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Racial and ethnic disparities in quality of health care among adults with diabetes in the United States

Yan-Jun Zhang
The University of Toledo

A Thesis

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Racial and Ethnic Disparities in Quality of Health Care among Adults with Diabetes in the United States

by

Yan-Jun Zhang

Submitted as partial fulfillment of the requirements for

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Administrative Pharmacy Option

Advisor: Monica Holiday-Goodman, R.Ph., Ph.D.

College of Graduate Studies

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An Abstract of

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Background: Studies have shown that racial and ethnic disparities in healthcare among adults with diabetes persist even after controlling for demographic and socioeconomic factors. To eliminate healthcare disparities in the U.S., monitoring and reporting the most

recent trends of disparities are critically important. In addition, no studies were found in the literature that focused on disparities in timeliness and patient centeredness of health care using retrospective databases.

Objectives: To examine the most recent racial and ethnic disparities in quality of health care (receipt of diabetes services, timeliness, and patient centeredness) among adults with diabetes in the U.S.

Methods: The 2005 and 2006 Medical Expenditure Panel Survey (MEPS) data files including the Diabetes Care Survey and the Self-Administered Questionnaire were used. The racial and ethnic disparities in receipt of recommended diabetes services, timeliness, and patient centeredness were examined. Statistical analyses included the chi-square test and logistic regression to evaluate the disparities before and after controlling for the confounding factors (age, gender, family income, education, health insurance coverage, residential location, and language spoken most often at home).

Results: In 2005–2006, the racial and ethnic disparities in quality of health care among U.S. adults with diabetes still exist. Blacks and Hispanics were less likely to receive recommended diabetes services and patient-centered health care than white Americans. The only exception was in regard to foot examinations. There was no statistically significant difference in timeliness of health care among racial and ethnic groups.

Conclusions: Racial and ethnic disparities in receipt of recommended diabetes services and patient centeredness of health care among adults with diabetes remained in the U.S. in 2005–2006. Age, family income, health insurance coverage, education, residential location, and English-speaking were correlated with racial and ethnic disparities. As this study focused on disparities among Whites, Blacks and Hispanics, future studies comparing possible differences among other U.S. racial groups are needed.

This thesis is dedicated to my wife, my son, my parents, my parents-in-law, and my siblings and their children.

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Chapter One

Introduction

Diabetes was the seventh leading cause of death in the United States in 2006.[1] It is one of the most prevalent diseases and a significant public health challenge in the U.S.[1-3] In 2007, 23.6 million people, or 7.8% of the population in the U.S., had diabetes; 17.9 million people were diagnosed while 5.7 million were undiagnosed.[1] The estimated diabetes costs in the U.S. in 2007 were $174 billion, of which the direct medical costs were $116 billion.[1, 4, 5] Therefore, in Healthy People 2010 (HP2010), the U.S. Department of Health and Human Services (HHS) established the following goal for diabetes: "Through prevention programs, reduce the disease and economic burden of diabetes, and improve the quality of life for all persons who have or are at risk for diabetes."[2, 6, 7] However, diabetes health disparities widely exist, especially among racial and ethnic minorities. They injure the quality of life of people with diabetes.[8]

Racial and Ethnic Disparities in Diabetes Health

Racial and ethnic minorities are disproportionately represented in the diabetes health epidemic: they bear higher prevalence of diabetes, worse disease control, and higher diabetes-related complications, comorbidities, and mortality rates.[8] For example, the overall rate of diagnosed diabetes in American Indians or Alaska Natives (AI/ANs) was twice that in non-Hispanic Whites (NHWs).[6] Among adults aged 20 years or older after adjusting for population age differences, 2004–2006 national survey data indicated that 6.6% of non-Hispanic Whites, 7.5% of Asian Americans, 10.4% of Hispanics (or Latinos), and 11.8% of non-Hispanic Blacks (NHBs) had diagnosed diabetes.[1] In addition, Blacks (or African Americans) and Hispanics have higher rates of complications from diabetes than White, including cardiovascular diseases, nephropathy, end-stage renal disease (ESRD), retinopathy, neuropathy, hypoglycemia, and lower extremity amputation.[9-13] The diabetes-related death rate is high in Non-Hispanic Blacks, AI/ANs, and Hispanics.[6, 8, 9] Thus, to achieve health equity and promote Americans' health, HP2010 has set the elimination of health disparities as one of its two overarching goals.[2, 6, 7]

Current information about the biologic and genetic characteristics of racial and ethnic minorities in the U.S. does not explain the health disparities experienced by these groups compared with non-Hispanic Whites.[2] There is evidence that healthcare disparities may contribute to the health disparities.[2, 6, 8, 11, 14, 15]

Racial and Ethnic Disparities in Diabetes Care

Healthcare disparities are any differences in access to health care and quality of health care among populations, according to the National Healthcare Disparities Report (NHDR).[11] The definition is consistent with HP2010.[2, 6, 11]

Quality of health care is "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge."[15] It examines whether the health care is safe, effective, patient-centered, timely, efficient, and equitable, which are established aims for the 21st-century U.S. health care system by the Institute of Medicine (IOM).[16] Correspondingly, the NHDR adopts effectiveness, patient safety, timeliness, and patient centeredness to measure the quality of health care.[11]

To evaluate the effectiveness of diabetes care, the NHDR uses three measure sets. One is a composite process measure for diabetes management: receipt of three recommended diabetes services—hemoglobin A1C test, retinal eye examination, and foot examination in the past year. The other two are outcome measures for diabetes prevention (hospital admissions for lower extremity amputations) and for diabetes management (controlled A1C, total cholesterol, and blood pressure), respectively.[9, 11] (For more information, refer to Table 1 in Chapter 2: Literature Review.)

Timely health care can reduce waits and sometimes harmful delays, and can prevent patient emotional distress, physical harm, and financial consequences.[11, 16] Research has shown that early and timely health care for diabetes-related complications can reduce hospitalization and overall costs of the disease.[11] Patient-centered health care is "providing care that is respectful of and responsive to individual patient preferences, needs, and values and ensuring that patient values guide all clinical decisions."[16] Patient-centered care is a good partnership among practitioners, patients, and their families (when appropriate), supported by good patient-provider communications.[11] The enhanced patient-provider relationship and effective patient-provider communication have been shown to help improve patient self-management skills and self-efficacy, reduce underuse and overuse of medical services, and save money by reducing the number of diagnostic tests and referrals.[9, 11, 16] There are no diabetes-specific measure sets for timeliness and patient centeredness reported in the NHDR; although, it is necessary for researchers to evaluate timeliness and patient centeredness of health care among persons with diabetes.

Overall, the incidence of healthcare disparities among persons with diabetes is not getting smaller, although progress has been made.[6, 11, 17] The 2007 NHDR reported that the proportion of adults aged 40 and over with diabetes who received three recommended services was lower for Hispanics than for Non-Hispanic Whites from 2002 to 2004.[11] The HP2010 progress review stated that the age-adjusted proportions of adults aged 18 years

and older with diabetes who had an A1C test at least twice a year for various racial and ethnic populations were different in 2004: Hispanics, 58%; Non-Hispanic Blacks, 61%; Non-Hispanic Whites, 68%; AI/ANs, 70%; and Asians, 86%.[17]

Some racial and ethnic disparities in diabetes care remain even after controlling for the socioeconomic status and other factors such as family income, education, and health insurance coverage.[2, 8-10, 15, 18-20] For instance, the logistic regression analysis of 2000–2001 MEPS showed that after controlling for age, gender, family income, education, insurance, and place of residence, Non-Hispanic Blacks were less likely to receive an influenza immunization than Non-Hispanic Whites, whereas Hispanics received fewer eye exams.[9]

Monitoring Trends of Healthcare Disparities

To understand and eliminate racial and ethnic disparities in healthcare, standardized and periodical data collection and reports on access to and quality of health care is critically important.[2, 15] The NHDR, HP2010 progress review, HP2010 database WONDER DATA2010, and *Health, United States* are monitoring and reporting the health and healthcare trends over time, using updated databases such as the Medical Expenditure Panel Survey (MEPS), the Healthcare Cost and Utilization Project (HCUP), the National Health Interview Survey (NHIS), and the Behavioral Risk Factor

Surveillance System (BRFSS).[6, 7, 11, 15, 17, 21, 22] The NHDR has been designed and produced by the Agency for Healthcare Research and Quality (AHRQ) annually since 2003 on behalf of the Department of Health and Human Services.[11]

Need for Research

The 2007 NHDR adopted 2002–2004 MEPS data because of the unavailability of the new data files at the time of its publication. Now 2005 and 2006 MEPS are on hand. The most recent data can help us grasp the most recent trends of healthcare disparities in the U.S. As stated above, researchers are also responsible to involve timeliness and patient centeredness in the evaluation of quality of health care among persons with diabetes.

Significance

This thesis project focused on racial and ethnic disparities in quality of health care among the civilian non-institutionalized U.S. adults with diabetes. Furthermore, the project examined timeliness and patient centeredness as the measure sets for quality of health care, which goes beyond the scope of the NHDR. The study findings will provide the basis for future development of race/ethnicity-specific strategies to help reduce or close the gaps in the quality of health care.

Goal

To monitor and report the most recent racial and ethnic disparities in quality of health care among adults with diabetes in the United States.

Objectives

1. To examine the possible racial and ethnic disparities in receipt of recommended diabetes services (such as A1C test, foot and eye exam) in the United States, using 2005 and 2006 MEPS databases.
2. To examine the possible racial and ethnic disparities in timeliness of health care (getting health care as soon as wanted) among adults with diabetes in the U.S., using 2005 and 2006 MEPS.
3. To examine the possible racial and ethnic disparities in patient centeredness of health care (patient-provider communications) among adults with diabetes in the U.S., using 2005 and 2006 MEPS.

Research Questions

1. Is there any difference in receipt of recommended diabetes services among racial and

ethnic populations aged 18 and over with diabetes in the U.S.?

2. Is there any difference in timeliness of health care among racial and ethnic populations aged 18 and over with diabetes in the U.S.?
3. Is there any difference in patient centeredness of health care among racial and ethnic populations aged 18 and over with diabetes in the U.S.?

Chapter Two

Literature Review

This chapter provides an overview of the literature related to the study. It is divided into the following sections: 1) Race and ethnicity-based health disparities related to diabetes; 2) Race and ethnicity-based healthcare disparities related to diabetes; 3) Methods of monitoring disparities.

Race and Ethnicity-Based Health Disparities Related to Diabetes

Race and ethnicity-based studies on health disparities related to diabetes have shown that racial and ethnic minorities are disproportionately represented in higher diabetes prevalence, diabetes-related complications, mortalities, and worse disease control.[8] For example, Maskarinec et al. estimated the prevalence of diabetes among 187,439 participants of the Multiethnic Cohort, who were from Hawaii and California. They found that the age-adjusted diabetes prevalence was 6.3% in Caucasians, 15.0% in African Americans, 15.8% in Latinos, and16.1% in Native Hawaiians. After adjustment

for risk factors, the prevalence ratio by ethnicity ranged between 2.1 (African Americans and Latinos) and 3.0 (Native Hawaiians) as compared to Caucasians. The prevalence of diabetes was at least two-fold higher in all ethnic groups than among Caucasians.[23]

Diabetes-related complications also vary among racial and ethnic groups. Emanuele and colleagues found a higher frequency of severe diabetic retinopathy in the Hispanic and African-American patients at entry into the Veterans Affairs Diabetes Trial that was not accounted for by traditional risk factors for diabetic retinopathy, such as age, duration of diagnosed diabetes, A1C, and blood pressure.[24]

Racial and ethnic minorities usually have worse diabetes control than non-Hispanic Whites (NHWs). Wendel et al. reported that in a large cohort of insulin-treated veterans with type 2 diabetes, African Americans had poorer glycemic control and received lower doses of insulin than Non-Hispanic Whites.[25] Saydah et al. examined the National Health and Nutrition Examination Survey (NHANES) 1999–2002 on the association between race/ethnicity and glycemic control among adults with previously diagnosed diabetes. They found that the glycemic control was lower among non-Hispanic Blacks (NHBs) and Mexican Americans compared with Non-Hispanic Whites. After multivariable adjustment for socioeconomic status, obesity, healthcare access and utilization and diabetes treatment, differences in glycemic control by race/ethnicity remained.[26] Harris and colleagues analyzed the NHANES III (1988–1994) and reported that non-Hispanic Black women

and Mexican-American men were disproportionately represented among those in poor glycemic control.[27]

The health disparities experienced by racial and ethnic minorities are believed to result from "the complex interaction among genetic variations, environmental factors, and specific health behaviors". Moreover, there is important evidence that the healthcare disparities may contribute to the health disparities related to diabetes.[2, 6, 8, 11, 14, 15]

Race and Ethnicity-Based Healthcare Disparities Related to Diabetes

The Institute of Medicine's (IOM's) report *Unequal Treatment: Confronting Racial and Ethnic Disparities in Healthcare* states that "racial and ethnic minorities experience a lower quality of health services, and are less likely to receive even routine medical procedures than are white Americans."[15] This difference is an example of healthcare disparities.

Healthcare disparities are any differences in both access to health care and quality of health care among populations.[11] Access to health care, or health services accessibility, is "[t]he degree to which individuals are inhibited or facilitated in their ability to gain entry to and to receive care and services from the health care system."[28] In Healthy People 2010 (HP2010), it is stressed that "[e]xpanding access to quality health care is important

to eliminate health disparities and to increase the quality and years of healthy life for all people living in the United States."[2] Measurements of access to health care include facilitators to health care (such as measures of health insurance coverage and having a usual source of care), patient assessments of accessibility, and health care utilization (such as measures of receipt of emergency care).[11] Refer to Chapter 1 for the definition and measurements of quality of health care.

It has been shown that racial and ethnic disparities in access to and quality of health care among American adults with diabetes still persist.[6, 11, 17] First, health insurance can have a reciprocal relationship to health care access; in other words, each can react to the other.[11] The HP2010 Midcourse Review reported that access to diabetes care is worsening as fewer U.S. citizens have health insurance.[6] Lack of insurance limits health care access and is significantly associated with undetected diabetes.[29] Wilper and colleagues estimated that among U.S. adults aged 18 to 64 years, 15.7% of Non-Hispanic Whites and 24.6% of Non-Hispanic Blacks were uninsured, and 16.6% of those with diabetes did not have insurance. The uninsured populations were more likely not to have a usual source of care or a health care provider than those with health insurance.[14]

Secondly, racial and ethnic disparities in quality of diabetes care such as the receipt of recommended diabetes services and avoidable hospital admissions for diabetes-related complications still exist. Chin et al. reported that African-American Medicare

beneficiaries with diabetes were less likely to undergo measurements of A1C, ophthalmological examinations, lipid measurements, and influenza vaccinations than White patients.[30] Jiang et al. examined the relationship between race/ethnicity and hospital readmissions for diabetes-related conditions using 1999 State Inpatient Databases (SID) of the Healthcare Cost and Utilization Project (HCUP). The risk-adjusted likelihood of 180-day readmission was significantly lower for Non-Hispanic Whites than for Hispanics across all 3 payers (Medicare, Medicaid, and private insurance) or for Non-Hispanic Blacks among Medicare enrollees. Within each payer, low-income Hispanics had the highest risk of readmission.[31]

Nwasuruba and colleagues analyzed the 2003 Behavioral Risk Factor Surveillance System (BRFSS) to assess racial/ethnic differences in multiple diabetes self-care behaviors (physical activity, fruits/vegetables consumption, glucose testing, foot examination, and all these 4 self-care behaviors). They found Hispanics were less likely to do home glucose testing than Whites, and Blacks were more likely to do home foot examinations than Hispanics and Whites.[32] Oladele and colleagues analyzed 1998-2001 BRFSS to examine racial/ethnic differences in diabetes preventive care practices (eye examinations, feet examinations, and yearly checkups). They reported that Blacks and Hispanics engaged in preventive care more frequently than Whites. Persons of lower social class were at greatest risk for not receiving preventive care regardless of race/ethnicity. Persons with no health insurance coverage were twice as likely to have not

had an eye exam, and 1.5 times more likely to have not had a foot exam. They concluded that persons of lower social class and persons with no health insurance are at greatest risk for not receiving preventive services.[33]

The 2007 National Healthcare Disparities Report (NHDR) reported that the proportions of adults aged 40 and over with diabetes who received A1C test, influenza immunization, and all three services (A1C test, and foot and eye exams) were lower for Blacks than for Whites in 2004. However, more percentages of Blacks than Whites had the eye exam, foot exam, and lipid profile measurements.[34] The second round of HP2010 progress review stated that in 2004, the age-adjusted proportions of adults aged 18 years and older with diabetes who had an A1C test at least two times a year differed by race and ethnicity: Hispanics, 58%; Non-Hispanic Blacks, 61%; Non-Hispanic Whites, 68%; American Indians or Alaska Natives (AI/ANs), 70%; and Asians, 86%.[17]

The HP2010 Database, DATA2010, monitors the age-adjusted percentages of A1C testing at least two times a year, the annual dilated eye examinations, and annual foot examinations among adults with diabetes aged 18 years and over.[35] From 2000 to 2006, the overall proportion of receipt of the A1C test was more than 60%. The percentages for Non-Hispanic Whites fluctuated from 65% to 68%, for Non-Hispanic Blacks from 56% to 66%. Hispanics had a wider range from 48% (in 2005) to 69% (in 2000). There were many missing data points on eye exams from 1998 to 2006 due to statistical reliability,

data quality, or confidentiality. Data was available in 1998, 1999, 2002, and 2003 only. The percentages for Hispanics were similar to Non-Hispanic Whites, which ranged from 53% to 57% in 2002 to 2003. Non-Hispanic Blacks had higher proportion of more than 61%. The percentages of foot exams were high among racial and ethnic groups from 1998 to 2006. The proportions for Blacks and AI/ANs were more than 70% and for Whites and Asians were more than 60%. Hispanics had the lowest proportion that ranged from 52% to 63% from 1999 to 2006.[35]

Methods of Monitoring Disparities

The IOM report *Unequal Treatment* recommends monitoring progress toward the elimination of healthcare disparities systematically.[15] Using updated databases, the DATA2010 and the annual NHDR have been providing researchers and decision-makers with valuable information on eliminating healthcare disparities.

The NHDR monitors diverse disease states, including cancer, heart disease, and diabetes. With respect to diabetes care, the NHDR measures disparities in effectiveness of care, using three measure sets (Table 1).[11] One is a composite process measure for the receipt of three recommended diabetes services; the other two are outcome measures for diabetes prevention (hospital admissions for lower extremity amputations), and for diabetes management (controlled A1C, total cholesterol, and blood pressure),

respectively.[9, 11] The composite measure is calculated based on the number of patients who received all appropriate services or reported all adverse responses.[11]

Table 1. Measure sets for quality of diabetes care used in NHDR

Section	Process Measure	Outcome Measure	Data Source
Diabetes management	● Composite: Adults with diabetes who had all three recommended services for diabetes in the past year (at least one hemoglobin A1C test, a retinal eye examination, and a foot examination)		MEPS-HC, DCS
Diabetes management		● Controlled A1C, total cholesterol, and blood pressure	NHANES
Diabetes prevention		● Hospital admissions for lower extremity amputations	HCUP-SID

NHDR: National Healthcare Disparities Report; MEPS-HC: Medical Expenditure Panel Survey, Household Component; DCS: Diabetes Care Survey; NHANES: National Health and Nutrition Examination Survey; HCUP-SID: Healthcare Cost and Utilization Project, State Inpatient Databases.

However, the NHDR does not provide the diabetes-specific measure sets for patient safety, timeliness, and patient centeredness. Additionally, no studies were found in the

literature that focused on disparities in timeliness and patient centeredness of health care using retrospective databases.

Summary

In sum, significant evidence reveals the racial and ethnic disparities in healthcare, including diabetes care, in the U.S. Researchers should pay close attention to the racial and ethnic healthcare-disparity trends, and include timeliness and patient centeredness as measure sets for quality of diabetes care.[11, 15]

Chapter Three

Methodology

This chapter describes the methodology used for the study. It is divided into the following sections: data sources, study subjects, independent variables and covariates, dependent variables—measure sets for quality of health care among adults with diabetes, and statistical analyses.

Data Sources

The Medical Expenditure Panel Survey Household Component (MEPS-HC) provides a nationally representative sample of the U.S. civilian non-institutionalized population with information on demographic and socioeconomic characteristics, health insurance coverage, health status, satisfaction with health care, and access to health care. Estimates can be produced for selected subpopulations using MEPS.[36, 37] This project used the 2005 and 2006 full-year consolidated data files (HC-097 and HC-105), and the pooled data file to analyze the quality of health care among American adults with diabetes. Pooling

annual files can generate a larger sample size and assess population subgroups more accurately.[9] The pooling methods can be found in the MEPS-HC documentation.[36, 37]

To analyze the quality of health care among adults with diabetes, the project used two supplemental surveys involved in the MEPS, which are the Diabetes Care Survey (DCS) and the Self-Administered Questionnaire (SAQ).[38-41] The DCS consists of a series of questions about diabetes complications, treatment, education, and effective diabetes management that includes three recommended diabetes services as well as appropriate influenza immunization and lipid management (Questions 2–4 and 11–12).[40, 41] Using the health plan version of the Consumer Assessment of Healthcare Providers and Systems (CAHPS®), the SAQ examines the quality of health care from the consumer's perspectives, including the timeliness and patient centeredness of health care (Questions 2 and 8–11).[36-39] Refer to Appendixes A and B for these questions.

Study Subjects

To identify the study subjects—adults with diabetes—the project used the DCS weight variables (DIABW05F and DIABW06F for 2005 and 2006, respectively). All those respondents with a positive DCS weight were persons who responded "YES" to both variables of DIABDX53 and DSDIA53. DIABDX53 indicates whether the respondent was ever diagnosed with diabetes (excluding gestational diabetes), which was

collected in the Priority Conditions section of the computer-assisted personal interview. Subsequently, each person who reported receiving a diagnosis of diabetes was asked to complete the self-administered paper-and-pencil questionnaire, DCS. The DSDIA53, collected in the DCS, confirms the diagnosis of diabetes. A small number of inconsistent cases with DIABDX53 = YES (1) but DSDIA53 = NO (2) do not have a positive DCS weight; thus they were excluded in data analysis. In addition, no one aged 17 or under receives a DCS weight.[36, 37] Therefore, all and only the adults with self-reporting diabetes were identified using the DCS weight variables.

The study was approved as exemption by the University of Toledo Social Behavioral and Educational Institutional Review Board (IRB) (#106355, Appendix C) as it involved no risk to human subjects.

Independent Variables and Covariates

The independent variables involved in the project are race and ethnicity; the covariates include age, gender, family income, education, health insurance coverage, residential location, and language spoken most often at home. The values of each variable are as follows:

- Race—American Indians or Alaska Natives (AI/ANs), Asians, Blacks or African

Americans, Native Hawaiians or Other Pacific Islanders (NHOPIs), Whites, and people of 2 or more races. The categories for race are consistent with the Office of Management and Budget's (OMB's) revised standards for the classification of federal data on race and ethnicity.[15]

- Ethnicity—Hispanics, non-Hispanic Whites (NHWs), and non-Hispanic Blacks (NHBs).
- Age—Age was used as a continuous variable ranging from 18 to 85 (top coded for confidentiality).
- Gender—Female and male.
- Family income—Poor, low-income, middle-income, and high-income. "Poor" is defined as having a family income less than 100% of the applicable poverty line (based on family size and composition); "low-income," between 100% and 199%; "middle-income," between 200% and 399%; and "high-income," 400% or more of the applicable poverty line.[36, 37]
- Education—Less than high school, high school, and any college education.
- Health insurance coverage—Uninsured all year, and having health insurance.
- Residential location—Metropolitan statistical area (MSA) and Non-MSA.
- Language spoken most often at home—English and non-English.

Dependent Variables—Measure Sets for Quality of Health Care among Adults with Diabetes

The project used 12 process measures and 1 outcome measure (for timeliness) to evaluate the quality of health care among adults with diabetes in effectiveness, timeliness, and patient centeredness (Table 2).[9, 11] The 13 measure sets are the dependent variables in the study, of which there are 2 composite measures for the receipt of recommended diabetes services and 1 composite measure for patient centeredness. For the A1C test, this study adopted the measure of at least two times in the past year, not one time, to be consistent with the revised objective 5-12 in Healthy People 2010 (HP2010) and the American Diabetes Association's (ADA's) recommendation.[21, 42]

Table 2. Measure sets for quality of health care among adults with diabetes used in the study

Section	Measure	Data Source
Effectiveness (Receipt of recommended diabetes services)	● A1C test: Adults with diabetes who had an A1C test at least twice in the past year	MEPS-HC, DCS
	● Eye exam: Adults with diabetes who had a retinal eye exam in the past year	MEPS-HC, DCS
	● Foot exam: Adults with diabetes who had a foot	MEPS-HC,

Section	Measure	Data Source
	examination in the past year	DCS
	● Adults with diabetes who had all 3 recommended services for diabetes mentioned above in the past year	MEPS-HC, DCS
	● Lipid profile measurement: Adults with diabetes who had a lipid profile measurement in the past 2 years	MEPS-HC, DCS
	● Influenza immunization: Adults with diabetes who had an influenza immunization in the past year	MEPS-HC, DCS
	● Adults with diabetes who had all 5 services for diabetes mentioned above in appropriate time frame	MEPS-HC, DCS
Timeliness	● Adults with diabetes who reported always or usually getting care for illness or injury as soon as wanted in the past year	MEPS-HC, SAQ
Patient Centeredness	● Adult ambulatory patients with diabetes who reported health care providers always or usually listened carefully in the past year	MEPS-HC, SAQ
	● Adult ambulatory patients with diabetes who reported health care providers always or usually	MEPS-HC, SAQ

Section	Measure	Data Source
	explained things clearly in the past year	
	● Adult ambulatory patients with diabetes who reported health care providers always or usually respected what patients said in the past year	MEPS-HC, SAQ
	● Adult ambulatory patients with diabetes who reported health care providers always or usually spent enough time with patients in the past year	MEPS-HC, SAQ
	● Adult ambulatory patients with diabetes who reported good communication with health care providers in the past year—providers always or usually listened carefully, explained things clearly, respected what patients said, and spent enough time with patients	MEPS-HC, SAQ

MEPS-HC: Medical Expenditure Panel Survey, Household Component; DCS: Diabetes Care Survey; SAQ: Self-Administered Questionnaire

Statistical Analyses

Two-tailed chi-square (χ^2) tests and analysis of variance (ANOVA. for variable AGE

only) were used to assess the differences in demographic and socioeconomic characteristics and the disparities in quality of health care by race and ethnicity. The statistical significance was considered at the alpha = 0.05 level.

Because racial and ethnic minorities are disproportionately more likely to be of lower socioeconomic status, healthcare disparities among racial and ethnic minorities are often highly correlated with the differences in demographic and socioeconomic status. To disaggregate racial, ethnic, demographic, and socioeconomic effects, logistic regression models were used to examine the differences in quality of health care after controlling for the confounding factors. These factors include age, gender, family income, education, health insurance coverage, residential location, and language spoken most often at home. In the multivariate models, the reference groups (RG) for each variable are Whites, Non-Hispanic Whites, female, high-income family, any college education, having health insurance, metropolitan statistical area (MSA), and English.[9, 11, 15, 43]

To account for the complex sample design of the MEPS and obtain accurate national estimates, the sampling strata, primary sampling unit (PSU), and sampling weights (DIABW05F and DIABW06F) were used in data analysis.[36, 37] Consistent with the established criteria for data reporting in the NHDR, estimates are considered unreliable and suppressed when they are based on sample size fewer than (<) 100 or with relative standard error (RSE) greater than (>) 30%. This is more conservative than HP2010 data

suppression criteria for the MEPS, which are sample cases < 70 or RSE > 30%. Additionally, records with missing values were excluded for analysis.[9, 44, 45]

The statistical analyses were conducted using SAS software (version 9.1.3, SAS Institute Inc., Cary, NC, USA).[46, 47] The SAS procedures SURVEYFREQ, SURVEYMEANS, and SURVEYREG were used for the descriptive statistics, χ^2 tests, and ANOVA. SURVEYLOGISTIC regression procedure was used to examine differences in quality of health care adjusting for the confounding factors.

Chapter Four

Data Analyses and Results

This chapter describes the data analyses and results of the study. It is divided into the following sections: study sample, demographic and socioeconomic characteristics of adults with diabetes, racial and ethnic healthcare disparities in receipt of recommended diabetes services, racial and ethnic disparities in timeliness of health care among adults with diabetes, and racial and ethnic disparities in patient centeredness of health care among adults with diabetes.

Study Sample

Out of 33,961, 34,145, and 68,106 respondents in 2005, 2006, and two-year data files, the sample sizes of adults with diabetes were 1654, 1803, and 3457, respectively. They represented 15,805,050, 17,790,588, and 17,362,430 civilian non-institutionalized adults self-reporting diabetes in 2005, 2006, and in two years, respectively.[36, 37] Results are presented by data years of 2005, 2006, and combined two years of 2005 and 2006, respectively. Because the sample sizes were inadequate and then data were suppressed,[9,

[44, 45] the analysis for the following races was not possible: American Indian or Alaska Native (AI/AN), Asian, Native Hawaiian or Other Pacific Islander (NHOPI), and people of two or more races.

Demographic and Socioeconomic Characteristics of Adults with Diabetes

Tables 3 and 4 present the demographic and socioeconomic characteristics of adults with diabetes by race and ethnicity, respectively. Overall, the average ages of all adults with diabetes were 60.4 in 2005 and 60.5 in 2006. The proportions of female diabetics were 53.0% in 2005 and 50.8% in 2006. The proportions living in metropolitan statistical areas (MSAs) were 78.0% in 2005 and 77.9% in 2006. The proportions of those respondents with any college education, high family income, health insurance, and who were English-speaking increased from 2005 to 2006.

Table 3 shows that between White and Black adults with diabetes in the U.S. in 2005, 2006, and these two years, there were statistically significant differences in age, gender, family income, education, residential location, and language spoken most often at home, except in health insurance coverage. Blacks with diabetes were younger than Whites. From 2005 to 2006, Blacks with diabetes were getting younger while Whites with diabetes were getting older. The proportion of females was higher among Blacks than Whites. However, the proportion of females decreased for both Blacks and Whites from

2005 to 2006. A higher proportion of Whites had a college education compared to Blacks. The proportion of high family income (≥ 400% of poverty line) was approximately two times higher for Whites than Blacks. More than half of Black subjects' family incomes were less than 200% of poverty line (low income and poor groups), compared with nearly a third of Whites'. Fewer White subjects lived in MSAs than did Blacks. More than 99% of Black subjects spoke English at home, compared to 90% of Whites. There was no significant difference between Whites and Blacks in health insurance coverage in 2005 and 2006, with the proportions of both being more than 92%. However, the percentage of those with health insurance was lower for Blacks in 2006 than in 2005.

Table 4 shows that among various ethnic groups with diabetes in the U.S. in 2005, 2006, and these two years, there were statistically significant differences in all of the examined demographic and socioeconomic characteristics. In the two years of 2005 and 2006, the average ages of adults with diabetes were 61.8 among non-Hispanic Whites (NHWs), 59.0 among non-Hispanic Blacks (NHBs), and 56.7 among Hispanics. From 2005 to 2006, Non-Hispanic Whites with diabetes were getting older, but Non-Hispanic Blacks and Hispanics were getting younger. The proportions of female patients was highest among Non-Hispanic Blacks (61.4%), followed by Hispanics (55.0%) and Non-Hispanic Whites (49.2%). Hispanics had the highest proportion of individuals with less than high school education (55.1%), followed by Non-Hispanic Blacks (32.4%) and Non-Hispanic Whites (18.1%). More than half of Non-Hispanic Blacks and Hispanics

were low income and poor, compared with 28.7% of Non-Hispanic Whites. Most Non-Hispanic Whites (94.6%) and Non-Hispanic Blacks (92.8%) had health insurance at least some of the time in 2005 and 2006, but only 82.9% of Hispanics had health insurance. Fewer Non-Hispanic Whites (72.9%) lived in MSAs than Non-Hispanic Blacks (87.1%) and Hispanics (91.7%). More than 99% of Non-Hispanic Whites and Non-Hispanic Blacks spoke English most often at home; however, less than 50% of Hispanics did.

Table 3. Demographic and socioeconomic characteristics of adults with diabetes, by race, United States (2005, 2006, and 2005–2006 MEPS) [a]

										p-Value [c]		
	Total [b]			White			Black or African American			between White and Black		
Characteristic	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year
n	1,654	1,803	3,457	1,207	1,329	2,536	342	367	709			
Age of years,	60.4	60.5	60.4	60.9	61.0	61.0	59.1	58.8	58.9	0.0578	**0.0129**	**0.0019**
mean (SE)	(0.42)	(0.40)	(0.34)	(0.46)	(0.46)	(0.38)	(0.95)	(0.71)	(0.67)			
Gender: Female	53.0%	50.8%	51.9%	51.2%	49.1%	50.1%	62.4%	60.3%	61.3%	**<0.0001**	**0.0008**	**<0.0001**
Male	47.0%	49.2%	48.1%	48.8%	50.9%	49.9%	37.6%	39.7%	38.7%			
Education:										**0.0105**	**0.0153**	**0.0019**
Any college	22.6%	24.8%	23.7%	22.3%	24.9%	23.6%	16.8%[#]	18.5%[#]	17.7%			
High school	51.6%	49.2%	50.4%	54.1%	50.0%	52.0%	49.2%	50.6%	49.9%			
< high school	25.3%	25.3%	25.3%	23.7%	25.1%	24.4%	34.0%	30.9%	32.4%			

Table 3. Demographic and socioeconomic characteristics of adults with diabetes, by race, United States (2005, 2006, and 2005–2006 MEPS) [a]

—continued (1)

	Total [b]			White			Black or African American			*p*-Value [c] between White and Black		
Characteristic	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year
Family income:										**<0.0001**	**<0.0001**	**<0.0001**
High income	31.6%	34.3%	33.0%	34.4%	37.6%	36.0%	17.4%#	18.4%#	17.9%			
Middle income	31.5%	30.1%	30.8%	32.1%	29.9%	31.0%	29.1%#	26.8%#	27.9%			
Low income	22.5%	22.4%	22.4%	21.3%	21.4%	21.3%	26.9%#	28.7%	27.8%			
Poor	14.3%	13.2%	13.8%	12.2%	11.1%	11.6%	26.6%	26.1%	26.4%			
Health insurance:										0.1849	0.5369	0.7975
Had insurance	92.5%	92.7%	92.6%	92.1%	92.7%	92.4%	94.3%	91.4%	92.8%			
Uninsured	7.5%	7.3%	7.4%	7.9%	7.3%	7.6%	5.7%#	8.6%#	7.2%#			

Table 3. Demographic and socioeconomic characteristics of adults with diabetes, by race, United States (2005, 2006, and 2005–2006 MEPS) [a]

—continued (2)

	Total [b]			White			Black or African American			*p*-Value [c] between White and Black		
Characteristic	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year
Residential										**0.0004**	**0.0120**	**0.0012**
location: MSA	78.0%	77.9%	77.9%	75.6%	76.4%	76.0%	89.0%	85.5%	87.3%			
Non-MSA	22.0%	22.1%	22.1%	24.4%	23.6%	24.0%	11.0%[#]	14.5%[#]	12.7%			
Language:										**<0.0001**	**<0.0001**	**<0.0001**
English	89.8%	90.3%	90.1%	89.8%	90.2%	90.0%	99.2%	99.1%	99.1%			
Other	10.2%	9.7%	9.9%	10.2%	9.8%	10.0%	0.8%[#]	0.9%[#]	0.9%[#]			

[a] Percentages are crude rates, not age-adjusted rates. Because the figures are rounded down, the sum of percentages in each classification may not be identical to one (1).

[b] The TOTAL here is for all of the racial groups, not just for White and Black.

[c] Bolded *p*-value indicates a statistically significant difference at the alpha level of 0.05.

[#] Data do not meet the criteria for statistical reliability. SE: Standard Error; MSA: Metropolitan Statistical Area.

Data Source: MEPS-HC, Agency for Healthcare Research and Quality (AHRQ).

Table 4. Demographic and socioeconomic characteristics of adults with diabetes, by ethnicity, United States (2005, 2006, and 2005–2006 MEPS) [a]

	Non-Hispanic Whites			Non-Hispanic Blacks			Hispanics			*p*-value [b]		
Characteristic	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year
n	834	920	1,754	335	358	693	388	433	821			
Age of years,	61.6	61.9	61.8	59.3	58.8	59.0	57.2	56.2	56.7	**<0.0001**	**<0.0001**	**<0.0001**
mean (SE)	(0.50)	(0.53)	(0.44)	(0.94)	(0.71)	(0.67)	(0.72)	(0.74)	(0.63)			
Gender: Female	50.9%	47.6%	49.2%	62.4%	60.4%	61.4%	53.6%	56.3%	55.0%	**0.0006**	**0.0007**	**<0.0001**
Male	49.1%	52.4%	50.8%	37.6%	39.6%	38.6%	46.4%	43.7%	45.0%			
Education: [c]										**<0.0001**	**<0.0001**	**<0.0001**
Any college	25.3%	27.6%	26.5%	17.0%[#]	18.7%[#]	17.8%	8.6%[#]	11.6%[#]	10.1%[#]			
High school	57.5%	53.5%	55.4%	49.0%	50.5%	49.8%	37.6%	32.2%	34.8%			
< high school	17.2%	18.8%	18.1%	34.0%	30.8%	32.4%	53.9%	56.2%	55.1%			

Table 4. Demographic and socioeconomic characteristics of adults with diabetes, by ethnicity, United States (2005, 2006, and 2005–2006 MEPS) [a]

—continued (1)

Characteristic	Non-Hispanic Whites			Non-Hispanic Blacks			Hispanics			*p*-value [b]		
	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year
Family income:										**<0.0001**	**<0.0001**	**<0.0001**
High income	37.5%	41.9%	39.7%	17.6%[#]	18.7%[#]	18.2%	19.9%[#]	14.8%[#]	17.3%[#]			
Middle income	33.4%	29.7%	31.5%	29.1%[#]	26.9%[#]	28.0%	26.5%[#]	32.2%	29.4%			
Low income	18.5%	19.4%	18.9%	26.7%[#]	28.8%	27.8%	33.9%	31.2%	32.6%			
Poor	10.6%	9.1%	9.8%	26.6%	25.6%	26.1%	19.7%	21.8%	20.7%			
Health insurance:										**0.0010**	**<0.0001**	**<0.0001**
Had insurance	94.1%	95.0%	94.6%	94.2%	91.3%	92.8%	83.4%	82.4%	82.9%			
Uninsured	5.9%[#]	5.0%[#]	5.4%	5.8%[#]	8.7%[#]	7.2%[#]	16.6%[#]	17.6%[#]	17.1%			

Table 4. Demographic and socioeconomic characteristics of adults with diabetes, by ethnicity, United States (2005, 2006, and 2005–2006 MEPS) [a]

—continued (2)

	Non-Hispanic Whites			Non-Hispanic Blacks			Hispanics			*p*-value [b]		
Characteristic	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year
Residential										**<0.0001**	**<0.0001**	**<0.0001**
location: MSA	72.5%	73.3%	72.9%	88.9%	85.4%	87.1%	90.3%	93.0%	91.7%			
Non-MSA	27.5%	26.7%	27.1%	11.1%[#]	14.6%[#]	12.9%	9.7%[#]	7.0%[#]	8.3%			
Language:										**<0.0001**	**<0.0001**	**<0.0001**
English	98.6%	99.4%	99.0%	99.7%	99.7%	99.7%	48.8%	45.1%	46.9%			
Other	1.4%[#]	0.6%[#]	1.0%[#]	0.3%[#]	0.3%[#]	0.3%[#]	51.2%	54.9%	53.1%			

[a] Percentages are crude rates, not age-adjusted rates. Because the figures are rounded down, the sum of percentages in each classification may not be identical to one (1).

[b] Bolded *p*-value indicates a statistically significant difference at the alpha level of 0.05.

[c] In addition to footnote a, there were some missing data in EDUCATION classification, so the sum of its rounded percentages may not be identical to one (1).

[#] Data do not meet the criteria for statistical reliability. SE: Standard Error; MSA: Metropolitan Statistical Area.

Data Source: Medical Expenditure Panel Survey Household Component (MEPS-HC), AHRQ.

Racial and Ethnic Healthcare Disparities in Receipt of Recommended Diabetes Services

As shown in Table 5 column "Total", the overall rates of receiving all five diabetes services, all three diabetes services, and influenza immunizations in the two years of 2005 and 2006 were low: 26.0%, 40.2%, and 58.2%, respectively. The service with the highest rate of receipt was lipid profile measurement. More than 94% of adults with diabetes had this service in the past two years.

Table 5 also presents the unadjusted percentages of the receipt of recommended diabetes services between Whites and Blacks. There were statistically significant differences in the proportions of eye exams in 2005, foot exams in 2006, influenza immunizations and all five services in 2005, 2006, and two consolidated years. Blacks had higher rates of foot exams than Whites (74.4% vs 69.5% in two years), but Whites had higher rates of eye exams, influenza immunizations, and all five services.

Tables 6 and 6-1 to 6-3 display the adjusted odds ratios of logistic regression models for diabetes services by race. Some racial disparities in receipt of diabetes services persisted even after adjusting for age, gender, education, family income, health insurance coverage, residential location, and language spoken most often at home. The difference in proportion of eye exams between Whites and Blacks in 2005 disappeared after

adjustment. However, the model confirmed all the other differences, including foot exams (Blacks had higher rate), influenza immunizations, and all five services. For example, in the combined data for 2005 and 2006 (Table 6-3), when all other confounders in the model were held constant, Blacks had 0.590 and 0.571 times the odds of receiving influenza immunizations and all five services compared to Whites.

Table 7 shows that there were more areas of significant difference in receipt of recommended diabetes services among ethnic groups. The only variable that did not show a statistically significant difference among ethnic groups was the A1C test. With the exception of foot exams, Non-Hispanic Whites had the highest rates and Hispanics had the lowest rates in these recommended diabetes services. Blacks had the highest rate of foot exams. The individual service that respondents were least likely to receive was influenza immunizations. The composite variable with the lowest reported rate of receipt was 'all five services'.

Tables 8 and 8-1 to 8-3 present the adjusted odds ratios of logistic regression models for diabetes services by ethnicity. The differences in all the diabetes services in the two years of 2005 and 2006 (Table 8-3) between Non-Hispanic Whites and Hispanics disappeared after adjusting for the covariates. The confounding factors in the models contribute to the disparities between Non-Hispanic Whites and Hispanics. However, the disparities in receipt of influenza immunization and all five services remained between

Non-Hispanic Whites and Non-Hispanic Blacks. In the two years of 2005 and 2006, when all other confounders in the model keep constant, compared with Non-Hispanic Whites, Non-Hispanic Blacks had 0.579 and 0.558 times the odds of receiving influenza immunization and all five services, respectively.

Furthermore, the results also revealed that age, family income, education, health insurance coverage, residential location, and language were important determinants of receiving diabetes services in 2005 and 2006, except gender. With an increase in age, people with diabetes were more likely to receive every recommended diabetes services. In contrast, the uninsured individuals were less likely to receive all the diabetes services than the insured ones. Subjects with poor, low, or middle family income, those with less than a high school education, those living in a non-MSA, and those who were non-English speaking were less likely to receive some of the recommended diabetes services among racial and ethnic minorities.

Refer to Tables 5 to 8 and Appendix D for more information.

Table 5. Receipt of recommended diabetes services, by race, United States (2005, 2006, and 2005–2006 MEPS) [a]

	Total [c]			White			Black or African American			*p*-Value [d] between White and Black		
Measure [b]	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year
A1C test	77.2%	77.3%	77.2%	78.0%	77.6%	77.8%	79.0%	76.0%	77.5%	0.7549	0.6051	0.9032
Foot exam	70.2%	69.3%	69.7%	70.4%	68.6%	69.5%	73.4%	75.3%	74.4%	0.4004	**0.0293**	0.0680
Eye exam	65.1%	68.3%	66.7%	66.3%	68.7%	67.5%	58.8%	66.1%	62.5%	**0.0339**	0.4721	0.0888
All 3 services [e]	38.5%	41.8%	40.2%	39.9%	42.5%	41.3%	34.7%	38.4%	36.6%	0.1352	0.3204	0.1442
Lipid profile	94.7%	94.3%	94.5%	95.0%	94.3%	94.6%	94.8%	95.1%	95.0%	0.9138	0.5540	0.7209
Flu immu.	56.7%	59.7%	58.2%	59.3%	61.8%	60.6%	45.1%	49.6%	47.4%	**<0.0001**	**0.0003**	**<0.0001**
All 5 services [f]	24.0%	27.9%	26.0%	26.2%	29.7%	28.0%	16.2%[#]	17.6%[#]	16.9%	**0.0003**	**<0.0001**	**<0.0001**

[a] Percentages are crude rates, not age-adjusted rates. [b] All the measure sets are the test or treatment at least once in the past year, except that A1C test is at least two times in the past year and lipid profile measurement at least one time in the past two years. [c] The TOTAL here is for all of the racial groups, not just for White and Black. [d] Bolded *p*-value indicates a statistically significant difference at the alpha level of 0.05. [e] The "all 3 services" here means the A1C test at least twice in the past year, and annual foot and eye exams. [f] The "all 5 services" here means the A1C test at least twice in the past year, annual foot and eye exams, lipid profile measurement at least once in the past two years, and annual influenza immunization. [#] Data do not meet the criteria for statistical reliability. **Data Source:** MEPS-HC, AHRQ.

Table 6. Receipt of recommended diabetes services—logistic regression, by race, United States (2005, 2006, and 2005–06 MEPS) [a]

Characteristic	Odds Ratio (95% Confidence Interval)						
	A1C test [b]	Foot exam	Eye exam	All 3 services [c]	Lipid profile	Influenza immunization	All 5 services [d]
Black vs White (RG):	1.143	1.261	0.789	0.877	1.099	**0.523**	**0.570**
2005	(0.768, 1.702)	(0.870, 1.827)	(0.576, 1.080)	(0.645, 1.193)	(0.563, 2.143)	**(0.377, 0.723)**	**(0.391, 0.833)**
2006	0.975	**1.433**	0.922	0.938	1.221	**0.656**	**0.574**
	(0.678, 1.402)	**(1.047, 1.961)**	(0.657, 1.293)	(0.659, 1.335)	(0.621, 2.401)	**(0.489, 0.881)**	**(0.419, 0.788)**
2005–2006	1.069	**1.340**	0.858	0.910	1.179	**0.590**	**0.571**
	(0.805, 1.421)	**(1.022, 1.759)**	(0.662, 1.111)	(0.691, 1.198)	(0.758, 1.833)	**(0.466, 0.747)**	**(0.444, 0.735)**

[a] Other than White and Black (or African American), data do not meet the criteria for statistical reliability, data quality, or confidentiality for the following racial groups: Asian, Native Hawaiian or Other Pacific Islander (NHOPI), American Indian or Alaska Native (AI/AN), and people of more than one race. Bolded odds ratios and confidence intervals indicate a statistical significance. [b] All the measure sets are the test or treatment at least once in the past year, except that A1C test is at least two times in the past year and lipid profile measurement is at least one time in the past two years. [c] The "all 3 services" here means the A1C test at least twice in the past year, and annual foot and eye exams. [d] The "all 5 services" here means the A1C test at least twice in the past year, annual foot and eye exams, lipid profile measurement at least once in the past two years, and annual influenza immunization. RG: Reference group; MSA: Metropolitan statistical area. **Data Source:** MEPS-HC, AHRQ.

Table 7. Receipt of recommended diabetes services, by ethnicity, United States (2005, 2006, and 2005–2006 MEPS) [a]

Measure [b]	Non-Hispanic Whites			Non-Hispanic Blacks			Hispanics			*p*-Value [c]		
	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year
A1C test	78.7%	78.1%	78.4%	79.1%	75.9%	77.5%	74.0%	74.9%	74.5%	0.3061	0.5432	0.3415
Foot exam	71.4%	70.1%	70.7%	73.4%	75.4%	74.4%	64.8%	60.2%	62.5%	0.0911	**0.0010**	**0.0014**
Eye exam	68.6%	71.1%	69.9%	59.0%	66.7%	62.9%	55.5%	55.4%	55.4%	**0.0004**	**<0.0001**	**<0.0001**
All 3 services [d]	41.5%	44.4%	43.0%	34.9%	38.6%	36.7%	32.1%	32.0%	32.0%	**0.0142**	**0.0005**	**0.0001**
Lipid profile	96.1%	95.1%	95.6%	95.0%	95.2%	95.1%	89.6%	89.7%	89.6%	**0.0007**	**0.0140**	**0.0004**
Flu immu.	61.9%	64.8%	63.4%	45.3%	50.2%	47.8%	46.2%	44.3%	45.2%	**<0.0001**	**<0.0001**	**<0.0001**
All 5 services [e]	28.7%	31.5%	30.1%	16.3%[#]	17.7[#]	17.0%	14.6%[#]	19.8%[#]	17.2%	**<0.0001**	**<0.0001**	**<0.0001**

[a] Percentages are crude rates, not age-adjusted rates.

[b] All the measure sets are the test or treatment at least once in the past year, except that A1C test is at least two times in the past year and lipid profile measurement at least one time in the past two years.

[c] Bolded *p*-value indicates a statistically significant difference at the alpha level of 0.05.

[d] The "all 3 services" here means the A1C test at least twice in the past year, and annual foot and eye exams.

[e] The "all 5 services" here means the A1C test at least twice in the past year, annual foot and eye exams, lipid profile measurement at least once in the past two years, and annual influenza immunization.

[#] Data do not meet the criteria for statistical reliability. **Data Source:** MEPS-HC, AHRQ.

Table 8. Receipt of recommended diabetes services—logistic regression, by ethnicity, United States (2005, 2006, and 2005–06 MEPS)

Characteristic	Odds Ratio (95% Confidence Interval) [a]						
	A1C test [b]	Foot exam	Eye exam	All 3 services [c]	Lipid profile	Influenza immunization	All 5 services [d]
2005:	1.102	1.192	0.775	0.858	0.943	**0.521**	**0.542**
NHBs vs NHWs (RG)	(0.727, 1.669)	(0.812, 1.750)	(0.554, 1.083)	(0.623, 1.182)	(0.470, 1.890)	**(0.372, 0.730)**	**(0.368, 0.796)**
Hispanics vs NHWs (RG)	0.712	0.762	0.998	0.857	**0.443**	0.942	0.678
	(0.468, 1.084)	(0.501, 1.159)	(0.638, 1.561)	(0.556, 1.318)	**(0.248, 0.792)**	(0.581, 1.525)	(0.417, 1.102)
2006:	1.008	**1.400**	0.914	0.929	1.405	**0.632**	**0.572**
NHBs vs NHWs (RG)	(0.692, 1.468)	**(1.017, 1.927)**	(0.649, 1.286)	(0.653, 1.322)	(0.683, 2.892)	**(0.468, 0.854)**	**(0.418, 0.783)**
Hispanics vs NHWs (RG)	1.414	0.809	0.755	0.876	2.212	**0.600**	0.931
	(0.933, 2.144)	(0.518, 1.262)	(0.498, 1.144)	(0.601, 1.276)	(0.625, 7.824)	**(0.398, 0.904)**	(0.625, 1.388)

Table 8. Receipt of recommended diabetes services—logistic regression, by ethnicity, United States (2005, 2006, and 2005–06 MEPS) —continued

Characteristic	Odds Ratio (95% Confidence Interval) [a]						
	A1C test [b]	Foot exam	Eye exam	All 3 services [c]	Lipid profile	Influenza immunization	All 5 services [d]
2005–2006:	1.061	1.289	0.849	0.895	1.168	**0.579**	**0.558**
NHBs vs NHWs (RG)	(0.786, 1.433)	(0.972, 1.708)	(0.648, 1.114)	(0.675, 1.187)	(0.746, 1.830)	**(0.452, 0.741)**	**(0.431, 0.721)**
Hispanics vs NHWs (RG)	0.949	0.785	0.880	0.863	0.828	0.768	0.806
	(0.678, 1.329)	(0.560, 1.101)	(0.634, 1.223)	(0.631, 1.180)	(0.432, 1.590)	(0.538, 1.096)	(0.585, 1.111)

[a] Bolded odds ratios and confidence intervals indicate a statistical significance at the alpha level of 0.05.
[b] All the measure sets are the test or treatment at least once in the past year, except that A1C test is at least two times in the past year and lipid profile measurement is at least one time in the past two years.
[c] The "all 3 services" here means the A1C test at least twice in the past year, and annual foot and eye exams.
[d] The "all 5 services" here means the A1C test at least twice in the past year, annual foot and eye exams, lipid profile measurement at least once in the past two years, and annual influenza immunization.
NHWs: Non-Hispanic Whites; NHBs: Non-Hispanic Blacks; RG: Reference group; MSA: Metropolitan statistical area.
Data Source: Medical Expenditure Panel Survey Household Component (MEPS-HC), Agency for Healthcare Research and Quality (AHRQ).

Racial and Ethnic Disparities in Timeliness of Health Care among Adults with Diabetes

Overall, 85.8% of all adults with diabetes got care as soon as wanted in two years of 2005 and 2006. But the rates decreased from 87.1% to 84.6%, from 2005 to 2006. (Table 9 Column "Total")

Tables 9 and 11 present the results regarding subjects' reporting of timeliness in the receipt of health care services by race and ethnicity. There were no racial or ethnic differences in timeliness of health care. The proportions of timely health care in Whites, Non-Hispanic Whites, and Hispanics with diabetes decreased from 2005 to 2006, whereas they increased in Black and non-Hispanic Black groups.

The logistic regression models (Tables 10 and 12) show that age, family income, and health insurance coverage are important determinants related to timely health care. Those subjects who were younger, poor or low income, or uninsured were less likely to receive health care in a timely manner. The effect of residential location was not as significant as the contributing factors noted above. Gender, education, and language had no significant impact on getting timely care. Refer to Appendix D for detailed information.

Table 9. Timeliness of health care among adults with diabetes, by race, United States (2005, 2006, and 2005–2006 MEPS) [a]

	Total [b]			Whites			Blacks or African Americans			*p*-Value between Whites and Blacks		
Measure	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year
Timeliness	87.1%	84.6%	85.8%	87.4%	84.7%	86.1%	86.0%	87.3%	86.7%	0.5929	0.3065	0.7639

Table 10. Timeliness of health care—logistic regression, by race, United States (2005, 2006, and 2005–2006 MEPS) [a]

Characteristic	Odds Ratio (95% Confidence Interval) [b]		
	2005	2006	two-year
Black vs White (RG)	1.071 (0.634, 1.810)	1.431 (0.892, 2.295)	1.274 (0.869, 1.868)
Age	**1.026 (1.010, 1.042)**	**1.020 (1.005, 1.036)**	**1.024 (1.011, 1.036)**
Male vs female (RG)	0.965 (0.610, 1.525)	0.956 (0.594, 1.538)	0.981 (0.690, 1.394)
Income: Poor vs high income (RG)	**0.332 (0.159, 0.693)**	0.558 (0.270, 1.153)	**0.485 (0.282, 0.833)**
Low income vs high income (RG)	**0.325 (0.155, 0.681)**	**0.451 (0.216, 0.941)**	**0.416 (0.233, 0.742)**
Middle income vs high income (RG)	0.456 (0.197, 1.056)	0.704 (0.371, 1.337)	0.616 (0.346, 1.099)
Education: Less than a high school vs any college (RG)	1.065 (0.472, 2.402)	1.196 (0.614, 2.331)	1.204 (0.704, 2.062)
High school vs any college (RG)	0.994 (0.488, 2.024)	1.422 (0.788, 2.565)	1.289 (0.771, 2.155)
Uninsured vs. insured (RG)	**0.409 (0.181, 0.925)**	**0.541 (0.319, 0.917)**	**0.458 (0.260, 0.807)**
Residential location: Non-MSA vs MSA (RG)	**0.592 (0.356, 0.984)**	1.237 (0.707, 2.165)	0.882 (0.599, 1.300)
Language: Non-English vs English (RG)	1.215 (0.614, 2.404)	0.930 (0.493, 1.754)	1.049 (0.616, 1.787)

[a] Other than White and Black (or African American), data do not meet the criteria for statistical reliability, data quality, or confidentiality for the following racial groups: Asian, Native Hawaiian or Other Pacific Islander (NHOPI), American Indian or Alaska Native (AI/AN), and people of more than one race.

[b] Bolded odds ratios and confidence intervals indicate a statistical significance at the alpha level of 0.05.

RG: Reference group; MSA: Metropolitan statistical area. **Data Source:** MEPS-HC, AHRQ.

Table 11. Timeliness of health care among adults with diabetes, by ethnicity, United States (2005, 2006, and 2005–2006 MEPS) [a]

	Non-Hispanic Whites			Non-Hispanic Blacks			Hispanics			*p*-Value		
Measure	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year
Timeliness	88.4%	85.2%	86.8%	86.2%	87.3%	86.8%	83.2%	78.8%	81.0%	0.1759	0.1007	0.0538

[a] Percentages are crude rates, not age-adjusted rates.

Data Source: Medical Expenditure Panel Survey Household Component (MEPS-HC), Agency for Healthcare Research and Quality (AHRQ).

Table 12. Timeliness of health care—logistic regression, by ethnicity, United States (2005, 2006, and 2005–2006 MEPS)

Characteristic	Odds Ratio (95% Confidence Interval) [a]		
	2005	2006	two-year
Ethnicity: NHBs vs NHWs (RG)	0.980 (0.563, 1.707)	1.456 (0.891, 2.382)	1.238 (0.824, 1.860)
HispanicS vs NHWs (RG)	0.654 (0.334, 1.283)	0.817 (0.448, 1.489)	0.724 (0.459, 1.141)
Age	**1.025 (1.010, 1.041)**	**1.020 (1.004, 1.036)**	**1.023 (1.011, 1.035)**
Male vs female (RG)	0.934 (0.588, 1.483)	0.959 (0.596, 1.542)	0.963 (0.676, 1.374)
Income: Poor vs high income (RG)	**0.381 (0.186, 0.784)**	0.575 (0.287, 1.153)	**0.499 (0.293, 0.852)**
Low income vs high income (RG)	**0.374 (0.184, 0.759)**	**0.438 (0.221, 0.868)**	**0.429 (0.247, 0.744)**
Middle income vs high income (RG)	0.505 (0.222, 1.153)	0.657 (0.354, 1.220)	0.622 (0.351, 1.103)
Education: Less than a high school vs any college (RG)	1.129 (0.487, 2.617)	1.243 (0.636, 2.427)	1.247 (0.728, 2.137)
High school vs any college (RG)	1.007 (0.491, 2.063)	1.451 (0.812, 2.594)	1.296 (0.773, 2.175)
Uninsured vs. insured (RG)	**0.389 (0.176, 0.858)**	**0.539 (0.317, 0.916)**	**0.463 (0.263, 0.816)**
Residential location: Non-MSA vs MSA (RG)	**0.599 (0.359, 0.998)**	1.189 (0.689, 2.052)	0.858 (0.582, 1.265)
Language: Non-English vs English (RG)	1.333 (0.518, 3.426)	1.156 (0.541, 2.473)	1.256 (0.665, 2.372)

[a] Bolded odds ratios and confidence intervals indicate a statistical significance at the alpha level of 0.05.

RG: Reference group; MSA: Metropolitan statistical area. **Data Source:** MEPS-HC, AHRQ.

Racial and Ethnic Disparities in Patient Centeredness of Health Care among Adults with Diabetes

Among all adults with diabetes in two years of 2005 and 2006, the overall rates were more than 91% in reporting that health care providers listened carefully, explained things clearly, and respected what patients said. The rate of providers spending enough time with patients was 86%. The overall rate of patient centeredness was 81.5%. Moreover, all the rates related to patient centeredness increased from 2005 to 2006. (Table 13 Column "Total")

Tables 13 and 15 present the unadjusted percentages of patient centeredness of health care among adults with diabetes, by race and ethnicity, respectively. There were differences in health care providers' explaining things clearly, showing respect, spending enough time, and composite patient centeredness between Whites and Blacks. Among Non-Hispanic Whites, Non-Hispanic Blacks, and Hispanics, there were significant difference in three variables: providers' explanation, respect to patients, and composite patient centeredness.

The logistic regression models (Tables 14 and 16) show that family income and health insurance coverage are important determinants of patient centeredness. Those subjects with poor, low, or middle income, or those who were uninsured were less likely

to get patient-centered health care than those people with high family income, or with health insurance. Non-English speaking subjects were more likely to report that their health care providers spent enough time with them and were patient centered. The effects of age and residential location were not as significant as the contributing factors stated above. Gender and education had no significant impact on getting patient-centered health care. See Appendix D for more information.

Table 13. Patient centeredness of health care among adults with diabetes, by race, United States (2005, 2006, and 2005–2006 MEPS) [a]

Measure	Total [b]			White			Black or African American			*p*-Value [c] between White and Black		
	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year
• Listened carefully	91.1%	91.1%	91.1%	91.4%	91.0%	91.2%	91.0%	93.0%	92.0%	0.8651	0.2825	0.5465
• Explained things clearly	90.8%	91.7%	91.3%	91.8%	92.6%	92.2%	86.9%	89.4%	88.2%	**0.0363**	0.1055	**0.0209**
• Respected what patients said	91.2%	91.9%	91.6%	92.3%	92.4%	92.3%	85.7%	90.3%	88.1%	**0.0029**	0.3757	**0.0145**
• Spent enough time with patients	86.1%	86.6%	86.3%	86.8%	87.9%	87.3%	81.1%	83.7%	82.4%	**0.0246**	0.1323	**0.0256**
• Composite measure	81.3%	81.7%	81.5%	82.5%	83.6%	83.1%	75.3%	77.1%	76.2%	**0.0124**	**0.0335**	**0.0051**

[a] Percentages are crude rates, not age-adjusted rates. [b] The TOTAL here is for all of the racial groups including AI/AN, Asian, Black, NHOPI, White, and people of more than one race, not just for White and Black. [c] Bolded *p*-value indicates a statistically significant difference at the alpha level of 0.05. **Data Source:** MEPS-HC, AHRQ.

Table 14. Patient centeredness of health care among adults with diabetes—logistic regression, by race, United States (2005, 2006, and 2005–2006 MEPS) [a]

Characteristic	Odds Ratio (95% Confidence Interval) [b]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
Blacks vs Whites (RG)	1.299	0.713	**0.581**	0.765	0.755
2005	(0.768, 2.198)	(0.431, 1.182)	**(0.380, 0.888)**	(0.515, 1.136)	(0.529, 1.077)
2006	1.725	0.921	0.992	0.895	0.839
	(0.993, 2.999)	(0.565, 1.501)	(0.552, 1.782)	(0.574, 1.396)	(0.572, 1.230)
2005–2006	**1.521**	0.815	0.776	0.846	0.796
	(1.007, 2.296)	(0.555, 1.196)	(0.529, 1.137)	(0.603, 1.187)	(0.599, 1.058)

[a] Other than White and Black (or African American), data do not meet the criteria for statistical reliability, data quality, or confidentiality for the following racial groups: Asian, Native Hawaiian or Other Pacific Islander (NHOPI), American Indian or Alaska Native (AI/AN), and people of more than one race.

[b] Bolded odds ratios and confidence intervals indicate a statistical significance at the alpha level of 0.05.

RG: Reference group; MSA: Metropolitan statistical area. **Data Source:** MEPS-HC, AHRQ.

Table 15. Patient centeredness of health care among adults with diabetes, by ethnicity, United States (2005, 2006, 2005–06 MEPS) [a]

Measure	Non-Hispanic Whites			Non-Hispanic Blacks			Hispanics			*p*-Value [b]		
	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year	2005	2006	two-year
• Listened carefully	91.2%	91.4%	91.3%	91.1%	92.9%	92.0%	91.0%	89.1%	90.1%	0.9952	0.3912	0.6523
• Explained things clearly	92.8%	93.4%	93.1%	86.9%	90.5%	88.7%	85.8%	86.0%	85.9%	**0.0008**	**0.0009**	**<0.0001**
• Respected what patients said	92.4%	92.8%	92.6%	85.7%	91.3%	88.5%	91.1%	89.4%	90.2%	**0.0136**	0.2658	**0.0446**
• Spent enough time with patients	86.7%	87.9%	87.3%	81.3%	84.2%	82.8%	85.7%	86.2%	85.9%	0.1185	0.4133	0.1488
• Composite measure	83.7%	84.2%	83.9%	75.5%	77.9%	76.7%	75.5%	77.3%	76.4%	**0.0042**	**0.0324**	**0.0021**

[a] Percentages are crude rates, not age-adjusted rates.

[b] Bolded odds ratios and confidence intervals indicate a statistical significance at the alpha level of 0.05.

Data Source: Medical Expenditure Panel Survey Household Component (MEPS-HC), AHRQ.

Table 16. Patient centeredness of health care among adults with diabetes—logistic regression, by ethnicity, United States (2005, 2006, and 2005–2006 MEPS)

Characteristic	Odds Ratio (95% Confidence Interval) [a]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
2005:	1.363	0.643	**0.581**	0.751	0.702
NHBs vs. NHWs (RG)	(0.801, 2.319)	(0.385, 1.073)	**(0.365, 0.925)**	(0.493, 1.144)	(0.484, 1.018)
Hispanics vs. NHWs (RG)	1.148	**0.481**	0.901	0.657	**0.547**
	(0.450, 2.925)	**(0.261, 0.888)**	(0.350, 2.319)	(0.386, 1.118)	**(0.310, 0.964)**
2006:	1.620	1.002	1.088	0.923	0.866
NHBs vs. NHWs (RG)	(0.923, 2.842)	(0.605, 1.659)	(0.563, 2.104)	(0.572, 1.487)	(0.574, 1.307)
Hispanics vs. NHWs (RG)	0.802	**0.540**	0.752	0.747	0.661
	(0.386, 1.667)	**(0.311, 0.937)**	(0.377, 1.498)	(0.436, 1.278)	(0.380, 1.150)

Table 16. Patient centeredness of health care among adults with diabetes—logistic regression, by ethnicity, United States (2005, 2006, and 2005–2006 MEPS) —continued

Characteristic	Odds Ratio (95% Confidence Interval) [a]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
2005–2006:	1.504	0.803	0.802	0.851	0.794
NHBs vs. NHWs (RG)	(0.985, 2.295)	(0.536, 1.202)	(0.536, 1.199)	(0.591, 1.226)	(0.580, 1.086)
Hispanics vs. NHWs (RG)	0.947	**0.512**	0.823	0.712	**0.605**
	(0.490, 1.832)	**(0.320, 0.820)**	(0.459, 1.478)	(0.454, 1.117)	**(0.378, 0.969)**

[a] Bolded odds ratios and confidence intervals indicate a statistical significance at the alpha level of 0.05.
NHWs: Non-Hispanic Whites; NHBs: Non-Hispanic Blacks; RG: Reference group; MSA: Metropolitan statistical area.
Data Source: Medical Expenditure Panel Survey Household Component (MEPS-HC), Agency for Healthcare Research and Quality (AHRQ).

Chapter Five

Discussion and Conclusions

As described in Chapter 1, a large body of research reveals that racial and ethnic minorities experience healthcare disparities compared to white Americans. Additionally, racial and ethnic healthcare disparities are associated with worse health outcomes in diverse diseases including diabetes. As one of the efforts to eliminate health disparities, monitoring and reporting the trends and progress of healthcare disparities is critically important.[11, 15, 20] This study provided the most recent trends of racial and ethnic disparities in quality of health care among adults with diabetes (receipt of recommended diabetes services, timeliness and patient centeredness of health care) in the United States using 2005 and 2006 Medical Expenditure Panel Survey (MEPS).

This chapter covers the discussion and conclusions based on the study results. It is divided into the following sections: racial and ethnic disparities in receipt of diabetes services, impact of demographic and socioeconomic factors on disparities in receipt of diabetes services, racial and ethnic disparities in timeliness and patient centeredness of

health care among adults with diabetes, racial and ethnic disparities in patient centeredness of health care among adults with diabetes, other potential sources of racial and ethnic disparities in healthcare, study limitations, future research, and conclusions.

Racial and Ethnic Disparities in Receipt of Diabetes Services

Diabetes is a complex chronic disease requiring comprehensive quality care. Providing timely and quality preventive diabetes services is essential for improving health outcomes, delaying or reducing the progression of diabetes-related complications, and decreasing the direct and indirect medical expenditures.[9] The hemoglobin A1C test is an important assessment of glycemic control, which is recommended by the American Diabetes Association (ADA). Retinal eye examinations and foot examinations help prevent or slow the development and/or progression of diabetic retinopathy, foot ulcers, and lower extremity amputations. The fasting lipid profile measurement helps control the lipid levels and detect dyslipidemia earlier.[42] Diabetes is associated with an increase in hospitalizations for influenza and its complications. The influenza immunization can prevent potentially severe viral infection. [42, 48, 49] Also, diabetes services provide health care professionals and patients with the opportunity to improve their communication and relationship.[9]

From 2005 to 2006, the percentage of patients reporting the receipt of most

recommended diabetes services increased somewhat (Table 5). The service that was most often received was lipid profile measurement. This finding is in accordance with previous years' analysis.[9] However, the percentages of influenza immunization, eye exam, foot exam, and A1C test still need to be improved based on Healthy People 2010's established objectives for diabetes management. For example, the targets of eye exams and foot exams are 76% and 91%, respectively. Although the percentage of subjects receiving all three services increased greatly from around 30% in 2000–2001[9] to 40% in 2005–2006, the percentages of those receiving all three and all five recommended services are still relatively low.

After adjusting for other confounding factors, in 2005–2006, Blacks had a significantly higher rate in foot exams, but lower rates in influenza immunization and all five services than Whites. Non-Hispanic Blacks reported significantly lower rates of influenza immunization and all five services than Non-Hispanic Whites (Tables 6-3 and 8-3). The HP2010's database (WONDER DATA2010) and other studies confirmed the higher rate of foot exams in Blacks compared to Whites.[50, 51] Although there were no differences in all the measure sets for receipt of diabetes services between Hispanics and Non-Hispanic Whites after adjustment, Hispanics had the lowest rates among these three ethnic groups. The disparities have been explained by the demographic and socioeconomic factors examined in the study.

Impact of Demographic and Socioeconomic Factors on Disparities in Receipt of Diabetes Services

Among the covariates examined in the study, age is the most important contributing factor. As age increased, subjects were significantly more likely to receive every diabetes service. They also were more likely to receive all three and all five services. This finding is consistent with those of other studies that show, in general, that diabetic patients in younger age groups are less likely to get the preventive diabetes care than those in older age groups.[21, 45, 52, 53]

Other important determinants are family income and health insurance coverage. In 2005–2006, after controlling for all other factors, the probabilities of receiving the recommended diabetes services for poor, low-income, and middle-income people were significantly less than high-income people in four, five, and three measure sets, respectively (Tables 6-3 and 8-3). The uninsured populations with diabetes were less likely to receive each of the diabetes services than the insured ones. It is also in accordance with the reports and studies mentioned in Chapter 1 and 2.[2, 9-11, 15, 18-20] Education, residential location, and English-speaking status were also contributors to the racial and ethnic disparities in receipt of recommended diabetes services. The study did not find that gender had a significant impact on the disparities. This finding is slightly different from a prior study using 2000–2001 MEPS, which found lower rates in receipt

of two diabetes services for females than males.[9]

However, there are still some racial and ethnic disparities unexplained by these demographic, socioeconomic, and healthcare access-related factors. Other potential sources of disparities are discussed below.

Racial and Ethnic Disparities in Timeliness of Health Care among Adults with Diabetes

From 2005 to 2006 (shown in Tables 9–12), there was no statistically significant difference in regard to timeliness of health care between Blacks and Whites, and among Non-Hispanic Blacks, Hispanics, and Non-Hispanic Whites. However, Blacks were more likely to report receiving timely health care for illness or injury compared to Whites. Also, Hispanics were less likely to report timely health care compared to Non-Hispanic Whites. Age, family income, and health insurance coverage were the significant predictors of timeliness of health care among adults with diabetes. Residential location was also a predictor to some extent.

The measurement of timeliness of health care in this study is from the patients' perspective, which has been shown to be different at times from the physicians' perspective. For example, Barry et al. reported that when physicians and patients

evaluated a scenario in which "A 60-year-old with diabetes needed to schedule a routine follow-up appointment", 97.8% of them thought it could be scheduled later, and only 2.2% thought it should be scheduled soon. No physicians felt that it was urgent. From the patients' perspective, on the other hand, 55.6% felt that the appointment should be scheduled later, 30.6% felt that the appointment should be scheduled soon, and 13.7% felt the appointment should be scheduled urgently. The authors believe that understanding patient expectations may help physicians respond to requests for urgent evaluation of diabetes.[54]

Racial and Ethnic Disparities in Patient Centeredness of Health Care among Adults with Diabetes

Compared with many studies focusing on receipt of certain laboratory tests and medical procedures, a small number of studies have focused on differences in patient-provider communication, which is closely related to patient centeredness.[15] Family income is an important contributor for patient-centered health care. Those patients with poor, low, and even middle income were less likely to feel that they received patient-centered care compared to those with high family income. This may result from several conditions. According to the IOM report Unequal Treatment, physicians may devalue low-income groups and their needs. The reports states that there may be stereotypes about the expectations, capacities, and desires of low-income patients. Also,

low-income patients may not request or demand a high level of performance from their physicians due to cultural norms or lack of confidence.[15]

It is noteworthy that those non-English speaking adults with diabetes were more likely than those that were English-speaking to report that the health care providers listened to them carefully, spent enough time with them, and felt patient-centered. Although language barriers and mismatches are a fertile source of racial and ethnic disparities in health care,[15] the study findings may indicate that health care providers have realized the increasing linguistic diversity in the U.S., and maybe more cognizant of the specific needs facing patients with linguistic barriers. It may also be possible that there are culturally-based differences in expectations regarding time spent with physicians.

Other Potential Sources of Racial and Ethnic Disparities in Healthcare

As noted above, there are still some racial and ethnic disparities unexplained by the demographic, socioeconomic, and healthcare access-related factors. Other potential sources of disparities may exist. The Institute of Medicine (IOM) report *Unequal Treatment: Confronting Racial and Ethnic Disparities in Healthcare* has classified the sources into patient- and system-level factors, and care process-level variables. Patient-level factors include patients' preferences, economic factors, insurance status, treatment refusal, biological differences, and overuse of clinical services by white

patients. For example, racial and ethnic minority patients are more likely than white patients to refuse treatment. Healthcare systems-level factors include language barriers, time pressures on physicians, clinical uncertainty, geographic availability of healthcare institutions, and changes in the financing and delivery of healthcare services, and so forth. Care process-level variables include bias, discrimination, and stereotyping. All these factors may also contribute to racial and ethnic disparities in healthcare.[15]

Study Limitations

Due to the small sample size, the study was unable to analyze the disparities among Asian, Native Hawaiian or Other Pacific Islander (NHOPI), and American Indian or Alaska Native (AI/AN) groups. In order to perform this type of analysis, more years of MEPS data files may be needed. Second, the information of diabetes services, timeliness, and patient centeredness is from self-reported surveys. The recall bias and social desirability in answering questions may limit the accuracy of the data.[9, 10] Third, the timeliness and patient centeredness are for all the health care received by adults with diabetes, not the measure sets specific to diabetes care. Fourth, some other important factors such as the duration, type, and severity of diabetes were not included in the survey and study. Fifth, the MEPS is focused on civilian non-institutionalized American people which does not include the populations residing in nursing homes. This may result in underestimate of the prevalence of diagnosed diabetes among all U.S. population, and

thus may lead to inaccurate estimate for the racial and ethnic healthcare disparities. Finally, there are no health outcomes variables such as A1C, blood glucose, and lipid levels in the MEPS, the study can not identify whether the receipt of diabetes services, and timeliness and patient centeredness of health care are correlated with improved health outcomes.

Future Research

The future research can increase the sample size by pooling data of more years, at least three years, or by using the databases such as the Behavioral Risk Factor Surveillance System (BRFSS) and/or the National Health and Nutrition Examination Survey (NHANES), which include more information on the health outcomes.

Conclusions

- Racial and ethnic disparities in receipt of recommended diabetes services and patient centeredness of health care among adults with diabetes remained in the U.S. in 2005–2006.
- Age, family income, health insurance coverage, education, MSA status, and English-speaking, except gender, are important contributors to racial and ethnic disparities.

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Appendixes

Appendix A. Diabetes Care Survey

Self 2006

MEPS

Medical Expenditure Panel Survey

A Survey About Your Diabetes Care

The care of people with diabetes is an important concern of the Public Health Service. Please take a few minutes to answer the following questions on the care you received for your diabetes. Your participation is voluntary and all of your answers will be kept confidential. If you have any questions about this survey, please call Alex Scott at 1-800-945-MEPS (6377).

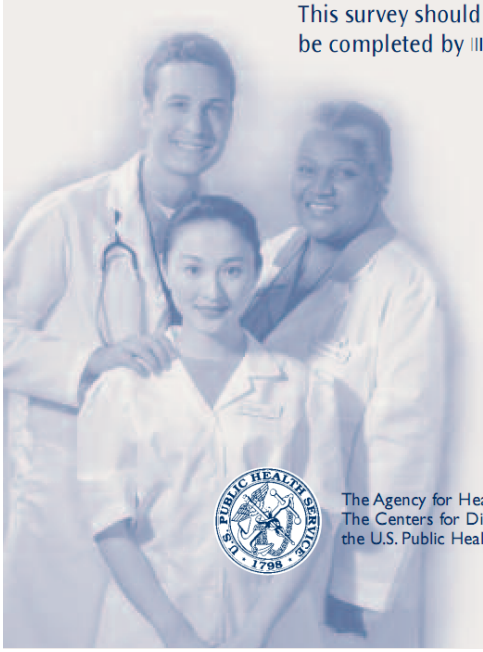
This survey should be completed by

NAME: _____

_____

DOB: _____ **PID:** _____

RUID: _____



When you have completed the survey, please fold it, seal it with this label, and place it in the envelope provided.

The Agency for Healthcare Research and Quality and The Centers for Disease Control and Prevention of the U.S. Public Health Service

OMB # 0935-0104

1

A Survey About Your Diabetes Care

Instructions: Answer every question by checking one box ☑ or filling in a number as indicated. If you are unsure about how to answer a question, please give the best answer you can.

1. Have you **ever** been told by a doctor or other health professional that you have diabetes or sugar diabetes? (CHECK ONE)

   Yes ..... ❑ 1
   ➠ **Please continue.**

   No ..... ❑ 2
   ➠ **Thank you for your time. This survey is complete.**

2. During 2005, how many times did a doctor, nurse, or other health professional check your blood for glycosylated hemoglobin or "hemoglobin A-one-C"? (FILL IN NUMBER OF TIMES)

   Number of Times ..... ____
   Did not have a blood test ..... ❑ 96
   Don't know ..... ❑ 98
   Never ..... ❑ 00

3. During 2005, how many times did a health professional check your feet for any sores or irritations? (FILL IN NUMBER OF TIMES)

   Number of Times ..... ____
   Never ..... ❑ 00

4. Which of the following year(s) did you have an eye exam in which your pupils were dilated? This would have made you temporarily sensitive to bright light. (CHECK ALL THAT APPLY)

   During 2006 ..... ❑ 1
   During 2005 ..... ❑ 2
   During 2004 ..... ❑ 3
   Before 2004 ..... ❑ 4
   Never ..... ❑ 00

5. Has your diabetes caused problems with your kidneys?

   Yes ..... ❑ 1
   No ..... ❑ 2

6. Has your diabetes caused problems with your eyes that needed to be treated by an ophthalmologist?

   Yes ..... ❑ 1
   No ..... ❑ 2

7. Is your diabetes being treated by modifying your diet?

   Yes ..... ❑ 1
   No ..... ❑ 2

8. Is your diabetes being treated by medications taken by mouth?

Yes ..... ❑ 1
No ..... ❑ 2

9. Is your diabetes being treated with insulin injections?

Yes ..... ❑ 1
No ..... ❑ 2

10. During the last 6 months, have you received any of the following to teach you how to take care of your diabetes:

Telephone call to your house

Yes ..... ❑ 1
No ..... ❑ 2

Appointment with nurse

Yes ..... ❑ 1
No ..... ❑ 2

Visit to your home

Yes ..... ❑ 1
No ..... ❑ 2

Referral to a specialist

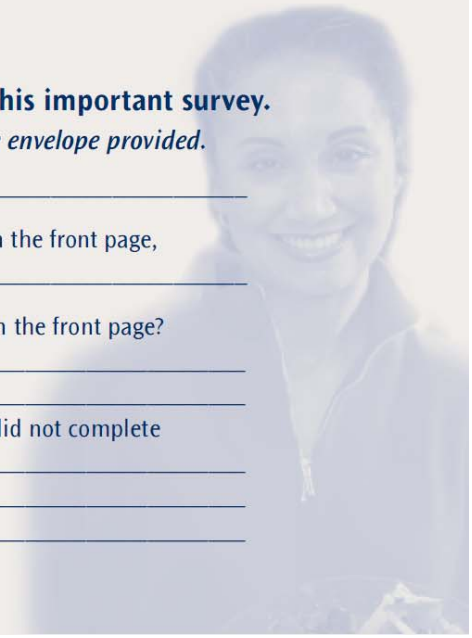
Yes ..... ❑ 1
No ..... ❑ 2

11. About how long has it been since you had your blood cholesterol checked by a doctor or other health professional?

WITHIN PAST YEAR ..... ❑ 1
WITHIN PAST 2 YEARS ..... ❑ 2
WITHIN PAST 3 YEARS ..... ❑ 3
WITHIN PAST 5 YEARS ..... ❑ 4
MORE THAN 5 YEARS ..... ❑ 5
NEVER ..... ❑ 00

12. About how long has it been since you had a flu shot?

WITHIN PAST YEAR ..... ❑ 1
WITHIN PAST 2 YEARS ..... ❑ 2
WITHIN PAST 3 YEARS ..... ❑ 3
WITHIN PAST 5 YEARS ..... ❑ 4
MORE THAN 5 YEARS ..... ❑ 5
NEVER ..... ❑ 00



Thank you for taking the time to complete this important survey.

Please remember to fold it, seal it, and place it in the envelope provided.

Date completed _____

If this survey was not completed by the person named on the front page, who completed the survey? _____

What is this person's relationship to the person named on the front page?

_____

_____

What is the reason the person named on the front page did not complete the survey himself/herself? _____

_____

_____

Appendix B. Self-Administered Questionnaire

2005

Your Health and Health Opinions

Your opinion matters!

MEPS

Medical Expenditure Panel Survey

Understanding how people feel about their health and health care is an important goal of MEPS. Please take a few minutes to answer the questions in this booklet.

Survey Instructions

- Please answer every question by checking **one** box "☑". If you are unsure about how to answer a question, please give the best answer you can.
- You are sometimes told to skip over some questions in this survey. When this happens you will see arrows that tell you what questions to answer next, like this:

1 ☐ Yes
2 ☐ No → **Skip to Question 3**

Next Question

This Booklet Should Be Completed By →

RUID: PID:

Name:

Version: DOB: Panel/ Round:

Attach label here (see back cover) →

Your participation is voluntary and all of your answers will be kept confidential. If you have any questions about this booklet, please call Alex Scott at 1-800-945-MEPS (6377).

When you have completed the booklet, please seal it with this label → and place it in the envelope provided. Have it ready to give to your interviewer at his or her next visit.

THE AGENCY FOR HEALTHCARE RESEARCH AND QUALITY AND
THE CENTERS FOR DISEASE CONTROL AND PREVENTION OF THE U.S. PUBLIC HEALTH SERVICE

OMB # 0935-0104

START HERE

Your Health Care in the Last 12 Months

1. In the last 12 months, did you have an illness, injury, or condition that needed care right away in a clinic, emergency room, or doctor's office?

1 ☐ Yes
2 ☐ No → **Skip to Question 3**

2. In the last 12 months, when you needed care right away for an illness, injury, or condition how often did you get care as soon as you wanted?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Usually
4 ☐ Always

3. A health provider could be a general doctor, a specialist doctor, a nurse practitioner, a physician assistant, a nurse, or anyone else you would see for health care.

In the last 12 months, not counting the times you needed health care right away, did you make any appointments with a doctor or other health provider for health care?

1 ☐ Yes
2 ☐ No → **Skip to Question 5**

4. In the last 12 months, not counting times you needed health care right away, how often did you get an appointment for health care as soon as you wanted?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Usually
4 ☐ Always

5. In the last 12 months (not counting times you went to an emergency room), how many times did you go to a doctor's office or clinic to get care for yourself?

0 ☐ None → **Skip to Question 13**
1 ☐ 1
2 ☐ 2
3 ☐ 3
4 ☐ 4
5 ☐ 5 to 9
6 ☐ 10 or more

6. In the last 12 months, did you or a doctor believe you needed any care, tests, or treatment?

1 ☐ Yes
2 ☐ No → **Skip to Question 8**

7. In the last 12 months, how much of a problem, if any, was it to get the care, tests, or treatment you or a doctor believed necessary?

1 ☐ A big problem
2 ☐ A small problem
3 ☐ Not a problem

8. In the last 12 months, how often did doctors or other health providers listen carefully to you?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Usually
4 ☐ Always

9. In the last 12 months, how often did doctors or other health providers explain things in a way you could understand?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Usually
4 ☐ Always

Please go to page 3 →

10. In the last 12 months, how often did doctors or other health providers show respect for what you had to say?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Usually
4 ☐ Always

11. In the last 12 months, how often did doctors or other health providers spend enough time with you?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Usually
4 ☐ Always

12. Using any number from 0 to 10 where 0 is the worst health care possible and 10 is the best health care possible, what number would you use to rate all your health care in the last 12 months?

☐ 0 Worst health care possible
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10 Best health care possible

13. Do you currently smoke?

1 ☐ Yes
2 ☐ No → **Skip to Question 15**

14. In the last 12 months did a doctor advise you to quit smoking?

1 ☐ Yes
2 ☐ No
3 ☐ Had no visits in the last 12 months

15. In the last 2 years, has your blood pressure been checked by a doctor, nurse, or other health professional?

1 ☐ Yes
2 ☐ No

Getting Health Care from a Specialist

When you answer the next questions, do not include dental visits.

16. Specialists are doctors like surgeons, heart doctors, allergy doctors, skin doctors, and others who specialize in one area of health care.

In the last 12 months, did you or a doctor think you needed to see a specialist?

1 ☐ Yes
2 ☐ No → **Skip to Question 18**

17. In the last 12 months, how much of a problem, if any, was it to see a specialist that you needed to see?

1 ☐ A big problem
2 ☐ A small problem
3 ☐ Not a problem

Please go to page 4 →

Appendix C. Institutional Review Board Approval Letter

THE UNIVERSITY OF TOLEDO
1872

The University of Toledo
Department for Human Research Protections
Social, Behavioral & Educational Institutional Review Board
Office of Research, Rm. 2300, University Hall
2801 West Bancroft Street, Mail Stop 944
Toledo, Ohio 43606-3390
Phone: 419-530-2844 Fax: 419-530-2841
(FWA00010686)

To: Monica Holiday-Goodman, Ph.D. and Yanjun Zhang
Department of Pharmacy Practice

From: Barbara K. Chesney, Ph.D., Chair
Wesley Bullock, Ph.D., Vice Chair

Signed: Wesley a Bullock **Date:** 02/20/09

Subject: IRB #106355
Title: **Racial and Ethnic Disparities in Quality of Health Care among Adults with Diabetes in the United States**

On 02/20/09, the above research was reviewed and approved as Exempt (category #4) by the Vice Chair of the University of Toledo (UT) **Social Behavioral & Educational** Institutional Review Board (IRB). The requirement to obtain a signed consent/authorization for use and disclosure of protected health information form has been waived as this research is determined to be minimal risk and a signed consent/authorization document would be the only record linking the subject to the data. It was determined that this waiver for signed consent/authorization will not adversely affect the rights and welfare of the participants. This action will be reported to the committee at its next scheduled meeting.

Please Note: A consent form is not required for this study. However an Information Sheet regarding the study should be distributed to potential participants. This Information Sheet should include the name and telephone number of a contact person in case the subjects need additional information. It is also strongly encouraged that the study be explained verbally to potential subjects.

Items Reviewed:
- IRB Application Requesting Exempt Review

Designated as EXEMPT RESEARCH on: 02/20/09

Please read the following attachment detailing Principal Investigator responsibilities.

Appendix D. Detailed Tables

Table 6-1. Receipt of recommended diabetes services—logistic regression, by race, United States (2005 MEPS) [a]

Characteristic	Odds Ratio (95% Confidence Interval)						
	A1C test [b]	Foot exam	Eye exam	All 3 services [c]	Lipid profile	Influenza immunization	All 5 services [d]
Black vs White (RG)	1.143	1.261	0.789	0.877	1.099	**0.523**	**0.570**
	(0.768, 1.702)	(0.870, 1.827)	(0.576, 1.080)	(0.645, 1.193)	(0.563, 2.143)	**(0.377, 0.723)**	**(0.391, 0.833)**
Age	**1.022**	1.006	**1.022**	1.008	**1.054**	**1.044**	**1.023**
	(1.010, 1.033)	(0.997, 1.015)	**(1.013, 1.032)**	(0.999, 1.018)	**(1.031, 1.078)**	**(1.034, 1.055)**	**(1.011, 1.036)**
Male vs female (RG)	0.860	1.024	0.885	0.874	**0.574**	0.865	0.826
	(0.642, 1.152)	(0.766, 1.369)	(0.699, 1.120)	(0.671, 1.139)	**(0.371, 0.887)**	(0.675, 1.109)	(0.597, 1.143)
Education: < high	1.071	0.714	0.826	0.765	0.548	**0.671**	**0.631**
school	(0.696, 1.649)	(0.461, 1.106)	(0.555, 1.230)	(0.531, 1.103)	(0.278, 1.077)	**(0.474, 0.950)**	**(0.417, 0.955)**

Table 6-1. Receipt of recommended diabetes services—logistic regression, by race, United States (2005 MEPS) [a] —continued (1)

Characteristic	Odds Ratio (95% Confidence Interval)						
	A1C test [b]	Foot exam	Eye exam	All 3 services [c]	Lipid profile	Influenza immunization	All 5 services [d]
High school	0.941	0.801	0.909	0.736	0.809	0.811	0.820
	(0.611, 1.449)	(0.568, 1.130)	(0.656, 1.261)	(0.536, 1.011)	(0.431, 1.520)	(0.595, 1.105)	(0.586, 1.147)
Any college (RG)	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Income:	0.931	0.758	**0.375**	**0.482**	0.488	0.986	**0.608**
Poor	(0.585, 1.484)	(0.506, 1.136)	**(0.249, 0.563)**	**(0.322, 0.723)**	(0.237, 1.005)	(0.674, 1.443)	**(0.387, 0.955)**
Low income	0.798	0.713	**0.409**	**0.490**	**0.434**	0.933	**0.532**
	(0.524, 1.215)	(0.490, 1.037)	**(0.270, 0.620)**	**(0.357, 0.671)**	**(0.227, 0.829)**	(0.635, 1.371)	**(0.357, 0.794)**
Middle income	1.064	0.833	**0.537**	**0.629**	1.012	0.896	**0.529**
	(0.728, 1.556)	(0.612, 1.133)	**(0.388, 0.743)**	**(0.468, 0.846)**	(0.458, 2.237)	(0.643, 1.249)	**(0.366, 0.765)**

Table 6-1. Receipt of recommended diabetes services—logistic regression, by race, United States (2005 MEPS) [a] —continued (2)

Characteristic	Odds Ratio (95% Confidence Interval)						
	A1C test [b]	Foot exam	Eye exam	All 3 services [c]	Lipid profile	Influenza immunization	All 5 services [d]
High income (RG)	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Uninsured vs. insured	**0.437**	0.691	**0.370**	**0.513**	**0.364**	**0.428**	0.703
(RG)	**(0.269, 0.710)**	(0.455, 1.051)	**(0.234, 0.585)**	**(0.302, 0.871)**	**(0.178, 0.743)**	**(0.276, 0.666)**	(0.363, 1.360)
Non-MSA vs MSA	1.005	0.882	**0.733**	**0.700**	0.997	0.894	0.707
(RG)	(0.701, 1.440)	(0.656, 1.186)	**(0.541, 0.992)**	**(0.525, 0.935)**	(0.552, 1.802)	(0.660, 1.211)	(0.495, 1.010)
Non-English vs English	1.440	1.201	0.690	0.907	1.118	**0.527**	**0.529**
(RG)	(0.911, 2.276)	(0.811, 1.780)	(0.446, 1.067)	(0.612, 1.345)	(0.501, 2.494)	**(0.353, 0.785)**	**(0.325, 0.860)**

[a] Bolded odds ratios and confidence intervals indicate a statistical significance. [b] All the measure sets are the test or treatment at least once in the past year, except that A1C test is at least two times in the past year and lipid profile measurement is at least one time in the past two years. [c] The "all 3 services" here means the A1C test at least twice in the past year, and annual foot and eye exams. [d] The "all 5 services" here means the A1C test at least twice in the past year, annual foot and eye exams, lipid profile measurement at least once in the past two years, and annual influenza immunization. **Data Source:** MEPS-HC, AHRQ.

Table 6-2. Receipt of recommended diabetes services—logistic regression, by race, United States (2006 MEPS) [a]

Characteristic	Odds Ratio (95% Confidence Interval)						
	A1C test [b]	Foot exam	Eye exam	All 3 services [c]	Lipid profile	Influenza immunization	All 5 services [d]
Black vs White (RG)	0.975	**1.433**	0.922	0.938	1.221	**0.656**	**0.574**
	(0.678, 1.402)	**(1.047, 1.961)**	(0.657, 1.293)	(0.659, 1.335)	(0.621, 2.401)	**(0.489, 0.881)**	**(0.419, 0.788)**
Age	**1.022**	**1.015**	**1.024**	**1.016**	**1.030**	**1.047**	**1.026**
	(1.011, 1.032)	**(1.005, 1.025)**	**(1.015, 1.033)**	**(1.007, 1.025)**	**(1.011, 1.049)**	**(1.037, 1.057)**	**(1.016, 1.036)**
Male vs female (RG)	0.862	0.973	0.990	1.075	0.866	0.819	1.002
	(0.649, 1.145)	(0.792, 1.196)	(0.777, 1.263)	(0.863, 1.339)	(0.530, 1.415)	(0.640, 1.047)	(0.782, 1.286)
Education: Less than	1.020	0.821	0.696	0.691	1.388	**0.700**	**0.587**
high school	(0.683, 1.521)	(0.562, 1.200)	(0.484, 1.001)	(0.470, 1.017)	(0.615, 3.130)	**(0.493, 0.994)**	**(0.380, 0.907)**
High school	1.054	0.854	0.928	0.900	1.729	0.887	0.773
	(0.748, 1.487)	(0.631, 1.155)	(0.666, 1.293)	(0.665, 1.216)	(0.858, 3.487)	(0.665, 1.184)	(0.566, 1.056)

Table 6-2. Receipt of recommended diabetes services—logistic regression, by race, United States (2006 MEPS) [a] —continued (1)

Characteristic	Odds Ratio (95% Confidence Interval)						
	A1C test [b]	Foot exam	Eye exam	All 3 services [c]	Lipid profile	Influenza immunization	All 5 services [d]
Any college (RG)	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Income:	0.975	0.965	0.790	0.725	0.446	0.861	**0.628**
Poor	(0.584, 1.628)	(0.639, 1.456)	(0.543, 1.150)	(0.487, 1.082)	(0.179, 1.111)	(0.591, 1.254)	**(0.408, 0.967)**
Low income	0.804	**0.689**	0.799	**0.608**	**0.381**	0.819	**0.701**
	(0.561, 1.153)	**(0.478, 0.994)**	(0.596, 1.071)	**(0.441, 0.839)**	**(0.167, 0.868)**	(0.594, 1.130)	**(0.496, 0.991)**
Middle income	1.130	1.053	1.064	0.966	0.572	0.832	0.841
	(0.788, 1.621)	(0.722, 1.535)	(0.782, 1.448)	(0.719, 1.297)	(0.231, 1.411)	(0.606, 1.143)	(0.603, 1.172)
High income (RG)	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Uninsured vs. insured	**0.691**	0.722	**0.415**	**0.617**	**0.310**	**0.575**	0.596
(RG)	**(0.445, 1.075)**	(0.493, 1.058)	**(0.278, 0.620)**	**(0.401, 0.948)**	**(0.160, 0.600)**	**(0.389, 0.851)**	(0.349, 1.016)

Table 6-2. Receipt of recommended diabetes services—logistic regression, by race, United States (2006 MEPS) [a] —continued (2)

Characteristic	Odds Ratio (95% Confidence Interval)						
	A1C test [b]	Foot exam	Eye exam	All 3 services [c]	Lipid profile	Influenza immunization	All 5 services [d]
Non-MSA vs MSA	1.115	**0.667**	**0.592**	**0.648**	0.926	0.948	0.717
(RG)	(0.770, 1.613)	**(0.478, 0.932)**	**(0.458, 0.765)**	**(0.463, 0.906)**	(0.498, 1.722)	(0.692, 1.298)	(0.509, 1.010)
Non-English vs	0.818	0.722	**0.606**	0.714	0.481	0.772	0.677
English (RG)	(0.556, 1.205)	(0.502, 1.039)	**(0.429, 0.857)**	(0.459, 1.111)	(0.228, 1.012)	(0.530, 1.124)	(0.388, 1.181)

[a] Other than White and Black (or African American), data do not meet the criteria for statistical reliability, data quality, or confidentiality for the following racial groups: Asian, Native Hawaiian or Other Pacific Islander (NHOPI), American Indian or Alaska Native (AI/AN), and people of more than one race. Bolded odds ratios and confidence intervals indicate a statistical significance at the alpha level of 0.05.

[b] All the measure sets are the test or treatment at least once in the past year, except that A1C test is at least two times in the past year and lipid profile measurement is at least one time in the past two years.

[c] The "all 3 services" here means the A1C test at least twice in the past year, and annual foot and eye exams.

[d] The "all 5 services" here means the A1C test at least twice in the past year, annual foot and eye exams, lipid profile measurement at least once in the past two years, and annual influenza immunization.

Data Source: Medical Expenditure Panel Survey Household Component (MEPS-HC), Agency for Healthcare Research and Quality (AHRQ).

Table 6-3. Receipt of recommended diabetes services—logistic regression, by race, United States (2005–2006 MEPS) [a]

Characteristic	Odds Ratio (95% Confidence Interval)						
	A1C test [b]	Foot exam	Eye exam	All 3 services [c]	Lipid profile	Influenza immunization	All 5 services [d]
Black vs White (RG)	1.069	**1.340**	0.858	0.910	1.179	**0.590**	**0.571**
	(0.805, 1.421)	**(1.022, 1.759)**	(0.662, 1.111)	(0.691, 1.198)	(0.758, 1.833)	**(0.466, 0.747)**	**(0.444, 0.735)**
Age	**1.021**	**1.011**	**1.023**	**1.012**	**1.041**	**1.045**	**1.025**
	(1.013, 1.030)	**(1.003, 1.018)**	**(1.016, 1.029)**	**(1.005, 1.019)**	**(1.023, 1.060)**	**(1.037, 1.053)**	**(1.016, 1.033)**
Male vs female (RG)	0.866	1.002	0.942	0.980	0.724	0.847	0.918
	(0.686, 1.094)	(0.828, 1.214)	(0.792, 1.122)	(0.817, 1.176)	(0.501, 1.047)	(0.693, 1.035)	(0.741, 1.136)
Education:							
Less than high	1.054	0.778	0.760	**0.731**	0.912	**0.684**	**0.605**
school	(0.763, 1.455)	(0.569, 1.064)	(0.577, 1.000)	**(0.546, 0.979)**	(0.463, 1.795)	**(0.518, 0.902)**	**(0.446, 0.821)**

Table 6-3. Receipt of recommended diabetes services—logistic regression, by race, United States (2005–06 MEPS) [a] —continued (1)

Characteristic	Odds Ratio (95% Confidence Interval)						
	A1C test [b]	Foot exam	Eye exam	All 3 services [c]	Lipid profile	Influenza immunization	All 5 services [d]
High school	1.015	0.840	0.924	0.825	0.228	0.849	0.791
	(0.744, 1.383)	(0.649, 1.088)	(0.726, 1.175)	(0.643, 1.057)	(0.681, 2.216)	(0.673, 1.070)	(0.621, 1.008)
Any college (RG)	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Income:	0.919	0.847	**0.551**	**0.593**	**0.454**	0.921	**0.627**
Poor	(0.636, 1.328)	(0.640, 1.122)	**(0.419, 0.723)**	**(0.441, 0.798)**	**(0.227, 0.909)**	(0.698, 1.215)	**(0.460, 0.854)**
Low income	0.794	**0.697**	**0.579**	**0.550**	**0.404**	0.872	**0.615**
	(0.575, 1.097)	**(0.542, 0.896)**	**(0.449, 0.747)**	**(0.433, 0.697)**	**(0.229, 0.712)**	(0.669, 1.136)	**(0.468, 0.808)**
Middle income	1.062	0.934	**0.755**	**0.776**	0.749	0.862	**0.680**
	(0.794, 1.421)	(0.728, 1.197)	**(0.606, 0.941)**	**(0.618, 0.974)**	(0.406, 1.382)	(0.675, 1.100)	**(0.533, 0.867)**

Table 6-3. Receipt of recommended diabetes services—logistic regression, by race, United States (2005–06 MEPS) [a] —continued (2)

Characteristic	Odds Ratio (95% Confidence Interval)						
	A1C test [b]	Foot exam	Eye exam	All 3 services [c]	Lipid profile	Influenza immunization	All 5 services [d]
High income (RG)	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Uninsured vs. insured	**0.552**	**0.703**	**0.398**	**0.574**	**0.338**	**0.502**	0.651
(RG)	**(0.392, 0.779)**	**(0.520, 0.949)**	**(0.290, 0.547)**	**(0.402, 0.821)**	**(0.210, 0.544)**	**(0.364, 0.691)**	(0.423, 1.002)
Non-MSA vs MSA	1.070	0.767	**0.664**	**0.674**	0.985	0.924	**0.708**
(RG)	(0.828, 1.383)	(0.586, 1.005)	**(0.527, 0.838)**	**(0.530, 0.856)**	(0.614, 1.581)	(0.711, 1.200)	**(0.541, 0.926)**
Non-English vs	1.070	0.927	**0.655**	0.807	0.702	**0.635**	**0.604**
English (RG)	(0.766, 1.495)	(0.684, 1.255)	**(0.493, 0.870)**	(0.587, 1.111)	(0.375, 1.312)	**(0.483, 0.835)**	**(0.407, 0.898)**

[a] Bolded odds ratios and confidence intervals indicate a statistical significance. [b] All the measure sets are the test or treatment at least once in the past year, except that A1C test is at least two times in the past year and lipid profile measurement is at least one time in the past two years. [c] The "all 3 services" here means the A1C test at least twice in the past year, and annual foot and eye exams. [d] The "all 5 services" here means the A1C test at least twice in the past year, annual foot and eye exams, lipid profile measurement at least once in the past two years, and annual influenza immunization. **Data Source:** MEPS-HC, AHRQ.

Table 8-1. Receipt of recommended diabetes services—logistic regression, by ethnicity, United States (2005 MEPS)

Characteristic	Odds Ratio (95% Confidence Interval) [a]						
	A1C test	Foot exam	Eye exam	All 3 services	Lipid profile	Influenza immunization	All 5 services
Ethnicity: NHBs vs NHWs	1.102	1.192	0.775	0.858	0.943	**0.521**	**0.542**
(RG)	(0.727, 1.669)	(0.812, 1.750)	(0.554, 1.083)	(0.623, 1.182)	(0.470, 1.890)	**(0.372, 0.730)**	**(0.368, 0.796)**
Hispanics	0.712	0.762	0.998	0.857	**0.443**	0.942	0.678
	(0.468, 1.084)	(0.501, 1.159)	(0.638, 1.561)	(0.556, 1.318)	**(0.248, 0.792)**	(0.581, 1.525)	(0.417, 1.102)
NHWs (RG)	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Age	**1.021**	1.004	**1.021**	1.007	**1.053**	**1.044**	**1.022**
	(1.010, 1.032)	(0.996, 1.013)	**(1.012, 1.031)**	(0.998, 1.017)	**(1.030, 1.077)**	**(1.034, 1.055)**	**(1.010, 1.034)**
Male vs female (RG)	0.866	1.039	0.889	0.881	**0.583**	0.866	0.833
	(0.647, 1.160)	(0.779, 1.385)	(0.701, 1.127)	(0.676, 1.148)	**(0.378, 0.899)**	(0.676, 1.109)	(0.602, 1.151)

Table 8-1. Receipt of recommended diabetes services—logistic regression, by ethnicity, United States (2005 MEPS) —continued (1)

Characteristic	Odds Ratio (95% Confidence Interval) [a]						
	A1C test	Foot exam	Eye exam	All 3 services	Lipid profile	Influenza immunization	All 5 services
Education:	1.148	0.780	0.861	0.798	0.596	**0.676**	0.670
Less than a high school	(0.739, 1.784)	(0.500, 1.218)	(0.572, 1.297)	(0.548, 1.160)	(0.300, 1.181)	**(0.473, 0.966)**	(0.440, 1.021)
High school	0.993	0.839	0.925	0.758	0.833	0.815	0.844
	(0.649, 1.520)	(0.594, 1.184)	(0.669, 1.279)	(0.552, 1.040)	(0.441, 1.574)	(0.598, 1.111)	(0.602, 1.183)
Any college (RG)	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Income:	0.926	0.785	**0.381**	**0.493**	0.503	0.981	**0.627**
Poor	(0.584, 1.471)	(0.527, 1.169)	**(0.255, 0.571)**	**(0.330, 0.737)**	(0.243, 1.044)	(0.670, 1.436)	**(0.399, 0.984)**
Low income	0.780	0.733	**0.415**	**0.498**	**0.440**	0.926	**0.546**
	(0.513, 1.186)	(0.504, 1.064)	**(0.275, 0.626)**	**(0.366, 0.678)**	**(0.225, 0.863)**	(0.631, 1.357)	**(0.368, 0.810)**

Table 8-1. Receipt of recommended diabetes services—logistic regression, by ethnicity, United States (2005 MEPS) —continued (2)

Characteristic	Odds Ratio (95% Confidence Interval) [a]						
	A1C test	Foot exam	Eye exam	All 3 services	Lipid profile	Influenza immunization	All 5 services
Middle income	1.035	0.846	**0.539**	**0.631**	1.018	0.893	**0.533**
	(0.709, 1.510)	(0.623, 1.148)	**(0.390, 0.745)**	**(0.469, 0.849)**	(0.465, 2.226)	(0.642, 1.243)	**(0.367, 0.774)**
High income (RG)	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Uninsured vs. insured (RG)	**0.473**	0.711	**0.379**	**0.537**	**0.382**	**0.432**	0.737
	(0.295, 0.758)	(0.469, 1.077)	**(0.238, 0.603)**	**(0.317, 0.908)**	**(0.194, 0.750)**	**(0.278, 0.671)**	(0.387, 1.406)
Non-MSA vs MSA (RG)	1.025	0.873	0.745	**0.705**	0.879	0.893	0.698
	(0.716, 1.466)	(0.647, 1.178)	(0.548, 1.012)	**(0.526, 0.946)**	(0.481, 1.607)	(0.658, 1.213)	(0.485, 1.006)
Non-English vs English	**1.696**	1.265	0.628	0.920	1.869	**0.553**	0.594
(RG)	**(1.007, 2.855)**	(0.780, 2.052)	(0.353, 1.118)	(0.554, 1.529)	(0.812, 4.304)	**(0.341, 0.897)**	(0.332, 1.063)

[a] Bolded odds ratios and confidence intervals indicate a statistical significance at alpha = 0.05. **Data Source:** MEPS-HC, AHRQ.

Table 8-2. Receipt of recommended diabetes services—logistic regression, by ethnicity, United States (2006 MEPS)

Characteristic	Odds Ratio (95% Confidence Interval) [a]						
	A1C test	Foot exam	Eye exam	All 3 services	Lipid profile	Influenza immunization	All 5 services
Ethnicity: NHBs	1.008	**1.400**	0.914	0.929	1.405	**0.632**	**0.572**
	(0.692, 1.468)	**(1.017, 1.927)**	(0.649, 1.286)	(0.653, 1.322)	(0.683, 2.892)	**(0.468, 0.854)**	**(0.418, 0.783)**
Hispanics	1.414	0.809	0.755	0.876	2.212	**0.600**	0.931
	(0.933, 2.144)	(0.518, 1.262)	(0.498, 1.144)	(0.601, 1.276)	(0.625, 7.824)	**(0.398, 0.904)**	(0.625, 1.388)
NHWs (RG)	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Age	**1.022**	**1.015**	**1.023**	**1.015**	**1.032**	**1.045**	**1.025**
	(1.012, 1.033)	**(1.005, 1.025)**	**(1.014, 1.032)**	**(1.006, 1.024)**	**(1.015, 1.050)**	**(1.035, 1.055)**	**(1.015, 1.036)**
Male vs female (RG)	0.863	0.970	0.983	1.071	0.896	0.814	0.997
	(0.649, 1.148)	(0.789, 1.194)	(0.772, 1.251)	(0.859, 1.334)	(0.552, 1.454)	(0.634, 1.045)	(0.777, 1.280)

Table 8-2. Receipt of recommended diabetes services—logistic regression, by ethnicity, United States (2006 MEPS) —continued (1)

Characteristic	Odds Ratio (95% Confidence Interval) [a]						
	A1C test	Foot exam	Eye exam	All 3 services	Lipid profile	Influenza immunization	All 5 services
Education:	0.989	0.857	0.726	0.716	1.259	0.751	**0.610**
Less than a high school	(0.660, 1.483)	(0.583, 1.260)	(0.503, 1.047)	(0.482, 1.064)	(0.601, 2.638)	(0.523, 1.078)	**(0.392, 0.949)**
High school	1.050	0.865	0.942	0.906	1.668	0.904	0.776
	(0.744, 1.482)	(0.639, 1.171)	(0.676, 1.312)	(0.669, 1.226)	(0.858, 3.241)	(0.677, 1.206)	(0.569, 1.060)
Any college (RG)	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Income:	0.953	0.978	0.796	0.730	0.424	0.870	**0.632**
Poor	(0.570, 1.592)	(0.648, 1.475)	(0.547, 1.160)	(0.490, 1.087)	(0.171, 1.050)	(0.599, 1.265)	**(0.414, 0.964)**
Low income	0.800	0.697	0.800	**0.611**	**0.380**	0.836	**0.698**
	(0.556, 1.149)	(0.483, 1.006)	(0.597, 1.073)	**(0.443, 0.843)**	**(0.169, 0.853)**	(0.606, 1.153)	**(0.495, 0.985)**

Table 8-2. Receipt of recommended diabetes services—logistic regression, by ethnicity, United States (2006 MEPS) —continued (2)

Characteristic	Odds Ratio (95% Confidence Interval) [a]						
	A1C test	Foot exam	Eye exam	All 3 services	Lipid profile	Influenza immunization	All 5 services
Middle income	1.111	1.053	1.059	0.963	0.583	0.837	0.846
	(0.774, 1.594)	(0.723, 1.534)	(0.776, 1.445)	(0.717, 1.295)	(0.243, 1.397)	(0.607, 1.153)	(0.606, 1.181)
High income (RG)	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Uninsured vs. insured (RG)	0.682	0.740	**0.421**	**0.628**	**0.295**	**0.596**	0.607
	(0.439, 1.059)	(0.508, 1.076)	**(0.284, 0.624)**	**(0.411, 0.961)**	**(0.152, 0.574)**	**(0.403, 0.880)**	(0.354, 1.039)
Non-MSA vs MSA (RG)	1.146	**0.658**	**0.573**	**0.640**	0.993	0.907	0.713
	(0.796, 1.650)	**(0.472, 0.917)**	**(0.439, 0.748)**	**(0.454, 0.903)**	(0.537, 1.838)	(0.657, 1.252)	(0.503, 1.011)
Non-English vs English	**0.613**	0.793	0.738	0.736	**0.274**	1.058	0.657
(RG)	**(0.384, 0.980)**	(0.486, 1.294)	(0.463, 1.174)	(0.451, 1.200)	**(0.077, 0.977)**	(0.673, 1.661)	(0.370, 1.166)

[a] Bolded odds ratios and confidence intervals indicate a statistical significance at alpha = 0.05. **Data Source:** MEPS-HC, AHRQ.

Table 8-3. Receipt of recommended diabetes services—logistic regression, by ethnicity, United States (2005–2006 MEPS)

Characteristic	Odds Ratio (95% Confidence Interval) [a]						
	A1C test	Foot exam	Eye exam	All 3 services	Lipid profile	Influenza immunization	All 5 services
Ethnicity: NHBs	1.061	1.289	0.849	0.895	1.168	**0.579**	**0.558**
	(0.786, 1.433)	(0.972, 1.708)	(0.648, 1.114)	(0.675, 1.187)	(0.746, 1.830)	**(0.452, 0.741)**	**(0.431, 0.721)**
Hispanics	0.949	0.785	0.880	0.863	0.828	0.768	0.806
	(0.678, 1.329)	(0.560, 1.101)	(0.634, 1.223)	(0.631, 1.180)	(0.432, 1.590)	(0.538, 1.096)	(0.585, 1.111)
NHWs (RG)	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Age	**1.021**	**1.010**	**1.022**	**1.011**	**1.041**	**1.045**	**1.024**
	(1.013, 1.030)	**(1.002, 1.017)**	**(1.015, 1.029)**	**(1.004, 1.019)**	**(1.024, 1.059)**	**(1.037, 1.053)**	**(1.015, 1.032)**
Male vs female (RG)	0.868	1.004	0.943	0.983	0.726	0.846	0.919
	(0.688, 1.096)	(0.828, 1.218)	(0.791, 1.123)	(0.818, 1.180)	(0.503, 1.046)	(0.692, 1.035)	(0.741, 1.139)

Table 8-3. Receipt of diabetes services—logistic regression, by ethnicity, United States (2005–2006 MEPS) —continued (1)

Characteristic	Odds Ratio (95% Confidence Interval) [a]						
	A1C test	Foot exam	Eye exam	All 3 services	Lipid profile	Influenza immunization	All 5 services
Education:	1.079	0.826	0.783	0.761	0.920	**0.710**	**0.635**
Less than a high school	(0.776, 1.500)	(0.599, 1.140)	(0.588, 1.042)	(0.561, 1.032)	(0.484, 1.749)	**(0.537, 0.939)**	**(0.462, 0.873)**
High school	1.027	0.860	0.932	0.837	1.228	0.860	0.802
	(0.755, 1.398)	(0.662, 1.117)	(0.732, 1.185)	(0.651, 1.075)	(0.688, 2.190)	(0.683, 1.084)	(0.625, 1.029)
Any college (RG)	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Income:	0.924	0.866	**0.554**	**0.601**	**0.457**	0.925	**0.635**
Poor	(0.643, 1.330)	(0.655, 1.145)	**(0.421, 0.729)**	**(0.448, 0.806)**	**(0.226, 0.924)**	(0.699, 1.224)	**(0.468, 0.863)**
Low income	0.789	**0.708**	**0.582**	**0.554**	**0.410**	0.877	**0.621**
	(0.573, 1.088)	**(0.551, 0.909)**	**(0.452, 0.751)**	**(0.437, 0.701)**	**(0.231, 0.729)**	(0.672, 1.145)	**(0.473, 0.815)**

Table 8-3. Receipt of diabetes services—logistic regression, by ethnicity, United States (2005–2006 MEPS) —continued (2)

Characteristic	Odds Ratio (95% Confidence Interval) [a]						
	A1C test	Foot exam	Eye exam	All 3 services	Lipid profile	Influenza immunization	All 5 services
Middle income	1.066	0.940	**0.759**	**0.783**	0.752	0.864	**0.688**
	(0.797, 1.425)	(0.735, 1.203)	**(0.609, 0.946)**	**(0.624, 0.982)**	(0.407, 1.388)	(0.676, 1.105)	**(0.538, 0.880)**
High income (RG)	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Uninsured vs. insured (RG)	**0.564**	**0.723**	**0.404**	**0.588**	**0.342**	**0.513**	0.669
	(0.401, 0.793)	**(0.537, 0.973)**	**(0.295, 0.555)**	**(0.412, 0.840)**	**(0.213, 0.550)**	**(0.372, 0.708)**	(0.434, 1.032)
Non-MSA vs MSA (RG)	1.086	**0.759**	**0.662**	**0.674**	0.960	0.905	**0.707**
	(0.839, 1.405)	**(0.578, 0.996)**	**(0.521, 0.842)**	**(0.527, 0.861)**	(0.598, 1.539)	(0.692, 1.184)	**(0.536, 0.933)**
Non-English vs English	1.070	1.003	**0.687**	0.830	0.804	0.740	**0.633**
(RG)	(0.731, 1.567)	(0.679, 1.481)	**(0.472, 0.999)**	(0.562, 1.227)	(0.346, 1.869)	(0.518, 1.058)	**(0.404, 0.992)**

[a] Bolded odds ratios and confidence intervals indicate a statistical significance at alpha = 0.05. **Data Source:** MEPS-HC, AHRQ.

Table 14-1. Patient centeredness of health care among adults with diabetes—logistic regression, by race, United States (2005 MEPS) [a]

Characteristic	Odds Ratio (95% Confidence Interval) [b]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
Black vs White (RG)	1.299	0.713	**0.581**	0.765	0.755
	(0.768, 2.198)	(0.431, 1.182)	**(0.380, 0.888)**	(0.515, 1.136)	(0.529, 1.077)
Age	1.011	1.006	1.014	1.009	1.010
	(0.997, 1.026)	(0.991, 1.021)	(0.998, 1.030)	(0.994, 1.024)	(0.997, 1.023)
Male vs female (RG)	0.925	1.128	0.834	0.985	1.008
	(0.615, 1.389)	(0.775, 1.643)	(0.576, 1.208)	(0.697, 1.391)	(0.735, 1.382)
Education:	0.713	0.510	0.696	0.863	0.722
Less than high school	(0.333, 1.525)	(0.247, 1.050)	(0.360, 1.346)	(0.465, 1.603)	(0.402, 1.298)

Table 14-1. Patient centeredness of health care—logistic regression, by race, United States (2005 MEPS) [a] —continued (1)

Characteristic	Odds Ratio (95% Confidence Interval) [b]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
High school	0.850	0.701	0.828	0.667	0.756
	(0.488, 1.480)	(0.385, 1.277)	(0.472, 1.453)	(0.413, 1.076)	(0.476, 1.201)
Any college (RG)	1.000	1.000	1.000	1.000	1.000
Income:	**0.335**	0.682	0.651	**0.532**	**0.574**
Poor	**(0.162, 0.693)**	(0.354, 1.313)	(0.332, 1.276)	**(0.298, 0.949)**	**(0.338, 0.973)**
Low income	**0.378**	**0.587**	0.627	0.638	**0.533**
	(0.211, 0.676)	**(0.352, 0.979)**	(0.354, 1.108)	(0.396, 1.027)	**(0.344, 0.825)**
Middle income	**0.474**	0.800	0.786	**0.482**	**0.540**
	(0.274, 0.820)	(0.461, 1.387)	(0.469, 1.316)	**(0.311, 0.746)**	**(0.360, 0.811)**

Table 14-1. Patient centeredness of health care—logistic regression, by race, United States (2005 MEPS) [a] —continued (2)

Characteristic	Odds Ratio (95% Confidence Interval) [b]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
High income (RG)	1.000	1.000	1.000	1.000	1.000
Uninsured vs. insured	0.637	**0.433**	**0.347**	**0.394**	**0.411**
(RG)	(0.298, 1.361)	**(0.228, 0.819)**	**(0.173, 0.693)**	**(0.224, 0.694)**	**(0.246, 0.685)**
Non-MSA vs MSA (RG)	1.002	1.195	1.112	1.127	1.117
	(0.630, 1.594)	(0.798, 1.788)	(0.729, 1.695)	(0.751, 1.691)	(0.762, 1.637)
Non-English vs English	1.593	1.203	1.577	**2.268**	1.360
(RG)	(0.820, 3.094)	(0.653, 2.214)	(0.863, 2.882)	**(1.185, 4.339)**	(0.833, 2.220)

[a] Other than White and Black (or African American), data do not meet the criteria for statistical reliability, data quality, or confidentiality for the following racial groups: Asian, Native Hawaiian or Other Pacific Islander (NHOPI), American Indian or Alaska Native (AI/AN), and people of more than one race.

[b] Bolded odds ratios and confidence intervals indicate a statistical significance at the alpha level of 0.05.

Data Source: Medical Expenditure Panel Survey Household Component (MEPS-HC), AHRQ.

Table 14-2. Patient centeredness of health care among adults with diabetes—logistic regression, by race, United States (2006 MEPS) [a]

Characteristic	Odds Ratio (95% Confidence Interval) [b]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
Black vs White (RG)	1.725	0.921	0.992	0.895	0.839
	(0.993, 2.999)	(0.565, 1.501)	(0.552, 1.782)	(0.574, 1.396)	(0.572, 1.230)
Age	1.007	1.013	1.009	**1.020**	**1.016**
	(0.992, 1.023)	(0.996, 1.030)	(0.993, 1.025)	**(1.005, 1.036)**	**(1.002, 1.030)**
Male vs female (RG)	0.956	1.083	1.060	1.157	1.153
	(0.624, 1.464)	(0.700, 1.676)	(0.682, 1.647)	(0.816, 1.641)	(0.860, 1.547)
Education:	0.978	0.932	1.110	1.162	0.763
Less than a high school	(0.480, 1.993)	(0.506, 1.717)	(0.551, 2.235)	(0.639, 2.114)	(0.442, 1.317)

Table 14-2. Patient centeredness of health care—logistic regression, by race, United States (2006 MEPS) [a] —continued (1)

Characteristic	Odds Ratio (95% Confidence Interval) [b]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
High school	1.144	0.857	1.205	1.262	0.962
	(0.651, 2.009)	(0.516, 1.423)	(0.660, 2.200)	(0.793, 2.008)	(0.622, 1.487)
Any college (RG)	1.000	1.000	1.000	1.000	1.000
Income:	**0.372**	**0.299**	**0.409**	**0.532**	**0.562**
Poor	**(0.197, 0.703)**	**(0.154, 0.579)**	**(0.212, 0.788)**	**(0.306, 0.926)**	**(0.334, 0.947)**
Low income	**0.409**	**0.449**	**0.448**	0.657	**0.615**
	(0.216, 0.775)	**(0.241, 0.835)**	**(0.216, 0.931)**	(0.402, 1.071)	**(0.390, 0.971)**
Middle income	**0.492**	0.607	0.667	0.925	0.815
	(0.276, 0.875)	(0.343, 1.073)	(0.351, 1.269)	(0.577, 1.481)	(0.533, 1.247)

Table 14-2. Patient centeredness of health care—logistic regression, by race, United States (2006 MEPS) [a] —continued (2)

Characteristic	Odds Ratio (95% Confidence Interval) [b]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
High income (RG)	1.000	1.000	1.000	1.000	1.000
Uninsured vs. insured (RG)	1.238 (0.566, 2.710)	1.259 (0.622, 2.546)	1.457 (0.666, 3.183)	1.049 (0.540, 2.037)	0.960 (0.544, 1.694)
Non-MSA vs MSA (RG)	**1.968 (1.060, 3.653)**	**1.710 (1.021, 2.865)**	**2.203 (1.065, 4.556)**	1.482 (0.982, 2.238)	**1.578 (1.073, 2.319)**
Non-English vs English (RG)	1.672 (0.884, 3.163)	0.835 (0.469, 1.488)	1.144 (0.618, 2.119)	**1.874 (1.029, 3.414)**	1.394 (0.863, 2.253)

[a] Other than White and Black (or African American), data do not meet the criteria for statistical reliability, data quality, or confidentiality for the following racial groups: Asian, Native Hawaiian or Other Pacific Islander (NHOPI), American Indian or Alaska Native (AI/AN), and people of more than one race.

[b] Bolded odds ratios and confidence intervals indicate a statistical significance at the alpha level of 0.05.

Data Source: Medical Expenditure Panel Survey Household Component (MEPS-HC), AHRQ.

Table 14-3. Patient centeredness of health care—logistic regression, by race, United States (2005–2006 MEPS) [a]

Characteristic	Odds Ratio (95% Confidence Interval) [b]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
Black vs White (RG)	**1.521**	0.815	0.776	0.846	0.796
	(1.007, 2.296)	(0.555, 1.196)	(0.529, 1.137)	(0.603, 1.187)	(0.599, 1.058)
Age	1.009	1.009	1.011	**1.015**	**1.013**
	(0.998, 1.021)	(0.997, 1.022)	(0.999, 1.024)	**(1.002, 1.028)**	**(1.002, 1.024)**
Male vs female (RG)	0.940	1.110	0.942	1.054	1.079
	(0.705, 1.252)	(0.822, 1.499)	(0.706, 1.257)	(0.805, 1.380)	(0.854, 1.363)
Education:	0.852	0.690	0.898	1.067	0.767
Less than a high school	(0.482, 1.506)	(0.413, 1.152)	(0.523, 1.543)	(0.653, 1.742)	(0.488, 1.204)

Table 14-3. Patient centeredness of health care—logistic regression, by race, United States (2005–2006 MEPS) [a] —continued (1)

Characteristic	Odds Ratio (95% Confidence Interval) [b]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
High school	1.006	0.788	1.020	0.965	0.879
	(0.657, 1.540)	(0.500, 1.241)	(0.655, 1.588)	(0.656, 1.419)	(0.607, 1.274)
Any college (RG)	1.000	1.000	1.000	1.000	1.000
Income:	**0.361**	**0.456**	**0.521**	**0.550**	**0.577**
Poor	**(0.216, 0.603)**	**(0.278, 0.748)**	**(0.326, 0.833)**	**(0.363, 0.834)**	**(0.389, 0.858)**
Low income	**0.401**	**0.511**	**0.531**	**0.655**	**0.584**
	(0.256, 0.628)	**(0.333, 0.785)**	**(0.326, 0.865)**	**(0.454, 0.946)**	**(0.415, 0.821)**
Middle income	**0.497**	0.692	0.728	**0.674**	**0.664**
	(0.327, 0.754)	(0.449, 1.065)	(0.480, 1.105)	**(0.469, 0.969)**	**(0.477, 0.925)**

Table 14-3. Patient centeredness of health care—logistic regression, by race, United States (2005–2006 MEPS) [a] —continued (2)

Characteristic	Odds Ratio (95% Confidence Interval) [b]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
High income (RG)	1.000	1.000	1.000	1.000	1.000
Uninsured vs. insured	0.850	0.703	0.632	**0.637**	**0.628**
(RG)	(0.478, 1.510)	(0.430, 1.152)	(0.381, 1.050)	**(0.419, 0.969)**	**(0.429, 0.920)**
Non-MSA vs MSA (RG)	1.384	1.392	1.496	1.262	1.293
	(0.931, 2.058)	(0.968, 2.001)	(0.974, 2.299)	(0.924, 1.724)	(0.977, 1.712)
Non-English vs English	**1.667**	0.996	1.378	**2.053**	1.405
(RG)	**(1.015, 2.739)**	(0.642, 1.544)	(0.857, 2.217)	**(1.269, 3.320)**	(0.978, 2.017)

[a] Other than White and Black (or African American), data do not meet the criteria for statistical reliability, data quality, or confidentiality for the following racial groups: Asian, Native Hawaiian or Other Pacific Islander (NHOPI), American Indian or Alaska Native (AI/AN), and people of more than one race.

[b] Bolded odds ratios and confidence intervals indicate a statistical significance at the alpha level of 0.05.

Data Source: Medical Expenditure Panel Survey Household Component (MEPS-HC), AHRQ.

Table 16-1. Patient centeredness of health care—logistic regression, by ethnicity, United States (2005 MEPS)

Characteristic	Odds Ratio (95% Confidence Interval) [a]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
Ethnicity: NHBs	1.363	0.643	**0.581**	0.751	0.702
	(0.801, 2.319)	(0.385, 1.073)	**(0.365, 0.925)**	(0.493, 1.144)	(0.484, 1.018)
Hispanics	1.148	**0.481**	0.901	0.657	**0.547**
	(0.450, 2.925)	**(0.261, 0.888)**	(0.350, 2.319)	(0.386, 1.118)	**(0.310, 0.964)**
NHWs (RG)	1.000	1.000	1.000	1.000	1.000
Age	1.012	1.005	1.014	1.009	1.009
	(0.997, 1.027)	(0.990, 1.021)	(0.998, 1.030)	(0.994, 1.024)	(0.996, 1.023)
Male vs female (RG)	0.908	1.129	0.827	0.980	1.013
	(0.607, 1.357)	(0.774, 1.649)	(0.576, 1.188)	(0.696, 1.379)	(0.739, 1.388)

Table 16-1. Patient centeredness of health care—logistic regression, by ethnicity, United States (2005 MEPS) —continued (1)

Characteristic	Odds Ratio (95% Confidence Interval) [a]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
Education:	0.683	0.535	0.684	0.875	0.762
Less than a high school	(0.317, 1.474)	(0.259, 1.104)	(0.347, 1.348)	(0.469, 1.633)	(0.419, 1.384)
High school	0.843	0.709	0.822	0.672	0.768
	(0.485, 1.465)	(0.391, 1.285)	(0.467, 1.446)	(0.417, 1.082)	(0.484, 1.220)
Any college (RG)	1.000	1.000	1.000	1.000	1.000
Income:	**0.333**	0.694	0.659	**0.537**	**0.588**
Poor	**(0.164, 0.674)**	(0.357, 1.348)	(0.339, 1.284)	**(0.305, 0.948)**	**(0.349, 0.990)**
Low income	**0.386**	0.606	0.649	0.652	**0.547**
	(0.216, 0.690)	(0.362, 1.014)	(0.370, 1.141)	(0.404, 1.054)	**(0.352, 0.852)**

Table 16-1. Patient centeredness of health care—logistic regression, by ethnicity, United States (2005 MEPS) —continued (2)

Characteristic	Odds Ratio (95% Confidence Interval) [a]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
Middle income	**0.485**	0.803	0.816	**0.490**	**0.546**
	(0.279, 0.842)	(0.466, 1.383)	(0.490, 1.360)	**(0.318, 0.756)**	**(0.363, 0.821)**
High income (RG)	1.000	1.000	1.000	1.000	1.000
Uninsured vs. insured (RG)	0.643	**0.456**	**0.354**	**0.409**	**0.425**
	(0.295, 1.403)	**(0.240, 0.864)**	**(0.175, 0.718)**	**(0.230, 0.729)**	**(0.252, 0.715)**
Non-MSA vs MSA (RG)	0.984	1.117	1.082	1.082	1.073
	(0.615, 1.574)	(0.747, 1.670)	(0.704, 1.662)	(0.720, 1.626)	(0.735, 1.567)
Non-English vs English	1.498	1.911	1.707	**3.028**	**1.958**
(RG)	(0.588, 3.815)	(0.911, 4.010)	(0.728, 4.005)	**(1.468, 6.247)**	**(1.044, 3.673)**

[a] Bolded odds ratios and confidence intervals indicate a statistical significance at alpha = 0.05. **Data Source:** MEPS-HC, AHRQ.

Table 16-2. Patient centeredness of health care—logistic regression, by ethnicity, United States (2006 MEPS)

Characteristic	Odds Ratio (95% Confidence Interval) [a]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
Ethnicity: NHBs	1.620	1.002	1.088	0.923	0.866
	(0.923, 2.842)	(0.605, 1.659)	(0.563, 2.104)	(0.572, 1.487)	(0.574, 1.307)
Hispanics	0.802	**0.540**	0.752	0.747	0.661
	(0.386, 1.667)	**(0.311, 0.937)**	(0.377, 1.498)	(0.436, 1.278)	(0.380, 1.150)
NHWs (RG)	1.000	1.000	1.000	1.000	1.000
Age	1.007	1.012	1.008	**1.020**	**1.016**
	(0.992, 1.022)	(0.995, 1.030)	(0.992, 1.024)	**(1.005, 1.035)**	**(1.002, 1.029)**
Male vs female (RG)	0.951	1.084	1.051	1.144	1.143
	(0.621, 1.455)	(0.703, 1.669)	(0.678, 1.629)	(0.805, 1.626)	(0.851, 1.536)

Table 16-2. Patient centeredness of health care—logistic regression, by ethnicity, United States (2006 MEPS) —continued (1)

Characteristic	Odds Ratio (95% Confidence Interval) [a]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
Education:	0.999	0.986	1.133	1.186	0.794
Less than a high school	(0.482, 2.070)	(0.536, 1.812)	(0.560, 2.293)	(0.652, 2.155)	(0.462, 1.365)
High school	1.146	0.894	1.206	1.297	1.001
	(0.655, 2.007)	(0.544, 1.468)	(0.662, 2.198)	(0.818, 2.056)	(0.653, 1.533)
Any college (RG)	1.000	1.000	1.000	1.000	1.000
Income:	**0.380**	**0.293**	**0.404**	**0.526**	**0.555**
Poor	**(0.201, 0.718)**	**(0.151, 0.570)**	**(0.209, 0.780)**	**(0.302, 0.915)**	**(0.328, 0.937)**
Low income	**0.415**	**0.446**	**0.434**	0.631	**0.599**
	(0.221, 0.777)	**(0.247, 0.806)**	**(0.213, 0.883)**	(0.392, 1.018)	**(0.382, 0.939)**

Table 16-2. Patient centeredness of health care—logistic regression, by ethnicity, United States (2006 MEPS) —continued (2)

Characteristic	Odds Ratio (95% Confidence Interval) [a]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
Middle income	**0.496**	0.586	0.666	0.897	0.791
	(0.281, 0.877)	(0.334, 1.027)	(0.352, 1.260)	(0.564, 1.426)	(0.519, 1.206)
High income (RG)	1.000	1.000	1.000	1.000	1.000
Uninsured vs. insured (RG)	1.264	1.334	1.479	1.081	1.003
	(0.584, 2.738)	(0.663, 2.683)	(0.679, 3.224)	(0.558, 2.096)	(0.569, 1.766)
Non-MSA vs MSA (RG)	**1.942**	1.596	**2.199**	1.425	**1.495**
	(1.039, 3.630)	(0.940, 2.711)	**(1.061, 4.555)**	(0.947, 2.143)	**(1.029, 2.172)**
Non-English vs English	1.876	1.387	1.455	**2.587**	**2.051**
(RG)	(0.867, 4.059)	(0.705, 2.728)	(0.723, 2.926)	**(1.381, 4.848)**	**(1.131, 3.719)**

[a] Bolded odds ratios and confidence intervals indicate a statistical significance at alpha = 0.05. **Data Source:** MEPS-HC, AHRQ.

Table 16-3. Patient centeredness of health care—logistic regression, by ethnicity, United States (2005–2006 MEPS)

Characteristic	Odds Ratio (95% Confidence Interval) [a]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
Ethnicity: NHBs	1.504	0.803	0.802	0.851	0.794
	(0.985, 2.295)	(0.536, 1.202)	(0.536, 1.199)	(0.591, 1.226)	(0.580, 1.086)
Hispanics	0.947	**0.512**	0.823	0.712	**0.605**
	(0.490, 1.832)	**(0.320, 0.820)**	(0.459, 1.478)	(0.454, 1.117)	**(0.378, 0.969)**
NHWs (RG)	1.000	1.000	1.000	1.000	1.000
Age	1.009	1.009	1.011	**1.015**	**1.013**
	(0.998, 1.020)	(0.997, 1.021)	(0.999, 1.023)	**(1.002, 1.027)**	**(1.002, 1.023)**
Male vs female (RG)	0.936	1.110	0.941	1.053	1.076
	(0.704, 1.245)	(0.823, 1.497)	(0.705, 1.256)	(0.805, 1.377)	(0.852, 1.359)

Table 16-3. Patient centeredness of health care—logistic regression, by ethnicity, United States (2005–2006 MEPS) —continued (1)

Characteristic	Odds Ratio (95% Confidence Interval) [a]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
Education:	0.850	0.725	0.903	1.087	0.798
Less than a high school	(0.477, 1.515)	(0.437, 1.201)	(0.523, 1.560)	(0.665, 1.777)	(0.505, 1.261)
High school	1.008	0.804	1.019	0.976	0.893
	(0.660, 1.540)	(0.514, 1.256)	(0.657, 1.580)	(0.664, 1.434)	(0.617, 1.292)
Any college (RG)	1.000	1.000	1.000	1.000	1.000
Income:	**0.363**	**0.455**	**0.520**	**0.545**	**0.582**
Poor	**(0.218, 0.604)**	**(0.276, 0.750)**	**(0.324, 0.833)**	**(0.361, 0.824)**	**(0.392, 0.865)**
Low income	**0.410**	**0.521**	**0.538**	**0.655**	**0.584**
	(0.263, 0.640)	**(0.343, 0.790)**	**(0.334, 0.868)**	**(0.457, 0.938)**	**(0.415, 0.824)**

Table 16-3. Patient centeredness of health care—logistic regression, by ethnicity, United States (2005–2006 MEPS) —continued (2)

Characteristic	Odds Ratio (95% Confidence Interval) [a]				
	Listened carefully	Explained things clearly	Respected what patients said	Spent enough time with patients	Composite: patient centeredness
Middle income	**0.496**	0.685	0.728	**0.666**	**0.662**
	(0.328, 0.750)	(0.447, 1.052)	(0.480, 1.102)	**(0.464, 0.956)**	**(0.477, 0.921)**
High income (RG)	1.000	1.000	1.000	1.000	1.000
Uninsured vs. insured (RG)	0.862	0.748	0.644	0.655	**0.653**
	(0.478, 1.554)	(0.455, 1.228)	(0.386, 1.075)	(0.426, 1.006)	**(0.442, 0.963)**
Non-MSA vs MSA (RG)	1.361	1.305	1.476	1.220	1.247
	(0.908, 2.039)	(0.898, 1.895)	(0.950, 2.293)	(0.888, 1.675)	(0.941, 1.654)
Non-English vs English	1.694	1.595	1.571	**2.693**	**1.983**
(RG)	(0.887, 3.235)	(0.959, 2.654)	(0.870, 2.834)	**(1.633, 4.440)**	**(1.255, 3.135)**

[a] Bolded odds ratios and confidence intervals indicate a statistical significance at alpha = 0.05. **Data Source:** MEPS-HC, AHRQ.