The Potential for Using HL7's FHIR Product in the Immunization Community

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What is FHIR?

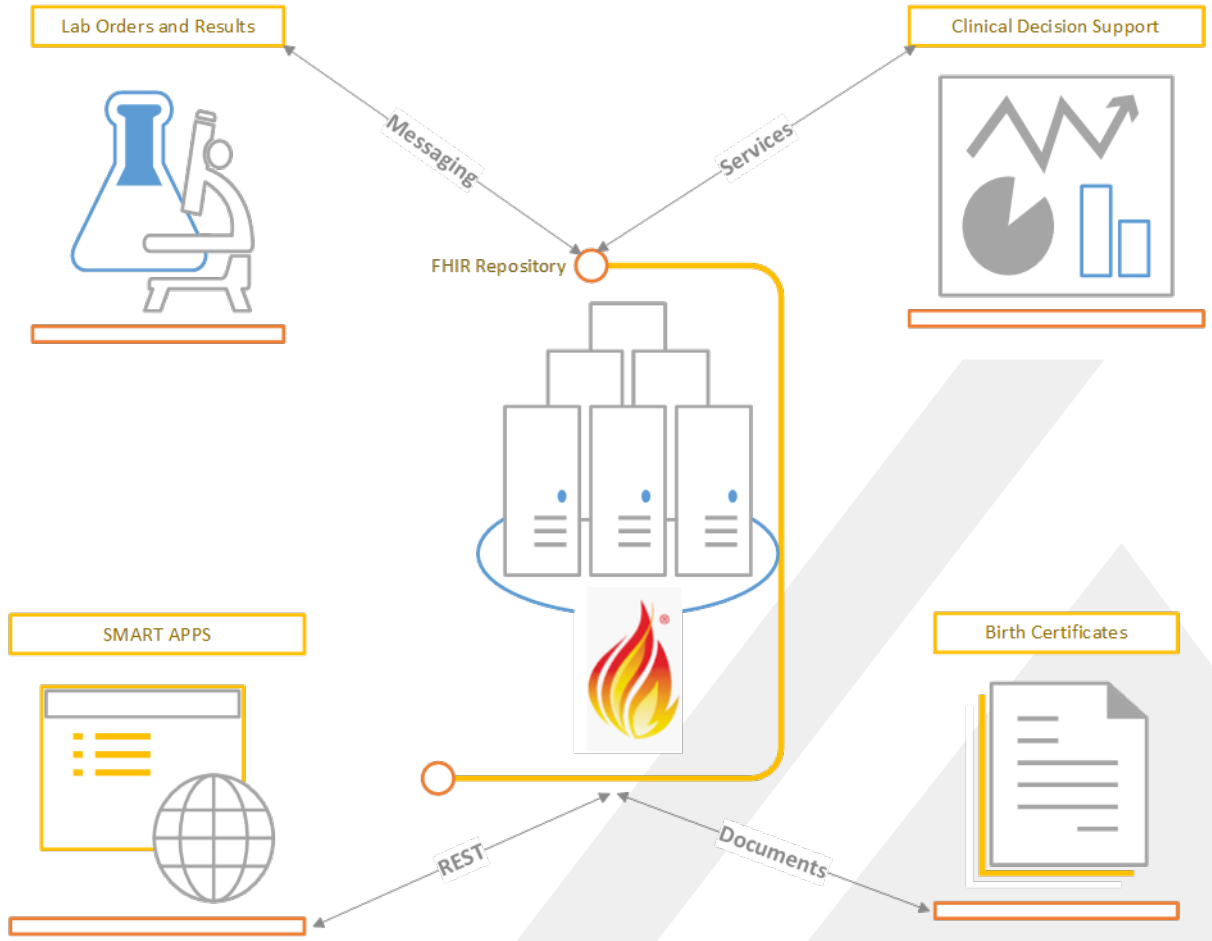
- The newest HL7 data exchange product family that has garnered a lot of attention recently and is an area of focus for many vendors
  - F- Fast (to design and implement, relatively speaking)
  - H – Healthcare (why we're all here)
  - I – Interoperability (share, share, share)
  - R – Resources (building blocks to use and reuse)
- Focused on the implementation needs of the community
- http://hl7.org/fhir/summary.html

Why FHIR?

- Implementer friendly
  - Based on mature internet conventions (RESTful APIs, XML, JSON, Oauth)
  - Broad range of tools to support implementations
  - Eliminates need for expert knowledge on how **each** EHR pushes and pulls data
  - Standards used in all industries and not locked down to healthcare standards
- Human readability
- Release 4 (R4) is the most current version and is the first to contain Normative content

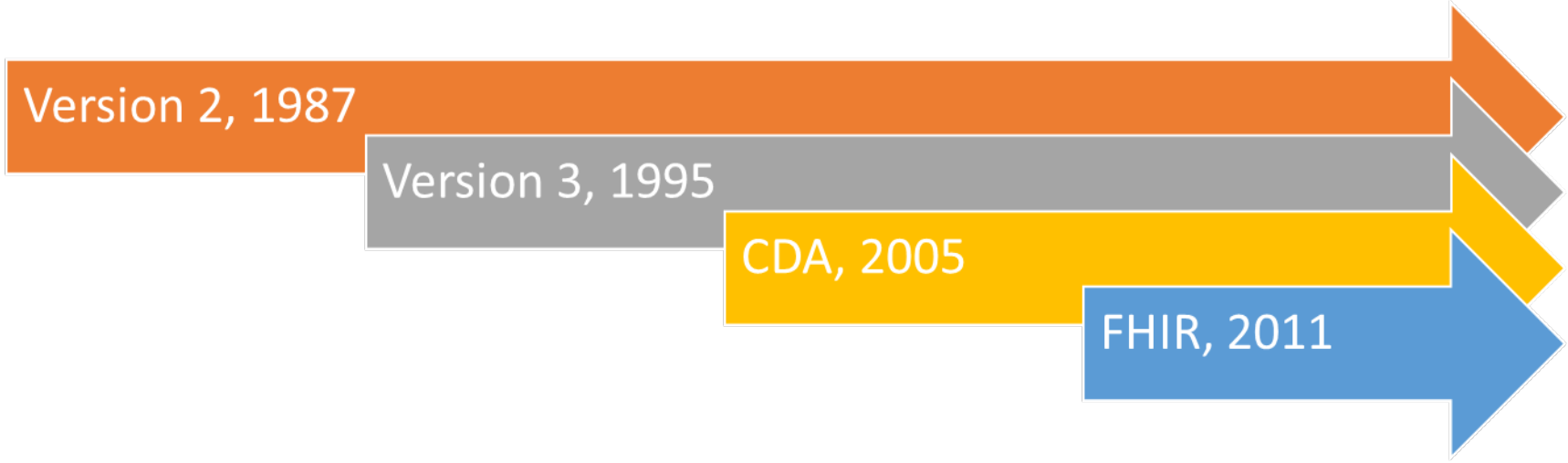
Why FHIR?

- Appropriate for use in a wide variety of contexts:
  - Mobile apps
  - Cloud communications
  - EHR-based data sharing
- Same resources used in different paradigms



HL7 Product Families

- V2 - Tried and true messaging standard that we all know and love
- V3/CDA (Clinical Data Architecture) - XML based documents which are the gold standard in exchanging clinical documents in the US
- FHIR - Supports multiple types of workflows (including messaging and documents)



The Goal is not to Replace Existing v2 Integrations!!

- Let's assume that we have no desire to replace the existing v2 messaging with FHIR (if it ain't broke…)
  - Although TEFCA and the Cures Act may dramatically impact how data is exchanged between organizations
- But we do want to think about if there are there other ways that FHIR might be of use in the immunization community.
  - Are there areas where increased interoperability would ease pain points or open up new areas of opportunity?

FHIR Resources

- FHIR defines a series of modular base resources
- HL7 likens resources to Lego™ for healthcare
- Each resource are discrete chunks of information
- Resources can be assembled into larger constructs to fulfill use cases

FHIR Resources

- Resources can contain healthcare content or can be infrastructural

	Individuals	Entities #1	Entities #2
Base	• Patient N • Practitioner 3 • PractitionerRole 2 • RelatedPerson 2 • Person 2 • Group 1	• Organization 3 • OrganizationAffiliation 0 • HealthcareService 2 • Endpoint 2 • Location 3	• Substance 2 • BiologicallyDerivedProduct 0 • Device 0 • DeviceMetric 1
	Summary	**Diagnostics**	**Medications**
Clinical	• AllergyIntolerance 3 • AdverseEvent 0 • Condition (Problem) 3 • Procedure 3 • FamilyMemberHistory 2 • ClinicalImpression 0 • DetectedIssue 1	• Observation N • Media 1 • DiagnosticReport 3 • Specimen 2 • BodyStructure 1 • ImagingStudy 3 • QuestionnaireResponse 3 • MolecularSequence 1	• MedicationRequest 3 • MedicationAdministration 2 • MedicationDispense 2 • MedicationStatement 3 • Medication 3 • MedicationKnowledge 0 • Immunization 3 • ImmunizationEvaluation 0 • ImmunizationRecommendation 1

FHIR Resources

- An individual resource is sort of like a v2 segment
- Defines data elements that are part of the resource concept

Name	Flags	Card.	Type	Description & Constraints
Patient	N		DomainResource	Information about an individual or animal receiving health care services Elements defined in Ancestors: id, meta, implicitRules, language, text, contained, extension, modifierExtension
identifier	Σ	0..*	Identifier	An identifier for this patient
active	?! Σ	0..1	boolean	Whether this patient's record is in active use
name	Σ	0..*	HumanName	A name associated with the patient
telecom	Σ	0..*	ContactPoint	A contact detail for the individual
gender	Σ	0..1	code	male | female | other | unknown AdministrativeGender (Required)
birthDate	Σ	0..1	date	The date of birth for the individual
deceased[x]	?! Σ	0..1		Indicates if the individual is deceased or not
deceasedBoolean			boolean	
deceasedDateTime			dateTime	
address	Σ	0..*	Address	An address for the individual
maritalStatus		0..1	CodeableConcept	Marital (civil) status of a patient MaritalStatus (Extensible)
multipleBirth[x]		0..1		Whether patient is part of a multiple birth
multipleBirthBoolean			boolean	
multipleBirthInteger			integer	

FHIR Immunization Resources

- Immunization Resource
  - Describes the Immunization Event
  - Patient, vaccine, date, site, route, educational material, eligibility, etc
- ImmunizationEvaluation Resource
  - Describes the evaluation of an immunization event
  - Validity (status), protocol, dose number, etc
- ImmunizationRecommendation Resource
  - Describes a forecast for a patient
  - Vaccine/target disease, series name, dose number, etc

Ways of Using FHIR

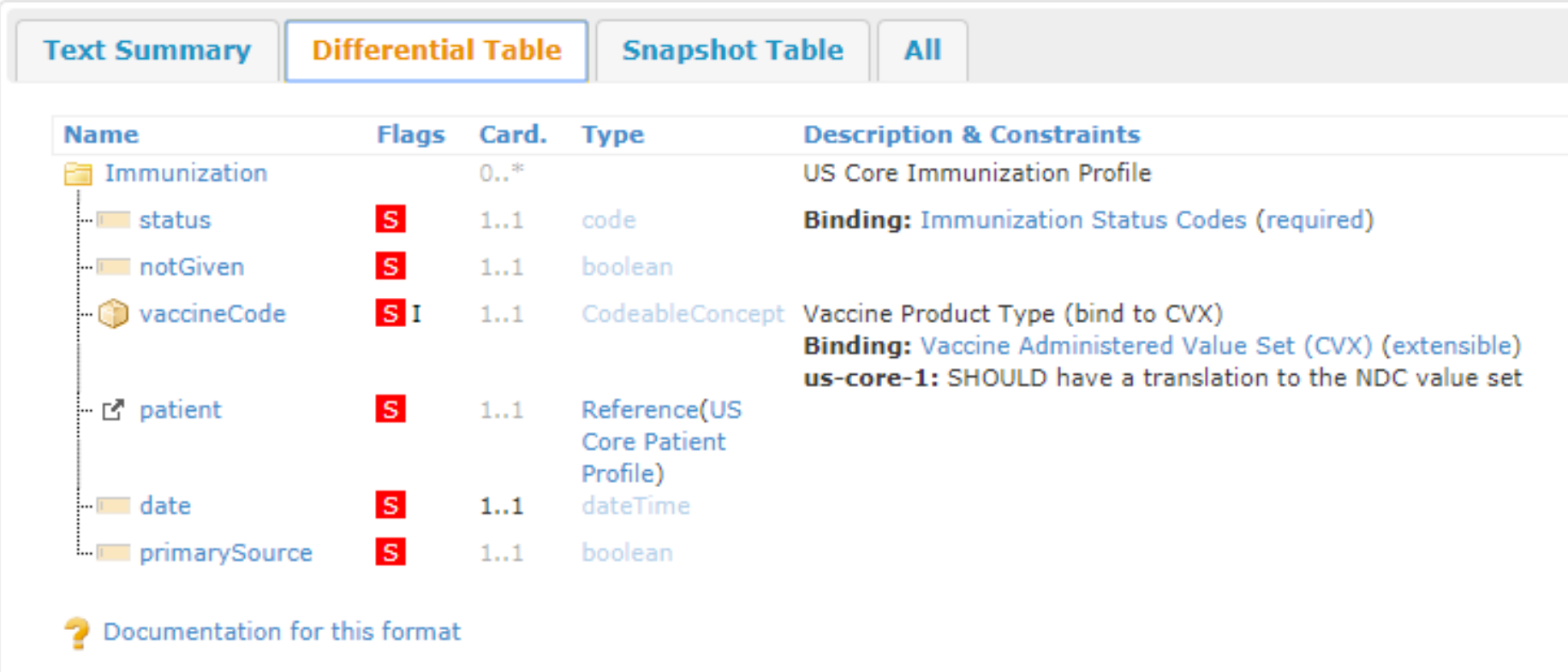
- FHIR outlines multiple ways of executing a workflow
  - RESTful API
    - Direct interaction
    - Read/Get/Update/Put/Delete
    - Search performs a search based on filter criteria
    - Operations (with defined inputs and outputs) can be used to extend the RESTful API
  - Messaging
    - Similar to v2
    - Transfer method is irrelevant to the base FHIR spec
    - An event triggers a message to be sent from one application to another with the return of one or more responses

Profiles and IGs

- Like v2, the base FHIR specification is pretty open ended
  - Not a lot of data elements are “required”
  - Many value sets are “example”
- Resources can be “profiled” to constrain the base standard for a specific purpose
- For example, the US Core IG defines a series of profiles for accessing patient data per the ONC 2015 Edition Common Clinical Data Set

Profiles and IGs

- The US Core Immunization Profile constrains the base resource in a number of places
- Several elements “must be supported” and an extensible set of CVX

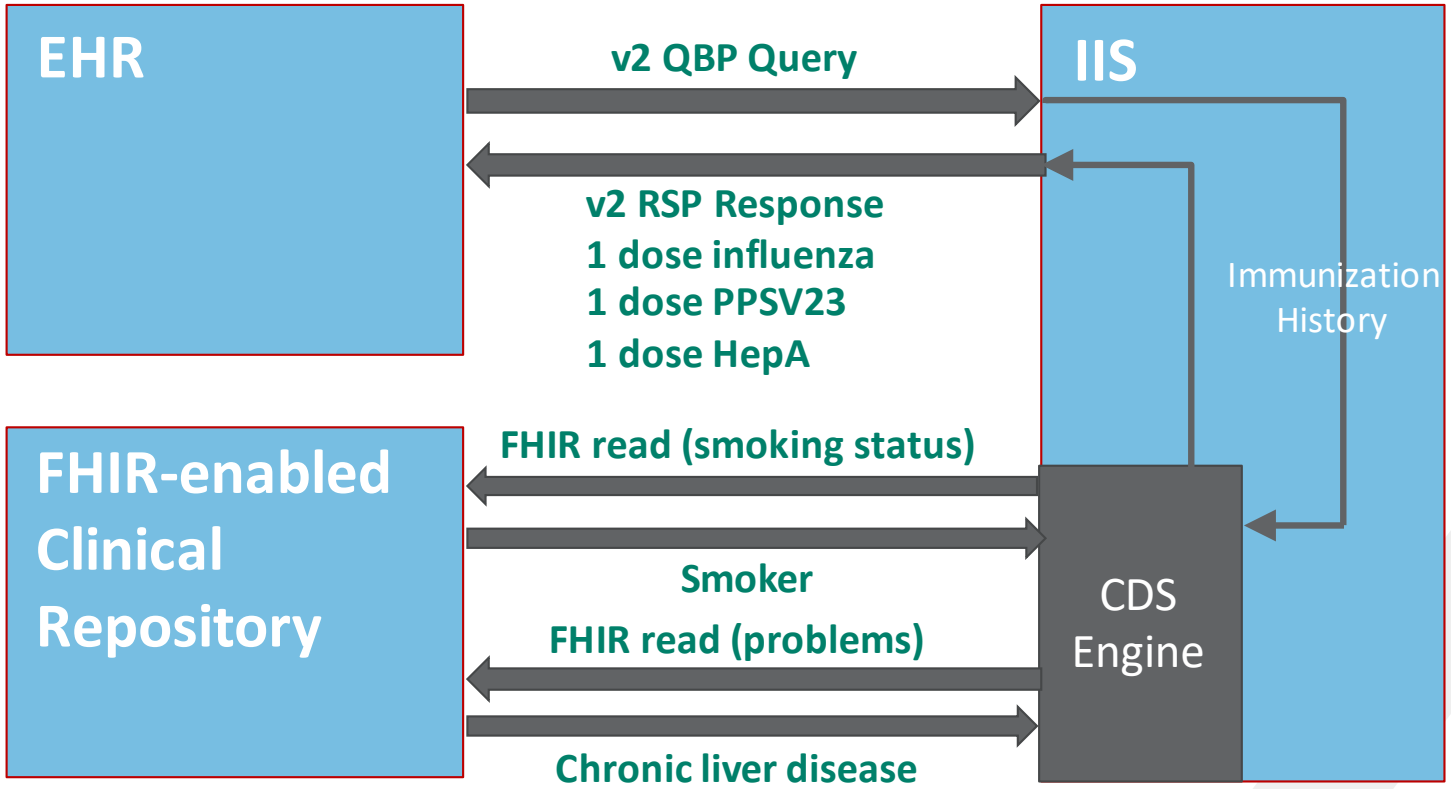


How Could We Use FHIR?

- CDS engines could transiently access patient clinical data (conditions, allergies, medications, occupational data, etc) that it doesn't normally have access to
- A Provider could query an IIS for a school entry report document as mandated by the local jurisdiction
- Enhanced opportunities for patient identification
- Vaccine inventory ordering workflows could be enhanced

Possible Workflow

25 year old male presents at the beginning of flu season



Things to Think About

- Not everyone may be ready to this (and that's OK)
- Anything we build today, we need to support tomorrow
  - This could be implemented in pieces
    - Query for smoking status now
    - Add problems next year
    - Add allergies the year after that
- Can we start defining a way to do this for systems that are interested?

Things to Think About

- Are Public Health Agencies using FHIR today?
  - The Public Health WG is working on a number of FHIR IGs
    - Bidirectional Services eReferrals
    - Vital Records Death Reporting
    - Electronic Case Reporting
- What will future regulations require?
  - Recent Notices of Proposed Rule Making (NPRMs) from ONC and CMS have called for the use of FHIR APIs for the exchange of data
  - The Trusted Exchange Framework and Common Agreement (TEFCA) mentions FHIR but doesn't require its use (at least for now)

Things to Think About

- Which EHR and HIE vendors may be able to implement this?
- Which existing profiles can we leverage to make this easier to implement?
- What authentication and security considerations are there?
  - What patients should an IIS be able to access clinical data for?
  - What types of clinical data should an IIS be able to access?
- Would these FHIR calls be quick enough to still process the query (and determine the forecast) in a timely fashion?
- Terminology work still needs to be done

Thank you.

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