



Electronic Health Record (EHR) Data Capture: Hopes, Fears, and Dreams

**Liora Alschuler, CEO
Lantana Consulting Group**

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A Little About Me & Lantana

Background:

- Electronic text systems analyst
- Helped introduce XML to healthcare IT (HIT)
- Co-editor of Health Level Seven (HL7) Clinical Document Architecture (CDA)

Lantana:

- Develops and implements standards-based solutions for healthcare
- Worked with NAACCR, NCI, ASCO, CMS, ONC

A Little About T&FLAs

NAACCR	You know that one
CDA	Clinical Document Architecture
MU	Meaningful Use (of Certified EHRs)
EHR	Electronic Health Record
HL7	Health Level Seven
ONC	Office of the National Coordinator for Health Information Technology
HIT	Health Information Technology
NCI	National Cancer Institute
ASCO	American Society of Clinical Oncology
CMS	Centers for Medicare & Medicaid Services
CDC	Centers for Disease Control & Prevention
NHSN	National Healthcare Safety Network
HAI	Healthcare Associated Infections
ACP	American College of Physicians
HITECH	Health Information Technology for Economic and Clinical Health Act of 2009

EHR Data Capture: Hopes



More data, better data, cheaper data

- **Better care (process improvement)**
- **Better cures (outcomes improvement)**

EHR Data Capture: Hopes



Meaningful Use:

- Certification criteria and interoperability standards
- For administrative and clinical data
- HITECH act incentive payments for adoption in inpatient, eligible provider outpatient settings; (excludes long term, specialty care)
- Supports all manner of reporting, analysis, decision making, improvement

EHR Data Capture: Fears



All programs:

- Have unintended consequences
- Can be disruptive of an already burdened care delivery system

Government programs:

- May not be cohesive
- May not be supported by vendors

EHR Data Capture: Fears



Unintended consequences:

- “The vast sum of stimulus money flowing into health information technology created a ‘race to adopt’ mentality – [buy today], but figure out how to make them work tomorrow.”
 - David Brailer, MD, First National Coordinator for Health IT, quoted in *NY Times*, January 10, 2013

EHR Data Capture: Fears



Failed promises:

- RAND Corporation in 2005 projected \$81 billion *per year* in system savings from adoption of electronic records
- In 2013 reassessment they state that “We’ve not achieved the productivity and quality benefits that are unquestionably there for the taking,”
 - Arthur L. Kellermann, MD, RAND, quoted in *NY Times*, January 10, 2013

EHR Data Capture: Fears



Uncertainty, doubt on rise:

- In ACP survey released March, 2013,
 - User satisfaction fell 12 % from 2010-12
 - Very dissatisfied rose 10% from 2010-12
- Would not recommend: 39%
- Dissatisfied that can decrease workload: 34%
- *Least satisfied: surgical specialists*

ACPOne.org, release March 5, 2013

EHR Data Capture: Fears



Even where in use, insufficient:

- Key clinical data required for quality reporting is missing from coded EHR data
- Example: Splenectomy documented only in narrative in 71% of records
 - Gandhi, et. Al, “Incomplete care...”, NEJM, 2011; 365(6):486-8
- Example: Key data missing from 65% of coded records at IPA
 - Apixio White Paper: Big Data Reveals Crucial Hidden Information...
<http://apixio.com>

EHR Data Capture:

Hopes



Fears



Dreams



How can we make it work?

Do we know where we are going?

“Would you tell me, please, which way I ought to go from here?”

“That depends a good deal on where you want to get to,” said the Cat.

“I don’t much care where—” said Alice.

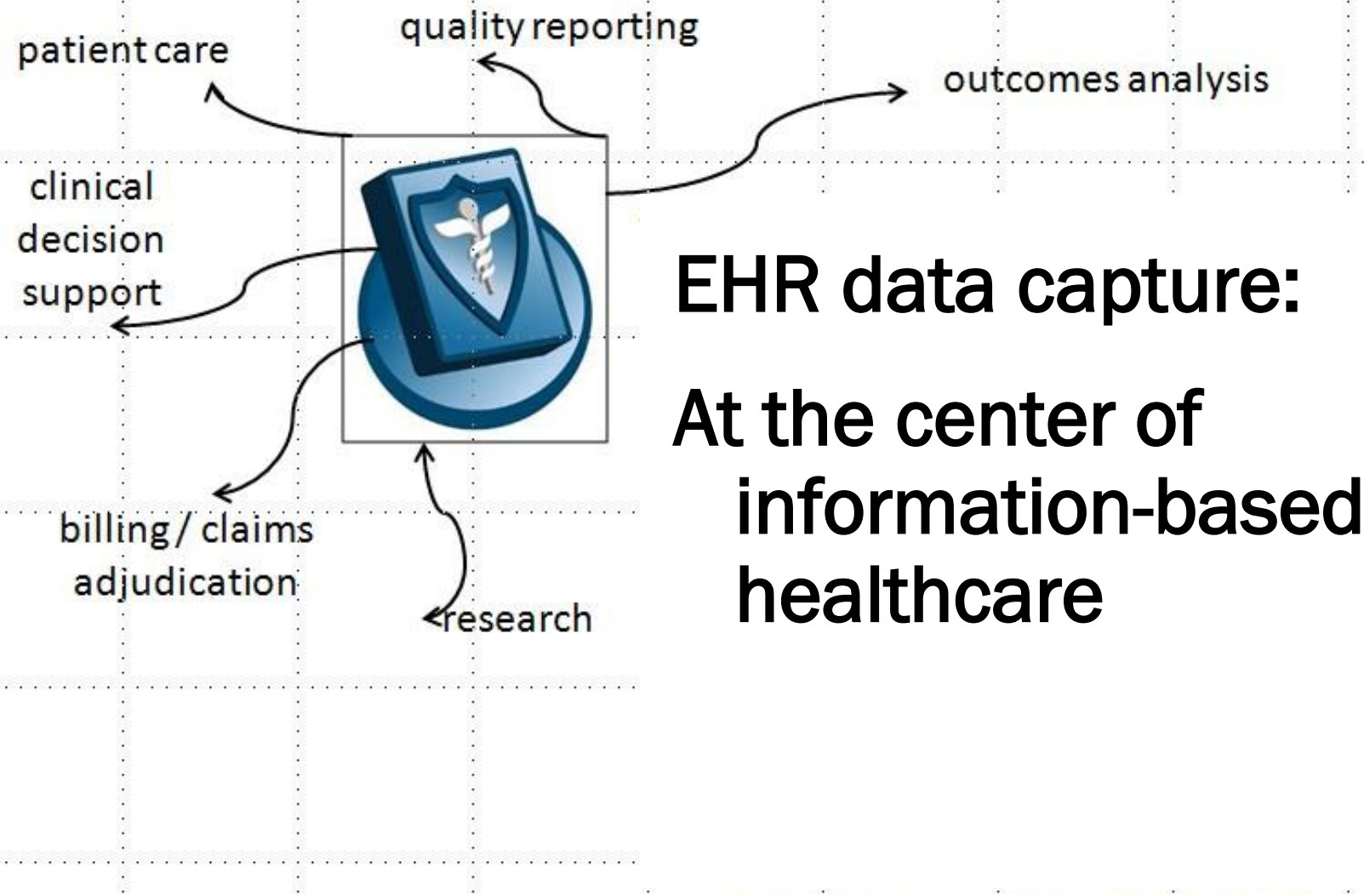
“Then it doesn’t matter which way you go,” said the Cat.

“—so long as I get SOMEWHERE,” Alice added as an explanation.

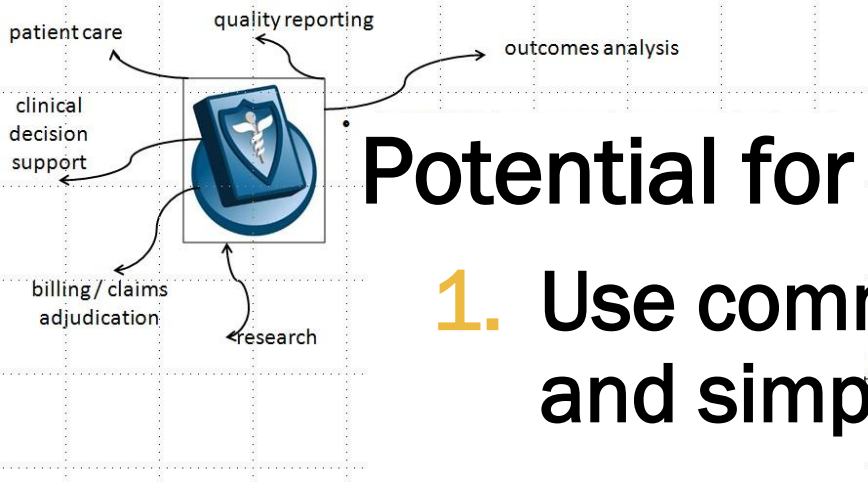
“Oh, you’re sure to do that,” said the Cat, “if you only walk long enough.”



We Do Know the Destination



We Do Know the Destination



Potential for EHR data capture:

1. Use common framework; Expand and simplify interoperability
2. Start from where we are, improve incrementally

Two opportunities to adjust course:

- Consistent use of templated CDA
- & Big Data

CDA: Common Framework



HL7 Clinical Document

Architecture, CDA, hits the “sweet spot”

- Specifies structure & semantics for exchange
- Complete object: text, data, media

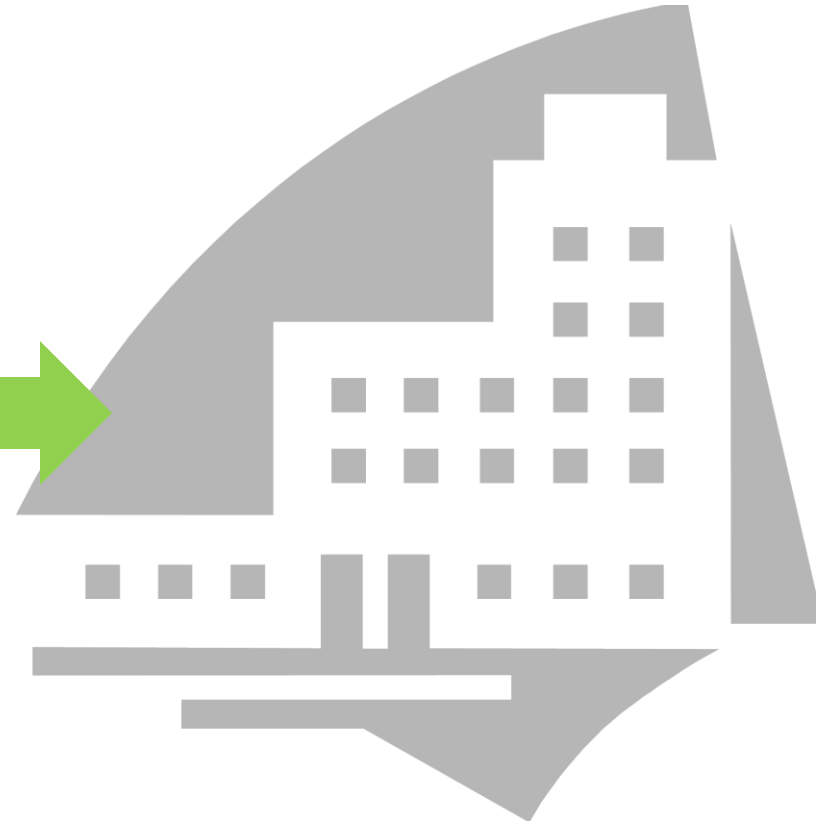
Widely implemented

- No. & So. America, Europe, Asia, Middle East
- Cited in Meaningful Use for continuity of care, registry and quality reporting

CDA Developed to Meet this Challenge



**Dictation is fast
and practical**



**Structured, coded
data is computable**

CDA Sweet Spot

Templated CDA data

- Takes abstract, universal: <observation>
- Applies constraints: <diagnosis>

Retains narrative

- Health Story Project estimates 1,200,000,000 clinical documents created each year in US
- Represent 60% of clinical record

There is Structure in All Clinical Notes

Discharge Summary		
Patient	Ned Nuclear	
Date of birth	November 25, 1954	Sex
Contact info	6666 Home Street Ann Arbor, MI 9999, USA Tel: (781)555-1212	Patient IDs
Document Id	999021 2.16.840.1.113883.19	
Document Created:	March 3, 2005, 17:15:04 +0500	
Author	Henry Seven, MD	
Contact info	1002 Healthcare Drive Ann Arbor, MI 99999, USA Tel: (555)555-1002	
Encounter Id	9937012 2.16.840.1.113883.19	
Encounter Date	From March 3, 2009 to June 25, 2009	
Discharge	Positive Discharge	

Hospital Course	
The patient was admitted and started on Lovex ruled out for myocardial infarction. The patient ischemia on the Cardiolite scan. The patient h not available at this time. The patient has rem	
Hospital Discharge Diagnosis	
Unspecified chest pain	
Hospital Discharge Medications	
Medication	
Lisinopril 5 mg	
Atenolol 25 mg	1 tablet once a day

I note that this patient has been on Prednisone for adrenal insufficiency in the past.


```

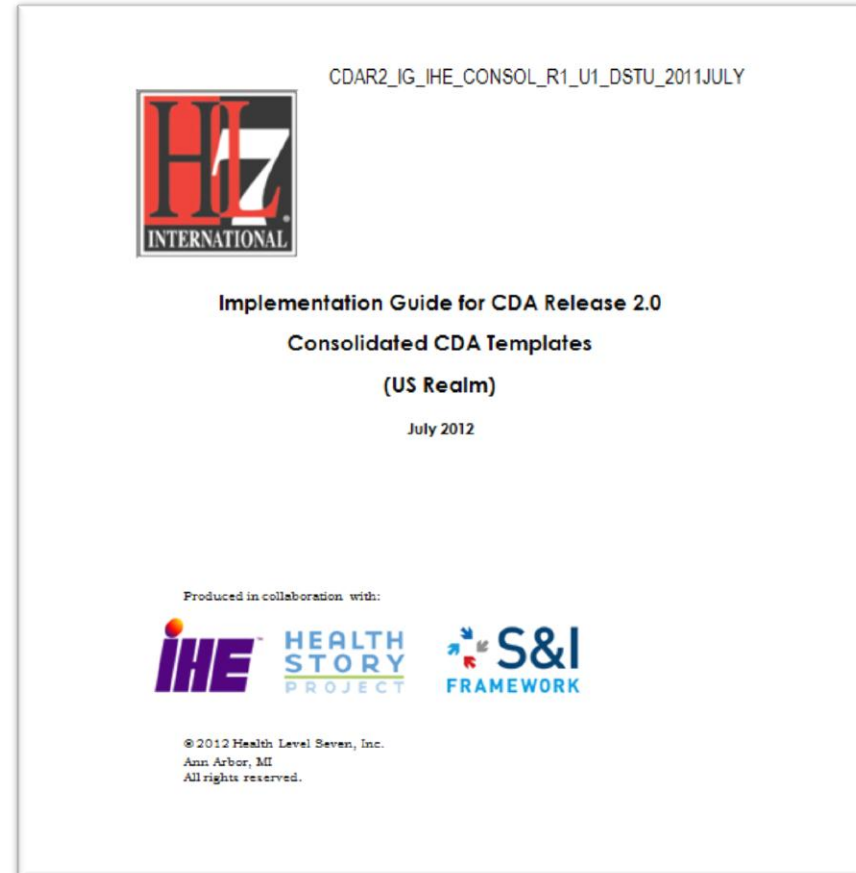
*****
Hospital Course - Required
*****
-->
- <component>
- <section>
  <templateId root="1.3.6.1.4.1.19376.1.5.3.1.3.5" />
  <code code="8648-8" displayName="HOSPITAL COURSE"
    codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC" />
  <title>Hospital Course</title>
  <text>The patient was admitted and started on Lovenox and
    nitroglycerin paste. The patient had serial cardiac enzymes and
    was ruled out for myocardial infarction. The patient underwent a
    dual isotope stress test. There was no evidence of reversible
    ischemia on the Cardiolite scan. The patient has been ambulated.
    The patient had a Holter monitor placed but the report is not
    available at this time. The patient has remained hemodynamically
    stable. Will discharge.</text>
- <entry>
- <observation classCode="OBS" moodCode="EVN">
  <code nullFlavor="NI" />
  
```

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 library of reusable templates (data elements)



Templated CDA Implementations

Consolidated CDA template library:

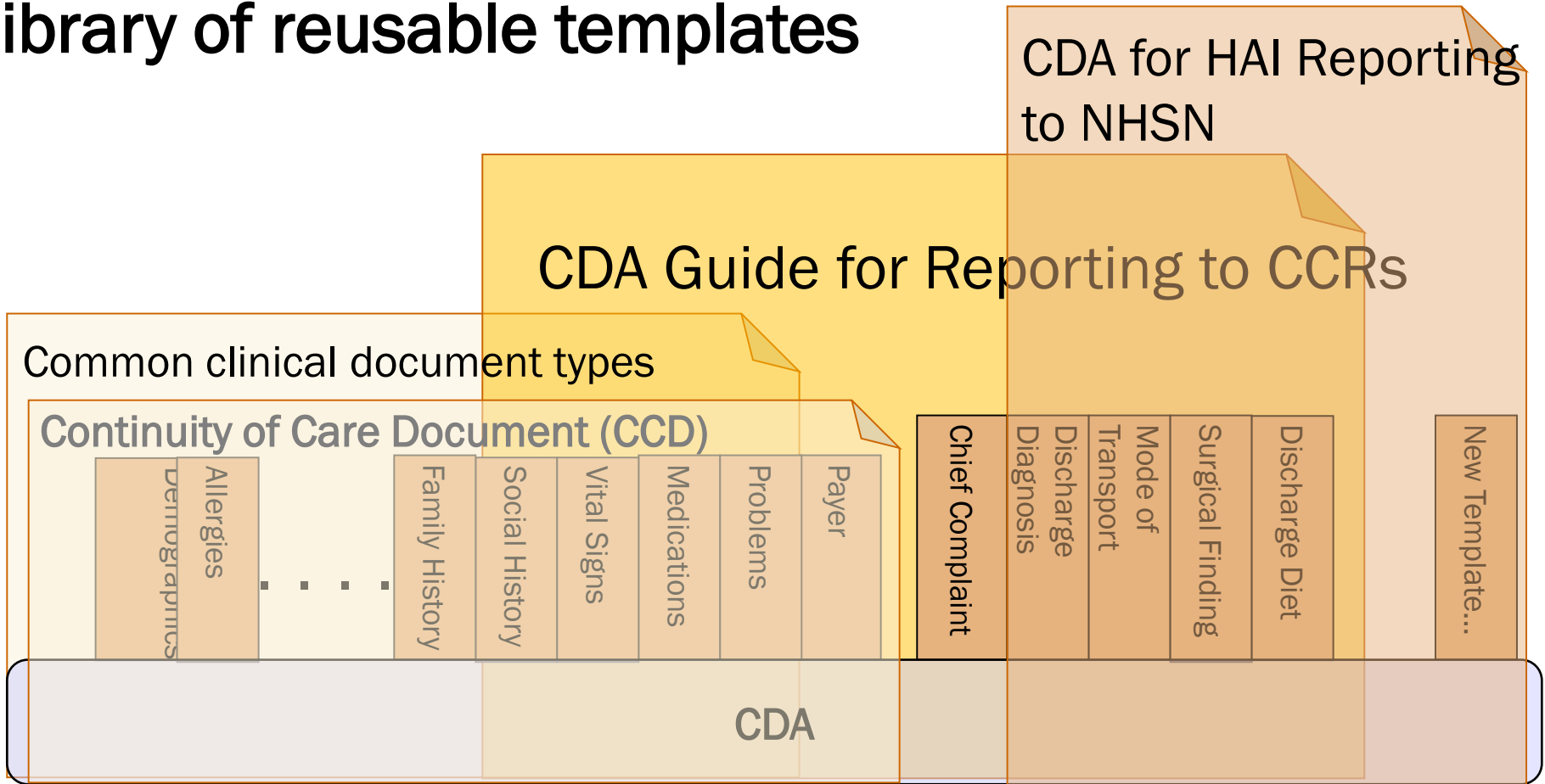
- Consolidate CDA: Nine common clinical documents, cited in MU2
- ASCO–Clinical Oncology Treatment Summary
- CDC National Healthcare Safety Network

Other Templated CDA libraries:

- CDA Guide for Reporting to Central Cancer Registries, cited in MU2
- NCI–for Breast Cancer Clinical Trial Data

Templated CDA: A Common Framework

Many different kinds of documents from a library of reusable templates

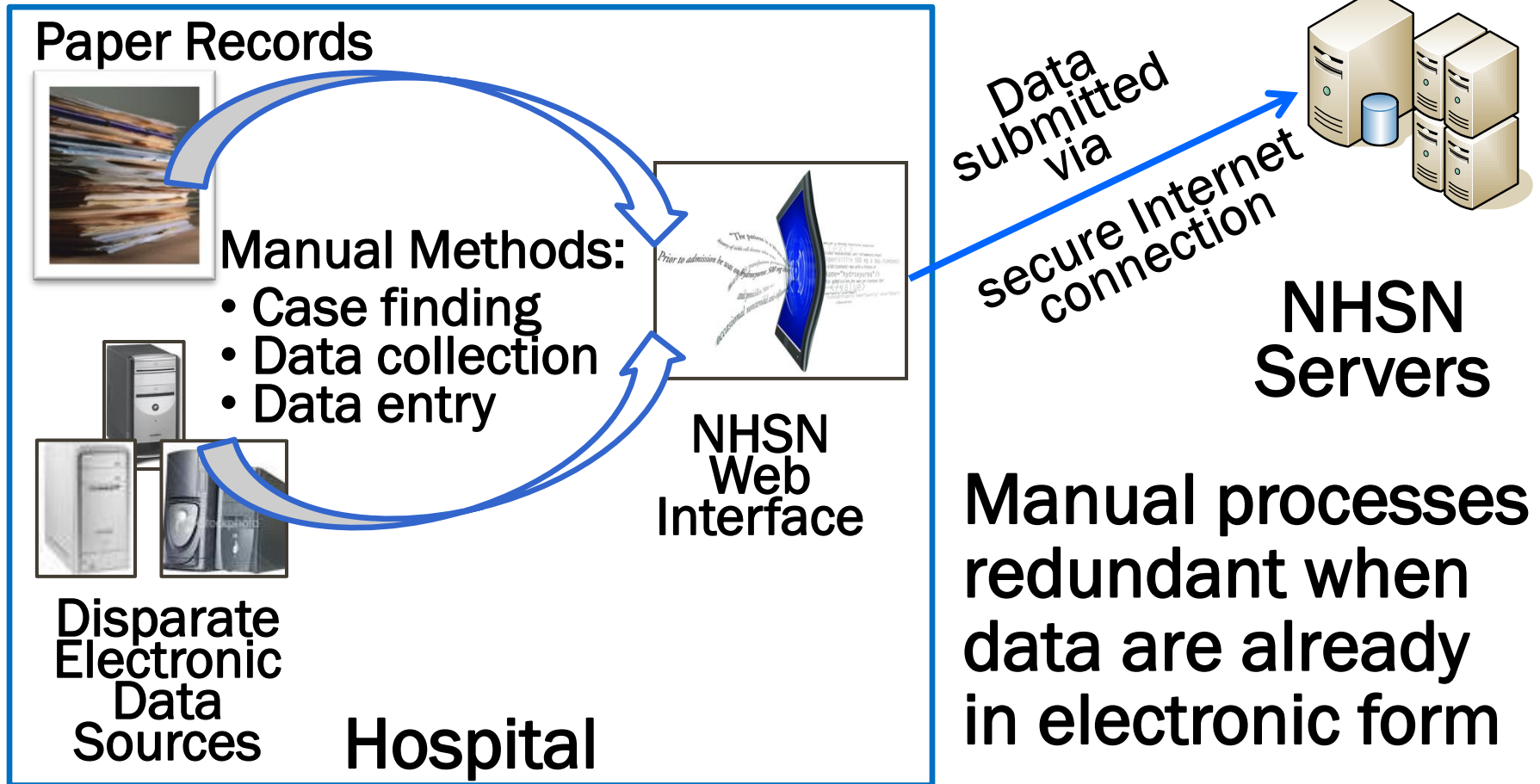


System for HAI Reporting:

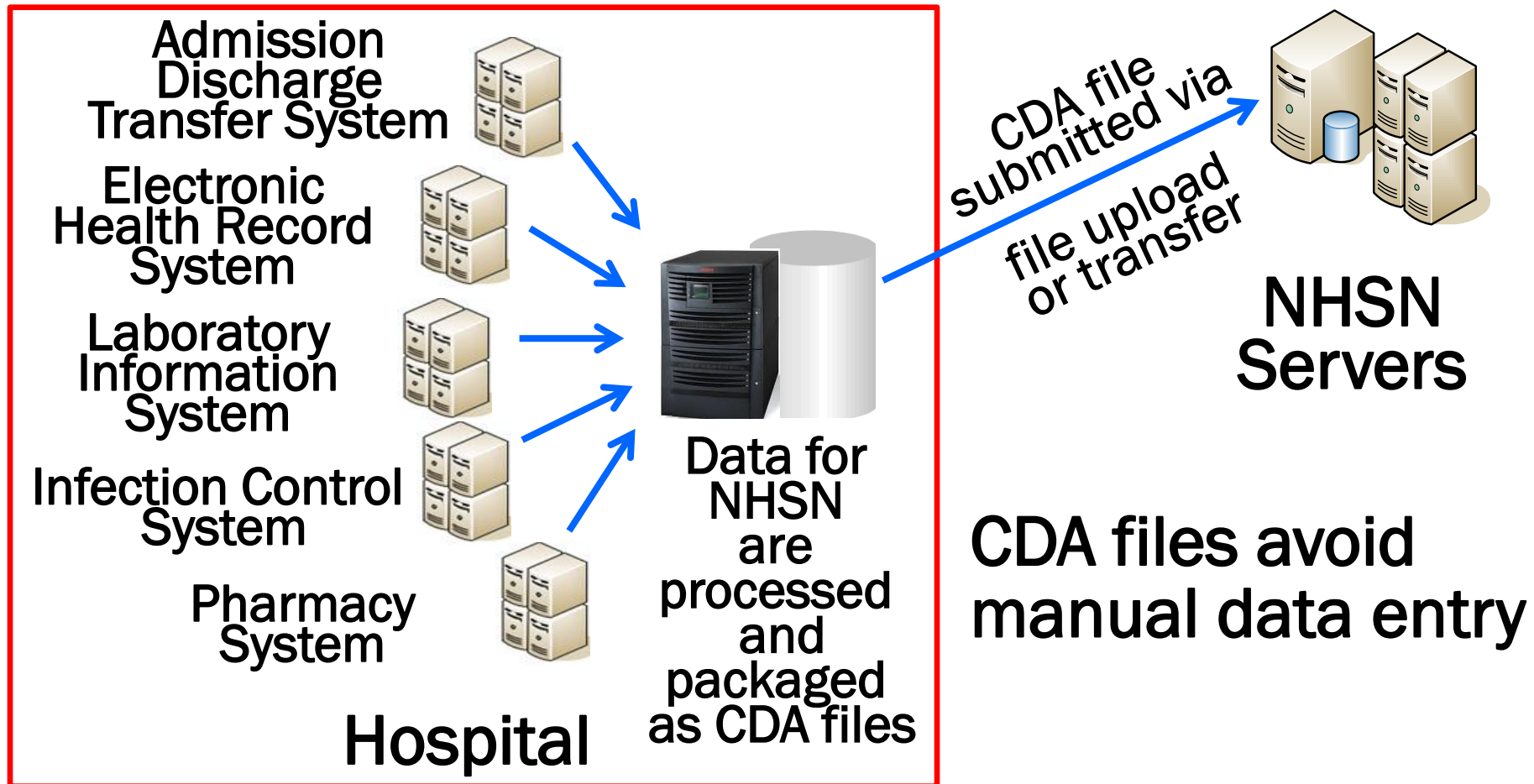
- Launched in 2005 for HAI reporting
- In use by 30 states and by CMS
- State and federal reporting requirements
- 2005: ~ 300 hospitals
- 2013: over 5,000 hospitals
- Manual data entry via a web interface
electronic reporting via CDA



Web Interface for reporting is labor intensive.



“Demonstrates that standards can be leveraged to reap new returns on investments in HIT.” Dan Pollock, MD



Big Data, Incrementally Structured

Supply analytic engines

- High volume
- Semi-structured data

Get the data flowing

Incrementalism Works for the Internet



Google

Narrative Rocks

Quality Reporting: 200,000 patients

- Coded data insufficient
- Narrative analysis shifted numerator and denominator significantly

NQF measure:

- Coded data: 22%
- Textual + coded data: 45%
- (study submitted for publication)

CDA preserves clinical narrative

Templated CDA – Interoperability Roadmap

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

IHE MEDQUEST HOSPITAL
DISCHARGE SUMMARY

PATIENT: DOGOOD, LARRY
MR#: A1234567
ACCOUNT #: 1234567

ADMITTED
DISCHARGED

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, HIG
4. Diabetes Mellitus, type II
5. Seasonal Allergies

PROCEDURE: CABG, LIHA->LAD, SVG->Circ, SVG->Z/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.

HL7 CDA Structured Documents

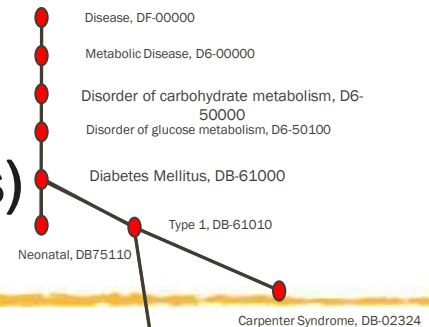
Narrative Text

```

<componentOf>
  <encapsulatingEncounter classCode="ENCR" moodCode="EVN"?>
    <id root="1.3.6.4.1.4.1.2835.12" extension="99379127"/>
    <code code="99213" codeSystem="2.16.840.1.113883.6.12" codeSystemName="CPT-4"
      display="Evaluation and Management"/>
    <effectiveTime>
      <low value="20070220T"/>
      <low value="20070220T"/>
    </effectiveTime>
    <dischargeDisposition code="01" codeSystem="2.16.840.1.113883.6.21" codeSystemName="UB92"
      display="Routine Discharge"/>
    </encapsulatingEncounter>
  </componentOf>
  <component>
    <structuredBody>
      <templateId root="1.3.6.1.4.1.11050.10" extension="DMEL_CDAR2_LEVEL1-2REF_US_ID_2005SEP"/>
      <component>
        <section>
          <templateId root="1.3.6.1.4.1.19376.1.5.3.1.3.7" extension="HOSPITAL DISCHARGE DX Template"/>
          <code code="11535-2" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC"
            display="HOSPITAL DISCHARGE DX"/>
          <code="DISCHARGE DIAGNOSES" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC"
            display="DISCHARGE DIAGNOSES" moodCode="NMTD"/>
          <text>
            <paragraph>1. Acute Myocardial Infarction s/p CABG </paragraph>
            <paragraph>2. Cardiovascular collapse </paragraph>
          </text>
        </section>
      </component>
    </structuredBody>
  </component>
</componentOf>
  
```

Coded Discrete Data Elements (via CDA templates)

SNOMED CT



Quality
Reporting

Decision
Support

Clinical
Applications

Meaningful
Use!

EHR Data Capture: Yes, We Can

Hopes



Fears

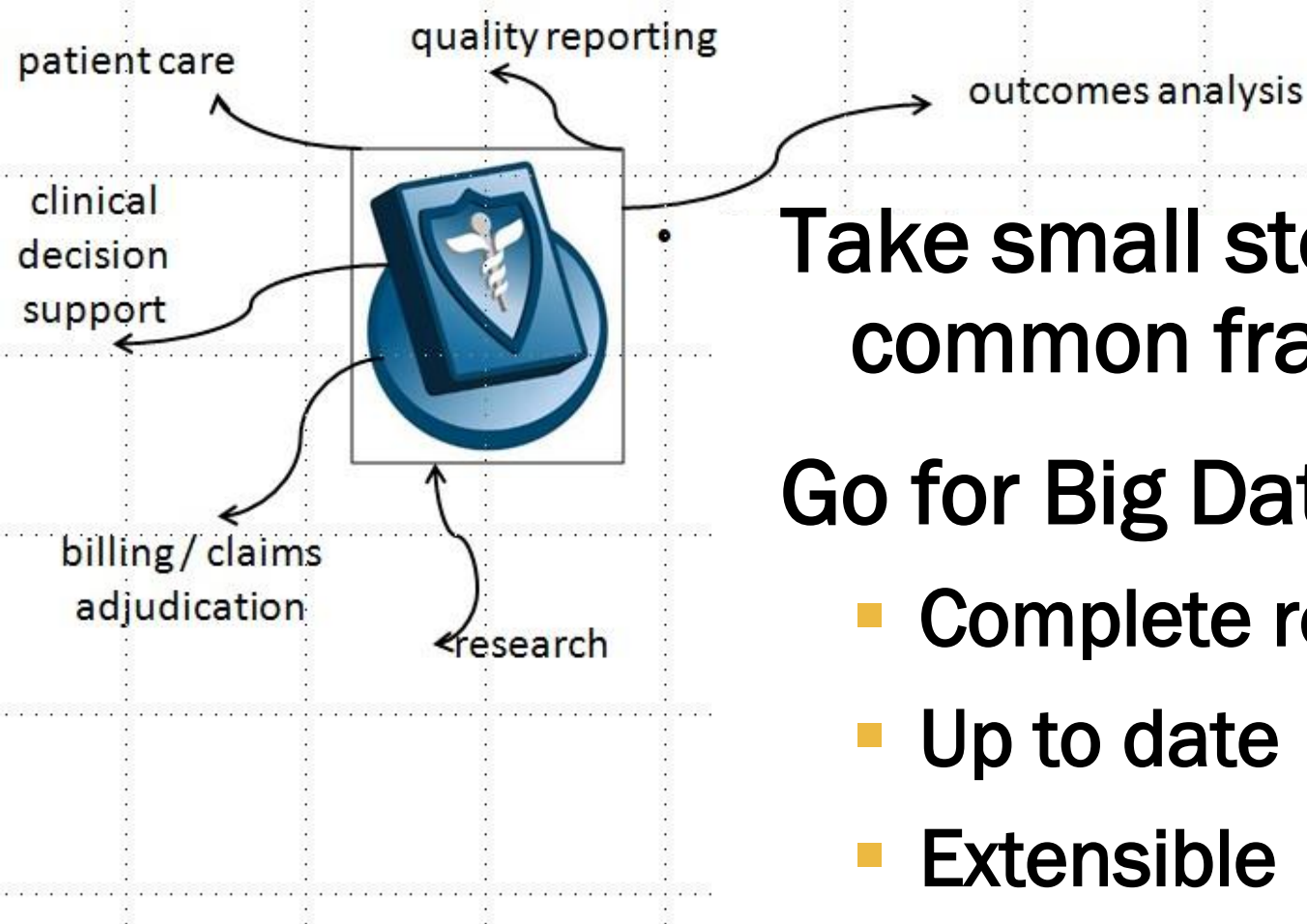


Dreams



- We do have a roadmap
- We can reuse data now
- We can preserve and mine narrative
- We can work with existing workflow

Dreaming Big



Take small steps toward a common framework

Go for Big Data:

- Complete record
- Up to date
- Extensible

EHR Data Capture:

Liora Alschuler

- www.lantanagroup.com
- liora.alschuler@lantanagroup.com



Thank you!

And thanks to:

Dan A. Pollock, M.D.
Surveillance Branch Chief
Division of Healthcare Quality
Promotion, CDC
dpollock@cdc.gov



Bob Dolin, M.D., FACP
President & CMO
Lantana Consulting Group
bob.dolin@lantanagroup.com

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