

Calculating CAHPS® Hospice Survey Top-, Middle-, and Bottom-Box Scores

This document summarizes the steps that the Centers for Medicare & Medicaid Services (CMS) uses to calculate top-, middle-, and bottom-box CAHPS Hospice Survey measure scores.

Step 1: Data Submission

A hospice's survey vendor submits CAHPS Hospice Survey data to the CAHPS Hospice Survey Data Warehouse.

Step 2: Data Cleaning

CMS cleans the submitted CAHPS Hospice Survey data by removing incomplete surveys and surveys from ineligible respondents. Complete details regarding survey eligibility, as well as the definition of a "completed" survey, are located in the *Quality Assurance Guidelines*, available at: <http://www.hospicecahpsurvey.org/en/quality-assurance-guidelines/>. Additionally, if a response to a screener question indicates that the respondent was not eligible to answer subsequent, "dependent" question(s), responses are set to missing for questions for the dependent questions. For example, if the response to Question 15, "While your family member was in hospice care, did he or she have any pain?" is "No," responses for Questions 16 and 17 are set to missing, even if the respondent provided responses to those questions.¹

Step 3: Calculating Unadjusted Top- and Bottom-Box Scores

CMS calculates the "top-box" and "bottom-box" scores for the questions in the eight CAHPS Hospice Survey measures. The eight measures, and the questions that compose them, are shown in Appendix A of this document.

If a survey respondent does not respond to a question for which he or she is eligible, a score is not calculated for that respondent for that question. With one exception, all responses to questions for which a respondent was eligible are used in the score calculation. The exception is the Training Family to Care for Patient measure; for this measure, the measure score is calculated only among

¹ Two questions (Q20 and Q23) used in composites have tailored non-applicable responses. For example, Q23 asks if the hospice gave the caregiver the training needed to help the family member if he or she had trouble breathing. The tailored non-applicable response is, "I did not need to help my family member with trouble breathing." Tailored non-applicable responses are set to missing and excluded from the denominator when CMS calculates scores. In this manner, those who indicate that the question is not relevant to them are considered non-respondents to the question for the purpose of calculating scores.

those respondents who indicated that their family member received hospice care at home or in an assisted living facility.²

For all questions, the “top-box” score for each response is calculated as a “100” if the most positive response category(ies) for that question is selected or a “0” otherwise. The “bottom-box” score for each response is calculated as a “100” if the least positive response category(ies) for that question is selected or a “0” otherwise.

Different questions have different response options. Table 1 displays the different response scales and how each response is categorized as “top-box,” “middle-box,” or “bottom-box.”

Table 1. “Top-Box,” “Middle-Box,” and “Bottom-Box” Score Crosswalk to Response Scales

Response Scale	Top-Box Response (most positive)	Middle-Box Response	Bottom-Box Response (least positive)
Never/Sometimes/Usually/Always	Always	Usually	Never; Sometimes
Never/Sometimes/Usually/Always (Question 10 <u>only</u>)*	Never	Sometimes	Always; Usually
No/Yes, Somewhat/Yes, Definitely	Yes, Definitely	Yes, Somewhat	No
Definitely No/Probably No/Probably Yes/Definitely Yes	Definitely Yes	Probably Yes	Probably No; Definitely No
Rating 0-10, where 10 is the most positive	9 or 10	7 or 8	0-6
Too Little/Right Amount/Too Much	Right Amount	N/A**	Too Little; Too Much

* Question 10 is “While your family member was in hospice care, how often did anyone from the hospice team give you confusing or contradictory information about your family member’s condition or care?”

**The response options for this response scale are grouped into top- and bottom-box scores only.

To calculate the unadjusted “top-box” score for each hospice, the numerator is the number of respondents who selected the most positive response category(ies) for that question and the denominator is the number of total respondents to that question. To calculate the unadjusted “bottom-box” score for each hospice, the numerator is the number of respondents who selected the least positive response category(ies) for that question and the denominator is the number of total respondents to that question.³

However, official scores are adjusted for mode of survey administration and case mix (see steps 4 and 5).

² In the CAHPS Hospice Survey Data Public Use File issued by CMS in December 2016, the national score for Getting Hospice Care Training includes respondents whose family members who received hospice care in all settings.

³ Bottom-box scores are calculated differently from the Emotional and Spiritual Support measure because the three questions that compose that measure have response options Too Little/Right Amount/Too Much, for which no middle-box score is defined. The calculation of the bottom-box scores for these questions and the overall composite measure parallels the method for calculating middle-box scores for all other measures (described in steps 7 and 8 below).

Step 4: Adjusting for Mode of Survey Administration

CMS applies survey mode adjustment to adjust responses for the effect of mode of survey administration.

Hospices participating in national implementation of the CAHPS Hospice Survey may choose from one of three modes of survey administration: Mail Only, Telephone Only, or Mixed Mode (mail with telephone follow-up). CMS conducted a randomized mode experiment in 2015 to assess the effect of mode on response rates and response patterns, and to determine whether survey mode adjustments were needed to fairly compare CAHPS Hospice Survey results for hospices that used different modes of data collection. The experiment found significant effects of survey mode on responses to several outcomes; therefore, to ensure fair comparisons across hospices, CAHPS Hospice Survey scores must be adjusted for mode of survey administration, which can affect scores but is not related to quality of hospice care.

In making mode adjustments, it is necessary to choose one mode as a reference point. One can then interpret all adjusted data from all modes as if they had been surveyed in the reference mode. For the CAHPS Hospice Survey, the Telephone Only mode is used as the reference mode; thus, surveys conducted using Telephone Only mode are not adjusted further for mode. Surveys conducted using the other two modes (Mail Only and Mixed mode) are adjusted according to the difference in mode effects between that mode and the Telephone Only mode, as estimated through linear regression in the CAHPS Hospice Survey Mode Experiment. For Mixed mode, there is a single adjustment regardless of whether an individual responded by mail or phone (i.e., the adjustment is for the overall administration mode, not the mode in which the individual responds).

The mode effects for each question for top-box scores are derived from the coefficients for the mode dummy variables in models regressing the top-box score on two mode dummy variables, hospice dummy variables, and case-mix adjustors. These coefficients estimate the remaining difference between Telephone Only mode and each of the other modes after case-mix adjustment. The mode adjustments are equal to -1 times the coefficients. The use of Telephone Only mode as the reference mode does not indicate that this mode is preferable to other approved modes in any way. Mode adjustments for bottom-box scores were derived in similar fashion for all questions except those with response options Too Little/Right Amount/Too Much, for which no middle-box score is defined.

Caregivers generally provided more positive responses in the Mail Only mode than in the Telephone Only mode. Appendix B of this document presents the mode adjustments derived from the CAHPS Hospice Survey Mode Experiment for each CAHPS Hospice Survey question relative to the Telephone Only mode for top- and bottom-box scoring. As an example, suppose a respondent surveyed using the Mail Only mode selects "Definitely Yes" for the Willing to Recommend this Hospice question and thus receives a top-box score of "100." This score would be adjusted to 99.47% (i.e., 100% - 0.53%) in order to account for the fact that 99.47% is the corresponding expected score for that question had the survey been conducted in Telephone Only mode.

Step 5: Adjusting for Case Mix

To ensure that comparisons between hospices reflect differences in performance rather than differences in patient and/or caregiver characteristics, CMS adjusts responses for “case mix” (i.e., variations of such characteristics across hospices). The case-mix adjustment model includes the following variables:

- response percentile (calculated by ranking lag time—that is, days between death and survey response—among respondents for each hospice in each month, then dividing by total sample size)
- decedent age
- payer for hospice care
- primary diagnosis
- length of final episode of hospice care
- respondent age
- respondent education
- relationship of decedent to caregiver
- language

The CAHPS Hospice Survey website (www.hospicecahpsurvey.org/en/scoring-and-analysis) presents more information regarding case-mix adjustment, including the case-mix adjustment factors for each CAHPS Hospice Survey measure for each quarter. Top-box and bottom-box scores were case-mix adjusted for all questions except for those with response options Too Little/Right Amount/Too Much, for which only top-box scores were case-mix-adjusted (since bottom-box scores for these questions are calculated as 100 – top-box score, as described in step 7).

Step 6: Calculating Composite Measure Scores from Question Scores

Steps 1 through 5 result in mode- and case-mix adjusted top-box hospice-level scores for each question and bottom-box scores for all questions except those with response options Too Little/Right Amount/Too Much. For single-question measures, the hospice-level top-box and bottom-box measure scores are simply equal to the adjusted question score calculated in Step 5. For all multi-question measures except Emotional and Spiritual Support, the hospice-level top- and bottom-box scores are calculated as the average of the hospice-level top- and bottom-box scores, respectively, for the questions that compose the measure. Bottom-box scores are calculated differently for the Emotional and Spiritual Support measure, as described in step 7.

Step 7: Calculating Top-Box and Bottom-Box Mean Scores for Each Hospice and for All Hospices Nationwide

Steps 1 through 6 are conducted separately for each of the quarters of data included in a given reporting period.

For each CAHPS Hospice Survey measure, CMS calculates a mean top-box score for each hospice using a weighted average of top-box scores across all quarters of data in the reporting period.

Specifically, for each hospice, each quarter is weighted according to the number of decedents/caregivers responding for that score. A mean bottom-box score is calculated for each measure (except the Emotional and Spiritual Support composite) in a similar way. For the Emotional and Spiritual Support composite, CMS calculates a mean bottom-box score as $100 - \text{top-box score}$.

CMS also calculates a national average for each measure in the reporting period by averaging measure scores across all hospices that had a minimum of 30 completed questionnaires during that reporting period.

Step 8: Calculating Middle-Box Mean Scores for Each Hospice and for All Hospices Nationwide

For each CAHPS Hospice Survey measure (except Emotional and Spiritual Support, for which there is no middle-box score), CMS calculates a middle-box score for each hospice as $100 - \text{top-box score} - \text{bottom-box score}$.

CMS also calculates a national average middle-box score for each measure (except Emotional and Spiritual Support) as $100 - \text{national average of top-box scores} - \text{national average of bottom-box scores}$.

Appendix A. CAHPS Hospice Survey Measures and Questions

Composite and question

Communication with Family

How often did the hospice team listen carefully to you when you talked with them about problems with your family member's hospice care?

While your family member was in hospice care, how often did the hospice team listen carefully to you?

While your family member was in hospice care, how often did the hospice team explain things in a way that was easy to understand?

While your family member was in hospice care, how often did the hospice team keep you informed about your family member's condition?

While your family member was in hospice care, how often did the hospice team keep you informed about when they would arrive to care for your family member?

While your family member was in hospice care, how often did anyone from the hospice team give you confusing or contradictory information about your family member's condition or care?

Getting Timely Help

While your family member was in hospice care, when you or your family member asked for help from the hospice team, how often did you get help as soon as you needed it?

How often did you get the help you needed from the hospice team during evenings, weekends, or holidays?

Treating Patient with Respect

While your family member was in hospice care, how often did the hospice team treat your family member with dignity and respect?

While your family member was in hospice care, how often did you feel that the hospice team really cared about your family member?

Emotional and Spiritual Support

In the weeks after your family member died, how much emotional support did you get from the hospice team?

While your family member was in hospice care, how much emotional support did you get from the hospice team?

Support for religious or spiritual beliefs includes talking, praying, quiet time, or other ways of meeting your religious or spiritual needs. While your family member was in hospice care, how much support for your religious and spiritual beliefs did you get from the hospice team?

Help for Pain and Symptoms

How often did your family member receive the help he or she needed from the hospice team for feelings of anxiety or sadness?

How often did your family member get the help he or she needed for trouble with constipation?

How often did your family member get the help he or she needed for trouble breathing?

Did your family member get as much help with pain as he or she needed?

Training Family to Care for Patient

Did the hospice team give you the training you needed about how to help your family member if he or she had trouble breathing?

Did the hospice team give you enough training about what side effects to watch for from pain medicine?

Did the hospice team give you the training you needed about what to do if your family member became restless or agitated?

Did the hospice team give you the training you needed about if and when to give more pain medicine to your family member?

Side effects of pain medicine include things like sleepiness. Did any member of the hospice team discuss side effects of pain medicine with you or your family member?

Rating of this Hospice

Using any number from 0 to 10, where 0 is the worst hospice care possible and 10 is the best hospice care possible, what number would you use to rate your family member's hospice care?

Willing to Recommend this Hospice

Would you recommend this hospice to your friends and family?

Appendix B. Mode Adjustments for Top- and Bottom-Box scores (Telephone Only as Reference Mode)

Survey Question	Survey Mode	Top-Box Mode Adjustment	Bottom-Box Mode Adjustment
How often did you get the help you needed from the hospice team during evenings, weekends, or holidays?	Mixed	1.36	-1.55
	Mail	1.14	0.06
While your family member was in hospice care, how often did the hospice team keep you informed about when they would arrive to care for your family member?	Mixed	2.04	1.16
	Mail	2.04	2.59
While your family member was in hospice care, when you or your family member asked for help from the hospice team, how often did you get help as soon as you needed it?	Mixed	-0.02	0.98
	Mail	0.10	2.23
While your family member was in hospice care, how often did the hospice team explain things in a way that was easy to understand?	Mixed	-0.78	1.61
	Mail	-2.20	2.80
While your family member was in hospice care, how often did the hospice team keep you informed about your family member's condition?	Mixed	-0.22	1.18
	Mail	-2.32	1.93
While your family member was in hospice care, how often did anyone from the hospice team give you confusing or contradictory information about your family member's condition or care?	Mixed	-2.06	1.43
	Mail	-2.77	2.33
While your family member was in hospice care, how often did the hospice team treat your family member with dignity and respect?	Mixed	-1.38	-0.24
	Mail	-1.73	0.27
While your family member was in hospice care, how often did you feel that the hospice team really cared about your family member?	Mixed	-0.40	0.20
	Mail	-0.38	0.94
How often did the hospice team listen carefully to you when you talked with them about problems with your family member's hospice care?	Mixed	-3.74	0.16
	Mail	-3.95	0.93
Did your family member get as much help with pain as he or she needed?	Mixed	-1.17	0.10
	Mail	-0.15	0.77
Side effects of pain medicine include things like sleepiness. Did any member of the hospice team discuss side effects of pain medicine with you or your family member?	Mixed	-2.38	2.80
	Mail	-0.25	3.01
Did the hospice team give you the training you needed about what side effects to watch for from pain medicine?	Mixed	-2.71	1.66
	Mail	-4.13	4.21
Did the hospice team give you the training you needed about if and when to give more pain medicine to your family member?	Mixed	-0.21	0.15
	Mail	-1.12	0.31

Survey Question	Survey Mode	Top-Box Mode Adjustment	Bottom-Box Mode Adjustment
How often did your family member get the help he or she needed for trouble breathing?	Mixed	1.28	-1.06
	Mail	-0.83	2.05
Did the hospice team give you enough training about how to help your family member if he or she had trouble breathing?	Mixed	1.26	-0.69
	Mail	-3.46	1.72
How often did your family member get the help he or she needed for trouble with constipation?	Mixed	-0.39	-0.84
	Mail	-0.97	1.04
How often did your family member receive the help he or she needed <u>from the hospice team</u> for feelings of anxiety or sadness?	Mixed	-2.38	2.56
	Mail	-4.24	5.24
Did the hospice team give you the training you needed about what to do if your family member became restless or agitated?	Mixed	-3.26	2.43
	Mail	-5.53	3.51
While your family member was in hospice care, how often did the hospice team listen carefully to you?	Mixed	-1.72	0.77
	Mail	-2.27	2.56
Support for religious or spiritual beliefs includes talking, praying, quiet time, or other ways of meeting your religious or spiritual needs. While your family member was in hospice care, how much support for your religious and spiritual beliefs did you get from the hospice team?	Mixed	-2.72	N/A
	Mail	-3.67	N/A
While your family member was in hospice care, how much emotional support did you get from the hospice team?	Mixed	-0.91	N/A
	Mail	-1.09	N/A
In the weeks after your family member died, how much emotional support did you get from the hospice team?	Mixed	-3.18	N/A
	Mail	-3.24	N/A
Using any number from 0 to 10, where 0 is the worst hospice care possible and 10 is the best hospice care possible, what number would you use to rate your family member's hospice care?	Mixed	-2.76	0.12
	Mail	-3.89	0.46
Would you recommend this hospice to your friends and family?	Mixed	-1.28	-0.02
	Mail	-0.53	0.89