CMS
CENTERS FOR MEDICARE & MEDICAID SERVICES
OFFICE OF MINORITY HEALTH

Racial and Ethnic Disparities in Diabetes Prevalence, Self-Management, and Health Outcomes among Medicare Beneficiaries

Introduction

About one in four adults ages 65 and older (around 11 million individuals) has been diagnosed with diabetes—making it one of the most common chronic conditions for this population.[1] Diabetes is associated with high morbidity, mortality, and costs, and was the sixth leading cause of death for all individuals ages 65 and older.[2] Total health care expenditures attributed to diabetes for individuals ages 65 and older was estimated at $104 billion in 2012. [3]

Among Medicare Fee-for-Service beneficiaries, prevalence of diabetes among Black (37 percent) and Hispanic (38 percent) beneficiaries was higher than among their White counterparts (25 percent) in 2012.[4] Minority beneficiaries with diabetes are also more likely to receive lower quality care[5] and have diabetes-related complications, such as end-stage renal disease, chronic kidney disease, and amputations.[6, 7] In addition, genetic predisposition,[8] higher rates of obesity,[9] earlier onset,[1] poor blood sugar control,[10] diet, and lack of exercise[11] have all been shown to contribute to these racial and ethnic disparities.

The study reported here used 2012 Medicare Current Beneficiary Survey (MCBS) data to examine racial and ethnic differences in self-reported measures on access to care, propensity to seek care, self-care knowledge and behaviors, diabetes management, and complications among Medicare beneficiaries ages 65 and older. The MCBS is an in-person, nationally representative, longitudinal survey of Medicare beneficiaries sponsored by the Centers for Medicare & Medicaid Services (CMS).[i] The cohort for this study included all community-dwelling[ii] beneficiaries ages 65 and older with self-reported Type 1 or Type 2 diabetes[iii]

Key Findings:

- Prevalence of diabetes was higher among minority beneficiaries compared to White beneficiaries. It was highest among Black beneficiaries (30.0 percent).

- Black and Hispanic beneficiaries were diagnosed at younger ages than White beneficiaries (57 vs. 60 years of age).

- Although Black beneficiaries were generally just as likely as White beneficiaries to perform diabetes self-management activities, they were less likely to report having adequate knowledge to self-manage their condition and having their blood sugar well controlled all of the time.

- Fewer Black and Hispanic beneficiaries reported knowing about Medicare coverage policies for diabetic testing supplies and self-management education compared to White beneficiaries.

Data Source: 2012 Medicare Current Beneficiary Survey, sponsored by the Centers for Medicare & Medicaid Services (CMS).

enrolled in the Medicare program at any time during 2012. Type 1 diabetes, a condition in which the body does not produce insulin, is usually diagnosed in children and young adults. Type 2 diabetes, also known as hypoglycemia, occurs when the body builds up insulin resistance. It is the most common form of diabetes.[12] Age at first diagnosis is defined as the age at which the beneficiary was first diagnosed with diabetes. Race and ethnicity are classified as follows: White, Black, and Hispanic. The Hispanic category includes all respondents indicating a Hispanic identity, regardless of what race they selected. Survey responses included additional racial categories, such as American Indian or Alaska Native, Asian, and Native Hawaiian or Other Pacific Islander. These are not displayed in the report due to limited sample sizes.

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i   Questions about diabetes self-management and prevention are asked on a biennial basis. The most recent available data are from 2012.

ii This definition excludes residents of nursing homes or similar long-term care facilities.

iii The study population excludes pre-diabetes, borderline diabetes, and gestational/pregnancy-related diabetes because the management of the conditions and outcomes are different from those with Type 1 or Type 2 diabetes.
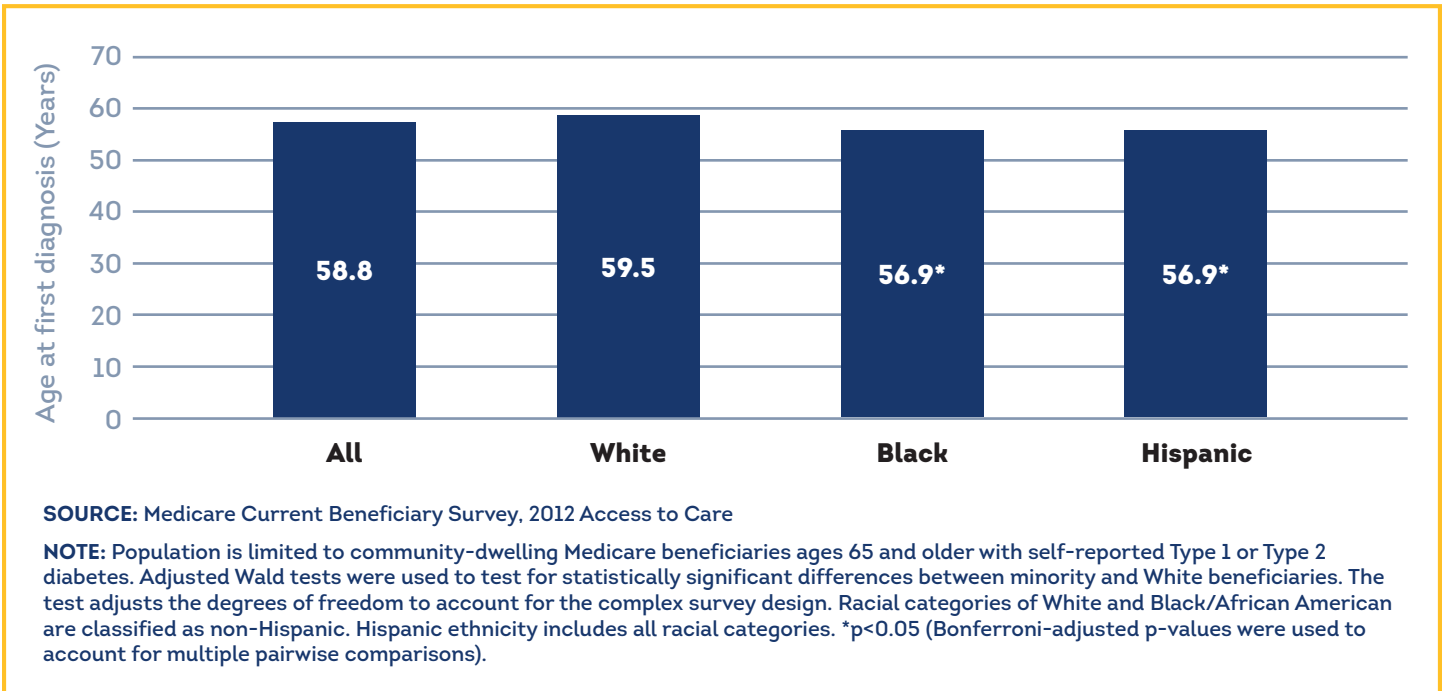
Results

Figure 1. Percentage of community-dwelling Medicare beneficiaries with self-reported diagnosed diabetes, by race/ethnicity and type of diabetes (2012)

SOURCE: Medicare Current Beneficiary Survey, 2012 Access to Care.

NOTE: Population is limited to community-dwelling Medicare beneficiaries ages 65 and older with self-reported Type 1 or Type 2 diabetes. Adjusted Wald tests were used to test for statistically significant differences between minority and White beneficiaries. The test adjusts the degrees of freedom to account for the complex survey design. Racial categories of White and Black/African American are classified as non-Hispanic. Hispanic ethnicity includes all racial categories. *p<0.05 (Bonferroni-adjusted p-values were used to account for multiple pairwise comparisons).

Nearly 8.4 million (20.3 percent) Medicare beneficiaries ages 65 and older had Type 1 or Type 2 diabetes in 2012, with 1.4 million (3.3 percent) having Type 1 and 7.0 million (17.0 percent) having Type 2 (Figure 1; Table A1, see Appendix). Diabetes prevalence was higher among Black (30.0 percent) and Hispanic (26.7 percent) beneficiaries compared to White beneficiaries (18.0 percent) — with the vast majority of all groups having Type 2 diabetes.
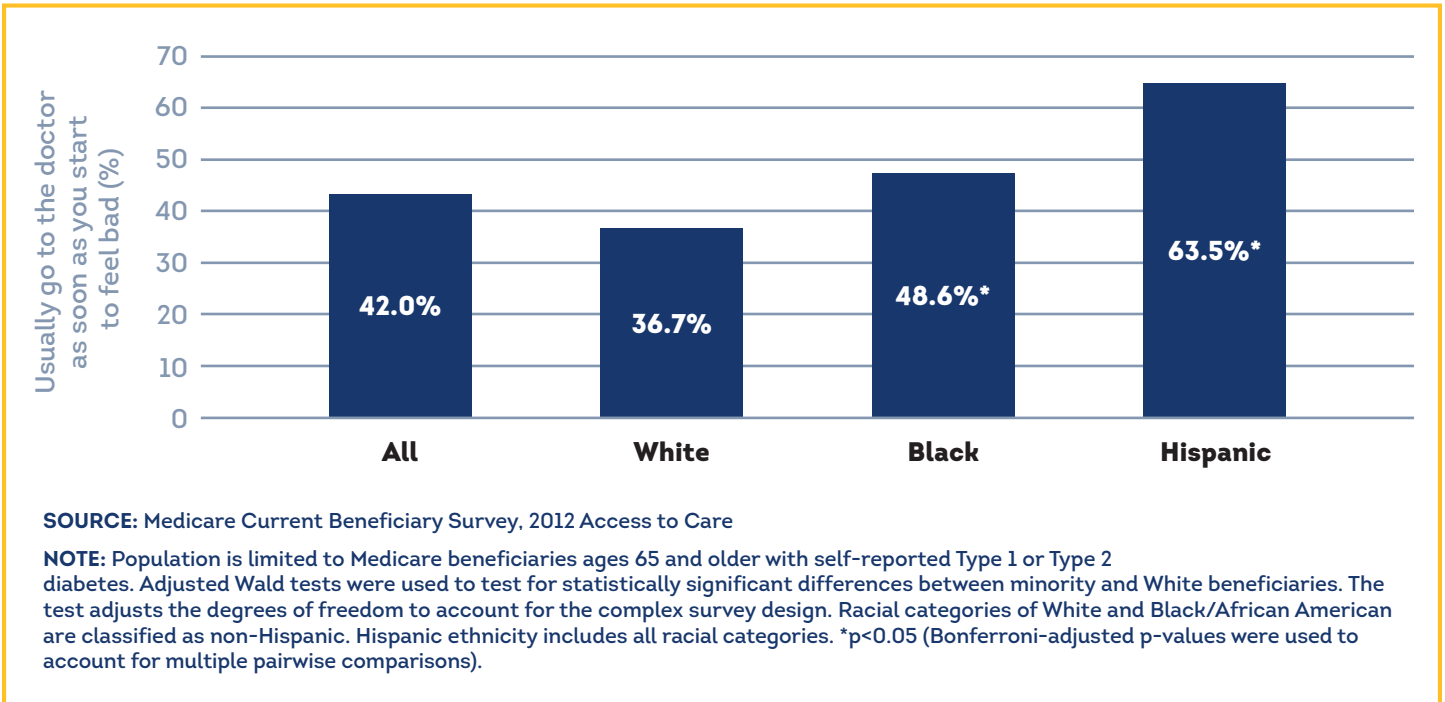
Diabetes prevalence was higher among Medicare beneficiaries who were male (22.3 percent vs. 18.6 percent for female); had less than a high school education (27.9 percent vs. 18.3 percent for high school graduates or higher); had incomes less than $25,000 (24.4 percent vs. 17.7 percent for those with incomes greater than $25,000); and who were eligible for both Medicare and Medicaid (30.1 percent vs. 20.2 percent for Medicare-only beneficiaries) (Table A2). Diabetes prevalence did not differ by age, marital status, or metropolitan status.

Figure 2. Age at first diabetes diagnosis, among community-dwelling Medicare beneficiaries with self-reported diagnosed diabetes, by race/ethnicity (2012)

Bar chart showing "Age at first diagnosis (Years)" on the y-axis (0 to 70):

All	White	Black	Hispanic
58.8	59.5	56.9*	56.9*

SOURCE: Medicare Current Beneficiary Survey, 2012 Access to Care

NOTE: Population is limited to community-dwelling Medicare beneficiaries ages 65 and older with self-reported Type 1 or Type 2 diabetes. Adjusted Wald tests were used to test for statistically significant differences between minority and White beneficiaries. The test adjusts the degrees of freedom to account for the complex survey design. Racial categories of White and Black/African American are classified as non-Hispanic. Hispanic ethnicity includes all racial categories. *$p<0.05$ (Bonferroni-adjusted p-values were used to account for multiple pairwise comparisons).
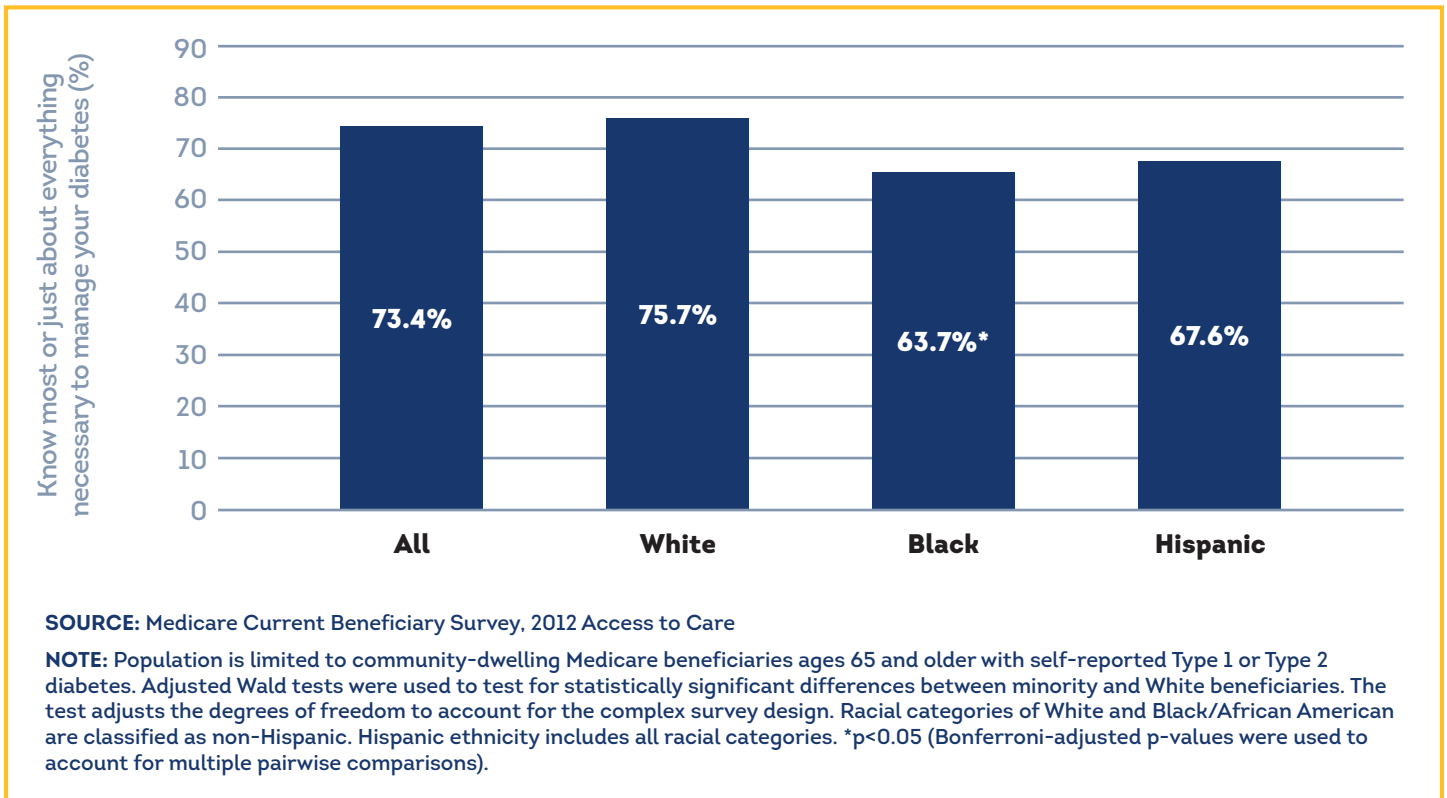
Community-dwelling Medicare beneficiaries ages 65 and older in 2012, as a group, were first diagnosed with diabetes at age 58.8, on average (Figure 2). Black and Hispanic beneficiaries were first diagnosed at younger ages (56.9 years, on average) compared to White beneficiaries (59.5 years, on average).

Figure 3. Percentage reporting they usually go to the doctor as soon as they start to feel bad, among community-dwelling Medicare beneficiaries with self-reported diagnosed diabetes, by race/ethnicity (2012)

SOURCE: Medicare Current Beneficiary Survey, 2012 Access to Care

NOTE: Population is limited to Medicare beneficiaries ages 65 and older with self-reported Type 1 or Type 2 diabetes. Adjusted Wald tests were used to test for statistically significant differences between minority and White beneficiaries. The test adjusts the degrees of freedom to account for the complex survey design. Racial categories of White and Black/African American are classified as non-Hispanic. Hispanic ethnicity includes all racial categories. *p<0.05 (Bonferroni-adjusted p-values were used to account for multiple pairwise comparisons).
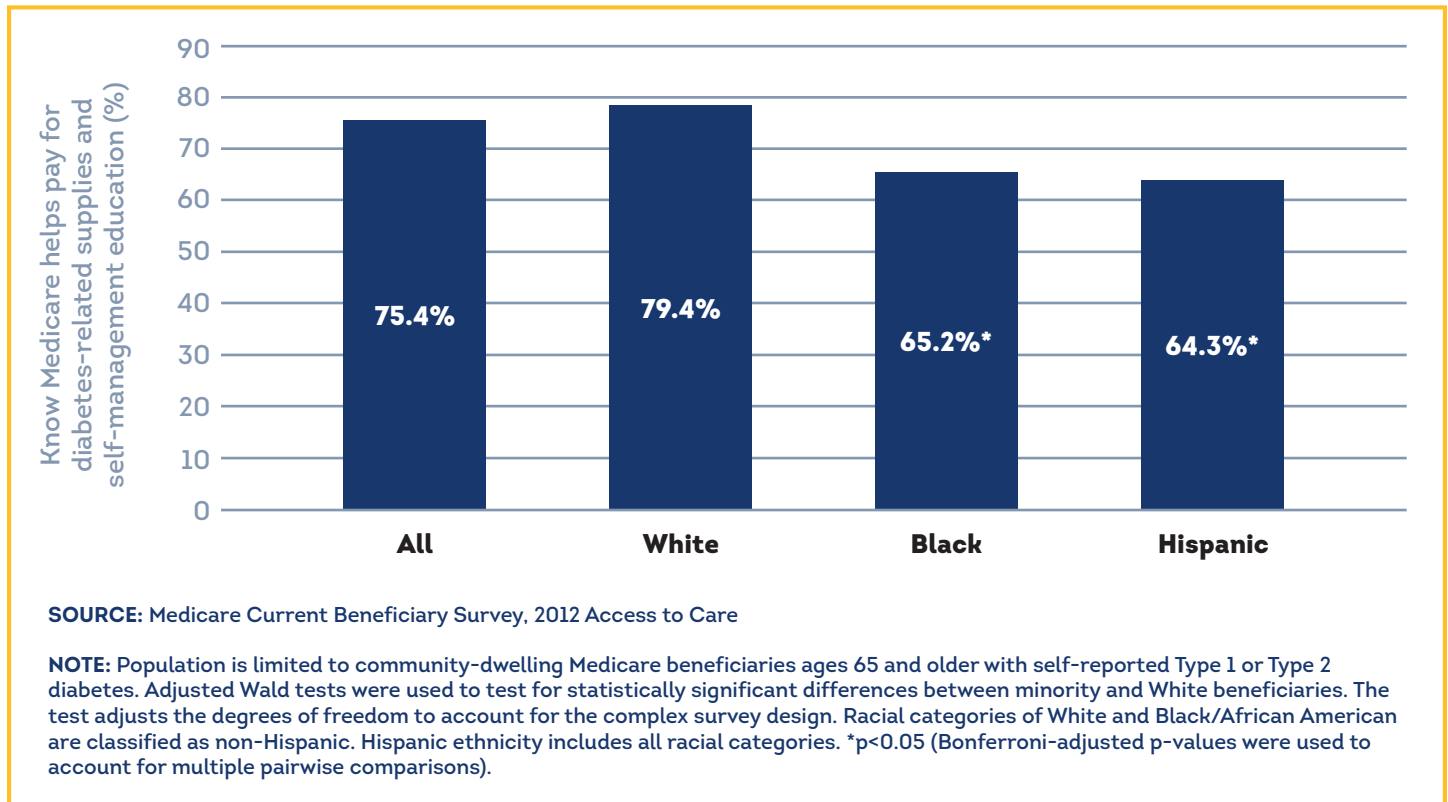
Among community-dwelling Medicare beneficiaries ages 65 and older diagnosed with diabetes, both Black (48.6 percent) and Hispanic (63.5 percent) beneficiaries were more likely to report that they usually go to the doctor as soon as they start to feel bad compared to White beneficiaries (36.7 percent) (Figure 3; Table A3).

Figure 4. Percentage reporting that they know most or just about everything necessary to manage their diabetes, among community-dwelling Medicare beneficiaries with self-reported diagnosed diabetes, by race/ethnicity (2012)

Know most or just about everything necessary to manage your diabetes (%)

All	White	Black	Hispanic
73.4%	75.7%	63.7%*	67.6%

NOTE: Population is limited to community-dwelling Medicare beneficiaries ages 65 and older with self-reported Type 1 or Type 2 diabetes. Adjusted Wald tests were used to test for statistically significant differences between minority and White beneficiaries. The test adjusts the degrees of freedom to account for the complex survey design. Racial categories of White and Black/African American are classified as non-Hispanic. Hispanic ethnicity includes all racial categories. *p<0.05 (Bonferroni-adjusted p-values were used to account for multiple pairwise comparisons).
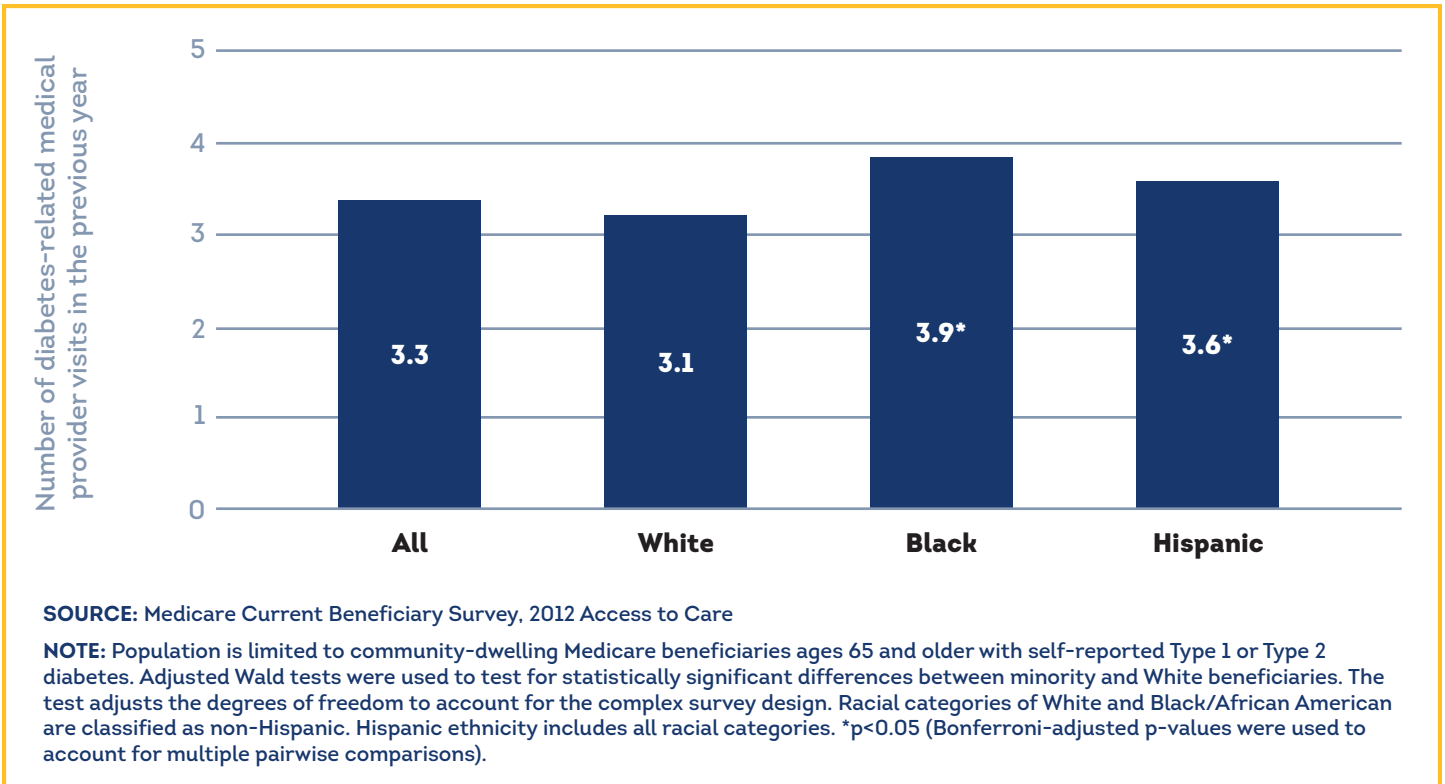
Racial and ethnic differences were also apparent in diabetes-related knowledge among Medicare beneficiaries ages 65 and older. Fewer community-dwelling Black beneficiaries ages 65 and older reported knowing most or just about everything to manage their diabetes (63.7 percent) compared to White beneficiaries (75.7 percent) (Figure 4; Table A4).

Figure 5. Percentage reporting they know Medicare helps pay for diabetic testing supplies and self-management education, among community-dwelling Medicare beneficiaries with self-reported diagnosed diabetes, by race/ethnicity (2012)
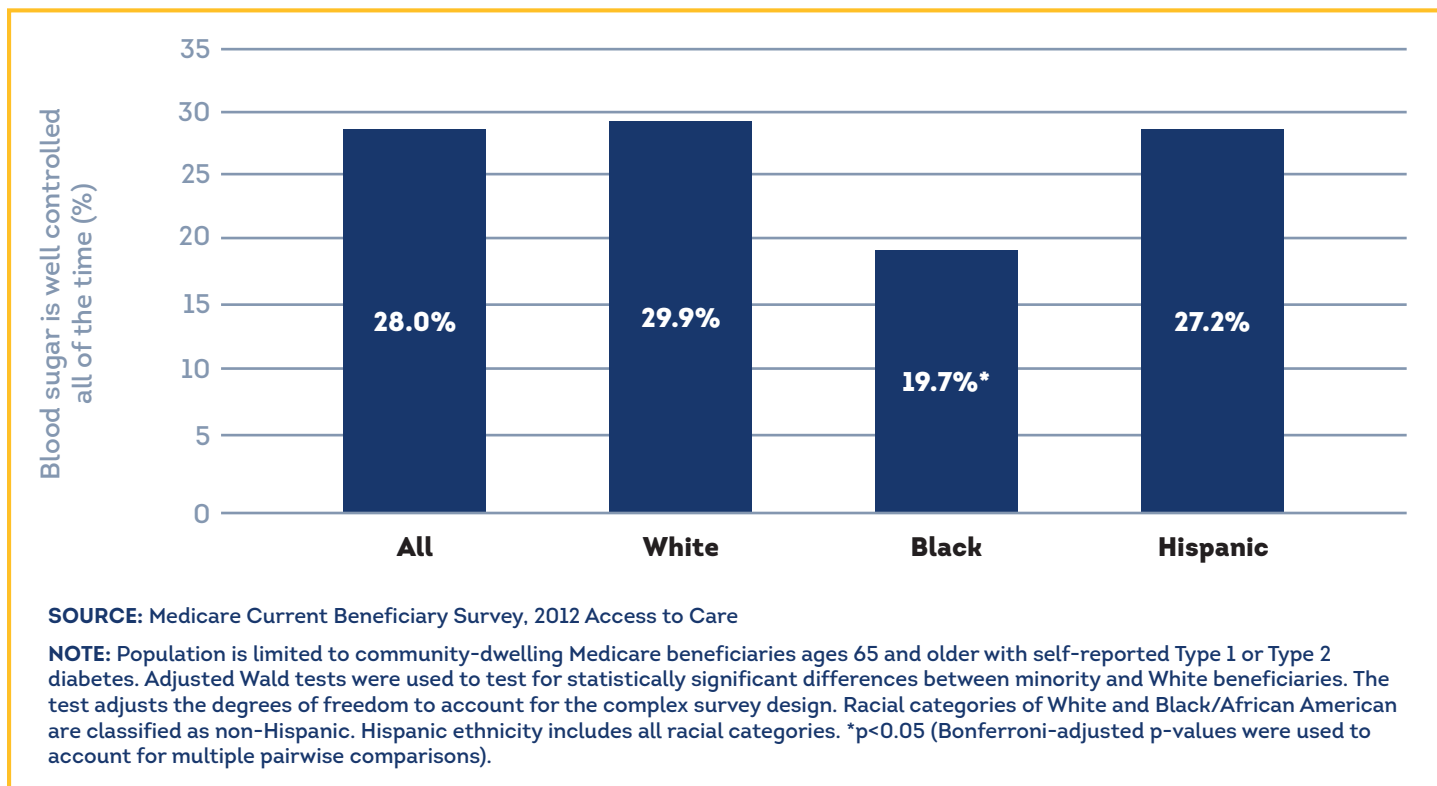
Know Medicare helps pay for diabetes-related supplies and self-management education (%)

All	75.4%
White	79.4%
Black	65.2%*
Hispanic	64.3%*

SOURCE: Medicare Current Beneficiary Survey, 2012 Access to Care

NOTE: Population is limited to community-dwelling Medicare beneficiaries ages 65 and older with self-reported Type 1 or Type 2 diabetes. Adjusted Wald tests were used to test for statistically significant differences between minority and White beneficiaries. The test adjusts the degrees of freedom to account for the complex survey design. Racial categories of White and Black/African American are classified as non-Hispanic. Hispanic ethnicity includes all racial categories. *p<0.05 (Bonferroni-adjusted p-values were used to account for multiple pairwise comparisons).

Similarly, fewer Black (65.2 percent) and Hispanic (64.3 percent) beneficiaries reported knowing about Medicare coverage policies for diabetic testing supplies and self-management education, compared to White beneficiaries (79.4 percent) (Figure 5).

Figure 6. Average number of diabetes-related medical provider visits in the previous year, among community-dwelling Medicare beneficiaries with self-reported diagnosed diabetes, by race/ethnicity (2012)
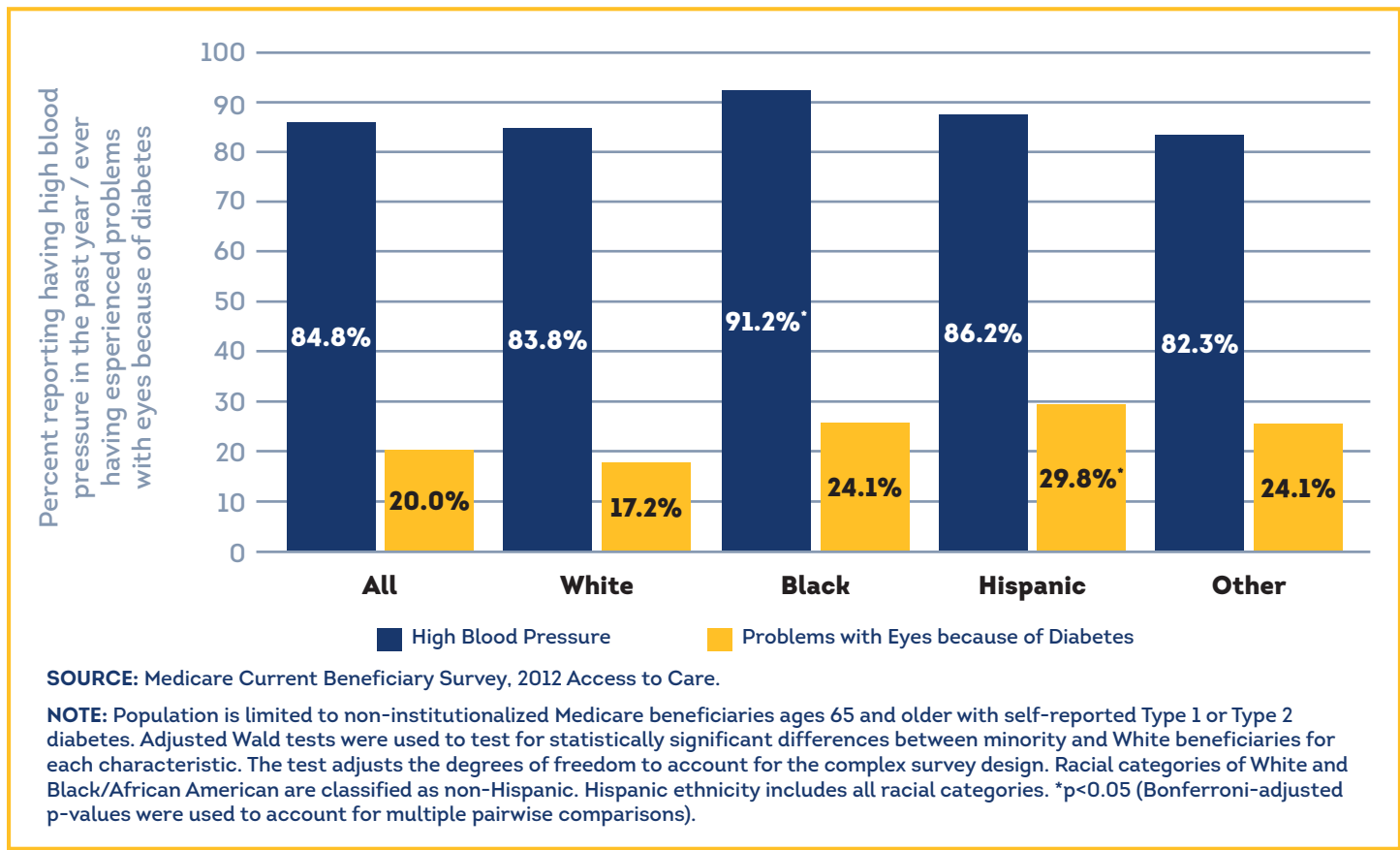

Number of diabetes-related medical provider visits in the previous year

Group	Value
All	3.3
White	3.1
Black	3.9*
Hispanic	3.6*

SOURCE: Medicare Current Beneficiary Survey, 2012 Access to Care

NOTE: Population is limited to community-dwelling Medicare beneficiaries ages 65 and older with self-reported Type 1 or Type 2 diabetes. Adjusted Wald tests were used to test for statistically significant differences between minority and White beneficiaries. The test adjusts the degrees of freedom to account for the complex survey design. Racial categories of White and Black/African American are classified as non-Hispanic. Hispanic ethnicity includes all racial categories. *$p < 0.05$ (Bonferroni-adjusted p-values were used to account for multiple pairwise comparisons).

Black and Hispanic beneficiaries ages 65 and older had more diabetes-related medical provider visits per year (3.9 and 3.6, respectively) than White beneficiaries (3.1 visits per year) (Figure 6; Table A4).

Figure 7. Percentage reporting that their blood sugar is well controlled all of the time, among community-dwelling Medicare beneficiaries with diagnosed diabetes, by race/ethnicity (2012)

SOURCE: Medicare Current Beneficiary Survey, 2012 Access to Care

NOTE: Population is limited to community-dwelling Medicare beneficiaries ages 65 and older with self-reported Type 1 or Type 2 diabetes. Adjusted Wald tests were used to test for statistically significant differences between minority and White beneficiaries. The test adjusts the degrees of freedom to account for the complex survey design. Racial categories of White and Black/African American are classified as non-Hispanic. Hispanic ethnicity includes all racial categories. *p<0.05 (Bonferroni-adjusted p-values were used to account for multiple pairwise comparisons).

Despite having more diabetes-related physician visits, fewer Black beneficiaries with self-reported diagnosed diabetes reported having their blood sugar well controlled all of the time (19.7 percent) relative to White beneficiaries (29.9 percent). Similar percentages of White and Hispanic beneficiaries (29.9 percent and 27.2 percent, respectively) reported having their blood sugar well controlled all of the time (Figure 7; Table A5).

Figure 8. Percentage reporting high blood pressure in the past year or ever having experienced diabetes-related eye problems, among community-dwelling Medicare beneficiaries with self-reported diagnosed diabetes, by race/ethnicity (2012)

SOURCE: Medicare Current Beneficiary Survey, 2012 Access to Care.

NOTE: Population is limited to non-institutionalized Medicare beneficiaries ages 65 and older with self-reported Type 1 or Type 2 diabetes. Adjusted Wald tests were used to test for statistically significant differences between minority and White beneficiaries for each characteristic. The test adjusts the degrees of freedom to account for the complex survey design. Racial categories of White and Black/African American are classified as non-Hispanic. Hispanic ethnicity includes all racial categories. *p<0.05 (Bonferroni-adjusted p-values were used to account for multiple pairwise comparisons).

High blood pressure levels can lead to and worsen many complications of diabetes.[14] More Black beneficiaries than White beneficiaries reported having high blood pressure (91.2 percent vs. 83.8 percent), and more Hispanic than White beneficiaries reported having problems with their eyes due to diabetes (29.8 percent vs. 17.2 percent; Figure 8; Table A6).

Conclusion

This brief examined racial and ethnic disparities in the prevalence, duration, self-management, treatment, and outcomes related to diabetes among Medicare beneficiaries ages 65 and older. Using data from the 2012 MCBS, we found that diabetes prevalence, including both Type 1 and Type 2 diabetes, was higher among Black and Hispanic beneficiaries compared to White beneficiaries, with prevalence highest among Black beneficiaries (30.0 percent). We also found that minorities, on average, were first diagnosed with diabetes at a younger age—56.9 years for both Black and Hispanic beneficiaries compared to 59.5 years for White beneficiaries. Beneficiaries eligible for both Medicare and Medicaid, who are generally of lower socio-economic status than Medicare-only beneficiaries, had a higher prevalence of diabetes (30.1 percent) compared to Medicare-only beneficiaries (20.2 percent). Diabetes was also more common among beneficiaries with less than a high school education and beneficiaries who earned less than $25,000 a year.

Diabetic-related outcomes (high blood pressure, eye problems) were generally found to be worse for minority beneficiaries than for their White counterparts. Clarifying the reasons underlying these differences is beyond the scope of this study because, as a descriptive analysis, it cannot be used to draw causal inferences. A plausible scenario does emerge, however, which may potentially help inform future studies.

For example, Black and Hispanic beneficiaries reported that they were more likely to immediately seek care when sick and reported more diabetes-related medical provider visits each year than did White beneficiaries, even though their outcomes were worse. A plausible reason is that minority beneficiaries were more likely to seek care because fewer report knowing how to manage their diabetes and/or what diabetes supplies and self-management education benefits were covered by Medicare. The differential levels of reported diabetes-related knowledge is consistent with the finding that that fewer Black than White beneficiaries reported having their blood sugar well controlled all of the time and more reported having high blood pressure.

These findings suggest that culturally and linguistically appropriate services and health education may improve glycemic control and diabetes management knowledge among minority beneficiaries.[15]

Definitions

Diabetes
The cohort for this study includes all community-dwelling (non-institutionalized) Medicare beneficiaries ages 65 and older with Type 1 or Type 2 diabetes enrolled in the Medicare program at any time during 2012. The analytic sample includes 2,435 survey respondents and is representative of 8,367,448 community-dwelling Medicare beneficiaries enrolled in the Medicare program at any time during 2012. Prevalence of diabetes is based on a respondent's self-report of any type of diabetes diagnosis by a doctor other than gestational or pregnancy-related diabetes.

Propensity to Seek Care
Beneficiary reported usually going to the doctor as soon as she/he started to feel bad.

Self-Management Knowledge
Beneficiary reported knowing of just about everything or most of what is necessary to manage their diabetes.

Medicare Coverage Knowledge
Beneficiary reported knowing that Medicare helps pay the cost of diabetic testing supplies and self-management education for people with diabetes.

Diabetes-Related Medical Provider Visits
Number of times in the past year the beneficiaries reported seeing a doctor or other health professional regarding their diabetes.

Data Sources and Methods

Analyses were conducted using data from the 2012 Medicare Current Beneficiary Survey (MCBS), an in-person, nationally-representative, longitudinal survey of Medicare beneficiaries sponsored by the Centers for Medicare & Medicaid Services (CMS) and directed by the Office of Enterprise Data and Analytics (OEDA). The MCBS is the most comprehensive and complete survey available on the Medicare population and is essential to capture data not otherwise collected through the administration of the Medicare program. The MCBS is unique among health surveys in that it contains detailed information on diabetes self-management, knowledge, and diabetes-related outcomes. This analysis used the Access to Care (ATC) files,[v] which includes a random cross-section of all beneficiaries who were continuously enrolled in one or both parts of the Medicare program from January 1, 2012 up to and including their interview during the 2012 fall round (September – December).

This analysis used survey weights to account for overall selection probability of each sample person and include adjustments for the stratified sampling design, survey nonresponse, and coverage error. This study used the MCBS "ever-enrolled" cross-sectional weights to produce nationally representative estimates of Medicare beneficiaries enrolled in the Medicare program at any time during 2012. Balanced repeated replication weights were used for variance estimation. Adjusted Wald tests were used to test for statistically significant differences in characteristics between minority and White beneficiaries. The test adjusts the degrees of freedom to account for the complex survey design.[16] Bonferroni correction was used to account for multiple pairwise comparisons. To address nonresponse-related issues, we made two adjustments. If observations were missing by design, we used domain/sub-population analysis to produce estimates for the subgroup for whom the measures are applicable. In all other cases, if a variable had a significant number of missing values (>10 percent), we excluded it from the analysis. All reported results are significant at the $p < 0.05$ level unless otherwise noted.

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[v] This analysis uses the following ATC data files – Survey Identification (RIC-1); Health Status and Function – Community (RIC-2); Prevention Supplement (RIC-2P); Access to Care (RIC-3); Administrative Identification (RIC-A); and Key Record (RIC-K).

Limitations

This study used self-reported information on diabetes prevalence, duration, treatment, and outcomes. While prevalence of diabetes correlates closely with the National Health and Nutrition Examination Survey, which is based on self-reports as well as blood and urine tests, this study did not include beneficiaries with undiagnosed diabetic conditions. In addition, research has shown disparities between self-reported and claims-based estimates of diabetes.[17]

Disparities among Medicare beneficiaries with diabetes who live in nursing homes or similar long-term care facilities is an important, policy-relevant issue this study is unable to address. Since the diabetes-related information in the Health Status and Function (HFQ) questionnaire was only administered to part- and full-year community-dwelling respondents, full-year facility-residing Medicare beneficiaries were excluded from the analysis.

The MCBS does not contain questions that capture diabetes severity or whether complications are directly related to diabetes. The survey also does not include other diabetes management activities, such as nutrition therapy and physical activities. The findings of this study were based on an exploratory bivariate analysis of disparities in prevalence, onset, treatment, and outcomes related to diabetes. Additional research that incorporates multivariate modeling to adjust for factors related to outcomes is required to fully understand factors contributing to the disparities noted here.

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Suggested Citation

CMS OMH and NORC. Racial and Ethnic Disparities in Diabetes Prevalence, Self-Management, and Health Outcomes among Medicare Beneficiaries. CMS OMH Data Highlight No. 6. Baltimore, MD. 2017

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This work was sponsored by the Centers for Medicare & Medicaid Services Office of Minority Health through a contract with NORC at the University of Chicago.

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Appendix

Table A1: Prevalence and age at onset of diabetes, by race and ethnicity

	Community-dwelling Medicare beneficiaries ages 65 or over	White	Black	Hispanic
Unweighted Count	11,628	9,017	975	1,039
Weighted Count	41,368,069	32,049,439	3,207,416	3,781,747
Prevalence of Type 1 & 2 Diabetes (95% CI)	20.3 (19.4 – 21.2)	18.0 (17.2 – 18.9)	30.0* (26.8 – 33.4)	26.7* (23.7 – 29.6)
	3.3 (3.0 – 3.7)	2.5 (2.2 – 2.9)	5.9* (4.3 – 7.6)	6.2* (5.0 – 7.5)
	17.0 (16.1 – 17.9)	15.5 (14.6 – 16.4)	24.1* (20.9 – 27.4)	20.5* (17.8 – 23.1)
Age at Diagnosis in Years (95% CI)	58.8 (58.2 – 59.5)	59.5 (58.7 – 60.3)	56.9* (55.4 – 58.3)	56.9* (55.1 – 58.6)

SOURCE: Medicare Current Beneficiary Survey, 2012 Access to Care

NOTE: Population is limited to community-dwelling Medicare beneficiaries ages 65 and older with self-reported Type 1 or Type 2 diabetes. Adjusted Wald tests were used to test for statistically significant differences between minority and White beneficiaries. The test adjusts the degrees of freedom to account for the complex survey design. Racial categories of White and Black/African American are classified as non-Hispanic. Hispanic ethnicity includes all racial categories. *p<0.05 (Bonferroni-adjusted p-values were used to account for multiple pairwise comparisons).

Table A2: Demographic and socioeconomic characteristics

	Prevalence of Type 1 or Type 2 Diabetes
Unweighted Count	2,435
Weighted Count	8,367,448
Gender (95% CI)	
Female (%)	18.6 (17.4 – 19.8)
Male (%)	22.3* (21.1 – 23.6)
Age (95% CI)	
65-74 years (%)	20.9 (19.7 – 22.1)
75-84 years (%)	21.3 (20.1 – 22.6)
> 85 years (%)	14.6 (13.0 – 21.1)
Marital Status (95% CI)	
Married (%)	20.1 (19.0 – 21.4)
Widowed (%)	20.7 (19.2 – 22.4)
Divorced or Separated (%)	20.1 (17.9 – 22.4)
Never Married (%)	18.9 (15.6 – 22.7)
Education (95% CI)	
Less than High School (%)	27.9 (25.7 – 30.2)
High School Graduate or Higher (%)	18.3* (17.3 – 19.4)
Annual Income (95% CI)	
Less than $25,000 (%)	24.4 (22.9 – 25.9)
$25,000 or Higher (%)	17.7* (16.6 – 18.9)
Metropolitan Area (95% CI)	
Yes (%)	20.1 (19.0 – 21.3)
No (%)	20.5 (19.5 – 21.6)
Dual-Eligibility (95% CI)	
Yes (%)	30.1 (27.7 – 33.3)
No (%)	20.2* (19.3 – 21.1)

SOURCE: Medicare Current Beneficiary Survey, 2012 Access to Care

NOTE: Population is limited to non-institutionalized Medicare beneficiaries ages 65 and older with self-reported Type 1 or Type 2 diabetes. Adjusted Wald tests were used to test for statistically significant differences between each characteristic and the following reference groups: Female; 65-74 years; Married; Less than high school; Less than $25,000; Metropolitan area; and Dual-eligibility. The test adjusts the degrees of freedom to account for the complex survey design. Racial categories of White and Black/African American are classified as non-Hispanic. Hispanic ethnicity includes all racial categories. *p<0.05 (Bonferroni-adjusted p-values were used to account for multiple pairwise comparisons).

Table A3: Access to care and propensity to seek care, by race/ethnicity

	All	White	Black	Hispanic
Unweighted Count	2,435	1,659	308	292
Weighted Count	8,367,448	5,757,276	949,842	1,001,229
General Access to Care (95% CI)				
Trouble Getting Needed Care (%)	4.9 (3.8 – 6.2)	4.3 (2.9 – 5.8)	2.9 (0.8 – 5.0)	7.8 (3.6 – 12.0)
Delayed Care Due To Cost (%)	10.4 (9.1 – 11.7)	10.5 (9.1 – 11.9)	8.6 (4.8 – 12.5)	8.6 (5.0 – 12.3)
Propensity to Seek Care (95% CI)				
Try Keeping Sickness to Self (%)	36.7 (34.6 – 38.8)	38.6 (36.0 – 41.2)	29.9 (22.8 – 37.1)	31.1 (25.2 – 37.0)
Usually go to the doctor as soon as they start to feel bad (%)	42.0 (39.4 – 44.5)	36.7 (33.7 – 39.8)	48.6* (43.2 – 54.0)	63.5* (56.4 – 70.5)
Unfilled Prescriptions for Medicines	6.0 (5.1 – 7.0)	5.9 (4.7 – 7.1)	7.0 (3.1 – 10.9)	6.0 (3.5 – 8.4)

SOURCE: Medicare Current Beneficiary Survey, 2012 Access to Care

NOTE: Population is limited to community-dwelling Medicare beneficiaries ages 65 and older with self-reported Type 1 or Type 2 diabetes. Adjusted Wald tests were used to test for statistically significant differences between minority and White beneficiaries. The test adjusts the degrees of freedom to account for the complex survey design. Racial categories of White and Black/African American are classified as non-Hispanic. Hispanic ethnicity includes all racial categories. *p<0.05 (Bonferroni-adjusted p-values were used to account for multiple pairwise comparisons).

Table A4: Knowledge of diabetes self-management and Medicare coverage, by race/ethnicity

	All	White	Black	Hispanic
Unweighted Count	2,435	1,659	308	292
Weighted Count	8,367,448	5,757,276	949,842	1,001,229
Self-Management Knowledge and Medicare Coverage Knowledge (95% CI)				
Know Most or Just about Everything Necessary About Diabetes Management (%)	73.4 (71.0 – 75.9)	75.7 (72.7 – 78.7)	63.7* (57.7 – 69.8)	67.6 (62.2 – 73.2)
Attended Diabetes Self-Management Course (%)	46.5 (43.9 – 49.1)	49.2 (46.2 – 52.2)	42.9 (34.7 – 51.1)	40.3 (34.0 – 46.6)
Knowledge that Medicare helps pays for diabetic testing supplies and self-management education (%)	75.4 (73.3 – 77.4)	79.4 (77.1 – 81.7)	65.2* (57.4 - 73.0)	64.3* (56.8 – 71.8)
Glycemic Management and Other Self-Management (95% CI)				
Test Own Blood for Sugar/Glucose (%)	86.8 (84.2 – 89.3)	86.7 (83.8 – 89.6)	92.2 (86.2 – 98.2)	85.2 (78.8 – 91.6)
Check For Sores on Feet (%)	80.4 (78.2 – 82.5)	80.2 (77.9 – 82.7)	86.0 (81.3 – 90.7)	79.3 (73.7 – 84.5)
Measure Blood Pressure at Home (%)	55.2 (53.0 – 57.4)	54.3 (51.5 – 57.2)	60.8 (54.5 – 67.1)	50.3 (45.4 – 55.3)
Take Aspirin Daily for Diabetes (%)	48.1 (45.3 – 51.0)	47.7 (44.7 – 50.8)	53.5 (46.0 – 60.9)	46.9 (40.5 – 53.3)
Number of Doctor Visits for Diabetes in Previous Year Count	3.3 (3.2 – 3.4)	3.1 (2.9 – 3.2)	3.9* (3.4 - 4.4)	3.6* (3.3 – 3.9)
Number of Hemoglobin Tests in Previous Year Count	2.7 (2.6 – 2.9)	2.7 (2.5 – 2.9)	3.1 (2.8 – 3.4)	2.6 (2.4 – 2.8)
Smoking Now (%)	8.9 (7.4 – 10.4)	9.4 (7.3 – 11.5)	10.1 (4.9 – 15.2)	4.6 (2.0 – 7.3)
Body Mass Index	46.0 (43.3 – 47.9)	47.5 (44.8 – 50.2)	46.2 (39.7 – 52.7)	36.6* (30.3 – 42.8)

SOURCE: Medicare Current Beneficiary Survey, 2012 Access to Care

NOTE: Population is limited to community-dwelling Medicare beneficiaries ages 65 and older with self-reported Type 1 or Type 2 diabetes. Adjusted Wald tests were used to test for statistically significant differences between minority and White beneficiaries. The test adjusts the degrees of freedom to account for the complex survey design. Racial categories of White and Black/African American are classified as non-Hispanic. Hispanic ethnicity includes all racial categories. *p<0.05 (Bonferroni-adjusted p-values were used to account for multiple pairwise comparisons).

Table A5: Knowledge of diabetes self-management and Medicare coverage, by race/ethnicity

	All	White	Black	Hispanic
Unweighted Count	2,435	1,659	308	292
Weighted Count	8,367,448	5,757,276	949,842	1,001,229
Glycemic Control (95% CI)				
Blood Sugar Under Control All of the Time (%)	28.0 (25.8 – 30.3)	29.9 (27.2 – 32.6)	19.7* (14.5 – 24.9)	27.2 (21.6 – 32.7)
Ever Experienced Hypoglycemia (%)	33.4 (31.1 – 35.7)	33.7 (30.8 – 36.7)	31.4 (26.1 – 36.7)	34.9 (28.3 – 41.5)
Pharmacological Management (95% CI)				
Take Insulin for Diabetes (%)	32.6 (30.4 – 34.8)	31.4 (28.9 – 34.0)	39.0 (31.7 -46.2)	33.8 (28.3 – 39.4)
Take Medication for Diabetes (%)	76.2 (74.1 – 78.3)	75.1 (72.7 – 77.5)	72.6 (67.5 – 77.7)	80.8 (74.9 – 86.6)

SOURCE: Medicare Current Beneficiary Survey, 2012 Access to Care

NOTE: Population is limited to community-dwelling Medicare beneficiaries ages 65 and older with self-reported Type 1 or Type 2 diabetes. Adjusted Wald tests were used to test for statistically significant differences between minority and White beneficiaries. The test adjusts the degrees of freedom to account for the complex survey design. Racial categories of White and Black/African American are classified as non-Hispanic. Hispanic ethnicity includes all racial categories. *$p<0.05$ (Bonferroni-adjusted p-values were used to account for multiple pairwise comparisons).

Table A6: Measures of diabetic complications, among community-dwelling Medicare beneficiaries diagnosed with diabetes, by race/ethnicity

	All	White	Black	Hispanic
Unweighted Count	2,435	1,659	308	292
Weighted Count	8,367,448	5,757,276	949,842	1,001,229
Cardiovascular Complications (95% CI)				
High Blood Pressure (%)	84.8 (83.4 – 86.2)	83.8 (81.8 – 85.8)	91.2* (88.1 – 94.5)	86.2 (82.5 – 89.9)
High Cholesterol (%)	75.1 (73.3 – 76.9)	76.3 (74.1 – 78.4)	70.0 (64.1 – 75.9)	75.1 (69.3 – 80.8)
Coronary Heart Disease (%)	16.9 (15.0 – 18.8)	18.1 (15.9 – 20.3)	12.2 (7.8 – 16.6)	11.2 (6.5 – 16.0)
Heart Failure (%)	11.2 (10.0 – 12.4)	11.2 (9.7 – 12.7)	14.9 (10.6 – 19.2)	6.5 (3.5 – 9.6)
Stroke / Brain Hemorrhage (%)	14.8 (13.3 – 16.3)	15.5 (13.5 – 17.4)	11.4 (8.2 – 14.5)	12.7 (9.1 – 16.2)
Microvascular Complications (95% CI)				
Problems with Feet from Diabetes (%)	23.8 (21.7 – 26.0)	23.3 (20.8 – 25.9)	20.1 (14.6 – 25.6)	27.8 (19.7 – 35.9)
Problems With Eyes Because of Diabetes (%)	20.0 (18.5 – 21.6)	17.2 (15.4 – 19.1)	24.1 (18.4 – 29.7)	29.8* (24.1 – 35.5)
Diabetes Diagnosis with Neuropathy (%)	29.1 (26.4 – 31.9)	30.7 (27.6 – 34.0)	24.6 (17.6 – 31.6)	22.7 (15.3 – 30.0)
Ever Problems With Kidneys Because of Diabetes (%)	13.2 (11.5 – 14.9)	11.8 (9.9 – 13.7)	15.0 (9.9 – 20.1)	17.8 (11.5 – 24.2)

SOURCE: Medicare Current Beneficiary Survey, 2012 Access to Care

NOTE: Population is limited to community-dwelling Medicare beneficiaries ages 65 and older with self-reported Type 1 or Type 2 diabetes. Adjusted Wald tests were used to test for statistically significant differences between minority and White beneficiaries. The test adjusts the degrees of freedom to account for the complex survey design. Racial categories of White and Black/African American are classified as non-Hispanic. Hispanic ethnicity includes all racial categories. *$p < 0.05$ (Bonferroni-adjusted p-values were used to account for multiple pairwise comparisons).