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## Beyond Black and White: Race/Ethnicity and Health Status Among Older Adults

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### Abstract

**Objectives**—This study examined physical and mental health, health symptoms, sensory and functional limitations, risk factors, and multimorbidity among older Medicare managed care members to assess disparities associated with race/ethnicity.

**Study Design and Methods**—We used data on 236,289 older adults from 208 Medicare plans who completed the 2012 Medicare Health Outcomes Survey to compare 14 health indicators across non-Hispanic whites, blacks, American Indians/Alaskan Natives, Asians, Native Hawaiians/Pacific Islanders, multiracial individuals, and Hispanics. Logistic regression models that clustered on the plan estimated the risk of indicators of adverse health and functional status.

**Results**—Even after controlling for key patient sociodemographic factors, race/ethnicity was significantly associated with most adverse health indicators. Except for Asians, all racial/ethnic minority groups were significantly more likely than whites to report poor mental health status, presence of most health symptoms, sensory limitations, and activities-of-daily-living disability. Important differences were observed across racial and ethnic groups.

**Conclusions**—Despite some exceptions, elders of racial/ethnic minority background are generally at higher risk than non-Hispanic whites for a broad range of adverse health and functional outcomes that are not routinely assessed. Limitations include bias related to self-reported data and respondent recall. Future research should consider ethnic subgroup variations; employing newer techniques to improve estimates for smaller groups; and prioritizing and identifying opportunities for care improvement of diverse enrollee groups by considering specific needs. To improve the health status of the elderly, service delivery targeting the needs of specific

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population groups, coupled with culturally appropriate care for racial/ethnic minorities, should also be considered.

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The maintenance and improvement of health and functioning is a major goal in providing care to older adults in the United States.<sup>1</sup> Improving health and eliminating disparities in quality of care are a primary objective of Healthy People 2020, a national initiative aimed at helping to improve health-related quality of life and other aspects of population health that have been identified as health system priorities by the Institute of Medicine.<sup>2,3</sup> Further, the Affordable Care Act (ACA) includes provisions to address health disparities, including enhanced understanding and data collection regarding care for specific racial and ethnic groups in federally supported health programs like Medicare managed care (MC).<sup>4</sup> Moving forward, MC plans will have strong incentives to address healthcare disparities, given that payment will be tied to their ability to provide better clinical quality and patient experiences for all members, as measured by common performance metrics (eg, Healthcare Effectiveness Data and Information Set or Consumer Assessment of Healthcare Providers and Systems measures). Among older adults, those of racial and ethnic minority backgrounds have been found to receive lower quality of care than whites,<sup>5–19</sup> including documented disparities in the delivery of primary and preventive services,<sup>7–9</sup> use of selected treatments,<sup>10–12</sup> and patient experiences with care.<sup>15–19</sup> Increasingly, patient-reported outcomes, including functional health outcomes, are being used as quality indicators.<sup>20</sup> However, little is known about how functional health outcomes vary across racial and ethnic groups. An understanding of patterns of health and functional status across racial and ethnic groups is needed to develop targeted interventions aimed at improving health outcomes.

Moreover, existing Medicare disparities research has focused primarily on blacks and whites—and, to a lesser extent, Hispanics—with much less analysis of the experiences of other racial/ethnic groups: American Indians/Alaskan Natives, Asians, Native Hawaiians/Pacific Islanders, or individuals of more than 1 race.<sup>5,21,22</sup> The proportion of elderly people within these other groups is expected to increase more quickly than that of blacks or whites by more than double—or even triple—by midcentury.<sup>23</sup> While studies have documented disparities among these other groups, often they do not simultaneously compare groups within a single study, and draw conclusions based on varying studies and sources, wherein populations are not necessarily comparable because of differences among data sources or health measures used.<sup>21,22</sup> Because of sample size limitations, many smaller racial/ethnic groups are also excluded from national comparative assessments (eg, Native Hawaiian/Pacific Islander, American Indian/Alaskan Native, and Asian populations). When included, there is often insufficient data for a large proportion of health indicators used in such assessments.<sup>21–23</sup> Studies that do include more diverse racial/ethnic groups have revealed somewhat mixed findings: studies generally find lower-quality care among minority groups compared with whites, but there is evidence that Asians fare better than whites for some aspects of healthcare.<sup>24–29</sup> Further, there is limited evidence for Native Hawaiians/Pacific Islanders because they are often included with Asians.<sup>23</sup>

This study examined racial/ethnic differences in a large variety of health indicators and functional status measures among adults 65 years and older from a diversity of racial/ethnic groups, using data from a nationally representative sample of Medicare beneficiaries

enrolled in Medicare health plans. It sought to (1) assess racial/ethnic differences in the prevalence of 14 health status indicators across diverse racial/ethnic groups within a single study; and (2) examine whether health status differs by race/ethnicity even after adjusting for patients' age, sex, socioeconomic status, region, and length of enrollment in their Medicare plan. Unlike much earlier research, this study used data on critical end points of care that are not routinely assessed (eg, functional health status), rather than health services receipt. The study also examined estimates for smaller groups often excluded from Medicare comparisons because of insufficient data (eg, Native Hawaiian, American Indian, and Asian populations).

## METHODS

### Data and Sample

Data are from the 2012 baseline Medicare Health Outcomes Survey (HOS), an annual mail survey with telephone follow-up sponsored by the Centers for Medicare & Medicaid Services. The survey collected health and demographic information from a nationally representative sample of Medicare beneficiaries enrolled in Medicare health plans, and had an overall response rate of 47.5%. Race/ethnicity was self-reported. The core measure of health was the Veterans-RAND 12-Item Short Form Survey (VR-12), an instrument embedded within the HOS that allows calculation of 0–100 Physical Component Summary (PCS) and Mental Component Summary (MCS) scores, with 0 representing the worst health and 100 representing the best health for each.<sup>30,31</sup> Other measures of health status in the survey assessed perceived health, presence of health symptoms, sensory limitations, risk factors, functional impairments, and chronic conditions.

The study sample included 236,289 elderly Medicare health plan members from 208 plans in 2012, who were 65 years and older, residing in the 50 US states or the District of Columbia, and who self-reported their race/ethnicity.

### Analytic Variables

The main independent variable was Medicare beneficiaries' self-reported race/ethnicity. Seven race/ethnicity categories were created based on respondents' self-report of Latino or Hispanic descent and race (white, black, American Indian/Alaskan Native, Asian, Native Hawaiian/Pacific Islander). A person identifying as Hispanic was coded "Hispanic" irrespective of race. Among those not self-identifying as Hispanic, a person reporting a single race was coded in the corresponding race group; a person reporting more than 1 race was coded as multiracial. The resulting race/ethnicity categories were Hispanic (of any race), non-Hispanic white, non-Hispanic black, non-Hispanic American Indian/Alaskan Native, non-Hispanic Asian, non-Hispanic Native Hawaiian/Pacific Islander, and non-Hispanic multiracial (individuals reporting more than 1 race).

The main dependent variables were 14 health status indicators from the HOS, assessing general health status, presence of health symptoms, sensory limitations, risk factors, functioning, and presence of chronic conditions.

Three measures of general health status and functioning were assessed: self-report of perceived health, VR-12 PCS score, and VR-12 MCS score. To focus on indicators of worse-than-average health, each measure was dichotomized as an adverse health indicator. Perceived health was dichotomized as fair or poor (vs excellent, very good, or good) health. The PCS measure was coded as poor physical health—scoring in the lowest quartile of the PCS score distribution (< 30.11) versus higher. The MCS measure was similarly coded as lowest quartile (< 45.05) versus higher. The choice to dichotomize the PCS and MCS health variables was motivated partly by the desire to understand racial/ethnic disparities for risk of being in the poorest health, focusing on the most vulnerable of the elderly, rather than capturing distinctions between average and better than average health.

Respondents reported the presence or absence of 5 health symptoms: chest pain symptoms in the last 4 weeks when exercising or resting (vs no symptoms); shortness of breath symptoms in the last 4 weeks (when lying flat, sitting, walking <1 block, or climbing 1 flight of stairs vs no symptoms); foot symptoms in the last 4 weeks (numbness, tingling, inability to feel hot/cold, or nonhealing sores on feet vs no symptoms); arthritis pain the last 4 weeks (severe or moderate pain vs mild, very mild, or no pain); and depressed mood for much of the last year (yes or no).

Respondents were asked to report vision problems (ability to see well enough to read newspapers, with glasses or contacts if needed) or hearing problems (ability to hear most things, with a hearing aid if needed). Respondents were classified as obese (body mass index [BMI]  $\geq 30$  kg/m<sup>2</sup>) versus not, based on self-reported weight and height. Current smoking status was dichotomized as smoking every day or some days versus not smoking at all.

Adverse indicators included activity-of-daily-living (ADL) disability and multimorbidity. Disability was assessed through a single dichotomous indicator of any (vs no) self-reported difficulty, or inability to perform any of 6 ADLs: bathing, dressing, eating, getting in or out of chairs, walking, and toileting. A multimorbidity indicator was defined as reporting 4 or more (vs 3 or fewer) of 14 chronic conditions: hypertension, angina pectoris or coronary artery disease, congestive heart failure, heart attack, other heart condition, stroke, respiratory conditions, inflammatory bowel disease, hip/knee arthritis, hand/wrist arthritis, osteoporosis, sciatica, diabetes, and any cancer.

Covariates were age (in years), gender, marital status (married vs not), education (some college or higher vs no college), Medicaid eligibility (based on administrative data), length of enrollment in Medicare health plan (in months), and census region (New England, Mid-Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, or Pacific).

## Data Analysis

Analyses were performed using SAS version 9.1 (SAS Institute, Cary, North Carolina). The patient was the unit of analysis. The unadjusted prevalence of all 14 adverse health indicators was compared by race/ethnicity using the  $\chi^2$  test, and the difference in prevalence of an indicator for each racial/ethnic group, relative to non-Hispanic whites, was reported. To further examine the association of race/ethnicity with health, 14 multivariate logistic

regressions were used to predict each health indicator from all racial/ethnic indicators other than non-Hispanic whites and the full set of covariates described above, accounting for clustering of members within plans using PROC GENMOD. Multivariate results were reported as adjusted odds ratios (ORs) with 95% confidence intervals (CIs). Because this study examined 14 dependent variables for each individual, a Bonferroni correction was used to interpret *P* values. Thus, at the alpha testing level of .05, only *P* values  $<.003$  (.05/14) were considered significant.

## RESULTS

### Patient Population

The 236,289 elderly Medicare health plan members in the study sample included 176,994 (74.9%) white; 20,553 (8.7%) Hispanic; 22,729 (9.6%) black; 1054 (0.5%) American Indian/Alaskan Native; 8228 (3.5%) Asian; 729 (0.3%) Native Hawaiian/Pacific Islander; and 6002 (2.5%) multiracial (>1 race) survey respondents. Blacks, Hispanics, American Indians/Alaskan Natives, Native Hawaiians/Pacific Islanders, and multiracial respondents had lower levels of education and homeownership than did whites, and higher levels of Medicaid eligibility (Table 1). Asians had higher levels of education than whites, but also reported lower levels of home ownership and higher levels of Medicaid eligibility.

Health and functional health status as measured by VR-12 PCS and MCS scores, number of ADL impairments, and number of chronic conditions were generally worse among those of racial/ethnic minority backgrounds (Table 1) than whites. Hispanics, blacks, American Indians/Alaskan Natives, and multiracial individuals had slightly lower mean PCS scores than other racial/ethnic groups. All minority groups had lower mean MCS scores than whites. The mean number of functional ADL limitations and chronic conditions was slightly higher among Hispanics, blacks, American Indians/Alaskan Natives, Native Hawaiians/Pacific Islanders, and multiracial individuals than other groups. With the exception of lower mean MCS scores, Asians had similar or better functional status on most measures than whites. Native Hawaiians/Pacific Islanders had functional status similar to whites.

### Adverse Health Status Outcomes

The prevalence of 14 adverse health indicators by race/ethnicity appears in Table 2. Adjusted ORs for all racial/ethnic minority groups relative to whites appear in Table 3.

**Perceived Health and PCS/MCS Scores**—A higher proportion of those of racial/ethnic minority backgrounds had fair or poor perceived health compared with whites (Table 2). Blacks (41.9%) and Hispanics (45.8%) had the highest prevalence of fair or poor perceived health, while whites had the lowest prevalence (24.1%). The proportion of beneficiaries in the sickest quartile of PCS scores ranged from 33.7% and 32.5% for American Indians/Alaskan Natives and multiracial individuals respectively to 18.6% and 21.3% for Asians and Native Hawaiians/Pacific Islanders. A higher proportion of all racial/ethnic minority groups also had poorer mental health (sickest quartile of MCS scores) than did whites, with the most pronounced absolute difference of 19 and 15 percentage points among Hispanics and American Indians/Alaskan Natives.

Adjusting for sociodemographic factors and region eliminated some differences between whites and racial/ethnic minority groups, but did not greatly alter these patterns (Table 3). Racial/ethnic minority groups generally had significantly higher odds of fair or poor perceived health than whites, from an OR of 1.30 for Hispanics and American Indians/Alaskan Natives (95% CI, 1.24–1.37 and 1.13–1.49, respectively) to an OR of 1.40 (95% CI, 1.32–1.49) for multiracial individuals. After adjustment, differences in the proportion of individuals who were in the lowest quartile of PCS were no longer significant for most groups. Moreover, Asians and Native Hawaiians/Pacific Islanders were significantly less likely than whites to have low PCS scores (OR, 0.52 [95% CI, 0.48–0.56] and OR 0.67 [95% CI, 0.55–0.81], respectively). All racial/ethnic minority groups had significantly higher adjusted odds of poor mental health than whites (from OR 1.22 [95% CI, 1.14–1.31] to 1.53 [95% CI, 1.32–1.78]).

**Health Symptoms**—Racial/ethnic minority groups were generally more likely than whites to report chest pain; shortness of breath; and foot, arthritis, and depression symptoms (Table 2). Prevalence of symptoms was usually highest among blacks, Hispanics, American Indians/Alaskan Natives, Native Hawaiians/Pacific Islanders, and multiracial individuals. Conversely, Asians had the lowest prevalence of arthritis symptoms and were similar to whites in prevalence of shortness-of-breath symptoms.

Most, but not all, significant findings in bivariate comparisons remained significant after multivariate adjustment, but patterns were largely similar (Table 3). Hispanics, blacks, American Indians/Alaskan Natives, Native Hawaiians/Pacific Islanders, and multiracial individuals had significantly higher odds than whites of most symptoms. Conversely, Asians had significantly lower odds than whites for shortness of breath (OR, 0.85; 95% CI, 0.80–0.90) and arthritis symptoms (OR, 0.60; 95% CI, 0.56–0.65).

**Sensory Limitations and Risk Factors**—Hispanics and Native Hawaiians/Pacific Islanders had the highest prevalence of vision and hearing problems. All racial/ethnic groups except Asians had a higher prevalence of obesity than whites. Blacks had the highest prevalence of obesity relative to whites (40.6% vs 28.6%), while Asians had a much lower prevalence than whites (8.1% vs 28.6%). Most groups had rates of smoking that were similar to, or lower than, those of whites.

Adjusting for sociodemographic factors did not greatly alter the patterns for vision problems (Table 3). Most racial/ethnic minority groups had significantly higher odds of vision problems than whites (from OR 1.36 [95% CI, 1.27–1.45] to 1.67 [95% CI, 1.32–2.10]). Racial/ethnic minority groups also had significantly higher odds of hearing problems than whites (from OR 1.18 [95% CI, 1.08–1.30] to 1.68 [95% CI, 1.30–2.17]). Reflecting the patterns observed in bivariate results, most groups except blacks and Asians had few significant differences from whites in obesity; blacks retained significantly higher odds of obesity than whites (OR 1.43; 95% CI, 1.38–1.48), while Asians retained significantly lower odds (OR 0.22; 95% CI, 0.19–0.25). Except for multiracial individuals, most racial/ethnic groups also had either no significant difference or lower odds of being smokers than did whites.



**Disability and Chronic Conditions**—Blacks, American Indians/Alaskan Natives, Native Hawaiians/Pacific Islanders, and multiracial individuals had worse functioning relative to whites, while Asians had better functioning (Table 2). The prevalence of multimorbidity (more than 3 chronic conditions) was similar among most groups (within approximately 5–7 percentage points of one another), with Asians reporting the lowest prevalence.

Adjustment did not greatly alter these patterns (Table 3). Blacks, American Indians/Alaskan Natives, and multiracial individuals had significantly higher odds of ADL impairment than whites (from OR 1.11 [95% CI, 1.07–1.15] for blacks to OR 1.37 [95% CI, 1.20–1.57] for American Indians/Alaskan Natives and multiracial individuals), while Asians had significantly lower odds than whites (OR 0.63; 95% CI, 0.59–0.67). Most racial/ethnic groups did not report significantly different odds for multimorbidity than whites, while Asians and Hispanics retained significantly lower odds than whites (OR 0.66 [95% CI, 0.61–0.69] and OR 0.90 [95% CI, 0.86–0.94], respectively).

## DISCUSSION

Findings from this nationally representative survey of Medicare MC members 65 years and older provide new evidence of significant racial/ethnic disparities in health status indicators. To our knowledge, this is one of the first national assessments of health and functional status among racially and ethnically diverse Medicare beneficiaries. The results provide unique national estimates of prevalence for many of these health indicators among older adults and add evidence to the literature on health status–based disparities among older adults. Even after controlling for key sociodemographic factors, race/ethnicity was significantly associated with most adverse outcomes on health indicators. Except for Asians, all racial/ethnic minority groups were significantly more likely than whites to report poor mental health status, presence of most health symptoms, sensory limitations, and ADL disability.

Unlike much earlier research, this study assesses health indicators that are critical end points of care but not routinely assessed (eg, functional health status), and not just receipt of health services. These indicators reflect quality-of-life issues that are especially important for older adults. Moreover, while the findings are consistent with prior Medicare disparities studies, many prior studies were typically limited to blacks, whites, or Hispanics, while this study examined smaller groups (eg, Native Hawaiians, American Indians, Asians, and multiracial individuals—a growing and heterogeneous group) typically excluded from national comparisons because of small numbers or unreliable race/ethnicity data.<sup>13,22,27–29,32–38</sup> This is critical, given the growing diversity of the aging, with proportions of elderly from many racial/ethnic subgroups expected to grow faster than those of blacks and whites.<sup>23</sup>

By providing a snapshot of disparities and health quality across diverse indicators, these data are useful in highlighting areas of greatest need for improving quality and equitable care in older US adults, particularly mental health status and health symptoms, where differences between minorities and whites were the most pronounced. These symptoms typically result from common chronic conditions such as diabetes, heart failure, and arthritis that are often the target of quality measurement and improvement efforts. Older adults from minority

racial/ethnic groups may have unique needs, including diverse health beliefs or attitudes,<sup>39,40</sup> and may report or perceive health status differently.<sup>17–19,28,41,42</sup> Teasing out these dynamics and changing business practices to include culturally appropriate care could potentially improve care delivery and close gaps in quality of care.<sup>43</sup> Examples of culturally appropriate care include improved language helpline support, availability of educational materials in multiple languages, and availability of non-English pharmacy labeling.

Promising analytic techniques that pool information across time may also increase the power to compare smaller racial/ethnic groups.<sup>44,45</sup> Future research should also consider changes over time, using baseline and 2-year follow-up data from the survey.

## Limitations

This study had several limitations. First is the capture of race and ethnic categories. Whereas the HOS distinguishes major federal categories of race and ethnicity (including distinguishing between Asians and Native Hawaiians/Pacific Islanders), it does not distinguish many important subgroups within each category. For example, Vietnamese and Spanish-speaking-only elderly may be higher-risk subgroups within Asian and Hispanic populations.<sup>34,46</sup> The study also excluded 11% of elderly respondents who returned a survey without self-reported race. Although self-reported race is considered more reliable than administrative race data (which was available in the study), it often includes more missing values than administrative race (this was the case with our data). Furthermore, while the HOS is offered in English, Spanish, and Chinese, it is possible that respondents or proxy respondents who do not have sufficient proficiency in these languages were reluctant to respond. These factors could introduce bias and limit our ability to generalize results to all racial and ethnic groups.

Second, the HOS relied on patient self-reported health information, and limitations include the possibility of bias in interpretation of survey question terminology, and in beneficiary recall, experience, or reporting of health. There is evidence that older adults can reliably report various aspects of their health symptoms and conditions, but there is also evidence that recall, experience, and reporting of health may differ by race/ethnicity, which may bias the results in this study.<sup>47,48</sup>

Third, along with the 47.5% response rate, there is no information on characteristics of those who did not respond to survey questions, and the results may not be generalizable to all Medicare MC enrollees. A 2004 study addressing potential nonresponse bias in the HOS found few meaningful differences between respondents and nonrespondents,<sup>49</sup> but future efforts to characterize nonrespondents in HOS could improve the accuracy of model estimates and provide better estimates of the strength of bias in the resulting data set.

Finally, the findings are based on individuals enrolled in Medicare health plans (ie, any private health plan, such as health maintenance organizations or preferred provider organizations, rather than traditional fee-for-service Medicare), who comprise only about 27% of all Medicare beneficiaries.<sup>50</sup> There may be selection bias at both the individual level, with healthier beneficiaries tending to enroll in plans, and at the regional level, with differences in plan penetration rates resulting in different types of enrolled populations (eg,



there may be a much higher Hispanic population in plans from high-penetration areas of California and Florida).<sup>51,52</sup>

## CONCLUSIONS

Despite some exceptions, elders of racial/ethnic minority background are generally at higher risk than non-Hispanic whites for a broad range of adverse outcomes on health and functional status indicators. Additional research is needed to understand whether these national-level differences vary regionally or within finer racial/ethnic subgroups who may be particularly vulnerable. Such research should examine the role of culture on self-reported health outcomes and should consider techniques that improve inference for smaller racial/ethnic groups.<sup>44,45,53</sup> When possible, stratifying quality indicators by race/ethnicity could identify disparities and assess progress toward eliminating them. Health plans could look at groupings that reflect the population they serve.

Nevertheless, our findings highlight the need to develop and test interventions to reduce identified disparities. Service delivery targeting the needs of specific population groups, coupled with culturally appropriate care programs for people of minority racial/ethnic backgrounds, should be considered. Examples of culturally appropriate or sensitive care include effective language helpline support, availability of educational materials in multiple languages, availability of non-English pharmacy labeling, provision of culturally tailored dietary advice for those with chronic conditions such as diabetes or hypertension, and cultural competency training for clinicians.<sup>54,55</sup> Finally, while the social determinants of health lie outside of the control of health plans, innovative partnerships with community organizations and/or public health may also help improve health outcomes in diverse enrollee groups. Examples include partnering with local supermarkets and pharmacies to provide health screenings, with community-area gyms and fitness groups to promote physical activity, and with community health centers to enhance education and distribution of appropriate health materials.<sup>55,56</sup> Such partnerships are critical to meeting the needs of an increasingly large and diverse population of elders.

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### Take-Away Points

Critical patient-reported outcomes of care are not routinely assessed among diverse elderly racial/ethnic groups in Medicare managed care.

- ■ Certain non-white racial/ethnic groups—blacks, Hispanics, American Indians, and Native Hawaiians—had worse functional status, health symptoms, and risk factors than whites. Asians were an exception.
- ■ As the proportion of older adults from non-white groups grows more rapidly than whites, it will be crucial to understand health outcomes in diverse enrollee populations.
- ■ To improve the health status of the elderly and reduce disparities, service delivery targeting the needs of specific population groups should be considered.

**Table 1** Basic Characteristics of Elderly Medicare Health Plan Members, by Race/Ethnicity: The Medicare Health Outcomes Survey, 2012 (n = 236,289)

	Percent or Mean						
	White n = 176,994 (74.9%)	Hispanic n = 20,553 (8.7%)	Black n = 22,729 (9.6%)	American Indian/ Alaskan Native n = 1054 (0.5%)	Asian n = 8228 (3.5%)	Native Hawaiian/ Pacific Islander n = 729 (0.3%)	Multiracial n = 6002 (2.5%)
<b>Sociodemographics</b>							
Mean age in years <sup>a</sup> (age)	74.8	73.7	73.9	74.2	74.7	73.1	74.0
Female <sup>a</sup>	57.4	58.9	66.4	59.8	53.3	60.6	60.3
Married <sup>a</sup>	57.5	48.4	32.4	44.0	63.9	45.7	46.7
Education some college <sup>a</sup>	46.6	20.2	27.1	30.4	47.7	31.0	32.6
Medicaid eligible <sup>a</sup>	12.3	47.1	38.8	33.8	36.8	33.9	27.3
Home owner <sup>a</sup>	74.4	46.8	48.7	56.2	46.1	44.7	60.3
<b>Basic Health Characteristics</b>							
Mean VR-12 PCS Score <sup>a</sup>	39.7	37.4	36.8	36.2	40.5	39.5	35.8
Mean VR-12 MCS Score <sup>a</sup>	52.7	47.6	49.3	48.8	50.0	49.6	49.8
Mean number of ADL impairments <sup>a</sup>	0.9	1.4	1.3	1.4	0.9	1.1	1.4
Mean number of chronic conditions <sup>a</sup>	3.1	3.4	3.5	3.5	2.8	3.4	3.6
<b>Enrollment Duration in 2012</b>							
Enrolled more than 1 year <sup>a</sup>	70.2	61.3	64.5	66.9	64.2	62.1	64.7
<b>Census Region</b>							
Northeast <sup>a</sup>	6.9	3.9	2.9	4.2	2.9	1.4	5.5
Mid-Atlantic <sup>a</sup>	13.8	16.5	16.8	10.9	10.3	4.1	10.9
East North Central <sup>a</sup>	16.7	3.5	13.4	9.7	4.0	1.7	11.7
West North Central <sup>a</sup>	9.8	1.7	4.7	8.8	3.4	1.2	6.9
South Atlantic <sup>a</sup>	15.8	15.6	34.6	15.1	7.5	6.6	20.1
East South Central <sup>a</sup>	4.2	0.6	7.2	3.1	0.5	0.4	5.7
West South Central <sup>a</sup>	7.5	16.2	13.1	15.2	5.0	1.5	12.8



	Percent or Mean						
	White n = 176,994 (74.9%)	Hispanic n = 20,553 (8.7%)	Black n = 22,729 (9.6%)	American Indian/ Alaskan Native n = 1054 (0.5%)	Asian n = 8228 (3.5%)	Native Hawaiian/ Pacific Islander n = 729 (0.3%)	Multiracial n = 6002 (2.5%)
Mountain <sup>a</sup>	13.2	21.4	3.3	18.1	6.0	7.8	10.0
Pacific <sup>a</sup>	12.1	20.8	3.9	14.8	60.5	75.3	16.5

ADL impairments indicates having any of 6 activities of daily living impairments (bathing, dressing, eating, getting in/out of chairs, walking, toileting); chronic conditions indicates having any of 14 conditions (hypertension, angina pectoris or coronary artery disease, congestive heart failure, heart attack, other heart condition, stroke, respiratory conditions, inflammatory bowel disease, hip/knee arthritis, hand/wrist arthritis, osteoporosis, sciatica, diabetes, and any cancer); VR-12 PCS and MCS indicate the Veterans-RAND 12-Item Short Form Survey physical and mental component summary scores (0–100 scale, 0 representing worst health).

Census region refers to the region to which an individual belongs, from a total of 9 regions: Northeast (CT, MA, ME, NH, RI, VT), Mid-Atlantic (NJ, N Y, PA), East North Central (IL, IN, MI, OH, WI), West North Central (IA, KS, MN, MO, NE, ND, SD), South Atlantic (DE, DC, FL, GA, MD, NC, SC, VA, WV), East South Central (AL, KY, MS, TN), West South Central (AR, LA, OK, TX), Mountain (AZ, CO, ID, MT, NM, NV, UT, WY), and Pacific (AK, CA, HI, WA, OR).

<sup>a</sup>Differences among racial/ethnic groups are statistically significant at  $P < .003$ .

**Table 2**

Prevalence of Adverse Health Outcomes Among Elderly Medicare Health Plan Members, by Race/Ethnicity, 2012 (n = 236,289)

Member Reported the Following	White n = 176,994	Hispanic n = 20,553	Black n = 22,729	American Indian/Alaskan Native n = 1054	Asian n = 8228	Native Hawaiian/Pacific Islander n = 729	Multiracial n = 6002
<b>Perceived Health</b>							
Fair or poor health, % <sup>a</sup>	24.1	45.8	41.9	38.1	32.5	30.1	38.2
Difference from whites <sup>b</sup>	—	21.7	17.9	14.0	8.4	6.0	14.1
<b>Sickest Quartile VR-12 PCS and MCS Scores</b>							
Sickest quartile PCS score, % <sup>a</sup>	24.1	28.4	29.7	33.7	18.6	21.3	32.5
Difference from whites <sup>b</sup>	—	4.3	5.6	9.6	-5.5	-2.8	8.4
Sickest quartile MCS score, % <sup>a</sup>	21.5	40.3	34.7	36.4	31.8	35.0	31.5
Difference from whites <sup>b</sup>	—	18.8	13.2	15.0	10.3	13.5	2.5
<b>Health Symptoms</b>							
Chest pain symptoms in last 4 weeks, % <sup>a</sup>	22.7	39.9	37.4	37.2	34.9	40.4	38.6
Difference from whites <sup>b</sup>	—	17.2	14.7	14.6	12.2	17.7	16.0
Shortness of breath symptoms in last 4 weeks, % <sup>a</sup>	50.5	62.1	63.3	64.1	50.6	62.8	62.7
Difference from whites <sup>b</sup>	—	11.6	12.8	13.6	0.1	12.3	12.4
Foot symptoms in last 4 weeks, % <sup>a</sup>	40.4	60.8	59.0	55.4	52.4	58.3	59.0
Difference from whites <sup>b</sup>	—	20.5	18.7	15.1	12.0	17.9	18.7
Severe or moderate arthritis pain in last 4 weeks, % <sup>a</sup>	33.3	46.0	44.1	42.5	27.0	36.7	39.0
Difference from whites <sup>b</sup>	—	12.7	10.8	9.1	-6.3	3.3	5.7
Depressed mood much of time in last year, % <sup>a</sup>	11.7	27.0	20.9	22.3	15.3	22.0	22.1
Difference from whites <sup>b</sup>	—	15.3	9.2	10.6	3.6	10.3	10.4
<b>Sensory Limitations</b>							
Vision problem, % <sup>a</sup>	5.6	14.5	11.2	11.2	10.5	10.9	11.0
Difference from whites <sup>b</sup>	—	9.0	5.7	5.7	4.9	5.3	5.4

Member Reported the Following	White n = 176,994	Hispanic n = 20,553	Black n = 22,729	American Indian/Alaskan Native n = 1054	Asian n = 8228	Native Hawaiian/Pacific Islander n = 729	Multiracial n = 6002
Hearing problem, % <sup>a</sup>	12.9	22.2	16.2	20.1	17.0	22.1	15.6
Difference from whites <sup>b</sup>	—	9.3	3.3	7.2	4.1	9.2	2.7
<b>Risk Factors</b>							
Obese (BMI ≥ 30 kg/m <sup>2</sup> ), % <sup>a</sup>	28.6	33.0	40.6	34.7	8.1	34.6	34.0
Difference from whites <sup>b</sup>	—	4.4	12.0	6.0	-20.5	6.0	5.4
Current smoker, % <sup>a</sup>	9.5	9.1	14.0	15.0	5.3	12.3	15.6
Difference from whites <sup>b</sup>	—	-0.4	4.5	5.5	-4.2	2.8	6.1
<b>Functioning and Chronic Conditions</b>							
1 ADL impairment, % <sup>a</sup>	35.3	45.7	46.5	49.3	31.9	1.9	47.8
Difference from whites <sup>b</sup>	—	10.4	11.2	14.0	-3.4	6.6	3.2
> 3 chronic conditions, % <sup>a</sup>	37.2	43.0	44.5	43.6	30.8	42.8	44.6
Difference from whites <sup>b</sup>	—	5.8	7.3	6.3	-6.5	5.6	7.4

BMI indicates body mass index; VR-12 PCS and MCS, the Veterans-RAND 12-Item Short Form Survey physical and mental component summary score (0–100 scale, 0 representing worst health).

Poor physical health indicates a VR-12 PCS score in the sickest quartile of the overall PCS score distribution, or PCS ≥ 30.11. Poor mental health indicates a VR-12 MCS score in the sickest quartile of the overall MCS score distribution, or MCS ≥ 45.05. Chest pain symptoms indicates having any of 2 symptoms (chest pain when exercising or resting) in last 4 weeks versus no symptoms. Shortness-of-breath symptoms indicates having any of 4 symptoms (shortness of breath when lying flat, sitting, walking <1 block, or climbing 1 flight of stairs) in last 4 weeks versus no symptoms. Foot symptoms indicates having any of 4 symptoms (numbness in feet, tingling in feet, inability to feel hot/cold in feet, or nonhealing sores on feet) in last 4 weeks versus no symptoms. ADL impairments indicates having any of 6 activities of daily living impairments (bathing, dressing, eating, getting in/out of chairs, walking, toileting). Chronic conditions indicates having any of 14 conditions (hypertension, angina pectoris or coronary artery disease, congestive heart failure, heart attack, other heart condition, stroke, respiratory conditions, inflammatory conditions, hip/knee arthritis, hand/wrist arthritis, osteoporosis, sciatica, diabetes, and any cancer).

<sup>a</sup>Differences among racial/ethnic groups are statistically significant at  $P < .003$ .

<sup>b</sup>Difference from whites is the numerical difference between the proportion among the non-white group and the proportion among the white group who report an adverse outcome. For example, 24.1% of whites and 45.8% of Hispanics reported fair or poor health; the numerical difference is 21.7 percentage points (45.8 minus 24.1). A positive difference indicates a less favorable result among the non-white group; a negative difference indicates a more favorable result among the non-white group.

Adjusted Odds Ratios (ORs) for Adverse Health Outcomes Among Elderly Medicare Health Plan Members, by Race/Ethnicity, 2012 (n = 236,289)

Table 3

Health Outcomes	Race/Ethnicity Group, Adjusted OR (95% CI)						
	White (Reference) n = 176,994	Hispanic n = 20,553	Black n = 22,729	American Indian/ Alaskan Native n = 1054	Asian n = 8228	Native Hawaiian/Pacific Islander n = 729	Multiracial n = 6002
<b>Perceived Health</b>							
Fair or poor health	1.00	1.30 (1.24–1.37) <sup>a</sup>	1.39 (1.33–1.46) <sup>a</sup>	1.30 (1.13–1.49) <sup>a</sup>	1.06 (0.98–1.14)	1.07 (0.91–1.27)	1.40 (1.32–1.49) <sup>a</sup>
<b>Sickest Quartile VR-12 PCS and MCS Scores</b>							
Sickest quartile PCS score	1.00	0.71 (0.68–0.75) <sup>a</sup>	0.93 (0.87–0.97)	1.16 (1.01–1.33)	0.52 (0.48–0.56) <sup>a</sup>	0.67 (0.55–0.81) <sup>a</sup>	1.21 (1.13–1.29) <sup>a</sup>
Sickest quartile MCS score	1.00	1.34 (1.29–1.40) <sup>a</sup>	1.23 (1.18–1.27) <sup>a</sup>	1.48 (1.29–1.69) <sup>a</sup>	1.22 (1.14–1.31) <sup>a</sup>	1.53 (1.32–1.78) <sup>a</sup>	1.25 (1.18–1.34) <sup>a</sup>
<b>Health Symptoms</b>							
Chest pain	1.00	1.35 (1.28–1.41) <sup>a</sup>	1.40 (1.35–1.45) <sup>a</sup>	1.48 (1.30–1.69) <sup>a</sup>	1.38 (1.29–1.47) <sup>a</sup>	1.80 (1.57–2.06) <sup>a</sup>	1.68 (1.58–1.78) <sup>a</sup>
Shortness of breath	1.00	0.98 (0.94–1.02)	1.16 (1.12–1.20) <sup>a</sup>	1.31 (1.14–1.52) <sup>a</sup>	0.85 (0.80–0.90) <sup>a</sup>	1.44 (1.23–1.67) <sup>a</sup>	1.30 (1.23–1.38) <sup>a</sup>
Foot symptoms	1.00	1.42 (1.36–1.49) <sup>a</sup>	1.53 (1.48–1.59) <sup>a</sup>	1.39 (1.22–1.59) <sup>a</sup>	1.29 (1.21–1.37) <sup>a</sup>	1.70 (1.50–1.94) <sup>a</sup>	1.75 (1.65–1.85) <sup>a</sup>
Arthritis pain	1.00	1.10 (1.05–1.15) <sup>a</sup>	1.15 (1.11–1.19) <sup>a</sup>	1.13 (0.99–1.30)	0.60 (0.56–0.65) <sup>a</sup>	0.98 (0.83–1.15)	1.05 (0.99–1.11)
Depressed mood	1.00	1.37 (1.31–1.44) <sup>a</sup>	1.13 (1.08–1.19) <sup>a</sup>	1.37 (1.17–1.60) <sup>a</sup>	1.00 (0.92–1.10)	1.51 (1.20–1.89) <sup>a</sup>	1.50 (1.39–1.61) <sup>a</sup>
<b>Sensory Limitations</b>							
Vision problem	1.00	1.55 (1.46–1.65) <sup>a</sup>	1.36 (1.27–1.45) <sup>a</sup>	1.46 (1.19–1.81) <sup>a</sup>	1.43 (1.29–1.57) <sup>a</sup>	1.67 (1.33–2.10) <sup>a</sup>	1.61 (1.46–1.77) <sup>a</sup>
Hearing problem	1.00	1.28 (1.21–1.34) <sup>a</sup>	1.03 (0.98–1.08)	1.33 (1.11–1.59) <sup>a</sup>	1.18 (1.08–1.30) <sup>a</sup>	1.68 (1.30–2.17) <sup>a</sup>	1.02 (0.95–1.10)
<b>Risk Factors</b>							
Obese (BMI ≥ 30 kg/m <sup>2</sup> )	1.00	0.99 (0.94–1.03)	1.43 (1.38–1.48) <sup>a</sup>	1.16 (1.02–1.31)	0.22 (0.19–0.25) <sup>a</sup>	1.20 (0.99–1.44)	1.13 (1.06–1.19) <sup>a</sup>
Current smoker	1.00	0.53 (0.49–0.58) <sup>a</sup>	1.00 (0.95–1.06)	1.17 (0.95–1.45)	0.44 (0.38–0.50) <sup>a</sup>	0.85 (0.68–1.06)	1.30 (1.20–1.41) <sup>a</sup>
<b>Functioning and Chronic Conditions</b>							
1 ADL impairment	1.00	0.92 (0.88–0.96) <sup>a</sup>	1.11 (1.07–1.15) <sup>a</sup>	1.37 (1.20–1.57) <sup>a</sup>	0.63 (0.59–0.67) <sup>a</sup>	1.06 (0.90–1.25)	1.37 (1.30–1.45) <sup>a</sup>
>3 chronic conditions	1.00	0.90 (0.86–0.94) <sup>a</sup>	1.03 (0.99–1.07)	1.04 (0.91–1.20)	0.66 (0.61–0.69) <sup>a</sup>	1.15 (0.98–1.35)	1.16 (1.10–1.22) <sup>a</sup>

ADL indicates activity of daily living; BMI, body mass index; CI, confidence interval; OR, odds ratio; VR-12 PCS and MCS Scores, the Veterans-RAND 12-Item Survey physical component summary score and mental component summary score (0–100 scale, 0 representing worst health, 100 representing best health). Chest pain symptoms indicates having any of 2 symptoms (chest pain when exercising

or resting) in last 4 weeks versus no symptoms. Shortness of breath symptoms indicates having any of 4 symptoms (shortness of breath when lying flat, sitting, walking <1 block, or climbing 1 flight of stairs) in last 4 weeks versus no symptoms. Foot symptoms indicates having any of 4 symptoms (numbness in feet, tingling in feet, inability to feel hot/cold in feet, or nonhealing sores on feet) in last 4 weeks versus no symptoms. Arthritis pain indicates severe or moderate arthritis pain in the last 4 weeks versus mild, very mild, or no pain. Current smoker indicates smoking all or some days versus not at all. Obese indicates a body mass index  $\geq 30$ , based on member's reported height and weight. Poor physical health indicates a VR-12 PCS score in the sickest quartile of the overall PCS score distribution, or PCS  $\leq 30.11$ . Poor mental health indicates a VR-12 MCS score in the sickest quartile of the overall MCS score distribution, or MCS  $\leq 45.05$ . Having 1 ADL impairment indicates having difficulty or being unable to perform any of 6 ADLs (bathing, dressing, eating, getting in/out of chairs, walking, toileting). Having  $>3$  chronic conditions indicates having 4 or more of any of 14 chronic conditions (hypertension, angina pectoris or coronary artery disease, congestive heart failure, heart attack, other heart condition, stroke, respiratory conditions, inflammatory bowel disease, hip/knee arthritis, hand/wrist arthritis, osteoporosis, sciatica, diabetes, and any cancer).

$P < .003$ . Statistically significant results are indicated by bold font. A Bonferroni correction was applied to account for the testing of 14 dependent variables from the sample of Medicare beneficiaries. Thus, at the alpha testing level of .05, only  $P$  values  $< .003$  (.05/14) were considered significant. The model adjusts for patient age, gender, marital status, education, Medicaid status, length of enrollment in Medicare health plan, and census region: New England (CT, MA, ME, NH, RI, VT); Mid-Atlantic (NJ, NY, PA); East North Central (IN, IL, MI, OH, WI); West North Central (IA, KS, MN, MO, NE, ND, SD); South Atlantic (DE, DC, FL, GA, MD, NC, SC, VA, WV); East South Central (AL, KY, MS, TN); West South Central (AR, LA, OK, TX); Mountain (AZ, CO, ID, MT, NM, NV, UT, WY); Pacific (AK, CA, HI, WA, OR).