A Study Of The Impact Of Meaningful Use Clinical Quality Measures

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The findings of this report reflect the views of the site visit participants and not necessarily the views of the authors or their respective organizations.

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Executive Summary

In adopting electronic health records (EHRs) to improve clinical care and patient health outcomes, American hospitals have invested tremendous financial and human resources. Hospitals have undertaken this task in the belief that the technology would support the development of automated clinical quality reporting and assist their local quality improvement initiatives. Based on the experience of the four hospitals in this case study, the current approach to automated quality reporting does not yet deliver on the promise of feasibility, validity and reliability of measures or the reduction in reporting burden placed on hospitals.

Measuring the ability to provide high-quality health care provides hospitals with a baseline from which they can improve their performance. However, the accelerating volume of hospital quality measures, and the linkage of quality measurement to payment, underscores the need for quality measure reporting solutions that balance the value of quality measurement and reporting and the burden associated with multiple reporting requirements. HITECH authorized the creation of the Medicare EHR Incentive Program to advance the use of automation in health care, including the use of EHRs to report quality measures. EHR-based automated quality measure reporting has the potential, if implemented correctly, to ease the burden of quality reporting, while increasing access to real-time information to support quality improvement in patient care. To do so, the quality measure results generated from EHR data must be based upon information that is feasible to collect in an automated fashion, generate valid and reliable results, and thereby demonstrate a benefit that outweighs the costs.

The American Hospital Association (AHA) commissioned iParsimony to conduct a study to investigate hospital experiences with implementation of the Medicare Electronic Health Record (EHR) Incentive Program's Meaningful Use (MU) Stage 1 electronic clinical quality measures (eCQMs). This study describes the experience with and impact of eCQM implementation in four hospitals – large and small, urban and non-metropolitan - each of which has significant experience with EHRs and uses a different EHR from a different vendor company.

The findings described in these case studies are based on interviews conducted with key leaders and operational staff directly involved in the oversight and management of eCQMs. The MU Stage 1 program for Eligible Hospitals and Critical Access Hospitals (CAHs) included 15 eCQMs that reflect care for patients with stroke or venous thromboembolism (VTE) or blood clots, as well as those visiting the emergency department (ED). Across the 15 measures, more than 180 individual data elements are needed.

CASE STUDY SITES

Each of the organizations visited was well situated for success in eCQM adoption. Each showed a strong commitment to health information technology (IT) as a means to enhance its ability to provide safe, effective, efficient, timely, patient-centered and equitable care. Each was externally recognized by national programs for its level of EHR adoption, with significant efforts preceding the MU program by five to 10 years. All exhibited a culture of clinician empowerment with strong leadership for using health IT to enable quality improvement. There was a common initial belief among the organizations that their significant EHR efforts should lead to a relatively straightforward process to implement the eCQMs.

FINDINGS

The case study hospitals and health systems were committed to the implementation of eCQMs as part of their overall quality improvement goals. They expected to use eCQMs and MU implementation as key tools to achieve their broader quality goals. Specifically, they expected to:

1. Generate quality data from the EHR. Each hospital sought to use certified vendor software to capture required data elements for reporting quality metrics as part of an organization-wide commitment to high-level use of EHRs.

2. Use all of their quality data, whether generated through their eCQM tools or other mechanisms, to improve care by sharing the data with physicians and other clinicians, and empowering them to continuously improve the efficiency and effectiveness of care.

3. Use the EHR for clinical decision support related to eCQMs. Each hospital planned to incorporate clinical decision support to encourage clinicians to deliver care consistent with guidelines (as captured in the measures).

Through the implementation process each hospital and health system encountered significant challenges to meeting those goals and had to create many adaptive workarounds. These challenges are outlined below.

Program Design Challenges: The eCQM specifications were difficult to access, complex, contained inaccuracies and were not maintained over time, creating confusion and additional work:

- Unclear specifications and lack of policy infrastructure caused multiple iterative updates of vendor eCQM reporting tools (specialized software or vendor supplied queries that are certified for the MU program to capture information and report the eCQM results).
- Iterative changes in regulatory guidance led to extensive re-work to update tools.
- The program required use of new and unfamiliar vocabularies to define required data.

Technology Challenges: The eCQM tools from vendors did not work as expected, and could not efficiently generate accurate measure results:

- Hospitals experienced significant difficulty implementing eCQM tools in their EHRs.
- The EHR could not draw relevant data from other systems.

Clinical Challenges: The eCQM implementation process negatively affected clinicians, adding to their workload with no perceived benefit to patient care as it duplicated information already entered in narrative text. The process also failed to generate usable data to support improvement efforts:

- eCQM reporting tools were poorly aligned with clinical workflow, necessitating the redesign of the patient care systems or the re-tooling of the reporting tools.
- Validation efforts were extensive, but not successful.
- Clinical staff did not trust the data.
- Rigid regulatory requirements caused the eCQMs to be out-of-date and out of step with advances in care; updates were available late in the process but were difficult to find and optional for vendors to incorporate.

Strategic Challenges: Hospitals expended excessive effort on the eCQMs that negatively affected other strategic priorities:

- Hospitals saw little to no return on investment.
- Extensive efforts delayed other planned projects.

POLICY IMPLICATIONS AND RECOMMENDATIONS

Specific policy changes are needed to address the challenges hospitals face as they move to electronic quality reporting:

1. Slow the pace of the transition to electronic quality reporting with fewer but better-tested measures, starting with Stage 2. The additional time would allow:
   - Policymakers to create a reliable policy process for eCQM implementation, a mechanism to provide eCQM updates, and a robust EHR testing/certification program;
   - Vendors to develop tools that support logical workflows, produce accurate measures and leverage all data already in the EHR; and
   - Hospitals to implement the tools in a way that supports their quality goals without excessive burden or risk to patients.
2. Make EHRs and eCQM reporting tools more flexible so that data capture can be aligned with workflow and interoperable so that data

can be shared across hospital department systems.

3. Improve health IT standards for EHRs and eCQM reporting tools to address usability and data management to achieve MU program expectations.

4. Carefully test eCQMs for reliability and validity before adopting them in national programs. Implement eCQMs within hospitals as part of testing to ensure information flow is accurate and there is no adverse impact on quality and patient safety.

5. Provide clear guidance and tested tools to support successful hospital transition to increased electronic quality reporting requirements. For example, develop and disseminate an accurate, complete and validated crosswalk from SNOMED-CT®, a vocabulary required by the 2014 eCQMs and MU Stage 2, to ICD-10-CM for conditions and ICD-10-PCS for procedures.

Background on MU eCQM Measures and Program

In the last 10 years, there has been an unprecedented expansion in the number and type of quality measures on which hospitals are required to report for federal programs. The Centers for Medicare & Medicaid Services' (CMS) Hospital Inpatient Quality Reporting (IQR) and Value-Based Purchasing (VBP) programs are two of the drivers of this development. The Hospital IQR program was created by the *Medicare Prescription Drug, Improvement, and Modernization Act of 2003* (MMA). *The Deficit Reduction Act of 2005* (DRA) expanded quality reporting requirements for hospitals and provided the Department of Health and Human Services (HHS) with the discretion to add and replace quality measures. In the hospital VBP program, included in the *Affordable Care Act of 2010* (ACA), CMS expanded the use of the IQR quality measures by making value-based incentive payments to acute care hospitals, based either on how well the hospitals perform on certain quality measures or how much the hospitals' performance results improve over time. The hospital VBP program is applicable to payments for discharges beginning October 1, 2012.[1] Measure requirements for VBP include: defining the end goal rather than processes, aligning provider incentives, enabling rapid-cycle measure development with attention to patient-centered measures, and support for quality improvement.[2] In 2013, the number of measures required for the IQR Program increased to 54 (from 10 in 2004), and non-reporting hospitals will have their Medicare inpatient payments reduced by 2 percent.[3]

Currently, hospitals report nearly 90 measures across all hospital quality reporting programs, including hospital inpatient and outpatient reporting. The measures are generally based on chart-abstracted data, supported by varying levels of automation. Some data required for measure reporting are straightforward, such as patient age, while others are challenging to collect, such as structured documentation that specific actions were taken (e.g., documenting that compression stockings were placed on the patient).

Many have considered EHRs as a rich source of information to improve the care patients receive, and also to measure the quality of the care provided. EHRs have been shown to enhance the efficiency of care and reduce errors by improving access to information such as laboratory results and medications administered, and by enhancing patient safety related to medication orders.[4] Computerized provider order-entry (CPOE) also has reduced prescribing errors, and using clinical decision support (CDS) has been shown to contribute to a decrease in adverse drug events of 41 percent.[5]

EHR-based automated quality measure reporting has the potential, if implemented correctly, to ease the burden of quality reporting, while increasing access to real-time information to support quality improvement. To do so, the quality measure results generated from EHR data must be based upon information that is feasible to collect in an automated fashion, generate valid and reliable results, and thereby demonstrate a benefit that outweighs the costs. The Medicare and Medicaid EHR Incentive Programs, created in the *Health Information Technology for Economic and Clinical Health Act of 2009* (HITECH), authorized HHS to provide financial incentives to hospitals and eligible professionals for the "meaningful use" (MU) of certified EHR technology to improve patient care.[6] The successful demonstration of meaningful use includes using a certified EHR to meet specified thresholds for a number of objectives and attesting

that the certified EHR is capable of electronically generating and reporting clinical quality measures (CQMs).

The 15 CQMs selected for hospital reporting in the MU program Stage 1 are a subset of CQMs included in the hospital IQR program that reflect care for patients with seven stroke, six venous thromboembolism (VTE, or blood clots), and two measures on emergency department (ED) throughput. This reporting is in addition to other Medicare quality reporting requirements. The MU CQMs did not replace the original chart-abstracted CQMs from which they were re-tooled. The CQMs chosen for the MU Stage 1 program were originally designed for collection by staff trained to review patient records and identify the data needed to generate the measure reports. The process is generally called chart abstraction, and measures designed for such a process are called chart-abstracted measures. The CQMs in meaningful use were modified to extract data directly from EHRs rather than require chart abstraction. Measures modified in this way, called *re-tooled* measures or eMeasures, were subsequently renamed eCQMs to indicate the electronic nature of data collection.

The measures were re-tooled using the first, untested draft version of the *Health Quality Measure Format* (HQMF) standard developed by the standards organization Health Level Seven (HL7) in 2009. In addition, to provide consistency, the re-tooling process used a common set of definitions, or terms, called the Quality Data Model (QDM), developed by the National Quality Forum (NQF)[7] to help describe the data needed for the measures. The vocabularies for the measures were defined by the organization that performed the retooling, the Health Information Technology Standards Panel (HITSP). Vocabularies for all new eCQMs (including those in MU Stage 2) are nearly the same as designated by the Health IT Standards Committee and are listed in the data element catalogue of the National Library of Medicine (NLM).[8] [Refer to the Appendix for detailed explanation of the purpose and background of the QDM and vocabulary usage.]

Across the 15 measures, more than 180 data elements are required. However, the eCQMs were not robustly tested to determine if all of the data needed were available in existing EHRs. Access to the eCQM specifications and associated vocabulary codes was difficult. A clear method to obtain clarification and provide feedback to CMS was slow to develop and advice for implementation was not readily available.

The rapid meaningful use policy development and EHR and eCQM certification process included a number of factors that likely have affected the accuracy of the eCQM measure results. For example, the eCQMs provided by CMS contained known errors and were never implemented within EHRs to test the feasibility of data collection or validation of results. Further, the EHR and eCQM reporting tool certification process was limited to whether the product could calculate the measures. It did not address whether the expected data were actually present in EHRs or that the calculation was accurate. Moreover, the EHR certification process does not ensure EHR vendors accommodate clinical workflow processes in eCQM data capture.

Methodology

The project team consisted of six experts in quality measurement and health IT with experience in CQM measure development and/or implementation of measures.

Site selection

The four hospitals selected for site visits met the following criteria:

- already attested to meaningful use;[9]
- accredited by The Joint Commission; and
- not classified as critical access hospitals.

Additional variables used to select sites and ensure diversity among sites included:

- representation of a distinct EHR vendor at each site;
- affiliation (inclusion in a health system vs. stand-alone facility);
- geographic location; and
- bed size and setting (urban vs. rural).

Some contingency factors that contributed to the final roster included willingness of the organization to participate in the study, as well as availability

of key staff for on-site interviews. The study team selected sites in collaboration with the American Hospital Association (AHA).

Data collection

Once the sites were identified and hospital leadership agreed to participate, the study team coordinated three main phases of data collection with each organization, including: 1) a pre-site visit demographic survey; 2) a site visit with interviews of key personnel involved with the MU program and the implementation of eCQMs; and 3) a post-site visit data validation teleconference.

Consistent with qualitative data collection methods, the study team created interview guides for each of the primary study participant groups to be interviewed (facility leadership, informatics, quality, technology, finance and operational staff). Interviews were conducted in both individual sessions and groups (two to three staff members from like departments) over a period of one to two days. Study team members had pre-defined roles (facilitator, note taker, etc.) to ensure consistency in the data collection process. For the facilities that belonged to a larger system, both hospital staff and system-level informants were interviewed.

Upon completion of each site visit, the study team validated and documented all descriptive data for the site and performed a content analysis on the interview notes. Post-visit conference calls were held with leaders interviewed in each organization in order to validate data and findings in each respective case study. A case study for each site visit was completed and informed the contents of this final report. The findings in this report draw on the experience of these four hospitals, and while their experience is most likely shared by other hospitals, this sample is not representative of the field as a whole.

Site demographics

Meaningful use attestation: Three out of the four sites completed MU attestation in 2012 alone, while the remaining site attested in both 2011 and 2012.

Affiliation: Two stand-alone hospitals and two health-system affiliated sites.

Geographic location: North East, South Central, Midwest, South Atlantic.

Bed size: Two of the facilities in the 100-199 bed size range, and two in the 300-399 bed size range.

Setting: Urban and non-metropolitan.

Financial classification: All of the sites are not- for- profit.

EHR: Each organization used a different EHR vendor.

Description of the Sites

The four hospitals have strong, but varied experience with EHR implementation. In addition, they all have strong leadership and organizational cultures tightly coupled with the MU program vision of supporting and improving patient care and safety with health IT. These qualities positioned each of the four organizations for success in eCQM reporting.

Commitment to health IT as infrastructure to enable change

Each hospital had a history of robust EHR use with a vision to support quality, safety and efficiency that predated the MU program. In fact, all organizations had started their journey towards EHR adoption more than five to 10 years before the MU program began. The high level of EHR maturity in each site visit hospital was nationally recognized.

Activities supported by the respective EHRs included:

1. CPOE – (all four hospitals) – entry of medication and other orders for patients by a physician directly into a the EHR using a computer or mobile device;

2. Nursing documentation – (all four hospitals) – entry of patient assessments and findings by nurses directly into the EHR; and

3. Bar-coded medication administration documentation – (three of the four hospitals) – using a bar-code reader to scan bar codes on the medication, the nurse's badge and the patient's identification bracelet to automatically record in the EHR which medication was administered, at what time, by whom and to whom.

Physician documentation, the ability of physicians to enter structured and narrative notes directly into the EHR, was available from the product vendor in most cases, but was considered one of the more challenging EHR components to implement. For all but one hospital, it remains in the planning stage at the time of this report.

Additional value to eCQM implementation was derived from a hospital and/or enterprise-wide data warehouse to store data from multiple sources within the organizational health IT ecosystem, including the EHR, departmental systems (e.g., pharmacy, laboratory, emergency department, operating room and anesthesia applications), as well as administrative and financial systems. While organizations were still in the early stages of planning or deploying data warehouses, all had the vision of leveraging such technology as a business intelligence tool to support operations, including clinical decision support and quality improvement.

A culture of empowerment and continuous improvement

Each hospital has a culture of encouraging physician and nurse participation in its quality improvement programs. Three organizations provide physicians and nurses direct access to performance results; the fourth is still developing the feedback mechanism. Presenting information with sufficient detail allows physicians to know what changes they can make in their practices to improve overall performance. Three of the hospitals provided dashboard reports for physicians and nurses to understand how their performance compared to peers with respect to quality measures in required external reporting programs, in addition to whether it met internal organizational objectives.

Improving staff performance was a focus at each hospital. However, each site takes a different approach to include and empower staff (physicians, nurses and other staff) to improve quality. Three of the organizations provide quality report information to physicians to help them perform better and to help fellow staff enhance performance. Leadership at one of the organizations referred to the feedback process as "activation" by providing sufficient detail for the staff to actively improve care for the individual patient thus encouraging organizational change.

Most of the organizations empowered staff by encouraging them to participate directly in projects that improve patient care and outcomes. One organization pairs clinical staff with IT department counterparts, enabling them to resolve issues related to clinical workflow, an important factor in the data capture process needed for eCQM reporting. Another example of organizational support to address clinical workflow is the use of agile LEAN approaches, such as Kaizen events[1], to generate change. In one such effort, nurses evaluated how they manage patient care plans and whether clinical patient care goals are met. The Kaizen evaluated the use of the EHR based on 18 months of previous work and led to a decision to return to a manual paper process to successfully handle patient care plans. Senior leadership accepted the proposal. There is now effort to determine how the EHR can support the successful manual process rather than change the workflow to fit the EHR's structure.

Strong leadership driving health IT-enabled quality improvement

All organizations demonstrated a vision for the EHR as an essential tool to provide real-time information access for clinical decision-making and to improve patient safety and clinical outcomes. This commitment was present at the board and senior administrative leadership level including the Chief Executive Officer (CEO), the Chief Operating Officer (COO) and the Chief Financial Officer (CFO).

The support continues through the eCQM implementation process including realigning staff and projects, and rapidly removing roadblocks to assure success in reporting and managing patient care processes and outcomes. One or two champions emerged at each site as the focal points for success in EHR use, generally the Chief Medical Information Officer (CMIO) or the Chief Medical Officer (CMO), although organizational structure, titles and responsibilities varied.

1. *Kaizen* is Japanese for "good change." It is used in LEAN business process engineering to describe a three to five day exercise to evaluate an existing process, identify wasteful or duplicate steps and develop a new, streamlined process that can begin at the end of the exercise.

In addition, each organization has a strong quality department and IT staff leadership. The departments are tightly coupled. At each organization, quality department nurses work directly in the IT area to explain to the IT staff what information is required for measurement and for routine clinical care activities. The IT staff translates how the EHR and its components can manage clinical details required by the eCQMs. One of the hospitals has formalized a position of Nursing Informatics Officer. In another hospital, quality staff report directly to the CMIO. The quality staff is generally the group that coordinates discussions between the clinical staff and the IT staff. In three of the organizations, the quality staff performs concurrent review, a process by which quality department staff works directly with primary care nurses during each patient's stay to support appropriate documentation for quality reporting, including but not limited to eCQM reporting. One hospital initiated the concurrent review process to establish new, positive working relationships between the quality department staff and the clinicians providing direct care. None of the organizations considered the staff-intensive concurrent review process to be sustainable, however, as government programs require more and increasingly complex measures.

Common eCQM Implementation Process Used Across Sites

As previously noted, all organizations adopted EHRs prior to the MU program, and each used a different, nationally known EHR vendor.

While the organizations approached eCQM implementation differently, the eCQM implementation required iterations of various steps, as depicted in Figure 1 below.

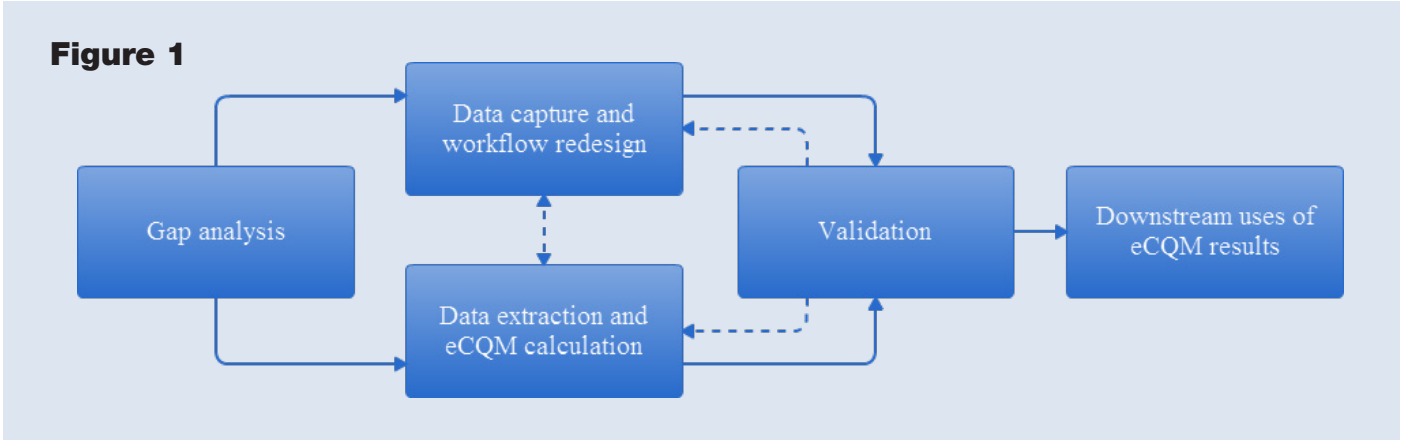
A gap analysis compared measure requirements against data captured in the EHR as part of clinical documentation (their workflow). While the next step included the extraction of the data from the EHR to calculate the measure, the eCQM reporting tools did not necessarily look for the data based on the clinical workflows the organizations designed. In the following step, the hospitals worked to validate the measures reported. The eCQM workflow process was not linear, but was an iterative process in which data capture and clinical workflow redesign, data extraction, and eCQM reporting were repeated frequently and influenced by the validation process.

A detailed explanation of how organizations approached the individual steps of the eCQM implementation process is provided below.

Gap analysis

All organizations conducted a gap analysis, comparing measure requirements against data captured in the EHR as part of the clinical workflow (the routine patterns of actions, including documentation clinicians use during patient care). The original expectation was that EHRs would collect data through the routine care process and that the eCQM reporting tool would accurately extract and report measurements from the existing data, thereby reducing provider burden. The gap

Figure 1. High level steps in the eCQM implementation process, illustrating an iterative process where data capture and workflow redesign, data extraction and eCQM reporting are interdependent steps, and are influenced by the validation results.



analysis was based on the data requirements set forth by the certified eCQM reporting tool; however, at least one organization conducted the analysis against the requirements for the chart-abstracted version of the measures. Regardless of the approach, this step enabled the organizations to identify gaps in discrete documentation, specifically the gap between the structured encoded data required by the measure and the data documented as narrative text.

Data capture and workflow redesign

The data capture and workflow redesign step was perceived as the most involved and onerous step in the expected eCQM implementation workflow process across all sites, regardless of EHR vendor. In order to accommodate the findings of the gap analysis, including measure requirements for documentation of specific clinical information in a discrete format, the organizations identified the need to modify their EHRs to support data capture of information required by the measure. The modification often included the addition of structured fields in the EHR (such as checkboxes and pre-defined lists of values). This represented an additional effort on the part of the sites, in addition to updates to the EHR infrastructure.

"It's not good enough that you [the clinician] document it; we need you to document some place where we can capture it for reporting."

-eCQM implementation team member on the constraints in data extraction for eCQM calculation and impact on clinical workflow

The previous clinical workflow included both narrative (free-text) documentation and structured entry of data. The additional fields were added to new or existing forms in the EHR to assure all measure data was entered in a structured form. The new or modified forms were disruptive to clinicians' workflow and increased time spent on documentation, rather than patient care. Moreover, the automatic extraction of the data for the eCQMs required defining a specific location where the data would be automatically recognized by the EHR, in order to be used for eCQM calculation. The organizations addressed placement of these structured fields differently. Some created specific forms in the EHR to capture the required data. Others embedded such fields throughout existing EHR documents, conducting extensive analytical work to minimize disruption to the workflow, while allowing documentation in the required encoded format. In one hospital, the EHR-designed workflow staff documented discharge medication for stroke as part of the discharge instruction form. The hospital had designed an efficient workflow where documentation was part of medication reconciliation at discharge, but the eCQM reporting tool was not programmed to find the information in that location. The solution required redesigning the programming; otherwise, the physicians would have had to document the medication twice.

Due to the inflexibility of the certified eCQM reporting tools, each hospital identified a need for workflow modifications to capture required data in specific locations. In addition, the organizations that conducted a gap analysis and modified their EHR data capture prior to receiving their eCQM reporting tools had to revise their prior workflow modifications yet again so that the data in the EHR specific forms would align with the certified software.

One organization used the version of the measures designed for manual chart abstraction and used for reporting under the hospital IQR program (CQMs rather than the eCQMs) to evaluate clinical workflow and incorporated those versions of the measures into their EHR. As an advanced EHR user, this site generally worked to gather as much data as possible. Citing the difficulty finding the eCQM specifications from the CMS website as the reason for this approach, this organization changed workflow processes to accommodate their electronic interpretation of e-specifications of the measures.

Data extraction and eCQM calculation

The hospitals and health system sites studied expected to rely on the eCQM reporting tools to perform the eCQM calculation. Organizations with integrated EHRs (those that include departmental systems in the same database used to store the data captured during clinical care in the EHR) had fewer challenges than organizations with unique departmental systems, regardless of whether these systems were from the same or different vendors. Organizations with unique departmental systems reported absent or limited interoperability among the multiple systems, some of which contain

information needed for eCQMs. Hence, duplicative workarounds using manual data entry for data already present in departmental systems have been implemented.

One organization invested significant time and resources perfecting the data crosswalks to maximize the data the eCQM reporting tool could find automatically and to limit duplicative documentation by physicians and nurses. Yet, even minor changes the hospital may have made to address local clinical workflow and preferences for routine care delivery in the EHR product as delivered by the vendor limited the ability of the eCQM reporting tool to find needed data.

Validation

The organizations expended significant effort to validate eCQM results derived from their respective eCQM reporting tools, but were ultimately unsuccessful. Validation included technical validation and clinical validation:

- Technical validation included: 1) verifying that all data required by the eCQM reporting tool *could* be captured in a discrete format in the EHR; and 2) verifying that the specific locations of the data were visible by the eCQM reporting tool for automated data extraction.

- Clinical validation included: 1) verifying the extent to which clinicians entered the discrete data used by eCQM reporting tool to accurately represent clinical care; and 2) verifying the validity of the eCQM calculation based on the captured data.

Organizations reported that the technical validation was an involved and iterative process. While working with its vendor during the development of the eCQM reporting tool, one organization struggled to achieve technical validation of its eCQM results and did not achieve clinical validation. Two hospitals were able to validate their technical ability to capture the necessary data; however, the use of these data fields was inconsistent and they did not achieve clinical validation. One hospital achieved technical validation and did not directly compare the results of the eCQMs and the corresponding chart-abstracted measures from which the eCQMs were derived.

As an ongoing step in the eCQM validation process, three organizations developed a staff-intensive and unsustainable concurrent review process to encourage documentation directly by nurses or order-entry by physicians. Assigned staff was charged with continuously reviewing EHR documentation to identify missing data in the EHR that could impact eCQM results, making the completeness and accuracy of the data used for eCQM calculation dependent on staff review and manual data input. As a result of the concurrent review process, these organizations became more comfortable that the data the eCQMs required were present in the required EHR fields, but it required more ongoing staff work than expected. One hospital found that the concurrent review process promoted better working relationships between the quality department staff and the clinicians providing direct care to patients.

Findings

Site visit experience

The hospitals and health systems were committed to the implementation of eCQMs as part of their overall quality improvement goals. They expected to use their eCQMs and their meaningful use implementation as key tools to achieve their broader quality goals. Specifically, they expected to:

1. Generate quality data from the EHR. Each hospital sought to use certified vendor software to capture required data elements for reporting quality metrics as part of an organization-wide commitment to high-level use of EHRs.

2. Use all of their quality data, whether generated through their eCQM tools or other mechanisms, to improve care by sharing the data with physicians and other clinicians, and empowering them to continuously improve the efficiency and effectiveness of care.

3. Use the EHR for clinical decision support related to eCQMs. Each hospital planned to incorporate clinical decision support to encourage clinicians to deliver care consistent with guidelines (as captured in the measures).

Despite extensive EHR implementation experience, each organization quickly learned that the eCQM implementation would be more challenging than anticipated. The actual eCQM implementation required multiple iterations of workflow redesign, data capture, eCQM calculation and validation.

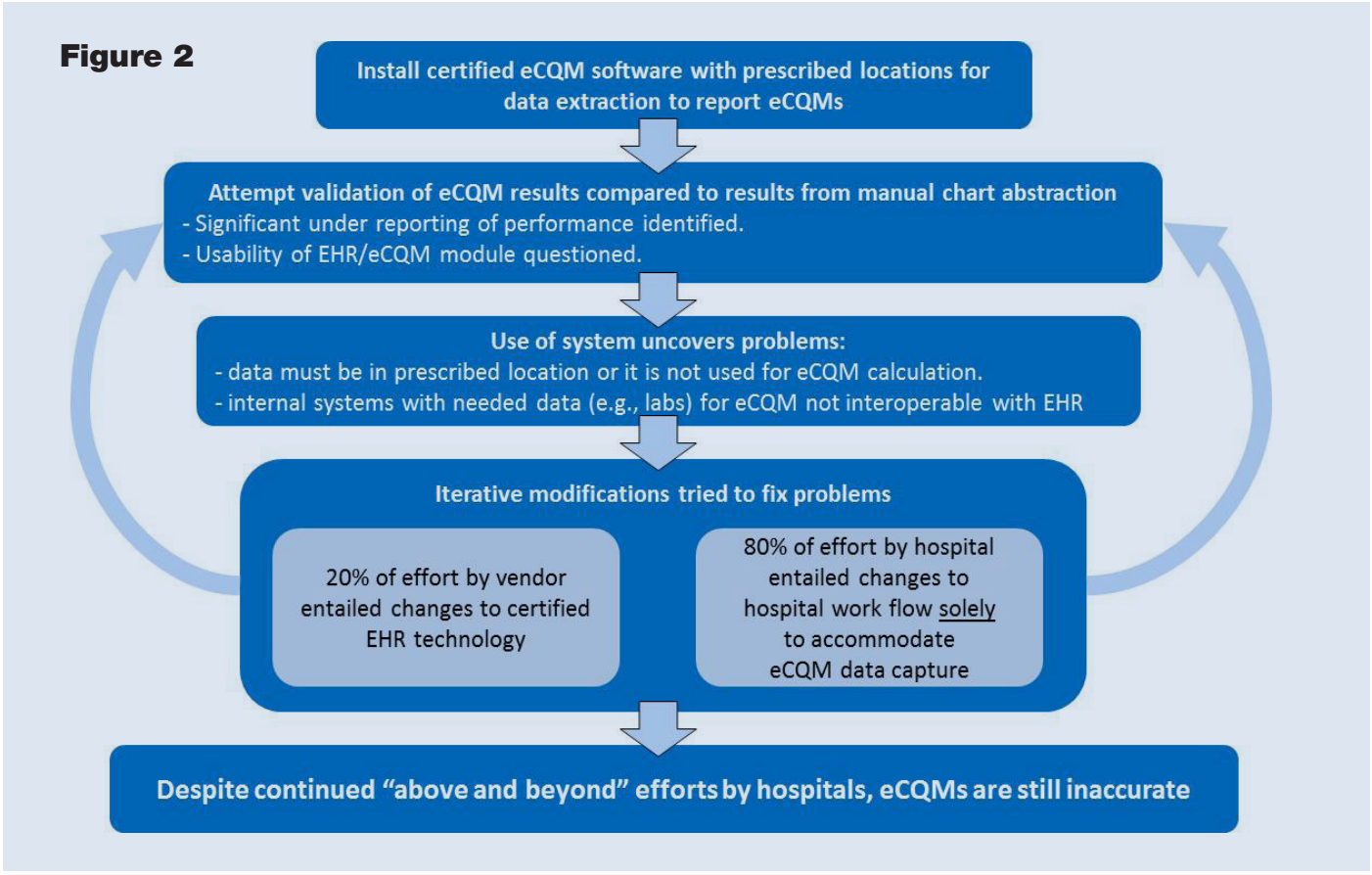
Figure 2 depicts the actual eCQM implementation experience.

eCQM implementation followed the same process at each site, progressing from gap analysis to workflow to implementation and validation. All of the hospitals expended an extensive amount of effort to modify workflow, create new data entry screens and use those screens. The majority of that work (80 percent) was performed by the hospitals; EHR vendors were able to support only 20 percent of the effort by updating their certified products. Only one of the four sites was able to validate that all patients that should be captured in the eCQM results are included and that all relevant interventions that occur are included in the measure calculations. Despite their efforts, the other three hospitals have not been able to achieve accurate measure calculations from their eCQM reporting tools.

The findings from the hospitals and health systems studied highlight the following challenges:

1. **Program Design Challenges:** The eCQM specifications were complex, difficult to access, contained inaccuracies and were not maintained over time, creating confusion and additional work.
2. **Technology Challenges:** The eCQM tools from vendors did not work as expected and could not efficiently generate accurate measure results.
3. **Clinical Challenges:** The eCQM implementation process negatively affected clinicians, adding to their workload with no perceived benefit to patient care as it duplicated information already entered in narrative text. The process also failed to generate usable data to support quality improvement efforts.
4. **Strategic Challenges:** Hospitals expended excessive effort on the eCQMs that negatively affected other strategic priorities.

Figure 2. High level steps in the actual eCQM implementation experience, illustrating the iterative process and challenges encountered within each step.



Program design challenges

Unclear specifications and lack of policy infrastructure caused confusion and re-work.

- The eCQM specifications were highly complex and contained errors. Vendors and hospitals were challenged with the content. CMS infrastructure to support vendors and hospitals was lacking; all organizations struggled with how to interpret the intent to provide consistent results.

- One organization used the version of the measures designed for manual chart abstraction (the CQMs rather than the eCQMs) to evaluate clinical workflow and implement the measures into their EHRs. This is the same process the organization follows for other measures, including those in the hospital IQR program. Citing the difficulty of finding the eCQM specifications on the CMS website for this approach, this organization already had changed workflow processes for its own implementation of the measures. Therefore, they tried to validate their results with those provided by the eCQM reporting tool, but they did not make any changes to workflow or training specifically for the eCQM specifications.

- The eCQMs are included in government regulation. However, if the eCQMs are updated, the EHR certification rules do not require vendors to include such updates in their certified modules.

- The MU Stage 1 eCQM specifications were difficult to find. Hospitals and vendors had to search through the links provided on the CMS website, eventually finding a 429-page technical note written from the perspective of a technical engineer. The note was out of date, and only updated long after the program began. Hospitals and vendors had to go to another website, the US Health Information Knowledge Base (USHIK) to access the codes used by the eCQMs.

Iterative changes in regulatory guidance led to extensive re-work

- To comply with the MU program, each hospital received updates to multiple EHR components from its vendor, often tied to changes in regulatory guidance or new interpretation of the rules. Each updated component had to be connected to the main EHR. Each time a new update was received, all prior connections had to be rechecked. For the eCQM reporting tool, any change to the EHR components could affect the ability to pull the required information.

- Although CMS originally had required hospitals to attest that the eCQM data were accurate, the agency changed policy in October 2011 based on early hospital experience that the certified EHRs did not generate accurate data. CMS used sub-regulatory guidance to clarify that the eCQM reporting tools were expected to report data and were not required to validate the accuracy of the data reported. This addressed the problem with the eCQMs and the eCQM reporting tools, but undermined the process and the program. In addition, providers were worried that attesting to the accuracy of data that they did not consider to be correct would create a compliance issue.

The program required use of new and unfamiliar vocabularies to define required data

- All of the organizations were challenged by requirements to move from ICD-9-CM to ICD-10-CM for conditions and ICD-10-PCS for procedures at the same time they are asked to enter clinical information in their problem lists using SNOMED-CT. For the most part, hospitals relied on their eCQM reporting tools to manage the crosswalks between the new vocabularies in the eCQMs and the terms used locally for clinical data. However, one organization purchased additional software and services to help with this crosswalk to the eCQM reporting tool for the MU Stage 1 eCQMs. At least one of the other organizations will be purchasing such software and services to support MU Stage 2 work. This same organization also will change from using the certified EHR vendor's eCQM reporting mechanism to one that also supports reporting of hospital IQR measures and also works closely with its EHR software. The leadership noted a preference for the information provided by the current IQR reporting software because it has better support for benchmarking with other hospitals regionally and nationally. Thus, the organization believes it will lose valuable management information by switching eCQM reporting tools specifically for the MU program.

Technology challenges

Hospitals experienced significant rework to create and revamp clinical workflows to meet eCQM tool requirements

- Some of the information needed was relatively straightforward, such as diagnoses that made the patient eligible for inclusion in the reported measure result. Such diagnoses are found directly on the discharge sheet and are appropriately coded so the hospital can bill for the hospitalization. Other information is documented only in narrative text (a typed or handwritten note) and not in a structured way (i.e., from a drop down list of predetermined choices, each of which is identified by the computer with a specific code).

- In order to accommodate the measure requirements for documentation of specific clinical information in a discrete format, the organizations had to modify their EHRs to support data capture of the measure required elements, often resulting in the addition of structured fields (such as checkboxes and pre-defined lists of values). This represented an additional effort on the part of the sites in addition to updates to the EHR infrastructure.

- The additional fields, as well as their placement within the EHR forms and navigation, created disconnects from the clinical workflow, which relied on narrative (free-text) documentation in addition to structured data and increased time spent on documentation, rather than patient care.

> ***"Make eCQMs easier to understand. Just because vendors are certified doesn't mean it really works with the workflow."***
>
> -Quality Department Director

- Each organization reports that its vendor is barely staying a step ahead of its customers, given rushed timelines and immature specifications. EHR and eCQM reporting tool vendors have insufficient infrastructure to support the eCQM requirements, and they are adjusting with rapidly designed workarounds to meet certification requirements that are not really usable solutions. EHR usability and the user perspective are sacrificed in place of being able to state functionality exists. There is insufficient opportunity to test and develop usable systems with careful customer workflow analysis and develop smarter ways to capture data given the time constraints of the MU program.

> ***"We recognize the sense of urgency, but sometimes you need to slow down to go faster…the time is not for the technology, it is the people aspect."***
>
> -Hospital CEO

The EHR could not draw relevant data from other systems

- Hospitals with departmental systems from multiple vendors reported the absence or limited connectivity and sharing of information among the different vendor products (intra-hospital interoperability). Such information may be essential to accurate reporting of the eCQMs. All organizations described the tool used to calculate and report the eCQM as inflexible and as the most significant challenge that disrupted workflow:

  - An example from one organization is the ability to retrieve basic information about admissions, discharges and transfers (ADT) from the administrative system, where the ADT product is from a different vendor than the EHR vendor. All of the organizations reported waiting months for resolutions to this type of problem, if one was available at all.

  - Another example is the lack of shared information about surgical incision times from the Operating Room (OR) or anesthesia departmental systems regardless of vendor. One of the measures included in MU Stage 2 eCQMs is derived from the Surgical Care Improvement Project (SCIP) and evaluates appropriate antibiotic use to prevent surgical infection (prophylaxis). The measure requires the surgical incision time to compare with the time the antibiotic is administered to

the patient. The surgical incision time is usually entered in the OR or the anesthesia departmental system. The antibiotic timing may be documented in the EHR or the anesthesia system.

- Hospitals devoted quality management staff and other clinicians to abstract the information from other department systems and enter it into the fields in the EHR required to report the eCQMs. The limited number of EHR data fields was cross-walked to the locations in the eCQM reporting tool that were recognized as data sources for eCQM calculation.

Clinical challenges

eCQM reporting tools were poorly aligned with clinical workflow, necessitating the redesign of the patient care systems or the re-tooling of the reporting tools

- How physicians and nurses work to best care for their patients can be dependent on local culture and circumstances. Changes to clinical workflow require careful analysis and readjustment to assure there is benefit to: (a) decrease the overall work for the physician or nurse; and/or (b) improve the speed of the patient care; and (c) improve the safety and quality of care patients receive.

- The eCQM reporting tools were not designed to support physician and nurse decision-making and documentation naturally. Therefore, up to two-thirds of the necessary information for eCQM reporting had to be specifically identified in the documentation process (also known as "hard-wiring" the data elements into the EHR) in order to capture them for eCQM reporting.

> ***"Don't make someone document some-thing just for the sake of reporting … The information should be in the workflow of health care professionals with value to the patient's care if it is used in a measure."***
>
> -Hospital Quality Management Director

- However, the physicians and nurses did not routinely use the EHR fields recognized by the eCQM reporting tools in the course of patient care because the design conflicted with their workflow. In an attempt to capture the needed data, physician and nursing leaders spent considerable time carefully analyzing and making iterative adjustments to clinical workflow so as to not diminish the safety, quality and speed of patient care. The time involved ranged from two to three months to 18 months per measure.

> ***"The more exercises and hoops we have to jump through, the less time and effort we are spending caring for patients, teaching patients and families how to engage and participate in their care, getting docs to adopt, etc."***
>
> -Hospital Chief Nursing Officer

- For example, to capture information required by eCQMs, physicians and nurses documented justifications for actions taken or avoided in the EHR fields the eCQM reporting tool required. However, the EHRs did not save the justification as part of information shared for clinical care. Unless the physician also documented the rationale for not ordering medication to break up a clot in a narrative note, it was not available for viewing by other clinicians. Therefore, clinical documentation supporting eCQM reporting had to be duplicated to assure patient safety (i.e., other clinicians understood clinical justification). The duplication is a significant efficiency issue.

- The workflow changes to meet the eCQM reporting tool requirements added to physician and nursing workload, and provided no perceived benefit to patient care.

Validation efforts were extensive, but not successful

- The organizations noted that although the eCQM reporting tools were technically valid because the EHR contained specific fields to store the information needed for the eCQMs, they were generally not clinically valid, despite their extensive efforts to change workflows to capture needed data.

- Organizations suggested three reasons for the conflicts with clinical workflow that limited the ability to achieve accurate measure data:
  - The rapid pace of the meaningful use program and the certification process did not give vendors sufficient time to perform careful user workflow analysis before developing the software;
  - Software usability is not a criterion for EHR certification; and
  - Some information required for eCQM reporting is entered in EHRs as a narrative text because it is efficient to do so within the course of patient care; eCQM reporting tools cannot directly use narrative text.

As described above, concurrent review was an eCQM validation process used by three of the hospitals. In these hospitals, designated staff ensured that data not automatically entered as structured data in the EHR were included as such in EHR screens that the eCQM reporting tool was designed to recognize. As a result, the accuracy of the data used for eCQM calculation is dependent on staff review of entries in the EHR and manual data input.

Clinical staff did not trust the data to support quality improvement

- Organizations either spent considerable time in re-work to revise and validate the eCQM measurement process with the eCQM reporting tool, or chose to ignore the results in favor of those derived from the chart-abstracted versions of the measures. Despite their extensive validation efforts, only one of the hospitals could successfully generate clinically valid, accurate data that it was confident could support quality improvement efforts. The fact that some of the organizations had corresponding trusted results from the chart-abstracted versions of the measures (CQMs) allowed them to compare actual clinical results with the eCQM reports.

- Two organizations were able to provide some level of detail regarding the wide differences between the reported rates from the certified eCQM reporting tools and the actual clinical care provided. These discrepancies varied by measure. The organizations reported the eCQMs underestimate actual performance.

> ***"The CMS message that reporting was more important than accurate results undermined physicians' faith in quality measurement."***
>
> -Health System Chief Medical Information Officer

- Only one organization reported the results of eCQMs to physicians but indicated they were a work in progress and not intended for any action. Two other organizations have delayed including the eCQM data in the quality reports they provide to physicians and staff until they can successfully validate the results are correct. One organization has not yet provided physicians access to the information. None of the organizations are using the eCQM results for quality improvement efforts.

Rigid regulatory requirements caused the eCQMs to be out-of-date and out of step with advances in care; updates were available late in the process but were difficult to find and optional for vendors to incorporate

- The eCQM measure process is new and a standard update process had not been implemented prior to the implementation of the MU Stage 1 program. Updates continue to be delayed and some of the clinical information in the eCQMs is out of date. The chart-abstracted measures from which the eCQMs were derived are updated twice a year.

- The eCQMs were not updated to reflect the most recent developments in clinical care until the program was in full force, and then the updates were out of synch with the respective chart-abstracted measures. Two of the hospitals purchased products from other vendors that provide up-to-date information about clinical treatments that improve how often and how fast patients get better. These products are kept current as new studies are published and they address each of the conditions measured by the eCQMs. The hospitals' physicians use these products to create sets of orders in their respective hospital's EHR. Thus, their order sets are consistent with the latest evidence, and

maintained as new evidence becomes available. Physicians who use up-to-date sets of orders may cause the hospital to have poorer performance as measured by compliance with the eCQMs.

- Each hospital's leadership supports physician and clinical staff efforts to "do the right thing" and treat patients based on the most current knowledge. However, the lack of timeliness in updating the eCQMs causes confusion among physicians. Additionally, results from the eCQM reporting modules can misrepresent the quality of care delivered to patients.

Strategic challenges

Hospitals saw no return on investment

- None of the organizations specifically itemized the costs attributable to implementing the eCQM measures, but all indicated spending an unexpectedly large and unsustainable amount of staff time on the effort. This included the very real costs of the nursing and physician time spent on activities to design the EHR screens and to perform extra work to enter data required for the eCQMs.

> ***"My nurse is nursing the chart now instead of nursing the patient."***
>
> -Physician Champion

- Some of the capital costs for the EHR implementations were expended prior to the institution of CMS' MU program, but eCQM-specific costs included reassignment of approximately three FTE quality analysts for each of the organizations, with up to 15 FTEs reassigned for Meaningful Use in general. These FTEs were distributed among IT staff, clinical staff assigned to the eCQM effort, and additional quality staff for the concurrent review process (in the three hospitals that performed concurrent review to enhance electronic quality reporting). On top of these direct technical staff resources, hospitals expended substantial nursing and physician time on activities to design the EHR screens and to enter data required for the eCQMs. That human resource effort was not quantified by any of the organizations.

- One organization cited additional capital costs of $122K to purchase an additional certified eCQM reporting tool. That organization estimated an annual expense of approximately $1M to $1.5M per year on MU and the eCQMs. Over the life of the MU program, the incentives of $10M may cover about 50 percent the specific incremental expenditures for the MU and the eCQM programs, but will not cover the sizable historic capital investment. Each of the hospitals studied reported similar financial experiences. In addition, one hospital plans to purchase a new eCQM reporting tool and additional software and services for vocabulary management, which will add significant expense.

Extensive efforts delayed other planned projects

- Hospitals delayed other projects important to their strategic goals to accommodate MU, as the overall budget for health IT among the organizations did not change during the MU program implementation. The time and cost of eCQM implementation was regarded as an integral part of the MU effort, and not tracked separately.

- Administrative and clinical leadership alike was challenged with the resources consumed by eCQM implementation and was concerned about the need to delay other important initiatives, including:
  - Strategic initiatives to improve patient safety and clinical outcomes.
  - Initiatives to improve patient engagement and shared decision-making to improve outcomes and decrease unnecessary resource use.
  - Readmission reduction initiatives.
  - Initiatives to improve the coordination of care within their communities and regions.

- Some specific examples of delayed projects important to hospital strategic goals, include:
  - Creating a function known as "single sign-on" to allow physicians and nurses to sign on to the hospital's EHR once and have access to all of the information available from different departmental systems (e.g., radiology or scheduling systems) without entering name and passwords for each of these systems.
  - Streamlining EHR nursing documentation to be less cumbersome and more standardized.

- Automating the documentation of medications administered using bar codes to electronically identify the patient, the medication and assure the dose and time are correct.
- Completing the use of all EHR components by implementing physician documentation, including narrative notes and some structured data to significantly reduce or eliminate the paper record.

■ Leadership at all sites expressed concern that the eCQMs focus on internal hospital processes that generally work well already. The significant work effort required to document the information to support the eCQM reporting is a distraction. All of the sites' leaders noted that the transition of care documents that are the focus of the MU programs are only minor steps in the process.

Hospitals developed workarounds to address the eCQM implementation challenges. The following table elaborates on these challenges, then describes adaptive workarounds hospitals created to manage them. The table also includes policy recommendations to address the cited challenges.

Table 1. Summary of findings, including challenges in eCQM program design, resulting challenges from technology and clinical perspectives and policy recommendations to address challenges, provider implications, adaptive workarounds and corresponding policy recommendations addressing the cited challenges.

Program Design Challenges	Provider Implications and Adaptive Workarounds	Policy Recommendations
eCQMs were introduced before robust testing for validity, accuracy and feasibility.	• Modifications led to multiple iterations of tools and associated workflow redesign. • Measure results were frequently inaccurate. • Costs to implement were much higher than expected.	• Reduce pace of rollout with fewer but more well-tested measures.
Specifications were hard to find, lengthy and frequently modified to correct errors.	• Hospitals spent excessive time searching for correct versions or used specifications for chart-abstract measures. • These problems contributed to inaccurate measure results.	• Provide clear guidance and a consistent, reliable process for eCQM development, updates, availability, access and implementation.
Meaningful use eCQMs require unfamiliar vocabularies for data elements (such as LOINC®, SNOMED-CT).	• Hospitals struggled with unfamiliar vocabularies. • Hospitals relied on eCQM reporting tools to manage the crosswalks between new vocabularies in the eCQMs and the terms used locally or purchased another vendor's service to support new vocabularies. • Hospitals incurred additional costs. • Hospitals voiced concerns about potential errors in coding or billing and associated risks of subsequent audits.	• Support the development of an accurate, complete and validated crosswalk from SNOMED-CT to ICD-10-CM and ICD-10-PCS. • Provide for adequate training and education.
Sub-regulatory guidance to ignore data accuracy conflicts with both hospital goals for quality improvement and other program policy to report accurate quality data.	• Hospitals and clinicians saw no benefit from generating inaccurate data. • Hospitals were worried that reporting data that they did not consider to be accurate would create a compliance issue.	• Create an eCQM development, testing, and certification program that supports accurate measurement.

Technology Challenges	Provider Implications and Adaptive Workarounds	Policy Recommendations
EHRs are not designed to capture and enable re-use of information captured during the course of care for later eCQM reporting.	• Hospital clinical staff enter information multiple places in EHRs to ensure data availability for eCQM reporting. • Staff time devoted to manual re-entry of information that already exists elsewhere in the EHR erases efficiencies gained from the use of EHRs and undermines the presumed value of automation for quality reporting and improvement.	• Improve heath IT standards for EHRs and eCQM reporting tools to address usability and data management. • Improve vendor tools to include workflow design flexibility.
EHRs are not designed to capture information from other department information systems at the level of detail needed for eCQM reporting.	• Quality or other staff abstract information from other department information systems and enter it into the fields in the EHR required to report the eCQMs.	• Improve EHRs and reporting tools to support intra-hospital interoperability.
EHR vendors update and separately deliver individual EHR components for Meaningful Use.	• Hospitals conducted multiple updates and iterative testing.	• Establish a predictable update process and schedule for eCQMs, with easy access and notification of updates. • Require vendors to support the latest update on a specified schedule

Clinical Challenges	Provider Implications and Adaptive Workarounds	Policy Implications
EHRs and certification requirements are not designed to support effective and efficient patient care workflows or draw data from them.	• Hospitals modified workflows solely to support adequate data capture, working iteratively with their vendors. • Ultimately, hospitals substantively altered clinical workflow solely to accommodate the data needed for the eCQMs, with no benefit for patient care.	Give vendors more time to develop useful and accurate tools that support logical workflows and leverage data already in the EHR.
Hospitals were unable to validate the eCQM results.	• Hospitals either reported the results of eCQMs as inaccurate, but a work in progress, or did not report the eCQM results directly to physicians and nurses. • Inaccurate results from the eCQM reporting tool combined with increased workflow requirements led to clinicians mistrusting the data and not using it for care improvement.	Create an eCQM development, testing, and certification program that supports accurate measurement.
Meaningful Use Stage 1 eCQM specifications are out-of-date and sometimes inconsistent with current care recommendations.	• Physicians who use up-to-date sets of orders may cause the hospital to have poorer performance as measured by the eCQMs.	Create a mechanism to update eCQMs to reflect new state of the art clinical practice and to match updates to corresponding chart abstracted measures.

Strategic Challenges	Provider Implications and Adaptive Workarounds	Policy Implications
Time and personnel requirements to implement eCQMs were far beyond expectations and excessive.	• Hospitals added tasks to existing IT and/or quality management staff responsibilities and delayed projects. • Clinical staff expended considerable time documenting for eCQMs, with no perceived value for patient care. • Excessive staff time spent on eCQMs delayed focus on other priorities such as reducing readmissions, improving patient safety or advancing care coordination.	• Consider the effort required in future policy for eCQMs.
Combination of time and effort involved and inability to validate results meant hospitals saw no return on investment.	• Results damaged credibility of hospital leadership and Meaningful Use program as a whole.	• Reduce pace of rollout with fewer but more well-tested measures that can be generated by tools that support logical workflows and leverage data already in EHRs.

Recommendations

Based on the experience of these four advanced and committed hospitals and health system sites, we make the following recommendations:

1. Slow the pace of the transition to electronic quality reporting with fewer but better-tested measures, starting with Stage 2.

The additional time would allow:

- Policymakers to create a reliable policy process for eCQM implementation, a mechanism to provide eCQM updates, and a robust EHR testing/certification program;
- Vendors to develop tools that support logical workflows, produce accurate measures and leverage all data already in the EHR; and
- Hospitals to implement the tools in a way that supports their quality goals without excessive burden or risk to patients.

HHS should clearly articulate a long-term program vision for the development, testing and use of accurate and reliable eCQMs and articulate a stable program roadmap. The timeline for implementing the eCQMs is unrealistic, as it emphasizes inclusion of regulatory requirements in advance of adequate development, vetting and testing of eCQM specifications for feasibility and clinical validity.

2. Make EHRs and eCQM reporting tools more flexible so that data capture can be aligned with workflow and interoperable so that data can be shared across hospital department systems.

Encourage the ability of EHRs to reuse captured data so that EHRs can support flexibility in workflow design and also reduce the need for to create multiple places in the EHR to repeat the same data.

3. Improve health IT standards for EHRs and eCQM reporting tools to address usability and data management to achieve MU program expectations.

The crux of the issues identified by implementation of the eCQMs is the need to add data fields in the EHR to capture the needed information. This "hard wiring" approach is a tactical response to quickly address specific measurement needs, but it has a risk of perpetuating the current process of implementing each measure directly in the EHR. All of the organizations noted that their current process primarily hard wires measure data into the EHR for MU Stage 1 eCQMs and also for those included in the 2014 edition of eCQMs.

A standard set of terms for data used by eCQMs can be cross-walked by vendors to specific sections of their respective EHRs to handle any new data request as a query to existing data in the EHR. Such a set of terms helps eCQM developers describe what they need and lets EHRs find it

without hard wiring each measure. The appendix elaborates on these technical and data issues.

Current EHR certification does not address EHR usability which makes them inefficient and counter-productive for providers. Usability standards should be applied to the certified EHR.

CMS should be the source that provides the education and all answers regarding the eCQMs in their programs. The Quality Net website was helpful for questions, but a real time help desk is needed to address obstacles.

4. **Carefully test eCQMs for reliability and validity before adopting them in national programs.** Implement eCQMs within hospitals as part of testing to ensure information flow is accurate and there is no adverse impact on quality and patient safety.

5. **Provide clear guidance and tested tools to support successful hospital transition to increased electronic quality reporting requirements.** For example, develop and disseminate an accurate, complete and validated crosswalk from SNOMED-CT®, a vocabulary required by the 2014 eCQMs and MU Stage 2, to ICD-10-CM for conditions and ICD-10-PCS for procedures.

The effort to move to new vocabulary standards is very challenging. Although some of the data elements in the eCQMs use only SNOMED-CT (e.g., to define actions that are not directly billable), it is not currently in active use by clinicians as they directly care for patients. SNOMED-CT adds a vocabulary rather than replacing an existing vocabulary as with ICD-9 to ICD-10.

To be successful, crosswalks are essential for SNOMED-CT to ICD-10-CM and ICD-10-PCS and they must be tested to show they are valid. Also, all providers will need a method to manage the crosswalk from the SNOMED-CT terms provided with the eCQMs.

The background and technical issues regarding eCQMs and health IT standards programs are discussed in the Appendix.

Conclusion

This study demonstrates that future policy requirements for eCQMs must consider the effort required and the capability of reporting specific eCQMs from certified EHRs. Specifically, the challenges identified in this study must be used to inform future plans and efforts to ensure eCQMs provide meaningful performance results that lead to improved patient outcomes.

Many hospitals, including the four facilities studied for this report, have shown a commitment to using their EHRs and eCQMs as a method to automate the quality measurement process. Even the most advanced hospitals have been unable to use their EHRs to efficiently implement the eCQMs and achieve accurate results. Hospitals have expended large amounts of financial and personnel resources in their efforts to make the process work.

Champions of EHR adoption within the hospitals have had to work closely with their physician and nursing staffs to maintain their engagement in the use of EHRs and the credibility of the organizations' quality programs. They have been significantly challenged by Meaningful Use Program eCQMs that are complex, inaccurate, outdated and that require incredible detail to be documented (often in duplicative ways) in a structured form in the EHR with no perceived additional value to patient care.

The standards for eCQM development and usage are new and evolving and need to be tested and improved to resolve the barriers and challenges experienced by providers in implementing the Meaningful Use Stage 1 eCQMs. The use of eCQMs derived from existing measures originally designed for data collection by chart abstraction highlights the challenges in seeking identical information from different data sources (e.g., structured EHR fields rather than narrative notes). The eCQM reported measure rates are substantially different than the chart-abstracted measure rates and the results cannot be compared. The current process is not sustainable. Feasibility, reliability, validity and usability must be addressed throughout the eCQM development and testing process at the data element level to truly address clinical workflow

challenges such as those experienced by the facilities examined for this report. Unless eCQMs are more robustly tested before incorporation in widespread national programs such as Meaningful Use, the reality is that hospitals will not be able to meet the new standards and certified EHRs will not deliver on the promise of eCQMs to improve patient care, provide comparative quality information to consumers and reduce the burden of quality reporting.

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