FHIR for Public Health

Presented By

Grahame Grieve
Health Intersections of Melbourne, Australia
and
Paula Braun
CDC’s National Center for Health Statistics
Joint Public Health Forum & CDC Nationwide

How to submit or ask questions for the panel members?

Submit or Ask Questions

• Submit your text question and comments using the Question Panel

• Please raise your hand to be unmuted for verbal questions.
FHIR for Public Health

What is FHIR?

- Standard for Healthcare Data Exchange
  - A base on which to build clinical interoperability
Clinical Interoperability

- IEEE Definition: "the ability of two or more systems or components to exchange information and to use the information that has been exchanged"

- My Definition: “the ability of two or more clinical teams to exchange patients and provide seamless care"
What is FHIR?

- Standard for Healthcare Data Exchange
  - A base on which to build clinical interoperability
- Developed and published by HL7 under an open source licence
- Rapidly becoming the standard of choice for all integration projects
  - And we’re not even done yet!
The FHIR acronym

- F – Fast (to design & to implement)
- H – Health
- I – Interoperable
- R – Resources

- FHIR is a technical specification
- FHIR is a community of implementers, a culture
FHIR – Web API for healthcare

- Uses Web Technologies
  - JSON / HTTP
  - Resources / RESTful API
  - URIs / linked data / semantic web
  - Aligns with other web standards

- Web community
  - Social Media, Open License

- Health Community
  - Connected with existing HL7 content and processes
  - Supports more than just RESTful API
<Patient xmlns="http://hl7.org/fhir">
  <id value="glossy"/>
  <meta>
    <lastUpdated value="2014-11-13T11:41:00+11:00"/>
  </meta>
  <text>
    <div xmlns="http://www.w3.org/1999/xhtml">
      <p>Henry Levin the 7th</p>
      <p>MRRN: 123456. Male, 24-Sept-1932</p>
    </div>
  </text>
  <extension url="http://example.org/consent#trials">
    <valueCode value="renal"/>
  </extension>
  <identifier>
    <use value="usual"/>
    <type>
      <coding>
        <system value="http://hl7.org/fhir/v2/0203"/>
        <code value="MRN"/>
      </coding>
    </type>
    <system value="http://www.goodhealth.org/identifiers/mrn"/>
    <value value="123456"/>
  </identifier>
  <name>
    <family value="Levin"/>
    <given value="Henry"/>
    <suffix value="The 7th"/>
  </name>
  <gender value="male"/>
  <birthDate value="1932-09-24"/>
  <careProvider>
    <reference value="Organization/2"/>
    <display value="Good Health Clinic"/>
  </careProvider>
  <active value="true"/>
</Patient>
Why did we do FHIR?

- Healthcare has many broken processes
  - in spite of high commitment by all parties

- Transformation needs to come to healthcare
  - as it has (or is) in other industries

- Transformation has many blockers, but one key pre-requisite is digital exchange standards that can create network effects
Network Effect Requirements

- Based on Web API technology
- Open license
- Simple definitions
- Pragmatic, not based on dogma
- Cheap to implement
- Strong community supporting adoption
- Lots of open source tools to leverage API
FHIR & Cost of Integration

- FHIR is Easier & Faster (stand on the shoulder of giants)
  - Re-uses technology & Community (Facebook, Google, Twitter etc)
  - Skills & Libraries are easily available, Content is free
  - Community is highly active and open
  - RESTful API is robust
  - Solid open source implementation tooling

- These factors will drive down the cost of integration and interoperability
  - Easier to Develop / Troubleshoot / Leverage in production
  - More people to do the work
FHIR & Market Consequences

- FHIR is a cheaper way to get things done - preferable
- Competing approaches will have to match the cost, or disappear

- FHIR is a brand new approach
  - Is it really worth doing something brand new?
  - Initial response from community members is always negative
  - Drive to adopt FHIR comes from outsiders
  - Classic change process problem
Adoption

▪ FHIR is a draft standard
▪ A ‘beta’ standard, subject to ongoing change
▪ In spite of this, it is being adopted quickly
  – Government projects + large consortiums (Argonaut, S4S, HSPC)
  – European national projects & Health Records
  – National Terminology Service
  – Many vendor and open source projects
  – *In-production systems for 3+ years*
▪ There is still v2 and CDA work
  – But moving towards the tail end of the standards process
Implementation Stack Using FHIR

- FHIR - a platform for interoperability (general use, very optional)
- DAF - A common way to find/access the data
- Argonaut - Common access to EHR data for patient/clinical portals
- S4S - working profile on argonaut for research synchronization
- HSPC / CIMI / lots of other work: make data itself consistent
SMART-On-FHIR Applications
Death Reporting on FHIR
Powerful & Flexible Tool to Help Physicians Determine Chain of Events that Led to Death

+ **Integrate Into Physicians’ Workflow:** Certify Deaths in the EHR & Send Electronically to State
+ **Save Time:** Provide Medical History & Pre-Populate Demographic/Basic Health Information
+ **Improve Accuracy:** Use Advanced Computing to Help Determine Cause-of-Death Sequence
+ **Advance Medical Research & Improve Care:** Send Coded Data Back to EHR
I49.9: Cardiac arrhythmia, unspecified
Description: arrhythmia
Time: 1/5/16 02:05
Time to death: D−10m

Cardiac Arrhythmia 10 min
Complete Heart Block 3.3 hr
Giant cell arteritis with polymyalgia rheumatica 14 days
FHIR Applications to Address Childhood Obesity

Demos
Patient App - http://cdc-st.i3l.gatech.edu/questionnaire/
Physician App - http://cdc-st.i3l.gatech.edu/
# Childhood Obesity Patient-Facing Application

## Healthy Habits Questionnaire

<table>
<thead>
<tr>
<th>Habit</th>
<th>Choice Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child eats veggies and fruits:</td>
<td>- 0-1 times a day</td>
</tr>
<tr>
<td></td>
<td>- 1-2 times a day</td>
</tr>
<tr>
<td></td>
<td>- 3-4 times a day</td>
</tr>
<tr>
<td></td>
<td>- 5 or more times a day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Child is active:</th>
<th>Choice Options</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Not very often</td>
</tr>
<tr>
<td></td>
<td>- Less than 30 minutes a day</td>
</tr>
<tr>
<td></td>
<td>- 30-60 minutes a day</td>
</tr>
<tr>
<td></td>
<td>- More than 60 minutes a day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Child drinks 100% fruit juice:</th>
<th>Choice Options</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- More than 3 cups a day</td>
</tr>
<tr>
<td></td>
<td>- 2 cups a day</td>
</tr>
<tr>
<td></td>
<td>- 1 cup a day</td>
</tr>
<tr>
<td></td>
<td>- Not very often</td>
</tr>
</tbody>
</table>

| Child has sweet drinks (soda, sweet tea, sports drinks, other fruit drinks): | Choice Options                                      |
|                                                                            |-----------------------------------------------------|
|                                                                            | - More than 3 cups a day                            |
|                                                                            | - 2 cups a day                                      |
|                                                                            | - 1 cup a day                                       |
|                                                                            | - Not very often                                    |

| Child watches television, plays video games, spends (non-school related) time on a computer, tablet or cell phone: | Choice Options                                      |
|                                                                                                                                  |-----------------------------------------------------|
|                                                                                                                                  | - 5 or more hours a day                            |
|                                                                                                                                  | - 3-4 hours a day                                  |
|                                                                                                                                  | - 1-2 hours a day                                  |
|                                                                                                                                  | - 1 hour a day                                     |
|                                                                                                                                  | - Not very often                                    |
Childhood Obesity Physician-Facing Application
Childhood Obesity Care Coordinator Application
Ways to Get Involved

FHIR Community
http://fhir.org – Home for FHIR Implementation
http://community.fhir.org – Discussion Forum
http://chat.fhir.org – Dedicated Instant Messaging
http://stackoverflow.com – Implementation questions
http://gforge.hl7.org/gf/project/fhir - public change proposals

Tools to Explore

MIRTH Connect now offers a FHIR Listener Connector
https://www.nextgen.com/Interoperability/Mirth-Solutions/Connect-Overview

Tools like Aidbox (http://health-samurai.io/products) can serve as a backend, data repository, provide REST APIs, and act as an integration bus

Matthew Spielman of Intersystems presented a tool called CCDA Shredder at the HL7 roundtable at Harvard in July (http://www.hl7.org/events/roundtable072016/prog am.cfm). As he presented it, you input a CCDA document and you get FHIR Resources. This could be one approach to help think through how to map existing CDA IGs to FHIR.
Questions?

Paula Braun

Phone: 404-498-6809
pabraun@cdc.gov

For more information, contact CDC
1-800-CDC-INFO (232-4636)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.