Medicare Health Outcomes Survey (HOS)
2021-2023 Cohort 24 Case-Mix Adjustment
May 2024

HOS 2021-2023 Cohort 24 Case-Mix Adjustment

The longitudinal outcomes for the Medicare HOS 2021-2023 Cohort 24 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 below 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 is substantive, the two measures will remain on display for the 2024 and 2025 Star Ratings and will be returned to the Star Ratings program in 2026.

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: HOS Model Covariates at Baseline (Death, PCS Better + Same, and MCS Better + Same models), the coefficient for "Female" in the PCS Better + Same Model is -0.213345, 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 gender interaction in the PCS Better + Same Model is 0.003405, 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	**-5.931545**	1.927909	2.092490
Age (linear)	0.054474	-0.011032	-0.003922
Age 75+	0.030663	-0.024892	-0.042231
Age 85+	0.018463	0.024167	0.021894
Age and gender interaction	0.000165	0.003405	0.001986
Female	-0.494030	-0.213345	-0.201054
Hispanic only	-0.518562	0.004366	-0.179452
Asian only	-0.909965	-0.082200	-0.183643
Native Hawaiian or Pacific Islander only	-0.005136	-0.153528	-0.396941
Black only	-0.244513	-0.011440	-0.096515
American Indian or Alaskan Native only	-0.074975	0.071105	-0.290211
Multiracial	-0.046452	-0.045189	-0.143271
Married	-0.182227	-0.021518	-0.125457
Receive Medicaid	0.127617	-0.053071	-0.255239
Eligible for SSI	0.130781	-0.055608	-0.340838
Homeowner	-0.093554	0.080890	0.148818
High school graduate or greater	-0.012752	0.109127	0.204396
Annual Household Income	0.089604	-0.049752	-0.184119
Baseline Functional Status			
One-item measure of General Health compared to others	0.186521		
Physical Functioning/Activities of Daily Living Scale	-0.018335		
General Health item	0.210581		
Physical Functioning item (limitations in moderate activities)	-0.048860		
Physical Functioning item (limitations climbing several flights of stairs)	0.034197		
Role Physical item (accomplished less than would like)	0.048467		
Role-Physical item (limited in the kind of work or other activities)	0.040248		
Role-Emotional item (accomplished less than would like)	0.020625		
Role-Emotional item (did not do work or other activities as carefully)	-0.017937		
Bodily Pain item (pain interfered with normal work)	-0.097478		
Mental Health item (felt calm and peaceful)	-0.034281		
Vitality item (had a lot of energy)	0.047611		
Mental Health item (felt downhearted and blue)	-0.009150		
Social Functioning item (health interfered with social activities)	-0.074626		
Chronic Medical Conditions			
Hypertension	-0.074868		
Angina/coronary artery disease	-0.080977		
Congestive heart failure	0.503003		
Myocardial infarction	0.117016		
Other heart conditions	0.054452		
Stroke	0.140282		
Pulmonary disease	0.245642		

Death Model Covariates	Death Model	PCS Model	MCS Model
Gastrointestinal disorders	-0.185427		
Arthritis of hip or knee	-0.276627		
Arthritis of hand or wrist	-0.152032		
Sciatica	-0.304590		
Diabetes	0.111349		
Depression	-0.087881		
Any cancer other than skin cancer	0.408008		
Colon cancer treatment	0.347796		
Breast cancer treatment	-0.144587		
Prostate cancer treatment	-0.320930		
Lung cancer treatment	0.997027		