NATIONAL QUALITY FORUM
Driving measurable health improvements together

http://www.qualityforum.org

Electronic Health Record (EHR) Data Quality Best Practices for Increased Scientific Acceptability

TEP Web Meeting 2

January 14, 2020

NATIONAL QUALITY FORUM

Agenda

- Welcome, Roll Call, and Meeting Objectives
- Discussion on Scope and Data Quality
- Discussion on the Environmental Scan
  - Additional Sources of Information
- Opportunity for Public and Member Comment
- Next Steps

Welcome, Roll Call, and Meeting Objectives

NATIONAL QUALITY FORUM

Project Staff

- Chuck Amos, MBA, Director
- Kathryn Goodwin, MS, Senior Project Manager
- Jean-Luc Tilly, MPA, Senior Project Manager
- Ameera Chaudhry, MS, Project Analyst
- Christopher Millet, NQF Consultant

NATIONAL QUALITY FORUM

TEP Roster

- JohnMarc Alban, MS, RN, CPHIMS
- Zahid Butt, MD FACG
- Cindy Cullen, MS, MBA, PMP
- John Derr, RPh
- Karen Dorsey, MD, PhD
- Zabrina Gonzaga, RN
- Toby Heyn
- Angela Kennedy, DC, MBA
- Joseph Kunisch, PhD, RN-BC, CPHQ
- James Langabeer, PhD, MBA
- Jamie Lehner, MBA, CAPM
- Michael Lieberman, MD, MS
- Jacob Lynch, RN-BC
- Jana Malinowski
- James Mcclay, MD, MS, FACEP
- Shelly Nash, DO
- Shea Polancich, PhD, RN
- Stan Rankins, MSIT
- Mike Sacca

NATIONAL QUALITY FORUM

Federal Liaisons

- Albert Taylor, MD
- David Kendrick, MD, MPH

NATIONAL QUALITY FORUM

Meeting Objectives

- Review and discuss results of the environmental scan to date
- Clarify data quality as it pertains to this project
- Identify additional sources of information on the extent of EHR data quality issues, if needed

NATIONAL QUALITY FORUM

Meeting Objectives

- After each section of the Environmental Scan presentation, the co-chairs will ask:
  - Does the TEP think this is an important section (yes or no)?
  - If Yes:
    - » Does the information accurately represent the current landscape?
    - » What needs to be corrected?
    - » What is missing from this section?

Discussion on the Environmental Scan

NATIONAL QUALITY FORUM

Outline of Environmental Scan

- Background and context
- Goals, objectives, and approach for the environmental scan
- Scan results and analysis
  - Challenges with eCQMs and EHR data
  - Challenges with EHR data in PAC settings
  - Unstructured EHR data
  - Data quality issues and NQF endorsement
  - Additional literature relevant to EHR data quality and quality measurement
  - Frameworks for assessing EHR data quality
  - Guidance from standard-setting bodies
- Next steps

NATIONAL QUALITY FORUM

Background and Context

- EHRs are primarily used to support patient care. A secondary use of EHR is as a data source for clinical quality measures.
- Summary of background
  - Primary use and promising use of EHR
  - Structured and unstructured data
  - High-level stats on EHR usage
  - Scope: hospital, ambulatory care, PAC

NATIONAL QUALITY FORUM

Summary of Key Legislation

Legislation	Summary
Health Information Technology for Economic and Clinical Health (HITECH) Act	Provides HHS with the authority to establish programs to improve health care quality, safety, and efficiency through the promotion of Health IT, including EHRs and private and secure electronic health information exchange
Certified EHR Technology (CEHRT) Program	Gives assurance to purchasers and users that an EHR system or module offers the necessary technological capability, functionality, and security to help them meet the meaningful use criteria
Promoting Interoperability Programs	Provides incentive payments to eligible professionals and eligible hospitals as they demonstrate adoption, implementation, upgrading, or meaningful use of certified EHR technology Previously known as The Medicare and Medicaid Electronic Health Records (EHR) Incentive Programs
Improving Medicare Post-Acute Care Transformation (IMPACT) Act	Requires the submission of standardized data by LTCHs, SNFs, HHAs, and IRFs.

NATIONAL QUALITY FORUM

Goals, Objectives, and Approach for the Environmental Scan

- Overarching goal: identify and summarize key findings on the causes, nature, and extent of EHR data quality issues and the impact these have on the scientific acceptability, feasibility, and use and usability of clinical quality measures

NATIONAL QUALITY FORUM

Goals, Objectives, and Approach for the Environmental Scan

Objectives include current-state assessment of:

- How measure developers use structured EHR data
- Varying approaches to mitigate data quality challenges
- Data needed to develop and test eCQMs
- Attributes of successful eCQM implementation
- Data quality issues and NQF endorsement of eCQMs
- Guidance from standard-setting bodies

Scan Results and Analysis: Challenges with eCQMs and EHR Data

Current eCQM-based specifications

- Quality Data Model (QDM) for data element criteria
- CQL – combining data element criteria to express the measure intent
- HQMF – encapsulate the measure specification
- QRDA – for representing individual and aggregate reports

NATIONAL QUALITY FORUM

Scan Results and Analysis: Challenges with eCQMs and EHR Data

- Future eCQM-based specifications
  - QI-Core to replace Data Model (QDM) for data element criteria
  - FHIR Quality Measure to replace HQMF
  - Data Exchange for Quality Measures (DEQM) to replace QRDA
- Better alignment to structured EHR data by aligning with FHIR
- Testing is baked into FHIR standards development process
  - Testing occurs at regular connectathons
  - FHIR maturity model provides a framework for ranking FHIR technical specs based on level of testing

NATIONAL QUALITY FORUM

Scan Results and Analysis: Challenges with eCQMs and EHR Data

Unstructured EHR Data ("free text")

- Natural language processing (NLP) is not yet mature enough to support clinical quality measurement.
- NLP needs to produce structured data that aligns into a data model.

NATIONAL QUALITY FORUM

Scan Results and Analysis: Challenges with EHR Data in PAC Settings

- Only ONC-certified EHRs can evaluate eCQM specs
- ONC-certified EHRs do not typically cover post-acute care
- IMPACT Act promotes PAC standard assessment tools:
  - Skilled nursing facilities: Minimum Data Set (MDS)
  - Home health: Outcome and Assessment Information Set (OASIS)
  - Inpatient rehabilitation facilities: Inpatient Rehabilitation Facility Patient Assessment Instrument (IRF-PAI)
  - Long-term care hospitals: Long-Term Care Hospital Continuity Assessment Record & Evaluation (CARE) Data Set (LCDS)
- Tools are in use and evolving to include interoperability, structured-data reuse, and FHIR
  - CMS Data Element Library aligns questions/answers across tools
  - FHIR Implementation Guide of the CMS Data Element Library

NATIONAL QUALITY FORUM

Scan Results & Analysis: Unstructured EHR Data

- Unstructured data are common and necessary for patient care and billing, the primary uses of EHRs
- Examples include qualitative information, narratives, or information that varies significantly between patients
- Studies show challenges and benefits of unstructured data
  - Chen et al.: challenges of EHRs to document tobacco use
  - D'Amore et al.: strengths and limitations of EHR data for quality
  - Bravata et al.: benefits of searchable data over free-text in hospital EHRs
  - Mullin et al.: importance of validating natural language processing when using unstructured data for eCQMs

NATIONAL QUALITY FORUM

Scan Results and Analysis: Data Quality Issues and NQF Endorsement

NQF has endorsed only a small number of eCQMs in part due to the lack of the requisite testing needed for NQF endorsement

Measure developers report challenges with:

- Number of EHR systems available for testing scientific acceptability
- Recruitment for testing
- Identifying test sites that are currently collecting all required data elements

NATIONAL QUALITY FORUM

Scan Results and Analysis: Data Quality Issues and NQF Endorsement

Important to Measure and Report (Evidence and Opportunity for Improvement)

- Several eCQMs evaluated for NQF endorsement have had low or insufficient evidence to support the measure focus, or lack of performance data to demonstrate quality problems and opportunity for improvement
- Measures that do not pass this first criterion are not evaluated on the remaining criteria, including scientific acceptability, feasibility and usability and use.

Scan Results and Analysis: Data Quality Issues and NQF Endorsement

Scientific Acceptability (Reliability and Validity)

Examples of eCQMs that did not pass the SA criteria:

- eCQM with empirical validity testing done at the data element and performance measure score level that showed poor agreement between the time a patient sees a provider and what is documented in the chart.
- eCQM with data element testing performed at only one hospital site.
- Lack of evidence to support alignment with the measure specifications.

Scan Results and Analysis: Data Quality Issues and NQF Endorsement

Feasibility

- A feasibility assessment is required and must address the data elements and measure logic and demonstrate that the eCQM can be implemented or that feasibility concerns can be adequately addressed.
- Domains to be addressed in the assessment include data availability, data accuracy, data standards and workflow.
- At the current time, feasibility is not a must-pass criterion for NQF endorsement.

NATIONAL QUALITY FORUM

Scan Results and Analysis: Additional Literature

- Herndon et al.: Validation strategy for 2 oral health eCQMs; stakeholder engagement helped anticipate threats to feasibility, reliability, and validity
- Welch et al.: Benefit of early data checking in High Value Healthcare Collaborative sepsis project
- Bravata et al.: Validation of trans ischemic attack and minor ischemic stroke eCQMs by comparing eCQMs from EHR data to chart review data
- Perry et al.: Description of reliable Natural Language Processing programs

NATIONAL QUALITY FORUM

Scan Results and Analysis: Additional Literature

- Cho et al.: Efforts to map data to current terminology standards (e.g., LOINC, ICNP)
- D'Amore et al.: Importance of automated tooling programs to detect data quality issues
- Skyttberg et al.: Benefits to data quality when using EHR for entire registration process
- Amster et al.: Assessment of five NQF-endorsed eCQMs and inherent barriers
- Bailey et al.: Implementation of two pediatric eCQMs
- Phipps et al: Successful implementation of stroke eCQMs in VA health system

NATIONAL QUALITY FORUM

Scan Results and Analysis: Frameworks for Assessing EHR Data Quality

- Literature review identified several proposed frameworks for assessing data quality in EHRs
  - Weiskopf & Weng, 2013
  - Feder, 2018
  - Hoeven et al., 2017
  - Weiskopf et al., 2017
- Meta-analyses identified a variety of approaches to mitigate EHR data quality issues, generally focused on clinical research rather than quality improvement
- Validation strategies included combining EHR data with other data elements to improve their reliability

1. Weiskopf NG, Weng C. Methods and dimensions of electronic health record data quality assessment: enabling reuse for clinical research. *J Am Med Inform Assoc*. 2013;20(1):144-151.
2. Feder SL. Data quality in electronic health records research: quality domains and assessment methods. *West J Nurs Res*. 2018;40(5):753-766
3. Hoeven LR van, Bruijne MC de, Kemper PF, et al. Validation of multisource electronic health record data: an application to blood transfusion data. *BMC Med Inform Decis Mak*. 2017;17(1):107. Data Quality Assessment Guideline for Electronic Health Record
4. Weiskopf NG, Bakken S, Hripcsak G, et al. A data reuse. *EGEMS (Wash DC)*. 2017;5(1):14.

NATIONAL QUALITY FORUM

Scan Results & Analysis: Frameworks for Assessing EHR Data Quality

	Weiskopf et al. 2013	Feder et al. 2018	Hoeven et al. 2017	Weiskopf et al. 2017
Completeness (a truth about a patient was present in the EHR)	X	X	X	X
Correctness (the information contained in the EHR was true)	X	X		X
Concordance (there was agreement or compatibility between data elements)	X	X	X	X
Plausibility (the data were in agreement with general medical knowledge)	X	X	X	X
Currency (the data were recorded in a reasonable period of time)	X	X		X
Uniformity (measures across time and data sources all have the same units, level of detail, and/or coding system)			X	
Time patterns (no unexpected changes over time)			X	
Linkage data sources within data warehouse (entities occurring in multiple data tables can be linked)			X	
Identity (no duplicates)			X	
Event attributes (all attributes relevant to an event description are present)			X	
Consistency hospitals within data warehouse (no unexplained differences between hospitals)			X	
Granularity (a data value was neither too specific nor too broad)				X
Fragmentation (a concept was recorded in only one place in the record)				X
Signal-to-Noise (information of interest could be distinguished from irrelevant data in the record)				X
Structuredness (data were recorded in a format that enables reliable extraction)				X

NATIONAL QUALITY FORUM

Scan Results and Analysis: Guidance from Standard-Setting Bodies

- Some articles in literature emphasize importance of regulatory bodies and accrediting organizations in EHR data quality
- Some legislation includes EHR data quality recommendations

Legislation	Key Quality Areas
American Recovery and Investment Act of 2009 (ARRA)	Additional support for EHR research.
Children's Health Insurance and Program Reauthorization Act of 2009 (CHIPRA)	Set minimum standards for EHR developers, created new e-measures and evaluated state-level endeavors in using health IT to improve pediatric care quality.
Health Information Technology for Economic and Clinical Health Act of 2009 (HITECH)	Financial incentives for providers to adopt and meaningfully use EHR.
Patient Protection and Affordable Care Act of 2010 (PPACA)	Incorporate existing incentive programs into value-based purchasing program with payments linked to certain EHR-related quality measures.

NATIONAL QUALITY FORUM

Terms, References, and Appendices

Please send suggestions for the following sections to EHRDataQuality@qualityforum.org

- NQF Health Information Technology Terms and Definitions
- References
- Appendix A: TEP and NQF Staff
- Appendix B: Environmental Scan Methodology

Discussion on Scope and Data Quality

NATIONAL QUALITY FORUM

Scope and Data Quality

"Data Quality" for this project refers to:

- How well EHR data (structured and unstructured) supports clinical quality measurement, including eCQMs as well as other electronic measurement (such as standardized assessment tools used in PAC)

Data Quality for this project does NOT refer to

- How well EHRs collect data for the primary purpose of supporting delivery of care

Draft "true north" statement:

- *The purpose of this Task Order (TO) is to establish a technical expert panel (TEP) to recommend best practices for improving EHR data in ways that support healthcare performance measures at all phases including measure development, measure endorsement, and implementation.*

Opportunity for Public and Member Comment

Next Steps

NATIONAL QUALITY FORUM

Next Steps

- Environmental Scan Draft Report - TEP Review: January 9 - 23, 2020
- 30-day Comment Period on the Environmental Scan: February 3 – March 4, 2020
- **TEP Web Meeting 3: March 31, 2020**
- **TEP Web Meeting 4: April 29, 2020**
- Final Environmental Scan: May 19, 2020
- **TEP Web Meeting 5: June 11, 2020**
- TEP Findings and Recommendations Draft Report - TEP Review: September 2-16, 2020
- **TEP Web Meeting 6: September 9, 2020**
- 30-day Comment Period on TEP Findings and Recommendations Draft Report: September 30 – October 30, 2020
- **TEP Web Meeting 7: November 10, 2020**
- TEP Findings and Recommendations Final Report: December 24, 2020

Adjourn

THANK YOU.

NATIONAL QUALITY FORUM

http://www.qualityforum.org