Guide to the Quarterly Dialysis Facility Compare – Preview for October 2017 Report:

*Overview, Methodology, and Interpretation*

*July 2017*
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I. Purpose of this Guide and the Quarterly Dialysis Facility Compare Reports

This guide explains in detail the contents of the Quarterly Dialysis Facility Compare (QDFC) reports that were prepared for each dialysis facility under contract to the Centers for Medicare & Medicaid Services (CMS). Included here are the reports’ objectives, discussions of methodological issues relevant to particular sections of each report and descriptions of each data summary.

These reports include information about directly actionable practice patterns such as dose of dialysis, vascular access, mineral metabolism, and anemia management, as well as patient outcomes (such as mortality, hospitalization, hospital readmission and transfusions) that can be used to inform and motivate reviews of practices. The information in the report facilitates comparisons of facility patient characteristics, treatment patterns, and outcomes to local and national averages. Such comparisons help evaluate patient outcomes and account for important differences in the patient mix - including age, sex, and patients’ diabetic status - which in turn enhances each facility’s understanding of the clinical experience relative to other facilities in the state and nation.

The QDFC report provides facilities with advance notice of their new and updated quality measures that will be reported on the Dialysis Facility Compare (DFC) website, allowing dialysis patients to review and compare characteristics and quality information on dialysis facilities in the United States.

We welcome your participation and feedback concerning the clarity, utility, limitations, and accuracy of this report. You will find information on how to directly provide feedback to us at the University of Michigan Kidney Epidemiology and Cost Center (UM-KECC) in Section XI.

II. Overview

The University of Michigan Kidney Epidemiology and Cost Center has produced the QDFC reports with funding from CMS. Each facility’s report is available to the facility on the secure Dialysis Reports website (www.DialysisData.org).

Each report provides summary data on each facility’s maintenance dialysis patients for the years 2013-2016. These summaries are compiled using the UM-KECC ESRD patient database, which is largely derived from the CMS Consolidated Renal Operations in a Web-enabled Network (CROWN), which includes Renal Management Information System (REMIS), the CMS Annual Facility Survey (Form CMS-2744), the CMS Medical Evidence Form (Form CMS-2728), and the Death Notification Form (Form CMS-2746); Medicare dialysis and hospital payment records; transplant data from the Organ Procurement and Transplant Network (OPTN), the Nursing Home Minimum Dataset; the Quality Improvement Evaluation System (QIES) Workbench, which includes data from the Certification and Survey Provider Enhanced Report System (CASPER); the Dialysis Facility Compare (DFC) and the Social Security Death Master File. The database is
comprehensive for Medicare patients. Non-Medicare patients are included in all sources except for the Medicare payment records. CROWNWeb provides tracking by dialysis provider and treatment modality for non-Medicare patients.

This quarter we provided reports for more than 6,500 Medicare-approved dialysis facilities in the United States. We did not create reports for transplant-only facilities or U.S. Department of Veterans Affairs (VA)-only facilities. The Standardized Ratios for Mortality, Hospitalization, Readmission, Transfusion, and Infection (SMR, SHR, SRR, STrR and SIR) were not calculated for facilities with very small numbers of patients. The SMR is not reported for facilities with fewer than 3 expected deaths, the SHR is not reported for facilities with fewer than 5 patient years at risk (or approximately 10 expected admissions), the SRR is not reported for facilities with fewer than 11 hospital discharges, the STrR is not reported for facilities with fewer than 10 patient years at risk (or approximately 4 expected transfusions), and the SIR is not reported if there are fewer than 12 complete months of data during the performance year and fewer than 132 eligible patient-months according to NHSN. Statistics produced for such small facilities can be unstable and particularly subject to random variation, and thus difficult to interpret.

This guide discusses the meaning of the data summaries each report provides, and describes the methodology used to calculate each summary (Sections III-IX). Sections V-X are organized according to the order of the summaries in the QDFC report, and may serve as references for their interpretation. Since in many cases, understanding a particular section’s contents requires you to understand the issues presented in the previous section, we recommend that you review the sections in order.

The first page provides the purpose and overview of the report, and how to submit comments. Page 2 includes the DFC preview followed by six tables which contain detailed information for your facility as well as regional averages for comparison. Table 1 provides patient mortality, hospitalization, hospital readmission and transfusion summaries for 2013-2016, 2016, 2016 and 2016 respectively. Note that for the four-year mortality summaries, individual patients typically contribute data for more than one year. Table 2 reports National Healthcare Safety Network bloodstream infection data for your facility for January 1, 2016-December 31, 2016. Table 3 reports patient practice patterns (hemoglobin and vascular access) for your facility for January 1, 2016-December 31, 2016 as well as for each quarter during the time period. Similar to Table 2, Table 4 reports dialysis adequacy, hypercalcemia rates and serum phosphorous concentrations for your facility January 1, 2016-December 31, 2016 as well as for each quarter during the time period. Table 5 contains patient experience of care measures from the In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems (ICH CAHPS) survey for April 22, 2016-July 15, 2016 and October 21, 2016- January 13, 2017. Finally, Table 6 provides an incremental look at how the star rating was calculated from the DFC measures for your facility from January 1, 2013 – December 31, 2016.

Each row of a table in the report summarizes an item. Your facility has a column for each time period, and in most cases, two columns for the corresponding geographical summaries, including averages for your facility’s state, and the entire nation. Whenever the statistic reported is a count (n), we calculated regional and national averages by taking the
average count for all facilities in that area. When the statistic reported for a period included more than one year, we annualized regional and national values to make them comparable to a single-year period. When a statistic is a percent, rate, or ratio, we calculated state and national summaries by pooling together all individual patients in that area to obtain an estimate for that area as if it were one large facility. We do not report state summary data for dialysis facilities in states or U.S. territories with only one or two dialysis units. We do provide summaries for the nation for facilities in these states or territories.

Ill. Assigning Patients to Facilities

This section describes the methods we used to assign patients to a facility in order to calculate the summaries appearing in the Preview Table and Table 1 related to the Standardized Mortality, Hospitalization, and Transfusion Ratios only.

Because some patients receive dialysis treatment at more than one facility in a given year, we use standard methods based on assigning person-years to a facility, rather than on assigning a patient’s entire follow-up to a facility. We developed conventions which define the group of patients assigned to a facility at any time during the particular year. This method is described below.

General Inclusion Criteria for Dialysis Patients

We only entered a patient’s follow-up into the tabulations after that patient had received ESRD for greater than 90 days. This minimum 90-day period assures that most patients are eligible for Medicare insurance either as their primary or secondary insurer. It also excludes from analysis patients who died during the first 90 days of ESRD.

In order to exclude patients who only received temporary dialysis therapy, we assigned patients to a facility only after they had been on dialysis there for at least 60 days. This 60 day period is used both for patients starting renal replacement therapy for the first time and for those who returned to dialysis after a transplant. That is, deaths and survival during the first 60 days do not impact the SMR of that facility.

Identifying Patients Treated at Each Facility

For each patient, we identified the dialysis provider at each point in time using a combination of Medicare dialysis claims, the Medical Evidence Form (Form CMS-2728), and data from CROWNWeb. Starting with day 91 of ESRD, we determined facility treatment histories for each patient, and then listed each patient with a facility only once the patient had been treated there for 60 days. When a patient transferred from a facility, the patient remained assigned to it in the database for 60 days. This continued tabulation of the time at risk for 60 days after transfer from a facility attributes to a facility the sequelae of treatment there, even when a patient was transferred to another facility (such as a hospital-based facility) after his or her condition worsened.

In particular, we placed patients in their initial facility on day 91 of ESRD once that facility had treated them for at least 60 days. If on day 91 a facility had treated a patient for fewer than 60 days, we waited until the patient reached day 60 of treatment at that facility before
placing him or her there. State and Network summaries do not include patients who were not assigned to a facility; these patients are, however, included in the U.S. summaries.

Using CROWNWeb data and dialysis claims to determine whether a patient has transferred to another facility, we attributed patient outcomes to the patient's original facility for 60 days after transfer out. On day 61 after transfer from a facility, we placed the patient in the new facility once the patient had been treated at the new facility for 60 days. When a patient was 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 did not attribute that patient to any facility.

Patients were removed from facilities upon receiving transplants. Patients who withdrew from dialysis or recovered renal function remained assigned to their treatment facility for 60 days after withdrawal or recovery. Additionally, patients for whom the only evidence of dialysis treatment is the existence of Medicare claims were considered lost to follow-up and removed from a facility’s analysis one year following the last claim, if there was no earlier evidence of transfer, recovery, or death. In other words, if a period of one year passed with neither Medicare dialysis claims nor CROWNWeb information to indicate that a patient was receiving dialysis treatment, we considered the patient lost to follow-up, and did not continue to include that patient in the analysis. If evidence of dialysis re-appeared, the patient was entered into analysis after 60 days of continuous therapy at a single facility. Finally, all CROWNWeb records noting continuing dialysis were extended until the appearance of any evidence of recovery, transfer, or death. Periods of lost to follow-up were not created in these cases since the instructions for CROWNWeb only require checking patient data for continued accuracy, but do not have a requirement for updating if there are not any changes.

**IV. Dialysis Facility Compare Preview**

The measures included in this table will appear on the DFC website for this facility. Please refer to sections V-X for more information on these measures. Dialysis facilities may submit comments to CMS during the comment period and throughout the year to UM-KECC on the measures included in this report by logging on to the secure section of www.DialysisData.org.


The first section of Table 1 (rows 1a-1g) provides information about patient mortality for all dialysis patients treated at your facility between 2013 and 2016. We also reported the averages in your state, and the nation for this combined four-year period. The remainder of Table 1 (rows 1h-1aa) provides information about hospitalization admissions among all Medicare dialysis patients and transfusions among all adult Medicare dialysis patients treated at your facility in 2016, along with regional and national comparisons for 2016.
Mortality Summary for All Dialysis Patients (1a-1g)

In the first section of the table, we have calculated a relative mortality rate, or Standardized Mortality Ratio (SMR), for 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, body mass index (BMI) at incidence, 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, factors relating to the process of care, or comorbid conditions that developed after incidence, 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.

Patients (1a)

We based the mortality summaries in the first half of the table (rows 1a-1g) on the dialysis patients who received treatment in your facility according to the conventions described in Section III.

Patient Years at Risk (1b)

For each patient in row 1a, time at risk began at the start of the facility treatment period (see on III) and continued until the earliest occurrence of the following: transplant; date of death; end of facility treatment period; or December 31 of the year. A patient may have been treated at one facility for multiple periods during the same year; patient years at risk include time at risk for all periods of treatment at a facility.

Deaths (1c)

We reported the number of deaths that occurred among 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 (1d)**

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, and patient BMI at incidence ($\text{BMI} = \frac{\text{weight(kg)}}{\text{height(m$^2$)}}$). In cases where BMI were missing for a patient, we used the average values of the group of patients with similar characteristics (age, race, ethnicity, sex, and diabetes). We also controlled for age-adjusted population death rates by state and race, based on the U.S. population in 2012-2014 (National Center for Health Statistics, 2016). As with the deaths in 1c, 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) (1e)**

The SMR equals the ratio of the actual number of deaths (1c) divided by the expected number of deaths (1d). The SMR estimates the relative death rate ratio for your facility, as compared 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 2013-2016 national death rates for patients with the same characteristics as those in your facility.

Detailed statistical methodology for the SMR is included in a separate document titled Technical Notes on the Standardized Mortality Ratio. This document and an accompanying Microsoft Excel spreadsheet are available on the Dialysis Reports website (www.DialysisData.org) under the Methodology heading.

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 and national 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 (1c/1d).

**Why the national SMR may not be exactly equal to 1.00**

The reported 2013-2016 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 DFC 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 rates. 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 nation’s. 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 (1e)**
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 limits enclose the true ratio between them approximately 95% of the time if this procedure is repeated on multiple samples. Statistically significant confidence intervals do not contain 1.00.

**P-value for SMR (1f)**
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 a widely used measure that corresponds to the probability that an SMR as far from 1.00 would occur by chance alone. A small p-value (often taken as <0.05) indicates that, the observed SMR (far from 1.00) does suggest a difference in death rates between this facility and the national norm. The smaller the p-value, the stronger is the evidence of a difference. 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 nation’s 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.

**Mortality Rate (per 100 patient-years) and Confidence Interval (Range of Uncertainty) for Mortality Rate (1g)**
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.
Hospitalization Summary for Medicare Dialysis Patients (1h-1n)

Hospitalization rates are an important indicator of patient morbidity and quality of life. On average, dialysis patients are admitted to the hospital approximately twice a year and spend an average of 11 days in the hospital per year (USRDS, 2014). Measures of the frequency of hospitalization and diagnoses associated with hospitalization help efforts to control escalating medical costs, and play an important role in providing cost-effective health care. Hospitalization summaries for Medicare dialysis patients are reported in the second section of Table 1.

This report includes summaries of hospitalization rates among dialysis patients in the facility, along with regional and national hospitalization rates for comparison. However, the reasons for differences in hospitalization rates by facility are complex. The clinical decision associated with individual hospitalization events is not possible to ascertain with the available administrative data. Therefore, these facility data may be best characterized as an assessment of hospital resource utilization across facilities.

Hospitalization rates are more difficult to summarize than mortality rates. For example, a patient can be hospitalized more than once during a year. Further, hospitalization data are not always as complete as mortality data. Ideally, this section of the table includes only patients whose Medicare billing records include all hospitalizations for the period. To achieve this goal, we require that patients reach a certain level of Medicare-paid dialysis bills to be included in hospitalization 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 $900 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 hospitalizations for all patients included in the years at risk.

Like the SMR, the SHR is intended to compare your facility’s observed number of admissions to the number that would be expected if patients at your facility were instead subject to the 2016 national average admission rates. The expected national rates are calculated from Cox models (SAS Institute Inc., 2000; Andersen, 1993; Collett, 1994) which make adjustments for patient age, sex, diabetes, duration of ESRD, nursing home status, patient comorbidities at incidence, BMI at incidence, and calendar year.

Medicare Dialysis Patients (1h)

The number of Medicare dialysis patients included in the hospitalization summaries (1h) is generally smaller than the number of patients included in the mortality summaries (1a). We calculated hospitalization rates based only on periods in which dialysis patients had satisfied the Medicare payment criterion (described above).

Patient Years at Risk (1i)

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) 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 (1j)**
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).

**Expected Total Admissions (1k)**
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, duration of ESRD, nursing home status, patient comorbidities at incidence, BMI at incidence, and calendar year. 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 reported in 1k.

**Standardized Hospitalization Ratio (SHR) for Admissions (1l)**
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 1.0 indicates that your facility’s total number of admissions was less than expected, based on national rates; whereas a value of greater than 1.0 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, duration of ESRD, nursing home status, comorbidities at incidence, and BMI in your facility. Additionally, the estimate is compared to the US hospitalization rates for the same year.

**Confidence Interval (Range of Uncertainty) for SHR (1l)**
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 limits enclose the true ratio between them approximately 95% of the time if this procedure is repeated on multiple samples. Statistically significant confidence intervals do not contain 1.00.

**P-value for SHR (1m)**
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 a widely used measure that corresponds to the probability that an SHR as far from 1.00 would occur by chance alone. A small p-value (often taken as <0.05) indicates that the observed result would be highly unlikely under the null hypothesis, and the observed SHR (far from 1.00) does suggest a difference in hospitalization rates between your facility and the national norm. The smaller the p-value, the stronger is the evidence of difference. 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 nation’s 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.

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

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.

_Hospital Readmission Summary for Dialysis Patients (1o-1t)_

Hospital readmission rates are an important indicator of patient morbidity and quality of life. Relative to the general population, dialysis patients experience much higher levels of mortality (de Jager et al., 2009) and morbidity (e.g., hospital readmission; MedPAC, 2007). Both hospitalization and readmission rates reflect morbidity and quality of life of dialysis patients as well as medical costs. For example, during the calendar year 2012 dialysis patients were admitted to the hospital twice on average and spent an average of 11 days in the hospital. This is indicative of a poorer quality of life for dialysis patients and also accounts for approximately 37% of Medicare expenditures for ESRD patients (USRDS, 2014). Furthermore, 35% of hemodialysis patients discharged from the hospital had a readmission within 30 days (USRDS, 2014). In other settings (e.g., cardiovascular disease, cancer), studies show that about 25% of unplanned readmissions are preventable, that preventability varies widely across diagnoses, and that readmissions were more likely to be preventable for patients with more severe conditions (van Walraven et al., 2011). Readmission summaries for dialysis patients are reported in the third section of Table 1.

This report includes summaries of unplanned readmission rates among all 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 makes adjustments for the discharging hospital of the index hospitalization and for the patient characteristics of age, sex, diabetes, 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 stay of the index hospital discharge, and BMI at onset of ESRD.

**Identifying Patients Treated at Each Facility**

We identified each patient’s dialysis provider over time using a combination of Medicare dialysis claims, the Medical Evidence Form (Form CMS-2728) and data from CROWNWeb. We determined these facility treatment histories as of day 1 of ESRD and used them to identify a patient’s dialysis treatment facility at the time of each index discharge.

We remove a patient from a facility upon receiving a transplant, withdrawing from dialysis or recovering renal function. Additionally, we considered a patient lost to follow-up for whom the only evidence of dialysis treatment is the existence of Medicare claims, and we removed them from a facility’s analysis one year following the last claim, if there was no earlier evidence of transfer, recovery or death. In other words, if a period of one year passed with neither Medicare dialysis claims nor CROWNWeb information to indicate that a patient was receiving dialysis treatment, we considered the patient lost to follow-up, and did not continue to include that patient in the analysis. If evidence of dialysis re-appeared, the patient re-entered the analysis. Finally, we extended all CROWNWeb records noting continuing dialysis until the appearance of any evidence of recovery, transfer or death. We did not create periods of lost to follow-up in these cases since the instructions for CROWNWeb only require checking patient data for continued accuracy and do not require updating if there are no changes.

**Differences in Inclusion Criteria for SRR Measure**

The inclusion criteria and facility assignment methods for the SRR described above are somewhat different than those for the SMR, SHR and STrR. First, patients are included in the SRR as of the first day of ESRD treatment. Second, patients are included in the SRR for a facility as soon as the patient begins treatment at the facility. This is in contrast to the other standardized measures, which require a patient to have ESRD for greater than 90 days and be in a facility for at least 60 days before he or she is included in the measure. The last difference is that patients are removed from the SRR analysis at withdrawal or lost to follow-up rather than 60 days later as is done for the other standardized measures.

**Index discharges (1o)**

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 (1p)**
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.

Hospital admissions were classified as being planned or unplanned according to the algorithm developed for CMS’ hospital-wide readmission measure (Horwitz et. al., 2012). A detailed description of this algorithm is available at www.dialysisdata.org.

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 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 (1q)**
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, 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 stay of the index hospital discharge, and BMI at onset of ESRD. For each patient, the expected number is adjusted for the characteristics of that patient.

**Standardized Readmission Ratio (SRR) (1r)**
We calculated the SRR by dividing the observed total readmissions in 1m by the expected total readmissions in 1n. 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 1.0 indicates that your facility’s total number of readmissions is less than expected, based on national rates; whereas a value of greater than 1.0 indicates that your facility had a rate of total readmissions higher than would be expected given national rates. Note that this measure is adjusted for the discharging hospital of the index hospitalization and for the patient characteristics described above in section 1n. In addition, the estimate is compared with the US readmission rates for the same year.
**Confidence Interval (Range of Uncertainty) for SRR (1r)**
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 limits enclose the true ratio between them approximately 95% of the time if this procedure is repeated on multiple samples. Statistically significant confidence intervals do not contain 1.00.

**P-value for SRR (1s)**
The p-value measures the statistical significance of (or evidence regarding) the hypothesis that the true ratio of the readmission rates for your facility versus the nation is different (higher or lower) from 1.00. The p-value is the probability that the SRR would differ from 1.00 as much as does the observed SRR and is often used to assess evidence. A small 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 is often taken as evidence that the ratio of readmission rates truly does differ from 1.00. For instance, a p-value of less than 0.05 would indicate that the difference between your facility’s readmission rate and the nation’s is unlikely to have arisen from random fluctuations alone. The smaller the p-value, the more statistically significant is the difference between national and individual facility readmission rates. A small p-value helps rule out the possibility that an SRR’s variance 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 nation’s 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 (1t)**
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.

**Transfusion Summary for Adult Medicare Dialysis Patients (1u-1aa)**
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. Transfusion summaries for Medicare dialysis patients are reported in the fourth section of Table 1.

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 apply the same rules as for hospitalization and 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 $900 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 2016 national average transfusion rates, 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, and calendar year. We report the transfusion summaries for 2016 only.
**Adult Medicare Patients (1u)**
The number of adult Medicare dialysis patients included in the transfusion summaries (1u) is generally smaller than the number of patients included in the mortality and hospitalization summaries (1a) and (1h) because of the exclusion criteria. See above.

**Patient Years at Risk (1v)**
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 (see Section III) 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 Transfusion (1w)**
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 revenue center, 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](http://www.DialysisData.org) under the Methodology heading.
**Expected Total Transfusion (1x)**

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 calendar year. 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 1x.

**Standardized Transfusion Ratio (STrR) (1y)**

The STrR is calculated by dividing the observed total transfusions in 1w by the expected total transfusions in 1x. 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 1.0 indicates that your facility’s total number of transfusion events was less than expected, based on national rates; whereas a value of greater than 1.0 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 (1y)**

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 limits enclose the true ratio between them approximately 95% of the time if this procedure is repeated on multiple samples. Statistically significant confidence intervals do not contain 1.00.

**P-value for STrR (1z)**

The p-value measures the statistical significance of (or evidence against) the hypothesis that the true transfusion rate for your facility is the same as (neither higher nor lower than) what would be predicted from the overall national transfusion rate. The p-value is a widely used measure that corresponds to the probability that an STrR as far from 1.00 would occur by chance alone. A small p-value (often taken as <0.05) indicates that the observed result would be highly unlikely under the null hypothesis, and the observed STrR (far from 1.00) does suggest a difference in transfusion rates between your facility and the national norm. The smaller the p-value, the stronger is the evidence of difference. 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 nation’s transfusion rates. An 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 (1aa)
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.

VI. Facility Bloodstream Infection Summary for Hemodialysis Patients Based on the National Healthcare Safety Network (NHSN), (01/01/16–12/31/16)

Table 2 displays bloodstream infection (BSI) information for hemodialysis outpatients as reported by dialysis facilities to the National Healthcare Safety Network (NHSN). Data are reported according to the NHSN Dialysis Event Surveillance Protocol. The surveillance population is hemodialysis outpatients.

Eligible patient-months (2a)
The number of eligible patient-months is the sum of patients who received hemodialysis in-center on the first two working days of each month, during the performance year. These data are reported to NHSN on the monthly “Denominators for Dialysis Event Surveillance” form.

Observed Bloodstream infections (2b)
The number of observed bloodstream infections is the total number of positive blood cultures that were reported by the facility for the performance year. This includes positive blood cultures collected from a patient under surveillance on the day of or the day following admission to a hospital. These data are reported to NHSN on the “Dialysis Event” form.

Predicted Bloodstream infections (2c)
The predicted number of bloodstream infections is calculated by multiplying the national aggregate BSI Rates Stratified by Vascular Access Type from NHSN Dialysis Event Data 2015* by the facility’s number of patient-months for each vascular access category. The number of patient-months is equal to the summed number of patient-month denominators reported by the facility to NHSN during the performance year. The total number of patients at a facility and the number of patients in different vascular access categories factor into the calculation. For example, a facility with many patients will tend to have more predicted BSIs than a facility with few patients.

*The 2015 national aggregate NHSN Dialysis Event Surveillance BSI rates are the aggregate pooled means from over 6,000 outpatient hemodialysis facilities that reported to NHSN in 2015. These data are referred to as the “baseline.”
**Standardized Infection Ratio (SIR) (2d)**
The SIR is a facility-level measure that is calculated by dividing the observed number of bloodstream infections (2b) by the predicted number of bloodstream infections (2c). As a ratio, the SIR (with its confidence interval) is interpreted relative to the number 1. If a facility reports an observed number of BSIs exactly equal to their predicted number of BSIs, the SIR is equal to 1. If a facility observed more BSIs than were predicted, the SIR is greater than 1. If a facility observed fewer BSIs than were predicted, the SIR is less than 1.

The measure accounts for the vascular access types of patients treated at the facility. The SIR is not reported if there are fewer than 12 complete months of data and fewer than 132 eligible patient-months reported to NHSN during the performance year.

**Confidence Intervals (Range of Uncertainty) for SIR (2d)**
The confidence interval (or range of uncertainty) provides an estimated range of probable values for the SIR. The lower and upper limits enclose the true SIR between them approximately 95% of the time if this procedure is repeated on multiple samples.

If the SIR’s confidence interval contains 1, the facility’s number of observed BSIs is not statistically different from their number of predicted BSIs, and the SIR will be categorized “as expected.” If the SIR’s lower confidence limit is greater than 1, the facility had a statistically significant result indicating more infections than predicted and the SIR will be categorized as “worse than expected.” If the SIR’s upper confidence limit is less than 1, the facility had a statistically significant result indicating fewer infections than predicted and the SIR will be categorized as “better than expected.”

**VII. Facility Hemoglobin and Vascular Access for Medicare Dialysis Patients based on Medicare Dialysis Claims, 01/01/2016 – 12/31/2016**

Table 3 reports information on facility practice patterns. Medicare claims are identified as dialysis claims if they are bill type ‘72’ or they are an outpatient claim with a dialysis revenue center code between the following ranges: 800-809 or 820-889. We restricted hemoglobin and vascular access information to patients who have had ESRD for at least 91 days. The inclusion criteria are described in more detail below. For the definition of V modifier codes, please see the list of diagnostic codes included in a separate document available at [www.DialysisData.org](http://www.DialysisData.org) under the Methodology heading. The statistics are reported for each quarter January 1, 2016-December 31, 2016 and the entire year along with comparative regional and national data for the year. Note that State and U.S. averages may differ from values in the DFR due to the difference in number of facilities receiving a report and difference in time periods.
**Hemoglobin (3a-3c)**

We based the hemoglobin information reported in rows 3a to 3c on all Medicare dialysis claims submitted by your facility that indicated the use of an ESA, specifically, the use of epoetin alfa, epoetin beta, darbepoetin alfa, or peginesatide (Omontys®). Hemoglobin was calculated as hematocrit divided by three for claims that report hematocrit but not hemoglobin, rounding to the nearest tenth of a g/dL. Neither patient claims starting before, or on, day 90 of ESRD nor claims with hemoglobin values less than 5 g/dL or greater than 20 g/dL were included. For each patient, the last claim reported for a month at a facility satisfying the above mentioned criteria was included in the summaries.

The rolling year summary in row 3a reports the number of patients for whom at least four claims fulfilling these criteria were submitted by the facility for the year. The quarterly summaries report the number of patients with at least one claim fulfilling these criteria. A patient treated at more than one facility during the year was included in the report for each.

For each patient in row 3a, the average hemoglobin reported on claims submitted by the facility was calculated. Rows 3b and 3c present the percentage of patients from 3a with an average hemoglobin less than 10g/dl, and greater than 12 g/dl, respectively. A slightly different group of patients are included in the DFC calculation of the percent of patients that have an average hemoglobin greater than 12, compared to the corresponding measure in the CMS ESRD Quality Incentive Program (QIP). The QIP calculations are restricted to adult patients while DFC includes all patients.

**Hemodialysis Vascular Access Type (3d-3g)**

This section of the table includes summaries of facility vascular access type as reported in Medicare claims using V-modifiers.

**Vascular Access: Eligible patients and patient-months (3d-3e)**

The number of adult Medicare HD patients who had at least one valid claim during the summary period is reported in 3d. The number of adult Medicare patient-months with at least one valid claim submitted by the facility are summed and reported in 3e. An individual patient may contribute up to 3 patient-months per quarter and up to 12 patient-months per year at a given facility. A claim was defined as valid if it came from a HD patient who was at least 18 years old and had ESRD for greater than 90 days. Modality is determined based on the last claim of the month when there are multiple claims submitted. If an HD claim is submitted from more than one facility in a month for a patient, the patient is counted in each facility’s denominator.

**Arteriovenous fistulae in use (3f)**

Row 3f reports the percentage of patient-months in 3e in which an arteriovenous fistula was reported as the access type in use on the last claim of the month. These data are reported using V-modifier “V7” in Medicare claims. Claims listing both catheter and fistula are reported in the fistula summary. Claims listing both graft and fistula are not reported in the fistula summary.
**Vascular catheter reported >90 days (3g)**

Row 2s reports the percentage of patient-months in 3e in which a vascular catheter was reported as the access type in use for all claims for at least three consecutive months. These data are reported using V-modifier “V5” in Medicare claims. Claims listing both catheter and fistula are reported in the fistula summary.

**VIII. Facility Dialysis Adequacy and Mineral and Bone Disorder for All Dialysis Patients based in CROWNWeb, 01/01/2016 – 12/31/2016**

Table 4 reports information primarily from CROWNWeb. Each section of the table includes a slightly different group of patients described in more detail below. All measures (except phosphorus) are restricted to patients who have had ESRD for greater than 90 days and received dialysis at the facility for at least one entire month during the reporting period. Hypercalcemia and serum phosphorus concentrations are obtained from CROWNWeb only while Kt/V is supplemented with Medicare claims data when values are missing or out of range.

**Patient Assignment Criteria for CROWNWeb Measures (Kt/V, Calcium, Phosphorus):**

For each patient, we identified the dialysis provider at each point in time primarily using data from CROWNWeb, the Medical Evidence Form (Form CMS-2728) and Medicare dialysis claims. Both patient assignment to the provider and modality (either hemodialysis or peritoneal dialysis) were determined according to the information reported in the above mentioned data sources. For each reporting month, patients were required to have been indicated as treated by the facility for the complete month in order to be included in the denominator for these measures. If there was a one-day gap or more in treatment at the facility during the reporting month, the patient-month was excluded. If a patient transferred in or out of the facility, discontinued dialysis, recovered renal function or died anytime during the month, the entire patient-month is excluded. Please note that the number of sessions are not considered and the patient may not have received treatment at the facility for the entire month to be included. For example, if a patient is hospitalized or travels during the month, the patient may still be included in the facility’s measure if they are indicated as the facility’s patient that month according to the data as described above. Additionally, patients for whom the only evidence of dialysis treatment is the existence of Medicare claims were considered lost to follow-up and removed from a facility’s analysis one year following the last claim, if there was no earlier evidence of transfer, recovery, or death. In other words, if a period of one year passed with neither Medicare dialysis claims nor CROWNWeb information to indicate that a patient was receiving dialysis treatment, we considered the patient lost to follow-up, and did not use him or her in the analysis.

**Mineral and Bone Disorder: 4a-4f**

Hypercalcemia is averaged from uncorrected serum or plasma calcium values over a rolling 3-month period. The percentage for a given month uses the average of the last reported uncorrected serum or plasma calcium value and the last reported values for the previous 2 months (if available). The acceptable range for calcium is 0.1 – 20 mg/dL. Values outside of this range are considered missing. For example, the percentage calculated for April
would be based on the average of uncorrected serum calcium values submitted in April, March and/or February. As opposed to hypercalcemia rates, serum phosphorous concentrations are calculated on a monthly basis, not a 3-month rolling average. The acceptable range for phosphorous is 0.1 – 20 mg/dL. Values outside of this range are considered as missing. For the serum phosphorus categories, patients were additionally required to be treated in the facility thereby excluding home hemodialysis patients. The last lab value for the month for a patient was used when there were multiple values submitted during the month by the facility. Patients with transplant failures were excluded.

**Eligible adult hypercalcemia patients and patient-months (4a-4b)**
The number of adult patients (18 years or older two months prior to the reporting month) who had ESRD for greater than 90 days and treated in the facility the entire reporting month is reported in row 4a. Patients with missing or out of range values who meet the criteria above are included in the denominator. The number of patient-months is reported in row 4b. An individual patient may contribute up to 3 patient-months per quarter and up to 12 patient-months per year.

**Hypercalcemia (Average uncorrected serum or plasma calcium >10.2) (4c)**
The percentage of all eligible patient-months (row 4b) with a 3-month rolling average uncorrected serum or plasma calcium greater than 10.2 is reported in 4c.

**Eligible adult phosphorous patients and patient-months (4d-4e)**
The number of adult patients with ESRD treated in the facility the entire reporting month is reported in row 4d. The number of patient-months is reported in row 4e. An individual patient may contribute up to 3 patient-months per quarter and up to 12 patient-months per year.

**Serum Phosphorous Categories (4f)**
The percentage of all eligible patient-months is characterized into five mutually exclusive categories: less than 3.5 mg/dL, 3.5-4.5 mg/dL, 4.6-5.5 mg/dL, 5.6-7.0 mg/dL, and greater than 7.0 mg/dL.

**Dialysis Adequacy: Kt/V (4g-4v)**
Kt/V is defined as: K-dialyzer clearance of urea; t-dialysis time; V-patient’s total body water. This section of the table is primarily based on information collected in CROWNWeb. If Kt/V is missing or out of range in CROWNWeb during the reporting month, the last valid Kt/V value collected for the patient during the reporting month according to paid, type-72 Medicare dialysis claims was selected (if available). Additional details are provided below.

**Eligible adult hemodialysis (HD) patients and patient-months (4g-4h)**
Eligible patients were adults (≥18 years) who had ESRD for greater than 90 days, were receiving hemodialysis at the facility for at least one whole calendar month during the reporting period (i.e., ‘assigned’ facility), and dialyzed thrice weekly (4g). Patient-months were excluded from the denominator if there was evidence the patient was not dialyzing thrice weekly anytime during the month. A patient may only be assigned to one dialysis facility each month and may not switch modalities during the month. The corresponding
number of eligible patient-months is reported in row 4h. Patients may be counted up to 12 times per year.

**Determination of thrice weekly dialysis**

A patient-month was excluded from the hemodialysis Kt/V patient counts described above if the prescribed number of sessions reported in CROWNWeb by the patient’s ‘assigned’ facility was not equal to 3 and/or the patient was identified in CROWNWeb as undergoing ‘frequent’ dialysis anytime during the reporting month. If information regarding the frequency of dialysis was not available for the reporting month in CROWNWeb by the patient’s ‘assigned’ facility, session information submitted by other dialysis facilities where the patient received treatment was considered.

If the dialysis frequency was not reported in CROWNWeb for the reporting month, eligible hemodialysis Medicare claims submitted by the patient’s ‘assigned’ facility during the reporting month were considered. A claim was considered eligible if it was for an adult (≥18 years old) HD patient (or pediatric in-center HD for pediatric HD measure) with ESRD for greater than 90 days as of the start of the claim. Any patient-month in which the patient received “frequent” or “infrequent” dialysis according to claims was excluded entirely (more details provided below).

If the prescribed dialysis information was not available for the patient during the reporting month in either data source (CROWNWeb or Medicare claims), the most recent information available were used to make the determination.

**Calculating “frequent” and” infrequent” dialysis in Medicare dialysis claims**

The number of dialysis sessions per week on a claim was calculated as a rate: 7*(# of HD sessions/# of days). This rate was only calculated for claims that covered at least seven days. A claim was identified as indicating “frequent” dialysis if any of the following criteria were met:

(a) reported a Kt/V value of 8.88,

(b) covered seven or more days and had a rate of four or more sessions/week, or

(c) covered fewer than seven days and had four or more total sessions indicated

A claim was identified as indicating “infrequent” dialysis if it covered at least seven days and had a rate of two or fewer sessions/week. No short claims (less than 7 days) were considered as indicating “infrequent” dialysis.

**Adult hemodialysis: Kt/V ≥ 1.2 (4i-4j)**

Summaries are calculated using CROWNWeb as the primary data source. The last Kt/V collected (from any facility) during the reporting month for the patient was selected. If Kt/V was missing or out of range (Kt/V > 5.0) in CROWNWeb, then the Kt/V (based on the value code ‘D5: Result of last Kt/V’) reported on the last eligible Medicare claim for the patient during the reporting month was selected when available.

A claim was considered eligible if it was from a HD patient who had ESRD for greater than 90 days, was at least 18 years old, and the claim was neither a “frequent” dialysis
claim nor an “infrequent” dialysis claim as described above. The last eligible claim with an in-range (less than or equal to 5.0) and not expired (in-center HD with Kt/V reported from a previous claim, or home HD with Kt/V reported from more than four months prior) Kt/V value reported was selected when there were multiple claims reported in a month.

Patients with missing or out of range Kt/V (Kt/V > 5.0) values from either data source (CROWNWeb or Medicare claims) (4i) are included in the denominator but not the numerator and therefore may result in a lower percentage than expected. The percentage of patient-months reported in 4h with a Kt/V value greater than or equal to 1.2 is reported in 4j.

**Eligible adult peritoneal dialysis (PD) patients and patient-months (4k-4l)**

Eligible patients were adults (≥18 years) who had ESRD for greater than 90 days and were receiving peritoneal dialysis at the facility for at least one whole calendar month during the reporting period (4k). A patient may only be assigned to one dialysis facility each month and may not switch modalities during the month. The corresponding number of eligible patient-months is reported in row 4l. Patients may be counted up to 12 times per year.

**Adult Peritoneal Dialysis: Kt/V ≥ 1.7 (4m-4n)**

Kt/V values are only required to be reported every four months for adult PD patients. Therefore, if Kt/V was missing for the reporting month, the most recent available value collected up to 3 months prior was selected when available. If all values in a 4-month look-back period were missing, then the PD Kt/V value was considered missing for that reporting month.

Summaries are calculated using CROWNWeb as the primary data source. The last Kt/V collected (from any facility) during the reporting month for the patient was selected. If Kt/V was missing or out of range (Kt/V > 8.5) in CROWNWeb, then the Kt/V (based on the value code ‘D5: Result of last Kt/V’) reported on the last eligible Medicare claim for the patient during the reporting month was selected when available.

A claim was considered eligible if it was from a PD patient who had ESRD for greater than 90 days and was at least 18 years old. The last eligible claim with an in-range (less than or equal to 8.5) and not expired (Kt/V reported from more than four months prior) Kt/V value was selected when there were multiple claims reported in a month.

Patients with missing or out of range Kt/V (Kt/V > 8.5) values from either data source (CROWNWeb or Medicare claims) (4m) are included in the denominator but not the numerator and therefore may result in a lower percentage than expected. The percentage of patient-months reported in 4l with a Kt/V value greater than or equal to 1.7 is reported in 4n.

**Eligible pediatric hemodialysis (HD) patients and patient-months (4o-4p)**

Eligible patients were pediatric (<18 years) patients who had ESRD for greater than 90 days, were receiving in-center HD at the facility for at least one whole calendar month.
during the reporting period (i.e., ‘assigned’ facility), and dialyzed thrice weekly (4o). Patient-months were excluded from the denominator if there was evidence the patient was not dialyzing thrice weekly anytime during the month. A patient may only be assigned to one dialysis facility each month and may not switch modalities during the month. The corresponding number of eligible patient-months is reported in row 4p. Patients may be counted up to 12 times per year.

CROWNWeb and eligible (pediatric, in-center, ESRD for greater than 90 days) paid type-72 Medicare dialysis claims were used to determine dialysis frequency for each patient-month. For detailed description regarding the determination of thrice weekly dialysis, and the calculation of “frequent” and “infrequent” dialysis in Medicare dialysis claims, please refer to the ‘Eligible adult HD’ section above.

**Pediatric Hemodialysis: Kt/V ≥ 1.2 (4q-4r)**
Summaries are calculated using CROWNWeb as the primary data source. The last Kt/V collected (from any facility) during the reporting month for the patient was selected. If Kt/V was missing or out of range (Kt/V > 5.0) in CROWNWeb, then the Kt/V (based on the value code ‘D5: Result of last Kt/V’) reported on the last eligible Medicare claim for the patient during the reporting month was selected when available.

A claim was considered eligible if it was from a HD patient who did not indicate home HD, had ESRD for greater than 90 days, was younger than 18 years old, and the claim was neither a “frequent” dialysis claim nor an “infrequent” dialysis claim as described above. The last eligible claim with an in-range (less than or equal to 5.0) and not expired (Kt/V reported from a previous claim) Kt/V value was selected when there were multiple claims reported in a month.

Patients with missing or out of range Kt/V (Kt/V > 5.0) values from either data source (CROWNWeb or Medicare claims) (4q) are included in the denominator but not the numerator and therefore may result in a lower percentage than expected. The percentage of patient-months reported in 4p with a Kt/V value greater than or equal to 1.2 is reported in 4r.

**Eligible pediatric peritoneal dialysis (PD) patients and patient-months (4s-4t)**
Eligible patients were pediatric (< 18 years) patients who had ESRD for greater than 90 days and were receiving peritoneal dialysis at the facility for at least one whole calendar month during the reporting period (4s). A patient may only be assigned to one dialysis facility each month and may not switch modalities during the month. The corresponding number of eligible patient-months is reported in row 4t. Patients may be counted up to 12 times per year.

**Pediatric Peritoneal Dialysis: Kt/V ≥ 1.8 (4u-4v)**
Kt/V values are only required to be reported every six months for pediatric PD patients. Therefore, if Kt/V was missing for the reporting month, the most recent available value collected up to 5 months prior was selected when available. If all values in a 6-month look-
back period were missing, then the PD Kt/V value was considered missing for that reporting month.

Summaries are calculated using CROWNWeb as the primary data source. The last Kt/V collected (from any facility) during the reporting month for the patient was selected. If Kt/V was missing or out of range (Kt/V > 8.5) in CROWNWeb, then the Kt/V (based on the value code ‘D5: Result of last Kt/V’) reported on the last eligible Medicare claim for the patient during the reporting month was selected when available.

A claim was considered eligible if it was from a PD patient who had ESRD for greater than 90 days and was younger than 18 years old. The last eligible claim with an in-range (Kt/V less than or equal to 8.5) and not expired (Kt/V reported from more than six months prior) Kt/V value was selected when there were multiple claims reported in a month.

Patients with missing or out of range Kt/V (Kt/V > 8.5) values from either data source (CROWNWeb or Medicare claims) (4u) are included in the denominator but not the numerator and therefore may result in a lower percentage than expected. The percentage of patient-months reported in 4r with a Kt/V value greater than or equal to 1.8 is reported in 4v.

IX. Patient Experience of Care based on ICH CAHPS survey 4/22/16-7/15/16 and 10/21/16-1/13/17

Overview
The ICH CAHPS Survey is intended to measure in-center hemodialysis patients’ perspectives on the care they receive at dialysis facilities. The survey is administered twice a year (once in the spring and once in the fall). It contains a total of 62 questions. Questions were chosen to reflect aspects of the in-center dialysis experience that are important to patients. Table 5 reports the results for three rating measures and three multi-item or “composite” measures. The data include the two most recent semi-annual surveys. A copy of the questionnaire can be found on the ICH CAHPS Survey web site, https://ichcahps.org.

Which patients are included?
Dialysis facility patients are eligible to participate if they meet the following criteria:

- 18 years or older on the last day of the sampling window for the semiannual survey;
- Still living as of the last day of the sampling window for the semiannual survey;
- Received in-center hemodialysis on an outpatient basis from their current facility for three months or longer; not currently residing in an institution, such as a residential nursing home or other long-term care facility, or a jail.

The ICH CAHPS survey is administered either to a random sample of adult patients or to all patients at each dialysis facility, depending upon the total number of patients at the facility. Only patients who get in-center hemodialysis can participate in the survey; home or peritoneal dialysis patients are excluded from the survey.

Produced by The University of Michigan Kidney Epidemiology and Cost Center
How are scores calculated?
The rating scores are based on single items in the survey, each of which has a response set from 0 to 10. Scores are calculated based on the proportion of patients that answered with the two most favorable responses, “9” or “10”, two middle favorable responses “7” or “8” and seven least favorable responses “0-6”. These results are publicly reported at the level of the dialysis facility.

The calculation for the composite scores is more complex. The scores for a facility are the average of the proportion of respondents who provided the most favorable (top box), least favorable (bottom box) or mid-range responses to each question included in each composite. The responses that are coded as the most favorable, least favorable, and mid-range will vary by question.

Number of Completed Surveys (5a)
The number of completed surveys from patients at the facility who met the inclusion criteria detailed above. Patients are assigned to the facility based on information in CROWNWeb. If the data in CROWNWeb show that a patient only visited one in-center hemodialysis facility during the sampling window, the patient is assigned to that facility. Patients who had visits to more than one facility during the sampling window are assigned to a facility using a variety of rules which take into account the number of visits the individual made to each facility and consider whether the facility is in the same state as the state in which the respondent lives.

Response Rate (5b)
The proportion of patients who completed the survey (5a) out of those who were offered the survey.

Percent of Patients reporting- Nephrologists' communication and caring (5c)
The proportion of patients who provided the most [middle or least] favorable responses to questions included in this composite measure are shown in the Always [Sometimes or Never, respectively] category. The scores for a facility are the average of the proportion of respondents who provided the most [middle or least] favorable responses to each question included in each composite (survey questions 3, 4, 5, 6, 7, 9).

Percent of Patients reporting- Quality of dialysis center care and operations (5d)
The proportion of patients who provided the most [middle or least] favorable responses to questions included in this composite measure are shown in the Always [Sometimes or Never, respectively] category. The scores for a facility are the average of the proportion of respondents who provided the most [middle or least] favorable responses to each question included in each composite (survey questions 10, 11, 12, 13, 14, 15, 16, 17, 21, 22, 24, 25, 26, 27, 33, 34, 43).

Percent of Patients reporting- Providing information to patients (5e)
The proportion of patients who provided the most [least] favorable responses to questions included in this composite measure are shown in the Yes [No] category. The scores for a facility are the average of the proportion of respondents who provided the most [least]
favorable responses to each question included in each composite (survey questions 19, 28, 29, 30).

**Percent of Patients reporting- Rating of the nephrologist (5f)**
The proportion of patients who provided the most (9 or 10) [middle (7 or 8) or least (0-6)] favorable response to question 8 on the survey receive a measure rating of Always [Sometimes or Never, respectively].

**Percent of Patients reporting- Rating of the dialysis center staff (5g)**
The proportion of patients who provided the most (9 or 10) [middle (7 or 8) or least (0-6)] favorable response to question 32 on the survey receive a measure rating of Always [Sometimes or Never, respectively].

**Percent of Patients reporting- Rating of the dialysis facility (5h)**
The proportion of patients who provided the most (9 or 10) [middle (7 or 8) or least (0-6)] favorable response to question 35 on the survey receive a measure rating of Always [Sometimes or Never, respectively].

**X. Facility Star Rating Calculation**

**Overview**
Table 6 reports the star rating, ranging from one to five stars, associated with the facility. The star rating methodology is consistent with that of the last release in October 2016 which was based on recommendations provided by a 2015 Technical Expert Panel. The October 2017 DFC release includes the use of baseline year (calendar year 2014) and an updated year of data for the current year (calendar year 2016), use of z-scores to calculate measure scores for the percentage measures, calculation of measure scores in the current year compared against relative scoring in a fixed baseline year, and assignment of star ratings in a current year based on relative cutoffs for final facility scores set in the same fixed baseline year. This star rating methodology allows users to compare dialysis facilities and observe changes in facility performance over time. Nine of the twelve Quality Measures (QMs) reported on the Medicare DFC website were used in the algorithm to calculate the star rating. Methods will be described briefly below and detailed information on the updated star rating methodology is available in the [Technical Notes on the Updated Dialysis Facility Compare Star Rating Methodology](#).

The nine QMs used in the calculation are grouped into different QM domains which are derived in the same way as in the original star rating methodology. Specifically, domains are empirically derived using factor analysis and assessing correlation tables among the QMs. Factor analysis detects underlying latent factors that are the source of correlations between variables. The method led to the creation of three domains of QMs. The first domain comprises the standardized measures for transfusions, mortality, and hospitalization (STrR, SMR, and SHR) and is named “Standardized Outcomes (SHR, SMR, STrR)”. The AV fistula and catheter measures form the second domain which is named “Other Outcomes 1 (fistula, catheter > 90 days).” All Kt/V and hypercalcemia QMs
form the third domain and is named “Other Outcomes 2 (Kt/V, hypercalcemia).” These domains are equally weighted in determining the final facility score for the star rating.

As the DFC 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 for baseline and current years.

**Baseline Year**

**Percentage Measures**
The four percentage QMs (Kt/V, hypercalcemia, catheter > 90 days, and fistula) vary in their distributions. These measures are scored with truncated z-scores in the updated methodology.

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 three standardized ratio QMs are scored differently than the four percentage QMs since the quality associated with a unit change in a ratio measure is not likely to be 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.

**Current Year**

**Percentage Measures**
The purpose of scoring measures relative to the baseline year data is to map each measure value to the same score that the measure value would have been mapped to if it had been observed in the baseline year. Z-scores in the current year are therefore calculated by subtracting the mean and dividing by the standard deviation of the measure in the baseline year. These z-scores are then truncated at the same values as truncated in the baseline year and re-standardized using the mean and the standard deviation of the truncated z-scores in the baseline year.

**Standardized Ratio Measures**
Current year facility ratios are first multiplied by the adjustment factor (described in the [Technical Notes on the Updated Dialysis Facility Compare Star Rating Methodology](#)) to create individual facility adjusted ratios. Each adjusted ratio is mapped to the same percentile that the ratio would have been mapped to if it had been observed in the baseline year. The cutoffs used for the percentiles are determined by the best measure value within each percentile in the baseline year.

Further details of the calculation are presented in the row descriptions below.
Standardized Outcomes Domain

**Standardized Outcomes Score (6a)**
The score for this domain is between -2.58 and 2.58 and was computed by averaging the measure scores for measures within the Standardized Outcomes 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 the domain were missing, then the domain did not receive a score. Please refer to Table 1 for the mean measure score values.

**Standardized Mortality Ratio (SMR) (6b)**
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 V of this guide for more information about the SMR. The time period used for the current star rating calculation is January 1, 2013 – December 31, 2016.

**Measure Score: SMR (6c)**
This measure is scored using 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) (6d)**
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 V of this guide for more information about the SHR. The time period used for the current star rating calculation is January 1, 2016 – December 31, 2016.

**Measure Score: SHR (6e)**
Same method as for SMR. Please see “Measure Score: SMR” above for description.

**Standardized Transfusion Ratio (STrR) (6f)**
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 V of this guide for more information about the STrR. The time period used for the current star rating calculation is January 1, 2016 – December 31, 2016.

**Measure Score: STrR (6g)**
Same method as for SMR. Please see “Measure Score: SMR” above for description.

**Other Outcomes 1 Domain**
Other Outcomes 1 Score (6h)
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. Please refer to Table 1 for the mean measure score values.

Arteriovenous fistulae in use (6i)
Percentage of adult patients who received treatment through arteriovenous fistula (AVF) (higher is better). The time period used for the current star rating calculation is January 1, 2016 – December 31, 2016. Percentages based on 10 or fewer patients are shown in this table but will be reported as ‘Not Available’ on DFC.

Measure Score: AVF (6j)
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.

Vascular catheter reported >90 days (6k)
Percentage of adult patients who had a catheter (tube) left in a vein longer than 90 days for their regular hemodialysis treatment (catheter > 90) (lower better). The time period used for the current star rating calculation is January 1, 2016 – December 31, 2016. Percentages based on 10 or fewer patients are shown in this table but will be reported as ‘Not Available’ on DFC.

Measure Score: Catheter (6l)
Same method as for AVF. Please see “Measure Score: AVF” above for description.

Other Outcomes 2 Domain

Other Outcomes 2 Score (6m)
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 (6n)
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 better). The time period used for the current star rating calculation is January 1, 2016 – December 31, 2016.
Percentages based on 10 or fewer patients are shown in this table but will be reported as ‘Not Available’ on DFC.

**Adult PD: Kt/V ≥1.7 (6a)**
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 better). The time period used for the star rating calculation is January 1, 2016 – December 31, 2016. Percentages based on 10 or fewer patients are shown in this table but will be reported as ‘Not Available’ on DFC.

**Pediatric HD: Kt/V ≥1.2 (6p)**
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 better). The time period used for the star rating calculation is January 1, 2016 – December 31, 2016. Percentages based on 10 or fewer patients are shown in this table but will be reported as ‘Not Available’ on DFC.

**Overall Kt/V ≥ specified threshold (6q)**
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 (Overall 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 (6r)**
Same method as for AVF. Please see “Measure Score: AVF” above for description.

**Serum calcium > 10.2 mg/dL (6s)**
Percentage of adult dialysis patients who had an average calcium over the past three months greater than 10.2 mg/dL (hypercalcemia) (lower better). The time period used for the current star rating calculation is January 1, 2016 – December 31, 2016.

**Measure Score: Hypercalcemia (6t)**
Same method as for AVF. Please see “Measure Score: AVF” above for description.

**Final Score**

**Final score (6u)**
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 three domains: Standardized Outcomes, Other Outcomes 1, and Other Outcomes 2. 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 the Other Outcomes 1 Domain 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 two 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 year, the missing value is imputed with the mean of the measure in the baseline year. And in the current year, the missing value is imputed with the mean of the measure in the current year. 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 the Standardized Ratio Measure Domain 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 (6v)**

The final score cutoffs for the star rating are defined using the baseline year data. Final score cutoffs for the baseline year (CY 2014) are set so that 10%, 20%, 40%, 20%, 10% facilities are assigned 1-, 2-, 3-, 4-, 5-stars, respectively. These final score cutoffs are retained and used to define star rating categories in the October 2016 star ratings and for future star ratings until a new baseline year is established.

The final score cutoffs defined using the baseline year data are used to assign star ratings to facilities for the current year. If the population of facilities improves in their measure performance from the baseline year, more facilities are likely to be in the higher star rating categories compared to the baseline year. That is because they are being compared to the lower of average performance that prevailed in the earlier baseline year, rather than relative to the average performance of other facilities in the current year. In contrast to the original methodology, in this updated methodology the distribution of star ratings is not fixed for determining current year star ratings. When facilities move up in star ratings other facilities will not necessarily move down into lower star rating categories, unless their individual performance declined compared to the baseline year.

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 the Other Outcomes 1 domain but will still receive a star rating based on the average of the other two 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.
**XI. Please Give Us Your Comments**

We welcome questions or comments about this report’s content, or any suggestions you might have for future reports of this type. Improvements in the content of future reports will depend on feedback from the nephrology community. Comments can be submitted on [www.DialysisData.org](http://www.DialysisData.org) July 15th through August 15th. If you have questions after the comment period is closed, please contact UM-KECC directly using the contact information provided below. Please note “Dialysis Facility Compare Reports – Preview for October 2017” as the topic of your correspondence, and include your contact information and facility’s CMS certification number (CCN).

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References


