## FHIRing on all Cylinders: Public Health & Government Perspectives

FHIR initiatives and use cases for population health

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.S. Department of ealth and Human Services enters for Disease ontrol and Prevention

#### The Data Lifecycle & Impacts to the Public's Health



#### The Data Lifecyc

#### he Public's Health



## Evidence Ecosystem



Adapted from MAGIC Evidence Ecosystem Foundation (www.magicevidence.org)

## **Clinical Quality Lifecycle with Situated Standards**



Adapted from HL<sup>7</sup> Clinical Quality Information (CQI) Workgroup by Maria Michaels, Centers for Disease Control and Prevention

The Learning Health System



Adapted from Researchgate.net by Maria Michaels, Centers for Disease Control and Prevention

## **Different Vehicles... but All Vehicles**



## From Health Care to Public Health

Taking population health to a national and global scale

#### The Data Lifecycle & Impacts to the Public's Health



## Need More Hours in a Day...

Hours/Month



It would take an estimated 627.5 hours/month to evaluate the volume of information in published literature.

Alper, B. et al. J Med Libr Assoc. 2004 Oct; 92(4): 429–437.

# Read Published Literature

Sleep, Eat, Family/Friends Time, See Patients, Complete Clinical Documentation, Etc.



#### Multi-stakeholder CDC Kaizen Event



- "Adapting Clinical Guidelines for the Digital Age Meeting" Feb 5-9, 2018
- Incorporates all relevant perspectives in both a strategic and tactical method FROM THE BEGINNING
- Achieves big changes in short order (i.e., weeks instead of years)
- Provides transparency among participants, which contributes to high level of buy-in & better understanding of the challenges from each perspective



#### Participating Stakeholder Groups

- Guideline authors
- Health IT developers
- Communicators
- Clinicians
- Patients / Patient Advocates
- Medical Societies
- Public Health Organizations
- Evaluation experts



- Standards experts
- Clinical decision support developers
- Clinical quality measure developers
- Policy or technical support for implementation

#### Adapting Clinical Guidelines for the Digital Age

**Problem**: Long Lag Time, Inconsistencies, and Inaccuracies in Translation



Leads to an average of 17 years for scientific evidence to apply in patient care

**Reason**: Playing the "Telephone Game"



Multiple translations of guidelines add complexity, opportunity for error, and variation across sites/providers **Solution**: Developing Tools and Guidelines Together



Can help evidence apply to patient care more easily, quickly, accurately, and consistently

#### https://www.cdc.gov/csels/phio/clinical-guidelines/index.html

#### **Today's Guideline Development and Implementation**

Long Implementation Time



https://dashboard.healthit.gov/quickstats/quickstats.php

#### **Translating Evidence to Executable CDS**



Knowledge	Description	Example
Level		
L1	Narrative	Guideline for a specific disease that is written in the format
		of a peer-reviewed journal article
L2	Semi-	Flow diagram, decision tree, or other similar format that
	structured	describes recommendations for implementation
L3	Structured	Standards-compliant specification encoding logic with data
		model(s), terminology/code sets, value sets that is ready to be
		implemented
L4	Executable	CDS implemented and used in a local execution environment
		(e.g., CDS that is live in an electronic health record (EHR)
		production system) or available via web services

# Redesigning Guideline Development and Implementation







Integrated Process for Developing and · Implementing Guidelines



# Implementation Guide: Representation of Clinical Practice Guideline Recommendations in FHIR®



Clinical Practice Guidelines - CI build (v0.1.0). See the Directory of published versions

#### 1.0.0FHIR Clinical Guidelines 🚱

This implementation is organized with the following sections, accessible via the menu bar at the top of every page:

- Home: The home page provides summary and background information
- Profiles: Index of all profiles
- Artifacts: Index of all artifacts (e.g. activity and plan definitions)
- Terminology: Index of all terminology (e.g. code systems and value sets)
- Examples: Index of examples
- Extensions: Index of extensions
- Documentation: Index of specification documentation
  - Approach: Describes the overall approach taken to representing computable guideline content
  - Terminology: Describes expectations for terminology defined as part of computable guideline content
  - Profiles: Describes expectations for profiles defined as part of computable guideline content
  - Libraries: Describes expectations for the use of libraries as part of computable guideline content
  - Recommendations: Describes how recommendations are structured and distributed
- Checklists: Checklists provided for moving guideline content from L1-L4
- Version History: Index of all versions of this implementation guide

#### Care Planning: Describes expectations for the use dynamic care planning with computable guideline content Downloads: Downloads for the specification

#### Current Draft: <u>http://build.fhir.org/ig/HL7/cqf-recommendations/</u> - Published Version (when available): <u>http://hl7.org/fhir/uv/cpg</u>

#### "CPG-on-FHIR®"

**FHIR®:** Fast Healthcare Interoperability Resources

FHIR is an interoperability standard intended to facilitate the exchange of healthcare information between organizations.

## What is CPG-on-FHIR®?

- **INTERNATIONAL standard** (HL7, Universal Realm), including a standardized and scalable approach, to help translate and implement clinical practice guidelines and other types of guidance more efficiently and effectively
- Framework for improving the knowledge ecosystem using FHIR<sup>®</sup> and related common health IT standards
- Key aspects include:
  - Integrated Process
    - An integrated guideline/guidance development and implementation process
  - Common standards
    - Across the entire data lifecycle (a.k.a. learning health system) and different electronic health record (EHR) platforms
  - Closed-loop guideline content and information flow
    - Inclusive of feedback and feedforward processes



FHIR Clinical Guidelines

## One Translation

## Many Ways to Implement It



#### The Data Lifecycle & Impacts to the Public's Health



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

 Funded by the Patient-Centered Outcomes Research Trust Fund (PCORTF) via the U.S. Department of Health and Human Services (HHS) Assistant Secretary for Planning and Evaluation (ASPE)

Total project timeline: 3 years

- **PROBLEM:** Patient-centered outcomes researchers and public health professionals need better ways to get data from different electronic health record (EHR) systems without posing additional burden on health care providers
- <u>GOAL</u>: Create a reliable, scalable, generalizable, configurable, interoperable method to get EHR data for multiple public health and research use cases
- **OBJECTIVE:** Develop a reference architecture and demonstrate a reference implementation (including implementation guides)

#### Technical Expert Panel (TEP): Participating Stakeholder Groups

- Federal Partners
- Health IT developers
- Clinicians/ Healthcare
  Organizations
- Medical Societies
- Public Health Organizations
- Evaluation experts
- Laboratory Professional Groups

- Standards experts
- Clinical decision support developers
- Clinical quality measure developers
- Policy or technical support for implementation



#### **Making EHR Data More Available for Research and Public Health**

#### **Technical Expert Panel:**

End Users, Data Recipients, Stakeholders – Including representatives of additional use cases

#### Foundation of standards supported by health IT certification (CCDS/USCDI, APIs, FHIR)

**Fully Modeled Use Cases** Hepatitis C, Cancer, Healthcare Surveys



Implementation Guides

For general use and for each use case

**Technological Strategies** To develop scalable and extensible architecture

**CCDS:** Core Clinical Data Set **USCDI:** US Core Data for Interoperability **APIs:** Application Programming Interfaces **FHIR:** Fast Healthcare Interoperability Resources

Software



Clinical organization



EHR platform

Other testing partners (e.g., public health departments, registries, health IT developers, etc.)

## Agile Development: Iterative Design-Build-Test Cycles (test case: Hepatitis C) </>> National Test Collaborative Including a variety of clinical organizations and their EHR platforms

Implementation Guides, Implementation and Sustainability Reference σ Ballote rchitecture Scalability ø Software) Roadmap for Φ eferenc Source PRODUCTS (Open

#### **Evaluation Planning**

#### Measure and Evaluate

#### **MedMorph Abstract Model of Actors and Systems**



### **Transforming the clinical data landscape with FHIR**



## Summing It Up

#### What it will take to keep the engine fueled and running smoothly

#### The Data Lifecycle & Impacts to the Public's Health



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## **Key Takeaways**



- Interoperability is crucial, and standards and standardization are necessary to achieve interoperability
- Many different perspectives are needed to achieve large scale approaches to interoperability
- Need to be able to accommodate implementation variation we're not likely getting to 100% standardization
- We CAN redesign processes that have been around for decades to make them work better in the digital age
- Developing common approaches and standards for using EHR data could help reduce burden on both data senders and data receivers

The ultimate goal is to get to a Learning Health System at multiple levels

The Learning Health System



Adapted from Researchgate.net by Maria Michaels, Centers for Disease Control and Prevention

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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.



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