NATIONAL QUALITY FORUM

National Voluntary Consensus Standards for Patient Outcomes
Measure Summary

Measure number: OT1-003-09

Measure name: 30-Day post-hospital AMI discharge evaluation and management service

Description: This measure estimates the percentage of eligible Medicare hospital discharges with the diagnosis of AMI for which beneficiaries receive an evaluation and management (E&M) service within 30 days of hospital discharge and prior to a hospital readmission or ED visit.

Numerator statement: The numerator is the number of eligible discharges in the target population with evidence of an evaluation and management (E&M) service within 30 days of a hospital discharge with the principal discharge diagnosis of AMI and prior to any hospital readmission or ED visit.

Denominator statement: Total hospital discharges among Medicare fee-for-service beneficiaries 65 years of age and older during the measurement time-frame with a discharge diagnosis of AMI.

Level of Analysis: Population: national

Type of Measure: Outcome

Data Source: Electronic adminstrative data/claims

Measure developer: Brandeis University/CMS

Type of Endorsement (full or time-limited): Recommended for endorsement (Steering Committee – March 24, 2010 [Recommend as a stand-alone measure—6; Recommend as part of the composite only—5; Do not recommend—5]).

Summary table of TAP Ratings of Subcriteria and Comments:

IMPORTANCE TO MEASURE AND REPORT		
1a. Impact	Completely	1a—High volume, high cost. 1b—Developer says it is a "bidirectional" measure—perhaps as a sign of deteriorating condition or a potential preventive for ED or readmission. 1c—No evidence of effect of visit on patient outcomes; E&M visit from RNP or PA, nurse also included—any billable visit eligible; process or outcome measure?; outcome compared to "expected."
1b. Gap	Completely	
1c. Relation to outcomes	Partially	
SCIENTIFIC ACCEPTABILTY		
2a. Specs	Completely	2a—Adminstrative data. 2b and 2c—Similar data as with the ED visit measure; low c-
2b. Reliability	Minimally	

2c. Validity	Minimally	statistic.
2d. Exclusions	Completely	
2e. Risk adjustment	Completely	2d—Exclusions—good.
2f. Meaningful differences	Partially	2f—Distribution narrow: 10 percent-11 percent difference between high and low; potential for lots of effort for minimal gain.
2g. Comparability	Not applicable	
2h. Disparities	Not at all	2h—Known disparities—not addressed.
USEABILITY		
3a. Distinctive	Completely	E&M visit and ED visit are inherently different concepts.
3b. Harmonization	Completely	
3c. Added value	Completely	
FEASIBILITY		
4a. Data a byproduct of care	Completely	Feasible with administrative data; subject to coding inaccuracies typical of administrative data.
4b. Electronic	Completely	
4c. Exclusions	Completely	
4d.Inaccuracies/errors	Completely	
4e. Implementation	Completely	

Measure Developer Responses:

Topic, Measure #, and Title	Follow-Up Issues
Topic Area: AMI **Measure#** OT1-003-09 **Title:** 30-Day post-hospital AMI discharge evaluation and management Service	**Questions/Conditions for Measure Developer:** 1. Clarify whether the coding as submitted includes home health visits 2. The discussion on whether E&M visits were a good thing (appropriate follow-up that might reduce ED or readmission) or a bad thing (as an indication of declining patient status) was confusing as to the intent of the measure 3. Address and clarify why these measures did not address measuring disparities. **Response from Measure Developer:** 1. Our initial submission did not specify the coding for home health visits although they are intended to be included in these measures. The numerator specification for these measures is the following. *Numerator Details (All information required to collect or calculate the numerator, including all codes, logic, and definitions)* The following five methods were applied to identify E&M services in the Part B line item and Part A outpatient revenue center files. The claim "from date" was

Topic, Measure #, and Title	Follow-Up Issues
	then set as the E&M service date. 1. HCPCS E&M codes as specified in Answer 1 of the following document. http://www.cms.hhs.gov/HospitalOutpatientPPS/downloads/OPPS_Q&A.pdf (HCPCS_CD: 99201–99215, 99241–99245 (note: only codes 99201–99205 and 99211–99215 occurred in the range of 99201–99215) 2. HCPCS E&M codes as specified for home health visits: 99324–99345 3. Revenue codes 0550, 0551, 0552, and 0553 for skilled nursing services provided in the home and/or G code G0154. 4. The HCPCS codes corresponding to the BETOS E&M codes, as specified by CMS. http://www.cms.hhs.gov/hcpcsreleasecodesets/20_betos.asp 5. BETOS and HCPCS E&M codes specified for SNFs and LTC facilities. (BETOS='M4B') 2. The discussion among and with the TAP pointed to different causes for E&M visits. Health status and severity are one type of cause, with greater severity leading to a greater likelihood of a visit, akin to a greater likelihood for an ED visit, readmission, or mortality. Hence, we risk-adjusted the expected value of E&M visits in a manner identical to the other outcome measures. However, the intent of this measure is to recognize that an E&M service following hospital discharge for AMI or HF is a good thing with the potential to prevent an adverse medical event. As such, the measure encourages a shared accountability for identifying and addressing any medical conditions during this period of vulnerability following hospital discharge. Scheduling and encouraging an E&M service following hospital discharge should be the expectation for **all** patients in these cohorts. The signal being sent to hospitals is to improve upon their care transitions composite score by lowering adverse events (ED, readmission, mortality) and by increasing the proactive, scheduled E&M visit rates. 3. This measure had not been evaluated prior to submission. Our recent evaluation of the proposed measure has demonstrated that performance on the composite measure is not systematically related to race (i.e., Black, White, Hispanic) among Medicare beneficiaries.

Summary Table of SC Ratings of Subcriteria and Comments:

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IMPORTANCE TO MEASURE AND REPORT	
The TAP highlighted some confusion as to the meaning of this measure. The developer indicated that an E&M visit is generally desirable after a hospitalization, but it may also be a sign of deteriorating condition. The bi-directionality is hard to interpret. Committee members referred to an analysis of Medicare readmission by Steve Jencks and others (Jencks SF, Williams MV, Coleman EA, Rehospitalizations among patients in the Medicare fee-for-service program, *N Engl J Med* 2009;360(14):1418-1428), noting that 50 percent of patients readmitted had not seen a physician. Committee members noted that some institutions are testing a variety of follow-up activities to reduce readmissions that would not be captured as an E&M visit but would serve the same purpose and would not be credited.	SC Vote on Importance Yes—16 No—0
SCIENTIFIC ACCEPTABILITY	
Some Committee members thought this is really a process measure—something that should happen without risk adjustment. Only validity assessment is face validity.	SC Vote on Scientific Acceptability Completely—5 Partially—9 Minimally—2 Not at all—0
USABILITY	
No disagreement if this measure as reported is an accurate depiction of care coordination. An E&M service claim does not indicate whether appropriate follow-up care was rendered. Other avenues of contact such as phone calls or nurse visits may be effective also. By concentrating solely on E&M service, innovative approaches to care coordination and prevention of readmissions may be stifled.	SC Vote on Usability Completely—7 Partially—6 Minimally—2 Not at all—0

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FEASIBILITY	
Again, the measure should apply as broadly as possible. Committee members raised the concern that some CMS carriers do not accept certain billing codes for nurse visits—this is variable region to region.	SC Vote on Feasibility Completely—9 Partially—5 Minimally—2 Not at all—0

Summary Table of Biostatistical Review:

Type of Risk Model : *Hierarchical logistic regression*
RISK FACTORS Are the risk factors clearly identified in the submission information? *YES*
Does the model include risk factors associated with differences/inequalities with care such as race, socioeconomic status or gender? *NO*
Are the conceptual and quantitative criteria for inclusion or exclusion or combining of risk factors explained and appropriate? *Somewhat. See review of OT1-002-09 AMI ED measure.*
Is quantitative assessment of the relative contribution of the model components described in detail? *No, but estimated regression coefficients are provided along with t-test statistics.*
Does the measure have exclusions that influence outcomes that should be included as risk factors? *NO*
Comments on risk factors: *See review of OT1-002-09 AMI ED measure.*
VALIDATION OF THE RISK MODEL Is there information provided on the cross-validation of the model comparing a development sample and a validation sample provided? *NO* Is there information on independent, external validation of the model in another data set? *NO* Are the results supportive of a valid model? *N/A*
RISK MODEL PERFORMANCE (2e)
DISCRIMINATION: *C = 0.553*

Does the statistic support good discrimination? *NO.*

CALIBRATION: Is a calibration curve included? *NO*
Is a risk decile plot included? *NO*
Hosmer-Lemeshow statistic: *NO*
Does the data support good model calibration? *Unable to assess. See review of OT1-002-09 AMI ED measure.*

Comments on Risk Model Performance: *See review of OT1-002-09 AMI ED measure.*

Reliability testing (2b):
Is the reliability of the key data elements, such as risk factors and the outcome demonstrated?

Information not provided. Risk adjustment uses same data and variables as previously endorsed readmission model.

Is there information about the reliability of the measure score, such as signal to noise ratio?

See review of OT1-002-09 AMI ED measure. Information about signal variation in performance estimates can be gleaned from the distribution of the point P/E point estimates. Since these are shrunken estimates, wide variation in the P/E would imply evidence of high signal variation. The observed variation (69.9% at 5th percentile to 83.7 percent at 95th percentile) strikes me as substantial variation. It is not clear what proportion of hospitals have large enough sample size to reliably estimate and detect this amount of signal variation.

Has a sensitivity analysis been performed for problem or missing data? *Not reported.*
Does the data demonstrate that the risk model is reliable? *NA*
Comments on reliability testing:

Validity testing (2c):

Is validity testing of the measure to demonstrate results can be used to make conclusions about quality provided? *No. Developers argue that E&M visits is an outcome by which other potential measures of care coordination would be validated, and is thus intrinsically valid.*

Are the results supportive of a valid measure? *N/A*
Comments on validity testing:

Scoring Method Justification (2f):
Is the choice of method for computing risk-adjusted scores and identifying statistically significant differences justified? *Information not provided.*

Comments on scoring methods:

The developers propose to rank the RSR estimates (equivalent to ranking the P/E's). See review of OT1-002-09 AMI ED measure.

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Summary Comments: *See attached.*
Reviewer: **Sean O'Brien, PhD**

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Measure Evaluation 4.1
January 2010

This form contains the measure information submitted by stewards. Blank fields indicate no information was provided. Attachments also may have been submitted and are provided to reviewers. The sub-criteria and most of the footnotes from the evaluation criteria are provided in Word comments and will appear if your cursor is over the highlighted area (or in the margin if your Word program is set to show revisions in balloons). Hyperlinks to the evaluation criteria and ratings are provided in each section.

TAP/Workgroup (if utilized)**:** Complete all yellow highlighted areas of the form. Evaluate the extent to which each sub-criterion is met. Based on your evaluation, summarize the strengths and weaknesses in each section.

Note: *If there is no TAP or workgroup, the SC also evaluates the* sub-criteria *(yellow highlighted areas)*.

Steering Committee: Complete all pink highlighted areas of the form. Review the workgroup/TAP assessment of the sub-criterion, noting any areas of disagreement; then evaluate the extent to which each major criterion is met; and finally, indicate your recommendation for the endorsement. Provide the rationale for your ratings.

Evaluation ratings of the extent to which the criteria are met
C = Completely (unquestionably demonstrated to meet the criterion)
P = Partially (demonstrated to partially meet the criterion)
M = Minimally (addressed BUT demonstrated to only minimally meet the criterion)
N = Not at all (NOT addressed; OR incorrectly addressed; OR demonstrated to NOT meet the criterion)
NA = Not applicable (only an option for a few sub-criteria as indicated)

(for NQF staff use) **NQF Review**	**NQF Project:** Patient Outcomes Measures: Phases I and II
MEASURE DESCRIPTIVE INFORMATION	
De.1 **Measure Title:** 30-day Post-hospital AMI Discharge Evaluation and Management Service Measure	
De.2 **Brief description of measure***:* This measure estimates the percentage of eligible Medicare hospital discharges with the diagnosis of AMI for which beneficiaries receive an evaluation and management (E&M) service within 30 days of hospital discharge and prior to a hospital readmission or ED visit.	
1.1-2 **Type of Measure:** outcome De.3 **If included in a composite or paired with another measure, please identify composite or paired measure** The proposed measure is one component of a three component composite measure, 30-day Post-hospital AMI Discharge Care Transition measure, being submitted concurrently under the Patient Outcomes Measures project call for measures.	
De.4 **National Priority Partners Priority Area:** care coordination De.5 **IOM Quality Domain**: efficiency De.6 **Consumer Care Need:** Living With Illness	

CONDITIONS FOR CONSIDERATION BY NQF	
Four conditions must be met before proposed measures may be considered and evaluated for suitability as voluntary consensus standards:	**NQF Staff**
A. The measure is in the public domain or an intellectual property (measure steward agreement) is signed. *Public domain only applies to governmental organizations. All non-government organizations must sign a measure steward agreement even if measures are made publicly and freely available.* A.1 **Do you attest that the measure steward holds intellectual property rights to the measure and the right to use aspects of the measure owned by another entity (e.g., risk model, code set)?** Yes A.2 **Indicate if Proprietary Measure** (*as defined in measure steward agreement*)**:**	**A** **Y**☒ **N**☐

A.3 **Measure Steward Agreement:** government entity- public domain- No Agreement A.4 **Measure Steward Agreement attached:**	
B. The measure owner/steward verifies there is an identified responsible entity and process to maintain and update the measure on a schedule that is commensurate with the rate of clinical innovation, but at least every 3 years. Yes, information provided in contact section	**B** Y☐ N☐
C. The intended use of the measure includes <u>both</u> public reporting <u>and</u> quality improvement. ►**Purpose:** public reporting, quality improvement Accountability	**C** Y☐ N☐
D. The requested measure submission information is complete. Generally, measures should be fully developed and tested so that all the evaluation criteria have been addressed and information needed to evaluate the measure is provided. Measures that have not been tested are only potentially eligible for a time-limited endorsement and in that case, measure owners must verify that testing will be completed within 12 months of endorsement. D.1**Testing:** Yes, fully developed and tested D.2 **Have NQF-endorsed measures been reviewed to identify if there are similar or related measures?** Yes	**D** Y☒ N☐
(for NQF staff use) **Have all conditions for consideration been met?** **Staff Notes to Steward** (*if submission returned*)**:**	**Met** Y☒ N☐
Staff Notes to Reviewers (*issues or questions regarding any criteria*)**:**	
Staff Reviewer Name(s):	

TAP/Workgroup Reviewer Name:	
Steering Committee Reviewer Name:	
1. IMPORTANCE TO MEASURE AND REPORT	
Extent to which the specific measure focus is important to making significant gains in health care quality (safety, timeliness, effectiveness, efficiency, equity, patient-centeredness) and improving health outcomes for a specific high impact aspect of healthcare where there is variation in or overall poor performance. *Measures must be judged to be important to measure and report in order to be evaluated against the remaining criteria.* (evaluation criteria) **1a. High Impact**	Eval Rating
(for NQF staff use) **Specific NPP goal**:	
1a.1 **Demonstrated High Impact Aspect of Healthcare:** severity of illness, a leading cause of morbidity/mortality, high resource use 1a.2 1a.3 **Summary of Evidence of High Impact:** While AMI is not a frequent event treatment for AMI is a high-cost to the Medicare program and is accompanied by substantial morbidity and mortality. and it does result in a high number of readmissions. AMI ranks among the ten most common diagnoses for Medicare inpatient care and therefore has the greatest impacts on costs to the Medicare program (Thorpe et al, 2006). In 2009, heart disease (the leading cause of AMI) is projected to cost more than $304.6 billion dollars (CMS, 2009). Hospital discharges for AMI result in a high number of readmissions; CMS' newly released three-year readmission rate for Medicare beneficiaries discharged with a diagnosis of AMI was 19.9%. Readmission to the hospital is a frequent occurrence among the Medicare population and comes at a tremendous cost to the Medicare program (Jencks et al, 2009). Jencks at al advocated for improved care transitions from inpatient to outpatient concluding that medical patients such as those with HF would likely benefit if their hospital physicians increased efforts to coordinate prompt and reliable follow-up with primary care physicians. Many studies in AMI patients specifically have demonstrated the importance of follow-up care to safely transition the patient from the hospital back to the outpatient setting via follow-up with a primary care physician or specialist (Ayanian, 2002; Daugherty, 2008; Carroll, 2007; Young, 2003; Bondestam, 1995; Pearson,2006; Sinclair,2005).	**1a** C☒ P☐ M☐ N☐

The receipt of an E&M service within 30-days of a hospital discharge for AMI provides evidence of the requisite transition between high-intensity acute care in the hospital setting and outpatient care in the ambulatory or SNF setting. An E&M service outcome measure signifies attainment or improvement in "care coordination"; the unobserved process/structure construct by changing the post-hospital care trajectories.

1a.4 Citations for Evidence of High Impact: 1. Thorpe KE, Howard DH: The rise in spending among Medicare beneficiaries: the role of chronic disease prevalence and changes in treatment intensity. HIthAff 2006; 25(22): w378-w388.
2. Jencks SF, Williams MV, Coleman EA: Rehospitalizations among patients in the Medicare fee-for-service program. N Engl J Med 2009; 360(14): 1418-28.
3. CMS Medicare Preventive Services To Keep You Healthy [http://www.womeningovernment.org/heartdisease/faqs/preventive]
4. Ayanian JZ, Landrum MB, Guadagnoli E, Gaccione P: Specialty of ambulatory care physicians and mortality among elderly patients after myocardial infarction. N Engl J Med 2002; 347(21): 1678-86.
5. Daugherty SL, Ho PM, Spertus JA, et al.: Association of early follow-up after acute myocardial infarction with higher rates of medication use. Arch Intern Med 2008; 168(5): 485-91; discussion 492.
6. Carroll DL, Rankin SH, Cooper BA: The effects of a collaborative peer advisor/advanced practice nurse intervention: cardiac rehabilitation participation and rehospitalization in older adults after a cardiac event. J Cardiovasc Nurs 2007; 22(4): 313-9.
7. Young W, Rewa G, Goodman SG, et al.: Evaluation of a community-based inner-city disease management program for postmyocardial infarction patients: a randomized controlled trial. CMAJ 2003; 169(9): 905-10.
8. Bondestam E, Breikss A, Hartford M: Effects of early rehabilitation on consumption of medical care during the first year after acute myocardial infarction in patients > or = 65 years of age. Am J Cardiol 1995; 75(12): 767-71.
9. Pearson S, Inglis SC, McLennan SN, et al.: Prolonged effects of a home-based intervention in patients with chronic illness. Arch Intern Med 2006; 166(6): 645-50.
10. Sinclair AJ, Conroy SP, Davies M, Bayer AJ: Post-discharge home-based support for older cardiac patients: a randomised controlled trial. Ageing 2005; 34(4): 338-43.

1b. Opportunity for Improvement

1b.1 Benefits (improvements in quality) envisioned by use of this measure: The E&M measure may promote a shared accountability for patient short-term outcomes between in-patient and out-patient providers by encouraging the active transfer of medical accountability for patient's treatment following an acute hospitalization.

1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across providers:
Jencks and colleagues recently provided a current profile of readmissions among the Medicare population and found that one in five hospitalized patients were readmitted to the hospital within 30 days and that more than half of these patients had no ambulatory visit before subsequent hospitalization (Jencks et al, 2009). The authors stated "the absence of a bill for an outpatient physician visit in the case of more than half the patients with a medical condition who were readmitted within 30 days after discharge to the community is of great concern and suggests a considerable opportunity for improvement." Another study examining type of physician visited (cardiologist versus internist/family practitioner) reported differences in E&M service receipt and type of physician in the 90 days following hospital discharge for AMI. The authors concluded that the lowest two-year mortality was among patients receiving collaborative care from a cardiologist and internist or family practitioner (Ayanian et al, 2002). This study supports the professional consensus on the need for E&M following hospital discharge for AMI and identifies the follow—up gap as framed by their specific research questions regarding physician type.

1b.3 Citations for data on performance gap:
1. Jencks SF, Williams MV, Coleman EA: Rehospitalizations among patients in the Medicare fee-for-service program. N Engl J Med 2009; 360(14): 1418-28.
2. Ayanian JZ, Landrum MB, Guadagnoli E, Gaccione P: Specialty of ambulatory care physicians and mortality among elderly patients after myocardial infarction. N Engl J Med 2002; 347(21): 1678-86.

1b.4 Summary of Data on disparities by population group:

1b
C☒
P☐
M☐
N☐

Numerous studies over the past two decades have documented racial/ethnic and socioeconomic differences in the use of cardiac care services (Groeneveld, 2004; Birkmeyer et al, 2008; Mukamel et al, 2007).

At least one study has concluded that racial disparities in health are more likely to be generated in the posthospital phase of the process of care delivery rather than during the hospital stay (Polsky et al, 2008).

1b.5 Citations for data on Disparities:

1. Mukamel DB, Weimer DL, Buchmueller TC, Ladd H, Mushlin AI: Changes in racial disparities in access to coronary artery bypass grafting surgery between the late 1990s and early 2000s. Med Care 2007; 45(7): 664-71.
2. Polsky D, Jha AK, Lave J, et al.: Short- and long-term mortality after an acute illness for elderly whites and blacks. Health Serv Res 2008; 43(4): 1388-402.
3. Groeneveld PW: Racial disparities in cardiac care: geography matters. LDI Issue Brief 2004; 10(3): 1-4.
4. Birkmeyer NJ, Gu N, Baser O, Morris AM, Birkmeyer JD: Socioeconomic status and surgical mortality in the elderly. Med Care 2008; 46(9): 893-9.

1c. Outcome or Evidence to Support Measure Focus

1c.1 Relationship to Outcomes (*For non-outcome measures, briefly describe the relationship to desired outcome. For outcomes, describe why it is relevant to the target population*)**:** High-risk patients especially the elderly with comorbidity and complex medical regimens should be seen by a primary care physician or specialist within at least 30-days according to medical experts and medical professional organizations (ideally a needs-based time frame is established at the time of discharge). Ideally an E&M visit provides the opportunity to conduct medication reconciliation, modify treatment plan and assess patient/family understanding of condition and treatment. An E&M visit has been identified as an outcome measure by Medicare's Quality Improvement Organization Program for the care transition interventions carried out under the 9th scope of work. An E&M measure within 30-days of hospital discharge constitutes the outcome to measure the effectiveness of interventions designed to address system-identified deficiencies in care transitions following hospital discharge among the elderly.

NQF has identified transitions or "hand-offs" as the fifth domain in their definition and framework for measuring care coordination. Transitions between care settings involve multiple providers and often compromised patients with complex needs resulting in care that is often unsafe, disconnected, and uncoordinated. Experts agree that breakdown in medical information occurs frequently during transitions between care settings, especially hospital to home.

The National Committee for Quality Assurance (NCQA) has endorsed a 7-day and 30-day follow-up after hospitalization for mental illness (HEDIS, 2002). NCQA describes the measure as assessing the continuity of care for psychiatric patients after discharge from high-intensity acute care to ambulatory follow-up within 7 and 30 days. Studies involving psychiatric hospitalizations have indicated that mental health follow-up after hospital discharge are effective in reducing hospital readmissions (Reich et al, 2003; Huff, 2000; Gibson, 1999).

While an E&M service does not guarantee that the comprehensive needs of transition across settings are met (improvement in condition, patient/family understanding of self-management, the recognition of deterioration, and the steps to take, medication reconciliation, etc.) it does provide readily available administrative claims evidence of a face-to-face medical encounter between the recently seriously ill elder and the ambulatory physician managing the patient's outpatient care. The E&M measure may facilitate acknowledgment of shared accountability in achieving optimal patient outcomes that results in the active transfer of medical accountability for patient's treatment following hospitalization (Sherman et al, 2009; Epstein, 2009).

Within this context, E&M service is the outcome desired and “care coordination” is the unobserved process/structure construct. Changing these post-hospital care trajectories signifies the attainment or improvement achieved via intermediate process steps initiated by hospital/provider systems. As previously mentioned several studies have examined the importance of E&M follow-up after hospital discharge for AMI especially among the elderly.

1c
C☐
P☒
M☐
N☐

1c.2-3. Type of Evidence: evidence based guideline

1c.4 Summary of Evidence (*as described in the criteria; for outcomes, summarize any evidence that healthcare services/care processes influence the outcome*)**:**
Currently, the only nationally endorsed post-hospital discharge follow-up measure is the NCQA measure for patients hospitalized with a psychiatric diagnosis. Empirical evidence (previously cited) does exist to support the efficacy of this measure in reducing adverse events including hospital readmissions.

Empirical evidence does not link receipt of E&M services to reduced hospital readmissions however we contend that the E&M service is an outcome measure in itself. An E&M measure for medical follow of an elder discharged from the hospital after an AMI is the intended outcome assessing the effectiveness of the hospital discharge planning process.

1c.5 Rating of strength/quality of evidence (*also provide narrative description of the rating and by whom***):**
No official rating - this is not a preventive health measure with a specific national rating. Based upon available evidence however there is moderate strength of evidence for proposed measure.

1c.6 Method for rating evidence: The method for rating evidence was expert consensus among medical professionals. However, evidence for its positive impact on other patient outcomes has been found within the mental health field as related to the NCQA ambulatory follow-up measure to a psychiatric hospitalization.

1c.7 Summary of Controversy/Contradictory Evidence: There was no controversy or contradictory evidence found for not receiving an E&M service within 30-days following hospital discharge for AMI.

1c.8 Citations for Evidence (*other than guidelines***):**

1c.9 Quote the Specific guideline recommendation (*including guideline number and/or page number***):**
C. Follow-Up Visit With Medical Provider

Class I
1. A follow-up visit should delineate the presence or absence of cardiovascular symptoms and functional class. (Level of Evidence: C)
2. The patient's list of current medications should be reevaluated in a follow-up visit, and appropriate titration of ACE inhibitors, beta-blockers, and statins should be undertaken. (Level of Evidence: C)

3. The predischarge risk assessment and planned workup should be reviewed and continued (Figure 6). This should include a check of LV function and possibly Holter monitoring for those patients whose early post-STEMI ejection fraction was 0.31 to 0.40 or lower, in consideration of possible ICD use (Figure 5). (Level of Evidence: C)

4. The healthcare provider should review and emphasize the principles of secondary prevention with the patient and family members (Table 4) (181). (Level of Evidence: C)

5. The psychosocial status of the patient should be evaluated in follow-up, including inquiries regarding symptoms of depression, anxiety, or sleep disorders and the social support environment. (Level of Evidence: C)

6. In a follow-up visit, the healthcare provider should discuss in detail issues of physical activity, return to work, resumption of sexual activity, and travel, including driving and flying. The metabolic equivalent values for various activities are provided as a resource in Table 34 of the full-text guideline. (Level of Evidence: C)

7. Patients and their families should be asked if they are interested in CPR training after the patient is discharged from the hospital. (Level of Evidence: C)

8. Providers should actively review the following issues with patients and their families: a. The patient's heart attack risk. (Level of Evidence: C) b. How to recognize symptoms of STEMI. (Level of Evidence: C) c. The advisability of calling 9-1-1 if symptoms are unimproved or worsening after 5 minutes, despite feelings of uncertainty about the symptoms and fear of potential embarrassment. (Level of Evidence: C) d. A plan for appropriate recognition and response to a potential acute cardiac event, including the phone number to access EMS, generally 9-1-1 (15). (Level of Evidence: C) 9. Cardiac rehabilitation/secondary prevention programs, when available, are recommended for patients with STEMI, particularly those with multiple modifiable risk factors and/or those moderate- to high-risk patients in whom supervised exercise training is warranted. (Level of Evidence: C) **1c.10 Clinical Practice Guideline Citation:** Antman EM, Anbe DT, Armstrong PW, Bates ER, Green LA, Hand M, Hochman JS, Krumholz HM, Kushner FG, Lamas GA, Mullany CJ, Ornato JP, Pearle DL, Sloan MA, Smith SC Jr. ACC/AHA guidelines for the management of patients with ST-elevation myocardial infarction: executive summary: a report of the ACC/AHA Task Force on Practice Guidelines (Committee to Revise the 1999 Guidelines on the Management of Patients With Acute Myocardial Infarction). J Am Coll Cardiol 2004;44:671–719. **1c.11 National Guideline Clearinghouse or other URL:** http://www.escardio.org/guidelines-surveys/esc-guidelines/Pages/acs-st-segment-elevation.aspx **1c.12 Rating of strength of recommendation (***also provide narrative description of the rating and by whom***):** Level of Evidence = C meaning expert consensus based recommendation for follow-up care with a physician **1c.13 Method for rating strength of recommendation** (*If different from* USPSTF system*, also describe rating and how it relates to USPSTF)***:** Consensus among professional cardiology organizations (American Heart Association and American College of Cardiologists) indicates that the clinical practice guideline recommendation for the follow-up treatment for an AMI after discharge from the hospital is derived by clinical judgment and experience. A level of evidence equivalent to 'C' indicates that the recommendation for hospital follow-up is not based upon randomized clinical studies. **1c.14 Rationale for using this guideline over others:** This clinical practice guideline has been developed and maintained by the leading authorities in the treatment and follow-up for AMI (American College of Cardiologists and the American Heart Association).	
TAP/Workgroup: What are the strengths and weaknesses in relation to the sub-criteria **for** *Importance to Measure and Report*? 1a. high volume, high cost 1b. developer says it is a "bidirectional" measure - perhaps as a sign of deteriorating condition or a potential preventive for ED or readmission; 1c. no evidence of effect of visit on patient outcomes; E&M visit from RNP or PA, nurse also included - any billable visit eligible; Process or outcome measure? - outcome compared to "expected"	**1**
Steering Committee: Was the threshold criterion, *Importance to Measure and Report***, met?** **Rationale:** • The TAP highlighted some confusion as to the meaning of this measure. The developer indicated that an E&M visit is generally desirable after a hospitalization but it may also be a sign of deteriorating condition. The bi-directionality is hard to interpret. • Committee members referred to an analysis of Medicare readmission by Steve Jencks and others (Jencks SF, Williams MV, Coleman EA, Rehospitalizations among patients in the Medicare fee-for-service program. N Engl J Med. 2009 Apr 2;360(14):1418-28.) noting that 50% of patients readmitted had not seen a physician. • Committee members noted that some institutions are testing a variety of follow-up activities to reduce readmissions which would not be captured as an E&M visit but would serve the same purpose but would not be credited.	**1** **Y☒** **N☐**

2. SCIENTIFIC ACCEPTABILITY OF MEASURE PROPERTIES	
Extent to which the measure, as specified, produces consistent (reliable) and credible (valid) results about the quality of care when implemented. (evaluation criteria)	Eval Rating
2a. MEASURE SPECIFICATIONS	
S.1 Do you have a web page where current detailed measure specifications can be obtained? **S.2 If yes, provide web page URL:** **2a. Precisely Specified**	
2a.1 Numerator Statement (*Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome***):** The numerator is the number of eligible discharges in the target population with evidence of an evaluation and management (E&M) service within 30 days of a hospital discharge with the principal discharge diagnosis of AMI and prior to any hospital readmission or ED visit. **2a.2 Numerator Time Window (***The time period in which cases are eligible for inclusion in the numerator***):** The opportunity for each eligible Medicare discharge is 30-days following an eligible hospitalization. **2a.3 Numerator Details (***All information required to collect/calculate the numerator, including all codes, logic, and definitions***):** The following five methods were applied to identify E&M services in the Part B line item and Part A outpatient revenue center files. The claim "from date" was then set as the E&M service date. 1. HCPCS E&M codes as specified in Answer 1 of the following document. http://www.cms.hhs.gov/HospitalOutpatientPPS/downloads/OPPS_Q&A.pdf (HCPCS_CD: 99201-99215, 99241-99245 (note: only codes 99201-99205 and 99211-99215 occurred in the range of 99201-99215) 2. HCPCS E&M codes as specified for home health visits: 99324-99345 3. Revenue codes 0550, 0551, 0552, and 0553 for skilled nursing services provided in the home and/or G code G0154. 4. The HCPCS codes corresponding to the BETOS E&M codes, as specified by CMS. http://www.cms.hhs.gov/hcpcsreleasecodesets/20_betos.asp 5. BETOS and HCPCS E&M codes specified for SNFs and LTC facilities (BETOS='M4B')	
2a.4 Denominator Statement (*Brief, text description of the denominator - target population being measured***):** Total hospital discharges among Medicare Fee-For-Service beneficiaries 65 years of age and older during the measurement time-frame with a discharge diagnosis of AMI. **2a.5 Target population gender:** Female, Male **2a.6 Target population age range:** Medicare Fee-For-Service beneficiaries 65 years of age and older **2a.7 Denominator Time Window (***The time period in which cases are eligible for inclusion in the denominator***):** Computed as a three-year rolling average (January through December each year) **2a.8 Denominator Details (***All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions***):** Identify Medicare Fee-For-Service beneficiaries 65 years of age and older having been discharged from the hospital (CMS's Inpatient Standard Analytic File) with a discharge diagnosis of AMI (AMI identification uses the ICD-9 codes: 410.00, 410.01, 410.10, 410.11, 410.20, 410.21, 410.30, 410.31, 410.40, 410.41, 410.50, 410.51, 410.60, 410.61, 410.70, 410.71, 410.80, 410.81, 410.90, and 410.91. This specification includes all 410.xx codes with the exception of 410.x2 which is defined as a planned subsequent episode of care for AMI.	**2a-specs** **C☒** **P☐** **M☐** **N☐**
2a.9 Denominator Exclusions (*Brief text description of exclusions from the target population***):** 1) In-hospital mortality	

2) Transfers-out to another acute care facility

2a.10 Denominator Exclusion Details (*All information required to collect exclusions to the denominator, including all codes, logic, and definitions***):**
1) In-hospital mortality does not permit for any post-hospital follow-up; identify exclusion via the patient status discharge table, code='20'
2) If the patient is transferred to another acute care facility during the hospitalization then the receiving hospital is accountable for the post-hospital follow-up; identify exclusion via the patient discharge table code='02'

2a.11 Stratification Details/Variables (*All information required to stratify the measure including the stratification variables, all codes, logic, and definitions***):**
N/A

2a.12-13 Risk Adjustment Type: risk adjustment method widely or commercially available

2a.14 Risk Adjustment Methodology/Variables (*List risk adjustment variables and describe conceptual models, statistical models, or other aspects of model or method***):**
We employ the Yale risk-adjusted methodology used in the NQF-endorsed Hospital 30-day Heart Failure Readmission Measure; consists of a modified approach to the Hierarchical Condition Catetory (HCC) clinical classification system (Pope et al, 2000)the incorporates 1)Part A secondary diagnoses from the index admission, 2)Part A prinicipal diagnosis from any hospitalization in the 12 months prior to the index admission, 3)Part A secondary diagnoses from any hospitalization in the 12 months prior to the index admission, 4)diagnoses from hospital outpatient services in the 12 months prior to the index admission, 5)diagnoses from Part B physician encounters in the 12 months prior to the index admission. Diagnoses identified from all sources are grouped into single CC indicator flags. Secondary diagnoses identified on the index admission that are potential complications as identified by the Yale-convened team of medical experts are removed as potential CC flags. Age, sex, history of CBAG or PTCA, and CC flags are entered as risk adjusters into the final statistical models. Variables maintained in the final model include the following: CHF (CC80), acute coronary syndrome (CC81,82), anterior myocardial infarction (ICD9 410.00-41.19), other location MI (ICD9 410.20-41.69), angina pectoris/old infarct (CC83), coronary atherosclerosis or other IHD (CC84), valvular and rheumatic heart disease (CC86), arrythmias (CC92,93), CVD (CC97-99,103), vascular or circulatory disease (CC104-106), hemiplegia, paraplegia (CC67-69, 100-102,177,178), diabetes (CC15-20,119,120), renal failure (CC131), ESRD (CC129,130), urinary tract disorders (CC136), COPD (108), hx of PNA(CC111-113), asthma (CC110), disorders of fluid/electrolyte/acid-base (CC22-23), hx infection (C1,3-6), metastatic cancer and acute leukemia (CC7) , cancer (CC8-12), iron deficiency (CC47), decubitus ulcer (CC148,149), dementia/senility (CC49,50), protein-calorie malnutrition (CC21), hx of PCI (ICD9 V45.82, 00.66,36.01,36.02,36.05,36.06, 36.07), hx of CBAG (ICD9 V45.81,36.10-36.16), age as continuous variable - 65 and above, and male sex. As an outcome measure of care coordination, our proposed measure is sensitive to health status constituting the need for adequate risk adjustment. Patient clinical characteristics are included because the objective is to measure the level of post-discharge E&M service as an outcome of hospitals' care coordination and transitions activities, and not the reaction of patients and doctors to differing health status and frailty at discharge. Hence it is desirable to control for relevant clinical characteristics of the patients.

2a.15-17 Detailed risk model available Web page URL or attachment: URL
http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1228749003528

2a.18-19 Type of Score: rate/proportion
2a.20 Interpretation of Score: better quality = higher score
2a.21 Calculation Algorithm (*Describe the calculation of the measure as a flowchart or series of steps***):**
Calculation Algorithm for E&M measure:

Step 1: Claims for all beneficiaries (regardless of clinical condition) from 2003-2007 Medicare Inpatient files were combined and cleaned to create a claims file with one claim per inpatient per provider stay. Next, a single-stay claims file for all beneficiaries (regardless of clinical condition) in which transfer claims are combined into a single inpatient stay record was created. This process is described in the "Input File Processing for 2009 CMS 30-day Mortality and Readmission Measures" documentation.

Step 2: Each stay in the five year period is then defined as either an index admission or a 30-day readmission. A single stay cannot count as both an index admission and a readmission for another index admission. Thus, additional admissions within 30-days of an index admission are not counted as index admissions. Index admissions with a qualifying primary discharge diagnosis from beneficiaries meeting the inclusion criteria were included in this measure. This process is described in the Hospital 30-Day Acute Myocardial Infarction Readmission Measure Methodology submitted by YNHH-CORE, and the Hospital 30-Day Heart Failure Readmission Measure Methodology submitted by YNHH-CORE.

Step 3: For each qualifying index admission, the beneficiary's inpatient and outpatient claims in the 12-months prior to the hospitalization are examined. All diagnoses from non-DME, non-diagnostic testing claims are used to construct flags for 184 clinical Condition Categories (CCs). Secondary diagnoses (excluding diagnoses associated with potential complications) from the index admission are used also to assign the 184 CCs. The process for creating the CC flags is described in the RiskSmart Stand Alone Users Guide, v2.2. These flags are used for risk adjustment.

Step 4: The following three flags (0/1 indicators) are then set for each index admission.
• Readmission=1 if a subsequent readmission occurs within 30 days of discharge from the qualifying index admission
• ED visit=1 if an ED visit occurs in the 30 days after discharge from the index admission, and the ED visit is not after the first readmission.
• E&M service=1 if an E&M service occurs in the 30 days after discharge from the index admission, and the E&M service is not after the first readmission, and is not after the first ED visit.

Step 5: Calculate the ratio of E&M service=1 events over the total number of qualifying index admissions to get unadjusted E&M rate. This is for descriptive purposes only.
Step 6: Estimate risk adjustment regression model on E&M service indicator using methodology developed for CMS 30-day all cause readmission measure.
Step 7: Applying the CMS 30-day readmission measure methodology, compute P/E ratio and corresponding risk standardized rate (the RSR is defined as P/E times overall population mean).
Step 8: For ease of interpretation only, rank computed RSR rates across all hospitals and calculate percentile values.

Note: RSR is the measure result

2a.22 Describe the method for discriminating performance *(e.g., significance testing)***:**
Individual hospital 30-day post discharge E&M service measures are standardized and all hospitals are ranked on the resulting standardized percentile; which may be converted to 5-star ratings based upon quintile.

2a.23 Sampling (Survey) Methodology *If measure is based on a sample (or survey), provide instructions for obtaining the sample, conducting the survey and guidance on minimum sample size (response rate)*:
NA-Full sample of FFS Medicare beneficiaries meeting measure eligibility criteria; hospitals with fewer than 10 cases will not report measure.

2a.24 Data Source (*Check the source(s) for which the measure is specified and tested)*
Electronic adminstrative data/claims

2a.25 Data source/data collection instrument (*Identify the specific data source/data collection instrument, e.g. name of database, clinical registry, collection instrument, etc.***):**
Medicare MedPAR (inpatient SAF) and Medicare Part B claims files.

2a.26-28 Data source/data collection instrument reference web page URL or attachment:

2a.29-31 Data dictionary/code table web page URL or attachment:

2a.32-35 Level of Measurement/Analysis (*Check the level(s) for which the measure is specified and tested)*
Population: national

2a.36-37 Care Settings (*Check the setting(s) for which the measure is specified and tested)*

Hospital

2a.38-41 Clinical Services (*Healthcare services being measured, check all that apply*)

TESTING/ANALYSIS

2b. Reliability testing

2b.1 Data/sample *(description of data/sample and size)*: The reliability testing and other analyses described in this submission use the Dartmouth Atlas 20% sample of Medicare Carrier Claim files for 2003-2007. Data from 2003 are used only for pre-admission information for risk-adjustment for patients admitted during 2004, and are not included directly in any of the analysis presented. December 2007 is used only for information about the 30-day post-discharge period; hence December 2007 index admissions are not in the results presented.

Reliability testing used only AMI index admissions to the 1,131 hospitals having 10 or more AMI index admissions in 2006. This sub-sample has 31,652 AMI index admissions for 2006 and 99,645 for the three year period 2004-2006. The 30-day E&M service rates for these patients were 0.825 in 2004, 0.822 in 2005 and 0.822 in 2006.

2b.2 Analytic Method *(type of reliability & rationale, method for testing)*:
Reliability was examined two ways: using correlations across years, and using kappa statistics for hospitals divided into quintiles based on risk-standardized rates in years being compared. In the case of correlations, both Pearson and Spearman (rank) correlations were computed.

Both correlations and kappa statistics were each computed for two periods: (1) between years 2006 and 2007; and (2) between 2007 and the average of three years (2004 through 2006). The proposed measure uses the second, i.e., three years of data, updated annually, in order to increase the signal-to-noise ratio relative to simple annual calculations. We also present here the one-year statistics to show what is gained in exchange for the loss of 'currentness' resulting from the three-year approach.

Both statistics were also computed for risk-standardized rates based on observed-to-expected (O/E) ratios as well as the proposed predicted-to-expected (P/E) ratios. The O/E rate for three years is a weighted average of three one year rates, with weights of 0.5 for the most recent year, 0.3 for the prior year and 0.2 for the first year. This and other approaches will be investigated during the provisional period, seeking to improve the ability of the measure to discriminate among hospitals while drawing on power of persistence in performance over time.

2b.3 Testing Results *(reliability statistics, assessment of adequacy in the context of norms for the test conducted)*:
Correlations to check reliability over time were always highly significant ($p<0.001$). Pearson correlations between single years (2007 and 2006) were 0.328 using P/E and 0.217 using O/E. Spearman correlations (which are less sensitive to outliers) were 0.284 and 0.235 respectively. Pearson correlations between 2007 and the three year average (2004-2006) were even stronger: 0.430 for P/E and 0.310 for O/E. For the same measures Spearman correlations were 0.418 and 0.337 respectively.

Weighted kappas measuring agreement within quintiles showed the same pattern of reliability. The weighted kappa was 0.270 ($p<0.001$) for 2007 predicted compared with the prior three year average and 0.234 ($p<0.001$) for 2007 observed compared with the prior three year average. For single years (2007 compared to 2006) the weighted kappas were 0.174 and 0.169 respectively (both $p<0.001$).

In contrast, these correlations over time and weighted kappas are considerably higher than those computed for the 30-day readmission measure using the same sample of AMI index admissions. For example, the Pearson correlations on the readmission measure between 2007 and the three year average (2004-2006) are 0.164 ($p<0.001$) using P/E and 0.070 ($p=0.019$) using O/E. The weighted kappas for the same period are 0.069 ($p<0.001$) using P/E and 0.031 ($p=0.064$) using O/E.

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2c. Validity testing — **2c**

2c.1 Data/sample *(description of data/sample and size)*: N/A (see discussion under Analytic Method) **2c.2 Analytic Method** *(type of validity & rationale, method for testing)*: Our E&M service measure is not a direct measure of care coordination, but rather an indication of the outcome of care coordination. Indeed, correlation of other, more direct measures of care coordination with our proposed E&M service indicator (within a specified time period) is used as a test of the direct measure's predictive validity. As such, we would argue that our E&M service measure is intrinsically valid. **2c.3 Testing Results** *(statistical results, assessment of adequacy in the context of norms for the test conducted)*: N/A (see discussion under Analytic Method)	C☐ P☐ M☒ N☐
2d. Exclusions Justified **2d.1 Summary of Evidence supporting exclusion(s):** This measure follows the previously NQF endorsed cohort specification for index admissions for AMI among Medicare FFS beneficiaries 65 years of age. Cohort specification becomes the measure denominator and includes defensible exclusions identified by the Yale research team in their development of the NQF endorsed Hospital 30-Day AMI Readmission measure. **2d.2 Citations for Evidence:** N/A (see discussion under Summary of Evidence Supporting Exclusions **2d.3 Data/sample** *(description of data/sample and size)*: N/A (see discussion under Summary of Evidence Supporting Exclusions) **2d.4 Analytic Method** *(type analysis & rationale)*: N/A (see discussion under Summary of Evidence Supporting Exclusions) **2d.5 Testing Results** *(e.g., frequency, variability, sensitivity analyses)*: N/A (see discussion under Summary of Evidence Supporting Exclusions)	**2d** C☒ P☐ M☐ N☐ NA☐
2e. Risk Adjustment for Outcomes/ Resource Use Measures **2e.1 Data/sample** *(description of data/sample and size)*: The risk adjustment method was assessed and applied using the 20% Medicare sample described in the section on reliability testing. However, for model estimation we used all index admissions, regardless of hospital volume. The total sample was 124,733 AMI index admissions for 2004-2006. **2e.2 Analytic Method** *(type of risk adjustment, analysis, & rationale)*: Since the risk adjustment method is the same as that used for an existing NQF approved measure, and is used for public reporting by CMS, the primary question examined in our analysis was the appropriateness of using the fixed covariates selected for 30-day readmissions for 30-day E&M services, both following IP AMI care. Our method was to estimate the same GLM model used by the YNHH-CORE developers of the model, using our sample of index admissions for 2004-2006 and the E&M service outcome, and to compute the same performance statistics. To gauge the potential for improvement by selecting different covariates for E&M services we estimated an alternate model in which all DxCG condition categories (CCs) were used in lieu of the CC-based covariates in the readmission model. **2e.3 Testing Results** *(risk model performance metrics)*: The maximum re-scaled R2 is 0.011 and the c-statistic 0.558. The decile with the lowest predicted E&M service rate had an actual rate of 0.742 whereas the highest decile had an actual rate of 0.855. Additional statistics are presented in Table 2 of the attached supporting document. The CC model's maximum re-scaled R2 is 0.018 and its c-statistic 0.575. The decile with the lowest predicted E&M service rate had an actual rate of 0.729 whereas the highest decile had an actual rate of 0.875. The alternate model performs somewhat better, but the improvement was judged not sufficient to justify further development at this time, though revision of the set of covariates representing co-morbid	**2e** C☒ P☐ M☐ N☐ NA☐

conditions may be an area for future refinement of the measure specification.

Table 3 (p. 4) of the attached supporting document also provides the incidence in our sample of each co-morbid condition used for risk adjustment and the parameter estimates, for the GLM model used to assess the covariates. Tables 4 and 5 (pp. 5-6) have parameter estimates for the HGLM model used to compute the measure itself.

2e.4 **If outcome or resource use measure is not risk adjusted, provide rationale:** N/A

2f. Identification of Meaningful Differences in Performance

2f.1 **Data/sample from Testing or Current Use** *(description of data/sample and size)*: The distribution of performance was assessed using the 20% Medicare sample described in the section on reliability testing.

2f.2 **Methods to identify statistically significant and practically/meaningfully differences in performance** *(type of analysis & rationale)*:
We calculated the intra-hospital correlation coefficient (ICC) to estimate the proportion of overall variance in 30-day post discharge E&M services which is variation between hospitals. We also examined the distribution of risk-standardized rates, and compared it to the distribution for the existing 30-day readmission measure. Over the next few months we will explore this issue further. As part of this analysis we'll examine two approaches: one grouping hospitals together based on significance - for example, three categories for 1) hospitals significantly lower than mean, 2) hospitals with no significant difference from mean, and 3) hospitals significantly higher than mean) and a second approach based on percentile ranks, for example, using quintiles as categories. The final selection will maximize the amount of variation in hospital categorization (i.e., many hospitals in each category), as well as the amount of significant differences among hospitals of different categories (i.e., hopefully, categories can be constructed to have significant differences among their means)

2f.3 **Provide Measure Scores from Testing or Current Use** *(description of scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance)*:
For the three year period 2004-6 the between hospital variance estimate is 0.147 (se=0.009), residual variance estimate is 0.978 (se=0.004) and the resulting ICC was 0.132, indicating that differences among hospitals account for approximately 13% of total variation. The result is similar for 2006 alone. The between hospital variance estimate is 0.156 (se=0.017), residual variance estimate is 0.949 (se=0.007), with a resulting ICC of 0.141.

This is substantially more variation among hospitals than observed for the 30-day post-discharge readmission measure, for which the between-hospital variance using this sample of index admissions is 0.033 (ICC is also 0.033) and that reported by the developers of the measure using all 2006 admissions was 0.023.

The median hospital with 10 or more admissions in 2006 has a risk-standardized E&M service rate for 2004-6 of 0.822. The inter-quartile range is 0.792 to 0.847 and the range of the 5th percentile to the 95th is 0.743 to 0.880.

For 2006 alone the median rate is 0.819, the inter-quartile range is 0.796 to 0.838 and the range of the 5th percentile to the 95th is 0.753 to 0.865.

The distribution is similar for hospitals with smaller and larger volumes. For example the 2004-6 inter-quartile range of the quartile of hospitals with the fewest cases (10-14 index admissions in the 2006 sample) is 0.797 to 0.843, which though shifted down is the same magnitude as the 0.784 to 0.856 inter-quartile range of the quartile of hospitals with the most cases (35-127 index admissions in the 2006 sample).

As described elsewhere in this submission, we also computed risk-standardized rates using observed-to-expected (O/E) ratios instead of predicted-to-expected (P/E). These rates are somewhat more dispersed. For example, the inter-quartile range of the risk-standardized rates using the 2004-6 weighted O/E average is 0.776 to 0.872 and the range of the 5th percentile to the 95th is 0.693 to 0.929.

Tables 7 and 8 (pp. 7-8) of the attached support document have more detail, and the appendix (pp. 10-13)

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provides histograms for a visual representation of these distributions.	
2g. Comparability of Multiple Data Sources/Methods 2g.1 **Data/sample** *(description of data/sample and size)*: N/A 2g.2 **Analytic Method** *(type of analysis & rationale)*: N/A 2g.3 **Testing Results** *(e.g., correlation statistics, comparison of rankings)*: N/A	**2g** C☐ P☐ M☐ N☒ NA☐
2h. Disparities in Care 2h.**1 If measure is stratified, provide stratified results** *(scores by stratified categories/cohorts)*: We examined the mean hospital scores by race/ethnicity quartiles (the ranked proportion of white, black, and "other" [non-white, non-black] patients served). No difference in the mean score was observed between hospitals with the lowest quartile of black patients versus the hospitals with the highest quartile of black patients (mean score =0.81). A minimal difference was observed for mean hospital scores by white race; the lowest quartile of white patients had a mean score of 0.82 whereas the hospitals with the highest quartile of white patients had a mean score of 0.81. Hospitals with the lowest quartile of "other" patients (non-white, non-black) had a mean score of 0.80 whereas hospitals with the highest quartile of "other" patients had a mean score of 0.83. 2h.2 **If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans:** We recommend continued monitoring of disparities in measure results. We did not evaluate the measure performance at the individual patient level but rather stratified the measure by the proportion of ethnic minorities served by hospitals. Our preliminary findings suggest a relationship between hospital performance on the measure and the race/ethnic distribution of patients served. Additional evaluation is warranted to examine the distribution of scores within each race/ethnic quartile.	**2h** C☐ P☐ M☐ N☐ NA☒
TAP/Workgroup: What are the strengths and weaknesses in relation to the sub-criteria **for** *Scientific Acceptability of Measure Properties?* 2a.adminstrative data 2b.and 2c - similar data as with the ED visit measure; low c-statistic 2d.exclusions -good; 2f. distribution narrow -- 10-11% difference between high and low; potential for lots of effort for minimal gain; 2h. known disparities -- not addressed	**2**
Steering Committee: Overall, to what extent was the criterion, *Scientific Acceptability of Measure Properties*, **met?** **Rationale:** • Some Committee members thought this is really a process measure – something that should happen without risk adjustment. • Only validity assessment is face validity.	*2* C☐ P☒ M☐ N☐
3. USABILITY	
Extent to which intended audiences (e.g., consumers, purchasers, providers, policy makers) can understand the results of the measure and are likely to find them useful for decision making. (evaluation criteria)	Eval Rating
3a. Meaningful, Understandable, and Useful Information 3a.1 **Current Use:** not in use but testing completed 3a.2 **Use in a public reporting initiative (disclosure of performance results to the public at large)** (*If used in a public reporting initiative, provide name of initiative(s), locations, Web page URL(s). If not publicly reported, state the plans to achieve public reporting within 3 years*): NCQA has an endorsed HEDIS measure for the Medicare product line of business that examines an ambulatory mental health visit within 30-days after discharge from the hospital for selected mental health diagnosis. http://www.ncqa.org/Portals/0/HEDISQM/HEDIS2008/2008_Measures.pdf	**3a** C☒ P☐ M☐ N☐

3a.3 **If used in other programs/initiatives (***If used in quality improvement or other programs/initiatives, name of initiative(s), locations, Web page URL(s). If not used for QI, state the plans to achieve use for QI within 3 years***):** The Medicare Quality Improvement Organization Programs have adopted a physician visit measure within 30-days of hospital discharge for Medicare patients as part of their care transitions project. http://www.ccmemedicare.org/documents/9thSOWThemeSummaries.pdf **Testing of Interpretability** (*Testing that demonstrates the results are understood by the potential users for public reporting and quality improvement*) 3a.4 **Data/sample** *(description of data/sample and size)***:** This proposed measure has not been tested for interpretation by potential users - providers, consumers. Such testing would be recommended as part of initial measure implementation and use. 3a.5 **Methods** *(e.g., focus group, survey, QI project)***:** N/A 3a.6 **Results** *(qualitative and/or quantitative results and conclusions)***:** N/A	
3b/3c. Relation to other NQF-endorsed measures 3b.1 **NQF # and Title of similar or related measures:** NQF# 0505 30-Day All-Cause Risk Standardized Readmission Rate following AMI hospitalization	
(for NQF staff use) **Notes on similar/related endorsed or submitted measures:**	
3b. Harmonization If this measure is related to measure(s) already endorsed by NQF (e.g., same topic, but different target population/setting/data source or different topic but same target population): 3b.2 **Are the measure specifications harmonized? If not, why?** No other NQF- endorsed measure specifically addresses the post-hospital discharge E&M service. The risk-adjustment methodology, however has been harmonized and is consistent with the NQF endorsed 30-Day All-Cause Risk Standardized Readmission Rate following AMI Hospitalization.	**3b** C☒ P☐ M☐ N☐ NA☐
3c. Distinctive or Additive Value 3c.1 **Describe the distinctive, improved, or additive value this measure provides to existing NQF-endorsed measures:** There is no NQF-endorsed post-hospital discharge measure for E&M follow-up; this measure is also proposed as one component of a three component care transition measure aimed at building upon the foundation of the approved 30-Day Readmission measure providing a more comprehensive view of the 30-day care trajectories following hospital discharge. 5.1 **Competing Measures If this measure is similar to measure(s) already endorsed by NQF (i.e., on the same topic and the same target population), describe why it is a more valid or efficient way to measure quality:**	**3c** C☒ P☐ M☐ N☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the sub-criteria **for** *Usability?* E&M visit and ED visit are inherently different concepts;	**3**
Steering Committee: Overall, to what extent was the criterion, *Usability***, met?** **Rationale:** • No disagreement if this measure as reported is an accurate depiction of care coordination. • An E and M service claim does not indicate whether appropriate follow-up care was rendered. • Other avenues of contact such as phone calls or nurse visits may be effective also. By concentrating solely on E&M service, innovative approaches to care coordination and prevention of readmissions may be stifled.	**3** C☒ P☐ M☐ N☐
4. FEASIBILITY	
Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (evaluation criteria)	Eval Ratin

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4a. Data Generated as a Byproduct of Care Processes 4a.1-2 **How are the data elements that are needed to compute measure scores generated?** coding/abstraction performed by someone other than person obtaining original information,	**4a** C☒ P☐ M☐ N☐
4b. Electronic Sources 4b.1 **Are all the data elements available electronically?** (*elements that are needed to compute measure scores are in defined, computer-readable fields, e.g., electronic health record, electronic claims*) Yes 4b.2 **If not, specify the near-term path to achieve electronic capture by most providers.**	**4b** C☒ P☐ M☐ N☐
4c. Exclusions 4c.1 **Do the specified exclusions require additional data sources beyond what is required for the numerator and denominator specifications?** No 4c.2 **If yes, provide justification.**	**4c** C☒ P☐ M☐ N☐ NA☐
4d. Susceptibility to Inaccuracies, Errors, or Unintended Consequences 4d.1 **Identify susceptibility to inaccuracies, errors, or unintended consequences of the measure and describe how these potential problems could be audited. If audited, provide results.** Our proposed measure as specified is not susceptible to inaccuracies.	**4d** C☒ P☐ M☐ N☐
4e. Data Collection Strategy/Implementation 4e.1 **Describe what you have learned/modified as a result of testing and/or operational use of the measure regarding data collection, availability of data/missing data, timing/frequency of data collection, patient confidentiality, time/cost of data collection, other feasibility/ implementation issues:** NA-administrative claims-based measure 4e.2 **Costs to implement the measure** (*costs of data collection, fees associated with proprietary measures*)**:** NA-administrative claims-based measure that does not add data collection burden to hospitals or providers 4e.3 **Evidence for costs:** NA 4e.4 **Business case documentation:** NA	**4e** C☒ P☐ M☐ N☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the sub-criteria **for** *Feasibility*? Feasible with administrative data; subject to coding inaccuracies typical of admin data	**4**
Steering Committee: Overall, to what extent was the criterion, *Feasibility*, **met?** **Rationale:** • Again, the measure should apply as broadly as possible. • Committee members raised the concern that some CMS carriers do not accept certain billing codes for nurse visits – this is variable region to region.	**4** C☒ P☐ M☐ N☐
RECOMMENDATION	
(for NQF staff use) **Check if measure is untested and only eligible for time-limited endorsement.**	**Time-limited** ☐

Steering Committee: Do you recommend for endorsement? **Comments:** Recommend as a stand-alone measure	**Y☒** **N☐** **A☐**

CONTACT INFORMATION

Co.1 Measure Steward (Intellectual Property Owner)
Co.1 Organization
Centers for Medicare and Medicare Services | 7500 Security Blvd. | Baltimore | Maryland | 21244

Co.2 Point of Contact
Shaheen | Halim, Ph.D. | Shaheen.Halim@cms.hhs.gov | 410-786-0641

Measure Developer If different from Measure Steward
Co.3 Organization
Brandeis University | 415 South Street | Waltham | Massachusetts | 02454

Co.4 Point of Contact
Christopher | Tompkins, Ph.D. | Tompkins@brandeis.edu | 781-736-3913

Co.5 Submitter If different from Measure Steward POC
Christopher | Tompkins, Ph.D. | Tompkins@brandeis.edu | 781-736-3913- |Brandeis University

Co.6 Additional organizations that sponsored/participated in measure development

ADDITIONAL INFORMATION

Workgroup/Expert Panel involved in measure development
Ad.1 Provide a list of sponsoring organizations and workgroup/panel members' names and organizations. Describe the members' role in measure development.
Technical Expert Panel:
Lisa Latts, MD, MBA -WellPoint
Julie Bynum, MD, MPH -Dartmouth Medical School
Joanne Lynn, MD -DC Department of Health – Chronic Disease and Cancer Community Health Administration
Anthony Armada, MHA, MBA -Henry Ford Hospital

Role:
The Technical Expert Panel assisted our workgroup developing measures by providing input to:
• Supplement, and provide texture, to the knowledge gathered through the literature review prior to measure development;
• Discussing existing measures and providing input as to next steps for CMS to adopt, adapt, and/or develop measures of care coordination relevant to the hospital setting; and
• Reviewing and providing input on draft measures and measure development testing.

Workgroup
Kristine Martin Anderson, MBA -Booz Allen Hamilton
James Burgess, PhD-Boston University
Sandra Lesikar, PhD-Booz Allen Hamilton
Timothy Martin, PhD-Brandeis University
Sue Lee, MS - Brandeis University
Marian Ryan, PhD - Brandeis University

Role:
The workgroup participated in development of measures, review of interim results during development, and reviewing NQF submission forms.

Ad.2 If adapted, provide name of original measure: 30-day Post-hospital AMI Discharge Evaluation & Management Service Rate
Ad.3-5 If adapted, provide original specifications URL or attachment

Measure Developer/Steward Updates and Ongoing Maintenance **Ad.6 Year the measure was first released:** **Ad.7 Month and Year of most recent revision:** **Ad.8 What is your frequency for review/update of this measure?** Every two years **Ad.9 When is the next scheduled review/update for this measure?**
Ad.10 Copyright statement/disclaimers: N/A
Ad.11 -13 Additional Information web page URL or attachment: Attachment NQF AMI Eval and Mgmt Service Measure Support (Sci Accept) - 28Sep2009 rev 18Feb2010 add HHA.doc
Date of Submission (*MM/DD/YY*)**:** 04/14/2010

30-Day Post-Hospital AMI Discharge Evaluation and Management Service Measure

Supporting Material for the Scientific Acceptability Section

Brandeis University

1. Introduction

This document elaborates and supports the statements on scientific acceptability in Brandeis University's September 18, 2009 submission of a measure titled "30-Day Post-Hospital AMI Discharge Evaluation and Management Service" to the National Quality Forum's Consensus Development Project on Proposed Patient Outcomes Measures (Phase I) in response to its call for candidate standards.

1.1. Data Sample

All data used for the analyses described in this document are from the Dartmouth Atlas 20% sample of Medicare Carrier Claim files for 2003-2007. Data from 2003 are used only for pre-admission information about patients admitted during 2004, and are not included directly in any of the analysis presented. December 2007 is used only for information about the 30-day post-discharge period; there are no December 2007 index admissions in the results presented here. These data were processed in accordance with the measure definitions described in the submission. All resulting index admissions were used in the model for testing and estimation and are reflected in the results presented in section 2 on Risk Adjustment. Scores and their analysis discussed in sections 3 and 4 were analyzed only for hospitals having 10 or more index admissions in 2006. Table 1 summarizes the number of resulting hospitals and index admissions with a primary diagnosis of AMI, and the rate at which a 30-day post-discharge E&M service occurs.

1.2. Measure Methods

The proposed measure uses three years of data, updated annually (i.e., rolling average) in order to increase the signal-to-noise ratio relative to simple annual calculations. This supporting analysis provides one-year and three-year computations show what is gained in exchange for the loss of 'currentness' resulting from the three-year approach.

Table 1: Count of AMI Index Admissions and 30-Day E&M Service Rate, By Year

	All Hospitals			Hospitals With 10+ Index Admissions in 2006		
	Number of Index Admissions	30-Day Evaluation and Management Service Rate	Number of Hospitals	Number of Index Admissions	30-Day Evaluation and Management Service Rate	Number of Hospitals
Year						
2004	44,267	0.773	3,508	34,712	0.783	1,126
2005	42,010	0.772	3,396	33,281	0.780	1,129
2006	38,456	0.773	3,243	31,652	0.783	1,131
2007	32,728	0.776	3,133	26,016	0.782	1,130

Analysis to-date has considered observed-to-expected (O/E) ratios as well as the proposed predicted-to-expected (P/E) ratios. Results of both approaches are documented below. The O/E rate for three years is a weighted average of three one-year rates, with weights of 0.5 for the most recent year, 0.3 for the prior year and 0.2 for the first year. The P/E rate for three years is computed using the results of the HGLM model estimated for three years. Other approaches will be investigated during the provisional period.

2. Risk Adjustment Strategy (Measure evaluation criterion 2e)

2.1. Method

The risk adjustment strategy is one of indirect adjustment, with predicted and expected 30-day post-discharge E&M service rates calculated for each hospital using a hierarchical logistic regression model. The statistical model is that of the Hospital 30-Day Acute Myocardial Infarction Readmission Measure Methodology prepared for CMS by the Yale University/Yale-New Haven Hospital Center for Outcomes Research and Evaluation (YNHH-CORE, 2008), with the level 1 demographic and condition covariates from that methodology and each hospital in our data as a level 2 unit. We are using the fixed covariates selected by YNHH-CORE for readmission following a AMI stay.

2.2. Analysis

2.2.1. YNHH-CORE tested and validated their selected covariates using a generalized linear model (GLM) with a logistic link function. We assessed the application of that model to the 30-day post-discharge E&M service outcome measure using this model and our index admissions for 2004-6. To assess the potential for substantial improvement from modification of the selected covariates for this different outcome, we also assessed a "naïve" alternate model using age, sex, history of PCI, history of CABG, location of MI (anterior or other) and all 166 DxCG CCs present in our data.

Table 2 summarizes the performance of both the proposed model and the alternate model using all CCs. The alternate model performs marginally better, but the improvement was judged not sufficient to justify further development at this time, though revision of the set of covariates representing co-morbid conditions may be an area for future refinement of the measure specification.

Table 2: AMI 30-Day E&M Service Measure -- GLM Model (covariates only) Performance (2004-6)

Statistic		**Proposed Model (YNHH-CORE)**	**Alternate Model (All CCs)** [2]
Actual Rate		0.773	0.773
Max. Re-scaled R^2		0.010	0.015
Predictive Ability (Lowest Decile, Highest Decile) [1]		0.700 - 0.810	0.683 - 0.823
c-statistic		0.553	0.566
Residuals Lack of Fit (Pearson Residual Fall %)	<-2 [-2, 0) [0, 2) [2+	5.2 17.5 77.3 -	5.3 17.4 77.3 -
Model Wald chi-squared (number of covariates)		844 (31)	1,247 (172)

[1] Average actual rate within indicated decile when ranked by estimated probability.
[2] Age, sex, history of PCI, history of CABG, anterior MI, other location MI and 166 CCs (18 CCs were not observed in the data).

Table 3 lists the covariates of the proposed model with their incidence among the AMI index admissions for 2004-6 and results of the GLM logistic estimates using those admissions.

2.2.2. The measure is specified to be computed annually, using the most recent three years of data. Testing was done with both one year of data and three. Table 4 gives parameter estimates for the fixed covariates in the HGLM model using data for one year, 2006, and table 5 for three years, 2004-6.

Table 3: AMI 30-Day E&M Service Measure -- GLM (2004-6) -- Proposed Covariates and Statistics

Effect	Mean, Std. Dev., or Proportion	Estimate	Standard Error	Std. Est.	Odds Ratio Estimate	OR 95% CI
Intercept	.	1.268	0.026	_	.	
Age-65 (years above 65, continuous)	13.8597	-0.003	0.001	-0.0132	0.997	0.995 - 0.999
Age - Std. Dev.	7.9883	.	.	.	.	
Sex (Male)	0.4995	-0.038	0.007	_	0.927	0.902 - 0.953
History of PCI	0.5053	0.217	0.016	0.0599	1.243	1.205 - 1.283
History of CABG	0.0619	0.006	0.029	0.0008	1.006	0.950 - 1.066
CC 80 Congestive heart failure	0.4247	-0.101	0.015	-0.0277	0.904	0.877 - 0.931
CC 81, 82 Acute coronary syndrome	0.0374	-0.038	0.036	-0.0040	0.963	0.897 - 1.032
ICD-9-CM 410.00-410.19 Anterior myocardial infarction	0.0201	-0.129	0.047	-0.0101	0.879	0.801 - 0.964
ICD-9-CM 410.20-410.69 Other location of myocardial infarction	0.1424	-0.034	0.020	-0.0065	0.967	0.930 - 1.006
CC 83 Angina pectoris/old myocardial infarction	0.0823	-0.084	0.025	-0.0127	0.920	0.876 - 0.965
CC 84 Coronary atherosclerosis/other chronic ischemic heart disease	0.6796	-0.004	0.016	-0.0011	0.996	0.965 - 1.028
CC 86 Valvular and rheumatic heart disease	0.1797	0.025	0.018	0.0052	1.025	0.989 - 1.062
CC 92, 93 Arrhythmias	0.3738	0.029	0.014	0.0077	1.029	1.001 - 1.059
CC 97-99, 103 Cerebrovascular disease	0.0331	-0.011	0.038	-0.0011	0.989	0.919 - 1.065
CC 95, 96 Stroke	0.0198	0.056	0.049	0.0043	1.058	0.961 - 1.164
CC 104-106 Vascular or circulatory disease	0.1520	0.001	0.019	0.0002	1.001	0.965 - 1.039
CC 67-69, 100-102, 177, 178 Hemiplegia, paraplegia, paralysis, functional disability	0.0151	-0.180	0.053	-0.0121	0.835	0.753 - 0.927
CC 15-20, 119, 120 Diabetes and DM complications	0.2743	-0.020	0.015	-0.0049	0.980	0.951 - 1.011
CC 131 Renal failure	0.1928	-0.054	0.019	-0.0113	0.948	0.913 - 0.983
CC 129, 130 End-stage renal disease or dialysis	0.0094	-0.652	0.063	-0.0343	0.521	0.460 - 0.590
CC 136 Other urinary tract disorders	0.0813	0.014	0.024	0.0022	1.014	0.968 - 1.063
CC 108 COPD	0.2050	-0.059	0.017	-0.0131	0.943	0.912 - 0.975
CC 111-113 History of pneumonia	0.1012	0.012	0.023	0.0020	1.012	0.968 - 1.059
CC 110 Asthma	0.0148	0.185	0.060	0.0123	1.203	1.069 - 1.353
CC 22, 23 Disorders of fluid/electrolyte/acid-base	0.1741	-0.058	0.018	-0.0122	0.943	0.910 - 0.978
CC 1, 3-6 History of infection	0.0017	0.137	0.172	0.0031	1.147	0.818 - 1.607
CC 7 Metastatic cancer and acute leukemia	0.0089	-0.374	0.069	-0.0192	0.688	0.601 - 0.788
CC 8-12 Cancer	0.0345	0.015	0.038	0.0015	1.015	0.941 - 1.094
CC 47 Iron deficiency and other/unspecified anemias and blood disease	0.1570	0.022	0.019	0.0044	1.022	0.985 - 1.061
CC 148, 149 Decubitus ulcer or chronic skin ulcer	0.0191	0.081	0.049	0.0061	1.084	0.984 - 1.195
CC 49, 50 Dementia and senility	0.0773	-0.220	0.025	-0.0322	0.803	0.764 - 0.843
CC 21 Protein-calorie malnutrition	0.0161	-0.110	0.053	-0.0075	0.896	0.808 - 0.993

Table 4: AMI 30-Day E&M Service Measure -- HGLM Parameter Estimates, 2006

Effect	Estimate	Standard Error	t Value	Pr > |t|
Intercept	1.373	0.049	28.07	<.0001
Sex (Male)	-0.116	0.026	-4.54	<.0001
Age-65 (years above 65, continuous)	-0.006	0.002	-3.61	0.0003
History of PCI	0.241	0.029	8.28	<.0001
History of CABG	-0.038	0.051	-0.75	0.4551
CC 80 Congestive heart failure	-0.122	0.027	-4.52	<.0001
CC 81, 82 Acute coronary syndrome	-0.102	0.065	-1.57	0.1157
ICD-9-CM 410.00-410.19 Anterior myocardial infarction	-0.077	0.084	-0.91	0.3623
ICD-9-CM 410.20-410.69 Other location of myocardial infarction	-0.031	0.037	-0.83	0.4058
CC 83 Angina pectoris/old myocardial infarction	-0.079	0.045	-1.75	0.0798
CC 84 Coronary atherosclerosis/other chronic ischemic heart disease	0.007	0.029	0.23	0.8211
CC 86 Valvular and rheumatic heart disease	-0.025	0.032	-0.77	0.4395
CC 92, 93 Arrhythmias	0.026	0.026	1.01	0.3142
CC 97-99, 103 Cerebrovascular disease	-0.021	0.068	-0.31	0.7596
CC 95, 96 Stroke	0.114	0.087	1.31	0.1893
CC 104-106 Vascular or circulatory disease	0.061	0.034	1.77	0.0774
CC 67-69, 100-102, 177, 178 Hemiplegia, paraplegia, paralysis, functional disability	-0.152	0.101	-1.50	0.1337
CC 15-20, 119, 120 Diabetes and DM complications	0.022	0.028	0.79	0.4310
CC 131 Renal failure	-0.065	0.031	-2.14	0.0326
CC 129, 130 End-stage renal disease or dialysis	-0.711	0.106	-6.70	<.0001
CC 136 Other urinary tract disorders	-0.019	0.051	-0.38	0.7007
CC 108 COPD	-0.062	0.030	-2.05	0.0400
CC 111-113 History of pneumonia	-0.005	0.041	-0.12	0.9045
CC 110 Asthma	0.085	0.104	0.82	0.4132
CC 22, 23 Disorders of fluid/electrolyte/acid-base	-0.056	0.033	-1.71	0.0878
CC 1, 3-6 History of infection	0.365	0.346	1.05	0.2918
CC 7 Metastatic cancer and acute leukemia	-0.416	0.122	-3.41	0.0007
CC 8-12 Cancer	-0.026	0.068	-0.38	0.7037
CC 47 Iron deficiency and other/unspecified anemias and blood disease	-0.019	0.034	-0.57	0.5688
CC 148, 149 Decubitus ulcer or chronic skin ulcer	0.251	0.094	2.68	0.0074
CC 49, 50 Dementia and senility	-0.262	0.045	-5.89	<.0001
CC 21 Protein-calorie malnutrition	-0.135	0.093	-1.45	0.1476

Table 5: AMI 30-Day E&M Service Measure -- HGLM Parameter Estimates, 2004 - 2006

Effect	Estimate	Standard Error	t Value	Pr > |t|
Intercept	1.328	0.028	48.06	<.0001
Sex (Male)	-0.078	0.014	-5.45	<.0001
Age-65 (years above 65, continuous)	-0.005	0.001	-4.97	<.0001
History of PCI	0.214	0.016	13.07	<.0001
History of CABG	-0.005	0.029	-0.18	0.8570
CC 80 Congestive heart failure	-0.107	0.015	-7.13	<.0001
CC 81, 82 Acute coronary syndrome	-0.041	0.036	-1.14	0.2551
ICD-9-CM 410.00-410.19 Anterior myocardial infarction	-0.117	0.047	-2.46	0.0137
ICD-9-CM 410.20-410.69 Other location of myocardial infarction	-0.026	0.020	-1.31	0.1908
CC 83 Angina pectoris/old myocardial infarction	-0.090	0.025	-3.64	0.0003
CC 84 Coronary atherosclerosis/other chronic ischemic heart disease	-0.002	0.016	-0.14	0.8868
CC 86 Valvular and rheumatic heart disease	0.011	0.018	0.58	0.5606
CC 92, 93 Arrhythmias	0.028	0.014	1.95	0.0514
CC 97-99, 103 Cerebrovascular disease	-0.008	0.038	-0.20	0.8382
CC 95, 96 Stroke	0.057	0.049	1.16	0.2442
CC 104-106 Vascular or circulatory disease	0.007	0.019	0.37	0.7110
CC 67-69, 100-102, 177, 178 Hemiplegia, paraplegia, paralysis, functional disability	-0.183	0.053	-3.43	0.0006
CC 15-20, 119, 120 Diabetes and DM complications	-0.017	0.015	-1.09	0.2746
CC 131 Renal failure	-0.066	0.019	-3.51	0.0005
CC 129, 130 End-stage renal disease or dialysis	-0.689	0.064	-10.81	<.0001
CC 136 Other urinary tract disorders	0.017	0.024	0.72	0.4703
CC 108 COPD	-0.055	0.017	-3.23	0.0013
CC 111-113 History of pneumonia	0.008	0.023	0.37	0.7131
CC 110 Asthma	0.179	0.060	2.98	0.0029
CC 22, 23 Disorders of fluid/electrolyte/acid-base	-0.060	0.018	-3.24	0.0012
CC 1, 3-6 History of infection	0.136	0.172	0.79	0.4270
CC 7 Metastatic cancer and acute leukemia	-0.404	0.069	-5.82	<.0001
CC 8-12 Cancer	0.003	0.038	0.07	0.9455
CC 47 Iron deficiency and other/unspecified anemias and blood disease	0.017	0.019	0.88	0.3792
CC 148, 149 Decubitus ulcer or chronic skin ulcer	0.069	0.049	1.39	0.1659
CC 49, 50 Dementia and senility	-0.223	0.025	-8.89	<.0001
CC 21 Protein-calorie malnutrition	-0.101	0.053	-1.91	0.0560

3. Identification of Meaningful Differences in Performance (Measure evaluation criterion 2f)

The between-hospital variance and intra-class correlation coefficients from both the one- and three-year versions of the HGLM indicate the existence of significant differences among hospitals in the rate at which their AMI patients receive at least one E&M service within the month following discharge. Table 6 summarizes these statistics for 2006. Results using data from other years were consistent.

Table 6: AMI 30-Day E&M Service Measure -- Variation Among Hospitals

Statistic	One Year (2006)	Three Years (2004-6)
Between-Hospital Variance (SE)	0.120 (0.014)	0.110 (0.007)
Residual Variance (SE)	0.967 (0.007)	0.978 (0.004)
Intra-Class Correlation	0.110	0.101

The final score will be a percentile ranking of a risk-standardized rate. For purposes of analysis, risk standardized rates were computed using (a) observed-to-expected (O/E) rates and (b) predicted-to-expected (P/E) rates, each for one-year and three-year time periods. The O/E rate for three years is a weighted average of three one-year rates, with weights of 0.5 for the most recent year, 0.3 for the prior year and 0.2 for the first year. The P/E rate for three years is computed using the results of the HGLM model estimated for three years. Table 7 summarizes the distribution of the underlying actual, predicted and respective risk-standardized rates computed using each of the time periods. The distribution is of hospital-level rates, for the 1,131 hospitals having 10 or more index admissions in 2006. Table 8 breaks these rates down by hospital AMI volume (quartile of index admissions in 2006). These statistics are illustrated by histograms in the Appendix.

Table 7: AMI 30-Day E&M Service Measure -- Distribution Among Hospitals of Actual and Risk-Standardized Rates, by Estimation Period

	Mean	P5	P25	Median	P75	P95
One-Year						
• **Actual**	0.782	0.609	0.720	0.788	0.850	0.932
• **Risk-Standardized Rate (Using O/E)**	0.782	0.609	0.718	0.787	0.853	0.939
• **Predicted**	0.775	0.714	0.754	0.778	0.799	0.829
• **Risk-Standardized Rate (Using P/E)**	0.775	0.713	0.756	0.778	0.797	0.824
Three-Year						
• **Actual**	0.781	0.656	0.737	0.788	0.830	0.891
• **Risk-Standardized Rate (Using O/E)**	0.781	0.653	0.735	0.788	0.833	0.894
• **Predicted**	0.776	0.701	0.751	0.780	0.804	0.836
• **Risk-Standardized Rate (Using P/E)**	0.778	0.699	0.754	0.782	0.807	0.837

Table 8: AMI 30-Day E&M Service Measure -- Distribution of Hospital-Level Actual and Risk-Standardized Rates, By Volume Quartile

		Mean	P5	P25	Median	P75	P95
One-Year Actual	**Vol. Quartile**						
	Q1: 10 - 14	0.788	0.538	0.700	0.800	0.900	1.000
	Q2: 15 - 21	0.781	0.619	0.722	0.789	0.850	0.944
	Q3: 22 - 34	0.778	0.609	0.719	0.782	0.840	0.917
	Q4: 35 - 127	0.783	0.629	0.732	0.784	0.846	0.914
One-Year Risk-Standardized Rate (Using O/E)	**Vol. Quartile**						
	Q1: 10 - 14	0.796	0.537	0.718	0.814	0.894	0.985
	Q2: 15 - 21	0.782	0.627	0.719	0.783	0.850	0.937
	Q3: 22 - 34	0.773	0.603	0.712	0.780	0.832	0.912
	Q4: 35 - 127	0.776	0.616	0.729	0.778	0.842	0.905
One-Year Predicted	**Vol. Quartile**						
	Q1: 10 - 14	0.770	0.713	0.750	0.773	0.794	0.817
	Q2: 15 - 21	0.775	0.719	0.755	0.776	0.797	0.820
	Q3: 22 - 34	0.777	0.711	0.758	0.779	0.802	0.827
	Q4: 35 - 127	0.781	0.699	0.755	0.782	0.814	0.845
One-Year Risk-Standardized Rate (Using P/E)	**Vol. Quartile**						
	Q1: 10 - 14	0.777	0.722	0.762	0.782	0.797	0.816
	Q2: 15 - 21	0.775	0.731	0.759	0.776	0.794	0.815
	Q3: 22 - 34	0.772	0.710	0.750	0.776	0.794	0.819
	Q4: 35 - 127	0.774	0.695	0.750	0.776	0.809	0.839
Three-Year Actual	**Vol. Quartile**						
	Q1: 10 - 14	0.782	0.614	0.732	0.790	0.836	0.906
	Q2: 15 - 21	0.782	0.655	0.736	0.791	0.833	0.883
	Q3: 22 - 34	0.780	0.662	0.739	0.782	0.826	0.882
	Q4: 35 - 127	0.781	0.661	0.738	0.789	0.829	0.878
Three-Year Risk-Standardized Rate (Using O/E)	**Vol. Quartile**						
	Q1: 10 - 14	0.790	0.617	0.736	0.803	0.850	0.917
	Q2: 15 - 21	0.784	0.654	0.737	0.791	0.831	0.892
	Q3: 22 - 34	0.776	0.656	0.733	0.777	0.826	0.882
	Q4: 35 - 127	0.776	0.656	0.731	0.782	0.827	0.875
Three-Year Predicted	**Vol. Quartile**						
	Q1: 10 - 14	0.771	0.704	0.750	0.774	0.795	0.824
	Q2: 15 - 21	0.776	0.704	0.753	0.781	0.803	0.826
	Q3: 22 - 34	0.778	0.709	0.756	0.780	0.804	0.836
	Q4: 35 - 127	0.779	0.690	0.749	0.786	0.817	0.854
Three-Year Risk-Standardized Rate (Using P/E)	**Vol. Quartile**						
	Q1: 10 - 14	0.780	0.715	0.758	0.784	0.804	0.830
	Q2: 15 - 21	0.780	0.702	0.759	0.785	0.807	0.832
	Q3: 22 - 34	0.775	0.705	0.750	0.780	0.802	0.832
	Q4: 35 - 127	0.775	0.682	0.745	0.780	0.816	0.847

4. Reliability Testing (Measure evaluation criterion 2b)

   Reliability was assessed by correlating the one-year measures for 2007 with both the one-year measures for 2006 and the three-year measures ending with 2006. In each case, both Pearson and Spearman correlations were calculated, the latter being less susceptible to outliers. As an additional assessment, measures were grouped in quintiles and weighted kappa statistics were computed. The results are in Table 9. All values are significant ($p<.001$). Correlation statistics between the three-year average ending in 2007 and the three-year average ending in 2006 are not calculated because the two measures share two years of data in common.

Table 9: AMI 30-Day E&M Service Measure -- Reliability When Comparing Across Years

Statistic	One Year (2006)		Three Years (2004-6)	
	Obs./Exp. Ratio	Pred./Exp. Ratio	Obs./Exp. Ratio	Pred./Exp. Ratio
Correlation Coefficients				
• **Pearson**	0.251	0.345	0.333	0.440
• **Spearman**	0.252	0.280	0.333	0.394
Kappa Statistic				
• **Weighted Kappa**	0.158	0.167	0.220	0.249
• **95% CI – Lower**	0.118	0.126	0.180	0.209
• **95% CI -- Upper**	0.199	0.208	0.260	0.289

Reference

Yale University/Yale-New Haven Hospital Center for Outcomes Research and Evaluation (YNHH-CORE). "Hospital 30-Day Acute Myocardial Infarction Readmission Measure Methodology". Prepared for Centers for Medicare & Medicaid Services (CMS), June 9, 2008.

Appendix
Histograms of Hospital 30-Day AMI E&M Service Rate Distributions

Figure 1: Distribution of Hospital Actual (unadjusted) 30-Day AMI E&M Service Rates (One Year – 2006)

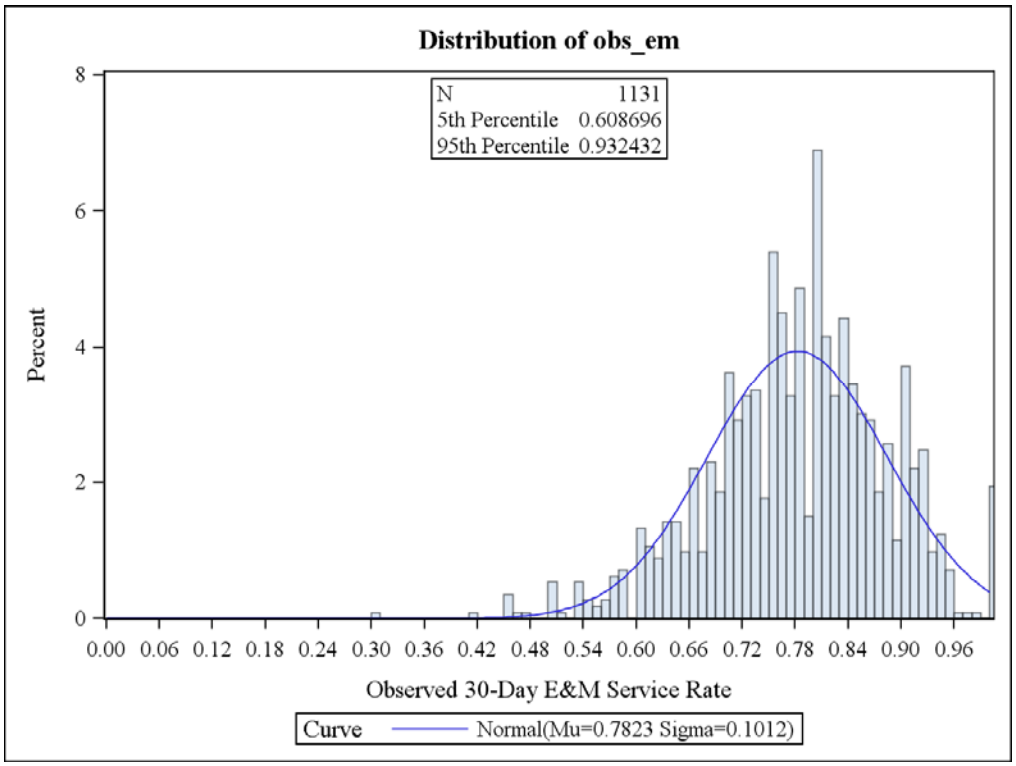


Figure 2: Distribution of Hospital Actual (unadjusted) 30-Day AMI E&M Service Rates (One Year – 2006) -- By Hospital HF Volume Quartile

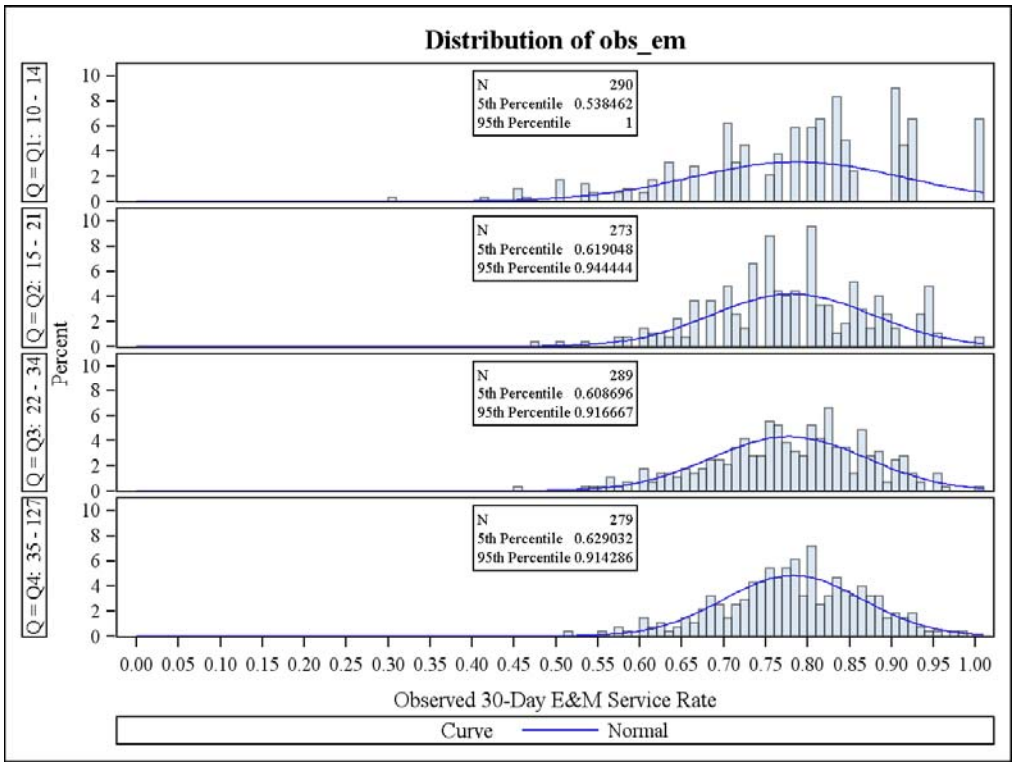


Figure 3: Distribution of Hospital Risk Adjusted 30-Day AMI E&M Service Rates (Using P/E Method, One Year – 2006)

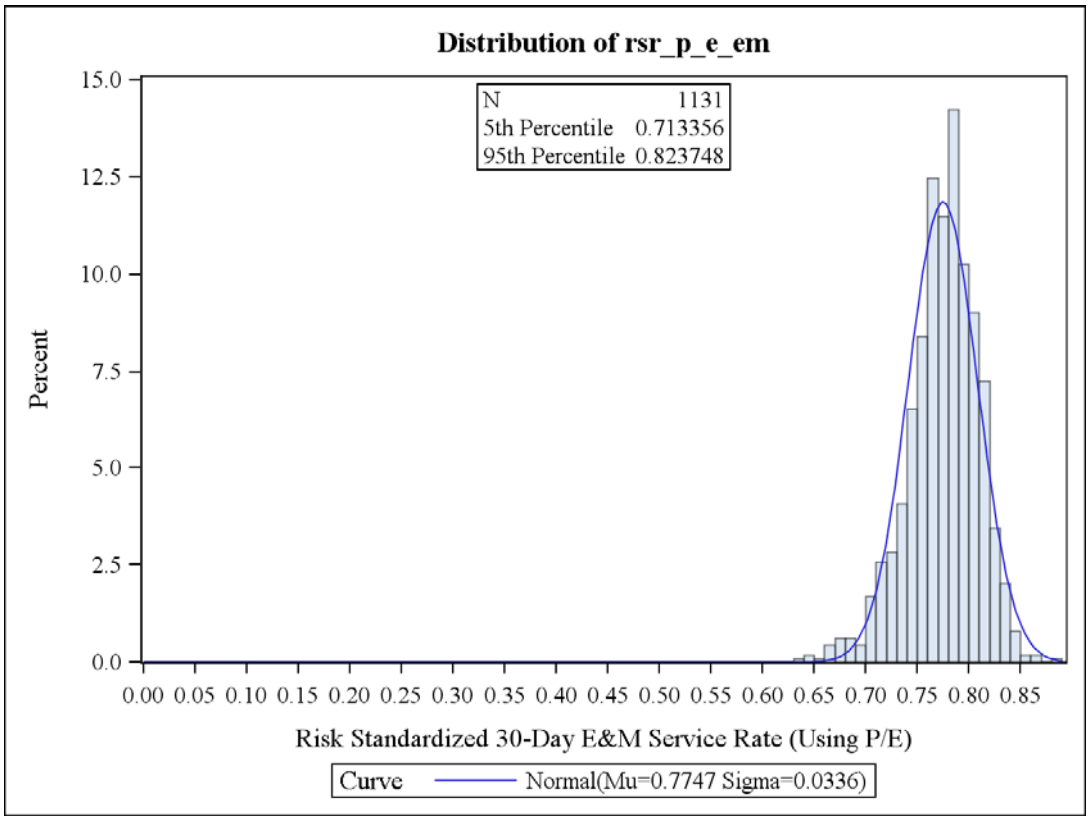


Figure 4: : Distribution of Hospital Risk Adjusted 30-Day AMI E&M Service Rates (Using P/E Method, One Year – 2006) -- By Hospital HF Volume Quartile

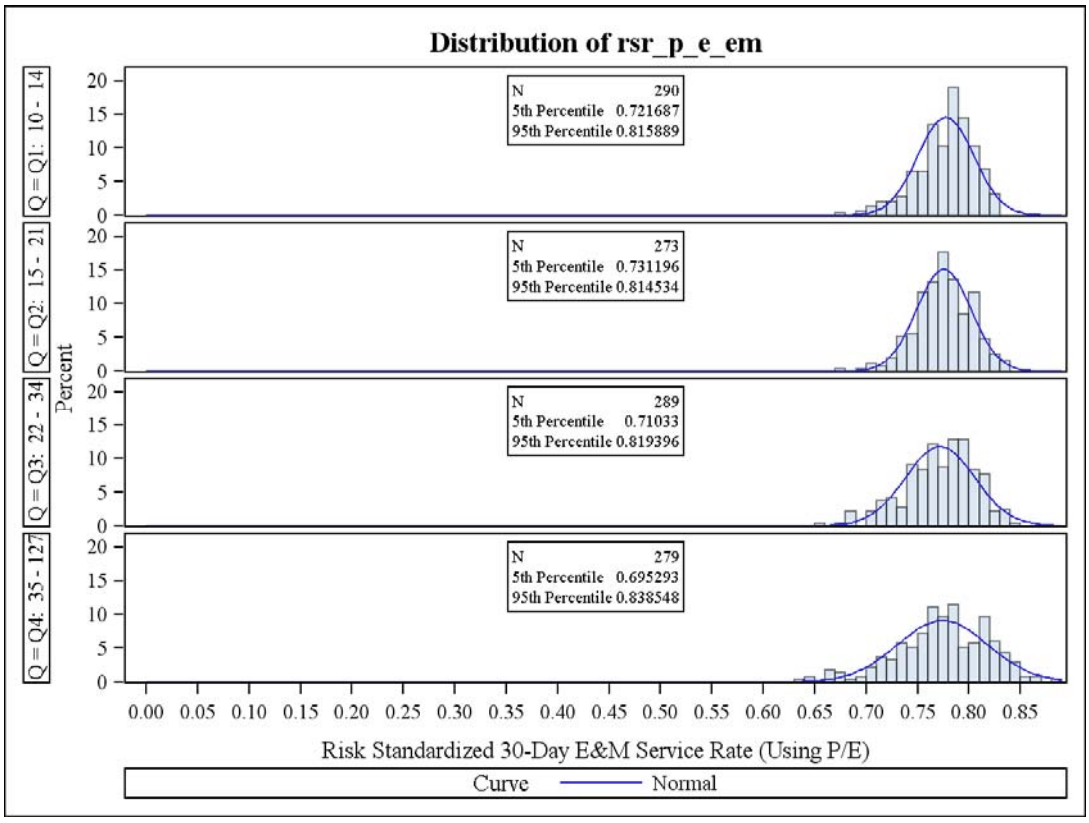


Figure 5: Distribution of Hospital Risk Adjusted 30-Day AMI E&M Service Rates (Using O/E Method, Three Years – 2004-6)

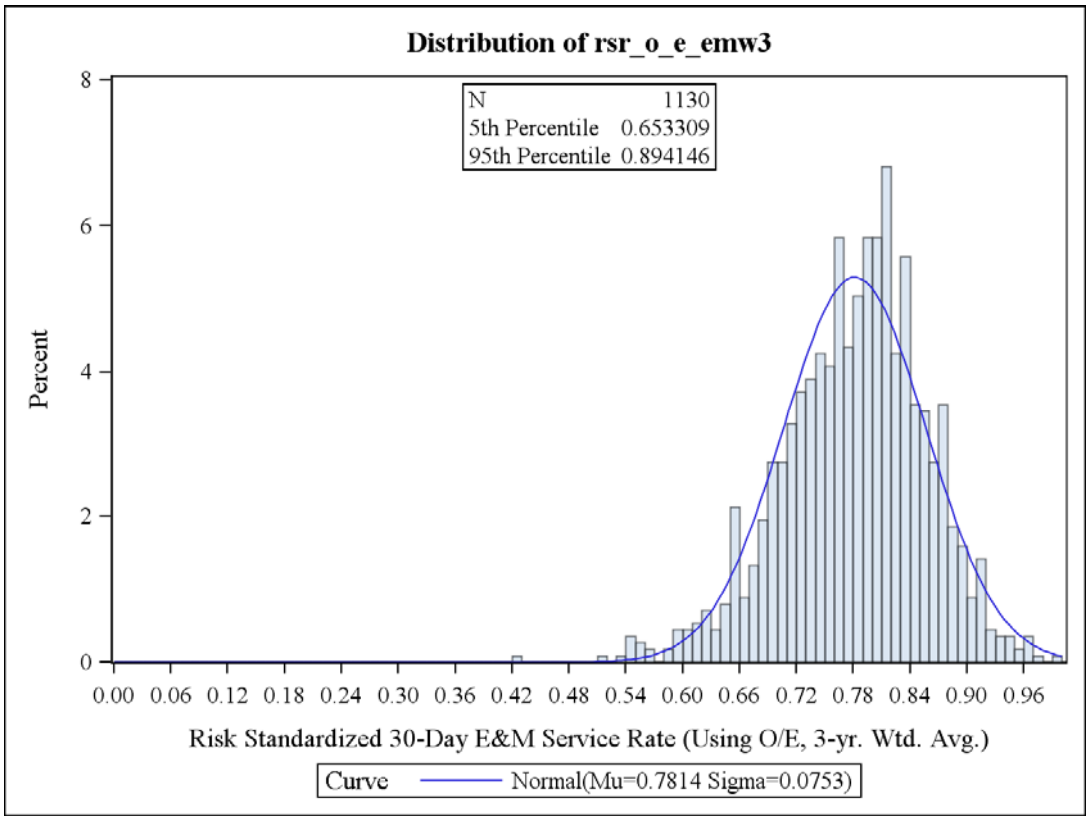


Figure 6: : Distribution of Hospital Risk Adjusted 30-Day AMI E&M Service Rates (Using O/E Method, Three Years – 2004-6) -- By Hospital HF Volume Quartile

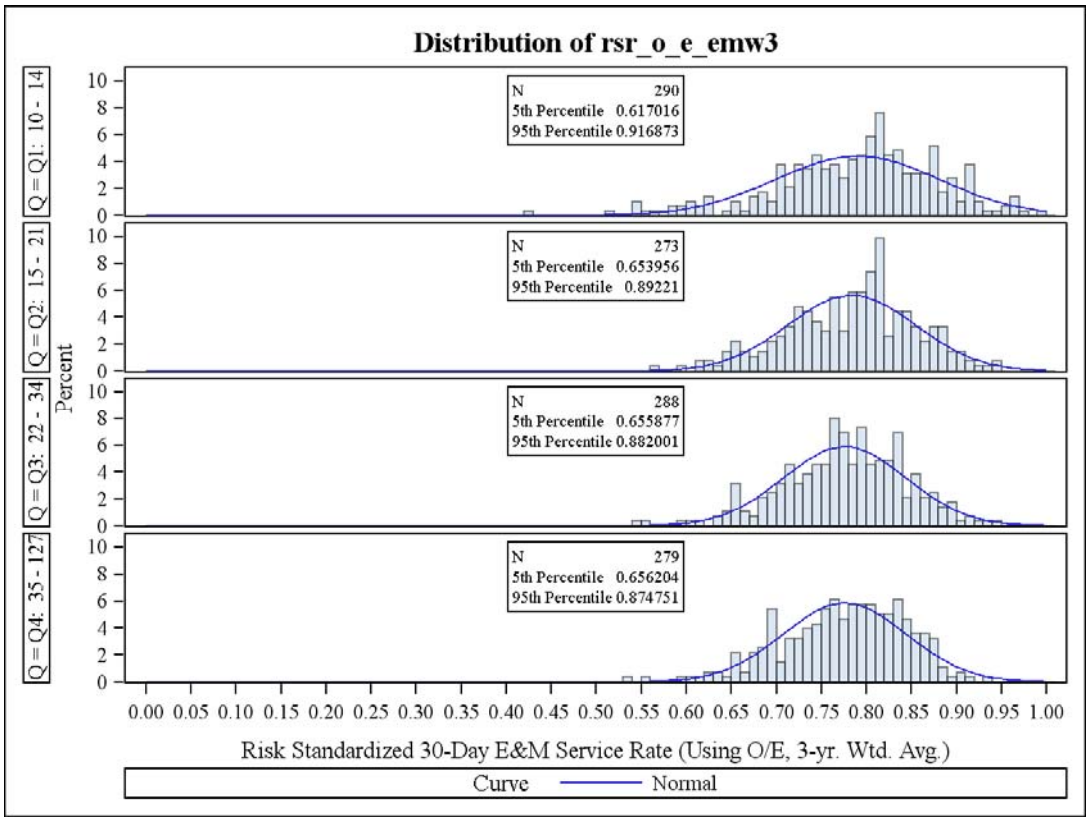


Figure 7: Distribution of Hospital Risk Adjusted 30-Day AMI E&M Service Rates (Using P/E Method, Three Years – 2004-6)

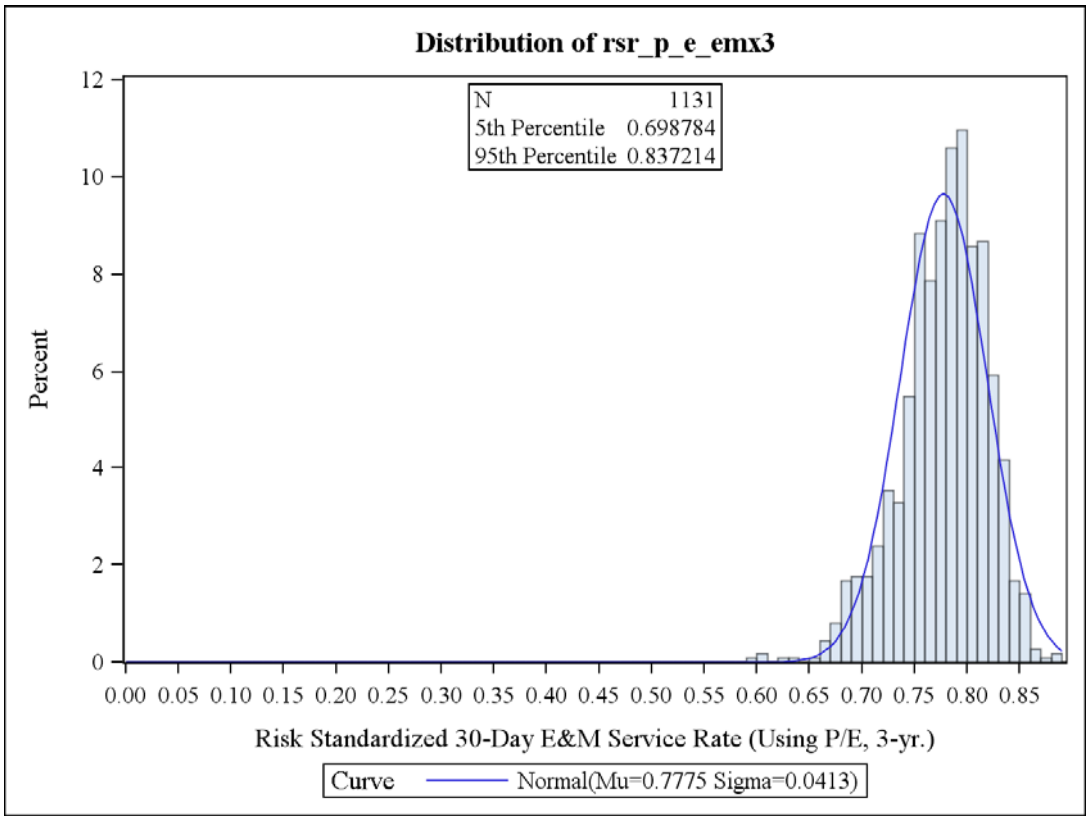
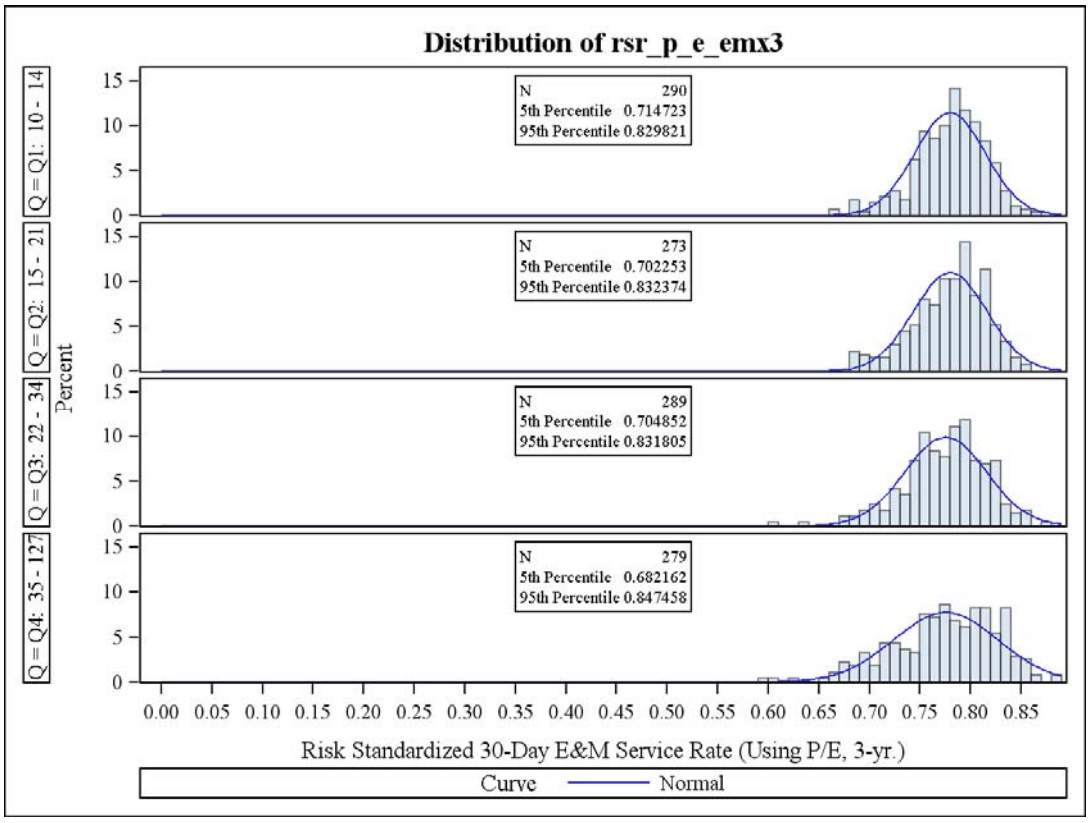


Figure 8: : Distribution of Hospital Risk Adjusted 30-Day AMI E&M Service Rates (Using P/E Method, Three Years – 2004-6) -- By Hospital HF Volume Quartile



THE NATIONAL QUALITY FORUM

National Voluntary Consensus Standards for Patient Outcomes

Follow Up Issues for Brandeis University/CMS
January 25, 2010

***Note: Measure Developers, please provide your answers under the "Response from Measure Developer" section.**
Any additional information that you have to respond to any of the TAP comments below would also be very welcomed. Many of these questions are likely to be asked again by the Steering Committee or during NQF member/public comment.

Deadline: Please submit your response for each measure no later than Tuesday, February 23, 2010

Topic, Measure # and Title	Follow-Up Issues
Topic Area: AMI **Measure#** OT1-002-09 **Title:** 30-Day Post-Hospital AMI Discharge Emergency Department Visit	**Questions/Conditions for Measure Developer:** 1. What are the reasons for the ED visit? Is there variation in the reasons among hospitals? 2. Clarify how deaths within the 30 days after discharge are handled in all the care transition measures. 3. Address and clarify why these measures did not address measuring disparities. **Response from Measure Developer:** 1. The attached spreadsheet (ED VisitICD9-5_NQF.xls) reports the diagnoses (5-digit ICD-9 codes) constituting 50 percent of all ED-visit diagnoses following a hospital discharge for AMI by year. For the years 2004 through 2007, 27 to 28 percent of ED visits following a principal discharge diagnosis of AMI were for cardiopulmonary diagnoses (ICD9 = 786.xx, 428.xx, 427.xx), seven percent were related to the general category of altered consciousness (ICD9 = 780.xx), and three percent were for UTIs (ICD9 = 599.xx). ED visit diagnoses post AMI discharge can vary for individual hospitals. Examples of a few hospitals are shown in the attached document (ED Visit_ICD9_Individual Providers_2006.xls). 2. Deaths within the 30-day window are included in the measure as the 30-day mortality rates account for deaths during this period and evaluate hospital performance related to death following hospital discharge. This specification is consistent with the CMS 30-day readmission measure specification. 3. This measure had not been evaluated prior to submission. Our recent evaluation of the proposed measure has demonstrated that performance on the composite measure is not systematically related to race (i.e., Black, White, Hispanic) among Medicare beneficiaries.
Topic Area: AMI and HF **Measure #**	**Questions/Conditions for Measure Developer:** 1. Clarify whether the coding as submitted includes home health visits 2. The discussion on whether E&M visits were a good thing (appropriate follow-up that might reduce ED

Topic, Measure # and Title	Follow-Up Issues
OT1-003-09 and OT1-004-09 **Title:** 30-Day Post-Hospital AMI Discharge Evaluation and Management Service 30-Day Post-Hospital HF Discharge Evaluation and Management	or readmission) or a bad thing (as an indication of declining patient status) was confusing as to the intent of the measure 3. Address and clarify why these measures did not address measuring disparities. **Response from Measure Developer:** 1. Our initial submission did not specify the coding for home health visits although they are intended to be included in these measures. The numerator specification for these measures is the following. *Numerator Details (All information required to collect or calculate the numerator, including all codes, logic, and definitions)* The following five methods were applied to identify E&M services in the Part B line item and Part A outpatient revenue center files. The claim "from date" was then set as the E&M service date. 1. HCPCS E&M codes as specified in Answer 1 of the following document. http://www.cms.hhs.gov/HospitalOutpatientPPS/downloads/OPPS_Q&A.pdf (HCPCS_CD: 99201–99215, 99241–99245 (note: only codes 99201–99205 and 99211–99215 occurred in the range of 99201–99215) 2. HCPCS E&M codes as specified for home health visits: 99324–99345 3. Revenue codes 0550, 0551, 0552, and 0553 for skilled nursing services provided in the home and/or G code G0154. 4. The HCPCS codes corresponding to the BETOS E&M codes, as specified by CMS. http://www.cms.hhs.gov/hcpcsreleasecodesets/20_betos.asp 5. BETOS and HCPCS E&M codes specified for SNFs and LTC facilities. (BETOS='M4B') 2. The discussion among and with the TAP pointed to different causes for E&M visits. Health status and severity are one type of cause, with greater severity leading to a greater likelihood of a visit, akin to a greater likelihood for an ED visit, readmission, or mortality. Hence, we risk-adjusted the expected value of E&M visits in a manner identical to the other outcome measures. However, the intent of this measure is to recognize that an E&M service following hospital discharge for AMI or HF is a good thing with the potential to prevent an adverse medical event. As such, the measure encourages a shared accountability for identifying and addressing any medical conditions during this period of vulnerability following hospital discharge. Scheduling and encouraging an E&M service following hospital discharge should be the expectation for **all** patients in these cohorts. The signal being sent to hospitals is to improve upon their care transitions composite score by lowering adverse events (ED, readmission, mortality) and by increasing the proactive, scheduled E&M visit rates. 3. This measure had not been evaluated prior to submission. Our recent evaluation of the proposed measure has demonstrated that performance on the composite measure is not systematically related to race (i.e., Black, White, Hispanic) among Medicare beneficiaries.

<table>
<tr><th>Topic, Measure # and Title</th><th>Follow-Up Issues</th></tr>
<tr><td></td><td></td></tr>
<tr><td>Topic Area: HF

Measure#

OT1-006-09

Title:

30-Day Post-Hospital HF Discharge Emergency Department Visit</td><td>Questions/Conditions for Measure Developer:
1. What are the reasons for the ED visit? Is there variation in the reasons among hospitals?
2. Address and clarify why these measures did not address measuring disparities.

Response from Measure Developer:
1. For the years 2004 through 2007, 27 to 30 percent of ED visits following a principal discharge diagnosis of HF were for cardiopulmonary diagnoses (ICD9 = 786.xx, 428.xx, 427.xx), six percent were related to the general category of altered consciousness (ICD9 = 780.xx), and three percent were for UTIs (ICD9 = 599.xx). The attached spreadsheet (ED VisitICD9-5_NQF.xls) reports the diagnoses (5-digit ICD9 codes) constituting 50 percent of all ED-visit diagnoses following a hospital discharge for HF. ED visit diagnoses post HF discharge can vary for individual hospitals. Examples of a few hospitals are shown in the attached document (ED Visit_ICD9_Individual Providers_2006.xls).
2. This measure had not been evaluated prior to submission. Our recent evaluation of the proposed measure has demonstrated that performance on the composite measure is not systematically related to race (i.e., Black, White, Hispanic) among Medicare beneficiaries.</td></tr>
<tr><td>Topic Area: AMI and HF

Measure#

OT1-016-09 and OT1-017-09

Title:

30-Day Post-Hospital AMI Discharge Care Transition Composite

30-Day Post-Hospital HF Discharge Care Transition Composite</td><td>Questions/Conditions for Measure Developer:
1. Address and clarify why these measures did not address measuring disparities.
2. To better understand how the components and composite relate, could you make a table listing the results of each component and the composite for a sample of hospitals in each quintile of the composite results (ranked highest to lowest), such as:

<table><tr><td></td><td>N</td><td>Readmission</td><td>ED visit</td><td>E/M visit</td><td>Composite</td></tr><tr><td>Hospital A</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Hospital B</td><td></td><td></td><td></td><td></td><td></td></tr></table>
We think this table for both composite measures would be extremely helpful in understanding how everything relates together and respond to the question about the added value for each component.

Response from Measure Developer:</td></tr>
</table>

Topic, Measure # and Title	Follow-Up Issues
	1. This measure had not been evaluated prior to submission. Our recent evaluation of the proposed measure has demonstrated that performance on the composite measure is not systematically related to race (i.e., Black, White, Hispanic) among Medicare beneficiaries. 2. We prepared a table and a document (attached) as suggested, describing the impact of individual measures on the overall composite scores. The attached table (Sample of Composite Scores With Associated Component Scores.pdf) illustrates the relative importance of each component within the HF composite for a sample of hospitals using color-coding. All hospitals were ranked by composite score initially and a sample of hospitals was then selected by taking hospital number 25 and every 50th hospital thereafter. The cells of the highest quintile scores are dark green, and the next highest quintile cells are light green. The cells of the lowest quintile scores are dark red and the next to the bottom quintile cells are light red. Within the quintile rank for the composite score we observe some differences in rank for the individual component measures. The attached document (Change in Rates Sufficient to Move Hospitals.doc) simulates the impact of changes in individual component scores on the overall composite score for a selected sample of five hospitals. Each hospital's composite score and quintile category are functions of all individual measures and not overly dependent on any single measure. As a result of differential measure weighting, a relatively small change in readmission rate (0.4 to 1.0%) would move a hospital into a higher or lower quintile. A larger change in the ED rate (0.8 to 2.0%) would be required for a hospital to move quintiles and an even larger change in the E&M rate (1.7 to 4.0%) would be required.

AMI post-30 OP ED Primary Dx (5-digit)

Year	dgns_cd1	Dx1_Desc	Freq	Pct	Cum Freq	Cum Pct
2004	78650	CHEST PAIN NOS	263	7.15	263	7.15
2004	4280	CHF NOS	189	5.14	452	12.29
2004	78659	CHEST PAIN NEC	150	4.08	602	16.37
2004	4275	CARDIAC ARREST	128	3.48	730	19.85
2004	5990	URIN TRACT INFECTION NOS	88	2.39	818	22.24
2004	7802	SYNCOPE AND COLLAPSE	75	2.04	893	24.28
2004	7847	EPISTAXIS	62	1.69	955	25.97
2004	78609	RESPIRATORY ABNORM NEC	62	1.69	1,017	27.65
2004	7804	DIZZINESS AND GIDDINESS	57	1.55	1,074	29.20
2004	78820	RETENTION URINE NOS	55	1.50	1,129	30.70
2004	78079	MALAISE AND FATIGUE NEC	49	1.33	1,178	32.03
2004	41401	CRNRY ATHRSCL NATVE VSSL	48	1.31	1,226	33.33
2004	7295	PAIN IN LIMB	44	1.20	1,270	34.53
2004	486	PNEUMONIA, ORGANISM NOS	42	1.14	1,312	35.67
2004	4019	HYPERTENSION NOS	42	1.14	1,354	36.81
2004	25080	DMII OTH NT ST UNCNTRLD	41	1.11	1,395	37.93
2004	78652	PAINFUL RESPIRATION	41	1.11	1,436	39.04
2004	4139	ANGINA PECTORIS NEC/NOS	37	1.01	1,473	40.05
2004	2765	HYPOVOLEMIA	36	0.98	1,509	41.03
2004	41400	COR ATH UNSP VSL NTV/GFT	36	0.98	1,545	42.01
2004	42789	CARDIAC DYSRHYTHMIAS NEC	31	0.84	1,576	42.85
2004	78605	SHORTNESS OF BREATH	31	0.84	1,607	43.69
2004	42731	ATRIAL FIBRILLATION	29	0.79	1,636	44.48
2004	78900	ABDMNAL PAIN UNSPCF SITE	29	0.79	1,665	45.27
2004	920	CONTUSION FACE/SCALP/NCK	28	0.76	1,693	46.03
2004	7851	PALPITATIONS	28	0.76	1,721	46.79
2004	78701	NAUSEA WITH VOMITING	28	0.76	1,749	47.55
2004	4111	INTERMED CORONARY SYND	27	0.73	1,776	48.29
2004	49121	OBS CHR BRONC W(AC) EXAC	26	0.71	1,802	48.99
2004	56400	CONSTIPATION NOS	25	0.68	1,827	49.67
2004	5589	NONINF GASTROENTERIT NEC	24	0.65	1,851	50.33

AMI post-30 OP ED Primary Dx (5-digit)

Year	dgns_cd1	Dx1_Desc	Freq	Pct	Cum Freq	Cum Pct
2005	78650	CHEST PAIN NOS	264	7.50	264	7.50
2005	4280	CHF NOS	178	5.06	442	12.56
2005	78659	CHEST PAIN NEC	155	4.40	597	16.96
2005	4275	CARDIAC ARREST	116	3.30	713	20.26
2005	5990	URIN TRACT INFECTION NOS	75	2.13	788	22.39
2005	7847	EPISTAXIS	72	2.05	860	24.43
2005	78609	RESPIRATORY ABNORM NEC	64	1.82	924	26.25
2005	7802	SYNCOPE AND COLLAPSE	63	1.79	987	28.04
2005	25080	DMII OTH NT ST UNCNTRLD	57	1.62	1,044	29.66
2005	7295	PAIN IN LIMB	56	1.59	1,100	31.25
2005	7804	DIZZINESS AND GIDDINESS	54	1.53	1,154	32.78
2005	4139	ANGINA PECTORIS NEC/NOS	49	1.39	1,203	34.18
2005	78079	MALAISE AND FATIGUE NEC	49	1.39	1,252	35.57
2005	78605	SHORTNESS OF BREATH	44	1.25	1,296	36.82
2005	78820	RETENTION URINE NOS	41	1.16	1,337	37.98
2005	41401	CRNRY ATHRSCL NATVE VSSL	39	1.11	1,376	39.09
2005	486	PNEUMONIA, ORGANISM NOS	38	1.08	1,414	40.17
2005	56400	CONSTIPATION NOS	38	1.08	1,452	41.25
2005	41400	COR ATH UNSP VSL NTV/GFT	37	1.05	1,489	42.30
2005	78652	PAINFUL RESPIRATION	35	0.99	1,524	43.30
2005	4019	HYPERTENSION NOS	34	0.97	1,558	44.26
2005	4111	INTERMED CORONARY SYND	34	0.97	1,592	45.23
2005	42731	ATRIAL FIBRILLATION	31	0.88	1,623	46.11
2005	42789	CARDIAC DYSRHYTHMIAS NEC	31	0.88	1,654	46.99
2005	2765	HYPOVOLEMIA	28	0.80	1,682	47.78
2005	78900	ABDMNAL PAIN UNSPCF SITE	25	0.71	1,707	48.49
2005	4359	TRANS CEREB ISCHEMIA NOS	24	0.68	1,731	49.18
2005	4589	HYPOTENSION NOS	24	0.68	1,755	49.86
2005	5997	HEMATURIA	24	0.68	1,779	50.54

AMI post-30 OP ED Primary Dx (5-digit)

Year	dgns_cd1	Dx1_Desc	Freq	Pct	Cum Freq	Cum Pct
2006	78650	CHEST PAIN NOS	229	7.38	229	7.38
2006	78659	CHEST PAIN NEC	156	5.03	385	12.40
2006	4280	CHF NOS	138	4.45	523	16.85
2006	4275	CARDIAC ARREST	100	3.22	623	20.07
2006	7847	EPISTAXIS	72	2.32	695	22.39
2006	5990	URIN TRACT INFECTION NOS	67	2.16	762	24.55
2006	7802	SYNCOPE AND COLLAPSE	66	2.13	828	26.68
2006	78079	MALAISE AND FATIGUE NEC	65	2.09	893	28.77
2006	78609	RESPIRATORY ABNORM NEC	50	1.61	943	30.38
2006	4139	ANGINA PECTORIS NEC/NOS	42	1.35	985	31.73
2006	78820	RETENTION URINE NOS	42	1.35	1,027	33.09
2006	25080	DMII OTH NT ST UNCNTRLD	39	1.26	1,066	34.34
2006	56400	CONSTIPATION NOS	39	1.26	1,105	35.60
2006	78605	SHORTNESS OF BREATH	38	1.22	1,143	36.82
2006	4019	HYPERTENSION NOS	37	1.19	1,180	38.02
2006	41401	CRNRY ATHRSCL NATVE VSSL	37	1.19	1,217	39.21
2006	7804	DIZZINESS AND GIDDINESS	33	1.06	1,250	40.27
2006	78652	PAINFUL RESPIRATION	33	1.06	1,283	41.33
2006	7295	PAIN IN LIMB	31	1.00	1,314	42.33
2006	27651	DEHYDRATION	31	1.00	1,345	43.33
2006	78900	ABDMNAL PAIN UNSPCF SITE	29	0.93	1,374	44.27
2006	99812	HEMATOMA COMPLIC PROC	28	0.90	1,402	45.17
2006	7851	PALPITATIONS	27	0.87	1,429	46.04
2006	42731	ATRIAL FIBRILLATION	27	0.87	1,456	46.91
2006	486	PNEUMONIA, ORGANISM NOS	24	0.77	1,480	47.68
2006	7823	EDEMA	24	0.77	1,504	48.45
2006	5997	HEMATURIA	22	0.71	1,526	49.16
2006	4111	INTERMED CORONARY SYND	21	0.68	1,547	49.84
2006	5589	NONINF GASTROENTERIT NEC	21	0.68	1,568	50.52

AMI post-30 OP ED Primary Dx (5-digit)

Year	dgns_cd1	Dx1_Desc	Freq	Pct	Cum Freq	Cum Pct
2007	78650	CHEST PAIN NOS	218	7.59	218	7.59
2007	78659	CHEST PAIN NEC	138	4.81	356	12.40
2007	4280	CHF NOS	122	4.25	478	16.64
2007	4275	CARDIAC ARREST	89	3.10	567	19.74
2007	5990	URIN TRACT INFECTION NOS	65	2.26	632	22.01
2007	7847	EPISTAXIS	63	2.19	695	24.20
2007	78079	MALAISE AND FATIGUE NEC	60	2.09	755	26.29
2007	7802	SYNCOPE AND COLLAPSE	59	2.05	814	28.34
2007	78609	RESPIRATORY ABNORM NEC	53	1.85	867	30.19
2007	25080	DMII OTH NT ST UNCNTRLD	49	1.71	916	31.89
2007	4019	HYPERTENSION NOS	44	1.53	960	33.43
2007	7804	DIZZINESS AND GIDDINESS	41	1.43	1,001	34.85
2007	41401	CRNRY ATHRSCL NATVE VSSL	37	1.29	1,038	36.14
2007	78820	RETENTION URINE NOS	37	1.29	1,075	37.43
2007	7295	PAIN IN LIMB	35	1.22	1,110	38.65
2007	78605	SHORTNESS OF BREATH	31	1.08	1,141	39.73
2007	78652	PAINFUL RESPIRATION	31	1.08	1,172	40.81
2007	4589	HYPOTENSION NOS	30	1.04	1,202	41.85
2007	4139	ANGINA PECTORIS NEC/NOS	28	0.97	1,230	42.83
2007	56400	CONSTIPATION NOS	27	0.94	1,257	43.77
2007	42731	ATRIAL FIBRILLATION	26	0.91	1,283	44.67
2007	49121	OBS CHR BRONC W(AC) EXAC	26	0.91	1,309	45.58
2007	486	PNEUMONIA, ORGANISM NOS	25	0.87	1,334	46.45
2007	5997	HEMATURIA	24	0.84	1,358	47.28
2007	7851	PALPITATIONS	22	0.77	1,380	48.05
2007	920	CONTUSION FACE/SCALP/NCK	21	0.73	1,401	48.78
2007	41400	COR ATH UNSP VSL NTV/GFT	21	0.73	1,422	49.51
2007	78900	ABDMNAL PAIN UNSPCF SITE	21	0.73	1,443	50.24

HF post-30 OP ED Primary Dx (5-digit)

Year	dgns_cd1	Dx1_Desc	Freq	Pct	Cum Freq	Cum Pct
2004	4280	CHF NOS	978	12.67	978	12.67
2004	78650	CHEST PAIN NOS	225	2.91	1,203	15.58
2004	78609	RESPIRATORY ABNORM NEC	216	2.80	1,419	18.38
2004	4275	CARDIAC ARREST	204	2.64	1,623	21.03
2004	5990	URIN TRACT INFECTION NOS	173	2.24	1,796	23.27
2004	78079	MALAISE AND FATIGUE NEC	148	1.92	1,944	25.18
2004	78605	SHORTNESS OF BREATH	148	1.92	2,092	27.10
2004	7847	EPISTAXIS	147	1.90	2,239	29.01
2004	78659	CHEST PAIN NEC	141	1.83	2,380	30.83
2004	7802	SYNCOPE AND COLLAPSE	133	1.72	2,513	32.56
2004	49121	OBS CHR BRONC W(AC) EXAC	129	1.67	2,642	34.23
2004	25080	DMII OTH NT ST UNCNTRLD	104	1.35	2,746	35.57
2004	2765	HYPOVOLEMIA	102	1.32	2,848	36.90
2004	78820	RETENTION URINE NOS	95	1.23	2,943	38.13
2004	56400	CONSTIPATION NOS	94	1.22	3,037	39.34
2004	42731	ATRIAL FIBRILLATION	92	1.19	3,129	40.54
2004	7804	DIZZINESS AND GIDDINESS	90	1.17	3,219	41.70
2004	920	CONTUSION FACE/SCALP/NCK	87	1.13	3,306	42.83
2004	78900	ABDMNAL PAIN UNSPCF SITE	80	1.04	3,386	43.87
2004	486	PNEUMONIA, ORGANISM NOS	67	0.87	3,453	44.73
2004	7823	EDEMA	67	0.87	3,520	45.60
2004	4019	HYPERTENSION NOS	60	0.78	3,580	46.38
2004	78652	PAINFUL RESPIRATION	56	0.73	3,636	47.10
2004	5997	HEMATURIA	53	0.69	3,689	47.79
2004	496	CHR AIRWAY OBSTRUCT NEC	52	0.67	3,741	48.46
2004	7295	PAIN IN LIMB	51	0.66	3,792	49.13
2004	7242	LUMBAGO	46	0.60	3,838	49.72
2004	4589	HYPOTENSION NOS	45	0.58	3,883	50.30

HF post-30 OP ED Primary Dx (5-digit)

Year	dgns_cd1	Dx1_Desc	Freq	Pct	Cum Freq	Cum Pct
2005	4280	CHF NOS	868	11.15	868	11.15
2005	78650	CHEST PAIN NOS	244	3.13	1,112	14.29
2005	78609	RESPIRATORY ABNORM NEC	209	2.68	1,321	16.97
2005	4275	CARDIAC ARREST	207	2.66	1,528	19.63
2005	5990	URIN TRACT INFECTION NOS	199	2.56	1,727	22.19
2005	7847	EPISTAXIS	161	2.07	1,888	24.25
2005	78605	SHORTNESS OF BREATH	156	2.00	2,044	26.26
2005	78079	MALAISE AND FATIGUE NEC	149	1.91	2,193	28.17
2005	25080	DMII OTH NT ST UNCNTRLD	139	1.79	2,332	29.96
2005	7802	SYNCOPE AND COLLAPSE	133	1.71	2,465	31.67
2005	49121	OBS CHR BRONC W(AC) EXAC	126	1.62	2,591	33.29
2005	78659	CHEST PAIN NEC	126	1.62	2,717	34.90
2005	56400	CONSTIPATION NOS	101	1.30	2,818	36.20
2005	2765	HYPOVOLEMIA	92	1.18	2,910	37.38
2005	920	CONTUSION FACE/SCALP/NCK	91	1.17	3,001	38.55
2005	42731	ATRIAL FIBRILLATION	91	1.17	3,092	39.72
2005	78820	RETENTION URINE NOS	91	1.17	3,183	40.89
2005	486	PNEUMONIA, ORGANISM NOS	89	1.14	3,272	42.03
2005	7804	DIZZINESS AND GIDDINESS	88	1.13	3,360	43.17
2005	78900	ABDMNAL PAIN UNSPCF SITE	82	1.05	3,442	44.22
2005	4019	HYPERTENSION NOS	79	1.01	3,521	45.23
2005	4589	HYPOTENSION NOS	70	0.90	3,591	46.13
2005	7295	PAIN IN LIMB	65	0.84	3,656	46.97
2005	7823	EDEMA	63	0.81	3,719	47.78
2005	496	CHR AIRWAY OBSTRUCT NEC	61	0.78	3,780	48.56
2005	4660	ACUTE BRONCHITIS	59	0.76	3,839	49.32
2005	8730	OPEN WOUND OF SCALP	56	0.72	3,895	50.04

HF post-30 OP ED Primary Dx (5-digit)

Year	dgns_cd1	Dx1_Desc	Freq	Pct	Cum Freq	Cum Pct
2006	4280	CHF NOS	834	11.93	834	11.93
2006	78650	CHEST PAIN NOS	224	3.20	1,058	15.14
2006	4275	CARDIAC ARREST	211	3.02	1,269	18.15
2006	78609	RESPIRATORY ABNORM NEC	208	2.98	1,477	21.13
2006	5990	URIN TRACT INFECTION NOS	187	2.68	1,664	23.81
2006	25080	DMII OTH NT ST UNCNTRLD	144	2.06	1,808	25.87
2006	7847	EPISTAXIS	140	2.00	1,948	27.87
2006	7802	SYNCOPE AND COLLAPSE	131	1.87	2,079	29.74
2006	78079	MALAISE AND FATIGUE NEC	127	1.82	2,206	31.56
2006	78605	SHORTNESS OF BREATH	113	1.62	2,319	33.18
2006	78659	CHEST PAIN NEC	111	1.59	2,430	34.76
2006	78820	RETENTION URINE NOS	96	1.37	2,526	36.14
2006	49121	OBS CHR BRONC W(AC) EXAC	93	1.33	2,619	37.47
2006	27651	DEHYDRATION	88	1.26	2,707	38.73
2006	56400	CONSTIPATION NOS	81	1.16	2,788	39.89
2006	7804	DIZZINESS AND GIDDINESS	80	1.14	2,868	41.03
2006	920	CONTUSION FACE/SCALP/NCK	76	1.09	2,944	42.12
2006	78900	ABDMNAL PAIN UNSPCF SITE	74	1.06	3,018	43.18
2006	42731	ATRIAL FIBRILLATION	69	0.99	3,087	44.16
2006	7823	EDEMA	68	0.97	3,155	45.14
2006	486	PNEUMONIA, ORGANISM NOS	67	0.96	3,222	46.09
2006	4019	HYPERTENSION NOS	57	0.82	3,279	46.91
2006	7295	PAIN IN LIMB	56	0.80	3,335	47.71
2006	5589	NONINF GASTROENTERIT NEC	51	0.73	3,386	48.44
2006	95901	HEAD INJURY NOS	48	0.69	3,434	49.13
2006	496	CHR AIRWAY OBSTRUCT NEC	47	0.67	3,481	49.80
2006	4589	HYPOTENSION NOS	46	0.66	3,527	50.46

HF post-30 OP ED Primary Dx (5-digit)

Year	dgns_cd1	Dx1_Desc	Freq	Pct	Cum Freq	Cum Pct
2007	4280	CHF NOS	675	11.22	675	11.22
2007	78650	CHEST PAIN NOS	183	3.04	858	14.26
2007	78609	RESPIRATORY ABNORM NEC	173	2.88	1,031	17.14
2007	5990	URIN TRACT INFECTION NOS	165	2.74	1,196	19.88
2007	4275	CARDIAC ARREST	153	2.54	1,349	22.43
2007	25080	DMII OTH NT ST UNCNTRLD	125	2.08	1,474	24.51
2007	7847	EPISTAXIS	121	2.01	1,595	26.52
2007	78605	SHORTNESS OF BREATH	111	1.85	1,706	28.36
2007	78079	MALAISE AND FATIGUE NEC	109	1.81	1,815	30.17
2007	78659	CHEST PAIN NEC	94	1.56	1,909	31.74
2007	7802	SYNCOPE AND COLLAPSE	80	1.33	1,989	33.07
2007	42731	ATRIAL FIBRILLATION	80	1.33	2,069	34.40
2007	49121	OBS CHR BRONC W(AC) EXAC	79	1.31	2,148	35.71
2007	27651	DEHYDRATION	78	1.30	2,226	37.01
2007	920	CONTUSION FACE/SCALP/NCK	75	1.25	2,301	38.25
2007	78820	RETENTION URINE NOS	74	1.23	2,375	39.48
2007	7804	DIZZINESS AND GIDDINESS	69	1.15	2,444	40.63
2007	78900	ABDMNAL PAIN UNSPCF SITE	68	1.13	2,512	41.76
2007	56400	CONSTIPATION NOS	66	1.10	2,578	42.86
2007	486	PNEUMONIA, ORGANISM NOS	62	1.03	2,640	43.89
2007	7823	EDEMA	58	0.96	2,698	44.85
2007	7295	PAIN IN LIMB	55	0.91	2,753	45.77
2007	4019	HYPERTENSION NOS	53	0.88	2,806	46.65
2007	95901	HEAD INJURY NOS	52	0.86	2,858	47.51
2007	496	CHR AIRWAY OBSTRUCT NEC	43	0.71	2,901	48.23
2007	4589	HYPOTENSION NOS	43	0.71	2,944	48.94
2007	78097	ALTERED MENTAL STATUS	43	0.71	2,987	49.66
2007	78652	PAINFUL RESPIRATION	40	0.67	3,027	50.32

Selected providers having 2006 AMI Index Admissions with a post-30 OP ED Visit

Year=2006 Provider A

dgns_cd1	Dx1_Description	Freq	Pct	Cum Freq	Cum Pct
2141	LIPOMA SKIN NEC	1	7.69	1	7.69
4139	ANGINA PECTORIS NEC/NOS	1	7.69	2	15.38
41401	CRNRY ATHRSCL NATVE VSSL	1	7.69	3	23.08
4280	CHF NOS	1	7.69	4	30.77
4619	ACUTE SINUSITIS NOS	1	7.69	5	38.46
490	BRONCHITIS NOS	1	7.69	6	46.15
7840	HEADACHE	1	7.69	7	53.85
78650	CHEST PAIN NOS	1	7.69	8	61.54
78900	ABDMNAL PAIN UNSPCF SITE	1	7.69	9	69.23
78902	ABDMNAL PAIN LFT UP QUAD	1	7.69	10	76.92
99674	COMP-OTH VASC DEV/GRAFT	1	7.69	11	84.62
99811	HEMORRHAGE COMPLIC PROC	1	7.69	12	92.31
V583	ATTEN-SURG DRESSNG/SUTUR	1	7.69	13	100

Year=2006 Provider B

dgns_cd1	Dx1_Description	Freq	Pct	Cum Freq	Cum Pct
78650	CHEST PAIN NOS	3	25	3	25
4280	CHF NOS	2	16.67	5	41.67
4239	PERICARDIAL DISEASE NOS	1	8.33	6	50
4589	HYPOTENSION NOS	1	8.33	7	58.33
53081	ESOPHAGEAL REFLUX	1	8.33	8	66.67
6823	CELLULITIS OF ARM	1	8.33	9	75
78609	RESPIRATORY ABNORM NEC	1	8.33	10	83.33
78652	PAINFUL RESPIRATION	1	8.33	11	91.67
78659	CHEST PAIN NEC	1	8.33	12	100

Year=2006 Provider C

dgns_cd1	Dx1_Description	Freq	Pct	Cum Freq	Cum Pct
41401	CRNRY ATHRSCL NATVE VSSL	2	16.67	2	16.67
78650	CHEST PAIN NOS	2	16.67	4	33.33
78659	CHEST PAIN NEC	2	16.67	6	50
3698	VISUAL LOSS, ONE EYE NOS	1	8.33	7	58.33
41091	AMI NOS, INITIAL	1	8.33	8	66.67
4280	CHF NOS	1	8.33	9	75
4359	TRANS CEREB ISCHEMIA NOS	1	8.33	10	83.33
5119	PLEURAL EFFUSION NOS	1	8.33	11	91.67
7820	SKIN SENSATION DISTURB	1	8.33	12	100

Selected providers having 2006 HF Index Admissions with a post-30 OP ED Visit

Year=2006 Provider D

dgns_cd1	Dx1_Description	Freq	Pct	Cum Freq	Cum Pct
4280	CHF NOS	3	17.65	3	17.65
4275	CARDIAC ARREST	2	11.76	5	29.41
78609	RESPIRATORY ABNORM NEC	2	11.76	7	41.18
486	PNEUMONIA, ORGANISM NOS	1	5.88	8	47.06
5990	URIN TRACT INFECTION NOS	1	5.88	9	52.94
7802	SYNCOPE AND COLLAPSE	1	5.88	10	58.82
7804	DIZZINESS AND GIDDINESS	1	5.88	11	64.71
7821	NONSPECIF SKIN ERUPT NEC	1	5.88	12	70.59
87342	OPEN WOUND OF FOREHEAD	1	5.88	13	76.47
920	CONTUSION FACE/SCALP/NCK	1	5.88	14	82.35
92231	BACK CONTUSION	1	5.88	15	88.24
9248	MULTIPLE CONTUSIONS NEC	1	5.88	16	94.12
9778	POISON-MEDICINAL AGT NEC	1	5.88	17	100

Year=2006 Provider E

dgns_cd1	Dx1_Description	Frequency	Percent	Cum Freq	Cum Pct
4280	CHF NOS	3	20	3	20
4241	AORTIC VALVE DISORDER	1	6.67	4	26.67
4254	PRIM CARDIOMYOPATHY NEC	1	6.67	5	33.33
4580	ORTHOSTATIC HYPOTENSION	1	6.67	6	40
4659	ACUTE URI NOS	1	6.67	7	46.67
5990	URIN TRACT INFECTION NOS	1	6.67	8	53.33
71941	JOINT PAIN-SHLDER	1	6.67	9	60
78099	OTHER GENERAL SYMPTOMS	1	6.67	10	66.67
78609	RESPIRATORY ABNORM NEC	1	6.67	11	73.33
78650	CHEST PAIN NOS	1	6.67	12	80
78652	PAINFUL RESPIRATION	1	6.67	13	86.67
99672	COMP-OTH CARDIAC DEVICE	1	6.67	14	93.33
V5881	FIT/ADJ VASCULAR CATHETR	1	6.67	15	100

Year=2006 Provider F

dgns_cd1	Dx1_Description	Freq	Pct	Cum Freq	Cum Pct
25080	DMII OTH NT ST UNCNTRLD	2	14.29	2	14.29
4280	CHF NOS	2	14.29	4	28.57
49121	OBS CHR BRONC W(AC) EXAC	2	14.29	6	42.86
25000	DMII WO CMP NT ST UNCNTR	1	7.14	7	50
5990	URIN TRACT INFECTION NOS	1	7.14	8	57.14
78820	RETENTION URINE NOS	1	7.14	9	64.29
81221	FX HUMERUS SHAFT-CLOSED	1	7.14	10	71.43
8470	SPRAIN OF NECK	1	7.14	11	78.57
9221	CONTUSION OF CHEST WALL	1	7.14	12	85.71
95901	HEAD INJURY NOS	1	7.14	13	92.86
99673	COMP-REN DIALYS DEV/GRFT	1	7.14	14	100

Mean AMI and HF Hospital Measure Scores by Race Quartile													
	Mean Readmission			Mean ED			Mean E&M			Mean Composite		
Race Quartile	**White**	**Black**	**Other***	**White**	**Black**	**Other**	**White**	**Black**	**Other**	**White**	**Black**	**Other**
AMI												
First	0.21	0.20	0.20	0.08	0.09	0.08	0.82	0.81	0.80	0.00	0.00	-0.02
Second	0.20	0.20	0.20	0.08	0.08	0.08	0.82	0.82	0.82	0.01	0.01	0.00
Third	0.20	0.21	0.20	0.08	0.08	0.08	0.82	0.82	0.82	0.00	0.01	0.01
Fourth	0.20	0.21	0.21	0.09	0.08	0.08	0.81	0.81	0.83	0.00	-0.01	0.01
HF												
First	0.22	0.22	0.22	0.08	0.08	0.08	0.80	0.81	0.80	-0.02	0.01	-0.02
Second	0.22	0.22	0.22	0.08	0.08	0.08	0.82	0.82	0.81	0.00	0.01	0.01
Third	0.22	0.22	0.22	0.08	0.08	0.08	0.82	0.82	0.82	0.02	0.01	0.01
Fourth	0.22	0.22	0.22	0.08	0.08	0.08	0.81	0.80	0.82	0.01	-0.02	0.01
* Other = 1 - (White + Black)												
Race Quartile is the ranking of hospitals for each measure by the cross-tab, the first is the lowest quartile and fourth is the highest. The reported rate is the mean within quartile for each race.												

Composite Scores, With Component Scores
Heart Failure
Representative Sample of Hospitals

	Risk Standardized Rates			Contribution to Composite Score			
Composite Score	Readmissions (Pop. Mean: 0.220)	ED Visits (Pop. Mean: 0.081)	E&M Services (Pop. Mean: 0.765)	Readmissions	ED Visits	E&M Services	Number of Index Admissions
0.199	0.190	0.051	0.782	0.120	0.061	0.017	189
0.164	0.206	0.070	0.851	0.056	0.022	0.086	92
0.145	0.201	0.063	0.799	0.075	0.036	0.034	87
0.131	0.205	0.071	0.814	0.060	0.021	0.050	48
0.119	0.214	0.067	0.829	0.026	0.029	0.064	149
0.111	0.217	0.062	0.825	0.012	0.039	0.060	124
0.103	0.208	0.053	0.764	0.049	0.056	-0.001	137
0.096	0.193	0.078	0.744	0.110	0.006	-0.020	168
0.087	0.201	0.070	0.755	0.076	0.021	-0.010	34
0.081	0.207	0.087	0.805	0.052	-0.011	0.041	38
0.075	0.220	0.066	0.810	0.000	0.029	0.046	60
0.069	0.208	0.093	0.811	0.047	-0.024	0.046	136
0.063	0.209	0.068	0.760	0.043	0.025	-0.005	112
0.058	0.218	0.068	0.786	0.009	0.027	0.021	71
0.052	0.208	0.083	0.772	0.048	-0.004	0.008	57
0.047	0.212	0.071	0.758	0.034	0.020	-0.007	130
0.042	0.219	0.072	0.784	0.004	0.019	0.019	84
0.038	0.201	0.084	0.734	0.075	-0.006	-0.031	54
0.033	0.203	0.080	0.727	0.067	0.003	-0.038	51
0.028	0.209	0.072	0.731	0.044	0.018	-0.034	213
0.025	0.212	0.084	0.762	0.032	-0.005	-0.003	151
0.021	0.216	0.091	0.789	0.016	-0.019	0.024	83
0.017	0.217	0.086	0.780	0.012	-0.010	0.015	39
0.013	0.215	0.085	0.766	0.018	-0.007	0.001	42
0.009	0.234	0.064	0.795	-0.056	0.034	0.031	36
0.004	0.218	0.092	0.783	0.008	-0.021	0.018	72
0.001	0.218	0.077	0.751	0.007	0.007	-0.014	44
-0.004	0.227	0.062	0.749	-0.026	0.038	-0.016	201
-0.009	0.208	0.108	0.761	0.049	-0.054	-0.003	28
-0.012	0.230	0.072	0.774	-0.040	0.019	0.009	73
-0.018	0.226	0.081	0.770	-0.023	-0.000	0.006	47
-0.022	0.214	0.087	0.730	0.025	-0.012	-0.035	47
-0.027	0.214	0.092	0.735	0.025	-0.022	-0.030	277
-0.033	0.213	0.106	0.753	0.029	-0.051	-0.011	84
-0.038	0.227	0.070	0.731	-0.027	0.023	-0.034	108
-0.043	0.239	0.052	0.742	-0.077	0.058	-0.023	217
-0.048	0.217	0.079	0.699	0.014	0.004	-0.066	102
-0.054	0.219	0.084	0.711	0.005	-0.006	-0.053	42
-0.060	0.237	0.077	0.763	-0.066	0.008	-0.002	132
-0.068	0.231	0.069	0.716	-0.044	0.025	-0.049	109
-0.075	0.219	0.092	0.705	0.006	-0.022	-0.059	72
-0.082	0.237	0.074	0.733	-0.066	0.015	-0.031	80
-0.090	0.238	0.085	0.752	-0.070	-0.008	-0.012	29
-0.099	0.260	0.049	0.758	-0.158	0.065	-0.006	204
-0.110	0.246	0.070	0.734	-0.102	0.022	-0.031	51
-0.121	0.235	0.085	0.713	-0.062	-0.008	-0.052	112
-0.136	0.240	0.068	0.683	-0.080	0.026	-0.081	243
-0.151	0.232	0.106	0.712	-0.048	-0.051	-0.053	94
-0.182	0.254	0.098	0.750	-0.134	-0.034	-0.015	139
-0.236	0.267	0.085	0.723	-0.187	-0.007	-0.042	54

COLOR KEY
Green: Score in best (dark) or second best (light) quintiles
Red: Sscore in worst (dark) or second worst (light) quintiles

To create the sample, hospitals were first ranked by composite score. Starting with the highest score, the 25th hospital and every 50th hospital after that were selected.

Changes in Rates Sufficient to Move Hospitals to Neighboring Quintile Categories

Supplemental Analysis for NQF Review of Care Transitions Composite Measure

2/23/2010

A question arising from the previous table is how much each hospital's performance on its measures would have to change for the hospital to move to some neighboring quintile category. In order to provide an answer to this question, we selected five hospitals with combination scores in the middle of each of the quintile examples (denoting them as hospitals A, B, C, D, and E) and calculated how much each of their measures would have to alter to move the hospital to another quintile (obviously, hospital A in the top quintile could not move up and hospital E in the bottom quintile could not move down, but otherwise the hospitals could move either up or down, if their performance on a measure or group of measures changed sufficiently).

Table 1 gives the individual measures for the five hospitals selected for illustration.

Table 1: Rates and Quintile Category for Example Hospitals

Hospital	Readmission rate (μ=22.0%)	ED rate (μ=8.1%)	E&M rate (μ=76.5%)	Quintile Category
A	21.4%	6.7%	82.9%	5 star
B	20.8%	8.3%	77.2%	4 star
C	23.4%	6.4%	79.5%	3 star
D	22.7%	7.0%	73.1%	2 star
E	24.6%	7.0%	73.4%	1 star

We should note that the quintile categories of these example hospitals do not align with any individual measure, including the readmission rate which has the highest weight and makes the largest individual contribution. Each hospital's combined overall score and resulting quintile category is a function of all individual measures and not overly dependent on any single one. Even the E&M measure, which has a weight only ¼ as large as the readmission rate makes an important contribution to the overall score, no doubt due to its large variation.

Change in Readmission Rate

Table 2 lists each hospital's observed readmission rate and indicates how much of a change in rate would be needed to move the hospital into an adjacent quintile. The table indicates that reasonably small changes in readmission rates by hospitals (i.e., from .4% to 1.0%) would facilitate a move into a higher or lower quintile category. Of the eight example scenarios, only one - hospital B's lowering its readmission rate by .7% to 20.1% - would result in a readmission rate outside the current range formed by all five hospitals. This indicates how sensitive the quintile ranking might be to an individual measure and

how a reasonably small change might be enough to move the hospital either up or down one ranking.

Table 2: Changes in Readmission Rate Sufficient to Move Hospitals

Hospital	Readmission rate (μ=22.0%)	Current Category	Change to move up to higher quintile	Change to move down to lower quintile
A	21.4%	5 star	--	1.0%
B	20.8%	4 star	-0.7%	0.6%
C	23.4%	3 star	-0.4%	0.7%
D	22.7%	2 star	-0.6%	0.8%
E	24.6%	1 star	-1.0%	--

Change in Emergency Department Rate

Table 3 similarly lists each hospital's observed rate of ambulatory visits to emergency departments and the changes needed to move hospitals to another quintile. The table shows that the changes in ED visit rates prompting such moves would have to be significantly larger (i.e. from .8% to 2.0%), and that in many cases the resulting ED rates would be outside the current range of 6.4% to 8.3%. Due to their lower values and a corresponding smaller variation, the ED measures produce a smaller, albeit still important impact on quintile rankings.

Table 3: Changes in Emergency Department Rate Sufficient to Move Hospitals

Hospital	Emergency Department rate (μ=8.1%)	Current Category	Change to move up to higher quintile	Change to move down to lower quintile
A	6.7%	5 star	--	1.9%
B	8.3%	4 star	-1.3%	1.3%
C	6.4%	3 star	-0.8%	1.2%
D	7.0%	2 star	-1.2%	1.6%
E	7.0%	1 star	-2.0%	--

Change in E&M Rate

Table 4 lists the change in E&M rates needed to move our five example hospitals to neighboring quintiles. It should be noted that because of the way the overall measure is constructed, the sign on the needed changes will be reversed from what they were for ED and readmission rates. Table 4 indicates that changes in E&M rates leading to quintile moves are larger still from any seen before (i.e. from 1.7% to 4.0%). However, because of the large variation in original E&M rates, the resulting rates would still, for the most part, lie within the original range of rates (the one exception is the rate hospital D would need to move it down into the lowest quintile). Obviously, such hypothetical rates would

be feasible and we may conclude that combined, overall scores will be sensitive to their E&M component.

Table 4: Changes in E&M Rate Sufficient to Move Hospitals

Hospital	E&M rate (μ=76.5%)	Current Category	Change to move up to higher quintile	Change to move down to lower quintile
A	82.9%	5 star	--	-3.9%
B	77.2%	4 star	2.6%	-2.5%
C	79.5%	3 star	1.7%	-2.4%
D	73.1%	2 star	2.4%	-3.2%
E	73.4%	1 star	4.0%	--