

ACO #8 – Risk Standardized All Condition Readmission

Measure Information Form (MIF)

Data Source

- ◆ Medicare Part A Outpatient Claims
- ◆ Medicare beneficiary enrollment data

Measure Set ID

- ◆ ACO #8

Version Number and effective date

- ◆ Version 1.0, effective 10/31/12

CMS approval date

- ◆ 10/18/12

NQF ID

- ◆ #1789, adapted for quality measurement in Accountable Care Organizations

Date Endorsed

- ◆ N/A

Care Setting

- ◆ Hospital

Unit of Measurement

- ◆ Accountable Care Organization (ACO)

Measurement Duration

- ◆ Calendar Year

Measurement Period

- ◆ Calendar Year

Measure Type

- ◆ Outcome

Measure Scoring

- ◆ Risk-standardized readmission rate (RSRR)

Payer source

- ◆ Medicare Fee-for-Service

Improvement notation

- ◆ Lower RSRR scores are better

Measure steward

- ◆ Centers for Medicare and Medicaid Services

Copyright / Disclaimer

- ◆ This ACO risk standardized all condition readmission quality measure is adapted from a hospital risk standardized all condition readmission quality measure previously developed for CMS by Yale (Horwitz et al., 2011).

Measure description

- ◆ Risk-adjusted percentage of Accountable Care Organization (ACO) assigned beneficiaries who were hospitalized who were readmitted to a hospital within 30 days following discharge from the hospital for the index admission.

Rationale

Readmission following an acute care hospitalization is a costly and often preventable event. During 2003 and 2004, almost one-fifth of Medicare beneficiaries – more than 2.3 million patients – were readmitted within 30 days of discharge (Jencks et al., 2009). A Commonwealth Fund report estimated that if national readmission rates were lowered to the levels achieved by the top performing regions, Medicare would save \$1.9 billion annually.

Hospital readmission is also disruptive to patients and caregivers, and puts patients at additional risk of hospital-acquired infections and complications (Horwitz et al., 2011). Some readmissions are unavoidable, but readmissions may also result from poor quality of care, inadequate coordination of care, or lack of effective discharge planning and transitional care.

Since studies have shown readmissions within 30 days to often be related to quality of care, coordination of care, or other factors within the control of health care providers, interventions have been able to reduce 30-day readmission rates for a variety of medical conditions, and high readmission rates and institutional variations in readmission rates indicate an opportunity for improvement, it is important to consider an all-condition 30-day readmission rate as a quality measure (Horwitz et al., 2011).

This ACO risk standardized all condition readmission quality measure is adapted from a hospital risk standardized all condition readmission quality measure previously developed for CMS by Yale (Horwitz et al., 2011).

Clinical Recommendation Statement

Randomized controlled trials have shown that improvement in health care can directly reduce readmission rates, including the following interventions: quality of care during the initial admission; improvement in communication with patients, caregivers and clinicians; patient education; pre-discharge assessment; and coordination of care after discharge. (Naylor et al., 1994; 1999; Krumholz et al., 2002; van Walraven et al., 2002; Conley et al., 2003; Coleman et al., 2004; Phillips et al., 2004; Jovicic et al., 2006; Garasen et al., 2007; Mistiaen et al., 2007; Courtney et al., 2009; Jack et al., 2009; Koehler et al., 2009; Weiss et al., 2010; Stauffer et al., 2011; Voss et al., 2011). Successful randomized trials have reduced 30-day readmission rates by as much as 20-40% (Horwitz et al., 2011).

Widespread application of these clinical trial interventions to medical practice settings has also been encouraging (Horwitz et al., 2011). Since 2008, 14 Medicare Quality Improvement Organizations (QIOs) have been funded to focus on care transitions, implementing lessons learned from these clinical trials. Several of these interventions have been notably successful in reducing readmissions within 30 days. (CFMC, 2010).

ACOs will have incentives under the Medicare Shared Savings Program (SSP) and Pioneer Model to manage the range of medical care, coordination of care, and other factors affecting readmission rates for their assigned beneficiaries. By taking responsibility for all aspects of the medical care of their assigned beneficiaries, ACOs will be able to assess the range of possible interventions affecting readmissions and then select the interventions appropriate for each population of patients included in among their assigned beneficiaries.

References

Coleman EA, Smith JD, Frank JC, Min S-J, Parry C, Kramer AM. Preparing patients and caregivers to participate in care delivered across settings: the Care Transitions Intervention. *Journal of the American Geriatrics Society*. Nov 2004;52(11):1817-1825.

Conley RR, Kelly DL, Love RC, McMahon RP. Rehospitalization risk with second-generation and depot antipsychotics. *Annals of Clinical Psychiatry*. Mar 2003;15(1):23-31.

Courtney M, Edwards H, Chang A, Parker A, Finlayson K, Hamilton K. Fewer emergency readmissions and better quality of life for older adults at risk of hospital readmission: a randomized controlled trial to determine the effectiveness of a 24-week exercise and telephone follow-up program. *Journal of the American Geriatrics Society*. Mar 2009;57(3):395-402.

Garasen H, Windspoll R, Johnsen R. Intermediate care at a community hospital as an alternative to prolonged general hospital care for elderly patients: a randomized controlled trial. *BMC Public Health*. 2007;7:68.

Horwitz L., et al. *Hospital-Wide All-Cause Risk-Standardized Readmission Measure: Measure Methodology Report*. Prepare for the U.S. Centers for Medicare and Medicaid Services. New Haven, Connecticut: Yale New Haven Health Services Corporation/Center for Outcomes Research & Evaluation, 2011.

Jack BW, Chetty VK, Anthony D, et al. A reengineered hospital discharge program to decrease rehospitalization: a randomized trial. *Ann Intern Med*. Feb 3 2009;150(3):178-187.

Jencks SF, Williams MV, Coleman EA. Rehospitalizations among patients in the Medicare fee-for-service program. *N Engl J Med*. Apr 2 2009;360(14):1418-1428.

Koehler BE, Richter KM, Youngblood L, et al. Reduction of 30-day post-discharge hospital readmission or emergency department (ED) visit rates in high-risk elderly medical patients through delivery of a targeted care bundle. *Journal of Hospital Medicine*. Apr 2009;4(4):211-218.

Jovicic A, Holroyd-Leduc JM, Straus SE. Effects of self-management intervention on health outcomes of patients with heart failure: a systematic review of randomized controlled trials. *BMC Cardiovasc Disord*. 2006;6:43.

Krumholz HM, Amatruda J, Smith GL, et al. Randomized trial of an education and support intervention to prevent readmission of patients with heart failure. *Journal of the American College of Cardiology*. Jan 2 2002;39(1):83-89.

Mistiaen P, Francke AL, Poot E. Interventions aimed at reducing problems in adult patients discharged from hospital to home: a systematic meta-review. *BMC Health Services Research*. 2007;7:47.

Naylor M, Brooten D, Jones R, Lavizzo-Mourey R, Mezey M, Pauly M. Comprehensive discharge planning for the hospitalized elderly. A randomized clinical trial. *Ann Intern Med*. Jun 15 1994;120(12):999-1006.

Naylor MD, Brooten D, Campbell R, et al. Comprehensive discharge planning and home followup of hospitalized elders: a randomized clinical trial. *Jama*. Feb 17 1999;281(7):613-620.

Phillips CO, Wright SM, Kern DE, Singa RM, Shepperd S, Rubin HR. Comprehensive discharge planning with postdischarge support for older patients with congestive heart failure: a meta-analysis. *JAMA*. Mar 17 2004;291(11):1358-1367.

Stauffer BD, Fullerton C, Fleming N, et al. Effectiveness and cost of a transitional care program for heart failure: a prospective study with concurrent controls. *Archives of Internal Medicine*. Jul 25 2011;171(14):1238-1243.

van Walraven C, Seth R, Austin PC, Laupacis A. Effect of discharge summary availability during post-discharge visits on hospital readmission. *Journal of General Internal Medicine*. Mar 2002;17(3):186-192.

Voss R, Gardner R, Baier R, Butterfield K, Lehrman S, Gravenstein S. The care transitions intervention: translating from efficacy to effectiveness. *Archives of Internal Medicine*. Jul 25 2011;171(14):1232-1237.

Weiss M, Yakusheva O, Bobay K. Nurse and patient perceptions of discharge readiness in relation to postdischarge utilization. *Medical Care*. May 2010;48(5):482-486.

Release Notes / Summary of Changes

- ◆ N/A

Technical Specifications

- ◆ Target Population
ACO assigned or aligned Medicare beneficiaries

Denominator

- ◆ Denominator Statement
All hospitalizations not related to medical treatment of cancer, primary psychiatric disease, or rehabilitation care, fitting of prostheses, and adjustment devices for ACO assigned beneficiaries at non-Federal, short-stay acute-care or critical access hospitals, where the beneficiary was age 65 or older, was continuously enrolled in fee-for-service Medicare Part A for at least one month after discharge, was not discharged to another acute care hospital, was not discharged against medical advice, and was alive upon discharge and for 30 days post-discharge.

- ◆ Denominator Details
The ICD-9 diagnosis and procedure codes of the index admission are aggregated into clinically coherent groups of conditions/procedures (condition categories or procedure categories) by using the Agency for Healthcare Research and Quality (AHRQ) Clinical Classifications System (CCS). Next, these discharge condition/procedure categories are organized into five mutually exclusive specialty cohorts defined by care team: surgery/gynecology, cardiorespiratory, cardiovascular neurology, and medicine. Rationale: Conditions typically cared for by the same team of clinicians are expected to experience similar added (or reduced) levels of readmission risk. The surgery/gynecology cohort includes admissions likely cared for by surgical or gynecological teams. These admissions are identified using AHRQ procedure categories. The cardiorespiratory cohort includes several condition categories with very high readmission rates such as pneumonia, chronic obstructive pulmonary disease, and heart failure. These admissions are combined into a single cohort because they are often clinically indistinguishable and patients are often simultaneously treated for several of these diagnoses. The cardiovascular cohort includes condition categories such as acute myocardial infarction that in large hospitals might be cared for by a separate cardiac or cardiovascular team. The neurology cohort includes neurologic condition categories such as stroke that in large hospitals might be cared for by a separate neurology team. The medicine cohort includes all non-surgical patients who were not assigned to any of the other cohorts. For further details see also Horwitz et al. (2011).

In order to define the eligible admissions, the ICD-9 codes of the index admission are first aggregated into clinically coherent conditions by using the Agency for Healthcare Research and Quality's Clinical Classifications Software (CCS). There are a total of 285 mutually exclusive AHRQ condition categories, most of which are single, homogenous diseases such as pneumonia or acute myocardial infarction. Some are aggregates of conditions, such as "other bacterial infections." Mental health and substance abuse categories are included. In addition, AHRQ

provides 231 mutually exclusive procedure categories to group procedures a patient might have had during hospitalization. Admissions are eligible for inclusion in the measure if:

1. Patient is aged 18 years or older
Rationale: Pediatric patients have substantially different illnesses, comorbidities and outcomes compared to an adult population.
2. Patient is alive upon discharge
Rationale: Patients who die during the initial hospitalization cannot be readmitted.
3. Patient is not transferred to another acute care hospital upon discharge.
Rationale: In an episode of care in which patient is transferred among hospitals, responsibility for the readmission is assigned to the final discharging hospital. Therefore these intermediate admissions within a single episode of care are not eligible for inclusion.

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

◆ Denominator Exceptions and Exclusions

Excluded from the measure are 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:

1. Admissions for patients without 30 days of post-discharge data
Rationale: This is necessary in order to identify the outcome (readmission) in the dataset.
2. Admissions for patients lacking a complete enrollment history for the 12 months prior to admission
Rationale: This is necessary to capture historical data for risk adjustment.
3. Admissions for patients discharged against medical advice (AMA)
Rationale: Hospital had limited opportunity to implement high quality care.
4. Admissions for patients to a PPS-exempt cancer hospital
Rationale: These hospitals care for a unique population of patients that is challenging to compare to other hospitals.
5. Admissions for patients with medical treatment of cancer
Rationale: These admissions have a very different mortality and readmission profile than the rest of the Medicare population, and outcomes for these admissions do not correlate well with outcomes for other admissions.
(Patients with cancer who are admitted for other diagnoses or for surgical treatment of their cancer remain in the measure).
6. Admissions for primary psychiatric disease
Rationale: Patients admitted for psychiatric treatment are typically cared for in separate psychiatric or rehabilitation centers which are not comparable to acute care hospitals.
7. Admissions for “rehabilitation care; fitting of prostheses and adjustment devices”
Rationale: These admissions are not for acute care or to acute care hospitals.

◆ Denominator Exceptions and Exclusions Details

Denominator exclusions are identified based on variables contained in the Medicare Standard Analytic File (SAF) or Enrollment Database (EDB). For Medicare FFS patients:

1. Lack of enrollment in Medicare FFS for 30 days post-discharge is identified by patient enrollment status in Part A FFS claims using CMS’ EDB; the enrollment indicators must be appropriately marked for the month(s) which falls within 30 days of hospital discharge date.

2. Lack of continuous enrollment in Medicare FFS for 12 months prior to index hospital stay is determined by patient enrollment status in Part A FFS using CMS' EDB; the enrollment indicators must be appropriately marked for each of the 12 months prior to the index hospital stay
3. Discharges AMA are identified using the discharge disposition indicator within the SAF.
4. PPS-exempt cancer hospitals are identified by their Medicare provider ID.
5. Table 3 indicates all cancer discharge condition categories excluded from the measure.
6. Table 4 indicates all psychiatric discharge condition categories excluded from the measure.
7. Admissions for "rehabilitation care; fitting of prostheses and adjustment devices" are identified by principal diagnosis codes (ICD-9 codes) included in CCS 254

In addition, in-hospital deaths are identified using the discharge disposition vital status indicator in the SAF and transfers to other acute care facilities are identified in the claims when a patient is discharged from an acute care hospital and admitted to another acute care hospital on the same day or next day.

Cancer discharge condition categories excluded from the measure (Medicare FFS data)

AHRQ CCS//Description
 42//Secondary malignancies
 19//Cancer of bronchus; lung
 45//Maintenance chemotherapy; radiotherapy
 44//Neoplasms of unspecified nature or uncertain behavior
 17//Cancer of pancreas
 38//Non-Hodgkin`s lymphoma
 39//Leukemias
 14//Cancer of colon
 40//Multiple myeloma
 35//Cancer of brain and nervous system
 16//Cancer of liver and intrahepatic bile duct
 13//Cancer of stomach
 29//Cancer of prostate
 15//Cancer of rectum and anus
 18//Cancer of other GI organs; peritoneum
 12//Cancer of esophagus
 11//Cancer of head and neck
 27//Cancer of ovary
 33//Cancer of kidney and renal pelvis
 32//Cancer of bladder
 24//Cancer of breast
 43//Malignant neoplasm without specification of site
 25//Cancer of uterus
 36//Cancer of thyroid//879
 21//Cancer of bone and connective tissue
 41//Cancer; other and unspecified primary
 20//Cancer; other respiratory and intrathoracic
 23//Other non-epithelial cancer of skin
 26//Cancer of cervix
 28//Cancer of other female genital organs
 34//Cancer of other urinary organs
 37//Hodgkin`s disease
 22//Melanomas of skin
 31//Cancer of other male genital organs

30//Cancer of testis

Psychiatric discharge condition categories excluded from the measure (Medicare FFS data)

AHRQ CCS//Description

657//Mood disorders

659//Schizophrenia and other psychotic disorders

651//Anxiety disorders

670//Miscellaneous disorders

654//Developmental disorders

650//Adjustment disorders

658//Personality disorders

652//Attention-deficit, conduct, and disruptive behavior disorders

656//Impulse control disorders, NEC

655//Disorders usually diagnosed in infancy, childhood, or adolescence

662//Suicide and intentional self-inflicted injury

Numerator

◆ Numerator Statement

Risk-adjusted readmissions at a non-Federal, short-stay, acute-care or critical access hospital, within 30 days of discharge from the index admission included in the denominator, and excluding planned readmissions.

◆ Numerator Details

The outcome for this measure is unplanned all-cause readmission within 30 days of discharge date of an eligible index admission. Because planned readmissions are not a signal of quality of care, the measure does not count planned readmissions in the outcome. The measure uses an algorithm to identify “planned readmissions” in claims data that will not count as readmissions in the measure. The algorithm is based on two main principles:

1. “Planned” readmissions are those in which one of a pre-specified list of procedures took place (which will be described in detail below), or those for maintenance chemotherapy, organ transplant, or rehabilitation.
2. Admissions for acute illness or for complications of care are not “planned.” Even a typically planned procedure performed during an admission for an acute illness would not likely have been planned. Readmissions can be identified as acute or non-acute by considering the principal discharge condition.

The algorithm developed to identify planned readmissions uses procedure codes and discharge diagnosis categories for each readmission. The measure defines planned readmissions as any readmission that was either: a non-acute readmission in which one of 35 typically planned procedures occurs; or a readmission for maintenance chemotherapy, organ transplant, or rehabilitation. All other readmissions are considered unplanned and are counted as readmissions in the measure.

Planned procedures are identified using AHRQ Clinical Classification System (CCS) procedure category list. Readmissions in which any of these procedures are performed are considered planned if the discharge condition category is not acute or a complication of care.

Procedure categories considered planned

AHRQ Procedure CCS//Description//Readmissions with no excluding diagnosis (“planned” readmissions):

45//Percutaneous transluminal coronary angioplasty (PTCA)

254//Rehabilitation

84//Cholecystectomy and common duct exploration

157//Amputation of lower extremity
 44//Coronary artery bypass graft (CABG)
 78//Colorectal resection
 51//Endarterectomy; vessel of head and neck
 113//Transurethral resection of prostate (TURP)
 99//Other OR gastrointestinal therapeutic procedures
 48//Insertion; revision; replacement; removal of cardiac pacemaker or cardioverter/defibrillator
 45//Maintenance chemotherapy
 211//Therapeutic radiology for cancer treatment
 3//Laminectomy; excision intervertebral disc
 43//Heart valve procedures
 152//Arthroplasty knee
 158//Spinal fusion
 55//Peripheral vascular bypass
 52//Aortic resection; replacement or anastomosis
 36//Lobectomy or pneumonectomy
 153//Hip replacement; total and partial
 60//Embolectomy and endarterectomy of lower limbs
 85//Inguinal and femoral hernia repair
 104//Nephrectomy; partial or complete
 1//Incision and excision of CNS
 124//Hysterectomy; abdominal and vaginal
 167//Mastectomy
 10//Thyroidectomy; partial or complete
 114//Open prostatectomy
 74//Gastrectomy; partial and total
 119//Oophorectomy; unilateral and bilateral
 154//Arthroplasty other than hip or knee
 //Radical laryngectomy, revision of tracheostomy, scarification of pleura (ICD-9 codes 30.4, 31.74, 34.6)
 166//Lumpectomy; quadrantectomy of breast
 64//Bone marrow transplant
 105//Kidney transplant
 176//Other organ transplantation
 //Electroshock therapy (ICD-9 codes 94.26, 94.27)//30, 0.03%

Admissions in which a planned procedure was performed are only considered “planned” if the patient was not admitted for an acute illness or complication of care. This list includes the 27 discharge condition categories considered either acute or complications of care.

Discharge condition categories considered acute or complications of care

AHRQ CCS//Description
 237//Complication of device; implant or graft
 106//Cardiac dysrhythmias
 //Fracture (CC 207, 225, 226, 227, 229, 230, 231, 232)
 100//Acute myocardial infarction
 238//Complications of surgical procedures or medical care
 108//Congestive heart failure; nonhypertensive
 2//Septicemia (except in labor)
 146//Diverticulosis and diverticulitis
 105//Conduction disorders
 109//Acute cerebrovascular disease

145//Intestinal obstruction without hernia
233//Intracranial injury
116//Aortic and peripheral arterial embolism or thrombosis
122//Pneumonia (except that caused by TB or sexually transmitted disease)
131//Respiratory failure; insufficiency; arrest (adult)
157//Acute and unspecified renal failure
201//Infective arthritis and osteomyelitis (except that caused by TB or sexually transmitted disease)
153//Gastrointestinal hemorrhage
130//Pleurisy; pneumothorax; pulmonary collapse
97//Peri-; endo-; and myocarditis; cardiomyopathy
127//Chronic obstructive pulmonary disease and bronchiectasis
55//Fluid and electrolyte disorders
159//Urinary tract infections
245//Syncope
139//Gastroduodenal ulcer (except hemorrhage)
160//Calculus of urinary tract
112//Transient cerebral ischemia

Stratification or Risk Adjustment

This measure uses risk adjustment and is not stratified.

For 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 ACO-level intercept. This model specification accounts for within-ACO correlation of the observed outcomes and models the assumption that underlying differences in quality among the ACOs being evaluated lead to systematic differences in outcomes. In brief, the approach simultaneously models two levels (patient and ACO) to account for the variance in patient outcomes within and between ACOs. 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 ACO-specific intercepts as following a normal distribution. The ACO intercept represents the underlying ACO specific risk of readmission, after accounting for patient risk.

A fixed, common set of variables is used in all of the models for simplicity and ease of data collection and analysis. However, a hierarchical logistic regression model is estimated for each specialty cohort separately, and the coefficients associated with each variable may vary across specialty cohorts. To group ICD-9-CM codes into comorbid risk variables, CMS Condition Category (CMS-CCs) groups are used.

This ACO-wide readmission quality measure was adapted from the hospital-wide readmission quality measure in two ways. First, the unit of analysis was changed from the hospital to the ACO. This was possible because both the hospital-wide readmission measure and the ACO-wide readmission measures have in common assessing readmission performance for a population that has patients clustered together (either in hospitals or in ACOs). The goal is to isolate the effects of beneficiary characteristics on the probability that a patient will be readmitted from the effects of being in a specific hospital or ACO. In addition, planned readmissions can be excluded for the ACO-wide readmission quality measure in the same way that they are excluded for the CMS hospital-wide readmission measure.

Second, an additional group of beneficiaries was then developed from the 2010 Medicare 5% claims file to represent a national perspective from the rest of the country for the ACO-wide readmission data analysis, since ACOs do not cover the entire country in the same way that the hospital-wide readmission measure analysis included all of the hospitals in the country. The additional group is limited to beneficiaries in the 5% file that had the basic eligibility characteristics required by the MSSP ACO patient assignment algorithm.

◆ Comorbid risk variables

Risk Variable Group Label//CMS-CCs//Description//"X" if not adjusted for if only present on index admission (complication)

Age// n/a//Age (-18)//

Cond. Ind.// n/a//Condition indicator (AHRQ CCS)//

rv1// 1, 3-5//Severe infection//

rv1//1//HIV/AIDS//

rv1//3//Central nervous system infection//

rv1//4//Tuberculosis//

rv1//5//Opportunistic infections//

rv2// 6, 111-113//Other infectious disease & pneumonias//

rv2//6//Other infectious disease//x

rv2//111//Aspiration and specified bacterial pneumonias//x

rv2//112//Pneumococcal pneumonia, emphysema, lung abscess//x

rv2//113//Viral and unspecified pneumonia, pleurisy//x

rv3// 7//Metastatic cancer/acute leukemia//

rv4// 8, 9//Severe cancer//

rv4//8//Lung, upper digestive tract, and other severe cancers//

rv4//9//Other major cancers//

rv6// 10, 11, 12//Other major cancers//

rv6//10//Breast, prostate, colorectal and other cancers and tumors//

rv6//11//Other respiratory and heart neoplasms//

rv6//12//Other digestive and urinary neoplasms//

rv9// 15-20, 119, 120//Diabetes mellitus //

rv9//15//Diabetes with renal manifestation//

rv9//16//Diabetes with neurologic or peripheral circulatory manifestation//

rv9//17//Diabetes with acute complications//x

rv9//18//Diabetes with ophthalmologic manifestation//

rv9//19//Diabetes with no or unspecified complications//

rv9//20//Type I diabetes mellitus//

rv9//119//Proliferative diabetic retinopathy and vitreous hemorrhage//

rv9//120//Diabetic and other vascular retinopathies//

rv10// 21//Protein-calorie malnutrition//

rv11// 25, 26//End-stage liver disease//

rv11//25//End-stage liver disease//

rv11//26//Cirrhosis of liver//

rv12// 44//Other hematological disorders//

rv14// 51-52//Drug and alcohol disorders//

rv14//51//Drug/alcohol psychosis//

rv14//52//Drug/alcohol dependence//

rv15// 54-56, 58, 60//Psychiatric comorbidity//

rv15//54//Schizophrenia//

rv15//55//Major depressive, bipolar, and paranoid disorders//

rv15//56//Reactive and unspecified psychosis//

rv15//58//Depression//

rv15//60//Other psychiatric disorders//

rv18// 67-69, 100-102, 177, 178//Hemiplegia, paraplegia, paralysis, functional disability//

rv18//67//Quadriplegia, other extensive paralysis//

rv18//68//Paraplegia//
rv18//69//Spinal cord disorders/Injuries//
rv18//100//Hemiplegia/hemiparesis//
rv18//101//Diplegia (upper), monoplegia, and other paralytic syndromes//
rv18//102//Speech, language, cognitive, perceptual//
rv18//177//Amputation status, lower limb/amputation//
rv18//178//Amputation status, upper limb//
rv19// 74//Seizure disorders and convulsions//
rv20// 80//CHF//x
rv21// 81-84, 89, 98, 99, 103-106//Coronary atherosclerosis or angina, cerebrovascular disease//
rv21//81//Acute myocardial infarction//x
rv21//82//Unstable angina and other acute ischemic heart disease//x
rv21//83//Angina pectoris/old myocardial infarction//
rv21//84//Coronary atherosclerosis/other chronic ischemic heart disease//
rv21//89//Hypertensive heart and renal disease or encephalopathy//
rv21//98//Cerebral atherosclerosis and aneurysm//
rv21//99//Cerebrovascular disease, unspecified//
rv21//103//Cerebrovascular disease late effects, unspecified//
rv21//104//Vascular disease with complications//x
rv21//105//Vascular disease//x
rv21//106//Other circulatory disease//x
rv24// 92, 93//Specified arrhythmias//
rv24//92//Specified heart arrhythmias//
rv24//93//Other heart rhythm and conduction disorders//
rv26// 108//Chronic obstructive pulmonary disease//
rv27// 109//Fibrosis of lung or other chronic lung disorders//
rv29// 130//Dialysis status//x
rv30// 148-149//Ulcers//
rv30//148//Decubitus ulcer //x
rv30//149//Decubitus ulcer or chronic skin ulcer//
rv31// 2//Septicemia/shock//x
rv32// 22-23//Disorders of fluid, electrolyte, acid-base//
rv32//22//Other significant endocrine and metabolic disorders//x
rv32//23//Disorders of fluid/electrolyte/acid-base//x
rv33// 47//Iron deficiency//x
rv34// 79//Cardio-respiratory failure or cardio-respiratory shock//x
rv39// 131//Acute renal failure//x
rv40// 32//Pancreatic disease//
rv41// 38//Rheumatoid arthritis and inflammatory connective tissue disease//
rv42// 77//Respirator dependence/tracheostomy status//
rv43// 128, 174//Transplants//
rv43//128//Kidney transplant status//
rv43//174//Major organ transplant status//
rv44// 46//Coagulation defects and other specified hematological disorders//
rv45// 158//Hip fracture/dislocation//

For further details see Horwitz et al., 2011.

Sampling

- ◆ N/A

Calculation Algorithm

1. Models for each specialty cohort are specified and estimated, using a separate hierarchical logistic regression model for that cohort. Each model is then used to calculate a standardized risk ratio (SRR) for each ACO which contributes index admissions to that model. These SRRs, weighted by volume, are then pooled for each ACO to create a composite ACO-wide SRR.
- 2.
3. 2. For each specialty cohort within an ACO, 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 ACO’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 overall performance with that ACO’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 ACO’s performance given its case-mix to an average ACO’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.
4. 3. These SRRs are then pooled for each ACO to create a composite ACO-wide SRR. This pooled 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 risk standardized readmission rate (RSRR) for reporting.

For further details see Horwitz et al., 2011.