



# Interoperability: Practical, Affordable & Valuable

Presented by:

*Lantana*

CONSULTING GROUP

# Agenda



- Welcome
- Speaker Introductions
- Finding the Value in Interoperability
- Health Information Technology Standards
  - Clinical Documents
  - Quality Reporting
  - Next Generation
- Conclusion: Practical, Affordable, Valuable
- Q&A

# Speakers



*Lantana*

CONSULTING GROUP



Liora Alschuler  
Chief Executive Officer



Kanwarpreet Sethi  
Senior Software Architect/Engineer



Rick Geimer  
Chief Technology Officer

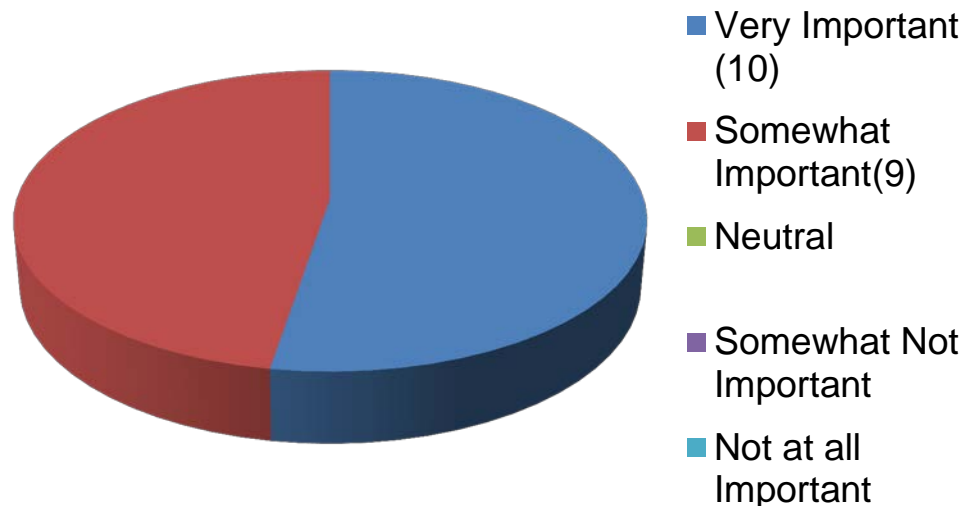
# Finding the Value in Interoperability

# Finding the Value?

- Perception: Poor interoperability a significant barrier (1)
  - Interoperability is a significant challenge for 95% of ACOs
  - At least 90 % cite the cost and lack of ROI of HIT as a key barrier to further implementation
- Thesis: Standards make information available
  - Within the enterprise – more broadly, efficiently
  - Across settings, now has business driver

- Standards a prerequisite to functionality (2)

## How important are data standards to the success of value-based purchasing?



– Caveat: not the whole solution

# Finding the Value

- Value-based purchasing (VBP)
  - From quantity to quality
  - From volume to value
  - ~11 % of reimbursement & growing (3)
  - 75% of provider organizations participating (4)
  - ACA, ACO, PCMH, Medicare incentives, PfP, PfC
- Shared risk/reward (5)
  - 500 provider organization (\$200M billing)
  - \$9M in play, as shared risk/reward
  - ROI for population health management: 2:1 – 5:1

## ***Information*** standards

- Content, not transport or application protocols
- That which needs to persist – the record of care delivery
- Related administrative data (coverage, claims)
- Required for care coordination; care coordination essential to success in meeting quality measures
- Information: data and narrative



# Standards for Interoperability



- Focus on 3 standards from Health Level Seven:

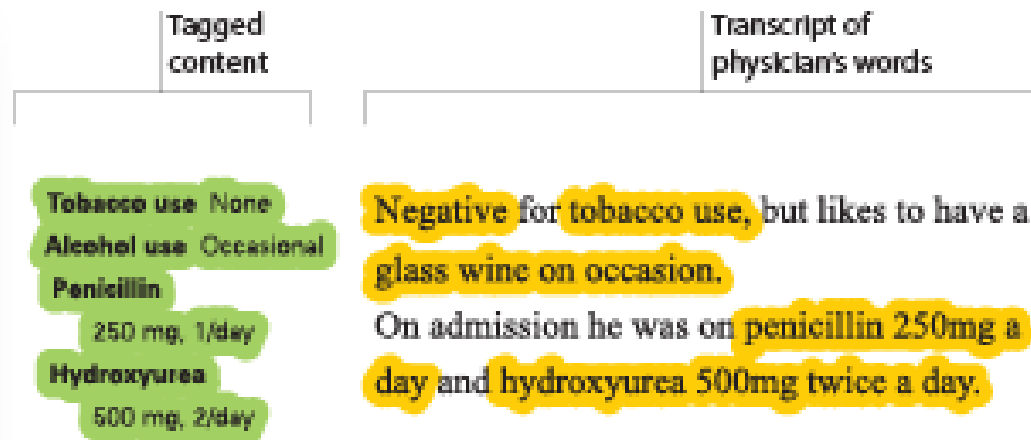
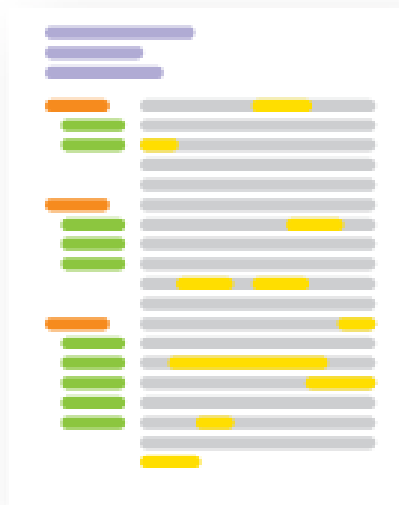


- Clinical Document Architecture (CDA)
- Quality Reporting Document Architecture (QRDA)
- Fast Healthcare Interoperable Resources (FHIR)

# Standards for Clinical Documents

# Clinical Documents

- Clinical Documents blend free form narrative and structured data elements (6)
  - represent the thought process, and
  - capture the clinical facts



- 7% structure required for “Meaningful Use”(7)

# HL7 CDA Basics



- A Header + Body
- CDA Header: metadata
- CDA Body
  - narrative (free-text) form **required** and
  - coded (computable) form **optional**
- CDA Levels
  - More codes, higher level
  - Section codes (Level 2) achievable by dictation, sufficient context for NLP
  - Meaningful Use requires less than 20 coded data elements (Level 3)

# Investing in Information



- CDA can be simple
- CDA can be complex
- Simple encoding relatively inexpensive, complex encoding costs more

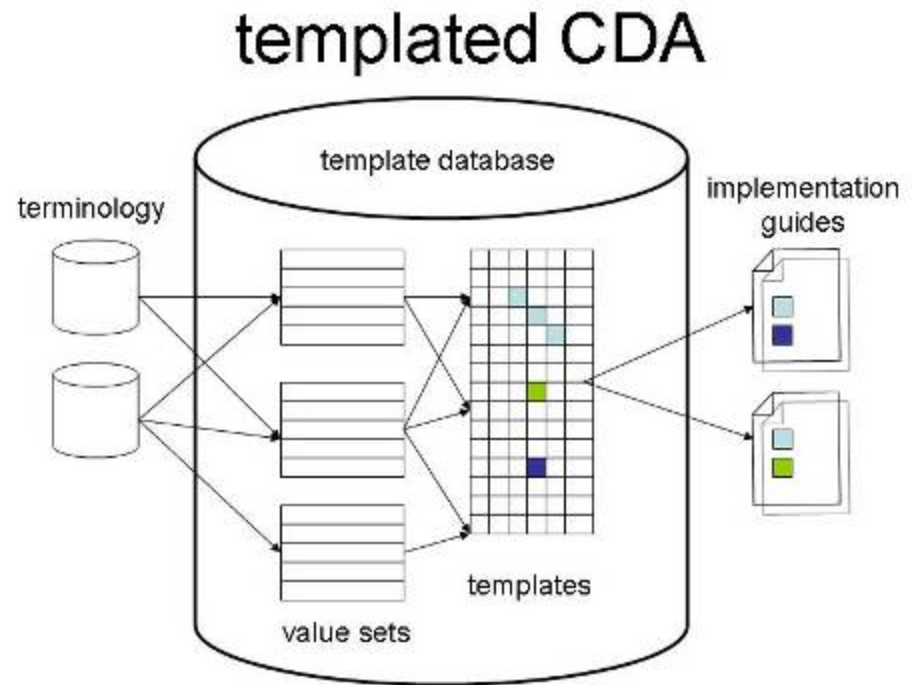
## **Gall's Law (8)**

- “A complex system that works is invariably found to have evolved from a simple system that worked.”
- The inverse proposition also appears to be true:
  - A complex system designed from scratch never works and cannot be made to work.
  - You have to start over, beginning with a working simple system.



# Templated CDA

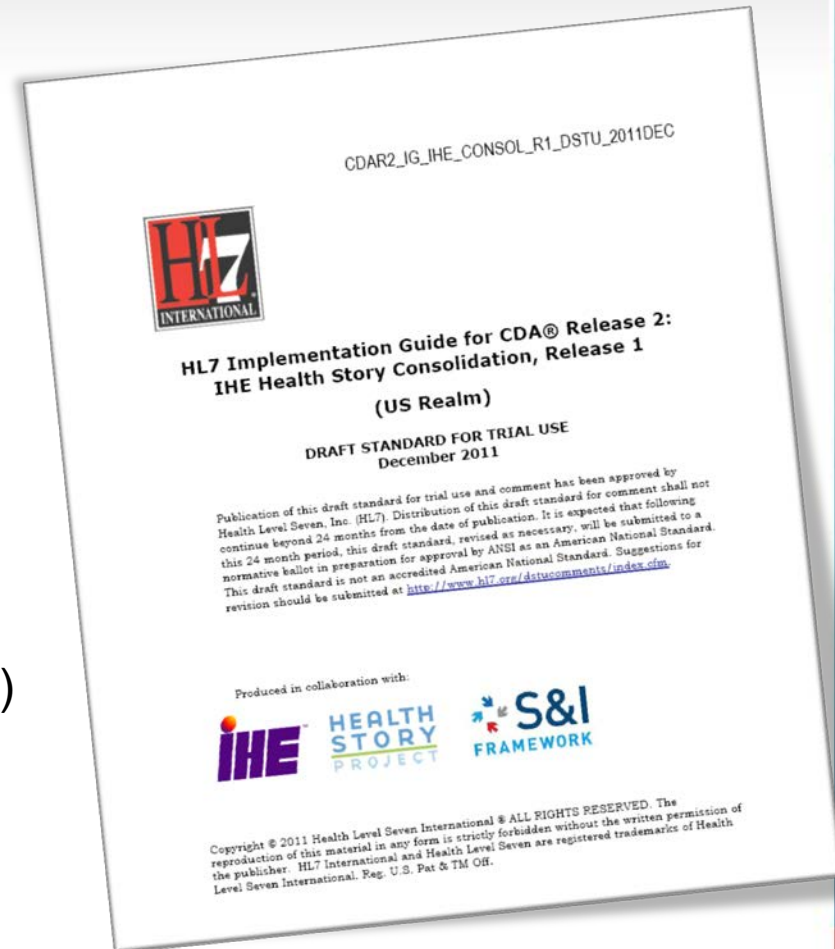
- Templates are semantic structures
- They reference value sets compiled from terminologies
- Templates are reused across implementation guides



# Consolidated CDA (C-CDA)



- Release 1.1
  - Continuity of Care Document
  - Consultation Note
  - Diagnostic Imaging Report
  - Discharge Summary
  - History and Physical
  - Operative Note
  - Procedure Note
  - Progress Note
  - Unstructured Document
- Release 2 (Pending Final Publication)
  - Care Plan
  - Referral Note
  - Transfer Summary
  - Patient Generated Document





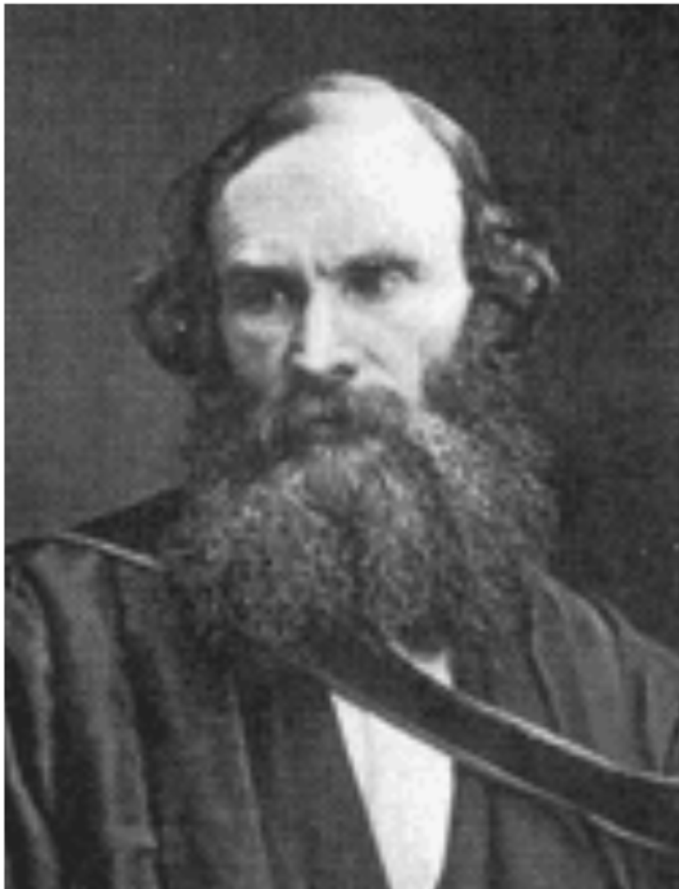
# Current CDA Initiatives



- C-CDA: MU, Transitions of Care
- Quality Reporting Document Architecture (QRDA)
- Healthcare Associated Infection (HAI) reporting to the National Healthcare Safety Network, Centers for Disease Control and Prevention
- Patient Safety Common Format (AHRQ)
- Personal Health Monitoring (PHM), Continua Alliance
- ASCO Oncology Treatment Plan & Summaries
- HRSA HIV/AIDS Services Report
- Privacy Consent Directives
- Structured Form Definition Document
- Plus
  - profiles from Integrating the Healthcare Enterprise (IHE)
  - In use in Canada, European Union, Japan, China, Australia, New Zealand, So. America

# Standards for Quality Reporting

## Standards are a Prerequisite to Functionality



*“If you cannot measure it,  
you cannot improve it.”*

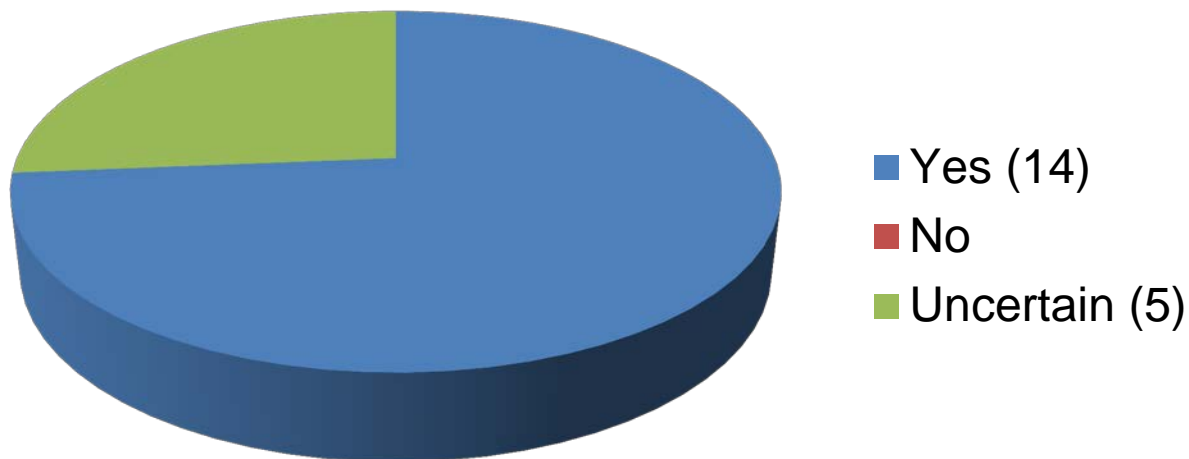
Lord Kelvin

*“If you cannot standardize it,  
you cannot measure it.”*

Lantana

# Payers Weigh in on Standards

**Should commercial payers and CMS  
adopt a single format (data standard)  
for electronic specification and  
submission of quality measurement  
data? (2)**

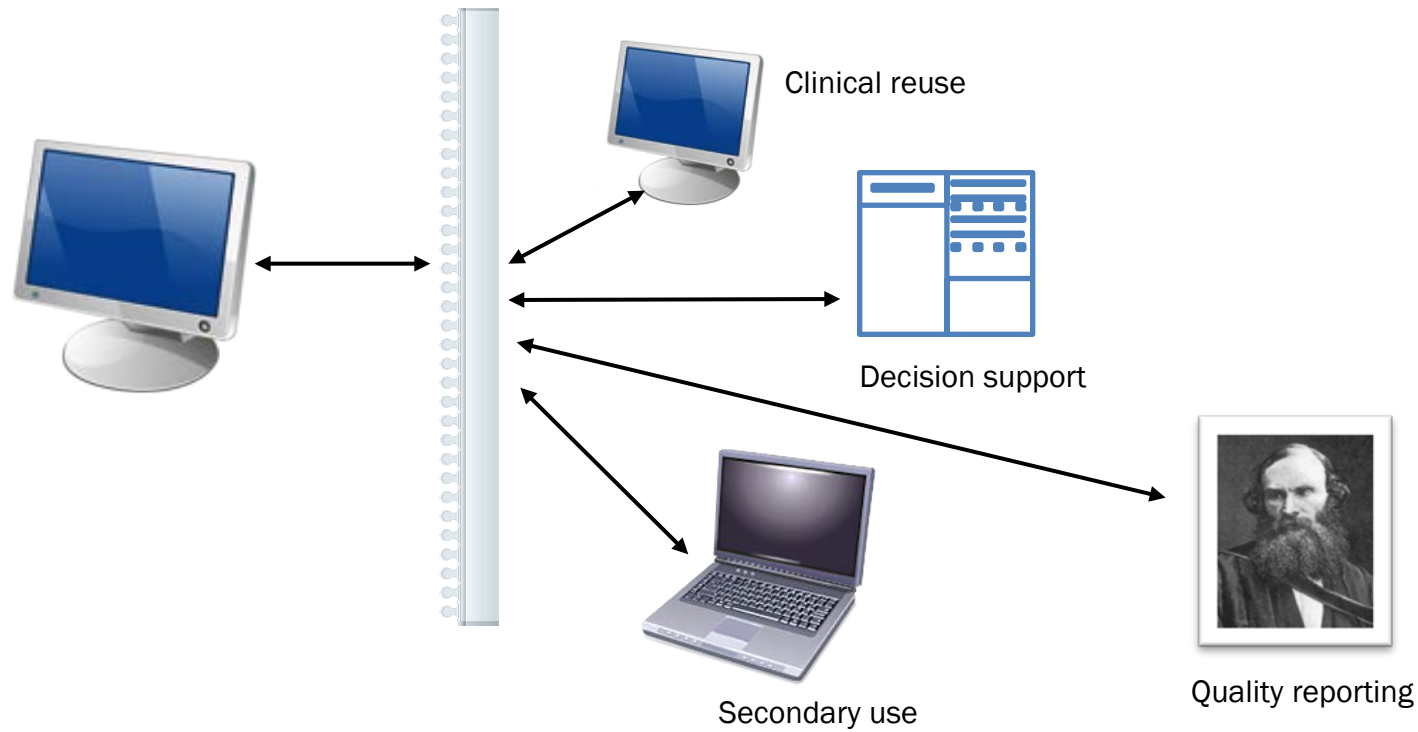


# Standardization Across Healthcare

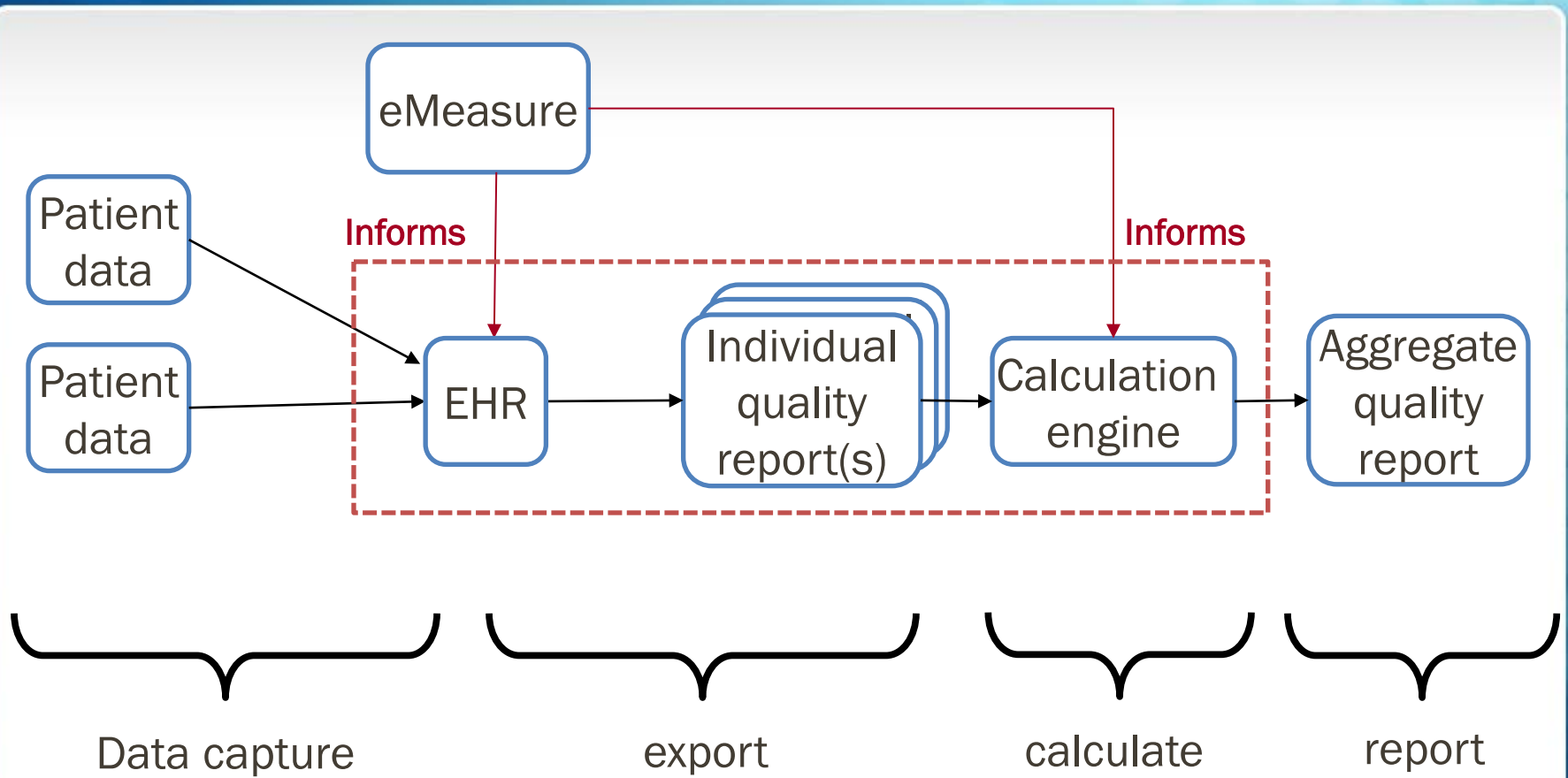


MU-certified EHR

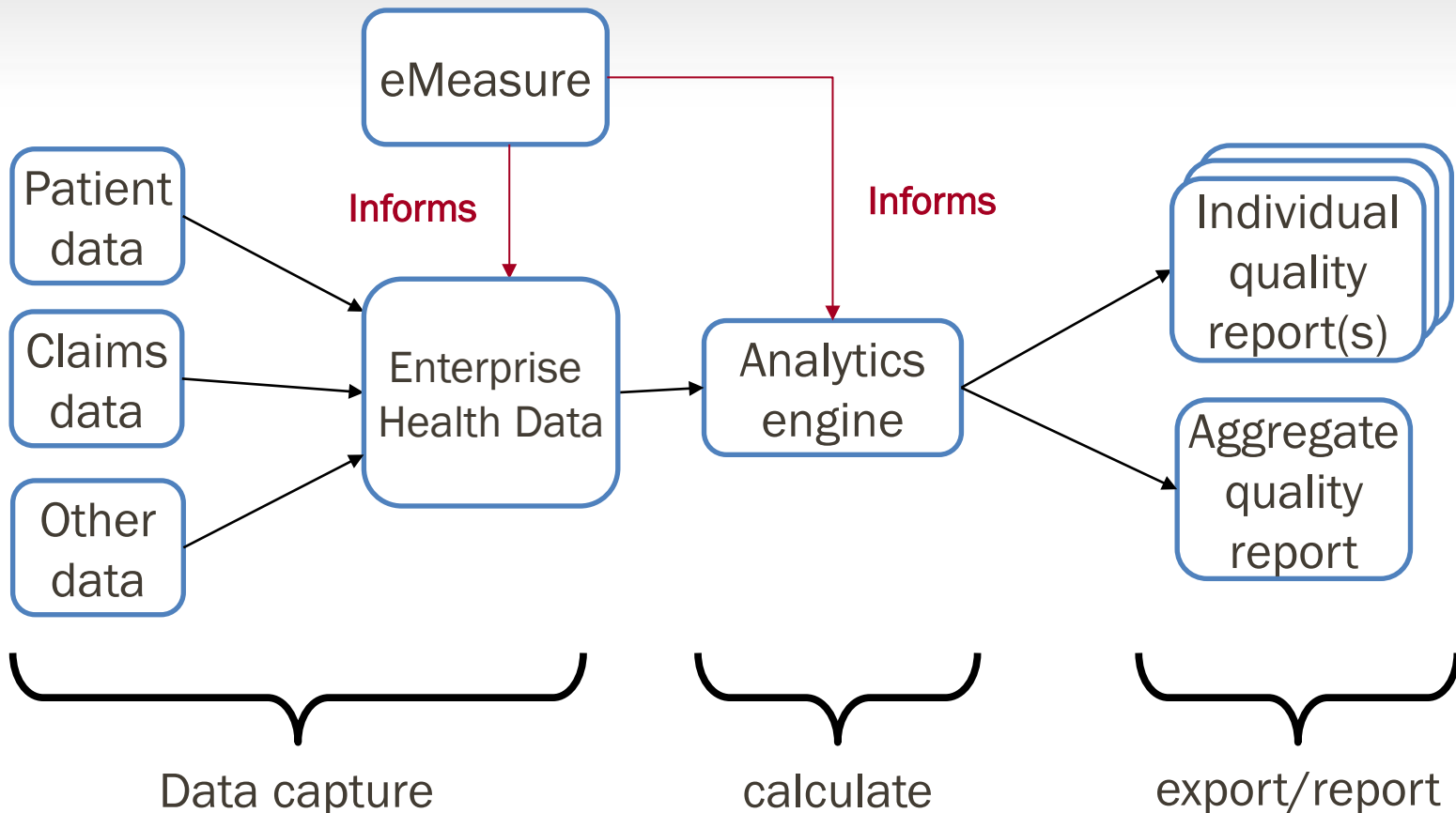
Meaningful Use (MU) of EHR Data



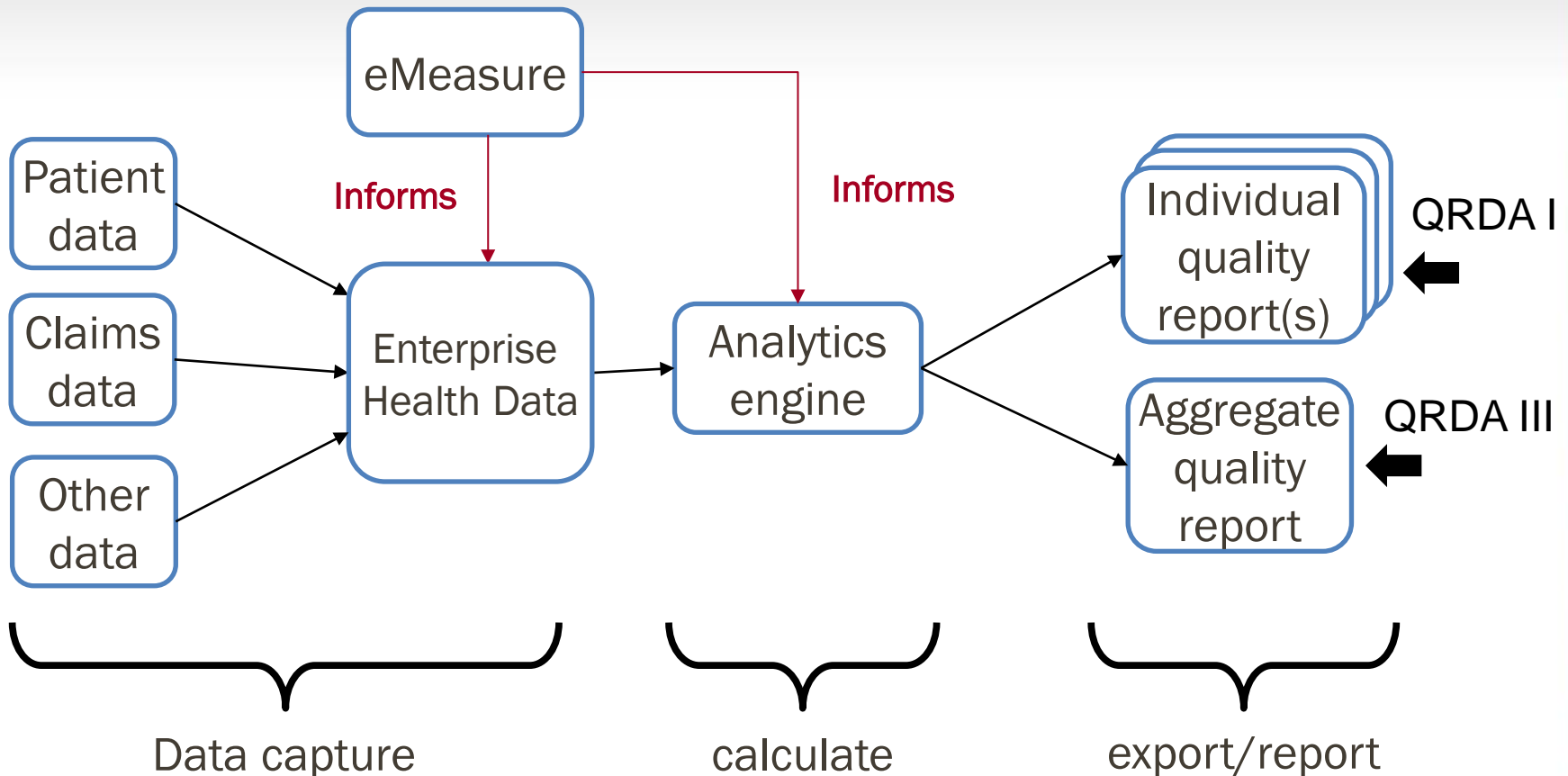
# Quality Reporting Process



# Quality Reporting Process



# Quality Reporting Process





# What is QRDA?



Quality Document Reporting Architecture (QRDA) is a standard for reporting patient or aggregate quality data for one or more quality measures.

- QRDA Category I – Single patient Report
- *QRDA Category II - Patient List Report\**
- QRDA Category III - Aggregate Report

I and III are Draft Standards for Trial Use (DSTU)

*\* II is not a DSTU*

# QRDA is a Kind of Templated CDA



QRDA is a CDA-based standard designed to have those data elements needed for quality measurement.

A QRDA document  
using C-CDA templates plus others

A CDA document using C-CDA templates

C-CDA

Demographics

Allergies

...

Family History

Social History

Vital Signs

Medications

Problems

Payer

Chief Complaint

Discharge  
Diagnosis

Discharge  
Diagnosis

Transport

Mode of

Surgical Finding

Discharge Diet

Discharge Diet

New Template...

CDA

# QRDA I – Single Patient Report



<b>Contact info</b>	1020 Healthcare Drive Burlington, MA 02368, US Tel: (555)555-1003
<b>Author</b>	Good Health Report Generator
<b>Contact info</b>	21 North Ave. Burlington, MA 02368, US Tel: (555)555-1003
<b>Legal authenticator</b>	Virgil Verify, MD of Good Health Hospital signed at December 31, 2011
<b>Contact info</b>	21 North Ave. Burlington, MA 02368, US Tel: (555)555-1003
<b>Document maintained by</b>	Good Health Hospital
<b>Contact info</b>	21 North Ave. Burlington, MA 02368, US Tel: (555)555-1003

## Table of Contents

- [Measure Section](#)
- [Reporting Parameters](#)
- [Patient Data](#)

## Measure Section

eMeasure Title	Version neutral identifier	eMeasure Version Number	NQF eMeasure Number	eMeasure Identifier (MAT)	Version specific identifier
Children's Asthma Care (CAC-1) Relievers for Inpatient Asthma	dc78ee5d-1487-4d79-84c3-1dfdaaff0781c	1	0143	93	8a4d92b2-373f-82e2-0137-7b9e21cc5c8f
Children's Asthma Care (CAC-2) Systemic Corticosteroids for Inpatient Asthma	d7c71959-3991-457c-b8ea-774238c87248	1	0144	106	8a4d92b2-373f-82e2-0137-baed84f55f93

## Reporting Parameters

- Reporting period: 01 Jan 2011 - 31 Dec 2011

## Patient Data

Data Element	Value	Date/Time
Encounter, Performed: Emergency Department Visit	Emergency Department visit	03/01/2011 4:00 - 03/01/2011 8:30
Encounter, Performed: Encounter Inpatient	Hospital admission	03/01/2011 9:00 - 03/03/2011 10:30
Diagnosis, Active: Asthma	Asthma	01/01/2011
Medication, Administered not done: Patient refusal, Asthma Reliever: albuterol 1.25 MG (albuterol sulfate 1.5 MG) per 3 ML Inhalant Solution	Drug declined by patient - reason unknown	Null
Medication, Administered: Systemic Corticosteroids	Hydrocortisone 10 MG Oral Tablet	03/01/2011 15:00
Patient Characteristic Clinical Trial Participant	True	03/01/2011
Patient Characteristic Payer	Medicare	03/01/2011

# QRDA III – Aggregate Report

<b>EHR Certification Number</b>	medical record, device 1a2b3c (ONC) 98765 ()
<b>Legal authenticator</b>	Good Health Hospital signed at August 11, 2012
<b>Document maintained by</b>	Good Health Hospital

## Table of Contents

- [Reporting Parameters](#)
- [Measure Section](#)

## Reporting Parameters

- Reporting period: 01 January 2012 - 31 March 2012
- First encounter: 05 January 2012
- Last encounter: 24 March 2012

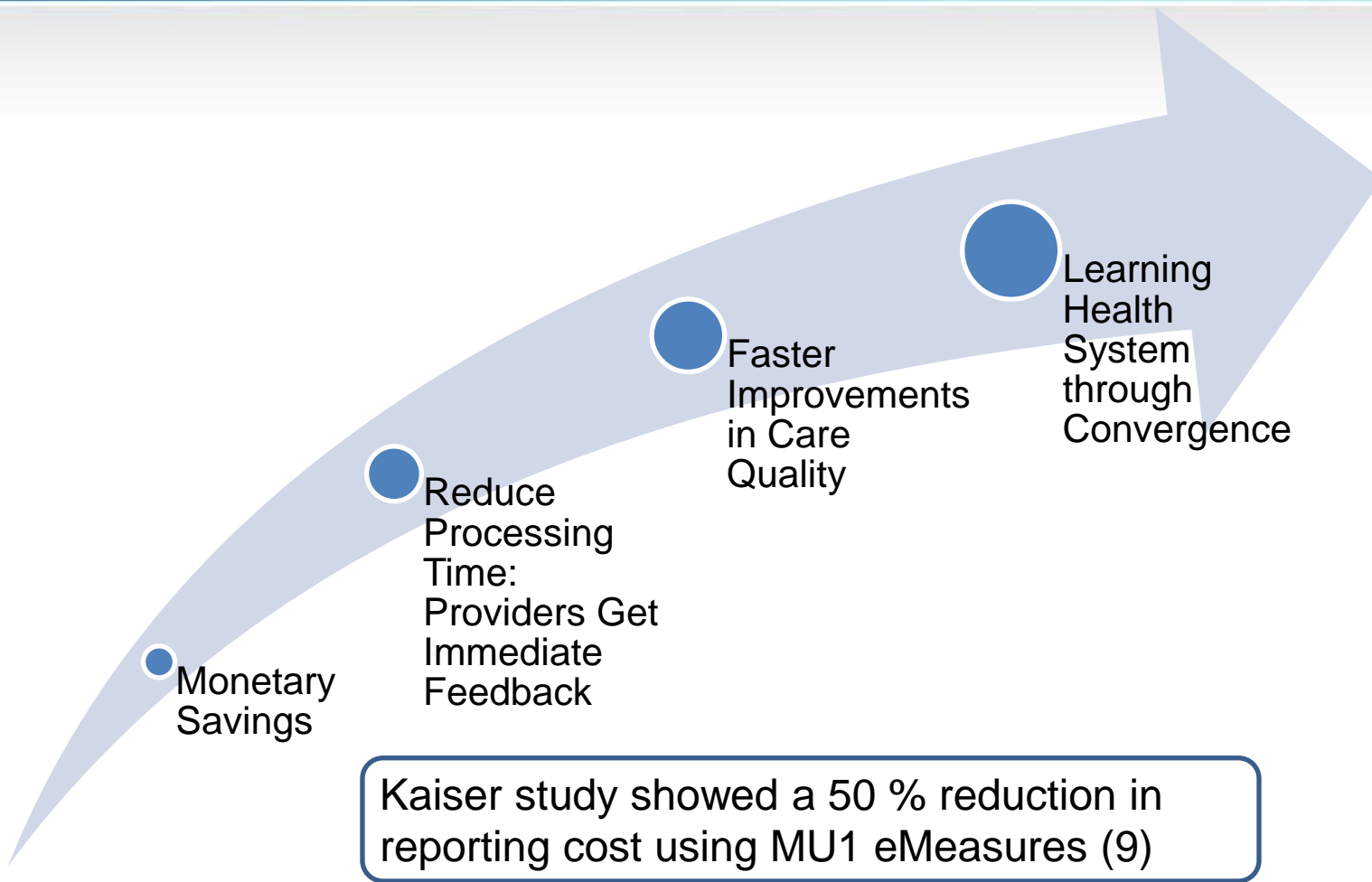
## Measure Section

eMeasure Title	Version neutral identifier	eMeasure Version Number	NQF eMeasure Number	eMeasure Identifier (MAT)	Version specific identifier
Anticoagulation Therapy for Atrial Fibrillation/Flutter	03876d69-085b-415c-ae9d-9924171040c2	1	0436	71	8a4d92b2-3887-5df3-0139-013b0c87524a

Member of Measure Set: Clinical Quality Measure Set 2011-2012 - b6ac13e2-beb8-4e4f-94ed-fcc397406cd8

- **Performance Rate:** 83% (Predicted = 62%)
- **Reporting Rate:** 84%
- **Initial Patient Population:** 1000
  - Male: 400
  - Female: 600
  - Not Hispanic or Latino: 350
  - Hispanic or Latino: 650
  - Black: 300
  - White: 350
  - Asian: 350
  - Payer - Medicare: 250
  - Payer - Medicaid: 550
  - Zipcode 92543: 15
- **Denominator:** 500
  - Male: 200
  - Female: 300
  - Not Hispanic or Latino: 175
  - Hispanic or Latino: 325
  - Black: 150
  - White: 175
  - Asian: 175
  - Payer - Medicare: 125
  - Payer - Medicaid: 275
  - Zipcode 92543: 15
- **Numerator:** 400 (predicted=300)
  - Male: 100
  - Female: 300
  - Not Hispanic or Latino: 140
  - Hispanic or Latino: 260
  - Black: 120
  - White: 140
  - Asian: 140
  - Payer - Medicare: 100
  - Payer - Medicaid: 220
  - Zipcode 92543: 6
- **Denominator Exclusions:** 20
  - Male: 6

# Benefits and Conclusions



# FHIR Overview

- **F** – Fast (to design and to implement)  
Relatively – there are no magic bullets
- **H** – Health  
That's why we are here
- **I** – Interoperable  
Key to leveraging HIT
- **R** – Resources  
Building blocks – more on these to follow

# Genesis of FHIR



- Recognition of the value of interoperability is increasing
  - Across organizations, disciplines, even borders
  - Regional and national programs
  - Mobile and cloud-based applications
  - Faster (integration in days or weeks, not months or years)
- Health information needs to be interoperable
  - CDA okay for documents; not everything is a document
  - HL7 V2 is around 25 years old; proprietary syntax
  - HL7 V3 messaging has not taken off



# FHIR Manifesto



- Focus on **Implementers**.
- Leverage cross-industry web technologies.
- Target support for common scenarios.
- Require human-readability as base level of interoperability.
- Support multiple paradigms and architectures.
- Make content freely available.
- Demonstrate best practice governance.

# FHIR is like Lego™ for Healthcare



- Resources = blocks
  - Discrete chunks of clinical information
  - Can be assembled into larger constructs
- You operate on resources via FHIR's REST APIs.  
(Think programming Lego Mindstorms™)



# Example Patient Resource

```
<Patient xmlns="http://hl7.org/fhir">
  <extension url="http://www.goodhealth.org/consent#trials">
    <valueCode value="renal"/>
  </extension>
  <text>
    <status value="generated"/>
    <div xmlns="http://www.w3.org/1999/xhtml">
      <p>Henry Levin the 7th</p>
      <p>MRN: 123456</p>
    </div>
  </text>
  <identifier>
    <use value="usual"/>
    <label value="MRN"/>
    <system value="http://www.goodhealth.org/identifiers/mrn"/>
    <value value="123456"/>
  </identifier>
  <name>
    <family value="Levin"/>
    <given value="Henry"/>
    <suffix value="The 7th"/>
  </name>
  <gender>
    <text value="Male"/>
  </gender>
  <birthDate value="1932-09-24"/>
  <managingOrganization>
    <reference value="Organization/2"/>
    <display value="Good Health Clinic"/>
  </managingOrganization>
  <active value="true"/>
</Patient>
```

Extension with reference  
to its definition

Human-readable  
Summary

Structured Data  
Content:

- MRN
- Name
- Gender
- Date of Birth
- Provider

# CDA on FHIR



- New HL7 project
- Addresses the core principles of CDA using FHIR:
  - Persistence
  - Stewardship
  - Potential for authentication
  - Context
  - Wholeness
  - Human-readability
- Timeline:
  - Sept. 2014: Initial mapping and profiles for review
  - Jan. 2015: CDA on FHIR first draft
  - Spring 2015: Ballot with FHIR DSTU 2

Will “CDA on FHIR” replace “CDA on HL7 V3”?

## Provisional conclusions:

- No fundamental issues with the overall approach have been identified.
- Many minor issues existing in the current FHIR resources are being addressed.
- More work is needed to find the most effective way to bind narrative content with the associated machine-readable data contained in the document.
- FHIR resources need to be developed in several remaining subjects.

# Working with FHIR today



## **Internal applications**

- FHIR works well as an “intermediate” format between proprietary data formats and standards like C-CDA and QRDA.
- Using it internally reduces external dependencies on a standard that is in flux.

## **Pilot exchanges between partners**

- Small scale prototypes that “test the waters” and get data flowing..

## **Technology Demonstrations**

- FHIR shows very well at trade shows, and the rapid development time associated with FHIR lends itself well to tight demo schedules.
- Examples: IHE Connectathon and HIMSS Showcase

## **Contributing to the Standard Itself**

- FHIR is still in flux, and now is the time to get your use cases recognized and incorporated into the standard.

# Conclusions

# Practical, Affordable, Valuable?



- Standards are part of the value chain
- CDA
  - Can be foundational
  - Can be semi-structured, key elements coded
- QRDA
  - Can build on CDA templates
  - Can become foundational across programs
- FHIR
  - Can simplify implementation
  - Reasonable migration possible from current work



# Practical, Affordable, Valuable?



- Information standards are not the full solution:
  - Identity management
  - Information governance
  - Adaptations in workflow
  - Business agreements
- Last words:
  - Look beyond the mandates.
  - Keep it simple.

# Q&A

For more information about standards, interoperability or quality reporting, please contact us at [info@lantanagroup.com](mailto:info@lantanagroup.com)

*Lantana*

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# References



1. Interoperability as barrier: Survey from Premier and the eHealth Initiative: [http://www.fiercehealthit.com/story/poor-interoperability-significant-barrier-acos/2014-09-25?utm\\_medium=nl&utm\\_source=internal](http://www.fiercehealthit.com/story/poor-interoperability-significant-barrier-acos/2014-09-25?utm_medium=nl&utm_source=internal)
2. Survey of payer participants at first HL7 Payer Summit, Sept. 2014 (not published; available from Lantana)
3. Percent of reimbursement: Catalyst for Payment Reform, <http://www.catalyzepaymentreform.org/>, quoted by Wellcentive, [www.Wellcentive.com](http://www.Wellcentive.com)
4. Percent of providers participating: Availity, <http://www.availity.com/>, quoted by Wellcentive
5. Wellcentive on the goal of population health management: financial, clinical & human impact
6. Source: M\*Modal, [www.Mmodal.com](http://www.Mmodal.com)
7. Mark Christensen, [www.webchartmd.com](http://www.webchartmd.com), "EHRs Can Place Excessive Data Entry Burden on Physicians," distributed by PRNewswire: <http://www.prnewswire.com/news-releases/ehrs-can-place-excessive-data-entry-burden-on-physicians-278377631.html>.
8. Gall's Law: [John Gall's Systemantics: How Systems Really Work and How They Fail](#):
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# The greenCDA Methodology

## greenCDA

### What is it?

- An implementation methodology for generating templated CDA instances.
- A simplified XML Schema paired with a transform to normative CDA
- An 80% solution

### What is it not?

- A replacement for normative CDA

# Example: Normative Output



```
327 <component>
328 <section>
329   <templated root="2.16.840.1.113883.10.20.1.2"/>
330   <templated root="1.3.6.1.4.1.19376.1.5.3.1.3.13"/>
331   <code code="48765-2" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC"
332   | | displayName="Allergies, adverse reactions, alerts"/>
333   <title>Allergies, Adverse Reactions and Alerts</title>
334   <text>
335     <table width="100%" border="1">
336       <thead>
337         <tr>
338           <th>Substance</th>
339           <th>Reaction</th>
340         </tr>
341       </thead>
342       <tbody>
343         <tr>
344           <td>
345             <content ID="d22e6">Penicillin</content>
346           </td>
347           <td>Hives</td>
348         </tr>
349       </tbody>
350     </table>
351   </text>
352   <entry>
353     <act classCode="ACT" moodCode="EVN">
354       <templated root="1.3.6.1.4.1.19376.1.5.3.1.4.5.3"/>
355       <templated root="2.16.840.1.113883.10.20.1.27"/>
356       <templated root="1.3.6.1.4.1.19376.1.5.3.1.4.5.1"/>
357       <id nullFlavor="NA"/>
358       <code nullFlavor="NA"/>
359       <statusCode code="completed"/>
360       <effectiveTime nullFlavor="UNK">
361         <low nullFlavor="UNK"/>
362         <high nullFlavor="UNK"/>
363       </effectiveTime>
364       <entryRelationship typeCode="SUBJ" inversionInd="false">
```

```
365     <observation classCode="OBS" moodCode="EVN">
366       <templated root="2.16.840.1.113883.10.20.1.18"/>
367       <templated root="1.3.6.1.4.1.19376.1.5.3.1.4.5"/>
368       <templated root="1.3.6.1.4.1.19376.1.5.3.1.4.6"/>
369       <templated root="2.16.840.1.113883.10.20.1.28"/>
370       <id nullFlavor="NA"/>
371       <code code="282100009" codeSystem="2.16.840.1.113883.6.96"
372       | | displayName="Adverse reaction to substance"/>
373       <statusCode code="completed"/>
374       <effectiveTime nullFlavor="UNK">
375         <low nullFlavor="UNK"/>
376       </effectiveTime>
377       <value xsi:type="CD" code="282100009" codeSystem="2.16.840.1.113883.6.96"
378       | | codeSystemName="SNOMED CT"
379       | | displayName="Adverse reaction to substance"/>
380       <participant typeCode="CSM">
381         <participantRole classCode="MANU">
382           <playingEntity classCode="MMAT">
383             <code code="70618" codeSystem="2.16.840.1.113883.6.88" displayName="Penicillin"/>
384             <originalText>
385               <reference value="d22e6"/>
386             </originalText>
387           </playingEntity>
388         </participantRole>
389       </participant>
390       <entryRelationship typeCode="MFST">
391         <observation classCode="OBS" moodCode="EVN">
392           <templated root="2.16.840.1.113883.10.20.1.54"/>
393           <code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4"/>
394           <statusCode code="completed"/>
395           <value xsi:type="CD" code="247472004" codeSystem="2.16.840.1.113883.6.96"
396           | | displayName="Hives"/>
397         </observation>
398       </entryRelationship>
399     </entryRelationship>
400   </entry>
401 </section>
402 </component>
```

The information in white contains the variable data for allergies.  
The rest (in yellow) is auto-generated by the transform.