Challenges in Evaluating All-Cause Hospital Readmission Measures for Use as National Consensus Standards

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Abstract

Context: The National Quality Forum (NQF) aims to improve the quality of health care for all Americans through fulfillment of its three-part mission. The NQF uses its formal Consensus Development Process to evaluate and endorse consensus standards, including performance measures, best practices, frameworks, and reporting guidelines.

Objective: To understand the opportunities and challenges in endorsing measures addressing all-cause readmissions to hospitals for use as national voluntary consensus standards for accountability and quality-improvement purposes.

Design: Report of standards development process.

Main Outcome Measures: The Consensus Development Process was used to evaluate 3 candidate standards using the NQF Measure Evaluation Criteria. A 21-member steering committee rated each standard according to the criteria and made initial endorsement recommendations for all measures.

Results: Through the evaluation of measures for endorsement, several overarching issues in measuring all-cause readmissions were identified, including statistical modeling and the usability of the measures for quality improvement and accountability. Additionally, it was decided that, for the first time, quality monitoring and accountability of readmissions will take place at the health-plan level. Measuring at various levels of accountability reinforces the idea that multiple stakeholders have a responsibility and a role to reduce readmissions.

Conclusions: These NQF-endorsed measures are a major step in promoting better understanding of readmissions and a reduction in hospital readmission rates, when appropriate. These measures can help reduce the substantial financial and emotional stress that readmissions place on the health care system, and patients will be able to communicate hospital-level performance on this important quality indicator.

Introduction

The National Quality Forum (NQF) is a not-for-profit membership organization created to develop and to implement a national strategy for health care quality measurement and accountability. Membership consists of national, state, regional, and local groups representing consumers, public and private purchasers, health care professionals, provider organizations, health plans, accrediting bodies, labor unions, suppliers, and other organizations involved in health care research or quality measurement and improvement. The NQF has focused on several areas and aims to improve the quality of health care in the US through fulfillment of its three-part mission:

1. setting national priorities and goals for performance improvement
2. endorsing national consensus standards for measuring and publicly reporting on performance
3. promoting the attainment of national goals through education and outreach programs.

To achieve quality health care across the continuum, there is a need for robust measures that specifically address outcomes of care provided in our nation's health care system. Before the start of this project, the NQF had endorsed more than 100 outcome measures through various Consensus Development Process projects, including the multiphase Patient Outcomes Project. However, many gaps remain, including those related to all-cause readmissions.

The private and public sector spends billions of dollars each year on hospital readmissions, with one-fifth of Medicare beneficiaries readmitted to a hospital within 30 days. Medicare payments for unplanned readmissions alone cost the Centers for Medicare & Medicaid Services (CMS) $17.4 billion in 2004.[1] Although patients who are privately insured are less likely to experience a readmission than those with public health insurance, the cost of readmitting commercially insured patients is higher because of higher commercial payment rates.[2] In 2008, 8% of patients who were privately insured in New York State were readmitted, costing private payers $568.9 million, or 15.2% of the state's total readmissions cost.[3]

To curb spending across the public and private sector on avoidable readmissions, lawmakers, purchasers, and health plans have proposed incentives to reduce unplanned readmissions through public reporting, making it clear that readmissions, as an outcome indicator of quality, is important to patients.[4-7] The Patient Protection and Affordable Care Act,[8] which enacted the Hospital Readmissions Reduction Program under Medicare, began penalizing hospitals for high rates of readmissions in Fiscal Year 2013. Condition-specific and/or all-cause readmission measures will be used across several federal programs, including the National Patient Safety Initiative, the Hospital Readmission Reduction Program, and the community-based Care Transition Program to better understand and ultimately reduce unplanned hospital readmission rates across the country.

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To support these initiatives, there is an important need to endorse consensus-based performance measures for all-cause readmissions that can be used across various quality reporting and accountability applications.

Methods

Consensus Development Process

In October 2011, the Department of Health and Human Services requested that the NQF launch a Consensus Development Process project to identify and endorse cross-cutting, noncondition-specific quality measures (candidate consensus standards) that addressed all-cause hospital readmissions.

As part of the NQF's maintenance of endorsed performance measures, consensus standards related to all-cause hospital readmissions and endorsed before June 2009 were evaluated in this same project. Endorsement maintenance provides the opportunity to update and to harmonize specifications, ensuring that the best available measures are endorsed and the NQF portfolio of voluntary consensus standards remains current.

Submitted measures were developed using national guidelines for publicly reported outcome measures and following the technical guidance set forth by the NQF guidance for outcome measures.[9] Candidate consensus standards were evaluated for their suitability on the basis of the four NQF Measure Evaluation Criteria (Table 1) and by using the NQF's Consensus Development Process.[10]

The Consensus Development Process is intended to consider the interests of stakeholder groups from across the health care industry. The NQF's Consensus Development Process is designed to satisfy the requirements of a voluntary consensus standards-setting organization as defined by the National Technology Transfer and Advancement Act[11] and as implemented by the Office of Management and Budget Circular A-119.

For the All-Cause Readmissions Consensus Development Process Project, a 21-member steering committee and the Consensus Standards Approval Committee, composed of clinical and methodologic experts from public and private health care sectors, evaluated the submitted candidate consensus standards (Table 2).

Statistical Modeling

Although the NQF's Measure Evaluation Criteria do not require, or prefer, a specific statistical modeling approach, all measures submitted to the NQF must be tested to ensure that they are reliable and valid. Additionally, the risk adjustment used must be evidence based, relying on intrinsic patient factors.

Each measure developer submitted different methods to capture a readmission. To control for differences in patient case-mix, measures used various approaches to logistic regression modeling. One particular approach used was hierarchical linear modeling, which helps to correct for the shared variance seen in hierarchically structured data. In other words, hierarchical linear modeling would account for the fact that patients who are nested in hospitals may not be independent of each other since patients would be treated by similar physicians in that hospital. Hierarchical linear modeling using a Bayesian estimator results in two coefficient estimates of the regression model for each level (patient and hospital).[12]

Table 1. National Quality Forum: measure evaluation criteria[a][1]	
Criterion	**Description**
Importance to measure and report	Extent to which the specific measure focus is evidence based, important to making significant gains in health care quality, and improving health outcomes for a specific high-priority (high-impact) aspect of health care where there is variation in or overall less-than-optimal performance
Scientific acceptability of measure properties	Extent to which the measure, as specified, produces consistent (reliable) and credible (valid) results about the quality of care when implemented
Feasibility	Extent to which the required data are readily available or could be captured without undue burden and can be implemented for performance measurement
Usability	Extent to which intended audiences (eg, consumers, purchasers, providers, policymakers) can understand the results of the measure and find them useful for decision making

[a] Effective until November 2012. Evaluation subcriteria are not included in this table.
[1] National Quality Forum: Measure evaluation criteria and guidance summary tables—effective for projects beginning after January 2011 [monograph on the Internet]. Washington, DC: National Quality Forum; 2012 [cited 2013 August 21]. Available from: www.qualityforum.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=69376.

Generalized Bayesian estimators[13] can be used to account for the simultaneous relationships and shared variance among hierarchical levels by computing a weighted combination of the two levels.[12] Furthermore, classic estimation theories do not assume prior knowledge of a distribution for variables in the regression model. In contrast, Bayesian estimation may be used to predict hospital performance from a common prior distribution, such as performance from a previous year, or from the grand mean of the population of all hospitals.

Results

Of the candidate consensus standards (Table 2), 2 measures, 1789: Hospitalwide all-cause unplanned readmission measure and 1768: Plan all-cause readmissions, were subsequently endorsed by the NQF Board of Directors.

Throughout the review process, several challenges to measuring and endorsing all-cause hospital readmissions were identified, and important overarching themes were noted throughout the evaluation.

Statistical Modeling

Stakeholders raised concerns that the risk-adjusted rates using hierarchical linear modeling with Bayesian estimators to predict performance for low-volume hospitals would be adjusted toward the mean performance of all hospitals. This shrinkage toward the mean could potentially cause bias for small-volume hospitals, which would seem to have average rates. However, others argued that if the measures did not use a Bayesian estimation technique, hospitals with small volumes would have large confidence intervals around their performance score that would overlap with the average performance of all hospitals. This would result in performance scores for low-volume hospitals that would not allow for statistically significant and practically meaningful differences in performance.

It was broadly recognized that shrinkage toward the mean should theoretically be less of a concern since there is a greater sample size per hospital for all-cause readmissions than condition-specific readmissions.

Hospital Volume

Major concerns also were raised about the lack of risk adjustment for hospital volume. Experts noted that growing literature demonstrates a relationship between hospital volume and quality performance. Two principal hypotheses have been advanced to explain the relationship. The first hypothesis is that physicians (and hospitals) develop more effective skills if they treat more patients (higher volumes), and the second hypothesis is that physicians (and hospitals) achieving better outcomes receive more referrals and thus accrue larger volumes.[14,15] This relationship would demonstrate that including volume, as a covariate, would improve the risk adjustment models performance. However, in developing risk adjustment models for performance measures, there should be consideration on why conceptually stakeholders should expect a priori differences in hospital performance on all-cause readmissions rates based on their patient volume and whether such differences are justified. A systematic review to understand what is known about how volume and outcomes are associated, and by what causal pathways they might be related, did not determine that any specific factor was able to explain outcome differences between high- and low-volume hospitals.[16]

The review found that no longitudinal studies address the important question of how much of the variability, especially among low-volume hospitals, is due to chance.

Usability for Quality Improvement

Throughout the Consensus Development Process, questions surrounded the usability and implementation of an all-cause readmission measure using Medicare claims data. Physicians expressed concern about the inability to produce strategies for effective performance evaluation and quality-improvement activities because of the timeliness of reporting by the CMS and others. Delays in receiving performance results means hospitals are unable to produce strategies for improvement, effectively making it difficult for consumers to make timely and informed decisions when selecting a physician. As such, there was consensus that if these measures are to be used for public reporting, accountability, or payment, the CMS and other users must provide timely feedback to hospitals to support rapid-cycle improvement. Equally as important, timely reporting of quality performance will help to inform consumers about higher-quality hospitals.

The CMS has indicated that they are working to develop methods to provide timely feedback and information on all readmissions, through the CMS dry run, hospital-level results will be shared with hospitals to better understand the performance on the number of readmissions, the patient risk factors, comorbidities, and the name of the hospital where the patient was readmitted.

Table 2. Patient outcomes: all-cause readmissions expedited review of submitted measures		
Measure ID no./title	**Measure description**	**Measure steward**
0329 Risk-adjusted 30-day all-cause readmission rate[a]	The existing NQF-endorsed measure provides a means for determining the risk-adjusted readmission rate for a selected adult target population and can be applied for any desired timeframe. Readmission rate is defined as the percentage of acute inpatient discharges during the measurement period followed by an acute inpatient admission for any diagnosis to any hospital within 30 days. We are proposing to change the measure and offer a risk factor approach. This method allows for calculation of a risk-adjusted readmission rate for use in two different ways: 1) retrospective analysis of hospital (or other study population) performance determination and 2) in a real-time electronic health record environment, analysis to determine the readmission risk factor for each inpatient admission.	UnitedHealth Group
1768 Plan all-cause readmissions	For members age 18 years and older, the number of acute inpatient stays during the measurement year that were followed by an acute readmission for any diagnosis within 30 days and the predicted probability of an acute readmission. Data are reported in the following categories: 1. Count of Index Hospital Stays (denominator) 2. Count of 30-Day Readmissions (numerator) 3. Average Adjusted Probability of Readmission 4. Observed Readmission (numerator/denominator) 5. Total Variance Note: For commercial insurance plans, only members age 18 to 64 years are collected and reported; for Medicare, only members age 18 years and older are collected, and only members age 65 years and older are reported.	National Committee for Quality Assurance
1789 Hospitalwide all-cause unplanned readmission measure	This measure estimates the hospital-level, risk-standardized rate of unplanned, all-cause readmission after admission for any eligible condition within 30 days of hospital discharge (RSRR) for patients age 18 years and older. The measure reports a single summary RSRR, derived from the volume-weighted results of 5 different models, 1 for each of the following specialty cohorts (groups of discharge condition categories or procedure categories): surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology. The measure also indicates the hospital standardized risk ratios for each of these 5 specialty cohorts. We developed the measure for patients age 65 years and older using Medicare fee-for-service claims and subsequently tested and specified the measure for patients aged 18 years and older using all-payer data. We used the California Patient Discharge Data, a large database of patient hospital admissions, for our all-payer data.	Centers for Medicare & Medicaid Services

[a] Maintenance measure.
NQF = National Quality Forum.

Of note, the usability of the health plan-level measure was also a point of discussion. The measure was seen as useful for holding health plans responsible for readmissions, recognizing that responsibility for effective care coordination is not solely the job of the hospital or physician.

Risk Adjustment and Socioeconomic Status

Measures submitted for this project were not risk adjusted for a patient's socioeconomic status. In accordance with the NQF guidance, inclusion of socioeconomic status factors in risk-adjustment models is inappropriate because it assumes that differences in outcomes based on those factors are acceptable. Risk adjustment for socioeconomic status may conceal disparities in care by race or ethnicity. The NQF guidance advises that distinctions among population groups should be emphasized to acknowledge disparities, and that including items such as race or ethnicity in a risk-adjustment model would mask differences based on these characteristics.[17]

Although the steering committee agreed that the NQF guidance was appropriate, there was concern regarding evidence indicating that a patient's socioeconomic status may affect his/her posthospitalization recovery owing to inaccessibility of community resources.[18,19] As such, hospitals argue that they cannot be solely responsible for readmissions because multiple factors influence their patients' likelihood of being readmitted.[20] Many methodologic challenges inhibit including socioeconomic status as a variable in a measure, since it is especially complex to interpret what this variable is correcting for in a predictive model. To overcome this challenge, some agreed that to support fair and appropriate comparisons, hospital performance on this measure could be reported in like comparison groups (eg, disproportionate-share hospitals). Doing so would highlight disparities in care and improve policy decisions, specifically potential unintended consequences such as the removal of community-level resources from vulnerable communities.

However, it should also be noted that stratification, by disproportionate-share hospitals in particular, might be inappropriate since payments to disproportionate-share hospitals are dependent on Medicaid eligibility and coverage, which vary across states. Also, there is no evidence to suggest that disproportionate-share hospitals should perform a priori differently than do nondisproportionate-share hospitals, or that the difference seen is justifiable. Recognizing that measuring readmissions without adjustment for socioeconomic status holds a hospital partially responsible for coordination and collaboration across care transitions, neither readmissions measure seeks to isolate simply the hospitals' role, but rather seeks to encourage shared accountability for care transitions. In short, developers of both measures recognized that readmissions are not a quality issue solely for hospitals but also for communities and for local health systems.

Discussion

The NQF process resulted in endorsement of both a health plan- and hospital-level 30-day all-cause hospital readmission measure. To address many of the overarching issues identified throughout the Consensus Development Process, the NQF developed guidance language to reflect the multiple perspectives voiced during the discussion, particularly related to the hospital-level measure (1789). This language sought to reinforce the multifactorial nature of readmissions and the importance of hospital-community collaboration to reduce readmission rates.

The NQF board provided the following guidance language for measure 1789:

Multiple factors affect readmission rates and other measures including: the complexity of the medical condition and associated therapies; effectiveness of inpatient treatment and care transitions; patient understanding of and adherence to treatment plans; patient health literacy and language barriers; and the availability and quality of postacute and community-based services, particularly for patients with low income. Readmission measurement should reinforce national efforts to focus all stakeholders' attention and collaboration on this important issue.[21]

The NQF acknowledges the concerns raised by physicians and hospitals on the potential negative impact to hospitals that disproportionately treat patients with complex social comorbidities. Ultimately, an all-cause readmission measure provides an opportunity to highlight important quality outcomes that are important to patients. ❖

> … neither readmissions measure seeks to isolate simply the hospitals' role, but rather seeks to encourage shared accountability for care transitions.

Disclosure Statement

The author(s) have no conflicts of interest to disclose.

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Nature and Kind Nurses

Their situation too, when sick, in the family of a good farmer, where every member is emulous to do them kind offices, where they are visited by all the neighbors, who bring them the little rarities which their sickly appetites may crave, and who take by rotation the nightly watch over them, when their condition requires it, is without comparison better than in a general hospital, where the sick, the dying, and the dead are crammed together in the same rooms, and often in the same beds. The disadvantages, inseparable from general hospitals, are such as can never be counterposed by all the regularities of medicine and regimen. Nature and kind nursing save a much greater proportion in our plan way, at a smaller expense, and with less abuse.

— Thomas Jefferson, 1743-1826, American Founding Father, author, and third President of the United States