Federal Health Architecture: Government Collaboration in Action

John Forrester, Program Manager
Neil Eforn, Enterprise Architect
Agenda

• What is FHA
• FHA Overview
• FHA Operations
• Use Case 1: Healthcare Directory
• Use Case 2: Opioid Management
• Use Case 3: Mental Health
What is FHA?

Federal Health Architecture (FHA):

- Established as an E-Government Line of Business in 2005
- Engages with federal stakeholders and their exchange partners
- Supports federal health IT standards and policy activities
- Enables federal health agencies to improve the exchange of health data
What Agencies are in FHA?
Inputs

Strategic Plans
- Interoperability Roadmap
- Federal Health IT Strategic Plan
- Strategic Plans for each Federal Agency

FHA Initiatives
- FHIM
- Healthcare Directory
- Opioid Management
- SIGG
- NIEM
- VSAC

Reference Models
- FEAF
- TOGAF
- Agency models
Controls

Governance
- Governing Board
- Managing Board
- Federal Health Architects’ Council

Laws, Regulations, Policies
- Clinger-Cohen
- NDAA/FITARA
- HIPAA
- HITECH

Standards
- Implementation Guides
- Guidance Documents
- Directives and Interpretations
Resources

• Health IT Systems
  • DOD
  • HHS
  • VA
  • CONNECT

• Organizations
  • Federal agencies
  • Standards Development Organizations (SDO)
  • Third party certification and testing
  • Public/private partnerships
Outputs

- Technical Recommendations
- Acquisition Guidance
- Strategic Recommendations
- FHit Roadmap and Strategic Plan
- Business Reference Model
- Stakeholder List
- Analysis and Recommendations for LRPs
- Risk Assessments

- CONOPS
- Interoperability
  - Testing Strategy
  - Guides
  - Uses Cases
- Security Plans
- Initiative Modeling
- Reference Architecture
Outcomes

- Increased Efficiency
- Increase Performance
- Increased Interoperability
- Increase Shared Services
- Improved Patient Outcomes
Use Cases

• Healthcare Directory
• Opioid Management
• Mental Health
Use Case 1: Healthcare Directory

Inputs
- Nationwide Interoperability Roadmap (IO Roadmap)
- ONC Tiger Team
- Federal agencies

Controls
- Governance
- Laws, Regulations, Policies
- Standards

Resources
- Agency HIT systems

Outputs
- Recommendations
- Strategic plan

Outcome
Use Case 2: Opioid Management

**Inputs**
- Federal agencies
- Industry

**Controls**
- Governance

**Resources**
- Agency HIT systems
- PDMP
- APPRISS (PMP Gateway)
- CONNECT

**Outputs**
- Recommendations
- Strategic plan

**Outcome**
Use Case 3: Mental Health

**Inputs**

**Controls**
- Governance
- Laws, Regulations, Policies
- Standards

**Resources**
- Agency HIT systems

**Outputs**
- Recommendations
- Strategic plan

**Outcome**
Summary

• Strong technical understanding of the federal health IT domain
• Robust program management infrastructure
• Technical infrastructure in evolving to provide additional services
• Outcome based solutions are developed to support federal agencies
• Federal agency architects and SMEs are always welcomed
Questions?
Questions? – Contact Us

e-mail: federal.health@hhs.gov
Website: www.healthit.gov/FHA
Social Networks:

@onc_fha
Find us on LinkedIn!
Backup Slides
Value of Architecture

• Comprehensive view of enterprise
• Reduces costs
• Understand risks
• Saves time
• Improves communication
• Exposes complex interactions
Purpose of FHA’s Enterprise Architecture

Cross agency evaluation to identify possibilities to converge on agreed upon:

- Standards
- Processes
- Policy
- Services
Record Matching in a Patient Centric World
A Look at the ONC/PCOR Project: Patient Matching, Aggregating, and Linking (PMAL)
Background

• The Patient Protection and Affordable Care Act of 2010 created the Patient-Centered Outcomes Research Trust Fund (PCORTF).

• The PCORTF is used by the Patient-Centered Outcomes Research Institute (PCORI) and HHS to fund specific initiatives.

• HHS delegated authority to the Office of the Assistant Secretary for Planning and Evaluation (ASPE) to manage these funds.

• All projects support the PCOR data infrastructure.
What is Patient Matching and how will it benefit healthcare?

**Patient Matching**: Comparing data from multiple sources to identify records that represent the same patient.

Challenges of Patient Matching

- Lack of metrics adoption
- Availability of Data
- Data quality
- Differences in electronic health record vendors
  - Data attributes collected
  - Variation in output formats

Project Objectives

- IMPROVE data quality and algorithm match rates
- STANDARDIZE attributes
- CREATE an open source visual tool for patient matching and aggregation
- INCLUDE clinical data research networks and their nodes in the piloting and testing of the proposed standards and services
- INVESTIGATE ways to incorporate accurate provider information
Areas of Focus

Patient Matching

PopHealth/ eCQM

Privacy & Security API

Challenges

NPPES
Overview

• ONC previously engaged CAMH to create popHealth, an open source electronic Clinical Quality Measure (eCQM) calculation platform
• eCQM calculations are only as good as the data they are given
• Providing data to eCQM engines can be a challenge
  – Patient data may be collected via different streams (claims and clinical)
  – Duplicate records may exist for a single individual
• ONC tasked CAMH with enhancing popHealth to address these issues
Open Platform

- FHIR Server
- HEART (OAuth and OIDC)
  - eCQM
  - Patient Matching
  - Patient Merging
  - Record Completeness
  - Claims Importer
Open Platform

FHIR Server

HEART (OAuth and OIDC)

- eCQM
- Patient Matching
- Patient Merging
- Record Completeness
- Claims Importer
FHIR Server

• Open Source
• Apache 2.0
• Support for DSTU2 and STU3
Open Platform
Authentication and Authorization
Open Platform

FHIR Server → eCQM

- HEART (OAuth and OIDC)
  - Patient Matching
  - Patient Merging
  - Record Completeness
  - Claims Importer
eCQM Server

- RESTful API - https://github.com/mitre/ecqm
- Web-based user interface- https://github.com/mitre/ecqm-frontend
Open Platform

- FHIR Server
- eCQM
- HEART (OAuth and OIDC)
- Patient Matching
- Patient Merging
- Record Completeness
- Claims Importer
Matching Systems on FHIR

FHIR Server

HEART (OAuth and OIDC)

- eCOM
- Patient Matching
- Record Matching System
- Patient Merging
- Record Completeness
- Claims Importer

http://mitre.github.io/test-harness-interface/
Patient Matching Test Harness

- RESTful API - https://github.com/mitre/ptmatch
- Web-based user interface - https://github.com/mitre/ptmatch-frontend
Record Completeness and Merging

• FHIR Scorecard – work in progress
  – https://github.com/mitre/scorecard_app
• Record Merging coming in March
Questions?

Contact:
Caitlin Ryan – Caitlin.Ryan@hhs.gov
Andy Gregorowicz – andy@mitre.org
Extending Electronic Case Reporting
Leveraging Existing Standards and Frameworks

Daniel Chaput, MM – ONC/OST
Agenda

• To review and discuss:
  – The possibilities and potential for taking an all-hazards approach to threats to public health.
  – The existing process frameworks that can support such a response
  – Specific Health IT standards and IT frameworks that may be (re)used to
All Hazards Planning

- The general concept
- National Incident Management System (NIMS)
- Incident Command System (ICS)
A public health approach

• Common Ground: Public Health Preparedness Toolkit

• The Common Ground Preparedness Framework: A Comprehensive Description of Public Health Emergency Preparedness
The Common Ground Preparedness Framework

Pre-Incident
- Assess Region-Specific Hazards
- Develop & Maintain All-Hazard Management Plan
- Assess Organizational Response Capacity

Prepare
- Inform & Empower the Public
- Develop and Implement Policy
- Develop Workforce Partnerships & Resources
- Mitigate Hazards

Incident
- Develop & Report Situational Information
- Develop Incident Plan
- Manage Resources

Manage
- Assess Population Trends and Patterns
- Conduct Syndromic Surveillance
- Conduct Notifiable Disease Surveillance
- Conduct Environmental Surveillance

Monitor
- Conduct Active Surveillance
- Conduct Public Health Investigation
- Test Samples and Specimens in Laboratory

Investigate
- Alert Responders and Stakeholders
- Distribute Vaccine or Medication
- Implement Isolation & Quarantine Measures
- Provide Guidance on Veterinary Medical Support
- Inspect Shelters Operations
- Provide Vector Management

Intervene
- Conduct Risk Communication
- Implement Social Distancing
- Ensure Provision of Mass Medical Care
- Support Management of Mass Facilities
- Ensure Food & Water Quality
- Mitigate Incident-Specific Hazards
- Develop Temporary Policies & Standards of Care

Recover
- Assess Organizational Responder Capacity
- Provide Mental & Behavioral Health Care
- Demobilize
- Obtain Reimbursement
- Monitor the Abatement of Health Hazards

Legend:
- Business Process
- Process
- Business Process

Notes:
- *Assess Organizational Response Capacity* appears twice in the diagram to emphasize its role. Its occurrence after the incident triggers the other Pre-incident Prepare processes, beginning a new cycle.
- These processes should be performed jointly with partners to develop the interoperability, trust, and communication with partner response agencies, which are critical for a coordinated response.

https://doi.org/10.2105%2FAJPH.2011.300546
<table>
<thead>
<tr>
<th><strong>Clinical Patterns</strong></th>
<th>The patient profile – in general</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Characteristics</strong></td>
<td></td>
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<tr>
<td><em>Gender</em></td>
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<td><em>Age</em></td>
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<td><em>Pregnancy Status, sexual activity</em></td>
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<tr>
<td><strong>Exposure</strong></td>
<td></td>
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<tr>
<td><em>Where were you? When were you there?</em></td>
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<tr>
<td><em>Examples: travel history, lived in Flint MI, known down wind of a radiation incident</em></td>
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<tr>
<td><strong>Symptoms</strong></td>
<td></td>
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<tr>
<td><em>What the patient says</em></td>
<td></td>
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<tr>
<td><em>E.g. chief complaint – “I have the worst headache ever”</em></td>
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<tr>
<td><strong>Physical findings</strong></td>
<td></td>
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<tr>
<td><em>What the provider measures, e.g. temperature</em></td>
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<tr>
<td><em>What the provider observes, e.g. Patient appears sensitive to light</em></td>
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<tr>
<td><strong>Assessment and Plans</strong></td>
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<td><em>Tests</em></td>
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<td><em>Orders (pregnancy)</em></td>
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<tr>
<td><em>Results</em></td>
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</tbody>
</table>

From: Floyd Eisenberg, MD, MPH, FACP - iParsimony, LLC
The patient profile – Workflow

TRIGGER

Identify patients with risk, e.g.,
• All patients presenting to clinic
• All pregnant female patients

EXPOSURE

Patients who have traveled to areas at risk (e.g., known Zika Virus transmission, lead exposure or radiation)

SYMPTOMS

Patient history / symptoms based on the suspected exposure

FINDINGS - EXAMINATION

Findings on examination consistent with the condition or exposure

TESTING

Studies appropriate to help define if the condition is present

TREATMENT ISOLATION REFERRAL

Recommendations regarding how to manage
a) The patient
b) Healthcare workers
c) The patient’s exposures

From: Floyd Eisenberg, MD, MPH, FACP - iParsimony, LLC
Structured Data Capture

1. Sends request for form/template
2. Sends requested form/template
3. Converts, populates and displays form
4. Fills, stores/transmits structured data
5. Extract, Transform, and Load Data by form/template

SDC Scope

CDE Library
Form Library

Metadata
Source

Form/Template Repository

Forms Fillers Filler
Forms Manager Manager
Form Receiver Receiver

Actor Key
Algorithms for developers

All women of child-bearing age. (P1)

Travel to area with active Zika Transmission (D1): Yes/No

Any Sexual Partner with Travel to area with active Zika Transmission (D1): Yes/No

Resident of area with active Zika transmission (D1): Yes/No

Planned Travel To area with active Zika Transmission (D1) Yes/No

Malaria Prevention & Contraception Advice (P2): Stop

Advise to avoid travel to area with active Zika transmission

Confer with state health department regarding Zika testing (P4)

Mosquito Prevention (P4)

Supportive Care Rest, Fluids, Analgesics, Antipyretics (Avoid aspirin/NSAIDs in case of dengue) (P5)

Serum + Urine rRT-PCR Test (P6): Symptom onset <2 Weeks

Symptom onset >2 and <12 Weeks Post Possible Exposure

Serum Zika virus IgM + Dengue virus IgM? (P7)

Test for Zika Virus IgM once during 1st or 2nd Trimesters (P7)

From: Floyd Eisenberg, MD, MPH, FACP - iParsimony, LLC
Similar flow as implementable in Drools

- BPMN model
- JBoss KIE environment
- Orchestrate execution of the Drools rules

From: Kensaku Kawamoto, M.D., Ph.D., M.H.S., University of Utah
Digital Bridge Project

- The vision of the Digital Bridge is to improve the health of our nation by enhancing bidirectional information exchange between public health and health care.

- The starting point for the Digital Bridge is the development of an interoperable, multi-jurisdictional approach to electronic case reporting (eCR).
  - http://www.digitalbridge.us/

Vignette #3

- Electronic Case Reporting to New York City Public Health: A Proposed Solution using Structured Data Capture
- Receipt of Cancer Data for Public Health Cancer Registry Use; State Public Health Cancer Registry
- The US Food and Drug Administration Safety Reporting Portal
- Vital Events Reporting Done Right: A Federal and State collaboration!
You may also wish to visit/see:

- Community Health UC12
  - HL7 CDS Hooks
  - HL7 CDS Hooks - SMART on FHIR
  - HL7 - eICR (C-CDA)
  - SDC

- ENHANCING INFORMATION EXCHANGE THROUGH A DIGITAL BRIDGE
  - February 21, 2017 — 02:30PM - 03:30PM EST
  - Orange County Convention Center
  - Room: W230A
Acknowledgments

- Floyd Eisenberg, MD, iParsimony, LLC
- Sanjeev Tandon, MD, CDC
- Kensaku Kawamoto, M.D., University of Utah
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- Rachel abbey, MPH, Public Health Analyst, Office of policy, ONC
- Hilary Wall, MPH, Zika, EOC, CDC
- Margaret Lampe, MPH, Zika, EOC, CDC
Contact Information

• Daniel Chaput, ONC – daniel.chaput@hhs.gov
C-CDA Scorecard

Nagesh Bashyam (ONC Contractor)
Nagesh.bashyam@drajer.com
Introduction

- What is the quality of data created by health IT systems used in clinical work flows?
  - Variations in Data Capture, Data Storage, Data Exchange etc.
  - Structured vs Un-structured (Text)

- Broad impacts of data quality
  - Affects Patient
    - Decision making (Personalized treatment), Duplicate tests
  - Affects Population
    - Types of treatments and their effects, Research and new treatment discoveries

- How do we improve the quality of data?
Improving Data Quality

• Improving the type of data captured in the workflows

• Representing the data captured and storing it for future use with appropriate context, structures and semantics

• Exchange the data captured and stored in an interoperable manner
  – C-CDA is the adopted mechanism for exchanging Transitions of Care documents in regulations
  – Built on highly flexible HL7 CDA standard
  – C-CDA is a large implementation guide with many different options and variations for data representation

• For e.g. Representing Name, Birth Sex, Lab Tests, Devices implemented, No Known Problems
C-CDA Scorecard

- Scorecard provides a mechanism to quantitatively measure and improve the interoperability and data quality of C-CDA documents created for exchange
  - Evaluates structured data in C-CDA documents
  - Uses Scoring criteria developed by HL7 and the industry
  - Can be used by both health IT vendors and Providers implementing health IT
  - Is an open source tool that can be installed, configured and optimized locally to improve C-CDA data quality
### C-CDA Scorecard cont’d

**Scorecard Grade:** A-  
**Scorecard Score:** 94 / 100

Your CCD scored a **A-** compared to an industry average of **C**.

**Scorecard Issues:** 20

**C-CDA IG Conformance Errors:** 1

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<thead>
<tr>
<th>Issue Area</th>
<th>Grade</th>
<th>Count</th>
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<tr>
<td>Miscellaneous</td>
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<td>4</td>
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<tr>
<td>Problems</td>
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<td>5</td>
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<td>Allergies</td>
<td>Certification Feedback</td>
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<tr>
<td>Immunizations</td>
<td>Certification Feedback</td>
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<tr>
<td>Social History</td>
<td>A+</td>
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<tr>
<td>Vital Signs</td>
<td>B</td>
<td>13</td>
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<tr>
<td>Procedures</td>
<td>A+</td>
<td>9</td>
</tr>
<tr>
<td>Medications</td>
<td>Certification Feedback</td>
<td>1</td>
</tr>
</tbody>
</table>

*2015 Edition Certification Feedback:*

Detailed grades and the number of issues for each of the sections of information present in your document are shown below. The scores are aligned based on industry standards for C-CDA IG conformance.

- **Quantitative Grade and Score, comparison to industry**
- **Identifies where data representation can be improved beyond conformance**
- **Identifies (structure and semantic) implementation errors that need to be eliminated**
- **Organized by clinical domains**
How do I access/use the Scorecard

- [https://sitenv.org/scorecard/](https://sitenv.org/scorecard/)

- **Manually upload** documents to SITE and get scoring results
  - Business Analysts building systems (health IT vendors)

- **Use RESTful APIs** to submit documents and get scoring results
  - Health IT vendors can integrate into their System Development and Verification Processes automatically

- **One Click Scorecard using Direct Transport**
  - Providers/Implementers can submit documents with PHI from their workflows and receive scoring results via Direct Messages
Live Demo and Questions

• **Manual**
  – [https://sitenv.org/scorecard/](https://sitenv.org/scorecard/)

• **RESTful**
  – [https://sitenv.org/scorecard/ccdascorecardservice2](https://sitenv.org/scorecard/ccdascorecardservice2)

• **Direct Transport**
  – [scorecard@direct.hhs.gov](mailto:scorecard@direct.hhs.gov) (Not active yet, available by Q1 2017)
  – [ccdascorecard@direct.sitenv.org](mailto:ccdascorecard@direct.sitenv.org) (Active currently)