0
- SubstanceSourceMaterial 0
- SupplyDelivery 1
- SupplyRequest 1
- Task 3
- TerminologyCapabilities 1
- TestPlan 0
- TestReport 1
- TestScript 4
- Transport 1
- ValueSet N
- VerificationResult 1
- VisionPrescription 3

Meet Esperanza Córdova

Ms. Córdova is not feeling well
(fever, body aches, congestion, coughing).

Ugh.

So, she arranges a visit with her primary care provider (Alleen Anderson, MD).

Patient

Individual receiving health services

Name	Flags	Card.	Type	Description & Constraints
Patient	N		DomainResource	Information about an individual or animal receiving health care services Elements defined in Ancestors: id, meta, implicitRules, language, text, contained, extension, modifierExtension
identifier	Σ	0..*	Identifier	An identifier for this patient
active	?! Σ	0..1	boolean	Whether this patient's record is in active use
name	Σ	0..*	HumanName	A name associated with the patient
telecom	Σ	0..*	ContactPoint	A contact detail for the individual
gender	Σ	0..1	code	male | female | other | unknown Binding: AdministrativeGender (Required)
birthDate	Σ	0..1	date	The date of birth for the individual
deceased[x]	?! Σ	0..1		Indicates if the individual is deceased or not
deceasedBoolean			boolean	
deceasedDateTime			dateTime	
address	Σ	0..*	Address	An address for the individual
maritalStatus		0..1	CodeableConcept	Marital (civil) status of a patient Binding: Marital Status Codes (Extensible)
multipleBirth[x]		0..1		Whether patient is part of a multiple birth
multipleBirthBoolean			boolean	
multipleBirthInteger			integer	
photo		0..*	Attachment	Image of the patient
contact	C	0..*	BackboneElement	A contact party (e.g. guardian, partner, friend) for the patient *+ Rule: SHALL at least contain a contact's details or a reference to an organization*
relationship		0..*	CodeableConcept	The kind of relationship Binding: Patient Contact Relationship (Extensible)
name	C	0..1	HumanName	A name associated with the contact person
telecom	C	0..*	ContactPoint	A contact detail for the person
address	C	0..1	Address	Address for the contact person

Patient

Ms. Esperanza Córdova is a **married female** who prefers to communicate in **Spanish**


```
{
    "resourceType": "Patient",
    "id": "62928",
    "identifier": [ …
    ],
    "name": [
        {
            "use": "official",
            "family": "Córdova800",
            "given": [
                "Esperanza675"
            ],
            "prefix": [
                "Ms."
            ]
        }
    ],
    "telecom": [ …
    ],
    "gender": "female",
    "birthDate": "1972-05-28",
    "address": [ …
    ],
    "maritalStatus": {
        "coding": [
            {
                "system": "http://terminology.hl7.org/CodeSystem/v3-MaritalStatus",
                "code": "M",
                "display": "Married"
            }
        ],
        "text": "Married"
    },
    "communication": [
        {
            "language": {
                "coding": [
                    {
                        "system": "urn:ietf:bcp:47",
                        "code": "es",
                        "display": "Spanish"
                    }
                ],
                "text": "Spanish"
            },
            "preferred": true
        }
```

Encounter

An interaction during which services are provided for a patient

Name	Flags	Card.	Type	Description & Constraints
Encounter	TU		DomainResource	An interaction during which services are provided to the patient Elements defined in Ancestors: id, meta, implicitRules, language, text, contained, extension, modifierExtension
identifier	Σ	0..*	Identifier	Identifier(s) by which this encounter is known
status	?! Σ	1..1	code	planned | in-progress | on-hold | discharged | completed | cancelled | discontinued | entered-in-error | unknown Binding: Encounter Status (Required)
class	Σ	0..*	CodeableConcept	Classification of patient encounter context - e.g. Inpatient, outpatient Binding: Encounter class (Preferred)
priority		0..1	CodeableConcept	Indicates the urgency of the encounter Binding: ActPriority (Example)
type	Σ	0..*	CodeableConcept	Specific type of encounter (e.g. e-mail consultation, surgical day-care, ...) Binding: Encounter Type (Example)
serviceType	Σ	0..*	CodeableReference(HealthcareService)	Specific type of service Binding: Service Type (Example)
subject	Σ	0..1	Reference(Patient | Group)	The patient or group related to this encounter
subjectStatus		0..1	CodeableConcept	The current status of the subject in relation to the Encounter Binding: Encounter Subject Status (Example)
episodeOfCare	Σ	0..*	Reference(EpisodeOfCare)	Episode(s) of care that this

Encounter

Ms. Córdova sees Dr. Anderson for an ambulatory visit about her symptoms.


```
{
    "resourceType": "Encounter",
    "id": "62988",
    "status": "finished",
    "class": {
        "system": "http://terminology.hl7.org/CodeSystem/v3-ActCode",
        "code": "AMB"
    },
    "type": [
        {
            "coding": [
                {
                    "system": "http://snomed.info/sct",
                    "code": "185345009",
                    "display": "Encounter for symptom (procedure)"
                }
            ]
        }
    ],
    "subject": {
        "reference": "Patient/62928",
        "display": "Ms. Esperanza675 Córdova800"
    },
    "participant": [
        {
            "type": [
                {
                    "coding": [
                        {
                            "system": "http://terminology.hl7.org/CodeSystem/v3-ParticipationType",
                            "code": "PPRF",
                            "display": "primary performer"
                        }
                    ],
                    "text": "primary performer"
                }
            ],
            "period": {
                "start": "2020-02-29T07:56:34-05:00",
                "end": "2020-02-29T08:57:34-05:00"
            },
            "individual": {
                "reference": "Practitioner/15116",
                "display": "Dr. Alleen813 Anderson154"
```

Observation

Because of her symptoms, Ms. Córdova has a NAAT for SARS-CoV-2


```
{
    "resourceType": "Observation",
    "id": "63006",
    "status": "final",
    "category": [
        {
            "coding": [
                {
                    "system": "http://terminology.hl7.org/CodeSystem/observation-category",
                    "code": "laboratory",
                    "display": "laboratory"
                }
            ]
        }
    ],
    "code": {
        "coding": [
            {
                "system": "http://loinc.org",
                "code": "94309-2",
                "display": "SARS-CoV-2 (COVID-19) RNA [Presence] in Specimen by NAA with probe detection"
            }
        ],
        "text": "SARS-CoV-2 (COVID-19) RNA [Presence] in Specimen by NAA with probe detection"
    },
    "subject": {
        "reference": "Patient/62928"
    },
    "encounter": {
        "reference": "Encounter/62988"
    },
    "effectiveDateTime": "2020-02-29T08:57:34-05:00",
    "issued": "2020-02-29T08:57:34.125-05:00",
    "valueCodeableConcept": {
        "coding": [
            {
                "system": "http://snomed.info/sct",
                "code": "260373001",
                "display": "Detected (qualifier value)"
            }
        ],
        "text": "Detected (qualifier value)"
    }
}
```

RESTful API

Defines common interactions (read, update, search, etc) performed on a repository of typed Resources

HL7 FHIR Release 5

HL7 International

Exchange > **RESTful API**

This page is part of the FHIR Specification (v5.0.0: R5 - STU). This is the current published version. For a full list of available versions, see the Directory of published versions. Page versions: **R5** R4B R4 R3 R2

3.2.0 RESTful API

FHIR Infrastructure Work Group	Maturity Level: Normative	Standards Status: Normative

FHIR is described as a 'RESTful' specification based on common industry level use of the term REST. In practice, FHIR only supports Level 2 of the REST Maturity model as part of the core specification, though full Level 3 conformance is possible through the use of extensions. Because FHIR is a standard, it relies on the standardization of resource structures and interfaces. This may be considered a violation of REST principles but is key to ensuring consistent interoperability across diverse systems.

For each "resource type" the same set of interactions are defined which can be used to manage the resources in a highly granular fashion. Applications claiming conformance to this framework claim to be conformant to "RESTful FHIR" (see Conformance).

In addition to a number of General Considerations this page defines the following interactions:

Instance Level Interactions	
read	Read the current state of the resource
vread	Read the state of a specific version of the resource
update	Update an existing resource by its id (or create it if it is new)
patch	Update an existing resource by posting a set of changes to it
delete	Delete a resource
history	Retrieve the change history for a particular resource
Type Level Interactions	
create	Create a new resource with a server assigned id
search	Search the resource type based on some filter criteria
delete	Conditional Delete across a particular resource type based on some filter criteria
history	Retrieve the change history for a particular resource type
Whole System Interactions	

API Examples:

Return *SARS-CoV-2 RNA NAAT* **Observation** for my patient

```
GET {base}/Observation?patient=62928&code=94309-2
```

Return any **Patients** with a *SARS-CoV-2 RNA NAAT* **Observation**

```
GET {base}/Patient?_has:Observation:patient:code=94309-2
```

FHIR Feature: Flexibility + Adaptation

Health data is inevitably complex; the **long tail**.

As a platform standard, FHIR's solution: specific techniques for extending and constraining via **profiles**.

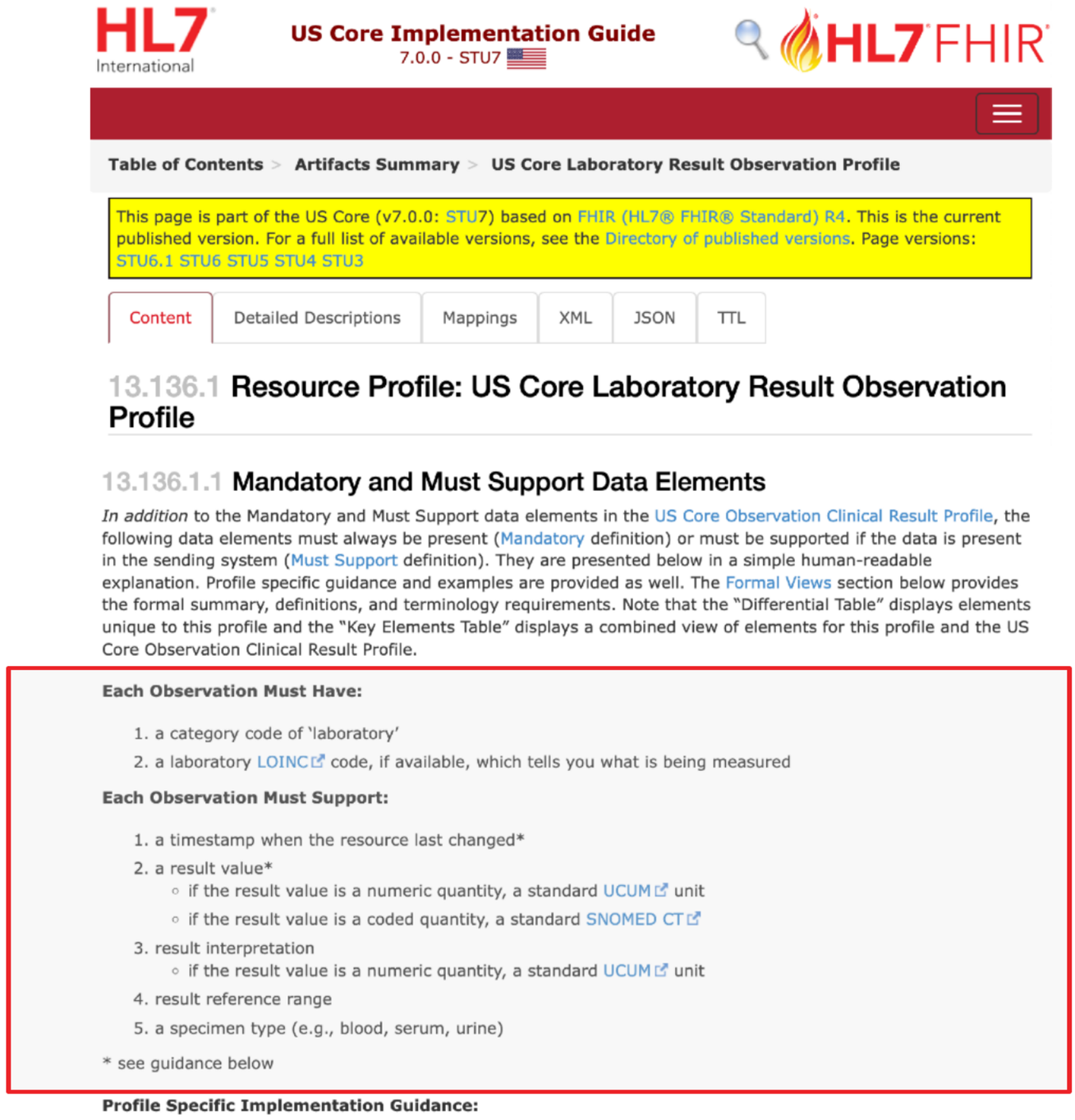
FHIR Lingo: *Implementation Guide (IG)*

A specification for how FHIR resources (and APIs) are used for a particular interoperability problem, including computable structures (called **profiles**) representing the adaptations of the base FHIR standard for that use case.

Profile

[Observation]

The FHIR specification is designed to be both **extended** and **constrained** for specific purposes



HL7 International

US Core Implementation Guide
7.0.0 - STU7

HL7 FHIR

Table of Contents > Artifacts Summary > US Core Laboratory Result Observation Profile

This page is part of the US Core (v7.0.0: STU7) based on FHIR (HL7® FHIR® Standard) R4. This is the current published version. For a full list of available versions, see the Directory of published versions. Page versions: STU6.1 STU6 STU5 STU4 STU3

Content | Detailed Descriptions | Mappings | XML | JSON | TTL

13.136.1 Resource Profile: US Core Laboratory Result Observation Profile

13.136.1.1 Mandatory and Must Support Data Elements

In addition to the Mandatory and Must Support data elements in the US Core Observation Clinical Result Profile, the following data elements must always be present (Mandatory definition) or must be supported if the data is present in the sending system (Must Support definition). They are presented below in a simple human-readable explanation. Profile specific guidance and examples are provided as well. The Formal Views section below provides the formal summary, definitions, and terminology requirements. Note that the "Differential Table" displays elements unique to this profile and the "Key Elements Table" displays a combined view of elements for this profile and the US Core Observation Clinical Result Profile.

Each Observation Must Have:

1. a category code of 'laboratory'
2. a laboratory LOINC code, if available, which tells you what is being measured

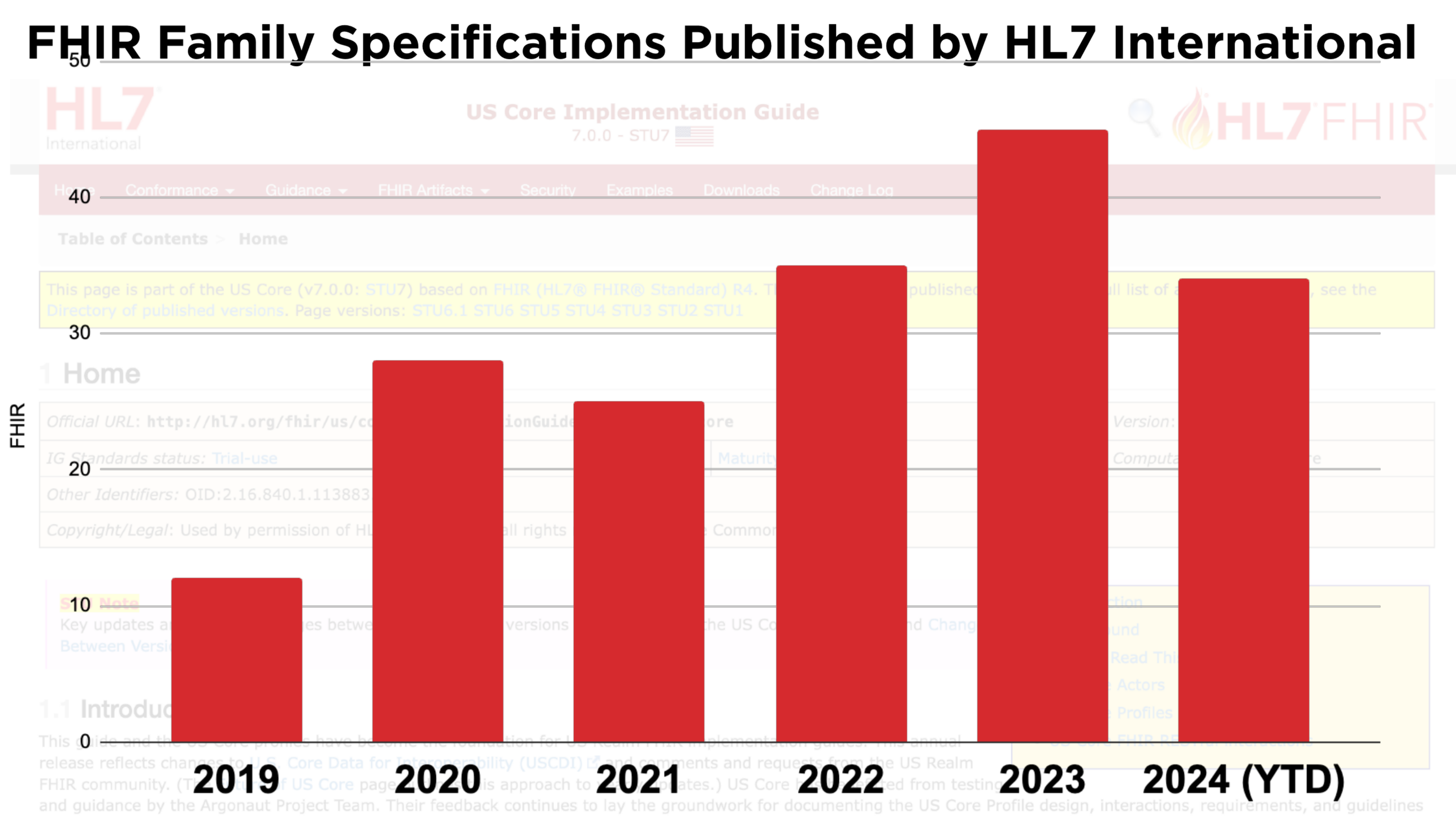
Each Observation Must Support:

1. a timestamp when the resource last changed*
2. a result value*
   - if the result value is a numeric quantity, a standard UCUM unit
   - if the result value is a coded quantity, a standard SNOMED CT
3. result interpretation
   - if the result value is a numeric quantity, a standard UCUM unit
4. result reference range
5. a specimen type (e.g., blood, serum, urine)

* see guidance below

Profile Specific Implementation Guidance:

FHIR Family Specifications Published by HL7 International



Example Use Cases for FHIR IGs in 2024

Patient Cost Transparency	Payer Data Exchange	Quality Improvement Core
Adverse Events in Clinical Research	Central Cancer Registry Reporting	Digital Insurance Card
Pharmaceutical Quality	Electronic Long-Term Services and Supports	Value-based Performance Reporting
Multiple Chronic Condition Care Plans	SDOH Data Exchange	Electronic Case Reporting

Building a foundation for FHIR-based exchange in the United States

- ONC Cures Act Rule (2020)
- CMS Interop and Patient Access Final Rule (2020)
- ONC HTI-1 Final Rule (2023)
- CMS Interop and Prior Authorization Final Rule (2024)
- Common Agreement 2.0 (2024)

Notice of Proposed Rule Making...

- ONC HTI-2 (2024)

U.S. Core Data for Interoperability (V2)

HL7 International

US Core Implementation Guide
7.0.0 - STU7

HL7 FHIR

Home | Conformance | Guidance | FHIR Artifacts | Security | Examples | Downloads | Change Log

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1 Home

Official URL: **http://hl7.org/fhir/us/core/ImplementationGuide/hl7.fhir.us.core**		*Version*: **7.0.0**
IG Standards status: Trial-use	Maturity Level: 3	*Computable Name*: USCore
Other Identifiers: OID:2.16.840.1.113883.4.642.40.2		
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STU Note
Key updates and detailed changes between this and prior versions are available on the US Core Change Log and Changes Between Versions pages.

1.1 Introduction

This guide and the US Core profiles have become the foundation for US Realm FHIR implementation guides. This annual release reflects changes to U.S. Core Data for Interoperability (USCDI) and comments and requests from the US Realm FHIR community. (The Future of US Core page outlines this approach to yearly updates.) US Core has benefitted from testing and guidance by the Argonaut Project Team. Their feedback continues to lay the groundwork for documenting the US Core Profile design, interactions, requirements, and guidelines for patient data access and ONC Certification testing. Under the guidance of HL7 and the HL7 US Realm Steering Committee, the content will expand in future versions to meet the needs specific to the US Realm.

The US Core Implementation Guide is based on FHIR Version R4. It defines the minimum constraints on the FHIR resources to create the US Core Profiles. The elements, extensions, vocabularies, and value sets that SHALL be present are identified, and how they are used is defined. It also documents the minimum FHIR RESTful interactions for each US Core Profiles to access patient data. Establishing the "floor" of standards to promote interoperability and adoption through common implementation allows for further standards development evolution for specific use cases. There are two different ways to implement US Core:

1. Profile Only Support: Systems may support *only* the US Core Profiles to represent clinical information.
2. Profile Support + Interaction Support: Systems may support *both* the US Core Profile content structure *and* the RESTful interactions defined for a resource.

For a detailed description of these different usages of US Core, see the Conformance Requirements page.

1.2 Background

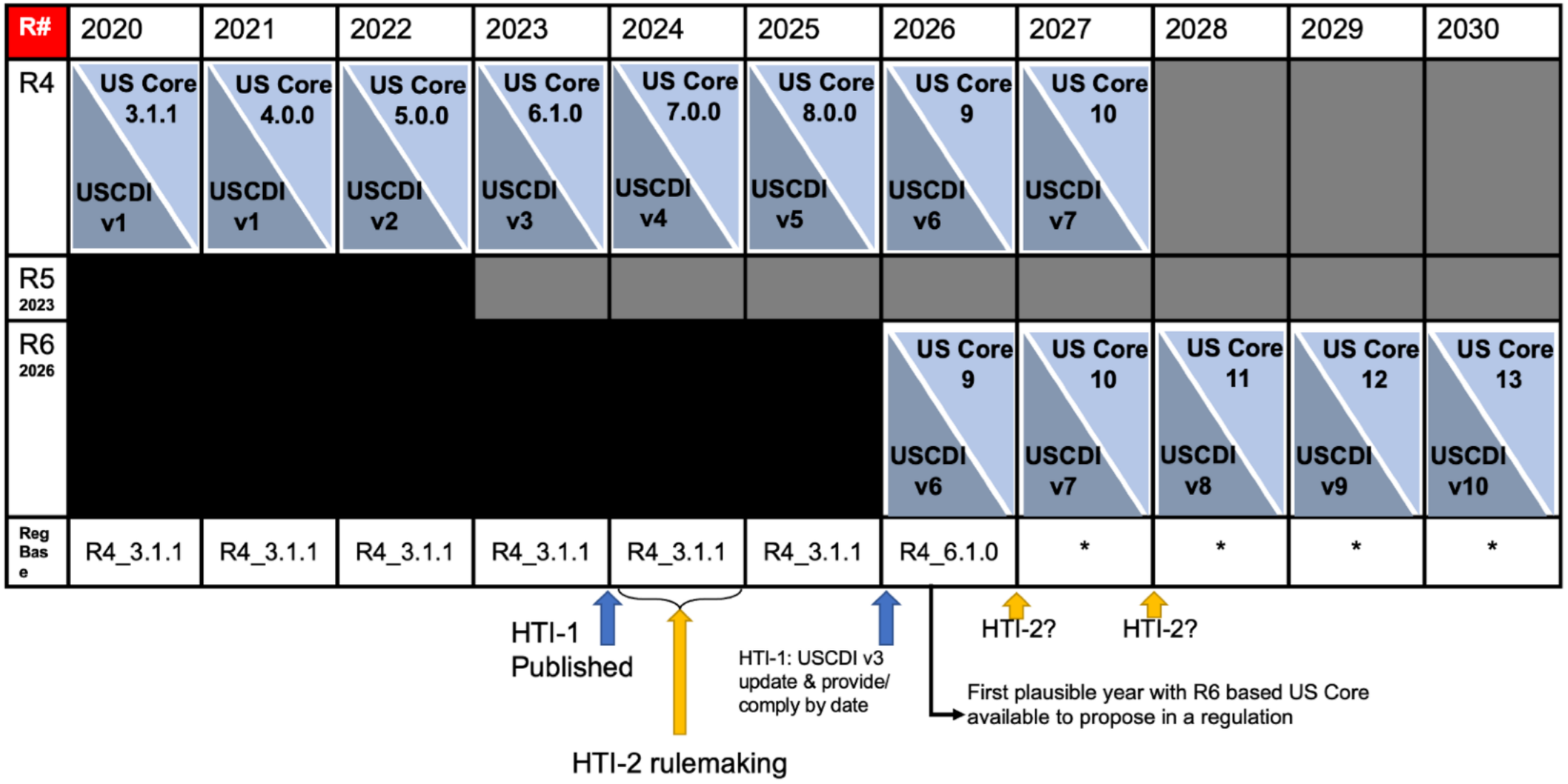
The US Core requirements were initially developed, balloted, and published in FHIR DSTU2 as part of the Office of the National Coordinator for Health Information Technology (ONC) sponsored Data Access Framework (DAF) project. The Argonaut Data Query Implementation Guide superseded DAF and documented security and authorization and the querying of the 2015 Edition Common Clinical Data Set (CCDS) and static documents. US Core descended directly from the Argonaut guide to support FHIR Version STU3 and eventually FHIR R4 and The ONC U.S. Core Data for Interoperability (USCDI).

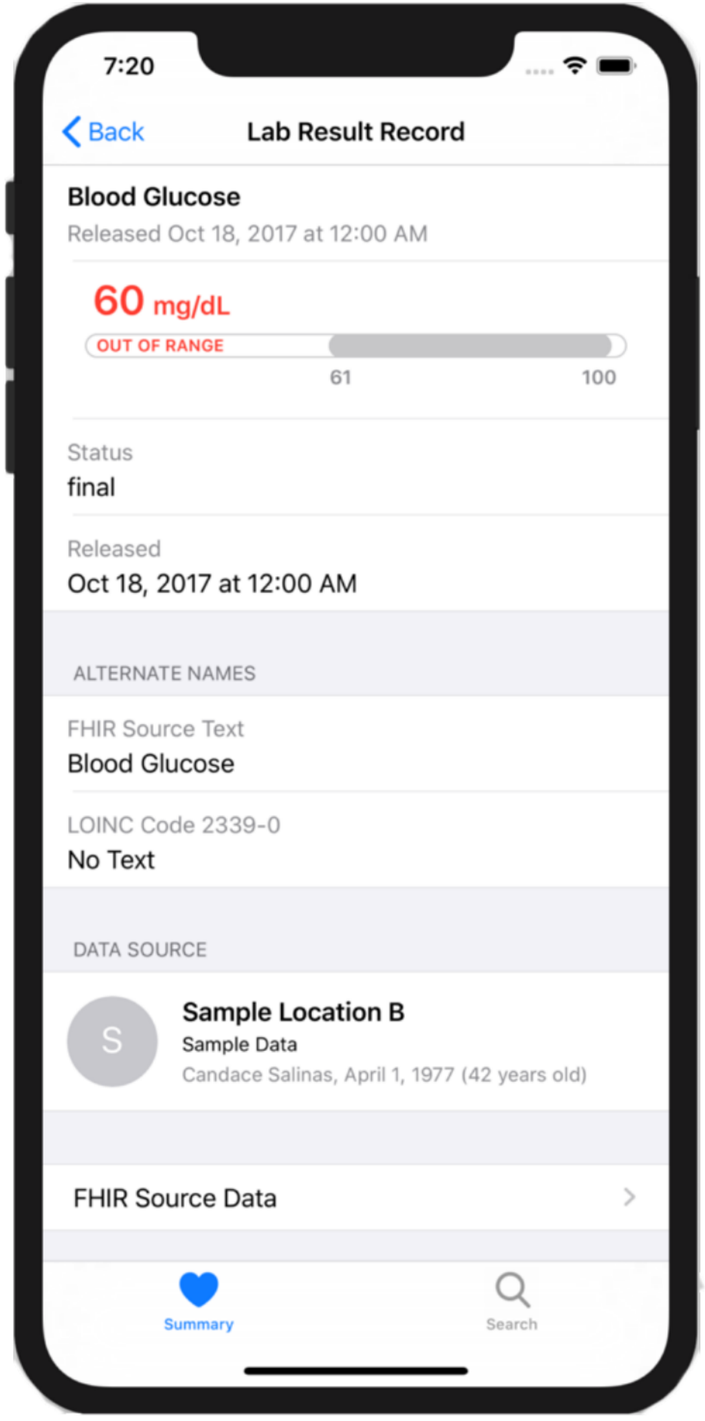
1.3 How To Read This Guide

This Guide is divided into several pages, which are listed at the top of each page in the menu bar.

Corresponds to USCDI V4

Advancing FHIR U.S. Core to meet industry needs





Current Endpoint Metrics

ENDPOINTS LAST QUERIED:
2024-10-07 14:07:27

TOTAL ENDPOINTS
34700

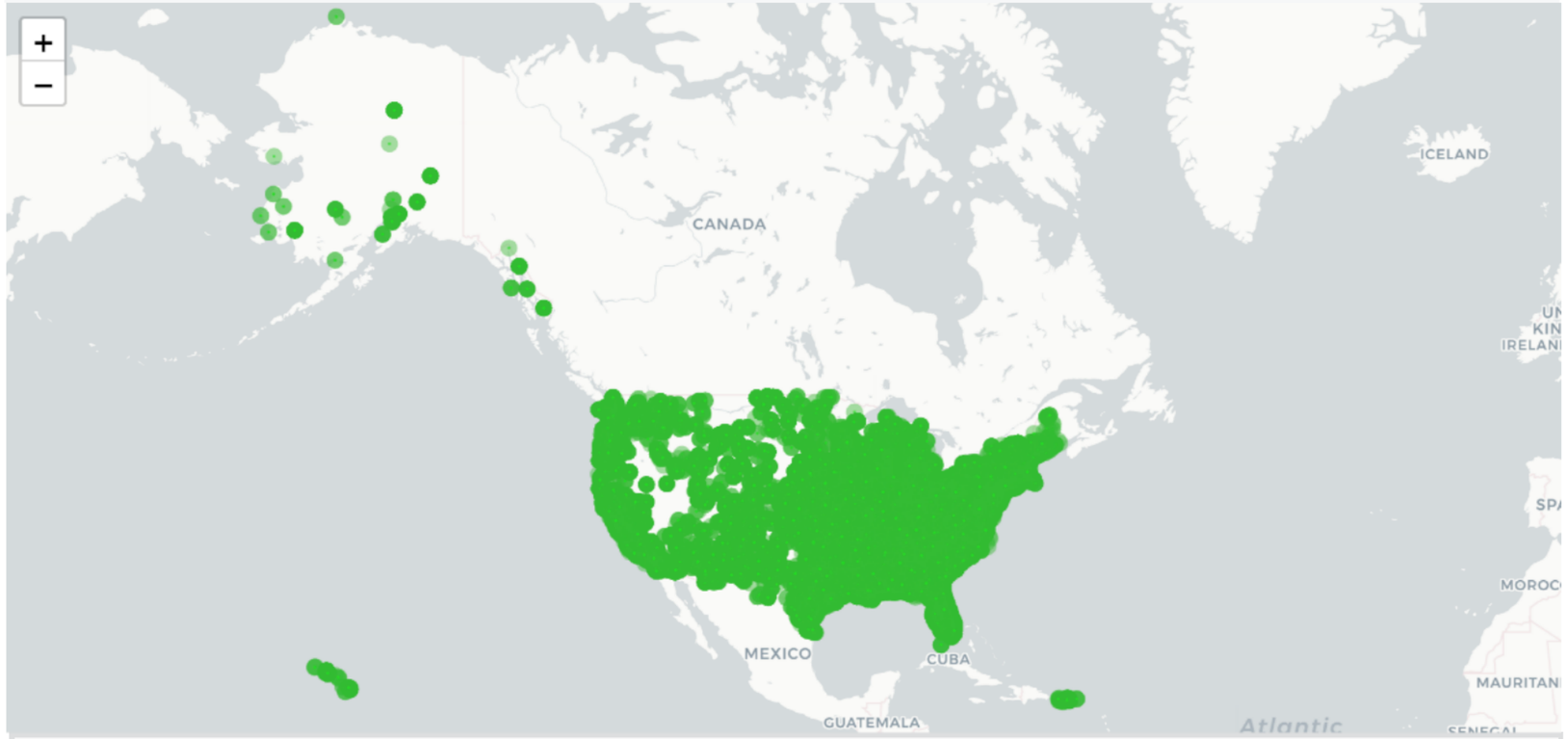
INDEXED ENDPOINTS*
34700

Current endpoint responses:

30743
200 (Success)

353
404 (Not found)

168
503 (Unavailable)



U.S. Office of National Coordinator for Health IT FHIR endpoint tracking

CMS Interoperability and Prior Authorization Final Rule CMS-0057-F

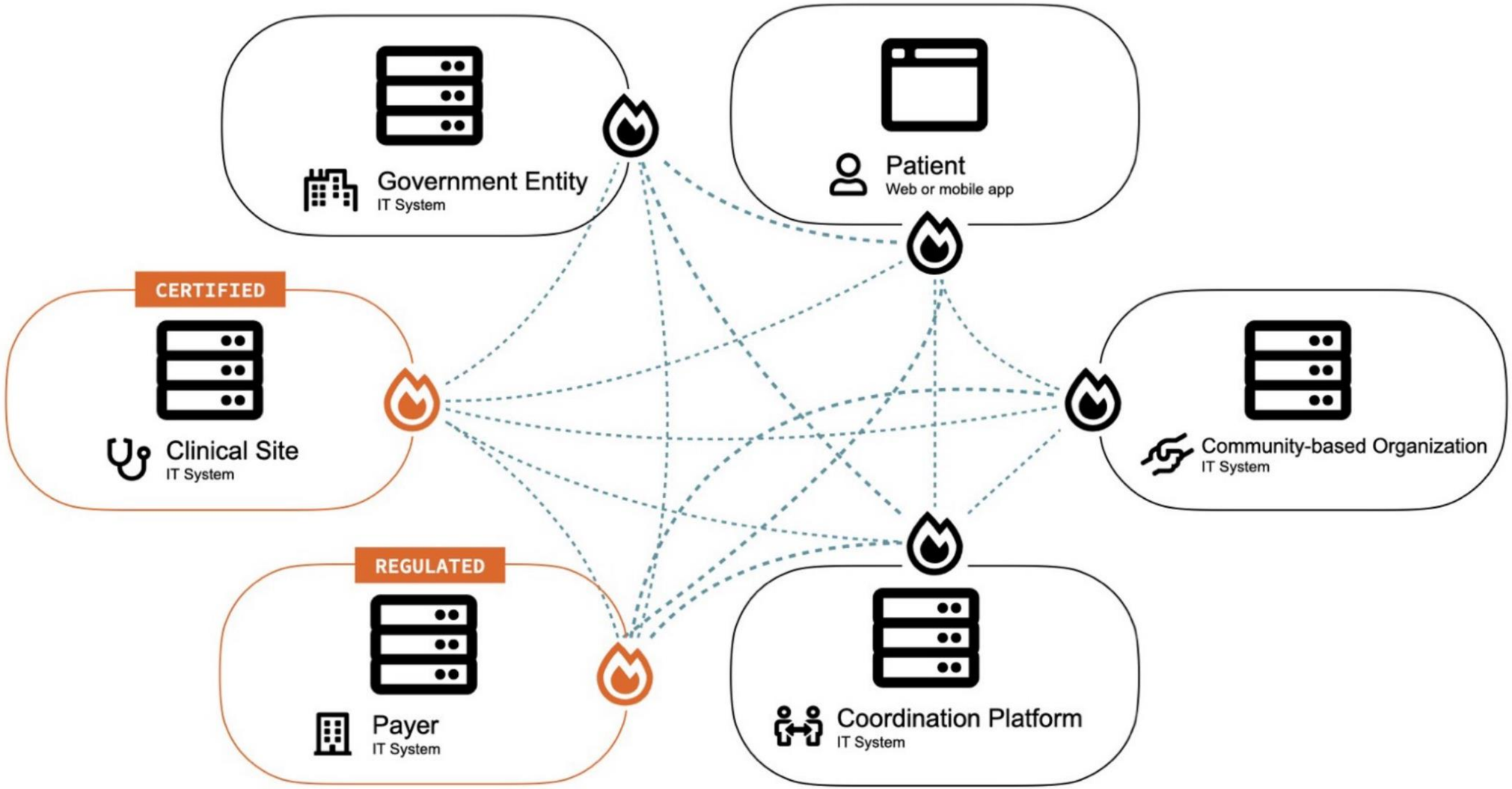
Required API Standards from HL7

	Patient Access API	Provider Access API	Provider Directory API	Payer-to-Payer APi	Prior Auth API
FHIR Release 4.0.1	✓	✓	✓	✓	✓
HL7 FHIR US Core IG STU 3.1.1	✓	✓	✓	✓	✓
HL7 SMART App Launch Framework IG 1.0.0	✓	✓	×	×	✓
HL7 FHIR Bulk Data Access IG v 1.0.0 STU 1	×	✓	×	✓	×

Recommended IGs from HL7

CARIN for Blue Button IG Version STU 2.0.0	✓	✓	×	✓	×
FHIR SMART App Launch IG Release 2.0.0	×	✓	×	✓	×
Da Vinci PDex IG Version STU 2.0.0	✓	✓	×	✓	×
Da Vinci PDex U.S. Drug Formulary IG Version STU 2.0.1	✓	×	×	×	×
Da Vinci PDex Plan Net IG Version STU 1.1.0	×	×	✓	×	×
Da Vinci Coverage Requirements Discovery (CRD) IG Version STU 2.0.1	×	×	×	×	✓
Da Vinci Documentation Templates/Rules (DTR) IG Version STU 2.0.0	×	×	×	×	✓
Da Vinci Prior Authorization Support (PAS) IG Version STU 2.0.1	×	×	×	×	✓

Growing the FHIR-enabled digital foundation



HL7 Product Portfolio

The extended FHIR family unlocks a massive world of opportunity

SMART on FHIR | Bulk FHIR | CQL | CDS Hooks

HL7 International

SMART on FHIR

Plug-and-play apps for seamless interoperability.

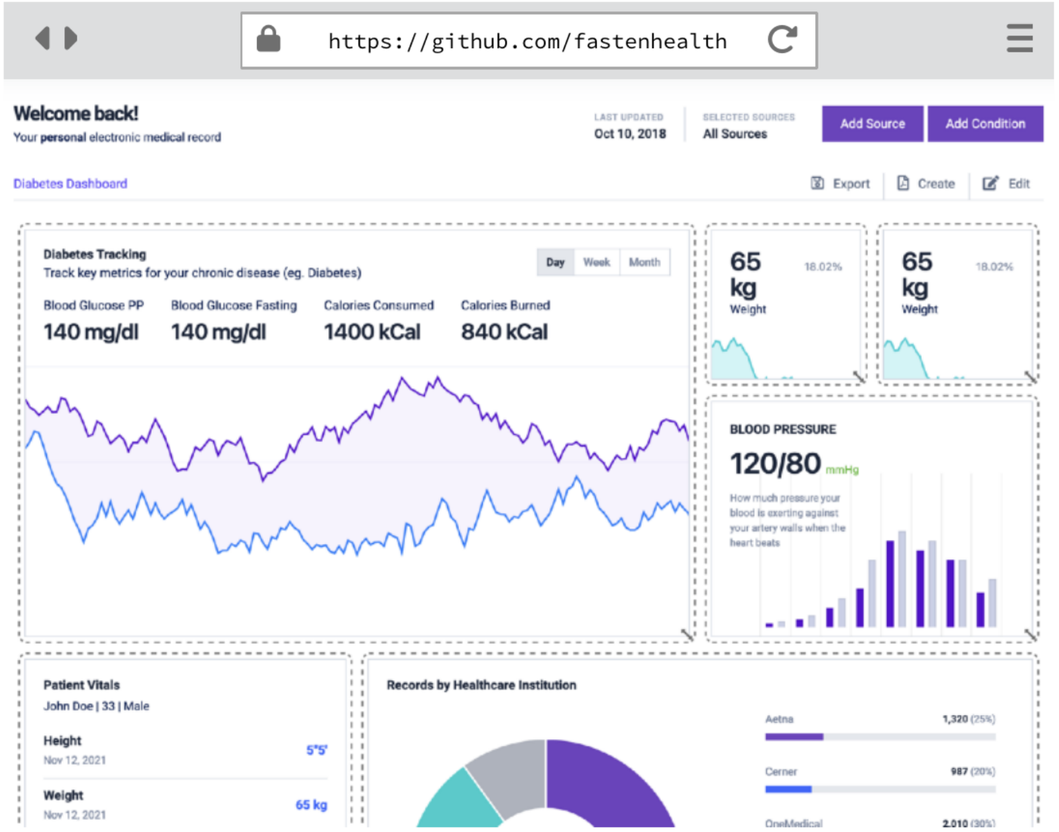
Highlight Reel

Dev friendly, OAuth 2.0-based

Patterns for user-facing apps and backend services

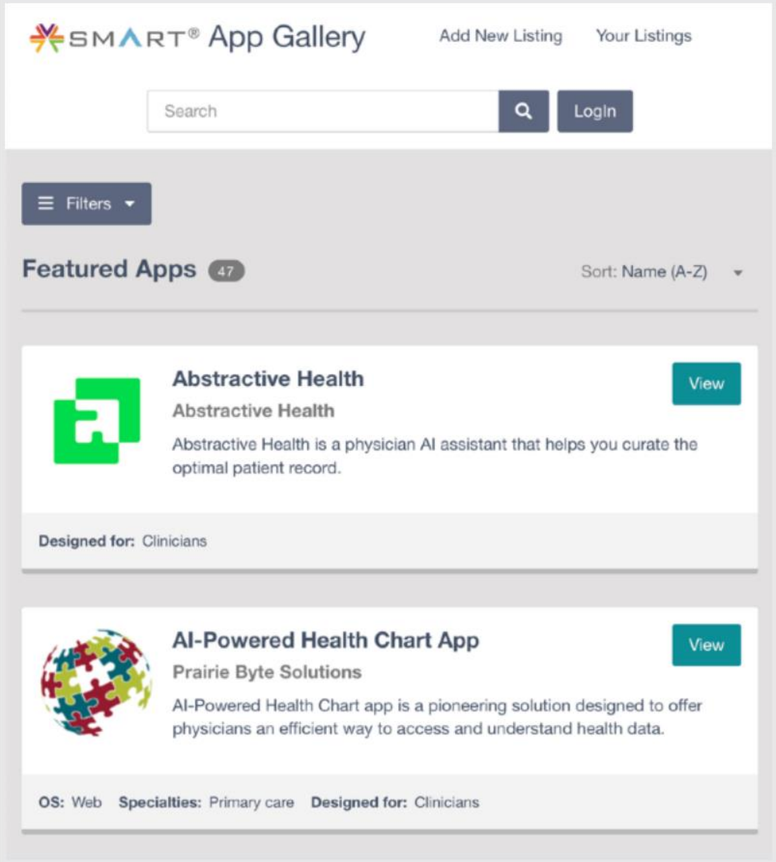
Capabilities for limiting access to certain data via *scopes*

Required in certified Health IT systems by federal regulations (e.g. HTI-1)



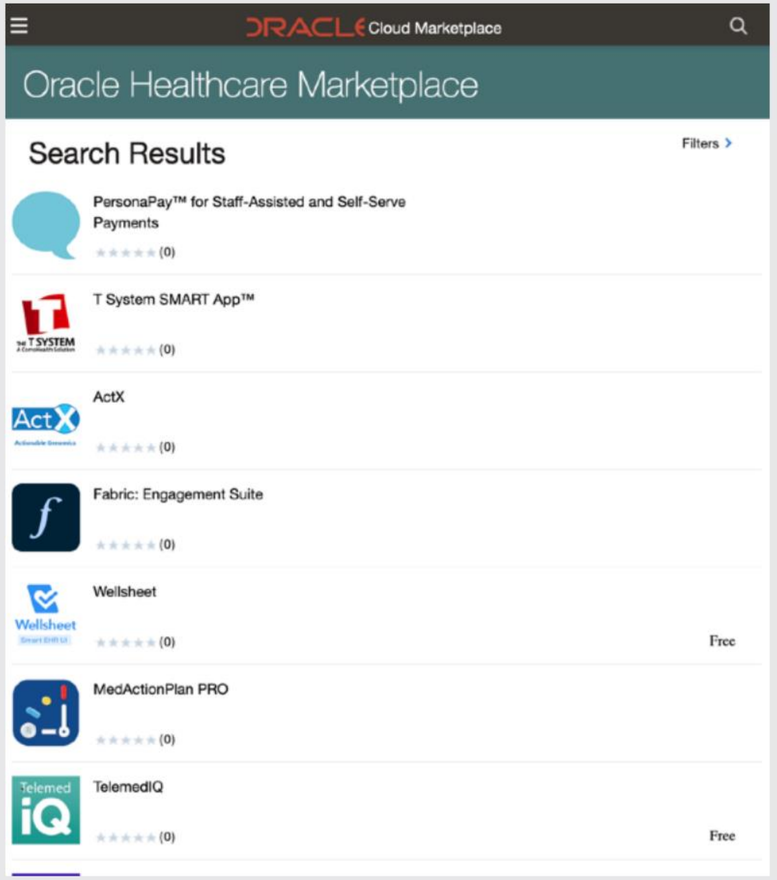
HL7 FHIR SMART App Launch

A Blooming App Ecosystem



SMART App Gallery

Epic Showroom



Oracle Healthcare Marketplace

Bulk FHIR

Efficient access to large data sets on groups of individuals

Highlight Reel

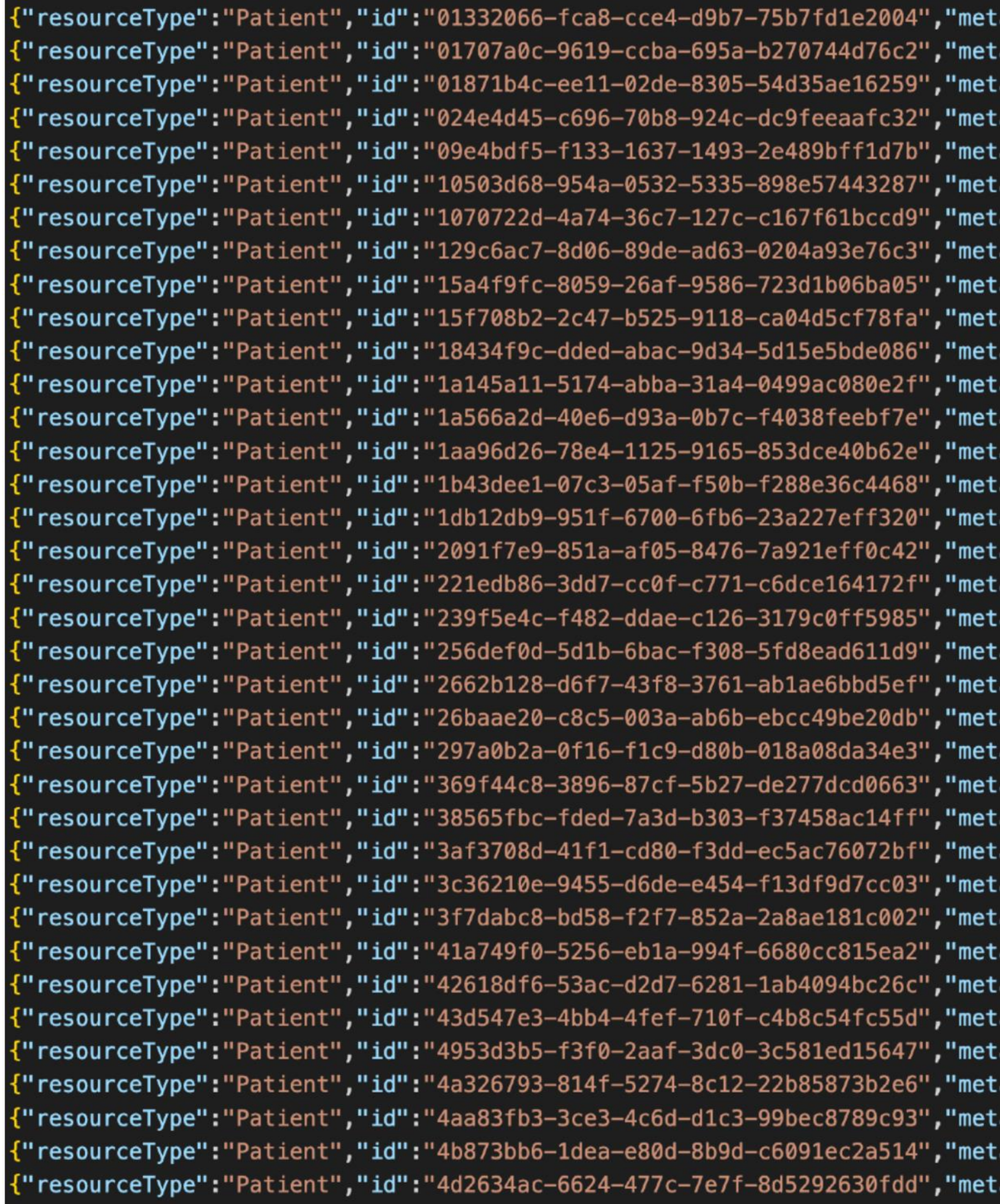
Uses FHIR asynchronous (single) request pattern

Produces FHIR in compact NDJSON

Uses system:system SMART backend services for security

Required in certified Health IT systems by federal regulations (e.g. HTI-1)

HL7 FHIR Bulk Data Access IG



CQL

Clinical quality language: standardized clinical logic for decision support and quality measures

Highlight Reel

Same logic can be deployed across multiple FHIR-based systems, enhancing efficiency and consistency

Enables clinicians and developers to clearly define clinical criteria and decision logic

Works hand-in-hand with FHIR

The language used to evaluate eCQMs in CMS quality programs

HL7 CQL Specification

```
library ChlamydiaScreening_CQM version '2'

using QUICK

valueset "Female Administrative Sex": '2.16.840.1.113883.3.560.100.2'
valueset "Other Female Reproductive Conditions": '2.16.840.1.113883.3.4
valueset "Genital Herpes": '2.16.840.1.113883.3.464.1003.110.12.1049'
valueset "Genococcal Infections and Venereal Diseases": '2.16.840.1.113
valueset "Inflammatory Diseases of Female Reproductive Organs": '2.16.8
valueset "Chlamydia": '2.16.840.1.113883.3.464.1003.112.12.1003'
valueset "HIV": '2.16.840.1.113883.3.464.1003.120.12.1003'
valueset "Syphilis": '2.16.840.1.113883.3.464.1003.112.12.1002'
valueset "Complications of Pregnancy, Childbirth and the Puerperium": '
valueset "Pregnancy Test": '2.16.840.1.113883.3.464.1003.111.12.1011'
valueset "Pap Test": '2.16.840.1.113883.3.464.1003.108.12.1017'
valueset "Lab Tests During Pregnancy": '2.16.840.1.113883.3.464.1003.11
valueset "Lab Tests for Sexually Transmitted Infections": '2.16.840.1.1
valueset "Chlamydia Screening": '2.16.840.1.113883.3.464.1003.110.12.10

parameter MeasurementPeriod default Interval[DateTime(2013, 1, 1, 0, 0,

context Patient

define "InDemographic":
    AgeInYearsAt(start of MeasurementPeriod) >= 16 and AgeInYearsAt(sta
        and "Patient"."gender" in "Female Administrative Sex"

define "SexuallyActive":
    exists (["Condition": "Other Female Reproductive Conditions"] C whe
        or exists (["Condition": "Genital Herpes"] C where Interval[C."
        or exists (["Condition": "Genococcal Infections and Venereal Di
        or exists (["Condition": "Inflammatory Diseases of Female Repro
        or exists (["Condition": "Chlamydia"] C where Interval[C."onset
        or exists (["Condition": "HIV"] C where Interval[C."onsetDateTi
        or exists (["Condition": "Syphilis"] C where Interval[C."onsetD
```

CDS Hooks

Standardized integration with remote decision support services within a clinician's workflow

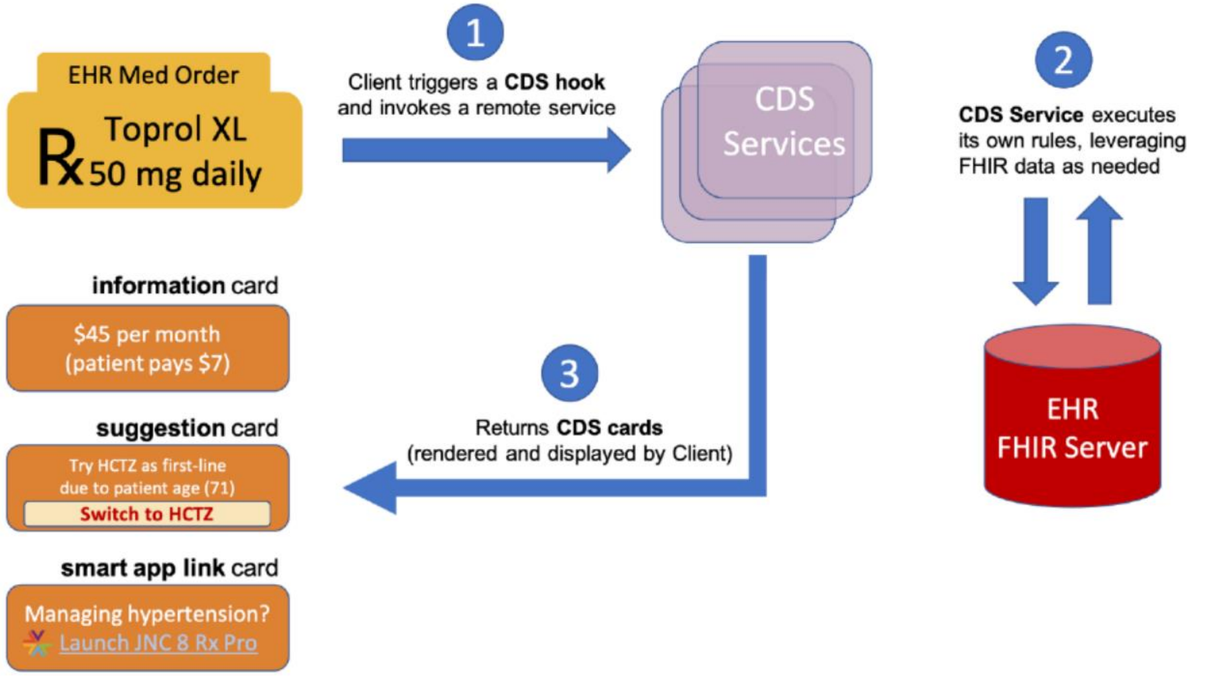
Highlight Reel

Synchronous, workflow-triggered CDS calls returning information, suggestions, or App launch

Works perfect with FHIR as patient data

"Hooks" for things like "opening a patient's record", "placing an order"

Proposed in draft HTI-2 regulation



HL7 CDS Hooks specification

Cheat Codes for Innovation in Health

Semantically interoperable health data at scale

Bulk

Simple export of big FHIR data (e.g. for model training)

CDS Hooks

Workflow-integrated interaction with CDS (including AI)

CQL

Standardized clinical knowledge and metrics

SMART App Launch

Standard integration for apps interacting with FHIR data

MCG, Regence, and MultiCare Connected Care Receive 2023 KLAS Points of Light Award

Leaders in prior auth automation recognized for their innovative work in the HL7 ® Da Vinci Project

SEATTLE, Wash., June 27, 2023 – MCG Health, part of the Hearst Health network and an industry leader in technology-enabled, evidence-based guidance, along with Regence Health Plans and MultiCare Connected Care, were recognized by KLAS with the 2023 Points of Light award. This was the first collaboration between a payer, provider, and clinical decision support vendor to produce a scalable and automated prior authorization (PA) workflow based on the HL7 Da Vinci Project's implementation guides (IGs). The three organizations were presented with the KLAS Points of Light award during the annual KLAS K2 Summit on May 10, 2023, in Salt Lake City.

KLAS recognized MCG, Regence, and MultiCare Connected Care for utilizing interoperability standards from the HL7 Da Vinci Project to create an end-to-end HL7 FHIR® (Fast Healthcare Interoperability Resources) workflow for prior authorizations. This technology automated the submission of prior authorization requests from the provider's electronic health record (EHR) to the payer's medical management system and was able to return an authorization determination in real-time back to the provider's EHR. MCG's rules engine was integrated into the process to ensure care

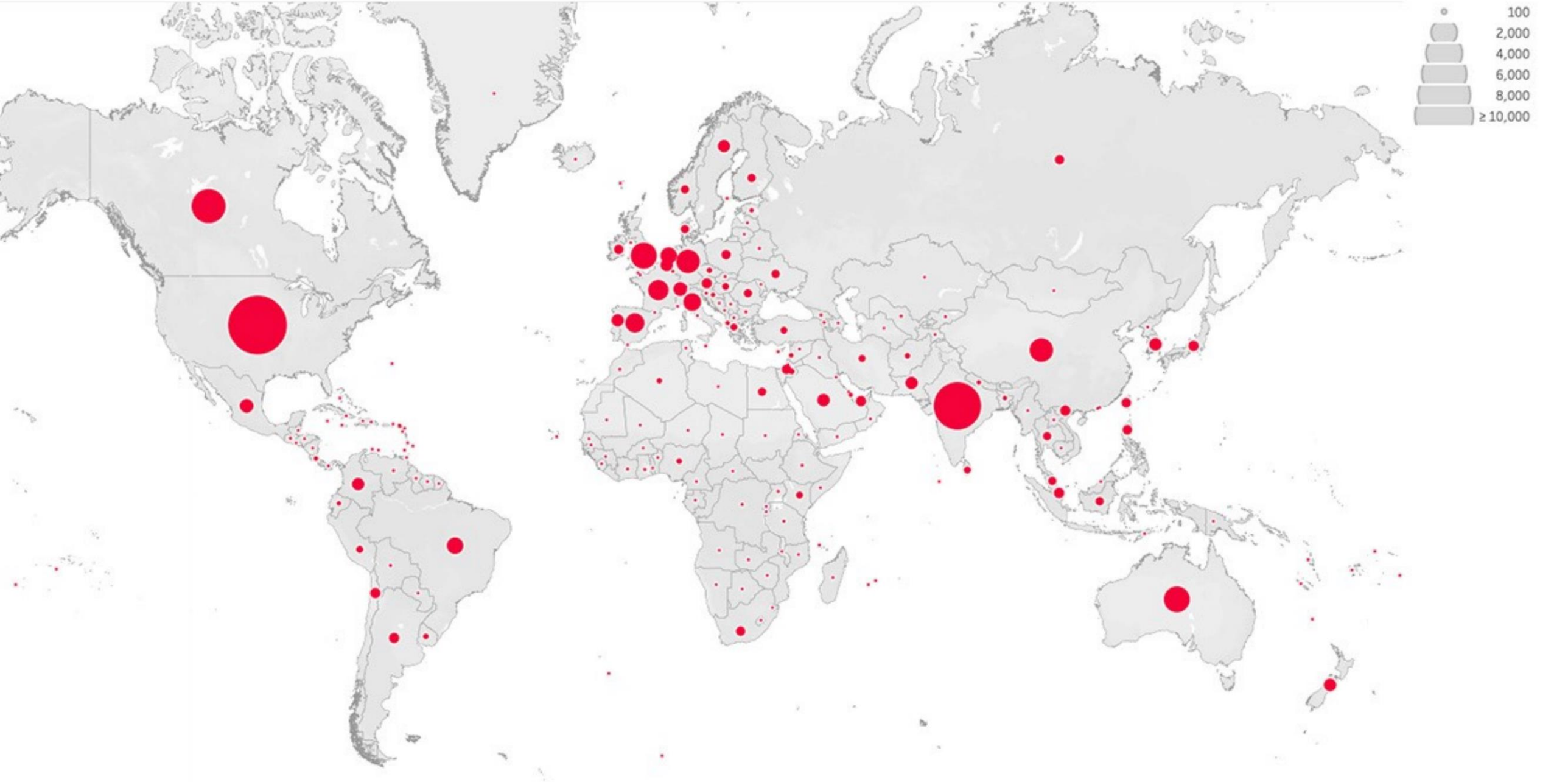
Endless Possibilities

HL7®
International

Let's focus now on the ***global community*** and how it works together


EVERYONE IS
WELCOME

Propelled by an Active Community Worldwide



Propelled by a growing global community

HL7 Membership

300+ corporate members

1300+ individual members

HL7 Affiliates

HL7 Argentina
HL7 Australia
HL7 Austria
HL7 Belgium
HL7 Brazil
HL7 Canada
HL7 Central America & Dominican Republic
HL7 Chile
HL7 China
HL7 Colombia
HL7 Croatia
HL7 Czech Republic
HL7 Denmark
HL7 Ecuador
HL7 Finland
HL7 France
HL7 Germany
HL7 Greece
HL7 Hong Kong
HL7 India
HL7 Italy
HL7 Japan
HL7 Mexico
HL7 Netherlands
HL7 New Zealand
HL7 Norway
HL7 Peru
HL7 Philippines
HL7 Poland
HL7 Portugal
HL7 Romania
HL7 Russia
HL7 Singapore
HL7 Slovakia
HL7 Slovenia
HL7 Spain
HL7 Sweden
HL7 Switzerland
HL7 Taiwan
HL7 UAE
HL7 UK
HL7 Ukraine

HL7 Regional Partner

HELINA HEALTH INFORMATICS IN AFRICA
The Pan African Health Informatics Association

AeHIN Asia eHealth Information Network

HL7 Education Partners

firely

AEGIS

HL7 Collaborations

30+ collaborations with associations, standards developers, societies, and fellow sojourners.

Support Organization

HL7 FHIR Foundation

FHIR Accelerator Program

HL7 FHIR ARGONAUT PROJECT

FAST FHIR AT SCALE TASKFORCE HL7 FHIR

carin Creating Access to Real-time Information Now through Consumer-Directed Exchange

gravity PROJECT

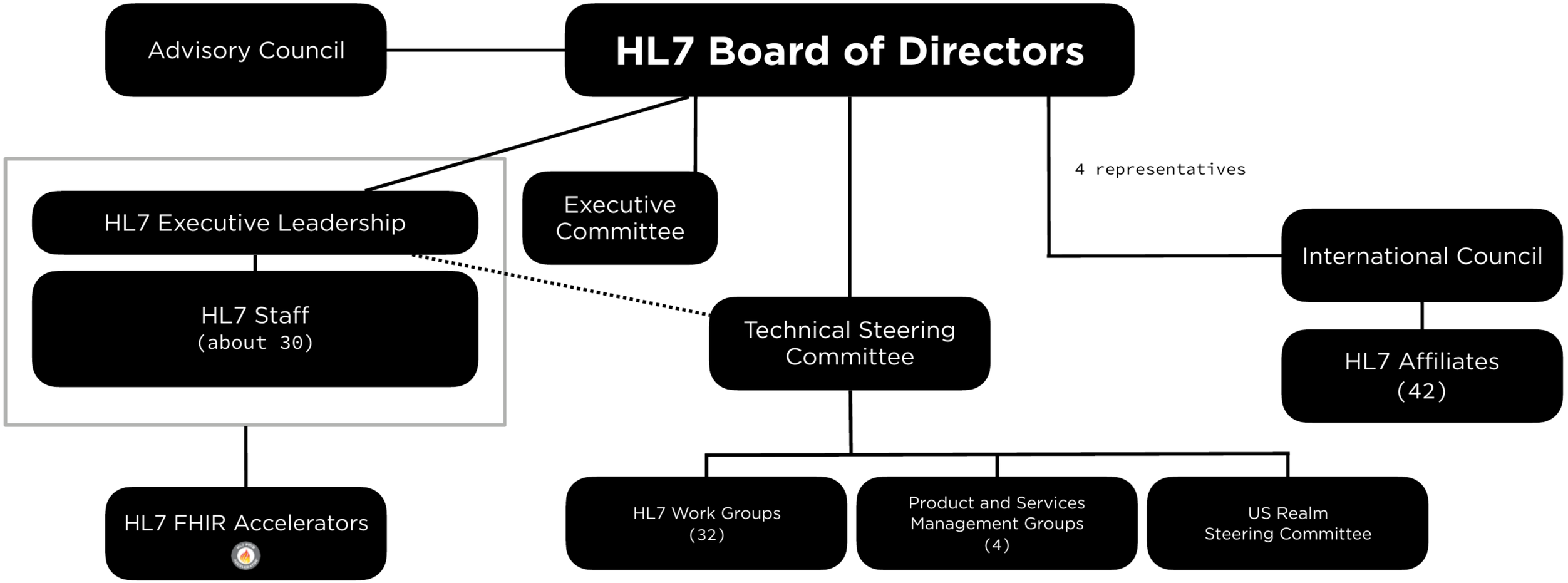
CodeX Common Oncology Data Elements eXtensions

HELIOS

DA VINCI HL7 FHIR

VULCAN HL7 FHIR

HL7 Organizational Structure



HL7 Work Groups

Where the conversation happens that builds consensus.

A Work Group is the unit that assumes responsibility for developing and maintaining a specification.

Open to participation by anyone.

Example Work Groups

- Clinical Decision Support
- Clinical Genomics
- Devices
- Electronic Health Records
- Emergency Care
- FHIR Infrastructure
- Human and Social Services
- Imaging Integration
- Orders and Observations
- Patient Care
- Patient Empowerment
- Payer/Provider Information Exchange
- Pharmacy
- Public Health
- Security
- Terminology Infrastructure

🌐 Full list of 35 HL7 Work Groups

How We Work

[Online collaboration]

[HL7 Working Group Meetings]

[HL7 FHIR Connectathons]

[HL7 FHIR DevDays]

[HL7 educational offerings]

[Regional events via Affiliates]

HL7 International Liaisons to (45) other organizations

- Alliance of Community Health Plans *(J Skapik)*
- America's Health Insurance Plans *(L James)*
- American College of Physicians *(C Jaffe)*
- American Dental Association *(R Fiehn)*
- American Health Information Management Association *(V Nguyen)*
- American Hospital Association *(open)*
- American Medical Association *(C Jaffe)*
- American Medical Informatics Association *(C Jaffe)*
- American Society for Testing Materials *(open)*
- Council for Affordable Quality Healthcare *(V Nguyen)*
- CEN/TC 251 *(E Hammond)*
- Civitas Networks for Health *(C Jaffe)*
- Clinical Data Interchange Standards Consortium *(open)*
- Coalition for Health AI *(C Jaffe)*
- College of Health Information Management Executives *(C Jaffe)*
- Designated Standards Maintenance Committee *(A Goss)*
- Digital Imaging and Communication In Medicine *(B Bialecki)*
- GS1 *(N Piper)*
- Global Consortium for eHealth Interoperability *(D Vreeman)*
- Healthcare Information and Management Systems Society *(V Nguyen)*
- IEEE *(E Hammond)*
- Integrating the Healthcare Enterprise International, Inc *(D Vreeman)*
- Interamerican Development Bank *(D Kaminker)*
- International Conference on Harmonisation *(open)*
- International Medical Informatics Association *(E Hammond)*
- International Organization for Standardization *(multiple)*
- Joint Initiative Council *(D Vreeman)*
- National Council for Prescription Drug Programs *(F McKinney)*
- Object Management Group *(K. Rubin)*
- Observational Health Data Sciences and Informatics *(E Hammond)*
- Open Concept Lab, LLC *(D Vreeman)*
- OpenMRS, Inc. *(D Vreeman)*
- Pharmaceutical Users Software Exchange *(P Guerra)*
- Regenstrief Institute, Inc. *(D Vreeman)*
- The Sequoia Project *(A Truscott)*
- SHIELD *(J Skapik)*
- SNOMED International *(A Truscott)*
- TransCelerate BioPharma, Inc *(C Jaffe)*
- UDAP.org *(D Pyke)*
- U.S. Department of Veterans Affairs *(K Rubin)*
- U.S. Food and Drug Administration *(C Jaffe)*
- U.S. Office of the National Coordinator for Health IT *(C Jaffe, D Vreeman)*
- Web3D Consortium *(E Hammond)*
- Workgroup for Electronic Data Interchange *(C Jaffe)*
- World Health Organization *(D Vreeman)*
- X12 *(J Keegan)*

HL7 FHIR Accelerator Program

Turbo charging FHIR development since 2014

HL7 International

HL7 FHIR Accelerator Program

An HL7 program fostering communities of practice who are collaboratively working on FHIR-based solutions to address specific industry needs in key domain areas.

Foundational FHIR capabilities

Infrastructure and scaling issues

Consumer-directed exchange

Social determinants of health

Common data elements: oncology, cardiology, genomics

Public health data

Payer and provider data exchange

Clinical research

HL7 FHIR Accelerator Program

Accelerants: *committed people (organizations) and resources*

Welcome!

A motivated **Community** of key stakeholders committed to working together

Prioritize

Member-driven prioritization of uses cases with commitment and potential to address the most pressing needs

Build

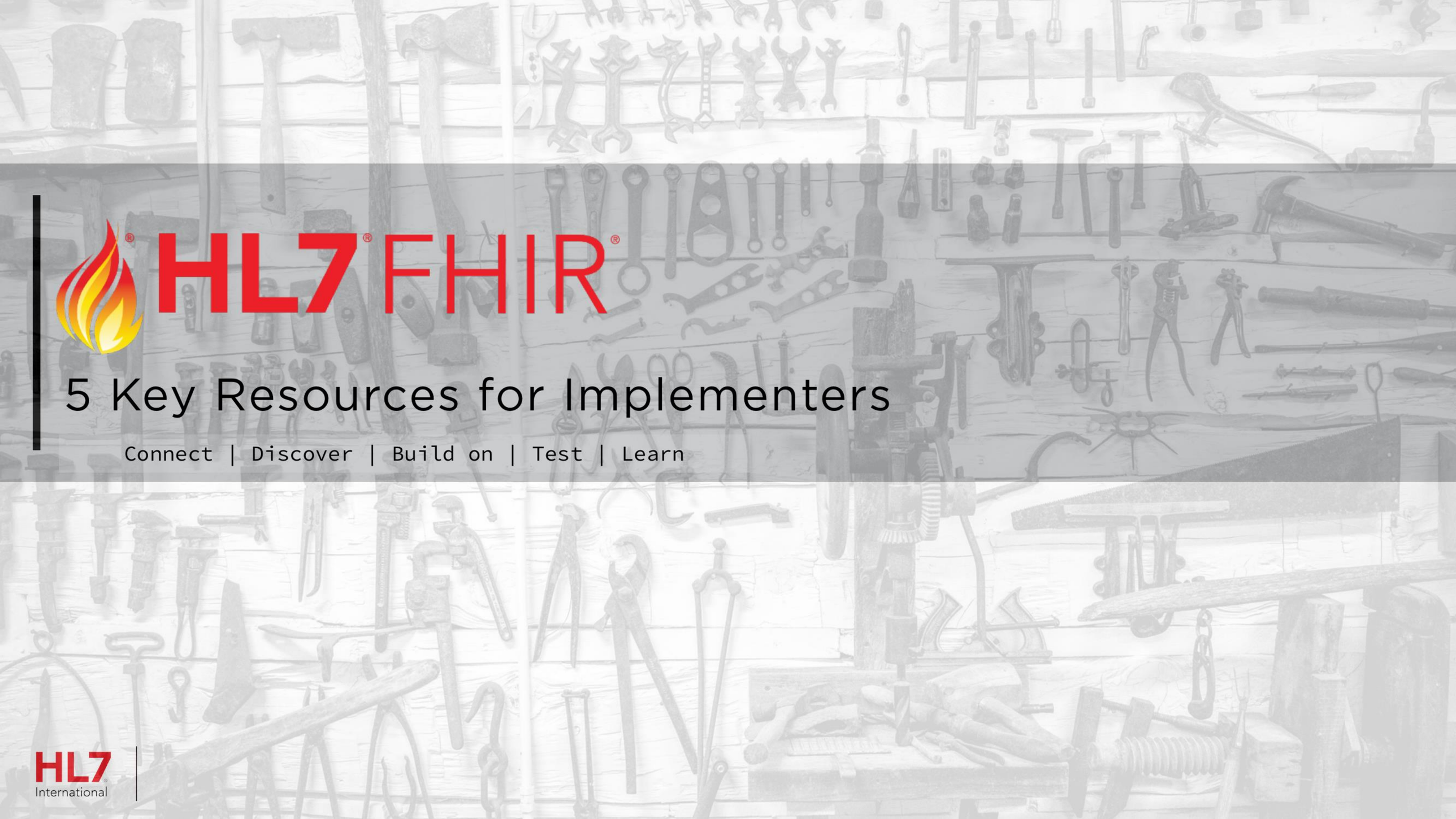
Create infrastructure and use case-specific FHIR implementation guides to specify functionality

Implement

Create software that implements the specifications and enables new capabilities and workflows

Evolve

Learn from pilots, demonstrate impact and value, promote adoption and scaling, share lessons with other, and improve as we go



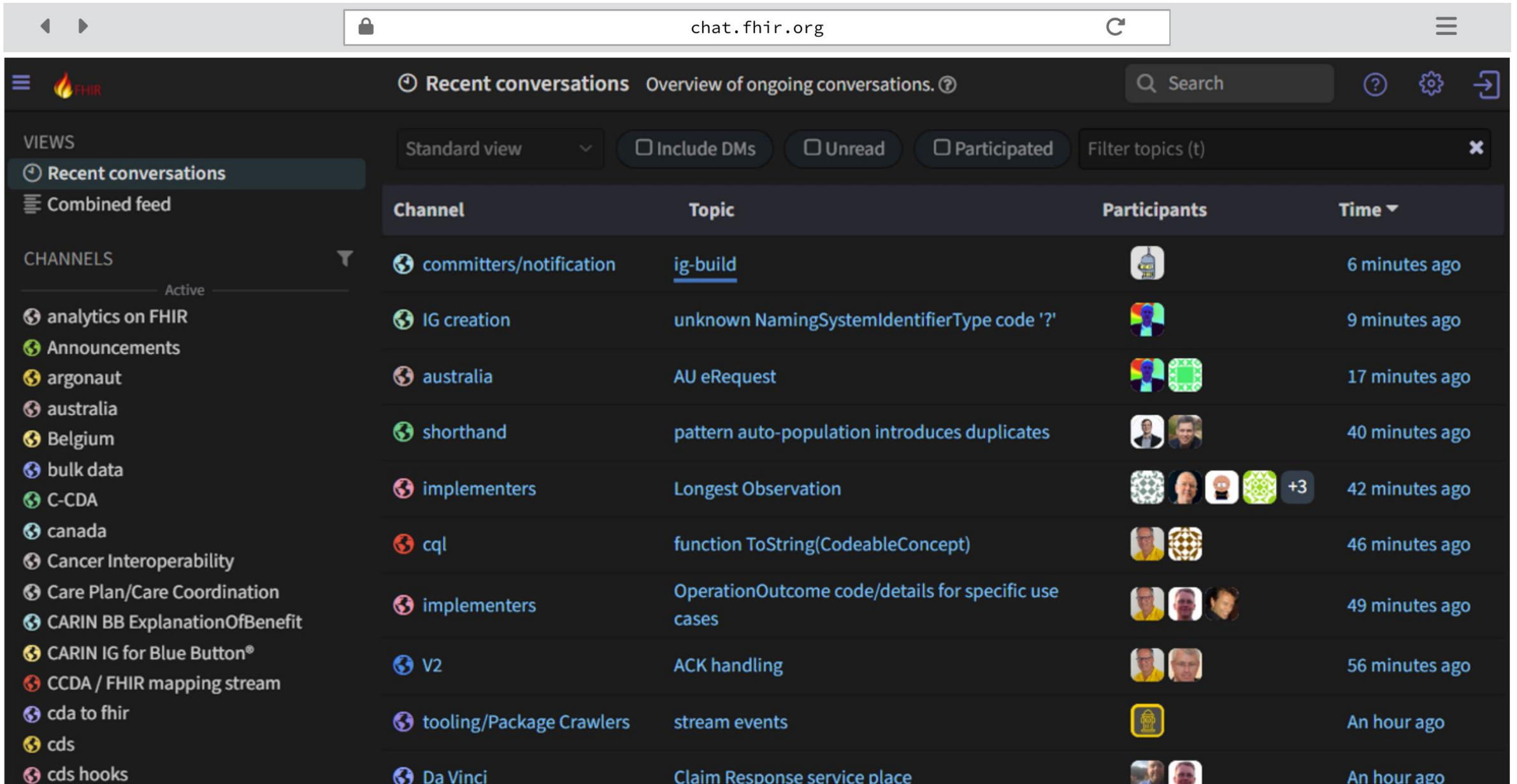
HL7® FHIR®

5 Key Resources for Implementers

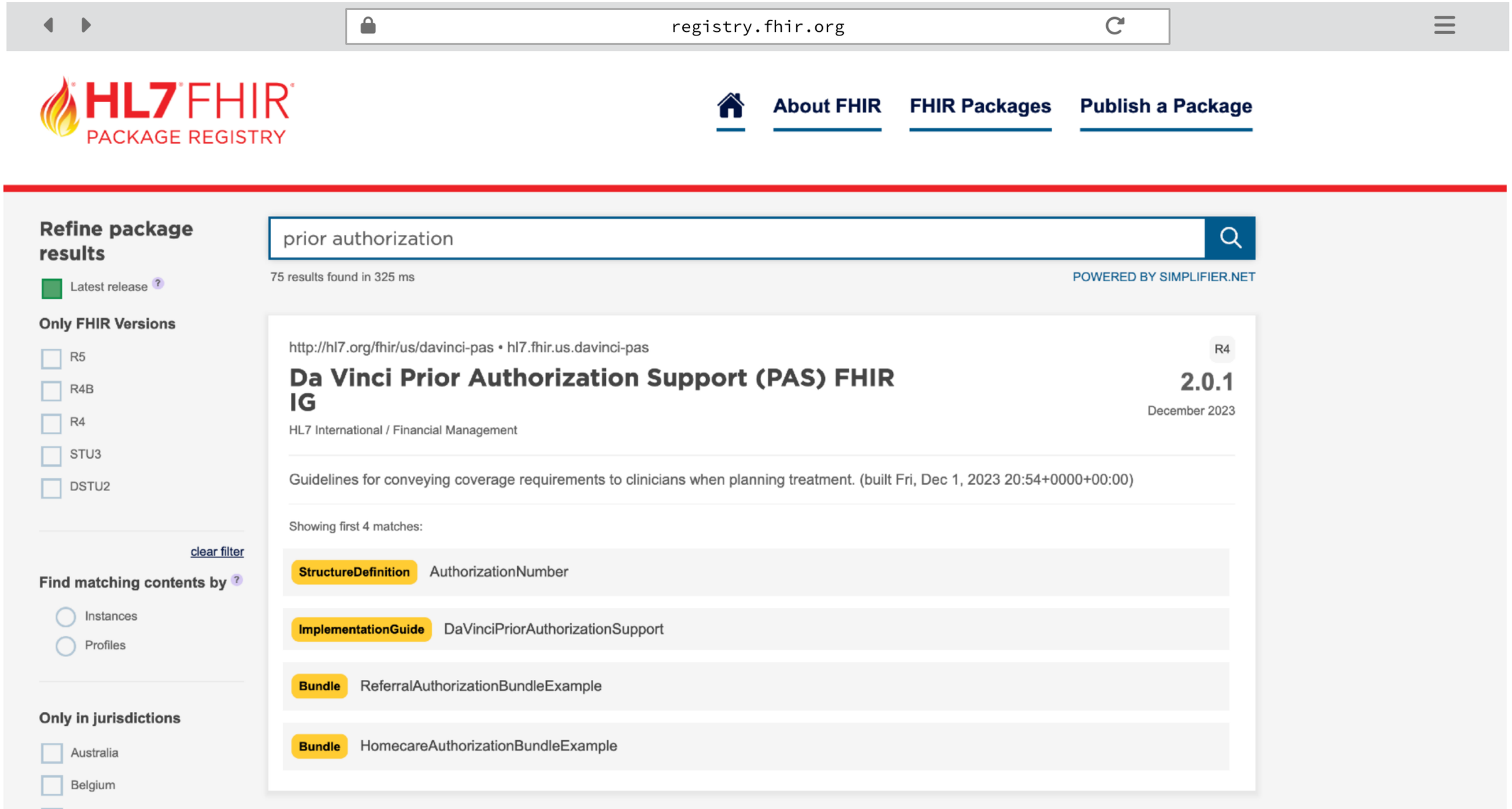
Connect | Discover | Build on | Test | Learn

HL7 International

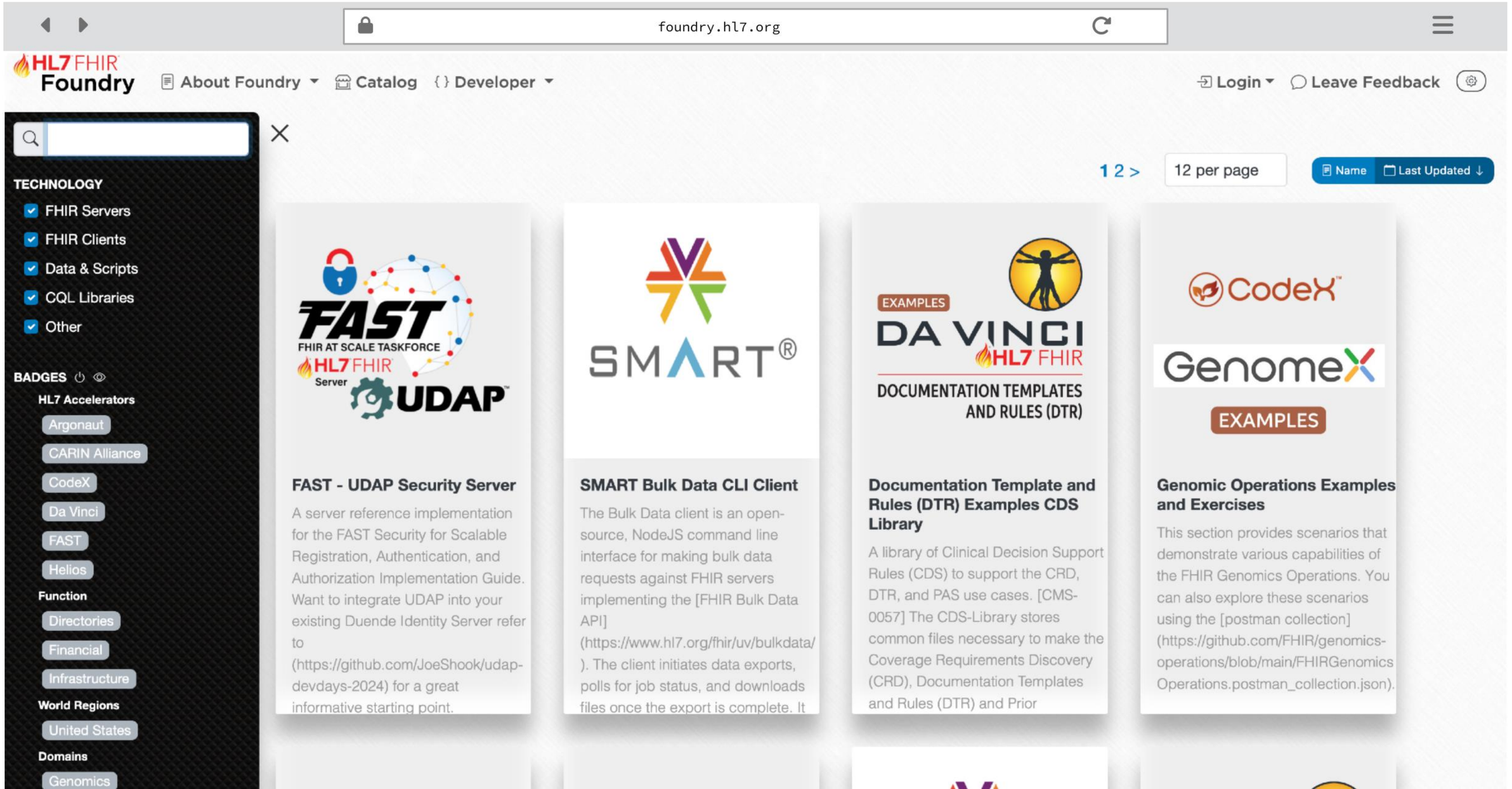
Connect: join the FHIR community online



Discover: find FHIR specifications



Build on: use open source reference implementations



foundry.hl7.org

HL7 FHIR Foundry

About Foundry | Catalog | { } Developer | Login | Leave Feedback

TECHNOLOGY

- FHIR Servers
- FHIR Clients
- Data & Scripts
- CQL Libraries
- Other

BADGES

HL7 Accelerators

- Argonaut
- CARIN Alliance
- CodeX
- Da Vinci
- FAST
- Helios

Function

- Directories
- Financial
- Infrastructure

World Regions

- United States

Domains

- Genomics
- Pharmacy

1 2 > | 12 per page | Name | Last Updated

FAST - UDAP Security Server

A server reference implementation for the FAST Security for Scalable Registration, Authentication, and Authorization Implementation Guide. Want to integrate UDAP into your existing Duende Identity Server refer to (https://github.com/JoeShook/udap-devdays-2024) for a great informative starting point.

SMART Bulk Data CLI Client

The Bulk Data client is an open-source, NodeJS command line interface for making bulk data requests against FHIR servers implementing the [FHIR Bulk Data API] (https://www.hl7.org/fhir/uv/bulkdata/). The client initiates data exports, polls for job status, and downloads files once the export is complete. It

Documentation Template and Rules (DTR) Examples CDS Library

A library of Clinical Decision Support Rules (CDS) to support the CRD, DTR, and PAS use cases. [CMS-0057] The CDS-Library stores common files necessary to make the Coverage Requirements Discovery (CRD), Documentation Templates and Rules (DTR) and Prior

Genomic Operations Examples and Exercises

This section provides scenarios that demonstrate various capabilities of the FHIR Genomics Operations. You can also explore these scenarios using the [postman collection] (https://github.com/FHIR/genomics-operations/blob/main/FHIRGenomics Operations.postman_collection.json).

Build on: many other open source tools

Reference Libraries

JAVA

.Net

Delphi

R

Ruby

Python

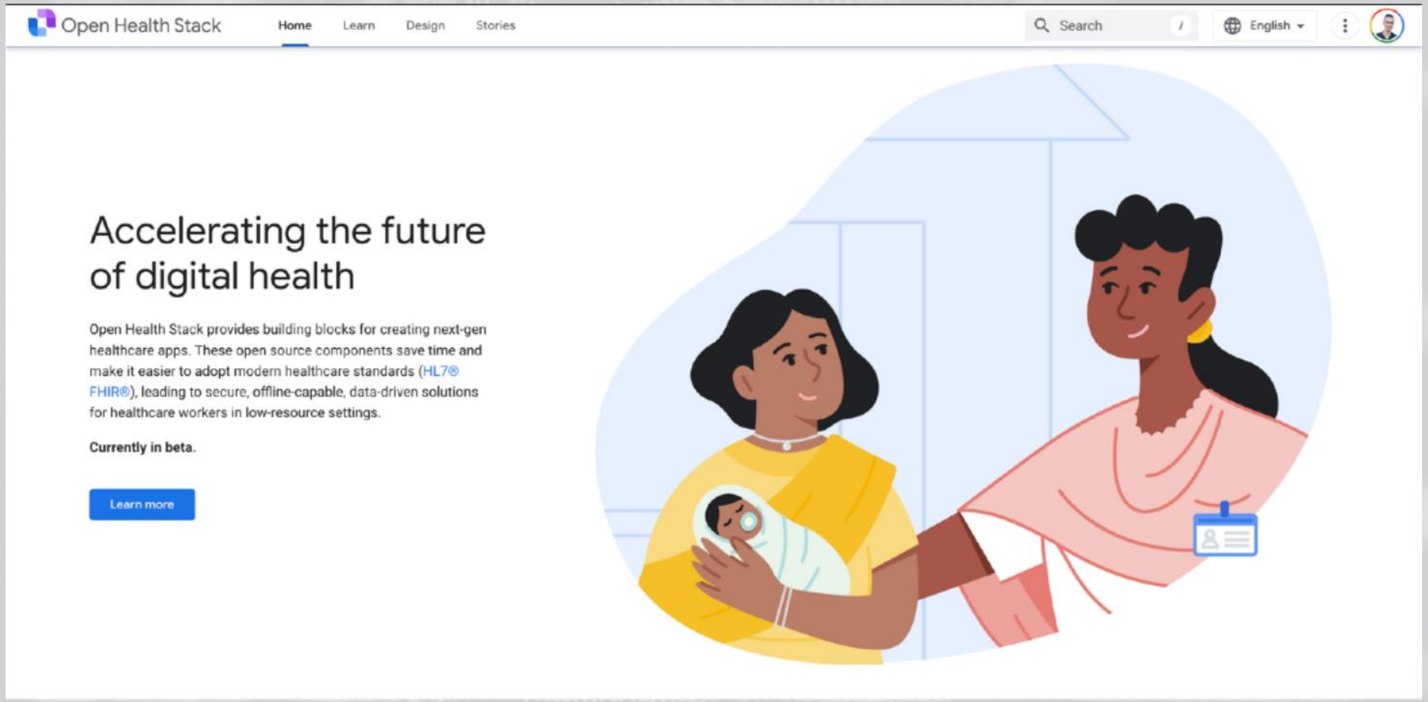
Swift

PHP

Dart/Flutter

Android

Clojure



Example: Open Health Stack

FHIR SDK for Android

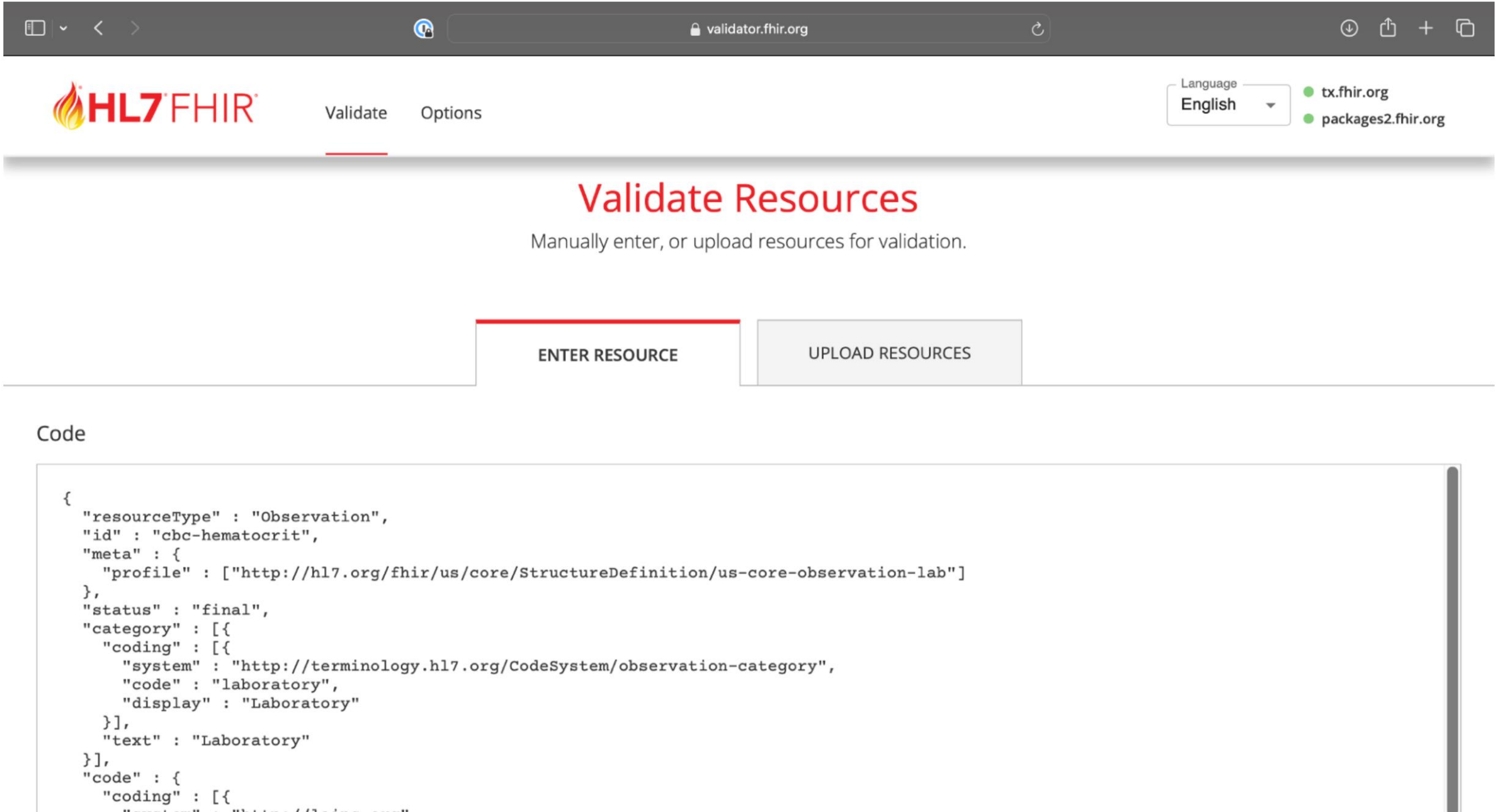
Offline-capable, mobile-first FHIR toolkit (including CQL!) allows developers to create applications helping community health workers in LMICs.

FHIR Analytics

Turn FHIR data into analytics-ready formats for on-prem or cloud processing

`Open Health Stack`

| **Test:** validate your FHIR content



Learn: advance *your* FHIR expertise

Education

On Demand

Virtual training events

In person training

Credentialing

Showcase your FHIR knowledge

Helps hirers find qualified people

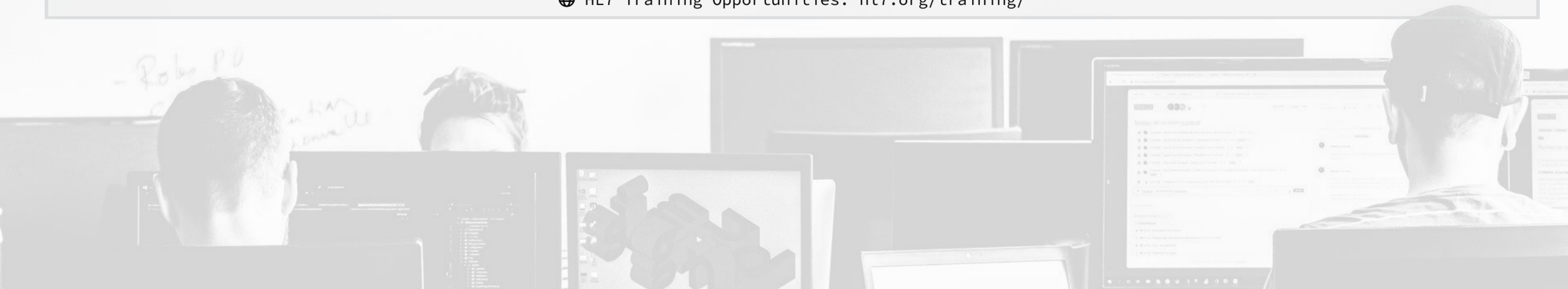
Events

HL7 Work Group Meetings

HL7 FHIR Connectathons

DevDays

HL7 Training Opportunities: hl7.org/training/

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Educate. Engage. Enable.

THANK YOU!

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Networks for Health

All things Civitas can be found on the website! And if not, reach out contact@civitasforhealth.org

SCAN

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