

Patient-Mix Coefficients for the In-Center Hemodialysis CAHPS (ICH CAHPS) Survey Results That Will be Publicly Reported in 2016

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 that 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 <http://www.Medicare.gov> in October 2016. The results posted on the DFC in October 2016 are based on survey responses from a sample of patients who received dialysis at their current ICH for 3 months or longer in calendar year 2015. Beginning in calendar year 2017, ICH CAHPS Survey results will be “refreshed” or updated on the DFC website twice each year and will be based on data from the two most recent semiannual surveys.

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 telephone-only mode, and 1,208 for the mixed mode. Sample patients who reported during the data collection period that they receive home dialysis, and those who were deceased, institutionalized, 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:

- 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.

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 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.

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 3:

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

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 adjustments, for the global ratings questions and questions comprising the composites, from Table 1 for top-box and Table 2 for bottom-box for the patient characteristics in the tables expressed as a proportion rather than as a percentage
- a29 to a30 are the national-level 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 and survey mode 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
- m1 to m28 are the national mean proportions of patients with each of the patient characteristics Table 3 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 for a given patient characteristic from an ICH facility’s share of patients on this same patient characteristic. For example, if nationally 20 percent of patients are aged 65–74, but an ICH facility’s share of patients on this measure is 25 percent, then the adjustment for the difference in the ICH facility’s patient composition versus the overall national patient composition is calculated as 25 percent minus 20 percent, or 5 percent.

After each facility’s patient mix adjusted score is created for the ratings questions and each of the individual survey questions included in each of the three composites, 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.

For each future public reporting period, Tables 1-3 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 Two 2015 ICH CAHPS Semiannual Surveys) for the October 2016 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	1.372	0.898	0.193	0.102	1.290	4.131
No	RC	RC	RC	RC	RC	RC
Patient Speaks Language other than English at Home						
Yes	-2.500	-1.570	0.987	-5.066	-2.804	-1.719
No	RC	RC	RC	RC	RC	RC
Overall Health						
Excellent	11.702	14.494	13.170	8.096	10.901	2.684
Very Good	4.833	6.089	5.991	3.249	4.103	1.592
Good	RC	RC	RC	RC	RC	RC
Fair	-2.478	-2.216	-2.561	-2.396	-2.090	-0.860
Poor	-4.729	-4.789	-5.789	-4.738	-3.750	-2.296
Mental Health						
Excellent	11.027	11.344	9.716	9.829	8.897	3.015
Very Good	5.422	5.295	4.572	4.195	3.169	1.595
Good	RC	RC	RC	RC	RC	RC
Fair	-3.581	-3.324	-3.304	-3.549	-3.040	-2.001
Poor	-10.790	-9.149	-9.030	-10.729	-7.517	-8.299
Treated for Heart Disease or Problems						
Yes	3.750	2.794	2.586	2.902	2.200	2.509
No	RC	RC	RC	RC	RC	RC
Deaf or Difficulty Hearing						
Yes	-1.209	-1.015	-0.750	-1.837	-1.052	-1.574
No	RC	RC	RC	RC	RC	RC

(continued)

Table 1. “Top Box” ICH CAHPS Patient-Mix Adjustment Factors (Average for the Two 2015 ICH CAHPS Semiannual Surveys) for the October 2016 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	-1.282	-0.718	0.211	-0.689	-0.145	-1.628
No	RC	RC	RC	RC	RC	RC
Difficulty Dressing or Bathing						
Yes	-2.359	-3.261	-2.429	-2.210	-2.389	-2.964
No	RC	RC	RC	RC	RC	RC
Age						
18–44	-6.327	-5.681	-8.069	-0.383	-1.390	7.372
45–54	-3.898	-5.624	-6.875	-0.119	-2.151	4.414
55–64	-1.592	-2.535	-3.345	0.134	-1.155	2.696
65–74	RC	RC	RC	RC	RC	RC
75+	0.425	1.854	2.824	-1.124	0.746	-4.983
Gender						
Male	-4.646	-2.543	-2.460	-1.198	0.600	0.065
Female	RC	RC	RC	RC	RC	RC
Education						
8th Grade or less	3.929	6.219	7.481	1.906	4.570	-1.236
Some High School	2.582	3.873	4.478	1.543	2.932	-0.856
High School	RC	RC	RC	RC	RC	RC
Some College	-4.257	-5.879	-6.633	-3.356	-4.724	-0.161
4-yr Degree	-5.766	-8.411	-9.394	-4.531	-6.155	-0.959
More than 4-yr college	-6.560	-10.569	-11.956	-5.357	-7.566	-0.940
Years on Dialysis						
1 Year	0.775	4.929	4.659	0.697	4.556	-0.641
2 Years	0.840	2.622	2.545	0.928	2.189	-0.283
3–4 Years	RC	RC	RC	RC	RC	RC
5–7 Years	1.106	-0.637	-0.744	0.758	-0.750	0.603
8+ Years	1.428	-1.386	-1.293	1.376	-1.569	1.332

RC = Reference Category

Table 2. “Bottom Box” ICH CAHPS Patient-Mix Adjustment Factors (Average for the Two 2015 ICH CAHPS Semiannual Surveys) for the October 2016 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	-0.858	-0.717	-0.484	-1.157	-2.136	-4.131
No	RC	RC	RC	RC	RC	RC
Patient Speaks Language other than English at Home						
Yes	0.316	-0.289	-1.621	3.189	2.221	1.719
No	RC	RC	RC	RC	RC	RC
Overall Health						
Excellent	-4.139	-4.055	-3.732	-3.031	-3.982	-2.684
Very Good	-1.704	-2.109	-2.070	-1.240	-1.767	-1.592
Good	RC	RC	RC	RC	RC	RC
Fair	1.607	1.352	1.215	1.422	0.997	0.860
Poor	4.695	3.864	4.030	4.658	3.105	2.296
Mental Health						
Excellent	-3.180	-2.343	-1.885	-3.611	-2.425	-3.015
Very Good	-2.480	-1.520	-1.167	-2.382	-1.693	-1.595
Good	RC	RC	RC	RC	RC	RC
Fair	3.081	2.620	2.409	3.216	2.875	2.001
Poor	12.356	11.084	10.503	12.410	10.363	8.299
Treated for Heart Disease or Problems						
Yes	-2.155	-1.248	-1.131	-2.260	-1.759	-2.509
No	RC	RC	RC	RC	RC	RC
Deaf or Difficulty Hearing						
Yes	1.060	0.484	0.303	1.552	1.028	1.574
No	RC	RC	RC	RC	RC	RC

(continued)

Table 2. “Bottom Box” ICH CAHPS Patient-Mix Adjustment Factors (Average for the Two 2015 ICH CAHPS Semiannual Surveys) for the October 2016 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	0.658	0.922	0.222	1.989	1.802	1.628
No	RC	RC	RC	RC	RC	RC
Difficulty Dressing or Bathing						
Yes	2.024	2.285	2.011	2.327	2.554	2.964
No	RC	RC	RC	RC	RC	RC
Age						
18–44	1.418	2.802	4.113	0.855	2.183	–7.372
45–54	1.062	3.590	3.940	0.724	2.991	–4.414
55–64	0.665	1.732	1.781	0.485	1.813	–2.696
65–74	RC	RC	RC	RC	RC	RC
75+	–0.206	–1.647	–1.966	–0.310	–1.629	4.983
Gender						
Male	1.038	0.437	0.098	1.041	–0.396	–0.065
Female	RC	RC	RC	RC	RC	RC
Education						
8th Grade or less	–1.163	–1.917	–2.175	1.867	0.794	1.236
Some High School	–0.100	–1.124	–1.163	1.270	0.787	0.856
High School	RC	RC	RC	RC	RC	RC
Some College	1.741	1.839	2.327	1.216	0.886	0.161
4–yr Degree	1.631	1.904	2.260	1.335	0.899	0.959
More than 4-yr college	2.232	3.293	3.687	1.629	1.362	0.940
Years on Dialysis						
1 Year	–0.285	–2.868	–2.664	0.094	–2.827	0.641
2 Years	–0.260	–1.251	–1.326	–0.134	–1.327	0.283
3–4 Years	RC	RC	RC	RC	RC	RC
5–7 Years	–0.396	0.436	0.352	–0.479	0.536	–0.603
8+ Years	–1.090	0.220	0.017	–1.106	0.734	–1.332

RC = Reference Category

Table 3. National Means on Patient-Mix Adjustment Factors (Average for the Two 2015 ICH CAHPS Semiannual Surveys for the October 2016 Public Reporting Period)

Patient Mix Characteristic Patient Mix Level	Mean
Survey Mode	
Mail Only	0.065
Phone Only	0.017
Mixed Mode	0.918
Patient Assisted with Survey	
Yes	0.108
No	0.892
Patient Speaks Language Other than English at Home	
Yes	0.142
No	0.858
Overall Health	
Excellent	0.056
Very Good	0.166
Good	0.373
Fair	0.323
Poor	0.081
Mental Health	
Excellent	0.180
Very Good	0.270
Good	0.348
Fair	0.175
Poor	0.026
Treated for Heart Disease or Problems	
Yes	0.442
No	0.558
Deaf or Difficulty Hearing	
Yes	0.158
No	0.842
Blind or Difficulty Seeing	
Yes	0.206
No	0.794
Difficulty Dressing or Bathing	
Yes	0.191
No	0.809

(continued)

Table 3. National Means on Patient-Mix Adjustment Factors (Average for the Two 2015 ICH CAHPS Semiannual Surveys for the October 2016 Public Reporting Period (continued))

Patient Mix Characteristic Patient Mix Level	Mean
Age	
18–44	0.069
45–54	0.134
55–64	0.256
65–74	0.284
75+	0.257
Gender	
Male	0.558
Female	0.442
Education	
8th Grade or less	0.122
Some High School	0.154
High School	0.334
Some College	0.248
4-yr Degree	0.074
More than 4-yr college	0.068
Years on Dialysis	
1 Year	0.193
2 Years	0.183
3–4 Years	0.257
5–7 Years	0.209
8+ Years	0.159