The Office of the National Coordinator for Health Information Technology

# FHIR for Public Health


*Presented By*

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and

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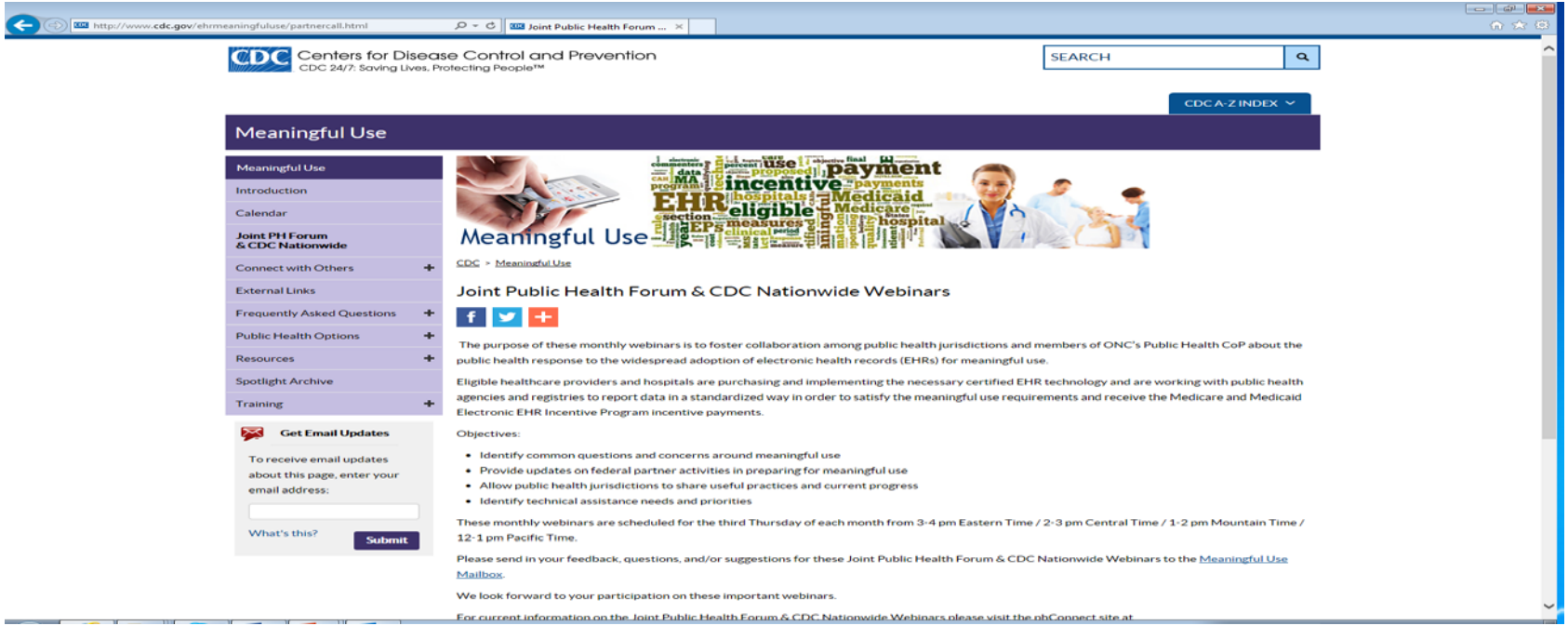
CDC's National Center for Health Statistics


Putting the I in HealthIT

www.HealthIT.gov

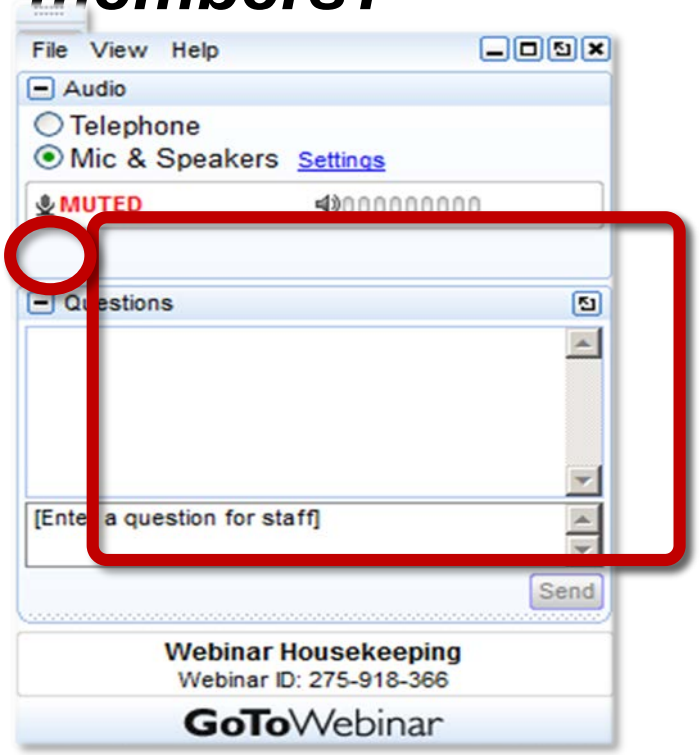
# Joint Public Health Forum & CDC Nationwide

http://www.cdc.gov/ehrmeaningfuluse/joint-public-health-forum--cdc-nationwide.html



*Question and Answer Session*

# *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

Grahame Grieve, Paula Braun. Sept 15th 2016

# 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>
    <status value="generated"/>
    <div xmlns="http://www.w3.org/1999/xhtml">
      <p>Henry Levin the 7th</p>
      <p>MRN: 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>
```

Resource Identity & Metadata

Human Readable Summary

Extension with reference to its definition

Standard Data Content:

- MRN
- Name
- Gender
- Date of Birth
- Provider

# 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-requirement 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

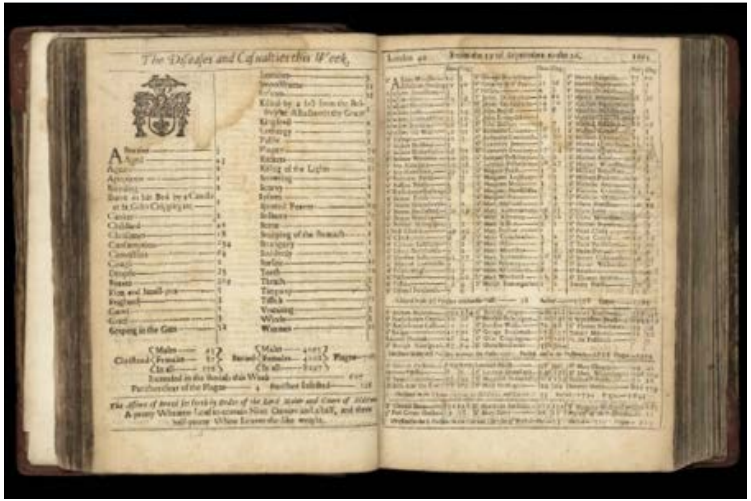
# Implementation Stack Using FHIR

- 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

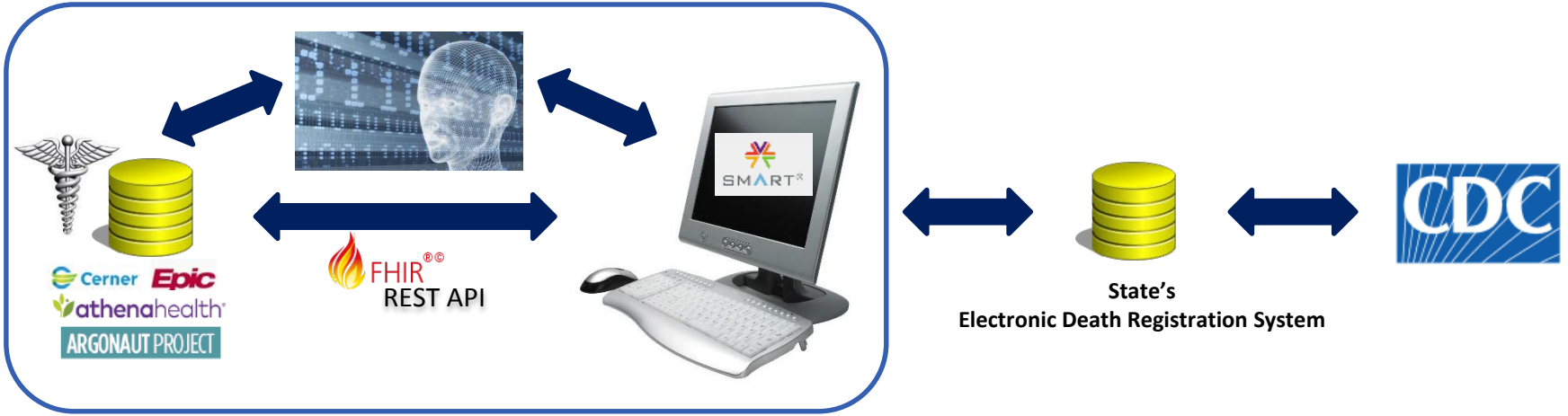
# SMART-On-FHIR Applications

# 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



Patient Info

Funeral Home Contacts

Manner of Death

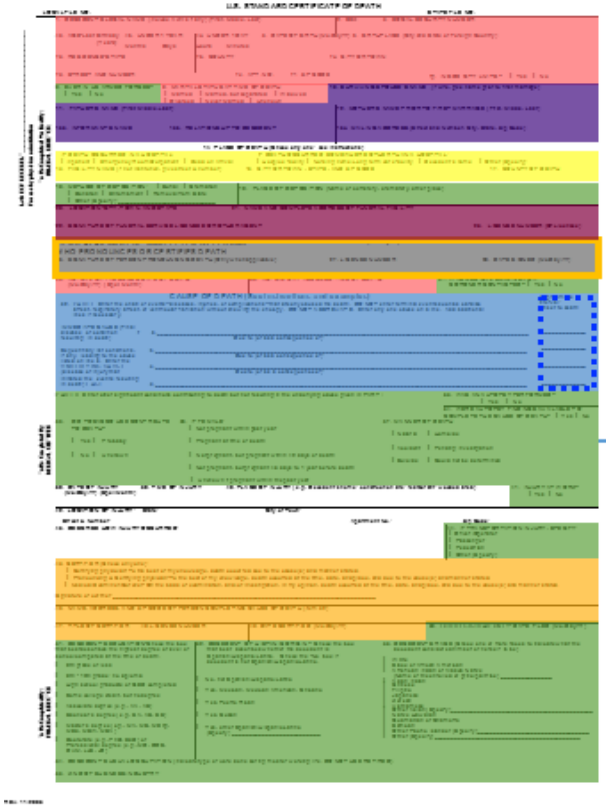
Demographic Data

Circumstances of Death

Pronouncing Clinician

Causes of Death

Certifying Medical Professional



**BUNDLE**
- Type: doc
- Total: int[1]
- Signature:

**Composition (Entry[0])**
- Date/Time: as filed/produced
- Type: D.C. Code able Concept
- Section → text: Summary (xhtml)

**Patient (Entry[1])**
- <Patient information>

**Questionnaire Response (Entry[2])**
- <Question answers>

**Practitioner (Entry[3])**
(for Pronouncing Dead)
- <Certifier information>

**Practitioner (Entry[4])**
(for Filling Death Certificate)
- <Certifier information>

**Practitioner (Entry[5])**
- <Funeral agent information>

**Location (Entry[6])**
- <Place of death>

**Observation (Upto 4)**
Onset [period]
- <Cause of death>

Subject

Questionnaire

Patient

**Related Person**
- <Surviving spouse if applicable>

**Related Person**
- <Mother>

**Related Person**
- <Father>

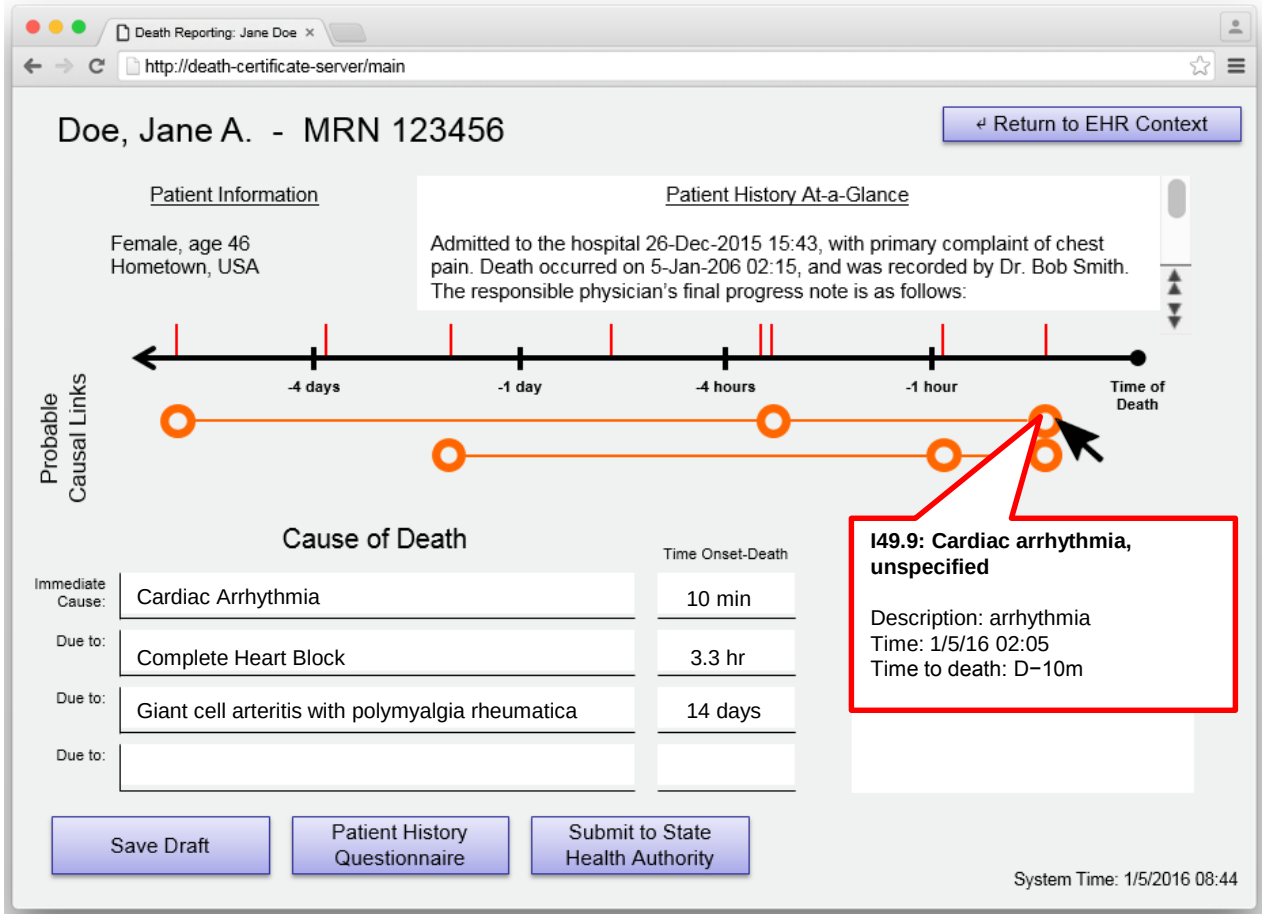
**Related Person**
- <Informant>

# Provide History at-a-Glance & Probable Causal Links

Basic patient information, to give context. Seamless return to EHR for more info.

Scroll-able, scale-able timeline for comprehensive view

Familiar chain-of-events layout, allowing changes if needed



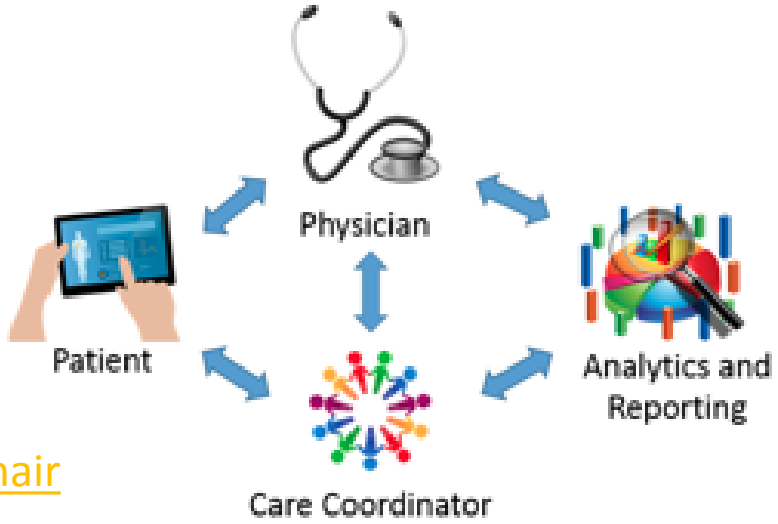

Salient plan-text history, with final progress note if available

Hover over events for more details

Clicking on a proposed timeline pre-populates the chain of events

Validate Data Before Sending to State

# FHIR Applications to Address Childhood Obesity

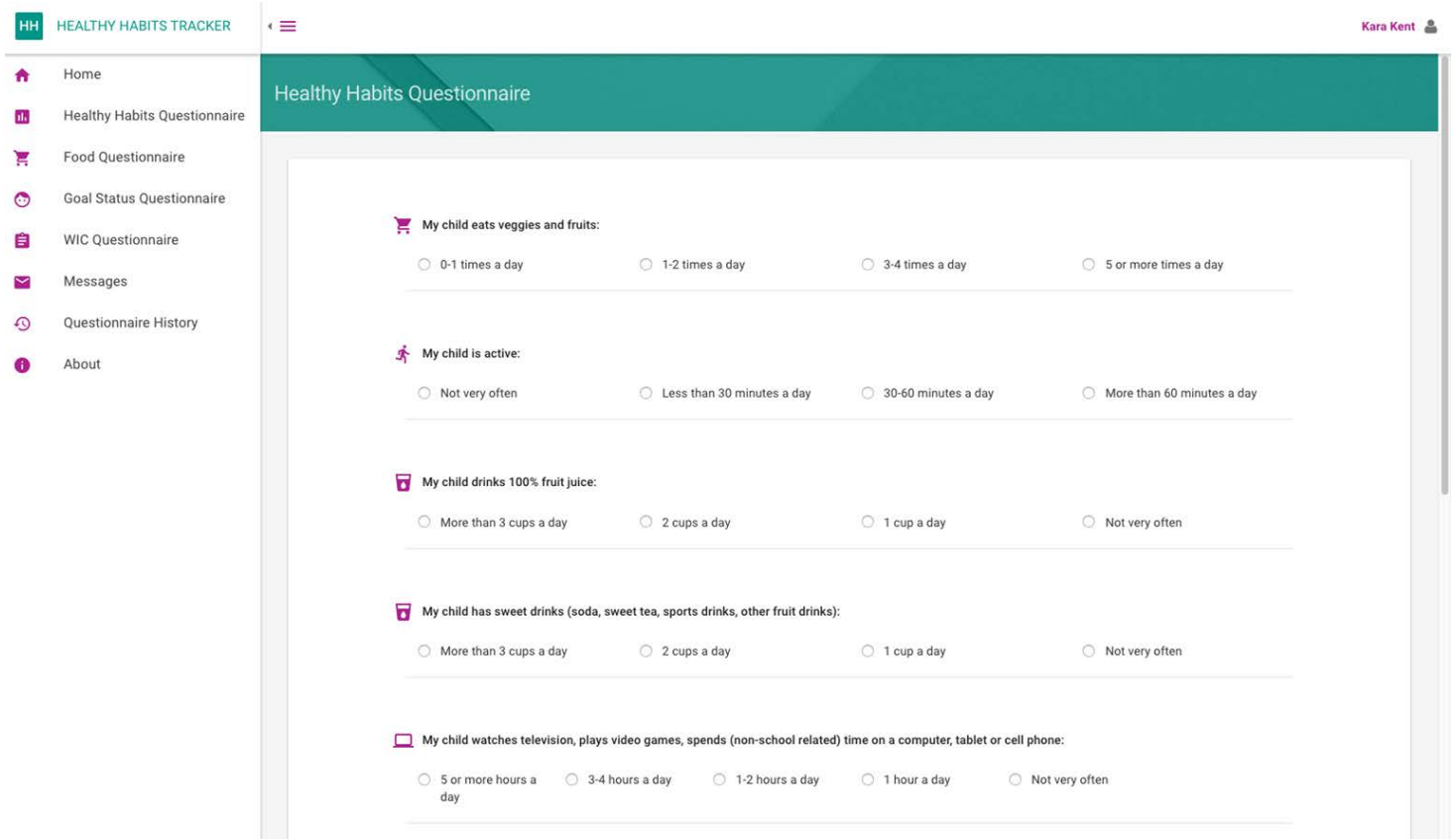



Demos

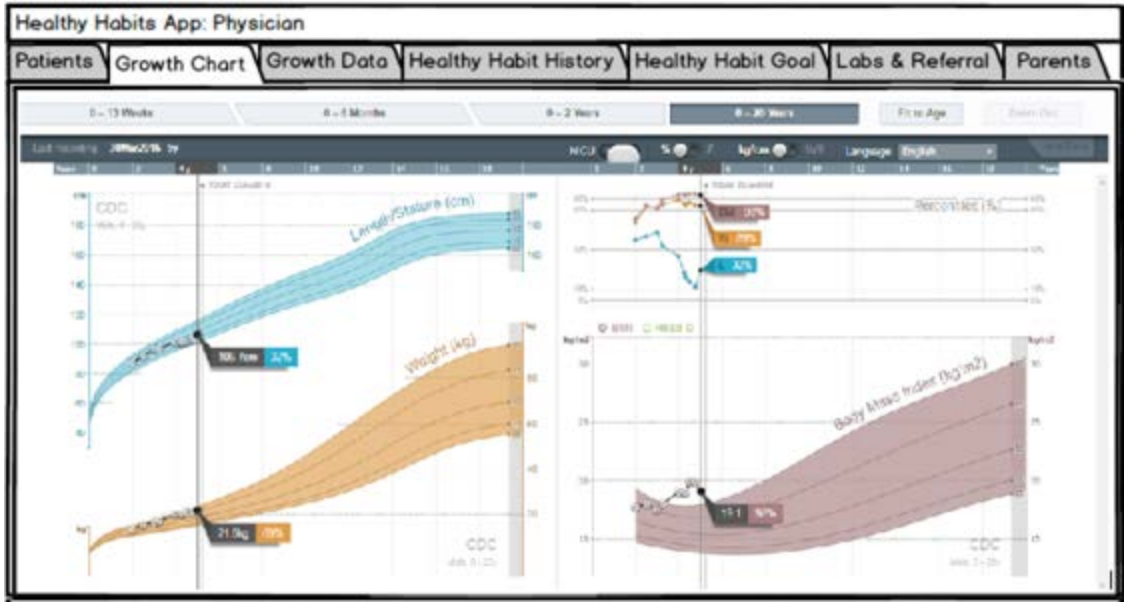
Patient App - http://cdc-st.i3l.gatech.edu/questionnaire/

Physician App - http://cdc-st.i3l.gatech.edu/

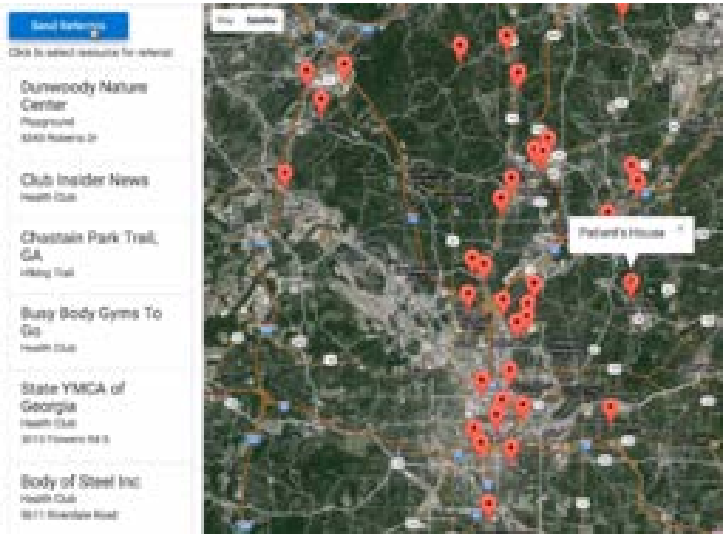
# Childhood Obesity Patient-Facing Application



# 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
http://wiki.hl7.org/index.php?title=FHIR – Wiki for Community Documentation

## 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/program.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?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