Integrating a Fully Realized FHIR-Based Representation of the World

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Meet Our Speakers

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Maria Michaels
Public Health Advisor,
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JULIA SKAPIK

- Medical Director, Informatics, NACHC
- Director, HL7 Board
- Former Senior Medical Informatics Officer, ONC
- Practicing Internist: Inova Health System, PCP: Neighborhood Health of VA
- Board Certified Clinical Informaticist/Evangelist
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MARIA MICHAELS

- Public Health Advisor, CDC
- Lead – International/National Multi-partner Initiatives involving the Learning Health System
- Former Program Manager/Technical Lead – electronic quality measurement, CMS
- Former Meaningful Use Director and Research Program Manager at academic medical
Conflict of Interest

Julia Skapik, MD, MPH, FAMIA

Maria Michaels, MBA, PMP

Have no real or apparent conflicts of interest to report.
Agenda

• Introduction to FHIR
• Presentation of Promising FHIR Use Cases and Efforts
• Review of Challenges Remaining in the FHIR Community
• Promise of the Future
Learning Objectives

• Understand how different FHIR Accelerators, Implementation Guides and formal standards support critical use cases from clinical decision support to payers to public health
• Describe what standards developers and implementers have done to instill harmony and demonstrate functionalities across use cases within the FHIR standard and its content
• Learn what challenges are likely to arise as your organization would move towards the larger scale use of FHIR and best practices that should be put in place to be successful both within a single use case and across multiple use cases
POLICY GETS RESULTS... THEY MAY BE THE ONES INTENDED...

American Recovery and Reinvestment Act (ARRA)
Health Information Technology for Economic and Clinical Health (HITECH) Act
Terminology requirements
C-CDA Transitions of Care
Patient Portal, eCQMs, Registry, Security

Migration of MU Common Clinical Data Set to USCDI
Removing barriers to data sharing for clinical use
Information Blocking regulatory authority
Creation of Interoperability Standards Advisory

2009-2014: Meaningful Use
2015: MACRA
2016-2019: 21st Century Cures
2020-2021: Implementation

2015 Edition of Certification
API Requirement
Initial CDEs: Vital Signs, DOB
UDI for Medical Devices, Health Concerns, Goals

USCDI v2
Federal Health IT Strategic Plan
Patient Access Expansion
Payer Exchange Requirements
# Integrating a Fully Realized FHIR-Based Representation of the World

## WHAT GETS PAID GETS DOCUMENTED AND DONE...

### Policy
- CMS Interoperability and Patient Access Final Rule
- CMS Interoperability and Prior Authorization Proposed Rule
- Guidance for States
- Best Practices for Payers and App Developers
- Patient Privacy and Security Resources

### Technical Standards
- FHIR
- SMART/OAUTH 2
- Open ID Connect
- United States Core Data for Interoperability (USCDI)

<table>
<thead>
<tr>
<th>API Name</th>
<th>Supporting IGs</th>
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<tbody>
<tr>
<td>Patient Access API</td>
<td>• The CARIN Consumer Directed Payer Data Exchange IG (also referred to as the CARIN IG for Blue Button®)</td>
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<tr>
<td></td>
<td>• HL7 FHIR Da Vinci PDEX IG</td>
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<td></td>
<td>• HL7 US Core IG</td>
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<td></td>
<td>• HL7 FHIR Da Vinci - PDEX US Drug Formulary IG</td>
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<td>Provider Access API</td>
<td>• See Above IGs for Patient Access API</td>
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<tr>
<td>Payer-to-Payer API</td>
<td>• See Above IGs for Patient Access API</td>
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<tr>
<td>Provider Directory API</td>
<td>• HL7 FHIR Da Vinci PDEX Plan Net IG</td>
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<td>Documentation Requirements</td>
<td>• HL7 FHIR Da Vinci - Coverage Requirements Discovery (CRD) IG</td>
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<tr>
<td>Lookup Service API</td>
<td>• HL7 FHIR Da Vinci - Documentation Templates and Rules (DTR) IG</td>
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<tr>
<td>Prior Authorization Support (PAS) API</td>
<td>• HL7 FHIR Da Vinci - PAS IG</td>
</tr>
<tr>
<td>Bulk Data</td>
<td>• HL7 FHIR Bulk Data Access(Flat FHIR) Specification</td>
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</table>

THE FUTURE IS FHIR

Designed for and excels at:

- Ease of data extraction
- Exchange through API
- Use of services
- Easy for programmers to use, even without health IT (HIT) expertise
- Name recognition/HIT bling
FHIR: ACCESSIBLE TO ALL

- Transparent
- Open source
- Comprehensive
THE FUTURE IS FHIR: ADAPTING CLINICAL GUIDELINES FOR THE DIGITAL AGE

- Need to apply evidence in patient care more easily, quickly, accurately, and consistently
- A redesigned process to co-develop computable and textual guidance in parallel helps minimizes unnecessary handoffs and redundancies
- International standard (FHIR Clinical Guidelines aka CPG-on-FHIR) provides a FHIR-based standard for faithfully representing textual guidance in computable form. More on this shortly...
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**FHIRE CLINICAL REASONING:**
**ENABLING NEXT-GENERATION CLINICAL CONTENT**

- Need stable and interchangeable approaches to make data usable for patient care
- Clinical reasoning allows highest-level complex use cases like clinical decision support, composite quality measurement, care cascades
- FHIR offers multiple methods to approach many use cases
MOVING CLINICAL GUIDELINES TO THE BEDSIDE (CPG-ON-FHIR)

- Provides a framework for using FHIR to create a computable representation of narrative clinical guidance that is faithful to the guidance’s intent

- Components of computable guidance can be reconfigured and reused like Lego blocks to create "enablers" such as cognitive and decision support, document templates, quality measures, case reports, etc.

- Content for particular use cases leverage the framework in CPG-on-FHIR IG and describe how the data elements, value sets, etc. needed for the use case should be specified
ENABLING CARE COORDINATION: FHIR CARE PLAN

Basic Components of a Care Plan

The 4 cornerstones of a care plan
- Health concern
- Goal
- Health status/evaluation & outcome
- Intervention (care activity)

Content:
- Health concern(s)
- Health goal(s)
- Activity/intervention
- Progress/outcome
- and more...

Dynamic behavior:
- Machine assisted care coordination

Corresponding FHIR standards:
- Care Plan
- Condition
- Goal
- Request-type resources
  - ServiceRequest, MedicationRequest, etc.
- Observation
- Questionnaire & Response

Source: HL7 Patient Care Work Group “Care Plan Standards Overview for ONC”, April 19, 2017

- Care Plan is a game-changer both for patient-centered, coordinated care and for documentation changes allowed under new CMS rules
- FHIR Care Plan is currently used across many use cases including payer and clinical care
- The customization of Care Plan templates could address some of the problem with FHIR content and add opportunities for CDS
- Already several of the components are supported in federal legislation
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MEDMORPH:
NEXT-GENERATION PUBLIC HEALTH

Making EHR Data More available for Research and Public Health (MedMorph)

- MedMorph: CDC-led, PCOR-TF funded project that brings together multiple public health and research cases in a common architecture
- Data reuse cases to harmonize and implement them at scale in FHIR
- Use cases include:
  - Chronic Hepatitis C Surveillance (infectious disease)*
  - Cancer Reporting (chronic disease)*
  - Health care surveys (non-case-based reporting)*

*Representative use cases – can apply to similar use cases as well
DAVINCI FHIR ACCELERATOR: BRINGING PAYERS TO THE CARE TABLE

⚠️ Payer involvement is key to making FHIR a standard that drives healthcare operations

⚠️ Missing exchange between clinical providers and payers (and the other clinical providers linked via payers) has the potential to drive value and identify care gaps

⚠️ DaVinci has set a standard for FHIR development and testing

- Standards (FHIR)
- Implementation guides
- Reference implementations
CHALLENGES: FHIR TOOLING

▲ FHIR’s collaborative development means that tooling may require sophisticated technical skills, may not support the current standard or isn’t ready for production

▲ This limits the participation of content authors who are not engineers/FHIR collaborators

▲ This also means that FHIR content, both in the standard and in the field, is likely to have limited testing

▲ However, tooling in FHIR is continually changing and investments over time will likely address some of these challenges
**CHALLENGES: GRANULARITY VS FREEDOM**

- Because FHIR attempts to accommodate the international and broadest use case, it rarely requires a lot of metadata.

- This means that how much of the available metadata will be included in a FHIR message is unknown so may mean that the data isn’t clinically useful or can’t be integrated locally.

- Furthermore, some FHIR profiles and resources may seek to include more metadata than a typical clinician is willing or able to capture.

- Better harmonization of profiles and resources for general clinical use would help address this issue.
CHALLENGES: FHIR TERMINOLOGY

- Due to its goal of being internationally usable, FHIR does not seek to limit terminology bindings, even to available and curated code systems—this leads to sometimes problematic freedom to user constraints.

- This means that the constant effort of mapping is unresolved and leads to further semantic equivalence issues.

- Even where there may be clinically equivalent concepts coded in multiple terminologies, FHIR does not have a mechanism to represent this or identify these.

- New US- and national-realm core sets can help to mitigate this problem.

- HL7 Terminology has made great headway from early terminologic support for FHIR and is working on better tooling and repositories.
CHALLENGES IN FHIR: CLINICAL ENGAGEMENT

- FHIR has a small community of clinicians involved in its development and an even smaller number of practicing ones.

- FHIR operates on an “80/20” principle, meaning that content not in the “80%” of common content is relegated to extensions and the FHIR community determines what is in the 80%.

- Clinician involvement in FHIR is difficult to say the least— a mechanism for clinician engagement is in development at HL7 but it has yet to yield much advancement in transmitting better use case, workflow and content review and feedback.
CHALLENGES IN FHIR: INTEGRATION

- Outside of FHIR Core, there are more profiles and resources in extensions than in the Core
- Because FHIR is not built against a logical model the development of extensions is largely free-form
- There is not currently any tooling or method to cross-check bundles and extensions across use cases to determine conformance for multiple purposes; in fact, it is known that many sets of extensions directly conflict one another
Putting It All Together: Integrating Components of Future HIT

* Notional in 2021
CHALLENGES IN FHIR:
GOVERNANCE

- FHIR is not a content standard (content governance is out of scope)
- FHIR does not endorse content other than bringing it into the core
- There is not a governance mechanism for content with the exception of conformance to the core and ballot process
- Additional clinical governance mechanisms in FHIR might help to promote high quality content and downgrade lower quality content
FHIR: OPPORTUNITIES
FINDING LOCAL CONTENT

While it is easy to develop applications using FHIR, developers are stuck when it comes to content—without clinical concepts that:

- Are coded and available broadly in HIT systems,
- Can be pulled through APIs, and
- Have a stable and visibly defined clinical meaning to users.

...there can be no plug and play interoperability!

Using FHIR Core resources to ensure interoperability does not work because there is too much optionality to guarantee successful exchange without additional effort.

USCDI could be the solution to this, but it not granular enough for even a partial data dictionary for developers to find defined content.
SHOULD FHIR CHANGE TO ADDRESS ITS CONTENT PROBLEMS?

- Forcing content management into FHIR is wanting to have your cake and eat it too.

- FHIR cannot and should not 'fix' its limitations in content by over-specifying or building its own logical clinical data model.

- FHIR relies on profiles to address the lack of specificity it has at its core—this harmonization is a FHIR issue.

- Observational Medical Outcomes Partnership (OMOP) provides a specification that can create structure and semantics for a family of profiles that, when used, provide important benefits.

- This allows the clinical data meaning to transcend the content standard and live beyond FHIR.
IS FHIR INADEQUATE?...NO, NOT FOR ITS PURPOSE—
IS THE PROOF IN THE PUDDING?...YOU BETCHA!

▲ FHIR, by design, does not tackle many of the challenges – for example, some tooling and clinical engagement should be improved, other limitations are by design

▲ There is still a largely misunderstood chasm between health IT and the rest of the IT industry, and it’s not that simple

▲ Yet, as in all healthcare technology challenges the problem ISN’T THE TECHNOLOGY— it is content- and governance-based

▲ Addressing content and governance (along with regulatory policy) can unlock the promise of FHIR in the decade to come
A (LITTLE) HISTORY...AND A LITTLE PREVIEW?

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<th>Date</th>
<th>Version</th>
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<td>Dec 27, 2018</td>
<td>4.0.0</td>
<td>Release 4 (1st Normative Content + Trial Use Developments)</td>
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<tr>
<td>Feb 21, 2017</td>
<td>3.0.0</td>
<td>Release 3 (STU - Standard for Trial Use)</td>
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<td>Oct 24, 2015</td>
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<td>DSTU2 (Second Draft Standard for Trial Use)</td>
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Plug and Play EHR SMART on FHIR?
Mobile FHIR Patient Platforms?
Next Generation EHR?

- FHIR Development
- The Present
- The Future
- R5 Development
- DaVinci FHIR Accelerator
- 21st Century Cures FHIR API Requirement
THE FUTURE: FHIR AND YOU (1 OF 2)

- Get involved in standards-based projects related to your use case to understand the content and the influences—represent individuals with your background.

- Integrate **DEVELOPERS, CLINICIANS, IMPLEMENTERS** (and **PATIENTS**) from day 1 in any development work.

- Find profiles, extensions, value sets from existing use cases and authoritative sources and **REUSE THEM**.

- Ask others to QA your material and validate your workflow and use case assumptions.

- Use the framework and tools that exist if they meet your purpose and reach out if they don’t.
THE FUTURE: FHIR AND YOU (2 OF 2)

Test, test, test

- Work to bring implementers in on day 1— if you can’t find them then look to vendor development labs for a chance to simulate
- Look for clinical partners and research/funding opportunities to get your name out there

And remember---If you are as close as you can legally get to a patient— you’re in the right place!
Questions

• Thank you for your attention!

• Questions and complaints can be sent to jskapik@nachc.com
• Maria Michaels: Maria.Michaels@cdc.gov

• Excited to hear from potential partners or advocates for FHIR solutions and improvements

• DON’T FORGET! to complete online session evaluation.
Pants on FHIR