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**SAMPLE  
2021 COHORT 24  
MEDICARE  
ADVANTAGE  
ORGANIZATION**

**BASELINE  
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

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October 2022

Medicare Advantage Organizations,

The Centers for Medicare & Medicaid Services (CMS) is pleased to provide you with your Medicare Advantage Organization's (MAO) baseline results for *2021 Cohort 24* of the Medicare Health Outcomes Survey (HOS). The *2021 Cohort 24 Baseline* Report includes results from the Medicare HOS Version 3.0. CMS encourages MAOs to examine their results for use in quality improvement activities.

The HOS Baseline Report is distributed to help MAOs identify opportunities to improve their HOS results. Information on the HOS measures used in the Medicare Star Ratings, as well as additional resources to assist MAOs in their quality improvement efforts, are included in the report. The information indicates where beneficiaries are doing poorly, and identifies subgroups where the MAO performance differs from the national average for a specific measure.

For more program information, you may submit inquiries to [hos@hsag.com](mailto:hos@hsag.com), or contact Health Services Advisory Group (HSAG) through the HOS Information and Technical Support telephone line at (888) 880-0077, and you may visit the CMS HOS website at [www.cms.gov/Research-Statistics-Data-and-Systems/Research/HOS](http://www.cms.gov/Research-Statistics-Data-and-Systems/Research/HOS).

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 24 Baseline* Report made available to all Medicare Advantage Organizations (MAOs) participating in the *2021 Cohort 24 Baseline* Medicare Health Outcomes Survey.

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.

The Medicare HOS Information and Technical Support Telephone Line (1-888-880-0077), and Email Address ([hos@hsag.com](mailto:hos@hsag.com)), are available to provide assistance with report questions and interpretation. A full description of the HOS program may be found at [www.HOSonline.org](http://www.HOSonline.org).

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## Executive Summary

This Medicare Health Outcomes Survey (HOS) Baseline Report presents aggregate results for Medicare Advantage Organizations (MAOs), as well as specific results for MAO HXXXXA based on data from the Medicare HOS *2021 Cohort 24 Baseline Survey*. The *2021 Cohort 24 Baseline* survey was fielded from July through November of 2021 and included a random sample of 910,581 members, consisting of both the aged and disabled, from 562 MAOs. The number of members represents a 18.5% increase from the 768,697 members sampled from 509 MAOs that participated in the HOS *2020 Cohort 23 Baseline Survey*.

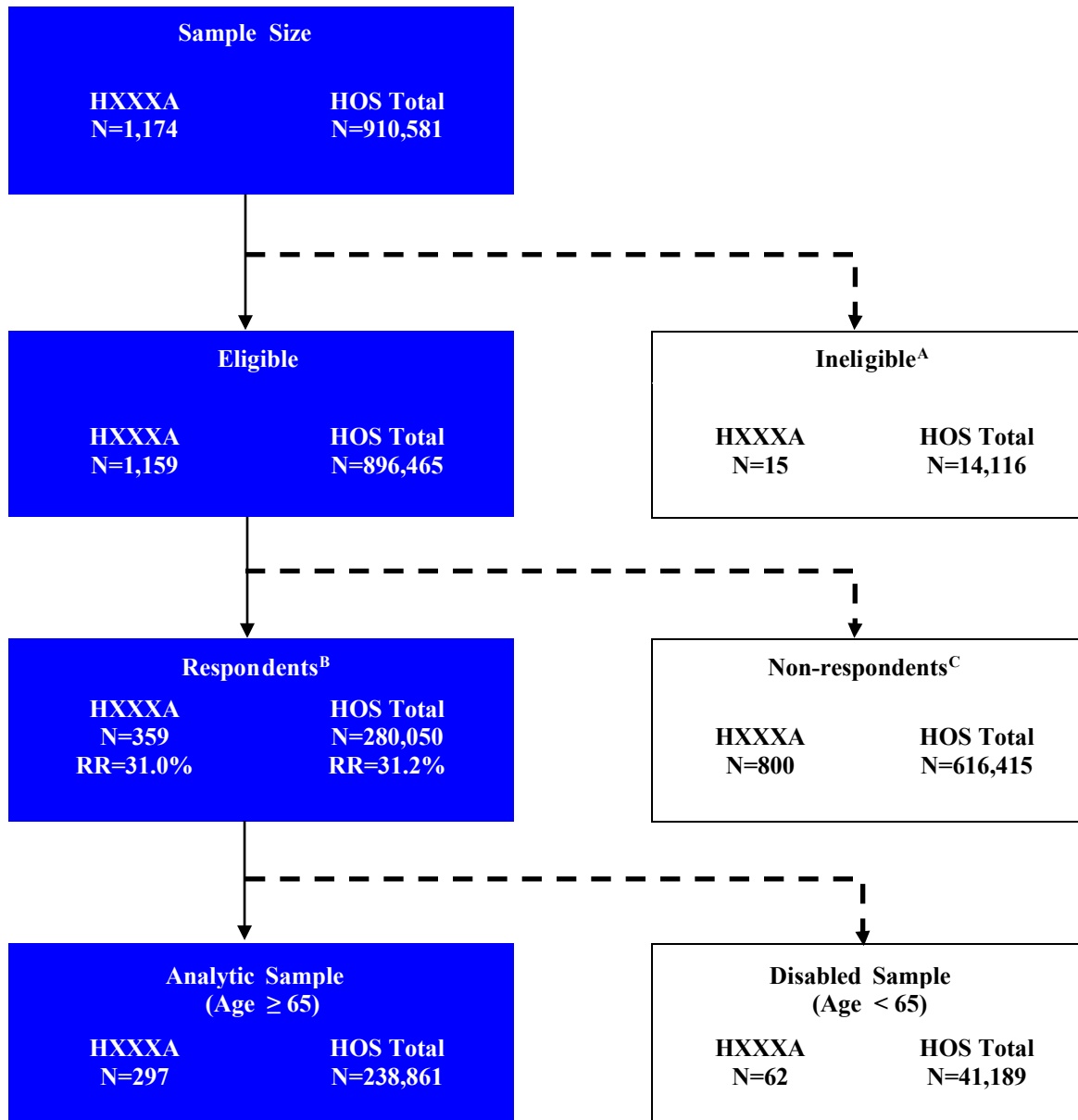
Figure 1 on the following page describes the distribution of the national HOS sample and the response rate for the HOS Total. Of the 910,581 members originally sampled, 14,116 were determined to be ineligible during the survey administration. Ineligible individuals met one of the following criteria: deceased, not enrolled in the MAO, bad address and phone number, bad address and mail-only protocol (*Russian only*), or language barrier. The exclusion of the ineligible individuals from the total sample yields the *Cohort 24 Baseline* eligible sample of 896,465.

Of the total eligible sample, 280,050 (31.2%) completed the survey. For the purposes of this report, a completed survey is defined as one that could be used to calculate a physical component summary (PCS) score or mental component summary (MCS) score. Of those eligible and completing the survey, 238,861 were seniors ( $\geq 65$  years) who comprised the final *2021 Cohort 24 Baseline* analytic sample. Respondents to this baseline cohort will be resurveyed for the *Cohort 24 Follow Up Survey* in 2023. Results from the combined baseline and follow up surveys will be available in the *2021-2023 Cohort 24 Performance Measurement Report* that is planned for distribution in the Summer of 2024.

The baseline results are intended to help MAOs identify areas for potential improvement and to identify areas where they are doing well. On the following pages of this Executive Summary, the reader will find MAO, state, and national results across key indicators of member health status. For instance, the baseline PCS and MCS scores are provided as well as trend results for the measures over three baseline cohorts. This Executive Summary also provides information about general and comparative health, healthy days, and obesity measures obtained from the survey. More detailed information about the results is found in the Baseline Results section of the report.

For MAOs with a small number of respondents, caution should be exercised when drawing conclusions from the results throughout the HOS Baseline Report, as the sample size may be insufficient to allow meaningful interpretation. State and Region level statistics in figures and tables are *not applicable* (NA) for Regional Preferred Provider Organizations (RPPO) and Private Fee-for-Service (PFFS) contracts. For reporting purposes, these types of plans are not included in any specific State or Region results; however, they are included in the HOS Total result.

**Figure 1: 2021 Cohort 24 Baseline Distribution of the Sample and Response Rates for MAO HXXXXA and HOS Total**



<sup>A</sup> Ineligible individuals met one of the following criteria: deceased, not enrolled in the MAO, bad address and phone number, bad address and mail-only protocol (*Russian only*), or language barrier.

<sup>B</sup> Response Rate = [(Respondent Sample/Eligible Sample)] x 100%.

<sup>C</sup> Surveys for which PCS and MCS scores cannot be calculated.



## Summary Score Trends for MAO HXXXXA

### Physical and Mental Health Scores

The primary physical and mental health status measures for the HOS are the PCS and MCS scores.<sup>D</sup> These baseline scores (when combined with the two-year follow up scores and death status) are important components of the HOS results used for the Medicare Star Ratings for all MAOs.<sup>E</sup> 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 baseline PCS and MCS scores are case-mix adjusted to allow for equitable comparisons across all MAOs.<sup>F</sup> For the 2021 HOS national sample, a mean PCS score of 39.5 and a mean MCS score of 52.6 were calculated.

At the national level:

- The mean adjusted PCS score was highest for the 65-69 year age group with a mean PCS of 41.7. As expected, a steady decline with increasing age was pronounced for the physical health measure, with a mean PCS score of 40.7 for 70-74 year olds, 38.9 for 75-79 year olds, and 37.2 for 80-84 year olds. The lowest mean PCS score of 34.7 was for those 85 or older.
- The mean adjusted MCS score was more consistent across age groups, with a mean score of 52.2 for 65-69 year olds, 52.8 for 70-74 year olds, and 52.9 for 75-79 year olds. The mean MCS score for the 80-84 year age group was (52.8) and for those 85 or older was (52.3).

Table 1 presents the mean unadjusted and adjusted PCS and MCS scores for your MAO, your state, and the HOS Total. The results presented in the table are from the *Cohort 24 Baseline* analytic sample. Additionally, in Appendix 2, Table 33 provides the mean unadjusted and adjusted PCS and MCS scores for each MAO in the state, as well as the state total and HOS Total. For detailed information about the scores, please refer to the Baseline Results section. The baseline information summarized in this table is not suitable for MAO level comparisons, and should not be used for public release or marketing purposes.

**Table 1: 2021 Cohort 24 Baseline Mean Unadjusted and Adjusted PCS and MCS Scores for MAO HXXXXA, StateXX, and HOS Total<sup>†</sup>**

	Unadjusted PCS Score (SD)	Adjusted PCS Score (SD)	Unadjusted MCS Score (SD)	Adjusted MCS Score (SD)
HXXXXA	39.0 (12.8)	39.0 ( 7.2)	52.6 (11.8)	52.2 ( 5.6)
StateXX	39.1 (12.6)	39.2 ( 7.0)	52.4 (10.9)	52.5 ( 5.4)
HOS Total	39.5 (12.5)	39.5 ( 7.0)	52.6 (10.9)	52.6 ( 5.4)

<sup>†</sup>See Appendix 2, Table 33 results for each MAO in the state, and Tables 34 and 35 for percentile score distributions.

<sup>D</sup> See Appendix 1 for more information about how PCS and MCS scores are derived from the HOS measure.

<sup>E</sup> For additional information, refer to the HOS and the Star Ratings section of this report.

<sup>F</sup> Case-mix adjustment is a statistical technique that controls for differences in demographics, socioeconomic characteristics, chronic medical conditions, and HOS study design variables.

Table 2 shows the trends in mean unadjusted and adjusted PCS and MCS scores for MAO HXXXXA over the most recent baseline cohorts, where available. The direction of these trends reflects the overall physical and mental health status of your MAO members over time. While the demographics of your members may change, negative trends indicate poorer health status across those questions comprising the PCS and MCS scores.

**Table 2: Trends in Mean Unadjusted and Adjusted PCS and MCS Scores over Three Baseline Cohorts for MAO HXXXXA**

	Unadjusted PCS Score (SD)	Adjusted PCS Score (SD)	Unadjusted MCS Score (SD)	Adjusted MCS Score (SD)
2021 Cohort 24	39.0 (12.8)	39.0 (7.2)	52.6 (11.8)	52.2 (5.6)
2020 Cohort 23	39.9 (12.9)	40.0 (7.5)	52.7 (10.9)	52.7 (5.6)
2019 Cohort 22	39.5 (12.5)	39.4 (7.3)	52.9 (11.1)	52.8 (5.5)

NA in a row indicates that the MAO did not have results for that cohort.

## Health Status Trends for MAO HXXXXA

The *2021 Cohort 24 Baseline Report* includes results for the Medicare population across different indicators of health: general health, comparative physical health, and comparative mental health. The indicator of general self-rated health is used in the calculation of PCS and MCS scores. The comparative health indicators are considered foundational measures of health-related quality of life (HRQOL).

Table 3 describes results for the general and comparative health status of members in your MAO, your state, and the HOS Total. Individuals who indicated that their general health was “Fair” or “Poor,” or that their physical or mental health was “Slightly Worse” or “Much Worse” compared to one year ago may assume greater risk for mortality.<sup>1, 2</sup> Thus, self-rated health status questions are sentinel indicators of underlying health problems that require effective identification and treatment.

**Table 3: 2021 Cohort 24 Baseline Self-Rated General and Comparative Health Status for MAO HXXXXA, StateXX, and HOS Total**

	General Health		Comparative Physical Health		Comparative Mental Health	
	Excellent to Good*	Fair or Poor	Much Better to About the Same*	Slightly Worse or Much Worse	Much Better to About the Same*	Slightly Worse or Much Worse
HXXXXA	66.4%	33.6%	69.1%	30.9%	83.3%	16.7%
StateXX	70.6%	29.4%	71.2%	28.8%	85.5%	14.5%
HOS Total	72.4%	27.6%	71.4%	28.6%	84.7%	15.3%

\* Categories for general health included “Excellent,” “Very good,” or “Good.” Categories for comparative health included “Much better,” “Slightly better,” or “About the same.”

Table 4 shows the results of general and comparative health status for your MAO over the current and previous two baseline cohorts, where available. These trends may change over time based on the composition of your MAO membership. Nevertheless, self-rated health status questions may help your MAO anticipate future health outcomes and health care utilization of your members. Negative trends indicate a decline in perceived health status that may be influenced by current or future disease or injury outcomes.

**Table 4: Trends in Self-Rated General and Comparative Health Status Over Three Baseline Cohorts for MAO HXXXXA**

	General Health		Comparative Physical Health		Comparative Mental Health	
	Excellent to Good*	Fair or Poor	Much Better to About the Same*	Slightly Worse or Much Worse	Much Better to About the Same*	Slightly Worse or Much Worse
2021 Cohort 24	66.4%	33.6%	69.1%	30.9%	83.3%	16.7%
2020 Cohort 23	75.9%	24.1%	74.3%	25.7%	84.6%	15.4%
2019 Cohort 22	74.5%	25.5%	68.9%	31.1%	88.1%	11.9%

\* Categories for general health included “Excellent,” “Very good,” or “Good.” Categories for comparative health included “Much better,” “Slightly better,” or “About the same.”

NA in a row indicates that the MAO did not have results for that cohort.

Table 5 illustrates the percentage of members with 14 or more days of poor physical health, poor mental health, and activity limitations in the past 30 days for your MAO, your state, and the HOS Total. In general, 14 or more days of poor health or activity limitations are considered indicative of poor well-being.<sup>3</sup> These HRQOL measures help identify vulnerable sub-populations with the greatest risk for disease or injury.

**Table 5: 2021 Cohort 24 Baseline 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
HXXXXA	20.4%	13.1%	17.4%
StateXX	21.3%	12.8%	16.0%
HOS Total	20.9%	12.7%	15.0%

Table 6 below describes the Healthy Days results for your MAO over the current and previous two baseline cohorts, where available. Your MAO may consider using these HRQOL indicators as tools to evaluate the distal or environmental factors that influence health (i.e., access to care and social support).<sup>3</sup> The health status of your members may improve as these broader influences on health are incorporated into quality improvement efforts.

**Table 6: Trends in Healthy Days Measures over Three Baseline Cohorts for MAO HXXXXA**

	14 or More Days of Poor Physical Health	14 or More Days of Poor Mental Health	14 or More Days of Activity Limitations
2021 Cohort 24	20.4%	13.1%	17.4%
2020 Cohort 23	19.2%	11.1%	15.8%
2019 Cohort 22	24.5%	12.8%	18.0%

NA in a row indicates that the MAO did not have results for that cohort.

Table 7 depicts the distribution of Body Mass Index (BMI)<sup>G,H</sup> for members in your MAO, your state, and the HOS Total. Healthy People 2030 set a target to reduce the proportion of obesity to 36% in the adult population.<sup>4</sup> Underweight and obesity are threats to the health status of older adults. Underweight in the elderly is usually caused by disease and acts as an effect modifier on the relationship between aging and muscle loss. Rapid unintentional weight loss hastens the muscle loss usually associated with increasing age.<sup>5</sup> On the other hand, obesity increases the risk for chronic diseases such as hypertension and type-2 diabetes. According to an analysis of obesity prevalence in MAOs, individuals who were obese accounted for significantly poorer health outcomes and higher utilization of health care services when compared to individuals who were overweight.<sup>6</sup> Helping your members maintain a healthy weight may increase their quality of life and reduce health care expenditures.

**Table 7: 2021 Cohort 24 Baseline BMI Measures for MAO HXXXXA, StateXX, and HOS Total**

	Underweight (BMI <18.5)	Normal Weight (BMI 18.5 to 24.99)	Overweight (BMI 25 to 29.99)	Obese (BMI ≥30)
HXXXXA	1.5%	35.7%	36.1%	26.8%
StateXX	2.3%	31.0%	35.6%	31.1%
HOS Total	2.3%	29.5%	35.8%	32.4%

Table 8 illustrates the distribution of BMI categories for your MAO over the current and previous two baseline cohorts, where available. As of 2018, obesity rates were still high and variables such as geographic location and socioeconomic status influenced these figures.<sup>7</sup> Although the composition of your MAO beneficiaries may change from year to year, these trend data allow your MAO to monitor the direction of the prevalence of obesity within your membership. Successful efforts to move individuals into the normal weight category may reduce the incidence of negative health outcomes directly linked to either underweight or obesity.

**Table 8: Trends in BMI Measures over Three Baseline Cohorts for MAO HXXXXA**

	Underweight (BMI <18.5)	Normal Weight (BMI 18.5 to 24.99)	Overweight (BMI 25 to 29.99)	Obese (BMI ≥30)
2021 Cohort 24	1.5%	35.7%	36.1%	26.8%
2020 Cohort 23	2.8%	26.5%	40.6%	30.2%
2019 Cohort 22	1.6%	27.8%	37.4%	33.2%

NA in a row indicates that the MAO did not have results for that cohort.

<sup>G</sup> 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  $\text{kg}/\text{m}^2$  units.

<sup>H</sup> 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." Trend tables also reflect the revised calculation for prior years.

## Reader's Guide

The Reader's Guide is provided to assist MAOs in using their Medicare HOS Baseline Report information effectively. This section will guide the reader to identify key topics, such as the CMS Medicare Star Ratings, and answer general questions about the reports and data. For further assistance, please refer to the Technical Assistance information below. Additionally, the HOS Highlights section in this report has information about new website content, webinars, and HOS program updates.

### Technical Assistance

The Medicare HOS Information and Technical Support Telephone Line (1-888-880-0077) and Email Address ([hos@hsag.com](mailto:hos@hsag.com)) are available to assist with report questions and interpretation. The CMS HOS website provides general information on the program ([www.cms.gov/Research-Statistics-Data-and-Systems/Research/HOS](http://www.cms.gov/Research-Statistics-Data-and-Systems/Research/HOS)). A full description of the HOS program is available at [www.HOSonline.org](http://www.HOSonline.org).

### How to Use the Information in this Report

The reports are 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 additional detail is included to help plans identify potential areas for further investigation.

### What information can I find in this Baseline Report?

A random sample of people with Medicare is drawn from each participating MAO and surveyed every spring (i.e., the HOS questionnaire is administered to a different baseline cohort, or group, each year). The results for key health indicators derived from the HOS are provided in the report. Please refer to the description of each report section below and to the Table of Contents for the specific section pages.

- **HOS Highlights:** 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. The *Improving or Maintaining Physical Health* and *Improving or Maintaining Mental Health* measures are reported in the HOS Performance Measurement Report. The *Improving Bladder Control*, *Monitoring Physical Activity*, and *Reducing the Risk of Falling* measures, previously reported in the HOS Baseline Report, are reported in the HEDIS<sup>®</sup> HOS Effectiveness of Care Report. Between 2012 and 2020, the Osteoporosis Testing in Older Women (OTO) measure was part of the Medicare Part C display measures on the CMS website. As of the 2021 HOS survey administration year, the OTO measure has been retired by the measure steward, NCQA. OTO data are no longer available, and all references to the measure have been removed. Information about

the Medicare Star Ratings is also available in the HOS and the Star Ratings section of this report.

- **2021 Cohort 24 Baseline Results:** provides results for the MAO and national HOS Total analytic samples including a summary of the number of participating members, the response rates, and demographic information. Detailed results are also provided for key health indicators derived from the HOS, such as physical component summary (PCS) and mental component summary (MCS) scores, Physical Functioning Activities of Daily Living (PFADL) scores, General Health and Comparative Health, Depression, Pain, Chronic Medical Conditions, Activities of Daily Living (ADLs), Healthy Days Measures, Body Mass Index (BMI), and Sleep Measures. In this section, demographic tables compare the MAO to the HOS Total, where estimates highlighted in **red** indicate groups in the MAO that are worse off than the overall HOS sample.
- **Appendix 1:** describes the program, sampling methodology, survey administration, and the HOS 3.0 instrument. Information is included about the questions used in the calculation of PCS and MCS scores, and case-mix adjustment of the scores.
- **Appendix 2:** includes a table that reports PCS and MCS scores for each MAO in the state, the state total, and HOS Total. Two new tables provide distributions of PCS and MCS percentile scores for your MAO, the state total, and HOS Total.
- **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](http://www.HOSonline.org). A table of MAO report and data distribution 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](http://www.medicare.gov/plan-compare) website and awards quality bonus payments to 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 Baseline Reports distributed?**

All reports are distributed electronically to participating MAOs through the CMS Health Plan Management System (HPMS), which requires an HPMS User ID. The HOS Baseline Reports are distributed in a ZIP file one year after data collection. Downloads include the PDF report and the summary-level data in a CSV file that contains contract-level survey responses and demographic data. Please visit the 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](http://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](mailto:hpms_access@cms.hhs.gov).

### **When will MAOs receive member-level data for *Cohort 24 Baseline*?**

The merged baseline and follow up member-level data will be distributed to the MAOs in 2024, after completion of the 2023 follow up survey. Data availability is expected to coincide with the release of the *2021-2023 Cohort 24 Performance Measurement Report* in 2024. MAOs are notified via HPMS about the report and data availability and how to request their merged data.

### **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](http://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. Participating MAOs may also access their earlier reports through HPMS.

### **Need More Help?**

- MAOs are encouraged to direct their questions to the HOS Technical Support Team at Health Services Advisory Group (HSAG) at [hos@hsag.com](mailto: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](http://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 that is specified in the NCQA HEDIS<sup>1</sup> Measurement Year (MY) 2020, Volume 6: Specifications for the Medicare Health Outcomes Survey manual.<sup>8</sup> The most recent HEDIS Volume 6 manuals are available at no cost from the NCQA Store (<https://store.ncqa.org/hedis-quality-measurement/hedis-specifications-for-the-medicare-health-outcomes-survey.html>). Copies of older editions of HEDIS publications may be obtained by calling NCQA Customer Support at 1-888-275-7585.

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<sup>1</sup> HEDIS is a registered trademark of the National Committee for Quality Assurance (NCQA).

## HOS Highlights

### Physical Functioning Activities of Daily Living (PFADL) Display Measure

The longitudinal PFADL change score measure is part of the 2023 display measures on both the CMS website and the 2023 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. The unadjusted PFADL scale score has been added to the Baseline report. 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](http://www.HOSonline.org)).

### Implementation of HOS 3.0

The 2021 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 Healthcare Effectiveness Data and Information Set (HEDIS®)<sup>J</sup> Effectiveness of Care measures are the *Management of Urinary Incontinence in Older Adults*, *Physical Activity in Older Adults*, and *Fall Risk Management*. The HOS survey instrument can be downloaded from NCQA's website ([www.ncqa.org/hedis/measures/hos](http://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
- Clearinghouse of electronic information about journal articles, bibliographies, and technical reports relating to the HOS
- Links to project partners

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<sup>J</sup> HEDIS is a registered trademark of the National Committee for Quality Assurance (NCQA).



## 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](mailto:hos@hsag.com).

## CMS Approved Survey Vendors

The [Survey Vendors](#) section under the Program page on the HOS website provides an annual list of CMS approved survey vendors. Survey vendors are required to reapply for approval each year. There were four survey vendors approved to administer the HOS in 2021.

## Frequently Asked Questions (FAQs)

The “FAQs” link at the bottom of site webpages ([www.HOSonline.org](http://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](http://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 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 Medicare Advantage (MA) Plan Ratings, also called the Medicare 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/](http://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](http://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 2022 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<sup>®</sup>) survey, and plan responsiveness.

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

The 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.

- *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

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

## 2022 and 2023 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 2022 Medicare Part C Star Ratings were posted on October 8, 2021. Data sources for the 2022 Star Ratings are highlighted yellow in the table below. For instance, the HOS *2018-2020 Cohort 21 Merged Baseline and Follow Up* dataset was used for the PCS and MCS functional health measures, and the combined *2020 Cohort 23 Baseline and 2020 Cohort 21 Follow Up* dataset was used for the HEDIS Effectiveness of Care measures.

The 2023 Medicare Part C Star Ratings will be posted in October 2022 and are highlighted green in the table below. The *2019-2021 Cohort 22 Merged Baseline and Follow Up* dataset will be used for the PCS and MCS functional health measures, and the combined *2021 Cohort 24 Baseline and 2021 Cohort 22 Follow Up* dataset will be used for the 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](mailto: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
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 &amp; 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 &amp; 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 &amp; 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 &amp; 2019 Cohort 20 Follow Up</i>	2021
2020	<i>Cohort 23</i>	<i>Cohort 21</i>	<i>Cohort 22</i>	<i>Cohort 20</i>	<i>2016-2018 Cohort 19</i>	<i>2018 Cohort 21 Baseline &amp; 2018 Cohort 19 Follow Up</i>	2020

\* 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](http://www.HOSonline.org).<sup>9</sup> 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](http://www.HOSonline.org).<sup>10</sup> 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](http://www.HOSonline.org).<sup>11</sup> 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](http://www.HOSonline.org). The study results may be found and downloaded from the Applications section of the Resources page.

## 2021 Cohort 24 Baseline Results

This report presents the Medicare HOS *2021 Cohort 24 Baseline* results for MAO HXXXXA and the national HOS Total. The aggregate data are provided to facilitate internal quality improvement activities. **Please be advised that the information in this report is not suitable for MAO level comparisons. Therefore, these data should not be used for public release or marketing purposes.**

### Distribution of the Sample and Response Rates

The HOS *2021 Cohort 24 Baseline* included a random sample of 910,581 members, both the aged and disabled, from 562 MAOs. The number represents a 18.5 % increase from the 768,697 people sampled from 509 MAOs in the HOS *2020 Cohort 23 Baseline*.

Of the 910,581 members originally sampled for the *2021 Cohort 24 Baseline*, 14,116 were determined to be ineligible during the survey administration. Ineligible individuals of the sample met one of the following criteria: deceased; not enrolled in the MAO; bad address and phone number; bad address and mail-only protocol (*Russian only*); or language barrier. Removing the ineligible individuals from the total sample yielded the *Cohort 24 Baseline* eligible sample of 896,465.

Of the 896,465 members in the eligible sample, 31.2% (280,050) completed the baseline survey. For the purposes of this report, a completed survey was defined as one that could be used to calculate a PCS or MCS score.<sup>K</sup>

The 896,465 members of the *Cohort 24 Baseline* eligible sample included 724,468 seniors (age 65 or older). Of the 724,468 eligible seniors sampled, 238,861 completed the baseline survey. This group of seniors comprised the *Cohort 24 Baseline* analytic sample. Please refer to Figure 2 on the following page for a graphical depiction of the response rates and distribution of the sample. 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.

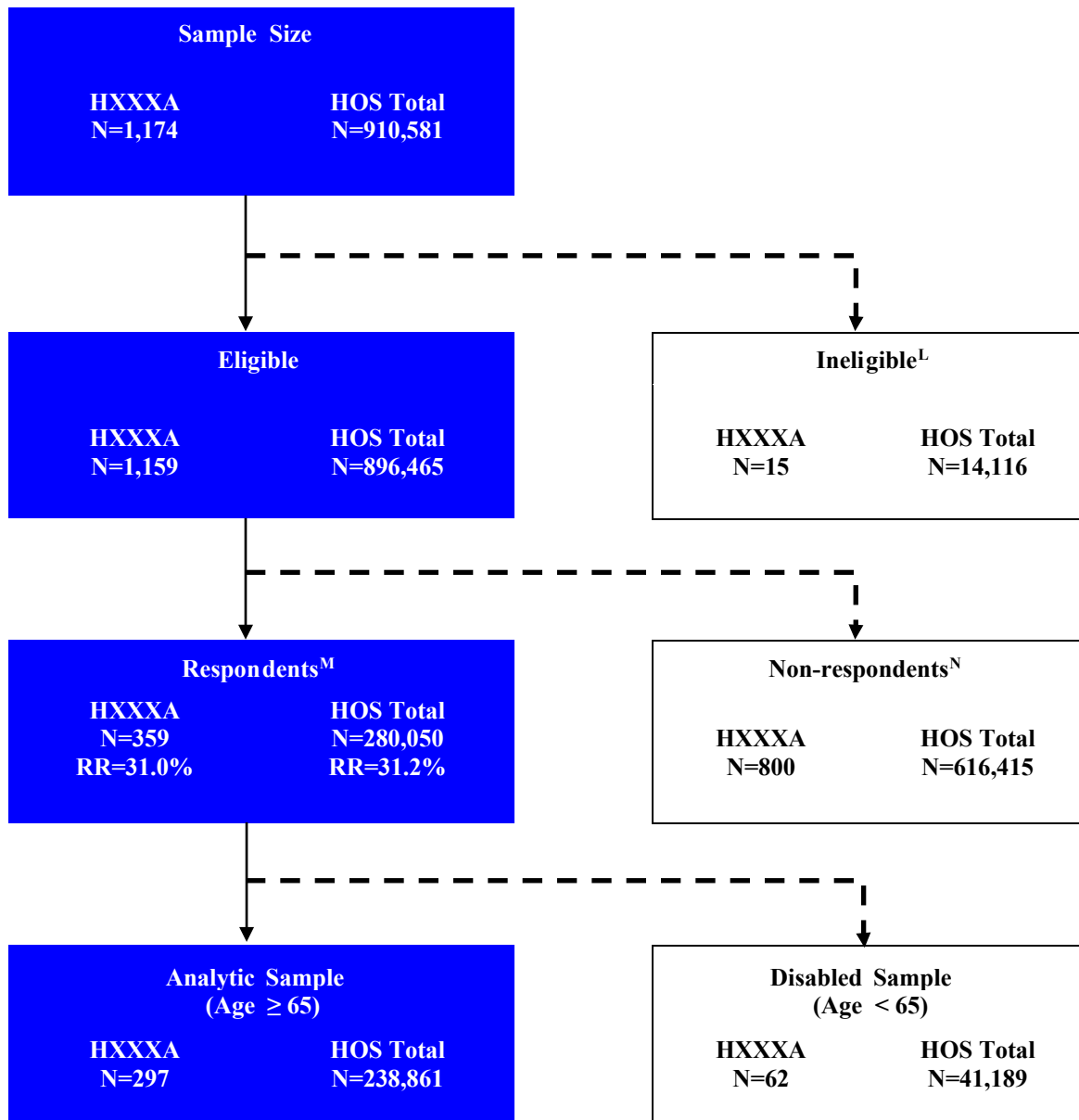
The average number of senior respondents per MAO was 426, with a minimum of 1 and a maximum of 1,574 respondents. The top 25% of MAOs had 470 or more senior respondents, while 25% had 265 or less. Ten percent of the MAOs had 862 or more respondents, and ten percent had 184 or fewer respondents. Based on the analytic criteria, the mean MAO level response rate at baseline for seniors was 32.8%, with a minimum response rate of 8.5% and a maximum of 57.7%. The top 25% of MAOs had a response rate of 36.8% or greater, while 25% had a response rate of 28.9% or less. Ten percent of the MAOs had a response rate of 40.6% or higher and ten percent had a response rate of 24.6% or lower.

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<sup>K</sup> The overall response rates in the report are calculated after data processing and score calculation. An initial overall survey completion rate was calculated by NCQA following the data collection and used the criteria of at least 80% completion of survey items and all 6 Activity of Daily Living (ADL) questions answered. This initial rate may be reported elsewhere and will differ from the overall response rate in this report.

Figure 2 illustrates the calculation of the response rates, the distribution of the eligible sample, and the process for determining the number of members in the analytic sample for MAO HXXXA and the HOS Total. All analyses in this report use the *Cohort 24 Baseline* analytic sample of seniors.

**Figure 2: 2021 Cohort 24 Baseline Distribution of the Sample and Response Rates for MAO HXXXA and HOS Total**



<sup>L</sup> Ineligible individuals met one of the following criteria: deceased, not enrolled in MAO, bad address and phone number, bad address and mail-only protocol (*Russian only*), or language barrier.

<sup>M</sup> Response Rate = [(Respondent Sample/Eligible Sample)] x 100%.

<sup>N</sup> Surveys for which PCS and MCS scores cannot be calculated.

## Demographics

Table 9 presents demographics for MAO HXXXXA and the HOS Total. The mean age for the HOS Total sample was 74.7 years (not shown in the table). HOS demographics in the table are detailed by sub-categories within the age, gender, race, marital status, education, annual household income, and Medicaid status groups.

**Table 9: 2021 Cohort 24 Baseline Demographics for MAO HXXXXA and HOS Total**

HOS Demographic	MAO HXXXXA N (%)	HOS Total N (%)
<b>Age</b>	(N=297)	(N=238,861)
65-69	83 (27.9%)	67,535 (28.3%)
70-74	89 (30.0%)	66,326 (27.8%)
75-79	56 (18.9%)	48,326 (20.2%)
80-84	36 (12.1%)	31,214 (13.1%)
85+	33 (11.1%)	25,460 (10.7%)
<b>Gender</b>	(N=297)	(N=238,861)
Male	118 (39.7%)	99,207 (41.5%)
Female	179 (60.3%)	139,654 (58.5%)
<b>Race</b>	(N=297)	(N=238,861)
White	217 (73.1%)	181,156 (75.8%)
Black	40 (13.5%)	29,289 (12.3%)
Other/Unknown	40 (13.5%)	28,416 (11.9%)
<b>Marital Status</b>	(N=281)	(N=225,523)
Married	129 (45.9%)	108,869 (48.3%)
Widowed	62 (22.1%)	52,235 (23.2%)
Divorced or Separated	65 (23.1%)	47,924 (21.3%)
Never Married	25 (8.9%)	16,495 (7.3%)
<b>Education</b>	(N=272)	(N=222,572)
Did Not Graduate HS	55 (20.2%)	37,959 (17.1%)
High School Graduate	72 (26.5%)	67,205 (30.2%)
Some College	65 (23.9%)	60,367 (27.1%)
4 Year Degree or Beyond	80 (29.4%)	57,041 (25.6%)
<b>Annual Household Income</b>	(N=261)	(N=210,005)
Less than \$10,000	34 (13.0%)	26,965 (12.8%)
\$10,000-\$19,999	41 (15.7%)	35,559 (16.9%)
\$20,000-\$29,999	34 (13.0%)	28,087 (13.4%)
\$30,000-\$49,999	43 (16.5%)	39,151 (18.6%)
\$50,000 or More	75 (28.7%)	54,633 (26.0%)
Don't Know	34 (13.0%)	25,610 (12.2%)
<b>Medicaid Status</b>	(N=297)	(N=238,861)
Medicaid	87 (29.3%)	64,553 (27.0%)
Non-Medicaid	210 (70.7%)	174,308 (73.0%)



## Physical (PCS) and Mental (MCS) Component Summary Scores

### Definition of Measures

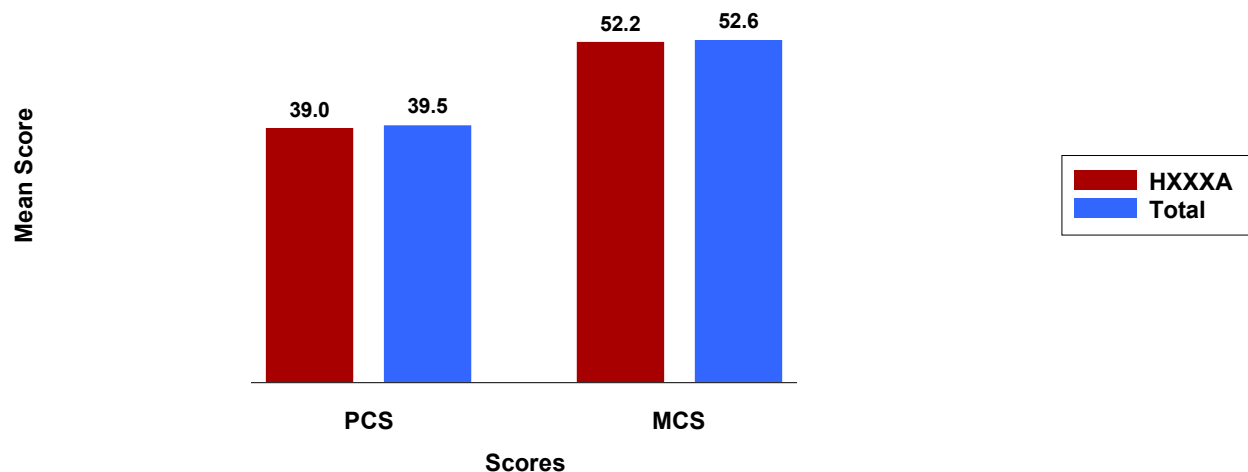
- The HOS health status measures are the PCS score and the MCS score. These scores are calculated from the VR-12 (Questions 1-7 in the HOS 3.0) which asks respondents about their usual activities and how they would rate their health.
- The VR-12 is a barometer of physical and mental health status. Concepts included in the measures are: physical functioning, role limitations due to physical problems (role-physical), bodily pain, general health, vitality, role limitations due to emotional problems (role-emotional), social functioning, and mental health.
- A higher PCS or MCS score reflects better health status. The PCS and MCS scores are case-mix adjusted<sup>o</sup> to allow for equitable comparisons across all MAOs.

### How Is Your MAO Doing?

Figure 3 depicts the mean adjusted PCS and MCS scores for MAO HXXXXA and the HOS Total. For the HOS Total, the mean PCS of 39.5 indicates that the physical health status of seniors is substantially lower, on average, than the mean PCS of 50 (SD=10) for the general U.S. population. The mean MCS of 52.6 indicates that the mental health status of seniors is slightly higher, on average, than the mean MCS of 50 (SD=10) for the general U.S. population.

For additional mean unadjusted and adjusted PCS and MCS scores, refer to the Executive Summary section. **Only adjusted scores are displayed in the tables and graphs in the remainder of the report.**

**Figure 3: 2021 Cohort 24 Baseline Mean Adjusted PCS and MCS Scores for MAO HXXXXA and HOS Total**



<sup>o</sup> Case-mix adjustment is a statistical technique that controls for differences in demographics, socioeconomic characteristics, chronic medical conditions, and HOS study design variables. For additional information about case-mix adjustment and scoring for the VR-12, please refer to Appendix 1.

## PFADL Scale Score

### *Definition of Measure*

- The PFADL scale combines two VR-12 physical functioning (PF) questions (Questions 2a-b about limitations in moderate activities or climbing stairs) with the six ADL questions (Questions 10a-f about difficulty with bathing, dressing, eating, walking, getting in and out of chairs, or using the toilet) to create a Likert-type scale ranging from 0-16.
- To create the PFADL scale score, each PF and ADL item is scored from 0-2 points, where a physical limitation or inability to perform an ADL = 0 points, some limitation or difficulty = 1 point, and no limitation or difficulty = 2 points. The unadjusted PFADL scale score is the sum of the points from the 8 items; the score ranges from 0 to 16, where a higher score is better.

The PFADL scale has been used since the *1998-2000 Cohort 1 Performance Measurement* as a covariate in death models to measure baseline functional status for the calculation of the 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.

The PFADL change score is created from the baseline and the two-year follow up scale scores and is posted as a display measure on the 2023 Star Ratings Validation table in HPMS. A detailed methodology used to create the PFADL change score is described on the Survey Results page of the HOS website at [www.hosonline.org](http://www.hosonline.org).

### *How Is Your MAO Doing?*

Table 10 depicts the mean PFADL scale score for MAO HXXXXA, StateXX, and the HOS Total. PFADL scale scores range from 0 to 16.

**Table 10: 2021 Cohort 24 Baseline Mean PFADL Scale Scores for MAO HXXXXA, StateXX, and HOS Total**

	Mean PFADL Scale Score
HXXXXA	13.17
StateXX	13.23
HOS Total	13.25

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 scale score for MAO HXXXXA, StateXX, and the HOS Total. At the national level, the mean PFADL scale score is 13.25, with a minimum of 0 and maximum of 16.00. The top 25% of MAOs had scores of 16.00, while 25% had scores of 12.00 or lower. Ten percent of MAOs had scores of 16.00, and 10% had scores of 9.00 or lower.

**Table 11: 2021 Cohort 24 Baseline Distribution of Mean PFADL Scale Scores for MAO HXXXXA, StateXX, and HOS Total**

	Mean	SD	P10	P25	Median	P75	P90	Min	Max
HXXXXA	13.17	2.93	9.00	11.50	14.00	16.00	16.00	3.00	16.00
StateXX	13.23	2.92	9.00	12.00	14.00	16.00	16.00	0.00	16.00
HOS Total	13.25	3.00	9.00	12.00	14.00	16.00	16.00	0.00	16.00

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).

## General Health and Comparative Health

### Definition of Measures

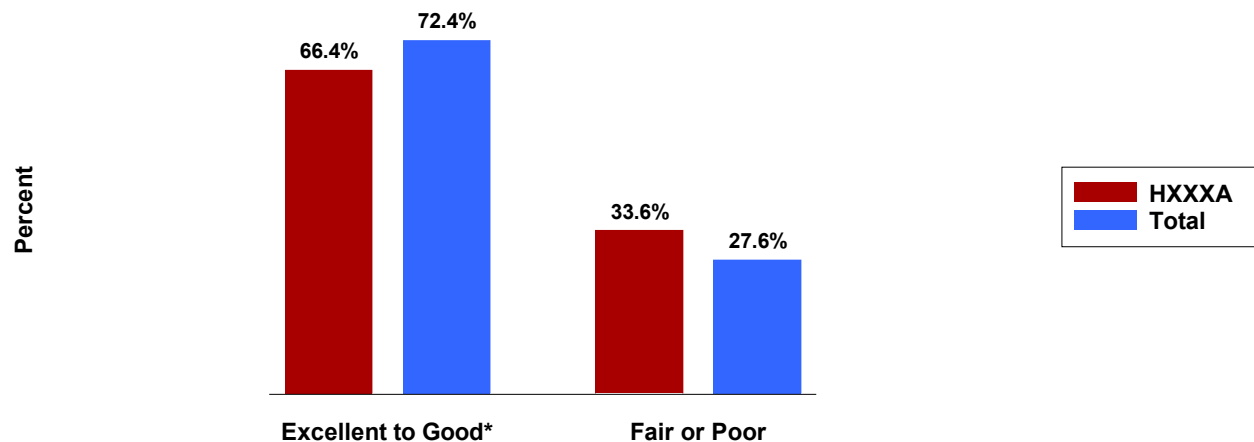
- General health status is a self-reported measure of health perception using ratings of “Excellent,” “Very good,” “Good,” “Fair,” or “Poor.”<sup>12</sup> This measure is found in Question 1 of the HOS.
- Two measures of physical and mental health compared to one year ago use ratings of “Much better,” “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.<sup>1</sup> 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.<sup>13, 14</sup>

### How Is Your MAO Doing?

Figure 4 displays the respondents’ self-reported general health status for your MAO and the HOS Total.

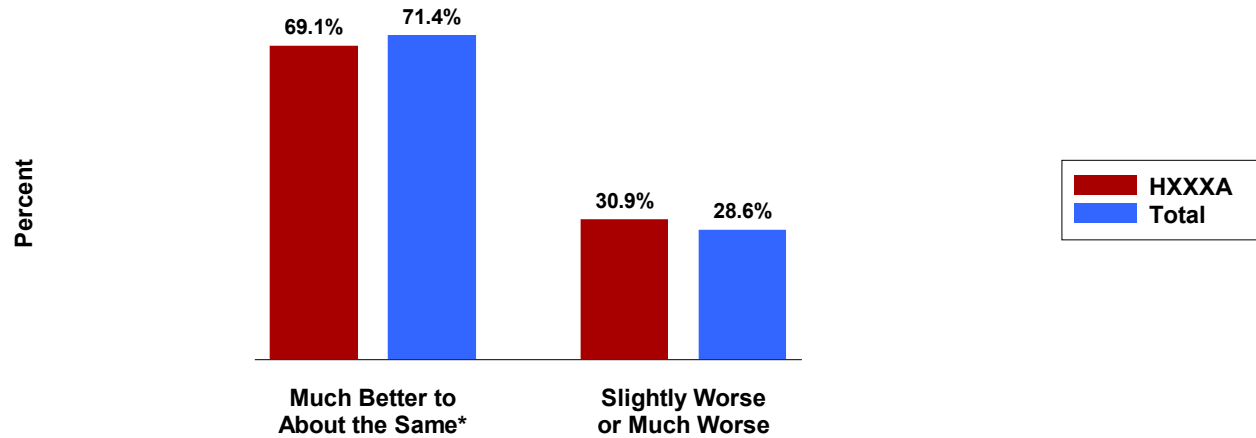
**Figure 4: 2021 Cohort 24 Baseline Self-Rated General Health Status for MAO HXXXXA and HOS Total**



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

Figure 5 displays the respondents' self-reported physical health status as compared to one year ago for your MAO and the HOS Total.

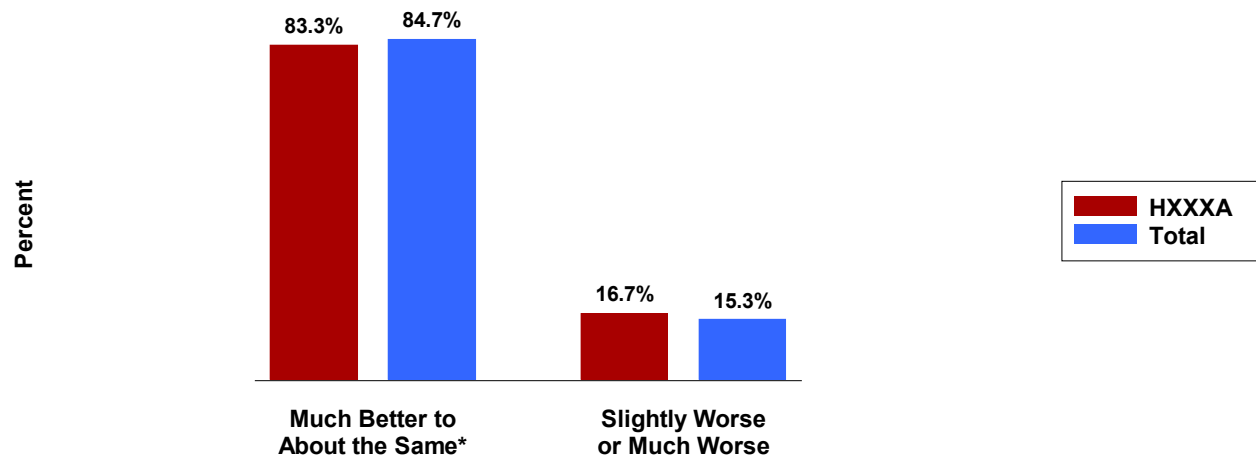
**Figure 5: 2021 Cohort 24 Baseline Self-Rated Physical Health Compared to One Year Ago for MAO HXXXXA and HOS Total**



\* Categories for comparative health included "Much better," "Slightly better," or "About the same."

Figure 6 displays the respondents' self-reported mental health status as compared to one year ago for your MAO and the HOS Total.

**Figure 6: 2021 Cohort 24 Baseline Self-Rated Mental Health Compared to One Year Ago for MAO HXXXXA and HOS Total**



\* Categories for comparative health included "Much better," "Slightly better," or "About the same."

Table 12 compares the self-reported general and comparative health status measures by adjusted PCS and MCS scores for MAO HXXXXA and the HOS Total.

**Table 12: 2021 Cohort 24 Baseline Mean Adjusted Scores by Self-Rated General and Comparative Health Status for MAO HXXXXA and HOS Total**

Self-Rated Health Status	MAO HXXXXA		HOS Total	
	PCS Mean (SD)	MCS Mean (SD)	PCS Mean (SD)	MCS Mean (SD)
<b>General Health</b>				
Excellent to Good*	41.1 (6.7)	53.8 (4.8)	41.3 (6.4)	53.8 (4.8)
Fair or Poor	35.0 (6.2)	49.2 (5.7)	34.9 (6.4)	49.5 (5.7)
<b>Comparative Health-Physical</b>				
Much Better to About the Same**	40.4 (7.1)	53.1 (5.1)	40.9 (6.6)	53.4 (5.0)
Slightly Worse or Much Worse	35.7 (6.9)	50.0 (6.3)	36.3 (6.9)	50.6 (6.0)
<b>Comparative Health-Mental</b>				
Much Better to About the Same**	39.4 (7.3)	53.1 (5.1)	40.2 (6.8)	53.3 (5.0)
Slightly Worse or Much Worse	36.6 (7.1)	47.6 (6.5)	36.2 (7.4)	48.9 (6.4)

\* 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 39a and 39b) that serve as a screening measure for depression.<sup>P</sup> 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.<sup>15, 16</sup> 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.<sup>17</sup> Additionally, depression is significantly associated with other psychological dysfunction, as well as the presence of common chronic medical conditions, such as diabetes.<sup>18, 19</sup> As a result, older adults with depression are frequently misdiagnosed or do not receive proper treatment for their depressive symptoms.<sup>20</sup> Depression screening tools 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.<sup>21, 22</sup> Evidence-based programs have been developed to improve mental health among older adults. Social supports through local area agencies may also be effective.<sup>17</sup>

### How Is Your MAO Doing?

Table 13 depicts members with a positive depression screen, and the distribution of responses to the two individual depression questions for MAO HXXXXA and the HOS Total.

**Table 13: 2021 Cohort 24 Baseline Frequency of Positive Depression Screen for MAO HXXXXA and HOS Total**

Depression Screening Questions	MAO HXXXXA N (%)	HOS Total N (%)
<b>Little interest or pleasure in doing things in past two weeks</b>		
Not at all (0 pts)	188 (65.7%)	151,274 (66.8%)
Several days (1 pt)	55 (19.2%)	45,011 (19.9%)
More than half the days (2 pts)	26 (9.1%)	16,628 (7.3%)
Nearly every day (3 pts)	17 (5.9%)	13,498 (6.0%)
<b>Feeling down, depressed, or hopeless in past two weeks</b>		
Not at all (0 pts)	209 (73.6%)	163,533 (72.7%)
Several days (1 pt)	50 (17.6%)	42,811 (19.0%)
More than half the days (2 pts)	18 (6.3%)	10,965 (4.9%)
Nearly every day (3 pts)	7 (2.5%)	7,586 (3.4%)
<b>Positive Depression Screen*</b>	40 (14.1%)	28,821 (12.9%)

\* 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.

<sup>P</sup> 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.

## Pain

### Definition of Measures

- The HOS includes three questions to measure self-reported pain over the previous seven days. Question 36 asks how much pain interfered with day-to-day activities from 1 (“Not at all”) to 5 (“Very much”), and Question 37 asks how often pain kept the member from socializing from 1 (“Never”) to 5 (“Always”). Both Questions 36 and 37 have five possible categorical responses. Question 38 asks the member to rate his/her average pain, ranging from 0 (“No pain”) to 10 (“Worst imaginable pain”). In 2021, the response scale for question 38 changed from 1 (“No pain”) to 0 (“No pain”). Due to the change, the “No pain” response is not comparable to prior years.

Self-reported pain is common among older adults.<sup>23</sup> Pain may be caused by, and contribute to, many health related quality of life factors,<sup>24,25</sup> 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.<sup>26</sup>

### How Is Your MAO Doing?

Figure 7 shows the distribution of self-reported pain scores, grouped into categories, for MAO HXXXXA and the HOS Total.

**Figure 7: 2021 Cohort 24 Baseline Frequency of Self-Rated Pain Score for MAO HXXXXA and HOS Total**

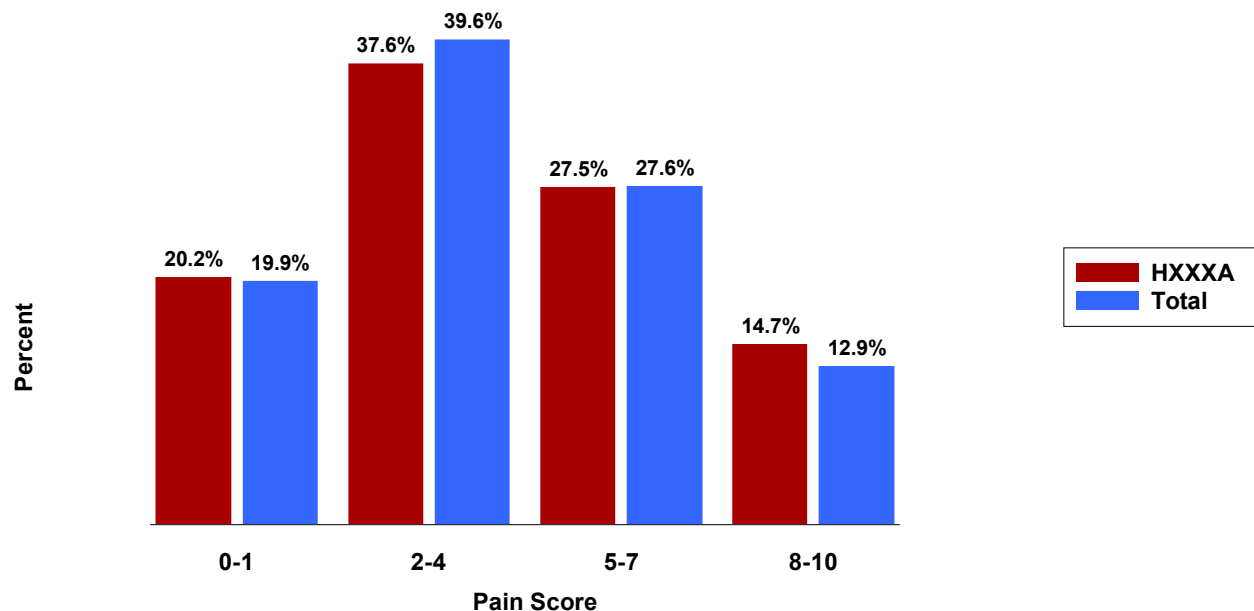




Figure 8 illustrates the relationship between the reported extent that pain interfered with day-to-day activities and mean adjusted PCS score for MAO HXXXA and the HOS Total.

**Figure 8: 2021 Cohort 24 Baseline Mean Adjusted PCS Score by Extent Pain Interfered with Day-to-Day Activities for MAO HXXXA and HOS Total**

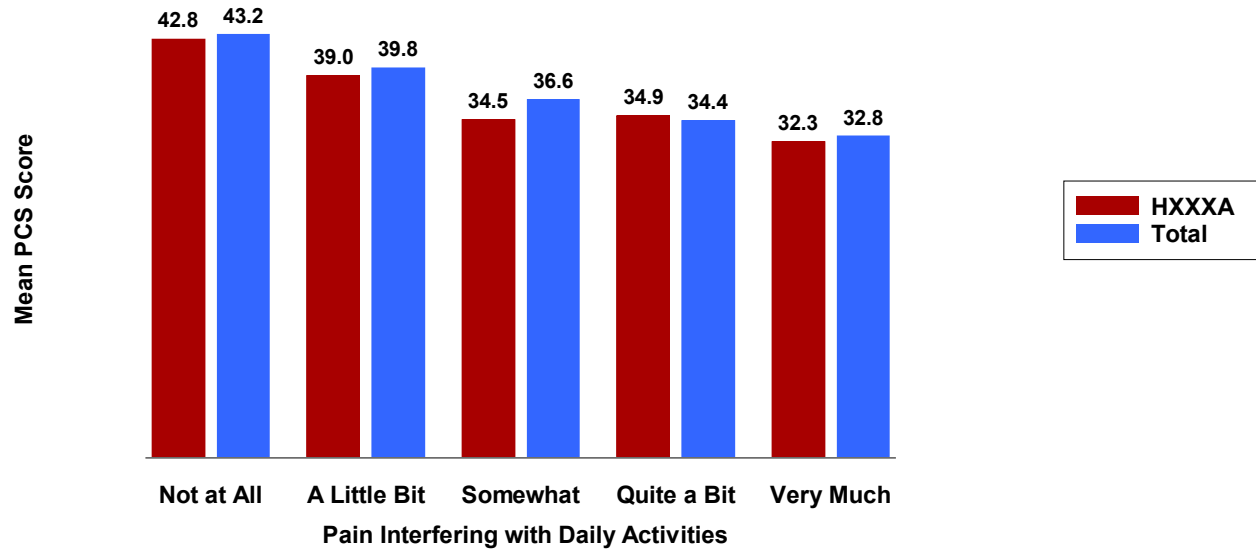
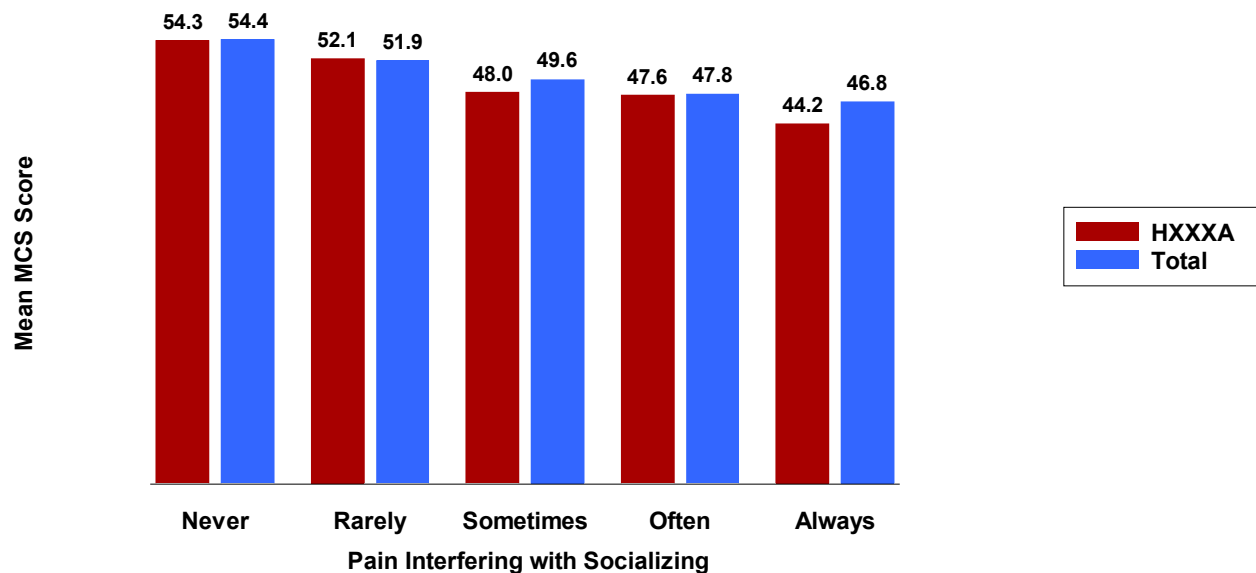


Figure 9 shows the relationship between the reported extent that pain interfered with socialization with others and mean adjusted MCS score for MAO HXXXA and the HOS Total.

**Figure 9: 2021 Cohort 24 Baseline Mean Adjusted MCS Score by Extent Pain Interfered with Socializing with Others for MAO HXXXA and HOS Total**



## 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 activities of daily living. Fifteen measures are found in Questions 20-34.

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.<sup>27</sup> The increased cost associated with chronic disease is an important factor driving overall Medicare spending.<sup>28</sup> 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.<sup>29</sup> 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 14 shows the prevalence of 15 chronic medical conditions in your MAO and the HOS Total. Depression was added to the list of chronic medical conditions in the 2013 HOS 2.5. 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 14: 2021 Cohort 24 Baseline Prevalence of Chronic Medical Conditions for MAO HXXXXA and HOS Total**

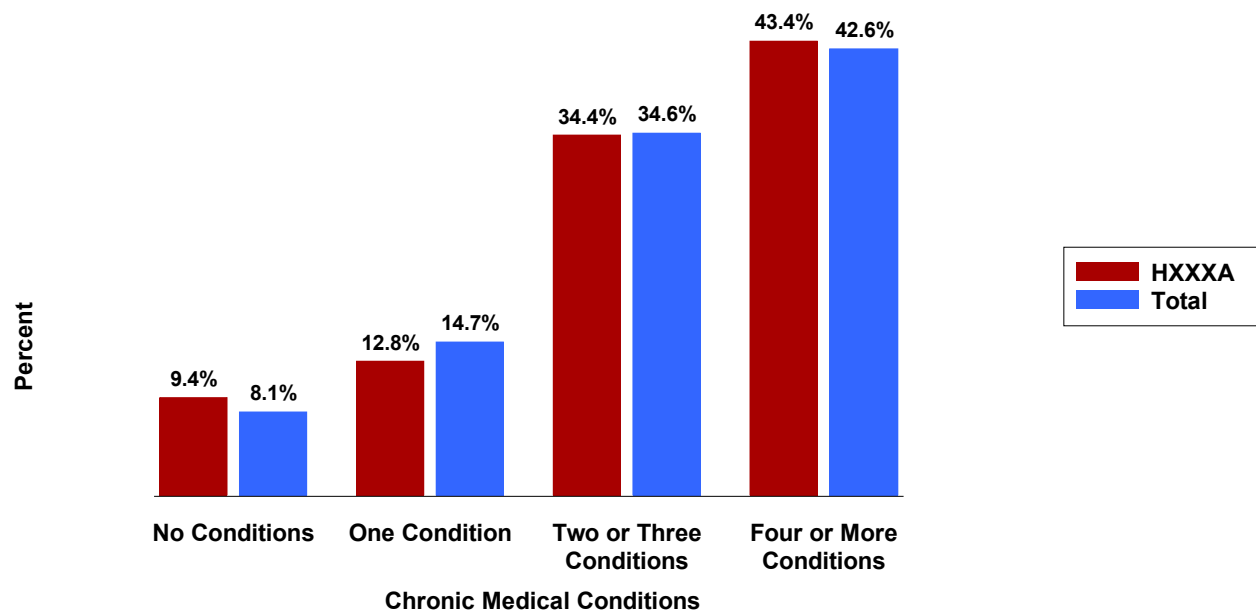
Medical Condition	MAO HXXXXA N (%)	HOS Total N (%)
Hypertension	185 (64.2%)	151,669 (66.3%)
Arthritis - Hip or Knee	122 (43.1%)	102,644 (45.1%)
Arthritis - Hand or Wrist	116 (40.8%)	85,271 (37.5%)
Diabetes	76 (26.7%)	64,059 (28.1%)
Sciatica	84 (29.8%)	62,394 (27.5%)
Other Heart Conditions	67 (23.5%)	48,840 (21.5%)
Osteoporosis	64 (22.9%)	48,835 (21.5%)
Depression	56 (19.9%)	47,105 (20.8%)
Pulmonary Disease	62 (21.9%)	43,184 (18.9%)
Any Cancer (except skin cancer)	37 (14.0%)	33,246 (15.4%)
Coronary Artery Disease	42 (14.7%)	26,968 (11.9%)
Congestive Heart Failure	26 ( 9.1%)	18,954 ( 8.3%)
Myocardial Infarction	17 ( 6.0%)	18,127 ( 8.0%)
Stroke	26 ( 9.3%)	16,908 ( 7.4%)
Gastrointestinal Disease	22 ( 7.7%)	12,281 ( 5.4%)

A longitudinal study using HOS data concluded that multiple conditions at baseline and the 2-year follow up were associated with worse health in terms of ADLs and HRQOL, and are important outcomes for intervention to improve long-term health.<sup>30</sup>

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.<sup>31</sup> 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.<sup>20</sup>

Figure 10 illustrates the distribution of members by number of chronic medical conditions, including categories of none, one, two or three, and four or more chronic conditions for MAO HXXXXA. Compare the percentage of members in your MAO who have multiple chronic conditions with the HOS Total.

**Figure 10: 2021 Cohort 24 Baseline Distribution of Chronic Medical Conditions for MAO HXXXXA and HOS Total**



## 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.<sup>32</sup> 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.<sup>33, 34</sup> IADLs include preparing meals, managing money, and taking medications. These measures are found 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 ability to perform these tasks is predictive of current disease status and mortality risk.<sup>35, 36</sup> Regular assessment of functional status is recommended for improving the effectiveness of care, especially for older adults prior to hospital discharge and those living with dementia.<sup>36</sup>

There are three IADLs in the HOS that examine reported difficulty with the performance of tasks of independence. In comparison to the ADLs, IADLs are considered to recognize earlier changes in functioning, and can be used as an indication of the need for intervention or further medical work-up.<sup>34</sup>

### How Is Your MAO Doing?

Table 15 highlights the prevalence of impairments in performing ADLs and IADLs for members in MAO HXXXXA and the HOS Total.

**Table 15: 2021 Cohort 24 Baseline Prevalence of Impairments in ADLs and IADLs for MAO HXXXXA and HOS Total**

Impairment Type	MAO HXXXXA Impairments N (%)	HOS Total Impairments N (%)
<b>Activities of Daily Living</b>		
Walking	101 (36.2%)	77,297 (34.0%)
Getting in or out of chairs	69 (24.6%)	51,271 (22.4%)
Bathing	41 (14.6%)	34,158 (14.9%)
Dressing	35 (12.4%)	27,106 (11.9%)
Using the Toilet	26 (9.4%)	19,365 (8.6%)
Eating	13 (4.6%)	11,889 (5.2%)
<b>Instrumental Activities of Daily Living*</b>		
Preparing meals	35 (13.3%)	25,063 (12.0%)
Managing money	18 (6.7%)	11,198 (5.2%)
Taking medication as prescribed	17 (6.3%)	11,238 (5.1%)

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

Table 16 presents the mean adjusted PCS scores for MAO HXXXXA and the HOS Total by level of impairment across ADLs and IADLs. You may compare members with and without impairments in your MAO to the HOS Total.

**Table 16: 2021 Cohort 24 Baseline Mean Adjusted PCS Score by ADL and IADL Impairment Status for MAO HXXXXA and HOS Total**

Impairment Type	MAO HXXXXA		HOS Total	
	Impairment PCS Mean (SD)	No Impairment PCS Mean (SD)	Impairment PCS Mean (SD)	No Impairment PCS Mean (SD)
<b>Activities of Daily Living</b>				
Walking	34.7 (6.0)	41.5 (6.9)	35.1 (6.4)	41.9 (6.2)
Getting in or out of chairs	34.5 (6.9)	40.6 (6.8)	34.5 (6.6)	41.1 (6.5)
Bathing	32.8 (6.7)	40.1 (6.9)	33.6 (6.7)	40.6 (6.6)
Dressing	33.0 (7.2)	39.9 (6.9)	33.5 (6.9)	40.4 (6.6)
Using the Toilet	32.6 (6.8)	39.7 (7.0)	33.2 (7.0)	40.2 (6.7)
Eating	32.3 (5.8)	39.3 (7.3)	33.5 (7.2)	39.9 (6.9)
<b>Instrumental Activities of Daily Living*</b>				
Preparing meals	33.7 (5.5)	40.1 (7.1)	34.1 (6.4)	40.8 (6.5)
Managing money	33.5 (5.4)	39.7 (7.3)	34.2 (6.8)	40.2 (6.7)
Taking medication as prescribed	32.7 (5.8)	39.3 (7.1)	32.9 (7.0)	40.0 (6.7)

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

Table 17 presents the mean adjusted MCS scores for MAO HXXXXA and the HOS Total by level of impairment across ADLs and IADLs. You may compare members with and without impairments to the HOS Total.

**Table 17: 2021 Cohort 24 Baseline Mean Adjusted MCS Score by ADL and IADL Impairment Status for MAO HXXXXA and HOS Total**

Impairment Type	MAO HXXXXA		HOS Total	
	Impairment MCS Mean (SD)	No Impairment MCS Mean (SD)	Impairment MCS Mean (SD)	No Impairment MCS Mean (SD)
<b>Activities of Daily Living</b>				
Walking	49.9 (5.9)	53.6 (5.0)	50.3 (5.8)	53.9 (4.8)
Getting in or out of chairs	49.4 (6.2)	53.2 (5.1)	49.7 (6.0)	53.5 (5.0)
Bathing	47.1 (6.2)	53.1 (5.1)	48.7 (6.0)	53.3 (5.0)
Dressing	47.8 (6.3)	52.9 (5.2)	48.5 (6.1)	53.2 (5.1)
Using the Toilet	46.9 (5.9)	52.8 (5.3)	48.3 (6.1)	53.0 (5.2)
Eating	46.6 (6.4)	52.5 (5.5)	47.8 (6.1)	52.9 (5.3)
<b>Instrumental Activities of Daily Living*</b>				
Preparing meals	48.8 (5.3)	53.0 (5.3)	48.9 (5.9)	53.4 (5.0)
Managing money	47.0 (5.5)	52.8 (5.3)	47.7 (5.9)	53.1 (5.1)
Taking medication as prescribed	47.0 (5.8)	52.5 (5.4)	47.3 (6.1)	53.0 (5.2)

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

Table 18 shows the survey respondents by the number of ADL impairments including categories of none, one, two, and three or more ADL impairments for members in MAO HXXXXA and the HOS Total.

**Table 18: 2021 Cohort 24 Baseline Number of ADL Impairments for MAO HXXXXA and HOS Total**

Number of ADL Impairments	MAO HXXXXA N (%)	HOS Total N (%)
None	171 (59.8%)	141,377 (61.4%)
1 ADL Impairment	40 (14.0%)	33,293 (14.4%)
2 ADL Impairments	31 (10.8%)	22,257 (9.7%)
3 or More ADL Impairments	44 (15.4%)	33,499 (14.5%)

Figure 11 shows the relationship between increasing numbers of ADL impairments and mean adjusted PCS scores for MAO HXXXXA and the HOS Total.

**Figure 11: 2021 Cohort 24 Baseline Mean Adjusted PCS Scores by Number of ADL Impairments for MAO HXXXXA and HOS Total**

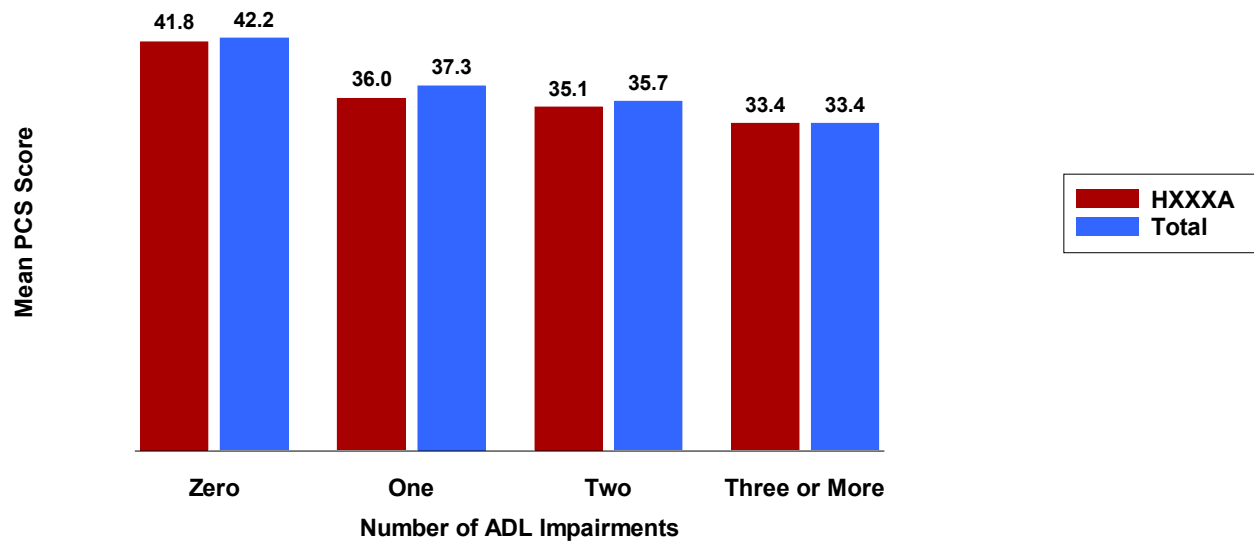
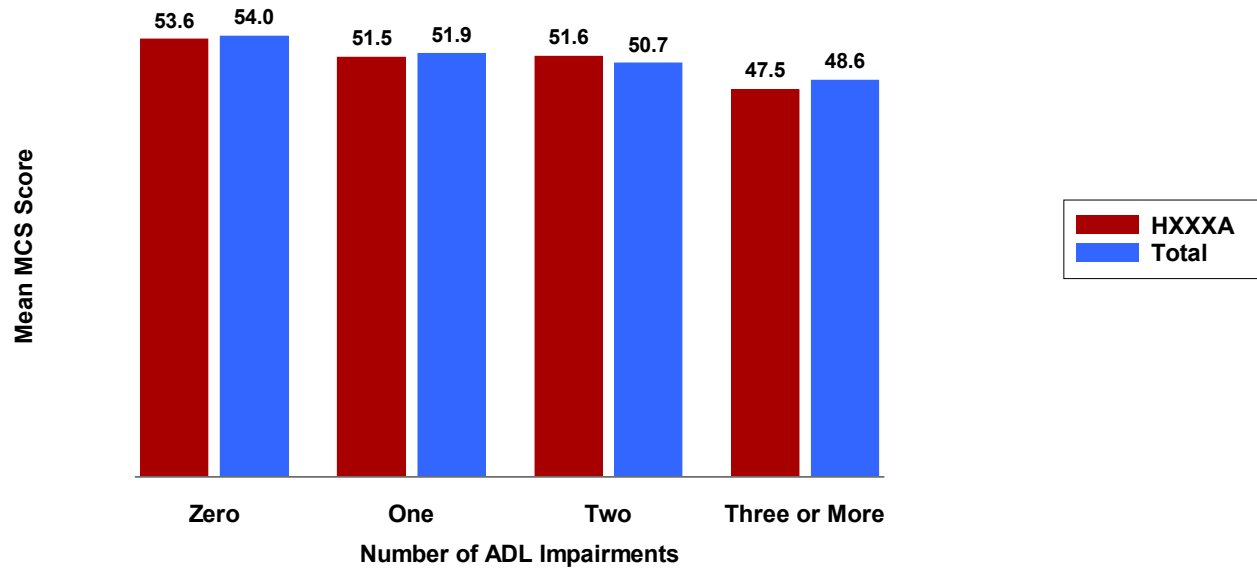


Figure 12 illustrates the relationship between increasing numbers of ADL impairments and mean adjusted MCS scores for MAO HXXXXA and the HOS Total.

**Figure 12: 2021 Cohort 24 Baseline Mean Adjusted MCS Scores by Number of ADL Impairments for MAO HXXXXA and HOS Total**



## 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 Health-Related Quality of Life (HRQOL)<sup>37</sup> 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.”<sup>38</sup> The CDC HRQOL program considers 14 or more unhealthy days in the past 30 days as an indicator of poor well-being.<sup>3</sup>

### *How Is Your MAO Doing?*

Table 19 provides the frequency distributions of Healthy Days Measures for your MAO and HOS Total.

**Table 19: 2021 Cohort 24 Baseline Distribution of Healthy Days Measures for MAO HXXXXA and HOS Total**

Healthy Days Measures	MAO HXXXXA N (%)	HOS Total N (%)
<b>Physically Unhealthy Days</b>		
None	150 (54.5%)	120,603 (54.5%)
1-13	69 (25.1%)	54,581 (24.7%)
14-30*	56 (20.4%)	46,205 (20.9%)
<b>Mentally Unhealthy Days</b>		
None	178 (64.7%)	142,993 (64.2%)
1-13	61 (22.2%)	51,615 (23.2%)
14-30*	36 (13.1%)	28,296 (12.7%)
<b>Days with Activity Limitations</b>		
None	185 (67.0%)	153,154 (68.7%)
1-13	43 (15.6%)	36,365 (16.3%)
14-30*	48 (17.4%)	33,480 (15.0%)

\* Fourteen or more unhealthy days in the previous 30 days indicates poor well-being.



Figure 13 depicts the relationship between the reported number of days with activity limitations during the previous 30 days and mean adjusted PCS scores.

**Figure 13: 2021 Cohort 24 Baseline Mean Adjusted PCS Scores by Number of Days with Activity Limitations for MAO HXXXXA and HOS Total**

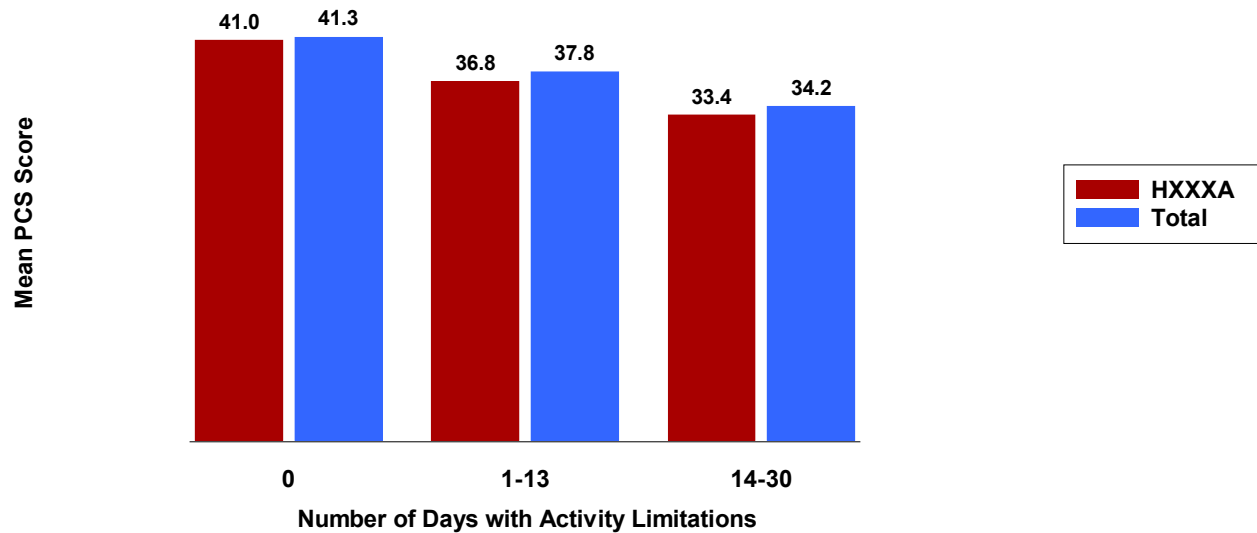
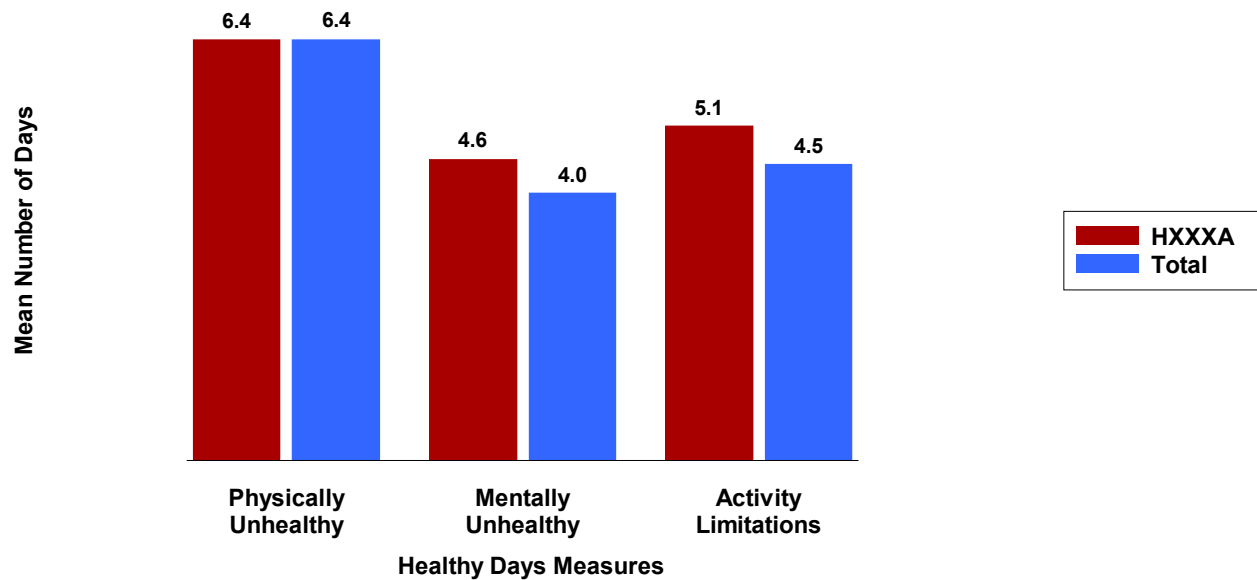


Figure 14 presents the mean numbers of reported physically unhealthy days, mentally unhealthy days, and days with activity limitations during the previous 30 days in MAO HXXXXA and the HOS Total.

**Figure 14: 2021 Cohort 24 Baseline Mean Number of Unhealthy Days for the Healthy Days Measures for MAO HXXXXA and HOS Total**



## Body Mass Index

### Definition of Measures

- Self-reported height and weight values are used to calculate BMI,<sup>Q</sup> a measure that correlates with the amount of body fat in adult men and women. BMI is derived from Questions 54 and 55.<sup>R</sup>

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.<sup>39</sup> Being overweight (BMI 25-29.9) or obese has been shown to accelerate the aging process.<sup>40</sup> Physical activity, diet, age, gender, ethnicity, and educational status are known to influence the risk for obesity.<sup>41</sup> 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.<sup>42</sup> 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.<sup>5</sup>

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.<sup>6</sup> 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.<sup>6</sup>

### How Is Your MAO Doing?

Table 20 shows the distribution of BMI categories by gender including underweight (BMI less than 18.5), normal or healthy 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.

**Table 20: 2021 Cohort 24 Baseline Distribution of BMI Categories by Gender for MAO HXXXXA and HOS Total**

BMI Category	MAO HXXXXA		HOS Total	
	Male N (%)	Female N (%)	Male N (%)	Female N (%)
Underweight (<18.5)	1 (0.9%)	3 (1.9%)	1,436 (1.6%)	3,579 (2.8%)
Normal (18.5-24.99)	33 (30.6%)	63 (39.1%)	24,744 (27.2%)	39,281 (31.1%)
Overweight (25-29.99)	48 (44.4%)	49 (30.4%)	38,179 (42.0%)	39,480 (31.3%)
Obese (≥30)	26 (24.1%)	46 (28.6%)	26,525 (29.2%)	43,764 (34.7%)

**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.”

<sup>Q</sup> 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  $\text{kg}/\text{m}^2$  units.

<sup>R</sup> Beginning in 2012, questions for weight and height changed from categorical responses to open ended responses.

Table 21 presents the mean adjusted PCS and MCS scores by BMI categories for MAO HXXXXA and the HOS Total.

**Table 21: 2021 Cohort 24 Baseline Mean Adjusted PCS and MCS Scores by BMI Categories for MAO HXXXXA and HOS Total**

BMI Category	MAO HXXXXA		HOS Total	
	PCS Mean (SD)	MCS Mean (SD)	PCS Mean (SD)	MCS Mean (SD)
Underweight (<18.5)	35.2 (10.4)	49.5 (7.8)	39.0 (7.3)	51.8 (5.6)
Normal (18.5-24.99)	40.4 (7.2)	53.0 (5.6)	40.9 (7.2)	53.2 (5.3)
Overweight (25-29.99)	39.7 (7.1)	53.3 (4.9)	40.3 (7.0)	53.1 (5.4)
Obese ( $\geq 30$ )	37.5 (7.3)	50.6 (6.3)	38.1 (6.9)	52.0 (5.7)

Table 22 shows the mean number of chronic conditions by BMI categories for MAO HXXXXA and the HOS Total. Obesity exacerbates chronic conditions such as diabetes, hyperlipidemia, and hypertension, increasing medical costs and negatively affecting quality of life.<sup>43, 44</sup>

**Table 22: 2021 Cohort 24 Baseline Mean Number of Chronic Conditions by BMI Categories for MAO HXXXXA and HOS Total**

BMI Category	MAO HXXXXA Number of Conditions Mean (SD)	HOS Total Number of Conditions Mean (SD)
Underweight (<18.5)	6.5 (5.0)	3.3 (2.4)
Normal (18.5-24.99)	3.2 (2.1)	2.9 (2.2)
Overweight (25-29.99)	3.2 (2.4)	3.2 (2.2)
Obese ( $\geq 30$ )	3.9 (2.5)	4.0 (2.4)

## 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 52.
- Sleep quality is a self-reported measure that rates the overall sleep quality during the past month. The measure is found in Question 53.

Two sleep questions in the 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.<sup>45</sup>

Over half of older adults suffer from symptoms of insomnia, a common problem related to aging.<sup>46</sup> 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.<sup>47</sup> Conversely, improved sleep may support patient engagement and adherence.<sup>48</sup>

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.<sup>49,50</sup> However, sleep disorders remain underdiagnosed in primary care settings for many reasons,<sup>51</sup> and patient surveys show that only a small number of patients discuss sleep problems with their doctors.<sup>52,53</sup> Therefore, it is recommended that providers routinely identify and evaluate sleep symptoms of disordered sleep and offer appropriate management.<sup>54</sup>

### *How Is Your MAO Doing?*

Table 23 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.

**Table 23: 2021 Cohort 24 Baseline Distributions of Sleep Duration and Quality for MAO HXXXXA and HOS Total**

<b>Sleep Questions</b>	<b>MAO HXXXXA N (%)</b>	<b>HOS Total N (%)</b>
<b>Hours of actual sleep</b>		
Less than 5 hours	21 ( 7.6%)	19,752 ( 8.8%)
5-6 hours	102 (37.1%)	87,247 (38.7%)
7-8 hours	138 (50.2%)	105,279 (46.7%)
9 or more hours	14 ( 5.1%)	13,226 ( 5.9%)
<b>Overall sleep quality</b>		
Very good	67 (24.2%)	50,002 (22.1%)
Fairly good	164 (59.2%)	135,990 (60.1%)
Fairly bad	40 (14.4%)	33,143 (14.6%)
Very bad	6 ( 2.2%)	7,132 ( 3.2%)

## Health Status by Baseline Demographic Groups for MAO HXXXA

Evidence from several studies suggests the differences in health among Medicare eligible people by age, gender, racial, and socioeconomic groups.<sup>55, 56, 57, 58, 59, 60, 61</sup> The following tables show differences in health status by demographic categories, including potential disparities within your MAO, and comparisons of your MAO with the HOS Total. Groups are defined by the sub-categories for a demographic characteristic (e.g., the 65-69 age group or White race). Estimates for the MAO that are highlighted in red indicate groups worse off than their HOS counterparts.

**Table 24: 2021 Cohort 24 Baseline Mean Adjusted PCS and MCS Scores by Selected Demographic Characteristics for MAO HXXXA and HOS Total**

HOS Demographic	Adjusted PCS		Adjusted MCS	
	MAO HXXXA Mean (SD)*	HOS Total Mean (SD)	MAO HXXXA Mean (SD)*	HOS Total Mean (SD)
<b>Total</b>	<b>39.0 (7.2)</b>	39.5 (7.0)	<b>52.2 (5.6)</b>	52.6 (5.4)
<b>Age</b>				
65-69	<b>40.5 (7.7)</b>	41.7 (6.9)	<b>51.6 (6.2)</b>	52.2 (5.7)
70-74	<b>40.3 (6.9)</b>	40.7 (6.7)	<b>52.5 (5.4)</b>	52.8 (5.5)
75-79	<b>38.5 (6.7)</b>	38.9 (6.4)	<b>52.0 (6.1)</b>	52.9 (5.2)
80-84	<b>36.7 (7.6)</b>	37.2 (6.2)	<b>52.7 (5.1)</b>	52.8 (5.0)
85+	<b>34.6 (4.3)</b>	34.7 (6.3)	<b>52.5 (4.3)</b>	52.3 (5.1)
<b>Gender</b>				
Male	<b>40.5 (7.2)</b>	40.5 (6.9)	<b>53.1 (4.9)</b>	53.2 (5.1)
Female	<b>38.0 (7.1)</b>	38.8 (6.9)	<b>51.6 (6.0)</b>	52.1 (5.6)
<b>Race</b>				
White	<b>39.8 (7.3)</b>	39.9 (7.0)	<b>53.1 (5.5)</b>	53.2 (5.4)
Black	<b>33.8 (6.1)</b>	36.9 (6.2)	<b>49.8 (4.9)</b>	50.9 (4.8)
Other/Unknown	<b>39.4 (5.5)</b>	39.6 (7.1)	<b>49.6 (5.7)</b>	50.7 (5.4)
<b>Marital Status</b>				
Married	<b>41.5 (7.1)</b>	41.5 (6.9)	<b>53.8 (5.6)</b>	53.9 (5.2)
Widowed	<b>36.4 (6.8)</b>	36.9 (6.8)	<b>51.5 (5.3)</b>	51.8 (5.5)
Divorced or Separated	<b>37.6 (7.2)</b>	38.6 (6.9)	<b>50.8 (5.8)</b>	51.3 (5.7)
Never Married	<b>37.3 (7.5)</b>	39.4 (6.7)	<b>50.6 (5.5)</b>	51.5 (5.5)
<b>Education</b>				
Did Not Graduate HS	<b>35.4 (6.8)</b>	35.6 (6.6)	<b>48.8 (6.2)</b>	49.6 (5.3)
High School Graduate	<b>38.2 (6.1)</b>	38.2 (6.5)	<b>52.4 (4.9)</b>	52.4 (5.3)
Some College	<b>38.1 (7.8)</b>	40.1 (6.7)	<b>52.3 (6.1)</b>	53.4 (5.5)
4 Year Degree or Beyond	<b>43.4 (7.0)</b>	43.7 (6.6)	<b>54.9 (4.6)</b>	54.5 (5.1)
<b>Annual Household Income</b>				
Less than \$10,000	<b>35.3 (6.1)</b>	35.8 (6.4)	<b>49.5 (5.3)</b>	49.2 (5.3)
\$10,000-\$19,999	<b>34.3 (6.5)</b>	36.2 (6.5)	<b>49.7 (5.4)</b>	50.6 (5.4)
\$20,000-\$29,999	<b>38.1 (6.9)</b>	38.3 (6.4)	<b>51.8 (5.7)</b>	52.3 (5.2)
\$30,000-\$49,999	<b>40.4 (6.2)</b>	40.6 (6.3)	<b>54.0 (4.5)</b>	53.7 (5.0)
\$50,000 or More	<b>44.3 (6.7)</b>	44.5 (6.3)	<b>55.2 (5.0)</b>	55.5 (4.6)
Don't Know	<b>37.4 (6.2)</b>	38.3 (6.6)	<b>51.4 (5.8)</b>	51.9 (5.5)
<b>Medicaid Status</b>				
Medicaid	<b>34.7 (6.0)</b>	35.9 (6.4)	<b>49.0 (5.5)</b>	49.6 (5.4)
Non-Medicaid	<b>40.7 (7.0)</b>	40.8 (6.7)	<b>53.5 (5.1)</b>	53.7 (5.0)

\* Means for demographic groups in the MAO column(s) highlighted in red are lower by ten percent or more compared to the corresponding groups in the HOS Total column(s). In this report, estimates highlighted in red indicate groups worse off than their HOS Total counterparts.

**Table 25: 2021 Cohort 24 Baseline Distribution of Self-Rated General Health Status, and Physical and Mental Health Status Compared to One Year Ago by Demographic Group for MAO HXXXXA and HOS Total**

HOS Demographic	General Health Status Fair or Poor		Comparative Health-Physical Slightly Worse or Much Worse		Comparative Health-Mental Slightly Worse or Much Worse	
	MAO HXXXXA N (%)*	HOS Total N (%)	MAO HXXXXA N (%)*	HOS Total N (%)	MAO HXXXXA N (%)*	HOS Total N (%)
<b>Total</b>	<b>98 (33.6%)</b>	64,563 (27.6%)	<b>88 (30.9%)</b>	65,408 (28.6%)	<b>47 (16.7%)</b>	34,625 (15.3%)
<b>Age</b>						
65-69	<b>31 (37.8%)</b>	17,721 (26.6%)	<b>27 (32.9%)</b>	16,507 (25.3%)	<b>16 (19.8%)</b>	9,746 (15.1%)
70-74	<b>25 (29.1%)</b>	16,159 (24.8%)	<b>21 (24.7%)</b>	16,299 (25.5%)	<b>11 (13.3%)</b>	9,035 (14.3%)
75-79	<b>21 (37.5%)</b>	12,830 (27.1%)	<b>18 (33.3%)</b>	13,279 (28.7%)	<b>11 (20.8%)</b>	6,768 (14.8%)
80-84	<b>9 (25.0%)</b>	8,947 (29.4%)	<b>7 (20.6%)</b>	9,530 (32.2%)	<b>5 (14.7%)</b>	4,582 (15.6%)
85+	<b>12 (37.5%)</b>	8,906 (36.1%)	<b>15 (50.0%)</b>	9,793 (40.9%)	<b>4 (13.3%)</b>	4,494 (19.0%)
<b>Gender</b>						
Male	<b>41 (35.0%)</b>	25,867 (26.6%)	<b>33 (29.5%)</b>	26,428 (27.8%)	<b>15 (13.6%)</b>	13,051 (13.8%)
Female	<b>57 (32.6%)</b>	38,696 (28.3%)	<b>55 (31.8%)</b>	38,980 (29.1%)	<b>32 (18.7%)</b>	21,574 (16.3%)
<b>Race</b>						
White	<b>61 (28.4%)</b>	43,775 (24.6%)	<b>59 (28.5%)</b>	50,059 (28.8%)	<b>31 (15.0%)</b>	25,715 (14.9%)
Black	<b>22 (56.4%)</b>	11,176 (39.1%)	<b>15 (37.5%)</b>	7,343 (26.5%)	<b>8 (20.0%)</b>	4,043 (14.8%)
Other/Unknown	<b>15 (39.5%)</b>	9,612 (34.5%)	<b>14 (36.8%)</b>	8,006 (29.4%)	<b>8 (22.9%)</b>	4,867 (18.0%)
<b>Marital Status</b>						
Married	<b>32 (24.8%)</b>	23,135 (21.6%)	<b>38 (30.4%)</b>	27,211 (25.6%)	<b>19 (15.6%)</b>	14,006 (13.3%)
Widowed	<b>19 (30.6%)</b>	16,479 (32.3%)	<b>15 (24.6%)</b>	16,412 (32.3%)	<b>6 (9.8%)</b>	8,588 (17.1%)
Divorced or Separated	<b>25 (40.3%)</b>	15,145 (32.2%)	<b>23 (35.9%)</b>	14,704 (31.4%)	<b>11 (17.5%)</b>	8,176 (17.6%)
Never Married	<b>15 (62.5%)</b>	5,161 (31.8%)	<b>8 (32.0%)</b>	4,288 (26.7%)	<b>8 (32.0%)</b>	2,373 (14.9%)
<b>Education</b>						
Did Not Graduate HS	<b>29 (53.7%)</b>	17,910 (48.2%)	<b>21 (39.6%)</b>	12,611 (34.2%)	<b>13 (24.5%)</b>	7,195 (19.7%)
High School Graduate	<b>26 (36.6%)</b>	19,837 (30.0%)	<b>22 (31.4%)</b>	19,075 (29.2%)	<b>17 (25.0%)</b>	9,681 (14.9%)
Some College	<b>19 (29.7%)</b>	13,283 (22.3%)	<b>18 (29.0%)</b>	16,472 (28.0%)	<b>7 (11.5%)</b>	8,632 (14.8%)
4 Year Degree or Beyond	<b>13 (16.3%)</b>	7,908 (14.1%)	<b>21 (26.3%)</b>	13,521 (24.3%)	<b>7 (8.9%)</b>	7,092 (12.8%)
<b>Annual Household Income</b>						
Less than \$10,000	<b>16 (48.5%)</b>	12,156 (46.0%)	<b>9 (26.5%)</b>	9,297 (35.5%)	<b>7 (21.9%)</b>	5,450 (21.0%)
\$10,000-\$19,999	<b>22 (55.0%)</b>	13,519 (38.7%)	<b>20 (50.0%)</b>	12,261 (35.4%)	<b>9 (22.5%)</b>	6,727 (19.6%)
\$20,000-\$29,999	<b>11 (32.4%)</b>	7,837 (28.3%)	<b>9 (28.1%)</b>	8,439 (30.9%)	<b>6 (19.4%)</b>	4,399 (16.2%)
\$30,000-\$49,999	<b>12 (28.6%)</b>	7,962 (20.6%)	<b>10 (23.3%)</b>	10,276 (26.9%)	<b>3 (7.0%)</b>	5,183 (13.7%)
\$50,000 or More	<b>8 (10.7%)</b>	6,102 (11.3%)	<b>17 (23.6%)</b>	11,438 (21.4%)	<b>12 (16.9%)</b>	5,788 (10.9%)
Don't Know	<b>14 (42.4%)</b>	8,517 (33.9%)	<b>12 (35.3%)</b>	7,056 (28.4%)	<b>4 (11.8%)</b>	3,737 (15.2%)
<b>Medicaid Status</b>						
Medicaid	<b>50 (60.2%)</b>	30,045 (47.6%)	<b>41 (48.2%)</b>	22,505 (36.7%)	<b>20 (24.1%)</b>	12,873 (21.2%)
Non-Medicaid	<b>48 (23.0%)</b>	34,518 (20.2%)	<b>47 (23.5%)</b>	42,903 (25.6%)	<b>27 (13.6%)</b>	21,752 (13.1%)

\* Percentages for demographic groups in the MAO column(s) highlighted in **red** are greater by ten percentage points or more compared to corresponding groups in the HOS Total column(s). In this report, estimates highlighted in **red** indicate groups worse off than their HOS Total counterparts.

**Table 26: 2021 Cohort 24 Baseline Distribution of Positive Depression Screen by Demographic Group for MAO HXXXA and HOS Total**

HOS Demographic	MAO HXXXA Positive Screen N (%)*	HOS Total Positive Screen N (%)
<b>Total</b>	<b>40 (14.1%)</b>	28,821 (12.9%)
<b>Age</b>		
65-69	<b>14 (17.7%)</b>	8,773 (13.8%)
70-74	<b>9 (10.6%)</b>	7,206 (11.5%)
75-79	<b>7 (13.5%)</b>	5,359 (11.9%)
80-84	<b>3 (8.3%)</b>	3,565 (12.4%)
85+	<b>7 (22.6%)</b>	3,918 (17.1%)
<b>Gender</b>		
Male	<b>17 (15.2%)</b>	10,768 (11.6%)
Female	<b>23 (13.5%)</b>	18,053 (13.9%)
<b>Race</b>		
White	<b>25 (12.1%)</b>	19,577 (11.5%)
Black	<b>7 (17.5%)</b>	5,012 (19.0%)
Other/Unknown	<b>8 (21.6%)</b>	4,232 (16.1%)
<b>Marital Status</b>		
Married	<b>15 (11.9%)</b>	9,738 (9.3%)
Widowed	<b>9 (14.8%)</b>	7,837 (15.8%)
Divorced or Separated	<b>9 (14.1%)</b>	7,777 (16.9%)
Never Married	<b>5 (20.0%)</b>	2,409 (15.3%)
<b>Education</b>		
Did Not Graduate HS	<b>15 (28.3%)</b>	8,414 (23.5%)
High School Graduate	<b>13 (18.3%)</b>	8,859 (13.8%)
Some College	<b>6 (9.5%)</b>	6,457 (11.1%)
4 Year Degree or Beyond	<b>4 (5.0%)</b>	3,541 (6.4%)
<b>Annual Household Income</b>		
Less than \$10,000	<b>8 (23.5%)</b>	6,087 (23.9%)
\$10,000-\$19,999	<b>7 (17.5%)</b>	6,343 (18.6%)
\$20,000-\$29,999	<b>7 (21.9%)</b>	3,647 (13.5%)
\$30,000-\$49,999	<b>4 (9.3%)</b>	3,541 (9.3%)
\$50,000 or More	<b>5 (6.8%)</b>	2,450 (4.6%)
Don't Know	<b>6 (17.6%)</b>	4,115 (17.0%)
<b>Medicaid Status</b>		
Medicaid	<b>21 (25.0%)</b>	14,149 (24.3%)
Non-Medicaid	<b>19 (9.5%)</b>	14,672 (8.9%)

\* Percentages for demographic groups in the MAO column highlighted in **red** are greater by ten percentage points or more compared to the corresponding groups in the HOS Total column. In this report, estimates highlighted in **red** indicate groups worse off than their HOS Total counterparts.



**Table 27: 2021 Cohort 24 Baseline Distribution of Pain Interfering with Daily Activities and Socializing by Demographic Group for MAO HXXXA and HOS Total**

HOS Demographic	Pain Interfering with Daily Activities Quite a Bit or Very Much		Pain Limiting Socialization Often or Always	
	MAO HXXXA N (%)*	HOS Total N (%)	MAO HXXXA N (%)*	HOS Total N (%)
<b>Total</b>	<b>52 (18.2%)</b>	38,479 (16.9%)	<b>27 (9.4%)</b>	21,494 (9.5%)
<b>Age</b>				
65-69	<b>17 (20.7%)</b>	11,536 (17.9%)	<b>9 (11.1%)</b>	6,724 (10.4%)
70-74	<b>14 (16.7%)</b>	9,604 (15.1%)	<b>8 (9.4%)</b>	5,376 (8.5%)
75-79	<b>11 (21.2%)</b>	7,342 (16.0%)	<b>5 (9.6%)</b>	3,950 (8.6%)
80-84	<b>2 (5.6%)</b>	5,076 (17.3%)	<b>3 (8.3%)</b>	2,699 (9.2%)
85+	<b>8 (25.0%)</b>	4,921 (20.8%)	<b>2 (6.3%)</b>	2,745 (11.6%)
<b>Gender</b>				
Male	<b>17 (15.2%)</b>	13,557 (14.4%)	<b>9 (8.0%)</b>	7,242 (7.7%)
Female	<b>35 (20.1%)</b>	24,922 (18.8%)	<b>18 (10.3%)</b>	14,252 (10.7%)
<b>Race</b>				
White	<b>32 (15.4%)</b>	27,164 (15.7%)	<b>17 (8.1%)</b>	14,535 (8.4%)
Black	<b>12 (30.0%)</b>	6,334 (23.3%)	<b>7 (17.9%)</b>	3,600 (13.3%)
Other/Unknown	<b>8 (21.1%)</b>	4,981 (18.5%)	<b>3 (7.9%)</b>	3,359 (12.5%)
<b>Marital Status</b>				
Married	<b>19 (14.8%)</b>	13,682 (12.8%)	<b>8 (6.3%)</b>	7,005 (6.6%)
Widowed	<b>13 (21.3%)</b>	10,286 (20.3%)	<b>8 (13.1%)</b>	5,863 (11.5%)
Divorced or Separated	<b>13 (20.3%)</b>	10,263 (21.9%)	<b>6 (9.4%)</b>	6,103 (13.0%)
Never Married	<b>5 (20.0%)</b>	2,848 (17.7%)	<b>3 (12.5%)</b>	1,719 (10.7%)
<b>Education</b>				
Did Not Graduate HS	<b>12 (22.2%)</b>	10,296 (27.9%)	<b>6 (11.1%)</b>	6,389 (17.3%)
High School Graduate	<b>11 (15.5%)</b>	11,868 (18.1%)	<b>6 (8.5%)</b>	6,344 (9.7%)
Some College	<b>19 (29.7%)</b>	9,295 (15.7%)	<b>10 (15.6%)</b>	5,077 (8.6%)
4 Year Degree or Beyond	<b>7 (8.8%)</b>	5,036 (9.0%)	<b>2 (2.5%)</b>	2,495 (4.5%)
<b>Annual Household Income</b>				
Less than \$10,000	<b>8 (23.5%)</b>	7,662 (29.3%)	<b>6 (17.6%)</b>	4,857 (18.6%)
\$10,000-\$19,999	<b>13 (31.7%)</b>	8,533 (24.6%)	<b>4 (10.0%)</b>	5,130 (14.8%)
\$20,000-\$29,999	<b>6 (18.2%)</b>	5,007 (18.2%)	<b>4 (12.1%)</b>	2,712 (9.9%)
\$30,000-\$49,999	<b>6 (14.0%)</b>	5,005 (13.0%)	<b>0</b>	2,386 (6.2%)
\$50,000 or More	<b>6 (8.2%)</b>	3,916 (7.3%)	<b>3 (4.1%)</b>	1,670 (3.1%)
Don't Know	<b>6 (17.6%)</b>	4,816 (19.3%)	<b>5 (14.7%)</b>	2,790 (11.2%)
<b>Medicaid Status</b>				
Medicaid	<b>26 (31.0%)</b>	18,156 (30.2%)	<b>15 (17.6%)</b>	11,601 (19.3%)
Non-Medicaid	<b>26 (12.9%)</b>	20,323 (12.2%)	<b>12 (6.0%)</b>	9,893 (5.9%)

\* Percentages for demographic groups in the MAO column(s) highlighted in **red** are greater by ten percentage points or more compared to the corresponding groups in the HOS Total column(s). In this report, estimates highlighted in **red** indicate groups worse off than their HOS Total counterparts.

**Table 28: 2021 Cohort 24 Baseline Distribution of Members Reporting Multiple Chronic Medical Conditions<sup>§</sup> in MAO HXXXXA and HOS Total**

HOS Demographic	MAO HXXXXA Multiple Conditions <sup>§</sup> N (%) <sup>*</sup>	HOS Total Multiple Conditions <sup>§</sup> N (%)
<b>Total</b>	<b>224 (77.8%)</b>	178,058 (77.2%)
<b>Age</b>		
65-69	57 (69.5%)	47,526 (72.5%)
70-74	64 (74.4%)	48,891 (76.0%)
75-79	45 (86.5%)	37,290 (79.8%)
80-84	28 (77.8%)	24,319 (81.4%)
85+	30 (93.8%)	20,032 (82.8%)
<b>Gender</b>		
Male	81 (71.7%)	70,132 (73.4%)
Female	143 (81.7%)	107,926 (80.0%)
<b>Race</b>		
White	161 (76.7%)	135,215 (77.1%)
Black	36 (90.0%)	22,668 (81.7%)
Other/Unknown	27 (71.1%)	20,175 (73.6%)
<b>Marital Status</b>		
Married	99 (77.3%)	79,781 (74.1%)
Widowed	51 (82.3%)	42,391 (82.3%)
Divorced or Separated	50 (78.1%)	37,917 (80.0%)
Never Married	19 (76.0%)	12,285 (75.3%)
<b>Education</b>		
Did Not Graduate HS	48 (88.9%)	31,132 (83.0%)
High School Graduate	54 (76.1%)	52,364 (78.9%)
Some College	51 (78.5%)	46,431 (77.7%)
4 Year Degree or Beyond	59 (73.8%)	40,263 (71.3%)
<b>Annual Household Income</b>		
Less than \$10,000	31 (91.2%)	22,071 (83.0%)
\$10,000-\$19,999	36 (87.8%)	29,284 (83.3%)
\$20,000-\$29,999	27 (81.8%)	22,149 (79.8%)
\$30,000-\$49,999	31 (72.1%)	29,677 (76.6%)
\$50,000 or More	48 (64.9%)	38,271 (70.7%)
Don't Know	28 (82.4%)	19,690 (77.7%)
<b>Medicaid Status</b>		
Medicaid	78 (91.8%)	51,791 (84.3%)
Non-Medicaid	146 (71.9%)	126,267 (74.7%)

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

\* Percentages for demographic groups in the MAO column highlighted in red are greater by ten percentage points or more compared to the corresponding groups in the HOS Total column. In this report, estimates highlighted in red indicate groups worse off than their HOS Total counterparts.

**Table 29: 2021 Cohort 24 Baseline Distribution of Multiple ADL Impairments<sup>§</sup> by Demographic Group for MAO HXXXA and HOS Total**

HOS Demographic	MAO HXXXA ADL Impairments <sup>§</sup> N (%) <sup>*</sup>	HOS Total ADL Impairments <sup>§</sup> N (%)
<b>Total</b>	<b>75 (26.2%)</b>	55,756 (24.2%)
<b>Age</b>		
65-69	22 (26.5%)	13,125 (20.0%)
70-74	20 (23.5%)	12,781 (19.9%)
75-79	12 (22.6%)	10,783 (23.2%)
80-84	7 (20.6%)	8,620 (28.9%)
85+	14 (45.2%)	10,447 (43.2%)
<b>Gender</b>		
Male	31 (27.4%)	20,831 (21.8%)
Female	44 (25.4%)	34,925 (25.9%)
<b>Race</b>		
White	49 (23.6%)	40,228 (23.0%)
Black	16 (40.0%)	8,710 (31.1%)
Other/Unknown	10 (26.3%)	6,818 (24.8%)
<b>Marital Status</b>		
Married	24 (19.2%)	19,846 (18.6%)
Widowed	18 (29.0%)	16,209 (31.6%)
Divorced or Separated	21 (32.3%)	12,966 (27.5%)
Never Married	9 (36.0%)	4,356 (26.8%)
<b>Education</b>		
Did Not Graduate HS	16 (29.6%)	13,500 (36.2%)
High School Graduate	20 (28.2%)	17,384 (26.4%)
Some College	18 (29.0%)	13,198 (22.3%)
4 Year Degree or Beyond	16 (20.0%)	8,264 (14.8%)
<b>Annual Household Income</b>		
Less than \$10,000	9 (26.5%)	9,875 (37.3%)
\$10,000-\$19,999	21 (52.5%)	11,971 (34.3%)
\$20,000-\$29,999	6 (18.8%)	7,326 (26.7%)
\$30,000-\$49,999	7 (16.3%)	7,645 (19.9%)
\$50,000 or More	11 (15.3%)	6,327 (11.8%)
Don't Know	11 (32.4%)	6,860 (27.3%)
<b>Medicaid Status</b>		
Medicaid	37 (43.5%)	24,674 (39.8%)
Non-Medicaid	38 (18.9%)	31,082 (18.4%)

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

\* Percentages for demographic groups in the MAO column highlighted in red are greater by ten percentage points or more compared to the corresponding groups in the HOS Total column. In this report, estimates highlighted in red indicate groups worse off than their HOS Total counterparts.

**Table 30: 2021 Cohort 24 Baseline Mean Number of Unhealthy Physical, Mental, and Activity Limitation Days by Demographic Group in MAO HXXXA and HOS Total**

HOS Demographic	MAO HXXXA			HOS Total		
	Number of Unhealthy Days			Number of Unhealthy Days		
	Physical Mean (SD)*	Mental Mean (SD)*	Activity Mean (SD)*	Physical Mean (SD)	Mental Mean (SD)	Activity Mean (SD)
<b>Total</b>	6.4 (9.9)	4.6 (8.6)	5.1 (9.2)	6.4 (10.0)	4.0 (7.9)	4.5 (8.8)
<b>Age</b>						
65-69	7.9 (11.0)	5.5 (9.2)	5.6 (9.2)	6.3 (9.9)	4.5 (8.2)	4.6 (8.7)
70-74	6.3 (10.1)	4.1 (8.2)	5.7 (10.2)	5.8 (9.6)	3.8 (7.6)	4.0 (8.2)
75-79	5.3 (8.3)	4.2 (8.5)	4.4 (8.6)	6.2 (9.9)	3.7 (7.5)	4.2 (8.6)
80-84	3.6 (7.8)	4.4 (9.1)	2.5 (5.7)	6.7 (10.3)	3.8 (7.7)	4.5 (9.0)
85+	7.3 (10.4)	4.3 (8.3)	6.1 (9.9)	8.1 (11.1)	4.6 (8.5)	6.1 (10.4)
<b>Gender</b>						
Male	5.4 (9.6)	3.7 (8.3)	4.5 (8.8)	5.9 (9.9)	3.5 (7.5)	4.2 (8.6)
Female	7.0 (10.0)	5.1 (8.8)	5.5 (9.4)	6.7 (10.1)	4.5 (8.1)	4.7 (8.9)
<b>Race</b>						
White	5.9 (9.6)	3.8 (7.9)	4.7 (8.7)	6.2 (10.0)	3.9 (7.7)	4.3 (8.7)
Black	9.2 (11.7)	8.6 (11.1)	8.0 (11.3)	7.4 (10.2)	4.8 (8.5)	5.0 (9.1)
Other/Unknown	5.9 (8.8)	4.5 (9.0)	4.2 (8.8)	6.5 (9.9)	4.5 (8.4)	4.8 (9.0)
<b>Marital Status</b>						
Married	4.7 (8.1)	3.7 (7.7)	3.4 (7.2)	5.3 (9.3)	3.1 (7.0)	3.6 (8.0)
Widowed	4.8 (8.6)	3.6 (7.3)	4.5 (8.4)	7.2 (10.4)	4.7 (8.3)	5.2 (9.4)
Divorced or Separated	9.0 (11.2)	5.7 (9.1)	7.1 (11.0)	7.6 (10.5)	5.2 (8.7)	5.5 (9.4)
Never Married	9.4 (12.7)	6.3 (11.1)	8.7 (11.6)	6.8 (10.1)	4.7 (8.5)	5.0 (9.1)
<b>Education</b>						
Did Not Graduate HS	8.5 (10.8)	7.1 (10.7)	6.4 (9.9)	8.8 (11.1)	5.9 (9.5)	6.6 (10.4)
High School Graduate	6.3 (9.8)	6.3 (10.0)	5.3 (9.0)	6.8 (10.2)	4.3 (8.0)	4.7 (9.0)
Some College	6.8 (10.4)	3.8 (6.8)	5.8 (9.5)	6.2 (9.9)	3.9 (7.6)	4.3 (8.5)
4 Year Degree or Beyond	4.1 (7.8)	1.6 (4.8)	3.3 (7.9)	4.3 (8.5)	2.7 (6.2)	2.9 (7.1)
<b>Annual Household Income</b>						
Less than \$10,000	9.7 (12.3)	8.4 (12.1)	8.0 (11.5)	9.5 (11.2)	6.5 (9.7)	7.2 (10.5)
\$10,000-\$19,999	10.1 (11.3)	6.7 (9.6)	8.8 (10.6)	8.6 (10.9)	5.7 (9.0)	6.4 (10.0)
\$20,000-\$29,999	6.1 (10.4)	6.3 (10.7)	4.1 (8.2)	7.0 (10.3)	4.4 (8.0)	4.9 (9.1)
\$30,000-\$49,999	5.9 (9.1)	3.4 (7.2)	3.4 (7.6)	5.5 (9.4)	3.4 (7.1)	3.8 (8.1)
\$50,000 or More	2.7 (6.0)	1.6 (4.5)	1.7 (5.5)	3.7 (7.9)	2.1 (5.5)	2.3 (6.5)
Don't Know	6.7 (10.0)	4.2 (8.1)	6.1 (9.7)	6.9 (10.3)	4.4 (8.4)	4.8 (9.2)
<b>Medicaid Status</b>						
Medicaid	11.2 (11.8)	8.4 (10.6)	10.1 (11.4)	9.9 (11.3)	6.6 (9.7)	7.6 (10.7)
Non-Medicaid	4.4 (8.2)	3.1 (7.2)	3.0 (7.1)	5.2 (9.2)	3.1 (6.9)	3.4 (7.7)

\* Means for demographic groups in the MAO column(s) highlighted in red are greater by ten percent or more compared to the corresponding groups in the HOS Total column(s). In this report, estimates highlighted in red indicate groups worse off than their HOS Total counterparts.

**Table 31: 2021 Cohort 24 Baseline Distribution of BMI Categories by Demographic Group for MAO HXXXA and HOS Total**

HOS Demographic	MAO HXXXA		HOS Total	
	Underweight (<18.5 BMI) N (%)*	Obese (≥30 BMI) N (%)*	Underweight (<18.5 BMI) N (%)	Obese (≥30 BMI) N (%)
<b>Total</b>	<b>4 (1.5%)</b>	<b>72 (26.8%)</b>	5,015 (2.3%)	70,289 (32.4%)
<b>Age</b>				
65-69	3 (3.7%)	25 (30.9%)	1,238 (2.0%)	23,446 (37.7%)
70-74	0	22 (27.8%)	1,178 (1.9%)	21,473 (35.3%)
75-79	1 (2.2%)	14 (31.1%)	936 (2.1%)	13,785 (31.4%)
80-84	0	6 (17.6%)	755 (2.7%)	7,412 (26.6%)
85+	0	5 (16.7%)	908 (4.1%)	4,173 (18.8%)
<b>Gender</b>				
Male	1 (0.9%)	26 (24.1%)	1,436 (1.6%)	26,525 (29.2%)
Female	3 (1.9%)	46 (28.6%)	3,579 (2.8%)	43,764 (34.7%)
<b>Race</b>				
White	2 (1.0%)	52 (26.0%)	3,659 (2.2%)	53,519 (32.1%)
Black	1 (2.7%)	13 (35.1%)	581 (2.3%)	10,787 (42.3%)
Other/Unknown	1 (3.1%)	7 (21.9%)	775 (3.1%)	5,983 (24.1%)
<b>Marital Status</b>				
Married	0	28 (22.4%)	1,920 (1.8%)	31,433 (30.1%)
Widowed	0	18 (30.0%)	1,394 (2.8%)	16,048 (32.7%)
Divorced or Separated	4 (6.6%)	24 (39.3%)	1,126 (2.5%)	16,482 (36.1%)
Never Married	0	2 (8.7%)	476 (3.1%)	5,530 (35.7%)
<b>Education</b>				
Did Not Graduate HS	0	15 (30.6%)	992 (2.9%)	12,357 (35.9%)
High School Graduate	1 (1.5%)	20 (30.8%)	1,460 (2.3%)	22,497 (35.5%)
Some College	2 (3.1%)	22 (33.8%)	1,174 (2.0%)	19,801 (34.3%)
4 Year Degree or Beyond	1 (1.3%)	11 (13.9%)	1,188 (2.2%)	13,388 (24.5%)
<b>Annual Household Income</b>				
Less than \$10,000	0	14 (43.8%)	787 (3.2%)	8,912 (36.2%)
\$10,000-\$19,999	1 (2.6%)	8 (20.5%)	866 (2.6%)	12,325 (36.9%)
\$20,000-\$29,999	0	8 (26.7%)	578 (2.2%)	9,312 (35.0%)
\$30,000-\$49,999	0	16 (37.2%)	687 (1.8%)	12,255 (32.8%)
\$50,000 or More	1 (1.4%)	13 (18.8%)	867 (1.6%)	14,167 (26.9%)
Don't Know	1 (3.2%)	4 (12.9%)	702 (3.0%)	7,501 (32.4%)
<b>Medicaid Status</b>				
Medicaid	3 (4.0%)	26 (34.7%)	1,782 (3.2%)	21,214 (37.9%)
Non-Medicaid	1 (0.5%)	46 (23.7%)	3,233 (2.0%)	49,075 (30.5%)

\* Percentages for demographic groups within the MAO column(s) highlighted in red are greater by ten percentage points or more compared to the corresponding groups in the HOS Total column(s). In this report, estimates highlighted in red indicate groups worse off than their HOS Total counterparts.

## Appendix 1

### Program Background

This section provides a brief introduction to the Medicare HOS. 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](http://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, to ensure 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 prior to 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 HOS Baseline 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 baseline results are intended to help MAOs identify areas for potential improvement. The report contains information on baseline measures of physical and mental health, chronic medical conditions, functional status (e.g., ADLs), clinical measures, and other health status indicators. The HOS Baseline Report is made available to all participating MAOs one year after the annual baseline cohort data collection is completed.

### 2021 Medicare Advantage Organization Participation

MAOs with Medicare contracts in effect on or before January 1, 2020, and a minimum enrollment of 500 members were required to report the Baseline HOS in 2021. The Baseline HOS was optional for Institutional Special Needs Plans (I-SNP):

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

MAOs that administered the HOS Baseline Survey in 2019 were required to administer the HOS Follow Up Survey in 2021. 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.

All PACE organizations with Medicare contracts in effect on or before January 1, 2020, and with a minimum enrollment of 30 members as of October 1, 2020, were required by CMS to administer the HOS-Modified (HOS-M) in 2021.

MAOs sponsoring Fully Integrated Dual Eligible (FIDE) Special Needs Plans (SNPs) within Medicare contracts in effect on or before January 1, 2020, and with a minimum enrollment of 50 members could elect to report 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. For the 2021 survey year, 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.

## **2021 Methodology and Design**

### Cohort 24 Baseline Sampling

- MAOs with fewer than 500 members were not required to report HOS.
- For MAOs with 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 for the baseline survey.
- 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 also request a survey sample larger than 1,200. Oversampling was expressed as a whole percentage of the standard sample size. Since 2019, I-SNPs are not required to report the HOS Baseline Survey.

### Survey Administration

- MAOs contracted with a CMS approved survey vendor to administer the survey following the protocol specified in the HEDIS MY 2020, Volume 6: Specifications for the Medicare Health Outcomes Survey manual. The manual detailed the methods for mail, telephone, and mixed methods of data collection.
- The mail component of the survey 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 24 Baseline*, the Russian language option became available in 2019.

- Survey vendors attempted telephone follow up in English, Spanish or Chinese (with at least six 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.

### Data Evaluation and Processing

The entire HOS data file was reviewed using SAS® 9.4 programs to verify the quality of the data submitted by survey vendors. Reliable and valid HOS data are essential for maintaining the integrity of HOS measures used in the Medicare Star Ratings. Data files were reviewed for errors prior to merging the files into a final HOS dataset. Vendor generated errors were identified for correction, while errors attributable to the survey respondent, such as skip pattern errors, were left ‘as is’ in the final HOS dataset.

- Data consistency checks were 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 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
- Text files from vendors were concatenated into the final HOS dataset.
- Additional fields were created and added to the final HOS dataset such as the percent of survey completed, the number of ADL questions answered, indicators for ineligible and completed surveys, and the PCS and MCS Scores.

### Medicare HOS 3.0 Instrument

The 2021 survey administration 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.<sup>62</sup> Modifications in the HOS 3.0 from the previous version (HOS 2.5) included: 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.

The HOS also contains questions about: socio-demographics, 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 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 are included to comply



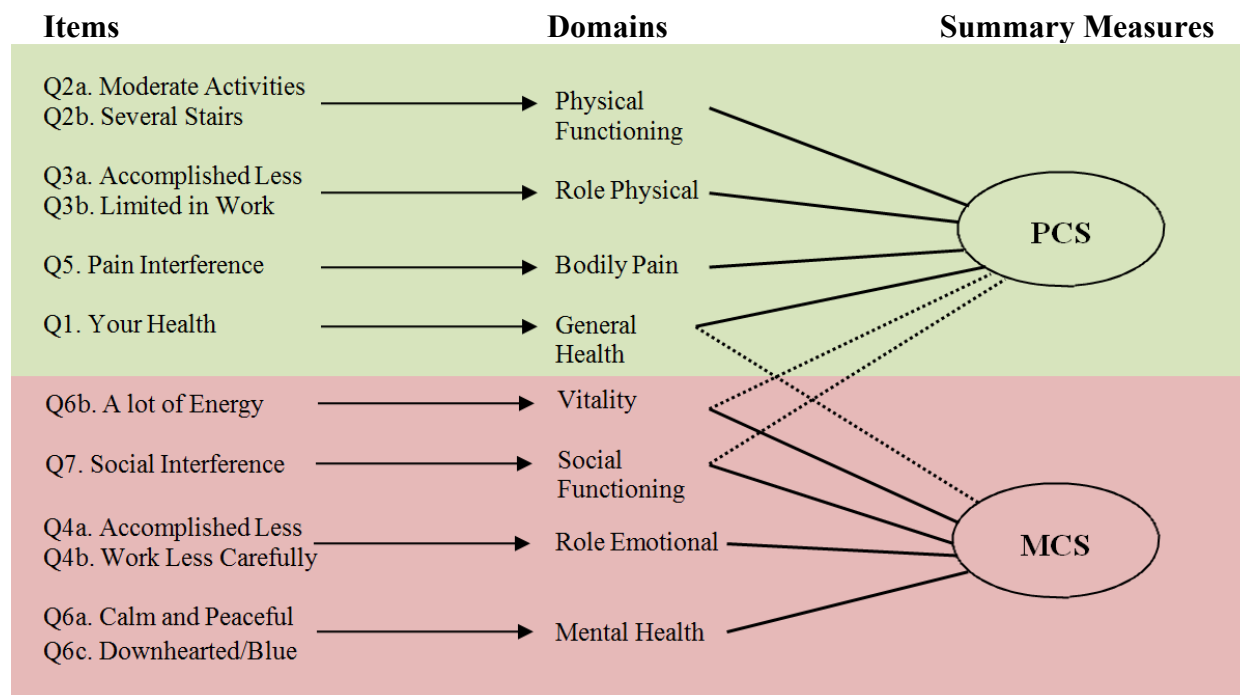
with standards established by Section 4302 of the Affordable Care Act. The HOS survey instruments are available on NCQA's website at [www.ncqa.org/hedis/measures/hos](http://www.ncqa.org/hedis/measures/hos).

The VR-12 was derived from the Veterans RAND 36-Item Health Survey (VR-36).<sup>63, 64, 65</sup> 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 (Questions Q1-Q7) and two items that assess change in physical and emotional health compared to 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 that allows reliable comparisons of HOS results.<sup>66</sup>

In comparison with the earlier 36-item survey, two modifications were made in the VR-12 and previously in the VR-36. 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.<sup>67, 68</sup>

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 15.

**Figure 15: 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 PCS and MCS scores were calculated from the VR-12 using the Modified Regression Estimate (MRE) for scoring and imputation of missing data.<sup>62</sup> For those members with complete responses across the VR-12, the following steps<sup>69</sup> were taken to calculate PCS and MCS:
  - 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.<sup>70</sup>
  - 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 zero through 100 (higher being better).
- When a respondent had missing data across the VR-12 items, PCS and MCS scores were imputed using the MRE. 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.<sup>71</sup> Depending on the pattern of missing item responses for a respondent, a different set of regression weights was required to compute that individual's PCS and/or

MCS scores.<sup>69</sup> For each combination of missing data, the respondents' data were merged with the stored regression weights and the PCS or MCS scores were computed and then standardized using the normative values from 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 to mail administered surveys.<sup>72</sup> 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.

#### Case-Mix Adjustment for Comparison of MAOs at Baseline

- Beneficiaries are not randomly assigned to MAOs. Therefore, unadjusted PCS and MCS scores may be biased by demographic and chronic health characteristics that are disproportionately represented in some MAOs. For this reason, the PCS and MCS scores are case-mix adjusted to allow for equitable comparisons across all MAOs. In the context of the HOS, case-mix refers to those member characteristics measured at baseline (such as age and the presence of chronic conditions) that are outside the control and influence of the MAO, but that may contribute to better or worse physical and/or mental health summary scores.<sup>71</sup> Case-mix adjustment is a statistical technique that uses multiple regression models to control for those differences, thus allowing comparisons in performance and quality across MAOs.
- Models used to adjust the summary scores included variables to control for differences in demographic and socioeconomic characteristics, chronic medical conditions, and HOS study design variables.
  - Demographic and socioeconomic characteristics included age, gender, race, education, marital status, and annual household income.
  - Chronic medical conditions were measured from 15 questions about medical conditions.
  - HOS study design variables included who completed the survey, CMS Region, and the survey vendor.
- Three different generalized linear regression models were used to adjust PCS and MCS scores since not all members responded to all survey questions. Only one model, the most comprehensive model possible, was used to calculate an adjusted score for each member.
  - Model One: If a respondent had completed data for all of the covariates, then the adjusted scores were calculated using Model One, which contains all variables.

- Model Two: If the respondent had completed data for all covariates except annual household income, which traditionally has the highest rate of missing data, then Model Two was used.
- Model Three: If a respondent did not have enough completed data for Model One or Two, then Model Three was used. Age, gender, race, CMS Region, and survey vendor were included in Model Three because they were available for all sampled members.
- Adjusted MAO scores can only be calculated with use of the complete HOS dataset.

**Table 32: Covariates Used in the Case Mix Adjustment of PCS and MCS Scores**

DEMOGRAPHICS COVARIATES	MODELS		
	ONE	TWO	THREE
Age (Integer)	√	√	√
Gender (Male or Female)	√	√	√
CMS Race (Black, Other Minority)	√	√	√
Education	√	√	
Marital Status	√	√	
Annual Household Income	√		
<b>CHRONIC MEDICAL CONDITIONS</b>			
Hypertension or high blood pressure	√	√	
Angina pectoris or coronary artery disease	√	√	
Congestive heart failure	√	√	
Myocardial infarction or heart attack	√	√	
Other heart conditions, such as problems with heart valves or arrhythmias	√	√	
Stroke	√	√	
Emphysema, or asthma, or COPD (Chronic Obstructive Pulmonary Disease)	√	√	
Crohn's disease, ulcerative colitis, or inflammatory bowel disease	√	√	
Arthritis of the hip or knee	√	√	
Arthritis of the hand or wrist	√	√	
Osteoporosis	√	√	
Sciatica	√	√	
Diabetes, high blood sugar, or sugar in the urine	√	√	
Depression	√	√	
Any cancer (other than skin cancer)	√	√	
<b>HOS STUDY DESIGN VARIABLES</b>			
Who Completed Survey (Self or Other)	√	√	
CMS Region	√	√	√
Survey Vendor	√	√	√

**Note:** Model One included all covariates listed in Table 32 and was used for respondents with completed data for all of the covariates. Model Two was used for respondents with completed data for all of the covariates except annual household income. Model Three was limited to age, gender, race, CMS Region, and survey vendor, and was used for respondents who did not have enough completed data for Model One or Model Two. The variables included in Model Three were available for all participating respondents.

## Appendix 2

**Table 33: 2021 Cohort 24 Baseline Mean Unadjusted and Adjusted PCS and MCS Scores for All MAOs in StateXX and HOS Total**

	Unadjusted PCS Score (SD)	Adjusted PCS Score (SD)	Unadjusted MCS Score (SD)	Adjusted MCS Score (SD)
HXXXXA	39.0 (12.8)	39.0 ( 7.2)	52.6 (11.8)	52.2 ( 5.6)
HXXXXB	40.0 (12.7)	39.7 ( 7.2)	52.1 (10.9)	52.9 ( 5.4)
HXXXXC	39.3 (12.2)	39.0 ( 6.4)	52.0 (10.9)	52.4 ( 5.3)
HXXXXD	38.8 (12.4)	39.1 ( 7.0)	53.2 (10.2)	52.8 ( 5.3)
HXXXXE	38.6 (12.9)	38.9 ( 7.0)	52.3 (10.6)	52.4 ( 5.4)
StateXX	39.1 (12.6)	39.2 ( 7.0)	52.4 (10.9)	52.5 ( 5.4)
HOS Total	39.5 (12.5)	39.5 ( 7.0)	52.6 (10.9)	52.6 ( 5.4)

**Table 34: 2021 Cohort 24 Baseline Percentile Distribution of Adjusted PCS Scores for MAO HXXXA, StateXX, and HOS Total**

	Mean	SD	P10	P25	Median	P75	P90	Min	Max
HXXXA	39.0	7.2	29.4	35.0	38.4	44.5	48.7	14.5	55.6
StateXX	39.2	7.0	30.7	35.3	38.7	44.4	48.3	14.5	56.9
HOS Total	39.5	7.0	31.2	35.6	38.8	44.6	48.8	0.9	57.6

**Table 35: 2021 Cohort 24 Baseline Percentile Distribution of Adjusted MCS Scores for MAO HXXXA, StateXX, and HOS Total**

	Mean	SD	P10	P25	Median	P75	P90	Min	Max
HXXXA	52.2	5.6	43.4	49.7	53.1	56.7	58.4	35.6	59.8
StateXX	52.5	5.4	43.9	49.9	53.9	56.9	58.2	34.3	60.0
HOS Total	52.6	5.4	44.0	49.9	54.0	57.0	58.3	29.8	60.9

## References

- <sup>1</sup> 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/>. Accessed on: June 27, 2022.
- <sup>2</sup> 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.
- <sup>3</sup> The Centers for Disease Control and Prevention. *Health-Related Quality of Life (HRQOL)*. Available at: <https://www.cdc.gov/hrqol/faqs.htm>. Accessed on: June 27, 2022.
- <sup>4</sup> U.S. Department of Health and Human Services. *Healthy People 2030*. Available at: <https://health.gov/healthypeople/objectives-and-data/browse-objectives/overweight-and-obesity/reduce-proportion-adults-obesity-nws-03>. Accessed on: June 27, 2022.
- <sup>5</sup> 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>. Accessed on: June 27, 2022.
- <sup>6</sup> 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://www.hosonline.org/globalassets/hos-online/publications/prevalence\\_of\\_obesity\\_in\\_maos\\_final\\_technical\\_report\\_2011.pdf](https://www.hosonline.org/globalassets/hos-online/publications/prevalence_of_obesity_in_maos_final_technical_report_2011.pdf). Accessed on: June 27, 2022.
- <sup>7</sup> Centers for Disease Control and Prevention. Overweight and Obesity. Available at: <https://www.cdc.gov/obesity/data/prevalence-maps.html>. Accessed on: June 27, 2022.
- <sup>8</sup> National Committee for Quality Assurance. *HEDIS® MY 2020, Volume 6: Specifications for the Medicare Health Outcomes Survey*. Washington, DC: NCQA Publication, 2021.
- <sup>9</sup> 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](https://www.hosonline.org/globalassets/hos-online/publications/key_drivers_medicare_hos_scores_2013.pdf). Accessed on: June 27, 2022.
- <sup>10</sup> 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://hosonline.org/globalassets/hos-online/publications/opportunities\\_for\\_improving\\_medicare\\_hos\\_results\\_2012.pdf](https://hosonline.org/globalassets/hos-online/publications/opportunities_for_improving_medicare_hos_results_2012.pdf). Accessed on: June 27, 2022.
- <sup>11</sup> 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](https://hosonline.org/globalassets/hos-online/publications/functional_status_in_older_adults_2011.pdf). Accessed on: June 27, 2022.
- <sup>12</sup> U.S. Department of Health and Human Services. *Healthy People 2020*. Available at: <https://www.healthypeople.gov/2020/about/foundation-health-measures/General-Health-Status>. Accessed on: June 27, 2022.
- <sup>13</sup> Ware JE, Kosinski M, Keller SD. *SF-36 Physical and Mental Health Summary Scales: A User's Manual*. Boston, MA: The Health Institute; 1994.



- 
- <sup>14</sup> 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: June 27, 2022.
- <sup>15</sup> Health Services Advisory Group. *Medicare Health Outcomes Survey: 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](https://hosonline.org/globalassets/hos-online/publications/hos_evaluation_mcs_depress.pdf). Accessed on: June 27, 2022.
- <sup>16</sup> 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: June 27, 2022.
- <sup>17</sup> Centers for Disease Control and Prevention. *National Association of Chronic Disease Directors (NACDD) State of Aging and Health in America: Data Brief Series 2020*. Available at: <https://www.cdc.gov/aging/publications/briefs.htm>. Accessed on: June 27, 2022.
- <sup>18</sup> 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: June 27, 2022.
- <sup>19</sup> 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/>. Accessed on: June 27, 2022.
- <sup>20</sup> 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: June 27, 2022.
- <sup>21</sup> 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.
- <sup>22</sup> 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.
- <sup>23</sup> Domenichiello AF, Ramsden CE. The silent epidemic of chronic pain in older adults. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*. 2019;93:284-290.
- <sup>24</sup> Miaskowski 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: June 27, 2022.
- <sup>25</sup> 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: June 27, 2022.
- <sup>26</sup> NIH National Center for Complementary and Integrative Health. Complimentary Health Approaches for Pain Management. September 2016. NCCIH Clinical Digest. Available at: <https://nccih.nih.gov/health/providers/digest/chronic-pain>. Accessed on: June 27, 2022.

- 
- <sup>27</sup> 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/sites/default/files/ash/initiatives/mcc/mcc\\_framework.pdf](https://www.hhs.gov/sites/default/files/ash/initiatives/mcc/mcc_framework.pdf). Accessed on: June 27, 2022.
- <sup>28</sup> 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](https://journals.lww.com/lww-medicalcare/Citation/2022/04000/Do_Financial_Incentives_Affect_Utilization_for.6.aspx). Accessed on: June 27, 2022.
- <sup>29</sup> Buttorff C, Ruder T, Bauman M. Multiple Chronic Medical Conditions in the United States. 2017. RAND Corporation. Available at: <https://www.rand.org/pubs/tools/TL221.html>. Accessed on: June 27, 2022.
- <sup>30</sup> 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](https://www.cdc.gov/pcd/issues/2013/12_0282.htm). Accessed on: June 27, 2022.
- <sup>31</sup> 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.
- <sup>32</sup> 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: June 27, 2022.
- <sup>33</sup> Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living. *Physical Self-maintenance*. 1969.
- <sup>34</sup> Coyne R, Kluwer W. The Lawton Instrumental Activities of Daily Living (IADL) Scale. *Try This: Best Practices in Nursing Care to Older Adults*. 2019; 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](https://hign.org/sites/default/files/2020-06/Try_This_General_Assessment_23.pdf). Accessed on: June 27, 2022.
- <sup>35</sup> 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.
- <sup>36</sup> 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/>. Accessed on: June 27, 2022.
- <sup>37</sup> Centers for Disease Control and Prevention. *Health-Related Quality of Life (HRQOL) Concepts*. Available at: <https://www.cdc.gov/hrqol/concept.htm>. Accessed on: June 27, 2022.
- <sup>38</sup> 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: June 27, 2022.
- <sup>39</sup> Centers for Disease Control and Prevention. *Overweight and Obesity*. Available at: <https://www.cdc.gov/obesity/adult/causes.html>. Accessed on: June 27, 2022.
- <sup>40</sup> 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/>. Accessed on: June 27, 2022.

- 
- <sup>41</sup> 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://pubmed.ncbi.nlm.nih.gov/29144594/>. Accessed on: June 27, 2022.
- <sup>42</sup> 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/>. Accessed on: June 27, 2022.
- <sup>43</sup> Sullivan PW, Ghushchyan V, Ben-Joseph RH. The Effect of Obesity and Cardiometabolic Risk Factors on Expenditures and Productivity in the United States. *Obesity*. 2008; 16 (9): 2155-2162.
- <sup>44</sup> Sullivan PW, Ghushchyan VH, Ben-Joseph RH. The impact of obesity on diabetes, hyperlipidemia and hypertension in the United States. *Quality of Life Research*. 2008; 17 (8): 1063-1071.
- <sup>45</sup> Backhaus J, Junghanns K, Broocks A, et al. Test-retest reliability and validity of the Pittsburgh Sleep Quality Index in primary insomnia. *Journal of Psychosomatic Research*. 2002; 53(3):737-40.
- <sup>46</sup> Zisberg A, Gur-Yaish N, Shochat T. Contribution of routine to sleep quality in community elderly. *Sleep*. 2010; 33(4):509-514.
- <sup>47</sup> Buysse DJ. Sleep health: can we define it? Does it matter? *Sleep*. Jan 1 2014;37(1):9-17.
- <sup>48</sup> 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.
- <sup>49</sup> Mukherjee S, Patel SR, Kales SN, et al. (2015). An official American Thoracic Society statement: the importance of healthy sleep. Recommendations and future priorities. *American journal of respiratory and critical care medicine*, 191(12), 1450-1458.
- <sup>50</sup> Neikrug AB, Ancoli-Israel S. "Sleep disorders in the older adult - a mini-review." *Gerontology* vol. 56,2 (2010):181-9. doi:10.1159/000236900.
- <sup>51</sup> 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.
- <sup>52</sup> Culpepper L. Insomnia: a primary care perspective. *J Clin Psychiatry*. 2005;66 Suppl 9:14-7.
- <sup>53</sup> 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*, 21 (2016).
- <sup>54</sup> Mysliwiec V, Martin JL, Ulmer CS, et al. (2020). 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. *Annals of internal medicine*, 172(5), 325-336.
- <sup>55</sup> 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](https://journals.lww.com/lww-medicalcare/Abstract/2021/11000/Racial_Disparities_in_Avoidable_Hospitalizations.7.aspx). Accessed on: June 27, 2022.
- <sup>56</sup> 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/>. Accessed on: June 27, 2022.
- <sup>57</sup> 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://doi.org/10.1016/j.yjpm.2022.106996>. Accessed on: June 27, 2022.

- 
- <sup>58</sup> Health Services Advisory Group. *Medicare Health Outcomes Survey: Report on the Health Status of Disadvantaged Medicare Beneficiaries*. 2005. Available at: [https://hosonline.org/globalassets/hos-online/publications/disadvantaged\\_medicare\\_beneficiaries.pdf](https://hosonline.org/globalassets/hos-online/publications/disadvantaged_medicare_beneficiaries.pdf). Accessed on: June 27, 2022.
- <sup>59</sup> 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](https://hosonline.org/globalassets/hos-online/publications/hos_disparities_final_technical_report.pdf). Accessed on: June 27, 2022.
- <sup>60</sup> 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: June 27, 2022.
- <sup>61</sup> 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.hosonline.org/globalassets/hos-online/publications/cms-omh-october2018-hispanic-medicare-benes-highlight.pdf>. Accessed on: June 27, 2022.
- <sup>62</sup> 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](https://hosonline.org/globalassets/hos-online/publications/veterans_rand_12_item_health_survey_vr-12_2007.pdf). Accessed on: June 27, 2022.
- <sup>63</sup> 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.
- <sup>64</sup> 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.
- <sup>65</sup> 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: June 27, 2022.
- <sup>66</sup> 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.
- <sup>67</sup> 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.
- <sup>68</sup> 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.
- <sup>69</sup> 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](https://hosonline.org/globalassets/hos-online/publications/hos_veterans_12_imputation.pdf). Accessed on: June 27, 2022.

- 
- <sup>70</sup> 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.
- <sup>71</sup> 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, MA. 2007. Available at: [https://hosonline.org/globalassets/hos-online/publications/hos\\_case\\_mix\\_final\\_technical\\_report.pdf](https://hosonline.org/globalassets/hos-online/publications/hos_case_mix_final_technical_report.pdf). Accessed on: June 27, 2022.
- <sup>72</sup> 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](https://hosonline.org/globalassets/hos-online/publications/hos_calculating_pm_results.pdf). Accessed on: June 27, 2022.