CAHPS Hospital Survey
Podcast Series—Transcript

HCAHPS Score Calculations Part II: Patient-Mix Adjustment

Slide 1-HCAHPS Score Calculations Part II: Patient-Mix Adjustment (PMA)

Welcome to the CAHPS Hospital Survey Podcast Series. This is the second of three episodes covering HCAHPS Score Calculations. The first episode included creation of the HCAHPS sample frame, calculation of the "Eligible Discharges" field, and the definition of a completed survey. To learn more about these important sampling topics, please listen to Part I.

In Part II, we will review details on patient-mix adjustment calculations. Note that the acronym PMA stands for patient-mix adjustment.

Slide 2-Overview

First, we will discuss CMS' rationale for employing patient-mix adjustment in HCAHPS score calculations. Additionally, we will review calculation of hospital means for each PMA variable. Finally, an example of PMA calculation for a hypothetical hospital will be presented.

Slide 3-Why Does CMS Adjust for the Effects of Patient-Mix?

CMS employs patient-mix adjustment of HCAHPS scores to ensure fair comparisons across hospitals by adjusting for factors that are not under a hospital's control, but which may affect HCAHPS scores.

Publicly reported patient-mix adjustments are patient-level, not hospital-level, adjustments. Hospital-level adjustments are derived from three components: hospital means, national means, and national patient-level adjustments for each patient-mix variable.

Slide 4- Calculate Hospital Means for PMA Variables: Self-Rated Health

Now, we will begin with example calculations of PMA hospital means for our hypothetical hospital, Hospital A.

In this table, the self-rated overall health responses for 7 completed surveys for Hospital A are shown. Self-rated health values range from 1 to 5 and correspond directly with the patient response from the HCAHPS survey instrument. After adding up each self-rated health response and dividing by the total number of respondents, the calculated self-rated overall health mean for Hospital A is 3.43.

Slide 5- Education

Next, we calculate Hospital A's mean for education. Hospital A's education mean is simply the average of the 7 linear responses for Question 29. Here we obtain a value of 3.14. Note that the linear education values in this table correspond directly with the response options shown on the HCAHPS survey instrument.

Slide 6-Language Spoken at Home

The next patient-mix adjustment variable is language spoken at home. Here, we create three indicator language variables for Spanish, Chinese, and Other Language. The Other Language category includes responses of Russian, Vietnamese, Portuguese or Some Other Language. The indicator variables are a value of 0 or 1 depending on the patient's response. For example, the first patient response is Spanish, and so the Spanish indicator should have a value of 1, while Chinese and Other Language indicator variables should have a value of 0. Note that since English is the reference category in the adjustment model, an English indicator variable is not needed.

Slide 7-Language Spoken at Home cont'd

On slide 7, we calculate Hospital A's means for each of the 3 language spoken at home indicator variables. Here we see 29% of Hospital A's completed surveys reported Spanish as the primary language spoken at home, and 14% reported Chinese and Other Language spoken at home respectively.

Slide 8-Age Range

Next, for the administrative variable patient age range, we set up seven indicator variables for the age range groups shown here. These are set up similarly to the language spoken at home indicator variables we just created. Note that the "Age 85 Plus" category serves as the reference group in the adjustment model, so an indicator is not needed.

Slide 9-Age Range cont'd

Here, we calculate Hospital A's means for each of the seven age range indicator variables. You can see that 29% of Hospital A's completed surveys had a patient age between 65 and 74 years.

Slide 10-Service Line by Gender

The next patient-mix adjustment component is the combination of the administrative variables for service line and gender. Here we create four indicator variables for Maternity, Female Surgical, Male Surgical and Male Medical, with Female Medical being the reference group. These four indicator variables are easily created from the service line and gender columns you see in the table. As an example, the first row shows the patient is in the surgical service line and is male. Thus, the Male Surgical indicator variable should take on the value of 1, while all others should take the value of 0.

Slide 11-Service Line by Gender cont'd

On slide 11, Hospital A's means for each of the service line by gender variables are shown. Notice there were no Female Surgical patients among Hospital A's completed surveys.

Slide 12-Service Line by Age

Next, we create the interaction variables for service line by age. To do this, we need the linear form of the age range categories. We will call this variable “Age” and it takes the values from 1 to 8 as shown in this table.

Slide 13- Service Line by Age cont’d

The surgical by age interaction variable is simply a product of the surgical indicator and age. Similarly, the maternity by age interaction variable is the product of the maternity indicator and age.

Slide 14-Service Line by Age cont’d

Here, we see the creation of the service line by age interaction variables for Hospital A. Recall the variable “Age” is the linear form of the age range, with possible values 1 through 8. The two interaction variables are shown in the last two columns of the table and are the product of the linear “Age” variable and the maternity indicator, and the product of the linear “Age” variable and the surgical indicator. As an example, the first row shows that the patient fell into the linear “Age” category of 6, meaning the patient was between the ages of 65 to 74 years, and was in the surgical service line.

Slide 15-Service Line by Age cont’d

Finally, we can calculate the mean for the two service line by age interaction variables for Hospital A’s seven completed surveys.

Slide 16-Lag Time for Response Percentile

The last patient-mix adjustment variable to review is response percentile, which is created from patient lag time. Lag time represents the number of days between the patient discharge and the date the data collection ended for a given patient. To calculate response percentile for Hospital A, first rank all lag times for a given month. Lag times are ranked from smallest to largest for all of Hospital A’s completed surveys. Next, patient-level response percentile is defined as lag time rank divided by the monthly sample size.

Slide 17-Response Percentile

This table shows Hospital A’s response percentile calculation and the components that go into each patient-level response percentile. Note that these calculations are shown by month since each month has a different sample size. Lag times are ranked within each month and the patient-level response percentile is simply the lag time rank divided by the month’s sample size. For example, look at row 5 or survey ID 005. This patient is given a lag time rank of 2 since 29 is the second highest lag time for the month of March. Then, the lag time rank of 2 is divided by the March sample size of 8 to get the response percentile for survey ID 005.

Slide 18-Response Percentile cont’d

Using the patient response percentile values from the previous table, we calculate Hospital A’s mean for response percentile which is 0.19.

Slide 19-Calculate Hospital PMA

Next, we look at the components needed for total hospital PMA. For each patient-mix variable, we need three values: hospital PMA means, which we just calculated; national means, which are provided by CMS on the HCAHPS website; and the national patient-level adjustments, which are also provided by CMS on the HCAHPS website.

Slide 20-Hospital PMA Variable Means

Here we see all of Hospital A's PMA variable means, which we calculated earlier in this podcast.

Slide 21-National Means for Patient-Mix Variables

Next, we need the corresponding national means for the patient-mix variables. The national means for a given public reporting period can be found in Table 3 of the PMA Web Document on hcahponline.org.

Slide 22-National Means cont'd

This slide shows the national means for each patient-mix variable. Note that we show the national means with a label of "M" for each patient-mix variable, while we use the label of "H" for Hospital A's patient-mix variable means.

Slide 23-Patient-Level Adjustments for Patient-Mix Variables

The third component needed for patient-mix adjustment is the patient-level adjustments derived by CMS for each public reporting period. Here, our example will focus on top-box scores for the HCAHPS composite measure Communication with Nurses. These are also located in the PMA Web Document and can be found in Table 1.

Slide 24-Patient-Level Top-Box Adjustments for Communication with Nurses Composite

In this slide, we arrange all the top-box national patient-level adjustments for the Communication with Nurses composite and we use the label of "A" for the adjustment variables.

Slide 25-Calculate Hospital PMA: Using PMA Equation

Finally, we can use the PMA equation. The PMA for a given patient characteristic variable is the patient-level adjustment multiplied by the difference of the hospital mean and national mean. Total patient-mix adjustment for Hospital A is simply the sum of all these adjustments across the different PMA variables. Recall that the national patient-level adjustments are denoted by "A" and are red; Hospital A's means are the "H" values and are shown in blue; and finally, the national means are the "M" values and are shown in green. After performing the calculation for each patient-mix variable and summing them all up, the total patient-mix adjustment for Hospital A equals 0.045 or 4.5% for top-box Communication with Nurses.

Slide 26-Questions and HCAHPS Technical Support

Please contact HCAHPS technical assistance at HCAHPS@hsag.com or 1-888-884-4007 for any questions. For more information about the HCAHPS survey, you can visit the HCAHPS website at: www.hcahpsonline.org.

Thank you for listening to HCAHPS Score Calculations Part II: Patient-Mix Adjustment. Please be sure to listen to the third and final HCAHPS Score Calculations Podcast, which covers HCAHPS measure score calculations.

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