Case Study: Integration of Different Interoperability Standards for Clinical Document Architecture (CDA) for a Public Health Pilot Project in New York State

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Guest Lecturers

- Kathleen Brousseau, PMP, has been a Project Manager with the New York State Department of Health for over 15 years
- Ms. Brousseau is a Certified Project Manager Professional and a member of the Council of State and Territorial Epidemiologists

- Nitin Kunte, MBA, is Director of Research and Development for OZ Systems, where he has worked to provide innovative information technology solutions for US and international health and education customers
- Mr. Kunte is a certified Project Management Professional and is a member of the Quality Research and Public Health Committee at Integrating Healthcare Enterprise (IHE)
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- **OZ Systems:** Mr. Nitin Kunte

- **Connexin - Office Practicum:** Mr. Gregory Anderson, Mr. William Lokes

- **Contributors:** Ms. Meg Hooper and Ms. Uma Kutty, Connecticut Department of Public Health; Dr. Michael Blechner and Ms. Kirsten Shea, University of Connecticut Health Center; Ms. Gillian A. Haney and Ms. Sita Smith, Massachusetts Department of Public Health; Mr. Edward Hartwick and Dr. Andrey Yeatts, Michigan Department of Community Health; Mr. Jim Coates, Cuyahoga County Board of Health, Ohio; Mr. Anthony Lee, Mr. Peter M. Lemmon, Ms. Rebecca Moore, Dr. Lauri Smithee, Oklahoma State Department of Health; Mr. Jason Alexander Collins, South Carolina Department of Health & Environmental Control; Dr. Rita Altamore, Washington State Department of Health; Mr. Roy Hightower, Greenway Medical; Mr. Peter Payne and Mr. Davis Trotter, Labware; Dr. Wesley Kennemore, Association of Public Health Laboratories; Mr. Gautam Kesarinath, Centers for Disease Control and Prevention; Capt. Margaret S. Filios, Dr. Genevieve Barkocy Luensman, Dr. Eileen Storey, National Institute of Occupational Safety and Health, CDC; and Mr. James Daniel, Office of the National Coordinator for Health IT
Outline

- CDA for Public Health Pilot Project Overview
- NYSDOH Organizational Mission and Strategic Plan
- Current State of Public Health Reporting in the State of New York
- Opportunities for Improving Public Health Reporting in New York State
- NYS Pilot Project Details
- Pilot Standards and Implementation: Using Interoperability Standards
- Data Exchange Process
- Lessons Learned and Next Steps
Terms

- **CCD**: the Continuity of Care Document (CCD) specification is an XML-based markup standard intended to specify the encoding, structure, and semantics of a patient summary clinical document for health information exchange (www.phdsc.org)
- **CDA**: The HL7 Version 3 Clinical Document Architecture (CDA®) is a document markup standard that specifies the structure and semantics of “clinical documents” for the purpose of exchange between health care providers and patients. It defines a clinical document as having the following six characteristics: 1) persistence, 2) stewardship, 3) potential for authentication, 4) context, 5) wholeness, and 6) human readability. A CDA can contain any type of clinical content—typical CDA documents would be a discharge summary, imaging report, admission and physical, pathology report, and more. The most popular use is for inter-enterprise information exchange, such as is envisioned for a US Health Information Exchange (HIE). (www.hl7.org)
- **EHR**: electronic health record
- **HIE**: health information exchange
- **HL7**: Health Level Seven International (HL7) is 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 (www.hl7.org)
- **IHE**: IHE is an initiative by health care professionals and industry to improve the way computer systems in health care share information. IHE promotes the coordinated use of established standards such as DICOM and HL7 to address specific clinical need in support of optimal patient care. Systems developed in accordance with IHE communicate with one another better, are easier to implement, and enable care providers to use information more effectively. (www.ihe.net)
- **RFD**: Retrieve Form for Data Capture provides a method for gathering data within a user’s current application to meet the requirements of an external system. RFD supports the retrieval of forms from a form source, display and completion of a form, and return of instance data from the display application to the source application. (www.ihe.net)
- **XDR**: Cross-Enterprise Document Reliable Interchange (XDR) provides document interchange using a reliable messaging system. This permits direct document interchange between EHRs, PHRs, and other health care IT systems in the absence of a document-sharing infrastructure such as XDS Registry and Repositories. (www.ihe.net)
CDA Document Transport to Public Health

Document Sender
- Provider
- EHR
- CCD
- CDA Pertussis Case Report

Document Transport
- Internet Secure Transport
- Public Health Infrastructure

Document Recipient
- NYS Department of Health
The Public Health Data Standards Consortium (PHDSC) in partnership with the Council of State and Territorial Epidemiologists (CSTE) and with support from the Centers for Disease Control and Prevention (CDC) conducted this pilot project.

The purpose of this pilot project was to demonstrate the feasibility of using CDA standards for public health reporting from health care providers to state and local health agencies.

The Health Level Seven (HL7) Clinical Document Architecture (CDA) standard was named in the Meaningful Use of Electronic Health Records (EHRs) for data exchanges between clinical systems.
NYSDOH Organizational Mission and Strategic Plan

- Since 2006, New York State has been investing in technology, operational capacity, and ...

- ... collaborative governance structures and processes to support adoption of electronic health record technology ...

- ... and to mobilize statewide health information exchange to improve the quality, safety, efficiency, and affordability of health care
The approach designated in the pilot aligns directly with the NYSDOH Strategic Plan to ...

- Adopt technologies to increase program effectiveness and efficiency
- Optimize community-wide efforts to improve outcomes and reduce costs
- Facilitate integrated, efficient, accessible health care and public health systems
Current State of Public Health Case Reporting in NYS

- Positive pertussis lab reports
  - Sent electronically to NYSDOH Electronic Clinical Laboratory Reporting System (ECLRS) or
  - Written form faxed or mailed to NYSDOH

- Data from ECLRS report populates the Communicable Disease Electronic Surveillance System (CDESS)

- Cases are assigned to the local health department based on the county in New York State that matches the patient’s zip code
The local health unit of each county is responsible for investigating the cases assigned to that county and possibly for follow-up on the case:
- Verification of facts
- Completion of supplemental forms for specific diseases
- Follow-up of patient care
- Investigation of possible outbreaks
Opportunities for Improvement of Current State of Reporting

- The lack of a standardized reporting structure causes duplication of efforts, increased costs, and case definition inconsistency across systems.

- Lab work results can take 7-10 days to be received from a commercial laboratory.

- The inconsistent exchange of information limits the ability of public health officials to quickly respond to public health emergencies and effectively coordinate integrated health care services.
Benefits to Public Health

- Electronic transfer of a CDA to public health offers the ability to improve timeliness of communicable disease reporting

- Would allow local health departments to ...
  - Begin investigations earlier
  - Make appropriate control recommendations to the providers
  - Offer preventative measures to contacts
Pilot demonstration would include implementation within the participant’s department to receive a public health report using the CDA standard by May 2012

- Disease selection
  - NYS selected pertussis case reporting

- Vendor recruitment
  - OZ Systems participated as forms manager
  - Office Practicum participated as EHR vendor
# Project Duration and Participants

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<thead>
<tr>
<th>Duration</th>
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<tr>
<td>Participants</td>
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<td>- Delaware</td>
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<td>- San Diego County</td>
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<td>Vendors</td>
<td>- Electronic health record (EHR) vendor (Connexin)</td>
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<td>- Health information exchange (HIE) vendor (OZ Systems)</td>
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<td>- Public health information systems (PHIS) vendor (OZ Systems)</td>
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<td>Observers</td>
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Project Methodology

- Assess existing documentation on state reportable and national notification for communicable diseases
- Assess different approaches to implement CDA reporting
- Draft public health approach to developing CDA implementation guides for public health reporting
- Test this approach
- Develop technical documentation required for these pilot projects
- Gather data from the pilot and finalize the approach based on feedback
Pilot Implementation Plan

- Identify the reportable condition—pertussis was chosen by New York State
- Identify the reportable data requirements for this condition
- Create CDA template for the reportable condition
- Identify the various standards/profiles required to generate this CDA
- Implement these identified standards/profiles
- Test the implementation
- Publish results
Pilot Implementation Challenge and Solution

- CDA template for pertussis case reporting did not exist and hence was created

- However, none of the EHR vendors had the capability to generate and send data based on the CDA template for pertussis to the New York Department of Health

- EHR applications usually have the capability to generate CCD which would provide more than half the data required for reporting

- EHR applications usually have the capability to submit CCD

- Based on the details above, a collection of standards was chosen to implement this project—details on the next slide
Profiles/Standards Used in This Pilot Project

- Retrieve form for data capture (RFD)
  - Form manager
  - Form filler
  - Form receiver

- Clinical Document Architecture (CDA)

- Continuity of Care Document (CCD)

- Cross-Enterprise Document Reliable Interchange (XDR)
  - Document source
  - Document recipient
Information Exchange Flow

Provider EHR

Form filler

CCD content to pre-populate pertussis case report

Public Health Infrastructure / HIE

Form manager

Form receiver

Document source

NY Department of Health

Document recipient

Transfer form data to CDA Pertussis Case Report

CDA Pertussis Case Report via XDR
Use of Retrieve Form for Data Capture (RFD)

- **RFD background**
  - RFD is a profile published by Integrating the Healthcare Enterprise (IHE)*
  - RFD allows the form filler to submit data to the form manager when requesting the form so that it can be used to pre-populate the form before it's sent back to the form filler

- EHR application sends CCD to pre-populate the form while requesting the form

- EHR user verifies pre-populated data, adds additional data, and submits the form

- HIE application accepts the data submitted via form

Use of (XDR)

- Cross-Enterprise Document Reliable Interchange (XDR) background
  - XDR is a profile published by Integrating the Healthcare Enterprise (IHE)*
  - XDR permits direct document interchange between different systems

- HIE application transforms the data received via RFD into CDA Pertussis Case Report

- HIE application submits the CDA Pertussis Case Report to New York Department of Health via XDR transaction

Example of RFD Form for CDA Pertussis Case Report
Example of CDA Pertussis Case Report XML

```xml
<?xml version="1.0" encoding="ISO-8859-1"?>
  <title>Public Health Case Report - Pertussis</title>
  <effectiveTime value="20120808124342-0600" />
  <confidentialityCode code="N" codeSystem="2.16.840.1.113883.5.25" codeSystemName="ConfidentialityCode" />
  <languageCode code="en-us" />
  <recordTarget>
    <patientRole>
      <id root="1.3.6.1.4.1.21367.13.60.15" extension="6bfbc0f8-478f-493a-850a-14a6137f5390" />
      <addr>
        <streetAddressLine>123 MAPLE AVENUE</streetAddressLine>
        <city>DOYLESTOWN</city>
        <state>PA</state>
        <postalCode>18901</postalCode>
      </addr>
      <telecom value="tel:+1-2-15--555-" />
      <patient classCode="PSN" determinerCode="INSTANCE">
        <name>
          <family>MOUSE</family>
          <given>MICKY</given>
        </name>
        <administrativeGenderCode code="M" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC" display="Male" />
        <birthTime value="200205311200" />
      </patient>
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</ClinicalDocument>
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### Example of CDA Pertussis Case Report Human Readable Format

**Public Health Case Report – Pertussis – Test Patient**

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<tr>
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<td>Race</td>
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<tr>
<td>Author</td>
<td>Kressly Pediatrics, P.C.</td>
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<tr>
<td>Contact info</td>
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Results

- The pilot concluded successfully, i.e., the data from EHR system was successfully transported to public health entity.

- The data flow from EHR was real-time and with minimal manual intervention.

- It was delivered on time and under budget.

- The documentation generated as a result of the pilot can be used for implementing future solutions.
Lessons Learned and Next Steps for New York State

- The New York State Department of Health is discussing future possibilities for CDA reporting in New York State

- Data analysis of the incoming data and integration steps
  - Possibility of incorporating this type of data stream into existing data systems
  - Review of the New York State-required and requested data elements

- Understanding the contents of EHR along with how the EHR system populates the CCD
Lessons Learned and Next Steps

- Although health care IT (HIT) standards exist, relying on a single standard may not solve existing problems.

- In the real world, existing legacy systems may not have capabilities to implement the interoperability standards.

- This pilot effort demonstrated that legacy systems can be upgraded to use multiple standards creatively to solve a real-world problem.
Lessons Learned and Next Steps

- Published results about this pilot effort can be found in the PHDSC CDA Pilot Project Report at https://wiki.phdsc.org/images/3/3a/PHDSC-CDA-for-PH-Pilot-Report-FINAL-10-12-12.docx

- Create public awareness—news about this project has been published in Forbes, Information Week, IBM, IBM Research News, Yahoo! Finance, HealthTech Zone, eWeek, Healthcare IT News, Reuters, PR Inside, and the PHDSC home page

- More information about this pilot project can be found at the PHDSC CDA for PH Project wiki pages at https://wiki.phdsc.org/index.php/EHD1_Project
Resources
