

Patient-Mix Coefficients and Star Ratings for the In-Center Hemodialysis CAHPS (ICH CAHPS) Survey Results Publicly Reported in April 2022

The In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems (ICH CAHPS[®]) Survey is designed to measure the experiences of people receiving hemodialysis from Medicare-certified in-center hemodialysis (ICH) facilities. The ICH CAHPS Survey is administered on a semiannual basis—that is, the Centers for Medicare & Medicaid Services (CMS) and its ICH CAHPS Coordination Team selects samples of hemodialysis patients who are surveyed each spring and fall (referred to as the ICH CAHPS Spring and Fall Surveys, respectively). CMS requires that ICH facilities use a third-party survey vendor trained and approved by CMS to administer the survey on their behalf. ICH facilities and their contracted survey vendors can administer the ICH CAHPS Survey using one of three approved data collection modes: mail-only mode, telephone-only mode, and mixed mode (mail with telephone follow-up of mail survey nonrespondents).

CMS began publicly reporting ICH CAHPS Survey results on the Dialysis Facility Compare (DFC) link at <https://www.medicare.gov/> in October 2016. Star Ratings were added to the DFC in October 2018. In 2020, Medicare.gov transitioned from the DFC to the compare tool on Medicare.gov. ICH CAHPS Survey results are currently refreshed or updated on Care Compare on Medicare.gov twice each year and are based on data from the two most recent semiannual surveys. ICH CAHPS Survey results posted on Care Compare on Medicare.gov in April 2022 are based on data from the 2020 Fall and 2021 Spring Surveys.

Determining the Effect of Survey Mode

Prior research has shown that patients' assessment of their health care may be affected by both data collection mode and patient characteristics. To address this issue, CMS and its ICH CAHPS Coordination Team conducted a randomized Mode Experiment with a sample of hemodialysis patients to determine whether they respond differently based on data collection mode. Data collected during the ICH CAHPS Mode Experiment were also used to determine which, if any, patient characteristics (patient-mix) affect patients' assessment of the hemodialysis they receive.

The ICH CAHPS Survey Mode Experiment was conducted in 2014 using the same sampling and data collection methods currently being used in the national implementation of the survey. The sample frame for the Mode Experiment consisted of all patients who met survey eligibility criteria—patients must have been 18 years of age or older at the end of the 3-month sampling window and must have received in-center dialysis care from their current ICH facility for 3 months or longer. Those known to be deceased were excluded from the sample.

The goal of the sampling process for the Mode Experiment was to obtain approximately 1,570 completed surveys for each of the three approved data collection modes. Given expected response rates for each mode, 4,800 hemodialysis patients were sampled for the mail-only mode, 3,733 for the telephone-only mode, and 3,360 were included in the mixed-mode sample. A total of 11,893 eligible patients were sampled from the ICH patient population. After the sample was selected, sampled patients were randomly assigned to one of the three data collection modes using the inverse of the estimated response rates. The number of respondents for each mode

allowed a 5 percentage point difference to be detected with 80% power with an alpha-level of 0.05.

A total of 3,557 surveys were completed during the Mode Experiment, including 1,355 from sample patients in the mail-only mode, 994 for the telephone-only mode, and 1,208 for the mixed mode. Sample patients who reported during the data collection period that they receive home dialysis; those who were deceased, institutionalized, or receiving hospice care; and those who could not participate because the survey was not offered in one of the CMS-approved languages were deemed to be ineligible for the survey. After adjusting for sampled patients found to be ineligible for the survey, an overall response rate of 33.6% was achieved. The response rates for the mail-only and telephone-only modes were similar at 30.4% and 30.7%, respectively. The response rate for the mixed mode was higher at 41.8%.

Data from the Mode Experiment were analyzed and included two types of variables: dependent variables that represented the patients' experiences with the care they received from ICH facilities and independent variables that represented the patient characteristics that may affect the dependent variables. The dependent variables included three variables calculated from individual ICH CAHPS Survey questions (the global ratings items) and 32 variables that are the multiple survey questions that comprise the composite measures. These dependent variables were:

- Global rating of nephrologist (calculated from survey Q8)
- Global rating of dialysis center staff (calculated from survey Q32)
- Global rating of dialysis center (calculated from survey Q35)
- Six questions that comprise the Nephrologists' Communication and Caring composite (Qs 3, 4, 5, 6, 7, and 9)
- Seventeen questions that comprise the Quality of Dialysis Center and Operations composite (10, 11, 12, 13, 14, 15, 16, 17, 21*, 22, 24, 25, 26, 27, 33, 34, and 43)
- Nine questions that comprise the Providing Information to Patients composite (calculated from survey Qs 19, 28, 29, 30, 31, 36, 38, 39, and 40)

For each dependent variable two dichotomous variables were created: the most positive responses versus all other responses, referred to as the "top box," and the least positive responses versus all other responses, referred to as the "bottom box," for a total of $35 \times 2 = 70$ dependent variables. These 70 dependent variables were analyzed using Ordinary Least Squares regression models.

The results of the analysis of data from the ICH CAHPS Survey Mode Experiment showed significant differences in patients' ratings and assessment of their hemodialysis care based on survey mode and in responses to the survey items that are attributable to patient-mix characteristics. A total of 13 patient-mix characteristics and survey mode were found to be statistically significant in at least one of the regression models. The 14 adjusters (13 patient characteristics plus survey mode) include the following:

* For Q21, response option 5 ("I insert my own needles") is coded as missing and not included when calculating the composite.

- Mode of survey administration
- Overall health
- Overall mental health
- Heart disease
- Deaf or serious difficulty hearing
- Blind or serious difficulty seeing
- Difficulty concentrating, remembering, or making decisions
- Difficulty dressing or bathing
- Age
- Sex
- Education
- Does the patient speak a language other than English at home
- Did someone help the patient complete this survey
- Total number of years on dialysis

During each ICH CAHPS public reporting period, CMS and its Coordination Team will use data from the two most recent semiannual ICH CAHPS Surveys to derive the 13 patient-mix adjustment factors using coefficients obtained from Ordinary Least Squares regression models for the top- and bottom-box scores for each of the three global ratings and the three composite measures. Patient-mix adjustment factors will be calculated directly from these regression coefficients for each individual survey item by multiplying the coefficients by negative one (-1.0). The coefficient that will be used to adjust for survey mode is based on the results of the Mode Experiment. CMS will use the coefficients to adjust the raw scores calculated on each measure from data collected in each semiannual survey. The ICH CAHPS scores that will be publicly reported are the weighted¹ average of the two most recent semiannual ICH CAHPS scores.

Calculating the Patient-Mix Adjusted Global Ratings and Composite Scores

Four sets of numbers are needed to calculate an ICH facility's adjusted score for the three individual global ratings (rating of nephrologist, the dialysis center staff, and dialysis center) and the individual survey questions included in each of the three composite measures. These are (1) the "raw score," or the ICH facility's mean on the respective ICH CAHPS outcome before adjustment (top- or bottom-box score for the global ratings and individual survey questions comprising the composites); (2) the national-level patient-mix adjustment factors shown in **Tables 1 and 2** (top- and bottom-box adjustment factors for the global ratings and individual survey questions comprising the composites); (3) the ICH facility's means on the patient-mix characteristics variables; and (4) the national mean on the patient-mix characteristics variables shown in **Table 3**.

¹ The scores are weighted using the number of respondents, thus a score derived from more respondents will have more influence in the average score that is publicly reported.

The adjusted score for the ratings questions and a given individual survey question that is included in one of the three ICH CAHPS Survey composite measures is the sum of a series of products in the equation shown below, where each product multiplies the adjustment from **Table 1** (top box) and **Table 2** (bottom box) by the deviation of the ICH facility’s mean on a given patient-mix characteristic from the national mean on that characteristic from **Table 4**.

$$y' = y + a1(h1 - m1) + a2(h2 - m2) + a3(h3 - m3) + \dots + a28(h28 - m28) + a29*h29 + a30*h30$$

where

- y' is the facility’s adjusted score (top or bottom box) for a ratings question or the individual ICH CAHPS question included in the composite.
- y is the facility’s “raw score,” or mean on the respective unadjusted top or bottom box ICH CAHPS ratings question or question included in the composite.
- $a1$ to $a28$ are the national-level patient characteristic adjustments, for the global ratings questions and individual questions that comprise the composites. **Tables 1 and 2** show the adjustments for these patient characteristics for the top-box and bottom-box scores, respectively. The adjustments for the patient characteristics in the tables are expressed as a proportion rather than as a percentage.
- $a29$ to $a30$ are the national-level survey mode adjustments for the global ratings questions and the individual questions that comprise the composites. **Tables 1 and 2** show the adjustments for survey mode for the top-box and bottom-box scores, respectively. The adjustment for survey mode in the tables are expressed as a proportion rather than as a percentage.
- $h1$ to $h28$ are the facility’s mean proportions of patients with each of the patient characteristics in the same row.
- $h29$ to $h30$ are the facility’s proportion for a given mode. This value will always be 0 or 1 because within a given facility all surveys are completed by either phone, mail, or mixed mode.
- $m1$ to $m28$ are the national mean proportions of patients with each of the patient characteristics in **Table 4** across the facility’s participating in ICH CAHPS.

The facility’s patient-mix adjusted scores for the ratings questions or an individual survey question, as described in the formula above, are adjusted for differences between a facility’s patient composition according to the ICH CAHPS patient-mix characteristics and the overall national composition of ICH patients on these same characteristics. This adjustment, which allows consumers to compare different ICH facilities based on the same overall patient composition, is made by subtracting the national mean—the “m’s” in the equation above—for a given patient characteristic from an ICH facility’s share of patients on this same patient characteristic—the “h’s” in the equation above—and then multiplying the difference by the patient-mix adjustment factor—the “a’s” in the equation above. The following is a fictitious example of adjusting for patient-mix.

- If overall (nationally) 56% of survey respondents are male, but 58% of the respondents from an ICH facility are male, then the adjustment factors for this ICH facility are multiplied by the difference between the ICH facility's patient composition versus the overall national patient composition.
- The score for each of the ICH CAHPS ratings and composite measures for the ICH facility in this example is calculated as 58% minus 56%, or 2%. Also, suppose for the rating of the kidney doctor for this facility, the top-box adjustment factor for males is 4.646 (males were 4.646% less likely to report a "9" or "10" in the rating of their kidney doctors).
- To obtain the top-box rating of the kidney doctor for the ICH facility in this example, we multiply 4.646 times 2% to get 9.29%. In this example, the adjustment for gender for the top-box rating of the kidney doctor for this ICH facility is 9.29%.

As demonstrated in the formula and example above, whether the scores for a given facility are adjusted upward or downward for a given measure depends on the patient-mix adjustments and the patient-mix of that facility relative to the national average patient-mix.

After each facility's patient-mix adjusted score is created for the ratings questions and individual survey questions, the facility-level composite scores are formed from the average of these facility-level adjusted scores for the individual survey questions that comprise a given composite. This creates the semiannual patient-mix facility-level ratings and composite scores. The two most recent semiannual patient-mix facility-level composite scores are then averaged to produce the current ICH CAHPS scores that are publicly reported.

For public reporting purposes, the final adjusted ICH CAHPS score is rounded to the nearest integer and expressed as a percentage (e.g., 70%). Note that middle-box scores are computed by subtracting the sum of patients who provided top- and bottom-box scores from 100.

Information presented in this document will allow ICH facilities to approximate the effect of patient-mix adjustment on their ICH CAHPS Survey results. Exact replication of published ICH CAHPS Survey results is not possible because of the effects of data cleaning and small differences between an effect of semiannual patient-mix adjustments and the averages presented here.

Calculating the Star Ratings

In 2018, CMS added star ratings to the ICH CAHPS quality measures that are published on Medicare.gov's Care Compare. Star ratings are a supplement to the top- and bottom-box measures and make it easier for consumers to spotlight excellence in health care quality on the compare tool. Star ratings are generated for each of the three publicly reported ICH CAHPS Survey global ratings (rating of the kidney doctors (nephrologists), dialysis center staff, and dialysis center) and three composite measures (kidney doctors' (nephrologists') communication and caring, quality of dialysis center and operations, and providing information to patients). These individual star ratings are shown in the Provider Data Catalog. An overall Survey summary star rating is calculated and shown on Medicare.gov's Care Compare for each dialysis facility – this is called the Patient Survey Rating. The Survey summary star rating is a simple average of the six individual star ratings.

There are two main steps in calculating star ratings—a) constructing a linear mean for each global rating and composite, and b) conducting a cluster analysis and grouping the linear means into 5 categories (i.e., the star ratings). This methodology is described in further detail below.

a. Construction and Adjustment of ICH CAHPS Linear Scores

The responses to the survey items used in each ICH CAHPS measure are converted to a 0–100 linear-scaled score in the following manner:

For ICH CAHPS Survey global ratings (Survey items 8, 32, and 35):

- Overall Rating “0” = 0; Overall Rating “1” = 10; Overall Rating “2” = 20; ...; Overall Rating “10” = 100

For ICH CAHPS Survey items 9, 16, 17, 19, 26, 28–31, 36, and 38–40:

- “No” = 0; and “Yes” = 100

For ICH CAHPS Survey items 3–7, 10–15, 21*, 22, 24, 25, 27, 33, 34, and 43:

- 1 = 0; 2 = 33 1/3; 3 = 66 2/3; and 4 = 100*

The 0–100 linear-scaled ICH CAHPS scores are statistically adjusted for data collection mode and for patient-mix to account for the tendency of certain patient subgroups to respond more positively or negatively to the ICH CAHPS Survey based on data collection mode and specific patient characteristics. In 2018, we re-examined the list of patient-mix variables for the linearized means and star ratings using the 2014 Mode Experiment Data and determined that the original set of patient-mix variables (as shown above) is also sufficient for the linearized means and star ratings. The steps for adjusting for mode and patient-mix directly parallel the process used for adjusting top- and bottom-box scores. The primary difference in this step is the independent variable. Whereas top- and bottom-box scores only allow for two values (0 or 100), the linear scores have a range of values between 0 and 100. The patient-mix adjustment factors and coefficients for the 2020 Fall and 2021 Spring ICH CAHPS Surveys are shown in **Table 3**.

Averages of ICH CAHPS linear scores across two survey periods are rounded to integer values using standard rounding rules, as follows:

- Let X represent the unrounded two-period average for an ICH CAHPS linear score.
- If X is less than [X.5], then round down to nearest whole integer.
- If X is equal to or greater than [X.5], then round up to nearest whole integer.

b. Conversion of Linear Scores into ICH CAHPS Star Ratings

After the ICH CAHPS scores are linearized, adjusted, and rounded, we group the scores into 1, 2, 3, 4, or 5 *whole stars* (only whole stars will be assigned; partial stars will not be used) for each of the six ICH CAHPS measures by applying statistical methods that use relative distribution and clustering. We determine the star rating for each of the six ICH CAHPS measures by applying a

* For Q21, response option 5 (“I insert my own needles”) is coded as missing and not included when calculating the composite.

clustering algorithm to the individual measure scores. Conceptually, the clustering algorithm identifies the “gaps” in the data and creates five categories (one for each star rating) such that scores of CCNs in the same score category (star rating) are as similar as possible, and scores of CCNs in different categories are as different as possible. The clustering algorithm that we use is the same one used by CMS to determine star ratings for most of the Medicare Part C and Part D measures, the Home Health CAHPS (HHCAHPS) Survey, and the Hospital CAHPS Survey.

The goal of the clustering algorithm is to minimize the differences within each cluster and maximize the differences between each cluster. The variance in measure scores is separated into within- and between-cluster sum of squares components. The algorithm develops clusters that minimize the variance of measure scores within the clusters. More specifically, the clustering algorithm minimizes the within-cluster sum of squares for each of the star ratings levels. Additional information about the clustering method can be found in *Appendix A*.

The cut points (boundaries) for star assignments are derived from the range of individual measures per cluster. The star levels associated with each cluster are determined by ordering the means of each cluster. The cut points for ICH CAHPS star ratings for the 2020 Fall and 2021 Spring ICH CAHPS Surveys are shown in *Table 5*. Cut points are recalculated for each reporting period.

Lastly, CMS will publish an ICH CAHPS Survey summary star rating, which is the average of all star ratings of the ICH CAHPS measures—the three global ratings and the three composite measures for each participating ICH facility. To calculate the summary star rating, we combine the star ratings for the six ICH CAHPS measures as a simple average. We apply the standard rounding rules described above to the six-measure average to arrive at the ICH CAHPS Survey summary star rating (1, 2, 3, 4, or 5 stars).

Example. A CCN has the following individual Star Ratings—4, 3, 4, 4, 3, and 3. The simple average of these six ratings is $(4 + 3 + 4 + 4 + 3 + 3) = 21 \div 6 = 3.5$. After rounding, their Summary Star Rating is 4 stars.


Table 6 provides a frequency of the total number of CCNs that fall within each star rating for the six individual ratings as well as the overall summary star rating. For each future public reporting period, *Tables 1–6* will be updated and posted on the ICH CAHPS website at <https://ichcahps.org> 

Table 1. “Top Box” ICH CAHPS Patient-Mix Adjustment Factors (Average for the 2020 Fall and 2021 Spring ICH CAHPS Semiannual Surveys) for the April 2022 Public Reporting Period

Patient-Mix Characteristic Patient-Mix Level	Rating of Kidney Doctors (Q8)	Rating of Dialysis Center Staff (Q35)	Rating of Dialysis Center (Q32)	Average of survey items comprising the Kidney Doctors Communication and Caring Composite	Average of survey items comprising the Quality of Dialysis Center and Operations Composite	Average of survey items comprising the Providing Information to Patients Composite
Survey Mode						
Mail-Only	1.385	2.608	5.431	6.550	3.928	2.894
Phone-Only	RC	RC	RC	RC	RC	RC
Mixed Mode	-3.086	-1.377	1.104	0.434	-0.041	1.293
Someone Helped Patient Complete Survey						
Yes	-0.972	-0.571	-0.985	0.31	-1.213	-3.712
No	RC	RC	RC	RC	RC	RC
Patient Speaks Language other than English at Home						
Yes	2.79	-0.261	1.685	6.264	3.229	2.248
No	RC	RC	RC	RC	RC	RC
Overall Health						
Excellent	-10.843	-12.258	-12.577	-7.689	-10.549	-2.315
Very Good	-4.623	-5.651	-5.525	-3.247	-3.931	-1.214
Good	RC	RC	RC	RC	RC	RC
Fair	2.41	2.768	2.42	2.143	2.323	0.765
Poor	5.39	5.436	4.917	5.061	4.03	2.492
Mental Health						
Excellent	-10.893	-9.406	-10.677	-9.475	-8.589	-2.813
Very Good	-5.149	-4.669	-5.214	-3.948	-3.154	-1.359
Good	RC	RC	RC	RC	RC	RC
Fair	3.226	2.904	3.404	3.975	3.171	2.474
Poor	9.69	9.75	10.387	9.67	7.221	7.935
Treated for Heart Disease or Problems						
Yes	-2.749	-2.014	-2.163	-2.34	-1.882	-2.262
No	RC	RC	RC	RC	RC	RC
Deaf or Difficulty Hearing						
Yes	1.069	1.162	1.777	2.245	1.766	2.25
No	RC	RC	RC	RC	RC	RC

(continued)

Table 1. “Top Box” ICH CAHPS Patient-Mix Adjustment Factors (Average for the 2020 Fall and 2021 Spring ICH CAHPS Semiannual Surveys) for the April 2022 Public Reporting Period (continued)

Patient-Mix Characteristic Patient-Mix Level	Rating of Kidney Doctors (Q8)	Rating of Dialysis Center Staff (Q35)	Rating of Dialysis Center (Q32)	Average of survey items comprising the Kidney Doctors Communication and Caring Composite	Average of survey items comprising the Quality of Dialysis Center and Operations Composite	Average of survey items comprising the Providing Information to Patients Composite
Blind or Difficulty Seeing						
Yes	1.72	0.55	1.333	0.961	0.562	1.314
No	RC	RC	RC	RC	RC	RC
Difficulty Dressing or Bathing						
Yes	2.541	2.703	3.01	2.356	2.367	2.717
No	RC	RC	RC	RC	RC	RC
Age						
18–44	4.514	7.288	4.885	–1.088	0.794	–6.996
45–54	2.959	6.96	5.713	–0.91	1.559	–4.74
55–64	1.302	4.025	3.567	–0.872	1.287	–2.317
65–74	RC	RC	RC	RC	RC	RC
75+	–0.589	–2.392	–1.404	1.147	–0.551	4.987
Gender						
Male	4.729	2.506	2.799	1.831	–0.24	0.114
Female	RC	RC	RC	RC	RC	RC
Education						
8th Grade or Less	–3.872	–5.623	–4.484	–1.699	–3.324	0.54
Some High School	–3.325	–4.448	–3.698	–1.868	–2.961	0.639
High School	RC	RC	RC	RC	RC	RC
Some College	3.855	5.926	4.874	3.458	4.292	0.156
4-year Degree	5.952	8.316	7.035	4.463	5.713	0.926
More than 4-year college	5.252	10.421	8.477	4.875	7.034	1.481
Years on Dialysis						
1 Year	0.858	–4.288	–4.042	0.091	–3.723	1.74
2 Years	0.075	–2.056	–2.379	–0.159	–1.793	1.009
3–4 Years	RC	RC	RC	RC	RC	RC
5–7 Years	–0.751	1.81	1.342	–0.355	1.719	–0.624
8+ Years	–2.098	2.285	1.842	–1.66	2.516	–2.304

RC = Reference Category

Table 2. “Bottom Box” ICH CAHPS Patient-Mix Adjustment Factors (Average for the 2020 Fall and 2021 Spring ICH CAHPS Semiannual Surveys) for the April 2022 Public Reporting Period

Patient-Mix Characteristic Patient-Mix Level	Rating of Kidney Doctors (Q8)	Rating of Dialysis Center Staff (Q35)	Rating of Dialysis Center (Q32)	Average of survey items comprising the Kidney Doctors Communication and Caring Composite	Average of survey items comprising the Quality of Dialysis Center and Operations Composite	Average of survey items comprising the Providing Information to Patients Composite
Survey Mode						
Mail-Only	-5.471	-3.445	-3.164	-0.244	0.496	-2.893
Phone-Only	RC	RC	RC	RC	RC	RC
Mixed Mode	-1.093	-0.599	0.670	1.371	1.889	-1.292
Someone Helped Patient Complete Survey						
Yes	0.393	0.561	0.368	0.829	1.923	3.712
No	RC	RC	RC	RC	RC	RC
Patient Speaks Language other than English at Home						
Yes	-0.138	1.83	0.826	-3.182	-2.06	-2.248
No	RC	RC	RC	RC	RC	RC
Overall Health						
Excellent	3.41	3.473	3.882	2.724	3.722	2.315
Very Good	1.644	2.05	1.941	1.291	1.481	1.214
Good	RC	RC	RC	RC	RC	RC
Fair	-1.585	-1.423	-1.43	-1.132	-1.011	-0.765
Poor	-4.9	-4.127	-3.639	-4.623	-3.083	-2.492
Mental Health						
Excellent	3.132	1.055	1.467	3.462	2.172	2.813
Very Good	2.202	0.957	1.02	2.39	1.669	1.359
Good	RC	RC	RC	RC	RC	RC
Fair	-2.741	-1.813	-2.209	-3.142	-2.827	-2.474
Poor	-10.049	-10.045	-10.631	-10.933	-9.6	-7.935
Treated for Heart Disease or Problems						
Yes	1.496	0.837	1.046	1.724	1.424	2.262
No	RC	RC	RC	RC	RC	RC
Deaf or Difficulty Hearing						
Yes	-1.198	-0.431	-1	-1.712	-1.351	-2.25
No	RC	RC	RC	RC	RC	RC

(continued)

Table 2. “Bottom Box” ICH CAHPS Patient-Mix Adjustment Factors (Average for the 2020 Fall and 2021 Spring ICH CAHPS Semiannual Surveys) for the April 2022 Public Reporting Period (continued)

Patient-Mix Characteristic Patient-Mix Level	Rating of Kidney Doctors (Q8)	Rating of Dialysis Center Staff (Q35)	Rating of Dialysis Center (Q32)	Average of survey items comprising the Kidney Doctors Communication and Caring Composite	Average of survey items comprising the Quality of Dialysis Center and Operations Composite	Average of survey items comprising the Providing Information to Patients Composite
Blind or Difficulty Seeing						
Yes	-1.106	-0.041	-0.424	-2.019	-1.542	-1.314
No	RC	RC	RC	RC	RC	RC
Difficulty Dressing or Bathing						
Yes	-1.798	-1.573	-1.951	-2.336	-2.235	-2.717
No	RC	RC	RC	RC	RC	RC
Age						
18–44	0.269	-3.386	-1.911	0.212	-1.946	6.996
45–54	-0.444	-3.461	-2.726	-0.294	-2.348	4.74
55–64	-0.276	-2.411	-2.193	-0.089	-1.888	2.317
65–74	RC	RC	RC	RC	RC	RC
75+	0.687	1.613	1.56	0.518	1.662	-4.987
Gender						
Male	-0.908	-0.138	-0.364	-1.273	-0.062	-0.114
Female	RC	RC	RC	RC	RC	RC
Education						
8th Grade or Less	1.649	1.279	0.826	-1.541	-1.199	-0.54
Some High School	0.957	0.794	0.561	-1.016	-0.554	-0.639
High School	RC	RC	RC	RC	RC	RC
Some College	-1.55	-2.009	-1.667	-1.307	-0.85	-0.156
4-year Degree	-1.276	-2.075	-1.971	-1.202	-0.636	-0.926
More than 4-year college	-1.604	-3.24	-2.549	-1.589	-1.223	-1.481
Years on Dialysis						
1 Year	-0.288	2.523	2.195	-0.644	1.836	-1.74
2 Years	-0.243	1.208	1.034	-0.43	0.898	-1.009
3–4 Years	RC	RC	RC	RC	RC	RC
5–7 Years	0.736	-0.486	-0.778	0.624	-1.087	0.624
8+ Years	1.995	-0.343	-0.283	2.291	-0.713	2.304

RC = Reference Category

Table 3. Linear Means ICH CAHPS Patient-Mix Adjustment Factors (Average for the 2020 Fall and 2021 Spring ICH CAHPS Semiannual Surveys) for the April 2022 Public Reporting Period

Patient-Mix Characteristic Patient-Mix Level	Rating of Kidney Doctors (Q8)	Rating of Dialysis Center Staff (Q35)	Rating of Dialysis Center (Q32)	Average of survey items comprising the Kidney Doctors Communication and Caring Composite	Average of survey items comprising the Quality of Dialysis Center and Operations Composite	Average of survey items comprising the Providing Information to Patients Composite
Survey Mode						
Mail-Only	2.252	2.058	2.825	2.851	1.362	2.893
Phone-Only	RC	RC	RC	RC	RC	RC
Mixed Mode	-0.073	-0.094	0.479	-0.242	-0.648	1.292
Someone Helped Patient Complete Survey						
Yes	-0.493	-0.148	-0.267	-0.246	-1.269	-3.712
No	RC	RC	RC	RC	RC	RC
Patient Speaks Language other than English at Home						
Yes	0.653	-0.652	-0.058	3.363	1.831	2.248
No	RC	RC	RC	RC	RC	RC
Overall Health						
Excellent	-3.97	-4.507	-4.613	-3.73	-4.983	-2.315
Very Good	-1.63	-1.954	-1.824	-1.687	-1.919	-1.214
Good	RC	RC	RC	RC	RC	RC
Fair	1.14	1.141	1.131	1.304	1.254	0.765
Poor	3.493	3.016	2.825	4.252	3.026	2.492
Mental Health						
Excellent	-3.561	-2.664	-3.039	-4.384	-3.484	-2.813
Very Good	-1.705	-1.176	-1.291	-2.266	-1.621	-1.359
Good	RC	RC	RC	RC	RC	RC
Fair	1.712	1.27	1.499	2.721	2.277	2.474
Poor	6.715	5.925	6.439	8.887	7.055	7.935
Treated for Heart Disease or Problems						
Yes	-1.195	-0.803	-0.891	-1.642	-1.325	-2.262
No	RC	RC	RC	RC	RC	RC
Deaf or Difficulty Hearing						
Yes	0.643	0.319	0.676	1.51	1.175	2.25
No	RC	RC	RC	RC	RC	RC

(continued)

Table 3. Linear Means ICH CAHPS Patient-Mix Adjustment Factors (Average for the 2020 Fall and 2021 Spring ICH CAHPS Semiannual Surveys) for the April 2022 Public Reporting Period (continued)

Patient-Mix Characteristic Patient-Mix Level	Rating of Kidney Doctors (Q8)	Rating of Dialysis Center Staff (Q35)	Rating of Dialysis Center (Q32)	Average of survey items comprising the Kidney Doctors Communication and Caring Composite	Average of survey items comprising the Quality of Dialysis Center and Operations Composite	Average of survey items comprising the Providing Information to Patients Composite
Blind or Difficulty Seeing						
Yes	0.774	0.011	0.354	1.217	0.782	1.314
No	RC	RC	RC	RC	RC	RC
Difficulty Dressing or Bathing						
Yes	1.318	1.193	1.348	1.881	1.815	2.717
No	RC	RC	RC	RC	RC	RC
Age						
18–44	0.991	2.916	1.948	–0.593	1.123	–6.996
45–54	1.104	2.92	2.534	–0.074	1.727	–4.74
55–64	0.524	1.816	1.715	–0.257	1.327	–2.317
65–74	RC	RC	RC	RC	RC	RC
75+	–0.578	–1.114	–0.917	0.11	–0.869	4.987
Gender						
Male	1.581	0.778	0.879	1.22	–0.041	0.114
Female	RC	RC	RC	RC	RC	RC
Education						
8th Grade or Less	–1.478	–1.997	–1.485	0.248	–0.563	0.54
Some High School	–1.182	–1.519	–1.204	–0.211	–0.813	0.639
High School	RC	RC	RC	RC	RC	RC
Some College	1.753	2.38	1.96	1.892	1.822	0.156
4-year Degree	2.348	3.132	2.797	2.201	2.226	0.926
More than 4-year college	2.552	4.263	3.542	2.528	2.895	1.481
Years on Dialysis						
1 Year	0.184	–1.908	–1.742	0.37	–2.076	1.74
2 Years	0.104	–0.851	–0.872	0.149	–1.013	1.009
3–4 Years	RC	RC	RC	RC	RC	RC
5–7 Years	–0.36	0.677	0.683	–0.427	1.079	–0.624
8+ Years	–1.234	0.727	0.567	–1.734	1.079	–2.304

RC = Reference Category

Table 4. National Means on Patient-Mix Adjustment Factors (Average for the 2020 Fall and 2021 Spring ICH CAHPS Semiannual Surveys) for the April 2022 Public Reporting Period

Patient-Mix Characteristic Patient-Mix Level	Mean
Survey Mode	
Mail-Only	0.011
Phone-Only	0.069
Mixed Mode	0.972
Patient Assisted with Survey	
Yes	0.098
No	0.902
Patient Speaks Language Other than English at Home	
Yes	0.161
No	0.839
Overall Health	
Excellent	0.057
Very Good	0.154
Good	0.371
Fair	0.335
Poor	0.083
Mental Health	
Excellent	0.189
Very Good	0.270
Good	0.346
Fair	0.170
Poor	0.025
Treated for Heart Disease or Problems	
Yes	0.458
No	0.542
Deaf or Difficulty Hearing	
Yes	0.160
No	0.840
Blind or Difficulty Seeing	
Yes	0.195
No	0.805
Difficulty Dressing or Bathing	
Yes	0.183
No	0.817

(continued)

Table 4. National Means on Patient-Mix Adjustment Factors (Average for the 2020 Fall and 2021 Spring ICH CAHPS Semiannual Surveys) for the April 2022 Public Reporting Period (continued)

Patient-Mix Characteristic Patient-Mix Level	Mean
Age	
18–44	0.058
45–54	0.112
55–64	0.235
65–74	0.306
75+	0.289
Gender	
Male	0.572
Female	0.428
Education	
8th Grade or Less	0.110
Some High School	0.131
High School	0.331
Some College	0.269
4-year Degree	0.082
More than 4-year college	0.077
Years on Dialysis	
1 Year	0.180
2 Years	0.188
3–4 Years	0.268
5–7 Years	0.198
8+ Years	0.166

Table 5. ICH CAHPS Star Rating Cut Points (Average for the 2020 Fall and 2021 Spring ICH CAHPS Semiannual Surveys) for the April 2022 Public Reporting Period

Performance Measures	1 Star	2 Stars	3 Stars	4 Stars	5 Stars
Rating of Nephrologist (Q8)	0–77	78–83	84–86	87–90	91–100
Rating of Dialysis Care Staff (Q32)	0–78	79–84	85–87	88–91	92–100
Rating of Dialysis Center (Q35)	0–81	82–85	86–89	90–93	94–100
Communication and Caring Composite	0–63	64–73	74–80	81–84	85–100
Quality and Operations Composite	0–73	74–77	78–82	83–84	85–100
Providing Information Composite	0–68	69–76	77–80	81–84	85–100

Table 6. Frequency of ICH CAHPS CCNs Assigned to Each Star Rating (Average for the 2020 Fall and 2021 Spring ICH CAHPS Semiannual Surveys) for the April 2022 Public Reporting Period

Performance Measures	1 Star	2 Stars	3 Stars	4 Stars	5 Stars
Rating of Nephrologist (Q8)	240	601	570	646	301
Rating of Dialysis Care Staff (Q32)	165	533	582	758	320
Rating of Dialysis Center (Q35)	260	407	708	737	246
Communication and Caring Composite	28	234	694	616	786
Quality and Operations Composite	213	404	874	360	507
Providing Information Composite	87	552	553	647	519
Survey Summary Star Rating	49	403	780	814	312

**APPENDIX A:
ADDITIONAL INFORMATION ON THE CLUSTERING METHOD USED TO
CREATE ICH CAHPS STAR RATINGS**

The sequence of steps taken in the clustering methodology to develop the six ICH CAHPS star ratings is provided below. For each ICH CAHPS linear measure, the clustering method:

1. Produces the individual measure distance matrix.
2. Groups the measure scores into an initial set of clusters.
3. Selects the final set of clusters.

Step 1. Produce the individual measure distance matrix.

For each pair of ICH facilities j and k ($j > k$) among the n ICH facilities with measure score data, the Euclidian distance of the measure scores (e.g., the absolute value of the difference between the two measure scores) is computed. The clustering method then enters this distance in row j and column k of a distance matrix with n rows and n columns. This matrix is produced using the DISTANCE procedure in SAS.

Step 2. Create a tree of cluster assignments.

The distance matrix calculated in Step 1 is the input to the clustering procedure. The stored distance algorithm is implemented to compute cluster assignments. The following process is implemented by the CLUSTER procedure in SAS:

- a. The input measure score distances are squared.
- b. The clusters are initialized by assigning each ICH facility to its own cluster.
- c. To determine which pair of clusters to merge, Ward's minimum variance method is used to separate the variance of the measure scores into within- and between-cluster sum of squares components.
- d. From the existing clusters, two clusters are selected for merging to minimize the within-cluster sum of squares over all possible sets of clusters that might result from a merge.
- e. Steps b and c are repeated to reduce the number of clusters by one until a single cluster containing all ICH facilities results.

Step 3. Select the final set of clusters from the tree of cluster assignments.

The process outlined in Step 2 produces a tree of cluster assignments from which the five final clusters (which represent the five-star rating categories) are selected using the TREE procedure in SAS.