

Case-Mix Adjustments for Q2 2015 – Q1 2017 Publicly Reported CAHPS Hospice Survey Results

Overview

Prior to public reporting, hospices' CAHPS Hospice Survey results are adjusted for the effects of both mode of survey administration and case mix. Steps for calculating top-box scores for public reporting, including adjustment for mode of survey administration, are available at <http://www.hospicecahpsurvey.org/en/scoring-and-analysis/>.

Data from a mode experiment, as well as CAHPS Hospice Survey national implementation data, were used to develop and validate the variables to be included in the CAHPS Hospice case-mix model. In order to estimate the exact case-mix coefficients as accurately as possible, we employ the large sample size of each quarterly national publicly reported data set. This approach allows us to detect changes in the association of case-mix adjustors and CAHPS Hospice Survey measures over time and then adjust accordingly. This approach is consistent with recommended CAHPS practice for case-mix adjustment <http://www.ahrq.gov/cahps/>.

As described on <http://www.hospicecahpsurvey.org/en/scoring-and-analysis/>, case-mix adjustment is performed within each quarter of data after data cleaning and after mode adjustment. *Coefficients* obtained in linear regression models estimate the tendency of caregivers to respond more positively or negatively. The *adjustments* needed to counter that tendency are obtained by multiplying the case-mix coefficients by (-1.0). Tables 1 through 6 below report case-mix *adjustments* for each question composing a publicly reported CAHPS Hospice Survey measure, averaged over 8 quarters: Q2 2015 – Q1 2017. As an example, caregivers aged 18-24 were 11.12% less likely to provide the most positive response (“Definitely yes”) for the Willingness to Recommend this Hospice item (“Would you recommend this hospice to your friends and family?”) when compared to the reference group of caregivers aged 55-64. Thus, the corresponding adjustment for caregivers aged 18-24 relative to caregivers aged 55-64 for that measure is an addition of 11.12%, reflected in the “11.12%” entry in Table 6.

Publicly reported CAHPS Hospice Survey measure scores are adjusted to the overall national mean of case-mix variables across all reporting hospices (as reported in Table 7). Thus, whether the scores of a given hospice are adjusted upward or downward for a given measure depends not only on these case-mix adjustments, but also on the case mix of that hospice relative to the national average of these case-mix characteristics. Specifically, the total case mix-adjustment for a given hospice is the sum of a series of products, where each product multiplies the adjustments in Tables 1-6 by the difference between the hospice's mean on the corresponding case-mix variable and the national mean on that case-mix variable (from Table 7).

Four sets of numbers are needed to calculate final case-mix adjusted scores for a given hospice for a given quarter: (1) Means of the items that compose each CAHPS Hospice Survey measure for the hospice in question that have been adjusted for survey mode; (2) item-level case-mix adjustments from Tables 1-6 of this document; (3) that hospice's means on case-mix variables; and (4) national means on case-mix variables from Table 7 of this document.

Variable Definitions

In this section, we provide additional detail regarding the calculation of the response percentile variable and the definition of the primary diagnosis categories.

A hospice's case-mix adjustment variable response percentile is calculated as follows: For a given hospice and a given month, all completed surveys are ranked based on their respective "lag times." Lag time is the number of days between a decedent's death and the return of the mail survey, or the final disposition of the telephone survey. Ranks are averaged in the case of ties. Response percentile is calculated by dividing lag time rank by monthly sample size.

ICD-9 (prior to October 2016) and ICD-10 codes are used to categorize primary diagnosis. The 20 most common terminal diagnoses categories among hospice patients in 2004-2009¹ were used to define diagnosis categories with an 'other' category including all other diagnoses. Two of the 20 categories, 'Debility NOS' and 'Failure to Thrive' were rare in these data, and thus were collapsed into the 'other' category. Further collapsing was attempted but analyses examining the predictive ability of these diagnosis categories to predict measure scores indicated that the only appropriate collapsing was of "Alzheimer's Disease" and "non-Alzheimer's Dementias" into a single category; no other categories were combined.

Score Calculation

The formula for applying case-mix adjustment is as follows:

- Let y be the mode-adjusted hospice mean of an item that composes a CAHPS Hospice Survey measure
- Let a_1 - a_{62} be the corresponding individual-level adjustments from Tables 1-6 for all rows other than reference categories
- Let m_1 - m_{62} be the national means for the CMA variables in the same rows in Table 7
- Let h_1 - h_{62} be the CMA means for the hospice in question in the same form as in Table 7
- Then $y' = y + a_1(h_1 - m_1) + a_2(h_2 - m_2) + \dots + a_{62}(h_{62} - m_{62})$ is the case-mix and mode-adjusted hospice score for that item

¹ https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/Hospice/Medicare_Hospice_Data.html

CAHPS Hospice Survey publicly reported multi-quarter hospice averages are weighted proportionately to the number of respondent decedents/caregivers in the hospice in each of the quarters. Specifically, each quarter's score has a weight equal to the quarter's number of decedent/caregiver respondents. Weights are applied after case-mix adjustment and survey mode adjustment.

Adjusted scores within each quarter that are below 0 are truncated at 0; adjusted scores within each quarter that are above 100 are truncated at 100. Rounding occurs after case-mix and mode adjustments have been applied and after data have been combined across quarters. For public reporting purposes, CAHPS Hospice Survey measure scores are rounded to integer percentages.

Please note: The information presented here will permit a hospice to closely approximate the effect of case-mix adjustment on its CAHPS Hospice Survey results. However, exact replication of published CAHPS Hospice Survey results may not be possible because of (1) the effects of data cleaning, and (2) small differences between the effects of quarterly case-mix adjustments and the eight-quarter averages presented here. For each future quarter, Tables 1 through 7 will be updated and will be posted on <http://www.hospicecahpssurvey.org/en/scoring-and-analysis/>.

Table 1. CAHPS Hospice Survey Case-Mix Adjustments for Communication with Family, Q2 2015 - Q1 2017

	Hospice team kept you informed about when they would arrive to care for your family member	Hospice team explained things in a way that was easy to understand	Hospice team listened carefully to you when you talked with them about problems with your family member's hospice care	Hospice team kept you informed about your family member's condition	Hospice team listened carefully to you	Hospice team gave you confusing or contradictory information about your family member's condition or care
Response percentile (per 1% of response percentile)	0.04%	0.05%	0.06%	0.05%	0.06%	0.05%
Decedent Age						
Age 18-54	-8.16%	-1.70%	-1.32%	-4.49%	-0.91%	2.77%
Age 55-64	-6.58%	-1.09%	-0.84%	-3.09%	-0.33%	2.64%
Age 65-69	-6.05%	-0.46%	-0.95%	-2.64%	-0.04%	2.40%
Age 70-74	-5.73%	-0.33%	-0.43%	-2.05%	0.03%	1.99%
Age 75-79	-5.23%	-0.86%	-0.22%	-1.70%	-0.41%	1.42%
Age 80-84	-3.89%	-0.38%	-0.63%	-1.18%	-0.34%	0.82%
Age 85-89	-2.02%	0.09%	0.04%	-0.28%	0.08%	0.63%
Age 90+ (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Payer for Hospice Care						
Medicare only (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Medicaid only or Medicaid and private insurance	1.15%	1.52%	0.31%	2.16%	0.39%	1.78%
Medicare and Medicaid	9.32%	2.53%	1.67%	5.14%	2.12%	0.14%
Private insurance only	0.48%	0.96%	0.20%	0.14%	-0.13%	-0.15%

Medicare and private insurance	0.76%	0.37%	0.91%	0.35%	0.32%	0.29%
Uninsured or no payer	-0.70%	-1.09%	-2.26%	-0.03%	-1.85%	-1.34%
Other	4.05%	1.34%	0.90%	2.40%	0.62%	-0.10%
Primary Diagnosis						
Alzheimer's and non-Alzheimer's dementias (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Bladder cancer	-6.71%	0.01%	1.22%	-1.20%	0.46%	1.98%
Blood and lymphatic cancers	-7.64%	0.70%	0.73%	-0.69%	1.51%	1.66%
Brain cancer	-6.54%	-0.16%	0.38%	-2.12%	0.24%	0.54%
Breast cancer	-8.25%	-0.11%	-0.88%	-1.82%	-0.07%	0.80%
Congestive heart failure	-5.67%	0.26%	0.78%	-1.11%	1.22%	1.55%
Chronic kidney disease	-4.93%	0.52%	-0.29%	-0.40%	1.31%	1.61%
Chronic liver disease	-5.75%	0.27%	-0.03%	-1.95%	0.06%	1.12%
Colorectal cancer	-8.67%	0.07%	-0.36%	-2.26%	0.35%	1.55%
CVA/Stroke	-3.10%	-0.03%	0.01%	-1.25%	0.03%	0.57%
Liver cancer	-8.89%	-0.26%	1.17%	-2.03%	0.72%	1.13%
Lung & other chest cavity cancer	-8.90%	-0.17%	0.16%	-1.98%	0.33%	1.59%
Non-infectious respiratory	-6.75%	0.14%	0.55%	-1.07%	0.89%	2.08%
Other heart disease	-5.75%	-0.22%	0.18%	-1.70%	0.37%	0.93%
Ovarian cancer	-9.43%	0.05%	-1.09%	-2.37%	-1.16%	1.16%
Pancreatic cancer	-9.73%	0.17%	0.44%	-3.29%	0.39%	1.72%
Parkinson's and other degenerative diseases	-3.02%	-0.05%	0.34%	-1.02%	0.13%	0.32%
Pneumonias and other infectious lung diseases	-4.50%	0.93%	0.46%	-0.91%	0.66%	1.68%
Prostate cancer	-8.32%	-0.09%	0.40%	-1.55%	0.61%	1.38%
Stomach cancer	-9.38%	-0.26%	-0.41%	-2.91%	0.42%	1.60%
Other	-5.93%	0.13%	0.27%	-1.36%	0.34%	1.31%

Length of hospice stay						
2-5 days	-8.17%	-2.13%	2.34%	-3.35%	-1.39%	-4.69%
6-12 days	-6.70%	-0.95%	2.05%	-1.78%	-0.46%	-2.74%
13-29 days	-4.75%	0.13%	2.18%	-0.47%	0.68%	-1.08%
30-80 days	-2.64%	0.50%	1.40%	0.36%	0.93%	-0.20%
81+ days (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Caregiver Age						
Age 18-24	5.88%	5.16%	9.68%	5.07%	9.27%	6.45%
Age 25-34	3.94%	5.13%	8.02%	2.54%	6.83%	5.16%
Age 35-44	0.92%	2.31%	4.68%	0.63%	3.71%	1.94%
Age 45-54	-0.28%	0.85%	2.26%	-0.06%	1.16%	1.25%
Age 55-64 (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Age 65-74	0.51%	-0.30%	-2.14%	0.36%	-1.03%	-2.04%
Age 75-84	2.54%	2.48%	-1.97%	4.16%	1.39%	-2.65%
Age 85+	3.67%	5.78%	-0.49%	7.34%	4.03%	-1.70%
Caregiver Education						
8 th grade or less	-2.92%	-0.87%	-0.47%	-2.64%	-0.12%	10.83%
Some high school	-4.28%	-1.36%	-2.06%	-2.81%	-1.59%	5.61%
High school graduate or GED (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Some college	4.47%	1.97%	3.20%	3.19%	2.35%	-0.30%
4-year college graduate	10.82%	3.84%	5.26%	7.06%	4.10%	0.50%
More than 4-year college graduate	13.54%	4.90%	6.83%	8.85%	5.89%	1.86%
Caregiver relationship (Decedent was the caregiver's ___)						
Spouse or partner	-5.36%	1.53%	0.92%	1.17%	1.83%	-0.34%
Parent (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Mother-in-law or father-in-law	-2.13%	-2.62%	-3.89%	-2.45%	-2.13%	-2.20%

Grandparent	-3.59%	-3.90%	-3.79%	-4.49%	-2.45%	-2.03%
Aunt or uncle	4.52%	-0.59%	-0.30%	1.06%	-0.67%	-2.40%
Sister or brother	4.80%	2.30%	2.15%	4.19%	2.41%	-0.73%
Child	-1.19%	1.84%	1.45%	2.35%	1.97%	-0.39%
Friend	4.16%	0.68%	0.25%	2.79%	0.85%	-2.10%
Other	2.41%	0.07%	0.17%	1.85%	0.77%	-1.17%
Survey Language/Respondent's home language						
Survey language was Spanish	-5.26%	-0.11%	-3.25%	-3.24%	-4.13%	-3.19%
Home language is Spanish but survey language was not Spanish	-6.43%	-2.24%	-4.61%	-4.56%	-3.03%	-3.39%
Survey language was Chinese*	--	--	--	--	--	--
Home language is Chinese but survey language was not Chinese	6.14%	11.94%	5.42%	12.89%	11.24%	4.80%
All others (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

* Number of cases too small to accurately estimate coefficient.

Table 2. CAHPS Hospice Survey Case-Mix Adjustments for Getting Timely Help and Treating Patient with Respect, Q2 2015 – Q1 2017

	Getting Timely Help		Treating Patient with Respect	
	Got help as soon as you needed it when you or your family member asked for help from the hospice team	Got the help you needed from the hospice team during evenings, weekends, or holidays	Hospice team treated your family member with dignity and respect	Felt that the hospice team really cared about your family member
Response percentile (per 1% of response percentile)	0.07%	0.06%	0.02%	0.05%
Decedent Age				
Age 18-54	-1.77%	-2.47%	0.31%	-0.47%
Age 55-64	-0.97%	-1.43%	0.36%	0.33%
Age 65-69	-0.97%	-1.38%	0.32%	0.45%
Age 70-74	-1.24%	-0.76%	0.25%	0.06%
Age 75-79	-1.33%	-0.94%	0.11%	0.05%
Age 80-84	-0.77%	-0.81%	0.07%	-0.31%
Age 85-89	-0.53%	-0.24%	0.14%	0.19%
Age 90+ (REFERENCE)	0.00%	0.00%	0.00%	0.00%
Payer for Hospice Care				
Medicare only (REFERENCE)	0.00%	0.00%	0.00%	0.00%
Medicaid only or Medicaid and private insurance	0.57%	1.80%	1.30%	1.53%

Medicare and Medicaid	2.35%	3.51%	1.26%	2.01%
Private insurance only	0.43%	0.32%	0.20%	0.23%
Medicare and private insurance	0.29%	0.46%	0.01%	0.16%
Uninsured or no payer	-2.91%	0.02%	-0.27%	-1.19%
Other	0.77%	0.46%	0.64%	0.72%
Primary Diagnosis				
Alzheimer's and non-Alzheimer's dementias (REFERENCE)	0.00%	0.00%	0.00%	0.00%
Bladder cancer	0.51%	-1.04%	0.52%	0.13%
Blood and lymphatic cancers	1.89%	-0.55%	0.96%	1.13%
Brain cancer	1.10%	-0.87%	0.36%	0.48%
Breast cancer	0.18%	-1.70%	-0.42%	-0.34%
Congestive heart failure	1.04%	-0.02%	0.43%	0.53%
Chronic kidney disease	1.20%	0.05%	0.59%	0.89%
Chronic liver disease	-0.31%	-0.75%	0.28%	0.07%
Colorectal cancer	0.39%	-0.81%	0.18%	0.15%
CVA/Stroke	-0.15%	-0.67%	0.15%	-0.24%
Liver cancer	0.52%	-0.46%	0.63%	0.79%
Lung & other chest cavity cancer	0.11%	-1.15%	0.33%	0.33%
Non-infectious respiratory	0.90%	-1.16%	0.42%	0.41%
Other heart disease	0.40%	-1.41%	0.29%	0.06%
Ovarian cancer	0.22%	-1.80%	0.16%	-1.06%
Pancreatic cancer	0.72%	-0.36%	0.30%	0.42%
Parkinson's and other degenerative diseases	0.98%	0.16%	-0.10%	0.03%
Pneumonias and other infectious lung diseases	0.39%	-1.25%	0.45%	0.07%
Prostate cancer	0.68%	-0.38%	0.71%	0.54%

Stomach cancer	0.01%	-0.81%	0.56%	1.36%
Other	0.44%	-0.77%	0.38%	0.12%
Length of hospice stay				
2-5 days	-6.11%	-6.52%	-0.12%	0.09%
6-12 days	-3.16%	-4.61%	0.21%	1.09%
13-29 days	-0.69%	-2.35%	0.51%	1.58%
30-80 days	0.36%	-1.07%	0.35%	1.30%
81+ days (REFERENCE)	0.00%	0.00%	0.00%	0.00%
Caregiver Age				
Age 18-24	9.14%	10.38%	5.93%	9.04%
Age 25-34	6.43%	5.76%	4.12%	6.51%
Age 35-44	3.12%	3.77%	2.33%	3.59%
Age 45-54	1.17%	0.67%	0.88%	1.39%
Age 55-64 (REFERENCE)	0.00%	0.00%	0.00%	0.00%
Age 65-74	-1.48%	-1.08%	-1.00%	-1.56%
Age 75-84	-0.63%	0.64%	-0.93%	-1.13%
Age 85+	1.00%	3.56%	-0.10%	0.23%
Caregiver Education				
8 th grade or less	-0.58%	3.52%	1.13%	-0.42%
Some high school	-2.21%	1.11%	-0.18%	-1.25%
High school graduate or GED (REFERENCE)	0.00%	0.00%	0.00%	0.00%
Some college	3.33%	0.96%	0.94%	2.72%
4-year college graduate	6.94%	3.08%	1.45%	4.52%
More than 4-year college graduate	9.59%	4.65%	2.30%	6.45%
Caregiver relationship (Decedent was the caregiver's ___)				
Spouse or partner	0.07%	0.44%	0.34%	0.50%

Parent (REFERENCE)	0.00%	0.00%	0.00%	0.00%
Mother-in-law or father-in-law	-2.35%	-1.65%	-1.20%	-2.53%
Grandparent	-4.31%	-3.01%	-1.38%	-3.27%
Aunt or uncle	-1.28%	-0.19%	-0.25%	-0.88%
Sister or brother	1.77%	1.82%	1.07%	1.37%
Child	0.14%	1.77%	0.74%	0.59%
Friend	1.09%	1.49%	0.71%	-0.12%
Other	-0.06%	2.04%	0.34%	-0.13%
Survey Language/Respondent's home language				
Survey language was Spanish	-1.23%	9.09%	-0.96%	0.21%
Home language is Spanish but survey language was not Spanish	-3.57%	0.31%	-1.66%	-2.23%
Survey language was Chinese*	--	--	--	--
Home language is Chinese but survey language was not Chinese	12.76%	25.89%	10.53%	11.51%
All others (REFERENCE)	0.00%	0.00%	0.00%	0.00%

* Number of cases too small to accurately estimate coefficient.

Table 3. CAHPS Hospice Survey Case-Mix Adjustments for Emotional and Spiritual Support, Q2 2015 - Q1 2017

	Amount of emotional support you got from the hospice team while your family member was in hospice care	Amount of emotional support you got from the hospice team in the weeks after your family member died	Amount of support for your religious and spiritual beliefs you got from the hospice team
Response percentile (per 1% of response percentile)	0.02%	0.02%	0.02%
Decedent Age			
Age 18-54	0.34%	2.81%	-0.50%
Age 55-64	0.55%	2.33%	-0.19%
Age 65-69	0.84%	2.44%	0.17%
Age 70-74	0.57%	1.73%	-0.09%
Age 75-79	0.53%	1.55%	0.07%
Age 80-84	0.24%	1.11%	0.21%
Age 85-89	0.24%	0.75%	0.04%
Age 90+ (REFERENCE)	0.00%	0.00%	0.00%
Payer for Hospice Care			
Medicare only (REFERENCE)	0.00%	0.00%	0.00%
Medicaid only or Medicaid and private insurance	2.54%	2.44%	2.03%
Medicare and Medicaid	1.69%	1.38%	1.37%
Private insurance only	0.01%	-0.74%	-0.38%

Medicare and private insurance	-0.05%	0.08%	-0.11%
Uninsured or no payer	-0.33%	-0.98%	-0.78%
Other	0.25%	-0.40%	0.08%
Primary Diagnosis			
Alzheimer's and non-Alzheimer's dementias (REFERENCE)	0.00%	0.00%	0.00%
Bladder cancer	1.42%	2.00%	1.42%
Blood and lymphatic cancers	1.24%	1.24%	0.65%
Brain cancer	0.30%	0.60%	-0.27%
Breast cancer	0.13%	0.18%	0.07%
Congestive heart failure	0.93%	1.57%	0.75%
Chronic kidney disease	1.15%	1.30%	1.16%
Chronic liver disease	0.24%	0.94%	0.23%
Colorectal cancer	0.71%	1.57%	0.46%
CVA/Stroke	0.13%	0.24%	-0.22%
Liver cancer	0.78%	1.29%	0.81%
Lung & other chest cavity cancer	0.83%	1.34%	0.69%
Non-infectious respiratory	1.10%	2.22%	0.80%
Other heart disease	0.57%	0.87%	0.39%
Ovarian cancer	-0.42%	-0.86%	-0.53%
Pancreatic cancer	0.57%	0.97%	0.15%
Parkinson's and other degenerative diseases	0.27%	0.63%	0.34%
Pneumonias and other infectious lung diseases	0.69%	1.25%	0.13%
Prostate cancer	0.71%	1.51%	0.73%
Stomach cancer	1.83%	2.17%	1.19%
Other	0.50%	0.82%	0.17%

Length of hospice stay			
2-5 days	0.53%	-2.22%	0.61%
6-12 days	0.87%	-1.43%	0.63%
13-29 days	1.08%	-0.55%	1.11%
30-80 days	0.95%	0.21%	0.86%
81+ days (REFERENCE)	0.00%	0.00%	0.00%
Caregiver Age			
Age 18-24	7.23%	10.49%	4.86%
Age 25-34	4.35%	7.74%	2.23%
Age 35-44	2.77%	5.18%	1.86%
Age 45-54	1.26%	2.43%	0.83%
Age 55-64 (REFERENCE)	0.00%	0.00%	0.00%
Age 65-74	-1.16%	-1.94%	-0.60%
Age 75-84	-1.52%	-2.68%	-0.40%
Age 85+	-0.75%	-1.68%	0.52%
Caregiver Education			
8 th grade or less	2.03%	2.46%	2.37%
Some high school	0.57%	1.21%	1.19%
High school graduate or GED (REFERENCE)	0.00%	0.00%	0.00%
Some college	0.71%	1.10%	0.12%
4-year college graduate	0.97%	0.46%	-0.20%
More than 4-year college graduate	1.77%	1.68%	0.43%
Caregiver relationship (Decedent was the caregiver's ___)			
Spouse or partner	1.05%	4.26%	1.07%
Parent (REFERENCE)	0.00%	0.00%	0.00%
Mother-in-law or father-in-law	-1.34%	-1.47%	-1.43%

Grandparent	-1.16%	-0.88%	-0.85%
Aunt or uncle	-0.88%	-2.36%	-0.51%
Sister or brother	0.48%	-0.29%	1.45%
Child	1.04%	2.31%	1.91%
Friend	-0.45%	-1.09%	0.12%
Other	0.22%	-0.40%	0.56%
Survey Language/Respondent's home language			
Survey language was Spanish	22.19%	17.21%	17.38%
Home language is Spanish but survey language was not Spanish	7.11%	9.39%	7.55%
Survey language was Chinese*	--	--	--
Home language is Chinese but survey language was not Chinese	4.32%	4.59%	7.88%
All others (REFERENCE)	0.00%	0.00%	0.00%

* Number of cases too small to accurately estimate coefficient.

Table 4. CAHPS Hospice Survey Case-Mix Adjustments for Help for Pain and Symptoms, Q2 2015 – Q1 2017

	Your family member got as much help with pain as he or she needed	Your family member got the help he or she needed for trouble breathing	Your family member got the help he or she needed for trouble with constipation	Your family member got the help he or she needed from the hospice team for feelings of anxiety or sadness
Response percentile (per 1% of response percentile)	0.04%	0.04%	0.07%	0.08%
Decedent Age				
Age 18-54	1.65%	-0.80%	-3.36%	-5.83%
Age 55-64	0.74%	-0.75%	-3.11%	-5.15%
Age 65-69	0.29%	-0.40%	-2.82%	-4.51%
Age 70-74	0.30%	-0.25%	-1.96%	-4.07%
Age 75-79	-0.60%	-0.19%	-1.57%	-3.54%
Age 80-84	-0.33%	0.02%	-0.48%	-1.91%
Age 85-89	-0.08%	0.11%	-0.43%	-0.97%
Age 90+ (REFERENCE)	0.00%	0.00%	0.00%	0.00%
Payer for Hospice Care				
Medicare only (REFERENCE)	0.00%	0.00%	0.00%	0.00%
Medicaid only or Medicaid and private insurance	1.60%	3.96%	2.25%	3.35%
Medicare and Medicaid	3.67%	3.76%	6.15%	5.57%
Private insurance only	0.39%	0.61%	0.99%	0.58%

Medicare and private insurance	-0.34%	-0.17%	-0.10%	0.63%
Uninsured or no payer	-3.04%	0.04%	-0.04%	0.81%
Other	1.19%	1.67%	2.14%	1.91%
Primary Diagnosis				
Alzheimer's and non-Alzheimer's dementias (REFERENCE)	0.00%	0.00%	0.00%	0.00%
Bladder cancer	1.39%	-1.55%	1.80%	0.09%
Blood and lymphatic cancers	1.37%	-0.79%	1.18%	0.93%
Brain cancer	-2.22%	-0.63%	0.25%	0.41%
Breast cancer	-0.80%	-2.78%	1.01%	-1.04%
Congestive heart failure	1.91%	-1.94%	1.46%	-0.40%
Chronic kidney disease	1.69%	-1.22%	1.72%	1.21%
Chronic liver disease	-0.83%	-0.70%	2.52%	0.72%
Colorectal cancer	0.22%	-0.79%	0.91%	-0.21%
CVA/Stroke	-0.27%	-0.19%	0.71%	-0.19%
Liver cancer	0.19%	-2.15%	-0.95%	-0.22%
Lung & other chest cavity cancer	0.40%	-3.64%	0.22%	-1.19%
Non-infectious respiratory	0.99%	-3.81%	0.11%	-1.62%
Other heart disease	1.20%	-2.40%	0.88%	-1.44%
Ovarian cancer	0.58%	-3.75%	2.24%	-1.90%
Pancreatic cancer	0.14%	-2.57%	0.54%	-0.65%
Parkinson's and other degenerative diseases	0.60%	-0.47%	1.51%	1.07%
Pneumonias and other infectious lung diseases	0.20%	-4.25%	-0.47%	-1.73%
Prostate cancer	0.80%	-1.27%	0.27%	0.13%
Stomach cancer	0.51%	-1.29%	0.39%	0.08%
Other	0.55%	-1.75%	0.87%	-0.10%

Length of hospice stay				
2-5 days	0.12%	1.18%	13.59%	2.98%
6-12 days	0.67%	1.57%	9.62%	3.46%
13-29 days	1.72%	1.68%	6.22%	3.84%
30-80 days	1.42%	1.39%	3.16%	2.92%
81+ days (REFERENCE)	0.00%	0.00%	0.00%	0.00%
Caregiver Age				
Age 18-24	7.72%	11.20%	11.18%	15.54%
Age 25-34	5.61%	7.64%	8.70%	8.50%
Age 35-44	1.81%	4.23%	4.60%	3.56%
Age 45-54	0.84%	1.55%	1.38%	0.67%
Age 55-64 (REFERENCE)	0.00%	0.00%	0.00%	0.00%
Age 65-74	-0.98%	-0.72%	0.07%	0.54%
Age 75-84	0.90%	1.79%	4.06%	6.18%
Age 85+	2.85%	5.38%	6.91%	10.90%
Caregiver Education				
8 th grade or less	0.06%	2.66%	3.01%	-0.19%
Some high school	-1.43%	-0.14%	-0.46%	-2.75%
High school graduate or GED (REFERENCE)	0.00%	0.00%	0.00%	0.00%
Some college	1.69%	1.67%	2.38%	3.60%
4-year college graduate	2.75%	3.88%	5.40%	8.79%
More than 4-year college graduate	4.45%	5.71%	7.43%	11.80%
Caregiver relationship (Decedent was the caregiver's ___)				
Spouse or partner	0.07%	0.93%	0.89%	2.40%
Parent (REFERENCE)	0.00%	0.00%	0.00%	0.00%
Mother-in-law or father-in-law	-3.02%	-2.39%	-5.80%	-5.57%

Grandparent	-3.20%	-3.46%	-5.72%	-7.18%
Aunt or uncle	-0.73%	-0.76%	-0.63%	-1.20%
Sister or brother	1.15%	2.71%	3.63%	4.80%
Child	0.59%	0.87%	1.72%	2.54%
Friend	-0.38%	-0.03%	1.95%	1.44%
Other	-0.66%	0.17%	-0.89%	0.17%
Survey Language/Respondent's home language				
Survey language was Spanish	-6.57%	3.14%	-0.04%	-1.51%
Home language is Spanish but survey language was not Spanish	-6.23%	2.60%	1.25%	-3.33%
Survey language was Chinese*	--	--	--	--
Home language is Chinese but survey language was not Chinese	2.80%	19.29%	20.74%	21.59%
All others (REFERENCE)	0.00%	0.00%	0.00%	0.00%

* Number of cases too small to accurately estimate coefficient.

Table 5. CAHPS Hospice Survey Case-Mix Adjustments for Training Family to Care for Patient, Q2 2015 - Q1 2017

	Hospice team gave you the training you needed about what side effects to watch for from pain medicine	Hospice team gave you the training you needed about if and when to give more pain medicine to your family member	Hospice team gave you the training you needed about how to help your family member if he or she had trouble breathing	Hospice team gave you the training you needed about what to do if your family member became restless or agitated	A member of the hospice team discussed side effects of pain medicine with you or your family member
Response percentile (per 1% of response percentile)	0.03%	0.03%	0.02%	0.05%	0.04%
Decedent Age					
Age 18-54	-5.71%	-2.51%	-1.53%	-1.10%	-5.92%
Age 55-64	-4.38%	-1.62%	-0.87%	-1.61%	-4.39%
Age 65-69	-5.11%	-1.90%	-0.82%	-2.57%	-5.09%
Age 70-74	-3.71%	-1.48%	-0.49%	-2.73%	-4.14%
Age 75-79	-4.02%	-1.72%	-0.64%	-3.44%	-3.72%
Age 80-84	-2.94%	-1.57%	-0.84%	-2.29%	-2.68%
Age 85-89	-1.40%	-0.87%	-0.64%	-1.23%	-1.36%
Age 90+ (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%
Payer for Hospice Care					
Medicare only (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%
Medicaid only or Medicaid and private insurance	2.05%	1.16%	0.71%	1.62%	1.01%
Medicare and Medicaid	5.05%	4.49%	4.48%	6.94%	3.36%
Private insurance only	-0.17%	-0.08%	0.46%	0.20%	-1.01%

Medicare and private insurance	0.11%	-0.19%	0.10%	0.00%	-0.55%
Uninsured or no payer	-1.94%	-2.31%	-4.39%	-4.79%	-2.27%
Other	1.53%	0.99%	1.31%	2.02%	0.27%
Primary Diagnosis					
Alzheimer's and non-Alzheimer's dementias (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%
Bladder cancer	-3.88%	-1.58%	-2.77%	-0.19%	-2.53%
Blood and lymphatic cancers	-4.21%	-1.76%	-3.18%	-0.33%	-2.49%
Brain cancer	-5.81%	-2.37%	-2.80%	-4.97%	-3.01%
Breast cancer	-5.85%	-2.86%	-3.36%	-2.23%	-3.97%
Congestive heart failure	-2.79%	-0.90%	-2.31%	-0.62%	-1.73%
Chronic kidney disease	-3.81%	-0.95%	-3.23%	-2.06%	-2.76%
Chronic liver disease	-4.29%	-1.66%	-3.14%	-2.78%	-3.37%
Colorectal cancer	-4.31%	-2.03%	-2.80%	-1.19%	-3.04%
CVA/Stroke	-3.19%	-1.78%	-2.33%	-2.96%	-1.31%
Liver cancer	-4.49%	-1.90%	-2.94%	-2.12%	-3.83%
Lung & other chest cavity cancer	-4.27%	-2.22%	-4.09%	-1.45%	-3.04%
Non-infectious respiratory	-3.33%	-1.60%	-3.30%	-1.14%	-3.15%
Other heart disease	-3.39%	-1.83%	-3.38%	-2.21%	-2.38%
Ovarian cancer	-8.21%	-4.12%	-3.76%	-3.94%	-5.94%
Pancreatic cancer	-4.02%	-2.25%	-3.25%	-0.58%	-3.49%
Parkinson's and other degenerative diseases	-1.82%	-1.12%	-1.28%	-0.52%	-1.25%
Pneumonias and other infectious lung diseases	-3.96%	-1.72%	-3.79%	-2.67%	-4.08%
Prostate cancer	-4.44%	-2.61%	-2.77%	-1.28%	-2.72%
Stomach cancer	-4.23%	-2.59%	-3.72%	-1.95%	-2.68%
Other	-3.73%	-2.04%	-2.87%	-0.87%	-2.83%

Length of hospice stay						
2-5 days	4.56%	3.24%	6.87%	2.14%	7.54%	
6-12 days	3.37%	2.30%	5.20%	1.59%	5.68%	
13-29 days	2.13%	1.83%	3.78%	1.37%	3.83%	
30-80 days	1.34%	1.02%	2.09%	1.11%	2.13%	
81+ days (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%	
Caregiver Age						
Age 18-24	11.65%	6.20%	13.44%	11.51%	9.85%	
Age 25-34	3.77%	3.02%	7.60%	4.66%	4.14%	
Age 35-44	0.74%	1.25%	3.09%	1.51%	1.46%	
Age 45-54	-0.75%	0.22%	0.57%	-0.01%	0.01%	
Age 55-64 (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%	
Age 65-74	0.94%	-0.61%	-1.03%	0.94%	0.74%	
Age 75-84	4.54%	1.28%	1.74%	5.56%	5.04%	
Age 85+	7.37%	4.07%	5.09%	8.42%	8.44%	
Caregiver Education						
8 th grade or less	-1.34%	-0.21%	0.92%	-1.68%	0.13%	
Some high school	-3.23%	-1.93%	-1.53%	-3.17%	-2.27%	
High school graduate or GED (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%	
Some college	1.92%	2.02%	2.06%	2.55%	1.51%	
4-year college graduate	5.94%	5.33%	5.43%	7.26%	4.29%	
More than 4-year college graduate	7.44%	7.00%	7.42%	9.65%	5.36%	
Caregiver relationship (Decedent was the caregiver's ___)						
Spouse or partner	0.37%	-0.14%	0.28%	0.09%	3.19%	
Parent (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%	
Mother-in-law or father-in-law	-5.46%	-3.93%	-5.67%	-6.11%	-4.74%	

Grandparent	-7.02%	-5.87%	-6.50%	-7.44%	-6.02%
Aunt or uncle	2.62%	0.35%	0.65%	2.29%	2.05%
Sister or brother	5.63%	2.87%	4.01%	4.80%	5.68%
Child	3.33%	0.70%	2.29%	1.49%	5.15%
Friend	4.15%	1.65%	1.28%	2.88%	2.86%
Other	1.75%	-0.43%	-0.44%	0.49%	2.15%
Survey Language/Respondent's home language					
Survey language was Spanish	-10.87%	-7.59%	-10.64%	-13.31%	-6.12%
Home language is Spanish but survey language was not Spanish	-8.89%	-4.83%	-6.16%	-9.23%	-5.09%
Survey language was Chinese*	--	--	--	--	--
Home language is Chinese but survey language was not Chinese	-0.82%	2.51%	-1.79%	4.61%	2.73%
All others (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%

* Number of cases too small to accurately estimate coefficient.

Table 6. CAHPS Hospice Survey Case-Mix Adjustments for Rating of this Hospice and Willing to Recommend this Hospice, Q2 2015 - Q1 2017

	Rating of this Hospice	Willing to Recommend this Hospice
Response percentile (per 1% of response percentile)	0.07%	0.07%
Decedent Age		
Age 18-54	-0.83%	-0.93%
Age 55-64	-0.35%	-0.48%
Age 65-69	0.01%	-0.32%
Age 70-74	-0.36%	-0.62%
Age 75-79	-0.40%	-0.75%
Age 80-84	-0.52%	-0.81%
Age 85-89	-0.08%	-0.18%
Age 90+ (REFERENCE)	0.00%	0.00%
Payer for Hospice Care		
Medicare only (REFERENCE)	0.00%	0.00%
Medicaid only or Medicaid and private insurance	1.23%	1.34%
Medicare and Medicaid	3.53%	3.24%
Private insurance only	0.21%	0.44%
Medicare and private insurance	-0.17%	0.11%
Uninsured or no payer	-2.22%	-2.65%
Other	0.68%	0.68%
Primary Diagnosis		
Alzheimer's and non-Alzheimer's dementias (REFERENCE)	0.00%	0.00%
Bladder cancer	1.11%	1.23%
Blood and lymphatic cancers	1.85%	1.24%

Brain cancer	-0.17%	0.56%
Breast cancer	-0.13%	-0.34%
Congestive heart failure	0.93%	0.94%
Chronic kidney disease	1.32%	1.68%
Chronic liver disease	0.62%	0.33%
Colorectal cancer	0.19%	0.77%
CVA/Stroke	-0.36%	-0.04%
Liver cancer	0.62%	1.56%
Lung & other chest cavity cancer	0.48%	0.48%
Non-infectious respiratory	0.79%	0.73%
Other heart disease	0.12%	0.27%
Ovarian cancer	-1.17%	-0.88%
Pancreatic cancer	0.47%	0.61%
Parkinson's and other degenerative diseases	0.25%	-0.09%
Pneumonias and other infectious lung diseases	0.71%	1.12%
Prostate cancer	0.71%	1.20%
Stomach cancer	1.58%	1.77%
Other	0.22%	0.37%
Length of hospice stay		
2-5 days	-1.02%	-0.10%
6-12 days	0.17%	0.49%
13-29 days	1.51%	1.16%
30-80 days	1.68%	1.21%
81+ days (REFERENCE)	0.00%	0.00%
Caregiver Age		
Age 18-24	11.88%	11.12%
Age 25-34	8.07%	6.04%
Age 35-44	4.35%	2.95%
Age 45-54	1.56%	1.16%
Age 55-64 (REFERENCE)	0.00%	0.00%

Age 65-74	-1.96%	-1.19%
Age 75-84	-0.91%	-0.48%
Age 85+	0.59%	0.61%
Caregiver Education		
8 th grade or less	-0.44%	0.62%
Some high school	-1.52%	-0.60%
High school graduate or GED (REFERENCE)	0.00%	0.00%
Some college	2.32%	1.42%
4-year college graduate	4.50%	2.20%
More than 4-year college graduate	5.79%	3.15%
Caregiver relationship (Decedent was the caregiver's __)		
Spouse or partner	0.95%	1.21%
Parent (REFERENCE)	0.00%	0.00%
Mother-in-law or father-in-law	-2.78%	-2.18%
Grandparent	-2.41%	-2.66%
Aunt or uncle	-0.40%	0.12%
Sister or brother	1.71%	2.62%
Child	1.14%	2.05%
Friend	0.45%	0.54%
Other	1.05%	1.22%
Survey Language/Respondent's home language		
Survey language was Spanish	-6.65%	-3.76%
Home language is Spanish but survey language was not Spanish	-2.54%	-2.12%
Survey language was Chinese*	--	--
Home language is Chinese but survey language was not Chinese	13.12%	9.10%
All others (REFERENCE)	0.00%	0.00%

* Number of cases too small to accurately estimate coefficient.

Table 7. National Means of CAHPS Hospice Survey Case-Mix Adjustment Variables, Q2 2015 – Q1 2017

	National Mean
Response percentile	20.6%
Decedent Age	
Age 18-54	2.9%
Age 55-64	7.6%
Age 65-69	7.0%
Age 70-74	9.2%
Age 75-79	11.7%
Age 80-84	15.7%
Age 85-89	19.3%
Age 90+	26.5%
Payer for Hospice Care	
Medicare only	71.9%
Medicaid only or Medicaid and private insurance	1.7%
Medicare and Medicaid	4.3%
Private insurance only	4.5%
Medicare and private insurance	3.9%
Uninsured or no payer	0.4%
Other	13.2%
Primary Diagnosis	
Alzheimer's and non-Alzheimer's dementias	14.1%
Bladder cancer	1.2%
Blood and lymphatic cancers	2.8%
Brain cancer	1.3%
Breast cancer	2.2%
Congestive heart failure	8.8%
Chronic kidney disease	2.2%
Chronic liver disease	1.6%
Colorectal cancer	3.0%
CVA/Stroke	7.6%
Liver cancer	1.7%
Lung & other chest cavity cancer	8.5%
Non-infectious respiratory	5.9%
Other heart disease	7.1%
Ovarian cancer	0.8%
Pancreatic cancer	2.9%
Parkinson's and other degenerative diseases	2.8%
Pneumonias and other infectious lung diseases	2.9%
Prostate cancer	2.1%
Stomach cancer	0.6%
Other	20.0%

Length of hospice stay	
2-5 days	20.6%
6-12 days	19.0%
13-29 days	18.8%
30-80 days	19.2%
81+ days	22.4%
Caregiver Age	
Age 18-24	0.1%
Age 25-34	0.8%
Age 35-44	2.6%
Age 45-54	11.1%
Age 55-64	30.1%
Age 65-74	30.8%
Age 75-84	17.6%
Age 85+	6.8%
Caregiver Education	
8 th grade or less	1.3%
Some high school	4.0%
High school graduate or GED	26.8%
Some college	32.3%
4-year college graduate	16.3%
More than 4-year college graduate	19.2%
Caregiver relationship (Decedent was the caregiver's __)	
Spouse or partner	40.3%
Parent	44.6%
Mother-in-law or father-in-law	2.2%
Grandparent	0.8%
Aunt or uncle	2.3%
Sister or brother	4.3%
Child	1.8%
Friend	1.6%
Other	2.1%
Survey Language/Respondent's home language	
Survey language was Spanish	0.9%
Home language is Spanish but survey language was not Spanish	0.5%
Survey language was Chinese	0.0%
Home language is Chinese but survey language was not Chinese	0.1%
All others	98.4%