

Medicare Health Outcomes Survey (HOS) 2022-2024 Cohort 25 Case-Mix Adjustment

Details of the Case-Mix Adjustment

The longitudinal outcomes for the Medicare HOS 2022-2024 Cohort 25 Performance Measurement analysis are based on risk-adjusted mortality rates, changes in physical health as measured by the physical component summary (PCS) score, and changes in mental health as measured by the mental component summary (MCS) score for the participating Medicare Advantage Organizations (MAOs). For reporting purposes, death and PCS outcomes are combined into one overall measure of change in physical health. Thus, there are two primary outcomes: (1) Alive and PCS Better + Same (vs. PCS Worse or Death) and (2) MCS Better + Same (vs. MCS Worse). For the Medicare Part C Star Ratings, the primary outcomes are reported as the percentage of respondents within an MAO who are “Improving or Maintaining Physical Health” and the percentage within an MAO who are “Improving or Maintaining Mental Health” over the two-year period, after adjustment for case-mix.

The analysis of death outcomes for the HOS performance measurement includes beneficiaries who are 65 years or older at baseline, completed the HOS at baseline with a calculable PCS or MCS score, and whose MAO participated in the HOS at follow up. Beneficiaries are included in the analysis of PCS and MCS change scores if they are 65 years or older at baseline, alive at follow up, enrolled in their original MAO when the follow up sample was drawn, and completed the HOS with calculable PCS and MCS scores at baseline and follow up. HOS outcomes are analyzed by calculating the national averages, and the differences between actual and expected contract-level results for death, PCS, and MCS over two years. The expected results are adjusted for the case-mix of beneficiaries within an MAO to control for pre-existing baseline differences across MAOs with respect to covariates, such as baseline measures of sociodemographic characteristics, chronic medical conditions, and functional health status. The PCS results are combined with the percentage remaining alive in the MAO. An adjusted contract-level percentage for each of the two primary outcomes (PCS and MCS change scores) is calculated by combining the national average and the MAO difference score, using a logit transformation.

Table 1 includes one multivariate logistic regression model for each of three outcomes (i.e., death, PCS, and MCS) that are used to case-mix adjust HOS outcomes, and to calculate expected outcomes for each beneficiary. Beginning in 2022 for the 2024 Star Ratings, CMS updated the case-mix specifications for the expected outcomes of the HOS performance measures from a multi-model approach requiring non-missing values for all covariates in each model to a single model for each outcome that uses the Contract-Mean Imputation (CMI) method for covariates with missing data. Under the CMI approach, a missing case-mix adjuster (covariate) for a beneficiary is replaced with the mean value for that adjuster for other beneficiaries in the same contract who have responses contributing to the longitudinal PCS and MCS measures: *Improving or Maintaining Physical Health* and *Improving or Maintaining Mental Health*. Since the change to the case-mix specifications was substantive, the two measures remained on display through the 2025 Star Ratings and are now returning for the 2026 Star Ratings.

The coefficients in the table report the log-odds for beneficiaries with a given characteristic having the expected outcome compared to beneficiaries in the reference category for that characteristic, controlling for all other model characteristics. In Table 1, the coefficient for “Female” in the PCS Better + Same Model is -0.605538, indicating a lower probability of PCS Better + Same for female compared to male respondents (the reference category), who otherwise have the same demographic and health characteristics. However, the coefficient for age and sex interaction in the PCS Better + Same Model is 0.008386, indicating a very small positive difference in the expected outcome between females and males of the same age.

More information about the calculation of HOS outcomes at the beneficiary and MAO contract levels is available on the HOS website at www.HOSonline.org.

Table 1: HOS Model Covariates at Baseline (Death, PCS Better + Same, and MCS Better + Same models)

Death Model Covariates	Death Model	PCS Model	MCS Model
Sociodemographic Variables			
Constant	-5.851021	2.232077	2.150314
Age (linear)	0.049369	-0.015024	-0.006411
Age 75+	0.042227	-0.027605	-0.035074
Age 85+	0.015949	0.030890	0.013175
Age and sex interaction	0.000296	0.008386	0.003247
Female	-0.539998	-0.605538	-0.275339
Hispanic only	-0.583694	0.003988	-0.235942
Asian only	-0.860608	-0.083129	-0.174167
Native Hawaiian or Pacific Islander only	-0.054307	0.115009	-0.100125
Black only	-0.323382	0.016556	-0.152964
American Indian or Alaskan Native only	-0.160022	-0.107038	-0.320198
Multiracial	-0.130566	0.020639	-0.110609
Married	-0.206517	0.013132	-0.054578
Receive Medicaid	0.126520	-0.094744	-0.329650
Eligible for SSI	0.004176	-0.143549	-0.369289
Homeowner	-0.105033	0.060250	0.181851
High school graduate or greater	-0.001094	0.122368	0.182702
Baseline Functional Status			
One-item measure of General Health compared to others	0.215457		
Physical Functioning/Activities of Daily Living Scale	-0.019277		
General Health item	0.237715		
Physical Functioning item (limitations in moderate activities)	-0.019810		
Physical Functioning item (limitations climbing several flights of stairs)	0.049275		
Role Physical item (accomplished less than would like)	0.028639		
Role-Physical item (limited in the kind of work or other activities)	0.056056		
Role-Emotional item (accomplished less than would like)	0.037802		
Role-Emotional item (did not do work or other activities as carefully)	-0.004613		
Bodily Pain item (pain interfered with normal work)	-0.159989		
Mental Health item (felt calm and peaceful)	-0.043500		
Vitality item (had a lot of energy)	0.038276		
Mental Health item (felt downhearted and blue)	0.000888		
Social Functioning item (health interfered with social activities)	-0.068082		
Chronic Medical Conditions			
Hypertension	-0.077153		
Angina/coronary artery disease	-0.068116		

Death Model Covariates	Death Model	PCS Model	MCS Model
Congestive heart failure	0.466143		
Myocardial infarction	0.088617		
Other heart conditions	-0.022755		
Stroke	0.168361		
Pulmonary disease	0.199861		
Gastrointestinal disorders	-0.246909		
Diabetes	0.033180		
Depression	-0.146026		
Any cancer other than skin cancer	0.383996		
Colon cancer treatment	0.216094		
Breast cancer treatment	-0.077125		
Prostate cancer treatment	-0.234924		
Lung cancer treatment	0.959773		