Fast Healthcare Interoperability Resources (FHIR): A New Paradigm for Exchanging Health Information

Briefing Prepared for the National Committee on Vital and Health Statistics Full Committee

Paula Braun
Entrepreneur-in-Residence
Centers for Disease Control and Prevention
National Center for Health Statistics, Division of Vital Statistics

January 2018
Overview

- Brief Introduction to HHS Entrepreneur in Residence Program and CDC/NCHS Modernizing Mortality Systems Project
- Overview of Fast Healthcare Interoperability Resources (FHIR)
  - Evolution of Health Level 7 (HL7) Standards
  - New Paradigm for Exchanging Health Information
- Fresh Opportunities and Current Limitations
- Question & Answer
HHS Entrepreneur-in-Residence
Tapping into outside talent to solve complex problems in health and the delivery of human services
The HHS Entrepreneurs-in-Residence Program
CDC EIR Project: Modernizing Mortality Data Systems

Medical
- Physicians
- Medical History
- Death Scene
- Autopsy
- Toxicology
- Medical Examiners & Coroners
- ME/C Case Management Systems

Demographic
- Funeral Home Directors
- RIP
- Demographic Data
- Funeral Home System

State and Territorial Exchange of Vital Events
- Registrar
- EDRS
- NCHS Division of Vital Statistics
- National Vital Statistics

Analyses and Reports
- NDI
- National Death Index

Electronic Verification of Vital Events
- surveillance, public use, and restricted data
Vision for the Modernizing Mortality Data Systems
Entrepreneur-in-Residence (EIR) Project

- Make it easier for Mortality Data Providers
  - Provide more specific and up-to-date mortality information to public health and public safety partners
  - In a coordinated, consistent, and secure way
  - Across jurisdictional boundaries
  - With the ability for mortality data providers and data requestors to get more value out of the data being collected
  - Without workflow disruption to data providers or data requestors
Potential to Transform Public Health Surveillance
FHIR Overview

Get the IT to work so we can deliver & help people make sense of health data and ultimately help solve high-priority health challenges
Interoperability: HL7’s Mission

“a not-for-profit, ANSI-accredited standards developing organization dedicated to providing a comprehensive framework and related standards for the exchange, integration, sharing, and retrieval of electronic health information that supports clinical practice and the management, delivery and evaluation of health services”
Evolution of Health Level Seven (HL7) Standards: Fresh Look in 2011
What is FHIR®?
Fast Healthcare Interoperability Resources

- Open Community within Health Level Seven (HL7)
  - Multi-stakeholder teams (of Healthcare Providers, Health IT Vendors, Standards Developers, Payers, etc.) open to all
  - Define priorities, coordinate work, and use modern technologies to exchange health data and open the data for secondary use

- Standardized Data Model for Exchanging Health Information
  - Represent data in a standardized way so that health information can be reused by multiple parties for multiple purposes

- Set of Modern, Internet-Based Technologies that Open Possibilities
  - Gather specific data needed, apply a range of technologies, and share insights that hadn’t easily been shared before
How is FHIR Different?
Unprecedented Adoption and Innovation

- Secure Application Platform Opens Data to Innovation
- Focus on Practicality and Scalability via Web-Based Tools
- Coalescence Among Broad Stakeholders and Early Adopters

Da Vinci Project
Federal Legislative & Regulatory Requirements for FHIR-Like Approach to Making Health Data Accessible

- **21st Century Cures Act**
  - Requires certified EHR vendors to make patient data accessible “without special effort, through the use of application programming interfaces (APIs).”

- **Meaningful Use Regulations (Stage 3)**
  - Provide patients access to their data via APIs

- **FHIR supports**
  - APIs
  - Modern web services
  - Older HL7 paradigms (messages & documents)

Using standards to drive innovation in public health
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:** Ability to Send Coded Data Back to EHR
Goals of the Death Worm Project

- Map Death Certificate Data Element to FHIR
  - Identify relevant FHIR resources and develop profiles for death reporting

- Develop Clinical Decision Support Tool for Death Reporting
  - Use SMART-on-FHIR and FHIR APIs to develop a tool that provide physicians information about the decedent’s health history and allows physicians to complete death certificates within electronic health records

- Analytics
  - Develop machine learning algorithms to help physicians determine sequence of diseases that led to death
Proposed Mappings to FHIR Resources

- Composition (Entry[0])
  - Type: doc
  - Total: int[1]
  - Signatures

- Patient
  - <Patient information>

- Questionnaire Response
  - Observations?
    - <Question answers>

- Practitioner
  - (for Pronouncing Death)
    - <Certifier information>

- Practitioner
  - (for Certifying Death event)
    - <Certifier information>

- Practitioner
  - <Funeral agent information>

- Location
  - <Place of death>

- Conditions
  - Onset [period]
  - <Cause of death>

- Related Person
  - <Spouse, if applicable>

- Related Person
  - <Mother>

- Related Person
  - <Father>

- Related Person
  - <Informant>
Clinical Decision Support Tool Prototype

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
Current Status of the Death Worm Project

- Map Death Certificate Data Element to FHIR
  - US 2003 standard death certificate mapped to FHIR resources
  - Development of profiles for death reporting underway

- Develop Clinical Decision Support Tool for Death Reporting
  - Application tested against Cerner’s FHIR developer sandbox to ensure compatibility
  - Application to be tested at IHE Connect-a-thon in January 2018

- Analytics
  - Initial work promising but additional work needed in this area (especially on data sets where detailed health record data are linked with death certificate data)
FHIR Projects in Public Health: Collaboration with GT

Online Master of Science in Computer Science
Are you ready to earn your master’s in computer science but not ready to stop working? Do you want a top-ranked degree without the top-ranked price tag?
If so, Georgia Tech has the answer.
Fresh Opportunities and Current Limitations

Putting the technical underpinnings in place to maximize the value of existing health data
Guiding Principles When Considering Pros and Cons of Existing Standards

- Don’t try to solve every problem. Focus real-world projects with committed and ongoing involvement.
- Technology improves as people use it. The best metric of success is sustained use.
- Test and see what works. Don’t try to make it perfect. Make it much better, through a series of sprints, with the tools that currently exist.
- Involve implementers early and often. People are more likely to adopt standards when they don’t have to do anything special to make it work.
- When considering where to invest resources (money, time, attention), distinguish “price” from “cost” and “value”.
- Adopt industry best practices for privacy and security.
Considerations for the National Committee on Vital and Health Statistics

- What change do you seek to make?
- How can vital and health statistics data collection better fit within data providers’ workflow?
- What are the most important things that need to be done?
- How can we work together to set priorities and promote as much coordination and consistency as early as possible in the process?
- What do vendor products currently have the capacity to do? What functionality needs to be added to core products? What options do we have to bridge any gaps?
- What workforce capabilities currently exist and how can they be enhanced?
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.