Best Practices for eMeasure Implementation

Breakout Session # 3:
Technical Working Group

Track Leaders:
Delane Heldt
Erik Pupo

April 26, 2012

NATIONAL QUALITY FORUM

eMeasure Learning Collaborative: What Are We All About?

- Public initiative convened by the NQF to bring together diverse stakeholders from across the quality enterprise.
- Promote shared learning across key eMeasure stakeholders including understanding of major drivers and barriers.
- Advance knowledge and best practices related to the development and implementation of eMeasures.
- Project consisting of interactive webinars and in-person meetings – spearheaded by Collaborative members and focused on array of relevant topics, tools, and resources.

eMeasure Collaborative Deliverables

1. Identification of current best practices (repeatable models)
2. Identification of gap areas
3. Development of recommendations for the future (to expand use of best practices and to address gap areas)

April 26th In-Person Collaborative Meeting
Best Practices for eMeasure Implementation

Four Questions for the Collaborative to Answer

1. ***What are best practices examples*** related to the development and implementation of eMeasures?

2. ***What are the mechanisms to enhance data and workflow capability?***

3. ***What are the recommendations*** for future use of health IT and standards to enable performance measurement?

4. ***How can we "rethink"*** **what we are looking for?**

Breakout Session Objectives

- Identify current efforts to format and express quality measures and other queries for secondary data use
- Review benefits and challenges of the HL7 Reference Information Model (RIM), Java Script and other formats to describe data, context of use and logic
- Identify essential requirements for queries to EHRs to fit data workflow
- Develop recommendations to drive eMeasure expression

Breakout Session Agenda
10:45am – 2:00pm with working lunch

- 10:45 – 11:00am
- 11:00 – 11:15am
- 11:15 – 11:35am
- 11:35am – 12:00pm
- 12:00 – 12:15pm
- 12:15 - 2:00pm
- 2:00pm
- 2:00 – 2:30pm
- 2:30pm

- Overview of Query Health efforts
- Overview of HQMF and QRDA
- Group discussion of alternate format
- Begin definition of requirements
- **Break: Lunch distributed, restrooms, phone calls**
- Continue group discussion of requirements
- Summarize key points for report out
- Breakout session ends
- **Break**
- Large group re-convenes

Review of Existing Efforts

- Presentation on Query Health - current status and direction
  - Erik Pupo, Deloitte Consulting, LLP
- Presentation on HQMF and QRDA - current status and direction
  - Floyd Eisenberg, MD, NQF

Challenges of Query Health

Erik Pupo
Specialist Leader
Federal Healthcare Consulting
Deloitte Consulting LLP

Deloitte LLP

Deloitte in the United States

- Largest professional services firm in the U.S. in terms of revenue and headcount
- More than 51,000 people, including 4,419 partners, principals and directors
- 100 offices in 89 cities
- $11.94 billion in revenue in FY11
- Offer audit, tax, consulting & financial advisory services
- Ranked No. 1 on BusinessWeek magazine's "50 Best Places to Launch a Career"
- Ranked as one of Fortune magazine's "100 Best Companies to Work for" for the 13th time since 1998
- 18 consecutive years on Working Mothers magazine's 100 Best Companies list

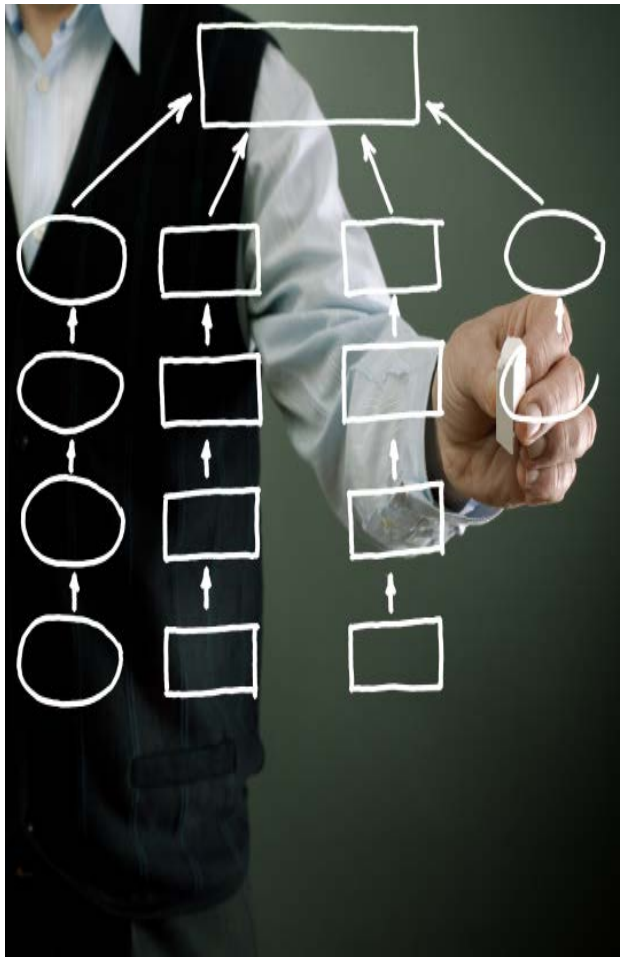
Challenges of Query Health

- Making the Quality Data Model a “living” model of information to support quality measure reporting and other potential uses.
  - How can we provide a potential path to implementation, especially with the inclusion of the QDM in Meaningful Use Stage 2?

- Using quality measures as the foundation for distributed queries
  - Recognizing the difficulties of calculations and interpretations for each measure
  - Expression in simplified language is not always that “simple”
  - Ensuring consistency in vocabularies

Initial Approach
Clinical Element Data Dictionary (CEDD)

- Demographics
- Payer Information
- Provider Information
- Allergies & Adverse Reactions
- Encounter
- Surgery
- Diagnosis
- Medication
- Procedure
- Immunization
- Vital Signs
- Physical Exam
- Family History
- Social History
- Order
- Result
- Medical Equipment
- Care Setting
- Enrollment
- Facility



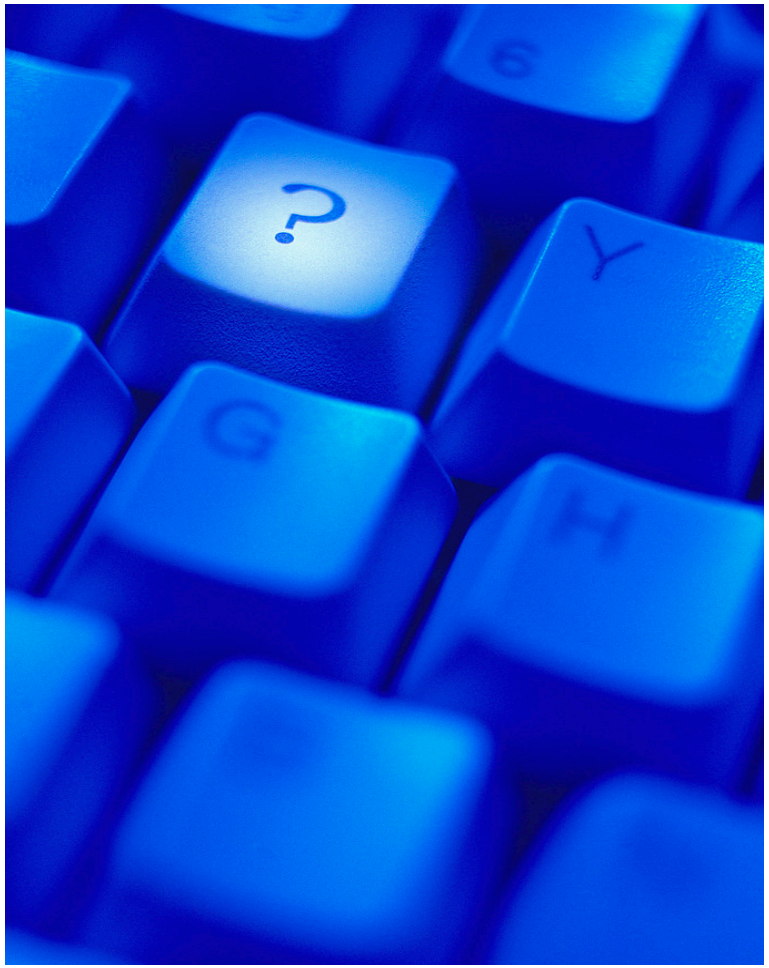
- Developed with implementers for implementers
- Focus on standards-independence

CEDD alignment with NQF's QDM
Aligning QDM 3.0 to working implementations

QDM Category Name	QDM Data Element	QDM State	NQF Vocabulary	Supporting CEDD Objects	Supported CEDD Data Elements	CEDD Vocabulary
Adverse Effect - Allergy	Causative Agent	Document Update	SNOMED-CT RXNorm for Medication as causative agent	Allergy and Adverse Reactions	Reaction Attributes	SNOMED-CT RxNORM for medication as substance
Adverse Effect – Non-Allergy	Causative Agent	Document Update	SNOMED-CT RXNorm for Medication as causative agent	Allergy and Adverse Reactions	Reaction Attributes	SNOMED-CT RxNORM for medication as substance
Characteristic	Source = Patient or Provider	Acknowledge Document Order Report	**Language** ISO 639-1	Culturally Sensitive Patient Care	Language	ISO 639-1
			Gender HL7 Administrative Gender		Gender	HL7 Administrative Gender
			Race PHIN-VADS (HL7)		Race	CDC Race and Ethnicity
			Ethnicity PHIN-VADS (HL7)		Ethnicity	CDC Race and Ethnicity
			Assessment LOINC	Social History	Social History Attributes	LOINC (assessment)
			Response SNOMED-CT		Social History Attributes	SNOMED-CT (response)
			Payer	Payer Information	Primary Insurance ID	NUCC

The Query Format - HQMF

- Health Quality Measure Format will be improved in coordination with HL7 and NQF
- HQMF newly modified to support the needs for dynamic population queries:
  - More executable queries
  - Simplified and readable
- Advantages for querying
  - Avoids “yet another standard”
  - Secure (vs procedural approach)
  - Works across diverse platforms
- Benefits – Speed and Cost
  - Improves adoption of NQF eMeasures



XML Schema Code

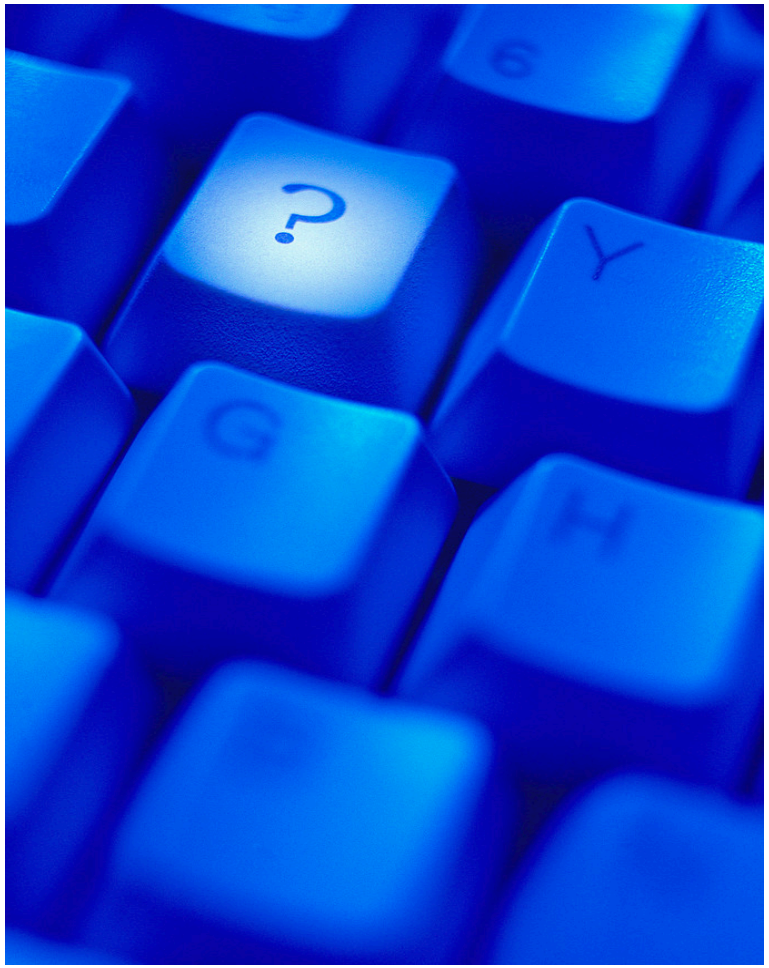
```
<xs:element name="LocalizedShortString">
  <xs:complexType>
    <xs:simpleContent>
      <xs:extension base="ShortString">
        <xs:attribute name="Language" type="LanguageType" />
      </xs:extension>
    </xs:simpleContent>
  </xs:complexType>
</xs:element>
```

Physical Model

Logical Model

Major Changes for HQMF

- Addition of business names to criteria and section elements to translate HQMF to executable code
- Inclusion of Variable definitions which allow for re-use of definitions within HQMF and also allow for easier translation to executable code
- Addition of Precondition conjunctions
- Complete List at http://wiki.siframework.org/Query+Health+-+Query+Format



QRDA Category 2 and 3 - Enhancement

- Quality Reporting Document Architecture
  - Category I – Patient Level
  - Category II – Patient Populations
  - Category III – Population Measures
- Query Health will use new definitions of Categories II and III
  - Not yet specified and balloted but work will be done within S&I Framework
  - Align with needs of CMS and NQF

Points for Discussion

- Making HQMF and QRDA more modular to make it easier to program and use
  - Increases adoption of NQF eMeasure specifications as “source of authority” for queries
  - Providing feedback loop to NQF on results of distributed query adoption

- Testing configuration of QDM as a possible future model for clinical data to be queried

Quality Data Model (QDM)

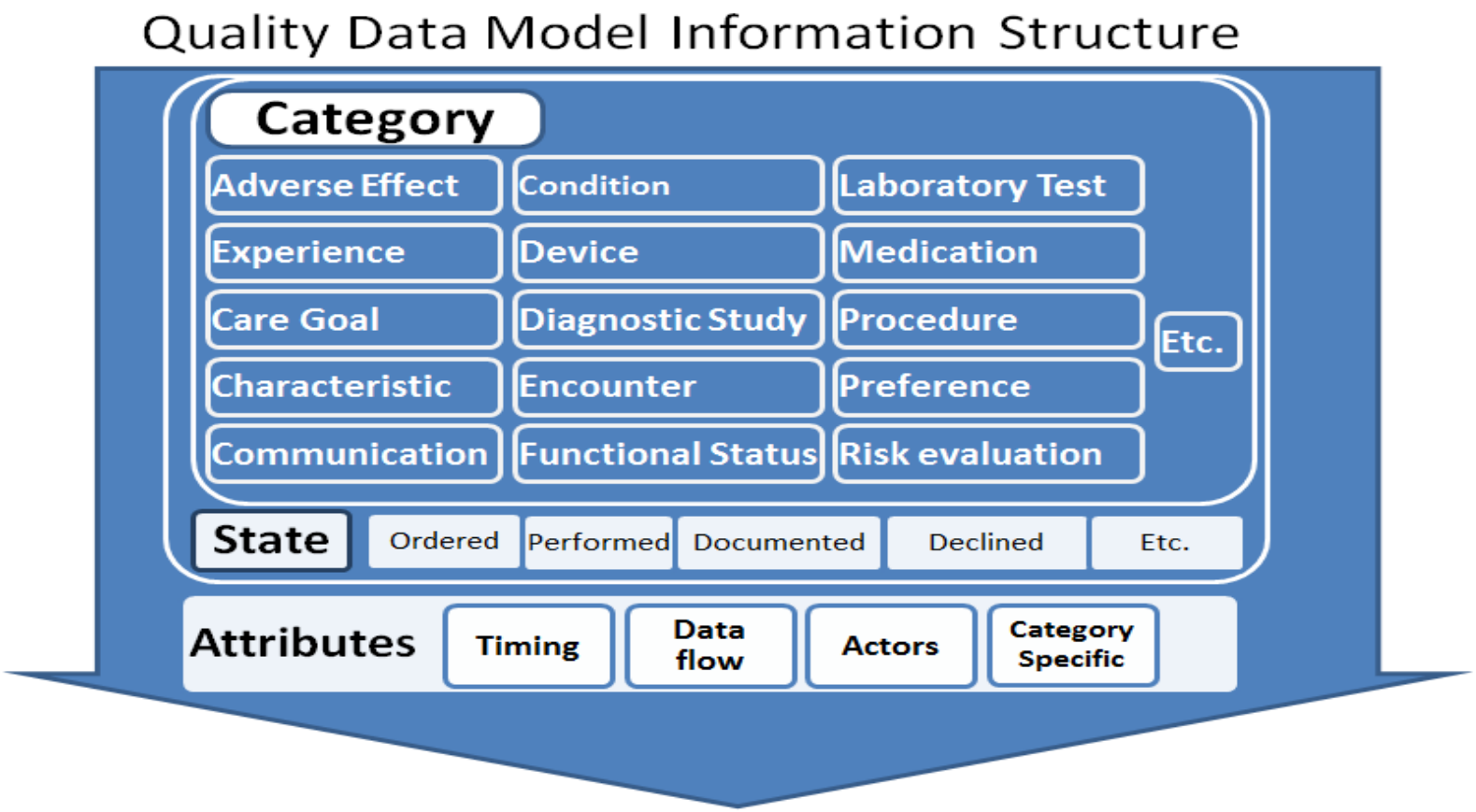
Floyd Eisenberg, MD, MPH
Senior Vice President, Health IT
National Quality Forum

National Quality Forum

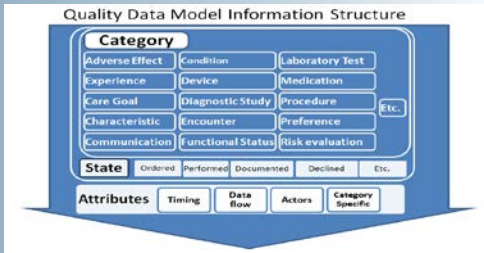
The National Quality Forum (NQF) is a nonprofit organization that operates under a **three-part mission** to improve the quality of American healthcare by**:**

- Building consensus on national priorities and goals for performance improvement and working in partnership to achieve them;
- Endorsing national consensus standards for measuring and publicly reporting on performance; and
- Promoting the attainment of national goals through education and outreach programs.

Quality Data Model (QDM)



Quality Data Model (QDM)

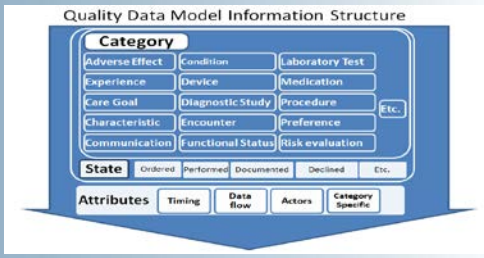


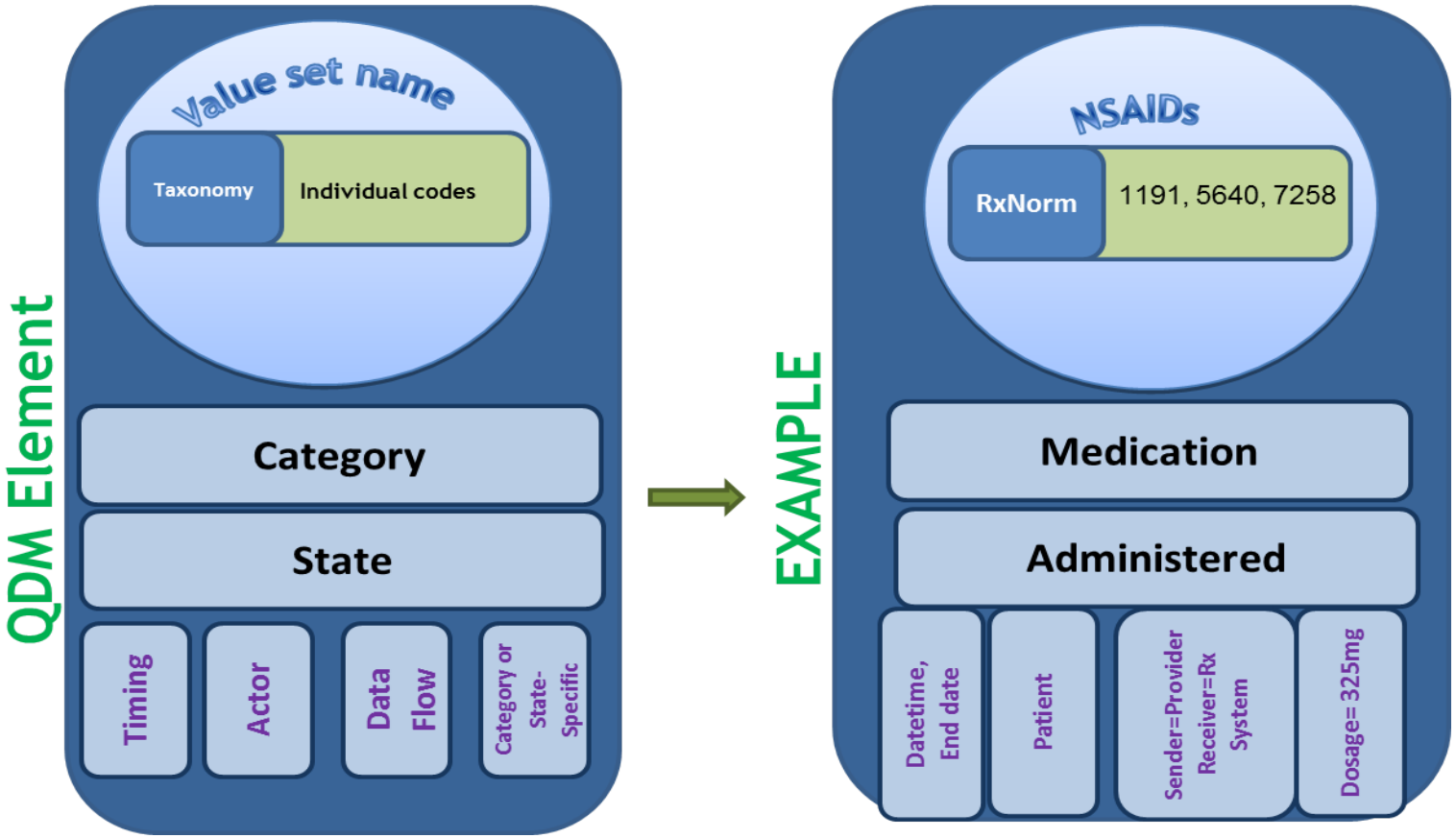
- Category: the type of information desired (some examples shown in the center blue boxes).

- State: the context of use that can be assigned to a category element
  - States of action
  - States of being)
  - The category-state pair, along with the associated value set, comprises the QDM element.

- Attributes: add precision to the definition of the data element.
  - Timing
  - Actor
  - Data flow
  - Category-specific

Quality Data Model (QDM)





Measure Logic – Simple Arithmetic

- Handling simple mathematical operators
  - e.g., Difference of:
    - AND: "Occurrence A of Encounter: Hospital Measures - Encounter ED (discharge datetime)"
    - AND: "Occurrence A of Encounter: Hospital Measures - Encounter ED (admission datetime)“
  - e.g., Difference of:
    - AND: "Occurrence A of Encounter: Hospital Measures - Encounter ED (discharge datetime)"
    - AND: "Occurrence A of Encounter: Hospital Measures - Encounter ED (admission datetime)"

Measure Logic – Start / Stop Time

- Handling time differences
  - Arrival time vs. Departure time
  - Admission time vs. Discharge time
  - e.g., Difference of:
    - AND: "Occurrence A of Encounter: Hospital Measures - Encounter ED (discharge datetime)"
    - AND: "Occurrence A of Encounter: Hospital Measures - Encounter ED (facility location arrival datetime: 'Hospital Measures-ED locations')“

Measure Logic – Continuous Variables

- Handling broader mathematical concepts such as Median, Mean, Count in addition to Boolean operators – and how they relate to each other (for a continuous variable measure)

- MEDIAN of:
  - Difference of:
    - » AND: "Occurrence A of Encounter: Hospital Measures - Encounter ED (discharge datetime)"
    - » AND: "Occurrence A of Encounter: Hospital Measures - Encounter ED (facility location arrival datetime: 'Hospital Measures-ED locations')"

Measure Expression: Complex Terms

- Cumulative duration of medications
  - How long the patient received medication
  - Did the patient receive enough medication for 90 days / 120 days
- Reference an external dynamic element
  - TOTAL DAYS MULTIPLIED by the applicant referent CAUTI population rate for each facility location*
- Handling changes over individual episodes of treatment
  - For each 40 days of treatment with warfarin, was an INR test performed
- Describing which of several observations to choose for calculation (reducing ambiguity – e.g., which of 4 recorded blood pressures taken during the single visit to use in trending for the measure)

* The predicted rate of catheter-associated urinary tract Infections per 1,000 urinary catheter days calculated for each hospital unit location in scope for the measure and summarized across all locations.

Measure Expression: Metadata

- Incorporating the context of information (e.g., ordered, dispensed, administered for meds; ordered, performed, resulted for procedures)
- Managing ordinality (e.g., principal procedure) and cardinality (second procedure) for diagnoses and procedures
- Determining preference
  - Declination – declining to participate
  - Choosing one treatment over another
- Patient experience – patient outcomes based on specific interventions provided
  - Past experience – poor outcomes to be avoided with future treatment
  - Current experience – whether goals have been met

Measure Logic – Data Linkages

- Using Act Relationships to handle expected outcomes for patient change over time (Care Plan related measures)

- "Care Goal: Weight loss" *has goal of*
  "Weight Delta 6-12 months (>= 10 lbs)" *is derived from*
  - *FIRST "Physical examination finding: Weight" DURING "Measurement Period"*
  - *MOST RECENT "Physical examination finding: weight" >=6 months starts after start of FIRST "Physical examination finding: Weight"*

Measure Logic – Data Linkages

- Using Act Relationships to handle individual patient outcome change over time (Delta measures)

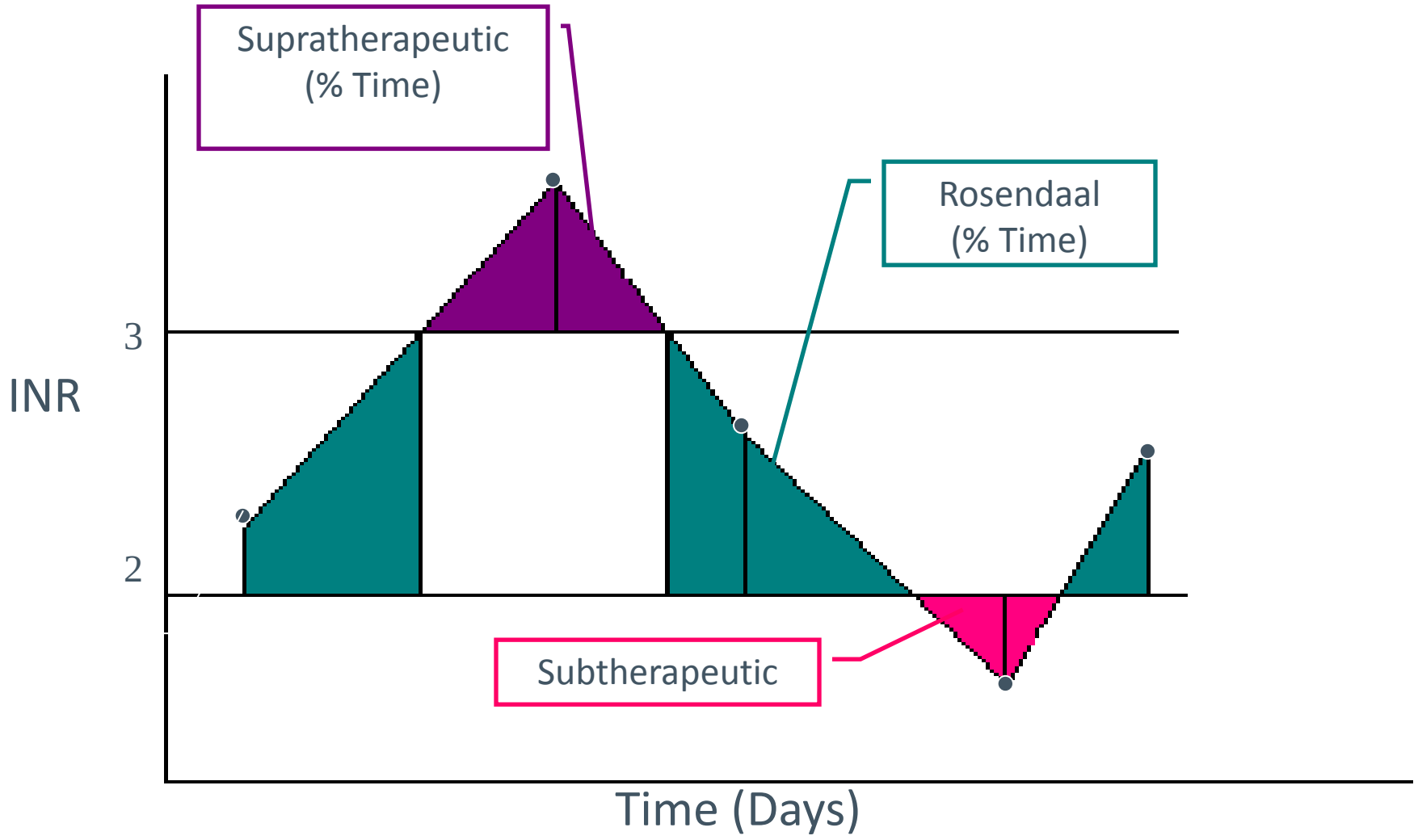
- "Procedure performed: weight loss diet education" *has outcome of*

  "Physical examination finding: Weight Delta 6-12 months (>= 10 lbs)" *is derived from*

  - *FIRST "Physical examination finding: Weight" DURING "Measurement Period"*
  - *MOST RECENT "Physical examination finding: weight" >=6 months starts after start of FIRST "Physical examination finding: Weight"*

Measure Logic – Complex

Rosendaal With Subtherapeutic and Supratherapeutic Time



eMeasure Query Requirements

- Group discussion about other existing efforts
- Identify purposes for secondary use-related queries to EHRs.
- Identify stakeholders (requesters, receivers) for secondary use by type of use.
- Identify common requirements for queries to EHRs for quality measurement and other secondary uses.
- Identify areas requiring additional research and recommend potential sources

April 26th In-Person Collaborative Meeting
Best Practices for eMeasure Implementation

Questions for the Collaborative to Answer

1. ***What are best practices examples*** related to the development and implementation of eMeasures?
   - Processes / Workflow with Existing Products
   - Code Systems (structured data)
   - Culture

Questions for the Collaborative to Answer

2. ***What are the mechanisms to enhance data and workflow capability?***

Workflow

- How can understanding the data workflow enhance standards and define expectations for EHRs and other clinical applications?
- What clinical workflow challenges exist with existing products (hospital and/or ambulatory)? What are the recommendations ?
- Are there workflow or staffing issues that constrain implementation?

Questions for the Collaborative to Answer

2. ***What are the mechanisms to enhance data and workflow capability?***

Data

- What are the challenges in using current code systems to express information required by eMeasures? What are the recommendations?
- What techniques are used to address unstructured data?

Questions for the Collaborative to Answer

3. ***What are the recommendations*** for future use of health IT and standards to enable performance measurement?

- What concepts are needed to address requirements for future measurement and how do they align with other secondary use data analysis needs?
- What innovative techniques are needed to capture structured data (or map unstructured data) and manage clinical workflow to enable performance reporting as a byproduct of care delivery?

What challenges to eMeasure implementation exist in today's EHRs?

- Identify risks / challenges for EHRs, e.g., missing data, clinical workflow, lack of standardization.
- What data sources are not available in structured format for reporting and why?
- What techniques are used to address unstructured data?
- Are there workflow or staffing issues that constrain implementation?
- What processes exist today that might be replicated or addressed (e.g., pharmaceutical research)?

What opportunities come out of our present state of eMeasure expression?

What recommendations would you make for future use of health IT and standards to enable performance measurement?

- What concepts are needed to address requirements for future measurement?
- What innovative techniques are needed to capture structured data and manage clinical workflow to enable performance reporting as a byproduct of care delivery?
- What are the methods for MU Stage 2?

How can we rethink what we are looking for?

- What are some innovative ideas for the future?
  - MU Stage 3 as an example

Summary of key discussion points

Goal

- **Complete logical / data model of a quality measure**
- **Electronic tool set to compare measures for common components / hierarchical relationships between them (risk adjustments)**
- **Relationship between stating a guideline and care delivery using measures**
- **Data required for measurement are captured structured at some point in the usual health data workflow (not in attestation / check box format)**
- **Do not limit measures to what can be currently an automated query**

Summary of key discussion points

Challenges

- **Liquidity vs Expressivity**
  - **Screening as a general concept has less meaning than a validated instrument that provides consistent results**
  - **Some structured data requires inference engines to create useful / structured data**
- **The overall measurement burden is too cumbersome, too many check boxes / attestation elements**
- **Copyright issues with standardized tools and results**
- **Measure implementation has been 'hard wired,' requiring specific locations for data entry to capture measure data**

Summary of key discussion points

Challenges

- **EHRs use a model of use, measures require a model of meaning – i.e., there is a dissonance in requirements**
- **Prescriptive requirements as to exactly where in the EHR the data must be captured and stored limit innovation**
- **The HL7 process is challenging due to a limited number of individuals with expertise and the ballot cycle is long – difficult to modify**
- **Implementation requirements can only handle change on a limited based (18 month best case cycle time, then 3 year for full implementation)**

Summary of key discussion points

Recommendations

- **Enable implementation method beyond the scope of the current EHR intent and capability, e.g.,**
  - **Inference engines / 'electronic abstraction'**
  - **Natural language processing**
- **Set a base on which tools for eMeasure development**
- **Avoid prescriptive requirements as to exactly where in the EHR the data must be captured and stored**
- **Identify or expand a logical model for defining a quality measure (more elaborated QDM)**
- **Create training and education for the eMeasure specification**

Summary of key discussion points

Recommendations

- **Evolve to standard templates for 'standard' queries that can be used for quality measures and clinical decision support**
  - **The sets need to be based on the same infrastructure for consistency (attributes and filters)**
  - **A health measure query could be based on such individual "standard" sections – aka "Phenotypes" that are basic**
  - **Expand beyond HQMF to allow evolution without constraining quality measurement**
- **Remain agnostic to technology where feasible to accommodate to future technology changes**
  - **Interoperability with backward compatibility**

Summary of key discussion points

Recommendations

- **Provide "English Language" specification language**
  - **XML can be an example but should not be XML limited**
  - **Computable representation is preferred – more amenable to the expressions needed**
  - **Prefer English equivalent, but needs some expression for query**
  - **The QDM does force resolution of ambiguity with respect to logic and meaning**
  - **Unified thesaurus – presentation**
  - **Need some XML, but not necessarily the HL7 RIM – a basic schema**
  - **Content standards for the XML to have hooks into the content**

Summary of key discussion points

Recommendations

- **Avoid constraint that limits quality measures. Preconditions and temporal relationships are important to quality measures. Are implementations to be constrained to only those elements that are 'available?'**
- **Provide structured English statements that translate to code – use libraries and templates for the existing HQMF but allow English expression of relationships to reduce complexity**