Patient-mix Coefficients for January 2027 (2Q25 through 1Q26 Discharges) Publicly Reported HCAHPS Results

As noted in the HCAHPS *Quality Assurance Guidelines*, prior to public reporting, hospitals' HCAHPS results are adjusted for the effects of both mode of survey administration and patient-mix. Generally speaking, HCAHPS adjustments for survey mode are larger than adjustments for patient-mix. The survey mode adjustments that are used in publicly reported HCAHPS results are reported in the paper entitled, "Mode and Patient-mix Adjustment of the CAHPS® Hospital Survey (HCAHPS) April 30, 2008," which can be found on https://www.hcahpsonline.org.

In order to derive the mode adjustment coefficients, it was necessary to conduct a randomized mode experiment. The resulting mode adjustment coefficients will not change as a function of the data used in public reporting. For more information on how the HCAHPS mode experiment was conducted and the survey mode and patient-mix adjustments were derived, please see, "*Effects of Survey Mode, Patient Mix, and Nonresponse on CAHPS Hospital Survey Scores.*" Elliott, M.N., A.M. Zaslavsky, E. Goldstein, W. Lehrman, K. Hambarsoomian, M.K. Beckett, and L. Giordano. Health Services Research. 2009. 44: 501-518.

The mode experiment data were also used to develop and validate the HCAHPS patient-mix model (which is referred to as "case-mix" elsewhere in the CAHPS literature), as described in the document referenced above. However, in the case of patient-mix adjustment, a randomized experiment is not necessary to accurately estimate the coefficients of the model.

In order to estimate the exact patient-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 patient-mix adjustors and HCAHPS measures over time and then adjust accordingly. This approach is consistent with recommended CAHPS practice for case-mix adjustment http://www.ahrq.gov/cahps/.

Please note: Beginning with January 1, 2025 (Q1 2025) discharges, the HCAHPS Patient-Mix Adjustment (PMA) model was updated to include Question 26 from the updated HCAHPS survey. Question 26 asks: "Was this hospital stay planned in advance?" The new PMA variable is called Planned Stay. The parameterization of Planned Stay codes patient responses as 1 for the "Yes, definitely" response, 0 for the "Yes, somewhat" response, and 0 for the "No" response. Therefore, HCAHPS scores are adjusted for the percentage of "Yes, definitely" respondents for the Planned Stay item. HCAHPS survey results were adjusted using the new PMA model beginning with January 1, 2025 discharges.

Patient-mix adjustment is performed within each quarter of data after data cleaning and after mode adjustment. *Coefficients* obtained in linear regression models (not reported) estimate the tendency of patients to respond more positively or negatively. The *adjustments* needed to counter that tendency are obtained by multiplying the patient-mix *coefficients* by (-1.0). Tables 1 and 2 below report patient-mix adjustments for the "top-box" (most positive response) and "bottom-box" (least positive response) respectively of the eleven publicly reported HCAHPS measures (seven composites, two individual items, and two global items), averaged across the four reported quarters.

As an example, patients aged 55-64 were 4.21% more likely to provide the most positive response ("Always") for items in the *Communication with Nurses* composite when compared to the reference group of patients 85 and older. Thus, the corresponding adjustment for patients aged 55-64 relative

to patients 85 and older for that composite is a subtraction of 4.21%, reflected in the "-4.21%" entry in Table 1. Similarly, for each level of decreasing self-rated health status (where 5=poor, 4=fair, 3=good, 2=very good, and 1=excellent), the percentage of patients providing an "Always" response for *Communication with Doctors* decreased by 3.22%. Thus, a patient in fair health (4) would have a (4-1) * 3.22=9.66% lower chance of an "Always" response than a patient in excellent health (1), and the corresponding adjustment for a patient in poor health relative to a patient in excellent health would be +12.88%.

Publicly reported HCAHPS scores are adjusted to the overall national means of patient-mix variables across all hospitals reporting in a given quarter (as reported in Table 3). Thus, whether the scores of a given hospital are adjusted upward or downward for a given measure depends not only on these patient-mix adjustments, but also on the patient-mix of that hospital relative to the national average of these patient-mix characteristics. Specifically, the total patient mix-adjustment for a given hospital is the sum of a series of products, where each product multiplies the adjustment in Table 1 (top-box) or Table 2 (bottom-box) by the deviation of the hospital's mean on the corresponding patient-mix variable from the national mean on that patient-mix variable (from Table 3).

Four sets of numbers are needed to calculate final patient-mix adjusted scores for a given hospital: (1) Means of HCAHPS outcomes (top-box proportions or bottom-box proportions) for the hospital in question that have been adjusted for survey mode; (2) individual-level patient-mix adjustments from Tables 1 and 2 of this document; (3) that hospital's means on patient-mix variables; and (4) national means on patient-mix variables from Table 3 of this document.

Below we provide additional detail regarding the calculation of the *response percentile* and *service line by age interaction* variables.

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

The *service line by age interaction* variables used in patient-mix adjustment can be calculated by following the steps below for all completed surveys:

1) Create an age variable that can take values from 1 through 8, depending on the age range of the patient. Denote this variable as AGE.
2) Create an indicator variable for whether a survey was from the surgical service line. Let this variable equal 1 if surgical and equal to 0 if not surgical. Denote this variable as SURG.
3) Create an indicator variable for whether a survey was from the maternity service line. Let this variable equal 1 if maternity and equal to 0 if not maternity. Denote this variable as MAT.
4) At this point, every completed survey should have a value from 1 to 8 for AGE, a value of 0 or 1 for SURG, and a value of 0 or 1 for MAT.

The surgical by age interaction variable (Surgical*Age) is equal to the product of SURG and AGE. Similarly, the maternity by age interaction variable (Maternity*Age) is calculated as the product of MAT and AGE. To obtain hospital-level values for these two interaction variables, simply average all the survey-level values just calculated for Surgical*Age and Maternity*Age.

Beginning in Q1 2025, the formula is updated to incorporate the new PMA variable, **Planned Stay**.

- **y** = the mode-adjusted hospital mean for an HCAHPS outcome (top-box or bottom-box);
- $\mathbf{a_1}$–$\mathbf{a_{21}}$ = individual-level PMA coefficients from Tables 1 (top-box) or 2 (bottom-box) for the 21 non-reference categories, expressed as proportions;
- $\mathbf{m_1}$–$\mathbf{m_{21}}$ = national means for the PMA variables, as reported in Table 3; and
- $\mathbf{h_1}$–$\mathbf{h_{21}}$ = hospital-specific means for the same PMA variables.

The updated mode and patient-mix adjusted hospital score (**y′**) is calculated as:

$$\mathbf{y' = y + a_1(h_1 - m_1) + a_2(h_2 - m_2) + \ldots + a_{21}(h_{21} - m_{21})}$$

HCAHPS publicly reported hospital averages are weighted proportionately to the number of eligible patients seen by the hospital in each of the quarters. Specifically, each quarter's score has a quarterly weight equal to the quarter's eligible discharge size divided by the total eligible discharge size that make up the reporting period. Quarterly weights are applied after survey mode adjustment and patient-mix adjustment.

For public reporting purposes, HCAHPS scores are rounded to integer percentages. Rounding occurs within top, middle, and bottom-box scores only after patient-mix and mode adjustments have been applied. If the sum of the three scores is not 100%, a further adjustment is made to the middle-box score.

Please note: The information presented here will permit a hospital to closely approximate the effect of patient-mix adjustment on its HCAHPS results. However, *exact replication* of published HCAHPS results may not be possible because of (1) the effects of data cleaning and (2) small differences between the effects of quarterly patient-mix adjustments and the four-quarter averages presented here. For each future public reporting period, Tables 1, 2 and 3 will be updated and will be posted on https://www.hcahpsonline.org.

Table 1: HCAHPS Patient-Mix Adjustments of Top-Box for Patients Discharged between Quarter 2, 2025 and Quarter 1, 2026 (April 1, 2025 to March 31, 2026)

	Communication with Nurses	Communication with Doctors	Restfulness of Hospital Env.	Care Coordination	Responsiveness of Hospital Staff	Communication About Medicines	Discharge Information	Cleanliness of Hospital Env.	Information About Symptoms	Hospital Rating	Recommend the Hospital
Education (per level; 1=8th grade or less and 6=More than 4-year college degree)	1.62%	1.87%	2.99%	2.56%	2.41%	2.84%	0.74%	1.29%	2.07%	2.91%	1.26%
Self-Rated Health (per level; 1=Excellent and 5=Poor)	3.41%	3.22%	4.30%	3.67%	4.71%	3.15%	1.03%	3.13%	3.68%	5.11%	4.42%
Self-Rated Mental Health (per level; 1=Excellent and 5=Poor)	4.11%	4.22%	3.61%	4.68%	4.69%	4.54%	1.69%	2.84%	4.67%	4.57%	4.23%
Planned Stay	-4.75%	-6.94%	-8.65%	-8.19%	-7.95%	-7.08%	-4.50%	-6.03%	-9.40%	-7.11%	-7.25%
Response Percentile (per 1% of response percentile)	0.20%	0.20%	0.07%	0.17%	0.32%	0.24%	0.08%	0.11%	0.06%	0.16%	0.18%
Spanish	-1.42%	-3.64%	-7.03%	-3.53%	-3.06%	-2.58%	-2.56%	1.90%	-5.47%	-13.25%	-11.29%
Chinese	5.03%	2.78%	-8.16%	2.06%	3.20%	3.70%	-2.80%	5.26%	-4.68%	0.62%	0.52%
Other (“Another Language”)	0.02%	-1.90%	-11.13%	-2.47%	-1.09%	-0.19%	-0.29%	2.64%	-3.91%	-2.85%	-3.28%
English (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Age 18-24	2.50%	4.14%	3.08%	5.58%	3.55%	-7.12%	-1.36%	-0.82%	2.31%	16.12%	11.39%
Age 25-34	-0.70%	1.67%	-0.16%	2.75%	-2.31%	-10.05%	-2.34%	-1.77%	0.17%	12.27%	7.15%
Age 35-44	-0.97%	1.06%	0.32%	2.32%	-3.06%	-10.69%	-2.35%	-1.59%	1.04%	10.01%	5.58%
Age 45-54	-3.02%	-1.48%	-0.08%	-0.30%	-4.50%	-11.51%	-3.46%	-0.98%	-1.16%	6.01%	2.33%
Age 55-64	-4.21%	-2.97%	0.35%	-1.58%	-4.89%	-10.68%	-3.84%	0.06%	-1.85%	2.50%	0.06%
Age 65-74	-4.55%	-3.60%	1.21%	-2.30%	-3.93%	-8.38%	-3.91%	0.24%	-1.92%	-0.01%	-0.45%
Age 75-84	-3.62%	-2.75%	0.35%	-2.26%	-2.80%	-4.83%	-2.12%	0.24%	-1.11%	-1.62%	-1.13%
Age 85+ (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Male Medical	-0.59%	0.21%	0.11%	-1.93%	-0.58%	-3.37%	-3.31%	-5.65%	-5.21%	-0.96%	-2.07%
Male Surgical	1.14%	-4.92%	1.09%	-2.78%	1.90%	-2.54%	-7.24%	-4.35%	-6.93%	-3.45%	-3.84%
Female Surgical	2.39%	-5.28%	-0.01%	-0.30%	3.07%	1.63%	-5.07%	1.57%	-1.62%	-1.98%	-1.34%
Female Maternity	-2.96%	-6.92%	-5.08%	-6.66%	-8.91%	-8.88%	-4.91%	0.36%	-4.60%	-7.74%	-8.49%
Female Medical (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Surgical Line * Age[1]	-0.28%	0.31%	0.08%	-0.11%	-0.59%	-0.09%	0.19%	-0.31%	-0.05%	0.03%	-0.02%
Maternity Line * Age[1]	0.13%	0.56%	2.28%	1.04%	0.44%	1.89%	0.48%	1.16%	-0.83%	1.66%	1.38%

[1] Age takes on the values of 1 to 8 as follows: (1: 18 to 24); (2: 25 to 34); (3: 35 to 44); (4: 45 to 54); (5: 55 to 64); (6: 65 to 74); (7: 75 to 84); and (8: 85+).

Table 2: HCAHPS Patient-Mix Adjustments of Bottom-Box for Patients Discharged between Quarter 2, 2025 and Quarter 1, 2026 (April 1, 2025 to March 31, 2026)

	Communication with Nurses	Communication with Doctors	Restfulness of Hospital Env.	Care Coordination	Responsiveness of Hospital Staff	Communication About Medicines	Discharge Information	Cleanliness of Hospital Env.	Information About Symptoms	Hospital Rating	Recommend the Hospital
Education (per level; 1=8th grade or less and 6=More than 4-year college degree)	-0.16%	-0.55%	-1.25%	-0.65%	-0.51%	-1.89%	-0.74%	-0.10%	-0.73%	-0.83%	-0.60%
Self-Rated Health (per level; 1=Excellent and 5=Poor)	-1.54%	-1.66%	-2.31%	-1.88%	-2.62%	-2.89%	-1.03%	-1.82%	-2.11%	-2.93%	-2.22%
Self-Rated Mental Health (per level; 1=Excellent and 5=Poor)	-0.98%	-1.19%	-1.30%	-1.12%	-1.68%	-2.28%	-1.69%	-0.75%	-1.10%	-1.31%	-0.62%
Planned Stay	1.25%	2.13%	2.97%	2.40%	2.49%	4.26%	4.50%	2.15%	2.94%	2.77%	1.85%
Response Percentile (per 1% of response percentile)	-0.03%	-0.03%	0.03%	-0.01%	-0.08%	-0.13%	-0.08%	0.01%	0.00%	0.01%	-0.01%
Spanish	1.71%	2.49%	4.53%	2.51%	2.93%	3.96%	2.56%	0.47%	3.15%	5.06%	3.35%
Chinese	-0.36%	0.30%	4.43%	0.32%	-1.20%	1.59%	2.80%	1.02%	3.77%	1.80%	1.62%
Other (“Another Language”)	0.03%	0.86%	5.19%	0.95%	-0.84%	2.86%	0.29%	-0.01%	2.18%	2.13%	1.75%
English (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Age 18-24	-4.91%	-7.08%	-7.10%	-7.27%	-9.79%	0.22%	1.36%	-3.40%	-4.93%	-10.10%	-8.35%
Age 25-34	-4.29%	-6.18%	-5.75%	-6.63%	-7.10%	1.82%	2.34%	-3.71%	-4.77%	-8.47%	-7.24%
Age 35-44	-4.10%	-5.69%	-6.30%	-6.29%	-6.60%	2.11%	2.35%	-4.36%	-5.20%	-7.89%	-6.81%
Age 45-54	-2.50%	-3.54%	-5.22%	-3.92%	-4.77%	3.19%	3.46%	-4.03%	-3.65%	-5.07%	-4.41%
Age 55-64	-1.18%	-1.71%	-4.01%	-2.07%	-2.88%	3.66%	3.84%	-3.77%	-2.18%	-2.60%	-2.38%
Age 65-74	-0.12%	-0.33%	-2.83%	-0.59%	-1.13%	3.56%	3.91%	-2.56%	-0.86%	-0.78%	-0.85%
Age 75-84	0.42%	0.34%	-1.02%	0.24%	0.29%	2.55%	2.12%	-1.17%	-0.28%	0.37%	0.06%
Age 85+ (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Male Medical	0.60%	0.33%	0.06%	1.32%	0.48%	3.75%	3.31%	3.87%	3.89%	1.52%	0.92%
Male Surgical	1.67%	5.50%	1.27%	4.67%	2.08%	4.29%	7.24%	4.61%	8.18%	5.03%	4.42%
Female Surgical	0.92%	5.41%	2.03%	3.54%	1.50%	0.15%	5.07%	0.90%	5.52%	3.59%	3.56%
Female Maternity	2.57%	5.47%	3.55%	5.24%	5.32%	6.06%	4.91%	0.57%	4.87%	6.31%	5.60%
Female Medical (REFERENCE)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Surgical Line * Age[1]	-0.11%	-0.58%	-0.23%	-0.34%	-0.05%	0.02%	-0.19%	0.02%	-0.45%	-0.36%	-0.41%
Maternity Line * Age[1]	0.28%	-0.11%	-0.47%	0.17%	0.06%	-0.31%	-0.48%	0.23%	0.90%	-0.04%	-0.07%

[1] Age takes on the values of 1 to 8 as follows: (1: 18 to 24); (2: 25 to 34); (3: 35 to 44); (4: 45 to 54); (5: 55 to 64); (6: 65 to 74); (7: 75 to 84); and (8: 85+).

Table 3: National Means of Patient-Mix Adjustment Variables for Patients Discharged between Quarter 2, 2025 and Quarter 1, 2026 (April 1, 2025 to March 31, 2026)

	National Mean
Education (per level; 1=8th grade or less and 6=More than 4-year college degree)	3.776
Self-Rated Health (per level; 1=Excellent and 5=Poor)	2.965
Self-Rated Mental Health (per level; 1=Excellent and 5=Poor)	2.345
Planned Stay	20.13%
Response Percentile	13.92%
LANGUAGE SPOKEN AT HOME	
Spanish	4.57%
Chinese	0.25%
Other ("Another Language")	1.73%
English (REFERENCE)	93.46%
AGE	
Age 18-24	1.66%
Age 25-34	5.68%
Age 35-44	4.35%
Age 45-54	5.03%
Age 55-64	12.36%
Age 65-74	26.62%
Age 75-84	29.56%
Age 85+ (REFERENCE)	14.74%
SERVICE LINE	
Male Medical	31.88%
Male Surgical	11.09%
Female Surgical	11.42%
Female Maternity	7.16%
Female Medical (REFERENCE)	38.44%
INTERACTIONS	
Surgical Line * Age[1]	1.319
Maternity Line * Age[1]	0.151

[1] Age takes on the values of 1 to 8 as follows: (1: 18 to 24); (2: 25 to 34); (3: 35 to 44); (4: 45 to 54); (5: 55 to 64); (6: 65 to 74); (7: 75 to 84); and (8: 85+).