# Task 3C: Electronic Health Record Technical Expert Panel Report

**SOD #12**

**Electronic Specification of Clinical Quality Measures & Support**
**Contract # HHSM-500-2011-00104C**
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**TEP Dates: February 1-2, 2012**


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## Meeting Date and Panel Composition

The Electronic Health Record (EHR) Technical Expert Panel (TEP) met February 1-2, 2012, in Baltimore, MD. Thirteen TEP members joined the meeting:

**Kathleen Aller**, MBA—Director, Performance Measurement, Enterprise Intelligence, McKesson, Gaithersburg, MD

**Barbara Frink**, RN, PhD, FAAN—Vice President and Chief Nursing Information Officer, MedStar Health, Columbia, MD

**Paul Fu**, MD, MPH—Director, Clinical Informatics, Harbor-UCLA Medical Center

**Anwar Hussain**, MD, MHA—Associate Chief Information Officer, United Health Services Hospitals, Johnson City, NY

**Vasudevan "Juggy" Jagannathan**, PhD—Vice President of Research, MedQuist M*Modal, Morgantown, WV

**Deborah Konicek**, RN, MSN, BC—Managing Director, College of American Pathologists (CAP), Wauconda, IL

**Rute Martins**, MS—Associate Project Director, Division of Healthcare Quality Evaluation, The Joint Commission, Oakbrook Terrace, IL

**John Mattison**, MD (by phone)—Assistant Medical Director and Chief Medical Information Officer, Kaiser Permanente, Southern California

**Chris Moore**, MD, RDMS, RDCS—Associate Professor, Department of Emergency Medicine, Yale University School of Medicine, New Haven, CT

**Fred Rahmanian**, MS—Principal Product Architect, Siemens Healthcare, Leesport, PA

**William M. Russell**, MD—Independent Consultant

**David Stumpf**, MD, PhD—Senior Vice President for Innovation and Transformation, OptumInsight, Evanston, IL

**Feliciano Yu**, MD, MSHI, MSPH, FAAP, FHIMSS—Chief Medical Information Officer, St. Louis Children's Hospital, St. Louis, MO

Other invited guests and partners attending the meeting included:

eQuality team members attending the meeting included:

**Liora Alschuler**—Lantana Consulting Group

**Mary Braman**— National Committee for Quality Assurance (NCQA)

**Chad Bennett**—Telligen

**Bob Dolin**—Lantana Consulting Group

**Gaye Dolin**—Lantana Consulting Group

**Jean Fajen** (by phone)—Telligen

**Rick Geimer**—Lantana Consulting Group

**Yan Heras**—Lantana Consulting Group

**Crystal Kallem**—Lantana Consulting Group

**Joy Kuhl**—Optimal Accords

**Jingdong Li**—Lantana Consulting Group

**Linda Phillips**—Telligen

**Adam Rothschild**—Lantana Consulting Group

**Aldo Tinoco**—NCQA

Observers:

**Deborah Krauss** —eQuality COR, Office of Clinical Standards & Quality, CMS

**Aneel Advani** (by phone)— Indian Health Service

**John Bott** (by phone)— Agency for Healthcare Research and Quality (AHRQ)

**Floyd Eisenberg**—National Quality Forum (NQF)

**Mary George** (by phone)— Centers for Disease Control (CDC)

**Jacob Reider**—Office of the National Coordinator (ONC)

**Martin Rice**—Health Services and Resources Administration (HRSA)

**Marsha Smith** (by phone)—CMS

# Purpose and Objectives

The EHR TEP was charged with discussing and providing information to the eQuality team on how EHR systems collect and report clinical quality measures in an electronic format and how such records can connect patient care outcomes with EHR clinical data.

The TEP focused on four key points of discussion.

1. Connecting patient care outcomes with EHR clinical data
2. The end-to-end quality reporting clinical workflow
3. eQuality work plan to test the scalability of e-specifications
4. Information that would be useful for implementers of eMeasures

# Findings and Recommendations

TEP members reviewed the eQuality project and discussed opportunities and barriers to leveraging EHR clinical data for quality reporting on patient care outcomes, the impact of quality reporting within the end-to-end clinical workflow, plans for e-specification scalability testing, and information needed to support implementers. The eQuality team and the TEP reviewed the current state of quality reporting standards and the plans for creating a cohesive set of interoperability standards that minimize gaps and redundancies.

## Connecting Outcomes with EHR Clinical Data

The TEP's deliberations highlighted four important barriers to improving the quality of clinical care through outcome measures:

1. **Outcome measures depend on risk adjustment models.** Many types of outcome measures require risk adjustment to evaluate providers fairly, but existing risk adjustment models often have poor predictive ability.
2. **Important data are not included in EHRs.** Some types of data required for outcome measures are not currently available in local EHR systems (e.g., patient-reported outcomes). The scope of electronic data sources used for outcome measures should be broadened beyond EHRs. For example, health information exchanges (HIEs) and accountable care organizations (ACOs) will be important components for aggregating patient data from multiple healthcare organizations and data sources.
3. **The Quality Data Model is not widely used.** The National Quality Forum's (NQF) Quality Data Model (QDM) is designed to support outcome measures but has not been widely utilized in this capacity.
4. **Outcomes depend on the performance of multiple providers.** The health outcome of a patient often depends on the practices of multiple providers and institutions. In these cases, no single provider or institution is responsible for the outcome and there may be no clear way to attribute an outcome to the clinical practices of any one provider. Attribution is a necessary piece of the information feedback that spurs practice improvement.

The TEP made recommendations for overcoming barriers to outcome measures:

- The development and implementation of outcome measures should be incremental to allow time for technology and practices to adapt.
- Connecting outcomes with EHR clinical data should begin by prioritizing outcomes of interest according to availability of data in EHRs and other electronic data systems. The prioritized outcome measures should be rated according to importance and other factors that affect ease of implementation.
- Electronic outcome measures (i.e., eMeasures) should be created de novo rather than re-specifying existing paper-based outcome measures. E-specification of outcome measures should begin with those that are easier to implement and gradually transition to those that are more difficult.
- Methods for leveraging EHR clinical data to create feasible and accurate risk adjustment models should be explored through case studies and pilot projects.

## End-to-End Quality Reporting Process

The TEP reviewed the end-to-end quality reporting process, identifying the key issues and points that represent either technical or procedural barriers to implementation. The eQuality team framed the discussion around the high-level process through these workflow components: 1) data capture, 2) data extraction, and 3) quality reporting. The TEP identified challenges associated with each component.

**Data capture**

- The process and workflow by which EHR systems capture quality measurement data vary widely. Defining uniform or prescriptive data capture methods creates a burden on some providers.
- Maintaining data quality and consistency is critical. Conflicting data are often present in a single patient record and there is no systematic way to identify and eliminate these inconsistencies (e.g., a diagnosis in the problem list that is contradicted by the discharge summary).
- Current quality measures may not be designed for capture of data in an electronic environment. The process of respecifying the measure can result in a mismatch between desired data and those available in EHRs.
- Information overload for the clinician at the point-of-contact is a concern.
- Terminology management is essential and requires a significant level of effort and expertise that small organizations often do not possess.

**Data extraction**

- Quality measures require data from sources outside the EHR (e.g., pre-visit inventories, patient portals, and disease registries). These systems may not share a common data model or be easily accessible by the reporting agencies.
- Data integrity is critical. Data transferred between applications and/or sites may not include sufficient information.
- Measure developers, when working independently, can create multiple, incompatible and overlapping value sets. This incoherence leads to confusion and inefficient implementation for providers and EHR vendors.

**Quality reporting**

- Quality reporting processes are implemented for a variety of purposes (e.g., immediate intervention, research, provider evaluation, etc.) which affects how data are captured and analyzed. Similar types of data are not necessarily comparable across reports thus impacting opportunities for reuse.
- Institutions differ in their technical infrastructure, workflow processes and goals. A single process for submission and transmission of quality reporting will not work for all participants.

The TEP made recommendations for including quality reporting in the end-to-end clinical workflow.

**Healthcare providers**

- Develop a strategy for managing data dictionaries and value sets. The strategy must be in place before starting the data capture process.
- Develop and implement strategies for manually extracting and validating data as backup to electronic quality reporting systems.

**EHR vendors**

- Streamline documentation processes to include quality measurement data as part of the clinical workflow (e.g., decision support reminders, pre-populating forms, etc.).
- Use natural language processing (NLP) and machine learning tools for extracting and reporting free text data from clinical documentation to broaden the sources of data available for reporting.
- Design new data capture methods so they do not increase the burden on healthcare providers at the point-of-contact.
- Assume that manual processes for human inference remain needed for backup data extraction and validation.

**Measure developers and standards development organizations**

- Create a data dictionary of all structured data elements (i.e., metadata on quality measure data elements) for the validation of data transmitted electronically to maintain and reuse value sets for quality measures.
- Tie eMeasure calculation to clinical decision support systems to create effective ways to alert clinicians.
- Ensure data provenance is a component of the transmitted quality measure data, especially with patient reported outcomes and multi-institutional data.
- Identify what data need be captured in "real-time" (at the point of care) from patients and clinicians and what data can be collected "off-line" (retrospectively).

**Centers for Medicare and Medicaid Services (CMS)**

- Support development of a data validation toolkit to assist in initial and ongoing data validation activities.
- Develop and make available quality measure implementation guides, including direction on how to address missing data elements.
- Establish rules based on which data should be captured and in what form (rather than prescribing how data should be captured) to allow organizations with different workflow patterns to report quality measures.

## Work Plan to Test E-specification Scalability

The eQuality team reviewed the interim work plan to test scalability of e-specifications. The TEP discussed with the eQuality team the various dimensions of validity testing and expanding quality analysis.

**Syntactic Validation:** The TEP acknowledged that validation is a complicated process with many challenges, such as multiple schema languages, dynamic value sets, etc. Since no single schema

language satisfies all validation needs, the eQuality team will likely continue pairing XML Schema and Schematron. The team will also explore ways to validate dynamic value sets using terminology services.

**Narrative Generation:** The eQuality team described how narrative generation tools transform the computable data contained in Quality Reporting Document Architecture (QRDA) and Health Quality Measure Format (HQMF) files and generate the human readable equivalent. The TEP confirmed that narrative generation tools are useful for satisfying the human readability requirements of QRDA and HQMF, ensuring that the computable and narrative data are in agreement and that the narrative style is consistent across measures.

**Data Extraction:** The eQuality team described plans to develop tools that will extract quality measure data from EHRs and other data stores. One is a tool that can run an eMeasure against an existing data store (e.g., EHR) and extract QRDA Category I instances for patients matching a measure's denominator criteria. Another is a **green**CDA tool for generating QRDAs. The TEP agreed that providing these types of tools will be extremely valuable, especially in post-acute care settings. They recommended that the eQuality team develop tools to help providers with the pre-data capture phase to identify gaps in their local data systems (e.g., simplified list of data elements required for each eMeasure, etc.). The TEP also felt that releasing the tools as open-source may not be sufficient and recommended that CMS promote and socialize the tools within target settings.

**Semantic Validation:** The eQuality team described the scope and purpose of an HQMF processing engine as a tool to drive automated computation of populations within a database. An HQMF processing engine would accept an HQMF file, convert it into a query, run it against a data store, and report the results. TEP members questioned whether other entities were already developing this type of tool. The team clarified that existing tools, such as MITRE's popHealth, require someone to manually create queries. The eQuality team has proposed working with MITRE to develop tools that will automatically process HQMF queries. The TEP confirmed that CMS should support the development of proof-of-concept tools and reference implementations to ensure that the standards are implementable as designed.

**EHR Certification:** The eQuality team reviewed plans for developing a testing framework, test scripts, and test data to assist with EHR certification for quality reporting. The TEP noted that the testing framework needs to accommodate certification of EHR modules. In addition, test scripts and tools should not assume how EHRs operate internally, but should focus on what can be generated.

## Information for Implementers

Throughout the two-day meeting, TEP members suggested information resources that should be developed or enhanced to support implementers.

- Glossary of acronyms and definitions.
- Documentation to help clinicians understand the relevance of the quality measures and how the data are used.
- Implementation guidance for vendors and providers.
- Instructions for validation testing.
- User friendly lists of data elements required for each eMeasure.
- Library of value sets and Clinical Document Architecture (CDA) templates.

- List of terminology tools and resources.
- Guidance for medical and specialty societies to clarify the capabilities and limitations of electronic data sources to guide new measure development initiatives.
- Executive-level summary of the current state and preferred future state of the end-to-end quality reporting process.
- Guidance on what an organization's infrastructure should look like, including the types of skill sets required, for implementation of quality reporting. Guidance should be scalable to accommodate organizations of different sizes and sophistication.
- Repackaged material from various eQuality project reports such as information gained from the end-to-end quality reporting process, outcomes measurement research, and scalability testing.

# ACTION ITEMS

| Task | Description | Assigned To | Due Date |
|---|---|---|---|
| 1 | HL7 QRDA Ballot for Spring 2012 | eQuality Team | 4/6/2012 |
| 2 | HL7 HQMF Ballot for Fall 2012 | eQuality Team | 7/22/2012 |
| 3 | Continue to vet draft project documents with the TEP | eQuality Team | Ongoing |
| 4 | Provide additional feedback to CMS and ONC via the Notice of Proposed Rule Making (NPRM) processes | TEP members | 5/7/2012 by 5:00 pm ET |

# Acronyms and Abbreviations

| | |
|---|---|
| ACO | Accountable Care Organization |
| CDA | Clinical Document Architecture |
| CMS | Centers for Medicare & Medicaid Services |
| COR | Contracting Officer's Representative |
| EHR | Electronic Health Record |
| HIE | Health Information Exchange |
| HL7 | Health Level Seven, Inc. |
| HQMF | Health Quality Measure Format |
| NQF | National Quality Forum |
| NLP | Natural Language Processing |
| ONC | Office of National Coordinator |
| QDM | Quality Data Model |
| QRDA | Quality Reporting Document Architecture |
| TEP | Technical Expert Panel |
| XML | Extensible Markup Language |
| XSLT | Extensible Stylesheet Language Transformation |