HL7 FHIR Connectathon 28 Track Report Out

Please include the following in your Track Report Out.

- summary: what was the track trying to achieve
- list of participants (with logos if you have time and energy) and systems which have implemented the IG, Profile, or Resource, and approximate percentage covered
- Where can test scripts and results be found (link to ConMan, Touchstone, or Inferno?)
- notable achievements
- screenshots of relevant and interesting things and/or links to further information about implementations/achievements
- discovered issues / questions (if there are any)
- now what?

Argonaut US Core & ONC Standardized API Criterion Track

Argonaut Write Track

Summary:

he *Argo Write* project is the first steps in providing guidance for supporting FHIR “write” use cases in the context of specific USCDI elements.

Currently very little guidance is provided on writing and updating data in the context of US Core profiles. There are multiple issues that will need to be considered when defining expected behavior by the various actors to support updates and writes to the data including:

- Defining the overall approach
    - direct updates to a particular resource via FHIR RESTful transactions
    - client supplied data provenance (source of data, whether requested, whether patient supplied, other)
    - expected Server behavior and capabilities
- Conformance expectations
- Write failure scenarios (e.g., insufficient data to create)

There are other ongoing efforts focusing on patient updates or corrections such as those sponsored by the HL7 Patient Empowerment WG as a specific "write" use case. We will be reaching out and sharing our efforts with these communities

The project has defined a simple Argo Direct Write and our first use case is *patient supplied* Observations. This Track will provide the first opportunity to test it and provide feedback for further refinement.

Argonaut Write Connectathon 28 Wrap Up

1. No Client/Servers Testing

2. Still in early stages of client write.

3. Recent updates to spec

4. Postman Collection available to demonstrate the simple transaction

5. Uses a mock server

Introduction Call

Review Australian Specification:

AU FHIR Smart App Launch:Writing back to the clinical record:
https://confluence.hl7australia.com/display/PA/Writing+back+to+the+clinical+record

Options being considered

- For DocumentReference splitting out binary upon receipt
- Use Transaction Bundles? reviewing options

Recognize need for there pre-coordination steps including *prior* to client being able to write to EHR

Including
- authorization
- "submission key" for requested data
- registration of a Device

Other Specifications addressing Patient's Writing to EHRs:

- POCD: https://build.fhir.org/ig/HL7/uv-pocd/
- PHD: http://build.fhir.org/ig/HL7/PHD/
- Finnish PHR: https://www.kanta.fi/en/system-developers/kanta-phr
- MedMij FHIR Implementation Guide Vital Signs 2.0.11: https://informatiestandaarden.nictiz.nl/wiki/MedMij:V2020.01/FHIR_VitalSigns

Patient Empowerment Break-Out Comments

- Patient Corrections Implementation Guide:http://build.fhir.org/ig/HL7/fhir-patient-correction/index.html
    - focus is on ability to follow up on request.

- Considering Using Communication to record and provide additional context to resources in addition to resources.

- Recognize that Performer vs Informant vs Author are different things instead of just referring to a performer
  - clean up language and mapping over resources.

- Argo Write Client can track workflow via tagging/deleted

Breakout on US Core Must Support element for Write

Discussion on the Draft Conformance Guidance: https://hackmd.io/ipt4Iyc3TMmwkB6PYNYnKw?view and what does *Must Support* means for clients writing a profile and a Server consuming it.

Review draft of 6 bullets on *Must Support* to use when following a profile that defines an element as Must Support.

Issues:

1. What about client authored DARs?
    1. The code meaning may change when a server stores the data.

        When would this happen?
        DAR codes for MS elements:
        - `unknown`
        - `masked`

- `not-applicable`
- `error`
- `not-performed`
- `not-permitted`

1. Would there need to be provenance on that particular DAR element?

e.g. a mandatory element as DAR = "unknown" - the Server stores that DAR and supplies the provenance on the record vs the element - how would that be different?

1. What if there were no MS requirements on Client Writes?
   1. Server would only accept based on its business rules
   2. How would Client know these business rules?
   3. Profiles like US Core, provide the minimum expectations for data elements across servers. Using them (and other profiles) provides a way for a Client to interact with multiple servers without having to discover the requirements for each one separately.
   4. Server May have additional requirements beyond US Core
      - how would you discover those additional requirements?

e.g., for Observation server A also needs an episode of care too... (does this relate to the tagging/provenance like .basedOn)

Wrap up Discussion

Whether the uploaded data tag is necessary

- Use "workflow resource instead" (e.g., ServiceRequest. Task)

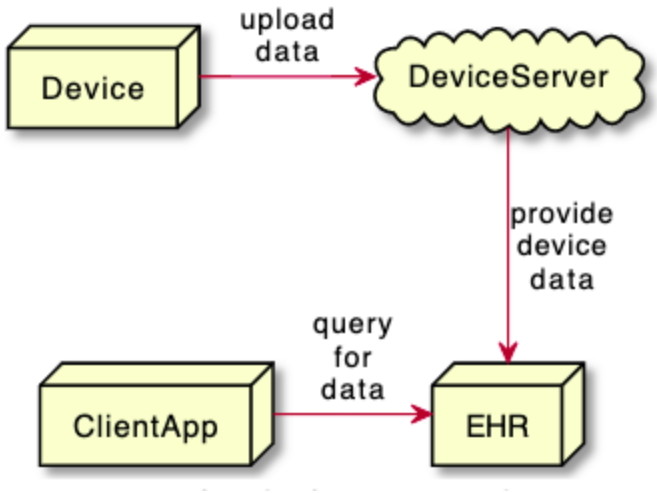
How to provisioning a patient observation through ServiceRequest

- This is a precondition and not detailed
- Whether unsolicited data is out of scope - we have concluded it is not

Registration of a Device

- This is a precondition and not detailed

Using backend services to write data to EHR



- common for devices to send measurements to a dedicated server
- instead of client app write to the ehr the service writes to it.
(or the ehr/provider fetches it)
- Out of scope?

Questions... PM me on Zulip @**Eric Haas**

Bulk Data

Summary

Healthcare and payor organizations have many reasons to transmit data on large populations of patients, such as moving clinical data into an analytic data warehouse, sharing data between organizations, or submitting data to regulatory agencies. Today, bulk export is often accomplished with proprietary pipelines, and data transfer operations often involve an engineering and field mapping project. The bulk data implementation guide (IG) is an exciting effort by HL7, Argonaut, and SMART to bring the FHIR standard to bear on these challenges of bulk-data export. This track provides a forum for server implementers (providing bulk data) and client implementers (retrieving bulk data) to test the current IG and the updates in version 2. Version 2 incorporates learnings from implementer experience with v1.0 and has been developed over the past year and a half through a series of open community meetings coordinated by the Argonaut FHIR Accelerator.

Participants

Name	Organization
Anarghya V Kini	Philips Healthcare
Bin Mao	Boston Children's Hospital
Dan Gottlieb	SMART / Argonaut
Don Newman	Roji Health Intelligence
George Hernandez	Roji Health Intelligence
Jamie Jones	Boston Children's Hospital
Joon Hyun Song	HealthAll Inc.
Lee Surprenant	IBM
Natalie Raketich	J Michael Consulting
Sumanth Bandaru	Dynamic Health IT
Timon Grob	Philips Healthcare
Vandhana Sree Gopinath	Philips Healthcare
Venkatesh Deo	Philips Healthcare
Vlad Ignatov	Boston Children's Hospital

Systems which have implemented the IG

https://docs.google.com/spreadsheets/d/1Wv8uGJwzIm6vchtipc4he3taknn0HTKOxMUFBaQdZjc/edit#gid=0

Notable achievements

- Tested SMART reference client against two open and two secure servers
- Demos of Bulk Data Testing Tool, Server Reference Implementation and Client Reference Implementation
- Demo of Bulk Data Census Toolkit
- Load bulk data into AWS Athena and queried for daily flu count, by gender, age_group, race, ethnicity

lab_code	result	gender	age_group	race	ethnicity	Test_date	patient_count
92141-1	a. POSITIVE	female	a. 0-18	WHITE	NOT HISPANIC OR LATINO	2020-02-24	1
80382-5	b. NEGATIVE	female	d. 65-84	WHITE	HISPANIC OR LATINO	2020-02-21	1
80382-5	b. NEGATIVE	male	b. 19-44	WHITE	NOT HISPANIC OR LATINO	2020-03-01	1

Discovered issues / questions

Client Behavior when Downloading Attachments. When a server exposes many attachments as urls (e.g., in DocumentReference resources), clients will want to decide behavior for following these links and

downloading attachments and informing users what the progress is. Two identified options for business decisions:

- decide based on attachment size or file type to either download, inline, or skip.
- log urls and asynchronously update the ndjson after the downloads finish.

Bulk Data Status Request Optionality. Question over requirement to have a 'request' field in the export manifest. Clients should be able to track the initial request on its own, so the extra complexity of the server storing the full url may not be needed. The field is listed as required in the current IG but "will be removed". Link to section in IG:
http://hl7.org/fhir/uv/bulkdata/2021May/export.html#bulk-data-status-request

Potential missed status endpoint handshakes. Servers aren't required to hold data indefinitely, so clients could potentially miss a window to receive a "200 Complete" response, especially when servers don't supply a reasonable (but optional) "retry-after" header. Suggest adding how long prepared files are served to server capability documentation. Link to section in IG:
http://hl7.org/fhir/uv/bulkdata/2021May/export.html#server-capability-documentation

Backend Services Inferno testing discussion and Zulip follow up:
Are servers required to validate the jku header?
Expected scope negotiation behavior
Can an auth server allow requests with no scope?

Now what?

- More testing with increasingly mature bulk data servers!
- Development and testing of open source auth layers
- Work continues on a new version of the Bulk Data Client. It is already capable of inlining attachments based on mime type and byte size, uploading to S3 or custom http destination, working with open servers and more...

Clinical Reasoning

1. What was the track trying to achieve?
    a. Expanding TestScript coverage of capabilities
    b. Testing Measure Repository capabilities, including $data-requirements
    c. Testing Measure Terminology Service capabilities, including version-specific expansion
    d. Continued testing of measure content and capabilities, especially stratifiers
    e. Testing FederatingTerminologyClient for multiple terminology sources
    f. Testing WHO ANC content
2. Participants
    - Alphora

- Apelon
- Apervita
- Bellese Technologies
- BCBST
- Clinovations Government + Health
- DCG
- Dynamic Health IT
- ESAC, Inc
- Flexion, Inc
- Indicina, LLC
- iParsimony, LLC
- Lantana Consulting Group
- Mathematica
- MD Partners, Inc
- NCQA
- NLM (Value Set Authority Center)
- Optum
- PJM Consulting, LLC
- SemanticBits
- Telligen
- The Joint Commission
- The MITRE Corporation

Logos

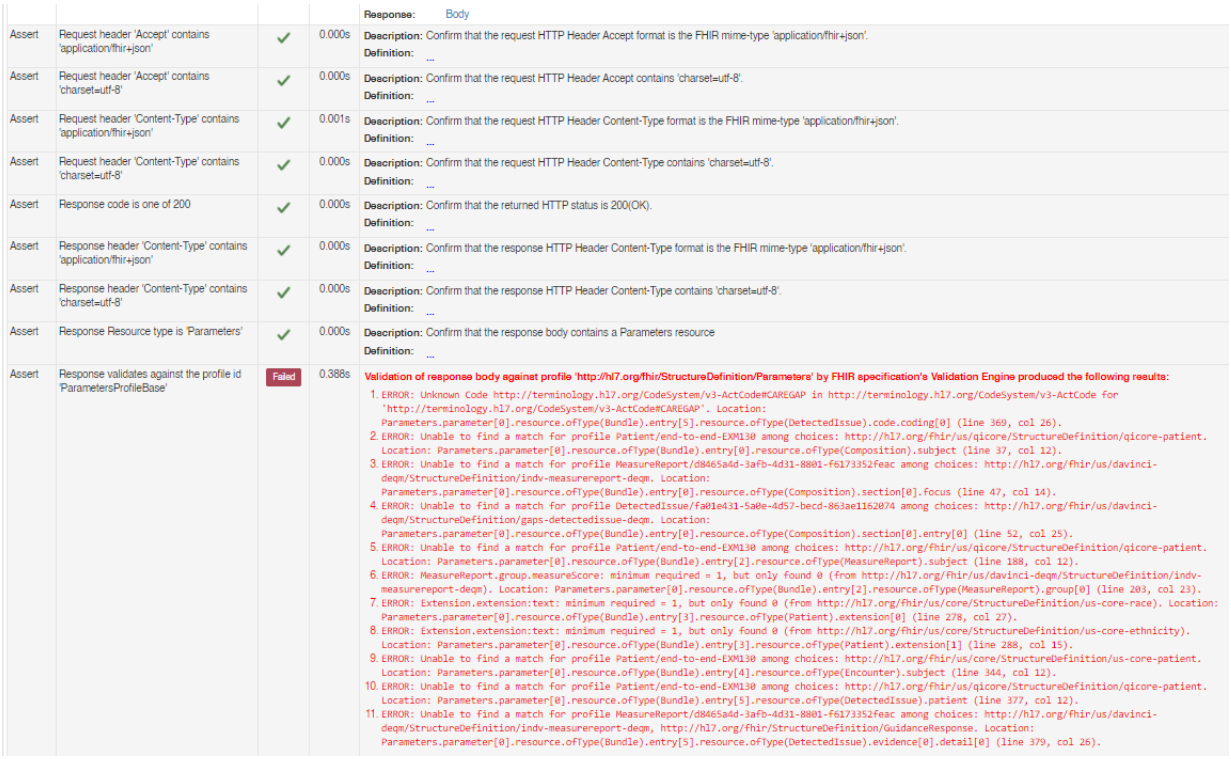
3. systems which have implemented the IG, Profile, or Resource, and approximate percentage covered (link to ConMan results if applicable)
    a. Connectathon (clinfhir.com) (Clinical Reasoning Track)
4. notable achievements
    a. Expanded test coverage with TestScripts
    b. Successful tests of version-specific expansion ValueSet Scenario w/ OntoServer
    c. Feedback to OntoServer and VSAC version-specific expand capability
    d. Feedback on MeasureTerminologyService
    e. Successful tests of FederatingTerminologyClient $expand, ongoing
    f. Successful end-to-end of Gaps-in-care testing with Colorectal Cancer

        i. Issues from last connectathon addressed
        ii. Additional issues logged
    g. Successful end-to-end of DataElements with MITRE Inferno testing tool
    h. Feedback on/discussion of Gaps-in-care use case and potential engine result enhancements to better support Gaps-in-care and other CQL testing/authoring use cases
    i. Testing 2021 content (exported from MAT) using test data (exported from Bonnie)
5. screenshots if relevant and interesting and/or links to further information about implementations/achievements **(see below)**
6. discovered issues / questions (if there are any)
    a. Feedback on Measure Terminology Service:
        i. Clarify Usage Warning conformance language on the ExecutableValueSet profile
        ii. Clarify override behavior of expansion, activeOnly, system-version, and includeDraft parameters specified in the $expand extension
        iii. Add the ability to search for value sets by manifest (and potentially multiple manifests to the Capability Statement
        iv. Define a composite search parameter for usage that is a composite of usage-user/usage-use
        v. Consider using useContext rather than usage-extension?
        vi. Restrict content to 0..0 in the Quality Program profile
    b. Feedback from Gaps-in-care discussion
        i. Consider a referenceDetail extension (complex w/ reference (Reference) and path (string) to provide a path to the element of interest for a particular reported GapReason. Used in the GuidanceResponse profile
        ii. Consider an approach that would allow “injection” of logic to inform gaps-in-care type results (“Show reasoning” behavior) into the ELM prior to evaluation, and would show up in the engine results
        iii. Consider adding a “GapReason” case that provides a fallback if a branch of logic is reached that doesn’t match a known pattern, and just returns the criteria (as CQL) from that point of the ELM branch with a message of “CriteriaNotMet” or something to that effect.
        iv. How is attribution determined with data element submission? (i.e. how does a submitting system know which members of a population to include?) What to include in the initial population
    c. Feedback on valueSet Scenario:
        i. Ontoserver’s implementation appears to be ignoring the valueSetVersion parameter (will provide as feedback to CSIRO)
        ii. Test cases needed to be expressed in terms of SNOMED International edition in order to be evaluated in some systems
        iii. VSAC implementation of $expand appears to be ignoring the valueSetVersion as well
        iv. VSAC implementation of $expand returns a Parameters resource (not clear in the spec if this is allowed for operations that returns a single result parameter)
            1. Feedback to base FHIR to clarify conformance requirements around return parameters in operations
        v. VSAC implementation of $expand returned Parameters resource has no “name” element for the single parameter, it should be named according to the operation definition.

d. Feedback on ANC content
    i. Concern about maintainability of the number of profiles involved. Discussions about potential approaches, but no clear recommendation. Could consider using concepts for the “primary code” binding, rather than ValueSets, that would reduce the overall number of ValueSets, but not of Profiles. Could consider collapsing profiles, but that would sacrifice the profile Validation aspect (could maybe do something with a property of the ANC CodeSystem to indicate which ValueSet should be used for a given concept, and then use some fancy FHIRPath in the profiles to get that validation)
    ii. Testing with DT-01 bundle returns a CarePlan with a RequestGroup, reference implementation may be at issue or may need to update the test and associated content
e. Feedback on QICore Authoring
    i. Concern about the additional burden introduced by mapping requirements for CQL that is written against an IG’s profile definitions. The ELM makes up for this, but for systems that are consuming the CQL directly, this would be an additional translation requirement.
        1. One potential option is to consider injecting that mapping in the ELM, rather than requiring it to be expanded in the translator.

7. Now what?
    a. Expanded testing for valueSet Scenario
    b. Expanded use cases/testing for FederatingTerminologyClient
    c. More testing of Measure Terminology Service and Measure Repository Service
    d. Continued Quality Measure Testing
    e. More development of potential “injection” approach to engine output
    f. BulkData testing (import scenario) Broad support among participants for this to be a primary focus of next connectathon
    g. Testing 2021 content (exported from MAT) using test data (exported from Bonnie)
    h. Continued validation of $data-requirements

9/15 DEQM/GIC testing demo, DEQM - GIC end-to-end scenario detected new validation issues:

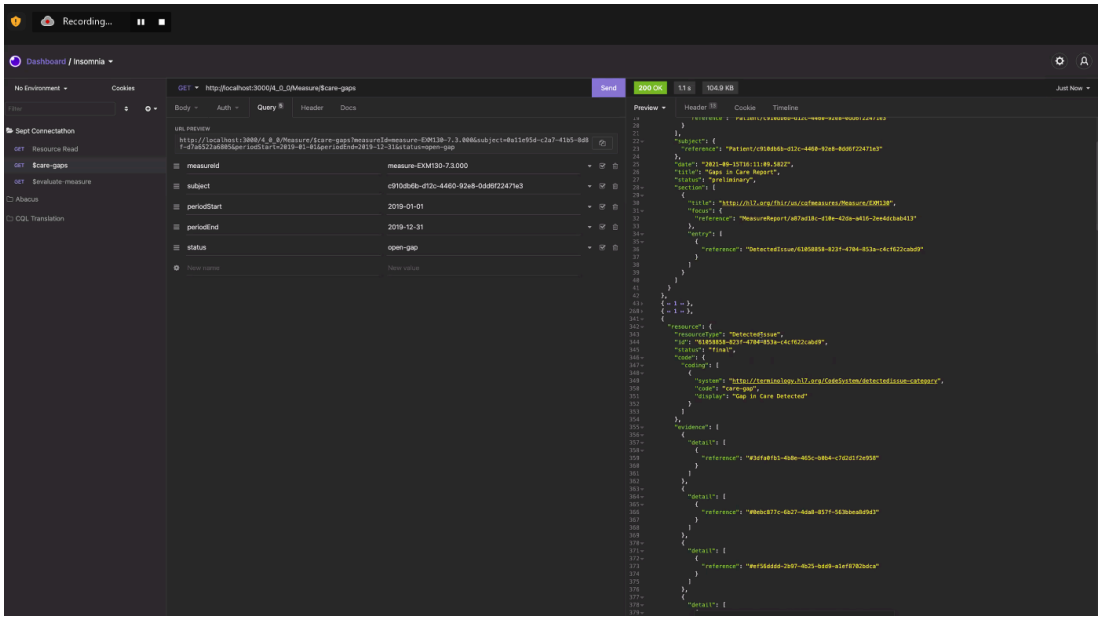


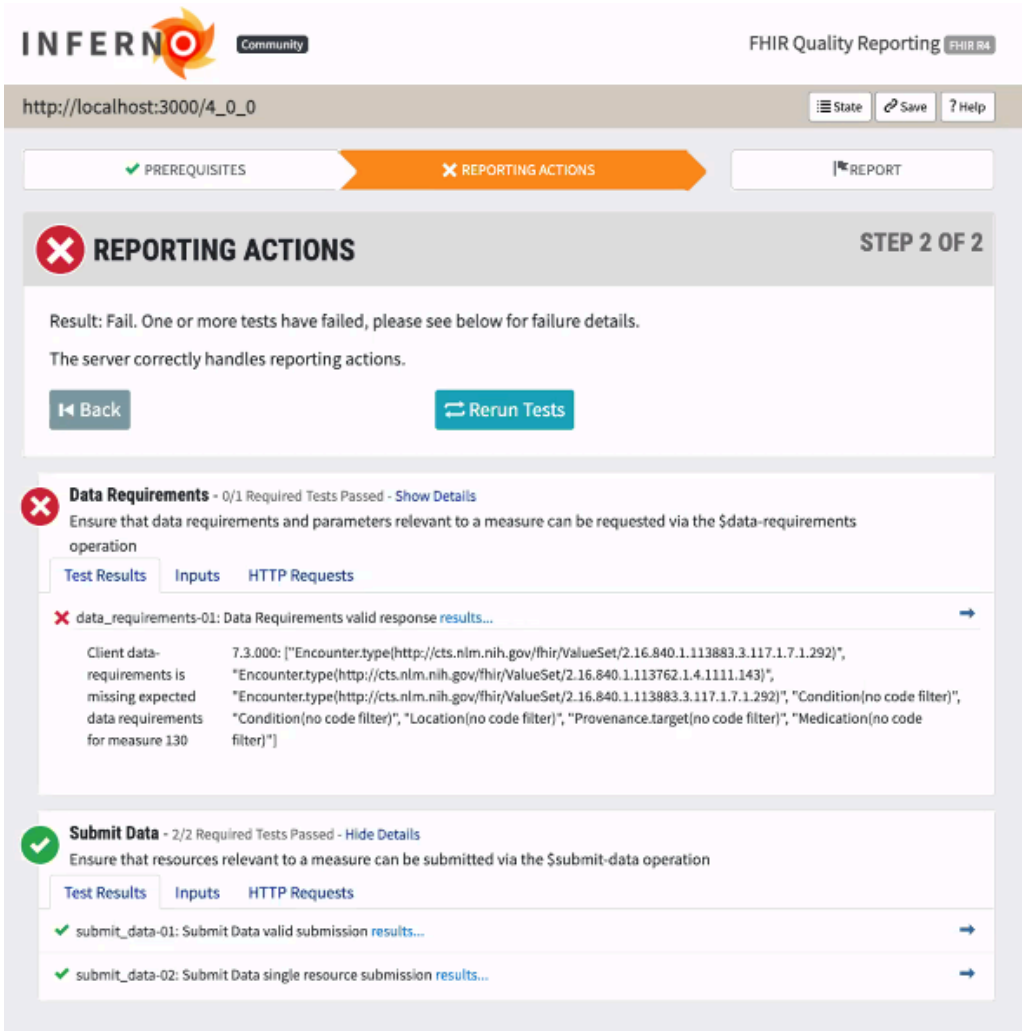
				Response: Body
Assert	Request header 'Accept' contains 'application/fhir+json'	✓	0.000s	**Description:** Confirm that the request HTTP Header Accept format is the FHIR mime-type 'application/fhir+json'. **Definition:** ...
Assert	Request header 'Accept' contains 'charset=utf-8'	✓	0.000s	**Description:** Confirm that the request HTTP Header Accept contains 'charset=utf-8'. **Definition:** ...
Assert	Request header 'Content-Type' contains 'application/fhir+json'	✓	0.001s	**Description:** Confirm that the request HTTP Header Content-Type format is the FHIR mime-type 'application/fhir+json'. **Definition:** ...
Assert	Request header 'Content-Type' contains 'charset=utf-8'	✓	0.000s	**Description:** Confirm that the request HTTP Header Content-Type contains 'charset=utf-8'. **Definition:** ...
Assert	Response code is one of 200	✓	0.000s	**Description:** Confirm that the returned HTTP status is 200(OK). **Definition:** ...
Assert	Response header 'Content-Type' contains 'application/fhir+json'	✓	0.000s	**Description:** Confirm that the response HTTP Header Content-Type format is the FHIR mime-type 'application/fhir+json'. **Definition:** ...
Assert	Response header 'Content-Type' contains 'charset=utf-8'	✓	0.000s	**Description:** Confirm that the response HTTP Header Content-Type contains 'charset=utf-8'. **Definition:** ...
Assert	Response Resource type is 'Parameters'	✓	0.000s	**Description:** Confirm that the response body contains a Parameters resource **Definition:** ...
Assert	Response validates against the profile id 'ParametersProfileBase'	Failed	0.388s	**Validation of response body against profile 'http://hl7.org/fhir/StructureDefinition/Parameters' by FHIR specification's Validation Engine produced the following results:** 1. ERROR: Unknown Code http://terminology.hl7.org/CodeSystem/v3-ActCode#CAREGAP in http://terminology.hl7.org/CodeSystem/v3-ActCode for 'http://terminology.hl7.org/CodeSystem/v3-ActCode#CAREGAP'. Location: Parameters.parameter[0].resource.ofType(Bundle).entry[5].resource.ofType(DetectedIssue).code.coding[0] (line 369, col 26). 2. ERROR: Unable to find a match for profile Patient/end-to-end-EXM130 among choices: http://hl7.org/fhir/us/qicore/StructureDefinition/qicore-patient. Location: Parameters.parameter[0].resource.ofType(Bundle).entry[0].resource.ofType(Composition).subject (line 37, col 12). 3. ERROR: Unable to find a match for profile MeasureReport/d8465a4d-3afb-4d31-8801-f6173352feac among choices: http://hl7.org/fhir/us/davinci-deqm/StructureDefinition/indv-measurereport-deqm. Location: Parameters.parameter[0].resource.ofType(Bundle).entry[0].resource.ofType(Composition).section[0].focus (line 47, col 14). 4. ERROR: Unable to find a match for profile DetectedIssue/fa01e431-5a0e-4d57-becd-863ae1162074 among choices: http://hl7.org/fhir/us/davinci-deqm/StructureDefinition/gaps-detectedissue-deqm. Location: Parameters.parameter[0].resource.ofType(Bundle).entry[0].resource.ofType(Composition).section[0].entry[0] (line 52, col 25). 5. ERROR: Unable to find a match for profile Patient/end-to-end-EXM130 among choices: http://hl7.org/fhir/us/qicore/StructureDefinition/qicore-patient. Location: Parameters.parameter[0].resource.ofType(Bundle).entry[2].resource.ofType(MeasureReport).subject (line 188, col 12). 6. ERROR: MeasureReport.group.measureScore: minimum required = 1, but only found 0 (from http://hl7.org/fhir/us/davinci-deqm/StructureDefinition/indv-measurereport-deqm). Location: Parameters.parameter[0].resource.ofType(Bundle).entry[2].resource.ofType(MeasureReport).group[0] (line 203, col 23). 7. ERROR: Extension.extension:text: minimum required = 1, but only found 0 (from http://hl7.org/fhir/us/core/StructureDefinition/us-core-race). Location: Parameters.parameter[0].resource.ofType(Bundle).entry[3].resource.ofType(Patient).extension[0] (line 278, col 27). 8. ERROR: Extension.extension:text: minimum required = 1, but only found 0 (from http://hl7.org/fhir/us/core/StructureDefinition/us-core-ethnicity). Location: Parameters.parameter[0].resource.ofType(Bundle).entry[3].resource.ofType(Patient).extension[1] (line 288, col 15). 9. ERROR: Unable to find a match for profile Patient/end-to-end-EXM130 among choices: http://hl7.org/fhir/us/core/StructureDefinition/us-core-patient. Location: Parameters.parameter[0].resource.ofType(Bundle).entry[4].resource.ofType(Encounter).subject (line 344, col 12). 10. ERROR: Unable to find a match for profile Patient/end-to-end-EXM130 among choices: http://hl7.org/fhir/us/qicore/StructureDefinition/qicore-patient. Location: Parameters.parameter[0].resource.ofType(Bundle).entry[5].resource.ofType(DetectedIssue).patient (line 377, col 12). 11. ERROR: Unable to find a match for profile MeasureReport/d8465a4d-3afb-4d31-8801-f6173352feac among choices: http://hl7.org/fhir/us/davinci-deqm/StructureDefinition/indv-measurereport-deqm, http://hl7.org/fhir/StructureDefinition/GuidanceResponse. Location: Parameters.parameter[0].resource.ofType(Bundle).entry[5].resource.ofType(DetectedIssue).evidence[0].detail[0] (line 379, col 26).

9/15 DEQM/GIC testing demo, But it resulted in a closed-gap so a prior issue "Delay between $submit-data and query of results" was fixed.

```
            {
                "url": "http://hl7.org/fhir/us/davinci-deqm/StructureDefinition/extension-gapStatus",
                "valueCodeableConcept": {
                    "coding": [
                        {
                            "system": "http://hl7.org/fhir/us/davinci-deqm/CodeSystem/gaps-status",
                            "code": "closed-gap"
                        }
                    ]
                }
            }
        ],
        "status": "final",
        "code": {
            "coding": [
                {
                    "system": "http://terminology.hl7.org/CodeSystem/v3-ActCode",
                    "code": "CAREGAP",
                    "display": "Care Gaps"
                }
            ]
        }
```

9/15 Guidance response demo showing a gap in care identified


Recording...
Dashboard / Insomnia
No Environment
Cookies
Sept Connectathon
Resource Read
$care-gaps
$evaluate-measure
Abacus
CQL Translation
GET http://localhost:3000/4_0_0/Measure/$care-gaps
Send
200 OK
Body
Auth
Query
Header
Docs
Preview
Cookie
Timeline
measureId
measure-EXM130-7.3.000
subject
periodStart
2019-01-01
periodEnd
2019-12-31
status
open-gap


INFERNO
Community
FHIR Quality Reporting
FHIR R4
http://localhost:3000/4_0_0
State
Save
Help
PREREQUISITES
REPORTING ACTIONS
REPORT
REPORTING ACTIONS
STEP 2 OF 2
Result: Fail. One or more tests have failed, please see below for failure details.
The server correctly handles reporting actions.
Back
Rerun Tests
Data Requirements - 0/1 Required Tests Passed - Show Details
Ensure that data requirements and parameters relevant to a measure can be requested via the $data-requirements operation
Test Results
Inputs
HTTP Requests
data_requirements-01: Data Requirements valid response results...
Client data-requirements is missing expected data requirements for measure 130
7.3.000: ["Encounter.type(http://cts.nlm.nih.gov/fhir/ValueSet/2.16.840.1.113883.3.117.1.7.1.292)", "Encounter.type(http://cts.nlm.nih.gov/fhir/ValueSet/2.16.840.1.113762.1.4.1111.143)", "Encounter.type(http://cts.nlm.nih.gov/fhir/ValueSet/2.16.840.1.113883.3.117.1.7.1.292)", "Condition(no code filter)", "Condition(no code filter)", "Location(no code filter)", "Provenance.target(no code filter)", "Medication(no code filter)"]
Submit Data - 2/2 Required Tests Passed - Hide Details
Ensure that resources relevant to a measure can be submitted via the $submit-data operation
Test Results
Inputs
HTTP Requests
submit_data-01: Submit Data valid submission results...
submit_data-02: Submit Data single resource submission results...

CARIN IG for Blue Button® Track

Summary

- Real world testing of the CARIN IG for Blue Button®.

Participants

Cambia Health	Azuba
1UpHealth	BCBSMN
UPMC	Edifecs
Optum	
MITRE	
CNSI	
SmileCDR	
Onyx	
MaxMD	

Notable Achievements

- On the app side, MaxMD successfully registered with UPMC and Optum and got patient resources and EOB resources from their servers using Postman. MaxMD is currently trying to import their info into the MaxMD database to show resources on their app.
- On the app side, 1UpHealth connected with Optum and received test data, but had some issues with displaying the number of EOBs. They were also able to connect with UPMC and pull data.
- On the server side, 1UpHealth connected with MaxMD.
- On the server side, Optum was able to share data with MaxMD and 1UpHealth.

Systems Implementing the IG

- 100% of the participants have implemented the IG. Most are on version STU1.0.0.

Test Scripts

- The CARIN IG for Blue Button® is using the Aegis Touchstone test scripts. The current version is STU1.0.0, but the STU1.1.0 will be available in the coming weeks.

- At least 4 organizations ran the CARIN test scripts during the Connectathon.
- To register and get setup, please follow the below PDF.

Discovered Issues

- How to support multiple versions of the IG?
- How to tie together multiple IGs?
- Validation of FHIR resource for various IGs.
- The documentation is not always clear to new implementers (Zulip, Confluence, etc.)

Next Steps

- Optum will continue to make their synthetic data available at the next Connectathon. They currently have hundreds of EOBs. If you are interested in keeping the samples, please download them before 9/16.
- UPMC will keep their server available beyond the Connectathon.
- 1UpHealth their server and app is available beyond the Connectathon.
- MITRE will keep their server available after the Connectathon.

CARIN IG for Digital Insurance Card Track

Summary

- This track was focused on introducing new users to the CARIN IG For Digital Insurance Card.

Participants

Humana	Centene
Google	AMA
Apple	Arcweb Technologies
Anthem	
UPMC	

Notable Achievements

- We heard from several new organizations who have not previously been engaged in our work and are interested in engaging in the work going forward.

Systems Implementing the IG

- The FHIR IG proposal was submitted on 9/14 and we will look to move forward with developing the IG soon.

Test Scripts

- The CARIN IG for Digital Insurance will eventually use Aegis Touchstone test scripts.

Discovered Issues

- N/A

Next Steps

- CARIN will review the FHIR IG proposal next week with the FHIR Management Group and will look to begin developing the IG.

CDS Hooks

Summary

1. Facilitate and encourage adoption of the CDS Hooks 1.0 specification, as well as testing balloted CDS Hooks 1.1 content
2. List of participants

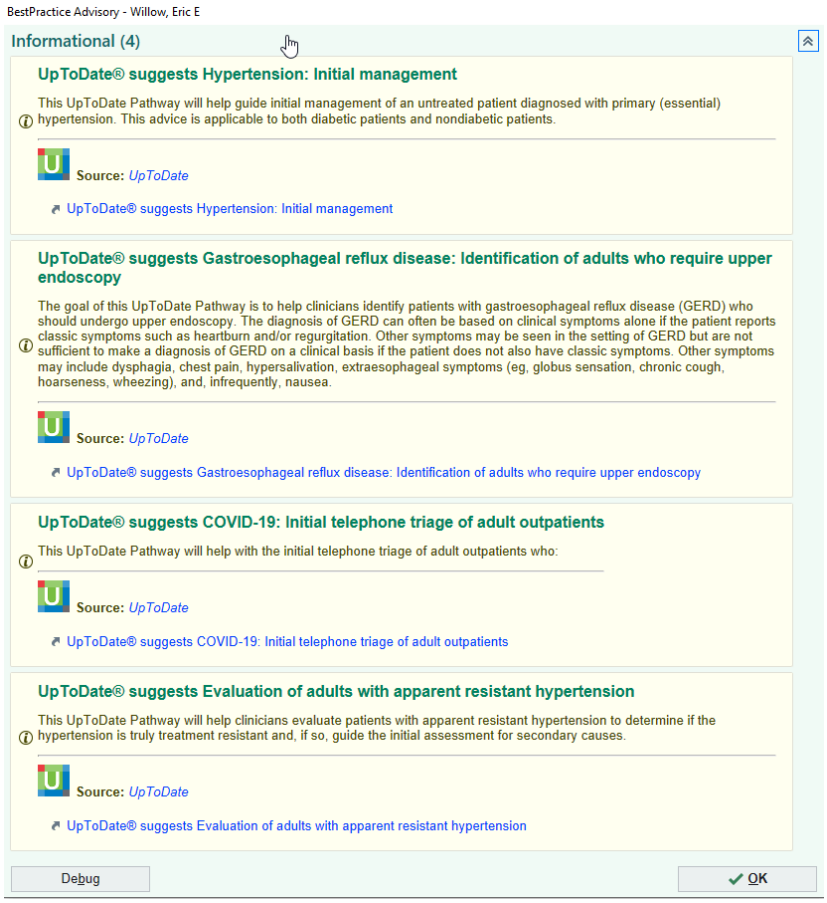
3. systems which have implemented the IG, Profile, or Resource, and approximate percentage covered
    - 1.0 functionality (patient-view, order-select, or order-sign invoked)
        - CDS Clients: CorroHealth, Epic
        - CDS Services: Alphora, First Databank, Wolters Kluwer, Optum, AutomateMedical
    - 1.1 override reasons and feedback
        - CDS Clients: Epic
        - CDS Services: First Databank, Wolters Kluwer

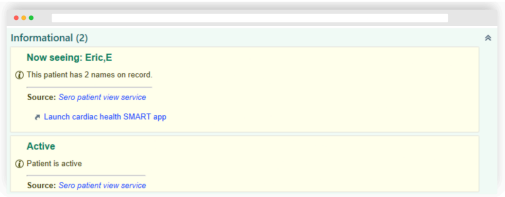
4. Observers
    - Cozevo
    - ONC
    - Security Risk Solutions

Notable achievements

- Normality of CDS Services' ability to integrate with multiple CDS Clients
- Educational presentations
  - Intro to CDS Hooks

screenshots if relevant and interesting and/or links to further information about implementations/achievements





Important (3)

KCl in Dextrose-NaCl Intravenous Solution 20-5-0.45 MEQ/L-%-% and KCl in Dextrose-NaCl Intravenous Solution 20-5-0.45 MEQ/L-%-% and KCl in Dextrose-NaCl Intravenous Solution 20-5-0.45 MEQ/L-%-% and KCl in Dextrose-NaCl Intravenous Solution 20-5-0.45 MEQ/L-%-% and Triamterene-HCTZ Oral Capsule 37.5-25 MG

Co-administration of KCl in Dextrose-NaCl Intravenous Solution 20-5-0.45 MEQ/L-%-% and Triamterene-HCTZ Oral Capsule 37.5-25 MG may cause hyperkalemia, possibly leading to cardiac arrhythmias or cardiac arrest.

Severity	Onset	Documentation Level	Avoidance Level
Major	Delayed	Established	N/A

Source: *Optum Drug Utilization Review*

GoodSense Ibuprofen Junior St Oral Tablet Chewable 100 MG and Warfarin Sodium Oral Tablet 5 MG and Warfarin Sodium Oral Tablet 5 MG and Warfarin Sodium Oral Tablet 5 MG and Warfarin Sodium Oral Tablet 5 MG

Use of GoodSense Ibuprofen Junior St Oral Tablet Chewable 100 MG with Warfarin Sodium Oral Tablet 5 MG may increase the risk of gastrointestinal (GI) bleeding, especially in the elderly. In addition, hypoprothrombinemic effects of Warfarin Sodium Oral Tablet 5 MG may be increased by GoodSense Ibuprofen Junior St Oral Tablet Chewable 100 MG.

Severity	Onset	Documentation Level	Avoidance Level
Major	Delayed	Probable	N/A

Source: *Optum Drug Utilization Review*

Moxifloxacin HCl Intravenous Solution 400 MG/250ML and Warfarin Sodium Oral Tablet 5 MG and Warfarin Sodium Oral Tablet 5 MG and Warfarin Sodium Oral Tablet 5 MG and Warfarin Sodium Oral Tablet 5 MG

Hypoprothrombinemic effects of Warfarin Sodium Oral Tablet 5 MG may be increased by Moxifloxacin HCl Intravenous Solution 400 MG/250ML. Dosage reduction of Warfarin Sodium Oral Tablet 5 MG may be required.

Severity	Onset	Documentation Level	Avoidance Level
Major	Delayed	Probable	N/A

Source: *Optum Drug Utilization Review*

Annual Urine Screening Check

Patients on opioid therapy should have a urine drug test performed every 12 months.

Source: *CDC guideline for prescribing opioids for chronic pain*

Patient View

BISHOP, Jay

MRN: MRN-6WP64S3 **Birthdate:** 2/21/1956

Now seeing: Jay

Details:
This patient has 1 name on record.

Launch cardiac health SMART app
Source: Sero patient view service

Active

Details:
Patient is inactive

Source: Sero patient view service

Critical (1)

Possible Pharmacogenetic Interaction

untitled image

This patient may have severe hypersensitivity to abacavir. **HLA-B*57:01 genotype testing recommended prior to prescribing.** See CPIC clinical guidelines for more information.

Remove the following orders?

Remove | Keep — **abacavir-lamiVUDine (EPIZICOM) 600-300 MG per tablet 1 tablet**
1 tablet, Oral, Daily, First dose today at 0945

Apply the following?

Order | Do Not Order — **HLA A and B phenotype**

Important (1)

PGX Warning.

Pharmacogenomic Alert

Genomic finding
HLA-B *57:01 positive

High risk for severe hypersensitivity reaction

Prescribe alternative

more information

Impacted medication(s)
abacavir-lamivudine oral

Source: *First Databank, call id: 27544fbf-e4fd-43e5-a532-63c869860a30*

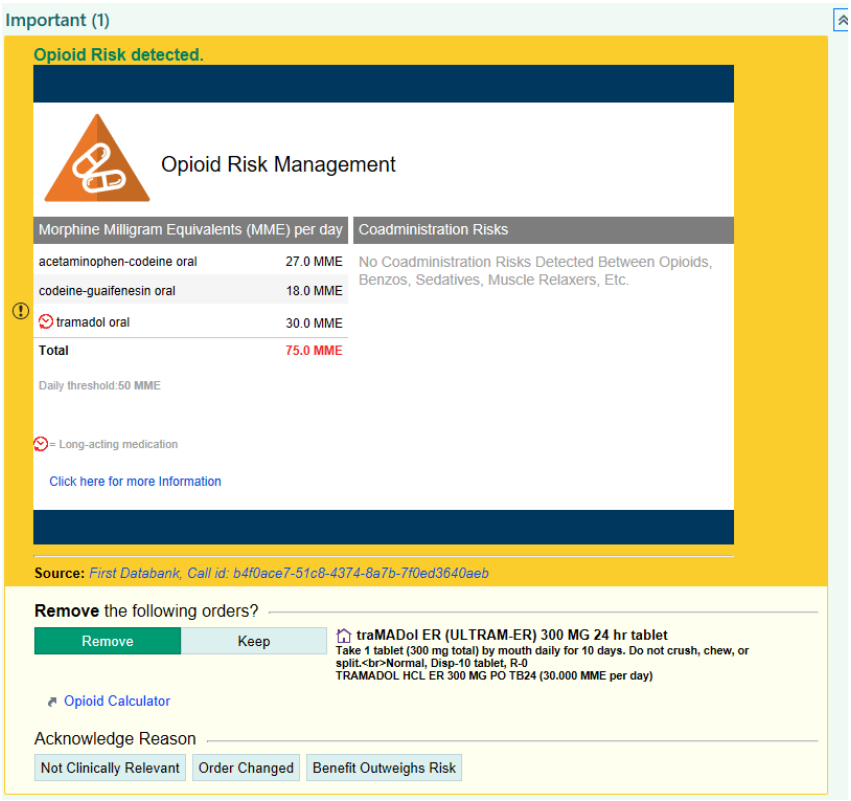
Remove the following orders?

Remove | Keep — **abacavir-lamiVUDine (EPIZICOM) 600-300 MG per tablet 1 tablet**
1 tablet, Oral, Daily, First dose today at 0945
ABACAVIR SULFATE-LAMIVUDINE 600-300 MG PO TABS

More Information

Acknowledge Reason

Not Clinically Relevant | Order Changed | Benefit Outweighs Risk | Will Review Clinical Data | Lab Ordered



Discovered issues / questions (if there are any)

- Prefetching medications for the MedicationRequest in context
  - r5 codeable reference allows for also including codeable concept if implementers support that, but general problem still exists for other attributes
  - https://github.com/cds-hooks/docs/issues/377 has previous discussions and CRD spec includes this approach
  - challenge is that the FHIR query doesn't work since those items aren't available via FHIR server
- Trigger guards - https://github.com/cds-hooks/docs/issues/6
  - Next step: PR to propose structure that at least includes a description of when it should be invoked
- Ability to share metadata from CDS client to CDS service provider other than what can be sent on context and prefetch
  - Extension is the way to go
  - Option to have optional ‘serviceContext’ field can be discussed but not necessarily to better compared to leveraging extensions

- Best practices to use prefetch given the expensive nature of making the CDS Hooks call hitting the FHIR server/DB on CDS Client side for every request
- Need to determine and document best practices around order-select and order-sign
    - Discussion with PDDI and CRD for alignment in them leveraging CDS Hooks especially around Advanced PDDI Implementation [https://build.fhir.org/ig/HL7/PDDI-CDS/cds-service-spec.html#advanced-implementation] and prefetch queries based on the FHIR resource expected in the Hooks context [http://build.fhir.org/ig/HL7/davinci-crd/hooks.html#additional-prefetch-capabilities]

Now what?

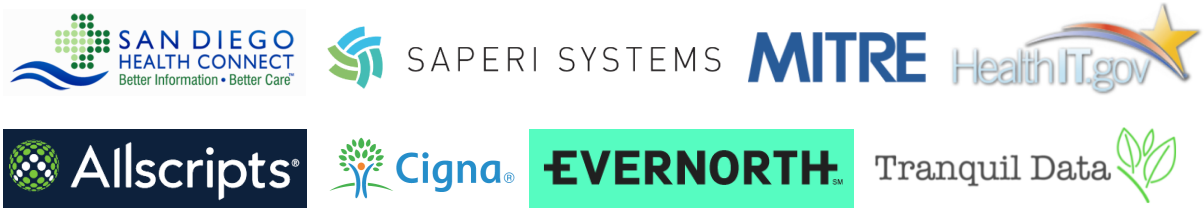
- 1.1 ballot resolution
- Advancing maturity of hooks (order-select and order-sign)
- Improve OpenAPI and library Support
- Closer collaboration with CRD
- Next Connectathon
    - Continue offering tutorials
    - More presentations from CDS Services
    - Improve and encourage usage of conman for tracking

Consent Management, Decision, Enforcement Services, and Computable Consent

Following the previous Consent Management tracks in the three most recent Connectathons, this track is focused on **consent management, consent decision services**, and **consent enforcement services**, with a special emphasis on **computable consents** --i.e., consents that record patient preferences in the form of machine-readable rules.

A broad set of use-cases are covered by this track including **privacy consent** (or consent to share information), **consent for treatment**, **consent for research**, and **advance directives**.

Participants




FHIR Resources:

Consent, Questionnaire, QuestionnaireResponse, AuditEvent, Provenance, and informed consent through interactions with MedicationRequest, ResearchSubject, and ResearchStudy

Services:

- **FHIR Consent Store:** FHIR server dedicated to serving FHIR Consent resources --and related resources such a Patient and Organization.
- **Consent Management Services (UI):** any consent management service (e.g., graphical user-interface) capable of generating FHIR Consent resources.
- **Consent Decision Service:** any component capable of consuming FHIR consent resources and making decisions about whether activities in a workflow (e.g., access, sharing, treatment, enrollment in a research project) are permitted based on the consent rules.
- **Consent Enforcement Service:** any component capable of enforcing the patient consent decision in a particular workflow (e.g., exchange, treatment, or research).
- **Security Labeling Service (SLS)** which can be used for labeling FHIR resources based on patient consent preferences.
- **Privacy Protective Services (PPS)** which can be used for modifying FHIR resources for privacy purposes based on consent rules and assigned labels, for example, redaction of confidential resources from an outgoing FHIR bundle.
- **Audit Service** which can be used for recording events of permitted or denied activities based on a consent decision.
- **Provenance Services** which can be used to maintain the link between different consent artifacts such as human readable consent documents, FHIR Consent resources, and FHIR QuestionnaireResponse.

Test Artifacts:

Example FHIR Consents(Computable):

https://github.com/sdhealthconnect/leap-consent-ui/tree/master/leap-consent-ui/test-scripts/fhir-connectathon-28/example-consents

Authorization Requests:

https://github.com/sdhealthconnect/leap-consent-ui/tree/master/leap-consent-ui/test-scripts/fhir-connectathon-28/authorization-requests

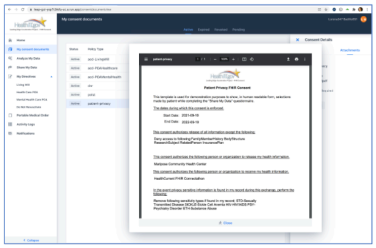
Postman Test Collection:

https://github.com/sdhealthconnect/leap-consent-ui/tree/master/leap-consent-ui/test-scripts/fhir-connectathon-28/postman-collection

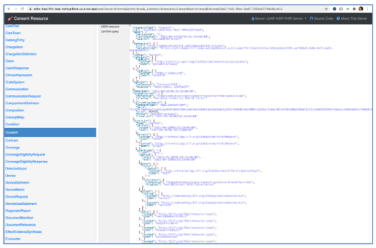
Notable Achievements:

Demonstrated 5 Uses Cases, Patient-Privacy, Advance Care Directives, DNR, POLST, and Informed Consent for Treatment and Research. Each of which created computable consent that was exercised against 23 test conditions.

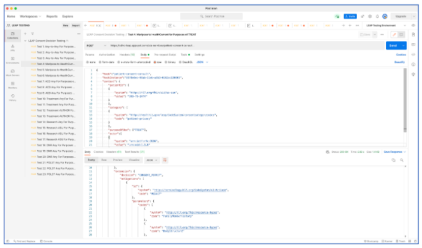
CREATE



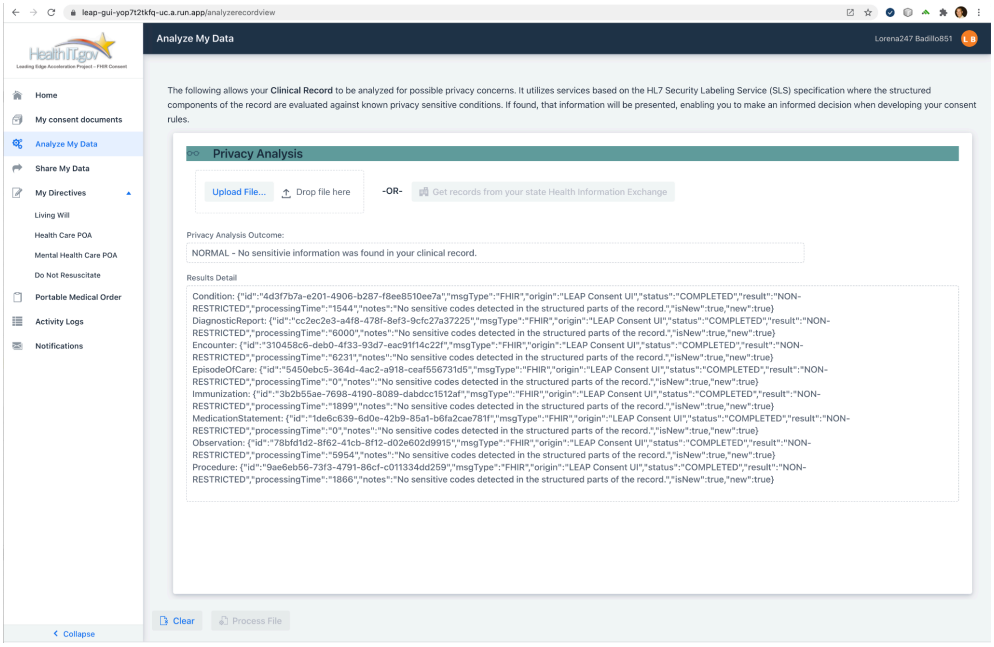
COMPUTE



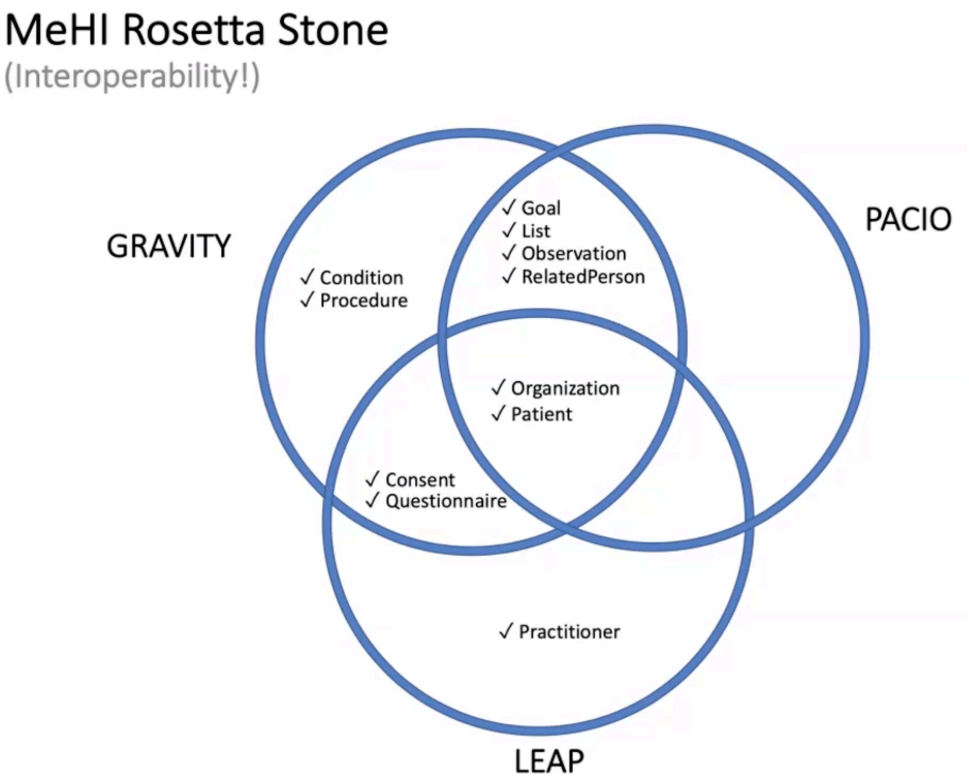
ENFORCE



Analyze My Data was demonstrated to the DS4P and Security Labeling track, where the integration of the LEAP SLS provides the Patient/User visibility into possible privacy concerns within their clinical record.



Abigail Watson of Mitre gave an overview of the MeHI Consent Engine evaluation of PACIO, Gravity, and LEAP projects. Where all shared some level of interoperability. The analysis, diagram below, of LEAP is incomplete, as MedicationRequest, ResearchSubject, and ResearchStudy resources demonstrated in LEAP's informed consent workflows were omitted.



Issues/Recommendations:

- Revisit if LEAP Questionnaires has structure issues as identified by MeHI tooling
- MedicationRequest, ServiceRequest, and ResearchSubject status codes are still limiting factors in moving informed consent for Treatment and Research forward.
- Continue to investigate interoperability with PACIO and Gravity projects.

Moving Forward:

- The work continues….

Session Recordings are available on YouTube at:

https://www.youtube.com/playlist?list=PLkBLKvxgUvucYr61xoCSIeMxAlj8w6iWr

Data Segmentation for Privacy (DS4P) and Security Labeling
Da Vinci DEQM and Gaps in Care
Da Vinci Risk Adjustment
Da Vinci Member Attribution Track

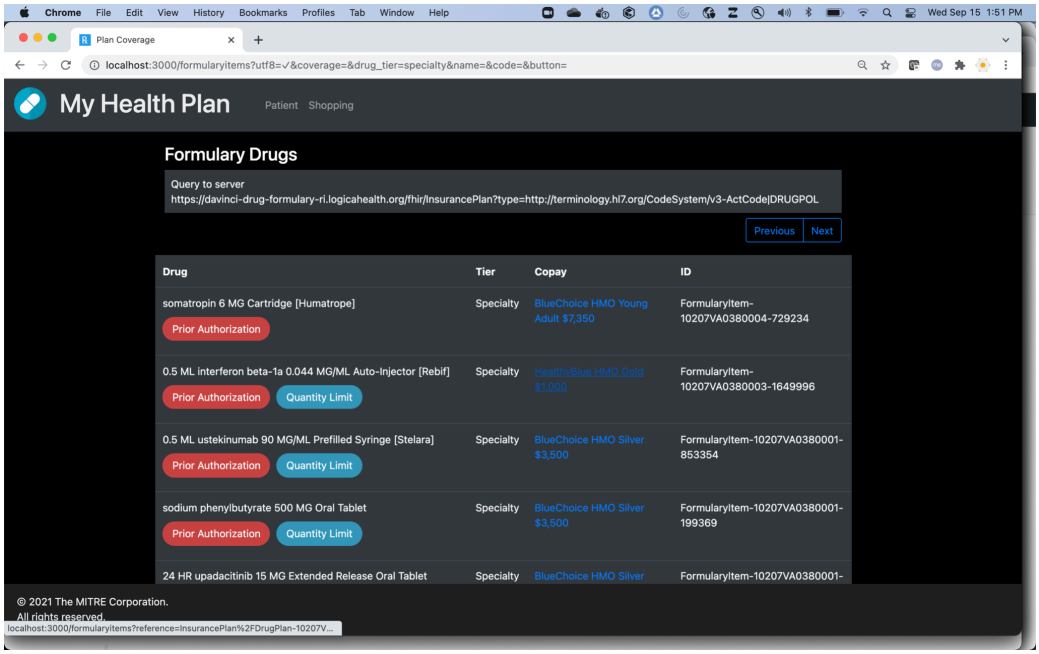
Da Vinci Payer Data Exchange Plan-Net and Drug Formulary (STU2)

- summary: what was the track trying to achieve
    - Test draft STU2 versions of the FHIR IGs for Plan-Net and Drug Formulary
    - Inform track participants about the new features and data structures in the draft STU2 FHIR IGs
    - Inform track participants about Da Vinci meetings that are relevant to this work and recruit their feedback
    - Answer questions about Plan-Net and Formulary work
- list of participants (with logos if you have time and energy)
    - We had up to 23 people on the track, including:

Organization	**Actor(s) Supported**	**Contacts**
MITRE	Reference Client (STU2), Reference Server (STU2)	Dave Hill, Sean Mahoney
IBM	Server (STU2)	Karen Barton, Michelle Schlicht
Edifecs	Server (STU1, possibly STU2)	
Optum		Emily Lozada, Ram Govindan
IBC		Chetana Suresh
CAQH		Ron Urwongse
Onyx	Server (STU1)	Michael Cox
AEGIS	Test scripts	Carie Hammond, Ryan Moehrke

- systems which have implemented the IG, Profile, or Resource, and approximate percentage covered
    - Testing focused on STU2 servers
    - MITRE Formulary Drug reference server - greater than 80%
    - IBM Formulary Drug server - greater than 80%
- Where can test scripts and results be found (link to ConMan, Touchstone, or Inferno?)

        - https://touchstone.aegis.net/touchstone/testdefinitions?selectedTestGrp=/FHIRSandbox/DaVinci/FHIR4-0-1-Formulary/Formulary-STU2&activeOnly=true&contentEntry=TEST_SCRIPTS
- notable achievements
    - MITRE demonstrated client and servers for both Formulary Plan-Net and Formulary using the STU2 draft IGs
    - AEGIS demonstrated their draft STU2 Touchstone test scripts for Formulary, which uncovered several validation errors
    - IBM implemented a draft STU2 version of their formulary server and used the AEGIS Touchstone test scripts to debug
    - Was able to successfully connect the MITRE reference client with the IBM server and perform queries
    - Answered many questions about Plan-Net and Formulary and pointed participants to many resources and Da Vinci meetings
- screenshots of relevant and interesting things and/or links to further information about implementations/achievements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Plan Coverage
localhost:3000/formularyitems?utf8=✓&coverage=&drug_tier=specialty&name=&code=&button=
My Health Plan
Patient Shopping
Formulary Drugs
Query to server
https://davinci-drug-formulary-ri.logicahealth.org/fhir/InsurancePlan?type=http://terminology.hl7.org/CodeSystem/v3-ActCode|DRUGPOL
Previous Next
Drug
Tier
Copay
ID
somatropin 6 MG Cartridge [Humatrope]
Prior Authorization
Specialty
BlueChoice HMO Young Adult $7,350
FormularyItem-10207VA0380004-729234
0.5 ML interferon beta-1a 0.044 MG/ML Auto-Injector [Rebif]
Prior Authorization
Quantity Limit
Specialty
HealthyBlue HMO Gold $1,000
FormularyItem-10207VA0380003-1649996
0.5 ML ustekinumab 90 MG/ML Prefilled Syringe [Stelara]
Prior Authorization
Quantity Limit
Specialty
BlueChoice HMO Silver $3,500
FormularyItem-10207VA0380001-853354
sodium phenylbutyrate 500 MG Oral Tablet
Prior Authorization
Quantity Limit
Specialty
BlueChoice HMO Silver $3,500
FormularyItem-10207VA0380001-199369
24 HR upadacitinib 15 MG Extended Release Oral Tablet
Specialty
BlueChoice HMO Silver
FormularyItem-10207VA0380001-
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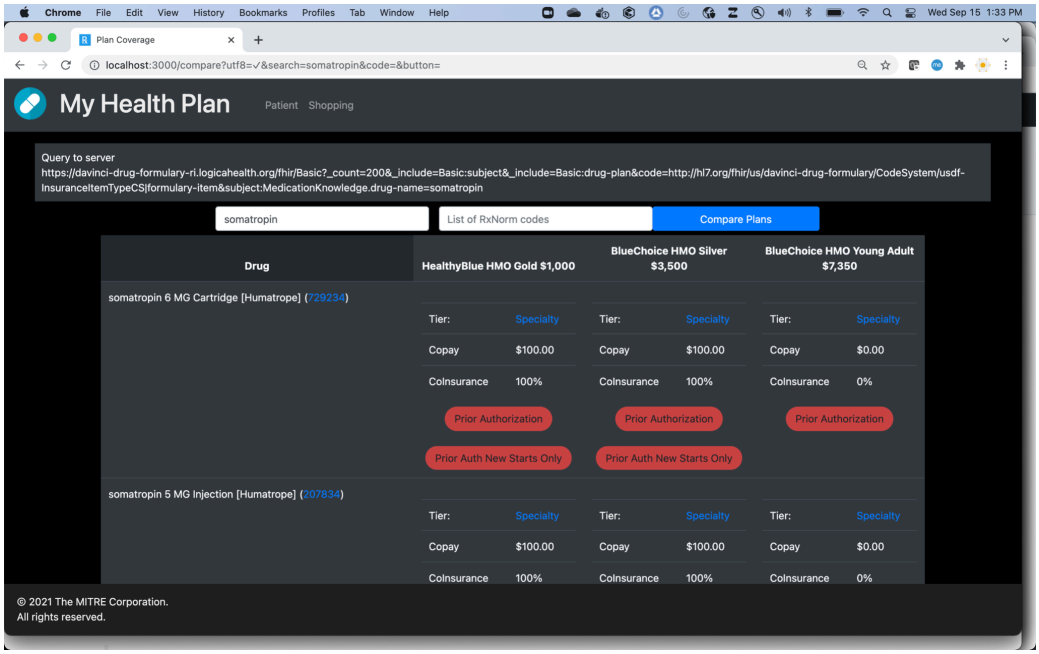
localhost:3000/formularyitems?reference=InsurancePlan%2FDrugPlan-10207V...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Plan Coverage
localhost:3000/compare?utf8=✓&search=somatropin&code=&button=
My Health Plan
Patient Shopping
Query to server
https://davinci-drug-formulary-ri.logicahealth.org/fhir/Basic?_count=200&_include=Basic:subject&_include=Basic:drug-plan&code=http://hl7.org/fhir/us/davinci-drug-formulary/CodeSystem/usdf-InsuranceItemTypeCS|formulary-item&subject:MedicationKnowledge.drug-name=somatropin
somatropin
List of RxNorm codes
Compare Plans
Drug
HealthyBlue HMO Gold $1,000
BlueChoice HMO Silver $3,500
BlueChoice HMO Young Adult $7,350
somatropin 6 MG Cartridge [Humatrope] (729234)
Tier: Specialty
Copay $100.00
CoInsurance 100%
Prior Authorization
Prior Auth New Starts Only
Tier: Specialty
Copay $100.00
CoInsurance 100%
Prior Authorization
Prior Auth New Starts Only
Tier: Specialty
Copay $0.00
CoInsurance 0%
Prior Authorization
somatropin 5 MG Injection [Humatrope] (207834)
Tier: Specialty
Copay $100.00
CoInsurance 100%
Tier: Specialty
Copay $100.00
CoInsurance 100%
Tier: Specialty
Copay $0.00
CoInsurance 0%
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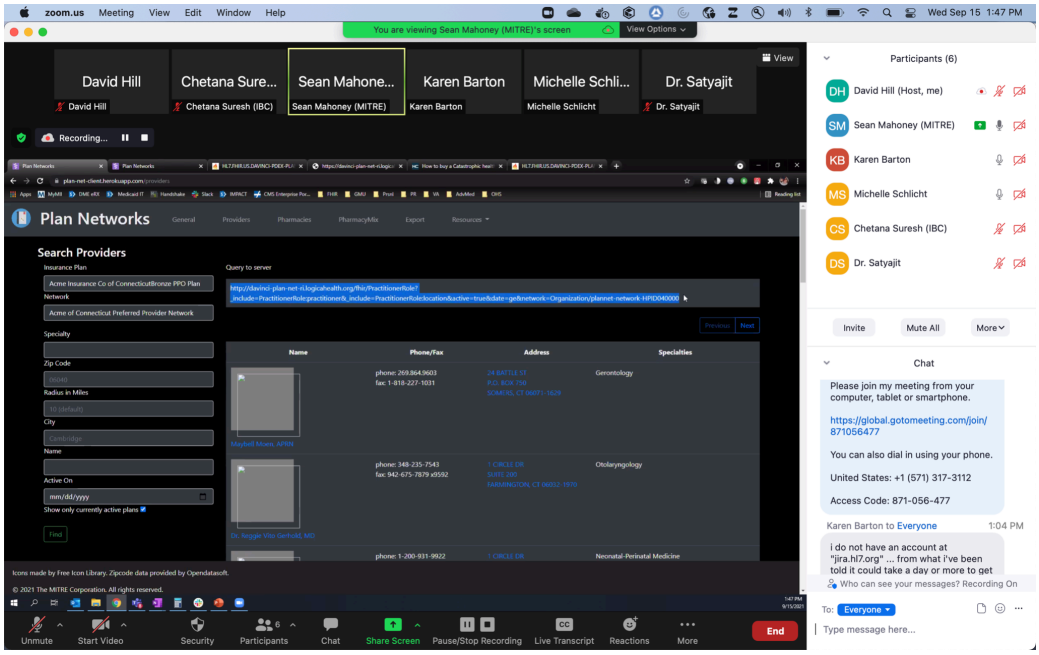
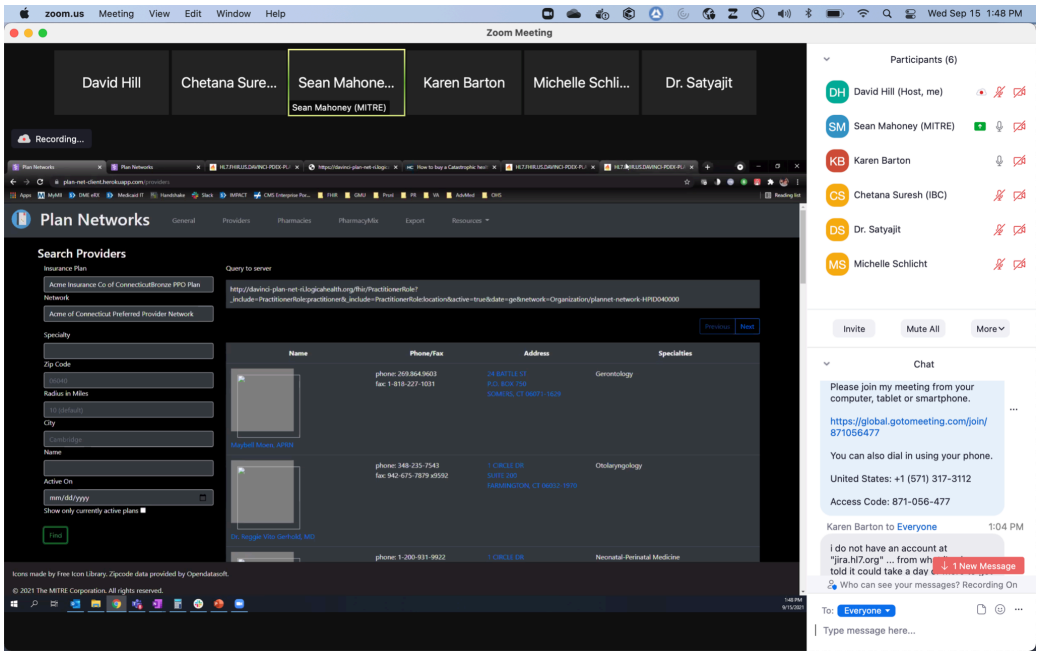

zoom.us Meeting View Edit Window Help
Wed Sep 15 1:47 PM
You are viewing Sean Mahoney (MITRE)'s screen
View Options
David Hill
Chetana Sure...
Sean Mahone...
Karen Barton
Michelle Schli...
Dr. Satyajit
Chetana Suresh (IBC)
Sean Mahoney (MITRE)
Michelle Schlicht
Recording...
Plan Networks
Search Providers
Insurance Plan
Acme Insurance Co of ConnecticutBronze PPO Plan
Network
Acme of Connecticut Preferred Provider Network
Specialty
Zip Code
Radius in Miles
City
Name
Active On
mm/dd/yyyy
Show only currently active plans
Find
Query to server
Name
Phone/Fax
Address
Specialties
Participants (6)
David Hill (Host, me)
Sean Mahoney (MITRE)
Karen Barton
Michelle Schlicht
Chetana Suresh (IBC)
Dr. Satyajit
Invite
Mute All
More
Chat
Please join my meeting from your computer, tablet or smartphone.
https://global.gotomeeting.com/join/871056477
You can also dial in using your phone.
United States: +1 (571) 317-3112
Access Code: 871-056-477
Karen Barton to Everyone 1:04 PM
i do not have an account at "jira.hl7.org" ... from what i've been told it could take a day or more to get
Who can see your messages? Recording On
To: Everyone
Type message here...
Unmute
Start Video
Security
Participants
Chat
Share Screen
Pause/Stop Recording
Live Transcript
Reactions
More
End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Karen Barton
Michelle Schli...
Dr. Satyajit
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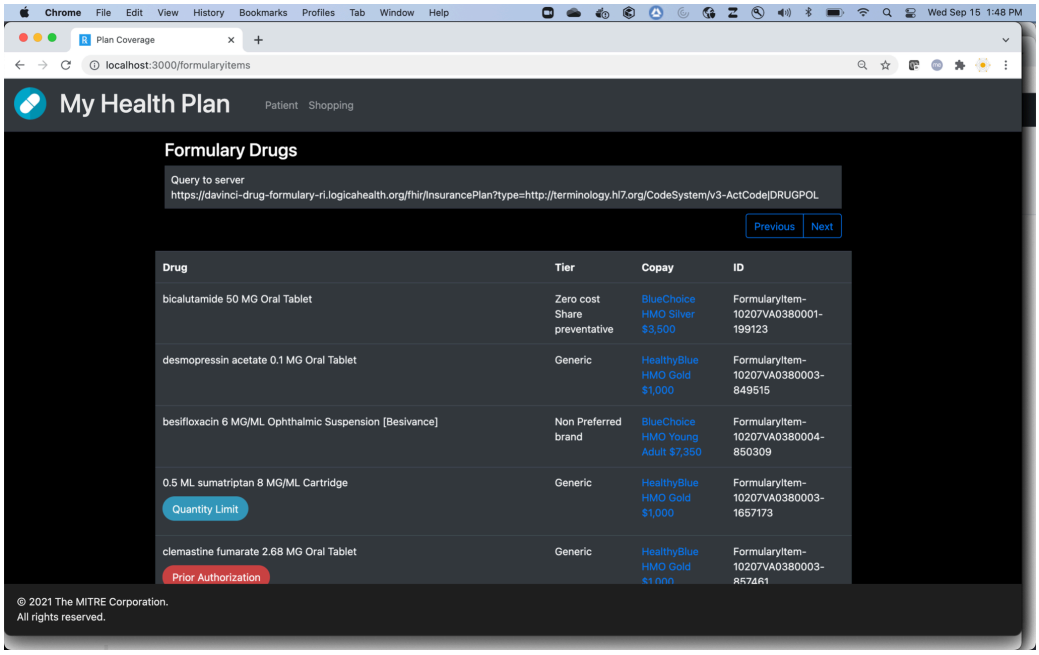
Recording...
Plan Networks
Search Providers
Participants (6)
David Hill (Host, me)
Sean Mahoney (MITRE)
Karen Barton
Chetana Suresh (IBC)
Dr. Satyajit
Michelle Schlicht
Invite
Mute All
More
Chat
Please join my meeting from your computer, tablet or smartphone.
https://global.gotomeeting.com/join/871056477
You can also dial in using your phone.
United States: +1 (571) 317-3112
Access Code: 871-056-477
Karen Barton to Everyone 1:04 PM
1 New Message
Who can see your messages? Recording On
To: Everyone
Type message here...


Chrome File Edit View History Bookmarks Profiles Tab Window Help
Wed Sep 15 1:48 PM
Plan Coverage
localhost:3000/formularyitems
My Health Plan
Patient Shopping
Formulary Drugs
Query to server
https://davinci-drug-formulary-ri.logicahealth.org/fhir/InsurancePlan?type=http://terminology.hl7.org/CodeSystem/v3-ActCode|DRUGPOL
Previous Next
Drug
Tier
Copay
ID
bicalutamide 50 MG Oral Tablet
Zero cost Share preventative
BlueChoice HMO Silver $3,500
FormularyItem-10207VA0380001-199123
desmopressin acetate 0.1 MG Oral Tablet
Generic
HealthyBlue HMO Gold $1,000
FormularyItem-10207VA0380003-849515
besifloxacin 6 MG/ML Ophthalmic Suspension [Besivance]
Non Preferred brand
BlueChoice HMO Young Adult $7,350
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Quantity Limit
Generic
HealthyBlue HMO Gold $1,000
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clemastine fumarate 2.68 MG Oral Tablet
Prior Authorization
Generic
HealthyBlue HMO Gold
FormularyItem-10207VA0380003-857461
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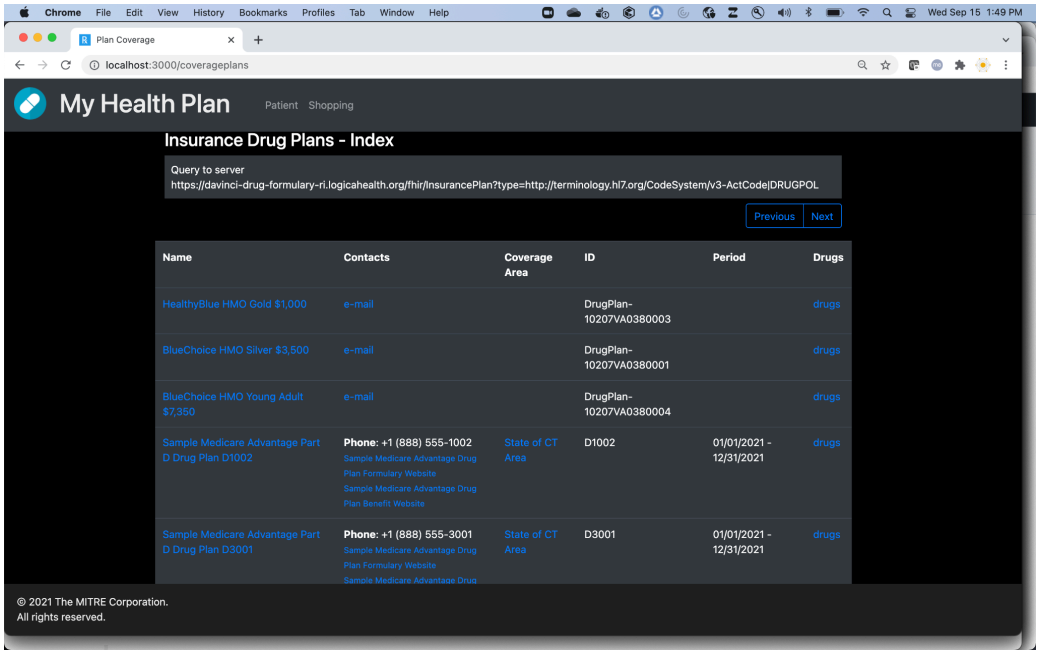
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Plan Coverage
localhost:3000/coverageplans
My Health Plan
Patient Shopping
Insurance Drug Plans - Index
Query to server
https://davinci-drug-formulary-ri.logicahealth.org/fhir/InsurancePlan?type=http://terminology.hl7.org/CodeSystem/v3-ActCode|DRUGPOL
Previous Next
Name
Contacts
Coverage Area
ID
Period
Drugs
HealthyBlue HMO Gold $1,000
e-mail
DrugPlan-10207VA0380003
drugs
BlueChoice HMO Silver $3,500
e-mail
DrugPlan-10207VA0380001
drugs
BlueChoice HMO Young Adult $7,350
e-mail
DrugPlan-10207VA0380004
drugs
Sample Medicare Advantage Part D Drug Plan D1002
Phone: +1 (888) 555-1002
Sample Medicare Advantage Drug Plan Formulary Website
Sample Medicare Advantage Drug Plan Benefit Website
State of CT Area
D1002
01/01/2021 - 12/31/2021
drugs
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D3001
01/01/2021 - 12/31/2021
drugs
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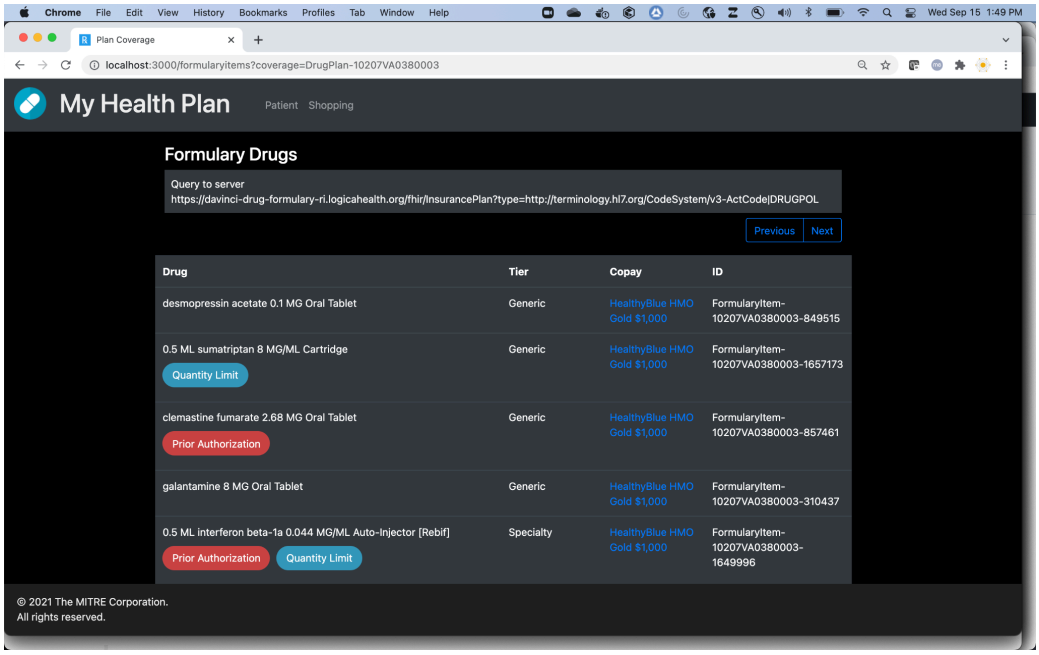
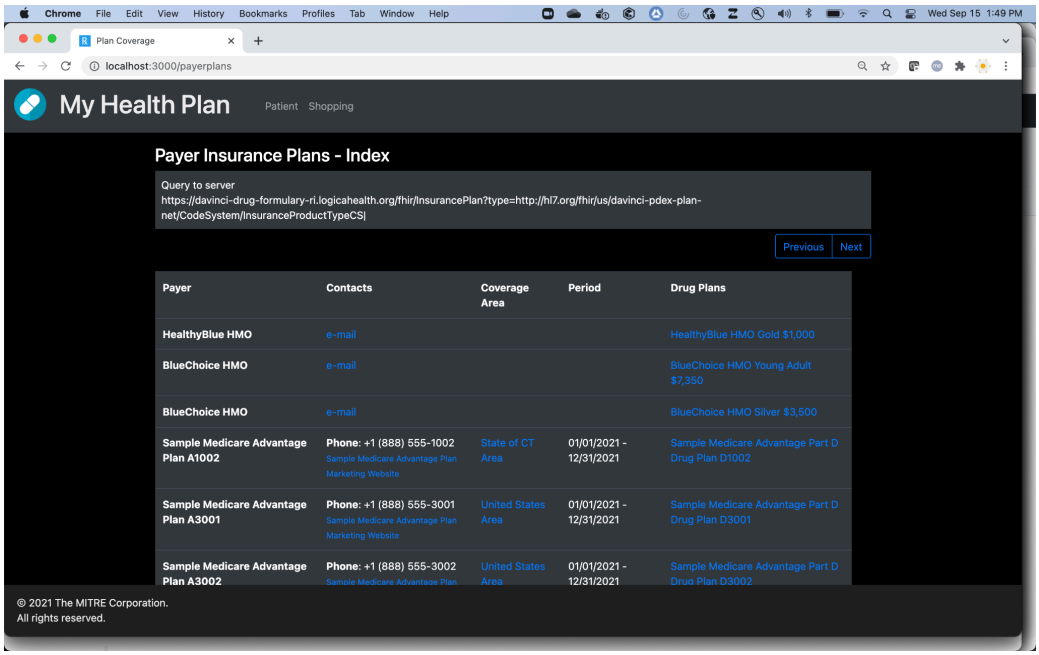




- discovered issues / questions (if there are any)
  - AEGIS Touchstone tests uncovered several validation errors in the draft STU2 Formulary reference server, which will need to be looked into.
  - AEGIS Touchstone tests uncovered several issues with the capability statement in the Plan-Net reference server
- now what?
  - Continue to reach out to get more implementations using the draft STU2 IGs as we prepare for ballot
  - Address the validation and capability statement issues raised during the connectathon

Da Vinci Payer Data Exchange Track for CMS Patient Access API

Da Vinci Clinical Data Exchange (CDex)

Summary

This Da Vinci track is focused on using Task as a mechanism to asynchronously solicit clinical information from a remote system. It covers provider to provider and provider to payer exchanges to help facilitate continuity of care.

Participants & Coverage

Azuba - has tested member match, direct query, Task-based query including both polling and subscription against Logica reference implementation

Notable achievements

- First non-reference implementation testing of subscription for Task-based queries
- Did a first-pass design for 'push' of information for CDex
    - https://confluence.hl7.org/display/FHIR/CDex+%27Push%27+design+discussion

Discovered issues / questions

- Agreed to add 'birth-sex' and dependent number to the 'member match' profile
- Some concerns about how linking to claims and prior authorizations will work with existing X12 back-ends
- Discussed a wide range of open issues around data exchange where different architectural approaches may impede interoperability
    - https://confluence.hl7.org/display/DVP/Non-happy+path+considerations
    - Some are questions for CMS, others will be resolved on HRex, CDex and/or PDex calls

Now what?

- Need more participants to test the IG!
- Will need to test the new "push" mechanism

Da Vinci Payer Data Exchange (PDex)

Summary

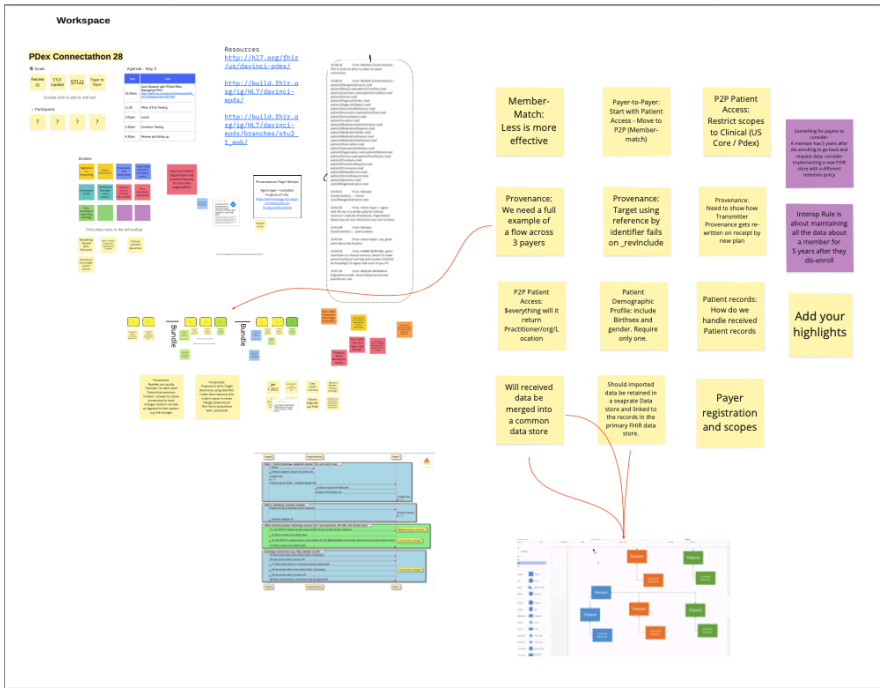
- Enable Patient Access API Testing
- Test Payer-to-Payer(P2P) Exchange using $member-match
- Provide Guidance on P2P using Patient Access API
- Review STU2 developments in PDex IG

Participants

Consistently 30-40 participants active. Numerous payers and Vendors
Anthem, Evernorth, IBC, BCBSAL, BCBSMN, Onyx Health, MyElth, Edifecs. This is not a full list.

Notable Achievements

- Testing of _RevInclude Feature with Provenance when target in Provenance is using identifier (It doesn't work - have to use the id as reference).
- $Member-Match tested successfully using Coverage and Patient Demographics.
- Detailed review of Payer-to-Payer flow and implications for Patient Demographics, Coverage and Consent profiles in the HRex IG.
- Used a collaborative whiteboard to crowdsource input from participants.



Discovered Issues

- Provenance.target references must use resource.id for _revinclude to work
- Payers are looking for more substantial examples of use of Provenance as data flows between payers.

Now What?

- Update PDex with STU1 Update
- Add extra examples to

Da Vinci Provider Access and Burden Reduction

Da Vinci Risk Adjustment Track

1. *What was the track trying to achieve*?

   Test the $report operation and its input parameters specified in the Da Vinci Risk Adjustment Implementation Guide to return risk based coding gap reports as expected

2. *Participants*

Optum	Novillus	Alphora	Inovalon	Applied Research Works - COZEVA
Musculoskeletal Outcomes Institute at St. Francis Hospital	POCP	PJM Consulting, LLC	Optimum eHealth, LLC	

and Medical Cente				

3. *systems which have implemented the IG, Profile, or Resource, and approximate percentage covered (link to ConMan results if applicable)*

   Alphora Reference implementation:
   Server Endpoint: https://ra-sandbox.alphora.com/cqf-ruler-r4/fhir/
   Testing covered approximately 80% of the testing focus planned for the Connectathon

   What's tested:
   - All of the input parameters for the $report operation for a single member.
   - Tested all of the profiles that were specified in the implementation guide, because TestStone test scripts run validations against the profiles

   What's not yet tested:
   - Subject that is a group of multiple members are not tested (have the test, but need the updated data to support group testing to run the test)
   - Results returned are not tested, e.g., the MeasureReport returned are correctly structured and conforms to the specification
     - More TouchStone test scripts and test cases need to be defined to test the results.

4. *notable achievements*

   - Participants were very engaged and conducted active testing
   - Identified a few places in the IG specification that needed an update. IG was updated to address the issues.
   - Pre-defined and set up test plan worked well
   - Developed a body of clinical test data set
   - Detected an resolved about 40 QA errors in the IG build

5. *screenshots if relevant and interesting and/or links to further information about implementations/achievements*

6. *discovered issues/questions (if there are any)*

   - Fixed the issue where we are testing the parameters count not the MeasureReport count
   - Identified and fixed the OperationOucome results
   - Discovered the discrepancy between when the patient is missing or the group is missing that needs to brought up to the CQI WG call to resolve

- Detected and resolved about 40 QA errors in the IG build (started out about 90 ish and finished with about 50 ish errors). The remaining QA errors are errors in examples.

7. *Now What*

- Prepare for the October Da Vinci Connectathon
- Continue to build the Implementation Guide
- Continue to build the clinical test data set
    - Need to build more data to support evaluatedResource
- Testing:
    - Start to develop test scripts for validating the results
    - Finish testing the $report operation for a group of multiple members
- Topics that need further discussion:
    - How do we handle these scenarios in the $report operation?
        - Patient not found
        - No MeasureReports for the patient
        - Two RA Models but patient only falls under one
        - Group not found
        - Next step: Take to CQI
    - Need to discuss whether to include evaluatedResource or all references in the returned bundle
    - Made the changes to the evidence status value set (changed from confirmed|non-confirmed to closed-gap|open-gap), this needs to be brought back to the Risk Adjustment use case community for discussion and validation
    - Does any resources referenced by the MeasureReport should all be returned in the bundle (e.g., reporter)? Or only resources referenced by the evaluatedResource should be included
    - Need to discuss whether ra-historicDiagnosis should remain as a child element of the group element, or it should be moved outside and be a child element of the evaluatedResource. The discussion leans to keep where it is, however, no final decision was made
    - Need to discuss whether the periodEnd refers to date of service for the encounter, or whether it refers to the date of when the evidence was received by the payer? Both of the dates are needed. However, only the date of service for the encounter is now supported in phase 1 (STU1). The date of when the evidence was received by the payer will be discussed for phase 2 (STU2)
    - Need to have some kind of mechanism in version 2 (STU2) to distinguish whether the periodEnd means date of service for the encounter or the date when the evidence was received by the payer.

- Need profile on Bundle for the return parameter of $report to specify .type is collection
    - May need to require MeasureReport depending upon Operation Outcome discussions

eCR/MedMorph Track

1. summary: what was the track trying to achieve
    - –Collaborate with EHRs and other interested vendors for data subscriptions and notifications
    - –Test (eCR/Hep C Reporting IG, Central Cancer Registry Reporting IG, Healthcare Survey Reporting IG, and Research Data Exchange IG)
        - –actors and systems
        - –workflows
    - –Discussions and Demos
        - –eCR and MedMorph architecture
        - –eRSD, measure integration and surveillance
        - –implementations/achievements so far
        - –Content IG feedback/recommendations from participants and observers

2. list of participants (with logos if you have time and energy)
    - On an average we had 16-20 participants seen in the sessions on both the track days.

Organization	**Actor(s) Supported**	**Contacts**
CAP	EMR	Alex Goel , Fred Marsh
Epic	EHR	Cooper Thompson
eCR Now App	BSA	John Loonsk, Nagesh (Dragon) Bashyam
MedMorph Contractor Team	BSA, KAR	Nagesh (Dragon) Bashyam
DCG/Alphora	eRSD/KAR	Jonathan (JP) Percival, Bryn Rhodes
eCR Now App	BSA	John Loonsk, Nagesh (Dragon) Bashyam

APHL AIMS	TTP	John Loonsk
Carequality	TTP	Bill Mehegan
eHealth Exchange	TTP	Michael McCune, Mike Yackanich
Altarum	PHA	Craig Newman, Michael Yaskanin, Edward Castagna, Jim Kamp, Thanh Cheng
University of Washington, Washington State PHA	PHA	Bill Lober, Justin McReynolds, Paul Bugni, Ivan Cvitkovic

3. systems which have implemented the IG, Profile, or Resource, and approximate percentage covered
    - CAP, eCRNow App, eHx, DCG/Alphora, Altarum worked on the specification Bundles.

4. Where can test scripts and results be found (link to ConMan, Touchstone, or Inferno?)
   Test Bundles are shared on our track page under “Artifacts of Focus” section
   https://confluence.hl7.org/pages/viewpage.action?pageId=118981411

5. notable achievements
    - Discussed ERSD/Knowledge Artifacts, Creation of PlanDefinitions (TriggerEvents, Actions, Sub-Actions, RelatedActions, Timings)
    - –Discussed EICR Content IG, Cancer Profiles and Healthcare Survey profiles.
    - –Created Output for EICRs and Cancer Reports.
    - –eCR Rules, Measures and Surveillance using the eCRNow App Session
    - –Discussion of the CareEquality IG
    - –Discussion of TTPs and their role for scaling the Public Health Reporting
    - –ODH Presentation followed by eCR IG reflecting ODH templates/elements.

6. screenshots of relevant and interesting things and/or links to further information about implementations/achievements
    - –MedMorph Reference Architecture FHIR IG http://hl7.org/fhir/us/medmorph/2021JAN/index.html
    - –eCR Architecture FHIR IG http://hl7.org/fhir/us/ecr/

–Content IGs

- –Hep C Content IG
  http://hl7.org/fhir/us/ecr/
- –Healthcare Surveys Reporting
  https://build.fhir.org/ig/HL7/fhir-health-care-surveys-reporting-ig/usecases.html
- –Central Cancer Registry Reporting
  https://build.fhir.org/ig/HL7/fhir-central-cancer-registry-reporting-ig/index.html
- –Research Data Exchange
  http://build.fhir.org/ig/HL7/fhir-medmorph-research-dex-ig/branches/master/index.html

7. discovered issues / questions (if there are any)
   - Have been added in Track Slides and Summary Deck placed on eCR/MedMorph Track page

8. now what?
   - In order to get more testing to happen to validate use cases:
     - Better defined testing plans
     - More EHR/Vendor participation in the testing
   - Recruit more EHRs to participate in the Connectathon
     - More publicizing of the Connectathon and what is needed by participants
     - Start recruiting early with a defined set of needs
     - More testing needs to happen
     - More EHR representation in the discussions
   - More exploratory discussions with Vendors/EHR
     - Better align use cases with advancing technical and standards capabilities
   - Looking forward to Connectathon-Jan 22 for testing of Content IGs

Evidence Based Medicine (COVID-19 Knowledge Accelerator)

- The EBMonFHIR/COVID-19 Knowledge Accelerator project is vast and described at https://confluence.hl7.org/display/CDS/EBMonFHIR and https://confluence.hl7.org/pages/viewpage.action?pageId=97468919

- The “proposed track agenda” was superseded by high-priority developments for demonstration of EvidenceReport viewing for potentially practice-changing evidence regarding anticoagulation for patients hospitalized for COVID-19.

- One result of the Connectathon Track was to introduce (relevant portions) of the EBMonFHIR/COKA efforts to:
    - Farai Mutero -- Health Information Systems in South Africa
    - Vishwambhar Mishra
    - Lynda Hoeksema -- MITRE Corporation
    - Evan Chicoine -- ESAC, Inc.
    - Yunwei Wang -- MITRE Corporation, CEDAR project which is using Citation Resource to support AHRQ data repository

- For the EvidenceReport Resource, we developed an EvidenceReport viewer to show each of:
    - an evidence report summarizing selected outcomes from a randomized trial (and showing the detailed Risk of Bias assessment) -- for a trial published in the NEJM (https://fevir.net/resources/EvidenceReport/18816) and trial published as a medRxiv preprint (https://fevir.net/resources/EvidenceReport/18824)
    - an evidence report providing a table of individual trial summaries (https://fevir.net/resources/EvidenceReport/18831)
    - an evidence report for a Summary of Findings (which includes a table with one row per outcome, using meta-analysis combining data where available and individual trial results when no meta-analysis available) (https://fevir.net/resources/EvidenceReport/18881)

FHIRcast

Goals

The goals of this connectathon track were three-fold:

- Simple interoperability testing: subscribe to session, receive, send event notifications.
- Assist & enable developers new to FHIRcast.
- Test, validate and explore more advanced content exchange scenarios.

Participants

Significant developer participants, included:

- Mihaly Herczku, Gergely Heja - Siemens
- Catie Ladd, Kamal - Nuance
- Isaac Vetter, Alex Z. Liu - Epic
- Stanislav Melnikov, Alvaro Sanchez, - Smart Reporting
- Ryan Becker, Ryan Gabrien - 3M
- Bas van den Heuvel - Philips

All significant developer participants have implemented at least websocket support for subscribe, send and receive event notifications and unsubscribe as described in FHIRcast STU2. This includes the following Hubs: Nuance, Epic, Siemens, Smart Reporting, and Philips. And the following FHIRcast clients: 3M, Siemens, Nuance, Philips, Smart Reporting.

Additionally, we held two educational overview sessions that were well attended.

Notable achievements: Maturity & new implementer success

- Increasingly, available and persistent FHIRcast Hubs.
- 3M attended the FHIRcast track for the first time, having previously only developed against the Epic hub, and successfully integrated with the Siemens hub, Nuance hub, Smart Reporting hub and Philips hub over the course of the connectathon.

Issues

- Alvaro from Smart Reporting identified and resolved a websocket time-out issue, by modifying their use of websocket's ping-pong functionality to avoid timeouts somewhere in their network infrastructure.
    - While ping-pong is a part of the websocket RFC 6455 (MDN provides a gentler introduction), ad hoc experience suggests that some network appliances and perhaps cloud vendors disregard ping-pong as evidence that a connection shouldn't be dismantled due to a lack of use.

Discovered issues

- We're going to continue investigating adding an "application-level" heartbeat. See: propose heartbeat event by isaacvetter · Pull Request #364 · HL7/fhircast-docs (github.com)
- Content exchange design conversations continue. See: Update STU3BallotDraft.md by EricOnFHIR · Pull Request #363 · HL7/fhircast-docs (github.com)

Now what?

- Join our recurring FHIRcast design calls! For example, tomorrow's: Conference Call Details | HL7 International
- We're beginning work towards an STU3, while striving for no or minimal backward compatibility breaks from STU2. After that … normative!?!!

Gravity

Summary/Objectives

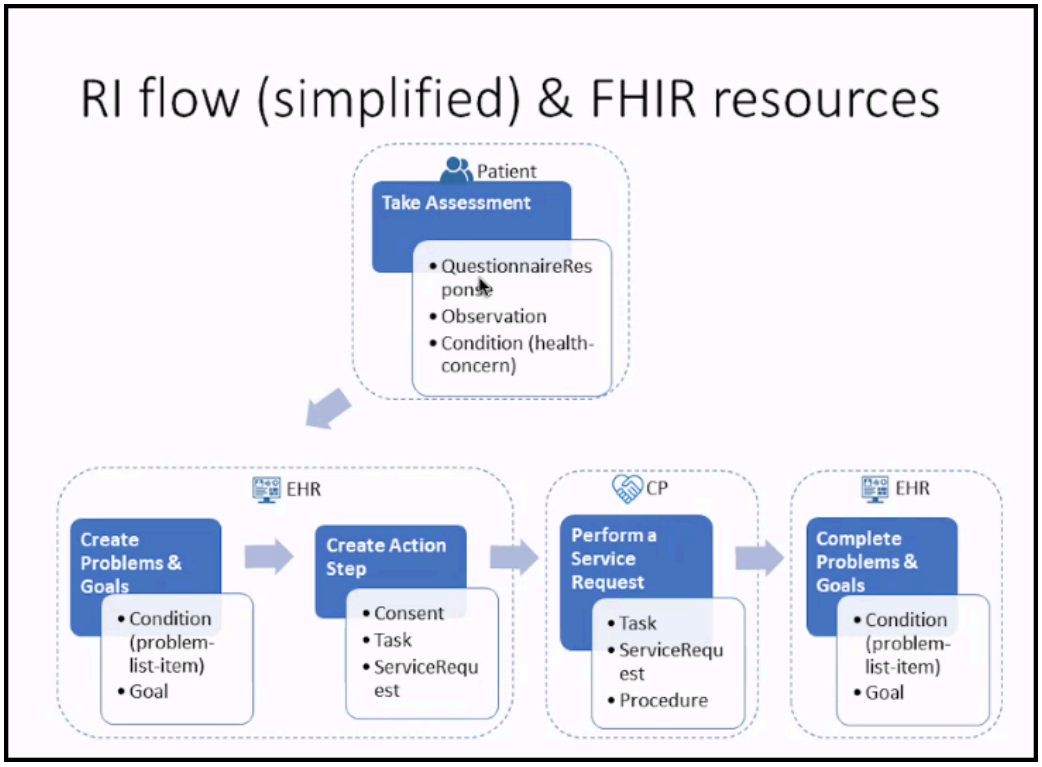
- Get to know one another
- Learn about the Gravity IG and RI
- Test the following scenarios:
    - Survey Process (Use Case B)
    - Closed Loop Referral (Use Case A)
    - Authorization and Authentication (Use Case C)

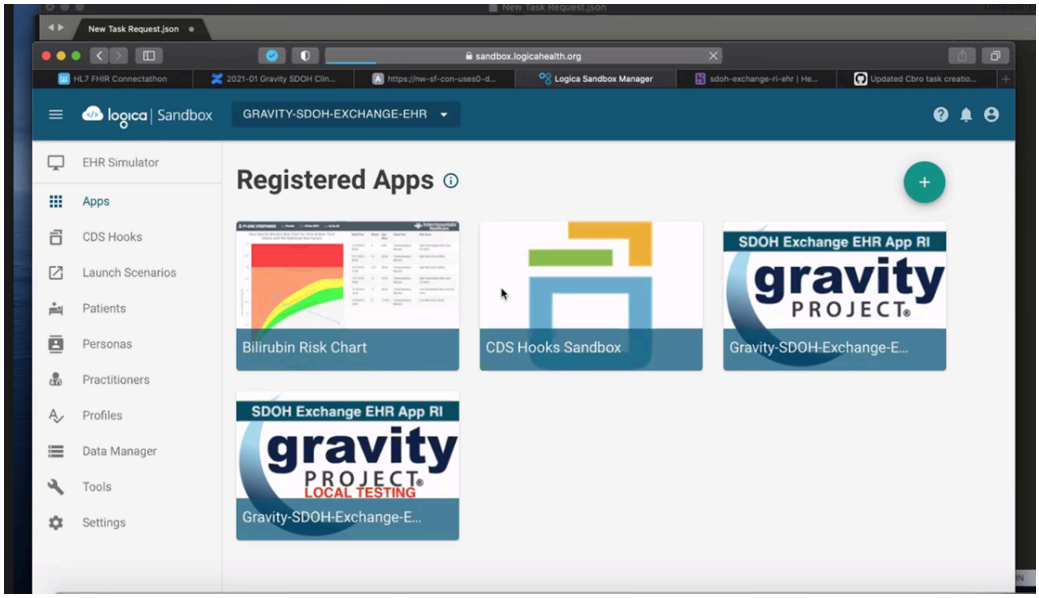
    - Patient smartphone app (Web app simulating a smart phone app) (Use Case D)
    - Community Based Organization (CBO) web app (Use Case E)
- Get feedback on the IG

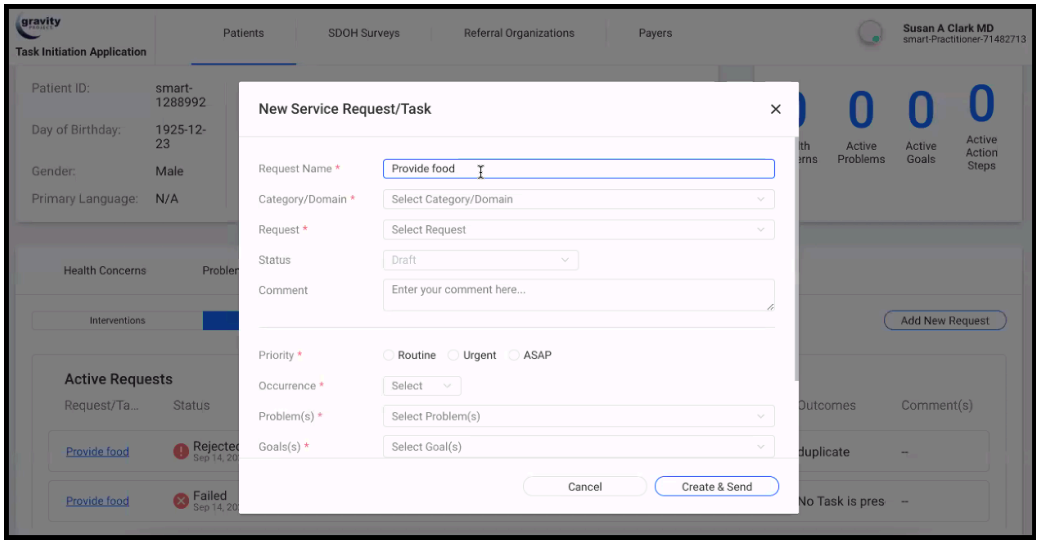
Participants

Notable Achievements

- RI demo of closed loop referral (demo by Yuriy Flyud from HealthLX)
- Demo of PRAPARE with SDC and NLM LHC Form Builder. The demo included the output to Gravity IG artifacts: QuestionnaireResponse, Observation, and Conditions using StructureMap (demo by Joee Garcia from Gevity Consulting)
- Reference Implementation walkthrough/demo - Focus on patient smartphone app and Community Based Organization (CBO) web app
- Solicited feedback and tested new IG functionality planned for STU2 ballot in January

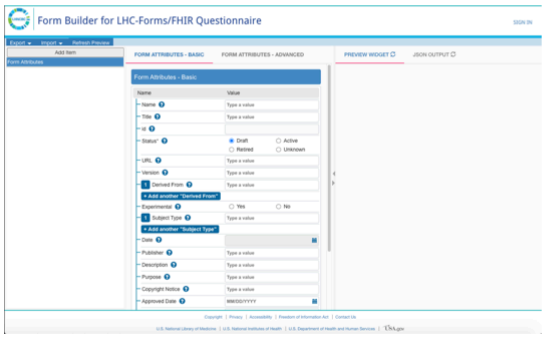



New Task Request.json
sandbox.logicahealth.org
logica | Sandbox
GRAVITY-SDOH-EXCHANGE-EHR
EHR Simulator
Apps
CDS Hooks
Launch Scenarios
Patients
Personas
Practitioners
Profiles
Data Manager
Tools
Settings
Registered Apps
Bilirubin Risk Chart
CDS Hooks Sandbox
SDOH Exchange EHR App RI
gravity PROJECT
Gravity-SDOH-Exchange-E...
SDOH Exchange EHR App RI
gravity PROJECT
LOCAL TESTING
Gravity-SDOH-Exchange-E...


Task Initiation Application
Patients
SDOH Surveys
Referral Organizations
Payers
Susan A Clark MD
smart-Practitioner-71482713
Patient ID: smart-1288992
Day of Birthday: 1925-12-23
Gender: Male
Primary Language: N/A
0 Active Problems
0 Active Goals
0 Active Action Steps
Health Concerns
Interventions
Add New Request
Active Requests
Request/Ta...
Status
Outcomes
Comment(s)
Provide food
Rejected
duplicate
Provide food
Failed
No Task is pres
New Service Request/Task
Request Name *
Provide food
Category/Domain *
Select Category/Domain
Request *
Select Request
Status
Draft
Comment
Enter your comment here...
Priority *
Routine
Urgent
ASAP
Occurrence *
Select
Problem(s) *
Select Problem(s)
Goals(s) *
Select Goal(s)
Cancel
Create & Send

Step 1. Convert PRAPARE to a FHIR Questionnaire

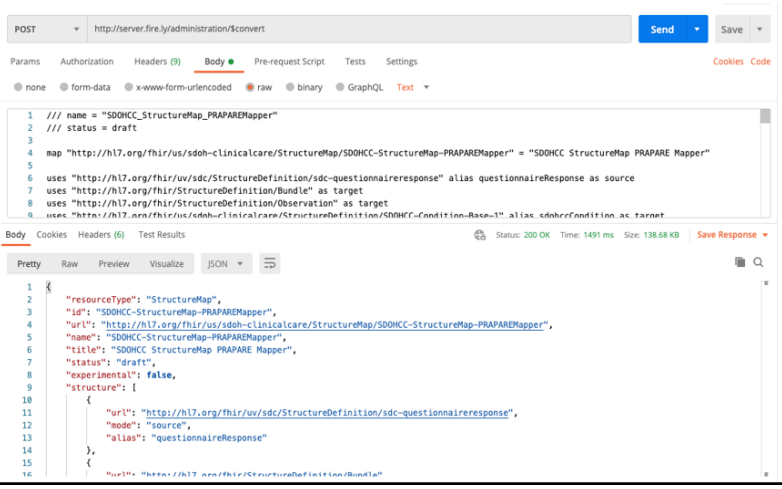
- Use the *enhanced* NLM Form Builder* web application
  - https://formbuilder-lhcforms.herokuapp.com



*Based on the NLM Form Builder web application http://lhcformbuilder.nlm.nih.gov/

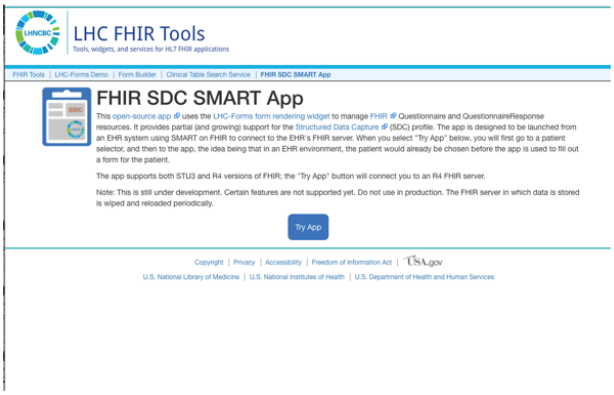
To generate the StructureMap using FHIR Mapping Language

- POST http://server.fire.ly/administration/$convert



Step 3. Execute FHIR Questionnaire

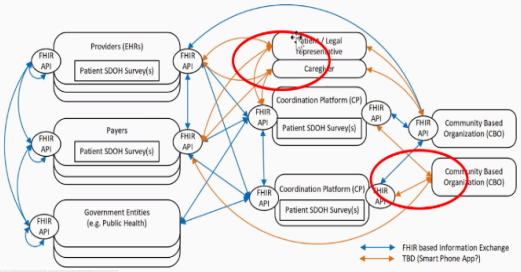
- Use the *enhanced* FHIR SDC SMART* App
  - Go to https://lforms-fhir-app.herokuapp.com/lforms-fhir-app/



*Based on the FHIR SDC SMART App http://lhcforms.nlm.nih.gov/sdc

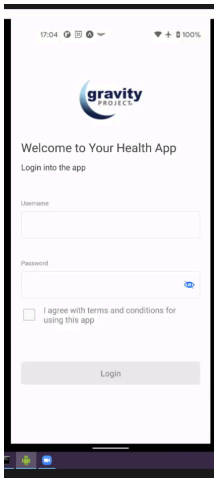
Technology Plan for SDOH FHIR IG STU2 (Draft)

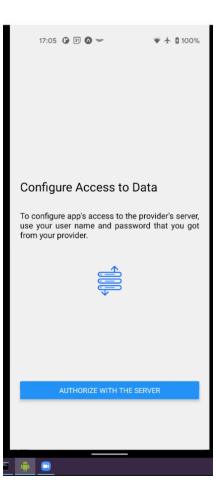
1) Support for patient/client application and workflow (patient closed loop referral and patient reported outcomes)
2) Support for CBO application and workflow (multiple patients/clients)
3) Support for automatic synchronization for applications with multiple referral sources (e.g., outlook style)
4) Support for social services terminologies / taxonomies
5) Support for value set filtering
6) Connectathon in September and early November to test outstanding items
7) Plan to ballot STU2 in the January ballot cycle

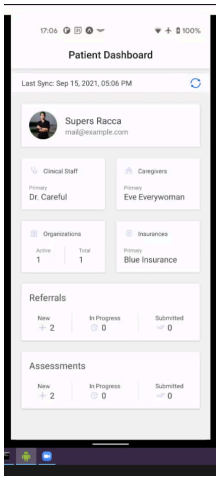


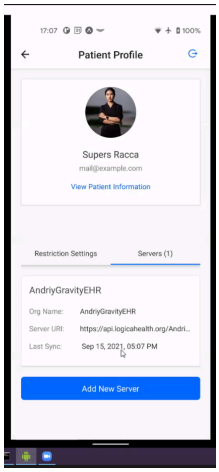
Footer

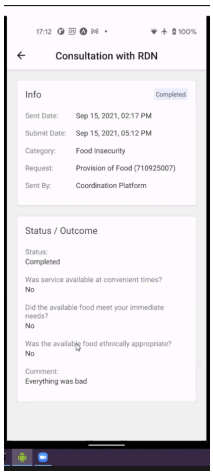
Patient Mobile App:

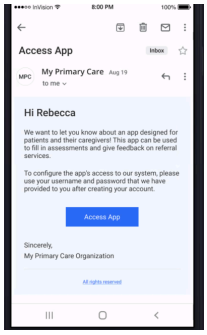












Open Issues/Questions

- Improving interoperability through standardized SDOH questionnaires represented in standardized coding system (e.g. LOINC)
- Acknowledgement of the need for unstructured data in the SDOH domain (e.g. to support patient expressed goals, other real-world data scenarios, etc.) while recognizing that interoperability requires structured, standardized data.
- Implementation of the SDOH standards is progressing but more implementation and pilot testing is desired.

Next Steps

- DaVinci Test Event in October
- Finalize scope for Gravity IG STU2 ballot in January 2022
- Finalize scope on possible additional SDOH-focused IG to support population health/research
- Further progress conversion of Gravity IG supplemental guide to value sets in VSAC

Integrating eLTSS among Health and Human Services Providers
International Patient Summary (IPS)
Medicolegal Death Investigation/Vital Records Death Reporting Track

ONC FAST - Hybrid/Intermediary Exchange

Summary

- The track focused on scenarios where a RESTful FHIR exchange is transmitted to a destination server via one or more intermediaries
- Participants tested multiple routing approaches in the roles of originator (to whom the intermediary aspect is invisible), intermediary and destination FHIR server
- Test scenarios included methods that were tested in earlier Connectathons, but with an eye toward evaluating the implementability by the intermediary, potential challenges to scaling, etc.
- Discussed exception handling scenarios
- Incorporate testing feedback into Implementation Guide (after)

List of participants

- Humana
- Epic
- eHealth Exchange
- BCBSA
- Surescripts
- HHS/ONC
- Point of Care Partners
- HCSC
- Rachel Foerster & Associates Ltd
- AEGIS
- The Sequoia Project
- CAQH

Systems which have implemented the IG

- eHealth Exchange
- Humana
- HCSC
- CAQH

Notable achievements

- Successfully tested routing through intermediaries using different routing methods:
    - DNS (to initial intermediary)
    - App path
    - Query string
    - HTTP header
- Tested URL rewriting
- Discussed / debated preferred approaches and pros/cons of each. Made progress toward consensus on preferred approach
- Identified next testing to be done after the Connectathon, including integration of security steps

Now what?

- Continue discussion with stakeholders (HL7 working calls on Tuesday's at 1:00 ET)
- Bring learnings into the FHIR IG
- Target: Ballot the IG in January

ONC FAST - National Directory US Realm

ONC FAST Security & Identity

Summary

- Test HL7 Identity & Security IGs
- Discuss Identity-related topics – Digital Identity and Matching

List of participants & observers

- Aegis
- BCBS
- By Light
- CommonWell
- Cozeva
- EMR Direct
- Evernorth
- HHS

- MiHIN
- MITRE
- Missouri Department of Mental Health
- Okta
- ONC
- Optum
- Sequoia
- Surescripts
- UPMC

Systems which have implemented the Security IG:

- EMR Direct
- Evernorth
- Health Intersections
- Inpriva
- Philips
- OneRecord
- Qvera
- QVH Systems
- ZeOmega
- ?

Systems which have implemented the Identity IG:

- EMR Direct ($match operation)
- ?

Where can test scripts and results be found (link to ConMan, Touchstone, or Inferno?)

- N/A for scripts; executed tests are recorded in ConMan
- A separate UDAP Test Tool is available for the Security workflows

Notable achievements

- First connectathon testing of cross-organization $match operation
- Introduction of UDAP Multihop Protocol during Wednesday pm breakout, in response to questions about how to use UDAP/Carequality FHIR framework beyond point to point settings
- Good crossover conversation at Wednesday am breakout session with SMART Health Cards re: implementer use of Identity; more at: https://bit.ly/FAST-SHC

Now what?

- Security/UDAP balloting continues through midnight tonight
- UDAP Multihop Protocol DRAFT discussion (response to questions about how to use UDAP in a non point-to-point setting; intrinsic to assertion objects as used today, but some additional discussion helps make this more explicit) will be further developed at future UDAP Community meetings - please join!
- Continued work on HL7 Interoperable Digital Identity and Patient Matching Capabilities - join us!

Opthalmology

PACIO Advance Directive Interoperability

Track Summary

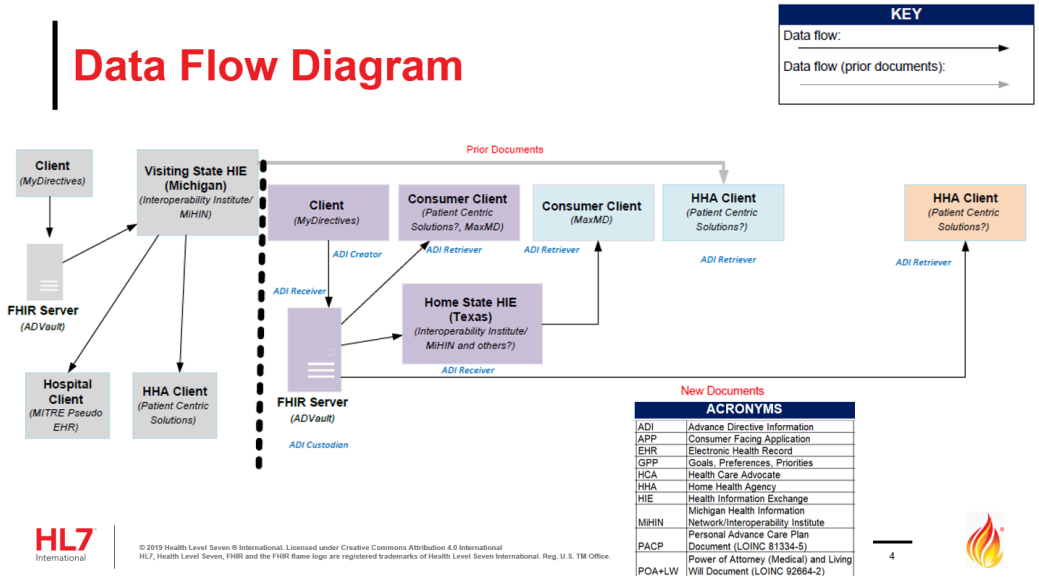
•Orient participants to the ADI w/FHIR Implementation Guide, references and profiles.

•Create, exchange, update and query person-authored advance directive information between multiple disparate health IT (HIT) systems, in a consumable format for clinicians, patients, and family members.

•Identify IG revisions or clarifications to improve use for implementers.

Participants

18+ participants, including: ADVault, CMS, Interoperability Institute, MaxMD, Michigan Health Information Network (MiHIN), MITRE, and Patient Centric Solutions.

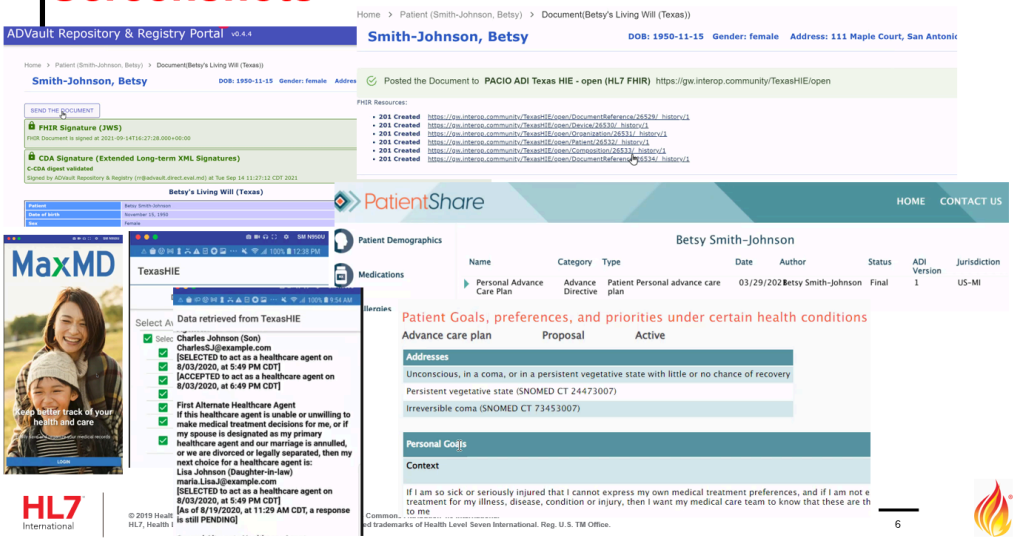


Systems

Test scripts and results located in ConMan/PACIO Advance Directive Interoperability:
http://conman.clinfhir.com/connectathon.html?event=con28

System	Role	Successful Test
MyDirectives	ADI Creator	Partial
ADVault	ADI Receiver/Repository	Y
PatientShare	ADI Retriever	Partial
MiHIN	ADI Receiver/Repository	Y
MaxMD	ADI Retriever	Y
MITRE Client	ADI Retriever	Partial
MITRE Server	ADI Receiver/Repository	N/A

Screenshots



Notable Achievements

•Exchanged data between 5 systems from 5 developers utilizing a majority of the planned STU1 IG Core data elements.

•Successfully demonstrated:

  –Converting CDA L3 structured document for "Personal Advance Care Plan" instances into ADI FHIR IG Resources.

  –Converting CDA L1 structured document for "Living Will" and "Power of Attorney + Living Will" instances into ADI FHIR IG Resources.

  –Posting and successfully query a collection of document bundles.

  –Demonstrated updating existing information and verifying / returning the current version.

•Through testing, discovered a gap area in the IG for exchanging the documents (i.e., binary, document bundle).

Discovered Issues/Questions

•FHIR Specification guidance on how to resolve a Reference in 'documentReference'

  –Use of fullUrl in bundle is unclear

  - –Use of document bundle vs. binary

- •Use of Digital Signature as embedded or detached
- •For Care Plan, include a Name and a Summary to help differentiate each AD information Care Plan
  - –Allow for quick identification and ease of use
- •Some of the test data was against a 2 week old version of the IG vs. the most recent update
- •Need to evaluate if all AD documents are returned to a query for the human to sort through, related to jurisdictional bias or preference
  - –All current document types
  - –Superseded
- •Consider adding guidance to the IG to indicate the version of the document, i.e., new vs. replaced

Feedback from Participants

- •We were disappointed to see so many last-minute changes to the IG, including core changes in approach made during the Connectathon. We were especially frustrated that the change in approach was made to address digital signatures, which were not even a part of this IG.

Now What?

- •Address issues identified during the Connectathon.
- •Add a requirement to the IG for Care Plan cardinality if 1..1 for CarePlan.Title.
- •Continue adding IT Implementers, real world systems and build out reference implementations for testing.
- •Correct Sample Data.
- •Continue to improve the Inferno Test scripts.
- •Hold informal testing with implementers.
- •Go to ballot in January 2022 for STU1.

Patient Request for Corrections

- SUMMARY: what was the track trying to achieve:
    - Test a draft IG to enable bi-directional communication between a patient and a covered entity to support a patient's request for corrections
    - Our ultimate goal is to build a FHIR Implementation Guide to provide a standard way to communicate information required to support a patient request for corrections workflow. After months of testing different resources to facilitate the bi-directional communication between patients and covered entities, we were directed to narrow the focus to a single path: using the Communication resource which will spawn a Task to track the status of the request. Therefore, the IG used at the Connectathon focused on that single path. As a bonus, we were also hoping to test using subscription to notify the patient that a new communication or change to the task has been made.

    The three use cases we planned to test were:

        - Patient requests change and change is accepted.
        - Patient requests change and change is denied.
        - Patient disagrees with denial.

    We also planned to test searches as part of the above workflows.

- List of participants (with logos if you have time and energy) and systems which have implemented the IG, Profile, or Resource, and approximate percentage covered

SYSTEMS:

- MaxMd (client)
- PatientLink (client): patientlink Better Patient Connection · Better Data Collection
- clinFHIR correction server (server)
- Timon Grob (client, using postman)
- Sequoia (worked to stand up a HAPI server)

PARTICIPANTS:

- Debi Willis PatientLink
- Virginia Lorenzi NewYork-Presbyterian
- John Moehrke By Light Professional IT Services

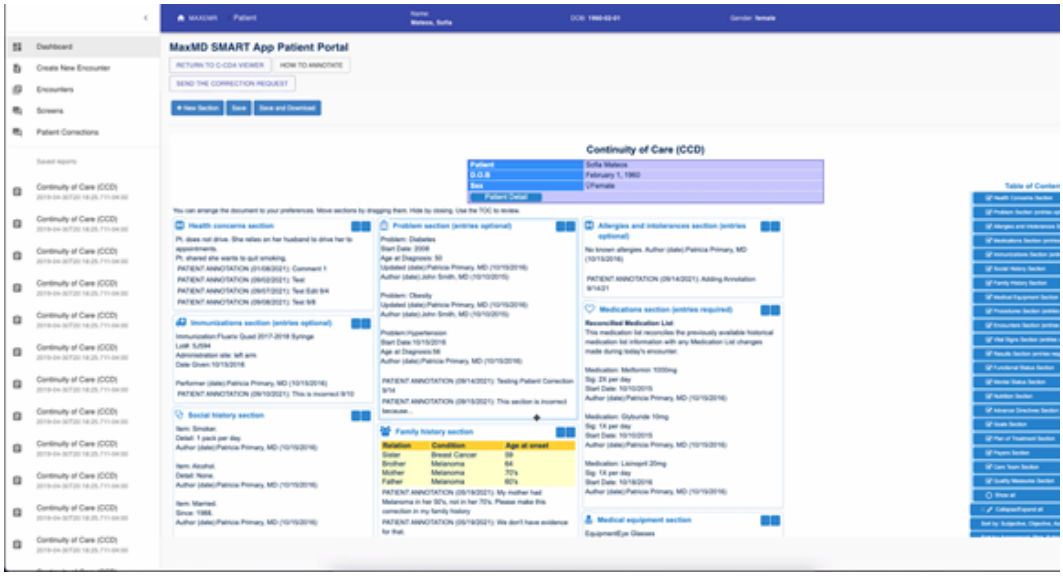
- Vassil Petchov Epic Systems
- Cecilia Wong Allscripts
- Matt Blackmon Sequoia Project
- Timon Grob Phillips Healthcare Systems
- Lisa Nelson maxMD
- Jake Zhou maxMD
- Jay Gustafson patientLink
- David Hay Lyniate
- Cheryl Lohman MedApptic
- Khaled Young
- Nancy Lush Patient Centric Solutions
- Matt Blackmon The Sequoia Project
- Hidde Schultz DRIMPY
- Eric Haas HealtheData
    - for joint session with ArgoWrite

- Where can test scripts and results be found (link to ConMan, Touchstone, or Inferno?)

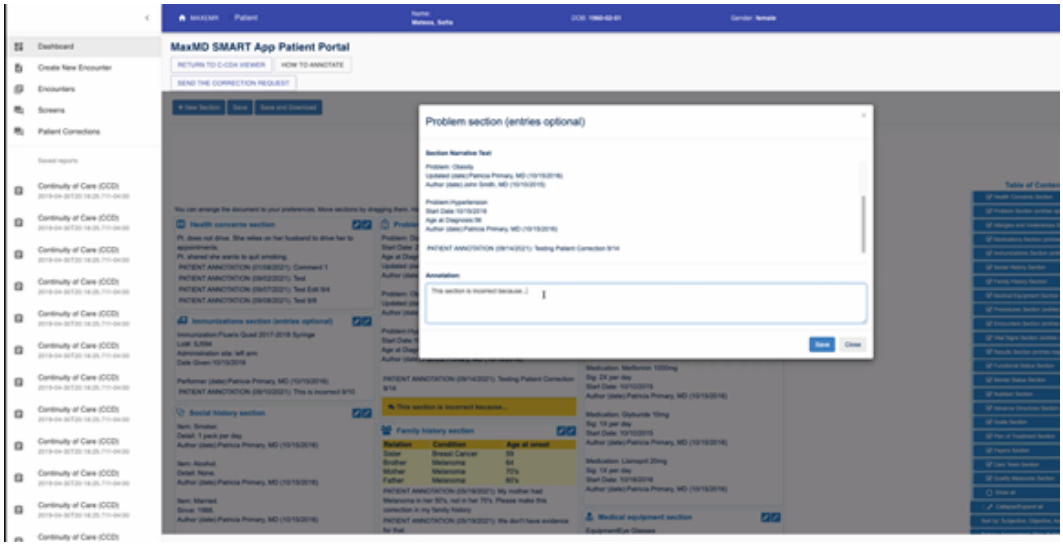
    See track details for test scripts: https://confluence.hl7.org/display/FHIR/2021-09+Patient+Request+for+Corrections
    Results are in this report out.
- Notable achievements:
    - Determined the need for a bundle and successfully tested it
    - Successfully spawned task when new Communication Bundle posted.
    - Successfully tested the full workflow for correction requested and request is accepted.
    - References between resources proved useful in searches and reads.
    - Tested/validated conversation threads. with decided approach
    -
- Screenshots of relevant and interesting things and/or links to further information about implementations/achievements:
    - A test server and emulation tools were created to facilitate testing by David Hay: https://docs.google.com/document/d/1hbkgsedrd4FGbZV-IMXz93ltdyTorVyJEtr3j0yKj4g/edit

CLIENT SIDE

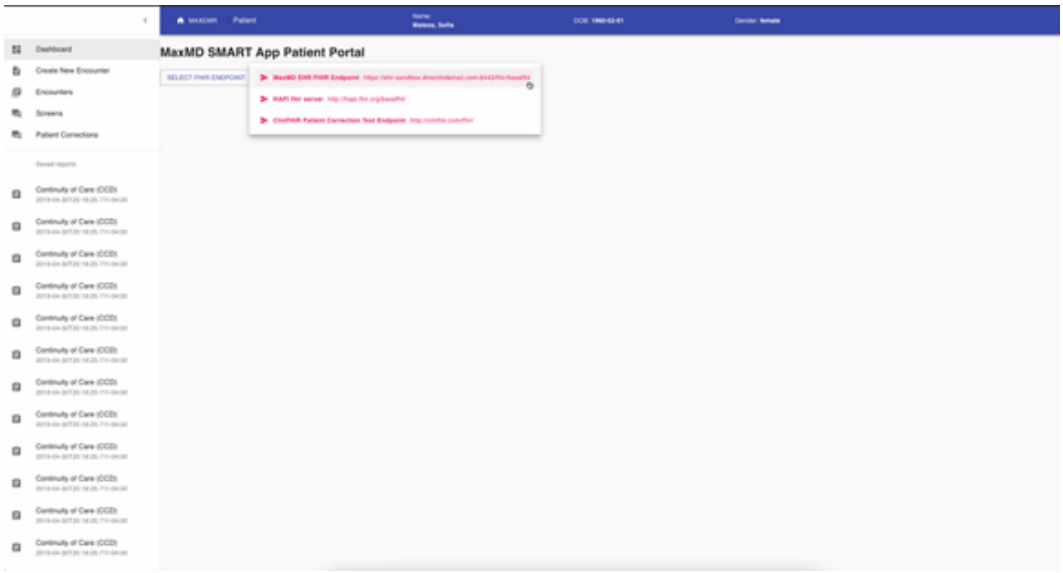
- A patient is reviewing a downloaded medical record (CCD retrieved from a patient portal) and notices a mistake in the Problems Section. She has had diabetes since she was 30, not 50. She wants to get the information corrected.



- She uses a patient app to create a copy of the document and annotates it explaining what is wrong in the Problems section and provides the correct information: (NOTE: This patient facing app example below is using a CCD notating workflow to accommodate the correction request flow. Other patient facing apps could use other types of workflows and UI. A UI could be similar to an email box for a patient to track all communications and task statuses.)



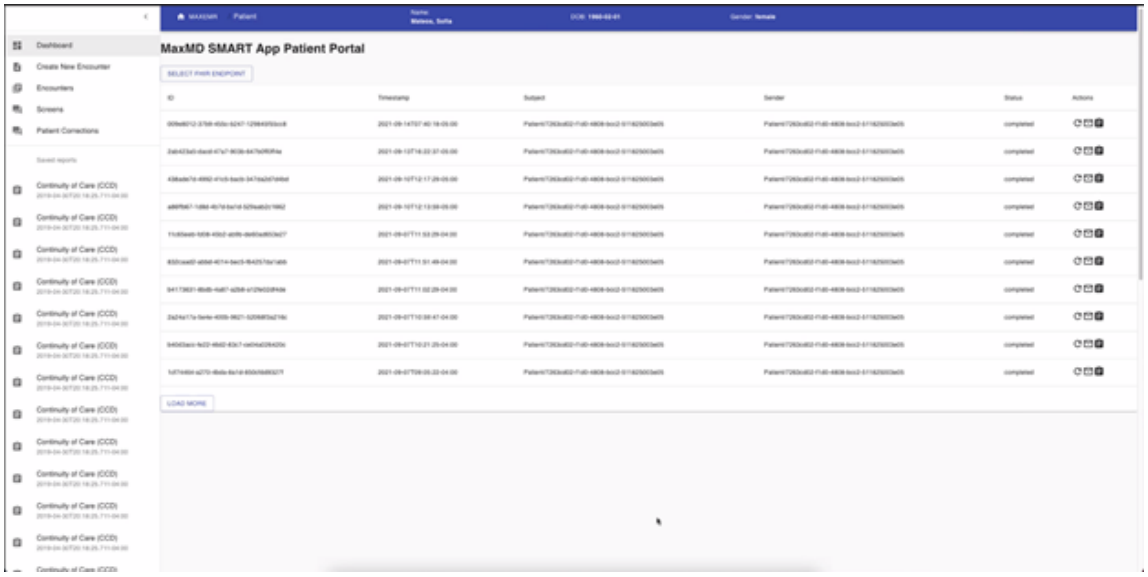
- She uses the patient app to send the request to the organization which provided this medical record



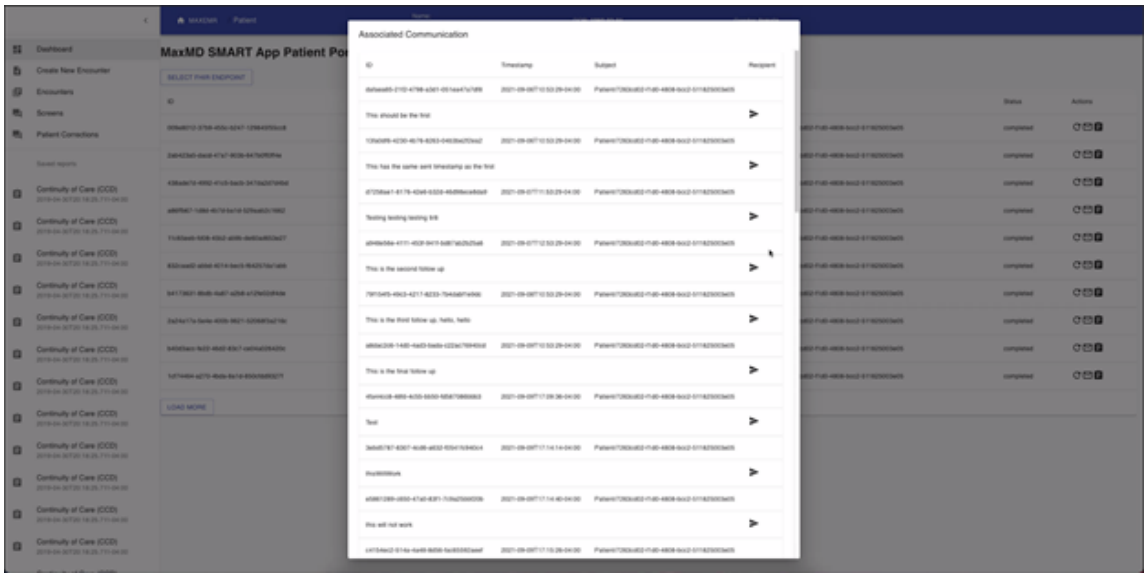
- Bundle Sent: https://chat.fhir.org/user_uploads/10155/3_8j56XUL-ejG6MvzVNoCqgq/clinFhirInitialBundle.json

- She uses the patient app to review the medical record correction requests she has made to a selected organization, and to see the status of the task they have

started to address her request for corrections. This correction request has been completed.

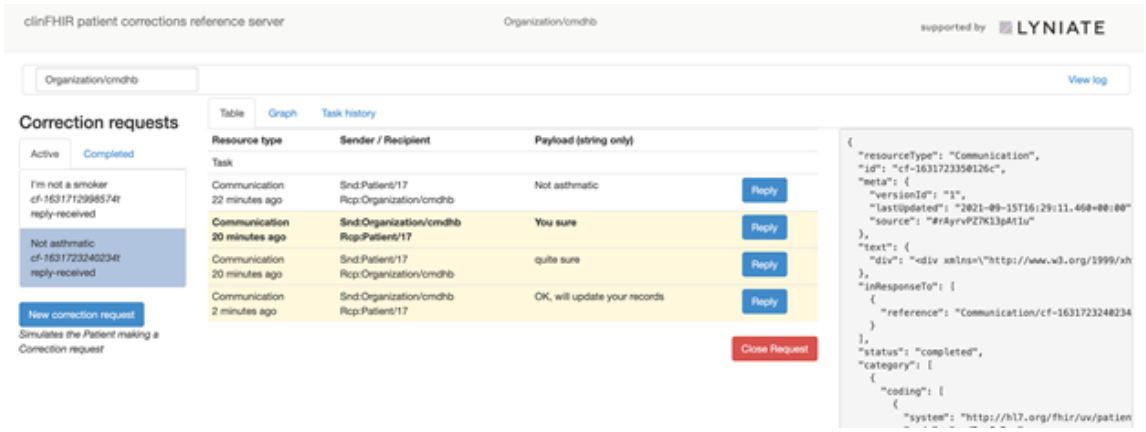


- She can respond to any earlier communication that has been received or sent:

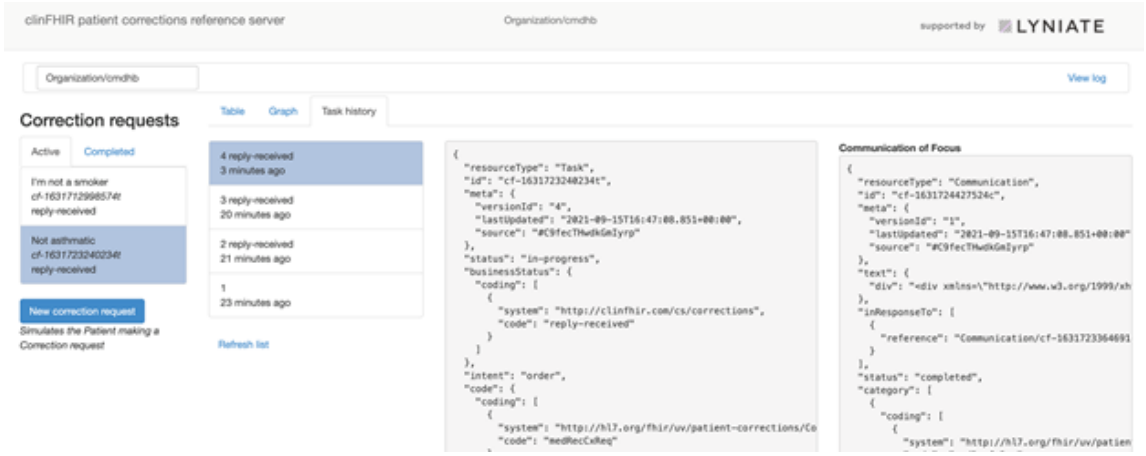


SERVER SIDE

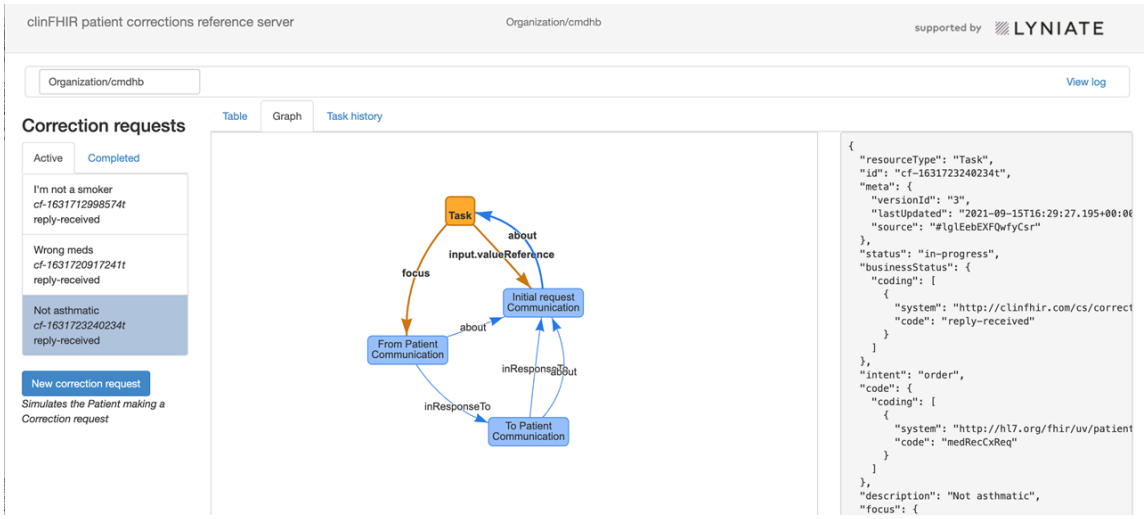
- Server receives correction requests. Medical records person can converse with patient as needed to clarify request:



- Each version of the associated Task has a new status (status/businessStatus). Some are associated with specific Communication resources:



- Underlying graph of resources on server side:



CONCLUSION

- Discovered issues / questions:
  - Need for a bundle for every conversation from client.
  - Need to address Endpoint discovery and security (narrative that provides implementation advice)
  - The value of domain specific status was made clear during this connectathon – need to define a value set.
- Now what?
  - Need more testers, especially EHRs/servers.
  - Need to test disagreement flow (did not get that far)
  - Would like to test subscriptions.

Patient Track:
The Patient Track continues to provide a good starting point for those wanting to learn about FHIR and how it works. We walked through a demonstration of each of the Level 1 testing scenarios--showing how to create, update, search and delete a FHIR Patient resource. We also discussed how the Touchstone testing tool provides a comprehensive way to ensure compliance with the FHIR RESTful API and ensures success when moving on to interact with other FHIR clients and servers.

Achievements:
Most of the track participants were observers interested in learning more about FHIR but not testing it themselves. They appreciated the demonstration that was provided and the discussions about testing tools. One participant, however, did pass each of the Level 1 scenarios as a FHIR client and found the Touchstone test scripts very helpful in guiding them on how to interact with the FHIR server. While the Patient Track participation seems to be waning, it certainly is still a very useful track to help newcomers along their path to FHIR proficiency.

Post Acute Orders (PAO)

Questionnaire

Summary: What was the track trying to achieve

Track objectives included:

- Representing a wide variety of forms using FHIR and verifying that the SDC implementation guide supports the needed representation capabilities, including flow control logic and calculations
- Testing authoring application abilities to create and edit such forms
- Test the ability of questionnaire completion tools abilities to handle different types of forms
- Test the ability of applications to automatically complete forms using existing data
- Test the ability of systems to handle rendering 'adaptive' forms (forms where a third-party system decides on the next question based on prior answers)
-

List of participants: (partial)

- Ilya Beta
- Oliver Egger
- Joee Garcia
- Paul Lynch
- Peter Muir
- Brian Postlethwaite
- Jose Teixeira
- ...and many others

Systems which have implemented the SDC IG:

See https://confluence.hl7.org/display/FHIRI/SDC+Implementations

Demos & Presentations:

- SDC IG walkthrough by Joee Garcia
- Demo of NLM Questionnaire tools by Paul Lynch
- Demo by Ilya Beda of an SDC development environment with a debugger for FHIRPath expressions

- Demo by Oliver Egger of an open source server supporting $extract for StructureMap-based extraction
- Demo by Brian Postlethwaite of an implementation of the new observationExtract and observation-extract-category changes; also of a test Questionnaire for testing enableWhen and enableWhenExpression implementations.
- Demo by Brian Postlethwaite of the FHIR Mapping Language to StructureMap conversion, and review of the open source code for this (c#)

Discovered issues / questions:

- When implementing the Observation based extraction, the Observation.issued (instant) element is higher precision than the QuestionnaireResponse.authored (datetime) element - need to include some clarifying text on what to do in this situation. - if precision is not sufficient, this could be dropped (and report a warning?), or arbitrarily include a time (midnight?)
- There was some discussion around what the intent was for item-control types autocomplete and drop-down, when used with answerValueSet (contained or external). Filed FHIR-33704 to clarify expected use and behavior.
- There was also some discussion around $extract, following Oliver Egger's demo of his server with support for StructureMap extraction in the $extract operation. There is some interest (by at least Paul Lynch) in adding an additional optional parameter to $extract so it could be stateless, if someone passes in a bundle of the needed Questionnaire, StructureMap, and whatever else is needed. The use case would be that a form renderer that does not support $extract could use some external service to handle StructureMap extraction. The external service would need to be provided with the Questionnaire and StructureMap (and any other supporting resources - e.g. referenced StructureMaps and StructureDefinitions). Currently, that would require POSTing those resources prior to $extract, and then deleting them afterward.
- Questions were raised about the intended behavior of observationExtract and observation-extract-category. Filed FHIR-33740
- Brian found an intermittent problem with importing a Questionnaire into the NLM form builder, which Paul and other NLM staff spent some time looking at. It is actually two problems, one in the code and one in the infrastructure.
- Brian found that LHC-Forms does not support enableWhen when the source is a date field.

Situation Awareness for Novel Epidemic Response Track

1. Summary: What was the track trying to achieve?

The primary goal was to test if the STU1 Published SANER IG h
issues that may need correction as an STU Update (or new rel

2. List of Participants

3. Systems Which Have Implemented the IG

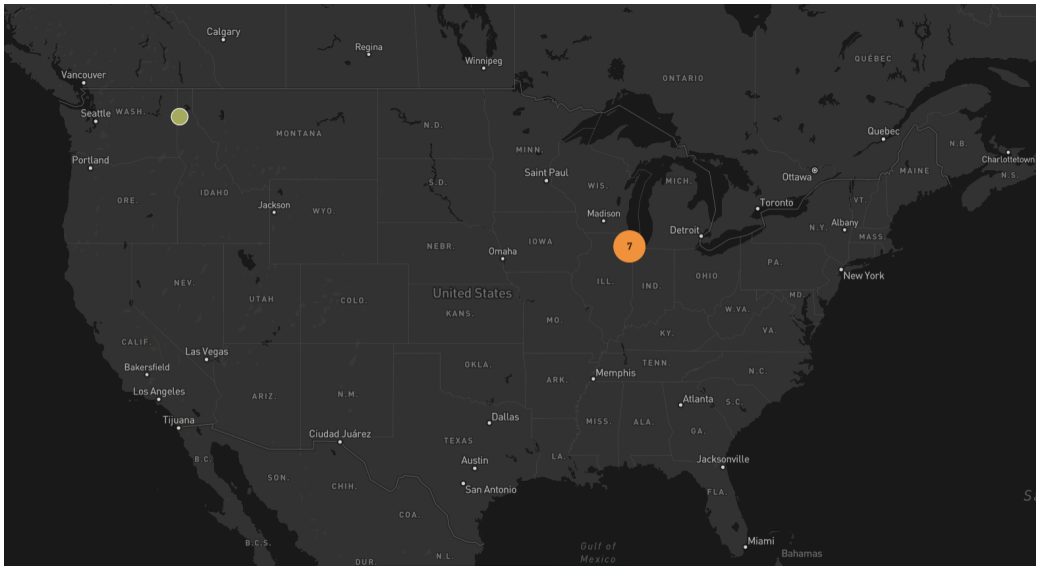
- Audacious Inquiry (Measure Source, Measure Computer, Measure Definition Consumer, Measure Definition Source) 90%
- Cerner (Measure Source) POC
- Epic (Measure Source) POC
- ESRI (Measure Consumer) 25%

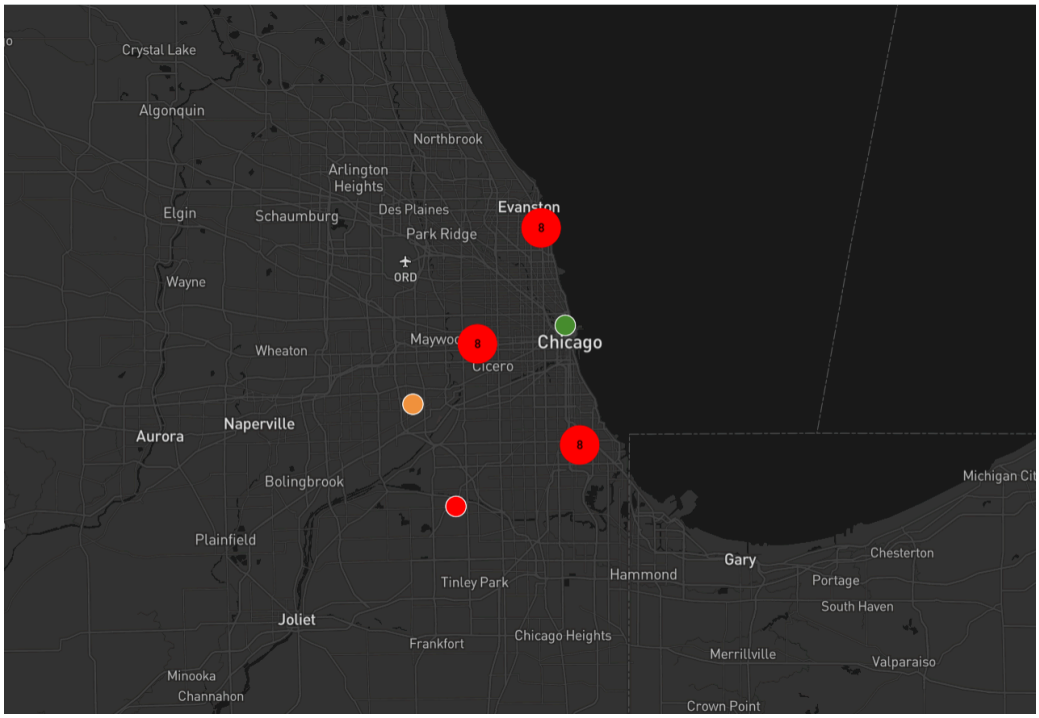
- Lantana (Measure Source, Measure Computer) 50%
- Leidos (Measure Consumer) 50%
- Netcare (Measure Source) POC
- Symptomatic (Measure Source) 25%

4. Notable Achievements

- Additional data consumed and tested to highlight Geolocation data.
- Review of several discovered issues.

5. Screenshots





6. Discovered Issues / Questions

Several issues were identified as needed changes. None were above the level of a STU Update

Issue Type	Key	Summary	Reporter	Created	Updated	Priority
Change Request	FHIR-33707	Allow components for stratification	David Pyke	2021-09-15 12:43	2021-09-15 12:43	Medium
Change Request	FHIR-33708	Allow specification of valueset for a stratifier, add comment for R5	David Pyke	2021-09-15 12:45	2021-09-15 12:45	Medium

Change Request	FHIR-33709	Update Measure computation logic.	David Pyke	2021-09-15 12:46	2021-09-15 12:46	Medium
Change Request	FHIR-33711	Change name of "Availability" measure	David Pyke	2021-09-15 12:52	2021-09-15 12:52	Medium
Technical Correction	FHIR-33712	Typo in 7.4.2 title	David Pyke	2021-09-15 01:00	2021-09-15 01:00	Medium

.

7. Next Steps

Review of issues and make changes discussed before STU Update.

SMART App Launch v2

External source here: https://docs.google.com/document/d/1WOUZTx6NfqFORrayU1qAmsbmc-NPPWQH61WXL9dLgak/edit#

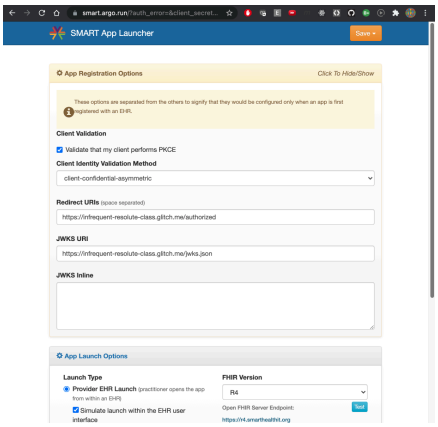
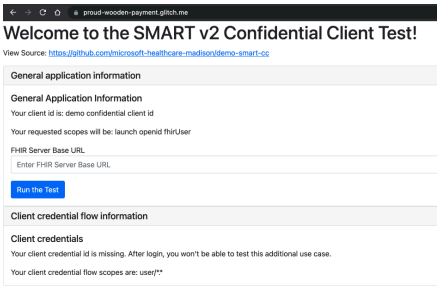
Summary	The purpose of this track was to facilitate the continued testing effort of new (in 2021) features in the SMART App Launch IG. Namely, PKCE, asymmetric authentication of clients, granular scopes, POST-based authentication, and token introspection. See connectathon track page for details.
Participants	Keith Carlson

	okta	Dan Cinnamon
	Microsoft	Carl Anderson Jared Irwin (And Josh -- see SMART below)
	THE SYSTEM	Chuck Feltner
	firely	Alexander Zautke
	UPMC LIFE CHANGING MEDICINE	Ryan Conley
	SMART®	Josh Mandel

Notable track achievements

Participant	Achievement
fhir.ly	• Added fhirContext to the token request response. Easy to implement in IdentityServer. • Progress on the German plan to require Oauth2 / SMART on FHIR *at all hospitals* in the coming 2 years. See https://github.com/gematik/isik-sicherheit (Content in German only)
Okta	• Confirmed asymmetric functionality on my reference server with the demo-cc client. Enhanced the demo-cc client to also optionally perform a back-end service

		asymmetric authentication test, and that test now works properly on my reference server. ● Ran through all of the test scenarios on https://smart.argo.run/granular to test PKCE, requesting granular scopes, token introspection and POST authorization. ○ Resolved an issue where I had not properly escaped the scopes being requested- so some of the finer grained scopes containing full http URLs in them were throwing me off. ● Testing with Keith uncovered a flaw in my server where I am not sufficiently surfacing errors encountered during the authorization process. That is to be fixed after the connectathon.
	ONC	● Connected to Dan's (Okta) server using asymmetric authentication and worked out some kinks with him ● Connected to Ryan's (UPMC) server that only supported symmetric auth
	Microsoft	Updated JS client library to support PKCE and asymmetric authn Created demo Node.js app showing server-side library usage
	T System	Successfully added PKCE support to client! Only caveat is that it doesn't work when hosted in Azure, seemingly because of the new node-jose dependency (possibly due to webpack issues). *Still working on testing / debugging this.*
Screenshots *Or other relevant and interesting things and/or links to further information about*		

<table>
<tr>
<td>implementations/achievements</td>
<td>
<table>
<tr>
<td>SMART App Launcher (new features)
PKCE
Asymmetric client auth
Separate config section for app-registration-time config settings</td>
<td> 
</td>
</tr>
<tr>
<td>Demo Confidential SMART Client
Confidential client keeps a secret encryption key
Tests PKCE
Tests the authorization_code flow for POST-based auth</td>
<td> 
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</tr>
<tr>
<td>Discovered Issues
Or other questions, if any.</td>
<td>

Jira

FHIR-33703 - Missing mention of token_endpoint_auth_signing_alg_values_supported in Conformance
https://jira.hl7.org/browse/FHIR-33662

Demo Confidential Client

Feat: (PR from Dan) express-session cookies, added token-auth flow support
TODO: Josh will publish an in-browser demo (non-nodejs confidential client using the client-js library)
TODO: carl will document the development process / debugging steps when pairing the cc demo with the smart launcher

SMART App Launcher

Bug: Access token response, Token Introspection properties aren't quite right

</td>
</tr>
</table>

- Bug: UI should allow either jwks or jwks_uri (not requiring one over the other)

- BREAKOUT SESSION NOTES
  - Auth requirements to protect a token introspection endpoint - Carl, Josh, Dan (Tuesday afternoon)
    - IG states that servers are free to ignore bearer tokens / headers on requests to the token inspection endpoint, potentially leaving it open to adversarial exploration.
    - What can be gained by an adversary? The adversary would (realistically) need to have a valid token in-hand to be able to inspect anything, assuming tokens were generated using the required entropy (making them hard to guess) and assuming they are short-enough lived (5 minutes).
    - [*meta*] Will there be reluctance to allow a server with that policy to exist on the network?
    - [*meta*] What is seen in current practice in similar use cases outside of healthcare?
      - Dan C - RFC7662 States: "To prevent token scanning attacks, the endpoint MUST also require some form of authorization to access this endpoint, such as client authentication as described in OAuth 2.0 [RFC6749] or a separate OAuth 2.0 access token such as the bearer token described in OAuth 2.0 Bearer Token Usage [RFC6750]. The methods of managing and validating these authentication credentials are out of scope of this specification."
      - As an implementation example, Okta's introspection endpoint takes the stance that "client authentication" must occur. So a public client may authenticate using only a client_id, and a confidential client may authenticate using

	client_id/secret. Resource servers wishing to call the introspect endpoint may be issued a dedicated client_id/secret for introspection. ● Firely: Can confirm that IdentityServer also requires authentication for token introspection. ● A cursory review of other popular identity products offering token introspection appear to have a similar policy (Ping, ForgeRock, Okta, IdentityServer, Keycloak, IBM, Oracle) ■ Discussed Wednesday - Carl, Dan, Bas: ● https://openid.net/specs/openid-connect-backchannel-1_0.html ● https://datatracker.ietf.org/doc/html/rfc7662 ● SMART App Launch Guide v1.1.0 ○ Typo fix: https://github.com/HL7/smart-app-launch/pull/368
Now what?	Questions for the group ● Are there any unsubmitted Jira issues to discuss? ○ From the breakout session, it may be desirable to suggest in the IG that *some* form of unspecified authentication SHALL be used to secure the token introspection endpoint. RFC-7662 Section 4 goes into detail over on topic and may be useful as a guide. ○ Also from the breakout session on Wednesday, is there a need to discuss the topic of token revocation (possibly WRT some kind of backchannel operation)? ● Bugs found in any of the testing tools? ○ Possibly in the MHM client-js - regarding Chuck's PKCE woes

	○ Failed to execute 'digest' on 'SubtleCrypto': The provided value is not of type '(ArrayBuffer or ArrayBufferView)' ● Are there publicly-available tools that should be advertised somewhere? ○ See Dan Cinnamon, if interested in connecting to his authentication server ○ Anyone who has something to share, please communicate that to #smart in Zulip - participants are welcome!

SMART Health Cards for Vaccination and Testing
Subscriptions
Questionnaire
Terminology Services
TestScript and FHIR Testing

Imaging Track

Summary

The primary objectives of the Imaging track were:

- Test Radiation Dose Summary for Diagnostic Procedures on FHIR IG to prepare for January 2022 ballot
- Test ImagingStudy resource to improve maturity

Additionally, participants discussed ImagingStudy notification use cases and possible solutions.

Participants

- Jonathan Whitby, Peter Dobbs -- Canon Medical Systems
- Abderrazek Boufahja, Steve Nichols. Herve Hoehn - GE Healthcare
- Khaled Younis, Sahil Khanna, Haritha Mouli, Anagd Nath, Nikhilesh Sonar - Philips
- Reinhard Egelkraut - HL7
- Peter Muir

Implementing Systems

- Radiation Dose Summary for Diagnostic Procedures on FHIR IG
    - Clients: GE Healthcare, Philips

    - Servers: Canon Medical Systems, GE Healthcare
- Imaging Study resource
    - Clients: GE Healthcare, Philips
    - Servers: Canon Medical Systems, GE Healthcare

Online available FHIR servers were also used like Aegis and HAPI FHIR test servers. Some test steps could not be fully exercised due to limitations of test data.

Testing Artifacts

- Touchstone: https://touchstone.aegis.net/touchstone/testdefinitions?selectedTestGrp=/FHIR4-0-1-Connectathon28/Imaging
- ConMan: http://conman.clinfhir.com/connectathon.html?event=con28 -- Imaging Track

Seven test scripts were used to validate the sharing and the exchange of the different FHIR resources. The detailed testing results are available under the ConMan tool.

Notable Achievements

- Successful testing of Dose Report Summary IG
    - Minor set of issues to be addressed
- First Connectathon test of ImagingStudy resource
    - No resource issues identified
- Narrowed down list of possible solutions to ImagingStudy notification use case
    - See discussion: https://confluence.hl7.org/display/IMIN/Study+Content+Notification+on+FHIR+-+Connectathon+28+Discussion

Discovered Issues

- DiagnosticReport does not allow searching by related ImagingStudy
- Practitioners extracted from DICOM data typically lack identifier so search use cases should use name instead
- Dose Report IG use of Study Instance UID and Accession Number identifiers not aligned with other FHIR resources -- both should be replaced with references
- DICOMweb GET requests frequently too large for Touchstone -- should try to use HEAD requests instead for test scripts
- Test data frequently insufficient to test all aspects of some test cases

Next Steps

- Fix minor IG issues
- Work with O&O to address DiagnosticReport / ImagingStudy search use case
- Improve test data for next Connectathon

Vulcan - Real World Data (RWD) Submission to FDA

Summary

The primary objective of the Vulcan Real World Data Submission to FDA track for this connectathon was to enhance the ability of retrieving concomitant medications from an EHR FHIR server and converting these data to a regulatory submission format (i.e. CDISC-SDTM).

Specifically:

Medication retrieval from all relevant Resources which may be present in the record (MedicationRequest, MedicationDispense, MedicationAdministration, and/or MedicationStatement).

Ensure all relevant EHR data are retained in the final SDTM dataset (drug was shown as a prescription or as an administrated drug).

Refine SDTM output to include both the CM and Supplemental CM files.

Participants

First Name	Last	Affiliation
Yannick	Boerner	Healex GmbH
Peter	Butterfill	Parexel
Djibril	Dione	Health Information System Program South Africa
Maryam	Garza	University of Arkansas
Hugh	Glover	HL7
Scott	Gordon	FDA
Jay	Gustafason	PatientLinks
Mike	Hamidi	Pfizer
Sergey	Krikov	Parexel
Cheryl	Lohman	MedApptic
Lauren	McCabe	Pfizer
Craig	McClendon	Accenture
Vishwambhar	Mishra	OSP Labs
Joe	Mundi	Pfizer
Balaji	Narayanan	Onyx Technology
Satyajit	Pati	Optum
Brian	Peck	EPIC
Nathaniel	Pung	Accenture
Karthick	Thiyagarajan	GE Healthcare
Michael	van Campden	Vulcan
Rien	Wetheim	Firely
Debi	Willis	PatientLinks
Darrell	Woelk	Green Room Technologies
Satyajit	Pati	Optum

Systems Implemented

Not applicable, this track is not yet at the point where implementation guidance can be provided.

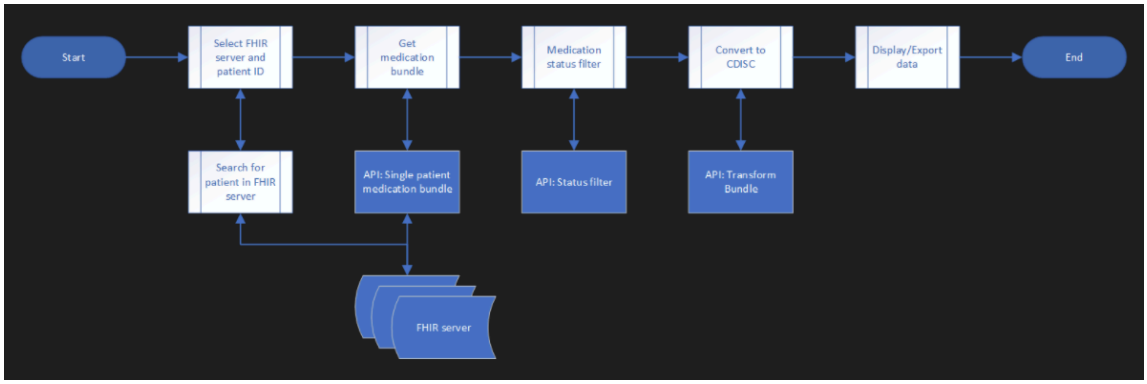
Notable Achievements

- Pete Butterfill (Parexel) and Jay Gustafson (PatientLinks) created a revised approach for querying FHIR server data. This entailed the creation of FHIR bundles of patient medications and transforming these bundles to SDTM CM and Supplemental CM files.
- The group discussed how to flag potential “negated” medication records, such as medications entered in error, to allow researchers to filter out medications likely not consumed by the patient.
    - Track participants used the List Resource to store the flag and this was demonstrated during the connectathon.

- The group identified elements of the medication resources which could be used consistently to identify medications taken concomitantly with the study intervention.
- Potential overlaps between this track and the Schedule of Activities (SoA) track were discussed in terms of how to identify medications taken concomitantly with the study interventions. The two tracks met on Day 2 of the connectathon.

Screenshots and Links to Further Information

Process Overview



FHIR links for medication status filter activity: remove medication if the status tells us it was not or will not be taken.

- https://www.hl7.org/fhir/valueset-medicationrequest-status.html
- https://www.hl7.org/fhir/valueset-medicationdispense-status.html
- https://www.hl7.org/fhir/valueset-medication-admin-status.html
- https://www.hl7.org/fhir/valueset-medication-statement-status.html

Draft identifying all elements of all Medication[x] resources which we recommend be implemented and utilized consistently (where relevant) in all EHRs in order to make concomitant medication determination more reliable. (There are absolutely strong pure healthcare justifications as well for these elements being present).

MedicationX Resources and ConMed.docx

6. Discovered Issues and Questions

- Current FHIR to SDTM mappings may require additional updates (in addition to what is already under the balloting review)
- Discussion of when in an implementation there should be filtering, flagging, or other “curation”/reconciliation steps applied
    - Proposal: this should NOT be a fixed choice. Since currently EHR-to-Research pipeline is going to be highly fragmented and differ in almost every case, modular approach should support implementation of

reconciliation steps anywhere in the pipeline – either in FHIR phases or in SDTM phases.

- An IG can explain the rationale and logic of all proposed flags and reconciliation options, but at what step to implement is left to implementer

- For connectathon, will show an example implemented in the FHIR data stage (can include that as an “example” in the IG)

- If in SDTM, need to ensure all relevant EHR data are represented in SDTM

- Claims data should be considered as an additional source to enhance the determination of study concomitant medications
- The many variations in how FHIR is being implemented in EHR systems to represent medications has made it challenging to determine concomitant medications

Next Steps

- Obtain access to more DATA SOURCES
- Touch base with DaVinci Group regarding claims data
- Touch base with Vulcan SoA Track regarding study windows relative to medication dates
- Consider if this track should expand beyond Concomitant Medications at this point such as Observation Resource, Questionnaire/Questionnaire Respons, Inclusion/Exclusion
    - Explore another domain that also requires supplemental domains – allows us to have a range of multiple SDTM fields to define metadata and test if this will actually work for research/regulatory use (ie with existing tools?)
- Alternative (at some time in the future?) – Instead of exploring this domain by domain, maybe design a “micro-study” that touches on multiple data domains. Allows a focused use case as a study and stimulates development in multiple areas
- Explore the ability to use resources under development.

Subscriptions Track

Summary

During Connectathon 28, the Subscriptions Track was focused on testing the changes in the R4 Backport IG and resources slated for publication in R4B (SubscriptionTopic and SubscriptionStatus).

Participants

- Gino Canessa, Microsoft
- Adam Strickland, Epic
- Aditya (Adi), Cotiva (?)
- Anurag Dongre, Philips
- Aravind Raghunath
- Dan Tripp, MDI Solutions (Toronto)
- David Hay, whom requires no further info =)
- Dylan Parmley, PatientLink
- Paul Taladay, Microsoft
- Robert (RB) Johnson, Microsoft

Notes

- A lot of good discussions, including a lot of complex workflow detail.
- Heavy focus on testing (deterministic, moving towards automated).
- Good policy discussions with DaVinci (re: intermediaries, large scale systems, etc.) and FHIRcast (re: possible alignment, delineation and overlap, etc.).
- Tooling issues:
    - Without R4B and R5 'cuts' for the connectathon, many people struggled with writing software against the specifications (extra time and effort).
- More details can be found on Confluence: https://confluence.hl7.org/pages/viewpage.action?pageId=79499153

Next steps

- Continue refining text in the specifications.
- Write additional tooling, specifically:
    - Tools to simulate various error states
    - Automated tooling for integration, both successful and error states

FHIR Testing and TestScript

Summary

The FHIR specification defines a Testing Framework that defines a Test Execution Engine and the TestScript resource for use in validating and verifying that a FHIR implementation (client and/or server) is conformant to the FHIR specification. The management and proper use of testing is fundamental to effective, interoperable data exchange, so this is an important capability to provide and validate in the Connectathons. We expect and hope to achieve:

1. improved capabilities of FHIR servers measured by conformance testing,
2. implementation and implementer experience with the FHIR Testing Framework and TestScript,
3. identify potential improvements to the FHIR Testing Framework and TestScript,
4. increased awareness of FHIR Testing and its benefits.

Participants

Name	Organization
Cage Cheung	NIH
Jose Costa Teixeira	HL7 Belgium
Khaled Younis	Philips Healthcare
Mario Hyland	AEGIS
Matt Blackmon	Healtheway Inc Dba the Sequoia Proj
Nikhilesh Sonar	Philips Healthcare
Richard Ettema	AEGIS (Track Lead / Host)
Rupinder Singh	Applied Research Works, Inc.
Sreenivas Gelle	BCBST
Sudhakara Bijjam	The Joint Commission
Timothy Bennett	Drummond
Wanda Govan-Jenkins	ONC

Systems which have implemented FHIR Testing / TestScript

AEGIS: Touchstone – https://touchstone.com – 100% coverage

MITRE: Crucible - https://www.projectcrucible.org – 50% coverage

NIST: Asbestos - https://github.com/usnistgov/asbestos - 80%(?) coverage

Notable achievements

Day 1 10:00-12:00 Session

The attendees were for the most part new to the FHIR specification and/or the FHIR Connectathon experience. So, this session became more of an education/demo presentation where we covered:

- The FHIR Testing Framework
- The FHIR TestScript Resource Structure
- Demonstration of FHIR TestScript execution using the Touchstone FHIR Testing Platform - https://touchstone.com

Day 1 2:00-4:00 Session

The first half of this session was a continuation of the education/demo presentation format reviewing the base functionality defined in the FHIR TestScript resource. A review of the Touchstone Testing IG and TestScript Profile was then done to illustrate how the functionality of a FHIR Test Engine and TestScript execution could be defined and implemented.

The second half of this session was a review of the May 2021 Connecathon 27 TestScript Track outcomes. The disposition of the HL7 FHIR JIRA issues created from the May 2021 event were reviewed as well as the original action items.

- Jose Costa Teixeira was on the call and a discussion of these action items was done.
- Follow up action items were assigned to Jose and Richard (myself) to begin FHIR Zulip Chat conversation around various questions:
    - TestScript integration into FHIR IGs
    - Use of common Definition Language that could be used to generate TestScripts as well as other Test Tool testing scripts; e.g., Postman collection

Day 2 10:00-12:00 Session

We had a limited number of attendees. So, this session continued with the education/demo presentation style where we discussed the broader topic of "Why TestScript vs Other Testing?"

- Presentation by Mario Hyland that describes the rationale behind the need for a standardized FHIR Testing Paradigm using the FHIR TestScript resource.

- Richard Ettema was away from 11:00-11:30 to present the Track Review for the Connectathon.

Day 2 2:00-4:00 Session

Session not recorded

This session ended up being an open/adhoc discussion that involved some related and other non-related topics.

Discovered issues / questions

- Various actions items from the May 2021 Connectathon still require attention

Now what?

- Multiple FHIR Zulip Chat discussions have been started and will continue based on various actions items.
- The TestScript HL7 FHIR JIRA issues will be completed for inclusion with FHIR R5.
- The TestScript resource will be moved up in FHIR Maturity to 3 or 4.

Vulcan Schedule of Activities

Track Goal

Test current state of FHIR SOA Implementation Guide and create a CarePlan

Track Summary:

Proved ability to:

- Load 3 Resource Bundles
    - Bundle-H2Q-MC-LZZT-Bundle-1.json
    - Bundle-H2Q-MC-LZZT-Bundle-2.json
    - Bundle-H2Q-MC-LZZT-Bundle-3.json
- Find a research study
- Navigate to planned definition
- Get back list of activities to be completed.
- Define a subject based on newly created patient
- Create a Care Plan for that subject! :-)

List of Participants:

- Geoff Low, Medidata Solutions
- Rahul Thandavan, Roche
- Hugh Glover, Blue Wave Informatics
- Andy Richardson, Zenetar
- Mike Ward, Lilly
- Mike Hamidi, Pfizer

Notable Achievements:

- Created foundational Python code to create a service request that
    - Navigates through the planned activities (PlanDefinition and ActivityDefinition) for a Research Study
    - Creates ServiceRequest
    - ALMOST SUCCESSFULLY creates the overarching CarePlan for entire study
    - SUCCESSFULLY creates the overarching CarePlan for Visit 1 that references the individual CarePlans instantiated for each Plan Definition and Activity Definition for a patient who is a subject in a Research Study.

Key Discoveries

Successes

- Created interconnected care plans and service requests related to the care plans
- Using Python, engineered way to emulate/replicate/simulate the CDS Hooks

Issues

- If you don't specify all the details in the bundle, it won't create the instance, it will create the placeholder
    - Need to more fully populate the resource bundles
    - Need to further expand on associating the Activity to the CarePlan

Next Steps

- Arrange call with Bryn Rhodes and CDS group to discuss
    - proper pattern for dealing with nested Plan Definitions when you apply them to a Care Plan
    - how should these resources be represented in an EHR system
    - Document learnings in Implementation Guide expectations

    - Ascertain better understanding of “Apply CQF Ruler”.
- Determine if this work be subsequently created as a Smart on FHIR app?
- Take everything that was completed during Connectathon and generate a bundle.
    - This bundle should represent all the planned activities.
    - Publish by year end.
- Evaluate how do we make the developed code scalable and consumable
- Arrange meeting with SMEs from Cerner or Epic to understand how their systems manifest workflows.

Vulcan/Gravitate Health - Electronic Product Information

Summary: what was the track trying to achieve

Obtain feedback on:

- the IG, the test scenarios, and the sample data
- EMA's ePI specification

Shed light on this IPS and ePI topic areas.

Shed light on potential solutions for these healthcare challenges.

List of participants (with logos if you have time and energy)

To be requested from HL7 admin team

Systems which have implemented the IG, Profile, or Resource, and approximate percentage covered

EMA has implemented via the ePI specification and the ePI server

Datafarm provided an ePI server

Trifork provided an IPS server

HL7 EU provided an IPS server

Rob Hausom provided an IPS server

Where can test scripts and results be found (link to ConMan, Touchstone, or Inferno?)

Refer to ConMan for test results

Notable achievements

EMA's participation

- Thankful for the European Medicine Agency's (EMA) participation, support and openness to attend the meetings, answer questions and provide feedback.
- Shed light on the capability of EMA's ePI API and server. Received positive feedback about it's performance (very fast) and EMA's response to granting API access was also very fast.
- Opportunity for track participants to provide direct feedback on the ePI plans. E.g.,
    - Opportunity to other FHIR capabilities like: chained searches; Graph QL; DocumentManifest resource vs List resource.

Developer demonstrations

- Testers confirmed they were able to pull the IPS and the leaflets from the servers.
- University of Oslo's Capable app demo
- Confirmed ability to pull and display ePI data from EMA.
    - Facilitated testing to identify issues when dealing with international data.
    - Learned from using real data rather than dummy data.
    - Showcased the need/use case for structure product information in a way that makes it usable and is consistent internationally.
    - Showcased the need/use case for structured dosing information. Also discussed the challenges associated with displaying (a) complex dose schedules like in Skilarence; and (2) regulatory approved dosing (i.e., as described in the label) vs the real-life dosing as described by the physician. Given the complexity and number of clinical dosing permutations, even an 80% solution would be considered a success.
    - Showcased the value of having multilingual international standards. We cannot build one country specific solution given the international nature of these healthcare/labelling scenarios.
    - Showcased the need for a common way of getting prescription information across borders. Both for the structure and the content.

Datafarm application demo

- Confirmed that the IPS and ePI data could be pulled from the server.
- Noted how fast and responsive the EMA's ePI API is. Was able to access, pull and render JSON to html in real time.

IPS and ePI Implementation Guide

- No direct feedback received on the IG so far. However, it is a work in progress and will serve as a foundation for future work. This is also the case for the sample data, which will be modified and reused for future connectathons.

Vulcan/Gravitate Health Team

- Pulled together everything needed to run the connectathon in a little over one month. Great teamwork!

Healthcare challenges/solutions

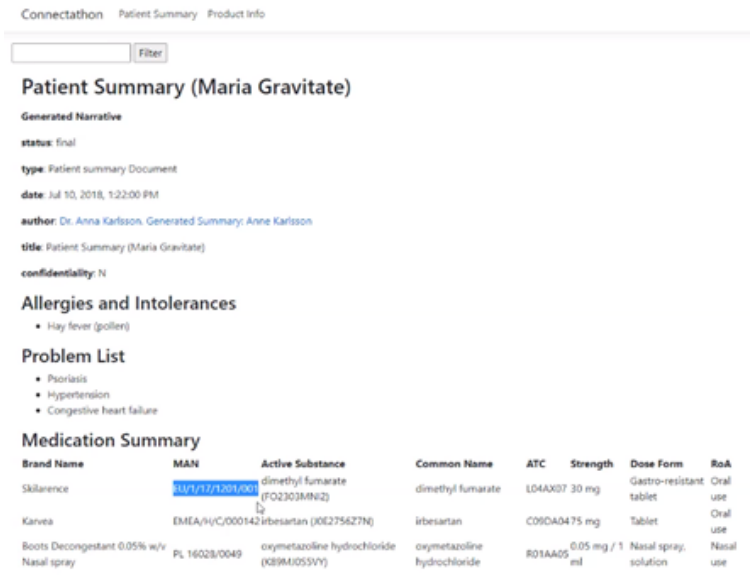
- Demonstrated how we can raise the bar for HL7 the organization and FHIR. Showing that there are a lot of similar healthcare challenges being faced by different jurisdictions. Showed that there is benefit in working together to develop common solutions.

Communications

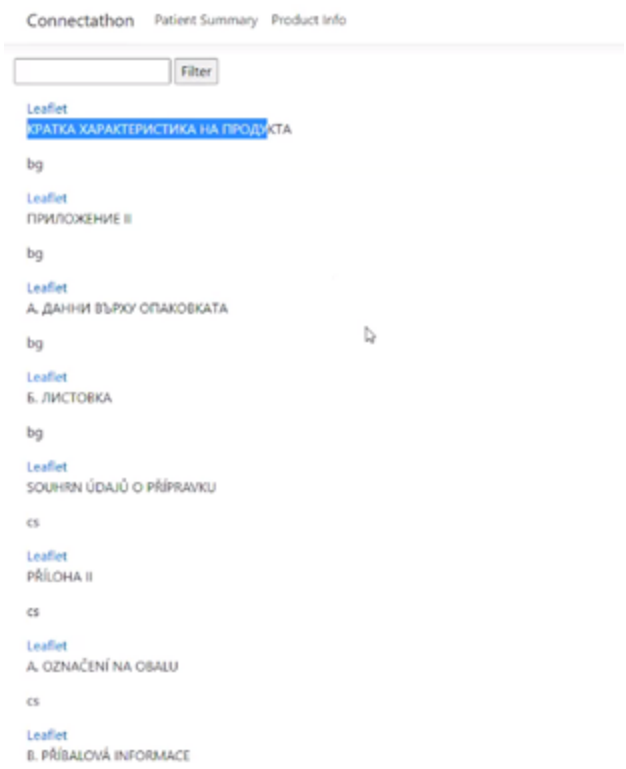
- Received positive feedback on Gravitate Health's communications (e.g., Tweets, LinkedIn posts, website posts).
- Received positive feedback on the LinkedIn meetup.

Screenshots of relevant and interesting things and/or links to further information about implementations/achievements

Screen capture from IPS Demo



Screen capture from ePI Demo



Discovered issues / questions (if there are any)

Identifiers:

- Need to ensure sample data is consistent and matches real life. E.g., mix of EMA and MHRA numbers.
- Consult with EMA on future plans on identifiers as connection points between ePI and other datasets. E.g., whether to use IDMP identifiers vs other identifiers MAN.
- Identified the need for unique packaging ID's

Manual effort required to build, trouble shoot and maintain sample data by hand. Especially the narrative text aspect of ePI's.

Identified a need for structured dosing information within the ePI documents.

Now what?

Begin planning for the next connectathon in January 2022. Continue working with EMA and invite FDA and UMC/WHO to participate as well. Also, consider inviting EPIC, Cerner and eHealth stakeholders.

Consider further collaboration with UNICOM to combine forces; share resources; share sample data; and co-develop content or scenarios for testing in future connectathons.

Consider applying the same communication approach in the next connectathon. Just further in advance.

Report back to Vulcan members to share what has happened to date and survey what they would like to see in a future Connectathons.

Prepare an interaction diagram across Gravitate. E.g., create an enterprise view of where we will be working next.

Look into longer term hosting for ePI sample data. Discuss whether the Denmark, Datafarm or future Vulcan servers as options.

Begin using more real-life scenarios with different actors playing different roles in the scenario. Consider scenarios that involve allergens and adverse effects.