Guide to the New and Modified Measures of the Quarterly Dialysis Facility Care Compare – Preview Report

Overview, Methodology, and Interpretation

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I. Purpose and Overview

The *Guide to the New and Modified Measures in the Quarterly Dialysis Facility Care Compare (QDFCC) – Preview Report* is a supplemental document to the *Guide to the Quarterly Dialysis Facility Care Compare (QDFCC) Report*. Together, these guides explain in detail the contents of the QDFCC preview reports that were prepared for each dialysis facility under contract to the Centers for Medicare & Medicaid Services (CMS). The guides include discussions of methodological issues relevant to particular sections of each report and descriptions of each data summary. For more information about the purpose and overview of these guides and the reports, please refer to the *Guide to the Quarterly Dialysis Facility Care Compare (QDFCC) – Preview Report* found on the DFCC Methods tab of DialysisData.org.

II. New and Modified Measures

The table "*Upcoming New and Modified Measures*" in the report provides information about emergency encounters, patient mortality for all Medicare dialysis patients treated at your facility during the specified time period, hospitalization admissions among all Medicare dialysis patients, readmissions of Medicare-covered hospitalizations and transfusions among all adult Medicare dialysis patients treated at your facility, along with state and national comparisons for corresponding reporting periods.

The information in this table will be neither released publicly on the DFCC website nor included in the star rating at this time.

COVID-19 Adjustment

This section describes the methods we used to implement COVID-19 adjustment in the modified Standardized Mortality, Hospitalization, Readmission and Transfusion Ratios. Due to the unique characteristics of each measure, the method of adjustment varies for each and is specified below.

Standardized Mortality Ratio

The modified SMR is adjusted for COVID-19 diagnosis based on inpatient Medicare claims. To account for the time-dependent impact of COVID-19, patients are classified as being in a COVID-19 period immediately following an inpatient COVID-19 diagnosis, until death or until they survive 90 days post-infection. After 90 days, the COVID-19 indicator resets after the period of heightened risk for mortality due to COVID-19, and the patient is no longer classified as having COVID-19.

Standardized Hospitalization Ratio

The modified SHR is adjusted for COVID-19 diagnosis based on inpatient Medicare claims. Patients with an inpatient COVID-19 event are identified as COVID-19 patients beginning on the discharge date of the first COVID-19 inpatient Medicare claim, or Index COVID-19 Hospitalization (ICovH), and are tracked for the following 6 months. The period following the ICovH is categorized into one of three mutually exclusive stages: the first month (days 1-30), the second month (days 31-60), or the 3rd – 6th month (days 61-180). Once it has been 6 months since the ICovH discharge, a patient is no longer classified as having COVID-19.

Standardized Readmission Ratio

The modified SRR is adjusted for COVID-19 diagnosis based on inpatient Medicare claims only. A claim record is confirmed as a COVID-19 diagnosis if the patient's inpatient claim reports any

COVID-19 diagnosis codes (ICD-10-CM: U071, B9729, J1282). Since comorbidities in the SRR are based solely on inpatient claims, we do not include COVID-19 diagnoses or other diagnoses from claims associated only with laboratory testing or outpatient visits. As opposed to SMR and SHR, the COVID period is not divided into sub-periods and is maintained as one covariate in the model.

Standardized Transfusion Ratio

Information on COVID-19 diagnosis for modified STrR is obtained from Medicare claims Part A and Part B. Since this measure uses outpatient claims for some transfusions, the measure is based on all Medicare fee-for-service (FFS) patients. Medicare Advantage patients are excluded. Patients with a COVID-19 event on February 20, 2020 or later (including during the Extraordinary Circumstance Exceptions (ECE) period of March-June 2020) are identified as COVID-19 patients. The COVID-19 clock starts at the claims from date of the first COVID-19 diagnosis and is assumed to continue after the first diagnosis date. We divided the period following the first COVID-19 diagnosis into three stages: the first month (days 1-30) after the first COVID-19 diagnosis is defined as "COVID1"; the second month (days 31-60) is defined as "COVID2"; more than two months (> 60 days) after the first diagnosis date is defined as "COVID3". In this way, STrR allows for separate parameters measuring the COVID-19 effect during the 1st month, the 2nd month, and more than two months. "COVID1", "COVID2", and "COVID3" are all included as covariates in the model, while "No COVID" is the reference group.

Standardized Emergency Department Encounter Ratio (SEDR) (1.1-1.7)

The Standardized Emergency Department Encounter Ratio is defined to be the ratio of the observed number of emergency department (ED) encounters that occur for adult Medicare ESRD dialysis patients treated at a particular facility to the number of encounters that would be expected given the characteristics of the dialysis facility's patients and the national norm for dialysis facilities. Note that in this document an "emergency department encounter" always refers to an outpatient encounter that does not end in a hospital admission. It enables a comparison of your facility's experience to the national average. A value of less than 1.00 indicates that your facility's total number of ED visits was less than expected, based on national ratios; whereas a value of greater than 1.00 indicates that your facility had a ratio of total ED visits higher than the national average. Note that this measure is adjusted for the actual patient characteristics of age, sex, diabetes, nursing home status, comorbidities at incidence, BMI at onset of ESRD, calendar year, and prevalent comorbidities. Additionally, the estimate is compared to the US ratios of ED visits for adult Medicare ESRD dialysis patients for the same year.

Eligible patients (1.1)

The number of Medicare dialysis patients included in the ED visit summaries is based on dialysis patients who received treatment in your facility according to the conventions described in Section III "*Assigning Patients to Facilities*" in the *Guide to QDFCC Report*. We also require that patients reach a certain level of Medicare-paid dialysis bills or that patients have Medicare inpatient claims during the period. Specifically, a patient-month within a given dialysis patient-period is included in the SEDR calculation if that month in the period is considered "eligible"; a month is deemed eligible if it is within two months of a month having at least $1,200 of Medicare-paid dialysis claims or at least one Medicare inpatient claim. Patient-months are excluded if patients are enrolled in Medicare Advantage coverage at the same month.

Patient-years at risk (1.2)
The number of patient years at risk indicates the total amount of time we followed patients in this table's analyses. For all patients, time at risk began at the start of the facility treatment period (see Section III "*Assigning Patients to Facilities*" in the *Guide to QDFCC Report*.) and continued until the earliest occurrence of the following: three days prior to a transplant; date of death; end of facility treatment; or December 31 of the year. Since a facility may have treated a patient for multiple periods during the same year, patient years at risk includes time at risk for all periods of treatment at your facility. Please note that the SEDR is not reported if the facility has less than five patient years at risk.

Emergency department events (1.3)
This is the total number of ED encounters among the Medicare dialysis patients assigned to this facility. Emergency department (ED) encounters are identified from Medicare outpatient claims using revenue center codes that indicate an ED visit (0450, 0451, 0452, 0453, 0454, 0455, 0456, 0457, 0458, 0459, and 0981). Note that this means that we include both outpatient ED visits and those that result in an observational stay, but not those that result in a hospital admission. The total number of emergency department encounters includes multiple encounters (i.e., second, third, etc.) for the same patient during the reporting period.

Expected number of emergency department events (1.4)
We calculated the expected number of ED visits among Medicare dialysis patients in a facility based on national rates for ED visits in the same year. The expected number of ED visits is calculated from a Cox model, adjusting for patient age, sex, diabetes, nursing home status, patient comorbidities at incidence, BMI at incidence, calendar year, and prevalent comorbidities. For each patient, the expected number is adjusted for the characteristics of that patient and summing over all patients gives the result.

Standardized Emergency Department Ratio (1.5)
The SEDR is calculated by dividing the observed total ED visits in 1.3 by the expected total ED visits in 1.4. It enables a comparison of your facility's experience to the national average. A value of less than 1.00 indicates that your facility's total number of ED visits was less than expected, based on national ratios; whereas a value of greater than 1.00 indicates that your facility had a ratio of total ED visits higher than the national average. Additionally, the estimate is compared to the US ED visit ratios for adult Medicare ESRD dialysis patients the same year.

Confidence Limit (1.5)
The 95% confidence interval (or range of uncertainty) gives a range of plausible values for the true ratio of facility-to-national ED visits, in light of the observed SEDR. The upper and lower confidence limits enclose the true ratio approximately 95% of the time if this procedure were to be repeated on multiple samples. Statistically significant confidence intervals do not contain the ratio value 1.00.

P-value (1.6)
The p-value measures the statistical significance of (or evidence against) the hypothesis that the true ED visit ratio for your facility is the same as (neither higher nor lower than) what would be

predicted from the overall national ratio of ED visits. The p-value is the probability that the observed SEDR would deviate from 1.00 as much as it does under the null hypothesis that this ratio is truly equal to 1.00. A small p-value (often taken as <0.05) indicates that the observed ratio would be highly unlikely under the null hypothesis, and the observed SEDR suggests that the ratio between the observed and expected ED visits differs significantly from 1.00. The smaller the p-value, the lower the probability that a facility's ratio of ED visits is equal to the national ratio. Note that the p-value is less than 0.05 whenever the confidence interval does not include the value 1.00. Because the p-value depends on the facility size, a small p-value in a large facility does not necessarily indicate that the difference between this facility's ratio and the national ratio is of clinical importance.

The SEDR's actual value can be used to assess the clinical importance of the difference between your facility's and the national ratios of ED visits. An SEDR of 1.25, for example, indicates that your facility's ratio is 25% higher than the national average, which may well be judged to be clinically important. On the other hand, SEDR values in the range of 0.95 to 1.05 would generally not be considered to be of clinical interest. With very large facilities, however, even relatively small differences in the SEDR can lead to significant results, so both aspects (the actual value of the SEDR and the p-value) are important.

Classification Category (1.7)

If the facility SEDR is less than 1.00 and statistically significant ($p<0.05$), the classification is "Better than Expected". If the ratio is greater than 1.00 and statistically significant ($p<0.05$), the classification is "Worse than Expected". Otherwise, the classification is "As Expected" on DFCC.

Standardized Ratio of Emergency Department Encounters Occurring within 30 Days of Hospital Discharge (ED30) (2.1-2.6)

The Standardized Ratio of Emergency Department Encounters Occurring within 30 Days of Hospital Discharge for Dialysis Facilities (ED30) is defined to be the ratio of observed over expected events. This report includes summaries of ED30 ratios among adult Medicare ESRD dialysis patients in your facility, along with regional and national ED30 ratios for comparison. The numerator is the number of index discharges from acute care hospitals that are followed by an outpatient emergency department encounter within 4-30 days after discharge. This numerator is counted over a two-year period among eligible adult Medicare dialysis patients treated at a particular dialysis facility.

The denominator is the expected number of index discharges followed by an ED encounter within 4-30 days during a two-year period given the discharging hospital's characteristics. The probability that a given discharge results in an ED encounter is based on a hierarchical logistic model that adjusts for the discharging hospital of the index hospitalization and for the patient characteristics of age, sex, diabetes as cause of ESRD, duration of ESRD at index hospital discharge, comorbidities in the year preceding the index hospital discharge, length of a nursing home stay 365 days prior to discharge, length of stay of the index hospital discharge, BMI at onset of ESRD and year of the index hospital discharge. Note that in this document, acute care hospital includes critical access hospitals, and "emergency department encounter" always refers to an outpatient encounter that does not end in a hospital admission.

Index hospital discharges (2.1)
We use Medicare inpatient hospital claims to identify acute hospital discharges. Among these acute hospital discharges, all live discharges of eligible patients in a calendar year are considered eligible for this measure. Those that do not meet one of the index discharge exclusion criteria described in the next section are considered index discharges. Please note that the ED30 is not reported if the facility has fewer than 11 index discharges.

Total ED visits within 30 days of hospital discharge (2.2)
The observed number of index hospital discharges during a two-year period that are followed by an emergency department encounter within 4–30 days of the discharge among eligible patients at a facility.

Expected total ED visits within 30 days of hospital discharge (2.3)
The expected number of index hospital discharges during the two-year period that is followed by an emergency department encounter within 4-30 days of the discharge among eligible patients at a facility. The expected value is the result of a risk-adjusted predictive model adjusted for the characteristics of the patients, the dialysis facility, and the discharging hospitals.

Standardized ED visits within 30 days of hospital discharge (2.4)
We calculated the ED30 by dividing the observed total ED visits within 30 days of hospital discharge in 2.2 by the expected total ED visits within 30 days of index discharges in 2.3. This allows a comparison of your facility's experience to what should be expected on the basis of the national norm. A value of less than 1.00 indicates that your facility's total number of ED visits within 30 days of hospital discharge is less than expected, based on national ratios; whereas a value of greater than 1.00 indicates that your facility had a ratio of total ED visits within 30 days of hospital discharge higher than what would be expected given national ratios. In addition, the estimate is compared with the US ED30 ratios for the same year.

Confidence Limit (2.4)
The 95% confidence interval (or range of uncertainty) gives a range of plausible values for the true ratio of facility-to-national ED30 discharge, in light of the observed ED30. The upper and lower confidence limits enclose the true ratio approximately 95% of the time if this procedure were to be repeated on multiple samples. Statistically significant confidence intervals do not contain the ratio value 1.00.

P-value (2.5)
The p-value measures the statistical significance of (or evidence against) the hypothesis that the true ED30 ratio for a facility is the same as what would be predicted from the overall national ratio. The p-value is the probability that the observed ED30 would deviate from 1.00 as much as it does, under the null hypothesis that the ratio is truly equal to 1.00. A smaller p-value indicates that the observed ED30 is not likely due to chance and occurs when the observed ED30 differs markedly from 1.00. A p-value of less than 0.05 suggests that the ratio between the observed and expected ED30 differs significantly from 1.00. The smaller the p-value, the lower the probability that a facility's ED30 ratio is equal to the national ED30 ratio. A small p-value helps rule out the

possibility that an ED30's deviance from 1.00 could have arisen by chance. However, a small p-value does not indicate the degree of importance of the difference between your facility's ED30 ratio and the nation's.

The ED30's actual quantitative value reflects the clinical importance of the difference between your facility's and the national ED30 ratios. An ED30 of 1.25, for example, indicates that your facility's ED30 ratio is 25% higher than the national average, which may well be judged to be clinically important. On the other hand, ED30 values in the range of 0.95 to 1.05 would generally not be considered to be of clinical interest. With very large facilities, however, even relatively small differences in the ED30 can lead to significant results, so both aspects (the actual value of the ED30 and the p-value) are important.

Classification Category (2.6)
If the facility ED30 is less than 1.00 and statistically significant ($p<0.05$), the classification is "Better than Expected". If the ratio is greater than 1.00 and statistically significant ($p<0.05$), the classification is "Worse than Expected". Otherwise, the classification is "As Expected" on DFCC.

Standardized Mortality Ratio (SMR) (3.1-3.8)
In the first section of the table, we have calculated a relative mortality rate, or Standardized Mortality Ratio (SMR), for Medicare patients in your facility. The SMR compares the observed death rate in your facility to the death rate that was expected based on national death rates during that year for patients with the same characteristics as those in your facility (Wolfe, 1992). The SMR uses expected mortality calculated from a Cox model (SAS Institute Inc., 2000; Andersen, 1993; Collett, 1994), adjusting for calendar year, patient age, race, ethnicity, sex, diabetes, duration of ESRD, nursing home status, patient comorbidities at incidence, prevalent comorbidities, body mass index (BMI) at incidence, Medicare Advantage coverage, COVID-19 diagnosis, and population death rates.

The SMR accounts for many patient characteristics known to be associated with mortality, but cannot account for all factors that may explain differences in mortality between facilities. For example, since the SMR accounts for age and diabetes, an older average age or large percentage of diabetic patients at a facility would not elevate the SMR. Other factors, such as nutritional status or factors relating to the process of care are not accounted for. Therefore, if the SMR statistic indicates potential differences in mortality for your facility compared to regional or national averages, please consider the role other important factors play within your facility. As with the hospitalization summaries which are described below, you will find the mortality summaries most informative if you use them as part of an integrated quality assurance process.

Medicare Patients (3.1)
We based the mortality summaries on Medicare dialysis patients who received treatment in your facility according to the conventions described in Section III of the *Guide to the Quarterly Dialysis Facility Care Compare (QDFCC) Report*. We also require that patients reach a certain level of Medicare-paid dialysis bills to be included in mortality statistics, or that patients have Medicare inpatient claims during the period. For the purpose of analysis, each patient's follow-up time is broken into periods defined by time since dialysis initiation. For each patient, months within a given period are included if that month in the period is considered 'eligible'; a month is deemed

eligible if it is within two months of a month having at least $1,200 of Medicare-paid dialysis claims or at least one Medicare inpatient claim. Patients are also included if they are in the same month of Medicare Advantage coverage.

Patient Years at Risk (3.2)

The number of patient years at risk indicates the total amount of time we followed patients in this table's analyses. For all patients, time at risk began at the start of the facility treatment period and continued until the earliest occurrence of the following: one day prior to a transplant; date of death; end of facility treatment; or December 31 of the year. Since a facility may have treated a patient for multiple periods during the same year, patient years at risk includes time at risk for all periods of treatment at your facility.

Deaths (3.3)

We reported the number of deaths that occurred among Medicare dialysis patients during the four years. This count does not include deaths from street drugs or accidents unrelated to treatment. Deaths from these causes varied by facility, with certain facilities (in particular, urban facilities that treated large numbers of male and young patients) reporting large numbers of deaths from these causes and others reporting extremely low numbers (Turenne, 1996). Since these deaths are unlikely to have been due to treatment facility characteristics, we excluded them from the calculations.

Expected Deaths (3.4)

We used a Cox model to calculate the expected deaths for each patient based on the characteristics of that patient, the amount of follow-up time (patient years at risk) for that patient during the year, and the calendar year (SAS Institute Inc., 2000; Andersen, 1993; Collett, 1994). We adjusted the Cox model for calendar year, age, race, ethnicity, sex, diabetes, years since start of ESRD, nursing home status, patient comorbidities at incidence, prevalent comorbidities, patient BMI at incidence (BMI = weight(kg) / height^2(m^2)), Medicare Advantage coverage, and COVID-19 diagnosis. We also controlled for age-adjusted population death rates by state and race, based on the U.S. population in 2014-2016 (2017 National Center for Health Statistics, 2018). As with the deaths in 3.3, we then summed these expected deaths in order to obtain the total number of deaths expected for each year at your facility, and we summed the annual values to yield the expected number of deaths over the four-year period for each facility.

Standardized Mortality Ratio (SMR) (3.5)

The SMR equals the ratio of the actual number of deaths (3.3) divided by the expected number of deaths (3.4). It estimates the ratio of facility death rate relative to the national death rate in the same year. Qualitatively, the degree to which your facility's four-year SMR varies from 1.00 is the degree to which it exceeds (>1.00) or is under (<1.00) the national death rates for patients with the same characteristics as those in your facility. Quantitatively, if your facility's death rates equal the national death rates (in deaths per patient year or per year at risk) times a multiplicative constant, then the SMR estimates that multiplicative constant. If the multiplicative constant varies for different subgroups of patients, then the SMR estimates a weighted average of those constants according to your facility's patient mix. For example, an SMR=1.10 would indicate that your

facility's death rates typically exceed national death rates by 10% (e.g., 22 deaths observed where 20 were expected, according to your facility's patient mix). Similarly, an SMR=0.95 would indicate that your facility's death rates are typically 5% below the national death rates (e.g., 19 versus 20 deaths). An SMR=1.00 would indicate that your facility's death rates equal the national death rates.

We calculated the regional summaries as the ratio of the total number of observed deaths among patients from each region to the number of expected deaths among patients from each region (3.3/3.4).

Why the national SMR may not be exactly equal to 1.00

The reported SMR for the U.S. as a whole may not be precisely equal to 1.00. The SMR value for the U.S. given in the DFCC does not include all U.S. dialysis facilities in its calculation. In particular, as discussed in the Overview, transplant-only, VA facilities, and non-Medicare facilities are not included in the geographic summaries.

Random variation

The SMR estimates the true ratio of death rates at your facility relative to the national death rates. An SMR value that differs from 1.00 indicates that your facility's death rates differ from the national death rate. However, the SMR's value varies from year to year above and below the true ratio, due to random variation. Thus, your facility's SMR could differ from 1.00 due to random variation rather than to a fundamental difference between your facility's death rates and the national death rate. Both the p-value and the confidence interval, discussed below, will help you interpret your facility's SMR in the face of such random fluctuations. We based our calculations of both items on an assumed Poisson distribution for the number of deaths at your facility.

Confidence Interval (Range of Uncertainty) for SMR

The 95% confidence interval (or range of uncertainty) gives a range of plausible values for the true ratio of facility-to-national death rates, in light of the observed SMR. The upper and lower confidence limits enclose the true ratio approximately 95% of the time if this procedure were to be repeated on multiple samples. Statistically significant confidence intervals do not contain the ratio value 1.00.

P-value for SMR (3.6)

The p-value measures the statistical significance of (or evidence against) the hypothesis that the true death rate for your facility is the same as (neither higher nor lower than) what would be predicted from the overall national death rate. The p-value is the probability that the observed SMR would deviate from 1.00 as much as it does, under the null hypothesis that this ratio is equal to 1.00. A small p-value (often taken as <0.05) suggests the ratio between the observed and expected death rates differs significantly from 1.00. The smaller the p-value, the lower the probability that a facility's death rate is equal to the national death rate. Note that the p-value is less than 0.05 whenever the confidence interval does not include the value 1.00. Because the p-value depends on the facility size, a small p-value in a large facility does not necessarily indicate that the difference between this facility's death rate and the national rate is of clinical importance.

The SMR's actual value can be used to assess the clinical importance of the difference between your facility's and the national death rates. An SMR of 1.25, for example, indicates that your facility's death rate is 25% higher than the national average, which may well be judged to be clinically important. On the other hand, SMR values in the range of 0.95 to 1.05 would generally not be considered to be of clinical interest. With very large facilities, even relatively small differences in the SMR can lead to significant results, so both aspects (the actual value of the SMR and the p-value) are important.

Classification Category (3.7)

If the facility SMR is less than 1.00 and statistically significant ($p<0.05$), the classification is "Better than Expected". This classification is based on the measure ratio, not the rate. If the ratio is greater than 1.00 and statistically significant ($p<0.05$), the classification is "Worse than Expected". Otherwise, the classification is "As Expected" on DFCC. Please note that the SMR is not reported if it is based on fewer than three expected deaths.

Mortality Rate (per 100 patient-years) and Confidence Interval (Range of Uncertainty) for Mortality Rate (3.8)

The mortality rate and confidence interval for the mortality rate are calculated by multiplying the SMR (and confidence interval for SMR) by the national rate of mortality.

Standardized Hospitalization Ratio (SHR): Admissions (4.1-4.8)

The SHR (admissions) is calculated by dividing the observed total admissions in 1j by the expected total admissions in 1k. As with the SMR, it enables a comparison of your facility's experience to the national average. A value of less than 1.00 indicates that your facility's total number of admissions was less than expected, based on national rates; whereas a value of greater than 1.00 indicates that your facility had a rate of total admissions higher than the national average. Note that this measure is adjusted for the actual patient characteristics of age, sex, diabetes as cause of ESRD, duration of ESRD, Medicare Advantage coverage, nursing home status, BMI at incidence, comorbidities at incidence, prevalent comorbidities and COVID-19 diagnosis. Additionally, the estimate is compared to the US hospitalization rates for Medicare dialysis patients for the same year.

Medicare Patients (4.1)

The number of Medicare dialysis patients included in the hospitalization summaries are based on dialysis patients who received treatment in your facility according to the conventions described in Section III of the *Guide to the Quarterly Dialysis Facility Care Compare (QDFCC) Report*. We also require that patients reach a certain level of Medicare-paid dialysis bills, or that patients have Medicare inpatient claims during the period, or that patients are under Medicare Advantage coverage according to the Medicare Enrollment Database. Specifically, a patient-month within a given dialysis patient-period is included in the SHR calculation if that month in the period is considered 'eligible'; a month is deemed eligible if it is within two months of a month having at least $1,200 of Medicare-paid dialysis claims or at least one Medicare inpatient claim. Patients are also included if they are in the same month of Medicare Advantage coverage.

Patient Years at Risk (4.2)

The number of patient years at risk indicates the total amount of time we followed patients in this table's analyses. For all patients, time at risk began at the start of the facility treatment period (see Section III of the *Guide to the Quarterly Dialysis Facility Care Compare (QDFCC) Report*) and continued until the earliest occurrence of the following: three days prior to a transplant; date of death; end of facility treatment; or December 31 of the year. Since a facility may have treated a patient for multiple periods during the same year, patient years at risk includes time at risk for all periods of treatment at your facility.

Total Admissions (4.3)

This is the total number of inpatient hospital admissions among the Medicare dialysis patients assigned to this facility. The total number of admissions includes multiple admissions (i.e., second, third, etc. hospitalizations for the same patient). If a patient was admitted near the end of one year and not discharged until the following calendar year (e.g., admitted on 12/28/2013 and discharged on 1/6/2014), the admission would count only in the second year (zero admissions in 2013 and one admission in 2014). Index COVID-19 Hospitalizations (ICovH) are not counted toward the total number of hospital admissions.

Expected Total Admissions (4.4)

We calculated the expected number of hospital admissions among Medicare dialysis patients in a facility based on national rates for hospital admissions in the same year. The expected number of admissions is calculated from a Cox model, adjusting for patient age, sex, diabetes as cause of ESRD, duration of ESRD, nursing home status, patient comorbidities at incidence, BMI at incidence, Medicare Advantage coverage, prevalent comorbidities and COVID-19 diagnosis. Duration of ESRD is divided into six intervals with cut points at 6 months, 1 year, 2 years, 3 years, and 5 years and hospitalization rates are estimated separately within each interval. For each patient, the time at risk in each ESRD interval is multiplied by the (adjusted) national admissions rate for that interval, and a sum over the intervals gives the expected number of admissions for each patient. For each patient, the expected number is adjusted for the characteristics of that patient and summing over all patients gives the result.

Standardized Hospitalization Ratio (SHR) for Admissions (4.5)

The SHR (admissions) is calculated by dividing the observed total admissions in 1j by the expected total admissions in 1k. As with the SMR, it enables a comparison of your facility's experience to the national average. A value of less than 1.00 indicates that your facility's total number of admissions was less than expected, based on national rates; whereas a value of greater than 1.00 indicates that your facility had a rate of total admissions higher than the national average. Additionally, the estimate is compared to the US hospitalization rates for Medicare dialysis patients the same year.

Confidence Interval (Range of Uncertainty) for SHR (4.5)

The 95% confidence interval (or range of uncertainty) gives a range of plausible values for the true ratio of facility-to-national hospitalization rates, in light of the observed SHR. The upper and lower confidence limits enclose the true ratio approximately 95% of the time if this procedure were to

be repeated on multiple samples. Statistically significant confidence intervals do not contain the ratio value 1.00.

P-value for SHR (4.6)

The p-value measures the statistical significance of (or evidence against) the hypothesis that the true hospitalization rate for your facility is the same as (neither higher nor lower than) what would be predicted from the overall national hospitalization rate. The p-value is the probability that the observed SHR would deviate from 1.00 as much as it does under the null hypothesis that this ratio is truly equal to 1.00. A small p-value (often taken as <0.05) indicates that the observed ratio would be highly unlikely under the null hypothesis, and the observed SHR suggests that the ratio between the observed and expected hospitalization rates differs significantly from 1.00. The smaller the p-value, the lower the probability that a facility's hospitalization rate is equal to the national hospitalization rate. Note that the p-value is less than 0.05 whenever the confidence interval does not include the value 1.00. Because the p-value depends on the facility size, a small p-value in a large facility does not necessarily indicate that the difference between this facility's hospitalization rate and the national rate is of clinical importance.

The SHR's actual value can be used to assess the clinical importance of the difference between your facility's and the national hospitalization rates. An SHR of 1.25, for example, indicates that your facility's hospitalization rate is 25% higher than the national average, which may well be judged to be clinically important. On the other hand, SHR values in the range of 0.95 to 1.05 would generally not be considered to be of clinical interest. With very large facilities, even relatively small differences in the SHR can lead to significant results, so both aspects (the actual value of the SHR and the p-value) are important.

Classification Category (4.7)

If the facility SHR is less than 1.00 and statistically significant ($p<0.05$), the classification is "Better than Expected". This classification is based on the measure ratio, not the rate. If the ratio is greater than 1.00 and statistically significant ($p<0.05$), the classification is "Worse than Expected". Otherwise, the classification is "As Expected" on DFCC. Please note that the SHR is not reported if the facility has less than 5 patient years at risk.

Hospitalization Rate (per 100 patient-years) and Confidence Interval (Range of Uncertainty) for Hospitalization Rate (4.8)

The hospitalization rate and confidence interval for the hospitalization rate are calculated by multiplying the SHR (and confidence interval for SHR) by the national rate of hospitalization.

Standardized Hospital Readmission (SRR) Summary for Dialysis Patients (5.1-5.8)

Unplanned readmission rates are an important indicator of patient morbidity and quality of life. On average, dialysis patients are admitted to the hospital nearly twice a year and hospitalizations account for approximately 38% of total Medicare expenditures for dialysis patients (U.S. Renal Data System, 2018). In 2010, 37% of dialysis patient discharges from an all-cause hospitalization were followed by an unplanned readmission within 30 days (U.S. Renal Data System, 2018). Measures of the frequency of unplanned readmissions, such as SRR, help efforts to control escalating medical costs, play an important role in providing cost-effective health care, and support

coordination of care across inpatient and outpatient settings. Preventive interventions such as fluid weight management, management of mineral and bone disease, anemia management as well as post-discharge processes of care (medication reconciliation) by dialysis facilities, and coordination of care with other providers in the pre and post-discharge periods (communication with the dialysis provider; medication reconciliation) have the potential to prevent hospital readmissions for ESRD dialysis patients. Preventing hospital readmissions is regarded as a shared responsibility that can be impacted by both dialysis providers and hospitals.

This report includes summaries of unplanned readmission rates among Medicare dialysis patients in your facility, along with regional and national hospitalization rates for comparison. These summaries are based on administrative data obtained primarily from Medicare claims and are risk adjusted for the discharging hospital and for patient-level factors. This readmission rate, as well as the SHR, can be viewed as giving a partial assessment of hospital resource utilization across facilities.

Like the SMR and SHR, the SRR compares your facility's observed number of unplanned readmissions with the number that would be expected if patients at your facility were instead subject to the national average readmission rate. The expected number is computed given the number and characteristics of the hospital discharges during the year. The probability that a given discharge results in a readmission is based on a hierarchical logistic model that adjusts for the discharging hospital of the index hospitalization and for the patient characteristics of age, sex, diabetes, age and diabetes interaction, duration of ESRD at index hospital discharge, comorbidities in the year preceding the index hospital discharge, the presence of a high-risk diagnosis at index hospital discharge, length of a nursing home stay 365 days prior to discharge, Medicare Advantage status at time of discharge, length of stay of the index hospital discharge, and BMI at onset of ESRD.

Index Discharges (5.1)

Index discharges are those hospitalizations that serve as starting points for identifying readmissions. This is the number of Medicare-covered hospital discharges occurring at acute-care hospitals in the calendar year for dialysis patients treated at your facility. Note that this does not include discharges from long-term care hospitals (LTCHs) or skilled nursing facilities (SNFs). An index discharge is attributed to the dialysis facility to which the patient is assigned as of his/her discharge date.

Total Readmissions (5.2)

The number of readmissions for the facility is defined as the number of index discharges followed by an unplanned readmission within 4-30 days of discharge—in other words, the number of index discharges for which the next admission was unplanned and occurred within 4-30 days of the index discharge. Like index discharges, those hospitalizations considered as potential readmissions are restricted to hospitalizations for inpatient care at acute care hospitals. Note that a hospitalization identified as a readmission may also be an index discharge.

The readmission is assigned to the index discharge dialysis facility regardless of the treatment facility at the time of readmission. In other words, if a patient is discharged from a hospital while

assigned to Facility A, transfers to Facility B on his or her 15th day after hospital discharge, then is readmitted to the hospital on the 20th day after discharge while in Facility B, that readmission will be attributed to Facility A, not to Facility B.

Expected Total Readmissions (5.3)

We calculated the number of hospital readmissions that would be expected given the set of index discharges of dialysis patients in your facility based on national rates for hospital readmissions in the same year. The expected number of readmissions is calculated from a hierarchical logistic model, adjusted for the discharging hospital of the index hospitalization and for the patient characteristics of age, sex, diabetes, age and diabetes interaction, COVID-19 diagnosis, duration of ESRD at index hospital discharge, comorbidities in the year preceding the index hospital discharge, the presence of a high-risk diagnosis at index hospital discharge, length of a nursing home stays 365 days prior to discharge, Medicare Advantage status at time of discharge, length of stay of the index hospital discharge, COVID diagnosis, and BMI at onset of ESRD. For each patient, the expected number is adjusted for the characteristics of that patient.

Standardized Readmission Ratio (SRR) (5.4)

We calculated the SRR by dividing the observed total readmissions in 1p by the expected total readmissions in 1q. As with the SMR and SHR, the SRR compares your facility's experience to what should be expected on the basis of the national norm. A value of less than 1.00 indicates that your facility's total number of readmissions is less than expected, based on national rates; whereas a value of greater than 1.00 indicates that your facility had a rate of total readmissions higher than would be expected given national rates. In addition, the estimate is compared with the US readmission rates for the same year.

Confidence Interval (Range of Uncertainty) for SRR (5.5)

The 95% confidence interval (or range of uncertainty) gives a range of plausible values for the true ratio of facility-to-national readmission rates, in light of the observed SRR. The upper and lower confidence limits enclose the true ratio approximately 95% of the time if this procedure were to be repeated on multiple samples. Statistically significant confidence intervals do not contain the ratio value 1.00.

P-value for SRR (5.6)

The p-value measures the statistical significance of (or evidence against) the hypothesis that the true readmission rate for a facility is the same as what would be predicted from the overall national rate. The p-value is the probability that the observed SRR would deviate from 1.00 as much as it does, under the null hypothesis that the ratio is truly equal to 1.00. A smaller p-value indicates that the observed SRR is not likely due to chance and occurs when the observed SRR differs markedly from 1.00. A p-value of less than 0.05 suggests that the ratio between the observed and expected readmission rates differs significantly from 1.00. The smaller the p-value, the lower the probability that a facility's readmission rate is equal to the national readmission rate. A small p-value helps rule out the possibility that an SRR's deviance from 1.00 could have arisen by chance. However, a small p-value does not indicate the degree of importance of the difference between your facility's readmission rate and the nation's.

The SRR's actual quantitative value reflects the clinical importance of the difference between your facility's and the national readmission rates. An SRR of 1.25, for example, indicates that your facility's readmission rate is 25% higher than the national average, which may well be judged to be clinically important. On the other hand, SRR values in the range of 0.95 to 1.05 would generally not be considered to be of clinical interest. With very large facilities, even relatively small differences in the SRR can lead to significant results, so both aspects (the actual value of the SRR and the p-value) are important.

Readmission Rate (percentage of hospital discharges) and Confidence Interval (Range of Uncertainty) for Readmission Rate (5.7)

The readmission rate and confidence interval for the readmission rate are calculated by multiplying the SRR (and confidence interval for SRR) by the national rate of readmission.

Classification Category (5.8)

If the facility SRR is less than 1.00 and statistically significant ($p<0.05$), the classification is "Better than Expected". This classification is based on the measure ratio, not the rate. If the ratio is greater than 1.00 and statistically significant ($p<0.05$), the classification is "Worse than Expected". Otherwise, the classification is "As Expected" on DFCC. Please note that the SRR is not reported if the facility has fewer than 11 index discharges.

Standardized Transfusion Ratio (STrR) (6.1-6.8)

Blood transfusion may be an indicator for underutilization of treatments to increase endogenous red blood cell production (e.g. erythropoiesis-stimulating agents (ESAs), iron). In addition, dialysis patients who are eligible for kidney transplant are at some risk of becoming sensitized to the donor pool through exposure to tissue antigens in blood products, thereby making transplant more difficult to accomplish. Blood transfusions also carry a small risk of transmitting blood borne infections and the development of a reaction to the transfusion. Using infusion centers or hospitals to transfuse patients is expensive, inconvenient, and could compromise future vascular access.

Monitoring the risk-adjusted transfusion rate at the dialysis facility level, relative to a national standard, allows for detection of differences in dialysis facility anemia treatment patterns. This is of particular importance due to recent FDA guidance regarding the use of ESAs and new economic incentives to minimize ESA use introduced by Medicare bundling payment for ESAs. In early 2012, a highly publicized United States Renal Data System (USRDS) study presented at the National Kidney Foundation (NKF) clinical meeting reported increased dialysis patient transfusion rates in 2011 compared to 2010. As providers use less ESAs in an effort to minimize the risks associated with aggressive anemia treatment it becomes more important to monitor for an over-use of blood transfusions to treat ESRD-related anemia.

This report includes summaries of the transfusion rates among adult Medicare dialysis patients in your facility, along with comparative state and national data. Because the intention behind the measure is to detect the possibility of underutilization of alternatives to transfusion, patients' time at risk and transfusion events are not included if they occur within one year of diagnoses contraindicating the use of ESAs. In particular, patients' time at risk is excluded beginning with

a Medicare claim for hemolytic or aplastic anemia, solid organ cancer, lymphoma, carcinoma in situ, coagulation disorders, multiple myeloma, myelodysplastic syndrome and myelofibrosis, leukemia, head and neck cancer, other cancers (connective tissues, skin, and others), metastatic cancer, and sickle cell anemia. Once a patient is diagnosed with one of these comorbidities, a patient's time at risk is included only after a full year free of claims that list any diagnosis on the exclusions list.

Transfusion rates are similar to hospitalization rates in that patients can be transfused more than once during a year and transfusion data are not always as complete as mortality data. As with the hospitalization statistics, this section of the table should ideally include only patients whose Medicare billing records include all transfusions for the period. To achieve this goal, we also require that patients reach a certain level of Medicare-paid dialysis bills to be included in transfusion statistics, or that patients have Medicare inpatient claims during the period. For the purpose of analysis, each patient's follow-up time is broken into periods defined by time since dialysis initiation. For each patient, months within a given period are included if that month in the period is considered 'eligible'; a month is deemed eligible if it is within two months of a month having at least $1,200 of Medicare-paid dialysis claims or at least one Medicare inpatient claim. In setting this criterion, our aim is to achieve completeness of information on transfusions for all patients included in the years at risk.

Like the SMR, SHR, and SRR, the STrR is intended to compare your facility's observed number of transfusions to the number that would be expected if patients at your facility were instead subject to the national average transfusion rates for that same year, adjusted by patient characteristics, as described here. The expected national rates are calculated from Cox models (SAS Institute Inc., 2000; Andersen, 1993; Collett, 1994) which make adjustments for patient age, diabetes, duration of ESRD, nursing home status, patient comorbidities at incidence, BMI at incidence, COVID diagnosis, and calendar year.

In 2021, the specifications for the Standardized Transfusion Ratio were revised. 1) Patient time at risk excludes time during which a patient is enrolled in Medicare Advantage, according to the Medicare Enrollment Database. 2) We used a broader definition of transfusion events. The revised definition includes inpatient transfusion events for claims that include only 038 or 039 revenue codes without an accompanying procedure or value code. This broader definition of transfusion events results in an increased total number of events identified as well as the range of total events for dialysis facilities.

Adult Medicare Patients (6.1)

The number of adult Medicare dialysis patients included in the transfusion summaries (6.1) is generally smaller than the number of patients included in the mortality and hospitalization summaries ((1.1) and (4.1)) because of the exclusion criteria. See above.

Patient Years at Risk (6.2)

The number of patient years at risk indicates the total amount of time patients were followed in this table's analyses. For all patients, time at risk began at the start of the facility treatment period and continued until the earliest occurrence of the following: a Medicare claim indicating a

diagnosis on the exclusions list, three days prior to a kidney transplant, death, end of facility treatment, or December 31 of the year. Patients whose time at risk was terminated due to a comorbidity on the exclusions list will have future time at risk included beginning after a full year free of claims with diagnoses on the exclusions list. Since a facility may have treated a patient for multiple periods during the same year, patient years at risk includes time at risk for all periods of treatment at your facility.

Total Transfusions (6.3)

This is the total number of transfusion events during eligible time-at-risk among the adult Medicare dialysis patients assigned to this facility. The total number of transfusion events includes multiple transfusions (i.e., second, third, etc. transfusions for the same patient).

Our method for counting transfusion events relies on a conservative counting algorithm and, because of the way transfusion information is reported in Medicare claims, we use different rules for counting transfusion events, depending on whether or not the event occurs in the inpatient setting, or an outpatient setting. The most common way that events are reported on claims is by reporting a revenue center, procedure, or value code (inpatient claims) or for outpatient claims, reporting Healthcare Common Procedure Coding System (HCPCS) codes with at least one revenue center codes.

One "transfusion event" is counted per inpatient claim if one or more transfusion-related procedure or value codes are present. We only count a single transfusion event for an inpatient claim regardless of the number of transfusion revenue center, procedure and value codes reported so that the number of discrete events counted is the same whether the claim indicates 1 unit of blood or multiple units of blood. This results in a very conservative estimate of blood transfusions from inpatient claims.

Transfusion events are not common in outpatient settings, but similar rules apply. One or more transfusion-related HCPCS codes with at least one transfusion-related revenue center codes, or one or more transfusion-related value codes listed on an outpatient claim are counted as a single transfusion event regardless of the number of units of blood recorded. In other words, 3 units of blood would be counted as a single transfusion event. A detailed list of procedure codes, value codes, and System HCPCS codes used to identify transfusion events is included in a separate document available at www.DialysisData.org under the DFCC Methods tab.

Expected Total Transfusion (6.4)

We calculated the expected number of transfusion events among Medicare dialysis patients in a facility based on national rates for transfusion events in the same year. The expected number of transfusion events is calculated from a Cox model, adjusting for patient age, diabetes, duration of ESRD, nursing home status, patient comorbidities at incidence, BMI at incidence, and COVID-19 diagnosis. Duration of ESRD is divided into six intervals with cut points at 6 months, 1 year, 2 years, 3 years, and 5 years and transfusion rates are estimated separately within each interval. For each patient, the time at risk in each ESRD interval is multiplied by the adjusted national transfusion rate for that interval, and a sum over the intervals gives the expected number of transfusions for each patient. For each patient, the expected number is adjusted for the characteristics of that patient and summing over all patients gives the result reported in 6.4.

Standardized Transfusion Ratio (STrR) (6.5)

The STrR is calculated by dividing the observed total transfusions in 6.3 by the expected total transfusions in 6.4. As with the SMR and SHR, the STrR enables a comparison of your facility's experience to the national average. A value of less than 1.00 indicates that your facility's total number of transfusion events was less than expected, based on national rates; whereas a value of greater than 1.00 indicates that your facility had a rate of total transfusion events higher than the national average. Note that this measure is adjusted for the actual patient characteristics of age, diabetes, duration of ESRD, nursing home status, comorbidities at incidence, and BMI in your facility. Additionally, the estimate is compared to the US transfusion rates for the same year.

Confidence Interval (Range of Uncertainty) for STrR (6.6)

The 95% confidence interval (or range of uncertainty) gives a range of plausible values for the true ratio of facility-to-national transfusion rates, in light of the observed STrR. The upper and lower confidence limits enclose the true ratio approximately 95% of the time if this procedure were to be repeated on multiple samples. Statistically significant confidence intervals do not contain the ratio value 1.00.

P-value for STrR (6.7)

The p-value measures the statistical significance of (or evidence against) the hypothesis that the true transfusion rate for a given facility is the same as (neither higher nor lower than) what would be predicted from the overall national transfusion rate. The p-value is the probability that the observed STrR would deviate from 1.00 as much as it does, under the null hypothesis that this ratio is truly equal to 1.00. A small p-value (often taken as <0.05) suggests the ratio between the observed and expected transfusion rates differs significantly from 1.00. The smaller the p-value, the lower the probability that a facility's transfusion rate is equal to the national transfusion rate. Note that the p-value is less than 0.05 whenever the confidence interval does not include the value 1.00. Because the p-value depends on the facility size, a small p-value in a large facility does not necessarily indicate that the difference between this facility's transfusion rate and the national rate is of clinical importance.

The STrR's actual value can be used to assess the clinical importance of the difference between your facility's and the national transfusion rates. A STrR of 1.25, for example, indicates that your facility's transfusion rate is 25% higher than the national average, which may well be judged to be clinically important. On the other hand, STrR values in the range of 0.95 to 1.05 would generally not be considered to be of clinical interest. With very large facilities, even relatively small differences in the STrR can lead to significant results, so both aspects (the actual value of the STrR and the p-value) are important.

Transfusion Rate (per 100 patient-years) and Confidence Interval (Range of Uncertainty) for Transfusion Rate (6.8)

The transfusion rate and confidence interval for the transfusion rate are calculated by multiplying the STrR (and confidence interval for STrR) by the national rate of transfusion.

Classification Category

Classification is based on the STrR, not the transfusion rate. If your facility's STrR is less than 1.00 and statistically significant ($p<0.05$), the classification is "Better than Expected". If the STrR is greater than 1.00 and statistically significant ($p<0.05$), the classification is "Worse than Expected". Otherwise, the classification is "As Expected" on DFCC. Please note that the STrR is not reported if there are fewer than 10 patient years at risk in your facility in the year.

III. Modified Facility Star Rating Calculation

Overview

The table "*Upcoming Modified Quality of Patient Care Star Rating*" reports the star rating, ranging from one to five stars, associated with the facility. The April 2023 DFCC release only includes the use of a baseline period (January 2018 – December 2021 for SMR, January 2018 – December 2020 for SWR, January – December 2021 for all other measures) to calculate the measure scores. The assignment of star ratings are based on the cutoffs for final facility scores set in the same baseline period. Thirteen of the fifteen Quality Measures (QMs) reported on the Medicare.gov website were used in the algorithm to calculate the star rating. Methods will be described briefly below and detailed information on the Star Rating methodology is available in the *Technical Notes on the Dialysis Facility Quality of Patient Care Star Rating Methodology*, dated October 2022. . You may also view the *Star Rating Measure Scoring Tables and Instructions* on the DFCC Methodology page of DialysisData.org to help in calculating individual measure scores.

The thirteen QMs used in the calculation are grouped into different QM domains. Specifically, domains are empirically derived using factor analysis and assessing correlations among the QMs. Factor analysis detects underlying latent factors that are the source of correlations between variables. The method led to the creation of four domains of QMs. The first domain comprises the COVID-adjusted standardized measures for mortality, hospitalizations, readmissions, and transfusions (SMR, SHR, SRR, and STrR, respectively) and is named Domain 1. The standardized fistula rate (SFR) and long-term catheter measures form Domain 2. All Kt/V and Hypercalcemia QMs form Domain 3. Standardized First Kidney Transplant Waitlist Ratio for Incident Dialysis Patients (SWR) and Percentage of Prevalent Patients Waitlisted (PPPW) form Domain 4. A facility's measure scores are first averaged within each of the four domains to calculate domain scores. Facilities are then given a final score by taking a weighted average of the four domain scores. Domains 1, 2, 3, and 4 will constitute 2/7, 2/7, 1/7, and 2/7 of a facility's final score, respectively. Please note that Domain 3 is weighted half as much as the other domains. Facilities are eligible to receive a final score if they have at least one measure value in each domain. Note that facilities providing only peritoneal dialysis do not have measure values for Domain 2. These facilities are rated based on a weighted average of the other domain scores, where Domains 1, 3, and 4 constitute 2/5, 1/5, and 2/5 of their final scores, respectively.

As the DFCC QMs have different distributions, scales, and direction of better performance, the measure values are transformed into measure scores in order to make the metrics comparable. Transformation of measure values into measure scores are described below.

Baseline Period

Percentage Measures
The five percentage QMs (Total Kt/V, Hypercalcemia, Long-Term Catheter Rate, SFR, and PPPW) vary in their distributions. These measures are scored with truncated z-scores.

Truncated z-scores represent the number of standard deviations away from the mean, truncated at a maximum/minimum allowed value. During the truncation process, these measures are iteratively re-scored to ensure a final mean of 0 and variance of 1.

Standardized Ratio Measures
The five standardized ratio QMs are scored differently than the five percentage QMs since the quality associated with a unit change in a ratio measure is not equally spaced. Probit scoring better reflects spacing differences than z-scores, which assume equal spacing. In addition, since the probit function maps percentiles of the standardized ratio measures to a distribution with mean 0 and variance 1, this type of scoring can be easily combined with the percentage measures.

Domain 1
Domain 1 Score (1)
The score for this domain is between -2.58 and 2.58 and was computed by averaging the measure scores for measures within the Domain 1. Suppressed measures were treated as missing when calculating the domain score. If there was at least one non-missing measure in the domain, the missing measures in the domain were given the average measure score to limit the non-missing measures from being too influential. If all measures within the domain were missing, then the domain did not receive a score. All four measures in Domain 1 were risk-adjusted for COVID-19 diagnosis.

Standardized Mortality Ratio (SMR) (1.1)
The SMR equals the ratio of the observed number of deaths at your facility divided by the expected number of deaths, as compared to the national death rate in the same year, adjusted for facility patient case mix, including incident patient comorbidities. A lower ratio is better. Please see Section II of this guide for more information about the COVID-adjusted SMR.

Measure Score: SMR (1.2)
This measure is scored using percentile ranking and probit scoring technique in order to accommodate for the unequal spacing with a unit change in a ratio measure. Percentiles ranging from 0.5 to 99.5 in increments of 0.5 are used, resulting in 199 distinct percentiles. The associated minimum probit score is -2.58 and the maximum probit score is 2.58.

Standardized Hospitalization Ratio (Admissions) (SHR) (1.3)
The SHR (admissions) is calculated by dividing the observed total admissions by the expected number of admissions. As with the SMR, it enables a comparison of your facility's experience to the national average. A lower ratio is better. Please see Section II of this guide for more information about the SHR.

Measure Score: SHR (1.4)
Same method as for SMR. Please see "Measure Score: SMR" above for description.

Standardized Readmission Ratio (SRR) (1.5)
The SRR is calculated by dividing the total number of unplanned hospital readmissions by the expected number of admissions. As with the SMR, it enables a comparison of your facility's experience to the national average. A lower ratio is better. Please see Section II of this guide for more information about the SRR.

Measure Score: SRR (1.6)
Same method as for SMR. Please see "Measure Score: SMR" above for description.

Standardized Transfusion Ratio (STrR) (1.7)
The STrR is calculated by dividing your facility's observed total transfusions by the expected number of transfusions. As with the SMR and SHR, the STrR enables a comparison of your facility's experience to the national average. A lower ratio is better. Please see Section II of this guide for more information about the STrR.

Measure Score: STrR (1.8)
Same method as for SMR. Please see "Measure Score: SMR" above for description.

Domain 2
Domain 2 Score (2)
The score for this domain is between -2.58 and 2.58 and was computed by averaging the measure scores for measures within this domain. Suppressed measures were treated as missing when calculating the domain score. If there was at least one non-missing measure in the domain, the missing measures in the domain were given the average measure score to limit the non-missing measures from being too influential. If all measures within this domain were missing, then the domain did not receive a score. Note, however, that facilities which service only peritoneal dialysis patients are not expected to have measures in this domain and, therefore, this domain is not included in the calculation of the star rating for these PD-only facilities.

Standardized Fistula Rate (SFR) (2.1)
Adjusted percentage of adult hemodialysis patient-months using an arteriovenous fistula (AVF) as the sole means of vascular access (higher is better). Percentages based on 10 or fewer patients are shown in this table but will be reported as 'Not Available' on DFCC.

Measure Score: SFR (2.2)
This measure is scored with truncated z-scores. Truncated z-scores represent the number of standard deviations away from the mean, truncated at a maximum/minimum allowed value. The upper and lower truncation bounds are different for each measure and are chosen so that all final measure scores have a maximum range of -2.58 to 2.58.

Long-Term Catheter Rate (2.3)
Percentage of adult hemodialysis patient-months using a catheter continuously for three months or longer for vascular access (lower is better). Percentages based on 10 or fewer patients are shown in this table but will be reported as 'Not Available' on DFCC.

Measure Score: Catheter (2.4)
This measure is scored with truncated z-scores. Truncated z-scores represent the number of standard deviations away from the mean, truncated at a maximum/minimum allowed value. The upper and lower truncation bounds are different for each measure and are chosen so that all final measure scores have a maximum range of -2.58 to 2.58.

Domain 3

Domain 3 Score (3)
The score for this domain is between -2.58 and 2.58 and was computed by averaging the measure scores for measures within this domain. Suppressed measures were treated as missing when calculating the domain score. If there was at least one non-missing measure in the domain, the missing measures in the domain were given the average measure score to limit the non-missing measures from being too influential. If all measures within this domain were missing, then the domain did not receive a score.

Adult HD: Kt/V ≥1.2 (3.1)
Percentage of adult hemodialysis patients who had enough wastes removed from their blood during dialysis: Kt/V greater than or equal to 1.2 (higher is better). Percentages based on 10 or fewer patients are shown in this table but will be reported as 'Not Available' on DFCC.

Adult PD: Kt/V ≥1.7 (3.2)
Percentage of adult peritoneal dialysis patients who had enough wastes removed from their blood during dialysis: Kt/V greater than or equal to 1.7 (higher is better). Percentages based on 10 or fewer patients are shown in this table but will be reported as 'Not Available' on DFCC.

Pediatric HD: Kt/V ≥1.2 (3.3)
Percentage of pediatric hemodialysis patients who had enough wastes removed from their blood during dialysis: Kt/V greater than or equal to 1.2 (higher is better). Percentages based on 10 or fewer patients are shown in this table but will be reported as 'Not Available' on DFCC.

Pediatric PD: Kt/V ≥1.8 (3.4)
Percentage of pediatric peritoneal dialysis patients who had enough wastes removed from their blood during dialysis: Kt/V greater than or equal to 1.8 (higher better). Percentages based on 10 or fewer patients are shown in this table but will be reported as 'Not Available' on DFCC.

Total Kt/V ≥ specified threshold (3.5)
The individual Kt/V measures were combined into one overall measure for calculation of the domain score. The percentage of patients that achieve Kt/V greater than the specified thresholds for the respective modality and adult or pediatric age group was weighted based on the number of patient-months of data available. The resulting combined measure (Total Kt/V) represents the percentage of total dialysis patients who had enough wastes removed from their blood (Kt/V greater than or equal to specified threshold). If the overall Kt/V percentage is based on 10 or fewer patients, then it is reported as 'Not Available' in this table.

Measure Score: Overall Kt/V (3.6)
Same method as for Catheter. Please see "Measure Score: Catheter" above for description.

Serum calcium > 10.2 mg/dL (3.7)
Percentage of adult dialysis patients who had an average calcium over the past three months greater than 10.2 mg/dL (hypercalcemia) (lower is better). Percentages based on 10 or fewer patients are shown in this table but will be reported as 'Not Available' on DFCC.

Measure Score: Hypercalcemia (3.8)
Same method as for Catheter. Please see "Measure Score: Catheter" above for description.

Domain 4

Domain 4 Score (4)
The score for this domain is between -2.58 and 2.58 and was computed by averaging the measure scores for measures within this domain. Suppressed measures were treated as missing when calculating the domain score. If there was at least one non-missing measure in the domain, the missing measures in the domain were given the average measure score to limit the non-missing measures from being too influential. If all measures within this domain were missing, then the domain did not receive a score.

Standardized First Kidney Transplant Waitlist Ratio for Incident Dialysis Patients (SWR) (4.1)
The SWR equals the ratio of the observed number of transplant waitlist events or receipt of a living-donor transplant divided by the expected number of transplant waitlist events or living donor transplant events. A higher ratio is better. Please see Section V of the *Guide to the Quarterly Dialysis Facility Care Compare (QDFCC) Report* for more information about the SWR.

Measure Score: SWR (4.2)
This measure is scored using percentile ranking and probit scoring technique in order to accommodate for the unequal spacing with a unit change in a ratio measure. Percentiles ranging from 0.5 to 99.5 in increments of 0.5 are used, resulting in 199 distinct percentiles. The associated minimum probit score is -2.58 and the maximum probit score is 2.58.

Percentage of Prevalent Patients Waitlisted (PPPW) (4.3)
The PPPW measure tracks the percentage of patients at each dialysis facility who were on the kidney or kidney-pancreas transplant waitlist. It is an adjusted percentage of waitlist events among dialysis patients. Results are averaged across patients who were assigned to the dialysis facility as of the last day of each month during the reporting year, adjusted for age (higher is better).

Measure Score: PPPW (7ab)
This measure is scored with truncated z-scores. Truncated z-scores represent the number of standard deviations away from the mean, truncated at a maximum/minimum allowed value. The upper and lower truncation bounds are different for each measure and are chosen so that all final measure scores have a maximum range of -2.58 to 2.58.

Final Score and Overall Star Rating

Final score (5)

The measure scores are combined to create a final facility score for each facility. First, each facility is given domain scores between -2.58 and 2.58 by averaging the measure scores within each of the four domains. Facilities are then given a final score between -2.58 and 2.58 by averaging the domain scores. Facilities are given final scores as long as they have at least one measure in each domain. Note again that facilities which only service peritoneal dialysis patients are not expected to have measures in Domain 2 (SFR, Catheter) and therefore this domain is not included in the calculation of the star rating for these PD-only facilities. These facilities will still receive a final score based on the average of the other three domains, provided those domains have at least 1 non-missing measure in each of them.

Missing values for facilities that qualify for ratings are assigned the mean of the scores given to that measure. In the baseline period, the missing value is imputed with the mean of the measure in the *baseline period*. This method of imputation ensures that one measure does not exert too much influence on the domain score, and in turn, the final score used to determine the Star Rating. For example, if one facility had the maximum measure score of 2.58 for STrR and had missing values for SMR and SHR, it would not be appropriate to assume that Domain 1 should be given the maximum score of 2.58 for the two missing measures (i.e., SMR and SHR) based on the one available measure for that domain (i.e., STrR).

Overall Star Rating (6)

The final score cutoffs for the star rating are defined using the *baseline year* data. Final score cutoffs for the baseline period are set so that approximately 10%, 20%, 40%, 20%, 10% facilities are assigned 1-, 2-, 3-, 4-, 5-stars, respectively, in order to maintain the longitudinal continuity of the star ratings. The final score cutoffs calculated based on these proportions are retained and used to define star rating categories until a new baseline year is established.

Some facilities will not receive a star rating if they are missing (or had suppressed) all measures in at least one domain (excepting PD-only facilities) or if they are new facilities. Facilities that only service peritoneal dialysis patients will not have measures in Domain 2 but will still receive a star rating based on the average of the other three domains, provided those domains have at least 1 non-missing measure in each of them. If a star rating is not provided, the table will say “Not Available” along with an explanation indicated by a footnote.