Opportunities and challenges for public health surveillance: a new world of interoperability with electronic health records

James Daniel, MPH
The Office of the National Coordinator for Health IT
Medicare and Medicaid Programs; Electronic Health Record Incentive Program-Stage 3

• Align all three stages of Meaningful Use into single program/rule
  – All providers would meet Stage 3 requirements starting in 2018
  – Phased-in timelines that allows some providers to continue to meet Stage 1 and Stage 2 requirements in 2017

• Aligns reporting periods – calendar year reporting for eligible professionals, eligible hospitals and critical access hospitals
  – Full year reporting periods
  – Allows 90 day reporting periods for first time attesters in 2017 only

• Provides simplified objectives and measures – only 8 objectives, all tied to HHS Delivery System Reform Goals
  – Objective 8: Public Health and Clinical Data Registry Reporting
<table>
<thead>
<tr>
<th>Program goal/objective</th>
<th>Delivery system reform goal alignment</th>
</tr>
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<tbody>
<tr>
<td>Protect Patient Health Information</td>
<td>Foundational to Meaningful Use and Certified EHR Technology *. Recommended by HIT Policy Committee.</td>
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<tr>
<td>Coordination of Care through Patient Engagement</td>
<td>Recommended by HIT Policy Committee. National Quality Strategy Alignment.</td>
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</table>
Objective 8: Public Health and Clinical Data Registry Reporting

• Proposed Objective: The EP, eligible hospital, or CAH is in active engagement with a PHA or CDR to submit electronic public health data in a meaningful way using certified EHR technology, except where prohibited, and in accordance with applicable law and practice.

• Six possible measures to meet the objective
  – Eligible professionals must meet three measures
  – Eligible Hospitals and Critical Access Hospitals must meet four measures

- New 2015 Base EHR Definition
- No optional/required criteria – developers should choose the criteria relevant to their purpose
- Can be used beyond CMS EHR Incentive Program
<table>
<thead>
<tr>
<th>Measure</th>
<th>Standard</th>
<th>Implementation Guide</th>
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</thead>
<tbody>
<tr>
<td>Measure 2 – Syndromic Surveillance Reporting</td>
<td>170.315(f)(2)</td>
<td>PHIN Messaging Guide for Syndromic Surveillance: Emergency Department, Urgent, Ambulatory Care, and Inpatient Settings, Release 2.0, September 2014 (“Release 2.0”)</td>
</tr>
<tr>
<td>Measure 3 – Case Reporting</td>
<td>170.315(f)(5)</td>
<td>IHE Quality, Research, and Public Health Technical Framework Supplement, Structured Data Capture, Trial Implementation (September 5, 2014)</td>
</tr>
<tr>
<td>Measure 4 - Public Health Registry Reporting</td>
<td>170.315(f)(4)</td>
<td>HL7 Implementation Guide for CDA© Release 2: Reporting to Public Health Cancer Registries from Ambulatory</td>
</tr>
<tr>
<td></td>
<td>170.315(f)(6)</td>
<td>Healthcare Providers Release 1</td>
</tr>
<tr>
<td>Measure 5 - Clinical Data Registry Reporting</td>
<td></td>
<td>HL7 Implementation Guide for CDA % Release 2: National Health Care Surveys (NHCS), Release 1—US Realm, Draft Standard for Trial Use (December 2014),</td>
</tr>
<tr>
<td>Measure 6 - Electronic Reportable Laboratory</td>
<td></td>
<td>HL7 Version 2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health, Release 2 (US Realm), DSTU R1.1, 2014 or “Release 2, DSTU R1.1</td>
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</table>
The reader is advised to read the S&I Framework Introduction before reading the Initiative Overview, Phases and Outputs.

You may also return to the Community Enabling Toolkit (CET).

1. S&I Initiative
A Standards and Interoperability (S&I) Initiative is a project aimed to solve a particular challenge that hinders interoperability in the healthcare industry. The Initiative organizes work necessary for the development or evolution of S&I Framework deliverables. The Initiative has no formal status outside of that purpose. There are two types of Initiatives within the S&I Framework: Staff Assigned Initiatives and Community Assigned Initiatives.

1.1 Staff Assigned Initiatives
Staff Assigned Initiatives are Initiatives that have formal staff allocations by the S&I Steering Team. The purpose of a Staff Assigned Initiative is to provide additional input and guidance to an area that the Office of the National Coordinator (ONC) and S&I Framework has determined to be an interoperability challenge.

1.2 Community Assigned Initiatives
Community Assigned Initiatives are Initiatives that do not have formal staff allocations by the S&I Steering Team.

2. Initiative Terms and Definitions
2.1 Initiative Charters
Data Access Framework

Local Access via Intra-Organization Query
- Create and disseminate queries internal to organization
- Query Structure Layer
- APIs
- Authentication/Authorization Layer
- Receive standardized responses
- Query Results Layer

Targeted Access via Inter-Organization Query
- Create and disseminate queries to external organization
- Query Structure Layer
- Transport Layer
- Authentication/Authorization Layer
- Receive standardized responses from external organization
- Query Results Layer

Multiple Data Source Access via Distributed Query (Query Health) – Completed Initiative
- Create and disseminate queries to multiple organizations
- Governed by a network
- Receive aggregated or de-identified responses
- Focus on Information Model for the network and leverage standards from earlier phases.

Standards based approach to enable access at all levels: Local, Targeted, and Distributed

Note: An organization can be a hospital that is part of larger organization and can also include HIEs, RIOs, other types of organizations etc.
Data Access Framework

• **Transport Layer** — establishing a protocol for getting patient data from one place to another.

• **Security Layer** — ensuring that patient data will only be accessible to authorized parties.

• **Query Structure** — making sure the “question” being asked is phrased appropriately for the data to answer it. “Questions” could include “what were the pathology results of this patient’s last test” and “how many immunizations has this clinic provided each month in the past year.”

• **Query Results** — appropriately formatting the “answer” to the question posed. Pathology results may need to conform to clinical document architecture, while an answer about immunization counts could be presented as a simple bar graph.

• **Data Model to Support Queries** — information models that define concepts used in clinical care.
The Data
Clinical Element Data Dictionary

- Demographic
- Patient Contact Information
- Payer Information
- Healthcare Provider
- Allergies & Adverse Reactions
- Encounter
- Surgery
- Diagnosis
- Medication
- Procedure
- Immunization
- Advance Directive
- Vital Signs
- Physical Exam
- Family History
- Social History
- Order
- Result
- Medical Equipment
- Care Setting
- Enrollment
- Facility

- Standards independent dictionary
- Aligned with QDM
- Built for flexible response to evolving standards (e.g., CIMI)
Active Query Health Pilots:
New York City Primary Care Information Project (PCIP)
Massachusetts Department of Public Health
Active Pilot- New York City

Hub System:
1. Builds and distributes queries
2. Collects, de-identifies and aggregates data from practices

All Practices Receive:
1. Queries
2. Messages

All Practices Transmit:
1. Query Results as Aggregate counts

Primary Care Information Project NYC Department of Health

Virtual Network of Independent Ambulatory Practices

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3392869/figure/fig1/
Active Pilot- New York City

- **Overseen by:** Primary Care Information Project (PCIP)
  - Bureau within the Department of Health and Mental Hygiene
- Queries sent through **network data partner:** New York City Hub Health System
- **Data Sources:** EHRs from 751 total practices, 4207 providers, >2.5M patients
- **Goals:** to expand population health monitoring in New York City to improve understanding of
  - population health quality/performance measures
  - chronic disease trends (diabetes, hypertension)
  - infectious disease outbreaks
- And to:
  - incorporate the essential technical and operational elements from the Query Health pilot project into the statewide health information exchange architecture – SHIN-NY

http://wiki.siframework.org/Query+Health+Pilots+Team
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3392869/
Obesity Prevalence in the NYC Pilot

Active Query Health Pilots:
Massachusetts Department of Public
Health
Massachusetts

- **Overseen by Massachusetts Department of Public Health Network**
- **ONC Funded Challenge Grant**
- **(MDPHnet)**
  - MDPHnet is a project of Massachusetts eHealth Institute
- **Network data partners:**
  - Electronic Medical Record Support for Public Health (ESP)
  - PopMedNet (PMN)
- **Participants:**
  - Massachusetts League of Community Health Centers (MLCHC)
  - Atrius Health
  - 1000+ physicians serving more than 1 million patients
- **Goals:** to improve population health statewide through improved quality and performance measures.
  - Initial Foci: diabetes and influenza like illness (ILI)surveillance

http://mehi.masstech.org/what-we-do/hie/mdphnet/popmednet
http://wiki.siframework.org/Query+Health+Pilots+Team
Active Pilot- Massachusetts

Requester: Massachusetts Department of Public Health

PopMedNet

Firewall

ESPnet

Nightly Uploads

MLCHC EHR 1

MLCHC EHRn

Atrius Health Ambulatory Network EHR 1

Atrius Health Ambulatory Network EHRn
Total Number of Flu Vaccinations and ILI Visits September 2009-March 2012
Gestational Diabetes

- Outreach to encourage pregnant women to get tested for gestational diabetes mellitus (GDM)
- Massachusetts State
- June 1-25, 2011: Media campaign
- Collect aggregated data via Query Health before and after the campaign
  - Massachusetts League of Community Health Centers
  - Atrius Health
- Use the number of HbA1c tests requested per month as a way to assess the campaign’s effectiveness
Number of HbA1c Tests Requested from Atrius Health, January 2011- July 2012
Conceptual Use Case Diagram: CDS Guidance Service Diagram (Use Case 2)

**CDS Guidance Requestor**

**Out of Scope**
- Workflow Integration
- User Presentation
- Direct Interaction with the User
- How the Guidance Integrator will utilize the information
- Deciding what guidance is subscribed to

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**CDS Request**

(patient data + context)

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**CDS Guidance**

(guidance + service structure)

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**CDS Guidance Supplier**

**Out of Scope**
- Authoring, Creation and Maintenance Clinical Decision Support Knowledge
- Internal Intervention Format of CDS services supplier

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**In Scope**

- Interface Definitions for Sending Patient Data & CDS Guidance
  - Patient Data Input to Service
  - Format of the CDS Guidance (output from CDS service)
  - Requirements to Support Service Transactions, Transport & Security
Pilots

• Planned
  – Pertussis reporting triggers

• Potential
  – Trigger SDC Report
  – Immunization Forecast
Structured Data Capture Data Architecture

Infrastructure will consist of four new standards that will enable EHRs to capture and store structured data:

1. Standard for the CDEs that will be used to fill the specified forms or templates
2. Standard for the structure or design of the form or template (container)
3. Standard for how EHRs interact with the form or template
4. Standard to auto-populate form or template

- Standards will facilitate the collection of data so that any researcher, clinical trial sponsor, reporting and/or oversight entity can access and interpret the data in electronic format
- Will leverage existing standards such as XML and CDISC Retrieve Form for Data Capture (RFD)
Pilots

• Pilots
  – Case Reporting
    • Wisconsin
    • New York City
  – Early Hearing Detection Intervention

• Next Steps
  – Common Data Elements
  – Identify Partners/Funding
Pilot Jurisdiction’s Implementation Overview: Transactions and Data Flow

1. Parse
2. Retrieve Form
3. Pre-populate web form
4. Send URL with pre-populated web form
5. Physician/Infection Control Practitioner (ICP) submits additional information directly to system
NYC Architecture

- **EPIC**
  - Request is made by clicking a URL in the EMR
  - CCD sent

- **NYC DOHMH**
  - Parse the CCD
  - Return Populated Web Form
  - Store CCD
  - Complete case report stored at the NYC DOHMH
  - Report sent to Surveillance System

- **Provider**
  - Completes the case report missing fields
WI Architecture

IHE Demonstration Flow – Components Related to Atlas

<table>
<thead>
<tr>
<th>EMR (Form Filler)</th>
<th>Provider completes case report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Request is made utilizing HTTP-POST standard</td>
<td>HTML specific to the request is sent back to EMR</td>
</tr>
<tr>
<td>HTML form is received and processed into surveillance system</td>
<td></td>
</tr>
<tr>
<td>Case report is sent to State Health Department</td>
<td></td>
</tr>
<tr>
<td>HTML forms includes patient demographics as well as disease specific questions</td>
<td></td>
</tr>
</tbody>
</table>

State Surveillance System (Form Receiver)
THE PUBLIC HEALTH COMMUNITY PLATFORM

A solution for a modern public health enterprise

www.thePHCP.org
@PHCommPlatform
Clinical Care / EHR

- **Use PH Trigger Codes**
- **Record DX/Problem In EHR**
- **Respond to Queued Clinical “Notification” With URL**
- **Continue process with Web-Based, Pre-Populated Report Form**

Public Health

- **PHA Preparedness Uses**
- **Decision Support Rules**
- **Decision Support Engine**
- **Clinical “Notification” Creation**
- **Form Creation**
- **PH Surveillance System**

**Asynchronous Core, “Initial” Case Message CCDA and Communication to Reporter**

**Pre-populated web form page**

**Synchronous SDC / RFD Transactions Over SOAP or eventually FHIR**

**For future consideration**

**Pre-Population**

**Storage**