

If you experience problems accessing any portion of our files,
please contact CMS at HOS@cms.hhs.gov.



SAMPLE
2020-2022 Cohort 23
**MEDICARE
ADVANTAGE
ORGANIZATION
PERFORMANCE
MEASUREMENT
REPORT**

MEDICARE HEALTH

OUTCOMES SURVEY

**CENTERS
FOR MEDICARE
& MEDICAID
SERVICES**

**HEALTH
SERVICES
ADVISORY
GROUP**



DEPARTMENT OF HEALTH & HUMAN SERVICES
Centers for Medicare & Medicaid Services
7500 Security Boulevard
Baltimore, Maryland 21244-1850



CENTER FOR MEDICARE

July 2023

Medicare Advantage Organizations,

The Centers for Medicare & Medicaid Services (CMS) is pleased to provide you with your Medicare Advantage Organization's (MAO) performance measurement results for *2020-2022 Cohort 23* of the Medicare Health Outcomes Survey (HOS). The *2020-2022 Cohort 23 Performance Measurement Report* includes results from the Medicare HOS Version 3.0. The report presents performance measurement results for MAOs based on data from the Medicare HOS *2020 Cohort 23 Baseline* and *2022 Cohort 23 Follow Up* surveys describing changes in health status over time for people with Medicare. CMS encourages MAOs to examine their results for use in quality improvement activities.

The Performance Measurement Report is distributed to help MAOs understand and find their HOS results for key health indicators. Information on the HOS measures used in the Medicare Star Ratings, as well as additional resources to assist MAOs in their quality improvement efforts, is included in the report. The *2020-2022 Cohort 23 Performance Measurement Report* also includes an Executive Summary, a Reader's Guide, HOS Highlights and Resources, as well as trend information over recent years for your individual MAO.

For more program information, contact Health Services Advisory Group (HSAG) through the HOS Information and Technical Support at hos@hsag.com or (888) 880-0077; you may also visit the CMS HOS website at www.cms.gov/Research-Statistics-Data-and-Systems/Research/HOS/index.html.

Sincerely,

Elizabeth Goldstein, PhD
Director
Division of Consumer Assessment & Plan Performance

MEDICARE HEALTH OUTCOMES SURVEY

SAMPLE MAO REPORT

The following is a **sample** version of the *Cohort 23* Performance Measurement Report made available to all Medicare Advantage Organizations (MAOs) participating in the *2020 Cohort 23 Baseline* and *2022 Cohort 23 Follow Up* Medicare Health Outcomes Surveys.

The figures, tables, and text in this document contain example MAO and state level data; however, all references to the *HOS Total* reflect **actual** data.

Medicare HOS Information and Technical Support at hos@hsag.com or (888) 880-0077 is available to assist with report questions and interpretation. A full description of the HOS program may be found at www.hosonline.org.

Table of Contents

Executive Summary	1
HOS Performance Measurement Results	3
Trends in Performance Measurement Results for MAO HXXXXA	3
Health Status Summary for MAO HXXXXA	4
Reader’s Guide	7
Technical Assistance	7
How to Use the Information in this Report	7
Need More Help?	9
HOS Highlights and Resources	10
Recent HOS Enhancements	10
HOS Resources	11
HOS and the Star Ratings	14
Medicare Star Ratings	14
2023 and 2024 Medicare Part C Star Ratings	15
MAO Resources for Best Practices and the Star Ratings.....	16
Cohort 23 Distribution of the Sample and Response Rates	17
MAO HXXXXA	18
Cohort 23 Performance Measurement Results	20
Physical Health.....	21
Mental Health	23
PFADL Change Score Measure	25
Demographics.....	28
General Health and Comparative Health	29
Depression.....	30
Pain.....	32
Chronic Medical Conditions	34
Activities of Daily Living	37
Healthy Days Measures.....	39
Body Mass Index.....	41

Sleep Measures.....	43
Health Status by Baseline Demographic Groups for MAO HXXXXA.....	45
Appendix 1	52
Program Background.....	52
2020-2022 Medicare Advantage Organization Participation.....	52
HOS Data Collection Tools.....	54
Data Evaluation and Processing.....	56
Calculation of Outcomes.....	57
Appendix 2	62
HOS Partners.....	62
References	67

Executive Summary

This Medicare Health Outcomes Survey (HOS) *2020-2022 Cohort 23 Performance Measurement* Report presents aggregate results for participating Medicare Advantage Organizations (MAOs), as well as specific results for MAO HXXXXA based on data from the HOS *2020 Cohort 23 Baseline* and *2022 Cohort 23 Follow Up* surveys. This report includes data for consolidating contracts where applicable, and therefore includes results for HXXXXA.

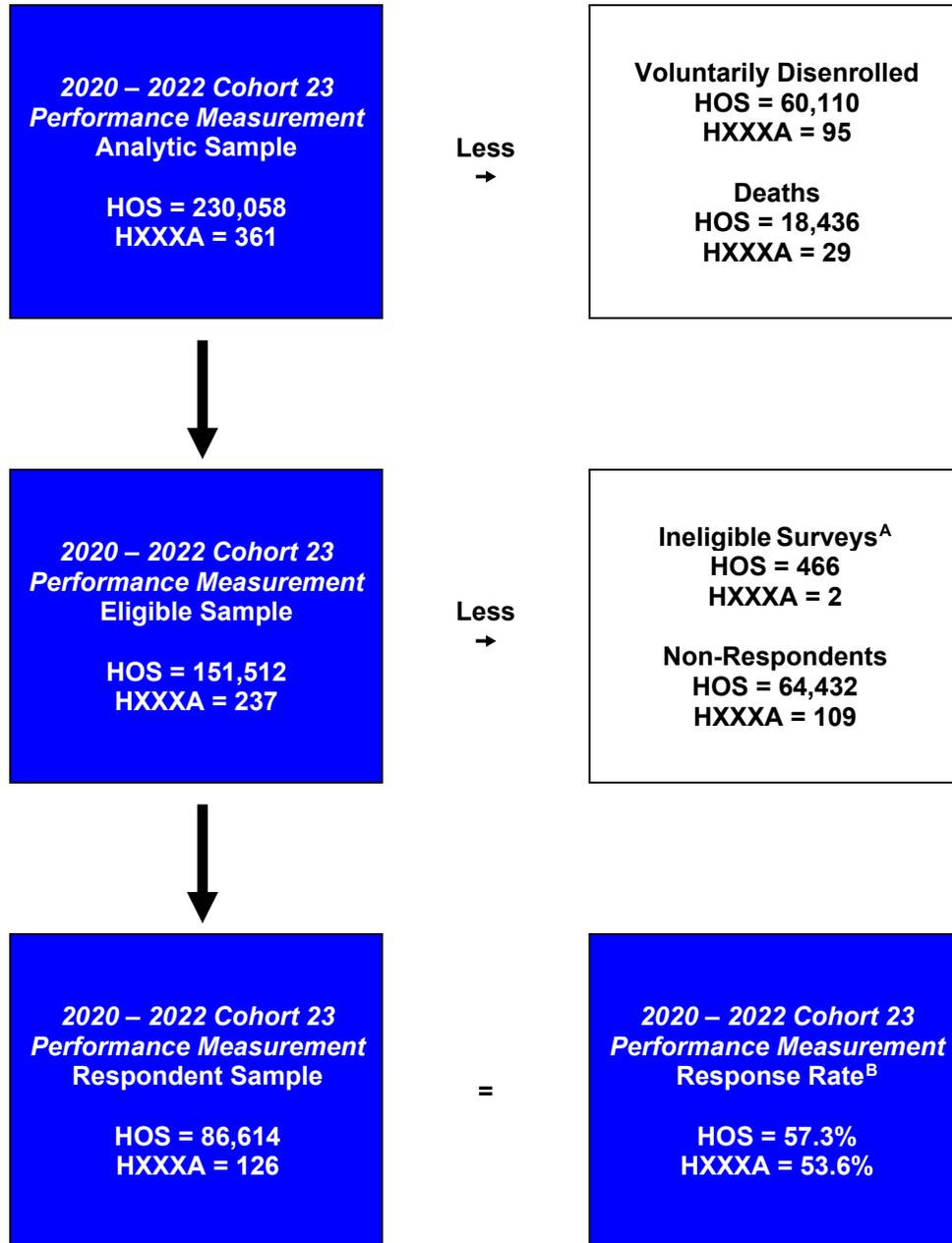
The HOS performance measurement results describe change in health status over time for people with Medicare. The *2020 Cohort 23 Baseline* included a random sample of 768,697 Medicare members, both the aged and disabled, enrolled in 509 MAOs. Of the eligible 748,823 individuals sampled, 37.3% (279,005) completed the baseline survey. A completed survey was defined as one that could be used to calculate a physical component summary (PCS) or mental component summary (MCS) score. Of the 279,005 respondents, 234,892 seniors (adults age 65 or older) returned a completed survey. During the two years between the baseline and follow up surveys, 20 participating MAOs discontinued offering managed care to Medicare members or consolidated with other MAOs. As a result of these changes, there remained 230,058 baseline respondents in 489 contract reporting units (MAOs). This group of 230,058 seniors comprises the *Cohort 23 Performance Measurement* analytic sample.

At the time of follow up, 151,512 members in the *Cohort 23 Performance Measurement* analytic sample were still enrolled in their original MAO. These members are referred to as the *Cohort 23 Performance Measurement* eligible sample since they were alive and eligible for remeasurement. After removing 466 individuals who were determined to be ineligible at follow up, 151,046 individuals remained. A total of 86,614 members returned a follow up survey with a calculable PCS or MCS score, yielding a follow up response rate of 57.3%. These 86,614 members comprise the *Cohort 23 Performance Measurement* respondent sample. Figure 1 on the following page depicts the distribution of the sample and the response rates for the national HOS sample and your MAO.

On the following pages of this Executive Summary, the results for MAO HXXXXA, StateXX, and the HOS Total respondent sample across key indicators of member health status are found. The primary physical and mental health results are included, as well as trend results for the current and previous two cohorts. The Executive Summary also provides the distribution of member responses at baseline and follow up for general and comparative health, chronic medical conditions, healthy days, and obesity measures. More detailed information about the results is provided in the *Cohort 23 Performance Measurement* Results section of the report. For MAOs with a small number of respondents, caution should be exercised when drawing conclusions from the results throughout this follow up report.

State level statistics in figures and tables are *not applicable* (NA) for Regional Preferred Provider Organization (RPPO) and Private Fee-for-Service (PFFS) contracts. For reporting purposes, these types of plans are not included in any specific state results; however, they are included in the HOS Total results.

Figure 1: Distribution of the Performance Measurement Sample and Response Rates for HOS Total and MAO HXXXXA



^A Ineligible individuals at follow up met one of the following criteria: bad address and phone number; bad address and mail-only protocol (*Russian only*); or language barrier.

^B Response Rate = [Respondent Sample/(Eligible Sample-Ineligible Surveys)] x 100%.

HOS Performance Measurement Results

The HOS national average, also referred to in this report as the HOS Total, is based on all MAOs that participated in the performance measurement. Outliers are those MAOs that performed significantly better or significantly worse than expected when compared to the national average. MAOs may be outliers on a measure of physical health, mental health, or both. The overall measure of change in physical health is calculated by combining death status and the PCS score. Change in mental health is calculated using the MCS score.

For the *2020-2022 Cohort 23 Performance Measurement*, a statistical assessment of the case-mix adjusted results for mortality and PCS revealed 30 outlier MAOs. There were 15 outlier MAOs that performed “better than expected” and 15 outlier MAOs that performed “worse than expected” compared to the national average. For MCS, statistical assessment of the case-mix adjusted results revealed 39 outlier MAOs. There were 18 outlier MAOs that performed “better than expected” and 21 outlier MAOs that performed “worse than expected” compared to the national average. Additional performance measurement results and details are provided in Tables 1 and 2 below and in the *Cohort 23 Performance Measurement Results* section.

Trends in Performance Measurement Results for MAO HXXXXA

Table 1 presents the trends in the physical health performance measurement results for your MAO. The current cohort results are provided, and when available, results for the past two cohorts are also shown for comparison. The Medicare Star Ratings measure for *Improving or Maintaining Physical Health* is derived from the combined “Percent Better+Same” result in Table 1. More information about this measure and the Medicare Star Ratings is found in the HOS and the Star Ratings section in this report.

Table 1: Trends in Physical Health Results Over Three Cohorts for MAO HXXXXA

	Percent Better*	Percent Same*	Percent Worse*	Percent Better+Same*	Performance Results**
<i>2020-2022 Cohort 23</i>	15.60%	53.14%	31.27%	68.73%	↔
<i>2019-2021 Cohort 22</i>	NA	NA	NA	NA	
<i>2018-2020 Cohort 21</i>	NA	NA	NA	NA	

Note: See Appendix 1 for a description of changes to the case-mix that may affect comparability of trending results.

NA indicates that the MAO did not have results for the specified cohort.

* The percent better, same, worse, or better+same refers to member health status within an MAO.

** The statistical significance of each performance result for the MAO is indicated by one of the following symbols:

- ⬆ MAO performed significantly better than expected (higher than the national average)
- ⬇ MAO performed significantly worse than expected (lower than the national average)
- ↔ MAO performed as expected (the same as the national average)

Table 2 below presents the trends in the mental health performance measurement results for your MAO. Results for the current cohort are displayed, and when available, results for the past two cohorts are also shown. The Medicare Star Ratings measure for *Improving or Maintaining Mental Health* is the combined “Percent Better+Same” result in Table 2.

Table 2: Trends in Mental Health Results Over Three Cohorts for MAO HXXXXA

	Percent Better*	Percent Same*	Percent Worse*	Percent Better+Same*	Performance Results**
2020-2022 Cohort 23	16.37%	66.32%	17.31%	82.69%	↔
2019-2021 Cohort 22	NA	NA	NA	NA	
2018-2020 Cohort 21	NA	NA	NA	NA	

Note: See Appendix 1 for a description of changes to the case-mix that may affect comparability of trending results.

NA indicates that the MAO did not have results for the specified cohort.

* The percent better, same, worse, or better+same refers to member health status within an MAO.

** The statistical significance of each performance result for the MAO is indicated by one of the following symbols:

⬆ MAO performed significantly better than expected (higher than the national average)

⬇ MAO performed significantly worse than expected (lower than the national average)

↔ MAO performed as expected (the same as the national average)

Health Status Summary for MAO HXXXXA

The following health status indicators are displayed as a resource to assist MAOs in their quality improvement efforts by emphasizing areas where members may be doing poorly. Data from these measures are not included in the Medicare Star Ratings.

General Health and Comparative Health

Table 3 describes baseline and follow up results for the general and comparative health status of members in MAO HXXXXA, StateXX, and the HOS Total. Populations with greater increases between baseline and follow up in the proportion of individuals who indicated that their *general health* was “Fair” or “Poor” or that their *physical* or *mental health compared to one year ago* was “Slightly worse” or “Much worse” may assume greater risk for mortality.^{1,2}

Table 3: 2020-2022 Cohort 23 Performance Measurement Distributions of Members with Worse Self-Rated General and Comparative Health Status for MAO HXXXXA, StateXX, and HOS Total

	General Health Fair or Poor		Comparative Physical Slightly Worse or Much Worse		Comparative Mental Slightly Worse or Much Worse	
	Baseline	Follow Up	Baseline	Follow Up	Baseline	Follow Up
HXXXXA	25.8%	29.4%	25.4%	28.3%	16.9%	10.9%
StateXX	22.9%	25.4%	23.2%	25.2%	14.4%	11.5%
HOS Total	21.9%	24.5%	24.6%	27.3%	15.6%	12.8%

Chronic Medical Conditions

Table 4 shows the percentage of members with multiple (i.e., two or more) chronic medical conditions at baseline and follow up for MAO HXXXXA, StateXX, and the HOS Total. Research demonstrates that having a greater number of chronic conditions increases the risks of the following outcomes: mortality, poor functional status, unnecessary hospitalizations, adverse drug events, duplicative tests, and conflicting medical advice.³ It may be useful to compare the relative differences in the results from baseline to follow up for MAO HXXXXA, StateXX, and the HOS Total.

Table 4: 2020-2022 Cohort 23 Performance Measurement Distribution of Members with Multiple Chronic Medical Conditions[§] for MAO HXXXXA, StateXX, and HOS Total

	Multiple Chronic Medical Conditions [§]	
	Baseline	Follow Up
HXXXXA	60.5%	65.3%
StateXX	62.6%	64.5%
HOS Total	60.5%	63.0%

[§] Multiple chronic medical conditions are defined as having two or more conditions.

Note: Removal of three conditions in 2022 will affect comparability between the baseline and follow up results in this report and reports from prior years.

Healthy Days Measures

Table 5 shows the percentages of members in MAO HXXXXA, StateXX, and the HOS Total with 14 or more days of poor *physical health*, *mental health*, or *activity limitations in the past 30 days*. In general, 14 or more days of poor physical health, mental health, or activity limitations are considered indicative of poor well-being.⁴ Healthy Days Measures serve as indicators of populations with greater risk for disease or injury. MAOs may use responses to Healthy Days Measures to identify members in poor health who may have undiagnosed conditions or are having difficulty managing stress or chronic diseases. It may be useful to compare the relative differences in the results for MAO HXXXXA, StateXX, and the HOS Total.

Table 5: 2020-2022 Cohort 23 Performance Measurement Distribution of Members with Worse Health for the Healthy Days Measures for MAO HXXXXA, StateXX, and HOS Total

	14 or More Days of Poor Physical Health		14 or More Days of Poor Mental Health		14 or More Days of Activity Limitations	
	Baseline	Follow Up	Baseline	Follow Up	Baseline	Follow Up
HXXXXA	16.9%	21.2%	9.7%	11.2%	10.6%	18.6%
StateXX	16.9%	19.3%	9.8%	9.3%	11.7%	14.9%
HOS Total	16.0%	18.4%	9.7%	10.1%	10.9%	13.0%

Clinical Measures

Table 6 illustrates the distribution of underweight, overweight, and obese members across baseline and follow up for MAO HXXXXA, StateXX, and the HOS Total. These Body Mass Index (BMI) categories are considered unhealthy and are associated with increased risk for chronic diseases, and in the case of the underweight, increased mortality for the elderly. It may be useful to compare the proportion of members who are in these unhealthy BMI categories for MAO HXXXXA, StateXX, and the HOS Total.

Table 6: 2020-2022 Cohort 23 Performance Measurement Distribution of Members in Extreme Categories of the BMI Measures for MAO HXXXXA, StateXX, and HOS Total

	Underweight (BMI < 18.5)		Overweight (BMI 25 to 29.99)		Obese (BMI ≥ 30)	
	Baseline	Follow Up	Baseline	Follow Up	Baseline	Follow Up
HXXXXA	2.6%	3.4%	33.3%	37.9%	29.8%	25.0%
StateXX	2.6%	3.1%	34.5%	36.7%	31.6%	27.9%
HOS Total	1.9%	2.3%	36.8%	36.5%	31.7%	30.2%

Note: BMI categories were modified beginning with the 2017 Cohort 20 Baseline Report. Underweight was changed from “<20” to “<18.5.”

Reader's Guide

The Reader's Guide is provided to assist MAOs in the use of information in their HOS Performance Measurement Report. This section will guide the reader in identifying key topics, such as the CMS Medicare Star Ratings, and will also answer general questions about the report and data. For further assistance, please refer to the Technical Assistance information below. Additionally, the HOS Highlights and Resources section of this report contains information about website content, webinars, and other HOS program updates.

Technical Assistance

Medicare HOS Information and Technical Support at hos@hsag.com or (888) 880-0077 is available to assist with report questions and interpretation. The CMS HOS website provides general information about the HOS program (www.cms.gov/Research-Statistics-Data-and-Systems/Research/HOS/index.html). A full description of the HOS program is available at www.HOSonline.org.

How to Use the Information in this Report

This report is designed to assist MAOs in identifying opportunities to reduce health disparities and explore potential programmatic interventions aimed at maintaining or improving the overall health of their Medicare population. Health status indicators are displayed within demographic groups to emphasize where members are doing poorly. This detail is included to help plans identify population subgroups and potential areas for further investigations that can inform health-related interventions for the MAO's population.

What information can I find in this Performance Measurement Report?

The results for key health indicators derived from the cohort of members at baseline and the two-year follow up are provided in this report. Please refer to the description of each report section below and to the Table of Contents for the specific section pages.

- **HOS Highlights and Resources:** introduces new and updated HOS program information, self-paced training webinars, and website resources for MAOs and other data users.
- **HOS and the Star Ratings:** discusses the HOS measures currently used by CMS for the Medicare Star Ratings. Three HOS measures are reported in both the HEDIS HOS Effectiveness of Care Report and the HOS Performance Measurement Report.
- **Cohort 23 Distribution of the Sample and Response Rates:** summarizes the number of participating members and the response rates at the MAO and national levels.
- **Cohort 23 Performance Measurement Results:** provides detailed result tables for the primary physical and mental health outcomes measures and other health indicators. Data estimates are provided to the second decimal place for the change score measures (better, same, and worse results) as these estimates are used in the Medicare Star Ratings. This section also provides demographic tables with values highlighted in **red** to indicate subgroups that are worse off at follow up compared to their baseline. Question numbers in the measure definitions are from the 2022 HOS 3.0 at follow up and may differ from

those in the 2020 HOS 3.0 at baseline. Arthritis of the Hip or Knee, Arthritis of the Hand or Wrist, Sciatica, Smoking, and Income items were removed from the 2022 HOS. Tables that contain these questions will show as *not applicable* (NA).

- **Appendix 1:** describes the program, the questions used in the calculation of PCS and MCS scores, and the case-mix adjusted outcomes for the performance measurement results.
- **Appendix 2:** includes information about the HOS Partners involved in the survey management, instrument design, sampling, administration, report production, and research activities.
- **References:** lists journal articles, technical reports, and website references that are provided throughout the report.

Where can I find additional HOS Program information, such as sampling methodology, and timelines for the reporting and data distribution?

An overview of the HOS Program, the sampling schedule, and program timelines are available on the Program page of the HOS website at www.HOSonline.org. A table with MAO report and data distribution dates is provided on the Data page of the website.

Are HOS measures part of the CMS Medicare Star Ratings?

HOS measures are included in the Medicare Star Ratings, which CMS developed to provide consumer information about MAOs and to reward high-performing health plans. CMS displays MAO information in the Medicare Plan Finder (MPF) tool on the www.medicare.gov/plan-compare website and awards quality bonus payments to the high-performing health plans. For information about the Star Ratings, refer to the HOS and the Star Ratings section in this report.

How are the Performance Measurement Reports distributed?

All reports are distributed electronically to participating MAOs through the CMS Health Plan Management System (HPMS), which requires an HPMS User ID. Downloads of the MAO report include summary-level data in a comma separated values (CSV) file that contains contract-level survey responses, demographic data, and the three HOS functional health display measures: *Improving or Maintaining Physical Health*, *Improving or Maintaining Mental Health*, and *Physical Functioning Activities of Daily Living (PFADL)*. Intermediate results of case-mix adjusted PCS and MCS change scores and MAO death results are included in the CSV file to assist MAOs in understanding the measure calculations. Please visit the following CMS site for information on how to establish access to HPMS: www.cms.gov/Research-Statistics-Data-and-Systems/Computer-Data-and-Systems/HPMS/UserIDProcess.html. If assistance is required regarding HPMS access, contact CMS at hpms_access@cms.hhs.gov.

When will MAOs receive member level data for Cohort 23 Performance Measurement?

The merged baseline and follow up member level data will be distributed to MAOs in the Summer of 2023. MAOs are notified via HPMS about the availability of their merged data and how to request it from the HOS Technical Support Team.

What is the difference between the Performance Measurement report and the member level data file?

The Performance Measurement report provides analysis of the aggregate data gathered from MAO members and presents results and overall findings for the MAO sample. The member level data file provides the sample and survey data that were compiled for each individual surveyed in the MAO. After the HPMS memo is posted in the summer to announce availability of the report and data, it is important for MAOs to obtain and review their reports through HPMS and to request their member level data through the HOS Technical Support email.

Where can I find overall survey results information for earlier HOS cohorts that can be compared to the information in this report?

The Survey Results section on the HOS website (www.HOSonline.org) provides a table depicting general status information at the national HOS level, including sample sizes, completed surveys, and response rates, for the baseline and follow up cohorts administered and reported to date. Scores for HOS measures that are part of Star Ratings may also be found in the HOS Star Ratings Validation tables on HPMS. Scores for other HOS measures that are not used in the Star Ratings can be found in the HOS Aggregate Score Analysis tables on HPMS. Participating MAOs may also access their earlier reports and table data through HPMS.

Where can I find the 2022 NCQA HEDIS® Measure results?

The 2022 National Committee for Quality Assurance (NCQA) Healthcare Effectiveness Data and Information Set (HEDIS)^C results are reported in the 2022 HEDIS HOS Effectiveness of Care Report (HEDIS HOS Report) that is distributed in HPMS as well as on the Star Ratings Validation tables in the HPMS HOS module. The HEDIS HOS measures that continue to be used in the Medicare Star Ratings are: *Improving Bladder Control*, *Monitoring Physical Activity*, and *Reducing the Risk of Falling*. Information about the Medicare Star Ratings is also available in the HOS and the Star Ratings section of this report.

Need More Help?

- MAOs are encouraged to direct their questions to the HOS Technical Support Team at HSAG at hos@hsag.com.
- Information about peer-reviewed articles, technical reports, and manuals related to the HOS is available on the Resources page of the HOS website (www.HOSonline.org). Consult the Home page for a listing of new reports and general updates.
- A glossary consisting of definitions relevant to the Medicare HOS may be accessed from the “[Glossary](#)” link at the bottom of site webpages.
- Participating MAOs contracted with a CMS approved survey vendor to administer the survey following the HOS protocol specified in the NCQA *HEDIS 2020* and *HEDIS Measurement Year (MY) 2021, Volume 6: Specifications for the Medicare Health Outcomes Survey* manuals.^{5,6} The most recent HEDIS Volume 6 manuals are available at no cost from the [NCQA Store](#). Copies of older HEDIS publications may be obtained by calling NCQA Customer Support at (888) 275-7585.

^C HEDIS is a registered trademark of the National Committee for Quality Assurance (NCQA).

HOS Highlights and Resources

Recent HOS Enhancements

Changes to the *Improving or Maintaining Physical Health* and *Improving or Maintaining Mental Health* Display Measures

CMS finalized the following updates to two measures from the Medicare HOS: the *Improving or Maintaining Physical Health* (PCS) measure and *Improving or Maintaining Mental Health* (MCS) measure for the 2022 measurement year (Federal Register 2021).⁷

- First, CMS changed the case-mix adjustment to improve the case-mix model performance and simplify the implementation and interpretation of case-mix results when particular case-mix variables, such as education level, are missing.
- Second, CMS increased the minimum required denominator from 30 to 100 respondents for each of these measures. The increase to the minimum denominator brings these measures into alignment with the denominator requirements for the HEDIS measures that come from the HOS survey.

Details regarding the case-mix adjustment are presented in the Calculation of Outcomes section in Appendix 1.

Since the case-mix specification change is substantive as described in Section 422.164(d)(2), the two measures will remain on display for the 2024 and 2025 Star Ratings and would be returned to the Star Ratings program in 2026.

Changes to the Aggregate Score Analysis tables in the Health Plan Management System (HPMS)

In 2021, the Aggregate Score Analysis tables were modified and expanded to present data in the following three tables: “Physical Health,” “Mental Health,” and “Other Health.”

- The Physical Health table includes: Physical Component Summary Score, Percent Reporting Health Now Compared to 1 Year Ago (Better/Same), Percent Reporting Problems with 2 or More ADLs, Percent Reporting 2 or More Chronic Conditions, Percent Reporting 14 or More Physically Unhealthy Days, and Percent Reporting Obesity with 30+ Body Mass Index (BMI).
- The Mental Health table includes: Mental Component Summary Score, Percent Reporting Depressive Symptoms, and Percent Reporting 14 or More Mentally Unhealthy Days.
- The Other Health table includes: Percent Deceased within 2 years of Baseline Survey, Percent Reporting 14 or More Days with Activity Limitations due to Poor Health, Percent Reporting 7-8 Hours of Actual Sleep, and Percent Reporting Very Good Overall Sleep Quality. These measures provide MAOs with a wider snapshot of member health that may encourage new interventions aimed at improving these health outcomes. MAOs are encouraged to review these data as they choose intervention programs for their members.

Enhancement to the CSV file accompanying the Performance Measurement Report

Since 2013, the MAO summary-level CSV data file has included a range of aggregate information such as survey responses, demographic data, and PCS and MCS scores. PFADL scores were added in 2020. In 2021, the summary-level CSV file was expanded to include an indicator for Hispanic ethnicity as well as intermediate measures used to derive the final MAO-level outcomes (Alive and PCS better or same; MCS better or same; death). The additional measure data provided may help MAOs better interpret the calculation of the final MAO-level outcomes. Exact replication of the final MAO-level Alive and PCS better or same results may not be possible because MAOs do not have access to records of disenrolled members that are included in the case-mix adjustment for death, which is used for PCS results.

Physical Functioning Activities of Daily Living (PFADL) Display Measure

The longitudinal PFADL change score measure is part of the 2024 display measures on both the CMS website and the 2024 Star Ratings Validation Tables in HPMS. CMS may consider the measure for the Star Ratings in the future.

The PFADL is a longitudinal change score measure derived from the HOS. It measures, at the MAO contract level, the change over two years in the physical functioning of members enrolled in MAO contracts and complements the measurement of physical health status. The PFADL change score can be interpreted as approximating the percent of function retained over two years by the average member in an MAO. The PFADL scale combines two VR-12 physical functioning questions (limitations in moderate activities and climbing stairs) with the six activities of daily living (ADL) questions to create a Likert-type scale. PFADL scale scores are created from responses to the baseline and the two-year follow-up questions. A more detailed methodology used to create the PFADL change score measure is described on the Survey Results page of the HOS website (www.HOSonline.org).

HOS Resources

HOS 3.0 Survey Instrument

The 2022 survey administration used the HOS 3.0 that was implemented in 2015. The HOS 3.0 uses the Veterans RAND 12-Item Health Survey (VR-12) as the core physical and mental health outcomes measures, and the three HEDIS Effectiveness of Care measures are *Management of Urinary Incontinence in Older Adults*, *Physical Activity in Older Adults*, and *Fall Risk Management*. The HOS survey instruments are available on NCQA's website at www.ncqa.org/hedis/measures/hos.

HOS Website

The HOS website is a resource that provides:

- Historical overview of the project
- Updates on project activities
- Reports of ongoing research efforts
- Access to public use files and supporting documentation

- Listing of journal articles, bibliographies, and technical reports relating to the HOS
- Links to project partners

Semiannual HOS Newsletters

The HOS Newsletters include information about HOS products, services, and timelines; program updates; self-paced training programs; and other relevant topics, such as sharing of best practices and highlights of recent research. HOS Newsletters are circulated semiannually via email, in spring and fall, to MAO contacts and users of HOS technical support. HOS Newsletters are also posted on the HOS website. If you would like to receive the HOS Newsletters, contact the HOS Information and Technical Support team at hos@hsag.com.

Participating MAOs

The current MAO Performance Measurement Contract List can be downloaded from the Survey Results section on the Survey page of the HOS website (www.HOSonline.org).

CMS Approved Survey Vendors

The Survey Vendors section under the Program page of the HOS website provides an annual list of CMS approved survey vendors. Survey vendors are required to reapply for approval each year. There were three survey vendors approved to administer the HOS in 2022.

Frequently Asked Questions (FAQs)

The “FAQs” link at the bottom of site webpages (www.HOSonline.org) provides answers to frequently asked questions about the Medicare HOS. Examples are questions about where to find the current survey administration documents and HOS questionnaires, how MAOs may obtain their reports and data, and where to find quality improvement ideas. Information is also provided about the types of files available for researchers and how to obtain the files.

Self-Paced Training Webinars

A series of basic to advanced self-paced training webinars are available on the HOS website. The webinars run approximately 30 minutes in length and may be accessed at any time at the convenience of the user. To access the webinars, go to the Trainings section under the Resources page on the HOS website (www.HOSonline.org).

- **Introduction to the Medicare Health Outcomes Survey (HOS):** A basic training session appropriate for MAOs that are new to the HOS or others seeking to obtain an overview of the HOS. In addition, the introductory training program provides some practical guidance about how to obtain HOS reports and data.
- **Getting the Most from Your Medicare Health Outcomes Survey (HOS) Baseline Report:** An intermediate training session that builds on the information from the basic tutorial described above. The training discusses maximizing the use of the HOS Baseline Report to provide information on the health of Medicare Advantage (MA) members and incorporating chronic care improvement programs (CCIPs) in quality improvement activities.

- **Using Your Medicare Health Outcomes Survey (HOS) Data:** An intermediate training session assisting MAOs with using their HOS data to identify priorities and assess the impact of interventions. It also demonstrates the advantages of linking HOS data with your own MAO data.
- **Understanding the Medicare Health Outcomes Survey (HOS) Performance Results Used in the MA Plan Ratings:** An advanced training session describing the methodology used in calculating the Performance Measurement Results. The tutorial discusses the primary health outcomes collected from the survey, the PCS and MCS scores, and how they are used to describe changes in the functional status of MAO members over a two-year period. It also discusses how the HOS results are used in the MA Plan Ratings, also called the Medicare Part C and D Star Ratings.

Veterans RAND 12-Item Health Survey (VR-12) Website

Information about the VR-36, VR-12, and VR-6D instruments is available on the Boston University School of Public Health website. The website offers details on development, applications, and references for the VR-12, which is the core health outcomes measure in the Medicare HOS and HOS-M. For information about the instruments and to request permission to use the documentation and scoring algorithms, go to: www.bu.edu/sph/about/departments/health-law-policy-and-management/research/vr-36-vr-12-and-vr-6d.

HOS and the Star Ratings

Medicare Star Ratings

CMS developed the Medicare Star Ratings to help consumers compare health plans and the care and services they provide based on quality and performance, to make accurate data more transparent and standardized among plans, and to reward top-performing health plans.

Consumers can use the Medicare Plan Finder (MPF) tool www.medicare.gov/plan-compare to search for health plans in their geographic area and compare cost estimates and coverage information. CMS rates the relative quality of service and care provided by MAOs based on a five-star rating scale that uses HOS measures combined with other measurement results. Up to 38 unique quality measures were included in the 2023 Medicare Part C and D Star Ratings. These measures include: providing preventive services, managing chronic illness, access to care, HEDIS measures, the Consumer Assessment of Healthcare Providers and Systems (CAHPS[®]) survey, and plan responsiveness.

The Medicare Part C Star Ratings include five contract level HOS measures: two measures of functional health and the three HEDIS Effectiveness of Care measures.

Three functional health measures are reported in each MAO's annual HOS Performance Measurement Report. Two results are derived from the VR-12 portion of the HOS, which serves as the core source for the PCS and MCS scores. The final measures are based on the case-mix adjusted PCS and MCS change scores between baseline and follow up surveys, as well as death status, in the Performance Measurement Results section. The PFADL measure is derived from two physical functioning and six ADL questions and remains under development.

- *Improving or Maintaining Physical Health* display measure is the “Physical Health Percent Better or Same” result
- *Improving or Maintaining Mental Health* display measure is the “Mental Health Percent Better or Same” result
- *Physical Functioning Activities of Daily Living* display measure is the PFADL result (in development)

Since 2021, the HEDIS Effectiveness of Care measures are reported in each MAO's annual HEDIS HOS Effectiveness of Care Report. These measures are calculated from questions about information and care members receive from their healthcare providers, using data for the baseline and follow up cohorts from the same measurement year (i.e., a round of data). Member responses are used to derive the HEDIS measures: Management of Urinary Incontinence in Older Adults, Physical Activity in Older Adults, and Fall Risk Management. CMS uses these measures for the Medicare Star Ratings. Further information is available in the HEDIS HOS Report.

- *Improving Bladder Control* measure is the Treatment of Urinary Incontinence rate
- *Monitoring Physical Activity* measure is the Advising Physical Activity rate
- *Reducing the Risk of Falling* measure is the Managing Fall Risk rate

2023 and 2024 Medicare Part C Star Ratings

The HOS cohorts related to data collection, report dissemination, and CMS Medicare Part C Star Ratings results are provided in the Medicare HOS Survey Administration Timeline Table below. This information will guide MAOs in understanding the sources of data used for specific Medicare Star Ratings measures.

The 2023 Medicare Part C Star Ratings were posted in October 2022. Data sources for the 2023 Star Ratings are highlighted **yellow** in the table below. For instance, the HOS *2019-2021 Cohort 22 Merged Baseline* and *Follow Up* dataset was used for the three functional health measures, and the combined *2021 Cohort 24 Baseline* and *2021 Cohort 22 Follow Up* dataset was used for the three HEDIS Effectiveness of Care measures.

The 2024 Medicare Part C Star Ratings will be posted in October 2023 and are highlighted **green** in the table below. The *2020-2022 Cohort 23 Merged Baseline* and *Follow Up* dataset will be used for the three functional health measures, and the combined *2022 Cohort 25 Baseline* and *2022 Cohort 23 Follow Up* dataset will be used for the three HEDIS Effectiveness of Care measures.

Additional information about the Medicare Star Ratings can be found on the CMS website at <https://go.cms.gov/partcanddstarratings>. For any questions related to Medicare Part C and D Star Ratings, you may send an email inquiry directly to PartCandDStarRatings@cms.hhs.gov. Please be sure to include your contract number(s) in the email.

Medicare HOS Survey Administration and Star Ratings Timeline Table

Year	Baseline Data Collected	Follow Up Data Collected	Baseline Reports	Follow Up Reports	2-yr PCS/MCS Change for Star Ratings	HEDIS Measures for Star Ratings*	Star Rating Year
2025	<i>Cohort 28</i>	<i>Cohort 26</i>	<i>Cohort 27</i>	<i>Cohort 25</i>	<i>2021-2023 Cohort 24</i>	<i>2023 Cohort 26 Baseline & 2023 Cohort 24 Follow Up</i>	2025
2024	<i>Cohort 27</i>	<i>Cohort 25</i>	<i>Cohort 26</i>	<i>Cohort 24</i>	<i>2020-2022 Cohort 23</i>	<i>2022 Cohort 25 Baseline & 2022 Cohort 23 Follow Up</i>	2024
2023	<i>Cohort 26</i>	<i>Cohort 24</i>	<i>Cohort 25</i>	<i>Cohort 23</i>	<i>2019-2021 Cohort 22</i>	<i>2021 Cohort 24 Baseline & 2021 Cohort 22 Follow Up</i>	2023
2022	<i>Cohort 25</i>	<i>Cohort 23</i>	<i>Cohort 24</i>	<i>Cohort 22</i>	<i>2018-2020 Cohort 21</i>	<i>2020 Cohort 23 Baseline & 2020 Cohort 21 Follow Up</i>	2022
2021	<i>Cohort 24</i>	<i>Cohort 22</i>	<i>Cohort 23</i>	<i>Cohort 21</i>	<i>2017-2019 Cohort 20</i>	<i>2019 Cohort 22 Baseline & 2019 Cohort 20 Follow Up</i>	2021

* The HEDIS Effectiveness of Care Measures collected by the HOS are calculated from the combined round of baseline and follow up data by reporting year: Management of Urinary Incontinence in Older Adults; Physical Activity in Older Adults; and Fall Risk Management.

MAO Resources for Best Practices and the Star Ratings

A study titled “Analysis of Key Drivers of Improving or Maintaining Medicare Health Outcomes Survey (HOS) Scores” is available on the HOS website at www.HOSonline.org.⁸ The study describes how two-year mortality and two-year changes in the VR-12 items are associated with key HOS measures used in the Medicare Star Ratings. The HOS measures relate to maintaining and improving health and are derived from changes in the PCS and MCS scores. The results from this study clarify the properties of several CMS quality measures and identify which items most influence contract-level PCS and MCS scores.

A resource guide titled “Opportunities for Improving Medicare HOS Results through Practices in Quality Preventive Health Care for the Elderly” is available on the HOS website at www.HOSonline.org.⁹ This guide is intended to help MAOs develop and apply strategies that address the HOS items used in the CMS Medicare Part C Star Ratings, including an overview of the HOS, national performance results on HOS items included in the Medicare Part C Star Ratings, best practices in promoting quality preventive health care for the elderly, and HOS resources available to MAOs. Section 1 discusses the prevalence of conditions measured by the HOS items and summarizes national HOS results to highlight opportunities for improvement and intervention strategies. Section 2 provides examples of interventions that some MAOs have used to promote patient/physician communication, screening services, or maintenance of functional status among their members.

A companion literature review titled “Functional Status in Older Adults: Intervention Strategies for Impacting Patient Outcomes” is available on the HOS website at www.HOSonline.org.¹⁰ This literature review synthesizes selected articles about functional status outcomes in older adults and supplements the resource guide. The articles include outcomes that target assessments of health from well-established questionnaires spanning the physical to psychological. In addition, outcome measures include ADLs that capture functional limitations. The articles were selected because they describe interventions that could impact functional status outcomes in elderly populations.

All three documents are available on the HOS website at www.HOSonline.org. The study results may be found and downloaded from the Applications section of the Resources page.

Cohort 23 Distribution of the Sample and Response Rates

The *Medicare HOS 2020 Cohort 23 Baseline* included a random sample of 768,697 members, including both the aged and disabled, from 509 MAOs. Of the eligible 748,823 individuals sampled, 37.3% (279,005) completed the baseline survey. A completed survey was defined as one that could be used to calculate a PCS or MCS score. Of those 279,005 respondents, 234,892 seniors (adults age 65 or older) returned a completed survey. During the two years between the *2020 Cohort 23 Baseline* survey and the *2022 Cohort 23 Follow Up* survey, 20 MAOs discontinued offering managed care to Medicare members or consolidated with other MAOs. As a result of these changes, 489 reporting units (MAOs), comprising 230,058 senior baseline respondents, remained in the HOS. For purposes of MAO comparisons, this group of 230,058 members comprises the *Cohort 23 Performance Measurement* analytic sample.

The performance measurement results are based on the analytic sample of 230,058 seniors (see Figure 2) and not the entire population sampled at baseline and follow up. At the national level, 18,436 (8.0%) members died between baseline and the two-year follow up. Another 60,110 (26.1%) members voluntarily disenrolled from their MAOs during the same two-year period. The remaining 151,512 (65.9%) seniors were still alive and still enrolled in their original MAO at the time of follow up. These members are referred to as the *Cohort 23 Performance Measurement* eligible sample. From the eligible sample, 466 individuals were determined to be ineligible at follow up.^D Of the remaining 151,046 members, 64,432 did not respond and 86,614 returned a follow up survey that could be used to calculate a PCS or MCS score. These 86,614 seniors comprise the *Cohort 23 Performance Measurement* respondent sample, yielding a follow up response rate of 57.3%.^E

Focusing on the 489 reporting units (MAOs) at follow up, the average number of respondents per MAO was 178, with a range of 3 to 896 respondents. Twenty-five percent of MAOs had 231 or more respondents, while 25% had 87 or less. Ten percent of the MAOs had 335 or more respondents, and 10% had 56 or fewer respondents. Based on the analytic criteria, the mean MAO level response rate at follow up was 55.8%, with a range of 8.8% to 100.0%. Twenty-five percent of MAOs had a response rate of 60.7% or greater, while 25% had a response rate of 51.1% or less. Ten percent of the MAOs had a response rate of 64.9% or higher, and 10% had a response rate of 46.8% or lower.

MAOs with a small number of respondents should exercise **caution** when drawing conclusions from the results as the sample size may be insufficient to allow meaningful interpretation.

^D Ineligible individuals at follow up met one of the following criteria: bad address and phone number; bad address and mail-only protocol (*Russian only*); or language barrier.

^E The overall baseline and follow up response rates in the report are calculated after data processing and score calculation. Initial overall survey completion rates were calculated by NCQA following each data collection and used the criteria of at least 80% completion of survey items and all 6 ADL questions answered. These initial rates may be reported elsewhere and will differ from the overall response rates in this report.

MAO HXXXXA

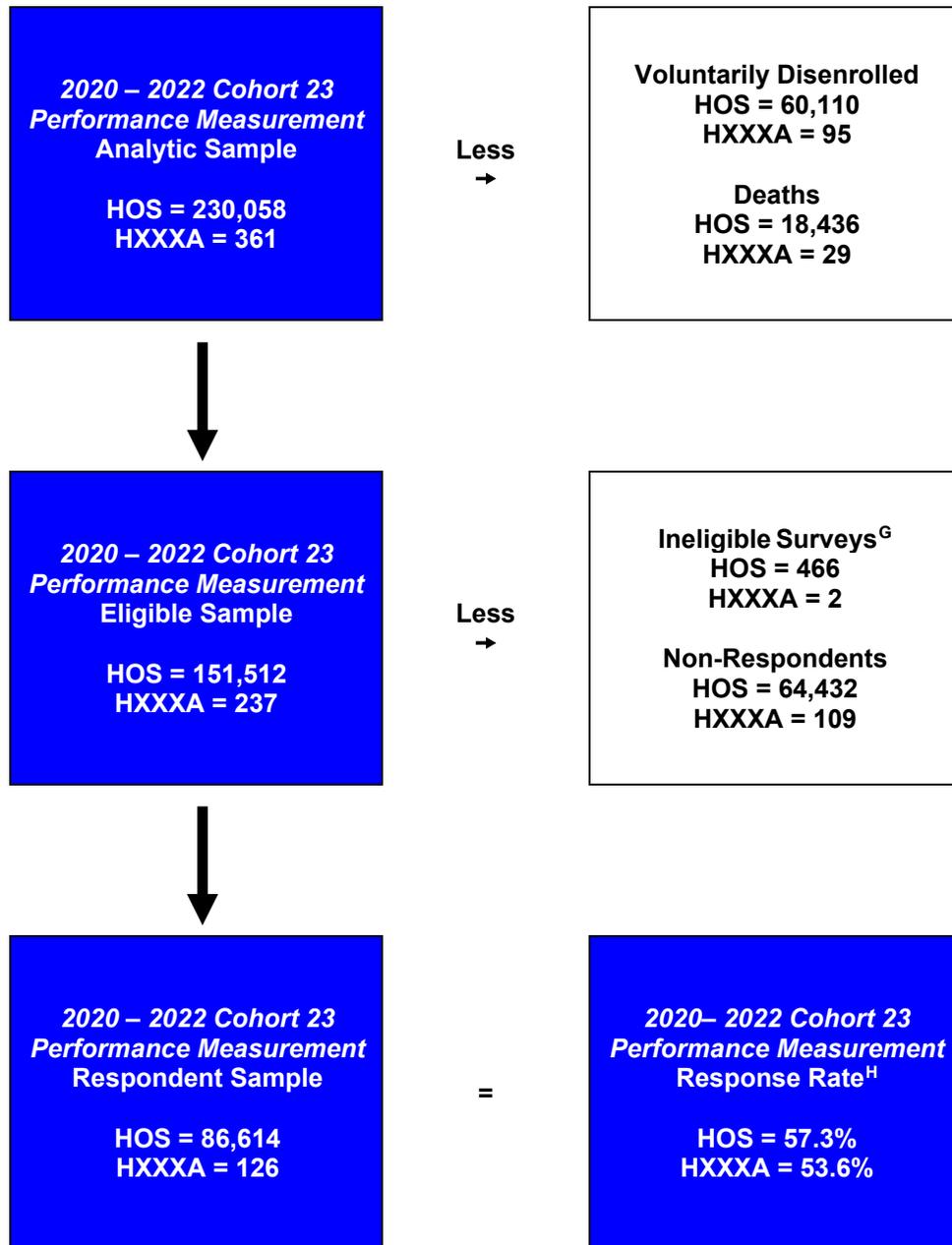
This report includes data for consolidating contracts where applicable, and therefore includes results for HXXXXA.

The original baseline sample size for MAO HXXXXA was 1,182; however, 821 members were not included in the analytic sample because they did not complete the baseline survey, were not seniors, or were determined to be ineligible individuals at baseline.^F Therefore, your MAO's analytic sample size is 361. Of the 361 members in your MAO's analytic sample, 95 voluntarily disenrolled from your MAO and 29 died between baseline and follow up. Of the 237 individuals sent a follow up survey, 2 were determined to be ineligible. Of the remaining 235 members, there were 109 who did not complete the survey and 126 who returned a completed follow up survey. This represented an overall follow up response rate of 53.6% for your MAO, as compared with the HOS follow up response rate of 57.3%.

On the following page, Figure 2 presents the Distribution of the Performance Measurement Sample and Response Rates for the HOS Total, as well as for MAO HXXXXA.

^F Ineligible individuals at baseline met one of the following criteria: deceased; not enrolled in the MAO; bad address and phone number; or language barrier.

Figure 2: Distribution of the Performance Measurement Sample and Response Rates for HOS Total and MAO HXXXXA



^G Ineligible individuals at follow up met one of the following criteria: bad address and phone number; bad address and mail-only protocol (*Russian only*); or language barrier.

^H Response Rate = [Respondent Sample/(Eligible Sample-Ineligible Surveys)] x 100%.

Cohort 23 Performance Measurement Results

The HOS 2020-2022 *Cohort 23 Performance Measurement* results describe change in health status over time for members in MAO HXXXXA. Health outcomes are assessed for a randomly selected set of members from each participating MAO contract over a two-year interval, with a baseline measure and a two-year follow up. In general, functional health status, as measured by the PCS score, is expected to decline over time in older age groups, while mental health status, as measured by the MCS score, may decline at a slower rate. The presence of one or more chronic medical conditions is associated with declines in both scores.¹¹ Though individual health status outcomes depend on individual medical care and personal circumstances, MAO performance may change over time, and is reported in the performance measurement results.

Case-mix variables of baseline demographics and health status as well as selected survey design variables are risk adjusted to make equitable health outcome comparisons across MAOs.⁵ Risk-adjustment is a statistical technique that adjusts for variations in patient outcomes that stem from differences in existing patient characteristics rather than differences in performance between MAOs. The risk-adjusted outcomes are aggregated for the respondents in your MAO, and yield the MAO level performance measurement results.

The performance measurement analysis compares the percentages of members in the MAO who are better, the same, or worse than expected at the two-year follow up to the national averages for both physical and mental health. Death and PCS scores are combined into one overall measure of change in physical health, while mental health is measured by MCS scores alone. There are six main categories of actual health outcomes used in the performance measurement analysis:

1. Alive and physical health better
2. Alive and physical health the same
3. Dead or physical health worse
4. Mental health better
5. Mental health the same
6. Mental health worse

The member samples for the performance measurement analysis include the sample of baseline respondents, which is used to calculate the MAO death rate, and the sample of baseline respondents that completed the follow up survey, which is used to create the final adjusted change scores.

- Members who were age 65 or older and completed the HOS at baseline with a calculable PCS or MCS score were included in the analysis of the two-year death rate for MAOs that were still participating at follow-up.
- Members were included in the analysis of PCS and MCS change scores if they were age 65 or older at baseline, enrolled in their original MAO at the time of the follow up sampling, and completed the HOS baseline and follow up surveys with a calculable PCS or MCS change score.

Member level results were aggregated to derive the MAO and HOS national percentage values. The HOS national average is based on all MAOs that participated in performance measurement. Outliers are those MAOs that performed significantly better or significantly worse than expected when compared with the national average. MAOs may be outliers on a measure of physical health or on a measure of mental health. An MAO that differed from the HOS national average by less than ± 2 standard deviations over the two-year period (based on case-mix adjusted results) is performing the same as expected. An MAO that had a significantly *higher* proportion of members whose health remained stable or improved (Alive and PCS better or same; MCS better or same) over the two-year period is a positive outlier. An MAO that had a significantly *lower* proportion of members whose health improved or remained stable over the two-year period is a negative outlier. For detailed information on the calculation of performance measurement results, see Appendix 1.

Physical Health

Performance measurement results for physical health combine risk-adjusted two-year mortality rates and changes in PCS scores for the primary physical health outcome (Alive and PCS better or same). Over the two-year follow up period, 15.07% of members at the national level had better physical health than expected, 53.56% were the same as expected, and 31.37% were worse than expected. The case-mix adjusted results for mortality and PCS revealed that at the national level, MAOs differed significantly on both the mortality and PCS measures. An overall *F* test showed that mortality differed significantly at the MAO level ($p < 0.0001$). “PCS better or same” differed significantly across all MAOs ($p = 0.0076$), as did “PCS better” ($p = 0.0044$).

Given that the physical health measures of both “Death” and “PCS better or same” differed significantly at the MAO level, an outlier analysis for the primary outcome (Alive and PCS better or same) was performed using *t*-tests. In the *Cohort 23 Performance Measurement* results, there were a total of 30 PCS outliers; 15 MAOs were identified as performing better than expected and 15 MAOs were identified as performing worse than expected, compared with the national average for physical health.

How Is Your MAO Doing?

On the next page, Table 7 depicts the Physical Health Performance Measurement results for MAO HXXXXA, each MAO in the state, the state total, and HOS Total. The Medicare Star Ratings display measure for *Improving or Maintaining Physical Health* is derived from the combined “Percent Better+Same” result (68.63% for the HOS Total in the table).

In terms of physical health, your MAO performed as expected when compared to the HOS national average.¹

¹ If your MAO performed “as expected,” it does not indicate your MAO performed well or performed poorly. It indicates your MAO’s performance on this measure differed by less than 2 standard deviations from the HOS national average.

Table 7: 2020-2022 Cohort 23 Physical Health Performance Measurement Results for MAOs in the state, StateXX and HOS Total

	Percent Better*	Percent Same*	Percent Worse*	Percent Better+Same*	Performance Results**
HXXXXA	15.60%	53.14%	31.27%	68.73%	↔
HXXXXB	15.35%	52.83%	31.82%	68.18%	↔
HXXXXC	12.80%	56.21%	30.99%	69.01%	↔
HXXXXD	14.89%	53.77%	31.34%	68.66%	↔
HXXXXE	13.63%	54.50%	31.87%	68.13%	↔
StateXX	14.94%	54.08%	30.98%	69.02%	
HOS Total	15.07%	53.56%	31.37%	68.63%	

Note: See Appendix 1 for a description of changes to the case-mix that may affect comparability of trending results.

* The percent better, same, worse, or better+same refers to member health status within an MAO.

** The statistical significance of the performance result for the MAO is indicated by one of the following symbols:

⬆ MAO performed significantly better than expected (higher than the national average)

⬇ MAO performed significantly worse than expected (lower than the national average)

↔ MAO performed as expected (the same as the national average)

Data estimates are provided to the second decimal place for PCS and MCS change score measures as these estimates are used in the Medicare Star Ratings.

Mental Health

Performance measurement results for mental health are based on risk-adjusted two-year changes in MCS scores for the primary mental health outcome (MCS better or same). Over the two-year follow up period for mental health (MCS) at the national level, 16.11% of members were better than expected, 67.57% were the same as expected, and 16.32% were worse than expected. The case-mix adjusted results for MCS reveal that at the national level MAOs differed significantly on this measure. An overall *F* test showed that “MCS better or same” differed significantly at the MAO level ($p < 0.0001$), as did “MCS better” ($p < 0.0001$).

Given that the primary mental health outcome measure (MCS better or same) differed significantly at the MAO level, outlier analysis for MCS was performed using *t*-tests. In the *Cohort 23 Performance Measurement* results, there were a total of 39 MCS outliers: 18 MAOs were identified as performing better than expected and 21 MAOs were identified as performing worse than expected compared with the national average for mental health.

The MCS may also be used as a screening tool for depression risk. Previous research suggested that individuals from a sample of the 1998 U.S. general population who have an MCS score of 42 or below are at increased risk for depression.¹¹ However, results from a Medicare population suggest an MCS score of 48 or below provides a reasonably predictive cut-off for depression risk in the elderly Medicare population.¹²

How Is Your MAO Doing?

On the next page, Table 8 depicts the Mental Health Performance Measurement results for MAO HXXXXA, each MAO in the state, the state total, and HOS Total. The Medicare Star Ratings display measure for *Improving or Maintaining Mental Health* is derived from the combined “Percent Better+Same” result (83.68% for the HOS Total in the table).

In terms of mental health, your MAO performed as expected when compared to the HOS national average.^J

^J If your MAO performed “as expected,” it does not indicate your MAO performed well or performed poorly. It indicates your MAO’s performance on this measure differed by less than 2 standard deviations from the HOS national average.

Table 8: 2020-2022 Cohort 23 Mental Health Performance Measurement Results for MAOs in the state, StateXX and HOS Total

	Percent Better*	Percent Same*	Percent Worse*	Percent Better+Same*	Performance Results**
HXXXA	16.37%	66.32%	17.31%	82.69%	↔
HXXXB	15.58%	66.92%	17.50%	82.50%	↔
HXXXC	18.02%	67.38%	14.60%	85.40%	↔
HXXXD	16.50%	67.51%	15.99%	84.01%	↔
HXXXE	19.54%	67.13%	13.34%	86.66%	↔
StateXX	16.04%	68.22%	15.74%	84.26%	
HOS Total	16.11%	67.57%	16.32%	83.68%	

Note: See Appendix 1 for a description of changes to the case-mix that may affect comparability of trending results.

* The percent better, same, worse, or better+same refers to member health status within an MAO.

** The statistical significance of the performance result for the MAO is indicated by one of the following symbols:

⬆ MAO performed significantly better than expected (higher than the national average)

⬇ MAO performed significantly worse than expected (lower than the national average)

↔ MAO performed as expected (the same as the national average)

Data estimates are provided to the second decimal place for PCS and MCS change score measures as these estimates are used in the Medicare Star Ratings.

PFADL Change Score Measure

The PFADL scale combines two VR-12 physical functioning questions (limitations in moderate activities and climbing stairs) with the six ADL questions to create a Likert-type scale, which ranges from 0-16. The PFADL scale has been used since the first *1998-2000 Cohort 1 Performance Measurement* as a baseline functional status covariate in the death models for calculation of Physical Health results, which combine risk-adjusted two-year mortality rates and changes in the PCS score. Responses from the six ADLs are also used by CMS in the annual frailty assessments for Program of All-Inclusive Care for the Elderly (PACE) organizations. For the longitudinal change score, PFADL scale scores are created from the baseline and the two-year follow up questions. The eligible sample used to assess the longitudinal PFADL change measure consists of all members age 65 or older at HOS baseline measurement for whom baseline and follow-up PCS or MCS scores were available, and who had calculable baseline and follow-up PFADL scale scores.

The PFADL change score measure can be interpreted as approximating the percent of function retained by average MAO members over two years compared to a maximum decline. A realistic clinical goal for many older adults is health maintenance with minimal functional decline, rather than improvement. Predicted PFADL change scores are estimated from a regression model that case-mix adjusts for baseline function. The member level case-mix adjusted PFADL change scores are averaged across members to create contract level scores. Contract-level change scores are on a 0-100 scale, with 100 equivalent to all MA members retaining 100% of baseline function over two years and 0 corresponding to every member in the MA contract experiencing maximum decline. Contract level scores exceeding 100 are re-set to 100.

In contrast to HEDIS measures, the PFADL change score measure for an MAO contract is its mean change score rather than the proportion passing the measure. The PFADL change score has good reliability and is positively correlated with both PCS and MCS scores calculated from HOS. A more detailed methodology used to create the PFADL change score measure is described on the Survey Results page of the HOS website (www.HOSonline.org).

How Is Your MAO Doing?

Table 9 below depicts the PFADL change score measure results for MAO HXXXXA, each MAO in the state, your state, and the HOS Total. Since the PFADL change score measure approximates the percent of function retained by average MAO members over two years, a higher score indicates little decline in function and therefore higher plan performance, while a lower score indicates greater functional decline and worse plan performance. The PFADL change score is posted as a display measure on the 2024 Star Ratings Validation Tables in HPMS.

Table 9: 2020-2022 Cohort 23 Performance Measurement PFADL Change Score Measure Results for MAOs in the state, StateXX and HOS Total

	PFADL Change Score*
HXXXXA	96.65
HXXXXB	95.93
HXXXXC	92.24
HXXXXD	93.01
HXXXXE	95.69
StateXX	94.70
HOS Total	94.43

* Contract-level change scores are on a 0-100 scale, with 100 equivalent to all MA members retaining 100% of baseline function over two years and 0 corresponding to every member in the MA contract experiencing maximum decline. Contract level scores exceeding 100 are re-set to 100. More detailed information on the scoring and case-mix adjustment of the PFADL change score is described on the Survey Results page of the HOS website (www.HOSonline.org).

Note: If no members reported for this measure, the result is *not applicable* (NA).

Table 10 depicts the mean PFADL scale at baseline and follow up, and the PFADL change score measure results for MAO HXXXXA, your state, and the HOS Total. Baseline and Follow Up PFADL scales range from 0-16 and are used to derive the longitudinal PFADL change score measure.

Table 10: 2020-2022 Cohort 23 Performance Measurement Mean PFADL Scale at Baseline and Follow Up and Change Score Measure Results for MAOs in the state, StateXX and HOS Total

	Mean PFADL Scale at Baseline	Mean PFADL Scale at Follow Up	PFADL Change Score
HXXXXA	13.23	13.09	96.65
StateXX	13.38	13.11	94.70
HOS Total	13.71	13.39	94.43

Note: If no members reported for these measures, the results are *not applicable* (NA).

Table 11 displays the means and percentile distributions of the PFADL change score measure results for your state, and the HOS Total. At the national level, the mean PFADL change score is 94.43, with a minimum of 70.76 and maximum of 100. The top 25% of MAOs had scores of 96.84 or greater, while 25% had scores of 92.84 or lower. Ten percent of MAOs had scores of 98.15 or higher, and 10% had scores of 89.91 or lower.

Table 11: 2020-2022 Cohort 23 Performance Measurement PFADL Distribution of Change Score Measure Results for StateXX and HOS Total

	Mean	SD	P10	P25	Median	P75	P90	Min	Max
StateXX	94.70	1.95	92.24	93.01	95.69	95.93	96.65	92.24	96.65
HOS Total	94.43	3.56	89.91	92.84	95.16	96.84	98.15	70.76	100.0

Note: If no members reported for this measure, the result is *not applicable* (NA). If there was only one MAO in the state, the standard deviation (SD) for the state was *not calculated* (NC).

Demographics

Table 12 presents the distribution of members' age, gender, race, marital status, educational level, annual household income, and Medicaid status at baseline and follow up for your MAO and the HOS Total respondent sample. In 2022, the income item was *not applicable* (NA).

Table 12: 2020-2022 Cohort 23 Performance Measurement Demographics for MAO HXXXXA and HOS Total at Baseline and Follow Up

	MAO HXXXXA		HOS Total	
	Baseline N (%)	Follow Up N (%)	Baseline N (%)	Follow Up N (%)
Age	(N=126)	(N=126)	(N=86,614)	(N=86,614)
65-69	34 (27.0%)	20 (15.9%)	22,000 (25.4%)	12,080 (13.9%)
70-74	39 (31.0%)	39 (31.0%)	25,412 (29.3%)	25,729 (29.7%)
75-79	19 (15.1%)	27 (21.4%)	19,018 (22.0%)	22,122 (25.5%)
80-84	21 (16.7%)	21 (16.7%)	11,763 (13.6%)	14,562 (16.8%)
85+	13 (10.3%)	19 (15.1%)	8,421 (9.7%)	12,121 (14.0%)
Gender	(N=126)	(N=126)	(N=86,614)	(N=86,614)
Male	40 (31.7%)	40 (31.7%)	36,188 (41.8%)	36,187 (41.8%)
Female	86 (68.3%)	86 (68.3%)	50,426 (58.2%)	50,427 (58.2%)
Race	(N=126)	(N=126)	(N=86,614)	(N=86,614)
White	103 (81.7%)	103 (81.7%)	69,222 (79.9%)	69,235 (79.9%)
Black	9 (7.1%)	9 (7.1%)	8,278 (9.6%)	8,277 (9.6%)
Other/Unknown	14 (11.1%)	14 (11.1%)	9,114 (10.5%)	9,102 (10.5%)
Marital Status	(N=123)	(N=123)	(N=83,909)	(N=82,695)
Married	56 (45.5%)	53 (43.1%)	44,154 (52.6%)	41,408 (50.1%)
Widowed	33 (26.8%)	38 (30.9%)	18,231 (21.7%)	20,479 (24.8%)
Divorced or Separated	25 (20.3%)	23 (18.7%)	15,850 (18.9%)	15,239 (18.4%)
Never Married	9 (7.3%)	9 (7.3%)	5,674 (6.8%)	5,569 (6.7%)
Education	(N=122)	(N=121)	(N=83,616)	(N=82,221)
Did Not Graduate HS	25 (20.5%)	32 (26.4%)	12,515 (15.0%)	12,462 (15.2%)
High School Graduate	28 (23.0%)	24 (19.8%)	24,205 (28.9%)	23,835 (29.0%)
Some College	35 (28.7%)	32 (26.4%)	22,531 (26.9%)	21,969 (26.7%)
4 Year Degree or Beyond	34 (27.9%)	33 (27.3%)	24,365 (29.1%)	23,955 (29.1%)
Annual Household Income	(N=115)	NA	(N=78,843)	NA
Less than \$10,000	12 (10.4%)	NA	8,594 (10.9%)	NA
\$10,000-\$19,999	21 (18.3%)	NA	12,009 (15.2%)	NA
\$20,000-\$29,999	17 (14.8%)	NA	10,164 (12.9%)	NA
\$30,000-\$49,999	23 (20.0%)	NA	16,119 (20.4%)	NA
\$50,000 or More	33 (28.7%)	NA	23,615 (30.0%)	NA
Don't Know	9 (7.8%)	NA	8,342 (10.6%)	NA
Medicaid Status	(N=126)	(N=126)	(N=86,614)	(N=86,614)
Medicaid	27 (21.4%)	28 (22.2%)	19,252 (22.2%)	20,208 (23.3%)
Non-Medicaid	99 (78.6%)	98 (77.8%)	67,362 (77.8%)	66,406 (76.7%)

General Health and Comparative Health

Definition of Measures

- General health status is a self-reported measure of health perception using ratings of “Excellent,” “Very good,” “Good,” “Fair,” or “Poor.”¹³ This measure is found in Question 1 of the HOS 3.0.
- Two measures of physical and mental health compared to one year ago use ratings of “Much better,” “Slightly better,” “About the same,” “Slightly worse,” or “Much worse.” These measures are found in Questions 8 and 9.

General self-rated health status is a valid and reliable method for assessing health across different populations.² Individuals who indicate that their general health was “Fair” or “Poor,” or that their physical or mental health compared to one year ago was “Slightly worse” or “Much worse,” are known to be at increased risk for near future hospitalization, use of mental health services, and mortality.^{2,14,15}

How Is Your MAO Doing?

Table 13 presents the distribution of members across *self-rated general health, physical health compared to one year ago, and mental health compared to one year ago* for MAO HXXXXA and the HOS Total respondent sample at baseline and follow up.

Table 13: 2020-2022 Cohort 23 Performance Measurement Frequency of Self-Rated General and Comparative Health Responses for MAO HXXXXA and HOS Total at Baseline and Follow Up

Self-Rated Health Status	MAO HXXXXA		HOS Total	
	Baseline N (%)	Follow Up N (%)	Baseline N (%)	Follow Up N (%)
General Health				
Excellent to good*	92 (74.2%)	89 (70.6%)	66,710 (78.1%)	64,251 (75.5%)
Fair or poor	32 (25.8%)	37 (29.4%)	18,725 (21.9%)	20,810 (24.5%)
Comparative Health-Physical				
Much better to about the same**	91 (74.6%)	86 (71.7%)	63,536 (75.4%)	60,749 (72.7%)
Slightly worse or much worse	31 (25.4%)	34 (28.3%)	20,688 (24.6%)	22,787 (27.3%)
Comparative Health-Mental				
Much better to about the same**	103 (83.1%)	106 (89.1%)	70,496 (84.4%)	72,279 (87.2%)
Slightly worse or much worse	21 (16.9%)	13 (10.9%)	13,009 (15.6%)	10,589 (12.8%)

* Categories for general health included “Excellent,” “Very good,” or “Good.”

** Categories for comparative health included “Much better,” “Slightly better,” or “About the same.”

Depression

Definition of Measures

- The HOS includes two questions (Questions 36a and 36b) that serve as a screening measure for depression.^K Each question is assigned points depending on the response given, from 0 (“Not at all”) to 3 (“Nearly every day”). For this report, a member is considered to have a positive depression screen when he or she scores three points or greater on the combined total points of the two depression questions, when both questions are answered.

Individuals with a positive depression screen may be at risk for depressive disorders. Depression is under-diagnosed in the elderly Medicare population, and is a significant health problem that has been linked to poor health outcomes.^{12,16} Older adults may suffer mental distress associated with limitations in daily activities, physical impairments, grief from loss of loved ones, changes in living situations, or untreated mental illness.¹⁷ Additionally, depression is significantly associated with other psychological dysfunction, as well as the presence of common chronic medical conditions, such as diabetes.^{18,19} As a result, older adults with depression are frequently misdiagnosed or do not receive proper treatment for their depressive symptoms.²⁰

Depression screening tools, such as the one used in the HOS, have been developed for use in clinical settings to rapidly identify individuals at risk for major depression. Those with positive depression screens should be followed-up by more comprehensive diagnostic evaluations to identify whether or not they have major depression.^{21,22} Evidence-based programs have been developed to improve mental health among older adults. Social supports through local area agencies may also be effective.¹⁷

How Is Your MAO Doing?

Table 14 depicts the percentage of members with a positive depression screen, and the distribution of responses to the two individual depression questions for MAO HXXXXA, and the HOS Total respondent sample at baseline and follow up.

^K Beginning with the 2013 HOS 2.5, two depression screening questions from the Patient Health Questionnaire-2 (PHQ-2) replaced the questions that served as the depression screening measure in previous versions of the HOS. Due to the change in the depression screening methodology, estimates of the proportion with positive depression screens in this report are not comparable to estimates produced using the HOS versions 1.0 or 2.0.

Table 14: 2020-2022 Cohort 23 Performance Measurement Frequency of Positive Depression Screen and Responses for MAO HXXXA and HOS Total at Baseline and Follow Up

Depression Screening Questions	MAO HXXXA		HOS Total	
	Baseline N (%)	Follow Up N (%)	Baseline N (%)	Follow Up N (%)
Little interest or pleasure in doing things in past two weeks				
Not at all (0 pts)	89 (73.0%)	85 (69.7%)	60,074 (72.0%)	58,897 (70.5%)
Several days (1 pt)	21 (17.2%)	18 (14.8%)	15,443 (18.5%)	15,875 (19.0%)
More than half the days (2 pts)	7 (5.7%)	13 (10.7%)	4,621 (5.5%)	5,010 (6.0%)
Nearly every day (3 pts)	5 (4.1%)	6 (4.9%)	3,294 (3.9%)	3,717 (4.5%)
Feeling down, depressed, or hopeless in past two weeks				
Not at all (0 pts)	87 (72.5%)	90 (75.6%)	63,206 (76.2%)	62,986 (76.3%)
Several days (1 pt)	25 (20.8%)	19 (16.0%)	14,857 (17.9%)	14,384 (17.4%)
More than half the days (2 pts)	5 (4.2%)	8 (6.7%)	3,030 (3.7%)	3,247 (3.9%)
Nearly every day (3 pts)	3 (2.5%)	2 (1.7%)	1,820 (2.2%)	1,919 (2.3%)
Positive Depression Screen*	14 (11.8%)	16 (13.6%)	7,638 (9.3%)	8,258 (10.1%)

* A positive depression screen is defined as scoring 3 points or greater on the sum total of the two depression questions, when both questions are answered.

Pain

Definition of Measures

- The HOS includes three questions to measure self-reported pain over the previous seven days. Question 33 asks how much pain interfered with day-to-day activities from 1 (“Not at all”) to 5 (“Very much”), and Question 34 asks how often pain kept the member from socializing from 1 (“Never”) to 5 (“Always”). Both questions have five possible categorical responses. Question 35 asks the member to rate his/her average pain, with responses ranging from 0 (“No pain”) to 10 (“Worst imaginable pain”).^L

Self-reported pain is common among older adults.²³ Pain may be caused by, and may contribute to, many health related quality of life factors,^{24,25} including but not limited to, selected health conditions, sleep, and sociodemographic characteristics, such as those measured in the HOS.

Pain screening is the initial step in establishing an appropriate pain management program for elderly patients. Physical activity and complementary medicine techniques may be helpful alternatives in relieving certain types of pain.²⁶

How Is Your MAO Doing?

Table 15 shows the distribution of self-rated pain scores, grouped into categories, for MAO HXXXXA and the HOS Total respondent sample at baseline and follow up.

Table 15: 2020-2022 Cohort 23 Performance Measurement Frequency of Self-Rated Pain Score for MAO HXXXXA and HOS Total at Baseline and Follow Up

Pain Score	MAO HXXXXA		HOS Total	
	Baseline N (%)	Follow Up N (%)	Baseline N (%)	Follow Up N (%)
0	NA	34 (28.6%)	NA	20,811 (25.0%)
1	29 (24.2%)	21 (17.6%)	24,540 (29.8%)	14,151 (17.0%)
2-4	61 (50.8%)	40 (33.6%)	35,905 (43.6%)	25,765 (31.0%)
5-7	21 (17.5%)	17 (14.3%)	15,596 (18.9%)	15,954 (19.2%)
8-10	9 (7.5%)	7 (5.9%)	6,288 (7.6%)	6,456 (7.8%)

Table 16 illustrates the relationship between the reported extent that pain interfered with day-to-day activities and the mean unadjusted PCS score for MAO HXXXXA and the HOS Total respondent sample at baseline and follow up. If only one member reported in a category, the standard deviation (SD) was *not calculated* (NC) for the category in Table 16 or any applicable tables.

^L In 2021, the follow up responses for Question 35 were changed from 1 (“No pain”) to 0 (“No pain”). Due to the change, the “No pain” response is not comparable between the 2020 baseline and 2022 follow up responses.

Table 16: 2020-2022 Cohort 23 Performance Measurement Mean Unadjusted PCS Score at Baseline and Follow Up by Extent Pain Interfered with Day-to-Day Activities at Follow Up for MAO HXXXXA and HOS Total

Extent Pain Interfered with Day-to-Day Activities	MAO HXXXXA		HOS Total	
	Baseline Mean (SD)	Follow Up Mean (SD)	Baseline Mean (SD)	Follow Up Mean (SD)
Not at all	46.0 (9.1)	46.2 (10.0)	48.3 (8.8)	48.6 (8.3)
A little bit	40.9 (11.5)	37.0 (10.4)	41.7 (10.0)	40.3 (9.0)
Somewhat	33.3 (11.5)	29.7 (8.3)	35.0 (10.4)	32.1 (8.8)
Quite a bit	33.1 (14.5)	28.9 (9.0)	29.6 (10.6)	25.7 (8.3)
Very much	19.4 (10.0)	19.4 (9.0)	25.7 (10.9)	21.1 (8.8)

Table 17 shows the relationship between the reported extent that pain interfered with socialization with others and the mean unadjusted MCS score for MAO HXXXXA and the HOS Total respondent sample at baseline and follow up.

Table 17: 2020-2022 Cohort 23 Performance Measurement Mean Unadjusted MCS Score at Baseline and Follow Up by Extent Pain Interfered with Socializing with Others at Follow Up for MAO HXXXXA and HOS Total

Extent Pain Interfered with Socializing with Others	MAO HXXXXA		HOS Total	
	Baseline Mean (SD)	Follow Up Mean (SD)	Baseline Mean (SD)	Follow Up Mean (SD)
Never	56.3 (7.1)	58.1 (6.8)	56.6 (7.6)	57.4 (7.1)
Rarely	53.2 (9.8)	50.7 (8.5)	52.5 (9.8)	52.2 (9.6)
Sometimes	44.9 (10.9)	42.2 (9.2)	48.3 (11.3)	46.9 (10.8)
Often	41.9 (16.6)	34.2 (5.8)	44.3 (12.7)	41.6 (12.1)
Always	42.4 (18.1)	40.6 (24.5)	41.1 (14.3)	36.5 (14.3)

Chronic Medical Conditions

Definition of Measures

- Chronic medical conditions are multiple measures of the prevalence of chronic disease across the member lifespan. Chronic conditions are those that last a year or more, and require ongoing medical attention and/or limit ADLs. Twelve measures are found in Questions 20-31.

For older adults, the presence of chronic medical conditions can reduce the quality of life, accelerate a decline in functioning, and lead to conflicting medical advice when care is not coordinated.³ The increased cost associated with chronic disease is an important factor driving overall Medicare spending.²⁷ This cost is further exacerbated by the proportion of multiple chronic conditions in the population, which accounts for over three-fourths of those 65 and over.²⁸ An important feature of the Medicare HOS is the ability to report and quantify self-reported chronic conditions in the MA population.

How Is Your MAO Doing?

Table 18 shows the prevalence of self-reported chronic medical conditions for MAO HXXXXA and the HOS Total respondent sample. Depression was added to the list of chronic medical conditions in the 2013 HOS 2.5. Three chronic medical conditions were removed from the list in the 2022 HOS 3.0. These were: Arthritis of the hip or knee, Arthritis of the hand or wrist, and Sciatica. As a result, there were 15 chronic medical conditions at baseline and 12 at follow up. The chronic medical conditions are quantified in the HOS when members positively respond to the question, “Has a doctor ever told you that you had (the specified condition)?”

Table 18: 2020-2022 Cohort 23 Performance Measurement Prevalence of Chronic Medical Conditions for MAO HXXXA and HOS Total at Baseline and Follow Up

Medical Conditions	MAO HXXXA		HOS Total	
	Baseline N (%)	Follow Up N (%)	Baseline N (%)	Follow Up N (%)
Hypertension	86 (69.4%)	79 (63.7%)	54,914 (65.3%)	56,249 (66.9%)
Diabetes	28 (23.0%)	31 (25.2%)	22,029 (26.3%)	22,978 (27.4%)
Osteoporosis	27 (21.8%)	37 (30.3%)	17,783 (21.3%)	19,096 (22.9%)
Other Heart Conditions	22 (17.9%)	23 (19.5%)	17,657 (21.1%)	19,046 (22.8%)
Pulmonary Disease	25 (20.3%)	22 (17.9%)	14,578 (17.3%)	15,106 (18.0%)
Depression	26 (21.5%)	30 (24.6%)	14,524 (17.4%)	14,446 (17.3%)
Any Cancer (except skin cancer)	19 (16.2%)	23 (19.7%)	12,143 (15.2%)	13,407 (16.8%)
Coronary Artery Disease	16 (13.0%)	12 (10.0%)	9,661 (11.6%)	10,161 (12.2%)
Congestive Heart Failure	11 (8.9%)	11 (9.2%)	5,886 (7.0%)	6,991 (8.4%)
Myocardial Infarction	9 (7.3%)	7 (5.7%)	6,060 (7.2%)	6,418 (7.7%)
Stroke	5 (4.2%)	7 (5.7%)	5,245 (6.3%)	5,831 (7.0%)
Gastrointestinal Disease	6 (4.9%)	9 (7.4%)	4,204 (5.0%)	4,286 (5.1%)
Arthritis - Hip or Knee	58 (46.8%)	NA	36,500 (43.6%)	NA
Arthritis - Hand or Wrist	58 (47.2%)	NA	30,338 (36.2%)	NA
Sciatica	35 (28.9%)	NA	21,545 (25.7%)	NA

Note: Removal of three conditions in 2022 will affect comparability between the baseline and follow up results in this report and to results from prior years.

A longitudinal study using HOS data concluded that multiple conditions at baseline and the two-year follow up were associated with worse health in terms of ADLs and Health Related Quality of Life (HRQOL), and are important outcomes for intervention to improve long-term health.²⁹

An earlier study of HOS respondents found that people with multiple chronic conditions and risk for depression had the largest mental health decline over the two-year follow up period. In this study, people with multiple chronic conditions had greater risks for mortality, poor functional status, unnecessary hospitalizations, adverse drug events, duplicative tests, and conflicting medical advice.³⁰ According to the Centers for Disease Control and Prevention (CDC), around 50% of older adults have at least two chronic medical conditions, which can increase the risk of depression.²⁰

Table 19 presents the frequencies of members who reported none, one, two, three, or four or more chronic medical conditions at baseline and follow up for your MAO and the HOS Total respondent sample.

Table 19: 2020-2022 Cohort 23 Performance Measurement Number of Chronic Medical Conditions for MAO HXXXXA and HOS Total at Baseline and Follow Up

Number of Conditions	MAO HXXXXA		HOS Total	
	Baseline N (%)	Follow Up N (%)	Baseline N (%)	Follow Up N (%)
None	18 (14.5%)	14 (11.3%)	11,551 (13.7%)	10,532 (12.4%)
1 Condition	31 (25.0%)	29 (23.4%)	21,908 (25.9%)	20,828 (24.6%)
2 Conditions	29 (23.4%)	32 (25.8%)	21,286 (25.2%)	21,236 (25.1%)
3 Conditions	22 (17.7%)	23 (18.5%)	13,984 (16.5%)	14,521 (17.2%)
4 or More Conditions	24 (19.4%)	26 (21.0%)	15,884 (18.8%)	17,547 (20.7%)

Note: Removal of three conditions in 2022 will affect comparability between the baseline and follow up results in this report and to results from prior years.

In Table 20, the means and standard deviations (SD) for unadjusted PCS and MCS scores at follow up are presented, grouped by the number of chronic medical conditions reported, for your MAO and the HOS Total respondent sample.

Table 20: 2020-2022 Cohort 23 Performance Measurement Mean Unadjusted PCS and MCS Scores at Follow Up by Number of Chronic Medical Conditions at Follow Up for MAO HXXXXA and HOS Total

Number of Conditions†	Mean (SD) Unadjusted PCS		Mean (SD) Unadjusted MCS	
	MAO HXXXXA Mean (SD)	HOS Total Mean (SD)	MAO HXXXXA Mean (SD)	HOS Total Mean (SD)
None	49.6 (6.3)	47.6 (9.5)	54.6 (7.7)	57.0 (7.0)
1 Condition	41.8 (11.0)	44.5 (10.6)	56.8 (8.7)	56.2 (8.1)
2 Conditions	40.2 (11.9)	41.1 (11.4)	54.6 (10.6)	54.7 (9.4)
3 Conditions	33.5 (14.9)	37.5 (11.7)	53.4 (9.5)	52.8 (10.7)
4 or More Conditions	34.3 (9.8)	32.0 (11.4)	45.8 (13.3)	49.0 (12.4)

† If no members reported for a category, the result is *not applicable* (NA). If only one member reported in a category, the standard deviation (SD) was *not calculated* (NC).

Note: Removal of three conditions in 2022 will affect comparability to results from prior years.

Activities of Daily Living

Definition of Measures

- ADLs refer to a set of common daily tasks that are necessary for personal self-care and independent living.³¹ ADLs include bathing, dressing, eating, getting in or out of chairs, walking, and using the toilet. These measures are found in Question 10. Impairment with ADLs is defined as members who reported either difficulty or inability to perform the specific ADL (“Yes, I have difficulty” or “I am unable to do this activity”).
- Instrumental Activities of Daily Living (IADLs) assess independent living skills that are more complex than ADLs.^{32,33} IADLs include preparing meals, managing money, and taking medications. These measures are in Question 11. For IADLs, impairment is defined as members who reported difficulty performing the specific IADL (“Yes, I have difficulty”).

Six ADLs are included in the HOS to examine reported difficulty with the performance of daily tasks. The HOS also includes three IADLs that examine reported difficulty with the performance of tasks of independence. The ability to perform ADLs is predictive of current disease status and mortality risk,^{34,35} while IADLs recognize earlier changes in functioning, and can indicate the need for intervention or further medical work-up.³³

How Is Your MAO Doing?

Table 21 shows the numbers and percentages of members with impairment in each of the six ADLs and three IADLs for your MAO and the HOS Total respondent sample at baseline and follow up.

Table 21: 2020-2022 Cohort 23 Performance Measurement Prevalence of Impaired ADLs and IADLs for MAO HXXXA and HOS Total at Baseline and Follow Up

Impairment Type	MAO HXXXA		HOS Total	
	Baseline N (%)	Follow Up N (%)	Baseline N (%)	Follow Up N (%)
Activities of Daily Living				
Walking	36 (29.0%)	37 (30.8%)	23,977 (28.5%)	27,594 (33.2%)
Getting in/out of chairs	27 (21.8%)	31 (25.6%)	15,575 (18.5%)	17,999 (21.6%)
Bathing	17 (13.7%)	20 (16.5%)	9,218 (10.9%)	11,269 (13.5%)
Dressing	7 (5.6%)	12 (9.9%)	7,164 (8.5%)	8,901 (10.7%)
Using the toilet	7 (5.6%)	8 (6.6%)	5,091 (6.1%)	6,351 (7.7%)
Eating	3 (2.4%)	8 (6.6%)	2,846 (3.4%)	3,831 (4.6%)
Instrumental Activities of Daily Living*				
Preparing meals	10 (8.5%)	17 (15.5%)	7,026 (9.0%)	8,268 (10.8%)
Managing money	1 (0.8%)	2 (1.8%)	2,830 (3.5%)	3,403 (4.3%)
Taking medications as prescribed	4 (3.3%)	6 (5.2%)	2,849 (3.5%)	3,514 (4.4%)

* Respondents who indicated “I don’t do this activity” to IADL questions were removed from the denominator.

Table 22 presents the frequencies of ADL and IADL impairments at baseline and follow up for your MAO and the HOS Total respondent sample. Regular assessment of functional status is recommended for improving the effectiveness of care, especially for older adults before hospital discharge and those living with dementia.³⁵

Table 22: 2020-2022 Cohort 23 Performance Measurement Number of ADL and IADL Impairments for MAO HXXXA and HOS Total at Baseline and Follow Up

Number of Impairments	MAO HXXXA		HOS Total	
	Baseline N (%)	Follow Up N (%)	Baseline N (%)	Follow Up N (%)
Activities of Daily Living				
None	80 (64.5%)	76 (62.8%)	56,890 (67.2%)	52,530 (62.5%)
1 ADL Impairment	18 (14.5%)	12 (9.9%)	11,428 (13.5%)	12,392 (14.7%)
2 ADL Impairments	14 (11.3%)	15 (12.4%)	7,229 (8.5%)	7,971 (9.5%)
3 or More ADL Impairments	12 (9.7%)	18 (14.9%)	9,127 (10.8%)	11,176 (13.3%)
Instrumental Activities of Daily Living*				
None	112 (91.1%)	98 (82.4%)	74,131 (88.5%)	71,402 (86.3%)
1 IADL Impairment	7 (5.7%)	18 (15.1%)	7,296 (8.7%)	8,429 (10.2%)
2 IADL Impairments	4 (3.3%)	2 (1.7%)	1,626 (1.9%)	1,959 (2.4%)
3 IADL Impairments	0	1 (0.8%)	719 (0.9%)	946 (1.1%)

* Respondents who indicated “I don’t do this activity” to IADL questions were removed from the denominator.

Table 23 presents means and SDs for unadjusted PCS and MCS scores by the number of ADL and IADL impairments at follow up for your MAO and the HOS Total respondent sample. Multiple impairments are associated with substantially lower PCS and MCS scores for the HOS respondents.

Table 23: 2020-2022 Cohort 23 Performance Measurement Mean Unadjusted PCS and MCS Scores at Follow Up by Number of ADL and IADL Impairments at Follow Up for MAO HXXXA and HOS Total

Impairment Type†	Mean (SD) Unadjusted PCS		Mean (SD) Unadjusted MCS	
	MAO HXXXA	HOS Total	MAO HXXXA	HOS Total
Activities of Daily Living				
None	46.0 (8.1)	46.5 (8.6)	56.0 (8.7)	56.3 (7.7)
1 ADL Impairment	34.0 (8.0)	34.1 (9.2)	53.1 (9.4)	53.6 (10.4)
2 ADL Impairments	27.6 (11.5)	29.5 (8.9)	50.1 (10.2)	51.0 (11.3)
3 or More ADL Impairments	24.0 (7.3)	24.8 (8.7)	43.5 (14.8)	44.1 (13.1)
Instrumental Activities of Daily Living*				
None	42.4 (11.0)	42.5 (11.0)	55.0 (9.5)	55.5 (8.7)
1 IADL Impairment	24.8 (9.1)	27.0 (10.1)	47.8 (10.6)	46.4 (12.2)
2 IADL Impairments	27.9 (9.6)	27.0 (9.2)	26.1 (19.0)	40.5 (12.3)
3 IADL Impairments	31.9 (NC)	27.6 (9.0)	25.9 (NC)	37.8 (11.8)

† If no members reported for a category, the result is *not applicable* (NA). If only one member reported in a category, the standard deviation (SD) was *not calculated* (NC).

* Respondents who indicated “I don’t do this activity” to IADL questions were removed from the denominator.

Healthy Days Measures

Definition of Measures

- Physically unhealthy days is a self-reported measure of the number of days during the past 30 days when physical health was not good. The measure is found in Question 12.
- Mentally unhealthy days is a self-reported measure of the number of days during the past 30 days when mental health was not good. The measure is found in Question 13.
- Days with activity limitations is a self-reported measure of the number of days during the past 30 days when poor physical or mental health kept the member from usual activities. The measure is found in Question 14.

Healthy Days Measures provide key information on the functional status of vulnerable sub-populations, and are used to assess the HRQOL³⁶ across the U.S. As sentinel indicators of present and future disease and injury risk, MAOs may use Healthy Days Measures to identify vulnerable sub-populations for effective preventative care and disease management. According to the CDC, “In recent years, several organizations have found these Healthy Days Measures useful at the national, state, and community levels for (1) identifying health disparities, (2) tracking population trends, and (3) building broad coalitions around a measure of population health compatible with the World Health Organization’s definition of health.”³⁷ The CDC HRQOL program considers 14 or more unhealthy days in the past 30 days an indicator of poor well-being.⁴

How Is Your MAO Doing?

Table 24 provides the frequency distributions of Healthy Days Measures for your MAO and HOS Total respondent sample.

Table 24: 2020-2022 Cohort 23 Performance Measurement Distribution of Healthy Days Measures for MAO HXXXXA and HOS Total at Baseline and Follow Up

Healthy Days Measures	MAO HXXXXA		HOS Total	
	Baseline N (%)	Follow Up N (%)	Baseline N (%)	Follow Up N (%)
Physically Unhealthy Days	(N=124)	(N=118)	(N=82,291)	(N=81,403)
None	74 (59.7%)	67 (56.8%)	49,738 (60.4%)	45,231 (55.6%)
1-13	29 (23.4%)	26 (22.0%)	19,355 (23.5%)	21,157 (26.0%)
14-30	21 (16.9%)	25 (21.2%)	13,198 (16.0%)	15,015 (18.4%)
Mentally Unhealthy Days	(N=124)	(N=116)	(N=82,629)	(N=81,875)
None	85 (68.5%)	70 (60.3%)	56,514 (68.4%)	55,566 (67.9%)
1-13	27 (21.8%)	33 (28.4%)	18,133 (21.9%)	18,033 (22.0%)
14-30	12 (9.7%)	13 (11.2%)	7,982 (9.7%)	8,276 (10.1%)
Days with Activity Limitations	(N=123)	(N=118)	(N=82,728)	(N=81,993)
None	99 (80.5%)	75 (63.6%)	61,439 (74.3%)	58,105 (70.9%)
1-13	11 (8.9%)	21 (17.8%)	12,275 (14.8%)	13,259 (16.2%)
14-30	13 (10.6%)	22 (18.6%)	9,014 (10.9%)	10,629 (13.0%)

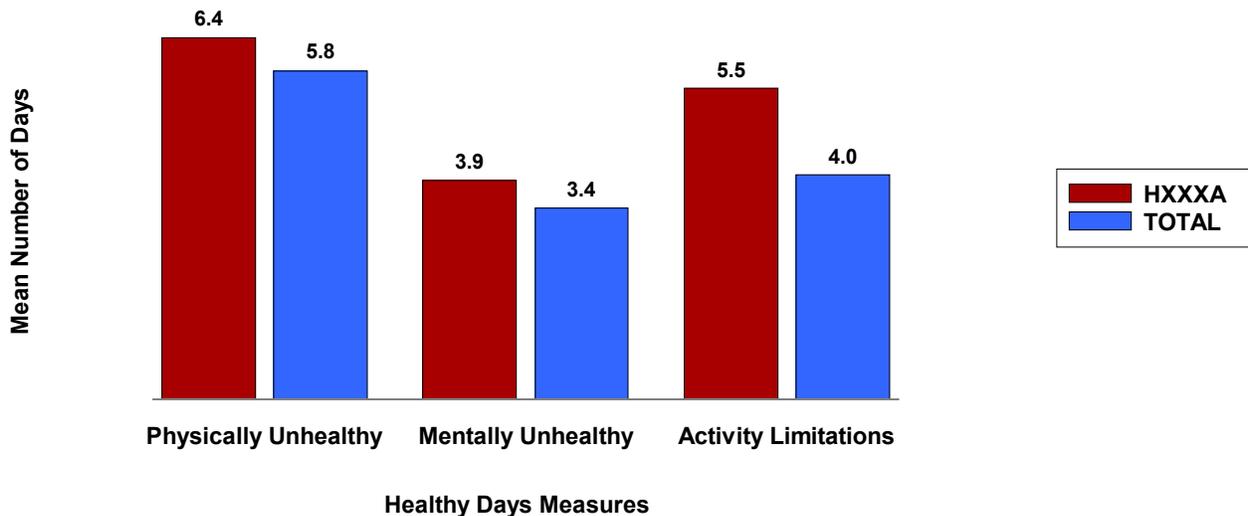
Table 25 presents the mean unadjusted MCS scores at baseline and follow up for your MAO and the HOS Total respondent sample by the number of mentally unhealthy days at follow up.

Table 25: 2020-2022 Cohort 23 Performance Measurement Mean Unadjusted MCS Scores at Baseline and Follow Up by Number of Mentally Unhealthy Days at Follow Up for MAO HXXXXA and HOS Total

Mentally Unhealthy Days	MAO HXXXXA		HOS Total	
	Baseline MCS Mean (SD)	Follow Up MCS Mean (SD)	Baseline MCS Mean (SD)	Follow Up MCS Mean (SD)
None	57.3 (7.1)	58.3 (7.0)	57.0 (7.4)	58.1 (6.5)
1-13	51.6 (8.8)	50.4 (8.5)	50.0 (9.7)	49.1 (8.2)
14-30	38.3 (12.6)	35.8 (11.8)	41.6 (12.4)	36.6 (10.8)

Figure 3 presents the results of the Healthy Days Measures as the mean number of unhealthy days in the previous 30 days for each of the three measures that were reported by members at follow up for your MAO and the HOS Total respondent sample.

Figure 3: 2020-2022 Cohort 23 Performance Measurement Mean Number of Unhealthy Days for the Healthy Days Measures for MAO HXXXXA and HOS Total at Follow Up



Body Mass Index

Definition of Measures

- Self-reported height and weight values are used to calculate BMI,^M a measure that correlates with the amount of body fat in adult men and women. BMI is derived from Questions 50 and 51.^N

A BMI of 30 or higher is considered obese and increases risk for several chronic conditions including: hypertension, dyslipidemia, type 2 diabetes, coronary heart disease, stroke, gallbladder disease, osteoarthritis, sleep apnea, and some cancers.³⁸ Being overweight (BMI 25-29.99) or obese has also been shown to accelerate the aging process.³⁹ Physical activity, diet, age, gender, ethnicity, and educational status are known to influence the risk for obesity.⁴⁰ For instance, females are at higher risk of developing morbid obesity than males. The prevalence of obesity among older adults has risen significantly over the past 30 years.⁴¹ A BMI under 18.5 is considered underweight. Rapid weight loss often indicates an underlying disease and can accelerate the loss of muscle mass, which naturally occurs with the aging process.⁴²

A study using the HOS 2006-2008 Cohort 9 Merged Baseline and Follow Up data explored the prevalence of obesity in MA members age 65 or older.⁴³ In this study, most of the reported health conditions were significantly more prevalent among obese than normal weight members, in particular, high blood pressure (75.8% of obese vs. 53.9% of normal weight), diabetes (34.8% vs. 12.7%), and arthritis of the hip or knee (55.3% vs. 31.3%). Exceptions were osteoporosis and stroke. Osteoporosis was significantly less prevalent among the obese (16.1% vs. 26.9%). The prevalence of stroke increased only slightly with BMI (7.9% vs. 7.3%). The results also indicated that obese individuals had substantially greater limitations with ADLs than people with normal weight.⁴³

How Is Your MAO Doing?

Table 26 shows the distribution of BMI categories by gender, including underweight (BMI less than 18.5), normal weight (BMI of 18.5-24.99), overweight (BMI of 25-29.99), and obese (BMI of 30 or more) for MAO HXXXXA and the HOS Total respondent sample.

^M BMI is calculated as: $BMI = [\text{weight in pounds} / (\text{height in inches})^2] \times 703$, which uses the member's self-reported height and weight to produce the standard measure of kg/m² units.

^N Beginning in 2012, questions for weight and height changed from categorical responses to open ended responses.

Table 26: 2020-2022 Cohort 23 Performance Measurement Distribution of BMI Categories by Gender for MAO HXXXA and HOS Total at Baseline and Follow Up

BMI Category	MAO HXXXA		HOS Total	
	Baseline N (%)	Follow Up N (%)	Baseline N (%)	Follow Up N (%)
Male				
Underweight (<18.5)	2 (5.1%)	0	402 (1.2%)	482 (1.4%)
Normal (18.5-24.99)	13 (33.3%)	14 (35.9%)	9,069 (26.8%)	9,533 (28.4%)
Overweight (25-29.99)	16 (41.0%)	18 (46.2%)	14,628 (43.3%)	14,319 (42.7%)
Obese (≥30)	8 (20.5%)	7 (17.9%)	9,720 (28.7%)	9,226 (27.5%)
Female				
Underweight (<18.5)	1 (1.3%)	4 (5.2%)	1,111 (2.4%)	1,358 (3.0%)
Normal (18.5-24.99)	26 (34.7%)	25 (32.5%)	14,784 (31.7%)	15,041 (32.8%)
Overweight (25-29.99)	22 (29.3%)	26 (33.8%)	14,950 (32.1%)	14,660 (32.0%)
Obese (≥30)	26 (34.7%)	22 (28.6%)	15,736 (33.8%)	14,750 (32.2%)

Note: BMI categories were modified beginning with the 2017 Cohort 20 Baseline Report. Underweight was changed from “<20” to “<18.5” and normal weight was changed from “20 to 24.99” to “18.5 to 24.99.”

Sleep Measures

Definition of Measures

- Sleep duration is a self-reported measure of the average number of hours of actual sleep at night during the past month. The measure is found in Question 48.
- Sleep quality is a self-reported measure that rates the overall sleep quality during the past month. The measure is found in Question 49.

Two sleep questions added in the 2015 HOS 3.0 were drawn from the Pittsburgh Sleep Quality Index (PSQI). The questions focus on “habitual” (i.e., past month) sleep duration and quality to capture more chronic sleep disturbances. The PSQI has a high test-retest reliability and good validity in patients with insomnia.⁴⁴

Over half of older adults suffer from symptoms of insomnia, a common problem related to aging.⁴⁵ Sleep disorders in the elderly can be caused by many factors, including medication, diseases, poor sleeping habits, and age-related changes in circadian sleep/wake regulation. Sleep can be evaluated in different ways and there is substantial evidence linking insufficient sleep duration and poor sleep quality to mental and physical health morbidity and mortality.⁴⁶ Conversely, improved sleep may support patient engagement and adherence.⁴⁷

Sleep disorders, including chronic insomnia, obstructive sleep apnea, and restless legs syndrome, are highly prevalent among older adults, often comorbid with other age-related health conditions, and portend poorer treatment and other health outcomes.^{48,49} However, sleep disorders remain underdiagnosed in primary care settings for many reasons,⁵⁰ and patient surveys show that only a small number of patients discuss sleep problems with their doctors.^{51,52} Therefore, it is recommended that providers routinely identify and evaluate sleep symptoms of disordered sleep and offer appropriate management.⁵³

How Is Your MAO Doing?

Table 27 provides frequency distributions of sleep duration (“Less than 5,” “5–6,” “7–8,” and “9 or more hours”) and sleep quality (“Very good,” “Fairly good,” “Fairly bad,” and “Very bad”) for MAO HXXXXA and the HOS Total at Baseline and Follow Up.

Table 27: 2020-2022 Cohort 23 Performance Measurement Distributions of Sleep Duration and Quality for MAO HXXXA and HOS Total at Baseline and Follow Up

Sleep Questions	MAO HXXXA		HOS Total	
	Baseline N (%)	Follow Up N (%)	Baseline N (%)	Follow Up N (%)
Hours of actual sleep				
Less than 5 hours	9 (7.4%)	12 (9.8%)	6,065 (7.2%)	6,220 (7.5%)
5-6 hours	47 (38.8%)	56 (45.5%)	31,827 (38.0%)	31,600 (38.2%)
7-8 hours	64 (52.9%)	50 (40.7%)	41,456 (49.5%)	39,952 (48.3%)
9 or more hours	1 (0.8%)	5 (4.1%)	4,428 (5.3%)	4,864 (5.9%)
Overall sleep quality				
Very good	24 (20.2%)	29 (23.6%)	19,291 (22.9%)	18,793 (22.7%)
Fairly good	80 (67.2%)	75 (61.0%)	51,804 (61.5%)	51,261 (61.8%)
Fairly bad	13 (10.9%)	17 (13.8%)	11,060 (13.1%)	10,920 (13.2%)
Very bad	2 (1.7%)	2 (1.6%)	2,016 (2.4%)	1,927 (2.3%)

Health Status by Baseline Demographic Groups for MAO HXXXXA

Evidence from several studies suggests the differences in health among Medicare eligible people by age, gender, racial, and socioeconomic groups.^{54,55,56,57,58,59,60} The following tables show differences in health status by demographic categories, including potential disparities within your MAO, and illustrate changes from baseline to follow up measurement. Groups are defined by the sub-categories for a demographic characteristic (e.g., the 65-69 age group or White race). In 2022, the income item was *not applicable* (NA).

Table 28: 2020-2022 Cohort 23 Performance Measurement Distribution of Mean Unadjusted PCS and MCS Scores* at Baseline and Follow Up by Baseline Demographic Group for MAO HXXXXA

Baseline Demographic	Unadjusted PCS		Unadjusted MCS	
	Baseline Mean (SD)	Follow Up Mean (SD)	Baseline Mean (SD)	Follow Up Mean (SD)
MAO HXXXXA Total	40.8 (12.3)	39.1 (12.2)	53.1 (10.2)	53.1 (10.9)
Age				
65-69	44.4 (12.1)	42.8 (9.1)	51.6 (10.0)	53.7 (9.5)
70-74	38.5 (13.4)	38.6 (13.6)	52.6 (11.2)	52.3 (11.7)
75-79	40.3 (12.5)	36.8 (15.5)	51.5 (11.2)	52.6 (11.4)
80-84	40.6 (12.2)	38.0 (11.5)	56.2 (8.3)	55.0 (11.1)
85+	39.9 (7.7)	35.8 (10.4)	56.3 (8.4)	51.3 (11.8)
Gender				
Male	42.4 (12.1)	40.1 (10.7)	56.4 (8.0)	57.8 (7.2)
Female	40.1 (12.3)	38.6 (12.9)	51.7 (10.8)	50.9 (11.6)
Race				
White	40.6 (12.6)	38.9 (12.4)	53.3 (10.4)	53.1 (10.9)
Black	36.4 (12.8)	36.7 (11.3)	51.5 (8.7)	51.3 (12.4)
Other/Unknown	45.8 (7.3)	41.9 (11.9)	52.9 (10.4)	53.9 (10.7)
Marital Status				
Married	43.4 (11.6)	41.6 (10.8)	54.8 (8.6)	55.5 (9.2)
Widowed	37.7 (12.1)	34.9 (12.7)	51.8 (11.8)	50.6 (12.5)
Divorced or Separated	37.9 (13.7)	38.6 (13.1)	53.0 (10.6)	52.4 (10.3)
Never Married	43.3 (12.2)	43.1 (10.0)	48.2 (11.9)	48.5 (12.0)
Education				
Did Not Graduate HS	35.8 (10.2)	34.4 (9.4)	46.9 (11.7)	48.3 (14.3)
High School Graduate	39.3 (12.8)	37.8 (13.6)	53.4 (11.1)	51.5 (10.5)
Some College	43.4 (13.5)	41.2 (12.6)	54.7 (8.9)	54.1 (10.4)
4 Year Degree or Beyond	42.9 (11.6)	42.1 (11.0)	55.7 (7.9)	56.7 (6.1)
Annual Household Income				
Less than \$10,000	33.2 (7.1)	NA	47.1 (11.6)	NA
\$10,000-\$19,999	39.7 (10.9)	NA	49.8 (12.0)	NA
\$20,000-\$29,999	33.8 (15.3)	NA	54.8 (11.9)	NA
\$30,000-\$49,999	41.1 (13.2)	NA	52.8 (8.8)	NA
\$50,000 or More	46.6 (10.0)	NA	54.1 (8.9)	NA
Don't Know	45.9 (6.5)	NA	60.3 (4.7)	NA
Medicaid Status				
Medicaid	34.7 (9.5)	34.5 (10.5)	46.9 (12.4)	47.5 (13.2)
Non-Medicaid	42.5 (12.4)	40.3 (12.4)	54.8 (8.9)	54.6 (9.7)

* Mean unadjusted PCS and MCS scores are the raw scores used to determine the final adjusted change scores in the *Cohort 23 Performance Measurement Results* section. Members are displayed according to their baseline demographic group.

Table 29: 2020-2022 Cohort 23 Performance Measurement Distribution of Self-Rated General Health Status, and Physical and Mental Health Status Compared to One Year Ago at Baseline and Follow Up by Baseline Demographic Group for MAO HXXXA

Baseline Demographic	General Health Status Poor or Fair		Comparative Health-Physical Slightly Worse or Much Worse		Comparative Health-Mental Slightly Worse or Much Worse	
	Baseline N (%)	Follow Up* N (%)	Baseline N (%)	Follow Up* N (%)	Baseline N (%)	Follow Up* N (%)
MAO HXXXA Total	32 (25.8%)	37 (29.4%)	31 (25.4%)	34 (28.3%)	21 (16.9%)	13 (10.9%)
Age						
65-69	7 (20.6%)	6 (17.6%)	5 (15.6%)	4 (12.9%)	8 (24.2%)	3 (9.4%)
70-74	13 (33.3%)	15 (38.5%)	14 (35.9%)	15 (40.5%)	8 (20.5%)	5 (13.5%)
75-79	3 (16.7%)	4 (21.1%)	3 (17.6%)	6 (31.6%)	2 (11.1%)	1 (5.3%)
80-84	8 (38.1%)	6 (28.6%)	6 (28.6%)	4 (19.0%)	2 (9.5%)	1 (5.0%)
85+	1 (8.3%)	6 (46.2%)	3 (23.1%)	5 (41.7%)	1 (7.7%)	3 (27.3%)
Gender						
Male	10 (25.6%)	11 (27.5%)	11 (27.5%)	10 (25.6%)	4 (10.0%)	2 (5.4%)
Female	22 (25.9%)	26 (30.2%)	20 (24.4%)	24 (29.6%)	17 (20.2%)	11 (13.4%)
Race						
White	25 (24.8%)	32 (31.1%)	26 (26.0%)	27 (27.3%)	18 (17.8%)	12 (12.4%)
Black	3 (33.3%)	0	2 (22.2%)	1 (12.5%)	1 (11.1%)	0
Other/Unknown	4 (28.6%)	5 (35.7%)	3 (23.1%)	6 (46.2%)	2 (14.3%)	1 (7.1%)
Marital Status						
Married	12 (21.8%)	16 (28.6%)	8 (15.1%)	15 (26.8%)	7 (13.0%)	8 (14.5%)
Widowed	11 (34.4%)	10 (30.3%)	16 (48.5%)	11 (36.7%)	6 (18.2%)	2 (6.9%)
Divorced or Separated	7 (28.0%)	9 (36.0%)	6 (24.0%)	7 (28.0%)	5 (20.0%)	3 (12.0%)
Never Married	1 (11.1%)	1 (11.1%)	1 (11.1%)	0	2 (22.2%)	0
Education						
Did Not Graduate HS	12 (50.0%)	8 (32.0%)	8 (32.0%)	7 (28.0%)	7 (28.0%)	5 (20.8%)
High School Graduate	8 (28.6%)	12 (42.9%)	10 (35.7%)	7 (25.9%)	3 (10.7%)	3 (11.5%)
Some College	6 (17.1%)	7 (20.0%)	3 (9.1%)	9 (27.3%)	5 (15.2%)	5 (15.2%)
4 Year Degree or Beyond	4 (12.1%)	8 (23.5%)	10 (30.3%)	10 (31.3%)	5 (14.7%)	0
Annual Household Income						
Less than \$10,000	7 (58.3%)	NA	4 (33.3%)	NA	1 (8.3%)	NA
\$10,000-\$19,999	4 (19.0%)	NA	6 (28.6%)	NA	5 (23.8%)	NA
\$20,000-\$29,999	7 (41.2%)	NA	6 (37.5%)	NA	4 (25.0%)	NA
\$30,000-\$49,999	6 (27.3%)	NA	6 (27.3%)	NA	4 (18.2%)	NA
\$50,000 or More	3 (9.4%)	NA	5 (15.2%)	NA	5 (15.2%)	NA
Don't Know	2 (22.2%)	NA	1 (11.1%)	NA	0	NA
Medicaid Status						
Medicaid	12 (44.4%)	13 (48.1%)	9 (36.0%)	10 (38.5%)	7 (28.0%)	5 (19.2%)
Non-Medicaid	20 (20.6%)	24 (24.2%)	22 (22.7%)	24 (25.5%)	14 (14.1%)	8 (8.6%)

* Percentages for demographic groups in the follow up column(s) highlighted in red are greater by ten percentage points or more compared to the baseline columns. Estimates highlighted in red indicate groups that were worse off at follow up compared to baseline. Members are displayed according to their baseline demographic group.

Table 30: 2020-2022 Cohort 23 Performance Measurement Distribution of Positive Depression Screens at Baseline and Follow Up by Baseline Demographic Group for MAO HXXXXA

Baseline Demographic	Positive Depression Screen	
	Baseline N (%)	Follow Up* N (%)
MAO HXXXXA Total	14 (11.8%)	16 (13.6%)
Age		
65-69	3 (9.1%)	3 (8.8%)
70-74	7 (18.4%)	6 (17.1%)
75-79	2 (11.8%)	4 (22.2%)
80-84	1 (5.6%)	1 (4.8%)
85+	1 (7.7%)	2 (20.0%)
Gender		
Male	3 (8.1%)	1 (2.7%)
Female	11 (13.4%)	15 (18.5%)
Race		
White	13 (13.4%)	13 (13.5%)
Black	1 (12.5%)	1 (11.1%)
Other/Unknown	0	2 (15.4%)
Marital Status		
Married	4 (7.5%)	3 (5.7%)
Widowed	5 (16.7%)	7 (25.0%)
Divorced or Separated	3 (12.0%)	4 (16.0%)
Never Married	2 (25.0%)	2 (22.2%)
Education		
Did Not Graduate HS	6 (26.1%)	7 (29.2%)
High School Graduate	2 (7.1%)	5 (19.2%)
Some College	3 (9.4%)	3 (9.1%)
4 Year Degree or Beyond	3 (9.4%)	1 (3.2%)
Annual Household Income		
Less than \$10,000	3 (25.0%)	NA
\$10,000-\$19,999	4 (22.2%)	NA
\$20,000-\$29,999	1 (6.3%)	NA
\$30,000-\$49,999	2 (9.1%)	NA
\$50,000 or More	3 (9.7%)	NA
Don't Know	0	NA
Medicaid Status		
Medicaid	6 (24.0%)	9 (33.3%)
Non-Medicaid	8 (8.5%)	7 (7.7%)

* Percentages for demographic groups in the follow up column highlighted in **red** are greater by ten percentage points or more compared to the baseline column. Estimates highlighted in **red** indicate groups that were worse off at follow up compared to baseline. Members are displayed according to their baseline demographic group.

Table 31: 2020-2022 Cohort 23 Performance Measurement Distribution of Multiple Chronic Conditions[§] at Baseline and Follow Up by Baseline Demographic Group for MAO HXXXXA

Baseline Demographic	Multiple Chronic Medical Conditions [§]	
	Baseline N (%)	Follow Up* N (%)
MAO HXXXXA Total	96 (77.4%)	81 (65.3%)
Age		
65-69	27 (79.4%)	20 (58.8%)
70-74	33 (84.6%)	25 (67.6%)
75-79	11 (64.7%)	14 (73.7%)
80-84	17 (81.0%)	15 (71.4%)
85+	8 (61.5%)	7 (53.8%)
Gender		
Male	32 (80.0%)	25 (62.5%)
Female	64 (76.2%)	56 (66.7%)
Race		
White	76 (75.2%)	67 (66.3%)
Black	8 (88.9%)	5 (55.6%)
Other/Unknown	12 (85.7%)	9 (64.3%)
Marital Status		
Married	43 (78.2%)	37 (66.1%)
Widowed	27 (84.4%)	21 (67.7%)
Divorced or Separated	18 (72.0%)	14 (56.0%)
Never Married	6 (66.7%)	7 (77.8%)
Education		
Did Not Graduate HS	23 (92.0%)	17 (68.0%)
High School Graduate	19 (67.9%)	17 (60.7%)
Some College	26 (76.5%)	24 (70.6%)
4 Year Degree or Beyond	25 (75.8%)	21 (63.6%)
Annual Household Income		
Less than \$10,000	11 (91.7%)	NA
\$10,000-\$19,999	16 (76.2%)	NA
\$20,000-\$29,999	13 (81.3%)	NA
\$30,000-\$49,999	19 (82.6%)	NA
\$50,000 or More	24 (75.0%)	NA
Don't Know	7 (77.8%)	NA
Medicaid Status		
Medicaid	23 (88.5%)	18 (66.7%)
Non-Medicaid	73 (74.5%)	63 (64.9%)

* Percentages for demographic groups in the follow up column highlighted in **red** are greater by ten percentage points or more compared to the baseline column. Estimates highlighted in **red** indicate groups that were worse off at follow up compared to baseline. Members are displayed according to their baseline demographic group.

[§] Multiple chronic medical conditions are defined as having two or more conditions (maximum of 15 at baseline and 12 at follow up). Removal of three conditions in 2022 will affect comparability between the baseline and follow up results in this report and to results from prior years.

Table 32: 2020-2022 Cohort 23 Performance Measurement Distribution of Multiple ADL Impairments[§] at Baseline and Follow Up by Baseline Demographic Group for MAO HXXXXA

Baseline Demographic	Multiple ADL Impairments [§]	
	Baseline N (%)	Follow Up* N (%)
MAO HXXXXA Total	26 (21.0%)	33 (27.3%)
Age		
65-69	5 (15.2%)	7 (21.9%)
70-74	10 (25.6%)	11 (29.7%)
75-79	2 (11.1%)	4 (21.1%)
80-84	5 (23.8%)	6 (28.6%)
85+	4 (30.8%)	5 (41.7%)
Gender		
Male	7 (17.5%)	8 (20.5%)
Female	19 (22.6%)	25 (30.5%)
Race		
White	23 (22.8%)	28 (28.3%)
Black	2 (22.2%)	2 (25.0%)
Other/Unknown	1 (7.1%)	3 (21.4%)
Marital Status		
Married	7 (13.0%)	10 (17.9%)
Widowed	10 (30.3%)	13 (43.3%)
Divorced or Separated	7 (28.0%)	8 (32.0%)
Never Married	2 (22.2%)	1 (14.3%)
Education		
Did Not Graduate HS	10 (40.0%)	9 (36.0%)
High School Graduate	7 (25.0%)	8 (29.6%)
Some College	4 (12.1%)	8 (24.2%)
4 Year Degree or Beyond	5 (14.7%)	7 (21.9%)
Annual Household Income		
Less than \$10,000	8 (66.7%)	NA
\$10,000-\$19,999	3 (14.3%)	NA
\$20,000-\$29,999	7 (43.8%)	NA
\$30,000-\$49,999	3 (13.6%)	NA
\$50,000 or More	1 (3.0%)	NA
Don't Know	1 (11.1%)	NA
Medicaid Status		
Medicaid	10 (40.0%)	12 (46.2%)
Non-Medicaid	16 (16.2%)	21 (22.1%)

* Percentages for demographic groups in the follow up column highlighted in **red** are greater by ten percentage points or more compared to the baseline column. Estimates highlighted in **red** indicate groups that were worse off at follow up compared to baseline. Members are displayed according to their baseline demographic group.

[§] Multiple ADL impairments are defined as having two or more impairments.

Table 33: 2020-2022 Cohort 23 Performance Measurement Mean Number of Unhealthy Physical, Mental, and Activity Limitation Days by Baseline Demographic Group for MAO HXXXA

Baseline Demographic	Physically Unhealthy Number of Days		Mentally Unhealthy Number of Days		Activity Limitations Number of Days	
	Baseline Mean (SD)	Follow Up* Mean (SD)	Baseline Mean (SD)	Follow Up* Mean (SD)	Baseline Mean (SD)	Follow Up* Mean (SD)
MAO HXXXA Total	5.1 (9.3)	6.4 (10.4)	2.9 (6.5)	3.9 (7.4)	3.2 (8.1)	5.5 (10.1)
Age						
65-69	4.7 (8.7)	2.3 (3.9)	4.0 (7.5)	2.4 (4.2)	2.8 (7.9)	2.7 (6.3)
70-74	9.0 (12.1)	9.3 (12.4)	3.5 (6.9)	6.0 (9.5)	5.4 (10.6)	9.3 (13.0)
75-79	5.1 (8.4)	9.9 (12.7)	3.1 (8.2)	4.8 (8.9)	3.1 (7.9)	7.1 (11.3)
80-84	1.4 (3.4)	5.7 (10.8)	0.5 (2.2)	1.6 (3.1)	1.2 (4.4)	1.8 (4.0)
85+	0.8 (2.8)	3.4 (6.2)	1.5 (3.0)	3.6 (8.4)	0.8 (2.8)	5.0 (10.0)
Gender						
Male	5.4 (10.7)	4.5 (9.6)	1.6 (5.3)	0.5 (1.5)	2.0 (7.0)	2.3 (7.3)
Female	5.0 (8.7)	7.3 (10.7)	3.5 (6.9)	5.5 (8.5)	3.7 (8.6)	7.1 (10.9)
Race						
White	5.1 (9.4)	6.4 (10.6)	2.8 (6.6)	3.6 (7.2)	3.1 (7.8)	5.1 (9.6)
Black	8.0 (12.9)	11.3 (12.5)	2.4 (4.9)	6.0 (10.8)	3.8 (10.6)	12.5 (14.6)
Other/Unknown	3.4 (5.3)	3.4 (6.6)	3.9 (6.9)	4.6 (7.0)	3.6 (9.3)	4.1 (9.2)
Marital Status						
Married	4.3 (8.8)	4.5 (8.2)	1.4 (3.3)	2.7 (5.5)	1.7 (5.9)	3.8 (8.9)
Widowed	3.8 (7.0)	8.6 (11.5)	4.3 (8.8)	4.7 (8.6)	3.5 (8.2)	7.0 (11.0)
Divorced or Separated	8.4 (12.1)	8.6 (12.9)	2.2 (4.8)	5.0 (9.4)	4.7 (10.3)	8.6 (12.3)
Never Married	6.3 (11.0)	3.6 (7.5)	7.8 (11.1)	6.0 (8.1)	8.8 (12.5)	4.3 (6.9)
Education						
Did Not Graduate HS	9.1 (11.3)	7.3 (9.4)	4.6 (7.9)	6.1 (9.4)	5.1 (9.7)	7.1 (11.1)
High School Graduate	5.9 (9.9)	7.8 (11.2)	2.7 (7.3)	4.9 (8.6)	2.9 (8.2)	5.2 (9.1)
Some College	3.0 (7.6)	6.8 (11.5)	2.0 (5.2)	3.7 (7.5)	2.8 (7.7)	8.6 (12.9)
4 Year Degree or Beyond	3.9 (8.4)	4.0 (8.7)	2.5 (5.8)	1.6 (3.2)	2.8 (7.9)	1.9 (5.4)
Annual Household Income						
Less than \$10,000	12.5 (12.5)	NA	6.3 (7.7)	NA	8.6 (10.2)	NA
\$10,000-\$19,999	6.8 (11.1)	NA	5.2 (9.8)	NA	5.8 (11.7)	NA
\$20,000-\$29,999	8.5 (11.2)	NA	1.3 (2.6)	NA	4.9 (10.2)	NA
\$30,000-\$49,999	5.5 (9.1)	NA	3.3 (7.1)	NA	2.5 (6.9)	NA
\$50,000 or More	1.8 (5.9)	NA	1.8 (5.0)	NA	1.2 (5.5)	NA
Don't Know	0.9 (1.8)	NA	0.0 (0.0)	NA	0.0 (0.0)	NA
Medicaid Status						
Medicaid	10.5 (11.8)	11.3 (12.0)	6.4 (9.6)	8.5 (10.8)	9.2 (12.5)	11.1 (12.4)
Non-Medicaid	3.8 (8.1)	5.1 (9.5)	2.0 (5.1)	2.6 (5.5)	1.7 (5.9)	3.9 (8.7)

* Means for demographic groups in the follow up column(s) highlighted in red are greater by ten percent or more compared to the baseline columns. Estimates highlighted in red indicate groups that were worse off at follow up compared to baseline. Members are displayed according to their baseline demographic group.

Table 34: 2020-2022 Cohort 23 Performance Measurement Distribution of BMI Categories by Baseline Demographic Group for MAO HXXXXA

Baseline Demographic	Underweight (<18.5 BMI)		Obese (≥30 BMI)	
	Baseline N (%)	Follow Up* N (%)	Baseline N (%)	Follow Up* N (%)
MAO HXXXXA Total	3 (2.6%)	4 (3.4%)	34 (29.8%)	29 (25.0%)
Age				
65-69	1 (3.1%)	0	13 (40.6%)	9 (29.0%)
70-74	1 (2.8%)	3 (8.1%)	14 (38.9%)	14 (37.8%)
75-79	0	0	4 (23.5%)	4 (21.1%)
80-84	1 (5.3%)	1 (5.9%)	2 (10.5%)	1 (5.9%)
85+	0	0	1 (10.0%)	1 (8.3%)
Gender				
Male	2 (5.1%)	0	8 (20.5%)	7 (17.9%)
Female	1 (1.3%)	4 (5.2%)	26 (34.7%)	22 (28.6%)
Race				
White	2 (2.1%)	4 (4.3%)	24 (25.3%)	24 (25.5%)
Black	0	0	7 (87.5%)	5 (55.6%)
Other/Unknown	1 (9.1%)	0	3 (27.3%)	0
Marital Status				
Married	1 (1.9%)	1 (1.8%)	14 (26.9%)	16 (28.6%)
Widowed	1 (3.3%)	2 (7.4%)	7 (23.3%)	3 (11.1%)
Divorced or Separated	1 (4.3%)	1 (4.5%)	8 (34.8%)	7 (31.8%)
Never Married	0	0	5 (62.5%)	3 (33.3%)
Education				
Did Not Graduate HS	0	1 (4.3%)	8 (36.4%)	8 (34.8%)
High School Graduate	1 (3.8%)	1 (3.7%)	8 (30.8%)	6 (22.2%)
Some College	0	0	13 (39.4%)	10 (31.3%)
4 Year Degree or Beyond	2 (6.3%)	2 (6.3%)	5 (15.6%)	5 (15.6%)
Annual Household Income				
Less than \$10,000	1 (9.1%)	NA	4 (36.4%)	NA
\$10,000-\$19,999	0	NA	9 (50.0%)	NA
\$20,000-\$29,999	0	NA	4 (26.7%)	NA
\$30,000-\$49,999	0	NA	8 (36.4%)	NA
\$50,000 or More	2 (6.3%)	NA	7 (21.9%)	NA
Don't Know	0	NA	1 (14.3%)	NA
Medicaid Status				
Medicaid	1 (4.3%)	1 (4.2%)	11 (47.8%)	10 (41.7%)
Non-Medicaid	2 (2.2%)	3 (3.3%)	23 (25.3%)	19 (20.7%)

* Percentages for demographic groups in the follow up column(s) highlighted in red are greater by ten percentage points or more compared to the baseline columns. Estimates highlighted in red indicate groups that were worse off at follow up compared to baseline. Members are displayed according to their baseline demographic group.

Appendix 1

Program Background

This section introduces the Medicare HOS, survey administration, and the calculation of outcomes for the performance measurement. A complete description of the HOS program, the program timeline, previous survey results, and supporting documents are available on the HOS website at www.HOSonline.org.

CMS is committed to monitoring the quality of care provided by MAOs. The HOS results continue to be an important part of the CMS quality improvement activities, ensuring that medical care paid for under the Medicare program meets professionally recognized standards of health care. Section 722 of the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (MMA) mandates collecting, analyzing, and reporting health outcomes information. This legislation also specifies that data collected on quality, outcomes, and member satisfaction to facilitate consumer choice and program administration must use the same types of data that were collected before November 1, 2003. Collected since 1998, the Medicare HOS is the first patient-reported outcomes measure in Medicare managed care, and therefore remains a critical part of assessing MAO quality. In addition, CMS includes the HOS results as one component of their performance assessment program.

The goal of the Medicare HOS program is to gather valid and reliable clinically meaningful data for uses such as: targeting quality improvement activities and resources; monitoring health plan performance; rewarding top-performing health plans; helping people with Medicare make informed health care choices; and advancing the science of functional health outcomes measurement. This Performance Measurement Report is part of a larger CMS effort to increase the health care industry's capacity to improve the health status of its Medicare population. The results are intended to help MAOs identify areas for potential improvement. The HOS Performance Measurement Report is made available to all participating MAOs after each annual follow up cohort data collection is completed.

2020-2022 Medicare Advantage Organization Participation

MAOs with Medicare contracts in effect on or before January 1, 2019, and a minimum enrollment of 500 members were required to report the Baseline HOS in 2020.

- All MAOs, including all coordinated care plans, local and regional preferred provider organizations (PPO), Private Fee-for-Service (PFFS) and Medical Savings Account (MSA) contracts
- Section 1876 cost contracts, even if closed for enrollment
- Employer/union only contracts
- Medicare-Medicaid Plans (MMP)

For MAOs that offered an I-SNP and had MA contracts in effect on or before January 1, 2019, the HOS reporting requirements were as follows. Contracts with only one PBP, or with multiple PBPs that were all I-SNPs, were excluded from the 2020 Baseline HOS. Contracts with at least one non-I-SNP PBP were required to administer 2020 HOS Baseline if 500 or more non-I-SNP members remained in the contract after I-SNP members were removed.

MAOs that administered the HOS Baseline Survey in 2020 were required to administer the HOS Follow-Up Survey in 2022. In the event of a consolidation, merger, or novation, the surviving contract had to report Follow Up HOS for all members of all contracts involved. All eligible members of these contracts were resurveyed and the results were reported as one under the surviving contract. For a contract conversion, the contract had to report if its new organization type was required to report. Refer to the list of participating MAO contracts available in the Survey Results section on the Survey page of the HOS website (www.HOSonline.org).

All PACE organizations with Medicare contracts in effect on or before January 1, 2021, and with a minimum enrollment of 30 members as of February 1, 2022, were required by CMS to administer the HOS-Modified (HOS-M) in 2022.

MAOs sponsoring Fully Integrated Dual Eligible (FIDE) Special Needs Plans (SNPs) within Medicare contracts in effect on or before January 1, 2021, and with a minimum enrollment of 50 members could elect to report the 2022 HOS or HOS-M at the plan benefit package (PBP) level for a frailty assessment under the Affordable Care Act. The assessment determined eligibility for a frailty adjustment payment, similar to the payments provided to PACE programs, for FIDE SNPs with similar average level of frailty to PACE. The FIDE SNP plans were permitted to choose whether their assessments would be calculated based on ADLs reported in the HOS or on a separate sample of members who completed the HOS-M. Voluntary reporting for frailty assessment at the FIDE SNP level is in addition to standard HOS requirements for quality reporting at the contract level.

Cohort 23 Baseline Sampling

- MAOs with fewer than 500 members were not required to report HOS.
- For MAOs with populations of 500 to 1,200 members, all eligible members were included in the sample.
- For MAOs with more than 1,200 members, a simple random sample of 1,200 members was selected.
- Members were defined as eligible if they were 18 years or older on the date the sample was drawn. The six months enrollment requirement was waived beginning in 2009, and members with End Stage Renal Disease (ESRD) were no longer excluded from the sampling beginning in 2010. Since 2019, MAOs could request a survey sample larger than 1,200. Oversampling was expressed as a whole percentage of the standard sample size. Since 2020, I-SNPs have been excluded at the PBP level from HOS Baseline.

Cohort 23 Follow Up Sampling

- Members were eligible for remeasurement if they had sufficient data to derive PCS or MCS scores at baseline and were enrolled in their original contract when the follow-up sample was drawn.
- Members were excluded from follow up if they were no longer enrolled in their original MAO when the follow-up sample was drawn or died after the baseline survey. Although deceased members were excluded from the sample, CMS includes deceased baseline respondents when calculating the HOS performance measurement results.⁵

Survey Administration

- MAOs contracted with a CMS approved survey vendor to administer the surveys following the protocols specified in the *HEDIS 2020* and *HEDIS MY 2021, Volume 6: Specifications for the Medicare Health Outcomes Survey* manuals. The manuals detailed the methods for mail, telephone, and mixed methods of data collection.
- The mail component of the surveys used prenotification letters, a standardized questionnaire, survey letters, and reminder/thank you postcards. Sample respondents completed the HOS in English, Spanish, Chinese, or Russian language versions of the mail survey. While no surveys were completed in Russian for *Cohort 23 Baseline* or *Follow Up*, the Russian language option became available in 2019.
- Survey vendors attempted telephone follow up in English, Spanish, or Chinese (with at least five attempts) in those instances when members failed to respond after the second mail survey or returned an incomplete mail survey, in order to obtain responses for missing items. The Chinese language telephone protocol was added to the HOS in 2020. A standardized version of an Electronic Telephone Interviewing System script was used to collect telephone interview data for the survey.
- Survey vendors performed initial data cleaning and follow up with survey respondents, as necessary.

Additional information about *Cohort 23* sampling and survey administration can be found in the NCQA *HEDIS 2020* and *HEDIS MY 2021 Volume 6* manuals.^{5,6}

HOS Data Collection Tools

The core HOS health status items were collected with the same instrument for the *2020 Cohort 23 Baseline* and *2022 Cohort 23 Follow Up*. Since 2006, the HOS has incorporated the Veterans RAND 12-Item Health Survey (VR-12).

Medicare HOS 3.0 Instruments

The 2020 and 2022 survey administrations used the HOS 3.0 that was implemented in 2015. The HOS 3.0 evaluates the HRQOL of MA members by measuring their physical and mental health status using the VR-12.⁶¹ The HOS contains questions about sociodemographic characteristics, ADLs, IADLs, chronic medical conditions, self-rated health, number of unhealthy days in the past 30 days, depression risk, cognitive functioning, memory, pain, living arrangements, and self-reported height and weight used for calculation of BMI. Three HEDIS Effectiveness of Care measures are included to evaluate management of urinary incontinence, physical activity, and fall risk management. Questions regarding race, ethnicity, sex, primary language, and disability status comply with standards established by Section 4302 of the Affordable Care Act. The HOS 3.0 includes changes to questions about leakage of urine, sleep duration and quality, and primary language spoken in the home. In a formatting change, the survey uses a two-column layout for each page. In 2022, the Arthritis of the Hip or Knee, Arthritis of the Hand or Wrist, Sciatica, Smoking, and Income items were removed. Current HOS survey instruments are made available on NCQA's website at www.ncqa.org/hedis/measures/hos.

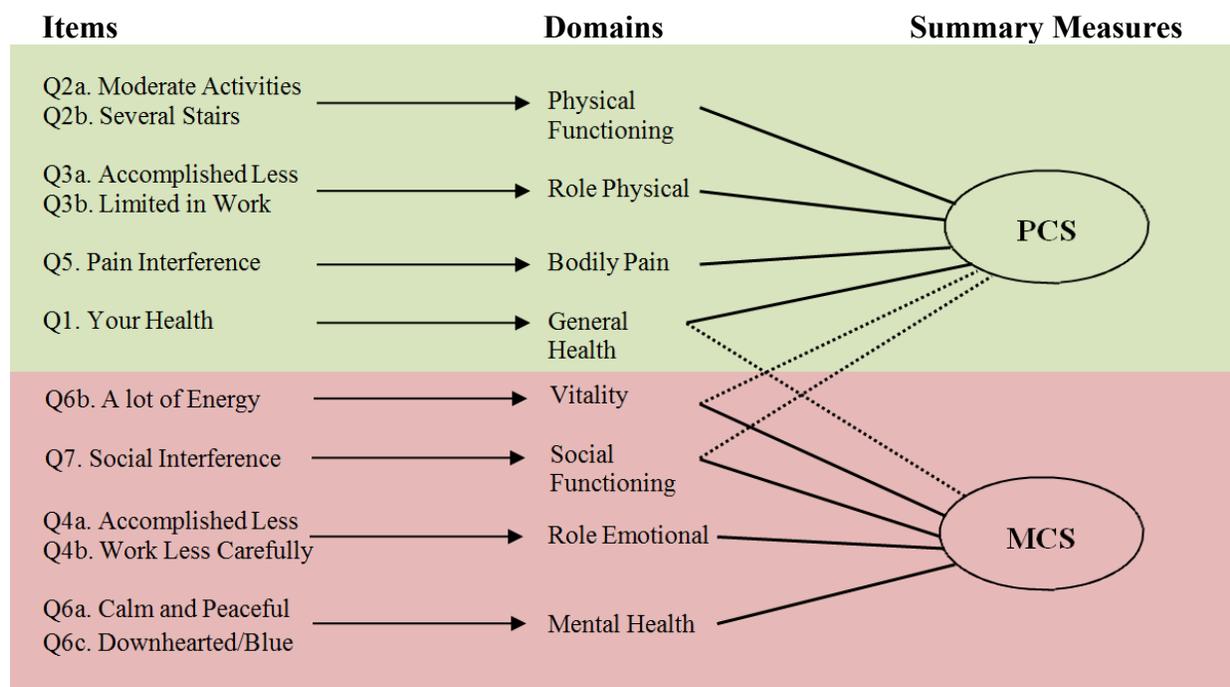
The VR-12 was derived from the Veterans RAND 36-Item Health Survey (VR-36).^{62,63,64} The VR-12 is a generic, multipurpose health survey, which consists of the 12 most important items from the VR-36 for construction of the physical and mental health summary scores (Q1-Q7) and

two items that assess change in physical and emotional health compared with one year ago (Q8 and Q9) that are not used in the calculation of the summary scores. The shorter instrument was adopted to reduce response burden and survey costs, while maintaining comparability of HOS results over time. The body of literature supports the shorter survey as a reliable and valid substitute for the 36-item health survey. In addition, conversion formulas have been developed and validated for comparison of the VR-12 with the earlier 36-item survey.⁶⁵

In comparison with the earlier 36-item survey, two modifications were made in the VR-12. The first modification was an increase in the number of response choices for the items used for role limitations due to physical problems (Q3a and Q3b) and role limitations due to emotional problems (Q4a and Q4b) from a two-point choice of “Yes” or “No” to a five-point Likert scale (“No, none of the time,” “Yes, a little of the time,” “Yes, some of the time,” “Yes, most of the time,” and “Yes, all of the time”). The role-physical questions assess whether respondents’ physical health limits them in the kind of work or other usual activities they perform, while the role-emotional questions assess whether emotional problems have caused respondents to accomplish less in their work or other usual activities. The second modification was that two questions were used to assess health change, one focusing on physical health (Q8) and one on emotional problems (Q9), in contrast to the one general change item in the 36-item survey.^{66,67}

The VR-12 measures the same eight health domains as the 36-item health survey: 1) Physical Functioning, 2) Role-Physical, 3) Role-Emotional, 4) Bodily Pain, 5) Social Functioning, 6) Mental Health, 7) Vitality, and 8) General Health. Each domain aggregates one or two items and all eight domains are used to calculate the two summary measures, as illustrated in the VR-12 mapping model that follows in Figure 4.

Figure 4: Mapping of HOS VR-12 to 8 Health Domains and 2 Summary Measures



Note: Domains contributing the most to each summary measure are indicated by a solid line. Domains contributing to a lesser degree are indicated by a broken line; however, all domains contribute to some extent to the scoring of both summary measures (PCS and MCS).

Physical and Mental Component Summary Scores

The baseline and follow up PCS and MCS scores were calculated from the VR-12 using the Modified Regression Estimate (MRE) for scoring and for imputation of missing data.⁶¹ These are the unadjusted scores that will be used to create the final adjusted change scores that are discussed in the Calculation of Outcomes below.

First, for those members with complete responses across the VR-12, the following steps⁶⁸ were taken to calculate the scores:

- Step One: New variables were created for each response level choice with one level omitted. Using the 59 total response categories across the VR-12 questions, 47 indicator variables were created.
- Step Two: Aggregate PCS and MCS scores were created separately from a regression equation that weighted each of the 47 indicator variables. The weights were derived from the Veterans SF-36 PCS and MCS Scales using the 1999 Large Health Survey of Veteran Enrollees.⁶⁹
- Step Three: A constant was added to each of the estimates obtained from Step Two. The scores were then standardized using normative values from a 1990 U.S. general population. Therefore, a mean score of 50 represents the national average, a 10-point difference above and below the mean score is one standard deviation, and with few exceptions, the scores have a range of 0 through 100 (higher being better).

Second, the PCS and MCS scores were imputed using the MRE when member data was missing across any of the VR-12 items. Using the MRE algorithm, PCS and MCS scores can be calculated in as many as 90% of the cases in which one or more VR-12 responses are missing.⁷⁰ Depending on the pattern of missing item responses for a member, a different set of regression weights was required to compute that individual's PCS and/or MCS scores.⁶⁸ For each combination of missing data, the members' data were merged with the stored regression weights and the PCS or MCS scores were computed and then standardized using the normative values from MRE Step Three.

Member PCS and MCS results were mode adjusted for the impact of telephone administration compared to the reference mode of mail administration. Comparisons across the VR-12 of matched HOS and Veterans Administration surveys for the same respondents showed that PCS and MCS scores were, on average, 1.9 and 4.5 points greater respectively for telephone compared with mail administered surveys.⁷¹ Therefore, for telephone surveys, 1.9 points were subtracted from the PCS score and 4.5 points were subtracted from the MCS score.

For the physical health summary measure, very high scores indicate no physical limitations, disabilities, or decline in well-being; high energy level; and a rating of health as "excellent." For the mental health summary measure, very high scores indicate frequent positive affect, absence of psychological distress, and no limitations in usual social and role activities due to emotional problems.

Data Evaluation and Processing

The entire HOS data file was reviewed to verify the presence of unique member records. Additional reviews of the data are performed using the complete HOS data file, as well as subsets of the data (e.g., mode of administration, survey vendor, and survey language).

- Data consistency checks are performed to identify:
 - Out of range dates and response values
 - Duplicate Beneficiary Link Keys and Medicare Beneficiary Identifier (MBI) numbers
 - Data shifts in value assignment
 - Inconsistencies in data distributions of survey response values among survey vendors
 - Discrepancies in the percent complete and survey disposition codes
 - Inconsistent assignment of survey variables (such as survey disposition, round number, and survey language)
 - Patterns of missing responses across MAO data
- Response consistency checks between related items are performed to validate the integrity of the data.
- Date variables are converted to a SAS[®] date format to facilitate the calculation of duration of enrollment and age, which are then stored in the data file.
- For the performance measurement, baseline and follow up data are evaluated and merged, and additional variables are calculated or obtained from other CMS data sources.

Calculation of Outcomes

The *2020-2022 Cohort 23 Performance Measurement Report* incorporates results from the 2020 HOS 3.0 for the baseline and the 2022 HOS 3.0 for the follow up survey administrations. The outcomes of the performance measurement analysis were death, change in physical health as measured by the PCS score, and change in mental health as measured by the MCS score. For the HOS results, death and PCS outcomes were combined into one overall measure of change in physical health. Thus, there are two primary outcomes: (1) Alive and PCS better or same (vs. PCS worse or death), and (2) MCS better or same (vs. MCS worse). These outcomes are designated as the primary outcomes of interest since health maintenance, rather than improvement, is a realistic clinical goal for many older adults.

The final adjusted physical and mental health measures are based on the case-mix adjusted PCS and MCS change scores derived from the baseline and follow up surveys, as well as death status. Multivariate logistic regression models were used for case-mix adjustment, and to calculate expected outcomes for each member. Case-mix adjustments were used so that all MAOs were as comparable as possible in terms of socio-demographic characteristics (age, gender, race, etc.), chronic conditions, baseline health status, and other design variables. Further details about the HOS variables are included in the PM Data Users Guide (DUG) that is provided to MAOs with their requested data or refer to the [online document](#) available on the Data Users Guides page of the HOS website at www.HOSonline.org.

For expected outcomes, the probability of being better or worse was calculated using statistical models that take into account the demographic and socioeconomic variables and other covariates. The expected outcomes were death, “PCS better or same,” and “MCS better or same.” For calculating expected outcomes, separate case-mix models were warranted for death, PCS scores, and MCS scores.

^o SAS[®] is a registered trademark of SAS Institute Inc., Cary, NC.

Beginning in 2022 for the 2024 Star Ratings, one model was used for each of the expected outcomes (one death model, one PCS model and one MCS model), in alignment with the updates finalized by CMS for the 2022 measurement year (Federal Register 2021).⁷ Under the updated case-mix specifications, when an adjuster is missing for a member, it is replaced with the mean value for that adjuster for other members in the same contract with responses contributing to the PCS/MCS measures. This approach for missing adjusters has been used for the Medicare Advantage and Prescription Drug Plan (MA and PDP) Consumer Assessment of Healthcare Providers & Systems (CAHPS[®]) survey for many years.⁷²

Death Model

All members age 65 or older, who completed the HOS at baseline with a PCS or MCS score, and whose MAO participated in the HOS at follow up were included in the analysis of death outcomes (i.e., analytic sample).

One model was used to predict the probability of death for each member and included variables to control for baseline differences in demographic and socioeconomic characteristics, chronic medical conditions, and functional status. Demographic and socioeconomic variables included age, gender, race, ethnicity, education, marital status, annual household income, home ownership, Medicaid status, and eligibility for Supplemental Security Income (SSI). The CMS reason for Medicare entitlement field, which has categories of disability, is used as a proxy for SSI eligibility. Chronic medical conditions were measured with a checklist of 14 conditions and four indicators of current cancer treatment. Additional variables considered for the models included the baseline item about general health compared to others, the six ADL items, and the individual VR-12 response items. For example, functional status was measured using a combined VR-12 physical functioning/ADL scale, the individual VR-12 response items, and the baseline item about general health compared to others. See Table A1 in this Appendix for detailed information about covariates used in the death model.

PCS and MCS Models

Members age 65 or older, who completed the HOS at baseline and follow up, for whom PCS and/or MCS scores could be computed at both time points, and who remained in their original MAO at the time of follow up sampling were included in the analysis of PCS and MCS outcomes (i.e., respondent sample).

There are two major steps in the scoring for the PCS and MCS outcomes. The first step is to calculate the unadjusted PCS and MCS scores from the VR-12 set of questions that are embedded in the HOS 3.0 questionnaire. The second step is to calculate the adjusted change scores for the HOS Performance Measurement analysis. Models used to predict expected change in PCS and MCS scores (e.g., PCS better or same) used a set of exogenous demographic and socioeconomic variables at baseline, such as age, gender, race, ethnicity, education, marital status, annual household income, home ownership, Medicaid status, and SSI (see Table A1 in this Appendix for detailed information about the PCS model and MCS model). Because each member served as his or her own control for the PCS and MCS analysis, substantial case-mix was already reflected in the baseline PCS or MCS scores. Sensitivity analyses determined that further adjustment for chronic medical conditions at baseline was not warranted, because errors in disease reporting were correlated with functioning.

The “Medicare HOS Performance Measurement Coefficient Tables” display coefficients from the multivariate logistic regression models applied to each outcome (death model, PCS model, and MCS model) that were used to case-mix adjust HOS outcomes and to calculate expected outcomes for each member. The tables are available from the Survey Results page on the HOS website at www.HOSonline.org.

Calculation of MAO-Level Results

Calculation of the overall MAO-level results was completed by creating an actual death indicator for each member in the MAO analytic sample who died during the two-year follow up (actual death=1) and who survived (actual death=0). The actual physical and mental health indicators were also created for each member in the MAO respondent sample, to indicate whether the PCS score and MCS score were better, the same, or worse at the two-year follow up. The PCS score is considered to be the same if it changed by less than 5.66 points (plus or minus) between baseline and follow up survey administrations. A change greater than 5.66 points (plus or minus) is outside of the 95% confidence interval for an individual member, as estimated from the standard deviation and reliability of the PCS score. The MCS score is considered to be the same if it changed by less than 6.72 points (plus or minus). For the MAO level, the mean actual death rate (A_d), mean actual “PCS better or same” rate (A_{psb}) and mean actual “MCS better or same” rate (A_{msb}) were then summarized for the MAO. The mean actual “Alive and PCS better or same” rate is $(1-A_d)*A_{psb}$.

An expected death rate, an expected PCS better or same rate, and an expected MCS better or same rate were calculated for each member within the MAO respondent sample using logistic regression models for the case-mix adjustment. To summarize data for the outcome “Alive and PCS better or same,” the mean expected death rate (E_d) was calculated, along with the mean expected “PCS better or same” rate (E_{psb}). The mean expected “Alive and PCS better or same” rate for the MAO is $(1-E_d)*E_{psb}$. For the MAO level, data were summarized for the mean expected “MCS better or same” rate (E_{msb}). Expected outcomes for “PCS better” and “MCS better” were also needed to calculate the percentage of members who were better, the same, or worse on each measure. The percentage of members who were worse at follow up is calculated as 1 minus the percentage who were better or the same. Member-level actual and expected results are then aggregated, and the resulting scores are used to derive the MAO-level Improving or Maintaining Physical Health (PCS better or same) and Improving or Maintaining Mental Health (MCS better or same) measures that are reported in the Medicare Part C Star Ratings.

HOS outcomes were analyzed by calculating the national averages, and the differences between actual and expected MAO level results for death, PCS, and MCS over two years. For example, the difference between actual and expected results indicates the percentage points by which the MAO’s actual “Alive and PCS better or same” rate was higher (for a positive difference) or lower (for a negative difference) than expected results. A t statistic, expressing the significance of the MAO differences from the average national results, was calculated by dividing the MAO deviation by the standard error. A t statistic plus or minus 2.0 or larger was considered significant, as long as an overall F test indicated that the MAOs differed on the outcome of interest (discussed below). An adjusted MAO percentage of “Alive and PCS better or same” also was calculated by combining the overall (national) results and the MAO deviation score, using a logit transformation. Similar logic was used to calculate adjusted MAO percentages for “Alive and PCS better,” “MCS better or same,” and “MCS better.”

Tests of Significance for MAO-Level Differences

For physical health (mortality and PCS) over the two-year follow up period, overall F tests are conducted to determine if mortality, “PCS better or same” and “PCS better” are significantly different at the MAO level. If both “Death” and “PCS better or same,” which when combined are specified *a priori* as the primary physical health outcome of “Alive and PCS better or same,” differ significantly at the MAO level, an outlier analysis for PCS is warranted. The PCS outlier analysis is performed using a t -test at the MAO level. MAOs with a t statistic ≥ 2.0 are designated as a better than expected outlier for the physical health measure, while MAOs with a t statistic ≤ -2.0 are identified as a worse than expected outlier, compared to the national average. If the F test for “Death” or “PCS better or same” is not significant, the t -tests are not warranted and all MAOs are designated as the same, when compared to the national average. The “Alive and PCS better or same” measure is the combined Physical Health Percent Better+Same result in Table 7 in the *Cohort 23 Performance Measurement Results* section and is used as the Medicare Star Ratings measure for *Improving or Maintaining Physical Health*.

For the two-year follow up period for mental health (MCS), an overall F test is conducted to determine if “MCS better or same” and “MCS better” are significantly different at the MAO level. If “MCS better or same,” which is specified *a priori* as the primary mental health outcome, differs significantly at the MAO level, an outlier analysis for MCS is warranted. The MCS outlier analysis is also performed using a t -test at the MAO level. MAOs with a t statistic ≥ 2.0 are designated as a better than expected outlier for the mental health measure, while MAOs with a t statistic ≤ -2.0 are identified as a worse than expected outlier, compared to the national average. If the F test for “MCS better or same” is not significant, the t -tests are not warranted and all MAOs are designated as the same, when compared to the national average. The “MCS better or same” measure is the combined Mental Health Percent Better+Same result in Table 8 in the *Cohort 23 Performance Measurement Results* section and is used as the Medicare Star Ratings measure for *Improving or Maintaining Mental Health*.

The information presented here will permit an MAO to closely approximate its expected PCS better or same (without death) and expected MCS better or same results. However, exact replication of the final MAO-level Alive and PCS better or same results may not be possible since MAOs do not have access to records of disenrolled members that are included in the case-mix adjustment for death, which is used for the PCS results.

Table A1: Covariates Used in Estimation of Expected Mortality and Estimation of Change in PCS and MCS Scores

	Death Model	PCS Model	MCS Model
Model Covariates at Baseline			
<i>Demographic and Socioeconomic Variables</i>			
Age (linear), Age 75+, Age 85+	✓	✓	✓
Gender	✓	✓	✓
Age and Gender interaction	✓	✓	✓
HOS Race/Ethnicity (Asian, Black/African-American, Hispanic Ethnicity, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, Multiracial, or White)	✓	✓	✓
Receive Medicaid or do not receive Medicaid	✓	✓	✓
Eligible or not for Supplemental Security Income (SSI) due to disability	✓	✓	✓
Home owner or non-home owner	✓	✓	✓
High school graduate or not high school graduate	✓	✓	✓
Married or not married (single, divorced, widowed, separated)	✓	✓	✓
Annual household income less than \$20,000 or annual household income of \$20,000 or greater	✓	✓	✓
<i>Chronic Medical Conditions</i>			
Presence or absence of each of 14 chronic medical conditions: hypertension, myocardial infarction, angina/coronary artery disease, congestive heart failure, other heart conditions, stroke, pulmonary disease, gastrointestinal disorders, arthritis of hip or knee, arthritis of hand or wrist, sciatica, diabetes, depression, any cancer other than skin cancer	✓		
Treatment or non-treatment for 4 cancer types: colon/rectal, lung, breast, prostate	✓		
<i>Functional Status</i>			
Physical Functioning/Activities of Daily Living Scale	✓		
General Health item (health is excellent, very good, good, fair, poor)	✓		
Physical Functioning item (limitations in moderate activities)	✓		
Physical Functioning item (limitations climbing several flights of stairs)	✓		
Role-Physical item (accomplished less than would like)	✓		
Role-Physical item (limited in the kind of work or other activities)	✓		
Role-Emotional item (accomplished less than would like)	✓		
Role-Emotional item (didn't do work or other activities as carefully)	✓		
Bodily Pain item (pain interfered with normal work)	✓		
Mental Health item (felt calm and peaceful)	✓		
Vitality item (had a lot of energy)	✓		
Mental Health item (felt downhearted and blue)	✓		
Social Functioning item (health interfered with social activities)	✓		
One-item measure of General Health compared to others	✓		

Appendix 2

HOS Partners

CENTERS FOR MEDICARE & MEDICAID SERVICES (CMS)

Address:

7500 Security Boulevard
Baltimore, MD 21244-1850

HOS websites:

www.cms.gov/Research-Statistics-Data-and-Systems/Research/HOS/index.html

www.HOSonline.org

HOS email:

hos@cms.hhs.gov

The Health Outcomes Survey (HOS) Team at the Centers for Medicare & Medicaid Services (CMS) is responsible for leadership, oversight, coordination, and successful implementation of the national Medicare HOS Program.

The HOS team directs and coordinates the work of various program partners. The survey implementation and operations contractors include the National Committee for Quality Assurance (NCQA), Research Triangle Institute (RTI) International, and the Center for the Assessment of Pharmaceutical Practices (CAPP), formerly Health Outcomes Technologies Program (HOT), of the Boston University School of Public Health. The data analysis, dissemination, education, and applied research contractor is Health Services Advisory Group (HSAG).

**CENTER FOR THE ASSESSMENT
OF PHARMACEUTICAL
PRACTICES (CAPP)**

*Health Law, Policy &
Management Department,
Boston University School of
Public Health*

Address:
715 Albany Street (T-3W)
Boston, MA. 02118

Phone: (617) 414-1418
Fax: (617) 638-5374

CAPP website:
www.bu.edu

Survey website:
[www.bu.edu/sph/about/
departments/health-law-policy-
and-management/research/vr-36-
vr-12-and-vr-6d](http://www.bu.edu/sph/about/departments/health-law-policy-and-management/research/vr-36-vr-12-and-vr-6d)

CAPP at the Boston University (BU) School of Public Health was launched in 1998. The principal goals of CAPP are to advance the use of patient-centered assessments of health to improve health outcomes and to advance research efforts in the areas of health outcomes, cost-effectiveness analysis, technology assessment, disease management, pharmaceutical administration, and health care policy. CAPP has integrated patient-centered measures with extensive pharmaceutical and health services databases. CAPP has led several major projects in the U.S. Department of Veterans Affairs (VA) involving the development of the Veterans RAND 36-Item Health Survey (VR-36), which is modified from the MOS SF-36 to provide greater precision and reliability than the original version. Well over 2 million administrations of the VR-36 have occurred in the VA since 1996. A shorter version of the VR-36, the Veterans RAND 12-Item Health Survey (VR-12), has also been developed by CAPP and administered to over 3.0 million users both inside and outside the VA. These assessments have contributed to the outcomes management system in the VA. The VR-12 is the principal outcome in HOS.

The work of the CAPP program is driven by an increased demand for new patient-based assessment tools and methodologies that can be used for clinical management and for monitoring the quality, efficiency, and effectiveness of patient care.

CAPP's staff have been engaged in several collaborative projects for the HOS, including comparisons of health outcomes between the HOS and the VA. The purpose of this study was to examine the differences in the outcomes of care for the HOS compared with the VA. Analyses included psychometric comparisons of a 36-item Health Survey between HOS and VA, and an examination of the differences of the disease burden of patients seen in the HOS systems of care compared with those veterans seen within the VA. A recent study examined the quality of care using medication data from the Medicare Part D data base merged with VR-12 outcomes from the HOS survey. The group has also developed imputation programs for the HOS to deal with missing values using the MOS SF-36 Version 1.0, the VR-36, and the VR-12, as well as risk adjustment models.

**HEALTH SERVICES ADVISORY
GROUP, INC. (HSAG)**

Address:
3133 East Camelback Road
Suite 140
Phoenix, AZ 85016

Phone: (602) 801-6600
Fax: (602) 801-6051

Website:
www.hsag.com

HOS Information and Technical
Support:
(888) 880-0077 or
hos@hsag.com

Originally established in 1979, HSAG has advanced to become a multi-state Quality Innovation Network-QIO (QIN-QIO), External Quality Review Organization (EQRO), and End-Stage Renal Disease (ESRD) Network.

As the QIN-QIO for Arizona and California, HSAG brings Medicare beneficiaries, providers, and communities together in data-driven initiatives that increase patient safety, make communities healthier, better coordinate post-hospital care, and improve clinical quality.

HSAG is the largest External Quality Review Organization (EQRO) in the nation and provides quality review services for states that operate Medicaid managed care programs and fee-for-service programs. As an EQRO, HSAG evaluates managed care organizations (MCOs), prepaid inpatient health plans (PIHPs), prepaid ambulatory health plans (PAHPs), and primary care case management (PCCM) programs. HSAG provides EQR-related services in 19 states and serves as the designated EQRO in 18 states. HSAG customizes quality review services based on each state's needs and can provide quality review technical assistance to states that do not operate managed care programs but wish to monitor the healthcare delivery and health outcomes of the population served in the Medicaid program. HSAG also provides quality improvement development and administration to enable states to monitor and achieve their strategic quality-related goals.

In its role as an ESRD Network, HSAG provides quality improvement, data management, grievance investigation, technical assistance, and patient and professional education services for providers and patients in multiple states. The goal of the ESRD Network is to efficiently and effectively increase the quality of care and quality of life for ESRD patients.

HSAG is an NCQA HEDIS[®] Certified Survey Vendor and NCQA Licensed Organization.

HSAG has been CMS' data analysis, dissemination, education, and applied research contractor for the Medicare HOS program since 1998.

**NATIONAL COMMITTEE FOR
QUALITY ASSURANCE (NCQA)**

Address:
1100 13th Street, NW
Third Floor
Washington, DC 20005

Phone: (202) 955-3500
Fax: (202) 955-3599

Website:
www.ncqa.org

Email:
HOS@ncqa.org

NCQA has served as the CMS contractor for implementing the Healthcare Effectiveness Data and Information Set (HEDIS[®]) Medicare HOS since the survey's inception in 1997. In this capacity, NCQA:

- Manages the data collection and transmittal of the HOS data.
- Evaluates and trains CMS-approved HOS survey vendors and conducts ongoing quality oversight of the survey process.
- Develops, evaluates, and refines quality measures for the HOS.
- Publishes the *HEDIS Volume 6: Specifications for the Medicare Health Outcomes Survey*, which contains the technical specifications for the measure and survey protocol.
- Provides CMS, Medicare Advantage Organizations (MAOs), and interested parties with technical assistance, and materials related to the HOS measures.

NCQA is a private, non-profit organization dedicated to improving health care quality. NCQA's website (www.ncqa.org) contains information to help consumers, employers, and others make more informed health care choices.

NCQA accredits and certifies a wide range of health care organizations, recognizes clinicians and clinician groups in key areas of performance, and manages the evolution of HEDIS, the tool the nation's MAOs use to measure and report on their performance. There are 96 HEDIS measures, which provide purchasers and consumers with the information they need to reliably compare the performance of managed care plans.

HEDIS is a registered trademark of the National Committee for Quality Assurance (NCQA).

**RESEARCH TRIANGLE INSTITUTE
(RTI) INTERNATIONAL**
Health Practice Area

Main Office Address:
3040 Cornwallis Road
PO Box 12194
Research Triangle Park, NC
27709

Phone: (919) 541-6000
Fax: (919) 541-5985

Waltham MA Office:
307 Waverley Oaks Road,
Suite 101
Waltham, MA 02452-8413

Phone: (781) 434-1700
Fax: (781) 434-1701

Website:
www.rti.org

RTI International is an independent, nonprofit research institute dedicated to improving the human condition. Clients rely on us to answer questions that demand an objective and multidisciplinary approach—one that integrates expertise across the social and laboratory sciences, engineering, and international development. We believe in the promise of science, and we are inspired every day to deliver on that promise for the good of people, communities, and businesses around the world. RTI's staff of more than 6,000 supports projects in more than seventy-five countries.

The organization was founded by a joint action of the University of North Carolina at Chapel Hill, Duke University, and North Carolina State University as the first scientific organization in the Research Triangle Park (RTP), North Carolina.

RTI staff have extraordinary depth of expertise in collecting, assessing, and reporting policy-oriented information and conducting health services research in many areas, including payment system design, risk adjustment, cost estimation and cost-effectiveness analysis, as well as state health care reform and Medicaid program evaluation. In addition, RTI possesses substantial capabilities in the analysis of large databases. Staff members are highly regarded in their respective areas of expertise, and they have testified before the U.S. Congress, MedPAC, and various state commissions.

RTI's main campus is located on 180 acres in North Carolina's RTP. In addition, RTI maintains well-staffed research facilities in sites such as Washington, DC; Waltham, Massachusetts; Atlanta, Georgia; and at numerous project locations in the United States and abroad.

References

- ¹ Idler EL, Benyamini Y. Self-rated health and mortality: a review of twenty-seven community studies. *Journal of Health and Social Behavior*. 1997; 38(1):21-37.
- ² Cho H, Wang Z, Yabroff KR, et al. Estimating life expectancy adjusted by self-rated health status in the United States: national health interview survey linked to the mortality. *BMC Public Health*. 2022 Jan 20;22(1):141. Available at: <https://link.springer.com/content/pdf/10.1186/s12889-021-12332-0.pdf?msclid=50a44f04a62111ec8c09f1f529e0c555>. Accessed on: March 7, 2023.
- ³ U.S. Department of Health and Human Services. *Multiple Chronic Conditions: A Strategic Framework. Optimum Health and Quality of Life for Individuals with Multiple Chronic Conditions*. Available at: https://www.hhs.gov/ash/initiatives/mcc/mcc_framework.pdf. Accessed on: March 7, 2023.
- ⁴ Centers for Disease Control and Prevention. Health Related Quality of Life (HRQOL). Available at: <https://www.cdc.gov/hrqol/faqs.htm>. Accessed on: March 7, 2023.
- ⁵ National Committee for Quality Assurance. *HEDIS® 2020, Volume 6: Specifications for the Medicare Health Outcomes Survey*. Washington, DC: NCQA Publication, 2020.
- ⁶ National Committee for Quality Assurance. *HEDIS® MY 2021, Volume 6: Specifications for the Medicare Health Outcomes Survey*. Washington, DC: NCQA Publication, 2022.
- ⁷ Medicare and Medicaid Programs; Contract Year 2022 Policy and Technical Changes to the Medicare Advantage Program, Medicare Prescription Drug Benefit Program, Medicaid Program, Medicaid Cost Plan Program, and Programs of All-Inclusive Care for the Elderly. Page 271 of the Federal Register /Vol. 86, No. 11 /Tuesday, January 19, 2021 / Rules and Regulations. Available at: <https://www.govinfo.gov/content/pkg/FR-2021-01-19/pdf/2021-00538.pdf>. Accessed on: March 7, 2023.
- ⁸ Health Services Advisory Group. *Analysis of Key Drivers of Improving or Maintaining Medicare Health Outcomes Survey (HOS) Scores*. 2013. Available at: https://www.hosonline.org/globalassets/hos-online/publications/key_drivers_medicare_hos_scores_2013.pdf. Accessed on: March 7, 2023.
- ⁹ National Committee for Quality Assurance. *Opportunities for Improving Medicare HOS Results Through Practices in Quality Preventive Health Care for the Elderly: A Guide for Medicare Advantage Organizations*. 2012. Available at: https://www.hosonline.org/globalassets/hos-online/publications/opportunities_for_improving_medicare_hos_results_2012.pdf. Accessed on: March 7, 2023.
- ¹⁰ Center for the Assessment of Pharmaceutical Practices (CAPP), Department of Health Policy and Management, Boston University School of Public Health. *Functional Status in Older Adults: Intervention Strategies for Impacting Patient Outcomes*. 2011. Available at: https://hosonline.org/globalassets/hos-online/publications/functional_status_in_older_adults_2011.pdf. Accessed on: March 7, 2023.
- ¹¹ Ware JE, Kosinski M. *SF-36 Physical and Mental Health Summary Scales: A Manual for Users of Version 1, Second Edition*. Lincoln, RI: QualityMetric, Incorporated, 2001.
- ¹² Health Services Advisory Group. *The Evaluation of a Mental Component Summary Score Threshold for Depression Risk in the Medicare Population*. 2006. Available at: https://hosonline.org/globalassets/hos-online/publications/hos_evaluation_mcs_depress.pdf. Accessed on: March 7, 2023.

-
- ¹³ Centers for Disease Control and Prevention. National Center for Health Statistics. Health, United States, 2020-2021. Available at: <https://www.cdc.gov/nchs/hus/topics/health-status.htm>. Accessed on: March 7, 2023.
- ¹⁴ Ware JE, Kosinski M, Keller SD. *SF-36 Physical and Mental Health Summary Scales: A User's Manual*. Boston, MA: The Health Institute; 1994.
- ¹⁵ Wuorela M, Lavonius S, Salminen M, et al. Self-rated health and objective health status as predictors of all-cause mortality among older people: a prospective study with a 5-, 10-, and 27-year follow-up. *BMC Geriatrics* 20, 120 (2020). Available at: <https://bmgeriatr.biomedcentral.com/articles/10.1186/s12877-020-01516-9>. Accessed on: March 7, 2023.
- ¹⁶ Choi NG, DiNitto DM, Marti CN, et al. Suicide Means among Decedents Aged 50+ Years, 2005–2014: Trends and Associations with Sociodemographic and Precipitating Factors [Abstract]. *American Journal of Geriatric Psychiatry*. December 2017; 25(12):1404–1414. Available at: [https://www.ajgonline.org/article/S1064-7481\(17\)30345-7/abstract](https://www.ajgonline.org/article/S1064-7481(17)30345-7/abstract). Accessed on: March 7, 2023.
- ¹⁷ Centers for Disease Control and Prevention. *National Association of Chronic Disease Directors (NACDD) State of Aging and Health in America: Data Brief Series*. Available at: <https://www.cdc.gov/aging/publications/briefs.htm>. Accessed on: March 7, 2023.
- ¹⁸ Darwish L, Beroncal E, Sison MV, et al. Depression in people with type 2 diabetes: current perspectives. *Diabetes Metabolic Syndrome and Obesity*. 2018;11:333-343. Published 2018 Jul 10. Available at: <https://www.dovepress.com/depression-in-people-with-type-2-diabetes-current-perspectives-peer-reviewed-fulltext-article-DMSO>. Accessed on: March 7, 2023.
- ¹⁹ Miklavcic JJ, Fraser KD, Ploeg J, et al. Effectiveness of a community program for older adults with type 2 diabetes and multimorbidity: a pragmatic randomized controlled trial. *BMC Geriatrics*. 2020 May 13;20(1):174. Available at: <https://bmgeriatr.biomedcentral.com/articles/10.1186/s12877-020-01557-0?msckid=3e19ffa9a63411eca7225b0de8ba6a92>. Accessed on: March 7, 2023.
- ²⁰ Centers for Disease Control and Prevention. Depression is Not a Normal Part of Growing Older. Available at: <https://www.cdc.gov/aging/depression/index.html>. Accessed on: March 7, 2023.
- ²¹ Li C, Friedman B, Conwell Y, et al. Validity of the Patient Health Questionnaire 2 (PHQ-2) in Identifying Major Depression in Older People. *Journal of American Geriatrics Society*. 2007; 55:596-602.
- ²² Kroenke K, Spitzer RL, Williams JBW. The Patient Health Questionnaire-2: Validity of a Two-Item Depression Screener. *Medical Care*. 2003. 41(11): pp 1284–1292.
- ²³ Domenichiello AF, Ramsden CE. The silent epidemic of chronic pain in older adults. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*. 2019;93:284-290.
- ²⁴ Miakowski C, Blyth F, Nicosia F, et al. A biopsychosocial model of chronic pain for older adults. *Pain Medicine*. 2020;21(9): 1793-1805. Available at: <https://academic.oup.com/painmedicine/article/21/9/1793/5679926?login=true>. Accessed on: March 7, 2023.
- ²⁵ Cohen SP, Vase L, Hooten WM. Chronic pain: an update on burden, best practices, and new advances. *The Lancet*. 2021;397(10289):2082-2097. Available at: <https://painsa.org.za/wp-content/uploads/2021/09/Chronic-pain-an-update-on-burden-best-practices-and-new-advances.pdf>. Accessed on March 7, 2023.

-
- ²⁶ NCCIH Clinical Digest. NIH National Center for Complementary and Integrative Health. Complimentary Health Approaches for Chronic Pain. August 2022. Available at: <https://nccih.nih.gov/health/providers/digest/chronic-pain>. Accessed on: March 7, 2023.
- ²⁷ Buttorff C, Girosi F, Lai J, et al. Do Financial Incentives Affect Utilization for Chronically Ill Medicare Beneficiaries? *Med Care*. 2022 Apr 1;60(4):302-310. Available at: https://journals.lww.com/lww-medicalcare/Citation/2022/04000/Do_Financial_Incentives_Affect_Utilization_for.6.aspx. Accessed on: March 7, 2023.
- ²⁸ Buttorff C, Ruder T, Bauman M. Multiple Chronic Conditions in the United States. Available at: https://www.rand.org/content/dam/rand/pubs/tools/TL200/TL221/RAND_TL221.pdf?%3E. Accessed on: March 7, 2023.
- ²⁹ Barile JP, Thompson WW, Zack MM, et al. Multiple Chronic Medical Conditions and Health-Related Quality of Life in Older Adults, 2004-2006. *Preventing Chronic Disease*. 2013; 10:120282. Available at: https://www.cdc.gov/pcd/issues/2013/12_0282.htm. Accessed on: March 7, 2023.
- ³⁰ Ellis BH, Shannon ED, Cox JK, et al. Chronic conditions: results of the Medicare Health Outcomes Survey, 1998-2000. *Health Care Financing Review*. 2004;25(4):75-91.
- ³¹ Wiener JM, Hanely RJ, Clark R. *Measuring the Activities of Daily Living: Comparisons Across National Surveys*. 1990. Available at: <https://aspe.hhs.gov/basic-report/measuring-activities-daily-living-comparisons-across-national-surveys>. Accessed on: March 7, 2023.
- ³² Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living. *Physical Self-maintenance*. 1969.
- ³³ Coyne R, Kluwer W. The Lawton Instrumental Activities of Daily Living (IADL) Scale. *Try This: Best Practices in Nursing Care to Older Adults*. 2013; 23. The Hartford Institute for Geriatric Nursing, New York University, College of Nursing. Available at: https://hign.org/sites/default/files/2020-06/Try_This_General_Assessment_23.pdf. Accessed on: March 7, 2023.
- ³⁴ Walter LC, Brand RJ, Counsell SR, et al. Development and Validation of a Prognostic Index for 1-Year Mortality in Older Adults After Hospitalization. *JAMA*. 2001; 285(23):2987-2994.
- ³⁵ Shi SM, McCarthy EP, Mitchell SL, Kim DH. Predicting Mortality and Adverse Outcomes: Comparing the Frailty Index to General Prognostic Indices. *J Gen Intern Med*. 2020 May;35(5):1516-1522. Available at: <https://link.springer.com/article/10.1007/s11606-020-05700->. Accessed on: March 7, 2023.
- ³⁶ Centers for Disease Control and Prevention. HRQOL Concepts. Available at: <https://www.cdc.gov/hrqol/concept.htm>. Accessed on: March 7, 2023.
- ³⁷ Centers for Disease Control and Prevention. *Measuring Healthy Days: Population Assessment of Health-Related Quality of Life*. November 2000. Available at: <https://www.cdc.gov/hrqol/pdfs/mhd.pdf>. Accessed on: March 7, 2023.
- ³⁸ Centers for Disease Control and Prevention. Overweight and Obesity. Available at: <https://www.cdc.gov/obesity/index.html>. Accessed on: March 7, 2023.
- ³⁹ Leitão C, Mignano A, Estrela M, et al. The Effect of Nutrition on Aging-A Systematic Review Focusing on Aging-Related Biomarkers. *Nutrients*. 2022 Jan 27;14(3):554. Available at: <https://www.mdpi.com/2072-6643/14/3/554/htm?msckid=fde6f728a63211ec8a25bad71b4a4d62>. Accessed on: March 7, 2023.
- ⁴⁰ Qasim A, Turcotte M, de Souza RJ, et al. On the origin of obesity: identifying the biological, environmental and cultural drivers of genetic risk among human populations. *Obes Rev*. 2018

-
- Feb;19(2):121-149. Available at: <https://onlinelibrary.wiley.com/doi/10.1111/obr.12625>. Accessed on: March 7, 2023.
- ⁴¹ Hales CM, Carroll MD, Fryar CD, et al. Prevalence of Obesity and Severe Obesity Among Adults: United States, 2017-2018. *NCHS Data Brief*. 2020 Feb;(360):1-8. Available at: <https://www.cdc.gov/nchs/data/databriefs/db360-h.pdf>. Accessed on: March 7, 2023.
- ⁴² Aligué J, Vicente M, Arnau A, et al. Etiologies and 12-month mortality in patients with isolated involuntary weight loss at a rapid diagnostic unit. *PLoS One*. 2021 Sep 23;16(9): e0257752. Available at: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0257752&msclkid=c29d47cca63211ecb0e0383b81821df2>. Accessed on: March 7, 2023.
- ⁴³ Health Services Advisory Group. *Medicare Health Outcomes Survey: Prevalence of Obesity in Medicare Advantage Organizations and Its Effect on Health Services Utilization and Health-Related Quality of Life*. 2011. Available at: https://hosonline.org/globalassets/hos-online/publications/prevalence_of_obesity_in_maos_final_technical_report_2011.pdf. Accessed on: March 7, 2023.
- ⁴⁴ Backhaus J, Junghanns K, Broocks A, et al. Test-retest reliability and validity of the Pittsburgh Sleep Quality Index in primary insomnia. *J Psychosom Res*. 2002; 53(3):737-40.
- ⁴⁵ Zisberg A, Gur-Yaish N, Shochat T. Contribution of routine to sleep quality in community elderly. *Sleep*. 2010; 33(4):509–514.
- ⁴⁶ Buysse DJ. Sleep health: can we define it? Does it matter? *Sleep*. Jan 1 2014;37(1):9-17.
- ⁴⁷ Grander MA, Malhotra A. Sleep as a vital sign: why medical practitioners need to routinely ask their patients about sleep. *Sleep health*. 2015;1(1):11-12.
- ⁴⁸ Mukherjee S, Patel SR, Kales SN, et al. An official American Thoracic Society statement: the importance of healthy sleep. Recommendations and future priorities. *Am J Respir Crit Care Med*. 2015;191(12), 1450-1458.
- ⁴⁹ Neikrug AB, Ancoli-Israel S. “Sleep disorders in the older adult - a mini-review.” *Gerontology*. 56,2 (2010):181-9. doi:10.1159/000236900.
- ⁵⁰ Koffel E, Bramoweth AD, Ulmer CS. Increasing access to and utilization of cognitive behavioral therapy for insomnia (CBT-I): a narrative review. *J Gen Intern Med*. Jun 2018;33(6):955-962.
- ⁵¹ Culpepper L. Insomnia: a primary care perspective. *J Clin Psychiatry*. 2005;66 Suppl 9:14-7.
- ⁵² Garcia-Borreguero D, Silber MH, Winkelmann JW, et al. Guidelines for the first-line treatment of restless legs syndrome/Willis-Ekbom disease, prevention and treatment of dopaminergic augmentation: a combined task force of the IRLSSG, EURLSSG, and the RLS-Foundation. *Sleep Med*. 2016 May;21:1-11.
- ⁵³ Mysliwiec V, Martin JL, Ulmer CS, et al. The management of chronic insomnia disorder and obstructive sleep apnea: synopsis of the 2019 US Department of Veterans Affairs and US Department of Defense Clinical Practice Guidelines. *Ann Intern Med*. 2020;172(5), 325-336.
- ⁵⁴ Park S, Fishman P, Coe NB. Racial Disparities in Avoidable Hospitalizations in Traditional Medicare and Medicare Advantage. *Medical Care*. 2021 Nov 1;59(11):989-996. Available at: https://journals.lww.com/lww-medicalcare/Abstract/2021/11000/Racial_Disparities_in_Avoidable_Hospitalizations.7.aspx. Accessed on: March 7, 2023.
- ⁵⁵ Martino SC, Mathews M, Damberg CL, et al. Rates of Disenrollment From Medicare Advantage Plans Are Higher for Racial/Ethnic Minority Beneficiaries. *Medical Care*. 2021 Sep 1;59(9):778-784. Available at:

<https://europepmc.org/article/MED/34054025?msclkiid=cfe94ba3a6db11eca1d80492202ac580>.

Accessed on: March 7, 2023.

- ⁵⁶ Jacobs PD, Abdus S. Changes in preventive service use by race and ethnicity after medicare eligibility in the United States. *Prev Med*. 2022 Feb 19;157:106996. Available at: <https://www.sciencedirect.com/science/article/abs/pii/S0091743522000445?via%3Dihub>. Accessed on: March 7, 2023.
- ⁵⁷ Health Services Advisory Group. *Medicare Health Outcomes Survey: Report on the Health Status of Disadvantaged Medicare Beneficiaries*. 2005. Available at: <https://www.hosonline.org/globalassets/hos-online/publications/cms-omh-october2018-hispanic-medicare-benes-highlight.pdf>. Accessed on: March 7, 2023.
- ⁵⁸ Ng J, Scholle SH, Wong L, et al. *Disparities in Medicare Beneficiary Outcomes: Sociodemographic Vulnerability and Prevalent Problems in Older Populations*. November 2007. Available at: https://hosonline.org/globalassets/hos-online/publications/hos_disparities_final_technical_report.pdf. Accessed on: March 7, 2023.
- ⁵⁹ CMS Office of Minority Health and HSAG. *Understanding the Health Needs of Diverse Groups of Asian and Native Hawaiian or Other Pacific Islander Medicare Beneficiaries*. Baltimore, MD. 2017. Available at: <https://www.hosonline.org/globalassets/hos-online/publications/cms-omh-data-highlight-vol10-aug-2017.pdf>. Accessed on: March 7, 2023.
- ⁶⁰ CMS Office of Minority Health and HSAG. *Understanding the Health Needs of Diverse Groups of Hispanic Medicare Beneficiaries*. Baltimore, MD. 2018. Available at: <https://www.cms.gov/About-CMS/Agency-Information/OMH/Downloads/CMS-OMH-October2018-Hispanic-Medicare-Benes-Highlight.pdf>. Accessed on: March 7, 2023.
- ⁶¹ Iqbal SU, Rogers W, Selim A, et al. The Veterans RAND 12 Item Health Survey (VR-12): What it is and How it is Used. 2007. Available at: https://hosonline.org/globalassets/hos-online/publications/veterans_rand_12_item_health_survey_vr-12_2007.pdf. Accessed on: March 7, 2023.
- ⁶² Kazis LE, Selim A, Rogers W, et al. Dissemination of methods and results from the Veterans Health Study: final comments and implications for future monitoring strategies within and outside the Veterans Health Care System. *Journal of Ambulatory Care Management*. 2006; 29(4):310-319.
- ⁶³ Kazis LE, Miller DR, Skinner KM, et al. Applications of methodologies of the Veterans Health Study in the VA Health Care System: conclusions and summary. *Journal of Ambulatory Care Management*. 2006; 29(2):182-188.
- ⁶⁴ Boston University School of Public Health. *VR-36, VR-12 and VR-6D Overview*. Available at: <https://www.bu.edu/sph/about/departments/health-law-policy-and-management/research/vr-36-vr-12-and-vr-6d/>. Accessed on: March 7, 2023.
- ⁶⁵ Jones D, Kazis LE, Lee A, et al. Health status assessments using the Veterans SF-36 and SF-12: Methods for evaluating outcomes in the Veterans Health Administration. *Journal of Ambulatory Care Management*. 2001; 24(3):1-19.
- ⁶⁶ Kazis LE, Lee A, Spiro III A, et al. Measurement comparisons of the Medical Outcomes Study and the Veterans SF-36 Health Survey. *Health Care Financing Review*. 2004; 25(4):43-58.
- ⁶⁷ Kazis LE, Miller DR, Clark JA, et al. Improving the response choices on the Veterans SF-36 Health Survey role functioning scales: results from the Veterans Health Study. *Journal of Ambulatory Care Management*. 2004; 27(3):263-280.

-
- ⁶⁸ Spiro A, Rogers WH, Qian S, et al. *Imputing physical and mental summary scores (PCS and MCS) for the Veterans SF-12 Health Survey in the context of missing data*. Technical Report prepared by: The Health Outcomes Technologies Program, Health Services Department, Boston University School of Public Health, Boston, MA and The Institute for Health Outcomes and Policy, Center for Health Quality, Outcomes and Economic Research, Veterans Affairs Medical Center, Bedford, MA. 2004. Available at: https://hosonline.org/globalassets/hos-online/publications/hos_veterans_12_imputation.pdf. Accessed on: March 7, 2023.
- ⁶⁹ Perlin J, Kazis LE, Skinner K, et al. Health status and outcomes of veterans: physical and mental component summary scores, Veterans SF-36, 1999 Large Health Survey of Veteran Enrollees. Executive Report. *Department of Veterans Affairs, Veterans Health Administration, Office of Quality and Performance*. Washington, DC. 2000.
- ⁷⁰ Selim A, Iqbal SU, Rogers W, et al. *Medicare Health Outcomes Survey: An Alternative Case-Mix Methodology*. Technical Report prepared by: Center for Health Quality, Outcomes, and Economic Research, VA Medical Center, Bedford, Massachusetts. 2007. Available at: https://hosonline.org/globalassets/hos-online/publications/hos_case_mix_final_technical_report.pdf. Accessed on: March 7, 2023.
- ⁷¹ Rogers WH, Gandek B, Sinclair SJ. *Calculating Medicare Health Outcomes Survey Performance Measurement Results*. Technical Report prepared by: Health Assessment Lab, Waltham, MA, The Health Institute, Department of Clinical Care Research, New England Medical Center, Boston, MA. 2004. Available at: https://hosonline.org/globalassets/hos-online/publications/hos_calculating_pm_results.pdf. Accessed on: March 7, 2023.
- ⁷² Centers for Medicare & Medicaid Services. Medicare 2022 Part C & D Star Ratings Technical Notes. Available at: <https://www.cms.gov/files/document/2022-star-ratings-technical-notes-oct-4-2022.pdf>. Accessed on: March 7, 2023.