

## Case-Mix Coefficients for MA & PDP CAHPS

### *Approach to Case-mix Adjustment*

As noted in Chapter IX of the *Medicare Advantage and Prescription Drug Plan CAHPS Survey Quality Assurance Protocols & Technical Specifications V7.0* (<http://www.ma-pdpcahps.org>), MA & PDP CAHPS results are adjusted for certain respondent characteristics not under the control of the health or drug plan but related to the sampled member's survey responses. The 2016 MA & PDP CAHPS case-mix coefficients are also publicly available in the "Medicare 2017 Part C & D Star Rating Technical Notes."

The case-mix model used to analyze MA & PDP CAHPS Survey data includes three self-reported characteristics (education, general health, mental health), together with age, indicators of Medicaid dual eligibility, eligibility for low-income subsidy, information indicating whether another person helped the respondent complete the questionnaire, and whether the survey was completed in Chinese.

Case-mix adjustment is implemented via linear regression models predicting CAHPS measures from case-mix adjustors and contract indicators. In these models, missing case-mix adjustors are imputed as the contract mean. Adjusted means represent the mean that would be obtained for a given contract if the average of the case-mix variables for that contract was equal to the national average across all contracts.<sup>1</sup>

Data from MA contracts are weighted to represent each contract's proportion of Part D enrollees.

The following three components are needed for case-mix adjustment at the contract level:

- Weighted contract means for each case-mix variable (only used in the case of respondents who answered the CAHPS items)
- Weighted national means for each case-mix variable (based on all respondents who answered the CAHPS items)
- Individual-level coefficients for each case-mix variable

The formula used to calculate a case-mix adjusted score is as follows: Adjusted Score = Raw Score – Net Adjustment. The net adjustment is the sum of a series of products. Each product is, for a single case-mix adjusted variable, calculated as follows:

$(\text{contract mean} - \text{national mean}) \times \text{Coefficient}$ .

To illustrate how the contract mean for a given case-mix variable is calculated, consider the case of age. The table below shows age data for a hypothetical contract with 7

---

<sup>1</sup> Consequently, the national mean of contract means is unchanged by case-mix adjustment.

respondents. Seven indicator (0 or 1) age variables are created for each of the 5 age range groups. The age 70-74 category is not shown because it serves as the reference category.

Survey ID	Actual age at time of finalizing survey	Age 64 and under	Age 65-69	Age 75-79	Age 80-84	Age 85 and older
1	65	0	1	0	0	0
2	57	1	0	0	0	0
3	82	0	0	0	1	0
4	71	0	0	0	0	0
5	88	0	0	0	0	1
6	36	1	0	0	0	0
7	66	0	1	0	0	0

For this contract, the mean of each of the 5 age range variables is calculated as follows:

$$H_{\leq 64} = (0+1+0+0+0+1+0) / 7 = 2/7 = 0.29$$

$$H_{65-69} = (1+0+0+0+0+0+1) / 7 = 2/7 = 0.29$$

$$H_{75-79} = (0+0+0+0+0+0+0) / 7 = 0/7 = 0.00$$

$$H_{80-84} = (0+0+1+0+0+0+0) / 7 = 1/7 = 0.14$$

$$H_{85+} = (0+0+0+0+1+0+0) / 7 = 1/7 = 0.14$$

***Case-mix Coefficients for 2017 Star Ratings***

Case-mix adjustment is performed by CMS contractors. The case-mix coefficients are re-estimated each year based on new data. The case-mix coefficients for 2017 Star Ratings were estimated from CAHPS data collected in 2016 and can be found in Tables 1 and 2, below. The coefficients indicate how much higher or lower people with a given characteristic tend to respond compared to others with the baseline value for that characteristic, on the 0-100 scale used in consumer reports.

For example, for the composite "Getting Needed Care," the coefficient for "age 80-84" is +0.021, indicating that respondents in that age range tend to score their contracts 0.021 point higher than otherwise similar people in the 70-74 age range (the baseline or reference category). Similarly, dual eligibles tend to respond 0.05 points lower on this item than otherwise similar non-duals. Contracts with higher proportions of beneficiaries who are in the 80-84 age range will be adjusted downwards to compensate for the positive response

tendency of their respondents on this composite. Similarly, contracts with higher proportions of respondents who are dual eligibles will be adjusted upwards to compensate for their respondents' negative response tendency. The case-mix patterns are not always consistent across measures.

The composites consist of multiple items, each of which is adjusted separately before combining the adjusted scores into a composite score. In the tables we report the average of the coefficients for these several items, for each of the categories (rows) of the table, as a summary of the adjustment for the composite.

There is one additional case-mix adjustor that was applied to the 2016 data. In 2016, due to an error in the original sample draw that resulted in a shortfall in the number of eligible sampled beneficiaries for some contracts, a supplemental sample of beneficiaries was drawn and surveyed via telephone. To account for any effect that the participation the supplemental sample may have on scores, CAHPS scores are adjusted for those beneficiaries who responded to the supplemental survey (see the last row in Tables 1 and 2). It is important to note that this case-mix adjustor is applied differently than all others. With all other case-mix adjustors, a given contract's score is adjusted based on the difference between the contract score and the national average score. In the case of the supplemental sample adjustor, an adjustment is made for the difference between the contract's score and zero. In other words, the supplemental sample is adjusted to zero rather than the national mean in order to estimate the effect with no supplemental sample and to ensure accurate trending of CAHPS scores.

Table 1. Case-mix Coefficients for Part C CAHPS Measures

Predictor	C03: Annual Flu Vaccine	C20: Getting Needed Care (Comp)	C21: Getting Appointments and Care Quickly (Comp)	C22: Customer Service (Comp)	C23: Rating of Health Care Quality	C24: Rating of Health Plan	C25: Care Coordination (Comp)
Age: 64 or under	N/A	-0.06578	-0.02325	-0.03938	-0.17422	-0.23044	-0.02052
Age: 65 - 69	N/A	0.02681	-0.00735	-0.01398	-0.01875	-0.04524	-0.00771
Age: 75 - 79	N/A	-0.00077	0.01679	-0.00516	0.06576	0.07395	-0.01673
Age: 80 - 84	N/A	0.01981	0.01068	0.01641	0.08601	0.12252	-0.01073
Age: 85 and older	N/A	0.00795	0.01965	0.00800	0.10873	0.19082	-0.04819
Less than an 8th grade education	N/A	0.06608	-0.00950	0.02536	0.05944	0.17079	0.03275
Some high school	N/A	0.00388	-0.01735	-0.01691	0.04845	0.13634	0.01237
Some college	N/A	-0.05811	-0.00695	-0.05239	-0.07413	-0.20580	-0.01708
College graduate	N/A	-0.07714	-0.02070	-0.04485	-0.18943	-0.24973	-0.05268
More than a bachelor's degree	N/A	-0.09723	0.00934	-0.08799	-0.20722	-0.35177	-0.01692
General health rating: excellent	N/A	0.06977	0.04362	0.06420	0.39167	0.34982	0.01861
General health rating: very good	N/A	0.05110	0.03878	0.03097	0.25460	0.22071	0.02660
General health rating: fair	N/A	-0.05850	-0.03825	-0.01015	-0.20037	-0.09609	-0.01362
General health rating: poor	N/A	-0.10608	-0.03876	-0.06759	-0.44555	-0.26483	-0.02675
Mental health rating: excellent	N/A	0.15143	0.12798	0.07152	0.51309	0.34293	0.13565
Mental health rating: very good	N/A	0.07691	0.06783	0.03355	0.23984	0.14657	0.07210
Mental health rating: fair	N/A	-0.07843	-0.03536	-0.05105	-0.16960	-0.18627	-0.05122
Mental health rating: poor	N/A	-0.17530	-0.11081	-0.21117	-0.54104	-0.48376	-0.10682
Proxy helped	N/A	0.00218	-0.04383	-0.03625	-0.08993	-0.06614	0.02356
Proxy answered	N/A	-0.01587	0.03219	-0.02592	-0.00134	-0.00815	0.02373
Medicaid dual eligible	N/A	-0.04851	-0.00408	0.00706	-0.06071	0.21234	-0.01415
Low-income subsidy (LIS)	N/A	0.02839	-0.08787	0.04764	-0.08275	0.05071	0.00955
Chinese Language	N/A	0.02772	0.05809	-0.15994	0.22584	-0.09093	0.00005
Supplemental sample	-0.059749	-0.06371	0.05024	0.03227	-0.11010	0.18672	0.02077

Source: Medicare 2017 Part C & D Star Rating Technical Notes

Table 2. Case-mix Coefficients for Part D CAHPS Measures

Predictor	MA-PD D08: Rating of Drug Plan	MA-PD D09: Getting Needed Prescription Drugs (Comp)	PDP D08: Rating of Drug Plan	PDP D09: Getting Needed Prescription Drugs (Comp)
Age: 64 or under	-0.27569	-0.06454	0.06211	-0.02891
Age: 65 - 69	-0.19440	-0.03037	-0.08983	-0.02822
Age: 75 - 79	0.07233	0.00378	0.24711	0.02864
Age: 80 - 84	0.21853	0.01595	0.47427	0.03152
Age: 85 and older	0.33341	0.01583	0.67113	0.10747
Less than an 8th grade education	0.08252	-0.03436	0.00931	-0.11294
Some high school	0.11874	0.00096	0.30042	-0.02304
Some college	-0.21490	-0.01862	-0.32058	-0.07855
College graduate	-0.24904	-0.02611	-0.37643	-0.10954
More than a bachelor's degree	-0.40747	-0.03288	-0.51899	-0.12881
General health rating: excellent	0.35712	-0.01633	0.23756	0.06252
General health rating: very good	0.20741	0.02448	0.18783	0.01657
General health rating: fair	-0.14385	-0.03628	-0.25042	-0.07071
General health rating: poor	-0.32451	-0.06472	-0.63890	-0.20834
Mental health rating: excellent	0.28843	0.09477	0.12897	0.08428
Mental health rating: very good	0.13911	0.05275	0.03531	0.05432
Mental health rating: fair	-0.10406	-0.02567	-0.08717	0.03976
Mental health rating: poor	-0.42811	-0.08262	-0.39533	-0.00522
Proxy helped	-0.00781	0.00945	-0.29024	-0.04416
Proxy answered	-0.02595	0.05698	-0.06049	0.07667
Medicaid dual eligible	0.59949	0.01851	0.89267	0.00984
Low-income subsidy (LIS)	0.45558	0.01937	0.47135	0.00984
Chinese Language	-0.25143	-0.02937	N/A	N/A
Supplemental sample	0.24165	-0.05079	0.25967	-0.05065

Source: Medicare 2017 Part C & D Star Rating Technical Notes