Meaningful Use Clinical Quality Measures and Beyond: Meeting the Challenges of eMeasurement

CONTINUING NURSING EDUCATION

Bonnie J. Norris
Deborah J. Hinrichs
Dwight A. Brown

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Objectives

The purpose of this continuing nursing education article is to enable the learner to have an understanding of the processes and challenges related to eMeasurement. After studying the information presented in this article, you will be able to:

1. Describe the role of a clinical informatics specialist in operationalizing eMeasurement plans.
2. Explain key concepts in the gap analysis process.
3. Identify two quality improvement tools that are potentially helpful in measure automation.

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Very few nursing informaticists are unfamiliar with Meaningful Use (MU) and have been untouched in some way by the provisions to use the electronic health record (EHR). In the 2009 American Reinvestment and Recovery Act (ARRA), provisions for using EHRs with the intention to improve patient care in the Health Information Technology for Economic and Clinical Health (HITECH) Act were introduced. This also included financial incentives for demonstrating the use of EHRs to collect objective measures and Clinical Quality Measures (CQMs) electronically, along with the threat of future penalties for not using the EHR for such activities. While most hospitals and outpatient practices have been collecting CQMs for incentives under MU, the Centers for Medicare & Medicaid Services (CMS) announced in their final rule, published in August (CMS, 2014a), clear intent to collect clinical process measures electronically in 2016. Hospitals may choose to voluntarily submit clinical process measures starting with patients discharged in 2015, and CMS strongly suggests that electronic submission of clinical process measures will be mandatory starting with 2016 discharges. In addition, CMS is proposing to collect additional measures electronically in 2016: Hepatitis B Vaccination Coverage Among All Live Newborn Infants Prior to Hospital Discharge, PC-02 Cesarean Section, Adverse Drug Events: Hypoglycemia, and Adverse Drug Events: Hyperglycemia. In parallel on the ambulatory care side, the Physician Quality Reporting System (PQRS) offers the option to report MU Eligible Provider (ambulatory care providers) data for PQRS, thus aligning some of the ambulatory regulatory reporting obligations. Thus the transition from the resource-intensive, manually abstracted measures to eMeasurement begins.

Despite most hospitals and ambulatory settings being in Stage 2 of MU, challenges abound for capturing and reporting data (Chan, Fowles, & Weiner, 2010). Furthermore, MU project teams may be seeking to move MU data, both objective measure and quality measures, from "project mode" to "operational mode," thus creating conversations about where this work ultimately resides. Across countries (Greiver, Barnsley, Glazier, Harvey, & Moineddin, 2012), populations (Jensen, Chan, Weiner, Fowles, & Neale, 2009), and settings (Parsons, McCullough, Wang, & Shih, 2012), researchers have demonstrated that data collection for submission to regulatory agencies such as CMS and The Joint Commission is possible technically, but concern regarding the accuracy of this data is still present (Kern et al., 2013). Rapid measurement changes have impacted workflow and processes for clinicians (Cimino, 2013). Some of the measures that can be submitted electronically have performance thresholds set forth by the Value Based Purchasing Program, and most of these measures are publicly reported on HospitalCompare.gov, an online database allowing patients to compare scores of participating hospitals.

Yet, despite the challenges, electronic performance measurement is here to stay (Conway, Mostashari, & Clancy, 2013). Believed to reduce reporting load over time, eMeasures involve intense work in planning and preparation prior to reporting. If eMeasures are used to calculate reimbursement or incentives (e.g., PC-1 Elective Delivery Prior to 39 Completed Weeks Gestation), are we as clinical informatics specialists ready for this? How can clinical informatics specialists demonstrate excellent patient care provided for patients in various settings across the care continuum with eMeasurement? How can a clinical informatics specialist do this in an efficient manner in the setting of cost containment with static budgets in a scalable timely fashion?

What is an eMeasure?

An eMeasure is an electronic version of a manually abstracted clinically quality

Table 1.
MU Clinical Quality Activities

Stage	Activities	Helpful Quality Tools
Planning	Metric prioritization	Prioritization matrix
	Key stakeholder engagement	Measurement plan
	Obtain baseline measurement	Gantt chart
	Goal setting	Benchmarking/literature review
Analysis	Identify current state documentation sources and quantification	Process mapping
	Identify future state extraction sources	Pareto chart
	Outline discrepancy	Gap analysis
Develop and Implement Solutions	Key stakeholder engagement	Brainstorming
	Develop change management strategy	Process mapping
	Develop communication plan	Communication plan template
	Code and map data	
Data Validation and Submission	Validate data	
	Submit data	
Evaluate and Maintain	Evaluate opportunities for improvement	Pareto chart
	Evaluate return on investment	Scorecard
	Establish maintenance plan	Dashboard

measure. The National Qu ality Forum (NQF) created specifications for electronic measurement from EHR data to replicate manually abstracted measures currently being reported to various regulatory agencies such as CMS. CMS now maintains these electronic measure specifications (CMS, 2014b). Electronic measure specifications – much like their manually abstracted counterparts – contain data elements, but instead of a flow chart process diagram, contain logic. Instead of the manually abstracted ICD-9 and medication lists in appendixes and data dictionaries, eMeasures are linked to standardized value sets provided by the U.S. National Library of Medicine (2014). While the resource-intensive, manually abstracted measures usually follow a sample methodology, eMeasures are thought to be scalable for population reporting.

Method

A clinical informatics specialist will find a methodical approach is needed to refine eMeasurement approaches to prepare data for use in regulatory reporting and public reporting after identifying high priority measures to automate. We developed an approach based on the template provided by Kaiser Permanente (Garrido et al., 2014), but expounded upon (based on our experience with core measure automation locally) local electronic data collection for quality improvement endeavors and MU Clinical Quality Measurement (see Figure 1 and Table 1).

Planning

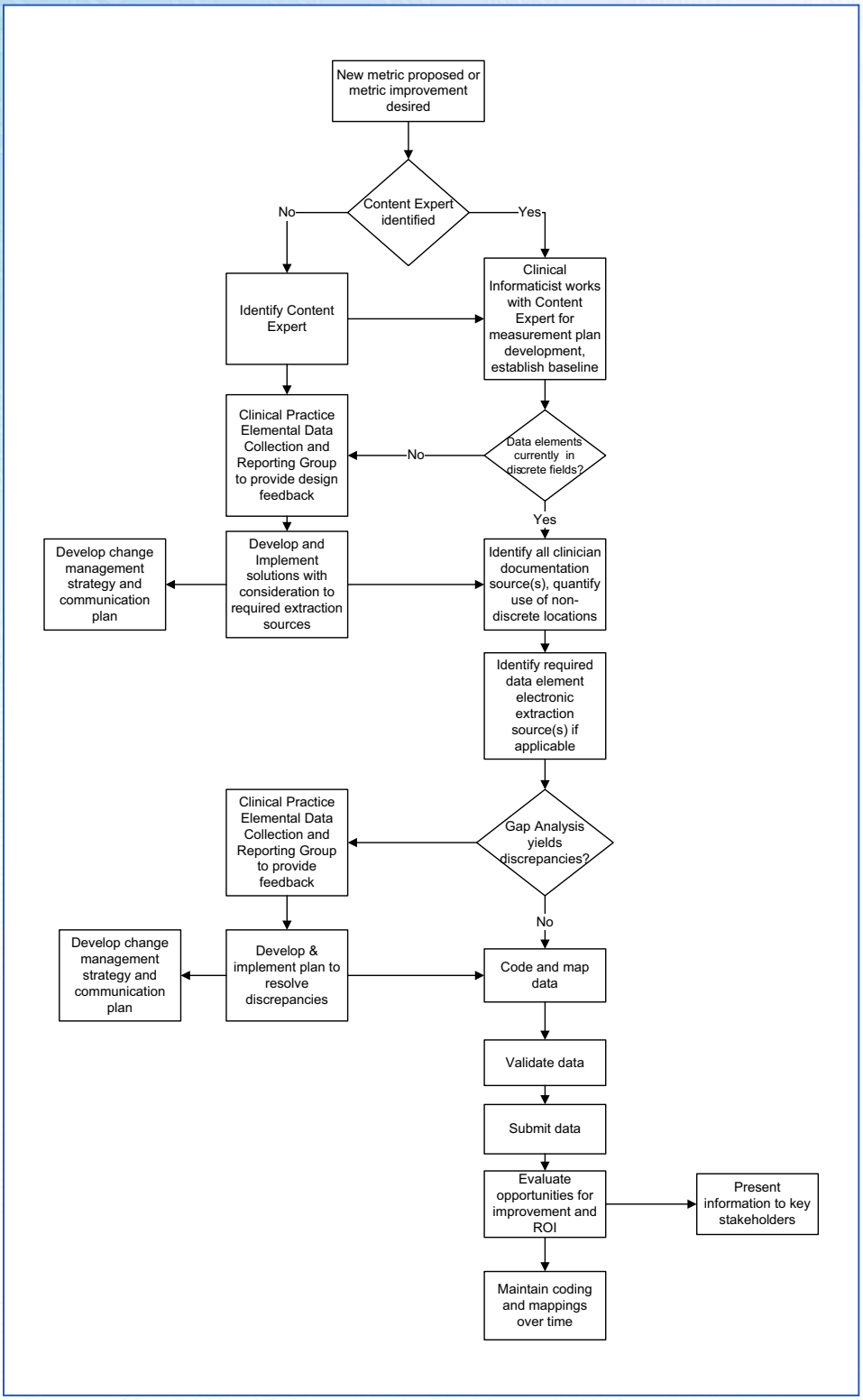
Planning for eMeasurement begins with prioritization, understanding the measurements chosen for eMeasurement, and engaging key stakeholders. A prioritization matrix is a useful quality tool and may be helpful for prioritizing work (North & Varkey, 2010). One of the helpful benefits of using a prioritization matrix is that it provides a structured objective tool for making decisions with quantified data. One of the basic foundations of eMeasurement is understanding the end-to-end data processes as well as the workflow of all clinicians in data capture, certainly within the scope of a clinical informatics specialist. Another step in the planning phase by the informaticist will usually involve identifying a content expert or proponent to support the eMeasurement planning endeavors from the clinician side. Content experts can be very helpful in understanding the measurement objective, numerator (number of patients meeting the measurement goals), denominator (number of patients eligible for the measure), denominator exclusions (patients who should be excluded from the measure), and denominator exceptions (allowable reason why an evidence-based medicine, treatment, or care was not given or performed; keeps patients from being in the denominator if numerator conditions are not met) from a practice perspective (CMS, 2014b). Our practical experience is to involve the clinical content expert, proponents, and key stakeholders as early as possible. An often overlooked component of planning is developing a baseline measurement of current or estimated measure performance and manual abstraction effort to compare with final outcomes to demonstrate informatics value added (e.g., reduce manual abstraction effort, including data validation of electronic measures, by 25%). Goal setting for performance is also helpful (e.g., electronic abstraction accuracy will achieve 80% agreement with manual abstraction across all measures). Additionally, Gantt charts can be helpful for organizing work, to list project tasks and display timelines in a bar chart format.

Analysis

As demonstrated in the literature, technically, it is possible to measure using electronic extraction, but electronic extraction might not support the way in which the data is collected (Burstin, 2013). Gap analysis can be a helpful tool in the assessment or analysis stage. Sometimes referred to as a *needs assessment* in the analysis phase of the system's development lifecycle, a gap analysis is a summary of existing conditions or current state compared with the proposed solution or future state (Waxman & Barter, 2013).

One of the first steps in gap analysis is to identify the current structure of the data needed for capture in eMeasurement. Ideally, data used for eMeasurement will be discrete, which refers to a data element documented in a structured fashion, rendering it able to be queried by a computer for reporting, analytics, and mining (e.g., standardized terminology, templates, checkboxes, radio buttons). However, in reality, most eMeasures require change to documentation from a non-discrete source (e.g., text notes) to obtain data in a discrete fashion. This is

Figure 1.
Generic Measure Automation Process Flow



where the clinical informatics specialist will spend much time analyzing workflow and, in later stages, designing strategies to resolve the discrepancy and implementing these solutions. The first step in gap analysis involves identifying where the data is stored and located for all documentation sources, in addition to quantifying use of non-discrete locations. For example, in some practices, medications may be charted in an emergency department record, the inpatient medication administration record, and a surgical episode record. Another example is that a specialty area might use a flow sheet for documentation, but another specialty area documents the same type of information in a text note. Knowledge of the required extraction sources and current clinical workflow is critical to ensuring that data collection fits into the appropriate place in care rather than simply requiring a clinician to "check a box," adding to documentation burden for data collection purposes (Cimino, 2013). Also, a discrete field provided by the EHR vendor may not be used consistently (Kmetik et al., 2011). Understanding tool use and quantifying this information can provide insight into the discrepancy.

One area that many clinical informatics specialists have found problematic for data capture is the denominator exception (or also negation rationale or negative indicators) in unstructured text data (Bayley et al., 2013). For example, in many electronic health records, a reason why a patient was not given an evidence-based therapy (such as Reason for No Statin upon Discharge for Stroke Measure-6 or Reason for No BMI for NQF 0421) may be documented in a text note rather than a discrete-structured field. Most of these reasons fit into two to three value sets: Medical Reason (e.g., medical contraindication or medically not needed), Patient Reason (e.g., patient refusal), and, in some ambulatory setting cases, System Reason (e.g., vaccine shortage). Historically, these items may not have been captured anywhere but in a clinical text note. Because the data elements are unstructured as text notes, they cannot be used in eMeasures unless there is a change in how this data is captured and stored.

These elements can be important when refining a metric for public reporting. Likewise, capturing exclusions from the patient population (e.g., patients receiving palliative care or comfort measures) and the denominator are challenging in the same respect.

One of the next steps in the gap analysis process is identifying where the

data elements needed for measure calculation will be extracted from based on specifications. Stage 1 MU data extraction was more liberal with extraction source, while 2014 Certified EHR Technology brought about more structure to CQM extraction. When preparing data elements for Stage 2 requirements, many denominator exceptions or exclusions had to be moved to an order source from a discrete field in a clinical note documentation template. These changes added much work for the clinical informatics specialist and were areas where much activity occurred.

Visual display of information using quality tools can be very helpful in communicating needs to key stakeholders and proponents. Pareto charts, a type of bar graph categorizing defects, help prioritize where the best value for effort might be realized (George, Rowlands, Price, & Maxey, 2005). A Pareto chart is easily created in spreadsheet software (tip: use a search engine to explore Pareto charts or charts with a column/line graph for your particular spreadsheet software).

Design and Implementation

After identifying gaps between the current state (how data is currently captured) and future state (where data will be extracted from in eMeasurement), opportunities to collaborate with the clinical practice experts are usually present. If data is not present in an extractable structured field, discussion with clinical practice leaders, content experts, and proponents is necessary. Locally, our organization formed a Clinical Practice Elemental Data Collection and Reporting group with such leaders to help facilitate the removal of barriers, promote discussion about design, and identify downstream impact to other areas. Membership is comprised of nursing informatics specialists, quality informatics specialists, physician leaders, and EHR application representatives. This group functions as a "think-tank," so to speak, and has been very productive in exploring technical, economic, and operational feasibility. A clinical informatics specialist is well-positioned for these discussions with understanding strengths and limitations of certain solutions within the medical record, clinical workflow, and system dependencies (e.g., order sets, structured documentation templates, education, messaging). Again, process mapping can be helpful as solutions are being developed.

After key stakeholders and the clinical informatics specialist agree and implement solutions (including, but not limited to, interactive alerts promoting documentation or adding discrete fields), the work shifts from the clinical informatics specialist being in a consultant role to information technology staff. The information technology staff will then program local solutions and map internal data concepts like orders, tests, labs, and problems used in measure calculation behind the scenes in database tables to external values in value sets such as SNOMED, LOINC, or RXNorm. As in manual abstraction, utilizing appendices containing lists of diagnosis codes, medications, or treatments, an eMeasure will utilize a value set catalogued by the U.S. National Library of Medicine (2014). Often, this is an ideal time for the clinical informatics specialist to consider the communication plan with the key stakeholders. Finally, information technology staff will extract the data elements used in the measure calculation, run the calculations, and provide data for validation.

Data Validation and Submission

The purpose of data validation for eMeasures is to ensure data correctness and troubleshoot problems to improve the usability of data queried. Data validation involves checking the data for accuracy and validating the data with a set of rules, if applicable. Data validation is a crucial step in the iterative process of preparing data for use for clinicians and anticipated external reporting. Usually, if clinicians are unhappy with the performance results, data reliability is the first item questioned. Improving the completeness and accuracy will take place through several cycles. Initially, data validation may consist of ensuring that data elements are appearing as expected in early reports, but later will transition to a more comparative analysis, evaluating both electronic data and manually abstracted data. Data submission will be according to specification set forth by the regulatory agency.

Evaluation and Maintenance

Population measurement has great potential to support and inform practice. During analysis of such vast data, opportunities for improvement may be discovered. In quality circles, an opportunity for improvement (also known as a defect or failure) is a case where a patient does not meet the numerator specifications. Investigating the patient record to see why the patient was not in the numerator, establish trends with practices, processes, or technology can be helpful to the practice. Again, knowledge of clinical processes and data element extraction sources are very helpful to guide clinicians to improve their processes. Visual displays of defects through Pareto charts are again very helpful. Visual display of performance using a scorecard or a dashboard tool is another way to promote knowledge and wisdom from data in clinical practice.

Another aspect of evaluation is demonstrating the value that clinical informatics and eMeasurement provide, tracking effort spent in streamlining measurement against an estimate of effort anticipated with manual abstraction. Although eMeasurement may be mandated by regulatory agencies, health care organizations might realize gains to abstraction efficiency. To provide a simple example, estimated manual abstraction time for a straightforward local measure with all fields captured discretely is estimated at 10 minutes per case. One hundred cases are manually abstracted a month, equaling 16.67 abstraction hours a month. The data request is four months in duration. The programming time equals 6 hours initially plus 30 minutes a month (8 hours total for the entire project) for electronic extraction. Over the course of the four-month project, overall effort was reduced by more than half (not including abstraction training time) had the measure been manually abstracted.

As the medical record is a dynamic, non-static environment, changes to the medical record occur on an ongoing basis. Another challenge is maintaining the mappings of internal concepts to external value sets and coding to specifications over time. Not only will eMeasure specifications and value sets change yearly, the medical record will change over time. Often the first indication that a field has been changed in the medical record is that a data element no longer returns data from electronic extraction, despite best intentions and change management notifications. Anticipating those changes and planning for resources to support those changes is an important step, but often overlooked when planning for eMeasurement.

Conclusion

When considering eMeasurement, the most important consideration isn't technology. Key to the entire eMeasurement process is understanding the clinician workflow and underlying structure or condition of the data. Gaps are present between the technology and the process. Informatics can help bridge that gap. Skills needed include understanding of data collection, storage,

and extraction, in addition to an appreciation for the power of data to drive and inform practice. Understanding of process and workflow to fit solutions is imperative. Useful quality tools include process mapping, gap analysis, Pareto charts, Gantt charts, and communication plans. Furthermore, return on investment, accuracy, and workflow considerations are all areas where further eMeasure research and literature across EHRs would be welcomed. Informatics professionals are perfectly positioned to help in clinical quality measures, nursing-sensitive measures, objective measures, or other measurement needs your organization may have.

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Bonnie J. Norris, RN-BC, MS, CDE, *is an Enterprise Quality Informatics Specialist, Mayo Clinic, Rochester, MN.*

Deborah J. Hinrichs, BSN, RN, *is an RN Quality Specialist, Mayo Clinic, Rochester, MN.*

Dwight A. Brown, MIM, CPHIMS, *is Manager, Enterprise Quality Analytics, Mayo Clinic, Rochester, MN.*

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