TO: NQF Members and Public

FR: NQF Staff

RE: Pre-voting review for *Patient Outcomes: All Cause Readmissions Expedited Review 2011: A Consensus Report*

DA: January 9, 2012

To achieve quality healthcare across the full continuum, there is a need for more measures that specifically address outcomes of care provided in our nation's healthcare system. Many outcome measures are inherently relevant because they reflect the reason consumers seek healthcare (e.g., to improve function, decrease pain), as well as reflect the treatment objective of healthcare providers. To date, NQF has endorsed more than 100 outcome measures, most recently through the multi-phase Patient Outcomes project. However, many gaps remain, including those related to complications, all-cause readmissions, and mortality. This project seeks to identify and endorse additional cross-cutting (not condition-specific) measures for accountability and quality improvement that specifically address all-cause readmissions to hospitals.

This consensus standards endorsement project will be an expedited review. In order to meet the legislative deadline required for implementation of all-cause readmissions measures. The HHS request for the expedited review of readmission measures is to meet statutory requirements under ACA Section 10303, Development of Outcome Measures. This section mandates that the Secretary shall develop 10 acute and chronic disease, provider-level (specifically including hospitals and physicians) outcome measures by March 2012.

The updated policy on the expedited review process was approved by the NQF Board of Directors in the fall of 2010 in order to meet emerging national needs.

Three criteria must be met prior to consideration by the Consensus Standards Advisory Committee (CSAC) for an expedited review:

1. The extent to which the measures under consideration have been sufficiently tested and/or in widespread use;
2. The scope of the project/measure set is relatively narrow; and
3. There is a time-sensitive legislative/regulatory mandate for measures.

A 21-member Steering Committee representing a range of stakeholder perspectives was appointed to review a total of 3 candidate and endorsed standards. The Steering Committee recommended 2 newly submitted measures for initial endorsement. The National Quality Forum (NQF)-endorsed® measure that had been updated as part of the maintenance process was not recommended for continued endorsement.

The draft document, *Patient Outcomes: All Cause Readmissions Expedited Review 2011: A Consensus Report* is posted on the NQF website along with the following additional information:

- Measure submission forms; and
- Meeting and call summaries from the Steering Committee's discussions.

Pursuant to section II.A of the Consensus Development Process v. 1.9, this draft document, along with the accompanying material, is being provided to you at this time for purposes of review and comment only and is not intended to be used for voting purposes. You may post your comments and view the comments of others on the NQF website.

The expedited review comment period is **10 business days** instead of 30 calendar days. **NQF Member and public comments must be submitted no later than 6:00 pm ET, January 20, 2012.**

Thank you for your interest in NQF's work. We look forward to your review and comments.

NATIONAL QUALITY FORUM

PATIENT OUTCOMES: ALL-CAUSE READMISSIONS EXPEDITED REVIEW, 2011

DRAFT TECHNICAL REPORT FOR COMMENT

January 9, 2012

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PATIENT OUTCOMES: ALL-CAUSE READMISSIONS EXPEDITED REVIEW, 2011
Draft Technical Report

INTRODUCTION

Approximately 18 percent of hospital admissions by Medicare beneficiaries result in a readmission within 30 days.[1] These readmissions amount to $15 billion in spending by the Centers for Medicare and Medicaid Services (CMS), of which $12 billion is spent on preventable readmissions.[2]

To achieve quality healthcare across the full continuum, there is a need for measures that specifically address outcomes of care provided in our nation's healthcare system. Many outcome measures are inherently relevant because they reflect the reason consumers seek healthcare (e.g., to improve function, decrease pain), as well as reflect the treatment objective of healthcare providers. To date, NQF has endorsed more than 100 outcome measures, most recently through the multi-phase Patient Outcomes project. However, many gaps remain, including those related to complications, all-cause readmissions, and mortality. A hospital readmission can be considered a proxy for a health outcome, specifically the deterioration in a patient's health status.

This expedited review endorsement maintenance project evaluated measures for public reporting/accountability and quality improvement that specifically address cross-cutting (not condition-specific) all-cause readmissions to hospitals. Additionally, as part of this process, all-cause hospital readmission-related consensus standards that were endorsed by NQF before June 2009 were evaluated under the maintenance process. The endorsement maintenance process provides an opportunity to harmonize measure specifications and ensures that the endorsed measure represents the best in class.

NQF EXPEDITED CONSENSUS DEVELOPMENT PROCESS

As a part of NQF's Consensus Development Process (CDP), this project has involved the active participation of representatives from across the spectrum of healthcare stakeholders and is being guided by a multi-stakeholder Steering Committee.

The NQF Board of Directors approved formal policy on the expedited review process in the fall of 2010. Expedited reviews assist the Department of Health and Human Services (HHS) meet deadlines set by legislative mandates. Three criteria must be met prior to consideration by the Consensus Standards Approval Committee (CSAC) for an expedited review:

1. Measures under consideration have been sufficiently tested and/or in widespread use;
2. The scope of the project/measure set is relatively narrow; and
3. There is a time-sensitive legislative/regulatory mandate for measures.

For this project, HHS requested an expedited review of readmission measures to meet its statutory requirements under the Patient Protection and Affordable Care Act (PPACA) Section 10303. Section 10303(f) 'Development of Outcome Measures' mandates the Secretary shall develop 10 acute and chronic-disease, provider-level (specifically including hospitals and physicians) outcome measures by March 2012. Language from PPACA relevant to this expedited project is included below: [3]

(2) CATEGORIES OF MEASURES. —The measures developed under this subsection shall include, to the extent determined appropriate by the Secretary—

(A) outcome measurement for acute and chronic diseases, including, to the extent feasible, the 5 most prevalent and resource-intensive acute and chronic medical conditions; and

(B) outcome measurement for primary and preventative care, including, to the extent feasible, measurements that cover provision of such care for distinct patient populations (such as healthy children, chronically ill adults, or infirm elderly individuals).

(3) GOALS. —In developing such measures, the Secretary shall seek to—

(A) address issues regarding risk adjustment, accountability, and sample size;

(B) include the full scope of services that comprise a cycle of care; and

(C) include multiple dimensions.

(4) TIMEFRAME-

(A) ACUTE AND CHRONIC DISEASES- Not later than 24 months after the date of enactment of this Act, the Secretary shall develop not less than 10 measures described in paragraph (2)(A).

CMS requested an expedited review to ensure its decisions regarding the selection of measures to meet the 10 measure requirement would be informed by the NQF evaluation and endorsement decision. CMS also wishes to include the Hospital Wide Readmission Measure in the Hospital Inpatient Quality Reporting (IQR) Program using the 2012 IPPS/LTCH rulemaking cycle for FY 2013, so that public reporting of the measure can occur can occur as early as 2013. CMS specifically included this measure on the pre-rulemaking list for the Hospital IQR, which was made available to the public on December 1, 2011, in order to be able to do so.

MEASURE EVALUATION

TABLE 1: READMISSIONS EXPEDITED REVIEW SUMMARY

	MAINTENANCE	NEW	TOTAL
Measures under consideration	**1**	**2**	**3**
Withdrawn from consideration			**N/A**
Recommended	**0**	**2**	**2**
Not recommended	**1**	**0**	**1**
Reasons for Not Recommending	**Scientific Acceptability - 1**		

Steering Committee members were asked to evaluate each of the measures on three occasions. Prior to the in-person meeting, Committee members provided preliminary ratings on the evaluation subcriteria for each submitted measure. Secondly, on day 1 of the December 5 and 6, 2011, in-person meeting, the Readmissions Steering Committee provided preliminary ratings at the criteria level (i.e., Importance, Scientific Acceptability, Usability, Feasibility) on two new measures and one measure undergoing

maintenance review using NQF's **measure evaluation criteria**. The preliminary ratings on the individual subcriteria were also referenced as a part of the evaluation on the measures on the first day.

The *Overarching Issues* section outlines the concerns raised by the Committee and the preliminary votes on the four evaluation criteria for each of the three measures under consideration are provided below in Table 2. Steering Committee members requested additional information on the two remaining measures (#1786, Hospital-wide all-cause unplanned readmissions measure (HWR) [CMS/Yale] and #1789, Plan all-cause readmissions [NCQA]) from the developers, for consideration on day 2. Due to the unanimous vote on the scientific acceptability criterion for Measure #0329, Risk-adjusted 30-day all-cause readmission rate (UnitedHealth Group), the discussion on the measure was not continued and the developer was not asked to provide any additional clarifying information on day 2.

TABLE 2: PRELIMINARY VOTING RESULTS (DAY 1)

Measure Number	Importance to Measure and Report (YES-NO)	Scientific Acceptability of Measure Properties (YES-NO)	Usability (HIGH-MODERATE-LOW-INSUFFICIENT)	Feasibility HIGH-MODERATE-LOW-INSUFFICIENT)	Meet Criteria for Endorsement (YES-NO)
1789	18-1	9-9	0-7-11-0	11-6-1-0	8-10
1786	18-0	8-11	3-6-7-1	6-9-2-0	6-11
0329	16-0	0-18			

Thirdly, the Committee provided updated votes on each criterion and an overall vote on whether the measure met criteria for endorsement on day 2 after receiving additional clarifying information from the developers (Appendix C) on Measures #1789 and #1786. These votes are provided in the Measure Summary Tables at the end of the document and in Table 3 below.

TABLE 3: UPDATED VOTING RESULTS (DAY 2)

Measure Number	Importance to Measure and Report (YES-NO)	Scientific Acceptability of Measure Properties (YES-NO)	Usability (HIGH-MODERATE-LOW-INSUFFICIENT)	Feasibility HIGH-MODERATE-LOW-INSUFFICIENT)	Meet Criteria for Endorsement (YES-NO)
1789	18-1 (day 1)	13-6	1-8-11-0	14-5-0-0	12-8
1786	18-0 (day 1)	12-7	5-4-9-1	8-6-4-1	10-9

At the conclusion of the second day of the in-person meeting, the developers of Measures #1789 and #1786 (CMS/Yale and NCQA, respectively) were asked to respond to the harmonization issues identified within one week, which were subsequently discussed on a conference call on December 16, 2011. These additional discussions are outlined under the Related and Competing Measures section. The Committee agreed that all of the harmonization issues were sufficiently addressed and the results in Table 3 were considered final after the conference call discussions. Both Measures #1789 and #1786 met NQF criteria for endorsement.

Overarching Issues

During the Steering Committee's discussion of the measures, several overarching issues emerged that were factored into their ratings and recommendations. These issues are discussed in detail in the following sections:

Modeling Approaches

Statistical Modeling

The measures submitted for this project used different approaches to statistical modeling. All three measures used logistic regression modeling for the purpose of controlling for differences in patient case-mix characteristics (e.g., clinical severity, comorbidity, age). The CMS/Yale measure also used a hierarchical model to estimate the hospital risk adjusted readmission rate. A hierarchical model is often used when the data have a hierarchical structure (e.g., patients clustered within hospitals). Some Steering Committee members expressed concern that with hierarchical modeling, the risk adjusted rates for low volume hospitals tend to be no different from the average rate. CMS/Yale explained that the hierarchical model incorporates information for the specific hospital as well as the average hospital. When there is little information about a hospital (i.e., few patients), more weight is placed on the average hospital performance. With small volume, the rates can vary substantially due to random chance, and will have large confidence intervals that often overlap the average rate. When rates have large confidence intervals they often cannot be differentiated from the average. Some Committee members expressed a strong preference for using only logistic regression modeling over hierarchical modeling. While the NQF criteria do not prescribe a specific approach to statistical modeling, the criteria do require that measures be tested to demonstrate reliability, validity, and address threats to validity by demonstrating adequacy of risk adjustment/stratification and appropriateness of exclusions. Statistical methods are determined by the type and structure of the data and there may be more than one appropriate statistical approach.

The Committee agreed that the methodological concerns for hospitals with lower volume are significant; however, because this project seeks to evaluate measures of all condition, all-cause hospital readmissions they agreed that there should theoretically be less of a concern of low volume hospitals than for other applications. In response to the Committee's concern about shrinkage estimates for small volume hospitals, the Committee was presented with the distribution statistics for measure scores of large volume hospitals and small volume hospitals (Appendix C). CMS/Yale calculated frequency distributions of the risk adjusted, hospital level, 30-day readmissions rates across their sample (N=4081). Hospitals with at least 25 index admissions were considered 'large volume hospitals' (N=3655) and below 25 index admissions were considered 'small volume hospitals' (N=426). Looking at the Risk Standardized Readmission Rate (RSRR), the distribution for large volume hospitals was as follows: median 16.50, 90^{th} percentile 18.23, and 10^{th} percentile 15.22. Among small volume hospitals the distribution of measure scores are as follows: median 16.43, 90^{th} percentile 17.47, and 10^{th} percentile 15.48. The Committee did not reach consensus about whether the distribution for small volume hospitals was narrower or similar to large volume hospitals.

Selection of Covariates

The Committee was interested in the rationale for the inclusion or exclusion of hospital volume and socioeconomic status as covariates in the readmissions model. Both CMS/Yale and NCQA chose to

use covariates that help to create a level playing field across hospitals, adjusting for patient clinical condition at the time of admission. In addition, the CMS/Yale measure uses 5 clinical cohorts (medicine, surgery/gynecology, cardiorespiratory, cardiovascular and neurology) to account for the variation in service mix across hospitals; risk standardized rates are computed for each cohort and combined for the overall performance measure score. The NCQA model includes an indicator of major surgery. The Committee discussed the methodological effects and policy implication of including hospital volume and socio-economic status covariates in the risk adjustment models.

Hospital Volume

The Committee considered the developer's rationale for not including volume as a covariate in the risk adjustment model for the CMS/Yale measure readmissions. Committee members noted that literature supports a relationship between hospital volume and quality; thus, including volume as a covariate may improve the statistical performance of the risk adjustment model. However, the developer argued that there is limited evidence to support any justification that differences in readmission performance between hospitals, on the basis of volume, are acceptable.

Socioeconomic Status (SES)

NQF measure evaluation criteria indicate that in general, factors associated with disparities in care (i.e., race, ethnicity, SES) should not be included in risk adjustment models because it assumes that differences in outcomes based on those factors are acceptable. Some Steering Committee members expressed concern that in the case of hospital readmission, SES influences resources available after hospitalization that can affect readmission. CMS/Yale presented data that demonstrated that hospitals with a high proportion of Medicaid patients have performed well on the measure.

The Committee also discussed potential stratification (i.e., hospital performance by SES category) or using hospital comparison groups based on SES category (i.e., compare hospitals with similar percentages of low SES). Several members of the Committee felt that stratifying results by SES (or a proxy such as Medicaid status) can help to: 1) surface any disparities of care, and 2) provide information which might better inform policy decisions especially with regard to the possible unintended consequences associated with diverting resources away from vulnerable populations based on factors beyond the control of an individual institution.

Both CMS/Yale and NCQA explained that they did not risk adjust for SES because they did not want to assume there are different standards of care based on SES. The developers explained that including an SES variable has the potential to mask differences across groups in the risk adjustment of a measure. In order to address disparities, measures should allow users to highlight differences in performance based on population groups across hospitals.

The Committee considered this rationale against a concern that differences in readmissions performance, across hospitals, have many different factors. While the differences are driven in part by variation in quality within hospitals, differences in readmissions performance are also influenced by the availability of support for patients as they transition from the hospital into the community. Some Committee members explained that readmissions are not uniquely a measure of hospital quality, but rather a measure of health system and community health quality. The hospital is dependent on resources available in the community, such as effective transitional care and other community level

factors, including distance to the hospital. Both CMS/Yale and NCQA expressed interest in exploring community level factors.

Socioeconomic status continues to be an extremely complex construct that is difficult to capture in a reliable and valid fashion. The experts agreed that there is no established methodology in the literature that could be used by the developer community, further limiting the ability of developers to include this variable in the measure. The developers explained that the use of SES is further complicated by its interpretability. The differences in SES may be attributed to intrinsic characteristics of the patients, or the hospital's ability to treat various types of patients (i.e. health literacy materials provided by the hospital, or social support/community relationships built by the hospital).

Usability for quality improvement

The Committee expressed concern that measure results for the CMS/Yale measure would not be available in a timely fashion. Some Committee members indicated that measure results from CMS are often received one or two years after the patient is discharged, making it not effective for hospitals to create actionable performance improvement strategies for reducing readmissions, nor for patients in their selection of providers.

Several members viewed the plan-level NCQA measure as a way to hold plans accountable for readmissions with the understanding that the hospital and physicians are not the only entities responsible for effective care transitions. Members also expressed frustration that measuring performance at the plan level may lead providers to focus on the care of only insured patients; thus, the Committee urged future efforts to consider how to expand to all patients not simply all payers.

Both the CMS/Yale and NCQA measures count readmissions to any hospital, not simply readmissions to the index hospital. Some Committee members expressed frustration that CMS does not provide the index hospitals with the name of the hospital where a patient is readmitted when the readmitting hospital is different from the index hospital. Providing hospitals this information is helpful for analysis and improvement efforts in care coordination.

Related and competing measures

The Committee concluded that the two recommended measures were related and not competing because the levels of analysis were different (NCQA-plan level and CMS/Yale-hospital level). Ideally, NQF prefers measures that would encompass the broadest applicability including both levels of analysis. Members of the Committee emphasized that providers face significant challenges and frustration when they receive discordant signals from reports based upon differing measurement methodologies. The Committee expressed a strong desire that the NCQA and CMS/Yale measures should be harmonized for both hospital and plan level measurement.

The Committee asked CMS/Yale and NCQA to provide responses to the harmonization issues identified during the discussion on day 2 of the in-person meeting. The Committee met via conference call on December 16, 2011, to review and discuss the measure developers' responses. The developers were unable to make modifications to the measures to address the harmonization issues in the time given but did indicate willingness and a plan to achieve this goal. The Committee decided to

recommend the measures as presently specified with the expectation that: 1) the developers will have updated their measures and harmonized the short-term issues that do not require significant changes to the measure specifications in one year at the time of the annual update; and 2) additional testing and changes to the risk adjustment models to fully harmonize the measures will likely take three years and should be reviewed at the time of their maintenance review. Because no additional modifications were made to the measures, the votes on the criteria and recommendation on endorsement from day 2 of the in-person meeting remained. The specific harmonization issues, developer responses, and Committee discussion from the conference call are outlined below.

Hierarchical condition category (HCC) versus Condition categories (CCs)
As currently specified, the NCQA measure uses HCC and the CMS/Yale measure uses CCs. The Committee suggested that both developers need to harmonize and use a single approach. In a memo responding to the Committee's request, both developers indicated that they would assess the effect of the recommendation on each of their measures. The developers are to inform the Committee of their efforts in harmonizing this issue at the annual update and harmonization should be fully completed and submitted at the time of maintenance review.

Logistic or hierarchical modeling
Each measure used a different modeling approach; NCQA used only logistic modeling as opposed to CMS/Yale, which uses a hierarchical logistic model. The Committee preferred that the developers harmonize their risk models. Some Committee members expressed a preference for using only logistic regression modeling. In the past, however, the NQF has endorsed approaches that are multilevel or clustered to reflect the true underlying structure of the data, and several members of the Committee also favored such an approach. Both developers determined that they will continue to use separate models. CMS/Yale stated that the use of hierarchical modeling accounts for data clustering of patients in hospitals. The Committee still was concerned with having two approaches and asked the developers to further evaluate the possibility of harmonization. The developers are to inform the NQF of their efforts in harmonizing this issue at the annual update and harmonization should be fully completed and submitted at the time of maintenance review.

Inclusion of structured cohorts
Members of the Committee requested that NCQA harmonize their denominator to include the five cohorts/conditions (medicine, surgery/gynecology, cardiorespiratory, cardiovascular and neurology) that are presently in the CMS/Yale measure to account for patient and service mix across hospitals. NCQA has noted that they would evaluate the impact of the proposal on their measure. The developers are to inform the NQF of their efforts in harmonizing this issue at the annual update and harmonization should be fully completed and submitted at the time of maintenance review.

Exclusion of planned readmissions
It was suggested that NCQA exclude planned readmissions from their measure as including planned readmissions is not a signal of poor quality of care. NCQA is willing to work on removing planned readmissions and will assess the effect it has on the measure. Harmonization of this issue should be fully completed and submitted in one year at the annual update.

Inclusion of patients with cancer
As currently specified, the NCQA measure includes planned readmissions, which contain the cancer patient population. The Committee suggested that NCQA exclude planned readmissions, but to retain the cancer patients that are not planned readmissions. CMS/Yale excluded patients treated for cancer for the following reasons: 1) post-discharge mortality is higher than the remaining hospital population; 2) a low correlation between the other cohorts (medicine, surgery/gynecology, cardiorespiratory, cardiovascular and neurology) and cancer patients and readmission hospital performance; 3) obtained support from other organizations for excluding the patients; 4) there are cancer patients that are included in the measure, many with a secondary diagnosis of cancer; and 5) CMS is currently in the process of developing measures for cancer specialty hospitals. Harmonization of this issue should be fully completed and submitted in one year at the annual update.

Counting readmissions as index admissions
The NCQA measure as currently specified did not permit a readmission to serve as an index hospitalization for additional readmissions. This raised a concern because all institutions should be held accountable for all hospital readmissions. The Committee requested that NCQA harmonize with the CMS/Yale measure to count readmissions as index admissions. Harmonization of this issue should be fully completed and submitted in one year at the annual update.

Inclusion of patients with behavioral health/substance abuse conditions
Both measures include behavioral health and substance abuse conditions; however, the conditions included were not identical. The Committee asked the developers to harmonize and include the same behavioral health and substance abuse conditions. Harmonization of this issue should be fully completed and submitted in one year at the annual update.

Inclusion of patients with psychiatric conditions
There are patients who receive primary psychiatric treatment at acute care hospitals. CMS/Yale was asked to incorporate these patients into their measure because of possible implications of the readmission rates for patients with comorbid psychiatric disorders. CMS/Yale agreed to evaluate the impact of including patients with psychiatric conditions in the medicine cohort or creating a sixth cohort. Harmonization of this issue should be fully completed and submitted in one year at the annual update.

MEASURES RECOMMENDED

1789 Hospital-wide all-cause unplanned readmissions measure (HWR) **11**

1768 Plan all-cause readmissions **15**

MEASURES NOT RECOMMENDED

0329 Risk-adjusted 30-day all-cause readmission rate **18**

MEASURE EVALUATION SUMMARY TABLES

MEASURES RECOMMENDED

1789 Hospital-wide call-cause unplanned readmissions measure (HWR)
Measure Submission and Evaluation Form Description: This measure estimates the hospital-level, risk-standardized rate of unplanned, all-cause readmission after admission for any eligible condition within 30 days of hospital discharge (RSRR). The measure reports a single summary RSRR, derived from the volume-weighted results of five different models, one for each of the following specialty cohorts (groups of discharge condition categories or procedure categories): surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology, each of which will be described in greater detail below. The measure also indicates the hospital standardized risk ratios (SRR) for each of these five specialty cohorts. We developed the measure for patients 65 years and older using Medicare claims. The measure has been tested in an all-payer population of patients aged 18 years or older. Numerator Statement: (Note: This outcome measure does not have a traditional numerator and denominator like a core process measure (e.g., percentage of adult patients with diabetes aged 18-75 years receiving one or more hemoglobin A1c tests per year); thus, we use this field to define the measure outcome.) The outcome for this measure is unplanned all-cause 30-day readmission. We defined a readmission as an inpatient admission to any acute care facility which occurs within 30 days of the discharge date of an earlier, eligible index admission. All readmissions are counted as outcomes except those that are considered planned. Denominator Statement: The target population for this measure as currently specified is admissions to acute care facilities for patients 65 and older. The measure is now being tested in an all-payer population of patients aged 18 years or older. Exclusions: We exclude from the measure all admissions for which full data are not available or for which 30-day readmission by itself cannot reasonably be considered a signal of quality of care. Exclusions: Admissions for patients without 30 days of post-discharge enrollment in FFS Medicare Rationale: This is necessary in order to identify the outcome (readmission) in the dataset. Admissions for patients not continuously enrolled in FFS Medicare for the 12 months prior to the index admission Rationale: This is necessary to capture historical data for risk adjustment. Admissions for patients discharged against medical advice (AMA) Rationale: Hospital had limited opportunity to implement high quality care. Admissions for patients to a PPS-exempt cancer hospital Rationale: These hospitals care for a unique population of patients that is challenging to compare to other hospitals. Admissions for patients with medical treatment of cancer (See Table 3 in Section 2a1.9) Rationale: These admissions have a very different mortality and readmission profile than the rest of the Medicare population, and outcomes for these admissions do not correlate well with outcomes for other admissions. (Patients with cancer who are admitted for other diagnoses or for surgical treatment of their cancer remain in the measure). Admissions for primary psychiatric disease (see Table 4 in Section 2a1.9) Rationale: Patients admitted for psychiatric treatment are typically cared for in separate psychiatric or rehabilitation centers which are not comparable to acute care hospitals. Admissions for “rehabilitation care; fitting of prostheses and adjustment devices” Rationale: These admissions are not for acute care or to acute care hospitals. Adjustment/Stratification: Hierarchical logistic regression models are used to model the log-odds of readmission within 30 days of discharge, as a function of patient-level demographic and clinical characteristics and a random hospital-level intercept. This model specification accounts for within-hospital correlation of the observed outcomes and models the assumption that underlying differences in quality among the health care facilities being evaluated lead to systematic differences in outcomes. In brief, the approach simultaneously models two levels (patient and hospital) to account for the variance in patient outcomes within and between hospitals [1]. At the patient level, each model adjusts the log-odds of readmission within 30-days of discharge for age and selected clinical covariates. The second level models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of readmission, after accounting for patient risk. The hospital-specific intercepts are given a distribution in order to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. We estimate a separate hierarchical logistic regression model for each specialty cohort. However, we use a fixed, common set of variables in all our models for simplicity and ease of data collection and

analysis. To group ICD-9-CM codes into comorbid risk variables, we use CMS Condition Category (CMS-CCs) groups, the grouper used in previous CMS risk-standardized outcomes measures [2]. See Table 5, of the Measure Submission and Evaluation Worksheetfor the final list of comorbid risk variables. The models also include a condition-specific indicator for all condition categories with sufficient volume (defined as those with more than 1,000 admissions nationally each year).
Stratification: Not Applicable
Level of Analysis: Facility
Type of Measure: Outcome
Data Source: Administrative claims
Measure Steward: Centers for Medicare & Medicaid Services (CMS)

1. Importance to Measure and Report: Y-18; N-1

Subcriteria rating prior to in-person meeting:
(1a. High Impact: 1b. Performance Gap, 1c. Evidence)
1a. Impact: H-17; M-2; L-0; I-0 1b. Performance Gap: H-15; M-4; L-0; I-0
1c. Evidence: Not applicable; outcome measure

Rationale: While evaluating the measures' importance to measure and report, the Committee agreed that the subcriteria was met and provided the following rationale:

- All readmission/care transitions goals have been identified in the National Quality Strategy under Patient Safety and Care Coordination and are further elaborated upon in the Partnership for Patients.
- As a stand-alone issue, readmissions is important to measure due to (1) high economic burden and (2) a complex relationship between the different elements of utilization, health status, transitions of care, and care coordination.
- An all-cause readmission measure would provide an opportunity to improve hospital accountability and performance.
- While discussing the evidence for the measure focus, there were concerns as to whether this measure was a health outcome or if hospital readmissions are an appropriate proxy for health outcomes.
- The Committee, particularly consumer representatives, agreed that readmissions are health outcomes because it is a proxy for deterioration in health status.

2. Scientific Acceptability of Measure Properties: Y-13; N-6

Subcriteria rating prior to in-person meeting:
(2a. Reliability – precise specifications, testing; 2b. Validity – testing, threats to validity)
2a. Reliability: H-10; M-8; L-1; I-0 2b. Validity: H-7; M-12; L-1; I-1

Rationale: While evaluating the measures' scientific acceptability, the Committee agreed that the subcriteria was met and identified 3 major issues:
1) Use of Hierarchical logistic regression model (HLM)
2) Hospital volume
3) Adjusting for socioeconomic status

Use of Hierarchical logistic regression model (HLM)

- Several Committee members expressed a wide range of concerns about the use of HLM due to its treatment of smaller volume hospitals, heavily relying on the assumption that the model does not make as much of an inference from patients within a small volume hospital, effectively pulling a smaller volume hospital towards more average estimates.
- The use of HLM attempts to level the playing field by adjusting for patient comorbidities and differences in services a hospital provides.
- The developer also stated that due to the fact that this is an all-cause measure, they did not have a large number of hospitals with small volumes, as may be seen in a condition-specific measure. With an all-cause measure, every hospital will have at least 'several hundred' observations.
- Small volume hospital readmission rates are calculated with less precision than larger hospitals.

Hospital volume

- Several Committee members felt that the decision to exclude hospital volume ignores the literature that explains that smaller volume hospitals generally have higher readmission rates.

- The Committee also expressed concern that the measure results may not be a true representation of a hospital readmission. This could pose an issue, when public reporting websites (i.e. Hospital Compare) use the results to educate consumers.
- Using this type of risk-adjustment in this setting may introduce bias for a small volume hospital performing well. Hospitals with low volume may appear as average, effectively removing an incentive to improve quality.
- The developers argued that they could have included volume in the model to improve the predicative power; however, it does not seem appropriate to allow quality expectations to vary based on hospital volume.
- At the request of the Committee, the CMS/Yale team presented additional information to address the question of hospital volume and quality performance. For large and small volume hospitals they demonstrated that there is no pull to the mean, a major concern expressed by the Committee.

Adjusting for socioeconomic status

- The measure was not adjusted for socio-economic status (SES).
- The Committee felt strongly those patient variables such as health literacy, access to care, dual eligibility, homelessness, domestic violence, and access to childcare drive patient's access to follow-up care.
- Committee members also expressed concern that to exclude SES might lead to an increase in cherry picking among hospitals.
- The developer pointed out that the measure was not adjusted for SES for several reasons:
    - In examining the data across hospitals with a different proportion of Medicaid patients, there was a wide range of performance on the measure due to quality of care and resource availability.
    - There is no reliable and acceptable proxy for SES using administrative data.
    - The developers did not want to adjust away differences in SES, but rather highlight the disparities seen across hospitals.
- Supplemental information was provided demonstrating that among hospitals with the highest proportion of Medicaid patients, 25 percent of them performed better than the average hospital with very few Medicaid patients.
- Calibration curves showed the CMS/Yale model was able to predict risk for aggregate groups of patients well (i.e. how well the model is able to predict a low risk patient's low risk).

Additional items

- *The exclusion of patients with a primary diagnosis of a psychiatric condition*. The developer excluded patients readmitted for primary psychiatric conditions for 3 reasons: (1) the number of patients falling into this category was a 'small number' not evenly distributed across hospitals, (2) smaller volume hospitals do not code these readmissions in a consistent manner, and (3) this patient population is usually treated in rehabilitation facilities or specialized psychiatric hospitals. One Committee member argued that many psychiatric patients are treated in single units, within acute care hospitals and should be included in this measure, because exclusion has implications for the readmission rates of patients with comorbid psychiatric disorders. The developer clarified that the exclusion is for Psychiatric patients readmitted with a primary psychiatric diagnosis only, and that patients with comorbid secondary psychiatric diagnosis that are admitted for other medical conditions are still included.
- *The use of the 5 specialty cohorts.* The developers noted that in order to account for variation and service mix across hospitals, the best risk adjustment and model performance came when using the 5 cohorts. Limiting the measure to 5 cohorts also gave the measure better utility for the hospital because the measure is able to provide detailed data on each service line.
- *The surgery/gynecology cluster does not include obstetrics*. Given the limited time during the call for measures, and because the measure was initially built upon a 65+ population the developers did not include obstetrics; however they will work to update the measure.
- The model only accounts for the receiving hospitals' performance, not the transferring hospital performance. This was a particular concern for transfers from a community-based facility to a larger hospital known more for specialty care.
- An additional recommendation to add reporting stratification by SES guidance was voted down (Y-8; N-11).

3. Usability: H-1; M-8; L-11; I-0

Subcriteria rating prior to in-person meeting:
(*Meaningful, understandable, and useful to the intended audiences for 3a. Public Reporting/Accountability and 3b. Quality Improvement)*
3a. Public Reporting: H-6; M-5; L-5; I-3
3b. QI: H-5; M-6; L-6; I-2

Rationale: While evaluating the measures' usability, the Committee found the usability to be low and identified 3 major issues:
1) Measurement issues regarding the model approach

2) Consumer use of the measure
3) Time lag

Measurement issues regarding the shrinkage model

- The Committee felt that smaller volume hospitals would not receive useful information to improve quality.
- Committee members expressed concerns that smaller volume hospitals would look better than larger hospitals because their means would be pulled to an overall national average. As such, the data generated may not be meaningful for public reporting.

Consumer Use of the Measure

- Addressing the issue of consumer use, the CMS/Yale group pointed out that the rate of readmission at which the public can call something 'good' vs. 'bad' is a policy decision by CMS. CMS currently uses a 95 percent confidence interval and large confidence intervals are a genuine representation of hospital performance. Committee members felt that a wide confidence interval makes the measure less useful for consumers.
- The Committee felt that to make this measure understandable and meaningful would require more education for consumers on readmissions, specifically that reduction of readmission rates is not rationing of care but rather improved quality
- The developer reiterated that their measure was built for two purposes: (1) public reporting in order to adequately compare different types of hospitals; and (2) for quality improvement by allowing hospitals to benchmark themselves against other hospitals to identify areas in which quality improvement is necessary, and catalyze activity.

Time lag

- The Committee was concerned that for the purposes of quality improvement, the lag in data collection and reporting (approximately 12 to 18 months) would be inadequate.
- The time lag would limit the ability to apply rapid cycle improvement events.

4. Feasibility: H-14; M-5 ; L-0 ; I-0

Subcriteria rating prior to in-person meeting:
(4a. Data generated during care; 4b. Electronic sources; 4c. Susceptibility to inaccuracies/ unintended consequences identified; 4d. Data collection can be implemented)
4a. Byproduct of Care Processes: H-14; M-5; L-0; I-0
4b. Electronic data sources: H-13; M-5; L-1; I-3
4c. Susceptability to inaccuracies, consequences: H-7; M-9; L-1; I-2
4d. Data collection strategy: H-11; M-6; L-0; I-2

Rationale:

- Members discussed ability of hospitals to receive information about readmissions to other hospitals and its effect on the measure implementation.

Steering Committee Vote: Meets Criteria for Endorsement: Y-12 ; N-8
Following harmonization discussion, the measure was recommended for endorsement

Rationale:

- This measure addresses a high impact area.
- This measure can be used at the hospital level.

1768 Plan all-cause readmissions

Measure Submission and Evaluation Form

Description: For members 18 years of age and older, the number of acute inpatient stays during the measurement year that were followed by an acute readmission for any diagnosis within 30 days and the predicted probability of an acute readmission.
Data are reported in the following categories:
1. Count of Index Hospital Stays (IHS) (denominator)
2. Count of 30-Day Readmissions (numerator)
3. Average Adjusted Probability of Readmission
4. Observed Readmission (Numerator/Denominator)
5. Total Variance
Note: For commercial, only members 18–64 years of age are collected and reported; for Medicare, only members 18 and older are collected, and only members 65 and older are reported.
Numerator Statement: At least one acute readmission for any diagnosis within 30 days of the Index Discharge Date.
Denominator Statement: For commercial health plans, ages 18-64 as of the Index Discharge Date. For Medicare and Special Needs Plans, ages 18 and older as of the Index Discharge Date.
Exclusions: Exclude hospital stays where the Index Admission Date is the same as the Index Discharge Date and any inpatient stay with a discharge date in the 30 days prior to the Index Admission Date.
Adjustment/Stratification: Indirect standardization, using logistic regression Uses the CC and HCC models to identify comorbidities and attaches weights to each statistically significant comorbidity by product line and age grouping. We estimated a stepwise logistic regression. The binary dependent variable was coded 1 for index hospital stays that had a subsequent readmission within 30 days, and 0 otherwise.
The independent variables in the models were
age-gender cohort:
Commercial:
•male 18-44, female 18-44, male 45-54, female 45-54, male 55-64 (reference group), female 55-64.
In year 1, the model for Medicare used: Medicare 18 and older:
•male 18-44, female 18-44, male 45-54, female 45-54, male 55-64, female 55-64. male 65-74 (reference group), female 65-74, male 75-84, female 75-84, male 85+, female 85+.
In year 2, the model for Medicare will use:
•male 65-74 (reference group), female 65-74, male 75-84, female 75-84, male 85+, female 85+. –
Major surgery: 1=index hospital stay was for major surgery (see code list in algorithm); 0, otherwise.
Discharge Clinical Condition (CC) from the HCC classification system: 1=index hospital stay was for the CC; 0, otherwise.
Note: each index hospital stay is coded into exactly one CC and is based only on the primary diagnosis.
Comorbid Hierarchical Clinical Condition (HCC): 1=index hospital stay had the associated comorbidity (HCC) indicated through any diagnosis on a face to face claim/encounter for the 12 months prior to the index hospital stay discharge date; 0, otherwise.
Stratification by risk category/subgroup. The measure includes a table that stratifies the five reporting data elements by age and gender.
The five elements are:
Count of Index Stays
Count of 30-Day Readmissions
Average Adjusted Probability
Observed Readmission (Numerator/Denominator)
Total Variance
The age stratifications are:
Commercial: 18-44, 45-54, 55-64, Total
Medicare: 65-74, 75-84, 85+., Total
The measure is also stratified by gender. Values are reported for each stratum
Level of Analysis: Health Plan
Type of Measure: Outcome
Data Source: Administrative claims
Measure Steward: National Committee of Quality Assurance

STEERING COMMITTEE MEETING 12/5-6/2011

1. Importance to Measure and Report: Y-18; N-0

Subcriteria rating prior to in-person meeting:

(1a. High Impact: 1b. Performance Gap, 1c. Evidence)
1a. Impact: H-13; M-5; L-1; I-0 1b. Performance Gap: H-5; M-8; L-2; I-2
1c. Evidence: Not applicable; outcome measure

Rationale: While evaluating the measures' importance to measure and report, the Committee agreed that the subcriteria was met and provided the following rationale:

- This particular measure creates a standard metric for quality monitoring and accountability of the health plan, leaving it to the health plan to work with its network of hospitals, providers, medical homes, and other entities to implement quality improvement strategies to improve readmissions.
- This health plan based measure can be a complement to a hospital-based measure.
- Readmissions are important to measure due to (1) high economic burden and (2) a complex relationship between the different elements of utilization, health status, transitions of care, and care coordination.
- This all-cause readmission measure would provide an opportunity to improve hospital and health plan accountability and performance.
-

2. Scientific Acceptability of Measure Properties: Y-12; N-7

Subcriteria rating prior to in-person meeting:
(2a. Reliability – precise specifications, testing; 2b. Validity – testing, threats to validity)
2a. Reliability: H-4; M-9; L3-; I-3 2b. Validity: H-3; M-10; L-5; I-1

Rationale: While evaluating the measures' scientific acceptability, the Committee agreed that the subcriteria was met, and identified 3 major issues:
1) Use of Health Plan level data
2) Risk Adjustment
3) Adjusting for Socioeconomic Status

Use of Health Plan level data

- In this measure, the data collected are at the health plan level. This measure focus shifts from the hospital as the unit of accountability, to a more population based approach.
- There are no current plans to develop this measure for use at a hospital level.
- The data are collected at the health plan level. The plans take NCQA specifications and implement them either themselves or through their software vendors that perform various calculations on the number of hospitalizations, transfers, etc.
- The Committee expressed concern that underperforming hospitals would not be seen in the plan level data. Plans seeking to reduce readmissions can work with hospitals and provide selective contracting or other value based payment arrangements.

Risk Adjustment

- This measure uses indirect standardization through a logistic model.
- The data are not nested since patients are extremely cross classified. Data are clustered across multiple hospitals and across multiple health plans.
- The measure accounts for a service mix of patients in a given setting by adjusting for patient attributes such as demographic information, age, comorbid conditions, and index condition.
- This measure uses CC's from the CMS HCC system.
- The Committee expressed concern regarding selection bias between health plans, and hospitals being unfairly penalized due to variability in the patients that they treat.
- This measure has modified the risk adjustment model to have separate risk adjusters and weights for the Medicare under 65 and the Medicare 65 and older population.
- The developer presented calibration curves demonstrating that the expected versus actual risk deciles plots had adequate discriminate ability. Actual differences between expected and actual risk were less than 1 percent in each decile.

Adjusting for Socioeconomic Status

- This measure does not adjust for socioeconomic status (SES). The developers feel there is not a suitable proxy for SES within a community, as the health plans do not report that information. NCQA feels that health plan comparisons are done on a local scale,

and they have no reason to believe there is an SES difference between health plans. The Committee challenged this assumption.
- NCQA argued that the measure takes SES into account to a certain degree through measurement of each health plan product line; Commercial and Medicare.

Additional Items
- Behavioral health and planned admissions are included in this measure.

3. Usability: H-5; M-4; L-11; I-0

Subcriteria rating prior to in-person meeting:
(*Meaningful, understandable, and useful to the intended audiences for 3a. Public Reporting/Accountability and 3b. Quality Improvement)*
3a. Public Reporting: H-7; M-5; L-6; I-1
3b. QI: H-6; M-6; L-5; I-2

Rationale: While evaluating the measures' usability, the Committee found the usability to be low and identified the following issues: The health plan is in a greater position to deal with the coordination issues between primary care and the care team (i.e. nurse care manager, etc.) and to follow up with the patient (i.e. about making follow up appointment, adhering to medication regiments, or other access issues).
- Coordination of care can be done by the payer within a given market.
- Useful to the health plan in setting up quality improvement methods that would affect individual institutions that are contracted with that plan.
- Consumer representatives on the Committee felt that this measure was extremely useful for purchasers and consumers, especially upon implementation of health insurance exchanges.
- There is added utility to having a health plan perspective in combination with and in complement to a hospital-based measure.

4. Feasibility: H-14; M-5; L-0; I-0

Subcriteria rating prior to in-person meeting:
(4a. Clinical data generated during care delivery; 4b. Electronic sources; 4c.Susceptibility to inaccuracies/ unintended consequences identified 4d. Data collection strategy can be implemented)
4a. Byproduct of Care Processes: H-11; M-7; L-1; I-0
4b. Electronic data sources: H-10; M-6; L-2; I-1
4c. Susceptibility to inaccuracies, consequences: H-4; M-9; L-5; I-1
4d. Data collection strategy: H-7; M-9; L-3; I-0

Rationale:
- Initial testing and development of this measure began in 2009, using commercial and Medicare Advantage plan based data from 2008 and 2009. NCQA has also collected first year measurement from Medicare Advantage commercial health plans. Those data are already in use at CMS.
- Data and evidence have been collected for one year
- The measure is already in implementation among several health plans.
- CMS is already in the process of using the measure within the STAR system for use in both health plan choice and incentive processes.

Steering Committee Vote: Meets Criteria for Endorsement : Y-10; N-9
Following harmonization discussion, the measure was recommended for endorsement.
Rationale:
- This measure demonstrated a high impact area.
- This measure can be used at the plan level.
- This measure is useful for consumers.

MEASURES NOT RECOMMENDED

0329 Risk-adjusted 30-day all-cause readmission rate

Measure Submission and Evaluation Form

Description: The existing NQF-endorsed measure provides a means for determining the risk-adjusted readmission rate for a selected adult target population and can be applied for any desired timeframe. Readmission rate is defined as the percentage of acute inpatient discharges during the measurement period followed by an acute inpatient admission for any diagnosis to any hospital within 30 days. We are proposing to change the measure and offer a risk factor approach. This method allows for calculation of a risk-adjusted readmission rate for use in two different ways: (1) retrospective analysis of hospital (or other study population) performance determination and (2) in a real-time Electronic Health Record (EHR) environment, analysis to determine the readmission risk factor for each inpatient admission.
Numerator Statement: Non-behavioral health acute inpatient admissions for patients who were readmitted following a discharge from a non-behavioral health acute inpatient admission (index admission).
Denominator Statement: The denominator contains all eligible non-behavioral acute care inpatient discharges for the target population being measured for the desired measurement period. A patient can have multiple eligible discharges during the measurement period.
Exclusions: The cases to be excluded from the denominator are those for patients who died during the hospital stay or were hospitalized for mental health disorders or substance abuse treatment.
Adjustment/Stratification: The readmission risk model is intended to be used in two ways:
(1) to conduct retrospective hospital performance measurement for reporting risk-adjusted readmission rates (so that the impact of changes in case mix can be removed); and (2) within electronic hospital records, to flag current acute hospital cases with a higher chance of readmission or whose readmission is potentially avoidable. Readmission risk is assessed via a direct standardization method. Readmission Risk Categories (RRCs) with higher weights have a higher probability of readmission within 30 days. Risk stratification is based on the combination of diagnosis/procedure groups and two age bands: ages 0 to 64 and ages 65 and over. There are 176 RRCs for ages 0 to 64 and 171 for ages 65 and over. The variables needed to assign the RRC weight to an admission are the age (while hospitalized) or if already discharged, the age at discharge, along with the primary diagnosis and primary procedure.

Stratification by risk category/subgroup. Variables needed to calculate the observed readmit rate includes: admit date, discharge date, and member identifiers. If risk adjustment and/or clinical bucketing is desired, then the required additional variables include: age at discharge, primary diagnosis, primary procedure, and the associated Readmission Risk Category (RRC).
Level of Analysis: Facility, Health Plan, Population: Community, County or City, National, Regional, State
Type of Measure: Outcome
Data Source: Administrative claims
Measure Steward: UnitedHealth Group

1.Importance to Measure and Report: Y-16; N-0

Subcriteria rating prior to in-person meeting:
(1a. High Impact: 1b. Performance Gap, 1c. Evidence)
1a. Impact: H-15; M-3; L-1; I-0 1b. Performance Gap: H-6; M-2; L-7; I-4
1c. Evidence: Not applicable; outcome measure

Rationale:

- This measure is undergoing maintenance review.
- Readmissions are important to measure due to (1) high economic burden and (2) a complex relationship between the different elements of utilization, health status, transitions of care, and care coordination.
- An all-cause readmission measure would provide an opportunity to improve hospital accountability and performance

2. Scientific Acceptability of Measure Properties: Y-0; N-18

Subcriteria rating prior to in-person meeting:
(2a. Reliability – precise specifications, testing; 2b. Validity – testing, threats to validity)
2a. Reliability: H-15; M-3; L-1; I-0 2b. Validity: H-4; M-3; L-8; I-4

Rationale: While evaluating the measures' scientific acceptability, the Committee agreed that the subcriteria was not met and identified 2 major issues:

1) Testing
2) Risk Adjustment

Testing

- The measure developer indicated the measure can be used for claims based and electronic health records, however, the developer only presented testing information for claims based data.
- The measure is a maintenance measure, thus the Committee requested information on how the measure was being used to demonstrate performance variation. The developer was not able to provide this information.

Risk Adjustment

- Case mix adjustment is based on age and discharge diagnosis. Each discharge diagnosis and readmission is sorted into 220 Readmission Risk Categories (RRC). A rate for each RRC is calculated and the appropriate rate is adjusted based on case mix at each institution.
- The measure was developed for a population that is very broad, ages 0-64. Committee members wanted to know the effect of this broad range on case mix.
- Specifically comparing children's hospitals and general hospitals on all-cause readmission seems problematic since readmissions may be very different in a pediatric population.
- The developer suggested to the committee that they might be able to stratify, by age, in to 3 groups ages 0-17, 18-64, and over 65.
- The developers do not consider a transfer a readmission; in this measure the developers attempted to remove, or group all transfers together.
- The measure does not adjust for co-morbid conditions. The developer asserted that claims-based data has a high risk of being inaccurate, and to ensure accuracy the hospital would have to examine each patient claim and identify any comorbidity in order to be fair in doing adjustments.
- The measure does not distinguish planned vs. unplanned readmission because the developers wanted to include all-cause, all readmissions. The developer felt there is no reliable way to determine what a planned readmit is using claims data.

Additional Items

- The developers explained that for this measure, there must be a specific time gap between index admit and discharge (i.e. discharge from acute care to rehab facility done on the same day is not a readmission).

Steering Committee Recommendation for Endorsement: Not recommended because measure did not pass Scientific Acceptability of Measure Properties criteria

Rationale:

- The measure had a very broad age range, 0 to 65.
- The measure did not have an appropriate risk adjustment or stratification approach.
- The developers did not include sufficient validity testing.
- This measure does not adjust for any comorbidity.

NOTES

1. Medicare Payment Advisory Commission (MEDPAC). Report to the Congress: Reforming the Delivery System. Washington, DC: MedPAC; 2008. Available at http://medpac.gov/documents/Jun08_EntireReport.pdf. Accessed October 2011.
2. ibid
3. The Patient Protection and Affordable Care Act (PPACA) (2010) Section 10303(f). Development of Outcome Measures.

APPENDIX A: MEASURE SPECIFICATIONS

MEASURES

1789 Hospital-wide all-cause unplanned readmission measure (HWR).....A-1
1768 Plan all-cause readmissions.....A-10

	1789 Hospital-wide all-cause unplanned readmission measure (HWR)
Steward	Centers for Medicare & Medicaid Services | 500 Security Blvd., Mail Stop S3-02-01 | Baltimore | Maryland, 21244
Description	This measure estimates the hospital-level, risk-standardized rate of unplanned, all-cause readmission after admission for any eligible condition within 30 days of hospital discharge (RSRR) for patients aged 18 and older. The measure reports a single summary RSRR, derived from the volume-weighted results of five different models, one for each of the following specialty cohorts (groups of discharge condition categories or procedure categories): surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology, each of which will be described in greater detail below. The measure also indicates the hospital standardized risk ratios (SRR) for each of these five specialty cohorts. We developed the measure for patients 65 years and older using Medicare fee-for-service (FFS) claims and subsequently tested and specified the measure for patients aged 18 years and older using all-payer data. We used the California Patient Discharge Data (CPDD), a large database of patient hospital admissions, for our all-payer data.
Type	Outcome
Data Source	Administrative claims
Level	Facility
Setting	Hospital/Acute Care Facility
Numerator Statement	(Note: This outcome measure does not have a traditional numerator and denominator like a core process measure (e.g., percentage of adult patients with diabetes aged 18-75 years receiving one or more hemoglobin A1c tests per year); thus, we use this field to define the measure outcome.) The outcome for this measure is unplanned all-cause 30-day readmission. We defined a readmission as an inpatient admission to any acute care facility which occurs within 30 days of the discharge date of an eligible index admission. All readmissions are counted as outcomes except those that are considered planned.
Numerator Details	**Time Window:** The time window for readmission is within 30 days from the date of discharge of the index admission. The outcome for this measure is unplanned all-cause readmission within 30 days of discharge date of an eligible index admission. Because planned readmissions are not a signal of quality of care, the measure does not count planned readmissions in the outcome. The measure uses an algorithm to identify "planned readmissions" in claims data that will not count as readmissions in the measure. The algorithm is based on two main principles: 1- "Planned" readmissions are those in which one of a pre-specified list of procedures took place (which will be described in detail below), or those for maintenance chemotherapy, organ transplant, or rehabilitation. 2- Admissions for acute illness or for complications of care are not "planned." Even a typically planned procedure performed during an admission for an acute illness would not likely have been planned. We can identify readmissions as acute or non-acute by considering the principal discharge condition. The algorithm developed to identify planned readmissions uses procedure codes and discharge diagnosis categories for each readmission. The HWR measure defines planned readmissions as any readmission that was either:

	1789 Hospital-wide all-cause unplanned readmission measure (HWR)

	A non-acute readmission in which one of 35 typically planned procedures occurs;
	
	or
	
	A readmission for maintenance chemotherapy, organ transplant, or rehabilitation
	
	All other readmissions are considered unplanned and are counted as readmissions in the measure. The following examples illustrate this approach:
	
	Example 1:
	A readmission with a discharge condition category of biliary tract disease that included a cholecystectomy would be considered planned.
	
	A readmission with a discharge condition category of septicemia that included a cholecystectomy would be considered unplanned.
	
	A readmission with a discharge condition category of "complications of surgical procedures or medical care" would be considered unplanned.
	
	List of planned procedures (Table 1)
	Planned procedures are identified using AHRQ Clinical Classification System (CCS) procedure category list (Table 1). Readmissions in which any of these procedures are performed are considered planned if the discharge condition category is not acute or a complication of care (i.e., not listed in Table 2).
	
	Table 1: Procedure categories considered planned
	
	AHRQ Procedure CCS//Description//Readmissions with no excluding diagnosis ("planned" readmissions): Number, Percent of total planned readmissions in the 2008 Medicare Provider Analysis and Review (MedPAR) dataset used for measure development
	
	45//Percutaneous transluminal coronary angioplasty (PTCA)//12,038, 13.83%
	//Rehabilitation (Condition CCS 254)//9,973, 11.46%
	84//Cholecystectomy and common duct exploration//7,191, 8.26%
	157//Amputation of lower extremity//6,649, 7.64%
	44//Coronary artery bypass graft (CABG)//6,290, 7.23%
	78//Colorectal resection//4,719, 5.42%
	51//Endarterectomy; vessel of head and neck//4,558, 5.24%
	113//Transurethral resection of prostate (TURP)//3,752, 4.31%
	99//Other OR gastrointestinal therapeutic procedures//3,475, 3.99%
	48//Insertion; revision; replacement; removal of cardiac pacemaker or cardioverter/defibrillator//2,541, 2.92%
	//Maintenance chemotherapy (condition CCS 45)//2,312, 2.66%
	211//Therapeutic radiology for cancer treatment//2,183, 2.51%
	3//Laminectomy; excision intervertebral disc//2,065, 2.37%
	43//Heart valve procedures//2,061, 2.37%
	152//Arthroplasty knee//1,989, 2.28%
	158//Spinal fusion//1,963, 2.25%
	55//Peripheral vascular bypass//1,902, 2.18%
	52//Aortic resection; replacement or anastomosis//1,529, 1.76%
	36//Lobectomy or pneumonectomy//1,492, 1.71%
	153//Hip replacement; total and partial//1,333, 1.53%
	60//Embolectomy and endarterectomy of lower limbs//1,263, 1.45%
	85//Inguinal and femoral hernia repair//981, 1.13%
	104//Nephrectomy; partial or complete//921, 1.06%
	1//Incision and excision of CNS//804, 0.92%

	1789 Hospital-wide all-cause unplanned readmission measure (HWR)

	124//Hysterectomy; abdominal and vaginal//524, 0.60%
	167//Mastectomy//474, 0.54%
	10//Thyroidectomy; partial or complete//353, 0.41%
	114//Open prostatectomy//338, 0.39%
	74//Gastrectomy; partial and total//278, 0.32%
	119//Oophorectomy; unilateral and bilateral//273, 0.31%
	154//Arthroplasty other than hip or knee//229, 0.26%
	//Radical laryngectomy, revision of tracheostomy, scarification of pleura (ICD-9 codes 30.4, 31.74, 34.6)//216, 0.25%
	166//Lumpectomy; quadrantectomy of breast//117, 0.13%
	64//Bone marrow transplant//100, 0.11%
	105//Kidney transplant//70, 0.08%
	176//Other organ transplantation//69, 0.08%
	//Electroshock therapy (ICD-9 codes 94.26, 94.27)//30, 0.03%
	
	List of discharge condition categories that are acute or complications of care (Table 2)
	Admissions in which a planned procedure was performed are only considered "planned" if the patient was not admitted for an acute illness or complication of care. Table 2 contains the list of 27 discharge condition categories considered either acute or complications of care.
	
	Table 2: Discharge condition categories considered acute or complications of care
	
	AHRQ CCS//Description //Number of 30-day readmissions with this condition and one of the planned procedures in the 2008 MedPAR dataset used for measure development.
	
	237//Complication of device; implant or graft//11,689
	106//Cardiac dysrhythmias//10,267
	//Fracture (CC 207, 225, 226, 227, 229, 230, 231, 232)//6,307
	100//Acute myocardial infarction//5,643
	238//Complications of surgical procedures or medical care//5,438
	108//Congestive heart failure; nonhypertensive//5,119
	2//Septicemia (except in labor)//3,372
	146//Diverticulosis and diverticulitis//2,434
	105//Conduction disorders//2,130
	109//Acute cerebrovascular disease//1,886
	145//Intestinal obstruction without hernia//1,341
	233//Intracranial injury//1,271
	116//Aortic and peripheral arterial embolism or thrombosis//1,115
	122//Pneumonia (except that caused by TB or sexually transmitted disease)//710
	131//Respiratory failure; insufficiency; arrest (adult)//678
	157//Acute and unspecified renal failure//645
	201//Infective arthritis and osteomyelitis (except that caused by TB or sexually transmitted disease)//608
	153//Gastrointestinal hemorrhage//566
	130//Pleurisy; pneumothorax; pulmonary collapse//510
	97//Peri-; endo-; and myocarditis; cardiomyopathy//484
	127//Chronic obstructive pulmonary disease and bronchiectasis//462
	55//Fluid and electrolyte disorders//424
	159//Urinary tract infections//410
	245//Syncope//353
	139//Gastroduodenal ulcer (except hemorrhage)//133
	160//Calculus of urinary tract//98
	112//Transient cerebral ischemia//88

	1789 Hospital-wide all-cause unplanned readmission measure (HWR)
	//All condition categories//64,181
Denominator Statement	This claims-based measure can be used in either of two patient cohorts: (1) admissions to acute care facilities for patients aged 65 years or older or (2) admissions to acute care facilities for patients aged 18 years or older. We have tested the measure in both age groups.
Denominator Details	**Time Window:** One year. The ICD-9 diagnosis and procedure codes of the index admission are aggregated into clinically coherent groups of conditions/procedures (condition categories or procedure categories) by using the Agency for Healthcare Research and Quality (AHRQ) Clinical Classifications System (CCS). Next, these discharge condition/procedure categories are organized into five mutually exclusive specialty cohorts defined by care team: surgery/gynecology, cardiorespiratory, cardiovascular neurology, and medicine. Rationale: Conditions typically cared for by the same team of clinicians are expected to experience similar added (or reduced) levels of readmission risk. The surgery/gynecology cohort includes admissions likely cared for by surgical or gynecological teams. These admissions are identified using AHRQ procedure categories. The cardiorespiratory cohort includes several condition categories with very high readmission rates such as pneumonia, chronic obstructive pulmonary disease, and heart failure. These admissions are combined into a single cohort because they are often clinically indistinguishable and patients are often simultaneously treated for several of these diagnoses. The cardiovascular cohort includes condition categories such as acute myocardial infarction that in large hospitals might be cared for by a separate cardiac or cardiovascular team. The neurology cohort includes neurologic condition categories such as stroke that in large hospitals might be cared for by a separate neurology team. The medicine cohort includes all non-surgical patients who were not assigned to any of the other cohorts. See attachments (Technical Report, Section 2.4.5, Table 8, and All-Payer memo, Tables 2-6). In order to define the eligible admissions, we first aggregated the ICD-9 codes of the index admission into clinically coherent conditions by using the Agency for Healthcare Research and Quality's Clinical Classifications Software (CCS). There are a total of 285 mutually exclusive AHRQ condition categories, most of which are single, homogenous diseases such as pneumonia or acute myocardial infarction. Some are aggregates of conditions, such as "other bacterial infections." Mental health and substance abuse categories are included. In addition, AHRQ provides 231 mutually exclusive procedure categories to group procedures a patient might have had during hospitalization. Admissions are eligible for inclusion in the measure if: a. Patient is aged 18 years or older Rationale: Pediatric patients have substantially different illnesses, comorbidities and outcomes compared to an adult population. b. Patient is alive upon discharge Rationale: Patients who die during the initial hospitalization cannot be readmitted. c. Patient is not transferred to another acute care hospital upon discharge Rationale: In an episode of care in which patient is transferred among hospitals, responsibility for the readmission is assigned to the final discharging hospital. Therefore these intermediate admissions within a

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	single episode of care are not eligible for inclusion. Note that a readmission within 30 days will also be eligible as an index admission, if it meets all other eligibility criteria. This allows our measure to capture repeated readmissions for the same patient, whether at the same hospital or another.
Exclusions	We exclude from the measure all admissions for which full data are not available or for which 30-day readmission by itself cannot reasonably be considered a signal of quality of care. Exclusions: 1. Admissions for patients without 30 days of post-discharge data Rationale: This is necessary in order to identify the outcome (readmission) in the dataset. 2. Admissions for patients lacking a complete enrollment history for the 12 months prior to admission Rationale: This is necessary to capture historical data for risk adjustment. 3. Admissions for patients discharged against medical advice (AMA) Rationale: Hospital had limited opportunity to implement high quality care. 4. Admissions for patients to a PPS-exempt cancer hospital Rationale: These hospitals care for a unique population of patients that is challenging to compare to other hospitals. 5. Admissions for patients with medical treatment of cancer (See Table 3 in Section 2a1.9) Rationale: These admissions have a very different mortality and readmission profile than the rest of the Medicare population, and outcomes for these admissions do not correlate well with outcomes for other admissions. (Patients with cancer who are admitted for other diagnoses or for surgical treatment of their cancer remain in the measure). 6. Admissions for primary psychiatric disease (see Table 4 in Section 2a1.9) Rationale: Patients admitted for psychiatric treatment are typically cared for in separate psychiatric or rehabilitation centers which are not comparable to acute care hospitals. 7. Admissions for “rehabilitation care; fitting of prostheses and adjustment devices” Rationale: These admissions are not for acute care or to acute care hospitals. Additionally, in the all-payer testing, we excluded obstetric admissions because the measure was developed among patients aged 65 years or older (approximately 500,000).
Exclusion Details	When the measure is applied to Medicare FFS patients, denominator exclusions are identified based on variables contained in the Standard Analytic File (SAF) or Enrollment Database (EDB). When the measure is applied to all patients aged 18 years or older, denominator exclusions are identified based on the most appropriate data source (e.g. for California, we used the California Patient Discharge Data). For Medicare FFS patients: 1. Lack of enrollment in Medicare FFS for 30 days post-discharge is identified by patient enrollment status in Part A FFS claims using CMS’ EDB; the enrollment indicators must be appropriately marked for the month(s) which falls within 30 days of hospital discharge date. 2. Lack of continuous enrollment in Medicare FFS for 12 months prior to index hospital stay is determined by patient enrollment status in Part A FFS using CMS’ EDB; the enrollment indicators must be appropriately marked for each of the 12 months prior to the index hospital stay 3. Discharges AMA are identified using the discharge disposition indicator within the SAF. 4. PPS-exempt cancer hospitals are identified by their Medicare provider ID. 5. Table 3 indicates all cancer discharge condition categories excluded from the measure. 6. Table 4 indicates all psychiatric discharge condition categories excluded from the measure. 7. Admissions for “rehabilitation care; fitting of prostheses and adjustment devices” are identified by principal

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	diagnosis codes (ICD-9 codes) included in CCS 254 In addition, in-hospital deaths are identified using the discharge disposition vital status indicator in the SAF and transfers to other acute care facilities are identified in the claims when a patient is discharged from an acute care hospital and admitted to another acute care hospital on the same day or next day. Obstetric admissions were identified for exclusion from the all-payer population with the AHRQ CCS diagnosis codes 176-196. Table 3: Cancer discharge condition categories excluded from the measure (Medicare FFS data) AHRQ CCS//Description//Number of Admissions 42//Secondary malignancies//45,319 19//Cancer of bronchus; lung//30,292 45//Maintenance chemotherapy; radiotherapy//21,522 44//Neoplasms of unspecified nature or uncertain behavior//10,160 17//Cancer of pancreas//8,462 38//Non-Hodgkin`s lymphoma//7,977 39//Leukemias//7,809 14//Cancer of colon//6,121 40//Multiple myeloma//4,624 35//Cancer of brain and nervous system//3,561 16//Cancer of liver and intrahepatic bile duct//3,491 13//Cancer of stomach//3,467 29//Cancer of prostate//3,100 15//Cancer of rectum and anus//3,030 18//Cancer of other GI organs; peritoneum//2,974 12//Cancer of esophagus//2,533 11//Cancer of head and neck//2,515 27//Cancer of ovary//2,081 33//Cancer of kidney and renal pelvis//1,863 32//Cancer of bladder//1,807 24//Cancer of breast//1,682 43//Malignant neoplasm without specification of site//1,451 25//Cancer of uterus//1,132 36//Cancer of thyroid//879 21//Cancer of bone and connective tissue//763 41//Cancer; other and unspecified primary//674 20//Cancer; other respiratory and intrathoracic//632 23//Other non-epithelial cancer of skin//593 26//Cancer of cervix//586 28//Cancer of other female genital organs//326 34//Cancer of other urinary organs//301 37//Hodgkin`s disease//236 22//Melanomas of skin//212 31//Cancer of other male genital organs//34 30//Cancer of testis//4 //Total//182,213 Table 4: Psychiatric discharge condition categories excluded from the measure (Medicare FFS data) AHRQ CCS//Description//Number of Admissions 657//Mood disorders//7,874 659//Schizophrenia and other psychotic disorders//7,849

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	651//Anxiety disorders//3,153 670//Miscellaneous disorders//1,315 654//Developmental disorders//594 650//Adjustment disorders//399 658//Personality disorders//127 652//Attention-deficit, conduct, and disruptive behavior disorders//119 656//Impulse control disorders, NEC//27 655//Disorders usually diagnosed in infancy, childhood, or adolescence//16 662//Suicide and intentional self-inflicted injury//10 //Total//21,483

Risk Adjustment	Hierarchical logistic regression models are used to model the log-odds of readmission within 30 days of discharge, as a function of patient-level demographic and clinical characteristics and a random hospital-level intercept. This model specification accounts for within-hospital correlation of the observed outcomes and models the assumption that underlying differences in quality among the health care facilities being evaluated lead to systematic differences in outcomes.
	
	In brief, the approach simultaneously models two levels (patient and hospital) to account for the variance in patient outcomes within and between hospitals [1]. At the patient level, each model adjusts the log-odds of readmission within 30-days of discharge for age and selected clinical covariates. The second level models the hospital-specific intercepts as following a normal distribution. The hospital intercept represents the underlying hospital specific risk of readmission, after accounting for patient risk. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.
	
	We use a fixed, common set of variables in all our models for simplicity and ease of data collection and analysis. However, we estimate a hierarchical logistic regression model for each specialty cohort separately, and the coefficients associated with each variable may vary across specialty cohorts. To group ICD-9-CM codes into comorbid risk variables, we use CMS Condition Category (CMS-CCs) groups, the grouper used in previous CMS risk-standardized outcomes measures [2]. See Table 5 for the final list of comorbid risk variables. The models also include a condition-specific indicator for all condition categories with sufficient volume (defined as those with more than 1,000 admissions nationally each year for Medicare FFS data) as well as a single indicator for conditions with insufficient volume in each model.
	
	Table 5: Final comorbid risk variables
	
	Risk Variable Group Label//CMS-CCs [2]//Description//"X" if not adjusted for if only present on index admission (complication)
	
	Age// n/a//Age (-18)//
	Cond. Ind.// n/a//Condition indicator (AHRQ CCS)//
	rv1// 1, 3-5//Severe infection//
	rv1//1//HIV/AIDS//
	rv1//3//Central nervous system infection//
	rv1//4//Tuberculosis//
	rv1//5//Opportunistic infections//
	rv2// 6, 111-113//Other infectious disease & pneumonias//
	rv2//6//Other infectious disease//x
	rv2//111//Aspiration and specified bacterial pneumonias//x
	rv2//112//Pneumococcal pneumonia, emphysema, lung abscess//x
	rv2//113//Viral and unspecified pneumonia, pleurisy//x
	rv3// 7//Metastatic cancer/acute leukemia//
	rv4// 8, 9//Severe cancer//
	rv4//8//Lung, upper digestive tract, and other severe cancers//
	rv4//9//Other major cancers//
	rv6// 10, 11, 12//Other major cancers//

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	rv6//10//Breast, prostate, colorectal and other cancers and tumors// rv6//11//Other respiratory and heart neoplasms// rv6//12//Other digestive and urinary neoplasms// rv9// 15-20, 119, 120//Diabetes mellitus // rv9//15//Diabetes with renal manifestation// rv9//16//Diabetes with neurologic or peripheral circulatory manifestation// rv9//17//Diabetes with acute complications//x rv9//18//Diabetes with ophthalmologic manifestation// rv9//19//Diabetes with no or unspecified complications// rv9//20//Type I diabetes mellitus// rv9//119//Proliferative diabetic retinopathy and vitreous hemorrhage// rv9//120//Diabetic and other vascular retinopathies// rv10// 21//Protein-calorie malnutrition// rv11// 25, 26//End-stage liver disease// rv11//25//End-stage liver disease// rv11//26//Cirrhosis of liver// rv12// 44//Other hematologoical disorders// rv14// 51-52//Drug and alcohol disorders// rv14//51//Drug/alcohol psychosis// rv14//52//Drug/alcohol dependence// rv15// 54-56, 58, 60//Psychiatric comorbidity// rv15//54//Schizophrenia// rv15//55//Major depressive, bipolar, and paranoid disorders// rv15//56//Reactive and unspecified psychosis// rv15//58//Depression// rv15//60//Other psychiatric disorders// rv18// 67-69, 100-102, 177, 178//Hemiplegia, paraplegia, paralysis, functional disability// rv18//67//Quadriplegia, other extensive paralysis// rv18//68//Paraplegia// rv18//69//Spinal cord disorders/Injuries// rv18//100//Hemiplegia/hemiparesis// rv18//101//Diplegia (upper), monoplegia, and other paralytic syndromes// rv18//102//Speech, language, cognitive, perceptual// rv18//177//Amputation status, lower limb/amputation// rv18//178//Amputation status, upper limb// rv19// 74//Seizure disorders and convulsions// rv20// 80//CHF//x rv21// 81-84, 89, 98, 99, 103-106//Coronary atherosclerosis or angina, cerebrovascular disease// rv21//81//Acute myocardial infarction//x rv21//82//Unstable angina and other acute ischemic heart disease//x rv21//83//Angina pectoris/old myocardial infarction// rv21//84//Coronary atherosclerosis/other chronic ischemic heart disease// rv21//89//Hypertensive heart and renal disease or encephalopathy// rv21//98//Cerebral atherosclerosis and aneurysm// rv21//99//Cerebrovascular disease, unspecified// rv21//103//Cerebrovascular disease late effects, unspecified// rv21//104//Vascular disease with complications//x rv21//105//Vascular disease//x rv21//106//Other circulatory disease//x rv24// 92, 93//Specified arrhythmias// rv24//92//Specified heart arrhythmias// rv24//93//Other heart rhythm and conduction disorders// rv26// 108//Chronic obstructive pulmonary disease// rv27// 109//Fibrosis of lung or other chronic lung disorders//

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	rv29// 130//Dialysis status//x rv30// 148-149//Ulcers// rv30//148//Decubitus ulcer //x rv30//149//Decubitus ulcer or chronic skin ulcer// rv31// 2//Septicemia/shock//x rv32// 22-23//Disorders of fluid, electrolyte, acid-base// rv32//22//Other significant endocrine and metabolic disorders//x rv32//23//Disorders of fluid/electrolyte/acid-base//x rv33// 47//Iron deficiency//x rv34// 79//Cardio-respiratory failure or cardio-respiratory shock//x rv39// 131//Acute renal failure//x rv40// 32//Pancreatic disease// rv41// 38//Rheumatoid arthritis and inflammatory connective tissue disease// rv42// 77//Respirator dependence/tracheostomy status// rv43// 128, 174//Transplants// rv43//128//Kidney transplant status// rv43//174//Major organ transplant status// rv44// 46//Coagulation defects and other specified hematological disorders// rv45// 158//Hip fracture/dislocation// References 1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22 (2): 206-226. 2. Pope, G., et al., Principal Inpatient Diagnostic Cost Group Models for Medicare Risk Adjustment. Health Care Financing Review, 2000. 21(3): 26. See attachments for detailed risk model (Technical Report, Section 3.1, Tables 9-13), and frequencies of comorbid risk variables in all-payer data (All-Payer Memo Tables 7-16). Attachments for detailed risk model: HWR_All-payer memo to NQF_508-compliant_12-27-11.pdf
Stratification	N/A
Type Score	Other A standardized risk ratio (SRR) for each hospital and each cohort is estimated using a separate hierarchical logistic regression model for that cohort. The five SRRs, weighted by volume, are then combined into a single score which is the risk-standardized hospital-wide readmission ratio. To improve interpretation, this ratio is then multiplied by the overall national raw readmission rate for all index admissions in all cohorts to produce the risk-standardized hospital-wide readmission rate (RSSR).
Algorithm	Models for each specialty cohort are specified and estimated, using a separate hierarchical logistic regression model for that cohort. Each model is then used to calculate a standardized risk ratio (SRR) for each hospital which contributes index admissions to that model. These SRRs, weighted by volume, are then pooled for each hospital to create a composite hospital-wide SRR. For each specialty cohort within a hospital, the numerator of the SRR ("predicted") is the number of readmissions for patients within the specialty cohort within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator ("expected") is the number of readmissions expected for patients within the specialty cohort on the basis of the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case-mix to an average hospital's performance with the same case-mix. Thus, an SRR less than 1 indicates lower-than-expected readmission or better quality and an SRR greater than 1 indicates higher-than-expected readmission or worse quality. These SRRs are then pooled for each hospital to create a composite hospital-wide SRR. This pooled SRR is the geometric mean of the specialty cohort SRRs, weighted by the number of admissions in the specialty cohort, and the pooled SRR is then multiplied by the overall crude readmission rate to produce the risk standardized

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	readmission rate (RSRR) for reporting. Please see attachment (Technical Report, Section 2.6) for more details on the calculation algorithm.

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Steward	National Committee for Quality Assurance
Description	For members 18 years of age and older, the number of acute inpatient stays during the measurement year that were followed by an acute readmission for any diagnosis within 30 days and the predicted probability of an acute readmission. Data are reported in the following categories: 1. Count of Index Hospital Stays (IHS) (denominator) 2. Count of 30-Day Readmissions (numerator) 3. Average Adjusted Probability of Readmission 4. Observed Readmission (Numerator/Denominator) 5. Total Variance Note: For commercial, only members 18–64 years of age are collected and reported; for Medicare, only members 18 and older are collected, and only members 65 and older are reported.
Type	Outcome
Data Source	Administrative claims
Level	Health Plan
Setting	Behavioral Health/Psychiatric : Inpatient, Hospital/Acute Care Facility
Numerator Statement	At least one acute readmission for any diagnosis within 30 days of the Index Discharge Date.
Numerator Details	**Time Window:** All acute inpatient stays with an admission date on or between January 2 and December 31 of the measurement year. Acute-to-acute transfers: Keep the original admission date as the Index Admission Date, but use the transfer's discharge date as the Index Discharge Date. Exclude acute inpatient hospital discharges with a principal diagnosis for codes that identify maternity related inpatient discharges for the following ICD-9CM codes: - Pregnancy: 630-679, V22, V23, V28 - Conditions originating in the perinatal period: 760-779, V21, V29-V39 For each IHS, determine if any of the acute inpatient stays have an admission date within 30 days after the Index Discharge Date.
Denominator Statement	For commercial health plans, ages 18-64 as of the Index Discharge Date. For Medicare and Special Needs Plans, ages 18 and older as of the Index Discharge Date.
Denominator Details	**Time Window:** Identify all acute inpatient stays with a discharge date on or between January 1 and December 1 of the measurement year. The denominator for this measure is based on acute discharges, not members. - Identify all acute inpatient stays with a discharge date on or between January 1 and December 1 of the measurement year. - Acute-to-acute transfers: Keep the original admission date as the Index Admission Date, but use the Transfer's discharge date as the index Discharge Date. - Calculate continuous enrollment. - Assign each acute inpatient stay to one age and gender category.
Exclusions	Exclude hospital stays where the Index Admission Date is the same as the Index Discharge Date and any inpatient stay with a discharge date in the 30 days prior to the Index Admission Date.
Exclusion Details	Exclude the hospital and inpatient stays for the following reasons. - Inpatient stays with discharges for death - Acute inpatient discharge with a principal diagnosis for pregnancy or for any other condition originating in the perinatal period in for the following ICD-9CM codes

	1768 Plan all-cause readmissions
	Pregnancy: 630-679, V22, V23, V28 Conditions originating in the perinatal period: 760-779, V21, V29-V39
Risk Adjustment	Indirect standardization, using logistic regression Uses the CC and HCC models to identify comorbidities and attaches weights to each statistically significant comorbidity by product line and age grouping. We estimated a stepwise logistic regression. The binary dependent variable was coded 1 for index hospital stays that had a subsequent readmission within 30 days, and 0 otherwise. The independent variables in the models were: - age-gender cohort: Commercial: male 18-44, female 18-44, male 45-54, female 45-54, male 55-64 (reference group), female 55-64. In year 1, the model for Medicare used: Medicare 18 and older: male 18-44, female 18-44, male 45-54, female 45-54, male 55-64, female 55-64. male 65-74 (reference group), female 65-74, male 75-84, female 75-84, male 85+, female 85+. In year 2, the model for Medicare will use: male 65-74 (reference group), female 65-74, male 75-84, female 75-84, male 85+, female 85+. - Major surgery: 1=index hospital stay was for major surgery (see code list in algorithm); 0, otherwise. - Discharge Clinical Condition (CC) from the HCC classification system: 1=index hospital stay was for the CC; 0, otherwise. Note: each index hospital stay is coded into exactly one CC and is based only on the primary diagnosis. - Comorbid Hierarchical Clinical Condition (HCC): 1=index hospital stay had the associated comorbidity (HCC) indicated through any diagnosis on a face to face claim/encounter for the 12 months prior to the index hospital stay discharge date; 0, otherwise. Attachments for detailed risk model: NQF_Weights Table for PCR Measures (Updated).pdf
Stratification	The measure includes a table that stratifies the five reporting data elements by age and gender. The five elements are: 1. Count of Index Stays 2. Count of 30-Day Readmissions 3. Average Adjusted Probability 4. Observed Readmission (Numerator/Denominator) 5. Total Variance The age stratifications are: Commercial: 18-44, 45-54, 55-64, Total Medicare: 65-74, 75-84, 85+., Total The measure is also stratified by gender. Values are reported for each stratification.
Type Score	Other Rate/Proportion and Count: The Counts are the number of index hospital stays (denominator) and stays with a subsequent 30-day readmission (numerator). The Rate/Proportions are the average adjusted probability of readmission (expected rate) and the observed rate of readmission (numerator / denominator).
Algorithm	Look at denominator details, numerator details and the risk adjustment methodology for the measure logic in sections 2a1.7 and 2a1.13. The calculation for continuous enrollment is as follows: Step 1: Determine the eligible population. For commercial health plans, ages 18-64 as of the Index Discharge Date. For Medicare and Special Needs Plans, ages 18 and older as of the Index Discharge Date. Step 2: Determine number discharges meeting the denominator criteria as specified in Section 2a1.7 above. Step 3: Determine the number of patients who meet the numerator criteria as specified in section 2a1.3 above. The numerator includes all patients in the denominator population who had acute inpatient stays with an

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	admission date on or between January 1 and December 31 of the measurement year. Step 4: Determine the number of exclusions Step 3 as specified in section 2a1.8. Patients with hospital stays where the Index Admission Date is the same as the Index Discharge Date and any inpatient stay with a discharge date in the 30 days prior to the Index Admission Date are exclusions. Step 5: Calculate the rate The risk adjustment calculation is: Surgeries: Determine if the member underwent surgery during the inpatient stay. Download the list of codes from the NCQA Web site for the surgery codes for risk adjustment and use it to identify surgeries. Consider an IHS to include a surgery if at least one procedure code is present from any provider between the admission and discharge dates. Discharge Condition: Assign a discharge Clinical Condition (CC) category code to IHS based on its primary discharge diagnosis. For acute-to-acute transfers, use the transfer's primary Discharge diagnosis. Exclude diagnoses that cannot be mapped. Comorbidities: This is determined by performing the following steps: Step 1: Identify all diagnoses for face-to-face encounters during the classification period. Exclude the primary discharge diagnosis on the IHS. Description // CPT // UB Revenue Outpatient // 92002,92004, 92012, 92014, 98925-98929, 98940-98942, 99201-99205, 99211-99215, 99217-99220, 99241-99245, 99341-99345, 99347-99350, 99384-99387, 99394-99397, 99401-99404, 99411, 99412, 99420, 99429, 99455, 99456 // 051x, 0520-0523, 0526-0529, 057x-059x, 082x-085x, 088x, 0982, 0983 Nonacute Inpatient // 99304-99310, 99315, 99316, 99318, 99324-99328, 99334-99337 // 0118, 0128, 0138, 0148, 0158, 019x, 0524, 0525, 055x, 066x, 1001, 1002 Acute Inpatient // 99221-99223, 99231-99233, 99238, 99239, 99251-99255, 99291 // 010x, 0110-0114, 0119, 0120-0124, 0129, 0130-0134, 0139, 0140-0144, 0149, 0150-0154, 0159, 016x, 020x, 021x, 072x, 080x, 0987 ED // 99281-99285 // 045x, 0981 Step 2: Assign each diagnosis to one comorbid Clinical Condition (CC) category using Table CC—Comorbid. Exclude all diagnoses that cannot be assigned to a comorbid CC category. For members with no qualifying diagnoses from face-to-face encounters, skip to the Risk Adjustment Weighting section. All digits must match exactly when mapping diagnosis codes to the comorbid CCs. Step 3: Determine HCCs for each comorbid CC identified. Refer to Table HCC—Rank. For each stay's comorbid CC list, match the comorbid CC code to the comorbid CC code in the table, and assign: - The ranking group - The rank - The HCC For comorbid CCs that do not match to Table HCC—Rank, use the comorbid CC as the HCC and assign a rank of 1. Note: One comorbid CC can map to multiple HCCs; each HCC can have one or more comorbid CCs. Step 4: Select only the highest ranked HCC in each ranking group using the Rank column (1 is the highest rank possible). Drop all other HCCs in each ranking group, and de-duplicate the HCC list if necessary. Example: Assume a stay with the following comorbid CCs: CC-15, CC-19 and CC-80 (assume no other CCs). •CC-80 does not have a map to the ranking table and becomes HCC-80

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	•HCC-15 is part of Ranking Group 1 and HCC-19 is part of Ranking Groups Diabetes 1–Diabetes 4. Because CC-15 is ranked higher than CC-19 in Ranking Group Diabetes 1, the comorbidity is assigned as HCC-15 for Ranking Group 1. Because CC-19 is ranked higher in Ranking Groups Diabetes 2-4, the comorbidity is assigned as HCC-19 for these ranking groups. The final comorbidities for this discharge include HCC-15, HCC-19 and HCC-80. Example: Ranking Group // CC // Description // Rank // HCC NA // CC-80 // Congestive Heart Failure // NA // HCC-80 Diabetes 1 // CC-15 // Diabetes With Renal or Peripheral Circulatory Manifestation // 1 // HCC-15 Diabetes 1 // CC-16 // Diabetes With Neurologic or Other Specified Manifestation // 2 // HCC-16 Diabetes 1 // CC-17 // Diabetes With Acute Complications // 3 // HCC-17 Diabetes 1 // CC-18 // Diabetes With Ophthalmologic or Unspecified Manifestation // 4 // HC-18 Diabetes 1 // CC-19 // Diabetes without Complications // 5 // HCC-19 Diabetes 2 // CC-16 // Diabetes With Neurologic or Other Specified Manifestation // 1 // HCC-16 Diabetes 2 // CC-17 // Diabetes with Acute Complications // 2 // HCC-17 Diabetes 2 // CC-18 // Diabetes With Ophthalmologic or Unspecified Manifestation // 3 // HCC-18 Diabetes 2 // CC-19 // Diabetes Without Complication // 4 // HCC-19 Diabetes 3 // CC-17 // Diabetes With Acute Complications // 1 // HCC-17 Diabetes 3 // CC-18 // Diabetes With Ophthalmologic or Unspecified Manifestation // 2 // HCC-18 Diabetes 3 // CC-19 // Diabetes Without Complication // 3 // HCC-19 Diabetes 4 // CC-18 // Diabetes With Ophthalmologic or Unspecified Manifestation // 1 //HCC-18 Diabetes 4 // CC-18 // Diabetes Without Complication // 2 // HCC-19 Step 5: Identify combination HCCs. Some combinations suggest a greater amount of risk when observed together. For example, when diabetes and CHF are present, an increased amount of risk is evident. Additional HCCs are selected to account for these relationships. Compare each stay's list of unique HCCs to those listed as combinations and assign any additional HCC conditions. For fully nested combinations (e.g., the diabetes/CHF combinations is nested in the diabetes/CHF/renal combination), use only the more comprehensive pattern. In this example, only the diabetes/CHF/renal combination is counted. For overlapping combinations (e.g., the CHF, COPD combination overlaps with the CHR/ renal/diabetes combination), use both sets of combinations. In this example, both CHF/COPD and CHF/renal/diabetes combinations are counted. Based on the combinations, a member can have none, one or more of these added HCCs. Example: For a stay with comorbidities HCC-15, HCC-19 and HCC-80 (assume no other HCCs), assign HCC-901 in addition to HCC-15, HCC-19 and HCC-80. This does not replace HCC-15, HCC19 or HCC-80. Example: Combination: Diabetes and CHF Comorbid HCC // Comorbid HCC // Comorbid HCC // Combination HCC HCC-15 // HCC-80 // NA // HCC-901

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	HCC-16 // HCC-80 // NA // HCC-901 HCC-17 // HCC-80 // NA // HCC-901 HCC-18 // HCC-80 // NA // HCC-901 HCC-19 // HCC-80 // NA // HCC-901 For each IHS, use the following steps to identify risk adjustment weights based on presence of surgeries, discharge condition, comorbidity, age and gender. Note: The final weights table will be released on November 15, 2011. Step 1: For each IHS with a surgery, link the surgery weight. For Medicare product lines ages 18-64: For Medicare product lines ages 65 and older: For commercial product lines: Step 2: For each IHS with a discharge CC Category, link the primary discharge weights. For Medicare product lines ages 18-64: For Medicare product lines ages 65 and older: For commercial product lines: Step 3: For each IHS with a comorbidity HCC Category, link the weights. For Medicare product lines ages 18-64: For Medicare product lines ages 65 and older: For commercial product lines: Step 4: Link the age and gender weights for each IHS. For Medicare product lines ages 18-64: For Medicare product lines ages 65 and older: For commercial product lines: Step 5: Identify the base risk weight. For Medicare product lines ages 18-64: For Medicare product lines ages 65 and older: For commercial product lines: Step 6: Sum all weights associated with the IHS (i.e., presence of surgery, primary discharge diagnosis, comorbidities, age, gender and base risk weight). Step 7: Use the formula below to calculate the adjusted probability of a readmission based on the sum of the weights for each IHS. Adjusted probability of readmission = (e(?Weights for IHS)) Divided by (1+e (?Weights for IHS)) OR Adjusted probability of readmission = [exp (sum of weights for IHS)] / [1 + exp (sum of weights for IHS)] Note: “xp” refers to the exponential or antilog function. Step 8: Use the formula below and the adjusted probability of readmission calculated in Step 7 to calculate the variance for each IHS. Variance = Adjusted probability of readmission x (1—Adjusted probability of readmission) Example: If the adjusted probability of readmission is 0.1518450741, then the variance is 0.1518450741 x 0.8481549259 = 0.1287881476

APPENDIX B: STEERING COMMITTEE and NQF STAFF

STEERING COMMITTEE

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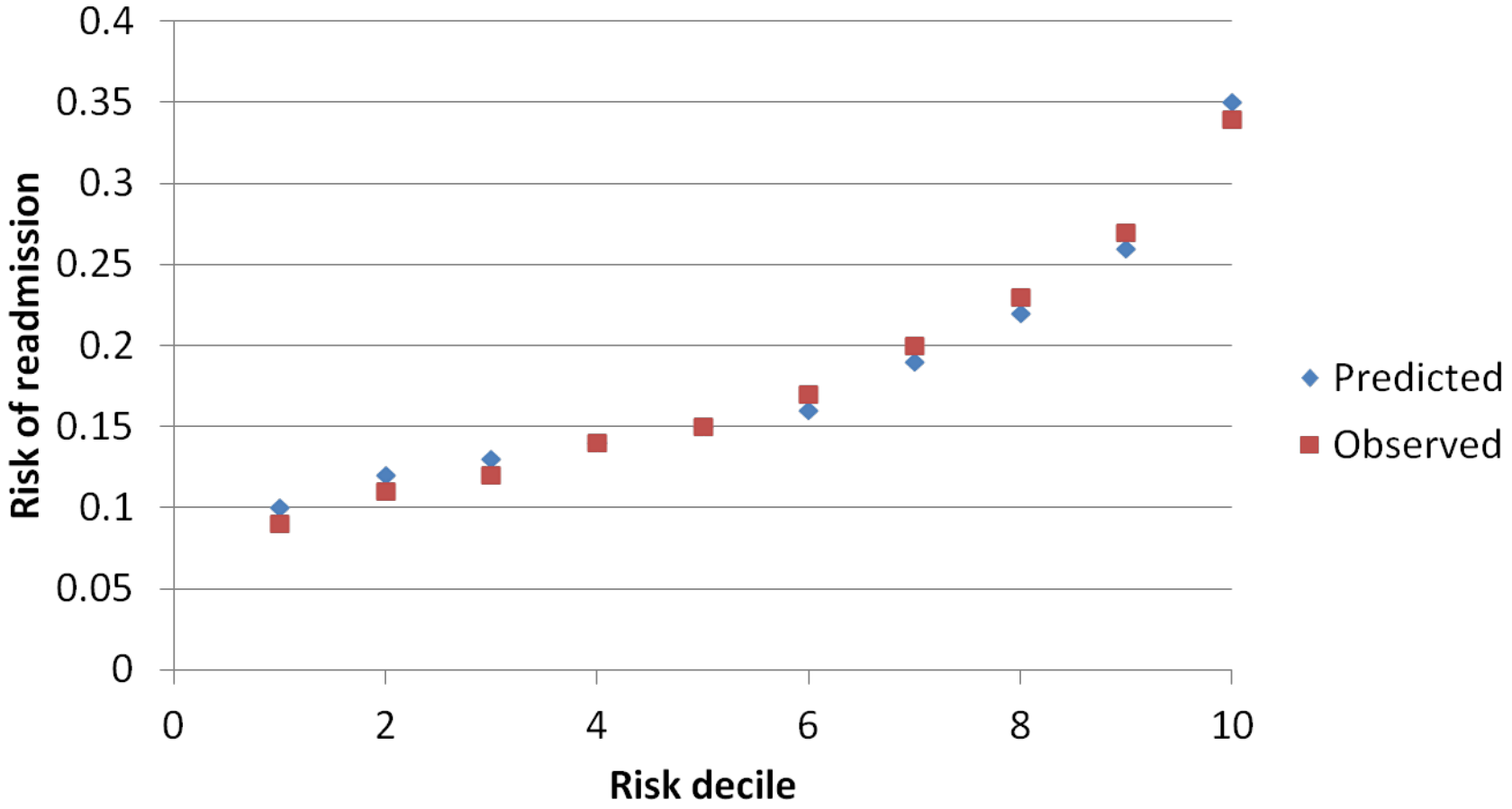
Calibration

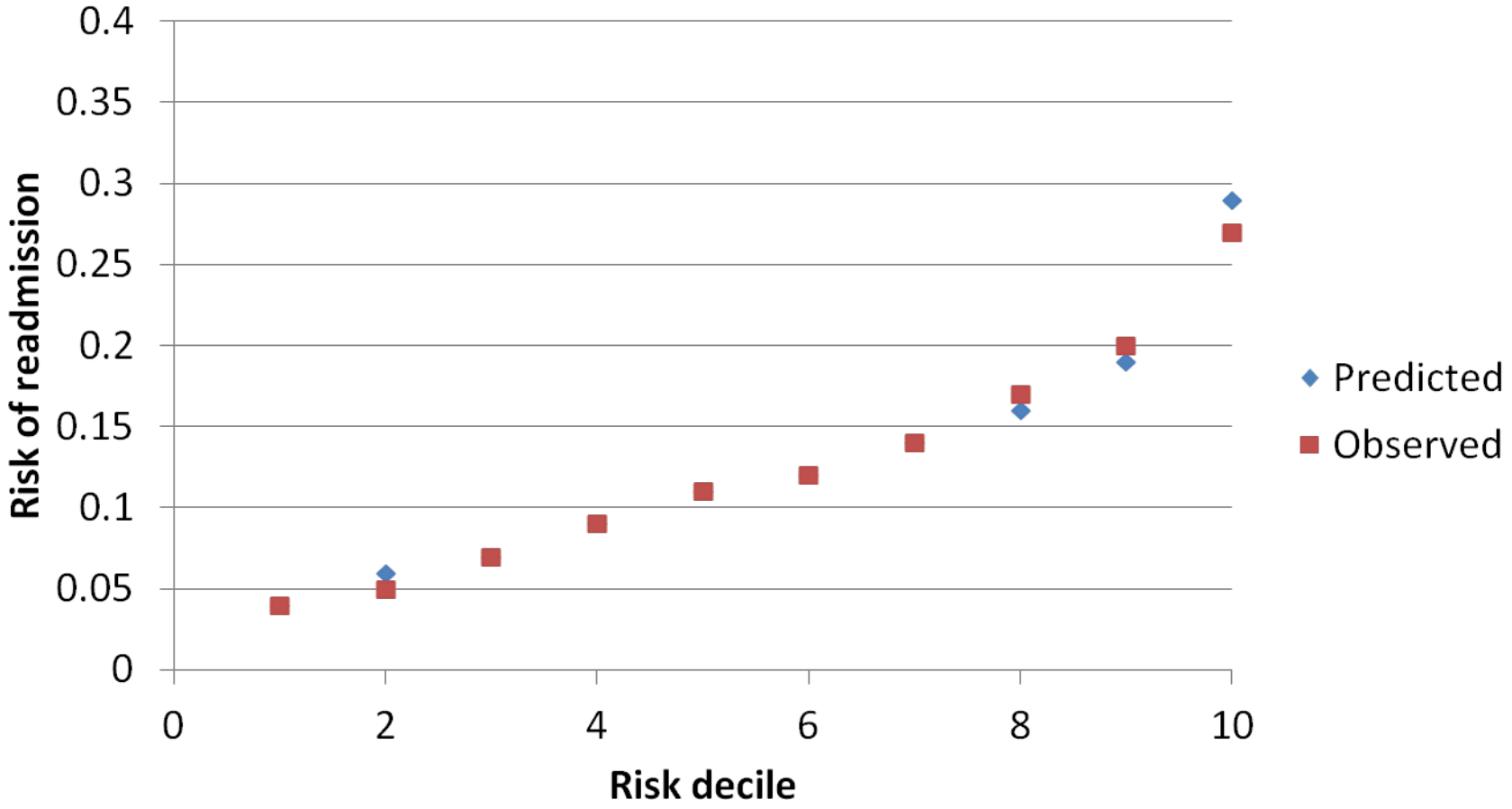
Medicine cohort

Calibration



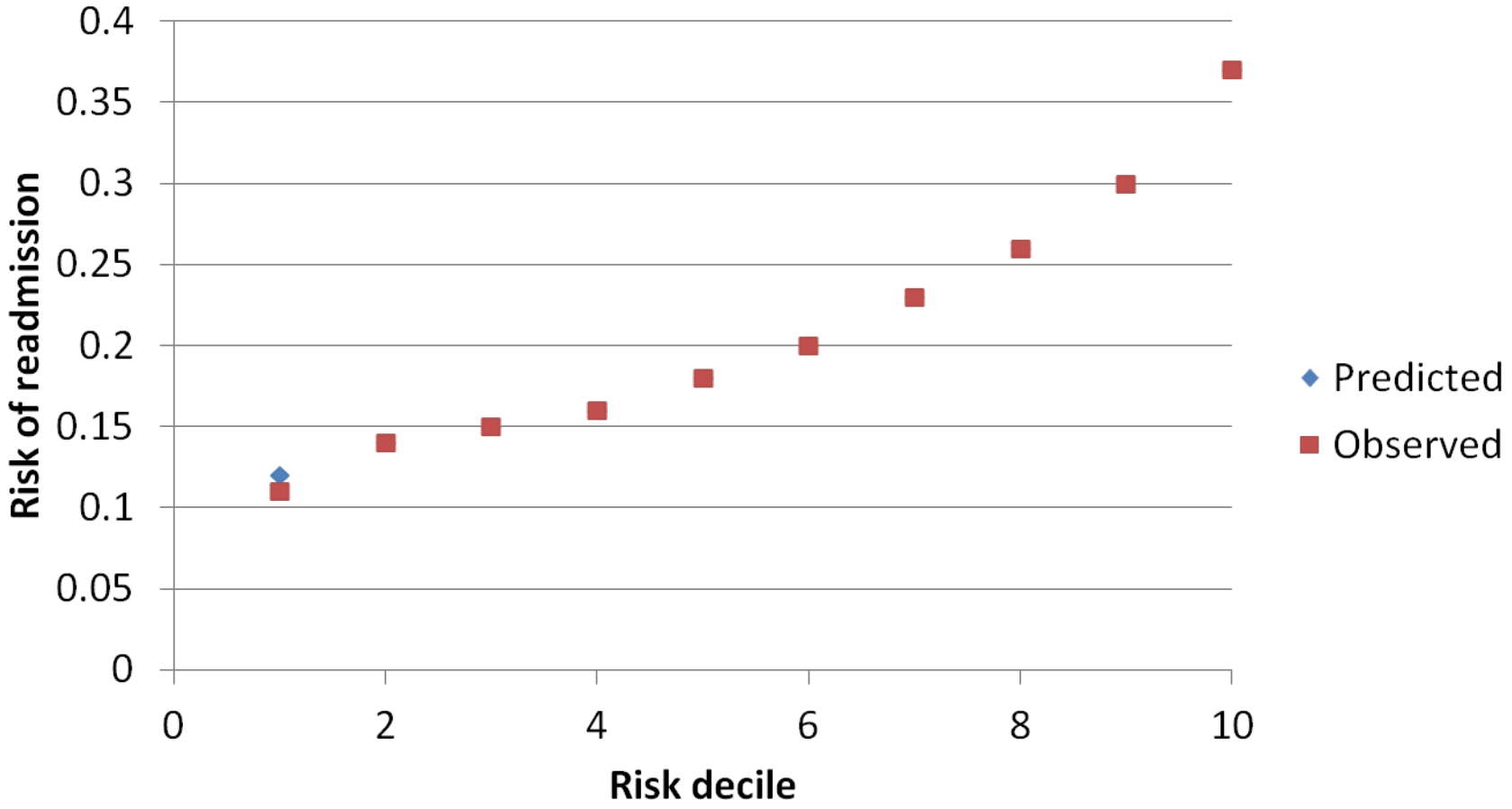
Surgery/gynecology cohort

Calibration



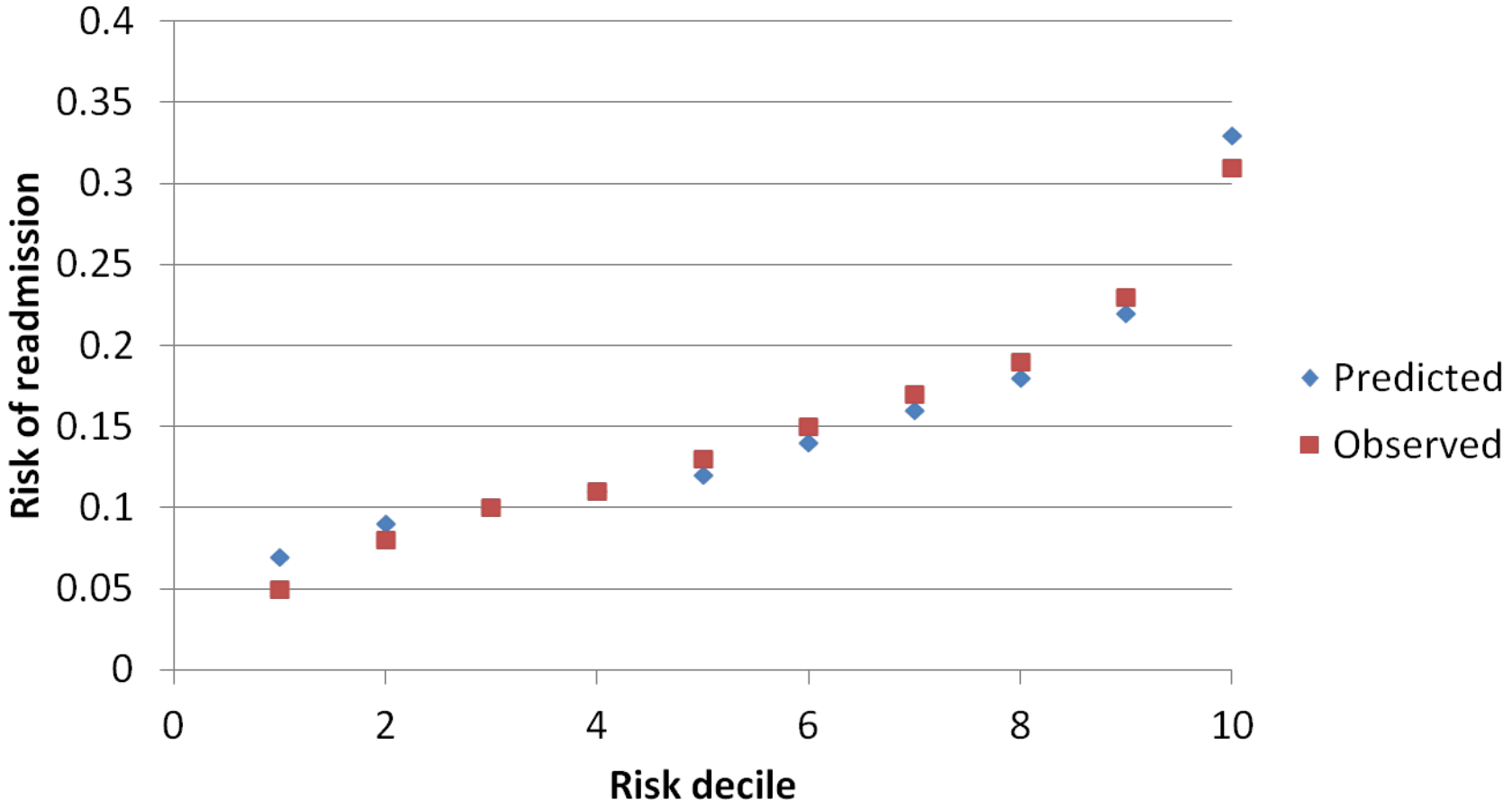
Cardiorespiratory cohort

Calibration



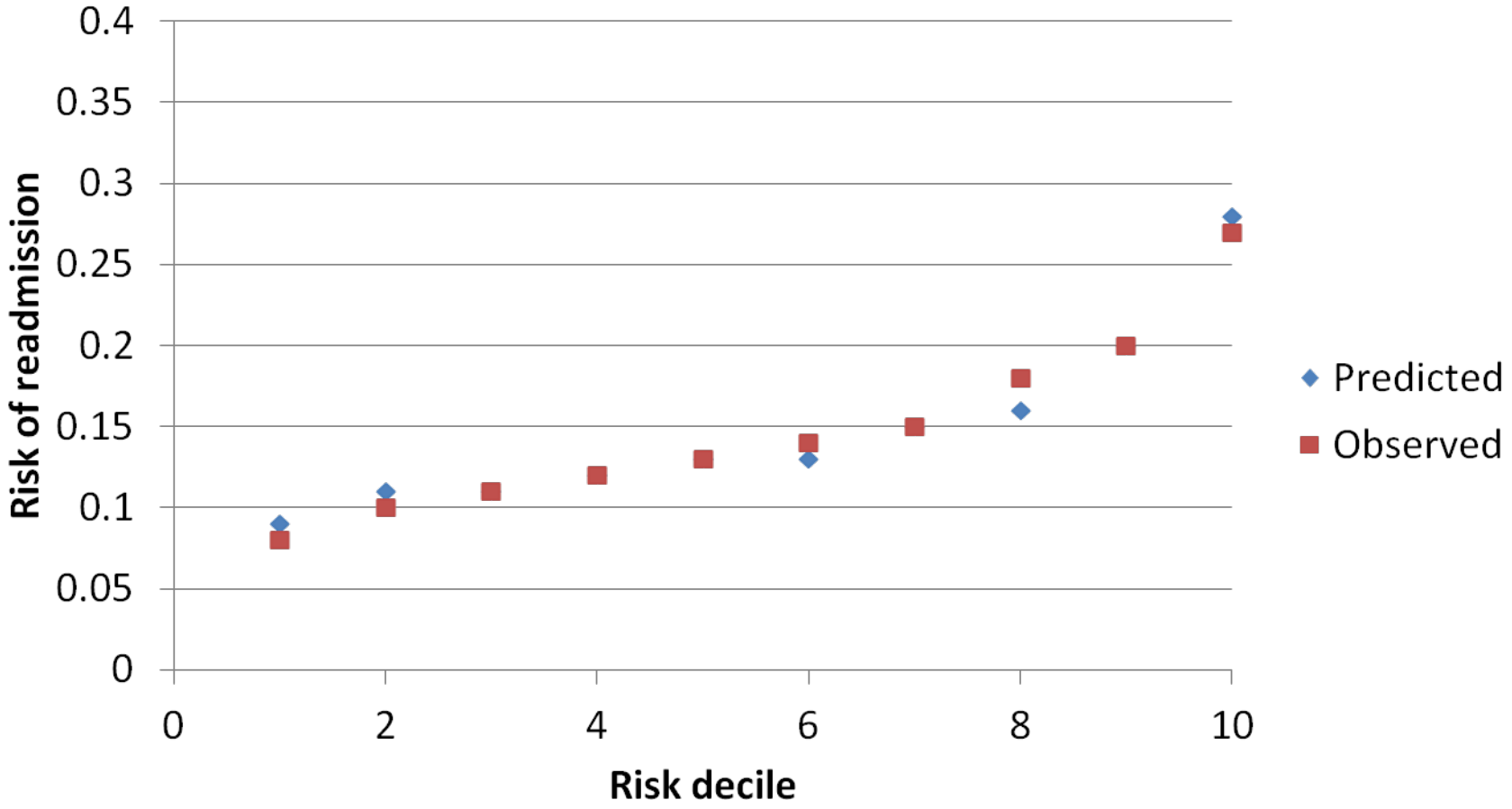
Cardiovascular cohort

Calibration



Neurology cohort

Calibration



Small hospitals and HGLM

Distribution of hospital volume N=4,995

Quantile	Estimate
100% Max	25,098
99%	9,165
95%	5,792
90%	4,216
75% Q3	2,258
50% Median	750
25% Q1	252
10%	88
5%	35
1%	4
0% Min	1

Distribution of bed size (N=4,714)

Quantile	Estimate
100% Max	2,204
99%	862
95%	524
90%	390
75% Q3	225
50% Median	100
25% Q1	36
10%	25
5%	17
1%	10
0% Min	6

RSRR and small hospitals*

Analysis Variable : RSRR								
volume 10th	N Obs	Min	10th Pctl	Lower Quartile	Median	Upper Quartile	90th Pctl	Max
<=88	292	15.07	15.9	16.16	16.48	16.76	17.03	18.19
>88	4495	12.51	15.27	15.85	16.49	17.27	18.16	22.69

Analysis Variable : RSRR								
bedsize 10th	N Obs	Min	10th Pctl	Lower Quartile	Median	Upper Quartile	90th Pctl	Max
< 25	426	12.67	15.48	15.96	16.43	16.9	17.47	21.65
>=25	3655	12.51	15.22	15.82	16.5	17.28	18.23	22.69

*excluding hospitals with <25 admissions/year, consistent with current public reporting methods

Socioeconomic status

Hospital RSRRs by Dual Eligible

	Hospital Proportion of Medicaid Patients			
	<10 (N=1216)	10-20 (N=2158)	20-30 (N=897)	>30 (N= 334)
Min	12.58	12.79	13.7	13.84
25th percentile	15.96	15.9	16.01	16.25
50th percentile	16.50	16.52	16.74	16.90
75th percentile	17.08	17.27	17.56	17.90
Max	19.84	21.73	21.35	22.76

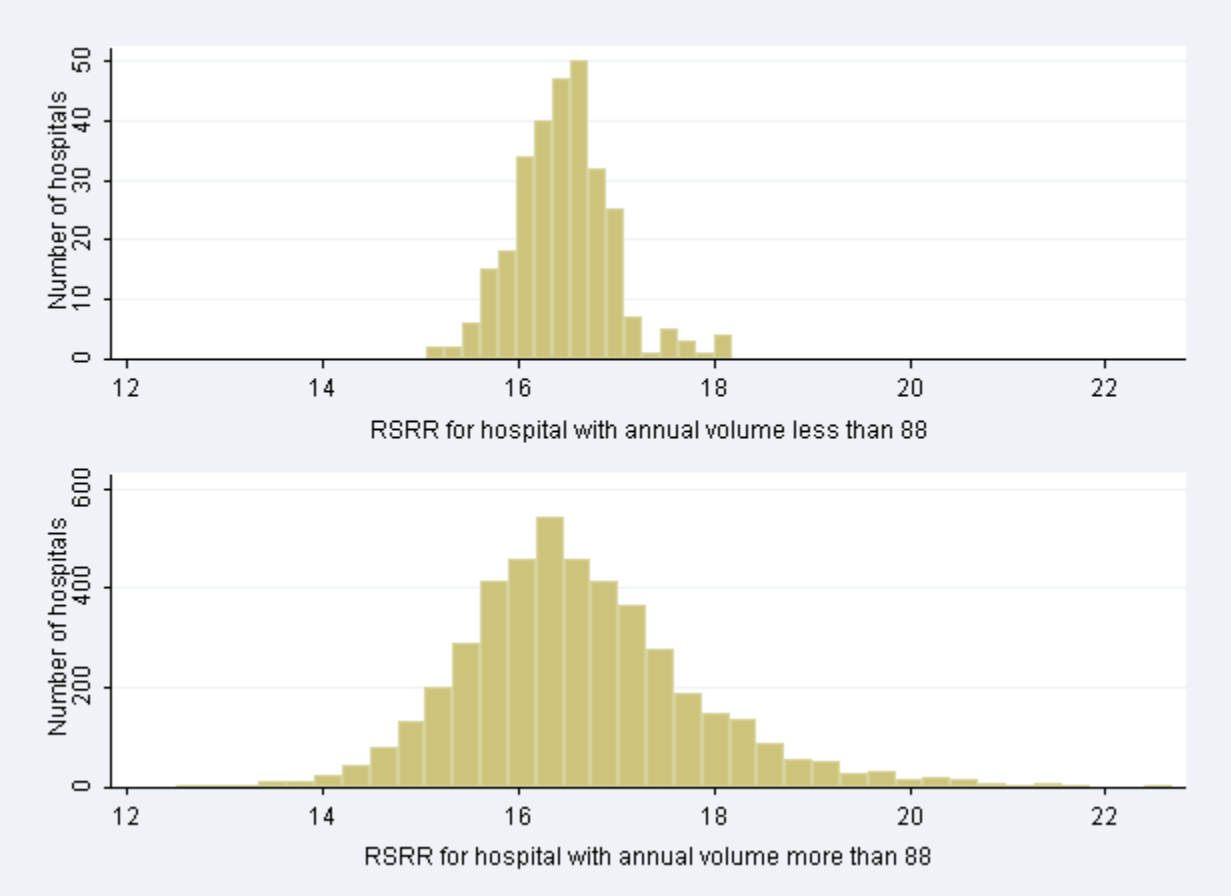
RSRR and small hospitals*

Analysis Variable : RSRR								
volume 10th	N Obs	Min	10th Pctl	Lower Quartile	Median	Upper Quartile	90th Pctl	Max
<=88	500	15.07	16.02	16.29	16.52	16.71	16.96	18.19
>88	4495	12.51	15.27	15.85	16.49	17.27	18.16	22.69

Analysis Variable : RSRR								
bedsize 10th	N Obs	Min	10th Pctl	Lower Quartile	Median	Upper Quartile	90th Pctl	Max
< 25	467	12.67	15.56	16	16.46	16.86	17.45	21.65
>=25	3718	12.51	15.23	15.84	16.5	17.27	18.21	22.69

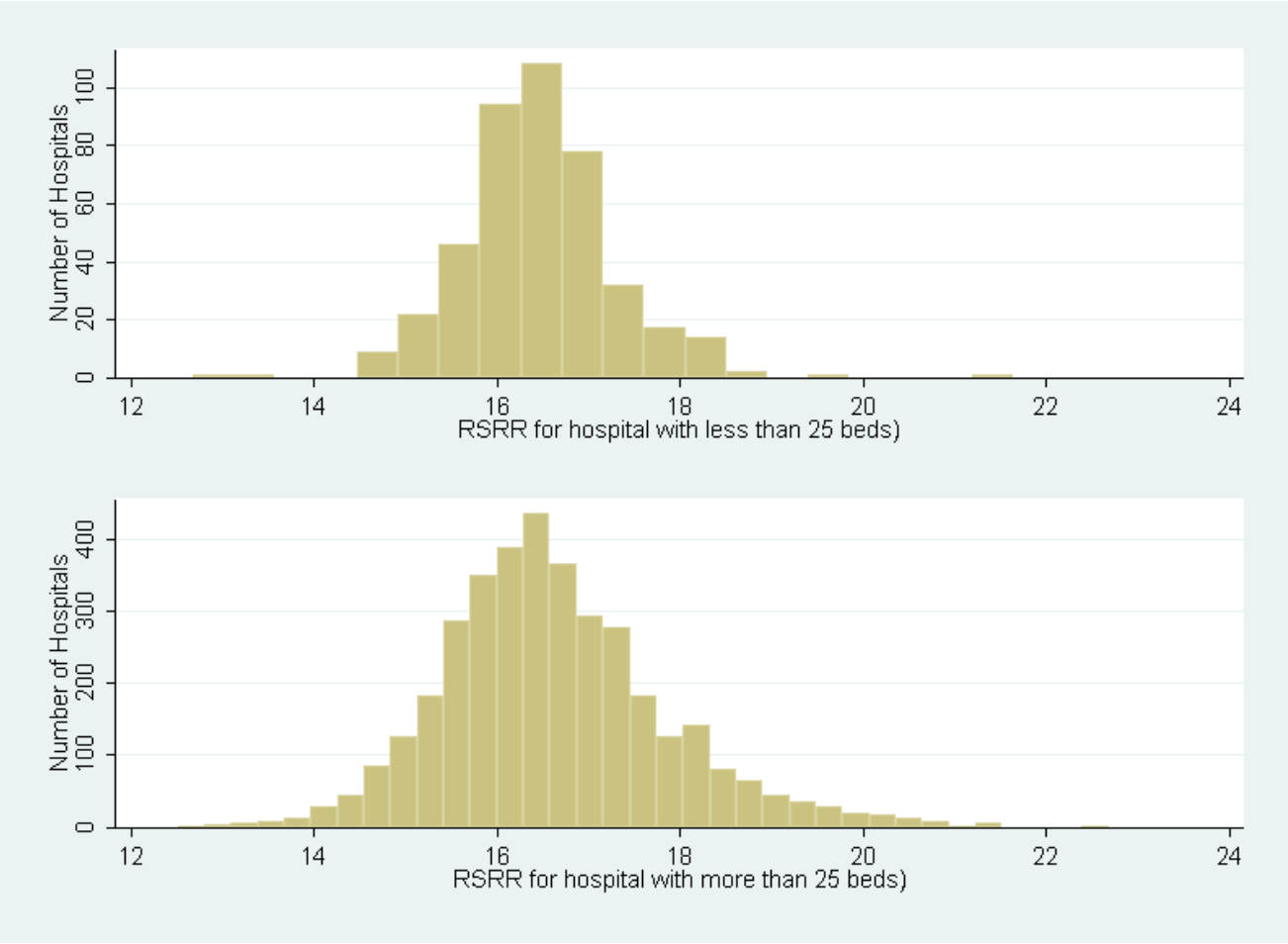
*no volume restriction

Distribution: Small volume*



*excluding hospitals with <25 admissions/year, consistent with current public reporting methods

Distribution: Bed size*



*excluding hospitals with <25 admissions/year, consistent with current public reporting methods

Classification Tables

	Commercial 18-64								
	Correct		Incorrect		Percentages				
Probability Level	Event	Non-Event	Event	Non-Event	Correct	Sensitivity	Specificity	False Pos.	False Neg.
0.02	104000	0	898000	0	10.4	100	0	89.6	.
0.04	99846	139000	759000	4084	23.8	96.1	15.5	88.4	2.9
0.06	89823	345000	553000	14107	43.4	86.4	38.4	86	3.9
0.08	75654	540000	358000	28276	61.5	72.8	60.1	82.6	5
0.10	64934	646000	252000	38996	70.9	62.5	71.9	79.5	5.7
0.12	57097	703000	195000	46833	75.9	54.9	78.3	77.4	6.2
0.14	49687	748000	150000	54243	79.6	47.8	83.3	75.1	6.8
0.16	42938	786000	113000	60992	82.7	41.3	87.5	72.4	7.2
0.18	37423	810000	88139	66507	84.6	36	90.2	70.2	7.6
0.20	33255	827000	70934	70675	85.9	32	92.1	68.1	7.9
0.22	30015	839000	59677	73915	86.7	28.9	93.4	66.5	8.1
0.24	27450	847000	51678	76480	87.2	26.4	94.2	65.3	8.3
0.26	25283	853000	45528	78647	87.6	24.3	94.9	64.3	8.4
0.28	23397	857000	40790	80533	87.9	22.5	95.5	63.5	8.6
0.30	20783	863000	35635	83147	88.1	20	96	63.2	8.8
0.32	16852	869000	28853	87078	88.4	16.2	96.8	63.1	9.1
0.34	15352	873000	25390	88578	88.6	14.8	97.2	62.3	9.2
0.36	12308	879000	19648	91622	88.9	11.8	97.8	61.5	9.4
0.38	8671	885000	13540	95259	89.1	8.3	98.5	61	9.7
0.40	6577	889000	9451	97353	89.3	6.3	98.9	59	9.9
0.42	5421	891000	7087	98509	89.5	5.2	99.2	56.7	10
0.44	4649	893000	5583	99281	89.5	4.5	99.4	54.6	10
0.46	4139	894000	4608	99791	89.6	4	99.5	52.7	10
0.48	3727	894000	3839	100000	89.6	3.6	99.6	50.7	10.1
0.50	3323	895000	3252	101000	89.6	3.2	99.6	49.5	10.1
0.52	2848	896000	2742	101000	89.6	2.7	99.7	49.1	10.1
0.54	2568	896000	2310	101000	89.7	2.5	99.7	47.4	10.2
0.56	2331	896000	2012	102000	89.7	2.2	99.8	46.3	10.2
0.58	1915	897000	1676	102000	89.7	1.8	99.8	46.7	10.2
0.60	1586	897000	1342	102000	89.7	1.5	99.9	45.8	10.2
0.62	1340	897000	1099	103000	89.7	1.3	99.9	45.1	10.3
0.64	1111	897000	885	103000	89.7	1.1	99.9	44.3	10.3
0.66	881	898000	710	103000	89.6	0.8	99.9	44.6	10.3
0.68	664	898000	548	103000	89.6	0.6	99.9	45.2	10.3
0.70	516	898000	427	103000	89.6	0.5	100	45.3	10.3
0.72	390	898000	321	104000	89.6	0.4	100	45.1	10.3
0.74	288	898000	230	104000	89.6	0.3	100	44.4	10.3
0.76	207	898000	156	104000	89.6	0.2	100	43	10.4
0.78	149	898000	115	104000	89.6	0.1	100	43.6	10.4
0.80	110	898000	73	104000	89.6	0.1	100	39.9	10.4
0.82	73	898000	49	104000	89.6	0.1	100	40.2	10.4
0.84	44	898000	30	104000	89.6	0	100	40.5	10.4
0.86	20	898000	22	104000	89.6	0	100	52.4	10.4
0.88	10	898000	9	104000	89.6	0	100	47.4	10.4
0.90	5	898000	3	104000	89.6	0	100	37.5	10.4
0.92	4	898000	1	104000	89.6	0	100	20	10.4
0.94	2	898000	0	104000	89.6	0	100	0	10.4
0.96	0	898000	0	104000	89.6	0	100	.	10.4

Classification Tables

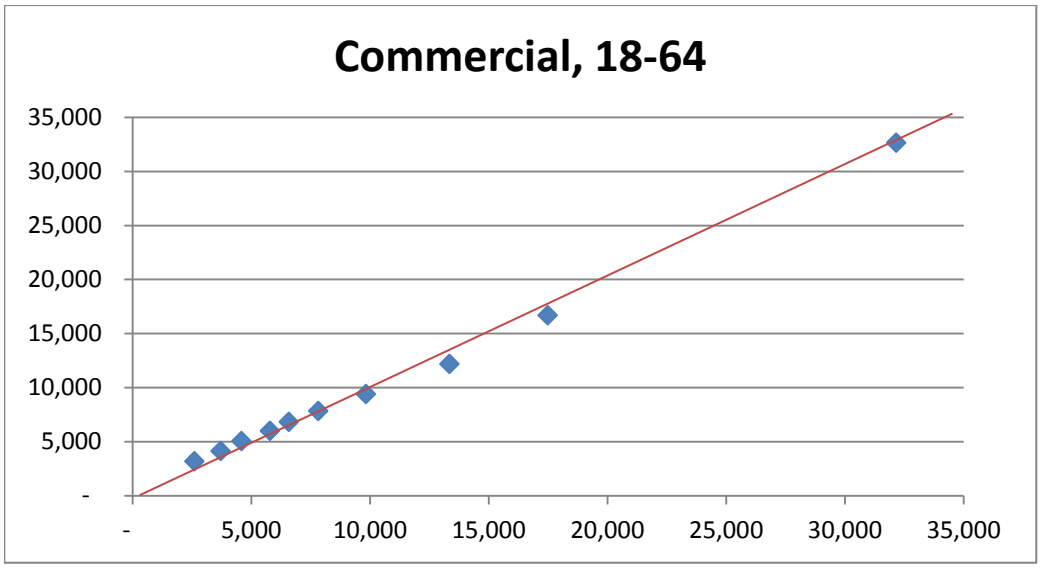
	Medicare 65+								
	Correct		Incorrect		Percentages				
Probability Level	Event	Non-Event	Event	Non-Event	Correct	Sensitivity	Specificity	False Pos.	False Neg.
0.02	199000	0	1250000	0	13.7	100	0	86.3	.
0.04	199000	20	1250000	0	13.7	100	0	86.3	0
0.06	196000	66412	1180000	2580	18.2	98.7	5.3	85.8	3.7
0.08	187000	200000	1050000	11627	26.8	94.1	16	84.8	5.5
0.10	165000	432000	814000	33796	41.3	83	34.7	83.2	7.3
0.12	138000	641000	605000	60137	54	69.7	51.5	81.4	8.6
0.14	113000	805000	442000	85829	63.5	56.8	64.6	79.7	9.6
0.16	89384	930000	317000	109000	70.5	45	74.6	78	10.5
0.18	68928	1020000	224000	130000	75.5	34.7	82	76.5	11.3
0.20	52159	1090000	157000	146000	79	26.3	87.4	75	11.8
0.22	38960	1140000	109000	160000	81.4	19.6	91.2	73.7	12.3
0.24	28770	1170000	76284	170000	83	14.5	93.9	72.6	12.7
0.26	21381	1190000	53428	177000	84	10.8	95.7	71.4	12.9
0.28	15843	1210000	37442	183000	84.8	8	97	70.3	13.1
0.30	11714	1220000	26291	187000	85.2	5.9	97.9	69.2	13.3
0.32	8733	1230000	18569	190000	85.6	4.4	98.5	68	13.4
0.34	6511	1230000	13287	192000	85.8	3.3	98.9	67.1	13.5
0.36	4887	1240000	9555	194000	85.9	2.5	99.2	66.2	13.5
0.38	3753	1240000	6819	195000	86	1.9	99.5	64.5	13.6
0.40	2828	1240000	4862	196000	86.1	1.4	99.6	63.2	13.6
0.42	2147	1240000	3538	196000	86.2	1.1	99.7	62.2	13.6
0.44	1648	1240000	2479	197000	86.2	0.8	99.8	60.1	13.7
0.46	1223	1240000	1775	197000	86.2	0.6	99.9	59.2	13.7
0.48	925	1250000	1255	198000	86.2	0.5	99.9	57.6	13.7
0.50	702	1250000	897	198000	86.2	0.4	99.9	56.1	13.7
0.52	525	1250000	659	198000	86.2	0.3	99.9	55.7	13.7
0.54	413	1250000	474	198000	86.3	0.2	100	53.4	13.7
0.56	300	1250000	323	198000	86.3	0.2	100	51.8	13.7
0.58	232	1250000	220	198000	86.3	0.1	100	48.7	13.7
0.60	165	1250000	154	198000	86.3	0.1	100	48.3	13.7
0.62	123	1250000	111	198000	86.3	0.1	100	47.4	13.7
0.64	93	1250000	73	199000	86.3	0	100	44	13.7
0.66	72	1250000	60	199000	86.3	0	100	45.5	13.7
0.68	52	1250000	38	199000	86.3	0	100	42.2	13.7
0.70	35	1250000	21	199000	86.3	0	100	37.5	13.7
0.72	21	1250000	12	199000	86.3	0	100	36.4	13.7
0.74	13	1250000	10	199000	86.3	0	100	43.5	13.7
0.76	9	1250000	4	199000	86.3	0	100	30.8	13.7
0.78	5	1250000	4	199000	86.3	0	100	44.4	13.7
0.80	4	1250000	1	199000	86.3	0	100	20	13.7
0.82	3	1250000	0	199000	86.3	0	100	0	13.7
0.84	3	1250000	0	199000	86.3	0	100	0	13.7
0.86	0	1250000	0	199000	86.3	0	100	.	13.7

Classification Tables

	Medicare 18-64								
	Correct		Incorrect		Percentages				
Probability Level	Event	Non-Event	Event	Non-Event	Correct	Sensitivity	Specificity	False Pos.	False Neg.
0.02	30581	0	170000	0	15.2	100	0	84.8	.
0.04	30574	210	170000	7	15.3	100	0.1	84.8	3.2
0.06	30376	4616	166000	205	17.4	99.3	2.7	84.5	4.3
0.08	29168	22809	147000	1413	25.9	95.4	13.4	83.5	5.8
0.10	26676	49620	121000	3905	38	87.2	29.1	81.9	7.3
0.12	23525	75027	95248	7056	49.1	76.9	44.1	80.2	8.6
0.14	20015	97734	72541	10566	58.6	65.4	57.4	78.4	9.8
0.16	16446	117000	53278	14135	66.4	53.8	68.7	76.4	10.8
0.18	13432	131000	39254	17149	71.9	43.9	76.9	74.5	11.6
0.20	10748	142000	28676	19833	75.8	35.1	83.2	72.7	12.3
0.22	8706	149000	21398	21875	78.5	28.5	87.4	71.1	12.8
0.24	7045	154000	16003	23536	80.3	23	90.6	69.4	13.2
0.26	5691	158000	12086	24890	81.6	18.6	92.9	68	13.6
0.28	4577	161000	9163	26004	82.5	15	94.6	66.7	13.9
0.30	3711	163000	7033	26870	83.1	12.1	95.9	65.5	14.1
0.32	2976	165000	5382	27605	83.6	9.7	96.8	64.4	14.3
0.34	2396	166000	4090	28185	83.9	7.8	97.6	63.1	14.5
0.36	1978	167000	3157	28603	84.2	6.5	98.1	61.5	14.6
0.38	1568	168000	2427	29013	84.3	5.1	98.6	60.8	14.7
0.40	1266	168000	1851	29315	84.5	4.1	98.9	59.4	14.8
0.42	1026	169000	1436	29555	84.6	3.4	99.2	58.3	14.9
0.44	819	169000	1110	29762	84.6	2.7	99.3	57.5	15
0.46	648	169000	852	29933	84.7	2.1	99.5	56.8	15
0.48	487	170000	646	30094	84.7	1.6	99.6	57	15.1
0.50	373	170000	479	30208	84.7	1.2	99.7	56.2	15.1
0.52	289	170000	372	30292	84.7	0.9	99.8	56.3	15.1
0.54	215	170000	261	30366	84.8	0.7	99.8	54.8	15.2
0.56	154	170000	185	30427	84.8	0.5	99.9	54.6	15.2
0.58	127	170000	136	30454	84.8	0.4	99.9	51.7	15.2
0.60	89	170000	97	30492	84.8	0.3	99.9	52.2	15.2
0.62	66	170000	67	30515	84.8	0.2	100	50.4	15.2
0.64	50	170000	50	30531	84.8	0.2	100	50	15.2
0.66	39	170000	33	30542	84.8	0.1	100	45.8	15.2
0.68	26	170000	25	30555	84.8	0.1	100	49	15.2
0.70	17	170000	18	30564	84.8	0.1	100	51.4	15.2
0.72	10	170000	11	30571	84.8	0	100	52.4	15.2
0.74	8	170000	6	30573	84.8	0	100	42.9	15.2
0.76	6	170000	2	30575	84.8	0	100	25	15.2
0.78	4	170000	2	30577	84.8	0	100	33.3	15.2
0.80	2	170000	1	30579	84.8	0	100	33.3	15.2
0.82	2	170000	1	30579	84.8	0	100	33.3	15.2
0.84	2	170000	1	30579	84.8	0	100	33.3	15.2
0.86	2	170000	1	30579	84.8	0	100	33.3	15.2
0.88	1	170000	1	30580	84.8	0	100	50	15.2
0.90	0	170000	0	30581	84.8	0	100	.	15.2

Hosmer-Lemeshow Tests

	Commercial 18-64				Medicare 65+				Medicare 18-64			
		Readmit				Readmit				Readmit		
Group	Total	Observed	Expected	Difference	Total	Observed	Expected	Difference	Total	Observed	Expected	Difference
1	100,483	2,606	3,177	(0.01)	144,491	7,126	8,695	(0.01)	20,176	1,138	1,332	(0.01)
2	100,499	3,708	4,126	(0.00)	144,513	10,531	11,582	(0.01)	20,087	1,514	1,692	(0.01)
3	100,215	4,591	5,050	(0.00)	144,516	12,923	13,281	(0.00)	20,086	1,929	1,969	(0.00)
4	101,004	5,791	5,998	(0.00)	144,307	15,087	14,887	0.00	20,087	2,207	2,246	(0.00)
5	100,184	6,582	6,815	(0.00)	144,512	17,031	16,685	0.00	20,086	2,639	2,537	0.01
6	100,221	7,825	7,840	(0.00)	144,511	19,547	18,702	0.01	20,086	2,945	2,848	0.00
7	100,221	9,829	9,410	0.00	144,511	22,257	21,131	0.01	20,086	3,367	3,218	0.01
8	100,219	13,351	12,192	0.01	144,516	25,825	24,229	0.01	20,083	3,856	3,694	0.01
9	100,222	17,488	16,680	0.01	144,513	30,012	28,741	0.01	20,085	4,674	4,451	0.01
10	98,925	32,159	32,642	(0.00)	144,739	38,259	40,668	(0.02)	19,994	6,312	6,594	(0.01)
Total	1,002,193	103,930	103,930	0.00	1,445,129	198,598	198,601	(0.00)	200,856	30,581	30,581	(0.00)
			Pr > ChiSq				Pr > ChiSq				Pr > ChiSq	
	$\chi^2_{(8)}$	413.5	<.0001		$\chi^2_{(8)}$	935.9	<.0001		$\chi^2_{(8)}$	110.0	<.0001	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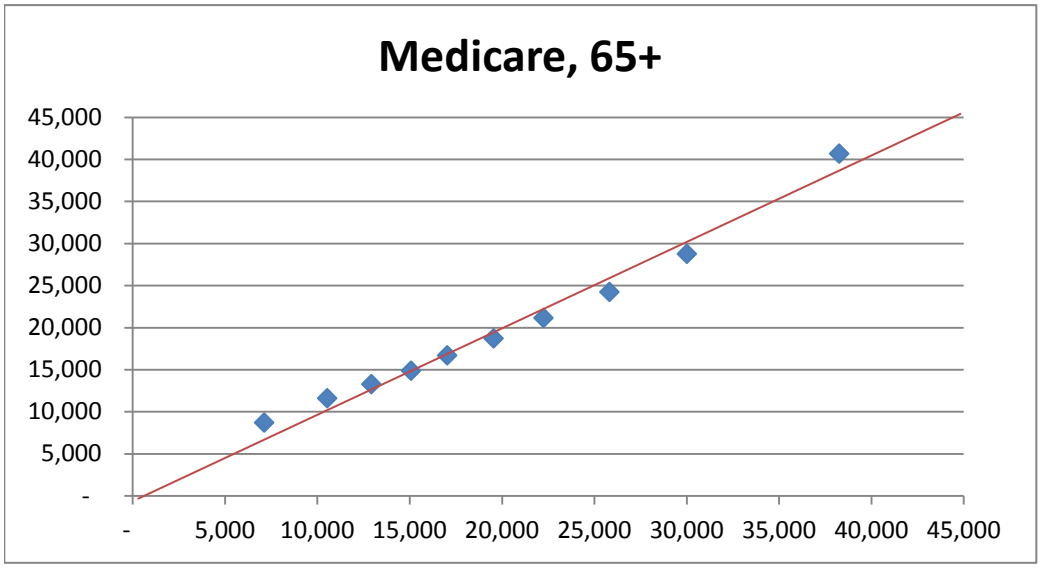
30,000
25,000
20,000
15,000
10,000
5,000
-
-
5,000
10,000
15,000
20,000
25,000
30,000
35,000


Medicare, 65+
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40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
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35,000
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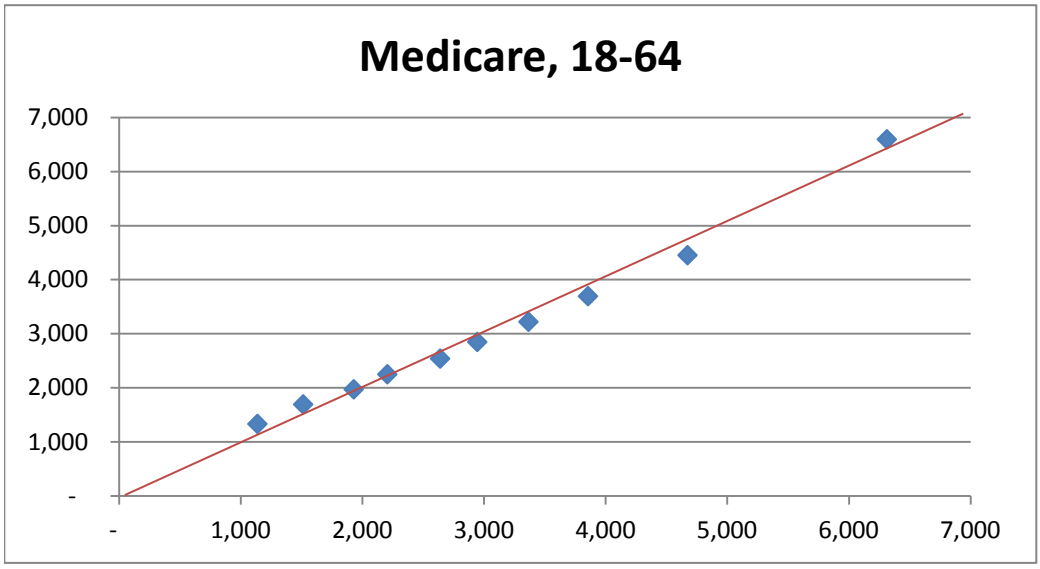
45,000


Medicare, 18-64
7,000
6,000
5,000
4,000
3,000
2,000
1,000
-
-
1,000
2,000
3,000
4,000
5,000
6,000
7,000

APPENDIX D: RELATED MEASURE COMPARISON TABLE

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)
Status	Currently undergoing review	Currently undergoing review
Steward	National Committee for Quality Assurance (NCQA)	Centers for Medicare & Medicaid Services (CMS)
Description	For members 18 years of age and older, the number of acute inpatient stays during the measurement year that were followed by an acute readmission for any diagnosis within 30 days and the predicted probability of an acute readmission. Data are reported in the following categories: 1. Count of Index Hospital Stays (IHS) (denominator) 2. Count of 30-Day Readmissions (numerator) 3. Average Adjusted Probability of Readmission 4. Observed Readmission (Numerator/Denominator) 5. Total Variance Note: For commercial, only members 18–64 years of age are collected and reported; for Medicare, only members 18 and older are collected, and only members 65 and older are reported.	This measure estimates the hospital-level, risk-standardized rate of unplanned, all-cause readmission after admission for any eligible condition within 30 days of hospital discharge (RSRR). The measure reports a single summary RSRR, derived from the volume-weighted results of five different models, one for each of the following specialty cohorts (groups of discharge condition categories or procedure categories): surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology, each of which will be described in greater detail below. The measure also indicates the hospital standardized risk ratios (SRR) for each of these five specialty cohorts. We developed the measure for patients 65 years and older using Medicare claims. The measure is now being tested in an all-payer population of patients aged 18 years or older.
Type of Measure	Outcome	Outcome
Numerator	At least one acute readmission for any diagnosis within 30 days of the Index Discharge Date.	(Note: This outcome measure does not have a traditional numerator and denominator like a core process measure (e.g., percentage of adult patients with diabetes aged 18-75 years receiving one or more hemoglobin A1c tests per year); thus, we use this field to define the measure outcome.) The outcome for this measure is unplanned all-cause 30-day readmission. We defined a readmission as an inpatient admission to any acute care facility which occurs within 30 days of the discharge date of an earlier, eligible index admission. All readmissions are counted as outcomes except

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)
		those that are considered planned.
Numerator Details	Acute-to-acute transfers: Keep the original admission date as the Index Admission Date, but use the transfer's discharge date as the Index Discharge Date. Exclude acute inpatient hospital discharges with a principal diagnosis for codes that identify maternity related inpatient discharges for the following ICD-9CM codes: - Pregnancy: 630-679, V22, V23, V28 - Conditions originating in the perinatal period: 760-779, V21, V29-V39 For each IHS, determine if any of the acute inpatient stays have an admission date within 30 days after the Index Discharge Date.	The outcome for this measure is unplanned all-cause readmission within 30 days of discharge date of an eligible index admission. Because planned readmissions are not a signal of quality of care, the measure does not count planned readmissions in the outcome. The measure uses an algorithm to identify "planned readmissions" in claims data that will not count as readmissions in the measure. The algorithm is based on two main principles: 1- "Planned" readmissions are those in which one of a pre-specified list of procedures took place (which will be described in detail below), or those for maintenance chemotherapy or rehabilitation. 2- Admissions for acute illness or for complications of care are not "planned." Even a typically planned procedure performed during an admission for an acute illness would not likely have been planned. We can identify readmissions as acute or non-acute by considering the principal discharge condition. The algorithm developed to identify planned readmissions uses procedure codes and discharge diagnosis categories for each readmission. The HWR measure defines planned readmissions as any readmission that was either: A non-acute readmission in which one of 35 typically planned procedures occurs; or A readmission for maintenance chemotherapy All other readmissions are considered unplanned and are counted as readmissions in the measure. The following examples illustrate this approach: Example 1: A readmission with a discharge condition category of biliary tract disease that included a cholecystectomy would be considered planned. A readmission with a discharge condition category of septicemia that included a cholecystectomy would be

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)

		considered unplanned.
		A readmission with a discharge condition category of "complications of surgical procedures or medical care" would be considered unplanned.
		List of planned procedures (Table 1)
		Planned procedures are identified using AHRQ Clinical Classification System (CCS) procedure category list (Table 1). Readmissions in which any of these procedures are performed are considered planned if the discharge condition category is not acute or a complication of care (i.e., not listed in Table 2).
		Table 1: Procedure categories considered planned
		AHRQ Procedure CCS//Description//Readmissions with no excluding diagnosis ("planned" readmissions): Number, Percent of total planned readmissions in the 2008 Medicare Provider Analysis and Review (MedPAR) dataset used for measure development
		45//Percutaneous transluminal coronary angioplasty (PTCA)//12,038, 13.83%
		//Rehabilitation (Condition CCS 254)//9,973, 11.46%
		84//Cholecystectomy and common duct exploration//7,191, 8.26%
		157//Amputation of lower extremity//6,649, 7.64%
		44//Coronary artery bypass graft (CABG)//6,290, 7.23%
		78//Colorectal resection//4,719, 5.42%
		51//Endarterectomy; vessel of head and neck//4,558, 5.24%
		113//Transurethral resection of prostate (TURP)//3,752, 4.31%
		99//Other OR gastrointestinal therapeutic procedures//3,475, 3.99%
		48//Insertion; revision; replacement; removal of cardiac pacemaker or cardioverter/defibrillator//2,541, 2.92%
		//Maintenance chemotherapy (condition CCS 45)//2,312, 2.66%
		211//Therapeutic radiology for cancer treatment//2,183,

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)

		2.51%
		3//Laminectomy; excision intervertebral disc//2,065, 2.37%
		43//Heart valve procedures//2,061, 2.37%
		152//Arthroplasty knee//1,989, 2.28%
		158//Spinal fusion//1,963, 2.25%
		55//Peripheral vascular bypass//1,902, 2.18%
		52//Aortic resection; replacement or anastomosis//1,529, 1.76%
		36//Lobectomy or pneumonectomy//1,492, 1.71%
		153//Hip replacement; total and partial//1,333, 1.53%
		60//Embolectomy and endarterectomy of lower limbs//1,263, 1.45%
		85//Inguinal and femoral hernia repair//981, 1.13%
		104//Nephrectomy; partial or complete//921, 1.06%
		1//Incision and excision of CNS//804, 0.92%
		124//Hysterectomy; abdominal and vaginal//524, 0.60%
		167//Mastectomy//474, 0.54%
		10//Thyroidectomy; partial or complete//353, 0.41%
		114//Open prostatectomy//338, 0.39%
		74//Gastrectomy; partial and total//278, 0.32%
		119//Oophorectomy; unilateral and bilateral//273, 0.31%
		154//Arthroplasty other than hip or knee//229, 0.26%
		//Radical laryngectomy, revision of tracheostomy, scarification of pleura (ICD-9 codes 30.4, 31.74, 34.6)//216, 0.25%
		166//Lumpectomy; quadrantectomy of breast//117, 0.13%
		64//Bone marrow transplant//100, 0.11%
		105//Kidney transplant//70, 0.08%
		176//Other organ transplantation//69, 0.08%
		//Electroshock therapy (ICD-9 codes 94.26, 94.27)//30, 0.03%
		List of discharge condition categories that are acute or complications of care (Table 2)
		Admissions in which a planned procedure was performed are only considered "planned" if the patient was not admitted for

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)

		an acute illness or complication of care. Table 2 contains the list of 27 discharge condition categories considered either acute or complications of care.
		Table 2: Discharge condition categories considered acute or complications of care
		AHRQ CCS//Description //Number of 30-day readmissions with this condition and one of the planned procedures in the 2008 MedPAR dataset used for measure development.
		237//Complication of device; implant or graft//11,689
		106//Cardiac dysrhythmias//10,267
		//Fracture (CC 207, 225, 226, 227, 229, 230, 231, 232)//6,307
		100//Acute myocardial infarction//5,643
		238//Complications of surgical procedures or medical care//5,438
		108//Congestive heart failure; nonhypertensive//5,119
		2//Septicemia (except in labor)//3,372
		146//Diverticulosis and diverticulitis//2,434
		105//Conduction disorders//2,130
		109//Acute cerebrovascular disease//1,886
		145//Intestinal obstruction without hernia//1,341
		233//Intracranial injury//1,271
		116//Aortic and peripheral arterial embolism or thrombosis//1,115
		122//Pneumonia (except that caused by TB or sexually transmitted disease)//710
		131//Respiratory failure; insufficiency; arrest (adult)//678
		157//Acute and unspecified renal failure//645
		201//Infective arthritis and osteomyelitis (except that caused by TB or sexually transmitted disease)//608
		153//Gastrointestinal hemorrhage//566
		130//Pleurisy; pneumothorax; pulmonary collapse//510
		97//Peri-; endo-; and myocarditis; cardiomyopathy//484
		127//Chronic obstructive pulmonary disease and bronchiectasis//462

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)

		55//Fluid and electrolyte disorders//424
		159//Urinary tract infections//410
		245//Syncope//353
		139//Gastroduodenal ulcer (except hemorrhage)//133
		160//Calculus of urinary tract//98
		112//Transient cerebral ischemia//88
		//All condition categories//64,181

Denominator	For commercial health plans, ages 18-64 as of the Index Discharge Date. For Medicare and Special Needs Plans, ages 18 and older as of the Index Discharge Date.	The target population for this measure as currently specified is admissions to acute care facilities for patients 65 and older. The measure is now being tested in an all-payer population of patients aged 18 years or older.
Denominator Categories	Adult/Elderly Care	Adult/Elderly Care
Denominator Details	The denominator for this measure is based on acute discharges, not members. - Identify all acute inpatient stays with a discharge date on or between January 1 and December 1 of the measurement year. - Acute-to-acute transfers: Keep the original admission date as the Index Admission Date, but use the Transfer's discharge date as the index Discharge Date. - Calculate continuous enrollment. - Assign each acute inpatient stay to one age and gender category.	The ICD-9 diagnosis and procedure codes of the index admission are aggregated into clinically coherent groups of conditions/procedures (condition categories or procedure categories) by using the Agency for Healthcare Research and Quality (AHRQ) Clinical Classifications System (CCS). Next, these discharge condition/procedure categories are organized into five mutually exclusive specialty cohorts defined by care team: medicine, surgery/gynecology, cardiorespiratory, cardiovascular, and neurology. Rationale: Conditions typically cared for by the same team of clinicians are expected to experience similar added (or reduced) levels of readmission risk. The surgery/gynecology cohort includes admissions likely cared for by surgical or gynecological teams. These admissions are identified using AHRQ procedure categories. The cardiorespiratory cohort includes several condition categories with very high readmission rates such as pneumonia, chronic obstructive pulmonary disease, and heart failure. These admissions are combined into a single cohort because they are often clinically indistinguishable and patients are often simultaneously treated for several of these diagnoses.

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)
		The cardiovascular cohort includes condition categories such as acute myocardial infarction that in large hospitals might be cared for by a separate cardiac or cardiovascular team. The neurology cohort includes neurologic condition categories such as stroke that in large hospitals might be cared for by a separate neurology team. The medicine cohort includes all non-surgical patients who were not assigned to any of the other cohorts. See attachment (Technical Report, Section 2.4.5, Table 8). In order to define the eligible admissions, we first aggregated the ICD-9 or CPT codes of the index admission into clinically coherent conditions by using the Agency for Healthcare Research and Quality's Clinical Classifications Software (CCS). There are a total of 285 mutually exclusive AHRQ condition categories, most of which are single, homogenous diseases such as pneumonia or acute myocardial infarction. Some are aggregates of conditions, such as "other bacterial infections." Mental health and substance abuse categories are included. In addition, AHRQ provides 231 mutually exclusive procedure categories to group procedures a patient might have had during hospitalization. Admissions are eligible for inclusion in the measure if: a. Patient is 65 or older Rationale: Younger Medicare patients represent a distinct population with dissimilar characteristics and outcomes. Of note, when the measure is applied to all-payer data, it will apply to patients 18 and older, including younger Medicare patients. b. Patient is alive upon discharge Rationale: Patients who die during the initial hospitalization cannot be readmitted. c. Patient is not transferred to another acute care hospital upon discharge Rationale: In an episode of care in which patient is transferred

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)
		among hospitals, responsibility for the readmission is assigned to the final discharging hospital. Therefore these intermediate admissions within a single episode of care are not eligible for inclusion. Note that a readmission within 30-days will also be eligible as an index admission, if it meets all other eligibility criteria. This allows our measure to capture repeated readmissions for the same patient, whether at the same hospital or another.
Exclusions	Exclude hospital stays where the Index Admission Date is the same as the Index Discharge Date and any inpatient stay with a discharge date in the 30 days prior to the Index Admission Date.	We exclude from the measure all admissions for which full data are not available or for which 30-day readmission by itself cannot reasonably be considered a signal of quality of care. Exclusions: 1. Admissions for patients without 30 days of post-discharge enrollment in FFS Medicare Rationale: This is necessary in order to identify the outcome (readmission) in the dataset. 2. Admissions for patients not continuously enrolled in FFS Medicare for the 12 months prior to the index admission Rationale: This is necessary to capture historical data for risk adjustment. 3. Admissions for patients discharged against medical advice (AMA) Rationale: Hospital had limited opportunity to implement high quality care. 4. Admissions for patients to a PPS-exempt cancer hospital Rationale: These hospitals care for a unique population of patients that is challenging to compare to other hospitals. 5. Admissions for patients with medical treatment of cancer (See Table 3 in Section 2a1.9) Rationale: These admissions have a very different mortality and readmission profile than the rest of the Medicare population, and outcomes for these admissions do not correlate well with outcomes for other admissions. (Patients with cancer who are admitted for other diagnoses or

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)
		for surgical treatment of their cancer remain in the measure). 6. Admissions for primary psychiatric disease (see Table 4 in Section 2a1.9) Rationale: Patients admitted for psychiatric treatment are typically cared for in separate psychiatric or rehabilitation centers which are not comparable to acute care hospitals. 7. Admissions for "rehabilitation care; fitting of prostheses and adjustment devices" Rationale: These admissions are not for acute care or to acute care hospitals.
Exclusion Details	Exclude the hospital and inpatient stays for the following reasons. - Inpatient stays with discharges for death - Acute inpatient discharge with a principal diagnosis for pregnancy or for any other condition originating in the perinatal period in for the following ICD-9CM codes Pregnancy: 630-679, V22, V23, V28 Conditions originating in the perinatal period: 760-779, V21, V29-V39	Denominator exclusions are identified based on variables contained in the Standard Analytic File (SAF) or Enrollment Database (EDB). 1. Lack of enrollment in Medicare FFS for 30 days post-discharge is identified by patient enrollment status in Part A FFS claims using CMS' EDB; the enrollment indicators must be appropriately marked for the month(s) which falls within 30 days of hospital discharge date. 2. Lack of continuous enrollment in Medicare FFS for 12 months prior to index hospital stay is determined by patient enrollment status in Part A FFS using CMS' EDB; the enrollment indicators must be appropriately marked for each of the 12 months prior to the index hospital stay 3. Discharges AMA are identified using the discharge disposition indicator within the SAF. 4. PPS-exempt cancer hospitals are identified by their Medicare provider ID. 5. Table 3 indicates all cancer discharge condition categories excluded from the measure. 6. Table 4 indicates all psychiatric discharge condition categories excluded from the measure. 7. Admissions for "rehabilitation care; fitting of prostheses and adjustment devices" are identified by principal diagnosis codes

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)
		(ICD-9 codes) included in CCS 254 In addition, in-hospital deaths are identified using the discharge disposition vital status indicator in the SAF and transfers to other acute care facilities are identified in the claims when a patient is discharged from an acute care hospital and admitted to another acute care hospital on the same day or next day. Table 3: Cancer discharge condition categories excluded from the measure AHRQ CCS//Description//Number of Admissions 42//Secondary malignancies//45,319 19//Cancer of bronchus; lung//30,292 45//Maintenance chemotherapy; radiotherapy//21,522 44//Neoplasms of unspecified nature or uncertain behavior//10,160 17//Cancer of pancreas//8,462 38//Non-Hodgkin`s lymphoma//7,977 39//Leukemias//7,809 14//Cancer of colon//6,121 40//Multiple myeloma//4,624 35//Cancer of brain and nervous system//3,561 16//Cancer of liver and intrahepatic bile duct//3,491 13//Cancer of stomach//3,467 29//Cancer of prostate//3,100 15//Cancer of rectum and anus//3,030 18//Cancer of other GI organs; peritoneum//2,974 12//Cancer of esophagus//2,533 11//Cancer of head and neck//2,515 27//Cancer of ovary//2,081 33//Cancer of kidney and renal pelvis//1,863 32//Cancer of bladder//1,807 24//Cancer of breast//1,682 43//Malignant neoplasm without specification of site//1,451 25//Cancer of uterus//1,132

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)

		36//Cancer of thyroid//879
		21//Cancer of bone and connective tissue//763
		41//Cancer; other and unspecified primary//674
		20//Cancer; other respiratory and intrathoracic//632
		23//Other non-epithelial cancer of skin//593
		26//Cancer of cervix//586
		28//Cancer of other female genital organs//326
		34//Cancer of other urinary organs//301
		37//Hodgkin`s disease//236
		22//Melanomas of skin//212
		31//Cancer of other male genital organs//34
		30//Cancer of testis//4
		//Total//182,213
		Table 4: Psychiatric discharge condition categories excluded from the measure
		AHRQ CCS//Description//Number of Admissions
		657//Mood disorders//7,874
		659//Schizophrenia and other psychotic disorders//7,849
		651//Anxiety disorders//3,153
		670//Miscellaneous disorders//1,315
		654//Developmental disorders//594
		650//Adjustment disorders//399
		658//Personality disorders//127
		652//Attention-deficit, conduct, and disruptive behavior disorders//119
		656//Impulse control disorders, NEC//27
		655//Disorders usually diagnosed in infancy, childhood, or adolescence//16
		662//Suicide and intentional self-inflicted injury//10
		//Total//21,483

Risk Adjustment	Indirect standardization, using logistic regression Uses the CC and HCC models to identify comorbidities and attaches weights to each statistically significant comorbidity by product line and age grouping. We	Hierarchical logistic regression models are used to model the log-odds of readmission within 30 days of discharge, as a function of patient-level demographic and clinical characteristics and a random hospital-level intercept. This

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)
	estimated a stepwise logistic regression. The binary dependent variable was coded 1 for index hospital stays that had a subsequent readmission within 30 days, and 0 otherwise. The independent variables in the models were: - age-gender cohort: Commercial: male 18-44, female 18-44, male 45-54, female 45-54, male 55-64 (reference group), female 55-64. In year 1, the model for Medicare used: Medicare 18 and older: male 18-44, female 18-44, male 45-54, female 45-54, male 55-64, female 55-64. male 65-74 (reference group), female 65-74, male 75-84, female 75-84, male 85+, female 85+. In year 2, the model for Medicare will use: male 65-74 (reference group), female 65-74, male 75-84, female 75-84, male 85+, female 85+. - Major surgery: 1=index hospital stay was for major surgery (see code list in algorithm); 0, otherwise. - Discharge Clinical Condition (CC) from the HCC classification system: 1=index hospital stay was for the CC; 0, otherwise. Note: each index hospital stay is coded into exactly one CC and is based only on the primary diagnosis. - Comorbid Hierarchical Clinical Condition (HCC): 1=index hospital stay had the associated comorbidity (HCC) indicated through any diagnosis on a face to face claim/encounter for the 12 months prior to the index hospital stay discharge date; 0, otherwise.	model specification accounts for within-hospital correlation of the observed outcomes and models the assumption that underlying differences in quality among the health care facilities being evaluated lead to systematic differences in outcomes. In brief, the approach simultaneously models two levels (patient and hospital) to account for the variance in patient outcomes within and between hospitals [1]. At the patient level, each model adjusts the log-odds of readmission within 30-days of discharge for age and selected clinical covariates. The second level models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of readmission, after accounting for patient risk. The hospital-specific intercepts are given a distribution in order to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. We estimate a separate hierarchical logistic regression model for each specialty cohort. However, we use a fixed, common set of variables in all our models for simplicity and ease of data collection and analysis. To group ICD-9-CM codes into comorbid risk variables, we use CMS Condition Category (CMS-CCs) groups, the grouper used in previous CMS risk-standardized outcomes measures [2]. See Table 5 for the final list of comorbid risk variables. The models also include a condition-specific indicator for all condition categories with sufficient volume (defined as those with more than 1,000 admissions nationally each year). Table 5: Final comorbid risk variables Risk Variable Group Label//CMS-CCs [1]//Description//"X" if not adjusted for if only present on index admission (complication) Age// n/a//Age (-65)// Cond. Ind.// n/a//Condition indicator (AHRQ CCS)// rv1// 1, 3-5//Severe infection// rv1//1//HIV/AIDS//rv1//3//Central nervous system

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)
		infection// rv1//4//Tuberculosis// rv1//5//Opportunistic infections// rv2// 6, 111-113//Other infectious disease & pneumonias// rv2//6//Other infectious disease//x rv2//111//Aspiration and specified bacterial pneumonias//x rv2//112//Pneumococcal pneumonia, emphysema, lung abscess//x rv2//113//Viral and unspecified pneumonia, pleurisy//x rv3// 7//Metastatic cancer/acute leukemia// rv4// 8, 9//Severe cancer// rv4//8//Lung, upper digestive tract, and other severe cancers// rv4//9//Other major cancers// rv6// 10, 11, 12//Other major cancers// rv6//10//Breast, prostate, colorectal and other cancers and tumors// rv6//11//Other respiratory and heart neoplasms// rv6//12//Other digestive and urinary neoplasms// rv9// 15-20, 119, 120//Diabetes mellitus // rv9//15//Diabetes with renal manifestation// rv9//16//Diabetes with neurologic or peripheral circulatory manifestation// rv9//17//Diabetes with acute complications//x rv9//18//Diabetes with ophthalmologic manifestation// rv9//19//Diabetes with no or unspecified complications// rv9//20//Type I diabetes mellitus// rv9//119//Proliferative diabetic retinopathy and vitreous hemorrhage// rv9//120//Diabetic and other vascular retinopathies// rv10// 21//Protein-calorie malnutrition// rv11// 25, 26//End-stage liver disease// rv11//25//End-stage liver disease// rv11//26//Cirrhosis of liver// rv12// 44//Other hematologoical disorders// rv14// 51-52//Drug and alcohol disorders// rv14//51//Drug/alcohol psychosis// rv14//52//Drug/alcohol dependence// rv15// 54-56, 58, 60//Psychiatric comorbidity// rv15//54//Schizophrenia// rv15//55//Major depressive, bipolar, and paranoid disorders// rv15//56//Reactive and unspecified psychosis// rv15//58//Depression// rv15//60//Other psychiatric disorders// rv18// 67-69, 100-102, 177, 178//Hemiplegia, paraplegia, paralysis, functional disability//

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)
		rv18//67//Quadriplegia, other extensive paralysis// rv18//68//Paraplegia// rv18//69//Spinal cord disorders/Injuries// rv18//100//Hemiplegia/hemiparesis// rv18//101//Diplegia (upper), monoplegia, and other paralytic syndromes// rv18//102//Speech, language, cognitive, perceptual// rv18//177//Amputation status, lower limb/amputation// rv18//178//Amputation status, upper limb// rv19// 74//Seizure disorders and convulsions// rv20// 80//CHF//x rv21// 81-84, 89, 98, 99, 103-106//Coronary atherosclerosis or angina, cerebrovascular disease// rv21//81//Acute myocardial infarction//x rv21//82//Unstable angina and other acute ischemic heart disease//x rv21//83//Angina pectoris/old myocardial infarction// rv21//84//Coronary atherosclerosis/other chronic ischemic heart disease// rv21//89//Hypertensive heart and renal disease or encephalopathy// rv21//98//Cerebral atherosclerosis and aneurysm// rv21//99//Cerebrovascular disease, unspecified// rv21//103//Cerebrovascular disease late effects, unspecified// rv21//104//Vascular disease with complications//x rv21//105//Vascular disease//x rv21//106//Other circulatory disease//x rv24// 92, 93//Specified arrhythmias// rv24//92//Specified heart arrhythmias// rv24//93//Other heart rhythm and conduction disorders// rv26// 108//Chronic obstructive pulmonary disease// rv27// 109//Fibrosis of lung or other chronic lung disorders// rv29// 130//Dialysis status//x rv30// 148-149//Ulcers// rv30//148//Decubitus ulcer //x rv30//149//Decubitus ulcer or chronic skin ulcer// rv31// 2//Septicemia/shock//x rv32// 22-23//Disorders of fluid, electrolyte, acid-base// rv32//22//Other significant endocrine and metabolic disorders//x rv32//23//Disorders of fluid/electrolyte/acid-base//x rv33// 47//Iron deficiency//x rv34// 79//Cardio-respiratory failure or

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)
		cardio-respiratory shock//x rv39// 131//Acute renal failure//x rv40// 32//Pancreatic disease// rv41// 38//Rheumatoid arthritis and inflammatory connective tissue disease// rv42// 77//Respirator dependence/tracheostomy status// rv43// 128, 174//Transplants// rv43//128//Kidney transplant status// rv43//174//Major organ transplant status// rv44// 46//Coagulation defects and other specified hematological disorders// rv45// 158//Hip fracture/dislocation// References 1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22 (2): 206-226. 2. Pope, G., et al., Principal Inpatient Diagnostic Cost Group Models for Medicare Risk Adjustment. Health Care Financing Review, 2000. 21(3): 26. See attachment (Technical Report, Section 3.1, Tables 9-13) for detailed risk model.
Stratification	The measure includes a table that stratifies the five reporting data elements by age and gender. The five elements are: 1. Count of Index Stays 2. Count of 30-Day Readmissions 3. Average Adjusted Probability 4. Observed Readmission (Numerator/Denominator) 5. Total Variance The age stratifications are: Commercial: 18-44, 45-54, 55-64, Total Medicare: 65-74, 75-84, 85+., Total The measure is also stratified by gender.	N/A
Type Score	Rate/Proportion and Count: The Counts are the number of index hospital stays (denominator) and stays with a subsequent 30-day readmission (numerator). The Rate/Proportions are the average adjusted probability of readmission (expected rate) and the observed rate of readmission (numerator / denominator).	A standardized risk ratio (SRR) for each hospital and each cohort is estimated using a separate hierarchical logistic regression model for that cohort. The five SRRs, weighted by volume, are then combined into a single score which is the risk-standardized hospital-wide readmission ratio. To improve interpretation, this ratio is then multiplied by the overall national raw readmission rate for all index admissions in all

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)
		cohorts to produce the risk-standardized hospital-wide readmission rate (RSSR).
Algorithm	Look at denominator details, numerator details and the risk adjustment methodology for the measure logic in sections 2a1.7 and 2a1.13. The calculation for continuous enrollment is as follows: Step 1: Determine the eligible population. For commercial health plans, ages 18-64 as of the Index Discharge Date. For Medicare and Special Needs Plans, ages 18 and older as of the Index Discharge Date. Step 2: Determine number discharges meeting the denominator criteria as specified in Section 2a1.7 above. Step 3: Determine the number of patients who meet the numerator criteria as specified in section 2a1.3 above. The numerator includes all patients in the denominator population who had acute inpatient stays with an admission date on or between January 1 and December 31 of the measurement year. Step 4: Determine the number of exclusions Step 3 as specified in section 2a1.8. Patients with hospital stays where the Index Admission Date is the same as the Index Discharge Date and any inpatient stay with a discharge date in the 30 days prior to the Index Admission Date are exclusions. Step 5: Calculate the rate The risk adjustment calculation is: Surgeries: Determine if the member underwent surgery during the inpatient stay. Download the list of codes from the NCQA Web site for the surgery codes for risk adjustment and use it to identify surgeries. Consider an IHS to include a surgery if at least one procedure code is present from any provider between the admission and discharge dates. Discharge Condition:	Models for each specialty cohort are specified and estimated, using a separate hierarchical logistic regression model for that cohort. Each model is then used to calculate a standardized risk ratio (SRR) for each hospital which contributes index admissions to that model. These SRRs, weighted by volume, are then pooled for each hospital to create a composite hospital-wide SRR. For each specialty cohort within a hospital, the numerator of the SRR ("predicted") is the number of readmissions for patients within the specialty cohort within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator ("expected") is the number of readmissions expected for patients within the specialty cohort on the basis of the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case-mix to an average hospital's performance with the same case-mix. Thus, an SRR less than 1 indicates lower-than-expected readmission or better quality and an SRR greater than 1 indicates higher-than-expected readmission or worse quality. These SRRs are then pooled for each hospital to create a composite hospital-wide SRR. This pooled SRR is the geometric mean of the specialty cohort SRRs, weighted by the number of admissions in the specialty cohort, and the pooled SRR is then multiplied by the overall crude readmission rate to produce the risk standardized readmission rate (RSRR) for reporting. Please see attachment (Technical Report, Section 2.6) for more details on the calculation algorithm.

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)
	Assign a discharge Clinical Condition (CC) category code to IHS based on its primary discharge diagnosis. For acute-to-acute transfers, use the transfer's primary Discharge diagnosis. Exclude diagnoses that cannot be mapped. Comorbidities: This is determined by performing the following steps: Step 1: Identify all diagnoses for face-to-face encounters during the classification period. Exclude the primary discharge diagnosis on the IHS. Description // CPT // UB Revenue Outpatient // 92002,92004, 92012, 92014, 98925-98929, 98940-98942, 99201-99205, 99211-99215, 99217-99220, 99241-99245, 99341-99345, 99347-99350, 99384-99387, 99394-99397, 99401-99404, 99411, 99412, 99420, 99429, 99455, 99456 // 051x, 0520-0523, 0526-0529, 057x-059x, 082x-085x, 088x, 0982, 0983 Nonacute Inpatient // 99304-99310, 99315, 99316, 99318, 99324-99328, 99334-99337 // 0118, 0128, 0138, 0148, 0158, 019x, 0524, 0525, 055x, 066x, 1001, 1002 Acute Inpatient // 99221-99223, 99231-99233, 99238, 99239, 99251-99255, 99291 // 010x, 0110-0114, 0119, 0120-0124, 0129, 0130-0134, 0139, 0140-0144, 0149, 0150-0154, 0159, 016x, 020x, 021x, 072x, 080x, 0987 ED // 99281-99285 // 045x, 0981 Step 2: Assign each diagnosis to one comorbid Clinical Condition (CC) category using Table CC—Comorbid. Exclude all diagnoses that cannot be assigned to a comorbid CC category. For members with no qualifying diagnoses from face-to-face encounters, skip to the Risk Adjustment Weighting section. All digits must match exactly when mapping diagnosis codes to the comorbid CCs. Step 3: Determine HCCs for each comorbid CC identified.	

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	Refer to Table HCC—Rank. For each stay's comorbid CC list, match the comorbid CC code to the comorbid CC code in the table, and assign: - The ranking group - The rank - The HCC For comorbid CCs that do not match to Table HCC—Rank, use the comorbid CC as the HCC and assign a rank of 1. Note: One comorbid CC can map to multiple HCCs; each HCC can have one or more comorbid CCs. Step 4: Select only the highest ranked HCC in each ranking group using the Rank column (1 is the highest rank possible). Drop all other HCCs in each ranking group, and de-duplicate the HCC list if necessary. Example: Assume a stay with the following comorbid CCs: CC-15, CC-19 and CC-80 (assume no other CCs). • CC-80 does not have a map to the ranking table and becomes HCC-80 • HCC-15 is part of Ranking Group 1 and HCC-19 is part of Ranking Groups Diabetes 1–Diabetes 4. Because CC-15 is ranked higher than CC-19 in Ranking Group Diabetes 1, the comorbidity is assigned as HCC-15 for Ranking Group 1. Because CC-19 is ranked higher in Ranking Groups Diabetes 2-4, the comorbidity is assigned as HCC-19 for these ranking groups. The final comorbidities for this discharge include HCC-15, HCC-19 and HCC-80. Example: Ranking Group // CC // Description // Rank // HCC NA // CC-80 // Congestive Heart Failure // NA // HCC-80 Diabetes 1 // CC-15 // Diabetes With Renal or	

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)
	Peripheral Circulatory Manifestation // 1 // HCC-15 Diabetes 1 // CC-16 // Diabetes With Neurologic or Other Specified Manifestation // 2 // HCC-16 Diabetes 1 // CC-17 // Diabetes With Acute Complications // 3 // HCC-17 Diabetes 1 // CC-18 // Diabetes With Ophthalmologic or Unspecified Manifestation // 4 // HC-18 Diabetes 1 // CC-19 // Diabetes without Complications // 5 // HCC-19 Diabetes 2 // CC-16 // Diabetes With Neurologic or Other Specified Manifestation // 1 // HCC-16 Diabetes 2 // CC-17 // Diabetes with Acute Complications // 2 // HCC-17 Diabetes 2 // CC-18 // Diabetes With Ophthalmologic or Unspecified Manifestation // 3 // HCC-18 Diabetes 2 // CC-19 // Diabetes Without Complication // 4 // HCC-19 Diabetes 3 // CC-17 // Diabetes With Acute Complications // 1 // HCC-17 Diabetes 3 // CC-18 // Diabetes With Ophthalmologic or Unspecified Manifestation // 2 // HCC-18 Diabetes 3 // CC-19 // Diabetes Without Complication // 3 // HCC-19 Diabetes 4 // CC-18 // Diabetes With Ophthalmologic or Unspecified Manifestation // 1 //HCC-18 Diabetes 4 // CC-18 // Diabetes Without Complication // 2 // HCC-19 Step 5: Identify combination HCCs. Some combinations suggest a greater amount of risk when observed together. For example, when diabetes and CHF are present, an increased amount of risk is evident. Additional HCCs are selected to account for these relationships. Compare each stay's list of unique HCCs to those listed as	

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)
	combinations and assign any additional HCC conditions. For fully nested combinations (e.g., the diabetes/CHF combinations is nested in the diabetes/CHF/renal combination), use only the more comprehensive pattern. In this example, only the diabetes/CHF/renal combination is counted. For overlapping combinations (e.g., the CHF, COPD combination overlaps with the CHR/ renal/diabetes combination), use both sets of combinations. In this example, both CHF/COPD and CHF/renal/diabetes combinations are counted. Based on the combinations, a member can have none, one or more of these added HCCs. Example: For a stay with comorbidities HCC-15, HCC-19 and HCC-80 (assume no other HCCs), assign HCC-901 in addition to HCC-15, HCC-19 and HCC-80. This does not replace HCC-15, HCC19 or HCC-80. Example: Combination: Diabetes and CHF Comorbid HCC // Comorbid HCC // Comorbid HCC // Combination HCC HCC-15 // HCC-80 // NA // HCC-901 HCC-16 // HCC-80 // NA // HCC-901 HCC-17 // HCC-80 // NA // HCC-901 HCC-18 // HCC-80 // NA // HCC-901 HCC-19 // HCC-80 // NA // HCC-901 For each IHS, use the following steps to identify risk adjustment weights based on presence of surgeries, discharge condition, comorbidity, age and gender. Note: The final weights table will be released on November 15, 2011. Step 1: For each IHS with a surgery, link the surgery weight. For Medicare product lines ages 18-64:	

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)
	For Medicare product lines ages 65 and older: For commercial product lines: Step 2: For each IHS with a discharge CC Category, link the primary discharge weights. For Medicare product lines ages 18-64: For Medicare product lines ages 65 and older: For commercial product lines: Step 3: For each IHS with a comorbidity HCC Category, link the weights. For Medicare product lines ages 18-64: For Medicare product lines ages 65 and older: For commercial product lines: Step 4: Link the age and gender weights for each IHS. For Medicare product lines ages 18-64: For Medicare product lines ages 65 and older: For commercial product lines: Step 5: Identify the base risk weight. For Medicare product lines ages 18-64: For Medicare product lines ages 65 and older: For commercial product lines: Step 6: Sum all weights associated with the IHS (i.e., presence of surgery, primary discharge diagnosis, comorbidities, age, gender and base risk weight). Step 7: Use the formula below to calculate the adjusted probability of a readmission based on the sum of the weights for each IHS. Adjusted probability of readmission = (e(?Weights for IHS)) Divided by (1+e (?Weights for IHS)) OR Adjusted probability of readmission = [exp (sum of weights for IHS)] / [1 + exp (sum of weights for IHS)] Note: "xp" refers to the exponential or antilog function. Step 8: Use the formula below and the adjusted probability of readmission calculated in Step 7 to	

	New Candidate Standard 1768: Plan all-cause readmissions	**New Candidate Standard 1789**: Hospital-wide all-cause unplanned readmission measure (HWR)
	calculate the variance for each IHS. Variance = Adjusted probability of readmission x (1 – Adjusted probability of readmission) Example: If the adjusted probability of readmission is 0.1518450741, then the variance is 0.1518450741 x 0.8481549259 = 0.1287881476.	
Data Source	Administrative claims	Administrative claims
Level of Measurement /Analysis	Health Plan	Facility
Care Settings	Behavioral Health/Psychiatric : Inpatient, Hospital/Acute Care Facility	Hospital/Acute Care Facility