Health IT Standards for Effective Use and Innovation

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Outline

Why standards?

What are some key standards to know about?

Standards for Effective Use and Innovation?

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WHY STANDARDS?

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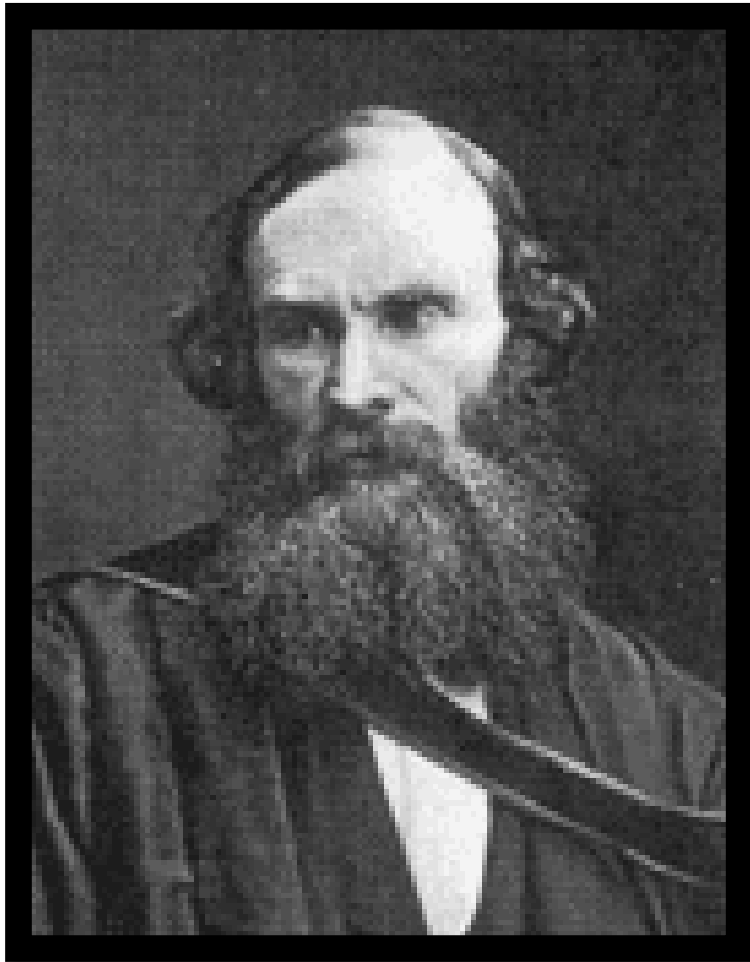CONSULTING GROUP

Standards are a Prerequisite to Functionality

"Well, then," said Milo, not understanding why each one said the same thing in a slightly different way, "wouldn't it be simpler to use just one? It certainly would make more sense."

The Phantom Tollbooth

Norton Juster

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Standards are a Prerequisite to Functionality

"If you cannot measure it, you cannot improve it."

Lord Kelvin (1824-1907)

"If you cannot standardize it, you cannot measure it."

Bob Dolin (2011)

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WHAT ARE SOME KEY STANDARDS TO KNOW ABOUT?

- CDA
    - Consolidated CDA
    - QRDA I/III
- HQMF eMeasure

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Meaningful Use and Health Level Seven

HL7: Standards Development Organization

HL7 develops those interoperability standards that are cited under Meaningful Use, and that need to be adopted by a "certified" EHR.

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Meaningful Use and Health Level Seven

Key standards include:

- **HL7 Lab, Immunization Messages**

- **HL7 Clinical Document Architecture (CDA)**

  - Standardized representation of clinical documents

- **HL7 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)

- **HL7 Quality Reporting Document Architecture**

  - A CDA-based representation of individual patient quality data (QRDA Category I) and aggregate patient quality data (QRDA Category III)

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What is the CDA?

- The CDA is a document mark-up standard for the structure and semantics of an exchanged "clinical document".

- A CDA document is a defined and complete information object that can exist outside of a message and can include text, images, sounds, and other multimedia content.

- The CDA specification is richly expressive and flexible. Templates can be used to constrain the generic CDA specification.

Major Components of a CDA Document

```
<ClinicalDocument>
  ...
  <structuredBody>
    <section>
      <text>...</text>
      <observation>...</observation>
      <substanceAdministration>
        <supply>...</supply>
      </substanceAdministration>
      <observation>
        <externalObservation>
          ...
        </externalObservation>
      </observation>
    </section>
    <section>
      <section>...</section>
    </section>
  </structuredBody>
</ClinicalDocument>
```

Header

Narrative Block

External References

E N T R I E S

S E C T I O N S

B O D Y

D O C U M E N T

Example

- Temperature is 36.9 C

```
<section>
  <code code="8716-3" codeSystem="2.16.840.1.113883.6.1"
   codeSystemName="LOINC"/>
  <title>Vital Signs</title>
  <text>Temperature is 36.9 C</text>
  <entry>
    <observation classCode="OBS" moodCode="EVN">
      <code code="386725007" codeSystem="2.16.840.1.113883.6.96"
       codeSystemName="SNOMED CT" displayName="Body temperature"/>
      <statusCode code="completed"/>
      <effectiveTime value="200004071430"/>
      <value xsi:type="PQ" value="36.9" unit="Cel"/>
    </observation>
  </entry>
</section>
```

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Example

- Father had fatal heart attack in 1970.

```xml
<section>
  <code code="10157-2" codeSystem="2.16.840.1.113883.6.1"
   codeSystemName="LOINC"/>
  <title>Family history</title>
  <text>Father had fatal heart attack in 1970.</text>
  <entry>
    <observation classCode="OBS" moodCode="EVN">
      <code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4"/>
      <value xsi:type="CD" code="22298006"
       codeSystem="2.16.840.1.113883.6.96"
       codeSystemName="SNOMED CT" displayName="MI"/>
      <effectiveTime value="1970"/>
      <subject>
        <relatedSubject classCode="PRS">
          <code code="FTH" codeSystem="2.16.840.1.113883.5.111"/>
        </relatedSubject>
      </subject>
      <entryRelationship typeCode="CAUS">
        <observation classCode="OBS" moodCode="EVN">
          <code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4"/>
          <value xsi:type="CD" code="399347008"
           codeSystem="2.16.840.1.113883.6.96" displayName="death"/>
          <effectiveTime value="1970"/>
        </observation>
      </entryRelationship>
    </observation>
  </entry>
</section>
```
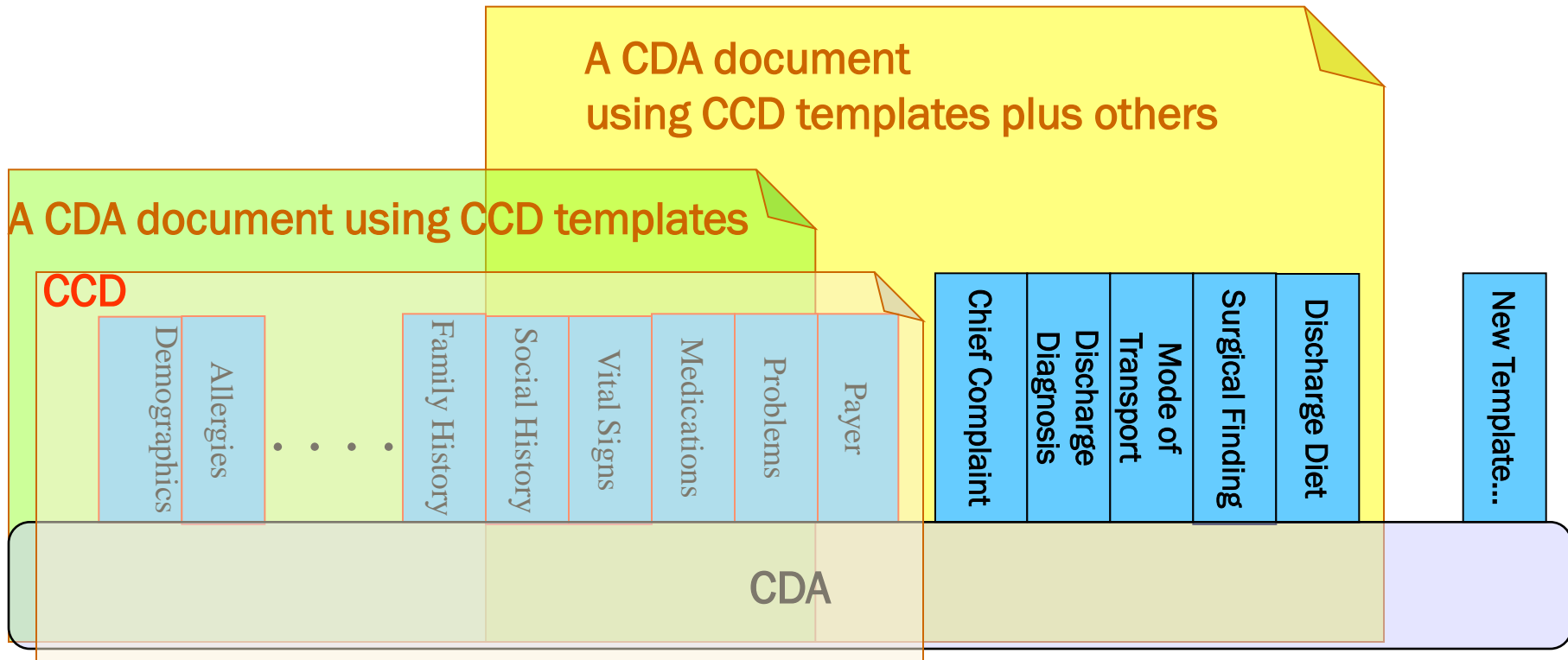
Example

- Suture removal from left forearm performed

```xml
<section>
  <code code="29554-3" codeSystem="2.16.840.1.113883.6.1"
   codeSystemName="LOINC"/>
  <title>In-office Procedures</title>
  <text>Suture removal from left forearm performed.</text>
  <entry>
    <procedure classCode="PROC" moodCode="EVN">
      <code code="30549001"
       codeSystem="2.16.840.1.113883.6.96"
       codeSystemName="SNOMED CT"
       displayName="Suture removal">
       <qualifier>
         <name code="363704007" displayName="Procedure site"/>
         <value code="66480008" displayName="Left forearm"/>
       </qualifier>
      </code>
      <effectiveTime value="200004071430"/>
    </procedure>
  </entry>
</section>
```

CDA is based on a principle of *Incremental Interoperability*.

- *Incremental Interoperability* means that an implementer can begin with a simple CDA and then add structured data elements over time.

- CDA R2 consists of a single CDA XML Schema and the "architecture" arises from the ability to apply one or more "templates" that serve to constrain the richness and flexibility of CDA.

- Professional society recommendations, national clinical practice guidelines, and standardized data sets can be expressed as CDA templates.

- There are many kinds of templates that might be created. Particularly relevant for documents are:

  o Document-level templates, which constrain the CDA header and allowable sections

  o Section-level templates, which constrain the allowable entries

  o Entry-level templates, which define the atomic clinical statements within document sections

Templated CDA

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

A CDA document
using CCD templates plus others

A CDA document using CCD templates

CCD

Demographics · Allergies · . . . . . · Family History · Social History · Vital Signs · Medications · Problems · Payer · Chief Complaint · Discharge Diagnosis · Mode of Transport · Surgical Finding · Discharge Diet · New Template…

CDA

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Consolidated CDA

- Many different kinds of documents:
  - CCD
  - Consultation Note
  - Diagnostic Imaging Report
  - Discharge Summary
  - H&P
  - Operative Note
  - Procedure Note
  - Progress Note
  - Unstructured Document
- A bucket of reusable templates

CDAR2_IG_IHE_CONSOL_R1_DSTU_2011DEC

HL7 Implementation Guide for CDA® Release 2: IHE Health Story Consolidation, Release 1

(US Realm)

DRAFT STANDARD FOR TRIAL USE
December 2011

Publication of this draft standard for trial use and comment has been approved by Health Level Seven, Inc. (HL7). Distribution of this draft standard for comment shall not continue beyond 24 months from the date of publication. It is expected that following this 24 month period, this draft standard, revised as necessary, will be submitted to a normative ballot in preparation for approval by ANSI as an American National Standard. This draft standard is not an accredited American National Standard. Suggestions for revision should be submitted at http://www.hl7.org/dstucomments/index.cfm.

Produced in collaboration with:

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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.

Quality Reporting

Decision Support

Clinical Applications

Meaningful Use!

Coded Discrete Data Elements

HL7 CDA Structured Documents

Narrative Text

SNOMED CT

Disease, DF-00000

Metabolic Disease, D6-00000

Disorder of carbohydrate metabolism, D6-50000

Disorder of glucose metabolism, D6-50100

Diabetes Mellitus, DB-61000

Type 1, DB-61010

Neonatal, DB75110

Carpenter Syndrome, DB-02324

Insulin dependant type IA, DB-61020

MU2 and Quality Reporting
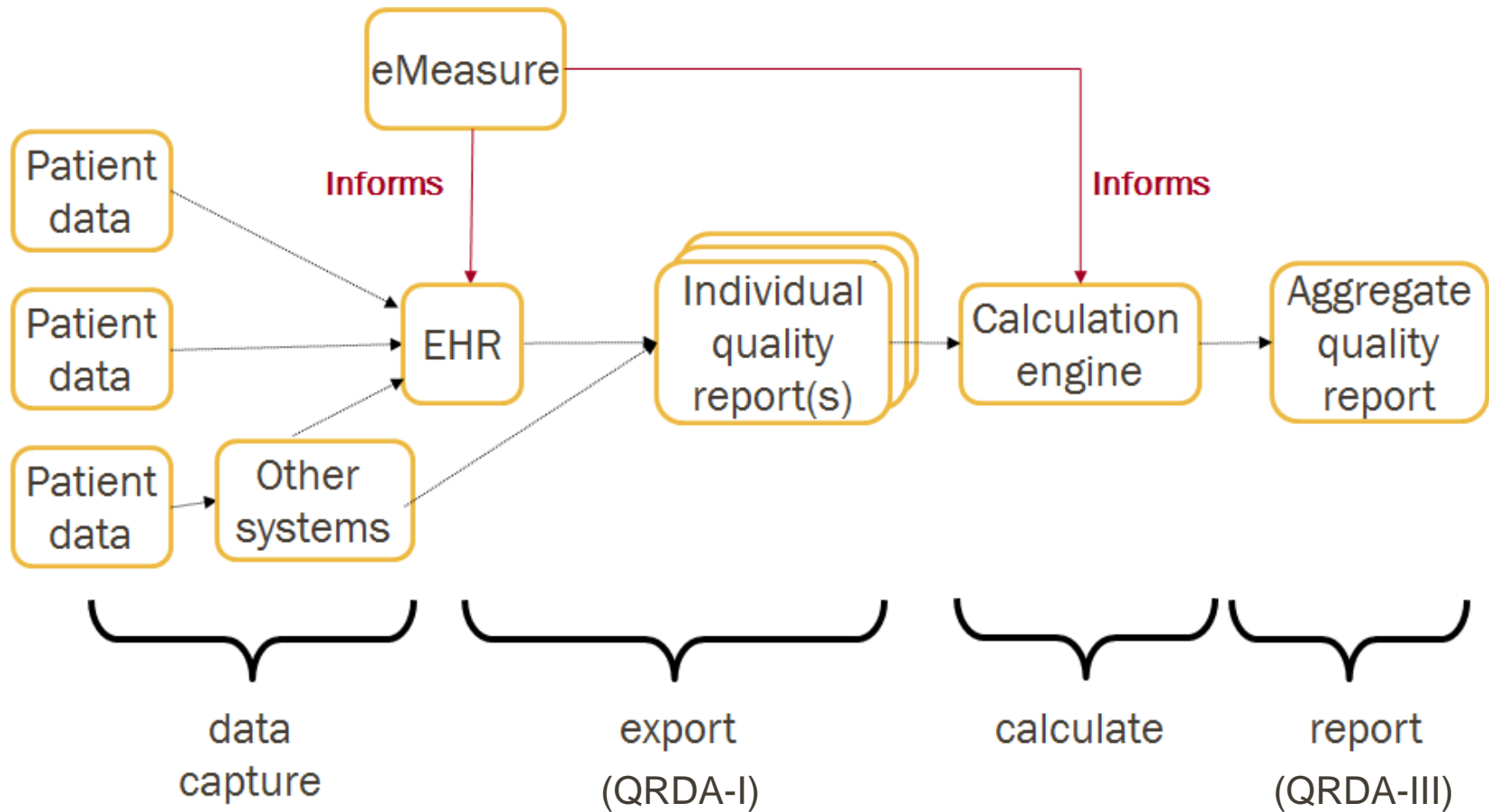
Data Capture – NQF Quality Data Model

Value Set

Quality Data Type

Quality Data Attributes
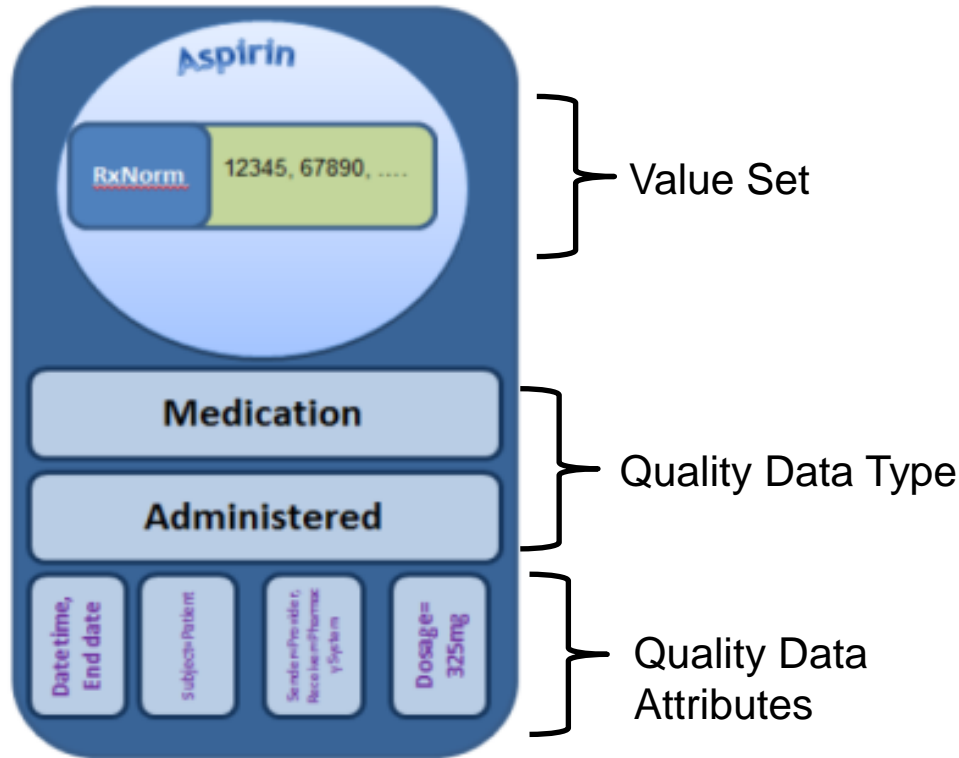
- QDM is a "Domain Analysis Model"

- HL7 has implemented QDM in eMeasure and QRDA

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QRDA in MU2

§ 170.314 (c) Clinical Quality Measures	
(1) Clinical quality measures—capture and export	
(i) Capture	For each and every CQM for which the EHR technology is presented for certification, EHR technology must be able to electronically record all of the data identified in the standard specified at § 170.204(c) that would be necessary to calculate each CQM. Data required for CQM exclusions or exceptions must be codified entries, which may include specific terms as defined by each CQM, or may include codified expressions of "patient reason," "system reason," or "medical reason."
(ii) Export	EHR technology must be able to electronically export a data file formatted in accordance with the standards specified at **§ 170.205(h)** that includes all of the data captured for each and every CQM to which EHR technology was certified under paragraph (c)(1)(i) of this section.
(2) Clinical quality measures—import and calculate	
(i) Import	EHR technology must be able to electronically import a data file formatted in accordance with the standard specified at **§ 170.205(h)** and use such data to perform the capability specified in paragraph (c)(2)(ii) of this section. EHR technology presented for certification to all three of the certification criteria adopted in paragraphs (c)(1) through (3) of this section is not required to meet paragraph (c)(2)(i).
(ii) Calculate	EHR technology must be able to electronically calculate each and every clinical quality measure for which it is presented for certification.
(3) Clinical quality measures—electronic submission	
	Enable a user to electronically create a data file for transmission of clinical quality measurement data: (i) In accordance with the standards specified at **§ 170.205(h) and (k)**; and (ii) That can be electronically accepted by CMS.

What is QRDA?

Quality Document Reporting Architecture (QRDA) is a CDA-based standard for reporting patient 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

*These are Draft Standards for Trial Use

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Export – HL7 Quality Reporting Document Architecture (QRDA-I)

- QRDA-I is another CDA-based Implementation Guide, that is designed so as to have those data elements needed for quality measurement

A QRDA-I document
using CCD templates plus others

A CDA document using CCD templates

CCD

Demographics · Allergies · . . . . . · Family History · Social History · Vital Signs · Medications · Problems · Payer · Chief Complaint · Discharge Diagnosis · Mode of Transport · Surgical Finding · Discharge Diet · New Template…

CDA
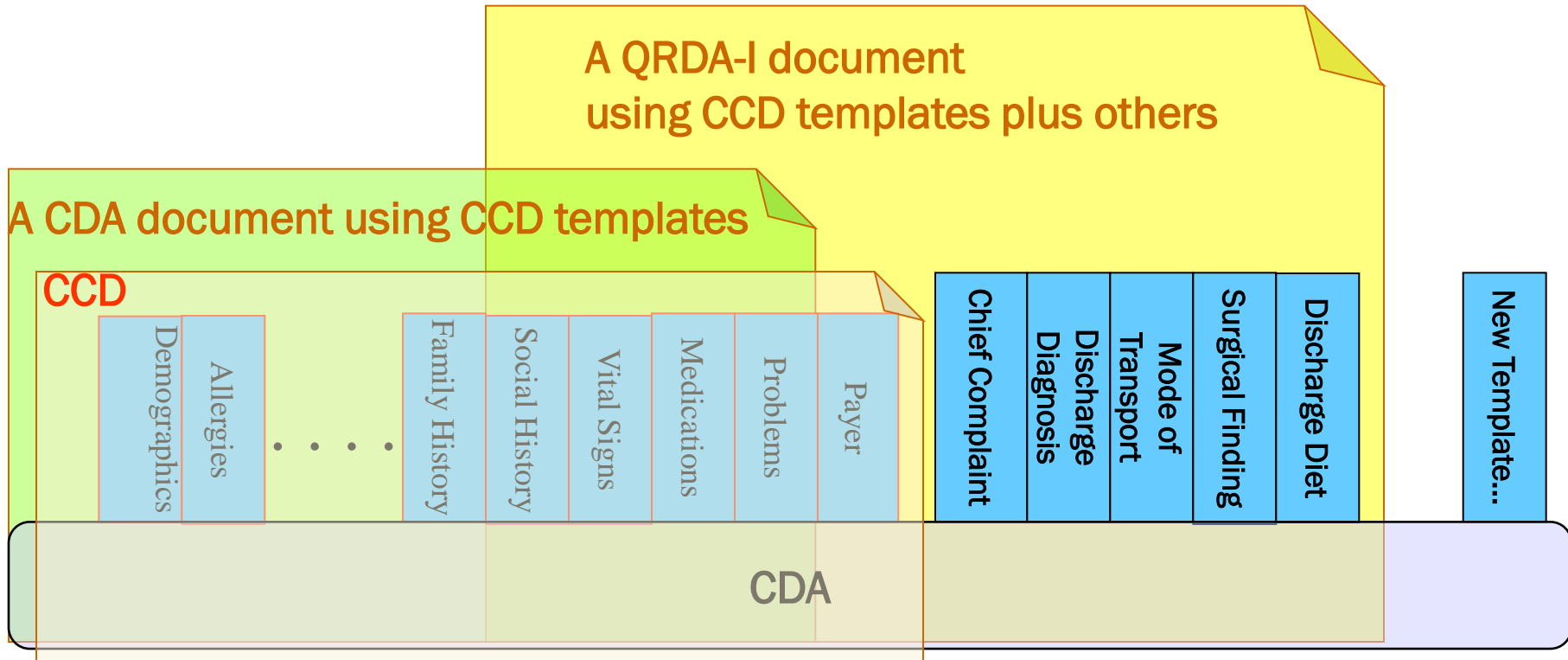
Export

MU2 NPRM:

"We request comment on whether any standards (e.g., QRDA category 1 or 2, or Consolidated CDA) would be adequate for CQM data export as well as whether Complete EHRs (that by definition would include calculation and reporting capabilities) should be required to be capable of data export."
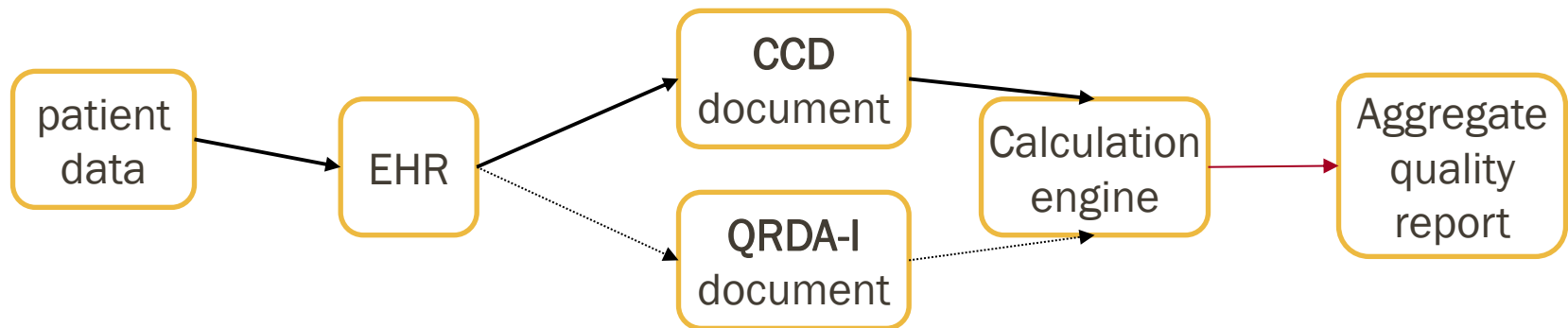
Export – CCD vs. QRDA

CCD	QRDA
Communicates patient level data	Communicates patient level data
Built to support Transition of Care	Built to support Quality Reporting
Includes a complete set of summary data	Data specific to one or more eMeasures
Comprised of "CDA templates" drawn from a common CDA template library	Comprised of "CDA templates" drawn from a common CDA template library and specified for quality data

patient data → EHR → CCD document → Calculation engine → Aggregate quality report

EHR ⇢ QRDA-I document ⇢ Calculation engine

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Calculate – Health Quality Measure Format (eMeasure)

Health Quality Measure Format (HQMF)

A standard for representing a health quality measure as an electronic document

An HL7 Draft Standard for Trial Use (DSTU) since 2009

Provides for quality measure consistency and unambiguous interpretation

eMeasure: a quality measure encoded in HQMF format

HQMF (eMeasure)

- HQMF: The first international standard for the formal representation of clinical quality measure **metadata**, **data elements**, and **logic**

```
<QualityMeasureDocument>

  HQMF Header

  HQMF Body
   <section>
     <title>Population criteria</title>
     <text>
     <entry>Initial Patient Population</entry>
     <entry>Denominator</entry>
     <entry>Numerator</entry>
     …
   </section>
   <section>
     <title>Data criteria</title>
     <text>
     <entry>
     …
   </section>
       …
</QualityMeasureDocument>
```

eMeasure and QRDA-I: STK-3

Percentage of inpatients diagnosed with ischemic stroke who were prescribed anticoagulation at discharge

eMeasure (criteria)

- DENOM
  - Discharge diagnosis of ischemic stroke
  - Age >= 18
  - Hx of Afib/Aflutter
- NUMER

  Anticoagulation prescribed at discharge

QRDA-I (patient data)

- Age
- Encounter type
- Encounter admit date
- Encounter d/c diagnoses
- Problem list
- Discharge medications

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eMeasure

Data criteria are the building blocks for population criteria.

Data Criteria

- Discharge diagnosis: Ischemic stroke
- Hx of: Afib/Aflutter
- Discharge medication: Anticoagulant

Population Criteria

- DENOM
  - **AND**: Discharge diagnosis: Ischemic stroke
  - **AND**: Hx of: Afib/Aflutter
- NUM
  - **AND**: Discharge medication: Anticoagulant

eMeasure

Data criteria are built from the NQF QDM

HITEP Quality Data Element	Value Set
Discharge diagnosis	Ischemic stroke code list
History of	Afib/Aflutter code list
Discharge medication	Anticoagulant code list

Data Criteria

- Discharge diagnosis: Ischemic stroke
- Hx of: Afib/Aflutter
- Discharge medication: Anticoagulant

Population Criteria

- DENOM
  - **AND**: Discharge diagnosis: Ischemic stroke
  - **AND**: Hx of: Afib/Aflutter
- NUM
  - **AND**: Discharge medication: Anticoagulant

QRDA III – Aggregate Report

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

Table of Contents

Reporting Parameters

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

Measure Section

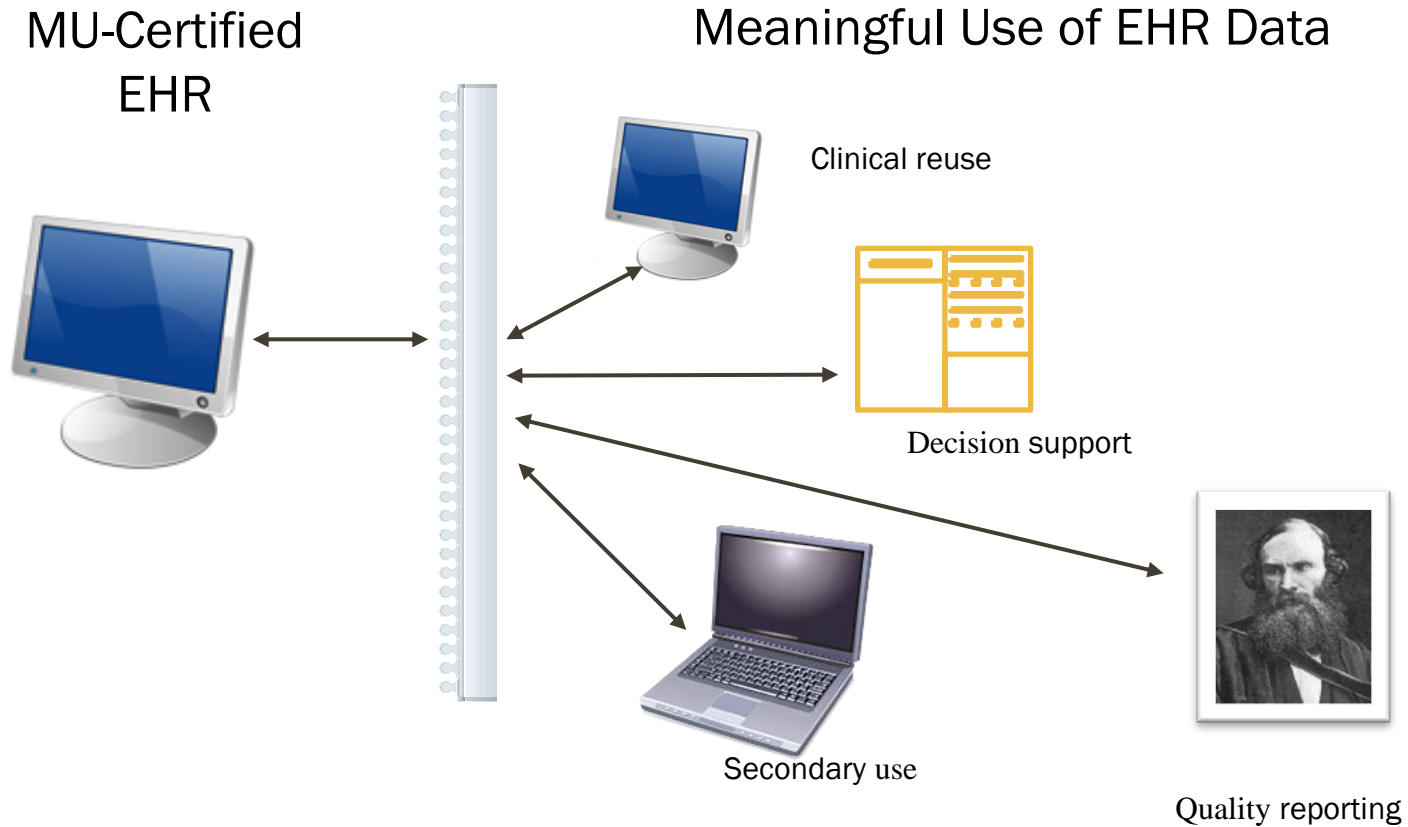| eMeasure Title	Version neutral identifier	eMeasure Version Number	NQF eMeasure Number	eMeasure Identifier (MAT)	Version specific identifier
Anticoagulation Therapy for Atrial Fibrillation/Flutter	03876d69-085b-415c-ae9d-9924171040c2	1	0436	71	8a4d92b2-3887-5df3-0139-013b0c87524a

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
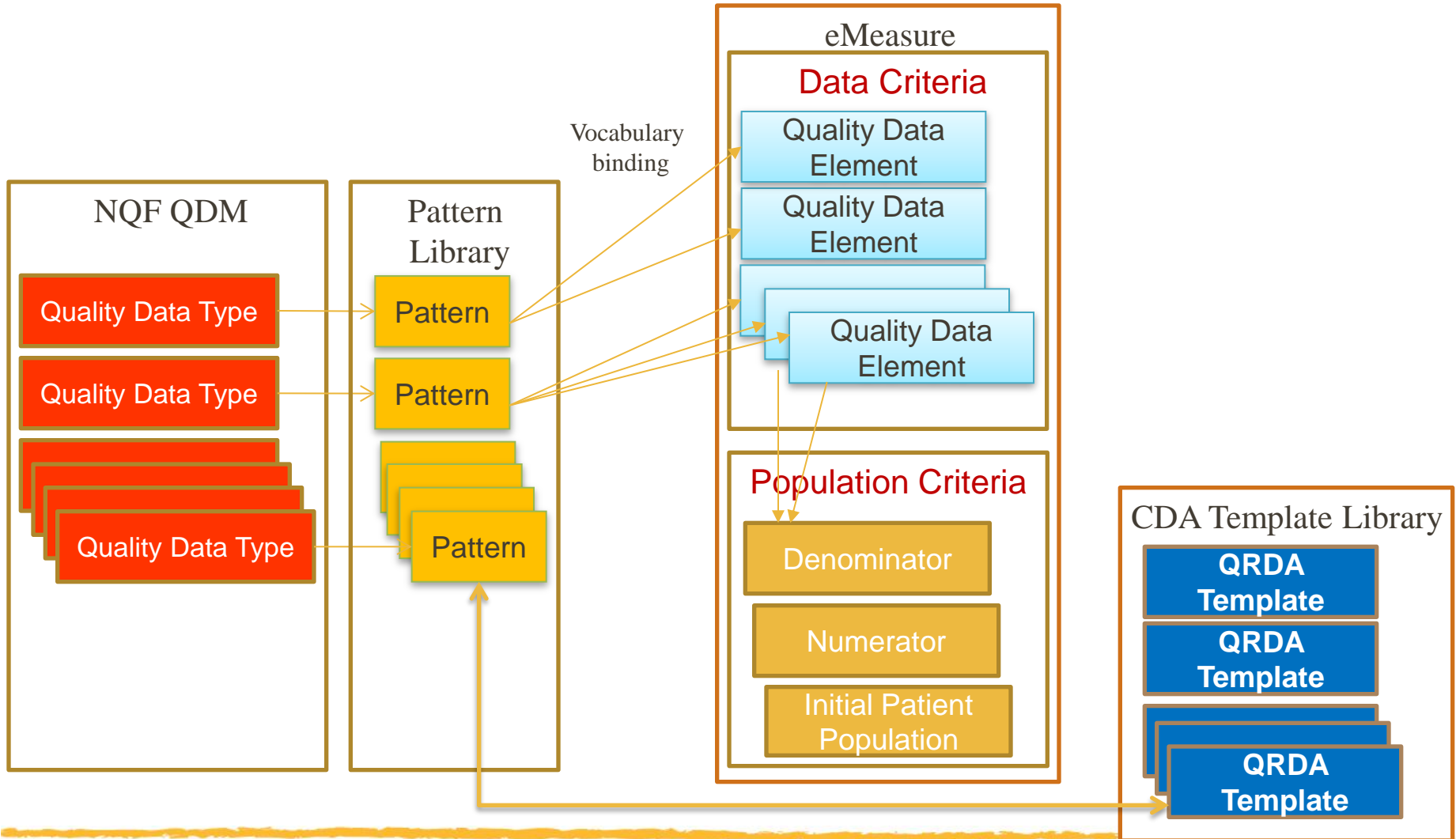- **Denominator Exclusions:** 20
    - **Male:** 8

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STANDARDS FOR EFFECTIVE USE AND INNOVATION?

Big Picture View

MU-Certified
EHR

Meaningful Use of EHR Data

Clinical reuse

Decision support

Secondary use

Quality reporting

Integrated, End-to-End Standards

Standards Adoption Strategy

This is what you want…

EXPORT **ANALYZE**

This is a path to get you there…

Interoperability Standards

DRIVE EHR FUNCTIONALITY

INFLUENCE DATABASE DESIGN

Thank you!

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