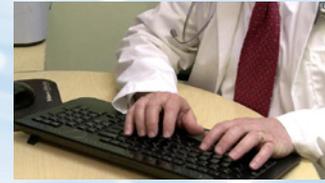


Developing and Testing Quality Measures for Interoperable Electronic Health Records



Traditionally, clinical quality measures have been assessed through either manual review of medical records, which is slow and expensive, or analysis of insurance claims which are limited in their ability to characterize the complexity of patients' health care. Clinical quality measures indicate the extent to which evidence-based recommended care and preventive services are provided to patients. Electronic health records (EHRs) that are interoperable, having the ability to exchange information across clinical settings, offer advantages in the generation of clinical quality measures since they capture and integrate detailed clinical data from multiple sources. With funding through the Agency for Healthcare Research and Quality's (AHRQ's) Enabling Quality Measurement (EQM) Through Health IT initiative, Dr. Rainu Kaushal and her colleagues at Weill Cornell Medical College successfully pursued the identification, prioritization, development, and reliability testing of quality measures using an interoperable EHR in a primary care setting. This project anticipated and addressed some quality measurement objectives in the subsequently issued national "Meaningful Use of EHR program," sponsored by the Centers for Medicare & Medicaid Services (see <http://www.cms.gov/ehrincentiveprograms/>). As health information exchange (HIE) capabilities continue

to become more widely available, other primary care organizations can benefit from this research and be better poised to generate more meaningful clinical quality measures, leading to important improvements in quality.

"We chose to test quality measures that the average ambulatory practice could generate in a reasonable time without further support from EHR vendors."

Michelle Picardo, EHR Program at Institute for Family Health

The researchers conducted a robust review of the literature, identifying and assessing 1000 potential quality measures which were narrowed to a potential set of 60 quality measures. With the assistance of a diverse 36-member expert panel, they applied a four-part conceptual framework to identify 18 prioritized measures of chronic disease management and preventive services from national sources that could be implemented by a primary care practice using an interoperable EHR. These 18 measures can be found in Table 1.



This video highlights Dr. Rainu Kaushal and colleagues' innovative approach to developing and testing quality measures for interoperable electronic health records
<http://healthit.ahrq.gov/EQMKaushalVideo>

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TABLE

1

Top-scoring existing clinical quality measures for electronic reporting of the effect on quality of electronic health records with health information exchange

	Measure Description	Original Measure Set*
1	The percentage of patients 18–56 years of age who were identified as having persistent asthma and who were appropriately prescribed medication during the measurement year. §†	NQF
2	Percentage of patients hospitalized with AMI (acute myocardial infarction) who received persistent beta-blocker treatment (6 months after discharge). †	AQA
3	Patients with ischemic vascular disease who have documentation of use of aspirin or another antithrombotic during the 12-month measurement period. §†	NQF
4	Patients with ischemic vascular disease whose most recent LDL-C had a result of less than 100mg/dL. §†	NQF
5	Percentage of patients with heart failure who also have paroxysmal or chronic atrial fibrillation who were prescribed warfarin therapy. †	DOQIT
6	Percentage of patients 18–75 years of age with diabetes whose most recent HbA1c level during the measurement year is >9.0%. §†	NQF
7	Percentage of patients 18–75 years of age with diabetes who had one or more HbA1c test(s) during the measurement year. §	NQF
8	Percentage of diabetic patients who had at least one HbA1C measured in the reporting period below 7%. §†	TCNY
9	2 part measure: Percentage of patients 18–75 years of age with diabetes whose most recent LDL-C level during the measurement year is <130 mg/dL; Percentage of patients 18–75 years of age with diabetes whose most recent LDL-C level during the measurement year is <100 mg/dL. §†	NQF
10	Percentage of patients having documentation of current medication list in outpatient record. †	NQF
11	Percentage of patients having documentation of allergies and adverse reactions in patient record. †	NQF
12	Percentage of patients 18 years of age and older who had a followup visit within 30 days after being discharged for an inpatient mental health stay (including hospitalizations for depression, schizophrenia, attention deficit disorder, and personality disorders).	NCQA
13	Percentage of patients aged 50 years and older with fracture of the hip, spine, or distal radius who had a central dual-energy X-ray absorptiometry (DXA) measurement ordered or performed or pharmacologic therapy prescribed.	PQRI
14	The percentage of women 21–64 years of age who received one or more Pap tests to screen for cervical cancer. §†	NQF
15	The percentage of women 40–69 years of age who had a mammogram to screen for breast cancer. §†	NQF
16	The percentage of patients 65 years and older who ever received a pneumococcal vaccination. §†	NQF
17	Flu shots for adults (50–64): The percentage of patients 50–64 years who received an influenza vaccination; Flu shots for older adults: The percentage of patients 65 years and older who received an influenza vaccination. §†	NQF
18	Colorectal cancer screening by colonoscopy performed (Age 50–80). §†	TCNY

* NQF = National Quality Forum, AQA = Ambulatory Quality Alliance, DOQIT = Doctor's Office Quality Information Technology, NCQA = National Committee on Quality Assurance, PQRI = Physician Quality Reporting Initiative, TCNY = Take Care New York.

§ Included in testing at IFH.

† Included in stage 1 meaningful use.



The Institute for Family Health (IFH), a Federally Qualified Health Center with extensive EHR experience, partnered with the research team to test if these measures could be accurately generated electronically. They conducted reliability testing, comparing automated quality measures relative to expert review of medical records for 12 of the 18 measures using data from laboratory, radiology, and pathology results that were made available through HIE and data from the EHR. The study team could not test the other six measures because they required access to data from specialty care providers or hospitals that were not routinely exchanged as part of the normal delivery of care at the time of the study. The accuracy of the electronic measurements was high overall, with some variance across measures.

Key Findings

The research team reviewed the literature and met with experts to identify existing clinical quality measures relevant to primary care clinicians and suitable for use with EHR data. To prioritize the hundreds of measures identified, the group developed and applied to each measure a conceptual framework with four dimensions:

1. The availability of needed data in an interoperable primary care EHR
2. The potential impact on medical decisionmaking
3. The clinical importance of the measure
4. The likely feasibility of electronically reporting the measure reliably

Eighteen chronic disease management and preventive care quality measures resulted from this process, 12 of which were programmed at IFH for automated reporting, and 15 of which were included in the stage 1 meaningful use objectives. These are shown on Table 1, adapted from the project final report.

Electronic reporting correctly identified 88 percent of the patients who received recommended care and 89 percent of the patients who did not receive recommended care compared to manual chart review. The researchers excluded the measure of mammography screening as the data in the primary care clinic EHR did not distinguish between mammograms ordered and mammograms completed. EHR-based measures that involved medications (e.g., use of asthma medications or aspirin) tended to have lower accuracy relative to manual chart review than measures that involved laboratory tests. Medications are frequently recorded in a combination of structured and unstructured (free text) forms and in multiple places in the medical record, making it more challenging to extract them for quality

“This study is one of the first to compare quality measurement information that’s automatically produced from an electronic record against the information as a whole that’s contained in the medical record.”

Neil Calman, MD, President and CEO of the Institute for Family Health in New York

measurement. Tests done by specialists (e.g., colorectal cancer screening) tended to have lower accuracy as well. These variations underscore the complexity of electronic quality measure reporting and the need for attention to detail in the programming that underlies the use of EHR data for quality measurement.

Sustainability and Future Directions

IFH has a long history of quality measurement and improvement and continues to electronically report and monitor the clinical quality measures tested in this study and others. The use of electronic health records and HIE are fundamental to its approach to the delivery and continuous improvement of clinical services.



Following the review and prioritization of the existing measures, the research team recognized the importance of developing new measures in five important categories not well-represented among existing measures: (1) test ordering, (2) medication management, (3) referrals, (4) followup after discharge, and (5) revisits. Working with the expert panel, they developed 14 new HIE-enabled measures. Once reliability testing is conducted and HIE capabilities mature, these new clinical quality measures can be generated and monitored over time. These new quality measures include:

- **Fill data:** Of all patient visits, how many have filled medication data available at the point of care?
- **Reason for Referral:** Of all patients referred to a specialist by a primary care physician, how many have the reason for the referral sent to the specialist's office?
- **Post-Discharge Hospital Followup:** Of all hospitalized patients, how many are seen by their primary care physicians within 14 days of discharge?

“This forward-thinking measure set identifies clinically important issues for patients and clinicians which will be measurable, as data integration across health care systems becomes more robust.”

Rainu Kaushal, MD, MPH, Principal Investigator

In early 2009, Congress passed the Health Information Technology for Economic and Clinical Health (HITECH) Act that provided funding and incentives for providers who achieved meaningful use of EHRs (see <http://www.cms.gov/ehrincentiveprograms/> for more details). The law motivates and supports the use of EHRs for quality measurement and data exchange across organizations and the establishment of local and regional HIEs. As EHRs evolve, and the ability of organizations to exchange clinical information improves, there will be both a greater need and improved capacity to implement clinical quality measures that use EHR data from across settings of care to measure the delivery of effective care and the impact on health outcomes.

