Frequently Asked Questions:
CMS Publicly Reported Risk-Standardized Outcome and Payment Measures

Acute Myocardial Infarction (AMI), Chronic Obstructive Pulmonary Disease (COPD), Heart Failure (HF), Pneumonia, and Stroke Readmission and Mortality Measures

Hospital-Wide All-Cause Unplanned Readmission (HWR) Measure

Total Hip Arthroplasty (THA) and/or Total Knee Arthroplasty (TKA) Readmission and Complication Measures

Acute Myocardial Infarction (AMI) Payment Measure

December, 2014
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Chapter 1. General Information

This chapter addresses general questions about measure methodology and public reporting for the CMS risk-standardized measures.

Rationale

1. Why measure outcomes?

   Outcome measures assess a broad set of healthcare activities that affect patients' well-being. Patients who receive high-quality care during their hospital stays and during the transition to non-acute settings (for example, home) will likely have better outcomes, such as survival, functional ability, and quality of life. Improving patient outcomes is a primary goal of hospital quality improvement. The measurement of outcomes allows hospitals, policymakers, and other stakeholders to evaluate the quality of care and to seek improvements that will impact patient well-being.

   Legislatively, the Deficit Reduction Act of 2005 mandated that the Secretary of Health and Human Services include measures of hospital outcomes and efficiency in the Hospital Inpatient Quality Reporting (IQR) program. In 2010, the Affordable Care Act directed the Secretary to develop additional outcome measures focused on resource-intensive conditions as well as primary and preventive care. The public reporting of outcome measures is also consistent with the priorities of the Department of Health and Human Services’ (HHS’) National Quality Strategy, which aims to a) improve health care quality, b) improve the health of the U.S. population, and c) reduce the costs of health care.

2. Which outcome measures will CMS publicly report in 2014?

   As of December 2014, the Centers for Medicare & Medicaid Services (CMS) will publicly report hospital data for a number of risk-standardized outcome measure sets as part of the IQR Program, including:

   - 30-day condition-specific readmission measures for acute myocardial infarction (AMI), chronic obstructive pulmonary disease (COPD), heart failure (HF), pneumonia, and stroke
   - 30-day hospital-wide all-cause unplanned readmission (HWR) measure
   - 30-day condition-specific mortality measures for AMI, COPD, HF, pneumonia, and stroke
   - 30-day readmission measure following total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)
   - Complication measure following THA/TKA
   - 30-day AMI payment measure

3. Why does CMS measure all-cause mortality and readmission instead of just related or preventable outcomes?

   The CMS mortality and readmission measures assess all-cause outcomes; meaning, they consider deaths or unplanned readmissions for any reason, not just only those deaths or...
unplanned readmissions that are due to the same or a “related” condition. There are several reasons for measuring all-cause outcomes.

First, from the patient perspective, death is an adverse outcome regardless of its cause and, similarly, an unplanned readmission is disruptive and costly regardless of cause.

Second, restricting the measure outcomes to those deaths and readmissions that seem to be directly related to the initial hospitalization may result in less meaningful measures. Since cause of death may be unreliably recorded, it may be difficult or impossible to limit the mortality measures to deaths related to certain diagnoses, and this may result in inaccurate mortality rates. Similarly, limiting the readmission measures to readmissions for certain diagnoses may make the measures susceptible to changes in coding practices. Although most hospitals would not engage in such practices, CMS wants to eliminate any incentive for hospitals to change coding practices in an effort to prevent readmissions from being captured in their readmission measure results.

Third, an apparently unrelated death or readmission may represent a complication related to the underlying condition. For example, a patient with heart failure who develops a hospital-acquired infection may be readmitted for an infection and may ultimately die as a result of the infection. It would be inappropriate to consider the readmission or death as unrelated to the care the patient received for heart failure.

Finally, hospitals can act to reduce deaths and readmissions from all causes. While CMS does not presume that each death or readmission is preventable, measuring all-cause patient outcomes incentivizes hospitals to evaluate the full range of factors that increase the risk for mortality and unplanned readmissions. For example, unclear discharge instructions, poor communication with post-acute care providers, and inadequate follow-up are factors that typically increase the risk for an unplanned readmission.

Although measuring all-cause patient outcomes will include some patients whose death or readmission may be unrelated to their care (for example, a casualty in a motor vehicle accident), such events should occur randomly across hospitals and therefore will not affect results on measures that assess relative performance.

**Data Sources and Years**

4. What are the data sources used for measure calculation?

To calculate the outcome measures, CMS uses Medicare claims data that hospitals submit to CMS for payment. CMS also uses Veterans Health Administration (VA) administrative data to calculate the AMI, HF, and pneumonia readmission and mortality measures. Therefore, hospitals do not need to prepare any data for the calculation of these measures.

For the detailed data sources for each measure, refer to Chapter 2, Question 2 (for the condition-specific readmission measures); Chapter 3, Question 2 (for the condition-specific mortality measures); Chapter 4, Question 2 (for the HWR measure); Chapter 5, Question 5 (for the total hip arthroplasty (THA) and/or total knee arthroplasty (TKA) measures); and Chapter 6, Question 2 (for the AMI Payment measure).
5. Why does CMS often use multiple years of data for measure calculation?

CMS uses a three-year measurement period for most of its measures in order to assess more cases per hospital than a single year of data would provide. Using a larger number of cases improves the precision of the estimation of each hospital’s mortality, readmission, complication, and payment measure results. This increased precision facilitates the identification of outliers in hospital performance (more hospitals above or below the national average), providing more information to consumers, payers, and stakeholders.

The THA/TKA complication measure uses a three-year measurement period but uses slightly earlier data than the other measures, in order to identify complications for up to 90 days after the end of the measurement period.

Note that the HWR measure is calculated using a single year of data. Since this measure includes most Medicare fee-for-service (FFS) admissions, it is possible to obtain a sufficient number of eligible admissions in only one year of data.

**Included Hospitals and Hospitalizations**

6. How do the outcome measures define an “index admission” for inclusion in the measure? Do admissions to the non-acute care setting qualify as “index admissions”?

The index admission is the initial hospitalization that is included in a particular outcome measure cohort. Furthermore, it must be at a short-term acute care hospital (or Critical Access Hospital), as evident by the CMS Certification Number used on the Medicare claim for that hospitalization. Admissions to non-acute facilities (or designated non-acute units within acute care hospitals) for hospice, rehabilitation, psychiatric, long-term/long-term acute care, or skilled nursing care do not qualify for inclusion as “index admissions”.

Importantly, the index admission’s discharge date and principal discharge diagnosis must also meet the specific measure’s inclusion criteria (Chapter 2, Question 3 (for the readmission measures), Chapter 3, Question 4 (for the HWR measure), Chapter 4, Question 3 (for the mortality measures), Chapter 5, Questions 6 and 7 (for the THA/TKA readmission and complication measures), and Chapter 6, Question 5 (for the AMI Payment measure) for a detailed listing of the measure eligible discharge diagnosis).

7. What hospitals are included in the measure calculations?

For the IQR program, all risk-standardized measure calculations include index admissions to non-federal acute care hospitals in the U.S. (including U.S. Virgin Islands, Puerto Rico, Guam, Northern Mariana Islands, and American Samoa), including Critical Access Hospitals (CAHs). The AMI, HF, and pneumonia readmission and mortality measure calculations also include Veterans Health Administration (VA) hospitals. The measure calculations exclude prospective payment system (PPS)-exempt cancer hospitals and children’s hospitals.
CMS has also adopted the AMI, HF, and pneumonia mortality for use in the Hospital Value-Based Purchasing as well as the AMI, HF, pneumonia, COPD, and THA/TKA readmission measures for use in the Hospital Readmissions Reduction Program. For these programs, CMS only includes in the measure calculation eligible admissions and readmissions to subsection (d) and acute care hospitals in Maryland participating in the All-Payer Model.

**Risk Adjustment**

8. Why does CMS believe that risk adjustment using claims data is scientifically valid?

CMS has performed validation work to confirm the scientific rigor of using claims data for risk adjustment in outcome measures. CMS validated the AMI, HF, pneumonia, and stroke mortality and readmission measures with models that use medical record-abstracted data for risk adjustment. These analyses demonstrated that using claims data produces estimated hospital-level risk-standardized mortality rates (RSMRs) and risk-standardized readmission rates (RSRRs) that are very similar to the rates estimated by models based solely on medical record data. This high level of agreement in the results based on the two different approaches supports the use of the claims-based models for public reporting.

CMS’s approach to gathering risk factors for patients also mitigates the potential limitations of claims data. Because not every diagnosis is coded at every visit, CMS uses claims data for the year prior to the index admission, as well as secondary diagnosis codes during the index admission, for risk adjustment.

Finally, CMS followed a rigorous review process involving clinicians, providers, consumers, purchasers, and researchers when developing the fourteen publicly reported measures. Details and technical information on the development of the models are provided on [QualityNet](#).

9. Why doesn’t CMS adjust for socioeconomic status (SES) in the calculation of the readmission measures?

CMS’s risk-standardized outcome measures do not adjust for SES because the association between SES and health outcomes can be due, in part, to differences in the quality of health care.

Risk-adjusting outcomes for patient SES would suggest that hospitals with low SES patients are held to different standards for the risk of readmission than hospitals treating higher SES patient populations. For example, if patients of low socioeconomic status have higher readmission rates, then adjusting for SES in the model will lower the risk-standardized rates for hospitals with a higher proportion of these patients relative to other hospitals with clinically similar patients and similar outcomes. CMS does not want to hold hospitals with different SES mixes to different standards. Adjusting for SES could also obscure differences that are important to identify if we want to reduce disparities where they do exist and diminish the incentives to improve such disparities. Thus, CMS chose to adjust only for clinical differences in the populations among hospitals.
Analyses presented in CMS’s 2011, 2012, and 2013 Medicare Hospital Quality Chartbooks demonstrate that patient SES is not strongly related to hospital performance on the publicly reported risk-standardized outcome measures. For example, many safety net providers and teaching hospitals perform as well as or better than hospitals without substantial numbers of low SES patients. CMS continues to monitor the relationship between patient SES and hospital performance on the publicly reported outcome measures.

**Updates to the Measures for 2014**

10. What were the updates to the CMS risk-standardized outcome measures for 2014 public reporting?

In 2014, CMS added five new outcome measures to the Hospital Inpatient Quality Reporting (IQR) Program:

- Two 30-day risk-standardized mortality measures for COPD and stroke patients
- Two 30-day risk-standardized readmission measures for COPD and stroke patients
- One 30-day risk-standardized episode of care payment measure for AMI patients

Every year, CMS updates the years of data used to calculate the outcome measures and the Condition Category (CC) maps that assign International Classification of Diseases, 9th Revision (ICD-9) codes to CCs for risk adjustment. The table below provides a summary of the measure-specific modifications for 2014:

### Table 1: 2014 Updates to the CMS Risk-Standardized Outcome Measures

<table>
<thead>
<tr>
<th>Measures (Data Timeframe)</th>
<th>Updates for 2014 Public Reporting</th>
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- Applied planned readmission algorithm version 3.0 to improve the accuracy of the algorithm.  
- Updated the Condition Category map for grouping diagnosis codes used in the risk adjustment. A full description of these updates can be found in the 2014 Readmission Measures Updates and Specifications Report posted on QualityNet. |
- Updated the Condition Category map for grouping diagnosis codes used in the risk adjustment. A full description of these updates can be found in the 2014 Mortality Measures Updates and Specifications Report posted on QualityNet. |
<table>
<thead>
<tr>
<th>Measures (Data Timeframe)</th>
<th>Updates for 2014 Public Reporting</th>
</tr>
</thead>
</table>
| Hospital-Wide Readmission (HWR) July 1, 2012 – June 30, 2013 | • Applied planned readmission algorithm version 3.0 to improve the accuracy of the algorithm.  
• Updated the Condition Category map for grouping diagnosis codes used in the risk adjustment. A full description of these updates can be found in the 2014 Readmission Measures Updates and Specifications Report posted on QualityNet. |
| THA/TKA Complication April 1, 2010 – March 31, 2013 | • Updated the performance period to begin in the second quarter instead of third quarter as for the other outcome measures.  
• Excluded index admissions with a primary and secondary diagnosis of fracture.  
• Excluded complications coded in the principal discharge diagnosis field, or are present on admission during the index admission, as they are presumably not related to the index procedure. |
| AMI Episode-of-Care Payment July 1, 2010 – June 30, 2013 | • Added a new risk-standardized AMI payment measure for 2014 reporting.  
• Updated the payment standardization method to reflect changes in Medicare payment policy and the Condition Category map for grouping diagnosis codes used in the risk adjustment. A full description of these updates can be found in the 2014 AMI Risk-Standardized Payment Measure Updates and Specifications Report posted on QualityNet. |

Planned Readmissions

CMS updated the planned readmission algorithm to version 3.0 for the 2014 Hospital IQR public reporting period. The updated algorithm, which incorporates improvements made after a validation study, was applied to each risk-standardized readmission measure, expanding the number of readmissions designated as planned. For more information about planned readmissions, refer to Chapter 2, Question 13 (for the AMI, COPD, HF, pneumonia, and stroke readmission measures); Chapter 3, Question 12 (for the HWR measure); and Chapter 5, Question 10 (for the THA/TKA readmission measure).

For a detailed description of the planned readmission algorithm version 3.0 for each measure, refer to the 2014 Measure Updates and Specifications Reports, posted in the Measure Methodology pages for each measure at Hospital-Inpatient>Claims-Based Measures on QualityNet website.
How the Measures Are Related

11. CMS is now reporting other outcomes that seem less serious than mortality – like readmission and payment – why should consumers consider these outcomes as well?

The CMS risk-standardized outcome measures contain complementary information and are relevant to consumers. The mortality measures can signal potential issues with a hospital’s clinical quality like rapid triage, effective safety practices, and early interventions in the hospital. Just as importantly, the readmission measures can signal potential issues with a hospital’s system for transitioning patients to the outpatient setting, collaborating with communities and providers, and communicating with patients and caregivers. CMS is currently reporting hospital results on the mortality and readmission measures for AMI, COPD, HF, Pneumonia, and Stroke patients. Consumers should talk to their doctor about how the readmission and mortality measure results are relevant to their situation.

In 2014, CMS added a 30-day risk-standardized payment measure for AMI patients to the Hospital IQR Program. The payment measure provides consumers information on another dimension of care that when paired with the outcome measures, such as AMI mortality, can show the hospital’s overall “value of care”. Therefore, CMS is pairing the AMI payment results with the AMI mortality measure results on Hospital Compare, on the Payment and Value of Care tab.

12. My hospital has “better” 30-day mortality and “worse” 30-day readmissions – aren’t hospitals with low mortality rates more likely to have high readmission rates?

No, there does not appear to be a meaningful correlation between hospital risk-standardized mortality rates and readmission rates (see the CMS 2010 Medicare Hospital Quality Chartbook). The national results suggest that the 30-day mortality and readmission measures are capturing different aspects of quality, and that the best-performing hospitals have both low mortality and low readmission rates. These results demonstrate that achieving high quality on both outcomes is possible.

Public Reporting and Payment Impact

13. How does CMS categorize hospital results for the outcome and payment measures?

CMS categorizes each hospital’s performance on the risk-standardized mortality, readmission, or complication measures based on how the hospital’s 95% interval estimate on a particular measure compares to the national observed rate for that measure. The interval estimate represents the range of probable values of the risk standardized outcome rate; a 95% interval estimate indicates that there is 95% probability that the true value of the risk standardized outcome rate lies between the lower limit and the upper limit of the interval.
For the risk-standardized mortality, readmission, and complication measures, CMS classifies the comparative performance for hospitals with 25 or more eligible cases as follows:

- “No different than the National Rate” if the 95% interval estimate surrounding the hospital’s rate includes the national mortality, readmission, or complication rate.
- “Worse than the National Rate” if the entire 95% interval estimate surrounding the hospital’s rate is higher than the national mortality, readmission, or complication rate.
- “Better than the National Rate” if the entire 95% interval estimate surrounding the hospital’s rate is lower than the national mortality, readmission, or complication rate.

Figure 1 provides a graphic on how CMS assigns hospitals to performance categories for the risk-standardized mortality, readmission, and complication measures.

Figure 1: Example Performance Category Assignment for the Mortality, Readmission, and Complication Measures

For the risk-standardized AMI Payment measure, CMS categorizes a hospital’s payments based on how the hospital’s 95% interval estimate compares to the national average.
payment. The interval estimate represents a range of probable values of the risk-standardized payment (RSP). A 95% interval estimate indicates that there is 95% probability that the true value of the RSP lies between the lower limit and the upper limit of the interval.

CMS classifies comparative payment results for hospitals with 25 or more cases as follows:

- “Less than the National Average Payment” if the 95% interval estimate surrounding the hospital’s RSP is lower than the national average payment
- “No Different than the National Average Payment” if the 95% interval estimate surrounding the hospital’s RSP includes the national average payment.
- “Greater than the National Average Payment” if the 95% interval estimate surrounding the hospital’s RSP is higher than the national average payment.

Figure 2 provides a graphic on how CMS assigns hospitals to payment categories for the risk-standardized AMI payment measure.

Figure 2: Example Payment Category Assignment for the AMI Payment Measure
If a hospital has fewer than 25 cases eligible for a measure, CMS assigns the hospital to a separate category: “Number of cases is too small”. If your hospital has fewer than 25 eligible cases, your outcome rates and interval estimates will not be publicly reported for that measure. However, they are presented in your Hospital-Specific Report (HSR) that you received via the **QualityNet Secure Portal**.

14. **How do the measures treat small volume hospitals?**

CMS places hospitals with 25 or fewer cases in a separate category, labeled “number of cases too small”. This helps consumers distinguish between hospitals that have average results based on a sufficient number of eligible cases, and those hospitals whose results are similar to the national observed rate because they have few eligible cases. The outcome rates (and risk-standardized payments) and their corresponding interval estimates are not reported on **Hospital Compare** for these hospitals. However, CMS continues to include eligible cases from these hospitals in the outcome and payment measure calculation, and provides these hospitals with their Hospital-Specific Reports.

The hierarchical logistic regression model that CMS uses to calculate the risk-standardized outcome measures allows the inclusion of hospitals with relatively few observations, but takes into account the uncertainty associated with sample size in estimating their risk-standardized outcome rates (and risk-standardized payments). The number of patient discharges that are eligible for inclusion in the measure cohort is a key factor in accurately classifying a hospital’s outcomes or payment. The model takes into account the uncertainty in the estimate of outcome rates (and risk-standardized payments) for small volume hospitals by assuming that each hospital is a typically performing hospital. It weighs that assumption along with the outcomes for the particular hospital in calculating the outcome rate (and risk-standardized payment). Hence, the estimated outcome rates (and risk-standardized payments) for smaller hospitals will likely be closer to the national observed outcome rates (and national average payment) because the limited number of eligible index admissions in the hospital tells little about that hospital’s true outcome rate or payment.

To maximize hospital case volume, CMS calculates the condition- and procedure-specific outcome (and payment) measures using multiple years of data. This increases the sample size, allowing for more precise measure estimates and categorization of hospital results, and increasing the number of hospitals whose results are eligible for reporting on **Hospital Compare**.

15. **Why did CMS choose 25 cases as the cutoff for the “number of cases too small” group?**

CMS chose a cutoff of 25 eligible cases since hospitals with fewer than 25 eligible cases during the reporting period would almost always be classified as “no different than national rate” (or “no different than national average payment”) regardless of their actual results. This is because there is not enough information to show that their results are different from that of an average hospital, so their estimated outcome rates (or payment) are near the average. CMS places these hospitals in their own category to avoid misleading consumers about their results. The cutoff of 25 is also consistent with the minimum volume requirement used in the publicly reported process of care measures.
16. If a hospital has no cases for a measure, how is this reported?

Hospitals having no qualifying cases for a measure will have an “N/A”, with the corresponding footnote: “No data are available from the hospital for this measure. No data will be reported on Hospital Compare.”

17. Where can consumers find hospitals’ outcome and payment measure results on Hospital Compare?

The results for the risk-standardized mortality, readmission, and complication measures are accessible under the “Readmissions, Complications, and Deaths” tab on Hospital Compare. Note that the HWR measure is labeled “Overall rate of readmission after discharge from the hospital” on Hospital Compare.

The results for the risk-standardized AMI payment measure will be located under the “Payment and Value of Care” tab of Hospital Compare, and will be reported alongside the AMI mortality measure results.

18. Can my hospital suppress reporting of its outcome and payment measure results?

Hospitals participating in the Hospital IQR program must agree to the public reporting of their risk-standardized mortality, readmission, complication, and payment measure results in order to receive full Annual Payment Update (APU) for Fiscal Year (FY) 2015. However, a hospital’s performance on these measures will not affect its APU for the Hospital IQR program. The stroke and COPD mortality and readmission measures will be publicly reported starting in FY2015, although reporting will not affect hospitals’ APU under IQR until FY2016.

Critical access hospitals (CAHs) and non-IQR participating hospitals will be able to suppress publication of their risk-standardized outcome and payment measures during the preview period that precedes the reporting of the measures each quarter. Since the risk-standardized outcome and payment measures are only refreshed annually, the updated results are reported on Hospital Compare each subsequent quarter for the remainder of the year. Eligible hospitals will need to suppress each quarter if they do not want their risk-standardized measure results posted on Hospital Compare.

To withhold publication of your hospital’s risk-standardized outcome and payment measure results, you must contact your Quality Improvement Organization (QIO) hospital public reporting contact. You must transmit a completed “Inpatient Hospital Compare Request for Withholding Data from Public Reporting” form to that contact no later than the end of the preview period for that quarter. The form and QIO contacts for each state are located within the Optional Public Reporting section of QualityNet.

19. How will my hospital’s results on the outcome and payment measures impact my hospital’s reimbursement?

Your hospital’s results on the outcome and payment measures will not impact your hospital’s Annual Payment Update (APU) under the Hospital IQR Program. CMS, however, has adopted a subset of the outcome measures for various hospital payment programs.
CMS has finalized plans to use the 30-day risk standardized AMI, HF and pneumonia mortality measures in its Hospital Value-Based Purchasing (VBP) incentive program for FY2015, and the THA/TKA complication measure in FY2019. For further information about the Hospital VBP Program, please refer to the information posted on the CMS website at: http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/hospital-value-based-purchasing/index.html.

CMS also finalized plans to use the 30-day risk-standardized AMI, COPD, HF, pneumonia, and THA/TKA readmission measures in the Hospital Readmissions Reduction Program in FY 2015. Hospital reimbursement under the Hospital Readmission Reduction Program is based on the hospital’s excess readmission ratios for AMI, COPD, HF, pneumonia, and THA/TKA. For more details, please refer to Chapter 2, Question 2 in this document. For further information about the Hospital Readmissions Reduction Program, please refer to the CMS website at http://cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/Readmissions-Reduction-Program.html.

### Accessing Hospital-Level Results

20. Will hospitals have an opportunity to preview their outcome and payment measure results prior to the annual public reporting on Hospital Compare?

Yes. Each year hospitals have the opportunity to preview their risk-standardized mortality, readmission, complication, and payment measure results prior to public reporting during the 30-day IQR preview period. The preview period for the December 2014 reporting will run from September 15, 2014 through October 14, 2014.

At the start of the preview period, hospitals will be able to access their preview reports with results for these measures through the “Run Reports” section of the QualityNet Secure Portal (formerly My QualityNet). To access the reports, in the Report Category menu, select “Public Reporting – Preview Periods,” then in the Report Program menu, select “Inpatient.” Hospitals will also receive a HSR via the QualityNet Secure Portal with detailed results for the risk-standardized outcome measures through the secure file transfer system.

Additionally, hospitals with receive a HSR and accompanying Measure Information and Instructions Report (MIIR) during the preview period. See Question 22 for more detailed information on what information is included in the HSR and MIIR.

For more information on how to obtain a QualityNet account and register for the Secure QualityNet Portal, please visit please visit the QualityNet homepage and select Portal Resources. If you have questions about your HSR, please contact the QualityNet Help Desk at qnetsupport@hcqis.org.

21. What information is included in my Hospital-Specific Report (HSR) and the accompanying Measure Information and Instructions Report (MIIR)?

The Hospital-Specific Report (HSR) Excel® files for December 2014 public reporting contains updated measure results for the 14 outcome and payment measures used in the
Hospital Inpatient Quality Reporting (IQR) Program. The HSR is divided into five Excel workbooks, grouping the measures as follows:

- 30-Day Risk-Standardized Readmission Measures for Acute Myocardial Infarction (AMI), Chronic Obstructive Pulmonary Disorder (COPD), Heart Failure (HF), Pneumonia, Stroke, and Elective Primary Total Hip Arthroplasty and/or Total Knee Arthroplasty (THA/TKA)
- 30-Day Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
- 30-Day Risk-Standardized Mortality Measures for Acute Myocardial Infarction (AMI), Chronic Obstructive Pulmonary Disorder (COPD), Heart Failure (HF), Pneumonia, and Stroke
- Risk-Standardized Complication Measure for Elective Primary Total Hip Arthroplasty and/or Total Knee Arthroplasty (THA/TKA)
- Risk-Standardized Payment Measure Associated with a 30-Day Episode of Care for Acute Myocardial Infarction (AMI) Payment Measure

The HSR includes your hospital’s results, along with results from other hospitals in your state and the nation for each measure. The HSR also provides discharge-level information for all discharges that were eligible for inclusion in the condition- and procedure-specific measure cohorts, as well as detailed risk factor information. For the HWR measure, your HSR provides details for all eligible discharges that resulted in readmissions, as well as case mix and service mix information for your patients compared to all hospitals in the nation.

For the AMI payment measure, your HSR includes payments associated with eligible patient episodes-of-care, as well as case mix information comparing your hospital’s results to your state and national results. Your HSRs provide important information to aid you in your quality improvement efforts and help you understand what will be publicly reported in the Hospital IQR Program. Hospitals that did not receive an HSR (see Chapter 1, Question 22) may access mock HSRs for each measure on QualityNet. These mock HSRs contain simulated hospital and state data, but actual national results.

The Measure Information and Instructions Report (MIIR) that accompanies your HSR provides reference information and instructions to help you interpret each tab of the HSR. A copy of the MIIR is posted publicly on QualityNet.

22. Why didn’t my hospital receive a Hospital-Specific Report?

If your hospital did not receive a HSR for the most recent reporting period, it could be due to any of the following reasons:

- Your hospital was not open during the time period in which the measures were calculated, or did not appear as open by the deadline for the reporting period. For December 2014, this deadline was January 10, 2013.
- Your hospital did not have eligible cases for the calculation of any of the 14 outcome and payment measures during the applicable hospital discharge timeframe.
- Your hospital is not currently pledged for either Annual Hospital Inpatient Quality Reporting (IQR) or Optional Public Reporting Notice of Participation, or did not pledge prior to the end of the preview period.
• Your hospital did not have a QualityNet Secure Portal user account with the two designated roles of “File Exchange & Search” (to receive the report) and “Hospital Reporting Feedback – Inpatient” (to download the report from the QualityNet Secure Portal).

If any of the above applies to your hospital, you did not receive an HSR. However, you may access a mock HSR on QualityNet. The mock HSR contains actual national-level results and simulated hospital and state-level data.

If you have questions about your QualityNet Secure Portal registration status, or whether an HSR is available or was sent to your hospital, please contact the QualityNet Help Desk at qnetsupport@hcqis.org. Please provide the name of your hospital and the hospital’s CMS Certification Number (CCN).

23. My hospital is not yet registered for QualityNet Secure Portal. How do we register?


After you register and have a QualityNet Secure Portal inbox with the designated roles (Hospital Reporting Feedback-Inpatient role and File & Exchange Search role), you must contact qnetsupport@hcqis.org to request an upload of your HSR. Please provide the name of your hospital and your hospital’s CMS Certification Number (CCN) assigned by CMS.

For more information on how to obtain a QualityNet account and register for the Secure QualityNet Portal, please visit the QualityNet homepage and select Portal Resources.
Chapter 2. Condition-Specific Readmission Measures for Acute Myocardial Infarction (AMI), Chronic Obstructive Pulmonary Disease (COPD), Heart Failure (HF), Pneumonia, and Stroke

This chapter addresses questions about measure methodology for the CMS 30-day risk-standardized unplanned readmission measures for AMI, COPD, HF, pneumonia, and stroke. These measures are referred to in this chapter as the “condition-specific readmission measures.”

Rationale

1. Why did CMS specifically choose to measure readmission for patients with AMI, COPD, HF, pneumonia, and stroke?

   While CMS evaluates 30-day all-cause readmission for most hospital admissions combined using the hospital-wide readmission measure, it is important to continue to assess all-cause readmission for specific conditions like AMI, COPD, HF, pneumonia, and stroke because these conditions have substantial mortality and morbidity, imposing a high burden on patients and the healthcare system. Also, there is marked variation in performance on these measures across hospitals.

   The condition-specific readmission measures provide stakeholders information on an important domain of quality of care that complements the publicly reported 30-day condition-specific mortality measures and the process of care measures. The combination of these measures provides stakeholders with comprehensive assessment of hospital performance.

Data Sources and Years

2. What data are used to calculate the readmission measure results?

   The condition-specific readmission measure results are based on administrative claims and enrollment data for eligible hospital discharges that occurred between July 1, 2010 and June 30, 2013. The Medicare claims are final action claims and were processed as of September 27, 2013.

   The data used to calculate the condition-specific measures come from the following sources:

   • Hospital inpatient claims are used to identify eligible index admissions and capture their relevant characteristics.
   • Hospital inpatient and outpatient claims as well as physician practice claims data are used to characterize comorbidities as documented during the index admission and in the year before the index admission to capture a comprehensive view of patients’ medical histories.
Cohort Inclusion and Exclusion Criteria

3. What are the inclusion and exclusion criteria for the condition-specific readmission measures?

Inclusion Criteria

The condition-specific readmission measures include index hospitalizations for patients who:

- Are enrolled in Medicare fee-for-service (FFS).
- Are at least 65 years of age at the time of their admission.
- Have a principal discharge diagnosis of one of the following conditions at the index hospitalization:
  - For the AMI measure: 410.00, 410.01, 410.10, 410.11, 410.20, 410.21, 410.30, 410.31, 410.40, 410.41, 410.50, 410.51, 410.60, 410.61, 410.70, 410.71, 410.80, 410.81, 410.90, and 410.91.
  - For the COPD measure: 491.21, 491.22, 491.8, 491.9, 492.8, 493.20, 493.21, 493.22, 496; or a principal diagnosis of respiratory failure (518.81, 518.82, 518.84, 799.1) when combined with a secondary diagnosis of acute exacerbation of COPD (491.21, 491.22, 493.21, 493.22).
  - For the HF measure: 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 428.0, 428.1, 428.20, 428.21, 428.22, 428.23, 428.30, 428.31, 428.32, 428.33, 428.40, 428.41, 428.42, 428.43, and 428.9.
  - For the pneumonia measure: 480.0, 480.1, 480.2, 480.3, 480.8, 480.9, 481, 482.0, 482.1, 482.2, 482.30, 482.31, 482.32, 482.39, 482.40, 482.41, 482.42, 482.49, 482.81, 482.82, 482.83, 482.84, 482.89, 482.9, 483.0, 483.1, 483.8, 485, 486, 487.0, and 488.11.
  - For the stroke measure: 433.01, 433.11, 433.21, 433.31, 433.81, 433.91, 434.01, 434.11, and 434.91.
- Are discharged alive from the index hospitalization, since only these patients have the opportunity for readmission.
- Are discharged from non-federal acute care hospitals.
- Were not transferred out to another acute care facility. (The measures consider these multiple contiguous hospitalizations as a single acute episode of care, and readmission for transferred patients is attributed to the hospital that ultimately discharges the patient to a non-acute care setting.)
- Were enrolled in Medicare Part A and Part B for the 12 months prior to the date of the index admission (in order to have a full year of data for risk adjustment).
The AMI, HF, and pneumonia readmission measures also include eligible patients admitted to Veterans Health Administration (VA) hospitals. Note that the requirement for 12 months of Medicare Parts A and B enrollment is dropped for patients with an index admission at a VA hospital.

Exclusion Criteria

After selecting admissions meeting the above inclusion criteria, the measures exclude index admissions for patients who:

- Did not have at least 30 days of post-discharge enrollment in FFS Medicare, since the 30-day readmission outcome cannot be assessed in this group. This exclusion applies only to patients who have index admissions in non-VA hospitals.
- Left against medical advice (AMA), since providers did not have the opportunity to deliver full care and prepare the patient for discharge.

Additionally, for AMI patients only, the measure excludes same-day discharges (admission and discharge date equal), as these patients are unlikely to have had a clinically significant AMI.

Finally, admissions within 30 days of discharge from an index admission are not considered as additional index admissions within the same condition-specific readmission measure. They are instead considered readmissions for that measure. However, because the cohorts of the condition-specific readmission measures are determined independently of each other, a readmission in one measure may qualify as an index admission in other CMS readmission measures, as long as they meet the inclusion and exclusion criteria for that measure.

An index hospitalization is any admission included in the measure calculation as the initial admission for an episode of AMI, COPD, HF, pneumonia, or stroke care.

Note: Effective in 2014, CMS modified how the measure cohort selection criteria are referenced. While this does not impact the outcome measure calculation or results (because the resulting measure cohort stays the same), it does change the values assigned to the inclusion/exclusion indicator(s) in the Hospital-Specific Report.

4. Do the readmission measures exclude hospice patients?

No, the readmission measures do not exclude patients based on hospice use or status. However, the measures do risk-adjust for factors associated with the likelihood that patients are sicker or are at the end of their lives (see Chapter 2, Question 15).

Note that if a patient is discharged from an index admission and is subsequently admitted to a dedicated separate hospice facility or unit, the admission to the hospice facility/unit is not considered a readmission. This is because only an inpatient admission to an acute care bed can qualify as an index admission or a readmission for the 30-day readmission measures. The patient is included in the measure cohort but is not considered “readmitted” unless the readmission was to an inpatient admission at a short-term acute care hospital within the 30-day window.
5. **How are transferred patients handled in the 30-day readmission measures?**

Readmissions for transferred patients are attributed to the hospital that ultimately discharges the patient to the non-acute care setting (for example, home or skilled nursing facility). For patients who are transferred between one acute care hospital and another, the readmission measures consider these multiple hospitalizations as a single acute episode of care.

Transfer patients are identified by tracking claims for inpatient short-term acute care hospitalizations over time. The readmission measures identify a transfer if the following criteria are met:

- The second inpatient admission must occur on the same day or the next calendar day following discharge from the first eligible inpatient admission at a short-term acute care hospital.
- The principal discharge diagnosis for each individual hospitalization in the transfer chain must have a qualifying ICD-9 code that meets the measure inclusion criteria for the same measure (see Chapter 2, Question 3).

Note that since the COPD measure cohort is selected based on primary and secondary discharge diagnoses, individual hospitalizations in a COPD patient’s transfer chain must have qualifying principal and secondary diagnosis codes that meet the COPD measure’s inclusion criteria.

6. **Why are respiratory failure patients included in the COPD readmission measure?**

COPD consists of a group of lung diseases characterized by airway obstruction. Patients hospitalized for an acute exacerbation of COPD present with varying degrees of severity ranging from a worsening of baseline symptoms (dyspnea, cough, and/or sputum) to respiratory failure. To capture the full spectrum of severity of illness of patients hospitalized for an acute exacerbation of COPD, we include patients with a principal diagnosis of COPD, as well as those with a principal diagnosis of respiratory failure who had a secondary diagnosis of an acute exacerbation of COPD. Requiring an acute exacerbation of COPD as a secondary code ensures that the measures include respiratory failure caused by COPD exacerbation and not by another condition (for example, heart failure).

7. **Why are patients with chronic obstructive asthma (asthma with COPD) included in the COPD readmission measure?**

Chronic obstructive asthma is part of the spectrum of COPD. Inclusion of these patients reduces biases due to regional variation in diagnostic and coding practices. Coding can be subjective for COPD/asthma patients, as it is often difficult for physicians to differentiate between patients with asthma and patients with COPD. Additionally, the two conditions can coexist. In the COPD/asthma group, a diagnosis of COPD is frequently overlooked for some patients, or misdiagnosed as asthma, including women and patients of low-socioeconomic status. Moreover, expert input during development of the COPD readmission measure supported the inclusion of chronic obstructive asthma patients.
8. Why limit the stroke measure cohort to patients hospitalized with ischemic stroke only?

Based on consultation with clinical experts, CMS chose to limit the measure to ischemic stroke hospitalizations for a few reasons. First, ischemic strokes are the most common type of stroke, accounting for the vast majority of stroke hospitalizations. Second, the causes and prognosis of ischemic stroke are quite different than those of hemorrhagic stroke, so a combined cohort would be more heterogeneous. This heterogeneity could make it more difficult to account for a hospital’s case mix. Similarly, the cohort does not include patients with transient ischemic attacks (TIAs) largely due to concerns about inconsistency in the use of administrative codes to define TIA and potential for inclusion of patients without cerebrovascular conditions.

**Defining Readmission**

9. What admissions are considered readmission in the CMS measures, and what types of admissions are not considered readmissions?

In the CMS readmission measures, a patient who had an eligible index admission is considered “readmitted” if he or she has one or more unplanned inpatient admissions at a short-term acute care hospital within 30 days of discharge from the original index hospitalization.

The following types of admissions are *not* considered readmissions in the measures:

- Planned readmissions (see Questions 13 and 14).
- Same-day readmissions to the same hospital for the same condition. This is because CMS rules already require Prospective Payment System (PPS) hospitals to combine same-day, same-condition readmissions into a single claim. Thus, such readmissions are considered a continuation of the index admission.
- Observation stays and emergency department (ED) visits. These are not inpatient admissions and therefore are not considered potential readmissions.
- Admissions to facilities other than short-term acute care hospitals. Facilities such as rehabilitation centers, psychiatric hospitals, hospice facilities, long-term care or long-term acute care hospitals, and skilled nursing facilities do not meet the definition of a short-term acute hospital, and admissions to these facilities are not considered for the readmission outcome.
- Admissions that occur at eligible short-term acute care hospitals, but where the patient is admitted to a separate, non-inpatient unit – such as separate units for rehabilitation, psychiatric care, hospice care, or long-term care – that bills under a separate CMS Certification Number (CCN). Such admissions are not inpatient admissions and therefore are not considered as readmissions.
10. Why do the readmission measures use a 30-day outcome timeframe?

CMS chose to measure readmission within 30 days of discharge because 30 days is a clinically sensible and meaningful timeframe for measuring hospital performance. Thirty days is a standard period that can be strongly influenced by hospital care and the early transition to the outpatient setting.

The use of the 30-day timeframe also emphasizes the importance of transitions of care and patients’ suitability for discharge. Actions taken by hospital staff while preparing to transition the patient to outpatient status can minimize a patient’s risk for adverse outcomes, as can collaboration and communication between the inpatient and outpatient providers within a community. Hospitals in collaboration with their medical communities can take actions to reduce 30-day readmission, such as:

- Ensuring patients are clinically ready for discharge
- Reducing the risk of infection
- Reconciling medications
- Improving communication among providers involved in the transition of care
- Encouraging strategies that promote disease management principles
- Educating patients about symptoms to monitor, whom to contact with questions, and where and when to seek follow-up care

11. How is the 30-day outcome timeframe defined in the readmission measures?

In the readmission measures, the 30-day outcome timeframe starts on the day the patient is discharged from the index admission and extends for 30 days after that. For example, the outcome window for a patient who is discharged from an index admission on January 1 would be January 1 - 31.

12. How do the 30-day readmission measures handle same-day readmissions?

The readmission measures do not consider patients as “readmitted” if they had a same-day readmission to the same hospital for the same condition. This is done to put all hospitals on a level playing field, since CMS rules already require Prospective Payment System (PPS) hospitals to combine same-day, same-condition readmissions into one claim. These readmissions thus appear in the claims data as a continuation of the index admission.

However, note the readmission measures do consider patients as “readmitted” if they had an eligible readmission to the same hospital on the same day but for a different condition.

13. Will a patient be considered readmitted in the CMS measures if he or she was readmitted for a planned surgery?

No, the CMS readmission measures do not consider planned readmissions as part of the readmission outcome. Generally speaking, planned readmissions are not a signal of quality of care. Therefore, CMS has worked with experts in the medical community as well as other stakeholders to carefully identify procedures and treatments that should be considered “planned,” and thus not considered in the readmission outcome.
Starting with the 2013 public reporting, the measures identify planned readmissions by using an expanded algorithm, which is a set of criteria for classifying readmissions as planned using Medicare claims. This algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital. The algorithm is based on three principles:

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

CMS conducted a validation study of the planned readmission algorithm using medical record data from 634 medical records at seven hospitals. For the 2014 public reporting, Version 3.0 of the algorithm includes modifications to enhance the accuracy of the algorithm based on the study findings.

For the details of the planned readmission algorithm as applied to the AMI, COPD, HF, pneumonia, and stroke measures, refer to the 2014 Readmission Measure Updates and Specifications Reports, posted at Hospitals – Inpatient > Claims-Based Measures > Readmission Measures > Measure Methodology on the QualityNet website. A flowchart illustrating how the planned readmission algorithm functions can be found on page 95 of the report.

14. Do the readmissions measures count multiple unplanned readmissions within 30 days as multiple readmissions? Are any of these multiple readmissions considered as new index admissions?

A patient’s readmission status is based on the occurrence of any unplanned readmission, and not on the number of unplanned readmissions. For each eligible index admission, the condition-specific readmission measures assign the patient a "readmitted" status if, within 30 days after discharge from the hospital, the patient had one or more eligible unplanned readmissions.

Furthermore, "unplanned" readmissions are not eligible to be included as additional index admissions within the same condition-specific readmission measure. However, once the 30-day outcome window that is associated with the first index admission has passed, the next eligible hospitalization is considered a new index admission. See scenarios 1-3 below for detailed examples of multiple readmissions within 30 days of an index admission.
Scenario 1: Multiple unplanned readmissions for the same condition.

As shown in Scenario 1 above, if a patient was discharged from an index admission for heart failure (HF) on January 1, and had an unplanned readmission for HF starting on January 15, and then again for HF on January 25, the patient would be assigned a “readmitted” status for the January 1 index admission. Neither the January 15 or January 25 readmission would be used as an additional index admission for the HF readmission measure. However, if the patient had a subsequent readmission for HF on February 10 that met other measure criteria, that stay would be considered a new index admission in the measure since the visit did not occur within the 30-day post-discharge timeframe of the January 1 discharge.

Scenario 2: Unplanned readmissions occurring after a planned readmission

Once a planned readmission occurs (see Chapter 2, Question 13), the measures stop looking for unplanned readmissions during the remainder of the 30-day post-discharge period. As shown in Scenario 2 above, if a patient has a HF index admission on January 1, then has a planned readmission starting on January 15, followed by an unplanned
readmission on January 25, all within 30 days of discharge from the original heart failure index admission; this patient would not be assigned a “readmitted” status because the first readmission was planned. This is done because it is unclear whether the unplanned readmission should be attributed to the care received during the index hospitalization or the intervening planned readmission.

Scenario 3: Multiple unplanned readmissions for different conditions

Cohorts for the AMI, COPD, HF, pneumonia, and stroke readmission measures are determined independently of each other. Therefore, a readmission in one measure may qualify as an index admission in another measure. As shown in Scenario 3 above, if a patient was discharged from an index admission for HF on March 1, and was readmitted for unplanned care for pneumonia on March 15, this readmission can be considered both a readmission for the HF measure and an index hospitalization for the pneumonia measure, if it met the pneumonia measure inclusion criteria. If the patient then had an unplanned pneumonia readmission on April 10, the patient would be assigned a “readmitted” status for the March 15 pneumonia index admission, since this falls within the 30-day post-discharge timeframe of the pneumonia discharge.

Risk Adjustment and Measure Calculation

15. What are the risk factors used for risk adjustment? Which diagnosis codes are included in each risk factor?

Each of the condition-specific readmission measures adjusts for age and a wide variety of clinical risk factors. You can find a list of the risk factors in the 2014 Readmission Measures Updates and Specifications Report. Refer to Table D.1.2 for the AMI measure, Table D.4.2 for the COPD measure, Table D.2.2 for the HF measure, Table D.3.2 for the pneumonia measure, and Table D.5.2 for the stroke measure.

The 2014 Readmission Measures Updates and Specifications Report is available at Hospitals – Inpatient > Claims-Based Measures > Readmission Measures > Measure Methodology on the QualityNet website. In addition, your Hospital-Specific Report (HSR)
presents the prevalence of each risk factor for your patients, compared to state and national
averages.

Some of the patient risk factors are grouped using the CMS Condition Categories (CC)
classification. A crosswalk of CCs to ICD-9-CM codes is available at Hospitals – Inpatient >
Claims-Based Measures > Readmission Measures > Resources on the QualityNet website.

16. How are the risk-standardized readmission rates (RSRRs) calculated?

The RSRRs are calculated as the ratio of the number of “predicted” readmissions to the
number of “expected” readmissions, multiplied by the national observed readmission rate.
For each hospital, the numerator of the ratio is the number of readmissions within 30 days
predicted on the basis of the hospital's performance with its observed case mix. The
denominator is the number of readmissions expected 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, a ratio of less than one indicates a lower-than-expected readmission rate (or
better quality), and a ratio of greater than one indicates a higher-than-expected readmission
rate (or worse quality).

For details on the statistical approach used to determine the predicted and expected rates,
please refer to the measure methodology and 2014 measure updates reports posted at
Hospitals – Inpatient > Claims-Based Measures > Readmission Measures > Measure
Methodology on the QualityNet website.

17. Will hospitals be able to replicate the RSRRs for the purpose of
validation?

No, hospitals will not be able to replicate the risk-standardized readmission rates (RSRRs)
independently. While hospitals have access to the inclusion/exclusion criteria and risk-
adjustment coefficients used, the model requires input of patient longitudinal data across
care settings and data from the entire national sample to estimate the hospital-specific
effects used in the equations. Please note that although hospital-specific effects are
provided to hospitals as part of the Hospital Readmissions Reduction Program Hospital-
Specific Report (HSR), they will not be the same for the Inpatient Quality Reporting Program
results.

However, you can validate the patient cohort used to calculate your hospital's readmission
measures using the discharge-level information contained in your HSR, available via the
QualityNet Secure Portal.

To be transparent in how the RSRRs are calculated, CMS has made the measure
calculation methodology (including the condition category algorithm) available on
QualityNet. Hospitals may also request a copy of the SAS software used to estimate the
RSRRs by emailing cmsreadmissionmeasures@yale.edu. However, please note that CMS
does not provide training, consultations, or technical assistance for using the software.
18. Where can I find more information about how the RSRRs are calculated?

The best source of information on the risk-adjustment models are the original methodology reports and the annual measure updates and specifications reports posted at hospitals – inpatient > claims-based measures > readmission measures > measure methodology on the QualityNet website.

Additional references on the readmission measures and the statistical models used can also be found in the published literature section hospitals – inpatient > claims-based measures > readmission measures > published literature on the QualityNet website.

Hospital Performance

19. My hospital provides discharge planning and education, but we cannot ensure patients follow up when they go home. Don’t the readmission measures penalize us for patient behavior that is outside the hospital’s control?

Improving readmission rates is the joint responsibility of hospitals and other clinicians. Measuring readmission will create incentives to invest in interventions to improve hospital care, better assess the readiness of patients for discharge, and facilitate transitions to outpatient status. CMS recognizes that some patients who receive education and discharge planning do not follow up on the plan when they leave the hospital, even if they have access to the care they need. However, all hospitals have the opportunity to reduce the rate of readmission, even among less compliant patients.

20. My hospital is interested in conducting a quality improvement program to understand and reduce our readmission rates. How can I best track my hospital’s performance on the readmission measures?

CMS’s risk-standardized readmission rates are not designed for hospitals’ internal quality tracking purposes, since they are measures of each hospital’s performance relative to the national readmission rate during a given period of time. However, your hospital may choose to track its raw readmission rates for quality improvement purposes. Your Hospital-Specific Report (HSR) provides you with detailed information on the discharges that were used to calculate your condition-specific readmission results (covering a 3-year performance period). If you wish to calculate your raw same-hospital readmission rate for a time period outside the HSR performance period, you may include in your cohort (denominator) the number of index admissions at your hospital that fulfill the inclusion and exclusion criteria described in question 3 for the condition of interest (AMI, COPD, HF, pneumonia, or stroke) within the date range of interest. Your numerator should be the number of eligible patients who had an unplanned readmission within 30 days of discharge from the index admission.

The numerator should not include patients who first had a planned readmission within 30 days of discharge, even if they were later readmitted for unplanned care.
Please note that an internally calculated raw rate will not capture major changes to your hospital’s case mix that affect risk-standardized readmission rates, nor will it include readmissions to other hospitals. However, if your hospital’s case mix and the proportion of same-hospital readmissions are stable over time, your raw rate can be used to track internal improvement over time.
Chapter 3. Hospital-Wide All-Cause Unplanned Readmission (HWR) Measure

This chapter addresses questions about measure methodology for the CMS 30-day risk-standardized hospital-wide all-cause unplanned readmission measure, referred to in this chapter as “the HWR measure.” The CMS 30-day risk-standardized unplanned readmission measures for AMI, COPD, HF, pneumonia, and stroke are referred to as the “condition-specific readmission measures.”

Rationale

1. Why measure hospital-wide readmissions?

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, the HWR measure provides a broad assessment of the quality of care at hospitals for all conditions. The measure reports the hospital-level, risk-standardized rate of all-cause unplanned readmission within 30 days of hospital discharge for all conditions.

Data Sources and Years

2. What are the data sources used to calculate the HWR measure?

The HWR measure results are based on Medicare claims and enrollment data for hospital discharges that occurred between July 1, 2012 and June 30, 2013. The deadline for the submission of claims that are used in the 2014 reporting was September 27, 2013.

The data used to calculate the HWR measure come from the following sources:

- Hospital inpatient claims are used to identify eligible index admissions and capture their relevant characteristics.
- Hospital inpatient claims are also used to characterize comorbidities as documented during the index admission and in the year before the index admission to capture a comprehensive view of patients’ medical histories.
- The Medicare Enrollment Database is used to obtain beneficiary demographic and mortality information.
- Finally, readmissions are identified by subsequent hospital inpatient claims for short-term acute care and critical access hospitals.

3. Why does the measurement period for the HWR measure differ from that of the other risk-standardized outcome measures?

Because the HWR measure captures most hospital admissions, one year of data provides a sufficient number of cases per hospital to estimate the risk-standardized readmission rate.
By contrast, the other measures use three years of data to ensure a sufficient number of cases per hospital to estimate the risk-standardized rates reliably.

**Cohort Inclusion and Exclusion Criteria**

4. What are the inclusion and exclusion criteria for the HWR measure?

**Inclusion Criteria**

The HWR measure includes index admissions for patients who:

- Are enrolled in Medicare fee-for-service (FFS).
- Are aged 65 years or older at the time of their admission.
- Are discharged from an inpatient stay at a non-federal short-term acute care hospital.
- Are discharged alive from the index hospitalization, since only these patients have the opportunity for readmission.
- Were not transferred to another acute care facility. (The measure considers these multiple contiguous hospitalizations as a single acute episode of care, and readmission for transferred patients is attributed to the hospital that ultimately discharges the patient to a non-acute care setting.)
- Were enrolled in Medicare Part A for the 12 months prior to the date of the index admission (in order to have a full year of data for risk adjustment).

The measure categorizes individual International Classification of Disease, Ninth Revision (ICD-9-CM) codes into categories using the Agency for Healthcare Research and Quality Clinical Classification Software (CCS). The CCS groups thousands of individual procedure and diagnosis codes into clinically coherent, mutually exclusive categories. For a listing of the CCS diagnosis and procedure categories included in the measure, see Table D.2, Table D.4, Table D.5, Table D.6, and Table D.7 in Appendix D of the 2014 HWR Measure Updates and Specifications Report, posted at Hospitals – Inpatient > Claims-Based Measures > Readmission Measures > Measure Methodology on the QualityNet website.

**Exclusion Criteria**

After selecting admissions meeting the above inclusion criteria, the HWR measure excludes index admissions for patients who:

- Were admitted to Prospective Payment System (PPS)-exempt cancer hospitals.
- Were not enrolled in FFS Medicare for at least 30 days after discharge, because the 30-day readmission outcome cannot be assessed in this group.
- Left against medical advice (AMA), since providers did not have the opportunity to deliver full care and prepare the patient for discharge.
- Were admitted for primary psychiatric diagnoses or rehabilitation. These patients are typically cared for in separate psychiatric or rehabilitation centers that are not comparable to acute care hospitals.
- Were admitted for medical treatment of cancer. These admissions have a very different readmission profile than the rest of the Medicare population, and outcomes for these admissions do not correlate well with outcomes for other admissions.
For the specific CCS categories excluded from the measure, see Table D.1 and Table D.3 in Appendix D of the 2014 HWR Measure Updates and Specifications Report, posted at Hospitals – Inpatient > Claims-Based Measures > Readmission Measures > Measure Methodology on the QualityNet website.

5. How does the HWR measure handle cancer patients?

The HWR measure excludes admissions for the medical treatment of cancer (for example, maintenance chemotherapy). Admissions for cancer treatment have a very different mortality and readmission profile than typical admissions for the Medicare population, and outcomes for these admissions do not correlate well with outcomes for other admissions.

The measure continues to include patients with cancer who are admitted for other diagnoses or for surgical treatment of their cancer.

More details, including a list of excluded cancer discharge condition categories, are found in Appendix D of the 2014 HWR Measure Updates and Specifications Report, posted at Hospitals – Inpatient > Claims-Based Measures > Readmission Measures > Measure Methodology on the QualityNet website.

6. How does the HWR measure handle transferred patients?

Readmissions for transferred patients are attributed to the hospital that ultimately discharges the patient to the non-acute care setting (for example, home or skilled nursing facility). For patients who are transferred between one acute care hospital and another, the HWR measure considers these multiple hospitalizations as a single acute episode of care.

Transfer patients are identified by tracking claims for inpatient short-term acute care hospitalizations over time. The HWR measure identifies a transfer if there is a second inpatient admission that occurs on the same day or the next calendar day following discharge from the first eligible inpatient admission at a different short-term acute care hospital, regardless of principal diagnosis.

7. What are specialty cohorts? How are patients assigned to specialty cohort groups in the HWR measure?

After applying the inclusion/exclusion criteria described in question 5 above, each admission is assigned to one of five mutually exclusive specialty cohorts: medicine, surgery/gynecology, cardiorespiratory, cardiovascular, and neurology.

The specialty cohorts reflect how care for patients is organized within hospitals. To assign admissions to specialty cohorts, the measure screens each index admission and first assigns admissions for eligible surgical procedures to the surgical cohort, regardless of the diagnosis code. Then the measure assigns all remaining index admissions to the appropriate specialty cohort based on the principal discharge diagnosis.

More information on the assignment of patients to specialty cohort groups is available in Appendix D of the 2014 HWR Measure Updates and Specifications Report, posted at Hospitals – Inpatient > Claims-Based Measures > Readmission Measures > Measure Methodology on the QualityNet website.
**Defining Readmission**

8. What admissions are considered readmissions in the HWR measure, and what types of admissions are not considered readmissions?

In the CMS readmission measures, a patient who had an eligible index admission is considered “readmitted” if he or she has one or more unplanned inpatient admissions at a short-term acute care hospital within 30 days of discharge from the original index hospitalization.

The following types of admissions are not considered readmissions in the HWR measure:

- Planned readmissions (see Question 12).
- Same-day readmissions to the same hospital for the same principal diagnosis. This is because CMS rules already require Prospective Payment System (PPS) hospitals to combine same-day, same-condition readmissions into a single claim. Thus, such readmissions are considered a continuation of the index admission.
- Observation stays and emergency department (ED) visits. These are not inpatient admissions and therefore are not considered potential readmissions.
- Admissions to facilities other than short-term acute care hospitals. Facilities such as rehabilitation centers, psychiatric hospitals, hospice facilities, long-term care or long-term acute care hospitals, and skilled nursing facilities do not meet the definition of a short-term acute hospital, and admissions to these facilities are not considered for the readmission outcome.
- Admissions that occur at eligible short-term acute care hospitals, but where the patient is admitted to a separate, non-inpatient unit – such as separate units for rehabilitation, psychiatric care, hospice care, or long-term care – that bills under a separate CMS Certification Number (CCN). Such admissions are not inpatient admissions and therefore are not considered as readmissions.

9. Why does the HWR measure use a 30-day outcome timeframe?

CMS chose to measure readmission within 30 days of discharge because 30 days is a clinically sensible and meaningful timeframe for measuring hospital performance. Thirty days is a standard period that can be strongly influenced by hospital care and the early transition to the outpatient setting.

The use of the 30-day timeframe also emphasizes the importance of transitions of care and patients’ suitability for discharge. Actions taken by hospital staff while preparing to transition the patient to outpatient status can minimize a patient’s risk for adverse outcomes, as can collaboration and communication between the inpatient and outpatient providers within a community. Hospitals in collaboration with their medical communities can take actions to reduce 30-day readmission, such as:

- Ensuring patients are clinically ready for discharge
- Reducing the risk of infection
- Reconciling medications
- Improving communication among providers involved in the transition of care
- Encouraging strategies that promote disease management principles
• Educating patients about symptoms to monitor, whom to contact with questions, and where and when to seek follow-up care

10. How is the 30-day outcome timeframe defined in the HWR measure?

For the HWR measure, the 30-day outcome timeframe starts on the day the patient is discharged from the index admission and extends for 30 days after that. For example, the outcome window for a patient who is discharged from an index admission on January 1 would be January 1 - 31.

11. How does the HWR measure handle same-day readmissions?

The HWR measure does not consider patients as “readmitted” if they had a same-day readmission to the same hospital with the same principal discharge diagnosis. This is done to put all hospitals on a level playing field, since CMS rules already require Prospective Payment System (PPS) hospitals to combine same-day, same-condition readmissions into one claim. These readmissions thus appear in the claims data as a continuation of the index admission.

However, note the HWR measure does consider patients as “readmitted” if they had an eligible readmission to the same hospital on the same day for a different principal diagnosis.

12. Will a patient be considered readmitted in the HWR measure if he or she was readmitted for a planned surgery?

No, the CMS readmission measures do not consider planned readmissions as part of the readmission outcome. Generally speaking, planned readmissions are not a signal of quality of care. Therefore, CMS has worked with experts in the medical community as well as other stakeholders to carefully identify procedures and treatments that should be considered “planned,” and thus not considered in the readmission outcome.

Starting with the 2013 public reporting, the measures identify planned readmissions by using an expanded algorithm, which is a set of criteria for classifying readmissions as planned using Medicare claims. This algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital. The algorithm is based on three principles:

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

CMS conducted a validation study of the planned readmission algorithm using medical record data from 634 charts at seven hospitals. For the 2014 public reporting, Version 3.0 of the algorithm includes modifications to enhance the accuracy of the algorithm based on the study findings.
For details of the planned readmission algorithm as applied to the HWR measure, refer to the 2014 HWR Measure Updates and Specifications Reports, posted at Hospitals – Inpatient > Claims-Based Measures > Readmission Measures > Measure Methodology on the QualityNet website.

13. Does the HWR measure count multiple unplanned readmissions within 30 days as multiple readmissions? Are any of these multiple readmissions considered as new index admissions?

A patient’s readmission status is based on the occurrence of any unplanned readmission, and not on the number of unplanned readmissions. For each eligible index admission, the HWR measure assigns the patient a “readmitted” status if, within 30 days after discharge from the hospital, the patient had one or more eligible unplanned readmissions.

Unlike the condition-specific readmission measures, a readmission in the HWR measure can also be considered as a new index admission if it meets all measure inclusion and exclusion criteria.

Note that once a planned readmission occurs, the measures stop looking for unplanned readmissions during the remainder of the 30-day post-discharge period. For example, if a patient has a planned readmission followed by an unplanned readmission all within 30 days of discharge from the original index admission, this patient would have a readmission status of “not readmitted” because the first readmission was planned. This is done because it is unclear whether the unplanned readmission should be attributed to the care received during the index hospitalization or the intervening planned readmission.

Risk Adjustment and Measure Calculation

14. What risk factors are used for risk adjustment? Which diagnosis codes are included in each clinical risk factor?

The HWR measure adjusts for age and a wide variety of clinical risk factors. You can find a list of the risk factors for each specialty cohort model in Tables D.8 – D.13 of the 2014 HWR Measure Updates and Specifications Report, available at Hospitals – Inpatient > Claims-Based Measures > Readmission Measures > Measure Methodology on the QualityNet website. In addition, your Hospital-Specific Report (HSR) presents the prevalence of each risk factor for your patients, compared to state and national averages.

The diagnosis codes for the comorbid risk factors are defined using the CMS Condition Categories (CC), which are clinically relevant diagnostic groups of the more than 15,000 ICD-9-CM codes. A crosswalk of CCs to ICD-9-CM codes is posted at Hospitals – Inpatient > Claims-Based Measures > Readmission Measures > Resources on the QualityNet website.

The diagnosis codes for the discharge diagnosis categories used in the service mix adjustment are defined using the Agency for Healthcare Research and Quality Clinical Classifications Software (CCS) diagnosis map. A crosswalk of CCS procedure categories to ICD-9-CM codes is available at Hospitals – Inpatient > Claims-Based Measures > Readmission Measures > Resources on the QualityNet website.
15. How are the risk-standardized readmission rates (RSRRs) and standardized readmission ratios (SRRs) calculated for the HWR measure?

In the HWR measure, admissions are assigned to one of five mutually exclusive specialty cohort groups consisting of related conditions or procedures. For each specialty cohort group, the measure calculates a standardized readmission ratio (SRR), which is the ratio of the number of “predicted” readmissions to the number of “expected” readmissions. For each hospital, the numerator of the SRR is the number of readmissions within 30 days predicted on the basis of the hospital’s performance with its observed case mix and service mix. The denominator is the number of readmissions expected on the basis of the performance of an average hospital with the same case mix and service mix.

This approach is analogous to a ratio of “observed” to “expected” used in other types of statistical analyses. Thus, an SRR of less than one indicates a lower-than-expected readmission rate (or better quality), and a ratio of greater than one indicates a higher-than-expected readmission rate (or worse quality).

The specialty cohort SRRs are then pooled for each hospital using a volume-weighted geometric mean to create a hospital-wide composite SRR. The composite SRR is multiplied by the national observed readmission rate to produce the hospital’s risk-standardized readmission rate (RSRR).

For more information on the risk-adjustment model and details on the statistical approach used to determine the predicted and expected rates, see the Hospital-Wide Readmission Technical Report posted at Hospitals – Inpatient > Claims-Based Measures > Readmission Measures > Measure Methodology on the QualityNet website.

16. Will hospitals be able to replicate the RSRRs for the purpose of validation?

No, hospitals will not be able to replicate the risk-standardized readmission rates (RSRRs) independently. While hospitals have access to the inclusion/exclusion criteria and risk-adjustment coefficients used, the model requires input of patient longitudinal data across care settings and data from the entire national sample to estimate hospital-specific effects used in the equations.

However, you may use the published HWR measure specifications to validate the size of your measure cohort and your hospital-specific report (HSR) to validate the patients in your cohort who qualified as “readmitted.”

To be transparent in how the RSRRs are calculated, CMS has made the measure calculation methodology (including the condition category algorithm) available on QualityNet. Hospitals may also request a copy of the SAS software used to estimate the RSRRs by emailing cmsreadmissionmeasures@yale.edu. However, please note that CMS does not provide training, consultations, or technical assistance for using the software.
17. Where can I find more information about how the RSRRs are calculated?

The best sources of information on the HWR risk-adjustment model are the original methodology report and the annual measure updates and specifications reports posted at Hospitals – Inpatient > Claims-Based Measures > Readmission Measures > Measure Methodology on the QualityNet website.

Additional references on the readmission measures and the statistical models used can also be found in the published literature section at Hospitals – Inpatient > Claims-Based Measures > Readmission Measures > Published Literature on the QualityNet website.

Hospital Performance

18. My hospital is interested in conducting a quality improvement program to understand and reduce our readmission rates. How can I best track my hospital’s performance on the HWR measure?

The HWR measure is not designed for hospitals’ internal quality tracking purposes, since it is a measure of each hospital’s performance relative to the national readmission rate during a given period of time. However, your hospital may choose to track its raw hospital-wide readmission rate for quality improvement purposes.

For that purpose, you may use for your denominator the number of index admissions that meet the HWR measure inclusion and exclusion criteria (described in Question 4) within the dates of interest. Your numerator should be the number of eligible patients who had an unplanned readmission within 30 days of discharge from their index admission.

The numerator should not include patients who had a planned readmission within 30 days of discharge from the index admission, even if they were later readmitted for unplanned care.

Please note that an internally calculated raw rate will not capture readmissions that occurred at other hospitals. Additionally, the raw rate will not capture major changes to your hospital’s case mix and service mix that affect your risk-standardized rate. If your hospital’s case mix, service mix, and the proportion of patients readmitted to other hospitals are stable over time, your raw rates can be used to track internal improvement over time.
Chapter 4. Condition-Specific Mortality Measures for Acute Myocardial Infarction (AMI), Chronic Obstructive Pulmonary Disease (COPD), Heart Failure (HF), Pneumonia, and Stroke

This chapter addresses questions about measure methodology for the CMS 30-day risk-standardized mortality measures for AMI, COPD, HF, pneumonia, and stroke, referred to in this chapter as the “mortality measures”.

Rationale

1. Why did CMS specifically choose to measure mortality for patients with AMI, COPD, HF, pneumonia, and stroke?

The mortality measures focus on AMI, COPD, HF, pneumonia, and stroke because they are common conditions with substantial mortality and morbidity and are part of the core process and outcome measure sets that are currently reported on Hospital Compare. These conditions impose a substantial burden on patients and the healthcare system, and there is marked variation in outcomes by institution.

CMS uses the AMI, HF, and pneumonia mortality measures for hospital payment determination as part of the Hospital Value-Based Purchasing Program.

Data Sources and Years

2. What data are used to calculate the mortality measure results?

The mortality measure results are based on administrative claims and enrollment data for patients with inpatient admissions that occurred between July 1, 2010 and June 30, 2013. The Medicare claims are final action claims and were processed as of September 27, 2013.

The data used to calculate the mortality measures come from the following sources:

- Medicare Inpatient, Outpatient, and Physician administrative claims data
- The Medicare Enrollment Database (used to obtain beneficiary demographic and mortality information for CMS beneficiaries with an index admission within a non-federal hospital)
- Administrative data from the National Patient Care Database for those patients with an index hospitalization within the VA (VA data is used for the AMI, HF, and pneumonia readmission measures only)
Cohort Inclusion and Exclusion Criteria

3. What are the inclusion and exclusion criteria for the mortality measures?

Inclusion Criteria

The mortality measures, AMI, COPD, HF, pneumonia, and stroke, include index hospital admissions for patients who:

- Are Medicare fee-for-service (FFS) enrollees admitted for inpatient care at non-federal short-term acute care hospitals.
- Are at least 65 years of age at the time of their admission.
- Have a principal discharge diagnosis of one of the following conditions at the index hospitalization:
  - For the AMI measure: 410.00, 410.01, 410.10, 410.11, 410.20, 410.21, 410.30, 410.31, 410.40, 410.41, 410.50, 410.51, 410.60, 410.61, 410.70, 410.71, 410.80, 410.81, 410.90, and 410.91
  - For the COPD measure: 491.21, 491.22, 491.8, 491.9, 492.8, 493.20, 493.21, 493.22, 496, and principal diagnosis of 518.81, 518.82, 518.84, 799.1 when combined with a secondary diagnosis of acute exacerbation of COPD (491.21, 491.22, 493.21, 493.22)
  - For the HF measure: 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 428.0, 428.1, 428.20, 428.21, 428.22, 428.23, 428.30, 428.31, 428.32, 428.33, 428.40, 428.41, 428.42, 428.43, and 428.9
  - For the pneumonia measure: 480.0, 480.1, 480.2, 480.3, 480.8, 480.9, 481, 482.0, 482.1, 482.2, 482.30, 482.31, 482.39, 482.40, 482.41, 482.42, 482.49, 482.81, 482.82, 482.83, 482.84, 482.89, 482.9, 483.0, 483.1, 483.8, 485, 486, 487.0, and 488.11
  - For the stroke measure: 433.01, 433.11, 433.21, 433.31, 433.81, 433.91, 434.01, 434.11, and 434.91.
- Were not transferred in from another acute care hospital or VA hospital (the acute episode is included in the measure but the death is attributed to the hospital where the patient was initially admitted rather than the hospital receiving the transferred patient).
- Were enrolled in Part A and Part B Medicare for the 12 months prior to the date of the index admission (in order to have a full year of data for risk adjustment).

The AMI, HF, and pneumonia measures also include Veterans Health Administrative (VA) beneficiaries and patients admitted to VA hospitals. Note that the requirement for 12 months of Medicare Parts A and B enrollment is dropped for patients with an index admission at a VA hospital.

Exclusion Criteria

After selecting admissions meeting the above inclusion criteria, the measures exclude index admissions for patients who:
• Were admitted for AMI, HF, or pneumonia and discharged alive on the day of admission or the following day who were not transferred, because it is unlikely they had a clinically significant diagnosis of AMI, HF, or pneumonia;
• Left against medical advice (AMA), since providers did not have the opportunity to deliver full care and prepare the patient for discharge;
• Had inconsistent or unknown vital status or other unreliable data (for example, where date of death precedes date of admission); or
• Were enrolled in the Medicare hospice program or used VA hospice services any time in the 12 months prior to the index admission, including the first day of the index admission, since it is likely these patients are continuing to seek comfort measures only.

After applying exclusion criteria above, if a patient has multiple eligible index admissions in a calendar year, one admission is randomly selected and the other eligible index admissions are excluded in that year.

Additionally, when two randomly selected admissions occur during the transition months (June and July for the public reporting data) and the patient subsequently dies, then only the first admission to occur in the 30 days prior to the patient's death is included. All other admissions in that 30-day period are excluded. This exclusion criterion is applied after one admission per patient per year is randomly selected so that a single death will not be assigned to two admissions in two separate reporting periods. (See Question 9 in this chapter for more details on how the mortality measures handle multiple admissions.)

An index hospitalization is any admission included in the measure calculation as the initial admission for an episode of AMI, COPD, HF, pneumonia, or stroke care.

Note: Effective in 2014, CMS modified how the measure cohort selection criteria are referenced. While this does not impact the outcome measure calculation or results (because the resulting measure cohort stays the same), it does change the values assigned to the inclusion/exclusion indicator(s) in the Hospital-Specific Report.

4. Why are respiratory failure patients included in the COPD mortality measure?

COPD consists of a group of lung diseases characterized by airway obstruction. Patients hospitalized for an acute exacerbation of COPD present with varying degrees of severity ranging from a worsening of baseline symptoms (dyspnea, cough, and/or sputum) to respiratory failure. To capture the full spectrum of severity of illness of patients hospitalized for an acute exacerbation of COPD, we include patients with a principal diagnosis of COPD, as well as those with a principal diagnosis of respiratory failure who had a secondary diagnosis of an acute exacerbation of COPD. Requiring an acute exacerbation of COPD as a secondary code identifies respiratory failure due to COPD exacerbation versus another condition (for example, heart failure).
5. **Why are patients with chronic obstructive asthma (asthma with COPD) included in the COPD mortality measure?**

Chronic obstructive asthma is part of the spectrum of COPD. Inclusion of these patients reduces biases due to regional variation in diagnostic and coding practices. Coding can be subjective for COPD/asthma patients, as it is often difficult for physicians to differentiate between patients with asthma and patients with COPD. Additionally, the two conditions can coexist. In the COPD/asthma group, a diagnosis of COPD is frequently overlooked for some patients, or misdiagnosed as asthma, including women and patients of low-socioeconomic status. Moreover, expert input during development of the COPD mortality measure supported the inclusion of chronic obstructive asthma patients.

6. **Why limit the stroke mortality measure cohort to patients hospitalized with ischemic stroke only?**

Based on consultation with clinical experts, CMS chose to limit the measure to ischemic stroke hospitalizations for a few reasons. First, ischemic strokes are the most common type of stroke, accounting for the vast majority of stroke hospitalizations. Second, the causes and prognosis of ischemic stroke are quite different than those of hemorrhagic stroke, so a combined cohort would be more heterogeneous. This heterogeneity could make it more difficult to account for a hospital’s case mix. Similarly, the cohort does not include patients with transient ischemic attacks (TIAs) largely due to concerns about inconsistency in the use of administrative codes to define TIA and potential for inclusion of patients without cerebrovascular conditions.

7. **Do the mortality measures exclude hospice patients?**

Yes, the 30-day mortality measures exclude patients who were enrolled in the Medicare or VA hospice programs at any time during the 12 months prior to the index admission or on the first day of the index admission.

Some stakeholders have recommended that CMS exclude not only patients enrolled in hospice at admission, but also patients who choose comfort care at any point during the index admission. CMS recognizes that in some cases, death is the anticipated outcome of a long, complicated illness, rather than an adverse event stemming from a failure of the healthcare system. However, consistent with guidelines for healthcare quality outcome measures, the mortality measures do not exclude patients who transition to hospice or palliative care during their hospital stay. Such transitions may be the result of quality failures that have led to poor clinical outcomes. Thus, excluding these patients could mask quality problems. Importantly, use of palliative care, in contrast to hospice care, is not necessarily an indication that a patient is no longer seeking life-sustaining measures. Palliative care is focused on providing patients relief of symptoms. It is increasingly used by patients who are not at the end of life and, therefore, should not be used to exclude patients from a mortality measure. For the vast majority of patients admitted for AMI, COPD, HF, pneumonia, and stroke, the goal of their hospitalization is survival.

The mortality measures continue to adjust for a number of factors associated with the likelihood that patients are at the end of their lives, including protein-calorie malnutrition,
metastatic cancer, dementia, and age, so that hospitals treating older, sicker patients can be fairly evaluated.

Finally, the intent of a mortality measure is not to convey that all deaths are the result of poor care. In certain cases, the best quality care may ultimately result from supporting patients’ goals and comfort needs at the end of life rather than prolonging life. While the goal is not to reach zero deaths, the premise is that there are many preventable deaths. Given that the mortality measures are relative measures of performance, knowledge of a hospital’s performance compared to what might be expected given its case mix is helpful in supporting efforts to improve outcomes.

8. How are transferred patients handled in the 30-day mortality measures?

For patients whose index admission includes one or more transfers between hospitals, the mortality outcome is attributed to the hospital where the patient was first admitted.

A patient who is later transferred to another hospital will not be included in the measure cohort of the receiving hospital. On the other hand, patients who are seen in the emergency department only (that is, who are not admitted to an inpatient acute care bed) and later are transferred to another hospital are included in the measure cohort at the receiving hospital because that is the first hospital that admits the patient to an inpatient acute care bed.

Assigning outcomes to the first admitting hospital has two advantages:

1. It allows for assessment of the broader system of care and how well Medicare and VA patients are being served. Actions taken at the admitting hospital, during the transfer, and at the receiving hospital all can affect outcomes. CMS hopes this approach will encourage coordination between hospitals and their referral networks.
2. It avoids creating an incentive for hospitals to transfer to other institutions patients who are critically ill and at high risk of dying. Although it is unlikely that hospitals would act on such an incentive, it is important that the measures do not create incentives for actions that may not be in the best interest of the patient.

Transfer patients are identified by tracking claims for inpatient short-term acute care hospitalizations over time. The measures identify a transfer if the following criteria are met:

- A patient has an inpatient admission to another short-term acute care hospital(s) that occurs on the same day as or the next day following discharge from the first eligible admission.
- The principal discharge diagnosis for each individual hospitalization in the transfer chain must be the same. (See Question 3 above for more information on inclusion and exclusion criteria).

Note that since the COPD measure cohort is selected based on primary and secondary discharge diagnoses, individual hospitalizations in a COPD patient’s transfer chain must have qualifying principal and secondary diagnosis codes that meet the COPD measure’s inclusion criteria.
9. How do the mortality measures handle patients who have multiple admissions with the same principal discharge diagnosis during the measurement period?

CMS uses a three-year measurement period of discharges (July 2010-June 2013 for 2014 public reporting) to calculate the mortality measures. However, because AMI, COPD, HF, pneumonia, and stroke patients commonly have multiple admissions in a year, the mortality measures include one randomly selected admission per patient per year per condition.

Thus, a single patient can contribute a maximum of three admissions during the measurement period for each mortality measure. If a patient dies within 30 days of the index admission date, that patient’s death is assigned to the hospital where the randomly selected index admission occurred, even if the patient was readmitted to another hospital before their death. Because the selection is random, this approach should not bias the model’s results against any hospital.

**Outcome Timeframe**

10. Why do the mortality measures use a 30-day outcome timeframe?

CMS chose to measure mortality within 30 days of admission because 30 days is a clinically sensible and meaningful timeframe for measuring hospital performance. Thirty days is a standard period that can be strongly influenced by hospital care and the early transition to the outpatient setting. The standard period is necessary so that the outcome for each patient is measured consistently; research has shown that measures not based on a standard follow-up period, such as in-hospital mortality measures, systematically favor hospitals with shorter lengths of stay (Drye et al., 2012).

The use of the 30-day timeframe also emphasizes the importance of transitions of care and patients’ suitability for discharge. Actions taken by hospital staff while preparing to transition the patient to outpatient status can minimize a patient’s risk for adverse outcomes, as can collaboration and communication between the inpatient and outpatient providers within a community.

11. How is the 30-day outcome timeframe defined in the mortality measures?

In the CMS mortality measures, the 30-day outcome timeframe starts the day the patient is admitted for the index admission and extends for 30 days after that. For example, the outcome window for a patient who is admitted on January 1 would be January 1 - 31.

**Risk Adjustment and Measure Calculation**

12. What are the risk factors used for risk adjustment? Which diagnosis codes are included in each risk factor?

Each of the mortality measures adjusts for age, as well as a wide variety of clinical risk factors. The number of risk factors ranges across the mortality measures. You can find a list
of the risk factors for each measure in the 2014 Mortality Measures Updates and Specifications Report. Refer to Table D.1.2 for the AMI measure, Table D.4.2 for the COPD measure, Table D.2.2 for the HF measure, Table D.3.2 for the pneumonia measure, and Table D.5.2 for the stroke measure.

The 2014 Mortality Measures Updates and Specifications Report is available at Hospitals – Inpatient > Claims-Based Measures > Mortality Measures > Measure Methodology on the QualityNet website. In addition, your Hospital-Specific Report (HSR) presents the prevalence of each risk factor for your patients, compared to state and national averages.

Some of the patient risk factors are grouped using the CMS Condition Categories (CC) classification. A crosswalk of CCs to ICD-9-CM codes is available at Hospitals – Inpatient > Claims-Based Measures > Mortality Measures > Resources on the QualityNet website.

13. How are the risk-standardized mortality rates (RSMRs) calculated?

The RSMRs are calculated as the ratio of the number of “predicted” deaths to the number of “expected” deaths, multiplied by the national observed mortality rate. For each hospital, the numerator of the ratio is the number of deaths within 30 days predicted on the basis of the hospital’s performance with its observed case mix. The denominator is the number of deaths expected 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 a ratio of less than one indicates a lower-than-expected mortality rate (or better quality), and a ratio of greater than one indicates a higher-than-expected mortality rate (or worse quality).

For details on the statistical approach used to determine the predicted and expected rates, please refer to the measure methodology and measures maintenance reports posted at Hospitals – Inpatient > Claims-Based Measures > Mortality Measures > Measure Methodology on the QualityNet website.

14. Will hospitals be able to replicate the RSMRs for the purpose of validation?

No, hospitals will not be able to replicate the risk-standardized mortality rates (RSMRs) independently. While hospitals have access to the inclusion/exclusion criteria and risk adjustment coefficients used, the model requires input of patient longitudinal data across care settings and data from the entire national sample to estimate the hospital-specific effects used in the equations. Please note that although hospital-specific effects are provided to hospitals as part of the Hospital Value-Based Purchasing Program Hospital-Specific Report, they will not be the same for the IQR results.

However, you can validate the cohort used to calculate your hospital’s mortality measures using the discharge-level information contained in your hospital’s Hospital-Specific Report, available via the QualityNet Secure Portal.
To be transparent in how the RSMRs are calculated, CMS has made the measure calculation methodology (including the condition category algorithm) available on QualityNet. Hospitals may also request a copy of the SAS software used to estimate the RSMRs by emailing cmsmortalitymeasures@yale.edu. However, please note that CMS does not provide training, consultations, or technical assistance for using the software.

15. Where can I find more information about how the RSMRs are calculated?

The best sources of information on the risk-adjustment models are the methodology reports, and measure updates reports posted at Hospitals – Inpatient > Claims-Based Measures > Mortality Measures > Measure Methodology on the QualityNet website.

Additional references on the mortality measures and the statistical model used can also be found in the published literature section at Hospitals – Inpatient > Claims-Based Measures > Mortality Measures > Published Literature on the QualityNet website.

How the Measures are Related

16. Why is the number of patients included in the AMI mortality measure different from the corresponding AMI payment measure?

CMS developed the AMI payment measure to align with existing AMI quality-of-care measures – specifically, the AMI mortality measure – in order to facilitate profiling of hospital value. However, largely due to data requirements for calculating the payment outcome, there are some differences in the cohorts for the two measures.

For example, the AMI mortality and AMI payment measures differ in that:

- The mortality measure includes patients admitted to Veterans Health Administration (VA) hospitals. The payment measure does not include these patients.
- The payment measure excludes patients for whom payment data is unavailable: patients who were transferred to a federal hospital (such as a VA hospital), and patients whose AMI index hospitalization that could not be located in the CCW data.
- The payment measure excludes patients whose index hospitalization had a missing index DRG weight and the index facility received no payment.

17. How do the mortality measures’ patient cohorts compare to the patient populations used in the core process of care measures?

For the December 2014 public reporting, the patient population for the 30-day mortality measures differs from that included in the core process measures in the following ways:

- For the 30-day mortality measures, only Medicare FFS patients and patients admitted to VA hospitals aged 65 and over were included in the cohorts.
- For the mortality measures, patients transferred out to a second hospital after admission were assigned to the first (index) hospital admission.
For the mortality measures, one hospitalization per patient per year per condition (AMI, COPD, HF, pneumonia, or stroke) was randomly selected for inclusion after applying the other exclusion criteria.

The pneumonia mortality measure includes certain viral pneumonias that are excluded from the core measures.

The pneumonia mortality measure includes only patients with a principal diagnosis of pneumonia; in contrast, the pneumonia core measures include patients who had a principal diagnosis of septicemia or respiratory failure and a secondary diagnosis of pneumonia.

Each of the AMI, COPD, HF, pneumonia, and stroke process measures only includes a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).

**Hospital Performance**

18. My hospital is interested in conducting a quality improvement program to understand and reduce our mortality rates. How can I best track my hospital’s performance on the mortality measures?

CMS’s risk-standardized mortality rates are not designed for hospitals’ internal quality tracking purposes, since they are measures of each hospital’s performance relative to the national mortality rate during a given period of time. However, your hospital may choose to track its raw mortality rates for quality improvement purposes. Your Hospital-Specific Report (HSR) provides you with detailed information on the inpatient admissions that were used to calculate your mortality measure results (covering a 3-year performance period). If you wish to calculate your raw mortality rate for a time period outside the HSR performance period, you may include in your cohort (denominator) the number of index admissions at your hospital that fulfill the inclusion and exclusion criteria described in Question 3 for the condition of interest (AMI, COPD, HF, pneumonia, or stroke) within the date range of interest. Your numerator should be the number of eligible patients who died within 30 days of the index admission.

Please note that an internally calculated raw rate will not capture major changes to your hospital’s case mix that affect risk-standardized mortality rates, nor will it include deaths that occurred outside the hospital. However, if your hospital’s case mix and the proportion of in-hospital deaths are stable over time, your raw rate can be used to track improvement over time.

19. How do the mortality measures in the Hospital IQR Program relate to the calculations used in the VBP program?

Although the Hospital Value-Based Purchasing (VBP) program and the Hospital Inpatient Quality Reporting (IQR) program use the same measure methodology, the two programs use different sets of hospitals and different discharge dates when calculating mortality measure results. Therefore, the selection of index admissions and deaths for the Hospital VBP calculations will differ from those used in the IQR programs.

Hospitals and data used in the two programs differ in the following ways:
• The IQR program includes Veterans Health Administration (VA) hospitals in the calculation of the AMI, HF, and pneumonia measures. These hospitals are not included in Hospital VBP.

• Hospital VBP includes subsection (d) hospitals, as well as hospitals in Maryland participating in the All-Payer Model.¹ By contrast, the IQR measure results are calculated using a more expansive group of hospitals, including critical access hospitals, cancer hospitals, and hospitals located in the U.S. territories, which are not subsection (d).

• The VBP program also excludes hospitals who received a payment reduction under Hospital IQR that fiscal year, hospitals cited for deficiencies that may cause immediate jeopardy to patients during the performance period, and hospitals lacking the minimum number of measures or cases per measure required to calculate a score.

• The Hospital IQR program uses a three-year period of data to calculate the mortality measures, while the VBP program uses a nine-month data period to calculate the measures for the FY 2015 program.

• The VBP program compares hospital performance on the measures against an achievement threshold and benchmark. The Hospital IQR Program does not use benchmarks; it compares hospitals' risk-standardized mortality rates (RSMRs) and their interval estimates against the national observed mortality rate for each condition to classify hospitals into performance categories for public reporting.

For the most up-to-date information about the VBP program, visit: http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/hospital-value-based-purchasing/index.html

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¹ Maryland hospitals have been waived from the Federal Fiscal Year (FY) 2015 Hospital VBP, and will not receive payment adjustments under the program. However, Maryland hospitals are included in the FY 2015 calculations of mortality measure results.
Chapter 5. Total Hip Arthroplasty (THA) And/Or Total Knee Arthroplasty (TKA) Readmission and Complication Measures

This chapter addresses questions about measure methodology for two measures:

1. The CMS 30-day risk-standardized unplanned readmission measure for elective total hip arthroplasty (THA) and/or total knee arthroplasty (TKA), referred to in this chapter as the “THA/TKA readmission measure”
2. The CMS risk-standardized complication measure for elective total hip arthroplasty (THA) and/or total knee arthroplasty (TKA), referred to in this chapter as the “THA/TKA complication measure”.

Rationale

1. Why measure readmission and complications for THA and TKA specifically?

THA and TKA are not only commonly performed procedures that improve quality of life, but their prevalence is on the rise. The variation in both readmission and complication rates after elective primary THA and TKA procedures across hospitals suggests differences in quality of care at the hospital level.

These measures focus on elective primary THA/TKA readmission and complication rates to inform healthcare providers about opportunities to improve care, strengthen incentives for quality improvement, and eventually enhance health outcomes for Medicare beneficiaries.

CMS also began using the THA/TKA readmission measure for hospital payment determination as part of the Hospital Readmissions Reduction Program effective FY 2015.

2. What is the benefit of measuring both readmissions and complications following elective primary THA/TKA?

The two measures are complementary measures that assess different domains of quality. The complication measure will inform quality improvement efforts targeted toward minimizing medical and surgical complications during surgery and the postoperative period. The readmission measure assesses the quality of the patient’s overall hospital care and transition to the outpatient setting.
Data Sources and Years

3. What data are used to calculate the THA/TKA readmission and complication measure results?

The THA/TKA readmission and complication measure results are based on Medicare claims and enrollment data for hospital discharges between July 1, 2010 and June 30, 2013 (for the readmission measure) and between April 1, 2010 and March 31, 2013 (for the complication measure). The deadline for the submission of claims that are used in the 2014 reporting was September 27, 2013. The data come from the following sources:

- Medicare Inpatient, Outpatient, and Physician Health Account Joint Information (HAJI) claims (used to characterize comorbidities as documented during the index admission and in the year before the index admission to capture a comprehensive view of patients' medical histories)
- The Medicare Enrollment Database (used to obtain beneficiary demographic and mortality information)

Readmissions and complications are identified in subsequent hospital inpatient claims for short-term acute care and critical access hospitals.

4. Why did the performance period for the THA/TKA complication measure change from 33 to 36 months?

When CMS first began publicly reporting the THA/TKA complication measure, the results were based on a 33-month performance period. While CMS had 3 years of data available to calculate the complication measure, the last three months of data were dedicated to capture specific complications like mechanical complications and periprosthetic joint infection or wound infection.

With more data available for the complication measure calculation in 2014, CMS expanded the performance period to 3 years. This increased the number of eligible discharges used to calculate the measure, thus improving the precision of your hospital’s complication estimates while capturing eligible complications for up to 90 days after the end of the performance period.

5. Why do the THA/TKA readmission and complication measures use different hospital discharge timeframes?

To be consistent with other CMS outcome measures that use a 3-year performance period and accommodate the longer 90-day outcome timeframe used to capture complications, CMS shifted the performance period for the complication measure to start one quarter before that of the readmission measure. This means that the complication measure uses discharges from April 1, 2010 to March 31, 2013, while the readmission measures uses discharges from July 1, 2010 to June 30, 2013.
Cohort Inclusion and Exclusion Criteria

6. What are the inclusion and exclusion criteria for the THA/TKA readmission measure?

The THA/TKA readmission and complication measures use different inclusion and exclusion criteria, resulting in a different number of patients in each measure cohort.

Inclusion Criteria

The THA/TKA readmission measure includes index admissions for:

- Patients having a qualifying elective primary procedure; elective primary THA/TKA procedures are defined as those procedures without any of the following:
  - Femur, hip, or pelvic fractures coded in principal or secondary discharge diagnosis fields of the index admission. Patients with fractures have higher mortality, complication, and readmission rates, and the procedures are not elective;
  - Partial hip arthroplasty (PHA) procedures with a concurrent THA/TKA. PHA procedures are done primarily for hip fractures and are typically performed on patients who are older, frailer, and have more comorbid conditions;
  - Revision procedures with a concurrent THA/TKA. Revision procedures may be performed at a disproportionately small number of hospitals and are associated with higher mortality, complication, and readmission rates;
  - Resurfacing procedures with a concurrent THA/TKA. Resurfacing procedures are different types of procedures involving only the joint’s articular surface, and are typically performed on younger, healthier patients;
  - Mechanical complication coded in the principal discharge diagnosis field; which suggests the procedure was more likely the result of a previous procedure and indicates the complication was present on admission. These patients may require more technically complex arthroplasty procedures and may be at increased risk for complications, particularly mechanical complications;
  - Malignant neoplasm of the pelvis, sacrum, coccyx, lower limbs, or bone/bone marrow or a disseminated malignant neoplasm coded in the principal discharge diagnosis field. Patients with these malignant neoplasms are at increased risk for readmission, and the procedure may not be elective;
  - Removal of implanted devices/prostheses. Elective procedures performed in these patients may be more complicated; and
  - Transfer from another acute care facility for the THA/TKA. If a patient is transferred from another acute care facility to the hospital where the index procedure occurs, it is likely that the procedure is not elective or that the admission is associated with an acute condition.

- Medicare fee-for-service (FFS) enrollees;
- Patients who are at least 65 years of age at the time of their admission;
- Patients discharged from non-federal short-term acute care hospitals alive, since they have the opportunity for readmission; and
Patients who were enrolled in Part A and Part B Medicare for the 12 months prior to the date of the index admission.

The specific ICD-9 procedure codes meeting the inclusion criteria for the THA/TKA readmission measure cohort are as follows:

- 81.51 Total Hip Arthroplasty
- 81.54 Total Knee Arthroplasty

For the specific ICD-9 codes that disqualify an admission from inclusion in the THA/TKA readmission measure cohort, refer to Appendix D of the 2014 Procedure-Specific Readmission Measures Updates and Specifications Report, posted at Hospitals – Inpatient > Claims-Based Measures > Readmission Measures > Measure Methodology on the QualityNet website.

Exclusion Criteria

After selecting admissions meeting the above inclusion criteria, the THA/TKA readmission measure excludes admissions for patients:

- Without at least 30 days post-discharge enrollment in FFS Medicare, because the 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether or not a patient was readmitted;
- Who left the hospital against medical advice (AMA), since providers did not have the opportunity to deliver full care and prepare the patient for discharge;
- Who were admitted for the index procedure and subsequently transferred to another acute care facility. Attribution of readmission to the index hospital would be difficult for these cases, since the index hospital performed the procedure but another hospital discharged the patient to the non-acute care setting;
- With more than two THA/TKA procedure codes during the index admission, because it is highly unlikely those patients would receive more than two elective THA/TKA procedures in one hospitalization, and this may reflect a coding error.

7. What are the inclusion and exclusion criteria for the THA/TKA complication measure?

The THA/TKA readmission and complication measures use different inclusion and exclusion criteria, resulting in a different number of patients in each measure cohort.

Inclusion Criteria

The THA/TKA complication measure includes index admissions for:

- Patients having a qualifying elective primary procedure at non-federal short-term acute care hospitals; elective primary THA/TKA procedures are defined as those procedures without any of the following:
  - Femur, hip, or pelvic fractures coded in principal or secondary discharge diagnosis fields of the index admission. Patients with fractures have higher mortality, complication, and readmission rates and the procedures are not elective;
o Partial hip arthroplasty (PHA) procedures with a concurrent THA/TKA. PHA procedures are done primarily for hip fractures and are typically performed on patients who are older, frailer, and have more comorbid conditions;
o Revision procedures with a concurrent THA/TKA. Revision procedures may be performed at a disproportionately small number of hospitals and are associated with higher mortality, complication, and readmission rates;
o Resurfacing procedures with a concurrent THA/TKA. Resurfacing procedures are different types of procedures involving only the joint’s articular surface, and are typically performed on younger, healthier patients;
o Mechanical complication coded in the principal discharge diagnosis field; which suggests the procedure was more likely the result of a previous procedure and indicates the complication was present on admission. These patients may require more technically complex arthroplasty procedures and may be at increased risk for complications, particularly mechanical complications;
o Malignant neoplasm of the pelvis, sacrum, coccyx, lower limbs, or bone/bone marrow or a disseminated malignant neoplasm coded in the principal discharge diagnosis field. Patients with these malignant neoplasms are at increased risk for readmission, and the procedure may not be elective;
o Removal of implanted devices/prostheses. Elective procedures performed in these patients may be more complicated; and
o Transfer from another acute care facility for the THA/TKA. If a patient is transferred from another acute care facility to the hospital where the index procedure occurs, it is likely that the procedure is not elective or that the admission is associated with an acute condition.

- Medicare fee-for-service (FFS) enrollees;
- Patients who are at least 65 years of age at the time of their admission;
- Patients who were enrolled in Part A and Part B Medicare for the 12 months prior to the date of the index admission; and

The specific ICD-9 procedure codes meeting the inclusion criteria for the THA/TKA complication measure cohort are as follows:

- 81.51 Total Hip Arthroplasty
- 81.54 Total Knee Arthroplasty

For the specific ICD-9 codes that disqualify an admission from inclusion in the THA/TKA complication measure cohort, refer to Appendix D of the 2014 Procedure-Specific Complication Measure Updates and Specifications Report, posted at Hospitals – Inpatient > Claims-Based Measures > Complication Measures > Measure Methodology on the QualityNet website.

Exclusion Criteria

After selecting admissions meeting the above inclusion criteria, the THA/TKA complication measure excludes admissions for patients:

- Who left the hospital against medical advice (AMA), since providers did not have the opportunity to deliver full care and prepare the patient for discharge;
With more than two THA/TKA procedures codes during the index admission, because it is highly unlikely those patients would receive more than two elective THA/TKA procedures in one hospitalization, and this may reflect a coding error.

After applying these exclusion criteria, we randomly select one index admission for patients with multiple index admissions in a calendar year. We therefore exclude the other eligible index admissions in that year.

8. How are transferred patients handled in the THA/TKA readmission and complication measures?

The THA/TKA readmission measure excludes index admissions that include one or more transfers between inpatient short-term acute care hospitals. Patients who are transferred in are excluded because they are unlikely to represent elective procedures. Admissions for patients who transfer out are excluded because it is difficult to definitively attribute the readmission outcome to the first (transferring) hospital since this hospital did not discharge the patient to the outpatient setting.

Similarly, the THA/TKA complication measure excludes admissions where the patient was transferred in to the index hospital, as these admissions likely do not represent elective procedures. However, the THA/TKA complication measure does include admissions where the patient was admitted for the index procedure and subsequently transferred to another short-term acute care hospital. Admissions for patients who transfer out are included in the measure because a transfer following THA/TKA likely indicates a complication of care occurring during the index hospitalization. In this case, the complication outcome is attributed to the hospital performing the initial procedure.

Defining Readmission

9. What type of admissions qualify to be considered as readmissions in the THA/TKA readmission measure, and what types of admission are not considered readmissions?

The THA/TKA readmission measure uses the same approach as the condition-specific measures. Please see Chapter 2, Question 9 for more details.

10. How does the THA/TKA readmission measure handle same-day readmissions?

The THA/TKA readmission measure uses the same approach as the condition-specific measures. Please see Chapter 2, Question 12 for more details.

11. Will a patient be considered readmitted in the THA/TKA readmission measure if he or she was readmitted for a planned surgery?

The THA/TKA readmission measure uses the same approach as the condition-specific measures. Please see Chapter 2, Question 13 for more details.
12. Does the THA/TKA readmission measure count multiple unplanned readmissions within 30 days as multiple readmissions? Are any of these multiple readmissions considered as new index admissions?

The THA/TKA readmission measure uses the same approach as the condition-specific measures. Please see Chapter 2, Question 14 for more details.

**Defining Complication**

13. What qualifies as a complication for the THA/TKA complication measure outcome?

The THA/TKA complication measure defines as a “complication” the occurrence of one or more of the following complications within specified timeframes:

- Acute myocardial infarction (AMI), pneumonia, or sepsis/septicemia/shock during the index admission or within 7 days of the index admission;
- Surgical site bleeding, pulmonary embolism, or death during the index admission or within 30 days of the index admission; or
- Mechanical complication or periprosthetic joint infection/wound infection during the index admission or within 90 days of the index admission

The measure includes complications that occur outside the specified time windows if they occur during the index admission, prior to the patient being discharged. For example, if a patient experiences an AMI on day 10 of the index admission, the measure will regard the AMI as a complication, although the specified follow-up time window for AMI is 7 days. Clinical experts agreed with this approach as such complications likely represent the quality of care provided during the index admission.

The complication outcome is a dichotomous “yes/no” outcome. If a patient experiences one or more of these complications in the applicable timeframe, the complication outcome for that patient is regarded in the measure as a “yes.”

As of 2014 reporting, complications that are coded as present on admission (POA) during the index admission are not regarded as complications in the measure outcome; this prevents identifying a condition as a complication of care if it was present on admission for the THA/TKA procedure.

14. Why does the THA/TKA complication measure use different follow-up timeframes for different complications?

To determine the appropriate follow-up timeframe for each complication, CMS analyzed trends in the complication rates for 90 days after THA/TKA procedures. These analyses revealed specific timeframes outside of which the incidence of such complications was uncommon. Furthermore, clinical experts agree that the specified complications are more likely to be attributable to the index procedure if they occur within these specified timeframes. The follow-up timeframes are listed above in Question 13.
Risk Adjustment and Measure Calculation

15. What are the risk factors used for risk adjustment? Which diagnosis codes are included in each risk factor?

The THA/TKA readmission and complication measures adjust for gender, age, and a wide variety of clinical risk factors. There are 33 risk factors in each THA/TKA measure. You can find a list of the risk factors for the THA/TKA readmission measure in Table D.1.9 in the 2014 Procedure-Specific Readmission Measure Updates and Specifications Report. You can find a list of risk factors for the THA/TKA complication measure in Table D.1.9 the 2014 Procedure-Specific Complication Measure Updates and Specifications Report.

The 2014 Readmission Measures Updates and Specifications Report is available at Hospitals – Inpatient > Claims-Based Measures > Readmission Measures > Measure Methodology on the QualityNet website.

The Complication Measures Updates and Specifications Report is available at Hospitals – Inpatient > Claims-Based Measures > Complication Measures > Measure Methodology on the QualityNet website.

In addition, your Hospital-Specific Report (HSR) presents the prevalence of each risk factor for your patients, compared to state and national averages.

Some of the patient risk factors are grouped using the CMS Condition Categories (CC) classification. A crosswalk of CCs to ICD-9-CM codes for the THA/TKA readmission measure is available at Hospitals – Inpatient > Claims-Based Measures > Readmission Measures > Resources on the QualityNet website.

A crosswalk of CCs to ICD-9-CM codes for the THA/TKA complication measure is available at Hospitals – Inpatient > Claims-Based Measures > Complication Measures > Resources on the QualityNet website.

16. How are the risk-standardized readmission rates (RSRRs) for the THA/TKA readmission measure, and the risk-standardized complication rates (RSCRs) for the THA/TKA complication measure calculated?

The RSRRs (or RSCRs) are calculated using the same approach as the condition-specific measures. Please see Chapter 2, Question 16 for more details.

17. Will hospitals be able to replicate the THA/TKA RSRRs and RSCRs for the purpose of validation?

No, hospitals will not be able to replicate the RSRRs and RSCRs independently. While hospitals have access to the inclusion/exclusion criteria and risk-adjustment coefficients used, the model requires input of patient longitudinal data across care settings and data from the entire national sample to estimate the hospital-specific effects used in the equations. Please note that although hospital-specific effects are provided to hospitals as
part of the Hospital Readmissions Reduction Program Hospital-Specific Report (HSR), the results for THA/TKA in these reports will not be the same for the IQR results.

However, you can validate the cohort included in your hospital’s THA/TKA measures for the years included in public reporting using the discharge-level information contained in your hospital’s HSR, available via the QualityNet Secure Portal.

To be transparent in how the RSRRs and RSCRs are calculated, CMS has made the measure calculation methodology (including the condition category algorithm) available on QualityNet. Hospitals may also request a copy of the SAS software used to estimate the RSRRs and RSCRs by emailing cmsreadmissionmeasures@yale.edu or cmscomplicationmeasures@yale.edu. However, please note that CMS does not provide training, consultations, or technical assistance for using the software.

18. Where can I find more information about how the RSRRs and RSCRs are calculated?

The best source of information on the risk-adjustment models are the THA/TKA methodology reports and the measure updates reports posted on QualityNet. For the THA/TKA Readmission Technical Report, please visit Hospitals – Inpatient > Claims-Based Measures > Readmission Measures > Measure Methodology at the QualityNet website.

For the THA/TKA Complication Technical Report, please visit Hospitals – Inpatient > Claims-Based Measures > Complication Measures > Measure Methodology on the QualityNet website.

Hospital Performance

19. My hospital is interested in conducting a quality improvement program to understand and reduce our THA/TKA readmission and complication rates. How can I best track my hospital’s performance on the THA/TKA measures?

CMS’s risk-standardized readmission and complication rates are not designed for hospitals’ internal quality tracking purposes, since they are measures of each hospital’s performance relative to the national readmission or complication rate during a given period of time. However, your hospital may choose to track its raw THA/TKA readmission and complication rates for quality improvement purposes. If you wish to calculate your raw readmission and complication rates for dates which are different from those provided in your HSR, you may include in your cohort (denominator) patients who were admitted to your hospital for elective primary THA/TKA within the date range of interest and fulfill the inclusion/exclusion criteria described in the Cohort Inclusion and Exclusion Criteria section above. Of those patients included in the cohort, your numerator should be patients who had an unplanned readmission within 30 days of admission (for the readmission measure) or patients who experienced one of the complications detailed in the Cohort Inclusion and Exclusion Criteria section above (for the complication measure).
Please note that an internally calculated raw rate will not capture readmissions that occurred at other hospitals. Additionally, the raw rates will not capture major changes to your hospital’s case mix that affect risk-standardized rates. If your hospital’s case mix and the proportion of patients readmitted to other hospitals are stable over time, your raw rates can be used to track internal improvement over time.
Chapter 6. Acute Myocardial Infarction (AMI) Payment Measure

This chapter addresses questions about measure methodology for the CMS risk-standardized payment measure for a 30-day AMI episode of care. In this chapter, the measure is referred to as the “AMI payment measure.”

Rationale

1. Why measure payment associated with a 30-day episode of care for AMI specifically?

AMI is a common condition among Medicare patients, and there is substantial variability in payments due to differences in practice patterns. The variation in payments suggests an opportunity to maximize efficiencies in AMI care. The AMI payment measure results are intended to capture differences in payments for AMI patients that are influenced by hospital care decisions over a 30-day timeframe. CMS already publicly reports hospital results for other AMI outcome measures, such as 30-day AMI mortality and readmission and the AMI process-of-care measures, making AMI an ideal condition in which to assess payments for Medicare patients.

2. How should hospitals use this measure?

The AMI payment measure provides hospitals, CMS, and other stakeholders a tool for comparing risk-standardized payments (RSPs) for AMI episodes of care in hospitals across the nation. The measure summarizes payments for AMI patients across multiple care settings, services, and supplies during the 30-day period; removes policy adjustments that are independent of care decisions; and risk-adjusts results based on patient case mix. The resulting RSPs reflect differences in the care provided for patients with AMI over the 30-day episode of care.

This measure can help hospitals understand whether payments made for their AMI patients over a 30-day episode-of-care are relatively higher or lower than the national average, incentivizing hospitals to understand the drivers of costs for their patients. CMS is providing hospitals with Hospital-Specific Reports (HSRs) that include detailed information on their results along with national and state results. The HSRs also contain detailed patient-level data for each AMI 30-day episode of care.

The payment measure results alone do not reflect the quality of care provided by hospitals. Accordingly, the RSP should be considered alongside hospital performance on other patient outcomes such as 30-day mortality. This would facilitate profiling hospital value (payments and quality).
Data Sources and Years

3. What data are used to calculate the payment measure results?

The AMI payment measure results are based on administrative claims and enrollment data for eligible hospital discharges that occurred between July 1, 2010 and June 30, 2013.

The data used to identify the AMI payment measure cohort come from the following sources:

- Hospital inpatient claims are used to identify the cohort of patients to include in the measure and to provide specific characteristics of the index hospitalization.
- Hospital inpatient and outpatient claims as well as physician practice claims data are used to characterize comorbidities as documented during the index admission and in the year before the admission to capture a comprehensive view of patients’ medical histories.
- The Medicare Enrollment Database is used to obtain beneficiary demographic and mortality information.

To calculate payments for the AMI 30-day episode of care, the measure uses Medicare claims data from the Chronic Condition Data Warehouse (CCW). The CCW data are derived from Medicare claims and contain payments for all care settings, services, and supplies. See Question 10 below for further detail.

4. Why are Medicare Part D payments not included in the measure?

The AMI payment measure excludes payments for prescription drugs because Medicare Part D benefits do not apply to all Medicare beneficiaries; the Kaiser Family Foundation estimates that only 75% of Medicare beneficiaries aged 65 or older are enrolled in Part D. Including these payments in the measure would not allow for a fair comparison across hospitals, since hospitals with a larger proportion of beneficiaries with Part D would appear more expensive than hospitals with fewer beneficiaries enrolled in Part D.

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**Cohort Inclusion and Exclusion Criteria**

5. What are the inclusion and exclusion criteria for the AMI payment measure?

**Inclusion Criteria**

The AMI payment measure includes index hospitalizations for patients who:

- Are enrolled in Medicare fee-for-service (FFS).
- Are at least 65 years of age at the time of their admission.
- Have a principal discharge diagnosis of AMI, as defined by the following ICD-9 diagnosis codes: 410.00, 410.01, 410.10, 410.11, 410.20, 410.21, 410.30, 410.31, 410.40, 410.41, 410.50, 410.51, 410.60, 410.61, 410.70, 410.71, 410.80, 410.81, 410.90, and 410.91
- Were not transferred in from another acute care hospital. (The acute episode is included in the measure, but the episode-of-care payments are attributed to the hospital where the patient was initially admitted.)
- Were enrolled in Medicare Part A and Part B for the 12 months prior to the date of the index admission (in order to have a full year of data for risk adjustment).

An index admission is any inpatient hospitalization included in the measure calculation as the initial admission which begins the 30-day episode of care for AMI.

**Exclusion Criteria**

After selecting admissions meeting the above inclusion criteria, the AMI payment measure excludes index admissions for patients who:

- Did not have at least 30 days of post-discharge enrollment in FFS Medicare, since the 30-day payment outcome cannot be assessed in this group.
- Were discharged alive on the day of admission or the following day, and who were not transferred to another acute-care hospital, as these patients are unlikely to have had a clinically significant AMI.
- With inconsistent or unknown vital status or other unreliable demographic data (for example, age and gender). Were enrolled in the Medicare hospice program any time in the 12 months prior to the index admission, including the first day of the index admission. These patients are excluded since it is likely these patients are continuing to seek comfort measures only, so payment may reflect patient preferences rather than hospital practice patterns.
- Were transferred to a federal hospital, since payment data associated with the federal hospital stay is unavailable for these patients.
- Left against medical advice (AMA), since providers did not have the opportunity to deliver full care and prepare the patient for discharge.
- Had an AMI index hospitalization that could not be matched to an admission in the AMI mortality measure (because as part of our current data processing, AMI index hospitalizations are matched to the AMI mortality cohort to obtain risk-adjustment variables).
• Had an AMI index hospitalization with a missing index DRG weight and the index facility received no payment.

After applying the exclusion criteria above, if a patient has multiple eligible index admissions in a calendar year, one admission is randomly selected and the other eligible admissions are excluded in that year.

Additionally, when two randomly selected admissions occur during the transition months (June and July for the public reporting data) and are within 30 days of one another, then the first admission to occur is considered the index admission, and payments for additional AMI admissions falling within 30 days of the index admission are captured as part of the first admission’s episode of care.

6. How are transferred patients handled in the AMI payment measure?

The episode of care begins with an admission for AMI to a short-term acute care hospital. The hospital that initially admits the patient is assigned all payments that occur during the episode of care. This includes payments for patients who are subsequently transferred to another hospital after the initial admission. A patient who is transferred to another acute care hospital is included in the measure, but they will only be included in the measure cohort of the hospital where they were first admitted, not the receiving hospital.

However, if a patient is transferred to a federal hospital (for example, a VA hospital), they are excluded from the measure because payment data for federal hospital stays are not available.

Note that an admission to an emergency department is not considered the start of an episode of care because CMS does not classify emergency department care as an inpatient admission. If a patient is transferred from an emergency department to another hospital and then subsequently admitted, the episode of care begins with the inpatient admission at the receiving hospital.

**Defining the Payment Outcome**

7. Why does the AMI payment measure use a 30-day outcome timeframe?

The measure assesses a 30-day episode because hospitalizations represent a brief period of acute illness that requires ongoing management post-discharge. Importantly, decisions made at the admitting hospital affect not only the payment for the hospitalization itself, but also payments for care in the immediate post-discharge timeframe. Additionally, assessing payments for a continuous episode of care may reveal practice variations in comprehensive care for patients with AMI. For instance, lower payments for inpatient care may be counterbalanced by greater dependence on post-acute care, such as skilled nursing. Such patterns would not be visible in a measure that only assesses costs that occur within the
hospital. Finally, a 30-day timeframe provides a standard observation period by which to compare all hospitals and is consistent with other publicly reported quality measures (for example, the risk-standardized mortality measures).

8. How is the 30-day outcome timeframe calculated?
For the AMI payment measure, the 30-day episode of care starts the day the patient is admitted for the index AMI hospitalization and extends for 30 days after that. For example, if a patient was admitted on January 1, the last day of the 30-day follow-up timeframe would be January 31.

9. What payments are included in the calculation of the AMI payment measure?
The AMI payment measure includes payments captured in the CCW data, which include payments made by CMS, patients (for example, co-pays and/or deductibles), and other insurers to providers. The measure captures payments made on behalf of Medicare FFS patients across the following care settings, services, and supplies:

Inpatient care settings
- Acute inpatient hospitals
- Inpatient psychiatric facilities
- Inpatient rehabilitation facilities
- Long-term care hospitals
- Skilled nursing facilities

Outpatient care settings
- Hospital outpatient services
- Community mental health centers
- Comprehensive outpatient rehabilitation facilities (CORFs) and Outpatient Rehabilitation Facilities (ORFs)
- Renal dialysis facilities
- Rural health clinics
- Federally qualified health clinics
- Ambulatory surgical centers

Other care settings
- Home health agencies
- Hospice

Services and supplies
- Laboratory services
- Ambulance services
- Part B drugs
- Physicians, physician extenders, social work services
10. Does the AMI payment measure prorate payments for a claim if the service started within the 30-day timeframe but extended beyond it?

Yes, if a claim for an eligible service began within the 30-day episode, but ended after the 30-day episode, payment is evenly prorated over each day of the claim. Only payments for the days of the claim that fall within the 30-day timeframe are included in the payment outcome.

For example, if on day 15 of the 30-day episode a patient is discharged from the hospital to a skilled nursing facility (SNF) and that SNF claim was for 20 days of care, then the total payment for that SNF claim would be divided by 20 to generate the payment amount for 1 day of SNF care. That 1-day payment amount would then be multiplied by 16 (the number of SNF claim days within the 30-day episode of care) and that 16-day payment amount would be included in the payment outcome.

**Risk Adjustment and Measure Calculation**

11. What are the risk factors used for risk adjustment? Which diagnosis codes are included in each clinical risk factor?

The AMI payment measure adjusts for age as well as a wide variety of clinical risk factors. You can find a list of the risk factors in the 2014 AMI Payment Measure Updates and Specifications Report. Refer to Tables C.1.2 and C.1.3 for the AMI Payment measure. The report is available at Hospitals - Inpatient > Claims-Based Measures > AMI Payment Measure > Measure Methodology on the QualityNet website.

Some of the patient risk factors are grouped using the CMS Condition Categories (CC) classification. A crosswalk of CCs to ICD-9-CM codes for the AMI payment measure is available at Hospital - Inpatient > Claims-Based Measures > AMI Payment Measure > Resources on the QualityNet website.

12. How is the AMI risk-standardized payment (RSP) calculated?

CMS calculates the RSP as the ratio of “predicted” payments to “expected” payments, multiplied by the national average payment for an episode of care. For each hospital, the numerator of the ratio is the payments within 30 days predicted on the basis of the hospital’s payments with its observed case mix. The denominator is the payments expected on the basis of the nation’s payments 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 payments given its case mix to an average hospital’s payments with the same case mix. Thus a ratio of less than one indicates lower-than-expected payments, and a ratio of greater than one indicates higher-than-expected payments.
For details on the statistical approach used to determine the predicted and expected payments, please refer to the measure methodology and measures maintenance reports available at Hospitals – Inpatient > Claims-Based Measures > AMI Payment Measure > Measure Methodology on the QualityNet website.

13. How does the measure handle payment adjustments such as wage index and indirect medical education?

The objective of the AMI payment measure is to calculate payments that capture differences in the care provided or coordinated by hospitals for AMI patients. To accomplish this, the measure removes variation in payments that are due to adjustments not directly related to clinical care through a process called “standardizing.” The AMI payment measure standardizes payments by removing geographic differences (such as wage index adjustments) and policy adjustments (such as indirect medical education) in payment rates for individual services. When geographic differences in payments cannot be removed (for example, for laboratory services), the measure standardizes by averaging payments across geographic areas for those services. Further detail on the approach to standardizing payments can be found in Appendix D of the AMI payment measure methodology report, available at Hospitals – Inpatient > Claims-Based Measures > AMI Payment Measure > Measure Methodology on the QualityNet website.

14. Will hospitals be able to replicate the risk-standardized payment (RSP) calculation for the purpose of validation?

No, hospitals will not be able to replicate the RSP independently. While hospitals have access to the inclusion/exclusion criteria and risk-adjustment coefficients used, the model requires input of patient longitudinal data across care settings and data from the entire national sample to estimate hospital-specific effects used in the equations.

15. Where can I find more information about how the RSP is calculated?

The best sources of information on the risk-adjustment model are the AMI payment methodology and measure updates reports posted on QualityNet. These reports are available at Hospitals – Inpatient > Claims-Based Measures > AMI Payment Measure > Measure Methodology on the QualityNet website.

Public Reporting

16. How does CMS plan to present hospitals’ AMI payment results on Hospital Compare?

CMS recognizes that the AMI payment measure results alone do not reflect the quality of care provided by hospitals. On Hospital Compare, the payment measure results will be reported with the AMI mortality measure results for that hospital on the “Payment and Value of Care” tab, allowing consumers to assess a hospital’s 30-day payments in the context of
quality of care. Providing the payment and mortality measure results together will enable consumers to better assess the value of care at each hospital.
Chapter 7. Additional Information

1. Who to Contact for More Information

To ensure proper handling of inquiries, please reference the specific measure(s) and the specific program(s) you are asking about when contacting CMS regarding the risk-standardized outcome measures.

Questions about the Hospital Inpatient Quality Reporting (IQR) Program

- For the AMI, COPD, HF, pneumonia, and stroke readmission measures: cmsreadmissionmeasures@yale.edu.
- For the AMI, COPD, HF, pneumonia, and stroke mortality measures: cmsmortalitymeasures@yale.edu.
- For the hospital-wide readmission (HWR) measure: cmsreadmissionmeasures@yale.edu.
- For the THA/TKA readmission measure: cmsreadmissionmeasures@yale.edu.
- For the THA/TKA complication measure: cmscomplicationmeasures@yale.edu.
- For the AMI Payment measure: cmsepiodepaymentmeasures@yale.edu.

Questions about the Hospital Value-Based Purchasing (VBP) Program

- For questions about the 30-day mortality measures methodology: cmsmortalitymeasures@yale.edu.
- For questions about the calculation and implementation of the measures as part of the VBP program, please contact the QualityNet Help Desk at qnetsupport@hcqis.org.

Questions about the Hospital Readmissions Reduction Program

- For questions about the 30-day readmission measures methodology: cmsreadmissionmeasures@yale.edu.
- For questions about the data for the Hospital Readmissions Reduction Program, please contact the QualityNet Help Desk at qnetsupport@hcqis.org.
- For questions about payment, please refer to the CMS website at http://cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/Readmissions-Reduction-Program.html.
Questions about the Hospital-Specific Reports

- For any questions about your HSRs, please contact the QualityNet Help Desk at qnetsupport@hcqis.org.

2. Where can I find strategies to reduce readmissions?

A list of websites and peer-reviewed studies identified by CMS as references for interventions to reduce readmissions appears below. CMS will continue to expand this list over time. These websites and studies do not necessarily represent CMS policies, but may be useful resources.

Initiatives to Reduce Readmissions:

- **Partnership for Patients** – This HHS initiative focuses on two goals: making care safer by preventing hospital-acquired conditions, and reducing readmissions by improving care transitions.

- **Integrating Care for Populations and Communities Aim (ICPCA)** – QIOs will work to reduce unnecessary readmissions to hospitals and promote seamless transitions between health care settings.

- **The Community-based Care Transitions Program (CCTP)** - Created by Section 3026 of the Affordable Care Act. CMS will allocate funds for qualified hospitals to pursue two-year renewable agreements aiming to test models for improving care transitions from the hospital to other settings and reducing readmissions for high-risk Medicare beneficiaries.

- **The National Priorities Partnership (NPP)** - NPP has a focus on care coordination.

- **The American College of Cardiology (ACC)** - The ACC and Institute for Healthcare Improvement (IHI) have launched a “Hospital to Home” (H2H) national campaign to reduce preventable readmissions.

- **State Action on Avoidable Rehospitalizations (STAAR) initiative** – IHI has additionally launched the STAAR initiative, which aims to reduce rehospitalizations by working across organizational boundaries and engaging multiple stakeholders.

- **The Commonwealth Fund** - The Commonwealth Fund together with the John A. Hartford Foundation, and Health Research & Educational Trust (HRET) of the American Hospital Association have produced a “Health Care Leader Action Guide to Reduce Avoidable Readmissions.”

- **INTERACT (Interventions to Reduce Acute Care Transfers)** – CMS quality improvement program that focuses on clinical and educational tools and strategies for long-term care facilities to reduce the frequency of transfers to the acute hospital.

- **The Society of Hospital Medicine** – Better Outcomes for Older Adults through Safe Transitions (Project BOOST) is a national initiative to improve the care of patients as they transition from hospital to home.

- **Project RED (Re-Engineered Discharge)** – Project RED is a research group at Boston University Medical Center that develops and tests strategies to improve the hospital discharge process in a way that promotes patient safety and reduces re-hospitalization rates.
Reports and Studies Focused on Reducing Readmissions:
A list of reports and studies focused on reducing readmissions can be found at Hospitals – Inpatient > Claims-Based Measures > Readmission Measures > Reducing Readmissions on the QualityNet website.

Readmission Calculator:
A patient-level, medical record-based predictor tool for readmission risk can be found at http://readmissionscore.org.