NATIONAL QUALITY FORUM

Measure Evaluation 4.1
December 2009

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 subcriteria and most of the footnotes from the evaluation criteria are provided in Word comments within the form and will appear if your cursor is over the highlighted area. Hyperlinks to the evaluation criteria and ratings are provided in each section.

TAP/Workgroup (if utilized): Complete all <mark>yellow highlighted</mark> areas of the form. Evaluate the extent to which each subcriterion 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 subcriteria (<mark>yellow</mark> highlighted areas).*

Steering Committee: Complete all <mark>pink</mark> highlighted areas of the form. Review the workgroup/TAP assessment of the subcriteria, 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 subcriteria as indicated)

(for NQF staff use) **NQF Review #:** 1463 **NQF Project:** End Stage Renal Disease	
MEASURE DESCRIPTIVE INFORMATION	

De.1 Measure Title: Standardized Hospitalization Ratio for Admissions

De.2 Brief description of measure*: Risk-adjusted standardized hospitalization ratio for admissions for dialysis facility patients.*

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 N/A

De.4 National Priority Partners Priority Area: Population health
De.5 IOM Quality Domain: Effectiveness
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.3** Measure Steward Agreement: Government entity and in the public domain - no agreement necessary **A.4** Measure Steward Agreement attached:	A Y☐ N☐
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	B Y☐

every 3 years. Yes, information provided in contact section	N☐
C. The intended use of the measure includes <u>both</u> public reporting <u>and</u> quality improvement. ►**Purpose:** Public reporting, Internal quality improvement	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.1Testing:** 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: Affects large numbers, High resource use, Severity of illness **1a.2** **1a.3 Summary of Evidence of High Impact:** Hospitalization rates are an important indicator of patient morbidity and quality of life. On average, dialysis patients are admitted to the hospital twice a year and spend an average of 13 days in the hospital per year [1]. Hospitalizations account for approximately 35 percent of total Medicare expenditures for ESRD patients [1]. Measures of the frequency of hospitalization have the potential to help efforts to control escalating medical costs, and to play an important role in identifying potential problems and helping facilities provide cost-effective health care. At the end of 2007 there were 562,085 patients being dialyzed of which 111,000 were new (incident) ESRD patients [1]. In 2007, total Medicare costs for the ESRD program were $23.9 billion, a 6.1% increase from 2006 [1]. Correspondingly, hospitalization costs for ESRD patients are very high with Medicare costs of over $8 billion in 2007. Hospitalization measures have been in use in the Dialysis Facility Reports (formerly Unit-Specific Reports) since 1995. The Dialysis Facility Reports are used by the dialysis facilities and ESRD Networks for quality improvement, and by ESRD state surveyors for monitoring and surveillance. In particular, the SHR for Admissions is used by ESRD state surveyors in conjunction with other standard criteria for prioritizing and selecting facilities to survey and has been found to be predictive of citations in the past (ESRD State Outcomes List). **1a.4 Citations for Evidence of High Impact:** 1) U S Renal Data System, USRDS 2009 Annual Data Report:	1a C☐ P☐ M☐ N☐

Atlas of Chronic Kidney Disease and End-Stage Renal Disease in the United States, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD, 2009.

1b. Opportunity for Improvement

1b.1 Benefits (improvements in quality) envisioned by use of this measure: Hospitalization rates are an important indicator of patient morbidity and quality of life. On average, dialysis patients are admitted to the hospital twice a year and spend an average of 13 days in the hospital per year. Hospitalizations account for approximately 35 percent of total Medicare expenditures for ESRD patients. Measures of the frequency of hospitalization have the potential to help efforts to control escalating medical costs, and to play an important role in identifying potential problems and helping facilities provide cost-effective health care.

1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across providers:
Standardized hospitalization admission rates vary widely across facilities. For example, for the period 2006 to 2008, the SHR admissions varied from 0.0 to 3.66. The mean value was 0.99 and the SD was 0.28.

1b.3 Citations for data on performance gap:
Annual Dialysis Facility Reports for ESRD Facilities, http://www.dialysisreports.org.

1b.4 Summary of Data on disparities by population group:
Investigations of the SHR by racial, ethnic and gender groups indicate relatively little variation and no substantial disparities among the groups.

1b.5 Citations for data on Disparities:
N/A

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N☐

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***):** Hospitalization rates are an important indicator of patient morbidity and quality of life. On average, dialysis patients are admitted to the hospital twice a year and hospitalizations account for approximately 36 percent of total Medicare expenditures for dialysis patients (U.S. Renal Data System, 2007). Measures of the frequency of hospitalization help efforts to control escalating medical costs, and play an important role in providing cost-effective health care.

1c.2-3. Type of Evidence:

1c.4 Summary of Evidence (*as described in the criteria; for outcomes, summarize any evidence that healthcare services/care processes influence the outcome***):**
N/A

1c.5 Rating of strength/quality of evidence (*also provide narrative description of the rating and by whom*):
N/A

1c.6 Method for rating evidence: N/A

1c.7 Summary of Controversy/Contradictory Evidence: N/A

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

1c.9 Quote the Specific guideline recommendation (*including guideline number and/or page number***):**
N/A

1c.10 Clinical Practice Guideline Citation: N/A
1c.11 National Guideline Clearinghouse or other URL: N/A

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1c.12 Rating of strength of recommendation (*also provide narrative description of the rating and by whom*): N/A **1c.13 Method for r**ating strength of recommendation (*If different from USPSTF system, also describe rating and how it relates to USPSTF*): N/A **1c.14** Rationale for using this guideline over others: N/A	
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Importance to Measure and Report?*	1
Steering Committee: Was the threshold criterion, *Importance to Measure and Report*, met? Rationale:	1 Y☐ N☐
2. SCIENTIFIC ACCEPTABILITY OF MEASURE PROPERTIES	
Extent to which the measure, <u>as specified</u>, 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*): Number of inpatient hospital admissions among eligible patients at the facility during the reporting period. **2a.2** Numerator Time Window (*The time period in which cases are eligible for inclusion in the numerator*): One year. **2a.3** Numerator Details (*All information required to collect/calculate the numerator, including all codes, logic, and definitions*): The numerator is calculated through use of Medicare claims data. When a claim is made for an inpatient hospitalization, the patient is identified and attributed to a dialysis facility following rules discussed below in the denominator details. The numerator is the count of all such hospitalizations over the reporting period. Once CROWNWeb is implemented nationally, the numerator could be calculated from data obtained from the CROWNWeb system. This would require the following data elements: #13.12.6.1 Hospitalizations: Indicates if a patient was hospitalized or went to the hospital emergency room #13.12.6.3 Hospital Admission Date: Indicates the date a dialysis patient was admitted to the hospital or taken to the emergency room The numerator would be calculated by counting the number of non-emergency room hospitalizations over the reporting period. This is indicated by CROWNWeb data element 13.12.6.1 Hospitalizations where only non-emergency room hospitalizations would be selected for the numerator calculation. CROWNWeb data element 13.12.6.3 Hospital Admission Date would be used to determine whether the hospitalization occurred within the reporting period and to determine which dialysis facility the patient is placed in at the time of hospitalization, following rules discussed below in the denominator details. The numerator is the count of all such hospitalizations over the reporting period.	2a-specs C☐ P☐ M☐ N☐
2a.4 Denominator Statement (*Brief, text description of the denominator - target population being*	

measured):
Number of hospital admissions that would be expected among eligible patients at the facility during the reporting period, given the patient mix at the facility.

2a.5 Target population gender: Female, Male
2a.6 Target population age range: All

2a.7 Denominator Time Window (*The time period in which cases are eligible for inclusion in the denominator***):**
One year.

2a.8 Denominator Details (*All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions***):**
For each patient, we identify the dialysis provider at each point in time. Starting with day 91 after onset of ESRD, we attribute patients to facilities according to the following rules. A patient is attributed to a facility once the patient has been treated there for 60 days. When a patient transfers from one facility to another, the patient continues to be attributed to the original facility for 60 days and then is attributed to the destination facility. In particular, a patient is attributed to their current facility on day 91 of ESRD if that facility had treated him or her for at least 60 days. If on day 91, the facility had treated a patient for fewer than 60 days, we wait until the patient reaches day 60 of treatment at that facility before attributing the patient to the facility. When a patient is not treated in a single facility for a span of 60 days (for instance, if there were two switches within 60 days of each other), we do not attribute that patient to any facility. Patients were removed from facilities three days prior to transplant in order to exclude the transplant hospitalization. Patients who withdrew from dialysis or recovered renal function remained assigned to their treatment facility for 60 days after withdrawal or recovery.

Based on a risk adjustment model for the overall national hospitalization rates, we compute the expected number of hospitalizations that would occur for each month that each patient is attributed to a given facility. The sum of all such expectations over patients and months yields the overall expected number of hospital admissions that would be expected given the specific patient mix and this forms the denominator of the measure.

As implemented this measure is based on data from the Standard Information Management System (SIMS) to obtain patient attributions, and data on hospitalizations are obtained from Medicare claims data. Thus, the measure is relevant to patients covered by Medicare. Specific information on the implementation of this measure is described in the SHR Technical Documentation (http://www.dialysisreports.org/pdf/esrd/public/SHRdocumentation.pdf).

Once CROWNWeb is implemented nationally, the denominator could be calculated as described above from the CROWNWeb data, using the following data elements:

#4.1.37 Date Regular Chronic Dialysis Began: Indicates the date that the patient started regular course of dialysis.
#4.3.5 Admit Date: Indicates the date of the patient's first dialysis treatment or home training date at the facility.
#4.3.12 Discharge Date: Indicates the date that the facility discharges the patient.
#4.3.13 Discharge Reason: Indicates the reason a patient was discharged from care at the facility.
#13.12.6.1 Hospitalizations: Indicates if a patient was hospitalized or went to the hospital emergency room.
#13.12.6.3 Hospital Admission Date: Indicates the date a dialysis patient was admitted to the hospital or taken to the emergency room
#13.12.6.4 Hospital Discharge Date: Indicates the date a dialysis patient was discharged from the hospital

2a.9 Denominator Exclusions (*Brief text description of exclusions from the target population***):** None.

2a.10 Denominator Exclusion Details (*All information required to collect exclusions to the denominator, including all codes, logic, and definitions***):**
N/A

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 devised specifically for this measure/condition

2a.14 Risk Adjustment Methodology/Variables (*List risk adjustment variables and describe conceptual models, statistical models, or other aspects of model or method*):
The denominator of the SHR uses expected hospital admissions calculated from a Cox model (Cox, 1972) as extended to handle repeated events (Lawless and Nadeau, 1995; Lin et al., 2000; Kalbfleisch and Prentice, 2002). For computational purposes, we adopt a model with piecewise constant
baseline rates (e.g. Cook and Lawless, 2007) and computational methodology as developed in Liu, Schaubel and Kalbfleisch (2010). A stage 1 model is first fitted to the national data with piecewise-constant baseline rates stratified by facility; hospitalization rates are adjusted for patient age, sex, diabetes, duration of ESRD, nursing home status, BMI at incidence, comorbidity index at incidence, and calendar year. This model allows the baseline hospitalization rates to vary between strata (facilities), but assumes that the regression coefficients are the same across all strata; this approach is robust to possible differences between facilities in the patient mix being treated. The linear predictor for each patient based on the regression coefficients in the stage 1 model is used to compute a risk adjustment factor that is then used as an offset in the stage 2 model.

2a.15-17 Detailed risk model available Web page URL or attachment: URL
http://www.dialysisreports.org/Methodology.aspx

2a.18-19 Type of Score: Ratio
2a.20 Interpretation of Score: Better quality = Lower score
2a.21 Calculation Algorithm (*Describe the calculation of the measure as a flowchart or series of steps*):
http://www.dialysisreports.org/Methodology.aspx

2a.22 Describe the method for discriminating performance *(e.g., significance testing)*:
The measure itself compares the observed number of hospitalizations at the facility to the expected number of hospitalizations that would be expected given the overall national rates and the particular case mix at this facility. Measuring or assessing significance of a large SHR (SHR much greater than 1) is based on two criteria defined by the choice of constants A and B. We assert statistical and/or clinical significance if a test of the null hypothesis SHR less than or equal to A is significant at the 5% level or if the observed SHR is at least B. A choice of A=1.2 and B=1.75, for example, leads to a signal if there is evidence at the 5% level that the true SHR for that facility is at least 20% greater than the national average or if the observed hospitalization rate is at least 75% greater than the national rate. Specific values of A and B are chosen in consultation with the user community and would depend on the use to which the measure is being put. For this example, overall 4.3% of facilities are flagged, with 2.1% having SHR > 1.75, 3.7% with p<0.05, and 1.5% satisfying both criteria.

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)*:
N/A

2a.24 Data Source (*Check the source(s) for which the measure is specified and tested*)
Electronic administrative 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.*):
Data for the hospitalization measures are derived from an extensive national ESRD patient database, which is largely derived from the Standard Information Management System (SIMS) database maintained by the 18 ESRD Networks, the CMS Annual Facility Survey (Form CMS-2744), Medicare dialysis and hospital payment records, the CMS Medical Evidence Form (Form CMS-2728), transplant data from the Organ Procurement and Transplant Network (OPTN), the Death Notification Form (Form CMS-2746), the Nursing Home Minimum Dataset, and the Social Security Death Master File. The database is comprehensive for Medicare patients. Information on hospitalizations is obtained from Medicare Inpatient Claims Standard Analysis Files (SAFs).

2a.26-28 Data source/data collection instrument reference web page URL or attachment: URL
http://www.cms.gov/Manuals/IOM/itemdetail.asp?filterType=none&filterByDID=-99&sortByDID=1&sortOrder=ascending&itemID=CMS018912

2a.29-31 Data dictionary/code table web page URL or attachment: URL
http://www.cms.gov/Manuals/IOM/itemdetail.asp?filterType=none&filterByDID=-
99&sortByDID=1&sortOrder=ascending&itemID=CMS018912&intNumPerPage=10

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

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

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

TESTING/ANALYSIS

2b. Reliability testing

2b.1 Data/sample (*description of data/sample and size*): Reliability of the Standardized Hospital Ratio for Admissions was assessed using data on hospitalizations among ESRD patients over a three year period of 2006-2008 for 4338 dialysis centers. Data for the hospitalization measures are derived from an extensive national ESRD patient database, which is largely derived from the Standard Information Management System (SIMS) database maintained by the 18 ESRD Networks, the CMS Annual Facility Survey (Form CMS-2744), Medicare dialysis and hospital payment records, the CMS Medical Evidence Form (Form CMS-2728), transplant data from the Organ Procurement and Transplant Network (OPTN), the Death Notification Form (Form CMS-2746), the Nursing Home Minimum Dataset, and the Social Security Death Master File. The database is comprehensive for Medicare patients. Information on hospitalizations is obtained from Medicare Inpatient Claims Standard Analysis Files (SAFs).

2b.2 Analytic Method (*type of reliability & rationale, method for testing*):
To assess reliability, we assessed the degree to which the measures were consistent year to year. If one looks at two adjacent time intervals, one should expect that a reliable measure will exhibit correlation over these periods since large changes in patterns affecting the measure should not occur for most centers over shorter periods. Year to year variability in the SHR values was assessed across the years 2006, 2007 and 2008 based on the 4338 dialysis centers for which an SHR is reported in the 2010 DFRs.

2b.3 Testing Results (*reliability statistics, assessment of adequacy in the context of norms for the test conducted*):
The correlation between SHR admissions across adjacent years (2006 versus 2007 and 2007 vs 2008) was approximately 0.67 indicating that centers with large or small SHR tended to have larger or smaller SHR on the following year. These correlations were highly significant. Similarly, there was persistence in SHRs that were significant from year to year. For example, there were 4.3% of facilities that had significant evidence of a true SHR of at least 1.2 in 2006. Of those that were significantly larger than 1.2 in 2006, 1.8/4.3 = 42% were again significantly larger than 1.2 in 2007. Of those that were not significant in 2006, only 2.5% were found to be significantly larger than 1.2 in 2007.
The measure is based on complete data and is not subject to judgment or rater variability. Hence the measures of inter-rater variability are not relevant here.

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2c. Validity testing

2c.1 Data/sample (*description of data/sample and size*): Validity of the Standardized Hospital Ratio for Admissions was assessed using data on hospitalizations as well as other quality measures among ESRD patients over a three year period of 2006-2008. We examined the validity of the measure by examining its covariability with other measures of quality as well as by examining the relationship of the overall hospitalization measure with measures that were more directly focused on specific causes.

2c.2 Analytic Method (*type of validity & rationale, method for testing*):
We have assessed the validity of the measure through various comparisons of this measure with other

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quality measures in use.

Also, hospitalization measures were reviewed by a TEP in 2007 and overall measures based on admissions and on days were recommended for inclusion in the Dialysis Facility reports. In addition, hospitalization is a major cost factor in the management of ESRD patients as noted earlier, so there is here a very strong case for face validity of the SHR admissions measure.

2c.3 Testing Results *(statistical results, assessment of adequacy in the context of norms for the test conducted)*:

The SHR Admissions measure is correlated with the Standardized Mortality Ratio (SMR) over the three year cohort (r=0.40) and in individual years r was approximately equal to 0.33, both correlations being highly significant. In addition, SHR Admissions is negatively correlated in each of the three year with percent of patients in the facility with AV Fistula (r=-0.27, -0.23, -0.21). Thus higher values of SHR are associated with lower usage of AV Fistulas. On the other hand, SHR admissions is positively correlated with catheter use (r=0.24, 0.23, 0.22), indicating that higher values of SHR are associated with increased use of catheters. These correlations are all highly significant (p<0.001). The SHR Admissions is also found to be negatively correlated (r=-0.10, p<0.0001) with the percent of patients with URR>65, again in the direction expected. The SHR Admissions is an overall measure of hospital use and is comprised of many different causes or reasons for hospitalization. The TEP considered the possibility of devising cause specific SHRs, but recommended the use of overall SHR measures due to various reasons including the lack of clear research to indicate what causes should be selected as indicative of poor ESRD care and issues associated with inter-rater reliability in assessing cause of hospitalization. The TEP reached a strong consensus that the overall measures should give a reliable and valid measure that would typically be related to quality of care. We have some crude measures of cause of hospitalization which we have taken to assess the relationship between the overall measure and cause specific components. These measures are useful in assessing the overall SHR measures, but we caution that the cause specific hospitalizations have not been tested or validated at this time. The overall SHR Admissions is strongly correlated with the SHR for cause specific hospitalizations. The correlation with Septicemia is r=0.44, with Chronic Heart Failure is r=0.55 and with an overall measure including Septicemia and a collection of coronary causes is r=0.66. Thus the overall hospitalization rate also correlates strongly with causes that are commonly thought to be potentially related to poor quality of care.

2d. Exclusions Justified	
2d.1 Summary of Evidence supporting exclusion(s):	
N/A	
2d.2 Citations for Evidence:	
N/A	
	2d
2d.3 Data/sample *(description of data/sample and size)*: N/A	C☐
	P☐
2d.4 Analytic Method *(type analysis & rationale)*:	M☐
N/A	N☐
2d.5 Testing Results *(e.g., frequency, variability, sensitivity analyses)*:	NA☐
N/A	

2e. Risk Adjustment for Outcomes/ Resource Use Measures

2e.1 Data/sample *(description of data/sample and size)*: Risk adjustment is based on a Cox model for the average rate of hospital admissions as described above. The data used are national data on Medicare covered patients from all dialysis facilities in the US. The current model was developed based on Medicare patient hospitalization for the period 2006-08 including hospitalizations from over 500,000 dialysis patients and over 4,000 dialysis facilities.

2e.2 Analytic Method *(type of risk adjustment, analysis, & rationale)*:

The risk adjustment is based on a Cox or relative risk model. The adjustment is made for patient age, sex, diabetes, duration of ESRD, nursing home status, BMI at incidence, comorbidity index at incidence, and calendar year. In this model, covariates are taken to act multiplicatively on the admission rate and the

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adjustment model is fitted with facility defining strata so as to provide valid estimates even if the distribution of adjustment variables differs across facilities. Relevant references are Cox (1972), Kalbfleisch and Prentice (2002), Lawless and Nadeau (1995), Lin et al. (2000), Cook and Lawless (2007) and Liu, Schaubel and Kalbfleisch (2010). All analyses are done using SAS.

The adjustments included in the model are measured at baseline and are all statistically significant in the model. Two-way interactions were examined and selected for the final model based on both the magnitude and statistical significance of the estimates.

2e.3 Testing Results *(risk model performance metrics)*:
Decile plots showing piecewise linear estimates of the cumulative rates by years since start of ESRD are plotted in Figure 1 of the attached document "SHR Admissions Risk Model Performance Metrics". The plot shows that the risk factors in the model are discriminating well between patients. There is good separation among all 10 groups and the ordering is as predicted by the model (patients predicted to be at lower risk have lower hospitalization rates). The absolute differences between the groups is also large with patients predicted to have the highest hospitalization rates (line 10) having 3 times higher hospitalization rates than those predicted to have the lowest rates (line 1). Martingale residual plots were also examined and did not indicate problems with the model fit. There was no pattern in the residuals that suggested lack of fit in any of the variables considered. In the LOESS plots attached, the LOESS curve for the mean of the residuals is flat indicating that there is no problem with the fit for each of the variables considered (Figures 2-4 in the attached document "SHR Admissions Risk Model Performance Metrics"). The adjustment variables are highly predictive of the hospital admissions, and model extensions to examine interactions suggest a good overall fit.

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)*: Assessment of the SHR Admissions was made using data on hospitalizations among ESRD patients over a three year period of 2006 to 2008. **2f.2** Methods to identify statistically significant and practically/meaningfully differences in performance *(type of analysis & rationale)*: Measuring or assessing significance of a large SHR (SHR much greater than 1) is based on two criteria defined by the choice of constants A and B. We assert statistical and/or clinical significance if a test of the null hypothesis SHR less than or equal to A is significant at the 5% level or if the observed SHR is at least B. A choice of A=1.2 and B=1.75, for example, leads to a signal if there is evidence at the 5% level that the true SHR is at least 20% greater than the national average or if the observed hospitalization rate is at least 75% greater than the national rate. Specific values of A and B are chosen in consultation with the user community and would depend on the use to which the measure is being put. For this example, overall 4.3% of facilities are flagged, with 2.1% having SHR > 1.75, 3.7% with p<0.05, and 1.5% satisfying both criteria. **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)*: In the 2006-2008 cohort, the distribution of SHR Admissions is positively skewed with a minimum value of 0.0 and a maximum value of 3.66. The mean value is 0.99 with a standard deviation of 0.2790. The first, second and third quartiles of the distribution are 0.81, 0.97, and 1.15.	**2f** C ☐ P ☐ M ☐ N ☐
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**

2h.1 If measure is stratified, provide stratified results *(scores by stratified categories/cohorts)*: N/A **2h.**2 If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans: N/A	C ☐ P ☐ M ☐ N ☐ NA ☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Scientific Acceptability of Measure Properties?*	2
Steering Committee: Overall, to what extent was the criterion, *Scientific Acceptability of Measure Properties*, met? Rationale:	*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: In use **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*): We plan to include the SHR in the public site Dialysis Facility Compare in the next cycle and will be submitting the measure for public comment soon. **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*): Hospitalization measures have been in use in the Dialysis Facility Reports (formerly Unit-Specific Reports) since 1995. The Dialysis Facility Reports are used by the dialysis facilities and ESRD Networks for quality improvement, and by ESRD state surveyors for monitoring and surveillance. In particular, the SHR for Admissions is used by ESRD state surveyors in conjunction with other standard criteria for prioritizing and selecting facilities to survey. See http://www.dialysisreports.org/. **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)*: N/A **3a.**5 Methods *(e.g., focus group, survey, QI project)*: N/A **3a.**6 Results *(qualitative and/or quantitative results and conclusions)*: N/A	**3a** C ☐ P ☐ M ☐ N ☐
3b/3c. Relation to other NQF-endorsed measures **3b.**1 NQF # and Title of similar or related measures:	
(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?	**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: **5.1** 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: N/A	3c C☐ P☐ M☐ N☐ NA☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Usability?*	3
Steering Committee: Overall, to what extent was the criterion, *Usability*, met? Rationale:	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 Rating
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? Data generated as byproduct of care processes during care delivery (Data are generated and used by healthcare personnel during the provision of care, e.g., blood pressure, lab value, medical condition)	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. N/A	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: Hospitalization measures have been in use in the Dialysis Facility Reports (formerly Unit-Specific Reports) since 1995. Data are derived from various existing data bases as described earlier. Specific assumptions and conventions used in the calculations are described in the SHR Technical Notes. There is a lag of approximately nine months needed to collect the hospital data through the CMS claims data files.	4e C☐ P☐ M☐ N☐

4e.2 Costs to implement the measure (*costs of data collection, fees associated with proprietary measures*): N/A **4e.3** Evidence for costs: N/A **4e.4** Business case documentation: Patient health care for ESRD patients carries high costs associated with hospitalization. Inefficient and inappropriate management of all aspects of patient ESRD care carries a high cost for both providers and payers. Since hospital admissions are associated with increased cost, efforts to reduce hospitalization may potentially result in cost-savings.	
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Feasibility*?	4
Steering Committee: Overall, to what extent was the criterion, *Feasibility*, met? Rationale:	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:	Y☐ N☐ A☐

CONTACT INFORMATION

Co.1 Measure Steward (Intellectual Property Owner)
Co.1 <u>Organization</u>
Centers for Medicare & Medicaid Services, 7500 Security Boulevard, Baltimore, Maryland, 21244

Co.2 <u>Point of Contact</u>
Thomas, Dudley, Thomas.Dudley@cms.hhs.gov, 410-786-1442-

Measure Developer If different from Measure Steward
Co.3 <u>Organization</u>
Arbor Research/UM-KECC, 315 W. Huron Street, Ann Arbor, Michigan, 48103

Co.4 <u>Point of Contact</u>
Adrienne, Janney, adrienne.janney@arborresearch.org, 734-665-4108-

Co.5 Submitter If different from Measure Steward POC
Thomas, Dudley, Thomas.Dudley@cms.hhs.gov, 410-786-1442-, Centers for Medicare & Medicaid Services

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.
October 2007 SHR Technical Expert Panel Members
Dr. Christopher Hollenbeak (The Pennsylvania State University College of Medicine)
Dr. Derrick Latos (Wheeling Renal Care)
Dr. Dana Mukamel (University of California, Irvine)
Dr. John Newmann (Health Policy Research & Analysis, Inc.)

Dr. Norma Ofsthun (Fresenius Medical Care North America) Dr. Chirag Parikh (Yale University School of Medicine) Dorian Schatell, MS (Medical Education Institute) Dr. Jay Wish (University Hospital of Cleveland)
Ad.2 If adapted, provide name of original measure: **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? Three years. **Ad.9** When is the next scheduled review/update for this measure? 2013
Ad.10 Copyright statement/disclaimers:
Ad.11 -13 Additional Information web page URL or attachment: Attachment SHR Admissions Risk Model Performance Metrics.pdf
Date of Submission (*MM/DD/YY*): 03/04/2011