



HEALTH IT: RIGHT TIME. RIGHT PLACE. IT'S ON.

NEW ORLEANS
HIMSS 13
ANNUAL CONFERENCE & EXHIBITION

➤ Streamline Quality Measurement Reporting to Meet State and Federal Requirements

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DISCLAIMER: The views and opinions expressed in this presentation are those of the author and do not necessarily represent official policy or position of HIMSS.



Conflict of Interest Disclosure

Daniel A. Pollock, M.D. and
Robert H. Dolin, M.D.
have no real or apparent
conflicts of interest to report.



Learning Objectives

1. Describe challenges that are often associated with data aggregation and reporting of healthcare quality measures
2. Explain CDC's role in healthcare quality measure reporting at the state and federal levels
3. List a minimum of three benefits of using available data standards to leverage EHRs and EHR modules for process and outcome reporting



Overview

- The Health Level Seven (HL7) Clinical Document Architecture (CDA) standard streamlines healthcare associated infection (HAI) quality measure reporting to the CDC's National Healthcare Safety Network (NHSN) by enabling hospitals to aggregate and submit data electronically rather than manually
- Use of CDA is expanding rapidly as a national healthcare interoperability standard, and HAI reporting is just one example of its use



Take Home Message #1: CDA Streamlines Required Reporting

- HAI and other clinical quality measure reporting requirements are increasing in the U.S.
- The national trend toward greater transparency and accountability in healthcare places a premium on reducing reporting burden
- CDC, HL7, and healthcare information technology vendors have collaboratively developed a CDA solution for submitting HAI data to NHSN that enables electronic reporting instead of manual data entry



HAIs: A Major Patient Safety Problem



- Occur too often - approximately 1 in 20 hospitalized patients in the U.S.
- HAI data reported to CDC's NHSN are used by:
 - Hospitals to monitor, report, and prevent infections
 - State and federal agencies for analysis and public reporting
 - CMS for its payment programs: pay-for-reporting and pay-for-performance



CDC's System for HAI Reporting

- NHSN was launched by CDC in 2005 and since then it has been adopted for use by 30 states with HAI reporting mandates and by CMS
- State and federal reporting requirements account for growth from ~ 300 hospitals initially to over 5000 hospitals in 2012
- Technical design enables manual data entry via a web interface or electronic reporting via CDA



The HAIs that Matter Most Are Reported to NHSN



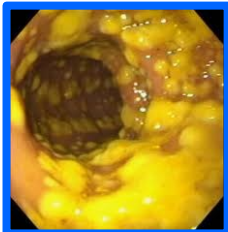
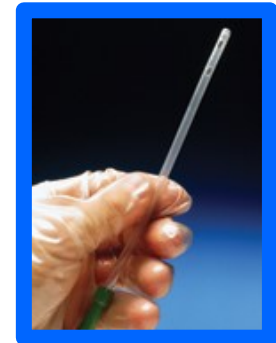
Central line associated
bloodstream infections
(CLABSIs)

Surgical site
infections (SSIs)



Ventilator associated
events (VAEs)

Catheter associated
urinary tract
infections (CAUTIs)



*Clostridium
difficile*
Infections (CDIs)



Some Laboratory Identified Events Are Reported As HAI Proxies*



Methicillin resistant *S. aureus*

Vancomycin resistant *Enterococcus*

Multi-drug resistant *Acinetobacter*

Cephalosporin resistant *Klebsiella*

Carbapenem resistant *Klebsiella*

Carbapenem resistant *E. coli*

*Positive laboratory results that were not present on hospital admission or early in a hospital stay serve as proxy measures for infection and are reported to NHSN



Healthcare Processes Are Reported Because of Their Link to HAI Prevention



Central line
insertion
practices (CLIP)

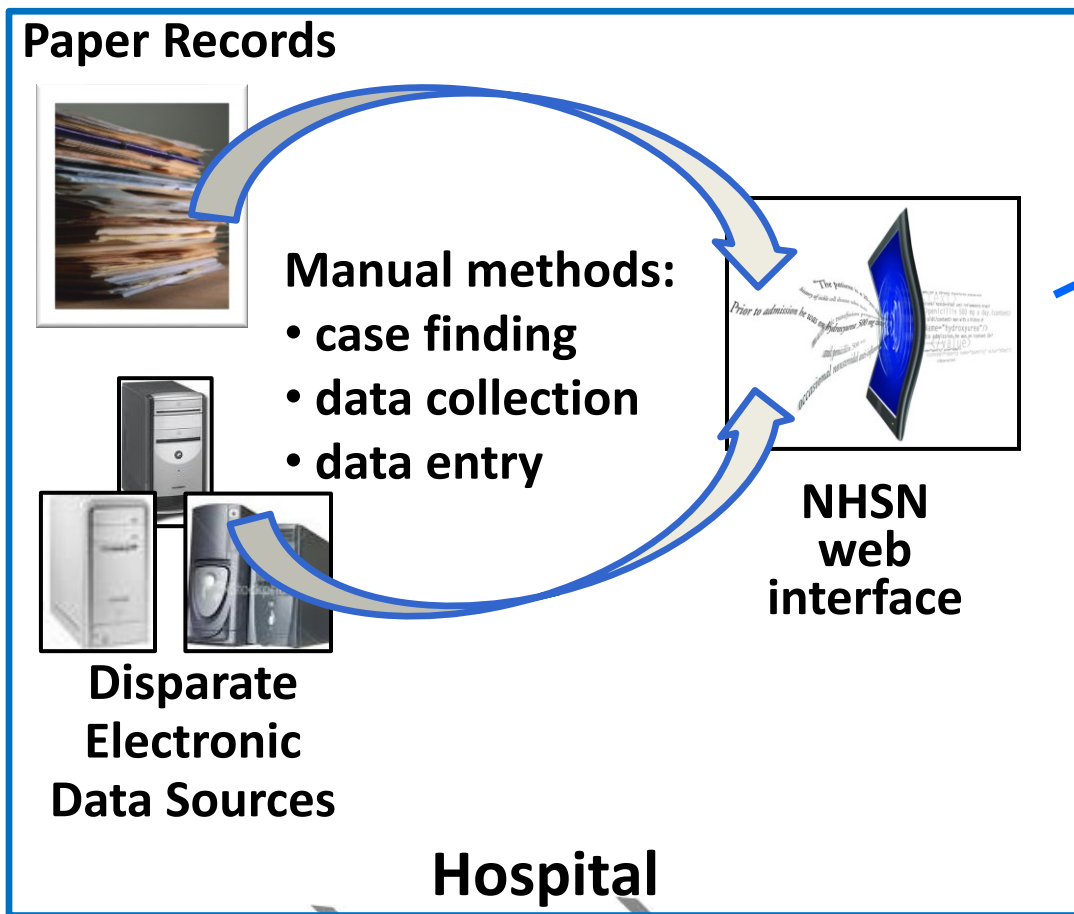
Influenza
vaccination
coverage



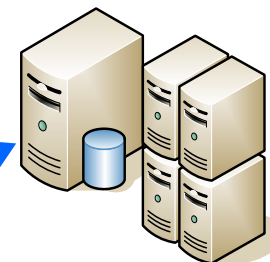
Antimicrobial use
and resistance
(AUR)



Use of NHSN's Web Interface for Reporting is Labor Intensive



Data submitted via secure Internet connection

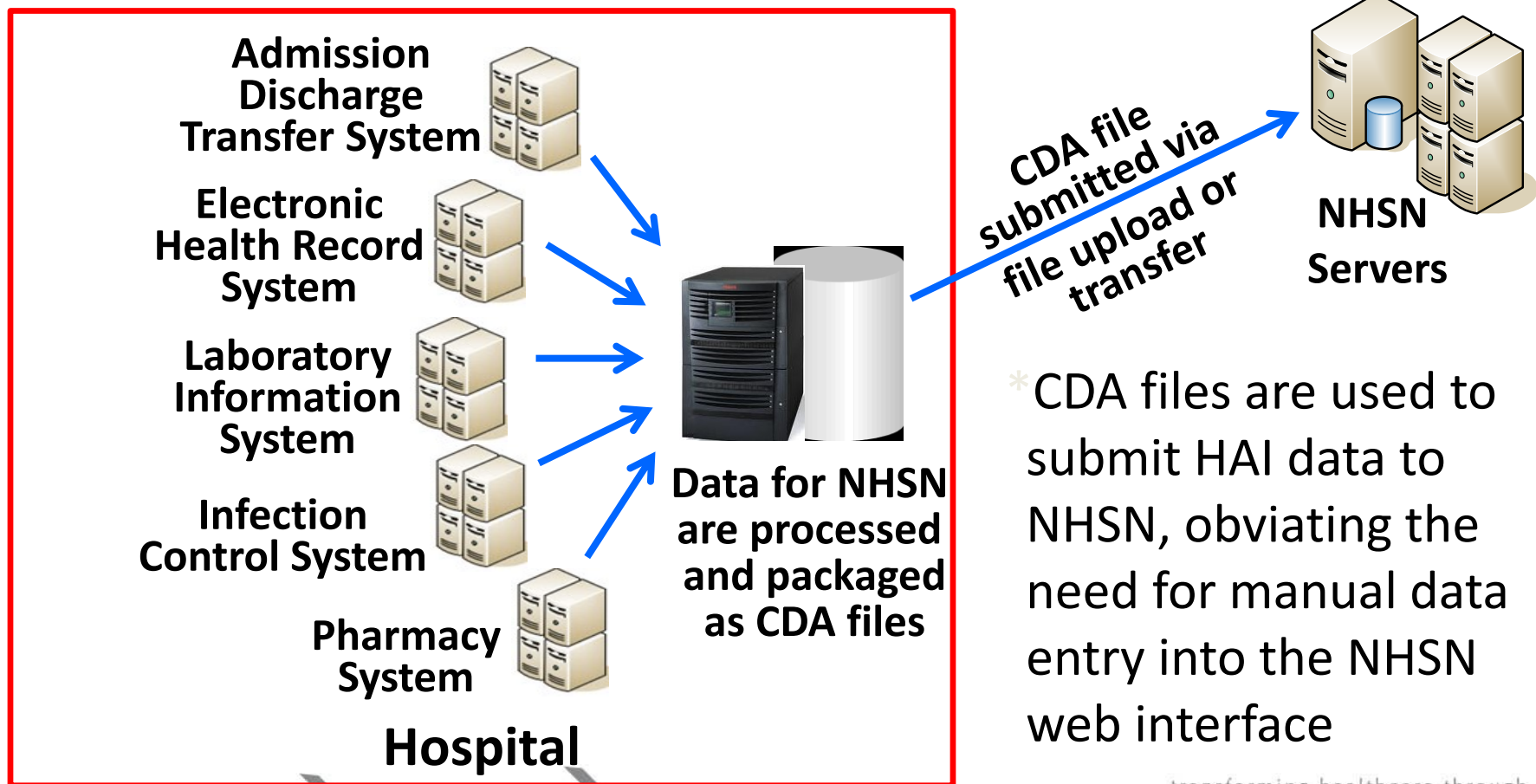


NHSN Servers

Manual processes are used to prepare and submit records to NHSN, even when healthcare data are available in electronic form



Use of CDA for HAI Reporting to NHSN – Leveraging Electronic Data Sources





Each CDA Instance Submitted to NHSN is an XML-Encoded Record

NHSN HAI Report Form

.....▶ XML*

Event Details

Specific Event: LCBI – Lab Confirmed BSI

Specify Criteria Used:

Signs & Symptoms (check all that apply)

Any patient

≤1 year old

Fever

Fever

Chills

Hypothermia

Hypotension

Apnea

Bradycardia

```
<observation>
  <code
    codeSystem="2.16.840.1.113883.5.4"
    code="ASSERTION"/>
  <statusCode code="completed"/>
  <value
    codeSystem="2.16.840.1.113883.6.96"
    codeSystemName="SNOMED CT"
    code="386661006"
    displayName="fever"/>
</observation>
```

* XML = Extensible Markup Language

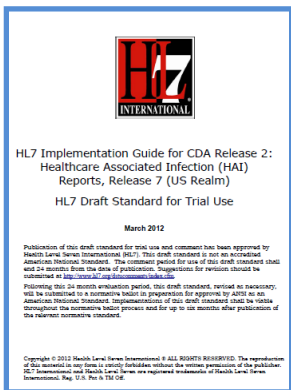


Templated CDA: Technical Lynchpin for HAI Reporting via CDA to NHSN

- CDA is built on the HL7 Version 3.0 Reference Information Model (RIM) which offers advantages for interoperability but has a reputation for complexity
- Templates, CDA's solution for dealing with RIM complexity, are pre-defined specifications for expressing a particular element of clinical data (e.g. blood pressure, HAI instance), the structure of a textual section in a CDA document, or the structure of the CDA header



HL7 CDA for HAI Reporting Implementation Guide (IG)



- Essentially a collection of templates and associated vocabulary for creating valid CDA records for submission to CDC's NHSN
- Each IG release is vetted with vendors and submitted to HL7 ballot
- CDC commits resources and provides tools for supporting use of CDA to report HAIs
- Getting started and getting help with the IG: nhsncda@cdc.gov



NHSN and CDA – Current Status

- NHSN currently accepts CDA files for CLABSI, CAUTI, SSI, CLIP, Laboratory Identified Event, Dialysis Event, and Antimicrobial Use reporting
- Approximately 10% of hospitals that participate in NHSN use a CDA solution for at least some reporting
- Infection control surveillance system vendors are the primary implementers; EHRs implementations are increasing
- Efforts are underway to include HAI reporting via CDA in Stage 3 Meaningful Use



Summing Up: NHSN and CDA

- NHSN's role as the primary system for HAI reporting mandates in the U.S. places a premium on creating greater efficiencies in the HAI data supply chain
- CDA is an integral part of a larger movement away from manual processes to electronic methods of detecting and reporting HAIs
- The near-term benefits achieved by using CDA to report HAIs to NHSN demonstrate how standards can be leveraged to reap new returns on investments in health information technology



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Meaningful Use and CDA



- **Consolidated CDA Implementation Guide:**
A CDA-based representation of common clinical documents (Consultation Note, H&P, Progress Note, Discharge Summary, Operative Note, Procedure Note, Diagnostic Imaging Report)
- **Quality Reporting Document Architecture:**
A CDA-based representation of patient-level and aggregate clinical quality data
- **Ambulatory Healthcare Provider Reporting to Central Cancer Registries:**
A CDA-based representation of clinical oncology data



Why is CDA So Popular??

1. Get the data flowing, get the data flowing, get the data flowing
2. Incrementally add structure, where valuable to do so

THE MEDQUIST HOSPITAL
 DISCHARGE SUMMARY

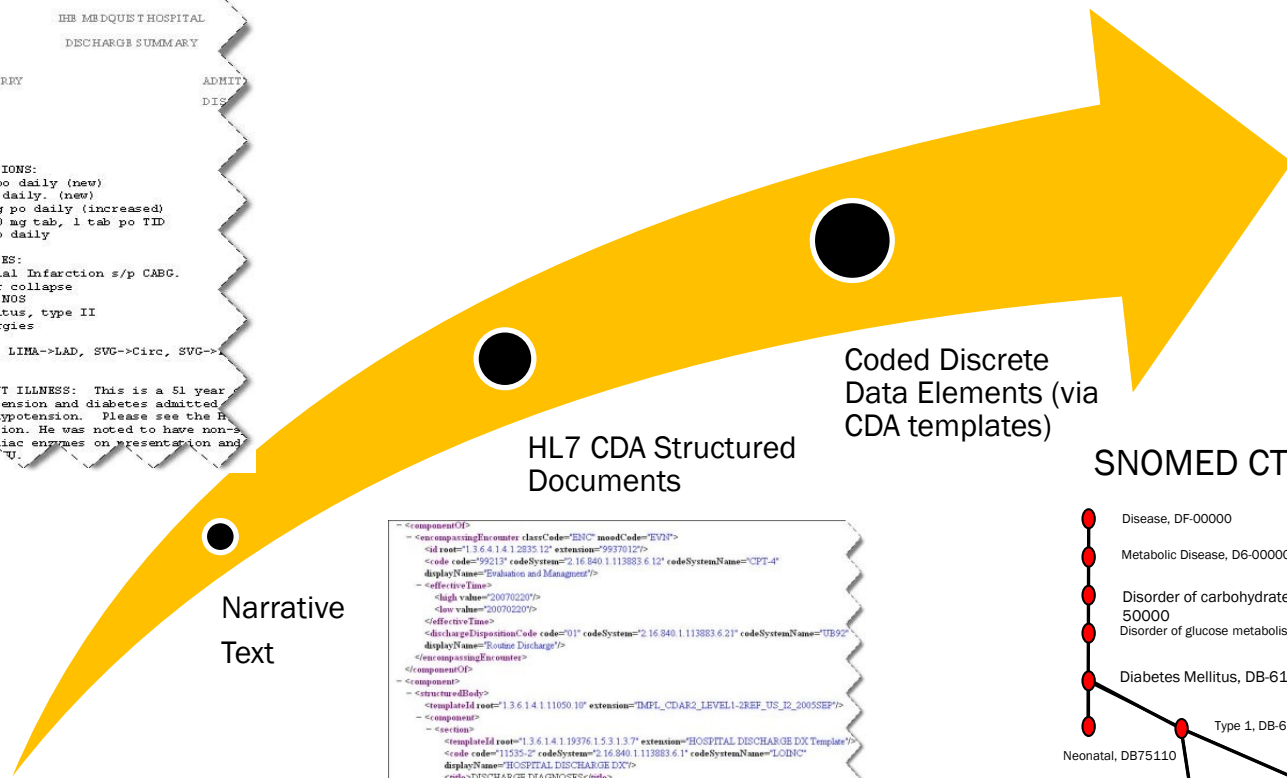
PATIENT: DOGOOD, LARRY ADMITTED:
 HR#: AL234567 DISCHARGED:
 ACCOUNT #: 1234567

DISCHARGE MEDICATIONS:
 1. ECASA 325 mg po daily (new)
 2. Zocor 40mg po daily. (new)
 3. Atenolol 100mg po daily (increased)
 4. Glucophage 850 mg tab, 1 tab po TID
 5. Zyrtec 10mg po daily

DISCHARGE DIAGNOSES:
 1. Acute Myocardial Infarction s/p CABG.
 2. Cardiovascular collapse
 3. Hypertension, NOS
 4. Diabetes Mellitus, type II
 5. Seasonal Allergies

PROCEDURE: CABG, LIMA->LAD, SVG->Circ, SVG->2/26/07.

HISTORY OF PRESENT ILLNESS: This is a 51 year history of Hypertension and diabetes admitted with chest pain, and hypotension. Please see the H details of admission. He was noted to have non- and positive cardiac enzymes on presentation and admit to the U.



Narrative Text

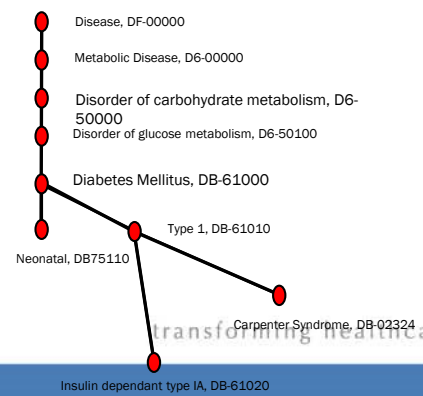
HL7 CDA Structured Documents

Coded Discrete Data Elements (via CDA templates)

```

<componentOf>
  <encapsulatingEncounter classCode="ENC" moodCode="EVN"?>
    <id root="1.3.6.4.1.1.2835.12" extension="9937812"?>
      <code code="99213" codeSystem="2.16.840.1.113883.6.12" codeSystemName="CPT-4"
        displayName="Evaluation and Management"/>
      <effectiveTime>
        <high value="20070220T"?>
          <low value="20070220T"?>
            <effectiveTime>
              <dischargeDispositionCode code="01" codeSystem="2.16.840.1.113883.6.21" codeSystemName="UB92"
                displayName="Positive Discharge"/>
            </dischargeDispositionCode>
          </encapsulatingEncounter>
        </componentOf>
      </component>
    </componentOf>
  </component>
  <structuredBody>
    <templateId root="1.3.6.14.1.11050.10" extension="DMFI_CDAR2_LEVEL1_ZREF_US_R_2005SEP"?>
      <component>
        <section>
          <templateId root="1.3.6.14.1.19376.1.5.3.1.3.7" extension="HOSPITAL DISCHARGE DX Template"?>
            <code code="11535.2" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC"
              displayName="HOSPITAL DISCHARGE DX"/>
            <title>DISCHARGE DIAGNOSES</title>
            <text>
              <p>paragrp>1 Acute Myocardial Infarction s/p CABG </paragrp>
              <p>paragrp>2 Cardiovascular collapse</paragrp>
            </text>
          </section>
        </component>
      </structuredBody>
    </componentOf>
  </component>
</componentOf>
  
```

SNOMED CT



Decision Support

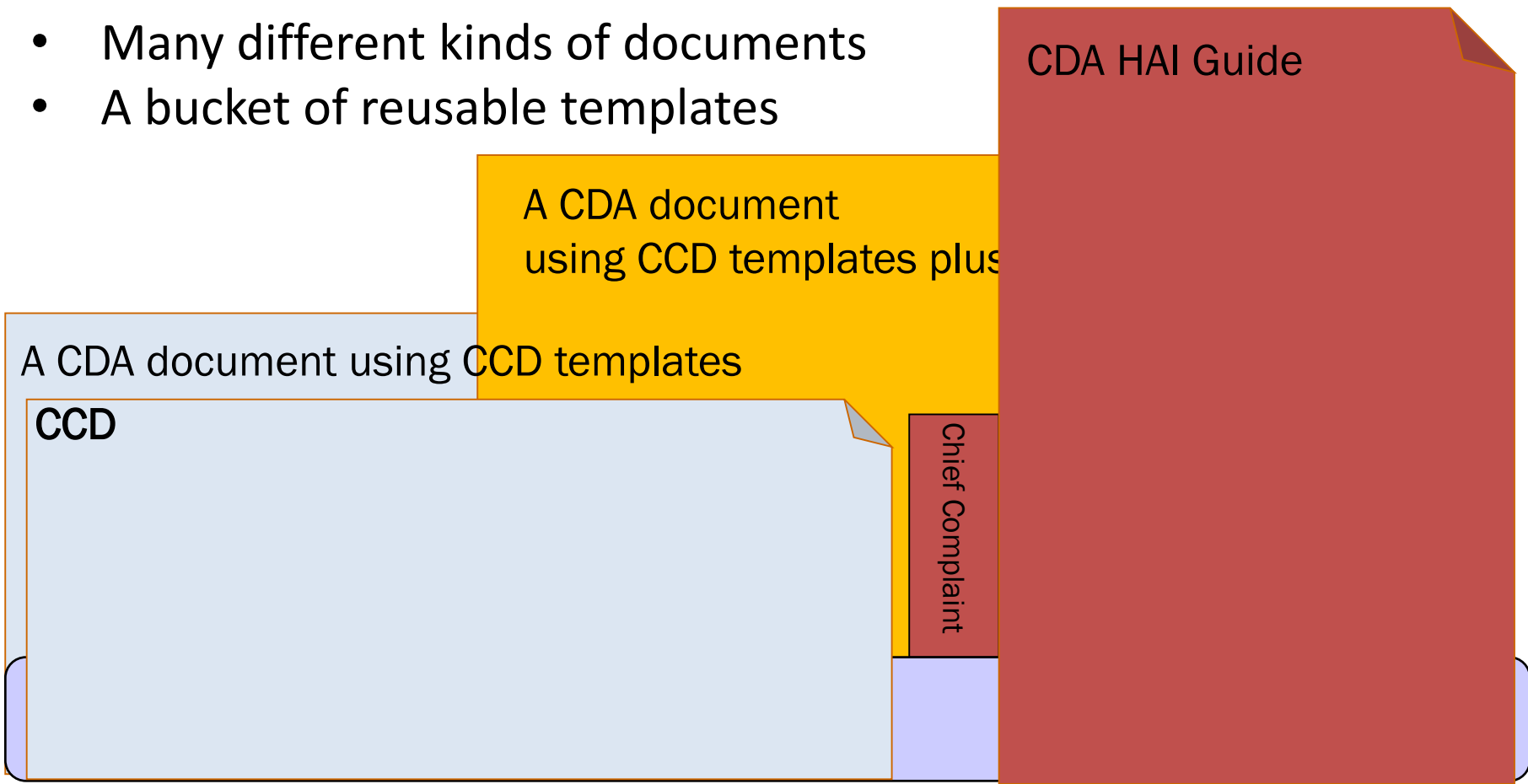
Clinical Applications

Meaningful Use!



Templated CDA

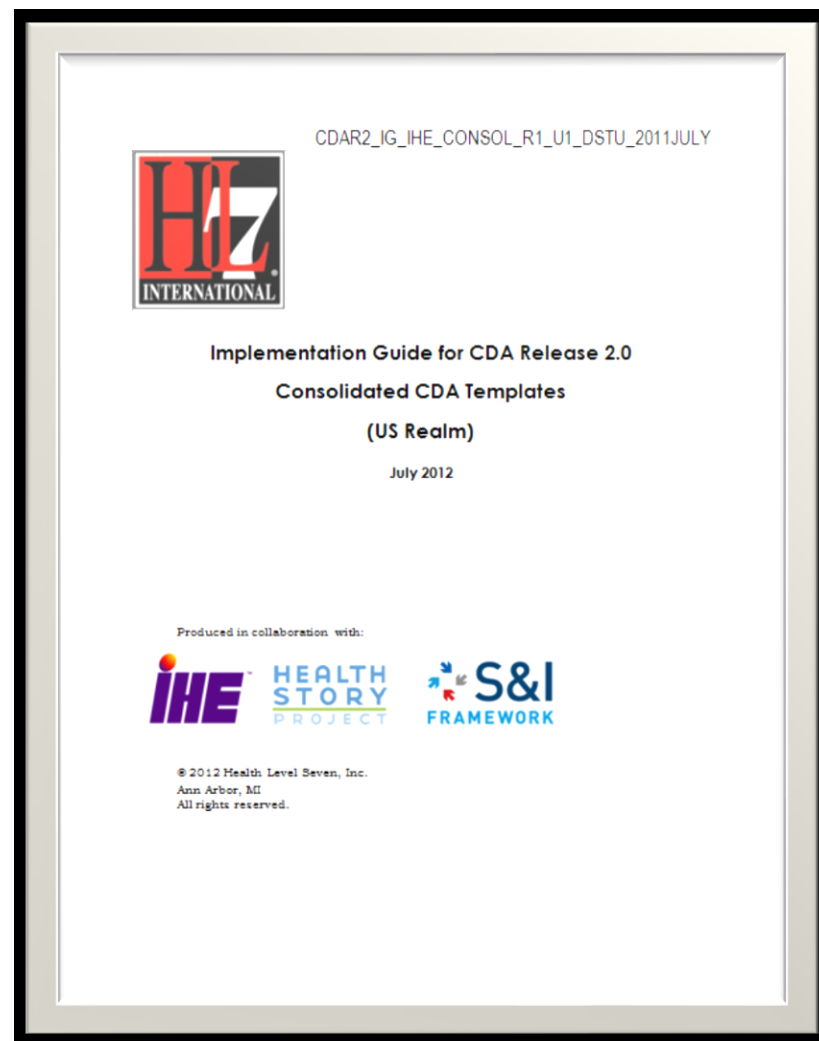
- Many different kinds of documents
- A bucket of reusable templates





Consolidated CDA

- Many types of documents:
 - Continuity of Care (CCD)
 - Consultation Note
 - Diagnostic Imaging Report
 - Discharge Summary
 - History & Physical (H&P)
 - Operative Note
 - Procedure Note
 - Progress Note
 - Unstructured Document
- A bucket of reusable templates
- www.hl7.org





```
<section>
  <code code="48765-2" codeSystem="2.16.840.1.113883.6.1"
    codeSystemName="LOINC"/>
  <title>Allergies and Adverse Reactions</title>
  <text>
    <list>
      <item>Penicillin - Hives</item>
      <item>Aspirin - Wheezing</item>
      <item>Codeine - Itching and nausea</item>
    </list>
  </text>
  <entry>
    <observation>
      <code code="247472004" codeSystem="2.16.840.1.113883.6.96"
        codeSystemName="SNOMED CT" displayName="Hives"/>
      <entryRelationship typeCode="MFST">
        <observation>
          <code code="91936005" codeSystem="2.16.840.1.113883.6.96"
            codeSystemName="SNOMED CT"
            displayName="Allergy to penicillin"/>
        </observation>
      </entryRelationship>
    </observation>
  </entry>
</section>
```

Allergies and Adverse Reactions

- Penicillin - Hives
- Aspirin - Wheezing
- Codeine – Itching and nausea



Simplifying CDA Implementation

- Templated CDA
- **greenCDA**



Simplifying CDA via templates

- No need to understand HL7 Reference Information Model
- No need to understand complete CDA standard
- Only need to
 - Populate required fields in CDA header
 - Map local data to fields in required CDA templates
- HAI templates reuse Consolidated CDA MU templates where possible



greenCDA

- **greenCDA** is a simplified XML, that maps to full CDA
- **greenCDA** hides certain CDA complexities (such as moodCodes, fixed attributes, etc).
- **greenCDA** schemas are modular, corresponding to CDA templates.



1. Create **greenCDA** guide

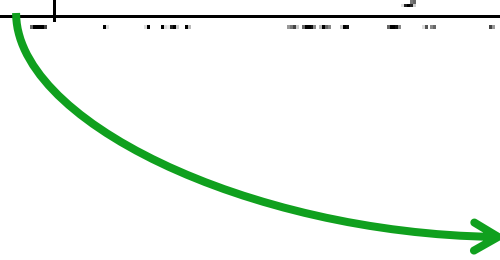
Requirements

| CDA Data Location | HITSP Data Element Identifier and Name |
|---|--|
| <code>cda:observation[cda:templateId/@root = '2.16.840.1.113883.10.20.1.31']</code> | Result Event Entry |
| <code>cda:id</code> | 15.01 - Result ID |
| <code>cda:effectiveTime</code> | 15.02 - Result Date/Time |
| <code>cda:code/@code</code> | 15.03 - Result Type |
| <code>cda:statusCode</code> | 15.04 - Result Status |
| <code>cda:value</code> | 15.05 - Result Value |
| <code>cda:interpretationCode/@code</code> | 15.06 - Result Interpretation |
| <code>cda:referenceRange</code> | 15.07 - Result Reference Range |

greenCDA schema

```

<result>
  <resultID>
  <resultDateTime>
  <resultType>
  <resultStatus>
  <resultValue>
  <resultInterpretation>
  <resultReferenceRange>
</result>
  
```





2. Create **greenCDA** instance

greenCDA instance

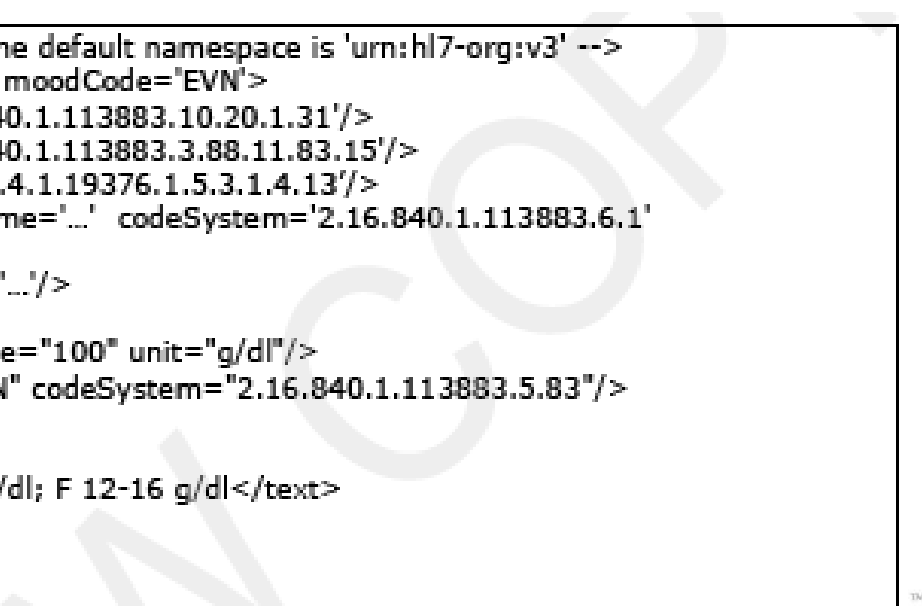
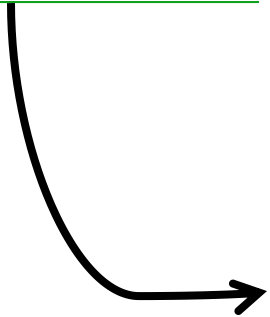
```

<result>
  <resultID>
  <resultDateTime>
  <resultType>
  <resultStatus>
  <resultValue>
  <resultInterpretation>
  <resultReferenceRange>
</result>
  
```

Conformant CDA instance

```

<!-- These examples assume the default namespace is 'urn:hl7-org:v3' -->
<observation classCode='OBS' moodCode='EVN'>
  <templateId root='2.16.840.1.113883.10.20.1.31'/>
  <templateId root='2.16.840.1.113883.3.88.11.83.15'/>
  <templateId root='1.3.6.1.4.1.19376.1.5.3.1.4.13'/>
  <code code='...' displayName='...' codeSystem='2.16.840.1.113883.6.1'
codeSystemName='LOINC'/>
  <effectiveTime low value='...'/>
  <statusCode value='N'/>
  <value xsi:type="PQ" value="100" unit="g/dl"/>
  <interpretationCode code="N" codeSystem="2.16.840.1.113883.5.83"/>
  <referenceRange>
    <observationRange>
      <text>M 13-18 g/dl; F 12-16 g/dl</text>
    </observationRange>
  </referenceRange>
</observation>
  
```

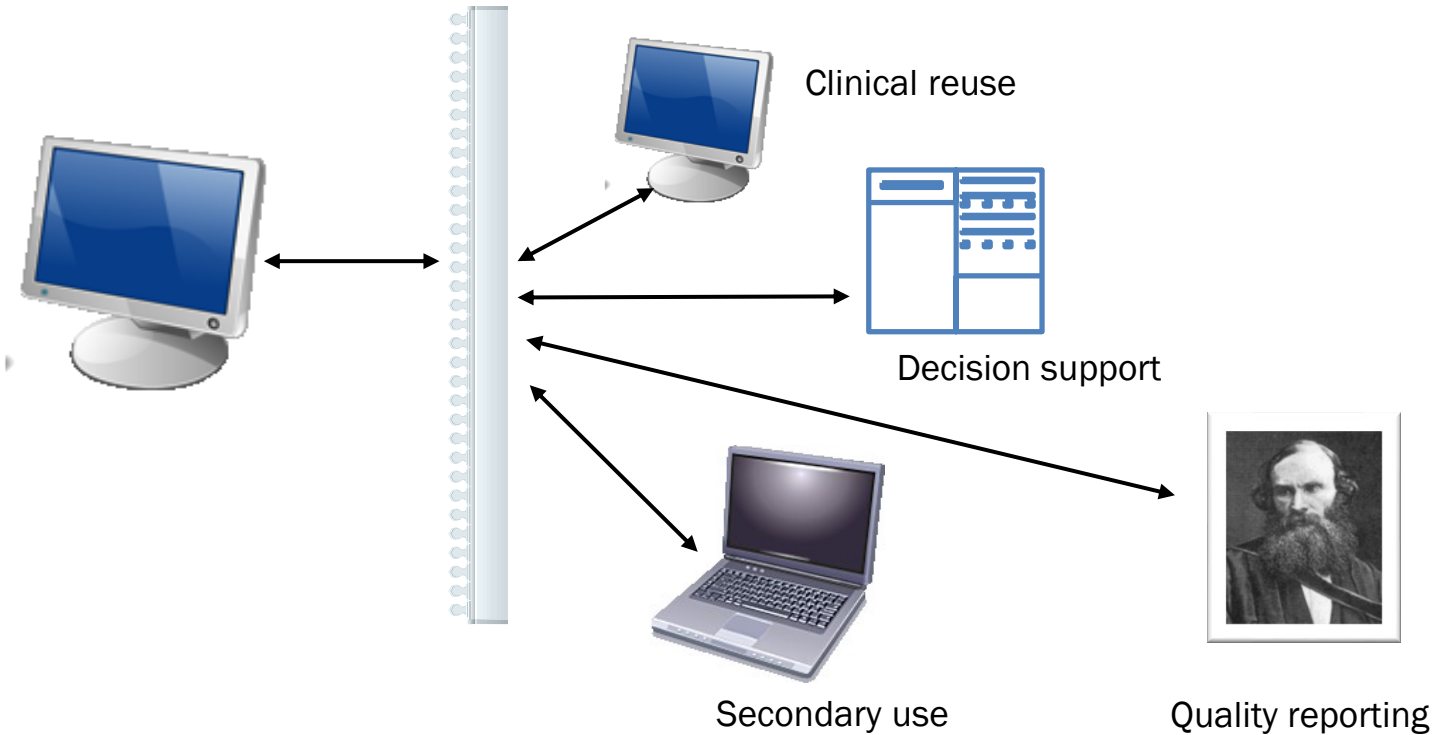




Conclusion

Local EHR

National Meaningful Use





Thank You!

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Promotion, CDC
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