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Racial/Ethnic Disparities in Diabetes Quality of Care: the Role of Healthcare Access and Socioeconomic Status

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Abstract
Introduction Blacks, Hispanics, and Asians are disproportionately affected by diabetes. We assessed the state of racial/ethnic disparities in diabetes quality of care in the USA.
Methods We analyzed cross-sectional data of adults diagnosed with Type 2 diabetes in the nationally representative 2013 Medical Expenditure Panel Survey. Differences in adherence to five diabetes quality of care recommendations (HbA1c twice yearly, yearly foot exam, dilated eye exam, blood cholesterol test, and flu vaccination) were examined by race/ethnicity while controlling for three social determinants of health (health insurance status, poverty, and education) and other demographic variables.
Results Among adults with diabetes in the USA, 74.9% received two or more HbA1c tests, 69.0% had a foot exam, 64.9% had an eye exam, 85.4% had a cholesterol test, and 65.1% received flu vaccination in 2013. Compared to Whites, all were lower for Hispanics; HbA1c tests, eye exam, and flu vaccination were lower for Blacks; HbA1c tests, foot exam, and eye exam were lower for Asians. In adjusted models, the only remaining disparities in quality of care indicators were HbA1c tests for Hispanics (AOR 0.67, CI = 0.47–0.97), Blacks (AOR 0.59, CI = 0.40–0.88), and Asians (AOR 0.47, CI = 0.42–0.99); foot exams for Hispanics (AOR 0.65, CI = 0.47–0.90); and flu vaccination for Blacks (AOR 0.68, CI = 0.49–0.93).
Conclusion Lack of insurance coverage and education explained some of the racial/ethnic disparities observed in diabetes quality of care. Improving quality of diabetes care could help reduce rates of diabetes complications, healthcare costs, and mortality.

Keywords Diabetes · Disparities · Quality of care

Introduction

Type 2 diabetes mellitus is a continuously growing public health problem in the USA. In 2012, 21 million people were diagnosed with diabetes, plus an additional 8 million with undiagnosed diabetes, contributing to an estimated $176 billion in direct medical costs and $69 billion in indirect costs [1]. This chronic disease disproportionally affects racial and ethnic minorities, with prevalence in 2012 for Hispanics at 12.8%, Blacks 13.2%, and Asians 9.0%, compared to 7.6% among Whites [1]. If not properly managed, Type 2 diabetes can lead to serious complications such as kidney failure, retinopathy, stroke, neuropathy, lower limb amputations, and premature death [2]. The prevalence of diabetes kidney complications among adult patients with Type 2 diabetes in the USA was estimated to be 15% in 2012 [3] and 28.5% for diabetes retinopathy complications in 2010 [4]. Hispanics, Blacks, and Native Americans have a 50–100% greater burden of diabetes complications and mortality than Whites [5, 6]. Social determinants of health, such as educational attainment, access to medical care, and income, have been associated with these disparities in diabetes-related morbidity and mortality [7–12].

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Quality of care refers to the extent to which recommended standards of care are implemented by healthcare providers [13]. Lower quality of care increases risk for diabetes complications and mortality [14]. Due to the complex nature of diabetes treatment and constantly emerging research evidence, the American Diabetes Association (ADA) periodically updates the standards for diabetes quality of care in the USA. [15] The guidelines include the frequency that physicians should perform the hemoglobin A1c (HbA1c) test, foot exam, dilated eye exam, blood cholesterol test, and flu vaccine in adult patients with Type 2 diabetes [16].

Some previous studies have examined racial/ethnic disparities in adherence to these diabetes quality of care recommendations [17]. However, very few studies have used nationally representative data, with the most recent study using data from 2010, and results have been inconsistent [18–20]. Further research is needed to examine the extent to which social determinants of health, such as health care access and socioeconomic status, explain racial/ethnic disparities in diabetes quality of care [21]. This study examined this question among adults with Type 2 diabetes in the USA by conducting secondary analysis of nationally representative survey data from the most recent available year (2013) of the Medical Expenditure Panel Survey (MEPS).

Methods

Study Design and Data

We used a quantitative, cross-sectional, and observational design to conduct secondary analysis of 2013 MEPS data. The MEPS is a set of surveys of households and individuals, their healthcare providers, and their employers. MEPS has been sponsored and implemented by the Agency for Healthcare Research and Quality (AHRQ) and the National Center for Health Statistics (NCHS) since 1996. Each year, a subsample of approximately 15,000 households that took part in the previous year's National Health Interview Survey is drawn to serve as the sample for the MEPS Household Component (MEPS-HC), a nationally representative samples of the civilian non-institutionalized population in the USA, with an oversampling of Black, Asian, and Hispanic individuals [22]. As a panel survey, participants in each sample are interviewed five times over a period of two calendar years. As part of the MEPS-HC, the Diabetes Care Survey (DCS) is collected during rounds 3 and 5 each year on adult participants (ages 18 and older) who reported physician-diagnosed diabetes. For each calendar year, the data for the two panels are consolidated and made available on the MEPS website as full-year public use data files, which are de-identified [22].

Due to a lag in collecting and preparing the data for use by researchers, the most recent year of MEPS-HC data currently available is 2013, which had an 88.1% response rate for the DCS in adults with diabetes [22]. The full 2013 MEPS-HC dataset contained 35,086 participants. For this study, a subset of the 2013 MEPS-HC full-year sample was used based on the following criteria: adult (ages 18 and older), diagnosed with diabetes by a physician, and responded to the MEPS DCS special questionnaire. From the full dataset, 2172 participants met the criteria for inclusion. Respondents who reported a race/ethnicity *other* than White, Black, Hispanic, Asian, or multiple races were excluded from the analysis due to small numbers and the diverse composition of this category. Thus, the final analytic dataset included 2107 respondents.

Measures

Diabetes Quality of Care Indicators Five variables drawn from the DCS questionnaire were used as diabetes quality of care indicators, coded as dichotomous variables to indicate adherent or non-adherent to the following five recommended services during the past year per the ADA guidelines during 2013 [16]. (1) HbA1c testing: respondents were asked how many times their doctor checked their HbA1c, and we recoded two or more HbA1c blood tests per year as adherent. Respondents were asked if they received each of the following services in 2013; if yes, it was considered adherent, (2) Foot exam: one annual foot exam, (3) Dilated eye exam: one annual dilated eye exam, (4) Blood cholesterol test: at least one blood cholesterol test per year, and (5) Flu vaccine: one annual flu vaccination.

Race/Ethnicity A categorical variable was used with the categories of 1 = White non-Hispanic, 2 = Hispanic, 3 = Black non-Hispanic, and 4 = Asian non-Hispanic.

Poverty Status The MEPS dataset included a variable for family income as a percentage of federal poverty level (depending on family size) with the following categories coded as: 1 = poor (below poverty level), 2 = near poor (100% to less than 125% of poverty level), 3 = low income (125% to less than 200% of poverty level), 4 = middle income (200% to less than 400% of poverty level), and 5 = high income (400% of poverty level or greater).

Healthcare Access Health insurance coverage was used to measure access to healthcare. A categorical variable was coded with the values of 1 = private insurance (e.g., employer, individual, military, veterans), 2 = public insurance only (e.g., Medicaid, Medicare), and 3 = uninsured.

Demographic Variables The respondent's age as of 31 December 2013 was recoded into variables with age categories coded as 1 = 18 to 24, 2 = 25 to 34, 3 = 35 to 44, 4 = 45 to 54, 5 = 55 to 64, 6 = 65 to 74, and 7 = 75 to 85. Sex was represented as

dichotomous variable with the values of 1 = male and 0 = female. Marital status as of 31 December 2013 was coded as a dichotomous variable with the values of 1 = married and 0 = not married. Education was recoded as a variable with the values of 1 = less than high school, 2 = high school/some college, 3 = bachelor's degree, and 4 = post graduate degree.

Statistical Analysis

The data were analyzed using IBM SPSS Statistics 24.0 software [23] using procedures for complex surveys that account for the stratified sample design of the MEPS and the provided DCS sample weight. Bivariate cross tabulations with 95% confidence intervals (CI) were used to compare the frequencies for the five diabetes quality of care indicators across racial/ethnic groups. Binomial logistic regression was performed for each of the diabetes quality of care indicators to estimate the differences by race/ethnicity while adjusting for insurance coverage, poverty level, years of education, age, sex, and marital status. A level of *alpha* < 0.05 was used to determine statistical significance.

Results

Table 1 presents weighted sample characteristics. The weighted racial/ethnic composition of the sample was 16.3% Hispanics, 15.2% Blacks, 5.7% Asians, and 62.8% Whites. Over half of the respondents (57.3%) had private health insurance, while 34.7% had public insurance and 8.0% were uninsured. Nearly one-fifth of the respondents were classified as poor or near poor. Over a quarter had less than a high school degree, and nearly one-fifth had a bachelor's degree or higher. Most respondents were age 45 or older, including 43.1% age 65 or older. The sample was evenly divided by sex, and just over half of participants were married.

Table 2 lists weighted percentages for the diabetes quality indicators by race/ethnicity in 2013. Among the quality of care outcomes, the most prevalent was receiving a blood cholesterol test (85.4%), and the least prevalent was receiving a dilated eye exam (64.9%).

Table 3 presents the results of the logistic regression analyses for the five diabetes quality indicators to estimate differences by race/ethnicity before and after adjusting for insurance, poverty, education, and other confounders. In the unadjusted models, compared to Whites, Hispanics were lower on all quality indicators; Blacks were lower on HbA1c tests, eye exam, and flu vaccine; and Asians were lower on HbA1c tests, foot exam, and eye exam.

In the adjusted models, the following were no longer significantly different from Whites: eye exam, cholesterol test, and flu vaccine for Hispanics; eye exam for Blacks; and foot exam and eye exam for Asians. Disparities persisted in receipt of at least two HbA1c tests in the past year existed for all three racial/ethnic minority groups compared to Whites (Hispanics: AOR 0.67, 95% CI = 0.47–0.97; Blacks: AOR 0.59, 95% CI = 0.40–0.88; Asians: AOR 0.47, 95% CI = 0.22–0.99). Hispanics were 35.0% less likely (AOR 0.65, 95% CI = 0.47–0.90) than Whites to obtain an annual foot exam in the adjusted model. Black respondents were 32.0% less likely (AOR 0.68, 95% CI = 0.49–0.93) to receive the flu vaccine compared to Whites in the adjusted model.

Uninsured adults with diabetes were significantly less likely to receive all five of the recommended services compared to those with private insurance, while adjusting for the other

Table 1 Sample characteristics of adults with diabetes

Variable	*N*	Weighted %[a]
Race/ethnicity		
White non-Hispanic	773	62.8
Hispanic	614	16.3
Black non-Hispanic	559	15.2
Asian non-Hispanic	161	5.7
Insurance coverage		
Private	989	57.3
Public	890	34.7
Uninsured	228	8.0
Poverty status		
Poor	476	14.0
Near poor	155	5.8
Low income	384	17.6
Middle income	601	30.1
High income	491	32.5
Education		
Less than high school	742	26.3
High school/some college	1036	54.3
Bachelor's degree	193	11.7
Post graduate degree	111	7.6
Age		
18–24	25	0.8
25–34	70	3.0
35–44	213	8.4
45–54	427	17.9
55–64	576	26.9
65–74	483	26.0
75–85	309	17.1
Sex		
Female	1142	50.2
Male	965	49.8
Marital status		
Married	1106	56.7
Not married	1001	43.3

[a] Percentages are weighted and adjusted for complex sample design

Table 2 Weighted percentages of respondents receiving diabetes quality indicators by race/ethnicity

Race/ethnicity	≥2 HbA1c tests	Foot exam	Dilated eye exam	Blood cholesterol test	Flu vaccine
White non-Hispanic	79.5 (75.9–82.7)	72.8 (69.3–76.0)	69.3 (65.5–72.9)	87.8 (85.4–89.8)	68.7 (65.0–72.1)
Hispanic	63.4 (57.6–68.9)	56.9 (51.8–61.9)	53.1 (48.1–58.0)	77.5 (72.6–81.8)	59.2 (53.4–64.8)
Black non-Hispanic	67.7 (61.5–73.3)	69.1 (64.7–73.1)	60.6 (56.1–65.0)	84.2 (80.5–87.3)	55.7 (50.8–60.5)
Asian non-Hispanic	68.5 (55.4–79.2)	61.0 (51.9–69.4)	59.9 (51.3–68.0)	84.1 (76.8–89.4)	67.6 (57.7–76.2)
Total	74.9 (72.0–77.6)	69.0 (66.4–71.4)	64.9 (62.2–67.5)	85.4 (83.5–87.1)	65.1 (62.4–67.7)

Percentages are weighted and adjusted for complex sample design

variables. Poverty status was not significantly associated with any of the diabetes quality of care indicators while adjusting for the other variables in the model.

Respondents with a high school degree and/or some college education were more likely to have a foot exam, a dilated eye exam, and a flu vaccine than with those with less than high school education, but did not differ on the other quality of care indicators while adjusting for the other variables. Individuals with a bachelor's degree were 77% more likely to obtain a foot exam, three times more likely to receive an eye exam, and nearly three times more likely to receive a blood cholesterol test than those with less than high school education, with no difference for HbA1c or flu vaccine. Respondents with a post graduate degree were more likely to obtain the flu vaccine compared to those with less than high school education but did not differ from the other quality of care indicators.

Respondent ages 25 to 44 and 75 to 85 were significantly less likely to receive two HbA1c tests compared to those ages 18 to 24 years while adjusting for the other variables. Patient ages 35 to 85 were between 4.1 and 7.4 times more likely to receive an annual blood cholesterol test than 18 to 24 year olds in the adjusted model. There were no significant differences in the quality of care indicators by sex and marital status while adjusting for the other variables.

Discussion

According to our analysis of the 2013 MEPS data, 74.9% of adults with diabetes in the USA received two or more HbA1c tests in the past year, which surpassed the *Healthy People 2020* [24] national goal of 71.1%. The quality indicators for dilated eye exam (64.7%) and blood cholesterol test (85.4%) also exceed the Healthy People 2020 goals of 58.7% and 85.3%, respectively. However, only 69.0% had a foot exam the past year, which did not meet the goal of 74.8%. Healthy People 2020 did not establish a goal for annual flu vaccination specifically among adults with diabetes, but the overall goal for adults is 90%, showing that adults with diabetes did not meet this goal with 65.1% flu vaccination coverage in the 2013 MEPS data. Overall, between 14.6 and 35.1% of adults with diabetes in the USA did not receive one of these recommended services for diabetes care.

In our analyses for 2013, the unadjusted frequencies for all five quality of care indicators were lower for Hispanics compared to Whites. Blacks were lower than Whites for HbA1c tests, eye exam, and flu vaccination. Asians were lower on HbA1c tests, foot exam, and eye exam. The most recent relevant study analyzing 2010 MEPS data measured the HbA1c quality of care indicator as receiving *one* or more test in the past year, which did not align with the ADA guideline of at least *twice* a year; thus, it is not directly comparable with our study [20]. Another study using 2008 MEPS data reported that Hispanics and Blacks adhered to the recommendation of two or more HbA1c tests less often than Whites (63 and 69% compared to 77%), with 74% for the total sample [19]. A study using 2005–2007 MEPS data found that an average of 83.2% of respondents reported receiving two or more HbA1c tests in the past year, including 83.0% for Whites, 77.8% for Hispanics, 84.5% for Blacks, and 83.3% for Asians [18]. Thus, our finding of 74.9% in 2013 was very similar to the 2008 study, which both suggest a possible decline in this quality of care indicator overall and for all of the racial/ethnic groups since 2005–2007 [18].

For the annual foot exam, the 2010 MEPS study found 68.6% adherence in the overall sample and significantly lower adherence for Hispanics (63.1%) and Blacks (64.8%) versus Whites [20]. This study did not examine Asians separately. Our findings were similar for the overall sample (69.0%) but suggested a potential decline in adherence among Hispanics to 56.9% and a potential improvement among Blacks to 69.1%. Adherence to the annual dilated eye exam was estimated at 64.7% overall, 54.8% for Hispanics, and 63.2% for Blacks in the 2010 MEPS study [20]. We found the same prevalence overall and slightly lower percentages for Blacks and Hispanics in 2013. In 2010, the annual blood cholesterol test was received by 83.9% overall, 78.8% of Hispanics, and 79.7% of Blacks [20]. In our analyses for 2013, use of the cholesterol test was similar overall for Hispanics and appeared to have increased to 84.2% for Blacks. None of these previous studies using MEPS data examined adherence to the flu vaccine recommendation for adults with diabetes.

Table 3 Binomial logistic regressions for each diabetes quality indicator

	Dependent variables				
	2+ HbA1c tests	Foot exam	Dilated eye exam	Cholesterol test	Flu vaccine
Unadjusted models	Crude OR (95% CI)	Crude OR (95% CI)	Crude OR (95% CI)	Crude OR (95% CI)	Crude OR (95% CI)
Race/ethnicity					
White non-Hispanic	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
Hispanic	0.48 (0.33–0.61)	0.49 (0.39–0.63)	0.50 (0.38–0.66)	0.48 (0.35–0.66)	0.66 (0.50–0.88)
Black non-Hispanic	0.54 (0.39–0.75)	0.84 (0.64–1.09)	0.68 (0.53–0.88)	0.74 (0.53–1.03)	0.57 (0.44–0.74)
Asian non-Hispanic	0.56 (0.31–0.99)	0.557 (.371–.835)	0.66 (0.45–0.97)	0.74 (0.45–1.21)	0.95 (0.60–1.52)
Adjusted models	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)
Race/ethnicity					
White non-Hispanic	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
Hispanic	0.67 (0.47–0.97)	0.65 (0.47–0.90)	0.98 (0.71–1.36)	0.94 (0.61–1.46)	1.01 (0.72–1.43)
Black non-Hispanic	0.59 (0.40–0.88)	0.87 (0.64–1.19)	0.88 (0.67–1.17)	0.94 (0.61–1.45)	0.68 (0.49–0.93)
Asian non-Hispanic	0.47 (0.22–0.99)	0.67 (0.42–1.06)	0.63 (0.39–1.00)	0.72 (.403–1.089)	1.00 (0.58–1.73)
Insurance coverage					
Private (ref)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
Public	0.92 (0.54–1.57)	1.32 (0.93–1.85)	0.74 (0.53–1.04)	0.81 (0.51–1.29)	0.82 (0.59–1.14)
Uninsured	0.29 (0.16–0.55)	0.45 (0.28–0.71)	0.24 (0.16–0.36)	0.22 (0.12–0.41)	0.36 (0.23–0.57)
Poverty status					
High income	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
Poor	0.77 (0.42–1.41)	0.95 (0.56–1.60)	0.89 (0.56–1.39)	0.90 (0.48–1.67)	1.32 (0.89–1.96)
Near poor	0.69 (0.25–1.88)	1.05 (0.53–1.60)	1.02 (0.57–1.83)	0.75 (0.31–1.79)	0.98 (0.55–1.73)
Low income	1.01 (0.65–1.70)	0.99 (0.61–1.60)	1.01 (0.66–1.83)	0.98 (0.53–1.79)	1.07 (0.72–1.59)
Middle income	1.05 (0.66–1.70)	0.85 (0.57–1.25)	0.93 (0.62–1.39)	1.15 (0.68–1.95)	1.24 (0.86–1.78)
Education					
Less than high school	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
High school/some college	0.95 (0.66–1.37)	1.40 (1.01–1.94)	1.64 (1.15–2.35)	1.25 (0.86–1.82)	1.35 (1.00–1.83)
Bachelor's degree	1.02 (0.53–1.96)	1.77 (1.04–3.01)	3.00 (1.64–5.50)	2.75 (1.30–5.85)	1.25 (0.74–2.10)

Table 3 (continued)

	Dependent variables				
	2+ HbA1c tests	Foot exam	Dilated eye exam	Cholesterol test	Flu vaccine
Post graduate degree	1.42 (0.63–3.19)	1.48 (0.79–2.77)	1.87 (0.90–3.88)	1.97 (0.87–4.48)	1.96 (1.12–3.43)
Age					
18–24	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
25–34	0.09 (0.02–0.48)	0.52 (0.16–1.71)	0.93 (0.33–2.62)	1.92 (0.42–8.80)	0.59 (0.20–1.77)
35–44	0.09 (0.02–0.40)	0.70 (0.23–2.09)	0.39 (0.14–1.10)	4.10 (1.06–15.84)	0.55 (0.18–1.62)
45–54	0.23 (0.05–1.06)	1.01 (0.37–2.71)	0.54 (0.22–1.31)	4.38 (1.24–15.49)	0.67 (0.25–1.81)
55–64	0.21 (0.05–1.01)	0.89 (0.31–2.58)	0.65 (0.24–1.76)	7.36 (2.01–26.98)	0.95 (0.35–2.58)
65–74	0.27 (0.06–1.26)	1.17 (0.41–3.36)	0.79 (0.31–2.03)	6.37 (1.76–23.07)	1.51 (0.54–4.25)
75–85	0.17 (0.4–0.75)	1.01 (0.41–3.36)	1.37 (0.53–3.51)	7.30 (2.01–26.62)	2.21 (0.78–6.26)
Sex					
Male	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
Female	1.14 (0.82–1.58)	0.95 (0.72–1.26)	1.14 (0.87–1.47)	1.03 (0.76–1.41)	1.01 (0.77–1.32)
Marital status					
Not married	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)	1.00 (Referent)
Married	1.57 (1.12–2.21)	1.04 (0.80–1.36)	1.26 (0.96–1.65)	1.12 (0.79–1.61)	0.83 (0.60–1.14)

Models included race/ethnicity, insurance coverage, poverty status, years of education, age, sex, and marital status

OR odds ratio

In our analyses, some of the disparities observed in the unadjusted frequencies disappeared after adjusting for other factors—specifically eye exams for all groups, cholesterol test and flu vaccine for Hispanics, and foot exams for Asians. These factors did not explain any of the racial/ethnic disparities in HbA1c tests. The significant confounders were insurance for all models, education for all except HbA1c tests, and age for HbA1c tests and cholesterol tests.

Previous studies that examined racial/ethnic disparities in diabetes quality of care indicators in older years of MEPS data found inconsistent results in analyses that adjusted for insurance, income, education, and other factors. In the 2008 MEPS study, the disparity in HbA1c adherence for Blacks disappeared after controlling for insurance and income but the disparity remained for Hispanics [19]. The 2010 MEPS study found that disparities among Hispanics and Blacks for foot exam remained after controlling for insurance, income, and education, and did not find disparities for eye exams or blood cholesterol tests before or after adjusting [20]. Expanding healthcare coverage, increasing educational attainment, and reducing the gap that exists between the generation of new scientific evidence and the implementation of evidence-based practice for diabetes, such that clinicians do not always comply with recommended diabetes care guideline, would likely help to reduce diabetes disparities.

The primary limitation of the study was the cross-sectional nature of the survey. Cross-sectional data cannot infer causality, only descriptions of variables and associations between variables. Another limitation was the self-reported nature of the questionnaire items for diabetes diagnosis, receiving diabetes-related care. Self-reported data can be biased because participants may be influenced by social desirability. Furthermore, these data can be less reliable than objectively measured data, because answers to the questions depend on

participant's memory and an accurate understanding of the procedures done at the physician's office. Finally, the models may not examine the possibility of bias in intensity of care for racial/ethnic minorities, including referrals to specialists, and other potential cofounding variables that could also influence quality of care. Future research should explore additional factors.

Strengths of the study include the nationally representative sample and the use of sample weights to enable generalizing to the population of adults with Type 2 diabetes in the USA. In addition, this study examined all five of the diabetes quality of care indicators measured in MEPS and four separate racial/ethnic groups, compared to previous studies that did not include cholesterol tests and flu vaccination or Asians as a separate group.

This study contributes valuable information to the scientific literature about the current state of quality of diabetes care in the USA. With the growing prevalence of diabetes and diabetic complications in the USA, the need to improve diabetes quality of care becomes increasingly urgent. The findings can inform quality improvement efforts aimed at enhancing the implementation of ADA standards of care in various medical settings and for all adult patients with diabetes. Physicians and other healthcare providers need to receive continuing education about periodic changes in the diabetes standards of care and strategies for implementing them in practice. In addition, continued efforts to expand clinical support systems could help ensure providers implement evidence-based practice for diabetes care. Finally, patients with diabetes need to be engaged in educational programs that are culturally and linguistically appropriate to inform them about which services they should receive and how frequently they should receive these services as part of their treatment. A better management of Type 2 diabetes requires having well-informed patients to ask for appropriate quality of care to their doctors. Furthermore, continued efforts to expand health insurance coverage would help to reduce barriers for patients with diabetes to access quality care. Improvements in quality of diabetes care can contribute to reducing rates of diabetes complications, as well as diabetes-associated healthcare costs and diabetes mortality.

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Compliance with Ethical Standards

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Ethical Approval For this type of study, formal consent is not required.

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