Electronic Public Health Case Reporting – Is There a Path Forward?

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American Medical Informatics Association
Webinar
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Key Points

• Despite PH’s desire, there remains significant work to achieve requisite interoperability for automated case reporting

• S&I Framework is crucial to collective HIT ecosystem and drives many MU standards

• Need greater PH organization, readiness, involvement, and S&I Framework-based solutions for effective interoperability like electronic case reporting
Is there a path forward for PH case reporting?

- Where does Stage 3 seem to be headed for Public/Population Health Meaningful Use Measures
  - Interoperability, exchange
    - immunization, case reporting
- Key Standards and Interoperability Framework Components
- Conclusions
<table>
<thead>
<tr>
<th>Domain</th>
<th>Stage 2</th>
<th>Stage 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immunization</td>
<td><strong>Core</strong>: Successful ongoing transmission of immunization data</td>
<td><strong>Core</strong>: <em>Receive</em> a patient’s immunization history supplied by an immunization registry or immunization information system, allowing healthcare professionals to <em>use</em> structured historical immunization information in the clinical workflow</td>
</tr>
<tr>
<td>Syndromic Surveillance</td>
<td><strong>EH Core</strong>: Successful ongoing transmission of syndromic surveillance data</td>
<td><strong>Core</strong>: Unchanged</td>
</tr>
</tbody>
</table>
## Meaningful Use (MU) Measures Comparison Stage 2 vs. Stage 3 (cont.)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Stage 2</th>
<th>Stage 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic Laboratory Reporting</td>
<td><strong>EH Core</strong>: Successful ongoing submission of reportable laboratory results</td>
<td><strong>Core</strong>: Unchanged</td>
</tr>
<tr>
<td>Registries</td>
<td><strong>Menu</strong>: Successful ongoing transmission of cancer case information or data to a specialized registry</td>
<td><strong>Menu</strong>: Electronically transmit data from CEHRT in standardized form (i.e., data elements, structure and transport mechanisms) to one registry</td>
</tr>
</tbody>
</table>
| Case Reporting                | • Capable of *using external knowledge* (i.e., CDC/CSTE Reportable Conditions Knowledge Management System) to prompt an end-user when criteria are met for case reporting.  
  • Capable of recording and maintaining an *audit* for the date and time of prompt.  
  • Capable of *using external knowledge* to collect (e.g., structured data capture) and report standardized case reports submitted to the state/local jurisdiction and the data/time of submission is available for audit. |
PH Clinical Decision Support (CDS)

Knowledge Generators
Public Health Agencies

Knowledge Management System (e.g., RCKMS, HLN)

Authoring Framework

Database
Who, What, When, Where, How

Structured Output Generator

Knowledge Consumers

PH Reporters (Clinicians/Laboratories)
- Reportable conditions
- Immunization forecasting

Reports/Exchange

Knowledge

Standard format
- Rules
- Actions
- Links

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PH Clinical Decision Support (IZ)

**Public Health State, Local, Territorial Agencies, ACIP**

- **Immunization Forecasting** (e.g., HLN – Open CDS)
  - Authoring Framework
  - Database
  - Structured Output Generator

**Database**
- Who, What, When, Where, How

**Structured Output Generator**
- HeD Compliant format
  - Rules
  - Actions
  - Links

**CDS Deployment Options**
1. HeD file output (e.g., IIS)
2. OpenCDS in cloud
3. OpenCDS local instance

**PH Reports**
- DSS Web Service
- HeD Web Service

**PH Reporters/Consumers (Clinicians)**
- Hospital
  - EHR
- Ambulatory Care
  - EHR

**Open CDS Deployment Options**
1. HeD file output (e.g., IIS)
2. OpenCDS in cloud
3. OpenCDS local instance

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Electronic Laboratory Reporting (ELR)

- ELR Release 1 (HL7 Version 2.5.1: ORU^R01) was built on the HITSP Lab-to-EHR Implementation Guide
- Improved HL7 2.5.1 IG (Draft Standard for Trial Use) Release 2, November 2013
  - “Reporters can access further information about reportable conditions at the website for their own Public Health jurisdiction relevant to their service area. (For information about a national Reportable Condition Knowledge Management System [RCKMS] see Appendix A)”
- CDC/CSTE work on the reportable condition knowledge management system (RCKMS).
Public Health State, Local, Territorial Agencies

Reportable Condition Knowledge Management System (RCKMS)

PH Clinical Decision Support (ELR)

HeD Compliant format
- Triggering Criteria
- Reporting Actions
- Links

CDS Deployment Options
1) HeD file download
2) OpenCDS in cloud
3) OpenCDS locally instance

PH Reporters (Clinicians)

Hospital Labs
- LIMS
- EHR

National, Clinical & PH Laboratories
- LIMS

Ambulatory Care
- EHR

PH Reports

Query/View
Subscription Management Including Notifications
Other Web Services

Database
Who, What, When, Where, How

Structured Output Generator

Web Service

(1) Health eDecision (HeD)

(2) Open CDS

(3) Open CDS Local

HeD
DSS Web Service

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Update on Current Measures:
- IZ, ELR, SS

Syndromic Surveillance (SS)

- ASTHO led centralized, cloud-based infrastructure
- evolving BioSense community of practice
- IG Version 1.1/1.2 vs 1.9 (for newer ONC 2015 rules)

Standards and Interoperability Framework

Mission

• Promote a sustainable ecosystem that drives increasing interoperability and standards adoption.

• Create a collaborative, coordinated, incremental standards process that is led by the industry in solving real world problems.

• Leverage “government as a platform” – provide tools, coordination, and harmonization that will support interested parties as they develop solutions to interoperability and standards adoption.
**S&I Initiative Portfolio Snapshot**

<table>
<thead>
<tr>
<th>Pre-Discovery</th>
<th>Use Case</th>
<th>Harmonization</th>
<th>RI, Test &amp; Pilot</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structured Data Capture</strong></td>
<td>Use Case &amp; Standards consensus complete; SOA/SAI, IG Consensus achieved on 3/18/14. FHx profile PSS was accepted through HL7 5/9/14. IHE Profile Volume III released through GMPH committee 5/2/14; IHE Profile Volume IV undergoing Public Comment in June; PHR Questionnaire - Answer and Draft Data Element Instances being drafted.</td>
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</tr>
<tr>
<td><strong>Data Access Framework</strong></td>
<td>Local DAF Use Case Consensus (12/11/13); Targeted DAF Use Case Consensus (2/5/14); IHE PCC white paper in second public comment period; evaluating current standards for both document metadata and data element-based queries.</td>
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</tr>
<tr>
<td><strong>EL/SWS eHealth Cooperation</strong></td>
<td>Interoperability WS – HL7 PSS for international Patient Summary Template approved by HL7 TSC; development of comparative analysis white paper in progress &amp; templates WS to kick off this summer; Workforce Development WS – completed skill-map for Direct Patient Care/Basic Clinical/care and began skill-map for Direct Patient Care/Advanced/Clinical bucket.</td>
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<tr>
<td><strong>Blue Button Plus</strong></td>
<td>88% + Direct (Push) &amp; 88% RESTful (Pull) Guidance complete, Pilots are underway; 88% Workshop event at Health Datapalooza 2014.</td>
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</tr>
<tr>
<td><strong>POMMP &amp; HIT Integration</strong></td>
<td>Project Charter consented on 12/31; Use Case consented on 3/25; Harmonization launched on 3/25; Evaluation standards for solution planning purposes; Currently analyzing proposed solutions to finalize entire plan &amp; drafting IG content.</td>
<td></td>
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</tr>
<tr>
<td><strong>Clinical Quality Framework</strong></td>
<td>Currently working on the harmonized Clinical Decision Support (CDS) and electronic Clinical Quality Measurement (eCQM) specifications which will be balloted at HL7 in September and used in CDP pilots. Defining data elements to be used in pilots. Exploring opportunities to coordinate with Data Access Framework and Structured Data Capture initiatives.</td>
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</tr>
<tr>
<td><strong>Data Provenance</strong></td>
<td>Charter consented on 6/15; Use Case is planned to launch on 6/12; Tiger Team kicked off on 4/28 to assist with detailed analysis of candidate standards for system functional requirements and interoperable exchange of data as directed by the initiative.</td>
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**Public Health**
- Community-Led, PHIN Framework and CDA Guide published; 5 Pilot projects conducted; Started monthly informational webinar series “Wednesdays with PHIN”; Started review of phase 2 user stories; Formed a new WG by consolidating with the NM Tiger Team to more efficiently provide support for NM use cases across all S&I Initiatives, where needed; Closing ceremony held 5/28/14.

**Lab Results Interface**
- Interface is 8G and Second Sprints published; As of 1/18/13, Lab pilots were completed and Validation Suite tools were released for 2014 CEHR, IG in cross-IG harmonization phase which includes reconciliation of all values sets and codes, and clarification of terms and definitions for consistent use across all Lab IGs.

**Laboratory Orders Interface**
- LOINC and eCDS IGs published December 2012; Reviewing LOINC errata, IG in cross-IG harmonization phase which includes reconciliation of all values sets and codes, and clarification of terms and definitions for consistent use across all Lab IGs.

**esMD**
- HL7 Digital Signatures IG is DSTU. Complete Documentation Templates IG HL7 ballot reconciliation in progress; Pilots in progress; AHA 12 $81 IG is consensus approved; eDoc X12 278 Companion Guide near completion; eDoc X12 275 IG in progress; eDoc Home Health User Story on hold; eDoc Coded Data discussions in progress.

**Longitudinal Coordination of Care**
- Community-Led; 2 Use Cases complete: Transfer Summary and ‘Care Plan’; LCP, LTPAC & PAS SWDs complete; C-CDA updates for Sept HL7 ballot ready by Spring 14; Pilots SWDs launched 9/18; Full implementation of C-CDA Core Plan standards in NY.

**Direct Project [S&I Archetype]**
- In production.

**Data Segmentation for Privacy**
- Pilots in Evaluation, Supplement in IHE SDO ownership and going to be published as final text, final all-hands meeting held on 3/02.

**Transitions of Care**
- C-CDA Companion Guide for Meaningful Use ballot in September 2013 and completed ballot reconciliation on 9/25; Target publication date is Summer 2014.

**Query Health**
- Pilots completed; QRDA IV & HCMR R2 Published.

**Health eDecisions**
- Use Case 1: Pilots Complete, Published CDS KA IG on 12/4; Use Case 2: Balloted 5 HL7 specifications in September 2013 for CDS Guidance Service UC; Submitted 5 artifacts for publication on 12/19; Submitted 3 UHR artifacts for re-publication as DSTU on 3/26; Initiative complete 3/31.

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**Active Initiatives**

- **Community** or Other Agency-Led Initiatives

**Inactive or Closed Initiatives**

- **June 2014 report**

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*Community led Initiatives leverage the S&I framework platform with minimal or no ONC funded contractor support.
Key Principle for PH Stage 3 MU

- **Adhere to Standards and Interoperability Framework Components Whenever Feasible**

<table>
<thead>
<tr>
<th>Component</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consolidated CDA</td>
<td>Standard message format</td>
</tr>
<tr>
<td>Query Health</td>
<td>Population based queries</td>
</tr>
<tr>
<td><strong>Structured Data Capture</strong></td>
<td>Populate standard forms</td>
</tr>
<tr>
<td><strong>Clinical Quality Framework</strong></td>
<td>Clinical decision support (e.g., triggers for PH screening, reporting or collecting data)</td>
</tr>
<tr>
<td>Data Access Framework</td>
<td>Query data: 1) locally, 2) to targeted organization and 3) distributed across multiple organizations</td>
</tr>
</tbody>
</table>
### Standards and Interoperability Framework Initiatives

<table>
<thead>
<tr>
<th>Status/Type</th>
<th>Initiative</th>
<th>Development Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active Initiatives</strong> (pertaining to case reporting)</td>
<td>Structured Data Capture (SDC)</td>
<td>Pre-discovery  Use Case  Harmonization  Reference Imp., Test/Pilot  Evaluation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Use case and standards consensus (<em>complete</em>)</td>
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<td></td>
<td></td>
<td>• Fast Healthcare Interoperability Resources profile accepted HL7 (5/9/14)</td>
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<tr>
<td></td>
<td></td>
<td>• IHE profile under public review (<em>June 2014</em>)</td>
</tr>
<tr>
<td></td>
<td>Data Access Framework (DAF)</td>
<td>Pre-discovery  Use Case  Harmonization  Reference Imp., Test/Pilot  Evaluation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Local use case consensus (12/11/13)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• IHE Patient Care Coordination white paper (<em>2nd comment period</em>)</td>
</tr>
<tr>
<td></td>
<td>Clinical Quality Framework (CQF)</td>
<td>Pre-discovery  Use Case  Harmonization  Reference Imp., Test/Pilot  Evaluation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Harmonizing CDS &amp; eClinical Quality Measurement (eCQM) – HL7 ballot (09/14)</td>
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<tr>
<td></td>
<td></td>
<td>• Exploring coordinating pilots with DAF and SDC</td>
</tr>
<tr>
<td>Community Initiatives</td>
<td>PH Reporting Initiative</td>
<td>Pre-discovery  Use Case  Harmonization  Reference Imp., Test/Pilot  Evaluation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Framework and CDA Guide published</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• New WG with PH Tiger Team for efficiency</td>
</tr>
</tbody>
</table>
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.
Health eDecisions -> Clinical Quality Framework (using external knowledge)

Use Cases

1. Standard **format** for sharing Clinical Decision Support (CDS) knowledge artifacts (RCKMS)
   - Rules (e.g., reportable conditions)
   Goal: CDS knowledge authored in standard format can be imported and used in any EHR system

2. Standard **interface** for accessing CDS Web services
   - Rules (e.g., immunization forecasting)
   Goal: CDS capability encapsulated using standard interface can be integrated with any EHR system
**Problem**: complex and evolving ACIP recommendations
  - Need to collaborate/share rules across users
  - Need loose coupling with various architectures

**Standards-Based Solution:**
  - HL7 Virtual Medical Record (vMR) Release 1
  - HL7 Decision Support Service (DSS) Release 1
  - Operates on the OpenCDS platform (www.opencds.org)
  - Separates terminology management from logic engineering
  - Reference implementation for DSS and vMR standards
Clinical Quality Framework

Clinical Decision Support (CDS) and electronic Clinical Quality Measurement (eCQM)

- Closely related, share many common requirements, and are both in support of improving health care quality.
  - Both need ability to identify cohort of patients based on logical combinations of patient data.
  - CQM measures adherence to a standard plan of care.
  - CDS guides a physician to follow a standard plan of care.
  - Meaningful Use requires implementation of CDS rules to improve the outcomes of certain eCQMs.
Standards for CDS and eCQM

- CDS and eCGM standards not developed in consideration of each other
  - Each uses different approaches to data and computable expression logic.
  - Adhering to different standards places an additional implementation burden on vendors and providers with homegrown systems.
  - Currently difficult to share logic between eCQMs and CDS rules.

<table>
<thead>
<tr>
<th>Clinical Decision Support (CDS)</th>
<th>Virtual Medical Record (for both physical and logical models)</th>
<th>CDS Knowledge Artifact Implementation Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic Clinical Quality Measurement (eCQM)</td>
<td>Quality Reporting Data Architecture (for physical model) Quality Data Model (for logical model)</td>
<td>Health Quality Measure Format (for physical model) Quality Data Model (for logical model)</td>
</tr>
<tr>
<td>Public Health case reporting</td>
<td>???</td>
<td>???</td>
</tr>
</tbody>
</table>
Clinical to Public Health Reporting

Public Health Reporters
- Healthcare
- Hospitals
- Laboratories
- Others

Clinical Data Warehouse

EHR

LIMS

Local CDS

CDS

Open Source

S&I – HeD UC-1

Reporting Specifications

Aggregate Query
S&I - DAF UC-3

Additional Case Information Query
S&I - DAF UC-2

Initial Case Information Query
S&I - DAF UC-1

Case Reports

S&I - SDC

S&I – HeD UC-2

PH Form Manager

RCKMS

PHIN VADS Vocabulary Manager

Jurisdiction-specific Reporting Specification

Public Health Jurisdictions

Case Reporting Forms
Conclusions

- Future EHR interoperability will significantly rely of Standards and Interoperability Framework (S&IF) Components
  - Public health needs to align, adopt and test these
- For electronic case reporting, PH needs to maximally engage with S&IF and adapt to standards that facilitate EHR vendor and eligible provider capacity for interoperability
  - Develop/use/integrate/promote S&I Framework components (e.g., CDS and RCKMS) for state/local health department interoperability initiatives
  - Participate in end-to-end testing for implementation guide development, enhancements and revisions