NQF-ENDORSED VOLUNTARY CONSENSUS STANDARD FOR HOSPITAL CARE

Measure Information Form

Measure Set: CMS Readmission Measures

Set Measure ID #: READM-30-HWR

Performance Measure Name: Hospital-Wide All-Cause Unplanned Readmission (HWR) Measure.

Description: This measure estimates the hospital-level, risk-standardized rate of all-cause, unplanned readmission within 30 days of hospital discharge with any eligible condition. The measure reports a single composite risk-standardized readmission rate (RSRR), derived from the volume-weighted results of five different models, one for each of the following specialty cohorts (groups of related discharge condition categories or procedure categories): surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology. We developed the measure for patients aged 65 years and older using Medicare claims.

Rationale: During 2003 and 2004, almost one fifth of Medicare beneficiaries – over 2.3 million patients – were re-hospitalized within 30 days of discharge from an acute care hospital. Jencks et. al. (2009) estimated that readmissions within 30 days of discharge cost Medicare more than $17 billion annually. A 2006 Commonwealth Fund report further estimated that if national readmission rates were lowered to the levels achieved by the top performing regions, Medicare would save $1.9 billion annually ("Why Not the Best," 2006). In a 2007 report to the Congress, the Medicare Payment Advisory Commission (MedPAC) estimated that in 2005, 17.6% of hospital patients were readmitted within 30 days of discharge and that 76% of these readmissions were potentially preventable; the average payment for a "potentially preventable" readmission was estimated at approximately $7,200 (Medicare Payment Advisory Commission, 2007).

The HWR measure reports the hospital-level, risk-standardized rate of all-cause unplanned readmission within 30 days of hospital discharge. A hospital's readmission rate is related to complex and critical aspects of care such as communication between providers; prevention of and response to complications; patient safety; and coordinated transitions to the outpatient environment. While the condition-specific measures of readmission are helpful for assessing the quality of care for specific groups of patients, they account for only a small minority of total readmissions (Jencks et al., 2009). By contrast, a hospital-wide, all-condition readmission measure provides a broad sense of the quality of care at hospitals and will reflect the full benefit of hospital-wide efforts to improve care and care transitions.

Studies have estimated the rate of preventable readmissions to be as low as 12% and as high as 76% (Benbassat et al., 2000; Medicare Payment Advisory Commission, 2007). Some readmissions are unavoidable and result from inevitable progression of disease or worsening of chronic conditions. However, readmissions may also result

from poor quality of care or inadequate transitional care. Randomized controlled trials have shown that improvement in the following areas can directly reduce readmission rates: quality of care during the initial admission; improvement in communication with patients, their caregivers, and their clinicians; patient education; pre-discharge assessment; and coordination of care after discharge. Evidence that hospitals have been able to reduce readmission rates through these quality-of-care initiatives illustrates the degree to which hospital practices can affect readmission rates. Successful randomized trials have reduced 30-day readmission rates by 20-40% (Jack et al., 2009; Coleman et al., 2004; Courtney et al., 2009; Garasen et al., 2007; Koehler et al., 2009; Mistiaen et al., 2007; Naylor et al., 1994; Naylor et al., 1999; van Walraven et al., 2002; Weiss et al., 2010; Krumholz et al., 2002).

Given that studies have shown readmissions to be related to quality of care, and that interventions have been able to reduce 30-day readmission rates, it is reasonable to consider an all-condition readmission rate as a quality measure.

Type of Measure: Outcome

Improvement Noted As: A decrease in the RSRR.

Numerator Statement: [Note: This outcome measure does not have a traditional numerator and denominator like a core process measure (e.g., percentage of adult patients with diabetes aged 18-75 years receiving one or more hemoglobin A1c tests per year); thus, we use this field to define the measure outcome.]

The outcome for this measure is all-cause unplanned 30-day readmission. We defined a readmission as an inpatient admission to any acute care facility which occurs within 30 days of the discharge date of an earlier, eligible index admission. All readmissions are counted as outcomes except those that are considered planned.

Denominator Statement:
The target population for this measure is admissions to acute care facilities for patients aged 65 and older.

Included Populations:
- Patient is 65 or older
- Patient is alive upon discharge
- Patient is not transferred to another acute care hospital upon discharge

Note that a readmission within 30 days will also be eligible as an index admission, if it meets all other eligibility criteria. This allows our measure to capture repeated readmissions for the same patient, whether at the same hospital or another.

Excluded Populations:
We exclude from the measure all admissions for which full data are not available or for which 30-day readmission by itself cannot reasonably be considered a signal of quality of care.
Exclusions:
- Admissions for patients without 30 days of post-discharge enrollment in FFS Medicare

- Admissions for patients not continuously enrolled in FFS Medicare for the 12 months prior to the index admission
- Admissions for patients discharged against medical advice (AMA)
- Admissions for patients to a prospective payment system (PPS)-exempt cancer hospital
- Admissions for patients with medical treatment of cancer
- Admissions for primary psychiatric disease
- Admissions for "rehabilitation care; fitting of prostheses and adjustment devices"

Admissions not counted as readmissions ("Planned readmissions"):
Admissions identified as planned by the planned readmissions algorithm are not counted as readmissions. The "algorithm" is a set of criteria for classifying readmissions as planned using Medicare claims. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital. CMS based the planned readmission algorithm on three principles:

1. A few specific, limited types of care are always considered planned (obstetrical delivery, transplant surgery, maintenance chemotherapy, rehabilitation);
2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and
3. Admissions for acute illness or for complications of care are never planned.

The planned readmission algorithm uses a flow chart and four tables of procedures and conditions to operationalize these principles and to classify readmissions as planned. The flow chart and tables are available in a report, CMS Planned Readmission Algorithm Version 2.1 - General Population at Centers for Medicare & Medicaid Services Planned Readmission Algorithm Version 2.1: General Population report

Risk Adjustment:
Hierarchical logistic regression models are used to model the log-odds of readmission within 30 days of discharge, as a function of patient-level demographic and clinical characteristics and a random hospital-level intercept. This model specification accounts for within-hospital correlation of the observed outcomes and models the assumption that underlying differences in quality among the health care facilities being evaluated lead to systematic differences in outcomes.

In brief, the approach simultaneously models two levels (patient and hospital) to account for the variance in patient outcomes within and between hospitals. At the patient level, each model adjusts the log-odds of readmission within 30 days of discharge for age and selected clinical covariates. The second level models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of readmission, after accounting for patient risk. The hospital-specific intercepts are given a distribution in order to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

We estimate a separate hierarchical logistic regression model for each specialty cohort. However, we use a fixed, common set of variables in all our models for simplicity and ease of data collection and analysis. Diagnoses recorded in hospital claims during the year prior to hospitalization and secondary diagnoses from the index admission are used in assigning comorbid risk variables for each admission. To group these ICD-9-CM codes into comorbid risk variables, we use CMS Condition Category (CMS-CCs) groups, the grouper used in previous CMS risk-standardized outcomes measures (Pope et al., 2000). See Table 2 for the final list of comorbid risk variables. In addition, an indicator for discharge diagnosis is included for every AHRQ CCS condition category with more than 1,000 admissions nationally each year.

Table 2. Final comorbid risk variables

Demographics	Age (-65) (years above 65, continuous)
Discharge condition indicator	Discharge condition category (AHRQ CCS)
Comorbidity variables	Severe infection Other infectious disease & pneumonias Metastatic cancer/acute leukemia Sever cancer Other major cancers Diabetes mellitus Protein-calorie malnutrition End-stage liver disease Other hematological disorders Drug and Alcohol disorders Psychiatric comorbidity Hemiplegia, paraplegia, paralysis, functional disability Seizure disorders and convulsions Chronic heart failure Coronary atherosclerosis or angina, cerebrovascular disease Specified arrhythmias Chronic obstructive pulmonary disease Fibrosis of lung or other chronic lung disease Dialysis status Ulcers Septicemia/shock Disorders of fluid, electrolyte, acid-base Iron deficiency Cardio-respiratory failure or cardio-respiratory shock Acute Renal failure Pancreatic disease Rheumatoid arthritis and inflammatory connective tissue disease Respirator dependence/tracheostomy status Transplants Coagulation defects and other specified hematological disorders Hip fracture/dislocation

Full details of the development of the risk-standardization model for this measure are available at http://www.qualitynet.org.

A separate hierarchical logistic regression model is specified and estimated for each specialty cohort. Each model is then used to calculate a specialty cohort SRR for each hospital. Hospitals with no index admissions in a specialty cohort do not receive an SRR for that cohort.

For each specialty cohort within a hospital, the numerator of the SRR ("predicted") is the number of readmissions for patients within the specialty cohort within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator ("expected") is the number of readmissions expected for patients within the specialty cohort on the basis of the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, an SRR less than 1 indicates lower-than-expected readmission or better quality and an SRR greater than 1 indicates higher-than-expected readmission or worse quality.

These SRRs are then pooled for each hospital to create a hospital-wide composite SRR. This composite SRR is the geometric mean of the specialty cohort SRRs, weighted by the number of admissions in the specialty cohort, and the pooled SRR is then multiplied by the overall crude readmission rate to produce the RSRR for reporting.

Data Collection Approach: Medicare claims data

Data Accuracy: The administrative claims data used to calculate the measure are maintained by CMS' Office of Information Services. These data undergo additional quality assurance checks during measure development and maintenance.

Measure Analysis Suggestions: None

Sampling: No

Data Reported As: Hospital-level, risk-standardized rate of unplanned, all-cause readmission after admission for any eligible condition within 30 days of hospital discharge (RSRR).

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