PATIENT, PHYSICIAN, AND COMMUNITY DEMOGRAPHICS AND PHYSICIANS' PERCEPTIONS OF PATIENTS, THEIR PRACTICE, AND THE MANAGEMENT OF DIABETES

by

Cameron G. Shultz

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Health Services Organization and Policy)
in The University of Michigan
2012

Doctoral Committee:

Associate Professor Richard L. Lichtenstein, Chair
Associate Professor Jane Banaszak-Holl
Associate Professor Michele Heisler
Professor Michael Spencer

To my parents, wife, and children:

Thank you, and I love you

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

ABSTRACT

A growing body of health services research shows that African Americans, when compared to whites, are more likely to perceive discrimination in health care, be the target of negative stereotypes from health care providers, and receive lower quality of care for a broad range of services even after controlling for socioeconomic status. Less well documented are the physician- and setting-related factors that predict or protect against negative stereotypes and unequal treatment. Through a mail-based questionnaire administered to primary care physicians and endocrinologists in the greater-Southeast Michigan area, this research investigated these factors with the goal of improving our understanding of the intersections among race, place, socioeconomic status, and health care as it relates to the management of diabetes. Specifically, this dissertation explored physicians' perceptions of patients, how these perceptions are associated with patients' and physicians' demographics, and how patients' and physicians' demographics are correlated with physicians' decision making and strategies to manage diabetes.

An overarching principle guiding this research is the notion that successful management of diabetes requires more than the provision of medical care; it requires balancing input from multiple influences across the ecological spectrum. Findings suggest that when physicians assess patients or when they make decisions on how to provide care they take into account not only information about patients' illness or disease but are influenced by patients' demographics, their own demographic and professional backgrounds, and the settings in which care is provided. After controlling for a broad set of covariates, physicians' gender and training background proved to be the most salient predictors of physicians' perceptions of patients, strategies to manage diabetes, and decision making style; results were not consistent with the notion that physicians respond more negatively or with biased attitudes when working with African American patients versus patients generally. Findings from this research indicate that (a) increasing physicians' competency in social determinant of health, (b) promoting policies that finance patient centered medical homes, and (c) rewarding health systems that grow the primary care physician workforce in urban settings may help to improve the quality of diabetes care for the populations living in such areas.

CHAPTER 1

INTRODUCTION

A growing body of health services research shows that African Americans, when compared to whites, are more likely to perceive race-based discrimination in health care, be the target of negative stereotypes from health care providers, and receive lower quality of care for a broad range of services even after controlling for economic variables such as insurance status and income (Cooper, Beach, Johnson, & Inui, 2006; Fiscella, Franks, Doescher, & Saver, 2002; Johnson, Saha, Arbelaez, Beach, & Cooper, 2004; Lucas, Stukel, Morris, Siewers, & Birkmeyer, 2006; Mayberry, Mili, & Ofili, 2000; Muni, Engelberg, Treece, Dotolo, & Curtis, 2011; Saha et al., 2008; Schulman et al., 1999; Smedley, Stith, & Nelson, 2003; van Ryn, 2002; Weinick, Zuvekas, & Cohen, 2000). Less well documented, however, are the physician- and setting-related factors that predict or protect against negative stereotypes and unequal treatment (Bach, Pham, Schrag, Tate, & Hargraves, 2004; Beach et al., 2006; Burgess, Fu, & van Ryn, 2004; Reschovsky & O'Malley, 2008; van Ryn, 2002; Varkey et al., 2009). Through a mail-based questionnaire administered to primary care physicians and endocrinologists in the greater-Southeast Michigan (MI) area, this research investigates these factors with the goal of improving our understanding of the intersections among race, place, socioeconomic status (SES), and health care as it relates to the management of diabetes. More specifically, this research will contribute to the health policy and practice literature by documenting physicians' perceptions of patients with diabetes, showing how these perceptions are associated with physician and patient demographics, and measuring the correlations between physician and patient demographics and strategies to manage diabetes.

Background

The number of adults in the United States (US) diagnosed with diabetes has grown sharply in recent decades, from approximately 5.5 million in 1980 to over 18.0 million in 2010 (Centers for Disease Control and Prevention, 2010). The costs associated with the disease have also swelled, increasing from $132 billion in 2002 to nearly $175 billion in 2007 (American Diabetes Association, 2003, 2008). Not all segments of the population, however, are equally affected by the disease. Non-Hispanic African American adults, for example, are 55% more likely than whites to have been diagnosed with diabetes (Centers for Disease Control and Prevention, 2011), and are more likely to experience excess morbidity and mortality (AHRQ, 2008). African Americans are also less likely than whites to receive optimal care (AHRQ, 2008; Blendon et al., 2008), to experience the healthcare system positively (Blendon, et al., 2008; Lake Snell Perry & Associates, 2003), and to have positive health outcomes (AHRQ, 2008; Smedley, et al., 2003). Multiple factors likely contribute to these differences including disadvantaged social and economic conditions (Lantz et al., 1998; Massey, 2004; Williams & Collins, 2001; Zenk et al., 2005), use of or access to different providers with unequal resources (Barnato et al., 2006; Carrier, Schneider, Pham, & Bach, 2011; Haas et al., 2004; Skinner, Chandra, Staiger, Lee, & McClellan, 2005), inadequate access to health care services (Bach, et al., 2004; Beal, Doty, Hernandez, Shea, & Davis, 2007; Brown, Ojeda, Wyn, & Levan, 2000; Hargraves & Hadley, 2003; Harris, 1999; Varkey, et al., 2009), clinic-related constraints due to time pressures (Mechanic, 2001; Ostbye et al., 2005; Yarnall, Pollak, Ostbye, Krause, & Michener, 2003) and case-mix complexity (Franks & Fiscella, 2002; Meduru et al., 2007), variations in medical practice (Bach, et al., 2004; Grant et al., 2007; Harris, 2001; Mick & Lee, 1999; Morris, Phillips, Fryer, Green, & Mullan, 2006; Scott, Shiell, & King, 1996), and ineffective patient-physician partnerships (Cooper et al., 2003; Johnson, Roter, Powe, & Cooper, 2004; Lutfey et al., 2008; Piette, Bibbins-Domingo, & Schillinger, 2006; Smedley, et al., 2003; van Ryn, 2002). This research will investigate these factors, adding to the growing body of literature suggesting that race influences physicians' perceptions of patients and the delivery of health care (Balsa & McGuire, 2005; Ciechanowski, Katon, Russo, & Walker, 2001; Hausmann, Kressin, Hanusa, & Ibrahim, 2010; Piette, et al., 2006; Schulman, et al., 1999; Smedley, et al., 2003; van Ryn, 2002).

Analytical Framework

Central to this inquiry is the notion that controlling diabetes requires more than the provision of medical care; it demands balancing input from multiple influences across the ecological spectrum. The Ecological Model, as shown in Figure 1, illustrates this multilevel interaction, with each level (represented by concentric circles) providing a unique contribution to the maintenance of health (Gebbie, Rosenstock, & Hernandez, 2003). Applying this model to diabetes, effective disease management necessitates synergies at the macro-, meso-[1], and micro-levels; for example, macro-level factors such as economic and social policies must ensure accessible and appropriate health care as well as ensure safety and security in terms of food, medications, and the built and natural environment; meso-level factors such as living and working conditions, organizations

---

[1] Used here, the term "meso" refers to physical and social environments.

providing medical care, and social and cultural norms must support the rigors of disease management and enable individuals to act upon their health-related needs; and micro-level factors such as innate characteristics (e.g., age, gender, race, ethnicity) inform how patients and physicians perceive one another, which in turn influences how health care is delivered and received. Important to the research here, influences at each level play a role in shaping the patient-physician partnership.

While the provision of medical care is only one of many factors contributing to effective management of diabetes, it remains a principal component to most peoples' disease management plan. In almost all cases, this means working closely with a physician or other health care provider who serves as the coordinator in developing and putting into effect a comprehensive disease management strategy. Typically, comprehensive disease management includes developing and monitoring a patient-specific medication regimen, coordinating services among ancillary health care providers (e.g., nutritionists and dieticians, social workers, nurse educators), reviewing and amending patients' treatment plan, and monitoring for a broad range of comorbid conditions that commonly afflict those with diabetes (American Diabetes Association, 2011). By broadening our understanding of how elements across the ecological spectrum—including patient and physician demographics—are linked to decision making and the strategies physicians employ to manage patients' diabetes, interventions designed to improve patient-physician partnerships and reduce race-based variation in clinical practice will be better positioned to target areas of concern.

A revised version of the ecological model, as shown in Figure 2, illustrates the theoretical framework informing the research contained within this dissertation.

Replacing the concentric circles of the model shown in Figure 1, Figure 2 presents each ecological level within the canopy of an umbrella. The canopy is used to signify that the components underneath it (i.e., decision making and strategies to manage diabetes) are influenced by the macro-, meso-, and micro-level influences symbolized in the ecological framework. The dashed lines between each level signify their fluidity, as elements in one level can impact or interact with elements in another level; for example, innate physical traits such as skin color or gender can affect individual behaviors, social networks, and working conditions for both patients and physicians. Notably, physicians and patients may share common experiences or traits (e.g., race, gender, childhood poverty), which may in turn affect the quality of the patient-physician partnership and subsequent provision of care. The arrow on the left side of the umbrella's canopy, representing the life course, symbolizes the link between each level and the historical and developmental context of a person's life. As it relates to managing diabetes, for example, access to healthcare may ebb and flow as a person transitions between life stages, or when benefits change as a function of insurance coverage and evolving health policy.

The hash-marked ring under the umbrella and encircling the umbrella's handle signifies the intersection of patients, physicians, the healthcare setting, and the community. Notably, the delivery of care occurs at this intersection, with influences from each level shaping how care is delivered and received. The dashed lines bordering this ring denote that neither patients, physicians, the healthcare setting, nor the community exist independently of one another; instead, they continually interact—a given healthcare setting is not merely located within the community but is a part of it, shaping the built environment, serving as a place of employment, and contributing to the surrounding area's economic engine.

When making decisions about the provision of health care, physicians must not only weigh the interest of a given patient but also the broader context in which care is provided. Some of the factors affecting physicians' decision making include resource constraints within the practice setting; institutional policies and procedures; professional guidelines and recommendations; perceptions of a patient's demographic profile; a patient's capacity to carry out treatment recommendations; biomedical data/assays; interpreting a patient's symptoms; and, discriminating between multiple treatment options. These factors are represented in Figure 2 by the four half circles labeled "resources," "policies and procedures," "biomedical information," and "provider perceptions of patients." The location of these half circles within the intersection of patients, providers, the healthcare setting, and the community signifies that each of these factors can shape the context of health care and how treatment related decisions are made. The arrows stemming from each half circle and leading to the black box titled "decision making," and then to the box titled "strategies to manage diabetes," indicate the pathway from input (patient and physician demographics, perception of patients, resources, and policies and procedures) to output (strategies to manage diabetes). Decision making is represented by a black box in this model to indicate that the research contained within this dissertation does not analyze the inner workings of *how* physicians make treatment related decisions; rather, this research simply measures the relationships between inputs and outputs.

By investigating physicians' perceptions of patients, resources, decision making, and disease management strategies, this research will contribute to the growing evidence on the physician contribution to race-based disparities in diabetes care. Given that current health policy solutions often emphasize physician behavior and the healthcare system as important levers for reducing disparities, improving our understanding of how physicians view themselves, their patients, and the settings in which they provide care is important.

Research Questions

Question 1

How are patients' race and socioeconomic status related to physicians' perceptions of patients and the strategies used to promote adherence among patients with diabetes?

Question 2

How are patients' race and socioeconomic status related to physicians' perceived access to resources as it relates to the management of diabetes?

Question 3

How are patients' race and socioeconomic status associated with physicians' self-reported decision making style when providing care to patients with diabetes?

Under the Umbrella of the Ecological Model

Figure 3 illustrates how these research questions fit into the theoretical framework informing this investigation. The highlighted pathways associated with each question are not intended to represent deterministic models, but instead are heuristics meant to illustrate the multiple and interrelated biological, environmental, social, and interpersonal elements connected to health and the delivery of health care. An overarching premise of this research is that the provision and receipt of health care does not occur in a vacuum. Physicians' perceptions of patients and the strategies employed to promote patient adherence, for example, are informed by the context of the healthcare environment (i.e., the intersection of patients, physicians, the healthcare setting, and the community) and the conditions defining patients' and physicians' lives over time. Physicians are drawn to certain healthcare settings for many different reasons, including personal experiences, professional background, and career goals; patients, too, are drawn to certain healthcare settings, often based on proximity, SES, and perceived quality of care.

Social and economic forces not only play a role in where physicians practice and where patients seek care, but also in how health care is provided and received. A number of scholars have argued that race (and residential segregation) and SES (including the geographic concentration of poverty) are important forces shaping the delivery and receipt of care because they play a role in the systematic isolation of large numbers of people from resources and institutions that aid in the maintenance of health (Link & Phelan, 1995; Massey, 2004; Schulz, Williams, Israel, & Lempert, 2002; Williams & Collins, 2001). To better understand the impact these forces have on the delivery and receipt of healthcare it is necessary to investigate the ways that race and SES shape the context of the patient-physician partnership. To this end, this dissertation will measure the relationship between race, SES, and physician demographics with physicians’ perceptions of patients, characteristics of healthcare settings, strategies to promote patient adherence, resources to manage diabetes, and treatment-related decision making.

CHAPTER 2

LITERATURE REVIEW: RACE-BASED DISPARITIES IN HEALTH CARE AND HYPOTHESIZED SOURCES OF UNEQUAL TREATMENT

As described by the Institute of Medicine (IOM) in its seminal report "Unequal Treatment," racial and ethnic disparities in health care likely stem from multiple sources, including patients, physicians, and health systems (Smedley, et al., 2003). The report notes that disparities persist even after differences in insurance status, health status, and access to care are accounted for. Several aspects of the clinical encounter are cited as possible contributors to the inequity, including physicians' negative racial or ethnic biases (prejudice); misperceptions about the behavior or health of certain racial or ethnic groups (stereotypes); ineffective communication between patients and physicians; and, clinical uncertainty. In her review assessing the role of the physician contribution to race-based disparities health care, van Ryn (2002) concludes that both physician beliefs and behaviors toward patients are likely influenced by patients' race and ethnicity. She concedes, however, that the specific causal pathways through which race and ethnicity affect care remain poorly understood. By focusing on physician perceptions of patients with diabetes, and more specifically, by highlighting how these perceptions differ when stratified by patient race, SES, and geographic region, the research contained within this dissertation works toward disentangling the multiple pathways by which both structural and interpersonal barriers impede effective disease management.

While effective disease management requires input from resources across multiple domains, the clinical encounter, i.e., the face-to-face visit between patient and physician, has special significance as it is the setting where treatment regimens are developed to help patients gain and maintain control over their blood-sugar levels. In general, these regimens address four areas of concern: (1) identifying, monitoring, and modifying the most appropriate medication and dosing schedule; (2) matching the timing and content of patients' food intake with peak insulin levels; (3) monitoring blood-glucose levels; and (4) making lifestyle modifications such as regular exercise, smoking cessation, improving one's diet, and minimizing the use of alcohol (Lutfey & Reese, 2005). Important to the development of these regimens is an effective relationship between patients and their physician.

Effective relationships are fostered when physicians show respect for patients' preferences, values, and stated needs; when communication is attentive, responsive, and trustworthy; and, when services are provided within the cultural context of the patient's day-to-day life (Cooper & Roter, 2003; Institute of Medicine, 2001). In the US, cultural context includes racial identity, and easily observed phenotypic expressions (e.g., skin color, hair texture, facial features) are commonly used as indicators to make inferences about individuals or groups (Bonilla-Silva, 2003; Feagin & O'Brien, 2003; Gossett, 1997). Such inferences, however, do not always match the true experience of the given individual or group. As described by Freeman and Payne (2000), "[inferences] can create false assumptions that result in unintended but serious harm to members of minority groups—especially those who are powerless and vulnerable" (p. 1046).

The growing literature investigating the physician contribution to race-based disparities in health care suggests that physicians, like Americans generally, are susceptible to holding and acting upon false assumptions when interacting with minority patients (Arber et al., 2006; Ayanian et al., 2004; Bonham et al., 2009; Burgess, van Ryn, Dovidio, & Saha, 2007; Burgess et al., 2008; Cooper-Patrick et al., 1999; Gordon, Street, Kelly, Souchek, & Wray, 2005; Huizinga, Bleich, Beach, Clark, & Cooper, 2010; Johnson, Roter, et al., 2004; Kelly & Haidet, 2007; Lutfey & Ketcham, 2005; Sabin, Rivara, & Greenwald, 2008; Schulman, et al., 1999; Stone, 2005; Street, Gordon, & Haidet, 2007; van Ryn, 2002; van Ryn & Burke, 2000). Holding and acting upon false assumptions based on race, however, requires neither animus nor conscious bias. It instead can be a normal and necessary process of human cognition. As noted by Macrae and Bodenhausen (2001):

> In their attempts to make sense of a complex stimulus world, perceivers regularly construct and use categorical representations (e.g. stereotypes) in their dealings with others. Given basic information-processing limitations and a challenging social environment, perceivers need some way to simplify and streamline the demands of the person perception process. This they achieve through the activation and implementation of categorical thinking (Allport, 1954; Bodenhausen & Macrae, 1998; Brewer, 1988; Brewer & Feinstein, 1999; Bruner, 1957; Fiske, 1998; Fiske, Lin, & Neuberg, 1999; Fiske & Neuberg, 1990; Macrae & Bodenhausen, 2000). By construing others on the basis of the social categories

> to which they belong (e.g. race, age, gender), perceivers can make use of the wealth of related (though often inaccurate) stereotype-based material that is acknowledged to reside in long-term memory (Bodenhausen, Macrae, & Garst, 1998; Bodenhausen, Macrae, & Sherman, 1999; Sherman *et al*., in press; Tajfel, 1969). (p. 242)

Investigations assessing whether physicians hold race-based categorical representations of patients is a critical and timely component of the broader body of health disparities research. Results from this line of inquiry suggest that physicians perceive and treat patients differently based on patient demographics and that physician demographics are associated with these differences. More specifically, racially discordant patient-physician interactions can be described as having less positive affect, less patient trust, fewer efforts at relationship building, and less shared decision making (Cooper, et al., 2003; Ferguson & Candib, 2002; Johnson, Roter, et al., 2004; Koerber, Gajendra, Fulford, BeGole, & Evans, 2004; Saha, Komaromy, Koepsell, & Bindman, 1999; Siminoff, Graham, & Gordon, 2006; Smedley, et al., 2003; van Ryn, 2002). Patterns within this literature suggest physicians vary in their capacity to interpret the lives of minority patients, that physicians ascribe attributes to minority patients that may or may not accurately reflect patients or their experiences, and that physicians' decisions related to diagnoses and therapies vary based on the attributes they assign.

To establish how this dissertation fits into the broader literature on race-based disparities in health care and hypothesized sources of unequal treatment, the following literature review is divided into four sections: patient and physician demographics and the provision of health care; physicians' implicit and explicit attitudes about race and race-based discrimination in healthcare; race-based variation in healthcare settings; and, nuances in the evidence on the physician contribution to unequal treatment. After presenting a number of articles for each section, the last part of this chapter synthesizes findings and explains how the research associated with this dissertation builds off the work of others and makes an incremental contribution to the literature investigating the provider contribution to race-based disparities in health care.

Patient and Physician Demographics and the Provision of Health Care

As noted, a growing body of research suggests that both patient and physician demographics matter in terms of how physicians perceive their patients and how health care is delivered and recieved. Using scripted and videotaped interviews with eight actors portraying patients with chest pain, Schulman et al. (1999) measured how cardiologists' (n=720) treatment recommendations varied by the actors' gender, age (55 or 70 years), and race (white or African American). Researchers found that physicians' mean estimates of the probability of heart disease were lower for women versus men, younger patients versus older patients, and patients with non-anginal pain. Researchers also discovered that women and African Americans were less likely to receive a referral for cardiac catheterization when compared to men and whites, with African American women being the least likely to receive a referral. Authors conclude that patients' race and sex may influence physicians' treatment recommendations independent of clinical factors, and that physician bias—whether overt prejudice or subconscious perceptions—may be a contributing factor.

Measuring the relationship between patient demographics and physicians' attitudes toward patients, van Ryn and Burke (2000) analyzed survey data from nearly

200 physicians reporting on over 600 clinical encounters. Their analyses show that physicians perceived African American patients and those with lower SES more negatively than whites or those from higher SES. Specifically, they found that African American patients were perceived as less intelligent; with less feeling of affiliation; as less likely to adhere to treatment; and as more likely to engage in risk behaviors. Patients with lower SES were perceived as less independent, less responsible, less rational, and less likely to participate in prescribed rehabilitation. Researchers found that these relationships remained even after controlling for potential confounders such as patient sex, age, income, and education, suggesting that physicians may rely on population based likelihoods based on patient race at the expense of an actual patient's personal history.

To assess if patient-physician communication varied based on the racial identity of both physicians and patients, Cooper et al. (2003) used patient and physician surveys along with audiotape recordings of primary care visits to measure differences between racially concordant and racially discordant patient-physician pairs. They found that race-concordant visits were longer, had slower patient and physician speech speed, scored higher for positive patient affect, and were perceived by patients as more participatory and with greater satisfaction when compared to race-discordant pairs. Given evidence that patients report greater comfort in discussing problems and making decisions when visits between patients and their physician are longer (Howie, Porter, Heaney, & Hopton, 1991; Morrell, Evans, Morris, & Roland, 1986; Roland, Bartholomew, Courtenay, Morris, & Morrell, 1986), and because African American patients are much less likely than their white counterparts to see a physician of their own race (Smedley, Butler, & Bristow, 2004), their findings suggest that African American patients may be at a disadvantage compared to whites in terms of diagnostic- and treatment-related conversations occurring in the clinical setting.

Investigating the relationship between physician communication and affect (whether positive or contentious) on physician perceptions of patients, and how communication and affect varied by physician and patient demographics, Street, Gordon, and Haidet (2007) analyzed data collected by means of audio recordings of patient-physician consultations with 29 physicians and 207 patients. They found that physicians were more patient centered and exhibited more positive affect when patients were perceived to be better communicators, more satisfied with their health care, and more likely to adhere to treatment recommendations. Patient race impacted physicians' communication and perceptions such that physicians were more contentious when working with African American patients when compared to white and Hispanic patients. Physicians also perceived African American patients as less effective communicators and being less satisfied with health care. Researchers found no evidence that physicians' less favorable perceptions of African American patients were a response to African American patients being more contentious or displaying less positive affect; however, they did find that compared to white or African American physicians, Asian physicians perceived African American patients as poorer communicators, and, when compared to Asian physicians, African American physicians perceived African American patients as more satisfied with their health care. While the researchers concluded that some aspects of communication between patients and physicians are likely reciprocal, with effective or ineffective communication from one party being reflected by the other, at other times broad social or cultural mores may facilitate physician bias against African American patients or constrain how African American patients interact with those who provide care.

Investigating the relationship between patient race and physicians' decision to prescribe opioids for back pain, Burgess et al. (2008) randomly assigned 375 physicians a paper-based clinical vignette varying by patient race (white or African American), non-verbal behavior (confident, dejected, or angry), and verbal behavior (challenging or non-challenging). Researchers measured the relationships between patient characteristics and physicians' decision to switch to a higher dose or stronger medication. Results showed that physicians were significantly more likely to increase the dose or change to a stronger opioid for African Americans exhibiting challenging behaviors versus non-challenging behaviors; conversely, physicians were more likely to increase the dose or switch to a stronger medication for white patients when they exhibited non-challenging behaviors. The only physician demographic associated with a change in prescribing pattern was age, with younger physicians being more likely to increase the dose or switch to a stronger medication. Authors suggest that physicians may be more likely to respond to direct requests from African American patients versus white patients because research shows that African Americans, on average, may be less assertive in the clinical encounter than whites (Collins et al., 2002; Gordon, et al., 2005; Siminoff, et al., 2006; Woodard, Hernandez, Lees, & Petersen, 2005). A direct request from an African American, therefore, may signal a greater need and hence carry more weight as a treatment indicator than when coming from a white. Researchers also suggest that the physicians in their study may have been aware of their own race-based biases or aware they were being tested for possible biases, resulting in physicians erring on the side of increasing treatment intensity when confronted with an African American patient who was presenting with challenging behaviors.

Physicians' Implicit and Explicit Attitudes about Race and Race-Based Discrimination in Health Care

Investigating the relationship between physicians' explicit and implicit bias and physicians' and patients' perceptions of medical encounters, Penner et al. (2010) analyzed survey data collected from 150 African American patients and 15 physicians who self-identified as either white, Asian, Pakastani, or Indian. The researchers hypothesized that African American patients would react most negatively when their physician fit the profile of what they describe as an aversive racist; that is, one who is high in implicit bias and low in explicit bias. By explicit bias, authors mean those behaviors that are overtly and deliberatively discriminatory toward those who are African American. By implicit bias, they mean those subtle expressions of discriminatory behaviors that are often indirect and tend to be automatically activated without conscious awareness. Authors propose that African Americans are keenly aware of both explicit and implicit bias, and that this awareness shapes their impression of the interpersonal processes associated with the clinical encounter. Researchers found that patients reacted most negatively to clinical encounters characterized by high implicit bias and low explicit bias when compared to encounters characterized by either high or low scores for both explicit and implicit bias. They suggest that even in the absence of explicit bias, subtle forms of implicit bias can negatively impact the interpersonal dynamic between patients and physicians. Authors conclude that if implicit bias decreases African American patients' ability to work in partnership with their physician relative to whites, that it can contribute to race-based disparities in care.

Researching pediatricians' implicit and explicit attitudes about race and their relationship to quality of care, Sabin, Rivara, and Greenwald (2008) analyzed data collected by means of a web-based survey that included written clinical vignettes. Explicit attitudes were measured using questions with scaled responses, and implicit attitudes were measured using Implicit Association Tests. In clinical vignettes the race of the patient was randomly assigned to participants. In their sample of 96 physicians, the researchers found respondents more likely to associate explicit concepts of "compliant patient" and "preferred medical care" (i.e., patient was the recipient of preferred versus acceptable medical care) with African American versus white patients. Tests measuring implicit attitudes produced mixed results, with the Race Attitude Implicit Association Test and Compliant Patient Implicit Association Test favoring white versus African American patients, and the Quality of Medical Care Implicit Association Test favoring African American versus white patients. The only significant association between physician demographics and the implicit measures was physician age, with older physicians being more likely to have scores relating the concept of compliant patient to white patients. Patient race was significant in only one scenario in the clinical vignettes, with African American patients being more likely to receive ideal care for urinary tract infection versus whites. In this scenario preferred care was treatment in the patient's home versus adequate or good enough care which was 14 days of inpatient antibiotic treatment; hence, this finding suggests whites would have been subjected to overly aggressive and unnecessary hospital-based care. Researchers also asked physicians to state their perceptions about patients generally and as they relate to their own practice specifically. When asked about patients generally there was little difference when considering white versus African American patients; however, when asked about their own practice respondents unexpectedly favored African American patients over whites. Researchers suggest that the ordering of questions may have elicited a social desirability bias among respondents, as explicit bias question came after subjects had already completed the Implicit Association Tests. While the pattern of physician attitudes toward patients in this research is inconsistent, explicit measures tended to favor African American patients, implicit measures tended to favor whites, and findings from the case vignettes suggests the presence of race-based variation in terms of ideal versus overly aggressive care. Researchers suggest the need for more research to disentangle the complex set of interactions between physician and patient demographics, stereotypes and divergent beliefs about patients, and the provision of medical care.

Unlike explicit bias or other frameworks used to explain overt forms of discriminatory behavior, Balsa and McGuire's (2001) statistical discrimination hypothesis does not rely upon the notion that physicians' are malevolent actors or motivated by racial animus or conscious bias. Rather, they suggest that because majority physicians are less knowledgeable about the everyday lives and experiences of those from target minority groups, they are less confident in interpreting minority patients' symptoms, needs, and wishes, and thereby are at increased risk of applying a decision making rule based on generalized prior knowledge or information (i.e., priors) that leads to disparities in care. As described by McGuire et al. (2008), statistical discrimination is different from race-based biases or stereotypes because biases or stereotypes may or may not accurately reflect the population to which they are being applied; conversely, “in statistical discrimination…providers apply correct information [i.e., priors] about *a group* [italics added] to reduce their clinical uncertainty about *an individual patient* [italics added]” (p. 532). Reliance on priors is attenuated, they note, as physicians acquire new information from a specific individual patient. Balsa and McGuire argue that because physicians are more likely to effectively communicate with patients having the same background, and because the majority of US physicians are white, physicians—as a group—are less good at interpreting African American patients’ descriptions of symptoms and, consequently, are more reliant on priors (Berger, 2008; Boukus, Cassil, & O'Malley, 2009). The increased reliance on priors when working with African American patients, suggest Balsa and McGuire, means that even the well-intentioned physician is prone to make more mistakes because priors are not patient specific.

To test the statistical discrimination hypothesis, Balsa, McGuire, and Meredith (2005) measured whether physicians’ prior knowledge about racial differences in disease prevalence accounts for racial differences in the diagnosis of hypertension, diabetes, and depression, as well as whether race affects patient-physician communication patterns. Using data from over 11,000 patients and 500 white family physicians or internists, researchers found that prior knowledge about race-based differences in prevalence accounted for differences in the diagnosis of diabetes and hypertension. When diagnosing depression, researchers found that physicians were less likely to rely on minority patients’ reports when compared to patients from the majority population. Authors suggest that improved communication between patients and their physician would help mitigate physician reliance on priors and enhance physicians' ability to more accurately assess patients' condition.

Using survey data from 156 physician-patient pairs in two large Midwest endocrinology clinics, Lutfey and Ketcham (2005) measured both patient and physician assessments of patient adherence to diabetes treatment and evaluated the degree to which corresponding assessments matched. Notably, researchers were not interested in an objective measure of adherence; rather, their goal was to evaluate for systematic differences in patient and physician assessments and to identify differences for certain groups of patients relative to others. Their findings show that (a) patient assessments of adherence varied little by patient characteristics; (b) physician assessments varied with easily observed patient characteristics such as race and age; and, (c) physician assessments varied little with characteristics not so readily observed such as patient education. The greatest absolute difference between patient and physician assessments, discovered the researchers, occurred when adherence scores were stratified by patient race, with the gap being approximately two-thirds larger for black patients than for white patients. The authors note that physicians' assessment of black patients' adherence is not systematically more negative or positive when compared to black patients' assessments of themselves, there is simply more discordance when compared with the difference between physicians' assessment of white patients' adherence and white patients' assessment of themselves. This suggests that physicians do not necessarily hold black patients in poorer regard (i.e., race-based prejudice), but that physicians are instead less certain in their assessment of blacks than of whites. Authors speculate that this uncertainty may be a function of poorer communication between black patients and their physician when compared to whites.

In a study designed to, first, examine the effect of patient and physician demographics on physicians' diagnostic certainty, and, second, the effect of diagnostic certainty on clinical decision making, Lutfey et al. (2008) showed 128 generalist physicians video vignettes of patients with either depression or coronary heart disease (CHD). The demographics of patients in the vignettes varied by age (55 years versus 75 years), gender, race (white versus African American), and SES (teacher versus janitor). Each physician was shown one vignette for each medical condition, with patient characteristics for each vignette being the opposite of the other (e.g., if the demographics of the depression patient was 75 years old, female, white, and a janitor, then the CHD patient was 55 years old, male, African American, and a teacher). After viewing each vignette, physicians were asked what they thought was going on with the patient, their level of certainty regarding their conclusion, and how they would treat the patient. Researchers found that physicians were less certain in making a CHD diagnosis for women when compared to men, for younger women when compared to older women, and for blacks when compared to whites. Researchers also found that as diagnostic certainty increased, physicians were less likely to seek out extra information about a patient's social circumstances and more likely to order CHD appropriate tests and prescriptions. In comparison to CHD, the certainty of a depression diagnosis was not influenced by patient or physician demographics except for female physicians having greater certainty in their diagnosis with higher SES patients and male physicians having less certainty in their diagnosis with higher SES patients. As diagnostic certainty of depression increased, physicians were more likely to seek out extra information about younger patients' social circumstances, make appropriate referrals (to a psychiatric versus non-psychiatric professional), and order appropriate depression-related prescriptions. While this research confirms previous work showing that physicians have decreased diagnostic certainty with some groups of patients, it adds to the literature by showing that certainty also influences clinical actions. Authors conclude that physicians' reactions to both patient characteristics and clinical certainty are important to understanding variation in physicians' decision making.

Race-Based Variation and Healthcare Settings

In contrast to the previous two sections examining the relationships between patient and physician demographics, the provision of health care, and the possible role of discrimination in unequal treatment (whether it be explicit, implicit, or statistical in nature), this section focuses on healthcare settings, their geographic distribution, and their providers as possible mediators of disparities. The six articles reviewed here point to a pattern of inequity in both the distribution and quality of healthcare facilities that corresponds to the nation's pattern of race-based residential segregation. As will be shown, evidence suggests that whites and African Americans commonly receive care from different settings of care, with African Americans tending to have poorer access to high-quality health care when compared to whites.

With the objective of testing for racial and ethnic variation in access to health care based on the proportion of African Americans and Latinos in a given county, Haas et al. (2004) used a nationally representative sample of 14,700 individuals to measure if they or a family member experienced difficulty in either obtaining care or paying for care.

Controlling for a broad range of covariates (sex, age, education, race, health status, marital status, insurance status, household income, family size, managed care market penetration, population density, high school graduation rates, per-capita income, and primary care physicians per 1000 people), researchers found that while African Americans were more likely to report difficulty in obtaining or paying for care when living in a county with a low prevalence of African Americans, the prevalence of African Americans in the county had no effect on whites. Latinos also experienced more difficulty in obtaining care in counties characterized by having few Latinos, though the proportion of Latinos in the county had no effect on financial barriers. While the proportion of African Americans in the county had no effect on whites, the proportion of Latinos in the county did—whites who lived in counties with larger Latino populations experienced both difficulty in obtaining care as well as paying for care. The authors suggest a number of possible explanations for their findings including (a) that areas with higher concentrations of African Americans may have more autonomous institutions associated with the healthcare system to overcome barriers related to access and cost; and, (b) that lower levels of racial concordance between patients and physicians in counties with a low prevalence of African Americans may impede communication regarding barriers and solutions to care. While this research shows that African Americans in higher density African American areas may experience fewer barriers associated with obtaining or paying for care, the authors concede that access to health care alone does not necessarily equate to improved heath: "[Racially] segregated areas could have fewer economic opportunities, worse physician environments, fewer public resources, a scarcity of adequate housing, and experience more pollution and violence. Each of these factors could adversely affect health" (p. 712).

Using linked data from the 2001 Medicare five-percent carrier file and the 2000-2001 Community Tracking Study Physician Survey, Bach et al. (2004) analyzed 150,000 primary care visits by Medicare beneficiaries to assess for physician- and system-related differences associated with patient race. In particular, the researchers measured how both physicians and physicians' working environments varied based on the racial demographics of the patient population being served. The researchers found that the majority of African American patients received care from a subset of physicians who provided care to only a fraction of white patients. Those physicians providing care to a mostly African American patient population were less likely to be board certified and more likely to report difficulties with providing high-quality care when compared to physicians treating a mostly white patient population. Specifically, those physicians with a largely African American patient population reported more difficulty obtaining non-emergency admissions to the hospital and accessing high-quality diagnostic imaging, subspecialty, and ancillary services. The authors suggest that the observed inequities likely reflect the maldistribution of physicians and healthcare resources in the US rather than patient choice, and that geographic variation in physicians' access to resources may be an important contributor to race-based disparities in care.

Similar to Bach e al. (2004), Carrier et al. (2011) sought to uncover the relationships between the composition of a physician's patient panel and indicators of high-quality care. Using a nationally representative sample of 1,008 primary care physicians responding to two telephone surveys, the first in 2000-2001 and the second in

2004-2005, and linked Medicare files using respondents' Unique Physician Identification Number, Carrier et al. investigated associations between quality of care and patient demographics. With the exception of providing the influenza vaccine (which was significantly associated with income, education, race, and Medicaid status across both measurement periods), researchers found that quality of care was not consistently associated with patient demographics at either time period or between periods. Medicaid status and local median income were the patient characteristics most commonly associated with quality indicators, with an increase in Medicaid patients and having more patients with lower household income being linked to poorer performance. Having a larger proportion of patients being African American was associated with poorer performance on HbA1c testing, urine protein tests, and the provision of the influenza vaccine in the first round of measurement, with only the provision of the influenza vaccine remaining significant in the second round. The authors suggest their findings illustrate the challenges associated with predicting the relationship between patient demographics and quality of care, making adjustments in physician payment based on patient demographics tenuous. While researches controlled for a limited set of physician- and practice-related variables (e.g., exposure to pay-for-performance incentives), a broader set of factors specific to physicians' clinical setting (e.g., access to on-site ancillary providers, time spent per-patient) could help to discern why some physicians perform well and others perform less well when serving the same patient population.

While Bach et al. (2004) showed that physicians' training and access to resources varied based on the racial demographics of the population being served, and both Bach et al. and Carrier et al. (2011) showed differences in quality-related indicators based on the demographics of patient panels, Skinner et al., (2005) sought to identify how the racial demographics of the population being served are related to health outcomes. Using a prospective cohort design including more than one million acute myocardial infarction (AMI) admissions at nearly 4500 hospitals across the US, Skinner et al. investigated whether hospitals having a high proportion of African American AMI admissions differ in their 30- and 90-day post-AMI mortality rates when compared to hospitals having a low proportion. Researchers discovered that hospitals with a high volume of African American AMI admissions experienced higher rates of mortality than low volume hospitals even after adjusting for patient age, race, gender, AMI severity and comorbidities, hospital teaching and ownership status, income, census region, and urban location. Authors note that because hospitals with the highest proportion of African American patients were the worst performing in terms of post-AMI mortality, that African Americans bear the brunt of the mortality burden when compared to whites. While conceding that unmeasured confounding factors may have biased the results, the researchers argued that this explanation is unlikely as the unmeasured factors would need to be unassociated with the measured confounders, which explained none of the identified mortality gradient. The researchers suggest their findings are more plausibly related to differences in hospital-level quality not accounted for in their analysis, such as the use of β-blockers, time to reperfusion, or attributes of the physicians. Focusing quality improvement initiatives on hospitals that treat a disproportionate share of African American patients, suggest authors, could help to reduce the observed-differences in AMI outcomes.

Also showing stratification in the use of hospitals based on patients' race, Barnato et al. (2006) measured for racial and ethnic variations in intensive care unit (ICU) use during terminal hospitalizations by analyzing admissions data (N=192,705) from nonfederal acute care hospitals in five east coast states (N=674). After adjusting for demographics, insurance status, admission type, and presence of chronic conditions, researchers found that African Americans and Hispanics were more likely than non-Hispanic whites to receive ICU care at the end of life. The majority of this difference, noted the researchers, could be explained by racial and ethnic variation in use of hospitals, with African Americans and Hispanics more likely to seek care from hospitals with high ICU use at the end of life (i.e., *between* hospital variation rather than *within* hospital variation). While identifying the source(s) of variation is beyond the scope of their research, authors speculate that practice-related norms at the hospital level (e.g., physician behaviors), characteristics of the community (e.g., patient preferences, community resources), or both, may be playing a role.

Seeking to determine whether hospital racial composition impacts patient survival after hospitalization for cardiac arrest or ventricular fibrillation, Merchant et al. (2011) employed multivariate logistic regression using patient- and hospital-related variables to examine survival rates for white and African American Medicare beneficiaries (n=68,115). Researchers found that unadjusted survival was worse for African Americans when compared to whites (30% versus 33%, respectively). After adjusting for patient and hospital factors, it was discovered that survival was worse for both African Americans and whites receiving care from hospitals with higher proportions of African American patients compared to hospitals with mostly white patients. Even though whites receiving care in predominantly African American hospitals had a higher probability of mortality when compared to African Americans receiving care from the same hospitals (31% versus 28%, respectively), African Americans were much more likely than whites to receive care from predominantly African American hospitals (23% versus 15%, respectively) and as such bear more of the burden in excess mortality when compared to whites. The authors note that hospitals with higher proportions of African American patients were more likely to have the capability of providing technically sophisticated treatments such as percutaneous coronary interventions. They assert, however, that "capability may not equate actual use in the post arrest setting" (p. 709). Because African Americans are more likely than whites to receive care at high mortality hospitals, improving care at these hospitals could help to lessen disparities.

Nuances in the Evidence on the Physician Contribution to Unequal Treatment

While a growing body of research shows that African Americans are more likely to perceive race-based discrimination in health care, be the target of negative stereotypes from physicians, and be the recipient of lower quality medical treatment when compared to whites, a more nuanced approach suggests patterns cannot always be so easily discerned. The five papers reviewed below illustrate some of the complexity within the literature, suggesting the need for additional research to better understand and clarify the array of mechanisms that likely contribute to unequal treatment.

To better understand patient preferences regarding participation in medical decision making and to assess how preferences vary by patient demographics and health status, Levinson, Kao, Kuby, and Thisted (2004) analyzed survey data from 2,765 respondents representing English-speaking adults in the US. The researchers found that while 52% of respondents favored leaving final decisions to their physicians and 44% favored relying on their physician for medical knowledge, nearly all (96%) preferred to be given choices and to be asked for their opinion. Using multivariate logistic regression to measure the independent effects of age, gender, race, education, health status, and access on patient participation, the researchers found that (a) those with more than a high school education were less likely to rely on their physician for medical knowledge and making final medical decisions; (b) women were less likely to rely on their physician for medical knowledge and making final medical decisions, but more likely to prefer being offered choices and asked for their opinion; (c) African Americans were more likely than whites to rely on their physician for making final medical decisions; (d) those rating their health as poor were more likely to rely on their physician for medical knowledge and making final medical decisions, but less likely to prefer being offered choices and asked for their opinion; (e) those who identified as having a regular doctor were more likely to rely on their physician for medical knowledge and for making medical decisions; and (f) older patients increasingly preferred to rely on their physician in making decisions, with the shift toward being more physician centered occurring at about age 45. These findings suggest that differential treatment may not necessarily be unequal treatment if physicians' interactions with a given patient reflect that patient's preferences. Specifically, if those with less education, who are in poorer health, or who are African American are, on average, more likely to prefer relying on their physician for medical decisions, providing care in a less participatory manner to these subgroups is not necessarily inequitable. Researchers suggest that medical decision making should be tailored to meet the preferences of *individual* patients and incorporate patients' wish for themselves in their own care.

In another study investigating possible differences in patients' preferences regarding participation in medical decision making, Gordon et al. (2006) employed qualitative research methods to examine 137 clinical encounters where initial treatment recommendations for pulmonary nodules or lung cancer were being discussed. Researchers found fewer information-related utterances (i.e., a unit of speech that conveys meaning such as a statement, vocal word, or vocal sound) from physicians and fewer active participation utterances from patients (including the patients' companion) when the patient was African American versus white. Using mixed effects multivariate regression with physicians' information-related utterances as the dependent variable, researchers found that the effect of patient race disappeared when patient (and companion) active participation utterances were added to the model. In this model, researchers also found that each additional active participation utterance from patients (and companion) increased the number of physician information-related utterances by 1.1, and that having a patient companion increased the number of physician information-related utterances by 18.2. Researchers further discovered that while self-initiated information-related utterances by the physician were not related to patient race, the number of information-related utterances from the physician was 16.5 fewer when the patient was African American and when the patient or companion was the initiator. Further analysis revealed that racial concordance between patients and physicians had a significant effect on patient and physician communication, such that patients in racially concordant pairs were more active participants (41.7 versus 27.2 mean utterances) and received more information-related utterances from physicians (99.4 versus 62.1). Adding patient (and companion) active participation utterances and other covariates eliminated the difference in physician information-related utterances between racially concordant and discordant pairs, but when the patient (and companion) initiated the physician information-related utterance, racially concordant pairs still received, on average, more information-related utterances. These findings suggest that while patient race may affect physician communication, differences in communication patterns—with less active participation from African American patients accounting for less information giving by physicians—may also play a role. Weighing the reciprocal nature of communication, researchers conclude that African American patients and those in racially discordant patient-physician pairs may "do less to prompt doctors for information and doctors in turn provide less information to these patients" (p. 1313).

Investigating the relationship between physicians' clinical decisions and patient characteristics, Arber et al. (2006) randomly assigned 256 physicians (128 from each the US and United Kingdom) to view a video-vignette of patients presenting with standardized symptoms of coronary heart disease (CHD) who varied by gender, age, social class, and race. Following each viewing, researchers interviewed each physician to gather more information about their diagnostic and disease management decisions. Researchers found that patient class had no effect on physicians' decision making, and the only significant finding related to patient race was that physicians were nearly twice as likely to refer African Americans/blacks to cardiology specialists when compared to whites. Being a female patient, however, was related to physicians' diagnostic and disease management strategies for nearly every category tested, with physicians asking female patients fewer questions, performing less extensive examinations, being less likely to mention CHD as a possible diagnosis, having less certainty of a CHD diagnosis, being less likely to order tests for possible CHD diagnosis, and being less likely to prescribe appropriate medications. In terms of the age of the patient, physicians ordered more diagnostic tests and asked patients to revisit their physician sooner when the patent was age 75 years versus 55 years. When stratifying physicians by nationality, researchers found that much of the age- and gender-related differences were driven largely by physicians practicing in the United Kingdom. Because both African American/black patients and those from lower socioeconomic groups suffer from higher rates of CHD when compared to whites and those from higher socioeconomic groups, researchers indicate that race and class based differences in physician decision making could have been expected. Results show, however, that African Americans/blacks and those from lower socioeconomic groups are treated as if they have the same risk profiles as whites and those from higher socioeconomic groups. Under this scenario, researchers suggest that equal treatment may be an indicator of inadequate and perhaps even discriminatory treatment.

Testing for associations between patients' race and gender with patients' literacy and physicians' ratings of patients' literacy, Kelly and Haidet (2007) found that physicians' overestimated the literacy of 54% of African American patients compared to only 11% of non-Hispanic whites. Consistent with previous research (Bass, Wilson, Griffith, & Barnett, 2002; Lindau et al., 2002), these findings suggest that physicians may commonly overestimate patients' literacy, which may in turn limit the quality and effectiveness of patient-physician communication. Because patients with low literacy are at an increased risk of misperceiving or miscommunicating information within the context of the medical interview, are less able to accurately recall health-related information, and are less able to effectively carry out disease management tasks, researchers suggest that physician overestimation of African Americans' literacy may contribute the implementation inappropriate disease management plans which may, in turn, contribute to poorer health outcomes.

Synthesizing Findings and this Dissertation's Incremental Contribution

The five studies in the first section of this review—patient and physician demographics and the provision of health care—demonstrate a variety of research strategies used to evaluate how physicians' perceptions of and interactions with patients vary when working with patients from differing racial or ethnic groups. Researchers employed (a) videotaped and paper-based clinical vignettes where physicians were asked to assess one of several patient types (e.g., white versus African American, young versus old, male versus female, challenging versus non-challenging, etc.); (b) post-visit physician surveys assessing clinical encounters with either white or African American patients; (c) qualitative analysis of audiotaped recordings of clinical encounters with white or African American patients; and (d) a mixed-methods approach using audiotaped recordings of clinical encounters with either white or African American patients and post-visit surveys with both patients and physicians. While Schulman et al. (1999) and Burgess et al. (2008) utilized randomization, the rest employed quasi-experimental designs where naturally occurring patient-physician dyads were observed directly in field (van Ryn & Burke, 2000; Cooper et al., 2003; Street, Gordon, & Haidet, 2007).

Despite the varying methodologies, each study shares an important characteristic—they all aggregate data associated with specific patient-physician encounters (whether an actual clinical visit or clinical vignette) and report observed differences based on patient race. The research associated with this dissertation, however, employs a slightly different strategy. Rather than measuring and aggregating data linked to a specific patient-physician encounter, it measures physicians' global sense of themselves, their practice, and their patients, with half of physicians limiting their frame of reference to encounters with African American patients and the rest considering encounters with all patients regardless of race. Compared to the five studies reviewed here, this approach captures a slightly different aspect of physicians' attitudes and behaviors toward patients—it delineates the frame of reference that physicians use to orient themselves to groups of patients based on race, and establishes how the construct of race influences physicians' perceptions about disease management resources and the provision of care.

Building on the argument put forth by van Ryn and Burke (2000) and others (Balsa & McGuire, 2001; Lutfey, et al., 2008), this dissertation investigates whether physicians hold population-based likelihoods about groups of patients in the absence of an actual patient's personal history. Notably, proving or disproving the presence of physician bias—whether overt prejudice or subconscious perceptions—is beyond the scope of this dissertation. Rather, the goal of this dissertation is threefold: first, to scrutinize the role that race plays in how physicians think about patients; second, to assess the relationship between race and physicians' views about the provision of health care; and third, to contribute to the incremental progression of research investigating the role that physicians may play in race-based disparities in health care.

The five studies presented in the second section of this review—physicians' implicit and explicit attitudes about race and race-based discrimination in health care—investigate provider bias as a possible source of unequal treatment and strive to measure its impact (whether directly or indirectly) on the provision of care. While the specific questions and methods associated with this dissertation differ from those asked and employed by the researchers in these studies, their arguments and conclusions are informative and help to shape this dissertation's hypotheses. First, if physicians act like Bayesian thinkers when treating patients of different racial or ethnic groups (i.e., applying knowledge of prior events to make assumptions about the way the world works and using those assumptions to predict future events), and given the robust literature documenting African Americans' poorer socioeconomic and health status when compared to the majority population (Agency for Healthcare Research and Quality, 2009; Smedley, et al., 2003; Smelser, Wilson, Mitchell, & National Research Council, 2001), it is reasonable to hypothesize that physicians would rate African Americans as having poorer health literacy, fewer resources to manage diabetes, and facing more disease management barriers when compared to patients generally. Second, if exposure to African American patients and patients with lower SES mediates priors (i.e., the application of a decision making rule based on generalized prior knowledge or information), then those physicians having more African American patients and patients with lower SES would be more likely than those with fewer African American patients and patients with higher SES to rate African Americans as having poorer health literacy, fewer resources to manage diabetes, and facing more disease management barriers when compared to patients generally. Third, if physician race (being African American) and gender (being female) mediate priors, then physicians who are African American and/or female would be more likely than those who are white and/or male to predict that African Americans have poorer health literacy, fewer resources to manage diabetes, and face more disease management barriers when compared to patients generally. Fourth, if physicians are less certain about their communication with African American patients (e.g., interpreting symptoms, assessing disease severity, fostering interpersonal relationship) when compared to white patients, then physicians ought to engage in a less participatory decision making style when working with African American patients when compared to patients generally. And fifth, if exposure to African American patients, physician race, and physician gender mediate priors, then physicians with more exposure, who are African American, and/or female would be more likely than those with less exposure, who are white, and/or male to have effective communication with African American patients and engage in a more participatory decision making style.

Unlike the research in the first two sections of this review focusing primarily on micro-level factors within healthcare (e.g., the patient-physician partnership), the six articles in the third section—race-based variation and healthcare settings—explore meso- and maco-level factors and their relationship to race-based disparities in care. An emergent theme from these articles is that *both* race *and* place matter, in large part because African Americans and whites tend to live in separate areas and seek healthcare from different physicians. With the exception of Haas et al. (2004), these articles show that African Americans have poorer access to high quality care and face an increased risk of mortality after obtaining care when compared to whites. Even Haas et al. may have reached a different conclusion if their analysis examined city level data rather than that from the county level. After all, as discussed by Massey and Denton (1993), analysis of large regions can dilute variation associated with race-based residential segregation and subsequent concentration of African American poverty. As will be illustrated in the next chapter, the consequence of race-based segregation is especially evident in Southeast MI, as this region contains some of the most racially segregated areas of the country.

While these articles confirm that both race and place matter, this dissertation will contribute to the literature by helping to explain *how* they matter. As described in more detail in the chapter on methods, this dissertation employs multivariate techniques to measure how physicians' perceptions of patients, disease management strategies (and barriers), and communication style vary by patient and physician demographics, characteristics of the healthcare setting, *and* characteristics of the community—i.e., the city—surrounding the site of care. Using cities as the geographic unit of measurement is appropriate for the following two reasons: larger geographic areas such as counties or metropolitan statistical areas mask too much variation (e.g., the profile of Detroit, MI is very different than Northville, MI, though they are both cities in Wayne County), and smaller geographic areas such as zip codes or census tracts lack context and may miss important group-level characteristics.

The validity of making assumptions about a physicians' patient population based on census-derived city-level data depends on whether patients typically seek care from a physician in the city where they live. While it is unreasonable to assume that all patients seek care from a physician in their home city—especially for those living in rural areas distant from a metropolitan center—evidence does show that people prefer to see a physician close to their home, that most people have access to physicians close to their home, and that people tend to travel relatively short distances when seeing health care providers (Bornstein, Marcus, & Cassidy, 2000; Probst, Laditka, Wang, & Johnson, 2007; Rosenthal, Zaslavsky, & Newhouse, 2005; Salisbury, 1989; Shannon, Skinner, & Bashshur, 1973). The task of getting to one's physician, however, is not equal for all segments of the population. Based on a nationally representative sample, Probst et al. (2007) found that while the distance traveled to obtain medical care is the same for whites and African Americans, African Americans spend nearly ten minutes longer traveling to their health care provider—28.91 minutes versus 18.97 minutes, respectively—primarily due to poorer economic standing and an increased reliance on public modes of transportation.

To help clarify the effects of patient race and SES, the research in this dissertation utilizes city-level data available through the US Census to construct a SES index using methods developed by Bonito et al. (2008). This index, along with data describing cities' racial composition, adds context to the environment where physicians' provide care. As described by Bonito et al (2008):

> It is particularly important to try to separate the influences of socioeconomic status (SES) and race/ethnicity on health and utilization of health services in our empirical research. Only then will it be possible for policymakers to identify where to place their priorities in the development of ameliorative interventions—to overcome the socioeconomic barriers to accessing timely, appropriate, and good quality care, the sub cultural values and restricted world view that keep

> some minorities from taking full advantage of the services available to them, or the prejudice against minorities of providers and the health care system. (p 38)

In addition to providing context and helping to distinguish between the influences of race and SES, these measures also add a layer of objective information about the setting of care thus enabling a richer interpretation of this dissertation's results.

And finally, the four studies in the last section of this review—nuances in the evidence on the physician contribution to unequal treatment—illustrate both the complexities and inconsistencies associated with investigating racial stereotypes, biases, and race-based differences in the provision of health care. Patients vary in terms of treatment preferences, including but not limited to how they choose to interact with their physician. Moreover, patients' preferences are not perfectly associated with demographics, and characteristics of the clinical encounter itself appear to affect how treatment-related decisions are made. Physicians, also, vary in their treatment preferences, with some evidence supporting and other evidence rejecting a link to physician demographics. Demographics notwithstanding, there is an emerging consensus in much of the health services literature that physicians are neither neutral purveyors of information nor equitable providers of care. While some inequity may stem from negative stereotypes or biases against certain groups of patients, a significant proportion likely comes from physicians' sincere attempts to weigh multiple treatment options against a patient's perceived ability to carry the treatment out. Under this latter scenario, an argument could be made that inequitable care may still be appropriate care when it is the best alternative in light of a patient's particular circumstances.

Given the state of research on this topic, however, uncertainty remains as to whether physicians' recognize or account for patients' particular circumstances, as well as whether patient and physician demographics are related to this process. By capitalizing on an innovative design, the research described in this dissertation will help toward alleviating some of this uncertainty. Some of the design-related strengths associated with this dissertation include (a) a randomized design; (b) a large sample (n=637—324 General Questionnaire respondents and 313 African American Questionnaire respondents); (c) a broad array covariates; and (d) the use of an instrument assessing physician views across several domains including perceptions of patients, strategies to improve adherence, disease management resources and barriers, and physician decision-making style.

CHAPTER 3

THE RESEARCH CONTEXT: THE ECOLOGICAL MODEL AND DETERMINANTS OF POPULATION HEALTH

Fundamentally, the ecological model illustrates the complex interplay between multiple influences on individual and population health at micro-, meso-, and macro-levels over the span of a person's life. As asserted by the IOM, however, there are important distinctions between the *model*—which illustrates the linkages and interactions among determinants of population health—and an ecological *perspective* toward research (Gebbie, et al., 2003). An ecological perspective toward research, asserts the IOM, "is a perspective that involves knowledge of the ecological model of determinants of health and an attempt to understand a specific problem or situation in terms of that model" (Gebbie, Rosenstock, & Hernandez, 2003, p. 32). To this end, this chapter documents the ecological context within the city of Detroit, MI and the greater-Southeast MI region, concentrating on factors that play a role—whether directly or indirectly—in the management of diabetes: patient race/ethnicity; race-based segregation; education; unemployment, wealth, and poverty; health insurance coverage; safety; the built environment; and diabetes prevalence. Because this dissertation investigates physicians' perceptions of patients within the context of racial, economic, and geographic stratification, and because the greater-Southeast MI region is one of the most racially and economically segregated areas of the country (Frey, 2011), Detroit, MI and its surrounding suburbs serve as an ideal location for this research.

Used here, the term Southeast MI refers to the six county region comprised of the Detroit-Warren-Livonia Metropolitan Statistical Area: Lapeer, Livingston, Macomb, Oakland, St. Clair, and Wayne (Michigan Department of Technology, Mangement & Budget2003). Importantly, these boundaries are somewhat arbitrary and do not mesh perfectly with all reference and data sources. For this reason, two additional geographic regions will be used when describing Detroit, MI and its surrounding area. The first, as defined by the Southeast MI Council of Governments (SEMCOG), includes the counties of Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne (Southeast Michigan Council of Governments, 2010); the second, greater-Southeast MI, expands SEMCOG's seven county region to include Lenawee, Genesee, Saginaw, and Tuscola Counties.

Race and Ethnicity

Since the first enumeration of the US population in 1790, the method of categorizing people into racial or ethnic groups has remained fluid, reflecting neither biological nor genetic differences but the nation's changing social and political leanings (Gibson & Jung, 2002). From 1850 to 1990, for example, a total of twenty-eight race terms in thirteen various combinations were used in the nation's decennial censuses, and it was not until 1977—when the Office of Management and Budget (OMB) set forth guidelines establishing Hispanic ethnicity as a distinct category from race—that a complete enumeration of the Hispanic population became possible (Bennett, 2000; Gibson & Jung, 2002; U.S. Census Bureau, 1977). In 1997, the OMB amended its 1977 policy, changing the Hispanic classification to Hispanic *or* Latino, terms that are now used interchangeably (Office of Management and Budget, 1997). In addition to using the two ethnicity categories—"Hispanic or Latino" and "not Hispanic or Latino"—the 2000 Census for the first time permitted people to report more than one race, resulting in 63 possible race combinations with which respondents could self-identify (U.S. Census Bureau, 2000).

While recognizing that the classification of people into racial and ethnic categories in the US has a fluid history, this and subsequent chapters, unless otherwise specified, will adhere to the following Office of Management and Budget conventions: "white" implies those individuals having origins in any of the original peoples of Europe, North Africa, or the Middle East; "African American" or “black” implies those having origins in any of the black racial groups of Africa; "Asian" implies those having origins in any of the original peoples of Southeast Asia, the Far East, or the Indian subcontinent; and "Hispanic" implies those of Puerto Rican, Mexican, Cuban, South or Central American, or other Spanish culture or origin, regardless of race (Office of Management and Budget, 1997). When referring to the white population alone, the term "white" will be used; when referring to the African American or black population alone, the term "African American" or “black” will be used; when referring to the Asian population alone, the term "Asian" will be used; when referring to the Hispanic population, regardless of race, the term "Hispanic" will be used; when referring to a race category in the absence of ethnicity, the prefix "non-Hispanic" will be used; and if referring to a race category represented by one or more races, the suffix "in-combination with one or more other races" will be used.

As displayed in Table 1, 2005-2007 3-year Census estimates show remarkable variation in the racial and ethnic concentration of the population across geographic regions, with Detroit's suburban area (Southeast MI minus Detroit) having a significantly larger white population and Detroit having a significantly larger African American population when compared to each of the other regions. While Detroit's suburbs are more than four-fifths (84.42%) white and the city itself is more than four-fifths (82.77%) African American, Detroit's suburban area has a small African American population (10.65%) and Detroit has a small white population (10.40%) (U.S. Census Bureau, 2008a). Both the city of Detroit and its suburbs also have small Asian and Hispanic populations, with Hispanics accounting for only 6.14% of Detroit's total population and Asians accounting for only 3.64% of the total suburban population (U.S. Census Bureau, 2008a). While included in the category of "white" in Table 1, Southeast MI 's percentage of Arab Americans—i.e., those having origins from Arab-speaking countries or areas of the world categorized as Arab—exceeds that of the state and nation. While Arab Americans represented an estimated 1.56% of the state's population and 0.51% of the nation's population over the 3-year period between 2005 and 2007, the group accounted for approximately 2.99% of the population in Southeast MI (U.S. Census Bureau, 2008a). The estimated proportion of Arab Americans in Dearborn, MI in 2000 was 29.9%--growing to 41.0% in 2010—making it the nation's most concentrated Arab American community and one of the world's largest Arab communities outside of the Middle East (de la Cruz & Brittingham, 2003; U.S. Census Bureau, 2012).

Race-Based Segregation

While Detroit's population swelled from 286,000 in 1900 to 1,850,000 in 1950—due primarily to the automotive boom and an influx of workers from the southern US and eastern Europe—the city has reduced in size by well over 50% since, with its 2007 population estimated at only 794,290 (U.S. Census Bureau, 1952, 1998, 2008b; U.S. Environmental Protection Agency, 2009). This decline, in large part, has occurred along racial lines with whites leaving the city in large numbers and, over several decades, reversing the proportion of whites and African Americans in the city—in 1950, whites and African Americans, respectively, represented 83.6% and 16.2% of city's population (U.S. Census Bureau, 1952). A principal explanation for whites' out-migration, and, relatedly, the concentration of African Americans within the Southeast MI's urban center, is the geographic shift in employment from the city to the suburbs and limits on African Americans' ability to access the suburban job market (Gobillon, Selod, & Zenou, 2007; Zax & Kain, 1996). These limits stemmed from African Americans' poorer economic standing (and lower rate of automobile ownership), unequal treatment in the real estate and mortgage lending markets, and racial prejudice from employers (Farley, Steeh, Krysan, Jackson, & Reeves, 1994; Kantor & Nystuen, 1982; O'Connor, Tilly, & Bobo, 2001; Turner & Skidmore, 1999). While the 1967 Detroit riots were a symptom of the demographic shift that had started two decades earlier, they have since come to symbolize the city’s decline and demographic change (Farley, Danziger, & Holzer, 2000). The enduring result of this decades-long demographic shift is Southeast MI’s status as one of the most racially segregated areas in the US: in 2000, Southeast MI had a dissimilarity index of 84.6, meaning that 84.6% of the area’s whites or African Americans would have to move in order to make the region perfectly integrated

(CensusScope, 2001; Iceland, Weinberg, & Steinmetz, 2002). As a benchmark, the dissimilarity index for whites and Africans in South Africa in 1991 (the last year of state sanctioned apartheid) was 91.5; for whites and African Americans in all US metropolitan areas in 2000 the index was 64.5 (Christopher, 2001; Iceland, et al., 2002).

As discussed by Massey and Denton (2001), race-based residential segregation isolates black urban populations and serves as an "institutional apparatus" that dislocates large segments of America's black population from economic opportunities and social mobility (p. 665). When African American communities become hyper-segregated, the risk for widespread poverty increases as a consequence of African American's lower net worth when compared to whites. With fewer resources to fall back on, proportionately more blacks than whites are literally a pay-check away from poverty, "creating uniquely disadvantaged environments that become progressively isolated—geographically, socially, and economically—from the rest of society" (p. 661). Hence, race-based segregation facilitates not only a *residential divide* but an *experiential divide*, and serves as a fundamental organizational feature of American society.

Education

As shown in Table 2, educational attainment also varies by region, race, and ethnicity (U.S. Census Bureau, 2008a). With the exception of non-Hispanic whites in Detroit, who have marginally poorer high school graduation rates when compared to African Americans, the three-year average from 2005-2007 shows that African Americans have attained less formal education when compared to non-Hispanic whites for each education level across all five of the regions delineated. When compared to Detroit's suburbs, those in Detroit have achieved less formal education regardless of race or ethnicity, with Detroit's Hispanic population being the least likely to have completed high school (including equivalency) and Detroit's Asian population being the most likely to have completed college. The relative deficit of an educated citizenry in Detroit is linked to several factors, including Detroit's economic and demographic transition over the second half of the 20th century and subsequent race-based segregation and concentration of poverty, legal decisions limiting school integration between Detroit and its suburbs, and a preference for educational policies that bolster compensatory programs (e.g., head start, Title I subsidies, bilingual programs) and imposing tough standards (e.g., course requirements, mandatory testing, No Child Left Behind) over reforms that target race- and class-based segregation directly (Chemerinsky, 2003; Massey & Denton, 1993; Orfield, 2001). Given the complexities associated with managing diabetes—e.g., adherence to specialized diet, monitoring blood-glucose levels, adjusting and administering medications, communicating with health care providers—those with less education are at a disadvantage in terms of navigating the healthcare system and developing and implementing an effective disease management plan when compared to those with more education (Chaturvedi, Stephenson, & Fuller, 1996; Nath, 2007; Schillenger, Barton, Karter, Wang, & Adler, 2006).

Unemployment, Income and Wealth, and Poverty

As shown in Tables 3 and 4, unemployment, income, poverty, and wealth (as measured by home ownership, home values, and having at least one vehicle per household unit) also vary by region and race/ethnicity (U.S. Census Bureau, 2008a). African Americans fare the poorest in terms of unemployment across regions, with the 2005-2007 3-year rate exceeding 22% in the city of Detroit. Directly related to unemployment, Table 3 also shows that African Americans fare the poorest in terms of median household income and the all person poverty rate, with nearly one-third of Detroit's African American population living in poverty. Across measures in Table 3, Asians tend to fare better than non-Hispanic whites, non-Hispanic whites tend to fare better than Hispanics, and Hispanics tend to fare better than African Americans. The relative difference between racial/ethnic groups is largest in Southeast MI, due primarily to the sharp contrast between those living in Detroit and those in the suburbs; however, when removing Detroit and looking only at the suburbs large race-based differences persist. When looking at Detroit only racial and ethnic differences shrink, but this shrinking does not come from African Americans doing better, it comes from all groups doing much worse.

The relative disadvantage of African Americans in the Southeast MI workforce is highlighted by inspecting the proportion of African Americans in the population compared to the group's proportion in the workforce and unemployed. Based on estimates over the three year period between 2005 and 2007, African Americans in Southeast MI accounted for 23.56% of the population, 19.99% of the labor force, and 37.39% of the unemployed; in Detroit's suburbs, African Americans accounted for 9.71% of the population, 8.62 of the labor force, and 14.66% of the unemployed; and in Detroit, African Americans accounted for 83.95% of the population, 82.79% of the labor force, and 86.12% of the unemployed (U.S. Census Bureau, 2008a). Hence, the proportion of African Americans in the ranks of Southeast MI's unemployed was 1.87 times greater than the proportion of African Americans in the labor force. This excess burden is virtually eliminated when looking only at the city of Detroit, but not because African

Americans are doing better; rather, the relative unemployment gap between racial and ethnic group diminishes because all groups in Detroit are doing worse. Factors contributing to African American's relative poor performance in Southeast MI's labor market include lower levels of educational attainment, fewer social network ties extending into the labor market, labor market discrimination, and restrictions on geographic mobility (Massey, 2007; Massey & Denton, 1993; O'Connor, et al., 2001; Shapiro, 2004).

As illustrated in Table 4, there are also stark regional and racial/ethnic differences for a number wealth indicators over the 3-year period between 2005 and 2007, including housing tenure, median home values, and the availability of at least 1 vehicle in the home (U.S. Census Bureau, 2008a). As with unemployment, income, and poverty rate, those living in Detroit's suburbs fare best and those in Detroit fare worst, with the one exception being African American housing tenure. For African Americans, the proportion of owner-occupied housing units is highest in Detroit, at 54.21%, and lowest in the nation as a whole, at 46.29%; however, the proportion of owner-occupied housing units for African Americans in Detroit is still approximately 25% lower than the lowest region for non-Hispanic whites, where nationally the proportion of owner-occupied housing units is 73.90%. The only group faring worse than African Americans in terms of the proportion of owner-occupied housing units is Hispanics in Detroit, at 48.50%. Non-Hispanic whites have the highest proportion of owner-occupied housing units across regions, with a high of 82.55% in Detroit's suburbs.

The difference in median home values between Detroit and all other regions is also large, with the 2005-2007 average price in Detroit being less than half that of the nation and Detroit's suburbs—at $89,500, $181, 800, and $183,626, respectively. This marked difference in home values, however, does not translate into proportionately lower rent. Compared to its suburbs and the nation, the median rent in Detroit is only 20% less—at $523 for Detroit, $665 for the suburbs, and $647 nationally (U.S. Census Bureau, 2008a). The combined impact of lower home values and, relative to these values, higher rent, suggests that Detroiter's face an economic double jeopardy when it comes to housing-related wealth; that is, while the savings from renting are small, the benefits of owning are even smaller. The impact of this double jeopardy is that it places constraints on the resources needed to meet daily economic demands and constricts the accumulation of resources necessary for future economic security (Boehm & Schlottmann, 2001; Oliver & Shapiro, 1997; Shapiro, 2006).

Access to transportation, as measured by having at least one vehicle in the household, varies by region and housing tenure (U.S. Census Bureau, 2008a). Across regions, those living in owner-occupied housing units are much more likely than those in renter-occupied units to have at least one vehicle in the household, with households in Detroit's suburbs being the most likely to have a vehicle and households in Detroit being the least likely. In Detroit's suburbs, only 2.41% of owner-occupied units and 14.71% of renter-occupied units have no vehicle; in Detroit, 9.81% of owner-occupied housing units and 34.13% of renter-occupied units are without a vehicle. Given Detroit's underserved and underfunded public transit system, which ranks poorly when compared to similar sized metropolitan areas across the nation, the absence of a household vehicle restricts where one can work, shop, and seek health care, and limits the range of options for making healthy lifestyle choices (Fitzpatrick, Powe, Cooper, Ives, & Robbins, 2004; Grengs, 2010; Kieffer et al., 2004)

Insurance Coverage

Averaged over the three-year period between 2005-2007, the proportion of the US population under 65 years without health insurance was approximately 17.4% (U.S. Census Bureau, 2010). Hispanics experienced the highest uninsured rate at an estimated 34.3%, followed by African Americans (21.2%), Asians (17.6%), and non-Hispanic whites (12.3%) (U.S. Census Bureau, 2010). In Southeast MI, the 2008 uninsured estimate among noninstitutionalized civilians under 65 years was 13.6%; in Detroit, this estimate was 21.1% (U.S. Census Bureau, 2009). When looking at the suburban area only, the rate dropped to 12.0%. Among noninstitutionalized civilians under 65 years with health insurance, the proportion receiving their insurance from a public source at the national and Southeast MI levels were 18.7% and 19.8%, respectively. In Detroit's suburbs, the proportion receiving their insurance from a public source was 14.0%, and in Detroit, nearly half (48.7%) of those with health insurance received it from a public source. The higher utilization of public health insurance in the city of Detroit reflects the city's higher poverty and unemployment rates. Given the variation in healthcare quality as a function of insurance status, with those receiving their insurance from a public source being more likely to receive poorer quality care, more Detroiters are at increased risk of receiving poorer quality care when compared to their suburban counterparts (Carrier, et al., 2011; Kapoor, Fonarow, et al., 2011; Kapoor, Kapoor, et al., 2011; Meyers et al., 2006; Pamboukian et al., 2006; Zhang et al., 2009).

Safety.

When compared to the US, MI, and Southeast MI, violent crime in the city of Detroit has in the past and continues to be strikingly high. Over the 23-year period between 1985 and 2008, for example, the average murder rate per 100,000 residents in Detroit was 51.2, ranging from a low of 35.7 in 2008 to 62.8 in 1987. During the same 23-year period, mean national and state rates were, respectively, 7.6 and 8.8 (Bureau of Justice Statistics, 2010). As delineated in Table 5, violent crime in Detroit in 2007 exceeded that of the nation, state, and Southeast MI as measured by a number of offenses including aggravated assault, robbery, property crime, burglary, motor vehicle theft, and larceny-theft (U.S. Department of Justice, 2007). These differences, in large part, are attributable to Detroit's high rate of concentrated poverty and the consequences of race-based residential segregation (Akins, 2007; Alba, Logan, & Bellair, 1994; Hipp, 2007; Hsieh & Pugh, 1993; Massey, 2007; Massey & Denton, 1993; Patterson, 1991; U.S. Government Accountablity Office, 2007). As noted by Massey (2007):

> Perhaps no consequence of concentrated poverty is as destructive as the proliferation of crime and violence. Because criminal behavior is strongly associated with income deprivation, the geographic concentration of poverty necessarily yields a concentration of crime, delinquency, and violence in poor neighborhoods. (p.205)

The Built Environment.

Whereas violent crime trends higher within Detroit, the concentration of healthcare establishments trends lower (U.S. Census Bureau, 2007). Table 5 highlights the relative deprivation of healthcare resources within Detroit when compared to surrounding areas (U.S. Census Bureau, 2007). Detroit's suburban area, for example, accommodates 87.53 physician offices per 100,000 residents whereas Detroit accommodates only 19.74. Moreover, the suburban area has approximately nine times more mental health specialist or practitioner offices, five times more dentist offices and home health care establishments, two times more free standing ambulatory surgical and emergency centers, and one-third more general medical and surgical hospitals per 100,000 residents. The relative excess of healthcare-related resources in the suburban area suggests that suburban establishments may have supplanted those that would have otherwise located within the city were it not for concerns related to safety; the proportion of the population without health insurance or receiving public insurance; biases regarding the racial, ethnic, behavioral, or social characteristics of the urban population; and misgivings about providing services in a resource stressed healthcare environment (Bach, et al., 2004; Grumbach, Vranizan, & Bindman, 1997; O'Connor, et al., 2001; van Ryn, Burgess, Malat, & Griffin, 2006; van Ryn & Burke, 2000).

In addition to the relative scarcity of healthcare establishments in Detroit compared to the surrounding areas, the city also fares poorer in terms of access to healthy foods (Mari Gallagher Research & Consulting Group, 2007; U.S. Census Bureau, 2007). Although Table 5 shows that Detroit has in total a greater number of supermarket and grocery store establishments per 100,000 residents when compared to surrounding areas, there are relatively few establishments within the city that have a large selection of high quality healthy foods . In 2002, for example, only 9 supercenters (e.g., Super Kmart, Meijer) and full-line grocery stores (e.g., Kroger, Busch’s, Farmer Jack) were located within Detroit, compared to 152 within a 15 mile buffer of the city (Mari Gallagher Research & Consulting Group, 2007; Zenk, et al., 2005). Hence, whereas those in

Detroit's suburban areas have relatively good access to both large and small grocery stores, residents within the city are limited to mostly small stores (Detroit Fresh Food Access Initiative, 2008). This relative dearth of supercenters and full-line grocers means Detroiters must travel greater distances than their suburban counterparts to access stores that have a decent variety of healthful food choices (Detroit Fresh Food Access Initiative, 2008; Zenk, et al., 2005).

Pharmacies and drug stores, fitness and recreational facilities, and child day care establishments, as displayed in Table 5, are also less abundant in Detroit when compared to its surrounding areas; For example, while the suburban area has18.95 has pharmacies and drug stores per 100,000 residents, the city of Detroit has just 12.87. Not only does this relative shortage contribute to poorer access to prescription medications, it likely moderates patient-pharmacist interactions and subsequent opportunities for professional consultation to enhance or modify disease management (Kiel & McCord, 2005; Lindenmeyer et al., 2006). Detroit also have markedly fewer fitness and recreational facilities per 100,000 residents when compared to the surrounding area—for every 6 fitness or recreational sports centers in the suburbs, Detroiters have only 1. As noted by Kieffer et al. (2004), the lack fitness facilities in the city of Detroit creates an added barrier for Detroiters when working toward the adoption an active lifestyle. Detroiter's also confront added barriers in terms of access to formal childcare establishments. Compared with 16.25 childcare establishments per 100,000 residents in the city of Detroit, Detroit's suburban area has 23.01. This scarcity likely fuels the use of informal child care networks that can be less reliable and more taxing on already stressed families

(Henley & Lyons, 2000; Minkler & Fuller-Thomson, 1999; Pruchno, 1999; Whitley, Kelley, & Sipe, 2001; Zippay & Rangarajan, 2007).

Diabetes

As with many inequities discussed in this chapter, the burden of diabetes is not evenly distributed across the population. After adjusting for age, the 2004-2006 combined diagnosed and undiagnosed prevalence of diabetes among those ages 20 years or older was 50% higher among non-Hispanic African Americans when compared to non-Hispanic whites, at 14.7% and 9.8%, respectively (National Institute of Diabetes and Digestive and Kidney Diseases, 2008b). Despite having poorer access to health care, the proportion of those age 20 years or older with diabetes who have received a diagnoses from a healthcare professional is higher for non-Hispanic African Americans than for non-Hispanic whites; that is, approximately 80% of non-Hispanic African Americans with diabetes have received a diagnosis compared to about 67% among non-Hispanic whites (National Institute of Diabetes and Digestive and Kidney Diseases, 2008b). One explanation for this difference is that healthcare providers are more proactive in screening African Americans for the disease, as having a family background that is African American is in and of itself an indicator for testing (National Institute of Diabetes and Digestive and Kidney Diseases, 2008a).

In MI, 2005-2007 prevalence estimates for diagnosed and undiagnosed diabetes among the adult population were 8.5% and 3.7%, respectively (Michigan Diabetes Prevention and Control Program, 2008). Like national prevalence estimates, the burden of diabetes was not shared evenly across the population. MI surveillance data of adults in 2007 show that non-Hispanic whites had the lowest prevalence of diagnosed diabetes at

7.3%, followed by Asians or other Pacific Islanders (11.3%), Hispanics (12.2%), and non-Hispanic African Americans (13.9%) (Michigan Diabetes Prevention and Control Program, 2008). Prevalence estimates averaged over the three-year period between 2006-2008 for diagnosed diabetes among adults in Southeast MI was 9.2%; for Detroit and Detroit's suburbs rates were 13.5% and 8.3%, respectively (Michigan Department of Community Health, 2009). Among the population age 60 years or older in the city of Detroit in 2001, the estimated prevalence of diagnosed diabetes was 23.0% (Wayne State University Institute of Gerontology, 2002). The high rate of diagnosed diabetes in the city of Detroit likely reflects the city's large African American population, high poverty rate, scarcity of resources, and the city's high rate of obesity when compared to surrounding areas (Centers for Disease Control and Prevention, 2008; Michigan Department of Community Health, 2009).

Summary

The eight elements described above—race/ethnicity; race-based segregation; education; unemployment, wealth, and poverty; health insurance coverage; safety; the built environment; and diabetes prevalence—provide the context for this research from the perspective of the ecological model. While there is no doubt considerable variation between individuals, with some individuals from each racial and ethnic group faring well and others faring poorly, these elements suggest (a) that from a population-based perspective there are large differences between racial and ethnic groups, and (b) that the everyday lives of African Americans (as a population) differ markedly from that of whites. Given this difference, it is reasonable to speculate that physicians will perceive and treat African American patients differently when compared to their patients generally. This dissertation measures these differences, and where they exist, assesses how patient and physician demographics are related to them.

If physicians approach the provision of care with consideration of the context of patients' social conditions, it is reasonable to speculate that physicians—regardless of practice location—will assess African Americans, on average, as having more disease management needs and fewer disease management skills and resources when compared to patients generally. Likewise, due to increased exposure to the set of economic and social conditions characterized by racial segregation and concentrated poverty, those physicians practicing in cities within Southeast MI with larger African American populations will likely assess their patient populations as having more disease management needs and fewer disease management skills and resources when compared those practicing in cities that are mostly white. And finally, an ecological research perspective informed by evidence indicating the structure and process of healthcare varies by the racial demographics of the population being served (Bach, et al., 2004; Barnato, et al., 2006; Carrier, et al., 2011; Merchant, et al., 2011; Skinner, et al., 2005; Varkey, et al., 2009) suggests that those physicians practicing in cities with large African American populations will report fewer resources to manage diabetes when compared to those practicing in cities that are primarily white.

CHAPTER 4

METHODS

This research has been approved by the University of MI Medical School and the Henry Ford Health System Institutional Review Boards. Funding for this research comes from the University of Michigan's Robert Wood Johnson Health & Society Scholars Program. Research partners include the University of Michigan School of Public Health, University of Michigan Health System, Henry Ford Health System, and the Centers for Disease Control & Prevention REACH 2010-Detroit Initiative.

The methods section is divided into two categories. The first—tool development, data collection, and cleaning—describes the steps taken to establish the sampling frame, develop and pilot the instrument, randomize the sample, collect the data, calculate response rates, data entry and cleaning, and the procedures employed to extrapolate or calculate missing values associated with respondent demographics. The second—research methods—describes the step-by-step process to answer the research questions. Specifically, these steps will include how missing data will be handled, the calculation of group-level derived variables, reducing the data by means of principle components analysis, and the statistical analyses.

Tool Development, Data Collection, and Data Cleaning

Sampling Frame

The sampling frame for this research included all adult primary care physicians (Family Practice, Internal Medicine, and General Practice) and Endocrinologists as identified by the Henry Ford Health System website (n=366), the Detroit Medical Center website (n=418), the Oakwood Health System website (n=278), and the PhysicianDatabases.com physician directory for the tri-county metro-Detroit area—Wayne, Oakland, and Macomb Counties—in 2007 (n=2,313). In total, these sources produced 3,375 individual listings. To maximize the accuracy of the frame and minimize expenditures (e.g., cash incentives, postage) associated with data collection, the following steps were taken to eliminate incomplete, redundant, outdated, or otherwise non-verifiable listings:

- Listings without complete first and last names were removed
- Duplicate listings of the same name were removed. If duplicate listings of the same name and address were listed on 2 or more source lists, the name remained on only one list using the following hierarchy: 1) Detroit Medical Center, 2) Henry Ford Health System, 3) Oakwood Health System, and 4) PhysicianDatabases.com (e.g., if a physician's name was on both the Detroit Medical Center and Henry Ford Health System lists, it would be removed from the Henry Ford Health System list). To maximize the geographic dispersion of the sampling frame and to lessen the concentration of physicians in the city of Detroit, MI, if duplicate listings for a single name had different addresses the preference was given to the address furthest in distance from the city of Detroit (e.g., if a physician was listed as having a Detroit, MI address and Livonia, MI address, the Livonia, MI address was retained).

- Listings where the physician was identified as practicing in a specialty area other than Endocrinology, Internal Medicine, Family Practice, or General Practice were removed.
- To confirm that physician names and addresses from PhysicianDatabases.com were valid (i.e., that the name and address corresponded with an actual physician practicing in greater-Southeast MI), each name was cross-referenced against on-line physician directories for three prominent health insurance companies serving greater-Southeast MI: Blue Cross and Blue Shield of Michigan, Health Alliance Plan, and M-Care. The listing was removed if it was not cited on at least one of the insurance companies' physician directories.

These procedures eliminated 1,797 individual listings, resulting in a revised sampling frame of 1,578 physicians.

In total, 108 cities across the greater-Southeast MI region are represented by the revised sampling frame, with nearly 99% of subjects (1,509 primary care providers and 46 endocrinologists) located within the state's three most populous counties (Wayne, Oakland, and Macomb) and17.8% located within the state’s most populous city (Detroit). While the combined Wayne, Oakland, and Macomb County region (hereafter referred to as the tri-county area) have proportionately more physicians per-100,000 residents when compared to the state as a whole, the proportion of primary care providers to specialists is smaller (Public Policy Associates, 2005; Rosenthal, et al., 2005). Based on Rosenthal, Zaslavsky, and Newhouse’s (2005) analysis of the distribution of primary care providers and specialists in urban, suburban, and rural areas, a conservative estimate suggests the tri-county area has at least 5-15% fewer adult primary care providers per-100,000 residents when compared to the rest of the state. Accordingly, the proportion of all physicians in the tri-county area who are adult primary care providers likely falls between 23% and 27%, as opposed to the state's rate of approximately 28% (Public Sector Consultants & Michigan Department of Community Health, 2008). Applying these estimates to the tri-county area's total active physician population (N= 14,500) suggests the area has somewhere between 3,335 (14,500 x 23%) and 3,915 (14,500 x 27%) physicians who provide adult primary care. Hence, this research targets roughly 38.5% (1,509 / 3,915) to 45.2% (1,509 / 3,335) of all adult primary care physicians in the area.

Instrument Development and Piloting

The two questionnaires used in this research are identical with the exception that one inquires about patients generally and the other about African American patients specifically. These instruments were developed in partnership with faculty members from Henry Ford Health System Institute of Multicultural Health, the Henry Ford Health System Center for Health Services Research, the Veterans Affairs Center for Practice Management & Outcomes Research (Ann Arbor, MI), and the University of Michigan School of Public Health Department of Health Management and Policy. Both the layout and content of the questionnaires were developed using an iterative revisioning process, with modifications a revisions evaluated by project partners until 100% consensus was achieved.

Questionnaires were designed to capture physician perceptions and attitudes as they relate to the following domains: patients' attitudes about diabetes and disease management; economic-, social-, and community-related barriers affecting disease management; access to resources that aid in the provision of diabetes care; patient involvement in treatment decision making; and, strategies to promote patients' adherence to treatment. The selection and wording of the instruments’ questions relied heavily upon a review of the literature, recommendations and correspondence from project partners and colleagues, and an existing physician survey (located in Appendix 1) developed by Michele Heisler, MD, MPA, Research Scientist at the Veterans Affairs Center for Practice Management & Outcomes Research (M. Heisler, personal communication, September 21, 2006). After consensus was reached among project partners regarding the overall layout and wording of the questionnaire (including the phrasing of questions), questionnaires were piloted with six physicians—four physicians were associated with the University of Michigan School of Medicine, one with the Henry Ford Health System Institute of Multicultural Health, and one with the Oakwood Health System—and in-depth follow-up interviews were conducted to collect detailed feedback regarding the questionnaires' wording, content, and layout. The instructions that piloting physicians received in advance of the questionnaire are located in Appendix 2. The final version of both the General and African American Questionnaires are located in Appendix 3.

Mindful of Dillman's Total Design Method, the layout of the questionnaires were designed to reduce subjects' perceived costs, maximize perceived rewards, and increase trust (Dillman, 1991; Dillman, Smith, & Christian, 2009). Specifically, steps were taken to design the instruments to appear clean and professional, easy to read, and not too time-consuming to complete; for example, the instruments have a color cover page, large fonts, simple language and clear directions, and require about 15 minutes to complete. Moreover, the questionnaires were presented to physicians as having direct relevance to their practice—i.e., that results could be used to improve outcomes for patients with diabetes by developing a better understanding of both pathways and barriers to effective disease management. And finally, to give the instruments institutional legitimacy and to promote trust in those who would be receiving them, the questionnaires prominently displayed logos from the Henry Ford Health System, the University of Michigan Health System, and the University Of Michigan School of Public Health, and both the cover letter and instruction page had hand-written signatures from local physician champions.

Randomization

The 1578 physicians in the revised sampling frame were stratified based on their address to receive either the General or African American Questionnaire. Specifically, physicians were sorted in ascending order by address number and street name, and each group with an identical mailing address was assigned, in alternating fashion, to receive either the General or African American Questionnaire. By using this procedure all physicians at the same address were sent the same version of the questionnaire, thus reducing the introduction of bias that could result from knowledge of the two different versions. This procedure resulted in the assignment of 785 physicians to the General Questionnaire group and 793 to the African American Questionnaire group.

Data Collection Procedures

Consistent with the literature on improving response rates to mail-based surveys, a number of strategies were employed to maximize physicians' participation in this research including the use of a personalized notation (e.g., hand-written greeting and signature) on the cover letter; allocation of maximal resources to initial incentive and inclusion of that incentive in the first round of mailing (before the questionnaire is completed and returned); usage of postage stamps rather than labels from a postage machine; usage of a non-standard delivery option (e.g., priority mail); inclusion of a prepaid and preaddressed return envelope; and usage of multiple follow-up contacts with non-responders (Asch, Christakis, & Ubel, 1998; Asch, Jedrziewski, & Christakis, 1997; Dillman, 1991; Dillman, et al., 2009; Halpern, Ubel, Berlin, & Asch, 2002; Kellerman & Herold, 2001; Shosteck & Fairweather, 1979; Tambor et al., 1993).

Each phase of recruitment is described below:

- Week of June 18, 2007 (week 0): At the recommendation of the project partner at the Henry Ford Health System Institute of Multicultural Health, a memo was sent to Henry Ford Health System physicians (n=203) from the Henry Ford Health System Primary Care Development Team (comprised of primary care physician leaders within the Henry Ford Health System) encouraging Henry Ford Health System primary care physicians to participate in the research. This memo (see Appendix 4), one version of which was tailored to the General Questionnaire and a second tailored to the African American Questionnaire, included a color image of the Henry Ford Health System logo, was personalized for each recipient, included four physicians from the Primary Care Development Team in the signature line, and was delivered via Henry Ford Health System's in-house mailing system.
- Week of June 18, 2007 (week 0): The first recruitment packet was mailed to the entire sample (n=1578). This packet contained the following components: a $10 cash gratuity; a personalized cover letter (one version of which was tailored to the General Questionnaire and a second tailored to the African American Questionnaire) with color logos and hand-written signatures in the signature line

(see Appendix 5); the questionnaire and consent;[2] a prepaid and preaddressed return envelope; and, a "do not contact" postcard for those wishing to drop out of the study. This packet was shipped Priority Mail in a 9 ½ in. by 12 ½ in. Priority Mail envelope.

- Week of July 9, 2007 (week 3): Follow-up post cards (see Appendix 6) were sent to non-respondents to request their participation (n=1098); postcards were shipped First Class
- Week of July 30, 2007 (week 6): A second recruitment packet was sent to non-respondents (n=986) containing the same materials as the mailing sent the week of June 18, but with a revised cover letter (one version of which was tailored to the General Questionnaire and a second tailored to the African American Questionnaire) (see Appendix 7) and without the $10 cash gratuity. This packet was sent First Class in a 9 ½ in. by 12 ½ in. envelope.
- Week of August 13, 2007 (week 8): A reminder email was sent to Henry Ford Health System non-respondents (n=117) from a physician champion within the health system requesting participation in the study (see Appendix 8).
- Week of August 20, 2007 (week 9): A third recruitment packet was sent to non-respondents (n=831) containing the same materials as the mailing sent the week of June 18, but with a revised cover letter/memo (see Appendix 9) and without the $10 cash gratuity; the "do not contact" postcards were provided only to Henry Ford Health System physicians. The cover letter/memo was tailored to include

---

[2] An Institutional Review Board waiver was obtained eliminating the need for written informed consent from each physician.

the recipients' name, and a hand-written "Thank you" was printed in the signature line. This packet was again shipped First Class in a 9 ½ in. by 12 ½ in. envelope.

- Week of November 19, 2007a (week 22): A fourth recruitment packet was sent to non-respondents from the three health systems (n=385) containing the same materials as the mailing sent the week of June 18, but with a revised cover letter/memo (see Appendix 10) and with a $5 rather than $10 cash gratuity; the "do not contact" postcards were also excluded. The cover letter/memo (one version of which was tailored to the General Questionnaire and a second tailored to the African American Questionnaire) included the recipients' name, and a hand-written "Thank you" was printed in the signature line. The cover letter/memo also contained an internet address which linked to a web-based version of the questionnaire giving physicians the option to complete an e-version of the questionnaire instead of the paper option. This packet was again shipped First Class in a 9 ½ in. by 12 ½ in. envelope.
- Week of November 19, 2007b (week 22): In lieu of the fourth recruitment packet, non-respondents from the PhysicianDatabases.com physician directory (n=336) were sent a postcard requesting participation either by returning a previously delivered questionnaire or by completing a web-based questionnaire (see Appendix 11). Postcards included color logos, were tailored to the General Questionnaire or to the African American Questionnaire, and shipped First Class.
- Week of January 28, 2008 thru week of February 18, 2008 (weeks 32 thru 35): A reminder email was sent to Henry Ford Health System non-respondents (n=76) from a physician champion within the health system requesting participation in

the study (see Appendix 12). Emails were addressed to each physician and the body was tailored to the General Questionnaire or to the African American Questionnaire.

- April 2008 (weeks 42 thru 45): The Henry Ford Health System physician champion contacted remaining Henry Ford Health System non-respondents (n=68) by phone to solicit participation in the study. A script (Appendix 13) was used to help guide the conversation.
- At the end of recruitment, the addresses of non-respondents from the three health systems were checked against their corresponding health system website to identify discrepancies. The addresses of non-respondents from the PhysicianDatabases.com physician directory and those health system physicians who were no longer listed on their corresponding health system websites were checked against the Blue Cross Blue Shield of Michigan website to identify existing discrepancies.
- After cross-referencing physician addresses with their corresponding health system website, the Blue Cross Blue Shield of Michigan website, or both, non-respondents from the PhysicianDatabases.com physician directory were contacted by telephone to verify whether the physician was still providing adult primary care (or Endocrinology care) at the address used for recruitment at the start of this study. The script for this phone call is located in Appendix 14.

Response Rates

In a review of the literature, Asch et al. (1998) show that the mean response rate of mailed surveys in medical journals is 60%, with published surveys of physicians having a mean response rate of 54% and a standard deviation of 17%. In this study, 689 questionnaires were returned (no online questionnaires were completed) for a crude response rate of 43.7%; however, during the recruitment process a subset of respondents and non-respondents were deemed ineligible for this study. The following bullets delineate respondents, non-responders, and, as marked by an asterisk, those determined to be ineligible for this study:

• Sampling Frame	1,578
o Completed questionnaires	689
o "Do not contact" postcards returned	88
o Returned open but not completed	27
o No response, but correct address confirmed	357
o Could not reach through phone follow-up (address is assumed to have been correct)	38
o Mailing returned to sender/wrong address	151*
o Physician not primary care or endocrinologist	45*
o Physician deceased	2*
o Physician retired	3*
o Physician confirmed to be no longer at health system as identified by physician champion follow-up phone call	8*
o Incorrect name used in mailings as identified by web-site address confirmation (e.g., correct name was "Ali" but mailings were addressed to "Alicia")	3*
o No longer at health system as identified during	

  address confirmation 84*
  - Address determined to be incorrect as identified by follow-up phone contact 83*

Subjects in categories identified by an asterisk (n=389) were removed from the sampling frame because they were incorrectly specified during the recruitment process. After removing these 379 subjects the sampling frame decreases to 1,199 (1,578 – 379) thus increasing the crude response rate to 57.5% (689 / 1,199).

While higher response rates are desirable, Kellerman et al. (2001) claim that among physicians a lower response rate may not be a major problem because "physicians as a group are more homogeneous regarding knowledge, training, attitudes, and behavior than the general population[;]" hence "nonresponse bias may not be as crucial in physician surveys as in surveys of the general population" (p. 65). To assess for demographic differences between respondents and non-respondents an analysis was performed comparing respondents and non-respondents to findings from the Michigan Department of Community Health's 2008 Survey of Physicians. The results of this analysis are presented in the last part of the following section *Data Entry and Cleaning, Missing Values for Physician Demographics, and an Analysis of Respondents versus Non-Respondents*.

Data entry and cleaning. Returned questionnaires were entered directly into PASW[3] Statistics 18. To check for entry accuracy, fifty questionnaires were compared against the electronic data file. With 134 data points for each questionnaire, a total of 6700 individual data entries (50 x 134) were verified. In all, 36 entry errors were

---

[3] SPSS and PASW are synonymous; instead of the SPSS name, versions 17.0.3 thru 18.0.3 used the name PASW; the SPSS name resumed in 2010 with the release of version 19.

discovered, for an entry error rate of 0.54%. Using the entire set of returned surveys (n=689), each variable was then checked for impossible values (i.e., values outside of the possible range of values) and potential outliers using a number of strategies including an examination of descriptive information about the variable's distribution (e.g., mean, median, mode, minimum value, maximum value) and graphical displays (e.g., boxplots, histograms). When suspect values were identified the electronic entry was cross-referenced with the original questionnaire and, when necessary, corrections were made.

Of the 689 returned questionnaires, fifty-two were excluded for the following reasons:

- 10—only demographic portions of the questionnaire were completed
- 19*— physician did not provide direct care to adult patients with diabetes
- 2*—had no experience practicing medicine post-residency
- 21*— practice medicine in an area other than primary care or endocrinology

Due to their ineligibility, the forty-two respondents identified above by an asterisk were subsequently dropped from the sample, reducing it to 1,157 (1,199 – 42). The revised number of returned *and* usable questionnaires also decreased, from 689 to 637 (689 – 52). As a result, the response rate for this research was adjusted from a crude rate of 57.5% (689 / 1,199) to a final rate 55.1% (637 / 1,157).

Missing Values for Physician Demographic Variables. Missing values for a subset of physician demographic variables were extrapolated or reclassified using the following procedures:

- Date of birth (DOB) was extrapolated for twenty-two respondents using the following methods: For the 16 respondents for whom the number of years practicing post-residency was known, DOB was calculated using the following formula: DOB = (($\hat{W}_1$ + Y) * (-1)) + Z, where $\hat{W}_1$ = 31years (i.e., the median age at which subjects for whom DOB was not missing started practicing medicine post residency), Y is number of years practicing medicine post residency, and Z is the year of recruitment for this research (i.e., 2007). For 5 respondents the same formula was used, but Y was ascertained through Healthgrades.com[4] and each physician was estimated to have had a three year residency. (Note: DOB remains missing for one respondent.)

- Race/ethnicity was reclassified for twenty-seven respondents using the following methods: Thirteen respondents' self-identified a racial or ethnic group in the "other" category (e.g., Middle Eastern/Chaldean, African, European American, Italian) rather than choosing one of the seven options offered. These respondents were reclassified into one of the seven categories based on best fit: Pakistani, Indian, and Asian Indian were each reclassified to Asian; Middle Eastern, Chaldean, Armenian, Italian, and European American were reclassified into white; and Kenyan and African were reclassified into African American. Fourteen respondents did not provide any information for the race/ethnicity questions and were subsequently reclassified into a new category identified as “no response.”
- City was extrapolated for twenty-eight subjects using the following method: Subjects were cross-referenced with the mailing list where city was indicated.

---

[4] HealthGrades.com is on on-line resource providing in-depth information on over 750,000 physicians in over 100 specialties across the US Physician information, compiled from both public and private sources including the Centers for Medicare and Medicaid Services, Department of Health and Human Services, and states' medical board records—is updated quarterly Healthgrades.com. (2012). Frequently asked questions. Retrieved Feburary 14, 2012, from http://www.healthgrades.com/business/information/faqs.aspx.

- Credential was extrapolated for fifteen respondents using the following method: respondents were cross-referenced with the mailing list where credential was indicated.
- Specialty was extrapolated for twelve subjects using the following method: Subjects were cross-referenced with the mailing list where specialty was indicated.
- Work environment was reclassified for fourteen respondents using the following method: fourteen respondents did not provide any information for the work environment question; these respondents were reclassified into a new category identified as "no response."
- Gender was extrapolated for thirteen respondents using the following method: Respondents were cross-referenced with the mailing list where first names were used to infer gender. (e.g., Susan classified as female, Anthony classified as male).[5]
- US medical graduate status (versus international medical graduate status) was extrapolated for six respondents using the following method: The country where respondents attended medical school was identified by cross-referencing the subject to a physician review website (HealthGrades.com)
- Board Certification was extrapolated or reclassified for 74 subjects using the following methods: Respondents were cross-referenced with health system websites, the American Medical Association website, and physician review

---

[5] To confirm gender, some first names were also cross-referenced with meaning-of-names.com, a website specializing "in name meanings for over 45,000 different baby names, surnames, and city names from all over the world" meaning-of-names.com. (2011). Retrieved November 22, 2011, from http://www.meaning-of-names.com/.

websites (HealthGrades.com and Vitals.com) where board certification was specified; thirteen respondents for whom no board certification was specified and for whom board certification could not be confirmed were reclassified into a new category identified as "no response."

Respondents versus nonrespondents and a comparison of respondents to findings from the Michigan Department of Community Health (MDCH) Survey of Physicians. An examination of demographic information comparing both respondents and non-respondents reveals several differences between groups. As outlined in Table 6, DOs were less likely than MDs to be non-responders. While the training for MDs and DOs is similar, osteopathic education places greater emphasis on a holistic approach to patient care which may in turn translate into a more patient-centered practice style (Carey, Motyka, Garrett, & Keller, 2003; Johnson & Kurtz, 2002; Licciardone, 2007; Peters, Clark-Chiarelli, & Block, 1999). This orientation may have primed DOs to be more ready and willing to complete and return the questionnaire as it focuses on a broad array of barriers—psychological, physical, and social—impacting the management of diabetes. Non-responders were also less likely to be from the Detroit Medical Center and Henry Ford Health Center mailing lists, and to specialize in Family Practice. Statistically significant differences by physicians' gender were not observed.[6] As illustrated in Table 7, these differences are in part accounted for by the higher response rate among DOs. Given that DOs, those affiliated with the Detroit Medical Center or Henry Ford Health Center, or those specializing in Family Practice were more likely than MDs, those

---

[6] Gender of non-respondents was confirmed by cross referencing with health system websites (where gender is specified) or by looking up first names on meaning-of-names.com, a website specializing "in name meanings for over 45,000 different baby names, surnames, and city names from all over the world" ibid..

affiliated with the Oakwood Health System or PhysiciansDatabases.com, or those specializing in Internal Medicine to return completed questionnaires, findings associated with these data may be biased. To help counter this possibility, as discussed in the next section, subsequent analyses will include a number of controls to account for patient and physician demographics and characteristics of the health care setting.

When compared to findings from the 2008 MDCH Survey of Physicians—a sample of Michigan physicians regardless of specialty—respondents to the General and African American Questionnaires are less likely to male or US medical graduates (versus international medical graduates) and more likely to be African American, Asian/Pacific Islander, a doctor of osteopathic medicine (versus allopathic medicine), or in private practice. Given that the questionnaires targeted only primary care physicians and endocrinologists in the state's largest metropolitan area, and because metropolitan areas tend to have an increased concentration of female physicians, physicians from racial and ethnic minorities, and international medical graduates, the observed differences between questionnaire respondents and the MDCH survey are not particularly remarkable (Boukus, et al., 2009; Health Resources and Services Administration, 2008; Morris, et al., 2006; Rosenblatt & Hart, 2000; U.S. Government Accountability Office, 2003).

Research Methods

Missing Data

Principal Independent Variables. As noted by Allison (2009), "The most obvious drawback of listwise deletion is that it often deletes a large fraction of the sample, leading to severe loss of statistical power" (p. 72). For the research proposed here, the inclusion of the eight predictors (listed below) without replacement of missing values would have resulted in the loss of fifty-nine (9.3%) cases. Given this problem, missing values for these predictors were estimated using a multi-step matching algorithm. The use of matching was a suitable method for this dataset based on the fact that relatively few values for any given variable were missing (Acuña & Rodriguez, 2004; Fichman & Cummings, 2003; Tabachnick & Fidell, 2007). As noted by Tabachnick and Fidell (2007), when only a few data points are missing "almost any procedure for handling missing values yields similar results" (p. 63). Analysis of the eight predictor variables listed below reveals that, overall, only 2.1% (108 / (8 * 637)) of values were missing, with each variable missing, on average, 13.5 values (median = 12; mode = 12). Table 9 illustrates how missing values were distributed across variables, showing most were missing less than 2% of their values and only one missing 5% of their values. To investigate the pattern of missing values, Tabachnick and Fiddell (2007) suggest converting the cases with missing values into a dummy variable (reflecting cases with missing values and cases without missing values) and then testing for mean differences between the groups.

Using this procedure to differentiate the fifty-nine cases that would have been eliminated if employing listwise deletion, Table 10 illustrates how cases with and without missing values differ across an array of demographic dimensions. Significant differences were found for two dimensions—proportion of patients African American (<50% of patients African American versus ≥50% of patients African American) and credential (MD versus DO)—with those with ≥50% of patients African American and those with a DO being more likely to have missing values. In terms of the research outlined in this proposal, however, the important question is whether this variation would introduce bias in the estimation of missing values.

The key to answering this question rests with the potential impact of the proportion of patients African American and credential on the estimation of missing values. As shown in Tables 11a and 11b, physicians with ≥50% of patients African American and those who are DOs account for an extremely small number of missing values when taken in context of the entire 637 person sample. More specifically, physicians with ≥50% of patients African American and DOs account for a total of 30 and 37 missing values, respectively, and total no more than eleven for any given variable. While the risk of introducing bias by using credential as part of the matching algorithm for extrapolating missing values would be very small, it was excluded as a matching criteria so as to eliminate this risk altogether. As described below, the proportion of patients either white or African American were used as a last resort matching criteria to estimate four missing values associated with two variables—white patient income and African American patient income—only after matches based on respondents' address or city were not available. In these cases, using patient race as a fallback matching criteria was justified given the relationship between income of race described in the previous chapter.

The following outline, then, describes the matching strategy used to estimate missing values for the eight variables that will be used as predictor variables in subsequent analysis:

- Year of Birth (YOB) (continuous variable)—YOB was incomplete for one respondent (0.16% of respondents). YOB was extrapolated for this individual by taking the median YOB for respondents who share the same gender, race/ethnicity, specialty, and US versus international medical graduate status.

- Proportion of patients who are white (continuous variable)—Proportion of patients who are white was incomplete for four respondents (0.63% of respondents). For two of these respondents there was at least one other respondent in the dataset who practiced at the same address and who returned a completed questionnaire. The median response for those practicing at the same address was used to replace the missing value for the corresponding respondent with the missing data. For the two respondents for whom no other respondent shared an address, the median response for those respondents practicing in the same city was used.
- Proportion of patients who are African American (continuous variable)—Proportion of patients who are African American was incomplete for twelve respondents (1.88% of respondents). For four of these respondents there was at least one other respondent in the dataset who practiced at the same address and who returned a completed questionnaire. The median response for those practicing at the same address was used to replace the missing value for the corresponding respondent with the missing data. For the eight respondents for whom no other respondent shared an address, the median response for those respondents practicing in the same city was used. (Note: When summed, the proportion of patients white and African American must be less than or equal to 100%. If one value was estimated and the summed total exceeded 100%, the estimated value was reduced so that the summed total equaled 100%. If both

values were estimated, they were each reduced while maintaining the same ratio so that the summed score equaled 100%.)

- Proportion of white patients having trouble meeting medical expenses (four category variable)—Proportion of white patients having trouble meeting medical expenses was incomplete for fourteen respondents (2.20% of respondents). For nine of these respondents there was at least one other respondent in the dataset who practiced at the same address and who returned a completed questionnaire. The modal response for those practicing at the same address was used to replace the missing value for the corresponding respondent with the missing data. For the five respondents for whom no other respondent shared an address, the modal response for those respondents practicing in the same city was used.
- Proportion of African American patients having trouble meeting medical expenses (four category variable)—Proportion of African American patients having trouble meeting medical expenses was incomplete for twelve respondents (1.88% of respondents). For nine of these respondents there was at least one other respondent in the dataset who practiced at the same address and who returned a completed questionnaire. The modal response for those practicing at the same address was used to replace the missing value for the corresponding respondent with the missing data. For the three respondents for whom no other respondent shared an address, the modal response for those respondents practicing in the same city was used.
- White patient income (five category variable)—White patient income was incomplete for thirty-two respondents (5.02% of respondents). For sixteen of

these respondents there was at least one other respondent in the dataset who practiced at the same address and who returned a completed questionnaire. The modal response for those practicing at the same address was used to replace the missing value for the corresponding respondent with the missing data. For fifteen respondents for whom no other respondent shared an address, the modal response for those respondents practicing in the same city was used. For the remaining respondent for whom there were no other respondents from the same city, the modal response of those respondents with approximately the same proportion (±5%) of white patients and who reported the same proportion of white patients having trouble meeting medical expenses was used.

- African American patient income (five category variable)—African American patient income was incomplete for twenty-eight respondents (4.40% of respondents). For twelve of these respondents there was at least one other respondent in the dataset who practiced at the same address and who returned a completed questionnaire. The modal response for those practicing at the same address was used to replace the missing value for the corresponding respondent with the missing data. For thirteen respondents for whom no other respondent shared an address, the modal response for those respondents practicing in the same city was used. For the remaining three respondents for whom there were no other respondents from the same city, the modal response of those respondents with approximately the same proportion (±5%) of African American patients and who reported the same proportion of African American patients having trouble meeting medical expenses was used.

- Number of patients seen per-week (six category variable)—Number of patients seen per-week was incomplete for five respondents (0.78% of respondents). For four of these respondents there was at least one other respondent in the dataset who practices at the same address and who returned a completed survey. The modal response for those practicing at the same address was used to replace the missing value for the corresponding respondent with the missing data. For the one respondent for whom there were no other respondents who shared an address, the modal response for those respondents sharing the same working environment, specialty, and city was used.

These matching procedures eliminated 100% of missing values for the eight variables being used as predictor variables in subsequent analysis.

Impossible Responses

In both the General and African American Questionnaires, respondents were asked to estimate the proportion of their patients that were white and African American. For seven respondents the summed total of the two values exceeded 100%. For these cases, the value of each response was reduced while maintaining the same ratio so that the summed score equaled 100%.

SES Indicator

Informed by van Ryn and Burke (2000), who created a composite SES variable by standardizing two SES-related variables and averaging the two, a patient SES indicator was created for each physician. Four questions were used to create the indicator: questions 3b and 4b asked physicians to indicate the proportion of their white and African American patients having difficulty meeting their medical expenses (0-25%, 26%-50%, 51%-75%, and 76%-100%), and questions 3c and 4c asked physicians to select the income category that best described their white and African American patients (poverty, low income, low middle income, high middle income, and high income). Responses for questions 3b and 4b were coded with values from zero to three, with zero representing the least impoverished category (0-25%) and three representing the most impoverished category (76%-100). Responses for questions 3c and 4c were coded with values from zero to four, with zero representing the least impoverished category (high income) and four representing the most impoverished category (poverty). The values associated with questions 3b and 3c were added to create a new variable, ranging from zero (least impoverished) to seven (most impoverished), indicating each physician's perception of *white* patients' SES; and the values associated with questions 4b and 4c were added to create a new variable, ranging from zero (least impoverished) to seven (most impoverished), indicating each physician's perception of *African American* patients' SES. The values for these newly created variables were then weighted to reflect the proportion of patients described by each physician as being either white or African American. After weighting, the variables were added together to create a single patient SES indicator for each physician. This indicator ranges from zero to seven, with zero indicating the least impoverished and seven indicating most impoverished. Values were then reverse coded for each respondent so that the highest value, seven, indicates the highest SES group and the lowest values, zero, indicates the lowest SES group.

Group-Level Derived Variable: SES Index and Racial Concentration

While individual and group-level measures of a given construct are similar, group level variables can provide information not readily conveyed by the individual-level measure. An individual's income, for example, describes earnings from work or another source and can be an indicator of that person's ability to garner resources and leverage opportunity; the average income in a given city, however, can be a marker of that city's infrastructure (e.g., schools, roads, recreational facilities) or social environment (e.g., safety, poverty, crime) (Diez Roux, 2003). Applying this concept to health, Bonito et al. (2008) assert that group-level measures can "reflect common culture, behavior, norms, and values in response to selected symptoms of ill health, health care seeking behavior, as well as demonstrating likely differences in access to services, quality of available care, and discrimination in the provision of services" (p. 38). For this research, two group-level variables derived from US Census data were created to add context about the environment where physicians' are providing care and to add a layer of objective information about physicians' practice settings: city-level SES Index and the proportion of the city's population that is African American. The city-level SES Index, calculated using a procedure developed by Bonito et al. (2008),[7] is a combined measure of economic and social factors conveying the relative economic position and social standing of a given community; The second measure, indicating the concentration of African Americans from a residential perspective, conveys how geographic regions are organized along racial lines. Including both the SES and racial concentration measures as predictor variables in subsequent statistical analyses enables the analyses to distinguish the relative contribution of each on a given outcome.

Bonito et al.'s formula for calculating the SES index can be expressed as

---

[7] The creation and validation of the SES index developed by Bonito et. al (2008) is described in detail in their report to the Agency for Healthcare Research and Quality and the Centers for Medicare and Medicaid Services.

SES Index Score = 50 + (-0.07*crowded) + (0.08*prop100) + (-
0.10*pct_poverty) + (0.11*hhinc100) + (0.10*high_educ) + (-
0.11*low_educ) +
(-0.08*pct_unemp)

Where crowded = percentage of households containing one or more person per room; prop100 = median value of owner-occupied values, standardized to range from 0-100; pct_poverty = percentage of persons below the federally defined poverty line; hhinc100 = median household income, standardized to range from 0-100; high_educ = percentage of persons aged ≥ 25 years with at least 4 years of college; low_educ = percentage of persons aged ≥ 25 years with less than a 12th-grade education; and, pct_unemp = percentage of persons aged 16 years or older in the labor force who are unemployed (and actively seeking work). As described by Bonito et al., the respective weights for each SES measure were derived by means of principle components analysis using the entire set of 211,267 US Census block groups. The data used to create the these group-level variables are based on 5-year estimates (2005-2009) from the American Community Survey obtained from the US Census Bureau (U.S. Census Bureau, 2011).

Data Reduction—Principle Components Analysis (PCA)

To reduce the large set of variables contained within in the questionnaires into a smaller, more manageable set of scales, PCA was employed. The General and African American Questionnaires contain fifty-seven variables, listed in Appendix 15, designed to capture physicians' perceptions of patients, strategies to promote patient adherence, and the availability of resources to aid in the provision of diabetes care. To uncover relationships between individual variables and to cluster them into coherent categories, PCA was employed using data from General Questionnaire respondents (n=324). The rationale for using only General Questionnaire respondents stems from the General and African American Questionnaires not having the same underlying component structure; hence, isolating the General Questionnaires reduces error, improves the pattern of clusters, and creates a more psychometrically sound summary of the data. The resultant component structure, and relatedly, General Questionnaire component scores, can then be used as the benchmark against which African American Questionnaire respondents are compared (J. M. Lepkowski, personal communication, May 2, 2011).

Sample size. When conducting PCA it is necessary to have a sample of sufficient size to ensure that correlation coefficients are being reliably estimated. There is little consensus, however, as to how large is large enough. While acknowledging that the requisite size depends on a range of study-specific parameters, Tabachnick and Fidell (2007) assert "as a general rule of thumb, it is comforting to have at least 300 cases" (p. 613). Gorsuch (1974) and Everitt (1975) suggest having at least five case per-variable, and Arrindell and Van Der Ende (1985) recommend having a sample that is roughly twenty times larger than the number of components. Employing Monte Carlo methods, MacCallum, Widman, Zhang, and Hong (2001) tested these commonly used guidelines and showed that the required sample size is contingent on the communality of variables and the level of components' overdetermination.[8] Their analyses showed that a sample between 200 to 400 cases is usually large enough to achieve good recovery of population components in the sample as long as the ratio between the variables and components is adequate (i.e., at least 10:3) and communalities among variables are not too low (i.e.,

---

[8] "Highly overdetermined factors are those that exhibit high loadings on a substantial number of variables (at least three or four) as well as good simple structure. Weakly overdetermined factors tend to exhibit poor simple structure without a substantial number of high loadings"(MacCallum, et al. (1999), p. 90).

≤0.4). Post-hoc analysis reveals the average level of communality across the fifty-seven variables in the initial PCA—described below—was 0.48, with no component yielding a weakly overdetermined structure (i.e., containing less than three variables). Hence, employing PCA using fifty-seven variables from the sample of 324 General Questionnaires is justified not only based on the sample size, cases per-variable, and variables per-component, but also by post-hoc examination of the mean communality and the strength of components' overdetermination.

Missing Values Among the Variables to be Used in PCA. The presence of missing values poses a significant problem when conducting PCA as it can distort the sample component structure and thereby produce a biased estimate of the true population parameter (Mackelprang, 1970). One commonly used strategy to deal with missing values when conducting PCA is listwise deletion; however, this method can significantly reduce sample size and thus negatively impact statistical power and the ability of components to converge. Moreover, if missing values are not missing at random, the underlying pattern can distort the sample (and resultant component structure) and introduce bias. An examination of the fifty-seven variables used in this analysis reveal that listwise deletion would produce an unacceptable loss of data (i.e., 51 cases), necessitating an alternate strategy to deal with missing values.

To determine the most appropriate strategy for imputing missing data it is important to first assess whether data is missing randomly or in some systematic fashion. Missing values analyses reveal that of the 18,468 data points in question (i.e., 57 variables * 324 respondents), only 109 (or 0.59%) are missing; the mean number of values missing per-variable is very small, at 1.9 (with both a median and mode of 2).

Table 12 summarizes how missing values are distributed across variables, with thirteen of the fifty-seven variables having no missing values and only one variable missing more than 2.5% of its values. While there are no hard-and-fast rules regarding how much missing data can be tolerated, Tabachnick and Fiddell (2007) and others assert that missing less than 5% from a large dataset is manageable, can be dealt with reasonably well using most methods, and poses little risk of producing biased results if evidence supports that values are not missing in a systematic fashion (Acuña & Rodriguez, 2004; Fichman & Cummings, 2003). To assess for patterns associated with missing data, Tabachnick and Fiddell (2007) suggest converting the cases with missing values into a dummy variable reflecting cases with missing values and cases without missing values and then testing for mean differences between groups. As shown in Table 13, this analysis reveals only one statistically significant difference, with USMGs being less likely to have missing values when compared to IMGs . Given the small number of missing values for any given variable, with fifty of the fifty-seven variables missing three or fewer values and only three variables missing more than five values, the possible effect of this difference is very small.

Because the proportion of missing values is very small and evidence supporting a systematic pattern of missing values is weak, missing values for the fifty-seven variables were estimated using multiple linear regression with the following predictor variables: Questionnaire type (General versus African American), year of birth, gender, race (non-Hispanic white versus others), specialty (Internal Medicine, Family Practice, and others), credential (MD versus DO), medical school (US graduate versus international graduate), practice environment (private practice, group practice, and others), board certification (yes versus no), and the percentage of patients identified by the respondent as being African American. To minimize the compression of standard errors, a random component was added to the regression estimates using an SPSS Missing Values procedure where “error terms are drawn from a distribution with the expected value 0 and the standard deviation equal to the square root of the mean squared error term of the regression” (SPSS, 2008, p. 14). While adding random error to each imputed value does not entirely eliminate the reduction in standard error, it is a significant improvement over hot deck methods or replacing missing values with the series mean; moreover, unlike pooled data generated through the use of multiple imputation, the predicted values can be used in SPSS when employing data reduction techniques (i.e., PCA).

Preparing Data for PCA. Prior to the imputation of missing values, sixteen variables were identified as having a reverse coding scheme. These variables were recoded to ensure uniformity with the remaining items, where low scores represent the positive attribute of the questions’ stem and high scores represents the negative attribute. To ensure all variables use the same five-point scoring system, variables with six- or ten-point response scales were transformed into five-point scales, with six-point scales transformed so that the middle two responses (3 and 4) were combined, and ten-point scales transformed so that each consecutive pair of scores (1 and 2, 3 and 4, 5 and 6, etc.) were combined; in all, two six-point and three ten-point response scales were recoded.

Identifying the correct number of components. To determine the correct number of components within the data, post-hoc procedures were performed using *Monte Carlo PCA for Parallel Analysis* (Watkins, 2000). This program enables the comparison of eigenvalues calculated from the dataset with eigenvalues calculated from a randomly generated dataset of the same size and having same number of variables. Eigenvalues calculated from the dataset are subsequently rejected if they are smaller than those associated with the randomly generated data. This procedure resulted in the retention of eight components; that is, the eigenvalue corresponding to the ninth component from the dataset was smaller than the ninth value from the random data, at 1.438 and 1.5062, respectively. Post-hoc examination using Catell's scree plot test—where each eigenvalue was plotted on its respective component number—confirmed the eight component solution, as indicated by the sharp drop in values immediately preceding the ninth component. Results from the parallel analysis and scree plot test are available in Appendix 16.

Assessment of the suitability of the data for PCA. To confirm PCA as an appropriate method of dimension reduction, the correlation matrix was examined and found to have many coefficients greater than or equal to 0.300 and very few coefficients greater than or equal to 0.500 (in all, only four pairs had coefficients in the 0.500 to 0.599 range, and only six pairs had coefficients in the 0.600 to 0.770 range). Bartlett's Test of Sphericity was also statistically significant ($p <.001$), but due to the large sample size and 5:1 cases per-variable ratio this result may be spurious. Tabachnick and Fidell (2009) suggest using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy in lieu of Bartlett's Test because the KMO statistic is less dependent on sample size. Analyses using the fifty-seven variables from General Questionnaire respondents (with missing values imputed) produced a KMO value of 0.815, a very strong indicator of the data's suitability for PCA (Field, 2009; Tabachnick & Fidell, 2007).

Factor rotation. To help improve the interpretability of the underlying structure, components were rotated and compared using two oblique methods, Direct Oblimin and Promax, and one orthogonal rotation, Varimax. The Varimax solution was rejected outright because the component correlation matrices from both oblique solutions contained coefficients of moderate size (≥0.3), indicating the underlying components were not independent. Examination of the Direct Oblimin and Promax structure matrices revealed similar patterns, with only eight variables loading onto different components between them. The Direct Oblimin rotation, however, revealed a more theoretically sound pattern, and unlike the Promax solution, had no components yielding a weakly overdetermined structure. In addition, examination of the Direct Oblimin component correlation matrix showed most pairs were either unrelated or weakly related, with only two pairs having coefficients larger than 0.2 and no pairs larger than 0.4. In contrast, the component correlation matrix from the Promax solution showed many significant relationships, with ten pairs having coefficients larger than 0.2 and one pair larger than 0.4. In all, the eight component solution explained 47.9% of the variance, with components one and two contributing 15.8% and 8.5%, respectively. The pattern and structure matrices, the component correlation matrix, and the mean communality for the fifty-seven variable direct Oblimin solution are each presented in Appendix 17.

Interpreting the PCA solution. Summarizing the structure matrix, Table 14 delineates the variables in each component, indexes variables in rank order by loading score, and specifies each components' internal consistency as measured by Cronbach's alpha and mean inter-item correlation. Italicized text indicates those variables that, if removed, would improve their respective component's alpha; bold text indicates those variables that, if removed, would improve their respective component's interpretability. In the case of two bold text variables—Physical Discomfort and Other Professional-reverse order—the removal would *both* increase alpha *and* the component's interpretability. In the case of the remaining bold text variable—Cultural Differences—the removal would slightly decrease alpha. While usually preferable to keep alpha as high as possible, the removal of the variable Cultural Differences would decrease the statistic by a very small amount, from 0.770 to 0.766, but would greatly improve the component's interpretability. One variable (Big Difference-reverse order) is excluded from Table 14 as it failed to adequately load on any of the eight components. By excluding the three variables that improve interpretability and the single variable that failed to load, a total fifty-three variables remain in this solution.

To characterize the underlying dimension unifying variables that load on the same component an analysis of each component's particular content was performed. Close inspection revealed similar thematic content in components one, seven, and eight, and in components five and six; specifically, components one, seven, and eight each measures physicians' perceptions of the barriers that patients face in managing diabetes, and components five and six each measure physicians' perceptions of resource constraints. Examination of the component correlation matrix reveals components one, seven, and eight to be moderately related, with components one and seven having an absolute correlation coefficient of 0.220 and one and eight having an absolute correlation coefficient of 0.315. Components five and six, however, are only weakly correlated with an absolute correlation coefficient of 0.121. Components two, three, and four tap into dimensions not readily shared by other components, with component two measuring physicians' endorsement of adherence promotion strategies, component three measuring physicians' perceptions of patients' disease management attitudes, and component four measuring physicians' perceived efficacy and control.

Given the lack of independence between components, and consequently the requirement to use oblique rotation, the rotated solution does not present a simple structure; namely, twelve variables have loading scores with an absolute value of 0.400 or greater on more than one component. Among these twelve, seven have secondary scores on a component with similar thematic content and the rest are loaded on a secondary component in no discernible pattern. Despite this limitation, the eight component solution is both empirically and theoretically justified as evidenced by the parallel analysis and Catell's scree test, KMO measure of sampling adequacy, uniformly high Cronbach's alphas, and each component's internal thematic consistency. Furthermore, loading scores for each retained variable exceed 0.400, a value substantially higher than the 0.298 cut-off recommended by Field (2009) and the 0.320 cut-off recommended by Tabachnick and Fidell (2007) .

Despite the empirical and theoretical justification for the eight component, fifty-three variable solution, there are also a number of drawbacks. First, it is not very parsimonious—a number of variables had to be excluded ex-post facto to improve interpretability, and there remains considerable thematic overlap between components. And second, with nearly a quarter of variables having loading scores of 0.400 or greater on more than one component, the solution is not simple (i.e., each variable does not load strongly on only one component and weakly on all others). While most of the dually loading variables fit well thematically with the component with the highest loading, some fit as well or better with the component with the smaller loading. Consequently, the oblique solution is not ideal, as it lacks organization and precision. In contrast, orthogonal solutions are by definition perfectly uncorrelated, making them more straightforward and easier to interpret. Orthogonal solutions also have the distinct advantage of fewer parameter estimates; hence, as noted by Kieffer (1998), they are arithmetically less complicated and more generalizable.

Pursuing an orthogonal solution. Transforming the oblique solution into an orthogonal solution requires the strategic removal of variables with the goal of reducing the most pronounced correlations between components. To this end, a correlation matrix was created using all fifty-seven variables. Pairs of variables with a Pearson's correlation coefficient equal to or greater than 0.500 were identified, and, as outlined in Table 15, broken into two blocks. Block one contains pairs having coefficients equal to or greater than 0.600, and block two has pairs with coefficients less than 0.600. One variable from each pair was designated for removal based on how directly it related the management of diabetes; namely, those variables judged to have a direct impact on disease management were retained (e.g., be overwhelmed with the demands of managing the disease; there is not enough time during office visits to discuss adherence-related barriers; etc.), and those judged to have a less direct impact were removed (e.g., lack social support; my patients have more important issues they would like to discuss with me; etc.). Several rounds of PCA using Direct Oblimin rotation were then performed—first using all fifty-seven variables, then using fifty-two variables (excluding variables from block one), and last using forty-nine variables (excluding variables from both block one and block two)—and component correlation matrices were examined. The number of components for each analysis was determined using parallel analysis and Catell's scree test, as described previously. Two analyses were conducted using 49 variables because the parallel analysis and scree test procedures produced conflicting results—the former indicating a six component solution and the later indicating five. As outlined in Table 16, the component correlation matrix from each analysis indicates that only when the sample of variables was reduced to forty-nine (for both the five and six component solutions) were there no longer moderately large correlations between components ($r \geq 0.3$). Hence, by eliminating the strongest correlations between variables the moderately large correlations between components disappear, and with only weak correlations between components, orthogonal (Varimax) rotation emerges as an acceptable method for organizing components.

Conducting PCA with orthogonal rotation. Forty-nine variables (i.e., the fifty-seven variables listed in Appendix 15 minus the eight variables indicated in Table 15) were subjected to PCA using Varimax rotation. Based on the pronounced change in slope as determined by Catell's scree test, five components were retained. The KMO value was sufficiently high at .806, and Bartlett's test of Sphericity reached statistical significance. An outline of eigenvalues, the proportion of variance explained by each component, the scree plot and parallel analysis, and the rotated component matrix are each presented in Appendix 18. As indicated in Table 17, the five component solution explained 38.7% of the variance, with components one and two explaining 14.9% and 8.5%, respectively. Table 17 also delineates each component, listing variables in rank order by loading score and specifying each component's internal consistency as measured by Cronbach's alpha and mean inter-item correlation. Italicized text indicates the two variables (Medical Equipment-reverse order and Free Samples-reverse order) that, if removed, would improve their respective component's alpha; underlined text indicates the single variable (Other Professional-reverse order) with a corrected item-total correlation less than 0.300, indicating that the variable likely measures something different from the component as a whole. Removing these three variables increases Cronbach's alpha for component three from 7.03 to 7.11, and raises the mean inter-item correlation from 0.196 to 0.239. Two variables (Big Difference-reverseorder and Get Medications-reverseorder) failed to adequately load on any component, and two other variables (Training to Resolve and Health Literacy) had loading scores of 0.400 or greater on more than one component. Close inspection of variables in each component revealed strong thematic consistency and no substantive overlap between components, with component one measuring physicians' perceptions of patients' disease management barriers, component two measuring physicians' perceive more resource constraints as it relates to the provision of high quality, culturally competent care, component three measuring physicians' strategies to promote patient adherence, component four measuring physicians' perceptions of patients' disease management attitudes, and component five measuring physicians' perceived efficacy and control.

To achieve a simple structure and to maximize the reliability of each component, a final PCA with Varimax rotation was conducted after removing those variables that (a) failed to adequately load on any component (Big-Difference-reverse order and Get Medications-reverse order), (b) had loading scores of 0.400 or greater on more than one component (Training to Resolve and Health Literacy), (c) diminished the component's Cronbach's alpha (Medical Equipment-reverse order and Free Samples-reverse order), or

(d) had a corrected item-total correlation of less than 0.300 (Other Professional-reverse order). These procedures reduce the set of variables from forty-nine to forty-two. Based on the results of parallel analysis and Catell's scree test, five components were retained. The KMO value for this forty-two variable solution was sufficiently high at .815, and Bartlett's test of Sphericity reached statistical significance. An outline of eigenvalues, the proportion of variance explained by each component, the scree plot and parallel analysis, and the rotated component matrix from this analysis are each presented in Appendix 19. As indicated in Table 18, the five component solution explained 41.3% of the variance, with components one and two explaining 15.8% and 8.9%, respectively. Table 18 also delineates each component, listing variables in rank order by loading score and specifying each component's internal consistency as measured by Cronbach's alpha and mean inter-item correlation. Unlike previous analyses using fifty-seven or forty-nine variables, the forty-two variable solution reveals the presence of a simple structure. Close inspection of variables in each component revealed strong thematic consistency and no substantive overlap between components, with variables loading in nearly the same pattern as when analyzing forty-nine variables—component one measures physicians' perceptions of patients' disease management barriers, component two measures physicians' resource constraints: quality and the provision of culturally competent care, component three measures physicians' perceptions of patients' disease management attitudes, component four measure physicians' strategies to promote patient adherence, and component five measures physicians' perceived efficacy and control. Only one variable has a loading score less than .400, and over three-quarters have loading scores greater than 0.500. With its simple structure, this 42 variable, five component solution is not only empirically rigorous and theoretically justified, but unlike the fifty-seven and forty-nine component solutions, does not require oblique rotation and is therefore decidedly more parsimonious.

Creating Component Scores. To prepare the forty-two variable, five component solution for subsequent analysis, summary scores were created to identify each respondents' location on the distribution of responses for each component. Two strategies for developing component scores were considered—the weighted sum method and Thurstone's least squares regression method. In the weighted sum method, responses to variables in each component were first multiplied by the loading score associated the variable and then added together for each respondent. Accordingly, items with the highest loading (i.e., the largest correlation between the variable and component) had the largest effect on their respective component's score. In the regression method, responses to variables in each component were first standardized, then weighted by regression coefficients obtained by multiplying the inverse of the correlation matrix by the factor loading matrix, and then added together for each respondent (DiStefano, Zhu, & Mîndrilă, 2009; Tabachnick & Fidell, 2007). An advantage of the regression procedure over the weighted sum method is that it takes into account the correlations between components, between components and item loadings, and between each of the variables themselves (DiStefano, et al., 2009).

To evaluate the suitability of the weighted sum and regression scoring methods on a specific dataset, Pett, Lackey, and Sullivan (2003) suggest assessing for univocality; that is, evaluating whether the pattern of correlations among component scores reflects the pattern of correlations among the components themselves. Because the forty-two variable, five component solution was obtained using orthogonal extraction, the resulting component structure is by definition not correlated—the component correlation matrix in Table 19a shows mostly negligible negative coefficients, with the largest coefficient having a negative value of 0.276. To test for correlations between component scores, Pearson product-moment correlations were calculated for scores derived from both weighted sum and regression methods. As shown in Table 19b, the weighted sum method produced a number of weak to moderate correlations, with three coefficients exceeding 0.200 and one approaching 0.400. Conversely, correlations between component scores calculated using the regression method closely resembled the pattern of correlations between the components themselves—most show negligible negative coefficients, with the largest coefficient having a value of 0.139. While the weighted sum method is simpler to compute and easier to interpret, the solution lacked univocality and, as noted by Tabachnick and Fidell (2007), likely correlates more poorly with the components themselves when compared to more sophisticated scoring methods such as regression. In contrast, the solution derived from the regression approach was univocal, making it the preferred scoring method for subsequent analyses. To improve interpretability, the regression-derived component scores were standardized to a scale from zero to 100, with scores between zero and one representing the bottom percentile of respondents for each component and scores between ninety-nine and 100 representing the top percentile of respondents for each component.

Question 1

How are physicians' perceptions of patients and strategies to promote patient adherence associated with patients' race and socioeconomic status?

Hypotheses. The preceding literature review suggests (a) that physicians act like Bayesian thinkers when treating patients of different racial or ethnic groups, (b) that patients with higher SES are better positioned to know about and have the resources to adhere to effective disease management, and (c) that physician gender and race mediate perceptions of and interactions with patients. Building on these inferences, this research tests the following hypotheses:

Q_1H_1: Physicians will perceive African American patients or patients lower in SES as facing more disease management barriers when compared to patients generally and those higher in SES.

Q_1H_2: Physicians will perceive African American patients or patients lower in SES as having more negative attitudes about managing diabetes when compared to patients generally and those higher in SES.

Q_1H_3: Physicians will perceive less efficacy and control when considering African American patients or patients lower in SES when compared to patients generally or those higher in SES.

Q_1H_4: Physicians will perceive using more strategies to promote patient adherence when considering African American patients or patients lower in SES when compared to patients generally or those higher in SES.

Q_1H_5: Physicians who are female or from a racial/ethnic minority group will be more likely than those who are male or white to perceive patients as (a) facing more disease management barriers and (b) having more negative disease management attitudes, and themselves as (c) using more strategies to promote patient adherence and (d) having increased efficacy and control.

Dependent Variables. Regression derived component scores standardized on a scale from 0 to 100 for components one (physicians' perceptions of patients' disease management barriers), three (physicians' perceptions of patients' disease management attitudes), four (physicians' strategies to promote patient adherence), and five (physicians' perceived efficacy and control) will be used as the dependent variables. Component one, measuring physicians' perceptions of disease management barriers faced by patients, contains fifteen items. As scores increase, physicians are perceiving more barriers relative to the other physicians in the sample—those with a score of 0 to 1 represent the bottom percentile and those with a score from 99 to 100 represent the top percentile of physicians in terms of perceiving patients' disease management barriers. As illustrated in Figure 4a and as confirmed by a non-significant Kolmogorov-Smirnov statistic, component one's regression scores are normally distributed with a mean of 45.70 and standard deviation of 17.28. As defined by a z score in excess of ±3.29, component one has no outliers.

Component three, measuring physicians' perceptions of patients' disease management attitudes, contains six items. As scores increase, physicians are perceiving more negative attitudes among patients relative to the other physicians in the sample—those with a score of 0 to 1 represent the bottom percentile and those with a score from 99 to 100 represent the top percentile of physicians in terms of perceiving patients' negative disease management attitudes. As illustrated in Figure 4b, these data have a moderate negative skew (-0.525) with a mean of 58.65, median of 60.05, and standard deviation of 13.84. Despite having a moderate negative skew and a positive kurtosis, the distribution will be treated as normal because, as noted by Tabachnick and Fidell (2007), departures from normality have less of an impact when samples are large and when the appearance of the distribution resembles normal. An inspection of the normal probability plots for component three (Figure 4b.2) shows a reasonably straight diagonal line confirming that the distribution's deviation from normal is minor; the primary deviation from the straight line is accounted for by 34 cases—or, 5.3% of all cases—having an observed value of less than 35. Component three has four extreme values as defined by a z score > ±3.29, but the 5% trimmed mean varies little from the sample mean—59.00 versus 58.65, respectively—suggesting their overall impact is small.

Component four, measuring physicians' strategies to promote patient adherence, contains eight items. As scores increase, physicians are perceiving using fewer strategies to promote patient adherence relative to the other physicians in the sample—those with a score of 0 to 1 represent the bottom percentile and those with a score from 99 to 100 represent the top percentile of respondents in terms of perceiving using the fewest strategies. As illustrated in Figure 4c, these data have a small positive skew (0.263) with a mean of 33.79, median of 33.64, and standard deviation of 11.45. Despite having a small positive skew and positive kurtosis, the appearance of the distribution closely resembles normal. An inspection of the normal probability plots for Component four (Figure 4c.2) shows a reasonably straight diagonal line, confirming that the distribution's deviation from normal is minor; the primary deviation from the straight line is accounted for by 3 cases—or, 0.5% of all cases—having an observed value of greater than 75. Component four has three extreme values (as defined by a z score > ±3.29), but the 5% trimmed mean varies very little from the sample mean—33.80 versus 33.79, respectively—suggesting their overall impact is not significant.

And component five, measuring physicians' perceived efficacy and control, contains five items. As scores increase, physicians are perceiving less efficacy and control relative to the other physicians in the sample—those with a score of 0 to 1 represent the bottom percentile and those with a score from 99 to 100 represent the top percentile of respondents in terms of perceiving the least efficacy and control. As illustrated in Figure 4d, these data have a small positive skew (0.333) with a mean of 33.99, median of 33.52, and standard deviation of 14.28. Despite having a small positive skew and positive kurtosis, the appearance of the distribution closely resembles normal. An inspection of the normal probability plots for Component five (Figure 4d.2) shows a reasonably straight diagonal line, confirming that the distribution's deviation from normal is minor; the primary deviations from the straight line are accounted for by 19 cases—or, 3.0% of all cases—having an observed value of less than 5 or greater than 70. Component five has one extreme value (as defined by a z score > ±3.29), but the 5% trimmed mean varies little from the sample mean—33.74 versus 33.99, respectively—suggesting its overall impact is minute.

Number of cases per-independent variable. Rules of thumb regarding how to identify the acceptable ratio of independent variables to cases when conducting multiple regression abound. Commonly used heuristics include $50 + m$, $5m$, $50 + 8m$, and $m \leq 3$ when samples are at least 100 and $m \leq 10$ when samples are between 300 to 400 (with m being the number of independent variables). In an assessment of the utility of such guidelines, Green (1991) found only limited evidence to support them, noting they tend to be overly simplistic and fail to hold up when underlying parameters are modified (e.g., changing effect size, alpha, and power). To account for different levels in one parameter—effect size—Green (1991), Tabachnick and Fidell (2007), and others (e.g., Maxwell, 2000) suggest the following guideline:

$$\mathrm{N} \geq (7.85/f^2)+(\mathrm{m}-1)$$

where N is the required sample size, m is the number of independent variables, and f^2 is the desired effect size. Based on Cohen's (1988) definition of a small effect size (where 0.02 is small, 0.15 is medium, and 0.35 is large), this formula predicts an analysis using ten independent variables requires a sample size of at least 403, or about forty cases per-independent variable. An obvious limitation to this method, however, is its inability to account for dramatic shifts in the proposed number of independent variables; for example, still assuming a small effect size but increasing the number of independent variables from ten to twenty-five increases the recommended sample size by only 14, to 417, thus changing the ratio of cases per-independent variable from a seemingly reasonable 40:1 to an ostensibly small 17:1. Given such a large range in the ratio of cases per-independent variable the value of this formula is debatable.

Instead of calculating sample size as a function of effect size, Maxwell (2000) developed procedures based on an exchangeable correlation structure. As described by Maxwell, an exchangeable correlation structure occurs when each correlation between predictors and between predictors and the dependent variable are equal. While conceding that exact exchangeability may be unusual, Maxwell argues the assumption of exchangeability often provides a reasonable approximation to reality and serves as a good starting point for the purpose of sample size estimation. Moreover, even in situations where independent variables are expected to correlate more highly with one another than with the dependent variable, Maxwell shows that estimations based on exchangeability are still appropriate as they establish a lower bound. When all correlations are equal, Maxwell suggests that

$$N = \frac{7.85(1 + m\rho)[1 + (m - 2)\rho]}{\rho^2} + m - 1$$

where ρ is the common value of correlations between predictor variables and between predictor variables and the dependent variable, and m is the number of predictor variables. Assuming five independent variables and a ρ of 0.2, Maxwell's formula predicts a minimum sample size of 632, or about 126 cases per-independent variable. Maxwell concludes that while commonly used conventions to determine sample size often lead researchers to use samples that are much too small, estimations based on exchangeability may produce recommendations that are too large. Rather than relying on a single method, Maxwell suggests using multiple methods and evaluating each outcome within the context of the research at hand.

To this end, there are a number of computer programs designed to assist researchers in making decisions about power and sample size where users can select a given statistical test, plug in a variety of parameters (e.g., alpha, power, effect size, number of independent variables), and receive output delineating a variety of critical levels (Elashoff, 2007; Faul, Erdfelder, Buchner, & Lang, 2009). Employing two commonly used programs to compute the minimum number of cases required to detect a significant R-square in linear multiple regression given an anticipated effect size of 0.05, alpha of 0.05, power of 0.95, and up to sixteen independent variables, nQuery Advisor and G*Power produced similar results at 554 and 583 cases, respectively. These output suggest analyses employing linear multiple regression with up to sixteen predictor variables would require a cases per-independent variable ratio of at least 34:1.

Taken as a whole, these methods demonstrate the challenges inherent to deciding upon the correct number of independent variables when conducting multiple linear regression. On the one hand, including too few predictors can lead to specification error and biased parameter estimates; on the other hand, too many predictors sacrifices power and can lead to variance inflation. The method proposed by Green (1991) and others seeks to account for variability in effect size. While simple, this approach produced widely divergent solutions as the number of proposed independent variables increased. Maxwell's (2000) method, which produced solutions that require markedly larger samples with each additional independent variable, is limiting on theoretical grounds as it requires the researcher to assume exchangeability. Conversely, the solutions produced using nQuery Advisor and G*Power converged around similar values, suggesting a minimum sample size somewhere between 566 and 595 cases. Based on these findings, subsequent analyses using hierarchical linear regression included no more than sixteen independent variables. With a sample of 637 cases and a maximum of sixteen independent variables, the cases-to-independent variable ratio for this research was just under 39.8:1.

Independent variables. The following sixteen predictor variables will be used in the analysis; the distributions for each variable are illustrated in Figures 5a thru 5p.2:

1. Questionnaire (general versus African American): This is a dummy variable, where 0 = General Questionnaire and 1 = African American Questionnaire.
2. Natural Log of the Proportion of Patients that are African American: This is a continuous variable standardized to a scale from 0 to 100, with 0-1 representing the bottom percentile of physicians in terms of the proportion

of patients who are African American and 99-100 representing the top percentile. Before conversion to its natural log, a value of 1 was added to each response to eliminate responses with a value of 0. As illustrated in Figure 5b, these data have a modest negative skew (-0.286) with a mean of 63.36, median of 65.90, and standard deviation of 24.23. Despite having a negative skew and kurtosis, the appearance of the distribution has properties similar to normal. An inspection of the normal probability plots for this variable (Figure 5b.2) shows a reasonably straight diagonal line, confirming that the distribution's deviation from normal is acceptable; the primary deviations from the straight line are accounted for by 12 cases—or, 1.9% of all cases—having an observed value of 0 or 100. This variable has no extreme values as defined by a z score > ±3.29.

3. Natural Log of the Proportion of City Population where Physician's Practice is Located that is African American: This is a continuous variable standardized to a scale from 0 to 100, with 0-1 representing the bottom percentile of physicians in terms of the proportion of city population where physician's practice is located that is African American and 99-100 representing the top percentile. Before conversion to its natural log, a value of 1 was added to each response to eliminate responses with a value of 0. As illustrated in Figure 5c these data have a moderate positive skew (0.551) with a mean of 50.13, median 37.86, and standard deviation of 28.68. Despite having a positive skew and negative kurtosis, the appearance of the distribution has properties similar to normal, but

more closely resembles a bi-modal distribution. The large concentration of values at the high end of the distribution are largely accounted for by the 117 physicians practicing in the city of Detroit. An inspection of the normal probability plots for this variable (Figure 5c.2) confirms the distribution deviates from normal, with many data points falling at a distance from the straight diagonal line; however, given the large sample size this deviation can be tolerated. The natural log of the proportion of city population where physician's practice is located that is African American has no extreme values as defined by a z score > ±3.29.

4. Driving Distance From Detroit's City Center to City Where Physician's Practice is Located: This variable, ascertained through Google Maps (Google Maps, 2012), indicates the shortest distance in driving miles from the Detroit city center to the city where the physician's practice is located; physicians practicing in the City of Detroit are coded as 0. As illustrated in Figure 5d, these data have a moderate positive skew (0.764) with a mean of 14.92, median of 14.80, and standard deviation of 10.36. Despite having a positive skew and kurtosis, the appearance of the distribution resembles normal, with the exception of a build-up of cases at the value of 0 miles representing the 117 physicians who practice in the city of Detroit. An inspection of the normal probability plots for this variable (Figure 5d.2) shows a reasonably straight diagonal line, confirming that the distribution's deviation from normal is acceptable; the primary deviation from the straight line is accounted for by 5 cases—or,

0.8% of all cases—having an observed value greater than 40 miles. This variable has two extreme values as defined by a z score > ±3.29, but the 5% trimmed mean varies little from the sample mean—14.45 versus 14.92, respectively—suggesting their overall impact is small.

5. Patient-Based SES Indicator: This is a continuous variable from 0 to 7, with low scores indicating lower SES and high scores indicating higher SES. As illustrated in Figure 5e, these data have a moderate negative skew (-0.870) with a mean of 4.43, median of 4.83, and standard deviation of 1.25. Despite its negative skew and positive kurtosis, the appearance of the distribution resembles normal. An inspection of the normal probability plots for this variable (Figure 5e.2) shows that most values cluster near the straight diagonal line, confirming that the distribution's deviation from normal is acceptable; the primary deviations from the straight line are accounted for by 26 cases—or, 4.1% of all cases—having an observed value of less than 2 or greater than 6. This variable has four extreme values as defined by a z score > ±3.29, but the 5% trimmed mean varies little from the sample mean—4.51 versus 4.43, respectively—suggesting their overall impact is small.
6. City-Based SES Index: This is a continuous variable from 0 to 100, with low scores indicating lower SES and high scores indicating higher SES. As illustrated in Figure 5f, these data have a modest positive skew (0.303) with a mean of 54.02, median of 54.03, and standard deviation of 6.15. Despite its positive skew and slight negative kurtosis, the appearance of

the distribution resembles normal, with the exception of a build-up of cases at the value of 45.28 representing the 117 physicians who practice in the city of Detroit. An inspection of the normal probability plots for this variable (Figure 5f.2) shows that most values cluster near the straight diagonal line, confirming that the distribution's deviation from normal is acceptable; the primary deviations from the straight line are accounted for by 14 cases—or, 2.2% of all cases—having an observed value of less than 45 or greater than 69. This variable has no extreme values as defined by a z score > ±3.29.

7. Physician Age: This variable measures physicians' age in years. As illustrated in Figure 5g, these data have a moderate positive skew (0.582) with a mean of 50.39, median of 50.00, and standard deviation of 11.30. Despite its positive skew and slight positive kurtosis, the appearance of the distribution resembles normal. An inspection of the normal probability plots for this variable (Figure 5g.2) shows that most values cluster near the straight diagonal line, suggesting that the distribution's deviation from normal is acceptable; the primary deviations from the straight line are accounted for by 42 cases—or, 6.6% of all cases—having an observed value of less than 33 or greater than 75 years. This variable has one extreme values as defined by a z score > ±3.29, but the 5% trimmed mean varies little from the sample mean—49.91 versus 50.39, respectively—suggesting its overall impact is small.

8. Physician Gender: This is a dummy variable, where 0 = Female and 1 = Male.
9. Physician Race: This is a dummy variable, where 1 = non-Hispanic white and 0 = all others. Used here, the term “non-Hispanic white” refers to physicians who self-identified as white or Middle Eastern, and “others” refers to physicians who self-identified as African American, Native American, Hispanic, Asian/Pacific Islander, Indian, other, or not otherwise specified.
10. Physician Credential: This is a dummy variable, where 1 = MD and 0 = DO.
11. US Medical Graduate: This is a dummy variable, where 1 = US medical graduate and 0 = international medical graduate.
12. Social Determinants of Health: Relevance plus Training: This is a continuous variable ranging from 0 to 18, with lower scores indicating the endorsement of fewer training areas and less training, and higher score indicating the endorsement of more training areas and more training. More specifically, a physician was awarded one point for each training area they endorsed as having clinical relevance to their day-to-day practice and another point if they had received formal training in the area. The nine training areas were (1) the health effects of poverty, (2) patient-provider communication skills, (3) the resources constraints associated with segregation/social exclusion, (4) racism, healthcare, and health outcomes, (5) cultural competency/diversity training, (6) barriers to

accessing health care, (7) environmental exposure(s) and health, (8) healthcare of the homeless, and (9) health literacy. As illustrated in Figure 5l, these data have a modest positive skew (0.112) with a mean of 8.44, median of 9.00, and standard deviation of 4.40. Despite its modest positive skew and slight negative kurtosis, the appearance of the distribution resembles normal. An inspection of the normal probability plots for this variable (Figure 5l.2) shows that most values cluster closely around the straight diagonal line, suggesting that the distribution's deviation from normal is small. This variable has no extreme values as defined by a z score > ±3.29.

13. Practice Specialty: This is a dummy variable, where 1 = Family Practice and 0 = others. Used here, the term "other" refers to Internal Medicine, General Practice, and Endocrinology.
14. Board Certification: This is a dummy variable, where 1 = board certified and 0 = not board certified or no response.
15. Working Environment: This is a dummy variable, where 1 = private practice and 0 = others. Used here, the term "others" refers to hospital-based practice, group-based practice, HMO employee, medical school employee, government employee, other, or not otherwise specified.
16. Patients per-week: This is a scaled variable with five categories, where 1 = less than 50; 2 = 50-74; 3 = 75-99; 4 = 100-149; and 5 = more than 149. As illustrated in Figure 5p, these data have a modest negative skew (-0.114) with a mean of 2.96, median of 3.00, and standard deviation of

1.18. Despite its slight negative skew and moderate positive kurtosis, the appearance of the distribution resembles normal. An inspection of the normal probability plots for this variable (Figure 5p.2) shows that most values cluster very near the straight diagonal line, suggesting that the distribution's deviation from normal is small. This variable has no extreme values as defined by a z score > ±3.29.

Analysis. Linear regression was employed to investigate the relationship between patients' race and SES and physicians' perceptions of patients and strategies to promote patient adherence. Four separate analyses were conducted, each using one of the four dependent variables described above. For dependent variables, both the normal probability plot and the scatterplot of standardized residuals are presented. To assess if outliers unduly impact regression results, Cook's distance scores greater than one are reported and discussed. The relationships between independent variables are assessed by means of the Pearson product-moment statistic and variance inflation factor (VIF) statistic; correlations greater than ±.500 are highlighted, and VIF values are discussed. The individual contribution of each independent variable on each dependent variable are presented. For each dependent variable, the following regressors were added to the regression model as a single block:

BLOCK 1—PRIMARY ANALYSIS:

Questionnaire

- X_1—General versus African American

Patient Race and SES

- X_2—Natural Log of the Proportion of Patients African American
- X_3—Natural Log of the Proportion of City Residents African American
- X_4—Patient-based SES Indicator
- X_5—City-based SES Index

Physician Demographics

- X_6—Gender
- X_7—Age
- X_8—Race (non-Hispanic white versus all others)

Physician Training

- X_9—Medical School (USMG versus IMG)
- X_{10}—Credential (MD versus DO)
- X_{11}—Practice Specialty (FP versus all others)
- X_{12}—Board Certified
- X_{13}—Training on Social Determinants of Health

Work Setting

- X_{14}—Private practice
- X_{15}—Patients per-week

Spatial Variability

- X_{16}—Driving Distance from Detroit's City Center

Question 2

How are patients' race and socioeconomic status related to physicians' perceived access to resources as it relates to the management of diabetes?

Hypotheses. The preceding literature review suggests (a) that physicians who provide care to a mostly African American patient population are more likely to report difficulties with providing high-quality care, (b) that practice-related norms and hospital-level quality vary based on the demographics of the population being served, and (c) that physicians practicing in urban and socioeconomically challenged areas differ in terms of personal and professional demographics when compared to those practicing in suburban and more economically prosperous areas. Building on these inferences, this research tests the following hypotheses:

Q_2H_1: As the proportion of African American patients increases, or as the SES of patients decreases, physicians will report more resources constraints as it relates to the provision of diabetes-related care.

Q_2H_2: As the proportion of African Americans in the city where the physicians' practice is located increases, or as the SES of patients in the city where the physicians' practice is located decreases, physicians will report more resources constraints as it relates to the provision of diabetes-related care.

Q_2H_3: Being a female physician, having graduated from an international medical school, or being from a minority racial/ethnic group (i.e., not non-Hispanic white) are predicted to be positively associated with reporting more resources constraints.

Dependent variables. Regression derived component score standardized on a scale from 0 to 100 for component two (physicians' perceived resource constraints: quality and the provision of culturally competent care), the natural log of the number of minutes spent per-patient standardized to scale from 0 to 100, and the natural log of physicians' access to on- and off-site ancillary service providers standardized to scale from 0 to 100 were each used as dependent variables. Component two, measuring physicians' perceived resource constraints as it relates to the provision of high quality, culturally competent care, contains eight items. As scores increase, physicians are perceiving more resource constraints relative to the other physicians in the sample—those with a score of 0 to 1 represent the bottom percentile and those with a score from 99 to 100 represent the top percentile of respondents in terms of perceiving resource constraints. As illustrated in Figure 4e and as confirmed by a non-significant Kolmogorov-Smirnov statistic, component two's standardized regression scores are normally distributed with a mean of 50.17 and standard deviation of 19.203. As defined by a z score in excess of ±3.29, component two has no outliers.

The number of minutes spent per-patient is a continuous variable ranging from five minutes to forty-five minutes. Given this variable's non-normal distribution, it was transformed to its natural log, and to ease interpretation, standardized to a scale from 0 to 100. As scores increase, physicians are reporting longer office visits relative to the other physicians in the sample—those with a score of 0 to 1 represent the bottom percentile and those with a score from 99 to 100 represent the top percentile of respondents in terms of the length of office visits.   Thirteen respondents failed to provide a response for this question, reducing the sample size from 637 to 624.   As illustrated in Figure 4f these data have a modest positive skew (0.140) with a mean of 54.58, median of 49.91, and standard deviation of 12.67. Despite its positive skew and kurtosis, the appearance of the distribution resembles normal. An inspection of the normal probability plots (Figure 4f.2) suggests a reasonably straight diagonal line, indicating that the distribution's deviation from normal is small; the primary deviations from the straight line are accounted for by 14 cases—or, 2.2% of all cases—having an observed value of less than 30 or greater than 85. The natural log of minutes spent per-patient, standardized to a scale for 1 to 100 has five extreme values as defined by a z score > ±3.29; however, the 5% trimmed mean varies only slightly from the sample mean—54.42 versus 54.58, respectively—suggesting their overall impact is minor.

Physicians' access to on- and off-site ancillary service providers is a continuous variable ranging from zero to fifteen.   Scores for this variable were constructed by assigning physicians one point for each *off-site* ancillary service provider endorsed as assisting in patient education or disease management and two points for each *on-site* ancillary service provider endorsed as assisting in patient education or disease management.   The list of ancillary service providers included on- and off-site nurses, educators, dieticians/nutritionists, social workers, and clinical pharmacists. Given this variable's non-normal distribution, it was transformed to its natural log. Before conversion to its natural log, a value of 1 was added to each response to eliminate responses with a value of 0. To ease interpretation, the converted values were standardized to a scale from 0 to 100. As scores increase, physicians are reporting increased access to on- and off-site ancillary service providers relative to the other physicians in the sample—those with a score of 0 to 1 represent the bottom percentile and those with a score from 99 to 100 represent the top percentile of respondents in terms of access to ancillary service providers. As illustrated in Figure 4g, these data have a moderate negative skew (-0.540) and with a mean of 50.41, median of 52.51, and standard deviation of 23.64. Despite having a moderate negative skew and kurtosis the distribution will be treated as normal because departures from normality have less of an impact when samples are large and when the appearance of the distribution resembles normal. An inspection of the variable's probability plots (Figure 4g.2) shows most values hover near the straight diagonal line, suggesting that the distribution's deviation from normal is manageable; the primary deviations from the straight line are accounted for by those cases with a value (n=59) and those with a value greater than 80 (n=47). The natural log of physicians' access to ancillary service providers, standardized to a scale from 0 to 100 has no extreme values as defined by a z score > ±3.29.

Independent variables. As outlined in detail above, a sample of 637 cases can reasonably support the use of up to sixteen independent variables when conducting linear regression. The same set of sixteen independent variables described in Question 1 were used in Question 2.

Analysis. Linear regression was employed to investigate the relationship between physicians' resources and demographics and characteristics of the patient population being served. Three separate analyses were conducted, each using one of the three dependent variables described above. For dependent variables, both the normal probability plot and the scatterplot of standardized residuals are presented. To assess if outliers unduly impact regression results, Cook's distance scores greater than one are reported and discussed. The relationships between independent variables are assessed by means of the Pearson product-moment statistic and VIF statistic; correlations greater than ±.500 are highlighted, and VIF values are discussed. The individual contribution of each independent variable on each dependent variable are presented. For each dependent variable, the following regressors were added to the regression model as a single block:

BLOCK 1—PRIMARY ANALYSIS:

Questionnaire

- X_1—General versus African American

Patient Race and SES

- X_2—Natural Log of the Proportion of Patients African American
- X_3—Natural Log of the Proportion of City Residents African American
- X_4—Patient-based SES Indicator

- X_5—City-based SES Index

Physician Demographics

- X_6—Gender
- X_7—Age
- X_8—Race (non-Hispanic white versus all others)

Physician Training

- X_9—Medical School (USMG versus IMG)
- X_{10}—Credential (MD versus DO)
- X_{11}—Practice Specialty (FP versus all others)
- X_{12}—Board Certified
- X_{13}—Training on Social Determinants of Health

Work Setting

- X_{14}—Private practice
- X_{15}—Patients per-week

Spatial Variability

- X_{16}—Driving Distance from Detroit's City Center

Question 3

How are patients' race and socioeconomic status associated with physicians' self-reported decision making style when providing care to patients with diabetes?

Hypotheses. The preceding literature review suggests that physicians are (a) less knowledgeable about the everyday lives and experiences of their African American patients, (b) less confident in interpreting African American patients' symptoms, needs, and wishes, and (c) less patient centered, exhibit less positive affect, and are more contentious when working with African American patients when compared to white patients. Evidence also suggests that patient and physician demographics—e.g., gender, race, age—are related to the quality and content of the medical encounter, with physicians who are women, younger, and of the same racial or ethnic identity as the patient being more patient centered and practicing with a more participatory decision making style. Building on these inferences, this research tests the following hypotheses:

Q_3H_1: As the proportion of African American patients increases, or as the SES of patients decreases, physicians will be less likely to report a more participatory decision making style.

Q_3H_2: As the proportion of African Americans in the city where physicians' practice is located increases, or as the SES of residents in the city where the physicians' practice is located decreases, physicians will be less likely to report a more participatory decision making style.

Q_3H_3: Physician age, being non-Hispanic white, or being male are predicted to be negatively associated with a more participatory decision making style.

Dependent variable. Physician's decision making style was measured using the following question:

In general, how do you tend to make decisions about treatment for your patients with diabetes?

a. I tend to make decisions regarding treatment based on my medical judgment. (n=107)
b. I tend to make the final decision about treatment, but seriously consider the patient’s opinion. (n=191)
c. I tend to share responsibility with patients when deciding which treatment is best for them. (n=296)
d. I tend to let patients make the final selection of treatment after seriously considering my opinion. (n=29)
e. I tend to let patients make the final selection about treatment with little input from me. (n=1)

(Missing: n=11)

Given the small number of responses for outcomes a, b, d, and e relative to c, outcomes a and b were combined and outcomes c, d, and e were be combined. Combining outcomes a and b was justified because neither indicate the direct involvement of patients in the decision making process; combining outcomes c, d, and e was justified because each, to lesser or greater degree, indicate the direct involvement of patients in the decision making process. Combining these outcomes creates 298 (107 + 191) responses in the "no patient participation" group and 326 (296 + 29 + 1) in the "patient participation" group (thirteen respondents left this question blank).

Number of cases per-independent variable. Based on the work of Peduzzi et al. (1996) and as described by MedCalc (2011), the following formula was used to estimate the number of independent variables that can be used when conducting logistic regression given a known sample: k = N(p) / 10, where “N” is the sample size, “p” is the smallest of the proportions of negative or positive cases in the population, and “k” is the number of independent variables. Three scenarios, each based on a sample size of 624 (298 + 326), will be calculated: the first will assume 30% of cases in the population are positive, the second will assume 20% of cases in the population are positive, and the third will assume 10% of cases in the population are positive:

1) 624(.30) / 10 = 18.72

2) 624(.20) / 10 = 12.48

3) 624(.10) / 10 = 6.24

Rounding down, these calculations suggest a sample of 624 cases could reasonably support somewhere between six to eighteen independent variables. The nQuery Advisor program enables users to identify the required sample size for testing the hypothesis that β=0 for one normally distributed covariate after adjusting for prior covariates. Assuming a two-sided test with an alpha of 0.05, power of .80, a squared correlation between the normally distributed covariate (predictor variable) and other covariates ranging from 0.01 to 0.02, and a critical β value—ln(odds ratio)—of ±0.532, the required sample size falls between 617 and 624. Based on these data, an analysis employing logistic regression with 624 cases can reasonably support up to 16 independent variables.

Independent variables. The same set of sixteen independent variables described in Question 1 were used in Question 3.

Analysis. Logistic regression was employed using the dependent and independent variables described above. Independent variables and covariates were added to the model in a single block, as outlined below:

BLOCK 1—PRIMARY ANALYSIS:

Questionnaire

- X_1—General versus African American

Patient Race and SES

- X_2—Natural Log of the Proportion of Patients African American
- X_3—Natural Log of the Proportion of City Residents African American
- X_4—Patient-based SES Indicator
- X_5—City-based SES Index

Physician Demographics

- X_6—Gender
- X_7—Age
- X_8—Race (non-Hispanic white versus all others)

Physician Training

- X_9—Medical School (USMG versus IMG)
- X_{10}—Credential (MD versus DO)
- X_{11}—Practice Specialty (FP versus all others)
- X_{12}—Board Certified
- X_{13}—Training on Social Determinants of Health

Work Setting

- X_{14}—Private practice
- X_{15}—Patients per-week

Spatial Variability

- X_{16}—Driving Distance from Detroit's City Center

Results from the final model will be presented, including βs, standard errors, Wald statistics, degrees of freedom, p-values, odds ratios, and 95% confidence intervals.

CHAPTER 5

RESULTS

Demographic differences between respondents and non-respondents, and between respondents and Michigan physicians participating in the 2009 Michigan Department of Community Health Survey of Physicians, were discussed in the previous chapter (refer to Tables 6 thru 8). Table 20 presents descriptive statistics for the 637 physicians participating in this research. In addition to presenting statistics for the entire sample, this table identifies statistically significant differences between physicians responding to the General Questionnaire and the African American Questionnaire. As shown, those responding to the African American questionnaire were less likely to have specialized in Internal Medicine and be in private practice, and were more likely to have specialized in Endocrinology.

Table 21 presents relationships between independent variables using the Pearson product-moment statistic. As shown, the strength of the relationships between most variables was small, with nine pairs showing a medium-sized relationship (coefficient between ±0.30 to ±0.49) and five pairs showing a large-sized relationship (coefficient greater than ±0.50). The most pronounced relationships were clustered in the top left quadrant of Table 21, showing strong correlations between patient race, the location of a physician's practice, and both patient- and city-based SES. As the size of a physician's African American patient population increases, both the SES of the population and distance from Detroit's city center decreases. Table 21 also shows that older physicians were less likely than younger physicians to be female or board certified, and that US medical graduates were more likely than international medical graduates to be non-Hispanic white or a Doctor of Osteopathic Medicine.

To answer question 1 (i.e., How are patients' race and socioeconomic status related to physicians' perceptions of patients and the strategies used to promote adherence among patients with diabetes), multiple regression was used to assess the relationships between patients' race and SES and Physician's Perceptions of Patients' Disease Management Barriers (component 1), Physician's Perceptions of Patients'Disease Management Attitudes (component 3), Physicians' Strategies to Promote Patient Adherence (component 4), and Physician's Perceived Efficacy and Control (component 5) after controlling for covariates. Table 22 presents findings for the regression using Physician's Perceptions of Patients' Disease Management Barriers as the dependent variable. (Note: higher scores indicate physicians perceiving patients as facing more disease management barriers.) In this analysis both the VIFs and the average VIF were sufficiently small, indicating multicollinearity was not a problem. Cook's distance scores were well below one, indicating there were no outlying cases having an undue influence on the results of the model as a whole. The normal probability plot of the regression standardized residual lined up in a reasonably straight line along the diagonal, signifying the residuals were normally distributed. Likewise, the scatterplot of the standardized residuals both resembled the shape of a rectangle and were evenly spread around zero, indicating the variance of the residual terms were constant and the relationship being modeled was linear. (The normal probability plot and scatterplot are presented in Appendix 20, Figures 1 and 2.) The total variance explained by the model was 31.9% (R^2=.319, F(16,620)=18.18, p<.0005). Both the Proportion of Patients African American (β=.14 p<.0005) and Patient-Based SES Indicator (β=-3.99, p<.0005) were statistically significant predictors: as the proportion African American patients increased, physicians perceived patients as facing more disease management barriers, and as patient SES increased, physicians perceived patients as facing fewer disease management barriers. Among covariates, both the physicians' gender (i.e., being male) (β=-4.76, p<.0005) and Distance from Detroit City Center (β=-.17, p<.05) were associated with perceiving fewer disease management barriers, and being an osteopathic physician (β=4.10, p<.05) and Social Determinants of Health: Relevance and Training (β=.50. p=.001) were associated with perceiving more disease management barriers. As indicated in Table 22, the unique contribution of each significant predictor variable to the total R^2 ranged from a high of 5.29% (Patient-Based SES Indicator) to a low of 0.71% (Credential).

Table 23 presents findings for the regression using Physician's Perceptions of Patients' Disease Management Attitudes as the dependent variable. (Note: higher scores indicate physicians perceiving more negative disease management attitudes among patients.) In this analysis both the VIFs and the average VIF were sufficiently small, indicating multicollinearity was not a problem. Cook's distance scores were well below one, indicating there were no outlying cases having an undue influence on the results of the model as a whole. The normal probability plot of the regression standardized residual lined up in a reasonably straight line along the diagonal, signifying the residuals were normally distributed. Likewise, the scatterplot of the standardized residuals both resembled the shape of a rectangle and were evenly spread around zero, indicating the variance of the residual terms were constant and the relationship being modeled was linear. (The normal probability plot and scatterplot are presented in Appendix 20, Figures 3and 4.) The total variance explained by the model was 7.2% (R^2=.072, F(16,620)=3.015, p<.0005). Questionnaire type (i.e., responding to the African American Questionnaire) was associated with perceiving patients as having more positive disease management attitudes (β=-5.79, p<.0005); the SES variables were not significant. Among covariates, physician Credential (i.e., having a DO) was associated with perceiving patients as having more negative disease management attitudes (β=4.33, p<.01). As indicated in Table 23, the unique contributions of Questionnaire and Credential to the total R^2 were 4.24% and 1.21%, respectively.

Table 24 presents findings for the regression using Physicians' Strategies to Promote Patient Adherence as the dependent variable. (Note: higher scores indicate physicians perceiving using fewer strategies to promote patient adherence.) In this analysis both the VIFs and the average VIF were sufficiently small, indicating multicollinearity was not a problem. Cook's distance scores were well below one, indicating there were no outlying cases having an undue influence on the results of the model as a whole. The normal probability plot of the regression standardized residual lined up in a reasonably straight line along the diagonal, signifying the residuals were normally distributed. Likewise, the scatterplot of the standardized residuals both resembled the shape of a rectangle and were evenly spread around zero, indicating the variance of the residual terms were constant and the relationship being modeled was linear. (The normal probability plot and scatterplot are presented in Appendix 20, Figures 5 and 6.) The total variance explained by the model was 12.8% (R^2=.128, F(16,620)=5.704, p<.0005). Responding to the African American Questionnaire (β=-1.81, p<.05) and practicing in a city with higher in SES (β=-.27, p<.05) were associated with using more strategies to promote patient adherence, and having patients with higher SES (β=.91, p<.05) was associated with using fewer strategies to promote patient adherence. Among covariates, being male (β=2.44, p<.05), a USMG (β=4.47, p<.0005), and practicing in a city further from Detroit (β=.17, p<.01) were associated with using fewer strategies to promote patient adherence, and Social Determinants of Health: Relevance and Training (β=-.52. p<.0005) was associated with using more strategies to promote patient adherence. As indicated in Table 24, the unique contribution of each significant predictor variable to the total R^2 ranged from a high of 3.04% (Social Determinants of Health: Relevance and Training) to a low of 0.61% (Questionnaire).

Table 25 presents findings for the regression using Physicians' Efficacy and Control as the dependent variable. (Note: higher scores indicate physicians perceiving less efficacy and control.) In this analysis both the VIFs and the average VIF were sufficiently small, indicating multicollinearity was not a problem. Cook's distance scores were well below one, indicating there were no outlying cases having an undue influence on the results of the model as a whole. The normal probability plot of the regression standardized residual lined up in a reasonably straight line along the diagonal, signifying the residuals were normally distributed. Likewise, the scatterplot of the standardized residuals both resembled the shape of a rectangle and were evenly spread around zero, indicating the variance of the residual terms were constant and the relationship being modeled was linear. (The normal probability plot and scatterplot are presented in

Appendix 20, Figures 7 and 8.) The total variance explained by the model was 8.2% ($R^2=.082$, $F(16,620)=3.443$, $p<.0005$). As the proportion of African Americans in the city where the physicians' practice was located increased physicians perceived more efficacy and control ($\beta=-.09$, $p<.01$); none of the SES predictors were significant. Among covariates, being male ($\beta=4.25$, $p=.001$) was associated with less efficacy and control, and being a USMG ($\beta=-3.02$, $p<.05$) and Social Determinants of Health: Relevance and Training ($\beta=-.55$. $p<.0005$) were associated with more efficacy and control. As indicated in Table 25, the unique contribution of each significant predictor variable to the total R^2 ranged from a high of 2.25% (Social Determinants of Health: Relevance and Training) to a low of 0.72% (USMG).

To answer question 2 (i.e., How are patients' race and socioeconomic status related to physicians' perceived access to resources as it relates to the management of diabetes?), multiple regression was used to assess the relationships between physician demographics, practice setting, and patient race and SES and Physicians' Resource Constraints: Quality and the Provision of Culturally Competent Care (component 2), Minutes Spent Per-Patient, and Physicians' Access to On- and Off-Site Ancillary Service Providers. Table 26 presents findings for the regression using Physicians' Resource Constraints as the dependent variable. (Note: higher scores indicate physicians perceiving more resource constraints.) In this analysis both the VIFs and the average VIF were sufficiently small, indicating multicollinearity was not a problem. Cook's distance scores were well below one, indicating there were no outlying cases having an undue influence on the results of the model as a whole. The normal probability plot of the regression standardized residual lined up in a reasonably straight line along the diagonal, signifying the residuals were normally distributed. Likewise, the scatterplot of the standardized residuals both resembled the shape of a rectangle and were evenly spread around zero, indicating the variance of the residual terms were constant and the relationship being modeled was linear. (The normal probability plot and scatterplot are presented in Appendix 20, Figures 9 and10.) The total variance explained by the model was 11.6% (R^2=.116, F(16,620)=5.078, p<.0005). None of the patient race or SES predictors were significant. Among covariates, being male (β=-3.67, p<.05), a DO (β=-7.24, p<.0005), and in private practice (β=-4.35, p<.01) were each associated with perceiving fewer resource constraints, and being a USMG (β=7.86, p<.0005), specializing in Family Practice (β=4.66, p<.01), and being board certified (β=6.41, p<.05) were each associated with perceiving more resource constraints. As indicated in Table 26, the unique contribution of each significant predictor variable to the total R^2 ranged from a high of 2.69% (USMG) to a low of 0.69% (Gender).

Table 27 presents findings for the regression using Minutes Spent Per-Patient as the dependent variable. (Note: higher scores indicate more minutes.) In this analysis both the VIFs and the average VIF were sufficiently small, indicating multicollinearity was not a problem. Cook's distance scores were well below one, indicating there were no outlying cases having an undue influence on the results of the model as a whole. The normal probability plot of the regression standardized residual lined up in a reasonably straight line along the diagonal, signifying the residuals were normally distributed. Likewise, the scatterplot of the standardized residuals both resembled the shape of a rectangle and were evenly spread around zero, indicating the variance of the residual terms were constant and the relationship being modeled was linear. (The normal probability plot and scatterplot are presented in Appendix 20, Figures 11 and 12.) The total variance explained by the model 16.8% (R^2=.168, F(16,607)=7.634, p<.0005). Among predictors, the Patient-Based SES Indicator (β=-1.07, p<.05) was significant, with an increase in SES being associated with a decrease in minutes-per patient. Among covariates, being male (β=-2.16, p<.05), a DO (β=-3.08, p<.05), board certified (β=-4.60, p<.01), and seeing more patients-per-week (β=-3.25, p<.0005) were each associated with fewer minutes per-patient. As indicated in Table 26, the unique contribution of each significant predictor variable to the total R^2 ranged from a high of 8.47% (Patients Per-Week) to a low of 0.55% (Gender).

Table 28 presents findings for the regression using Physicians' Access to Off- and On-Site Ancillary Service Providers as the dependent variable. (Note: higher scores indicate more access.) In this analysis both the VIFs and the average VIF were sufficiently small, indicating multicollinearity was not a problem. Cook's distance scores were well below one, indicating there are no outlying cases having an undue influence on the results of the model as a whole. The normal probability plot of the regression standardized residual lined up in a reasonably straight line along the diagonal, signifying the residuals were normally distributed. Likewise, the scatterplot of the standardized residuals both resembled the shape of a rectangle and were evenly spread around zero, indicating the variance of the residual terms were constant and the relationship being modeled was linear. (The normal probability plot and scatterplot are presented in Appendix 20, Figures 13 and 14.) The total variance explained by the model was 14.3% (R2=.143, F(16,620)=6.462, p<.0005). Responding to the General Questionnaire was positively associated with access to off- and on-site ancillary service providers (β=5.24, p<.01); none of the SES predictors were significant. Among covariates, being male (β=-4.65, p<.05), a DO (β=-5.73, p<.05), and in private practice (β=-8.65, p<.01) were each associated with poorer access to off- and on-site ancillary service providers. Being a USMG (β=9.29, p<.0005), Social Determinants of Health: Relevance and Training (β=.65, p<.01), and being board certified (β=9.25, p<.01) were each associated with better access to off- and on-site ancillary service providers. As indicated in Table 28, the unique contribution of each of these predictor variables to the total R^2 ranged from a high of 2.46% (USMG) to a low of 0.72% (Credential).

To answer question 3 (i.e., How are patients' race and socioeconomic status associated with physicians' self-reported decision making style when providing care to patients with diabetes?), logistic regression was used to assess the impact of physician demographics, practice setting, and patient demographics on the likelihood that respondents would report a more participatory decision making style when managing patients with diabetes. (Note: a score of 1 for the dependent variable indicates a more participatory style.) Results from this analysis are outlined in Table 29. Goodness of fit tests—Omnibus Tests of Model Coefficients and the Hosmer and Lemeshow Test—indicated support for the model. The model using all sixteen predictors was statistically significant, $X^2(16, N=624) = 50.42$, p<.0005, meaning the model was able to distinguish between respondents who did and did not endorse a participatory decision making style. The model explained between 7.8% (Cox and Snell R^2) and 10.4% (Nagelkerke R^2) of the variance, and correctly classified 62.2% of cases. Three predictor variables were statistically significant: Social Determinants of Health: Relevance and Training, being male, and being in private practice. The odds ratio for Social Determinants of Health:

Relevance and Training was 1.062, meaning that for each increase of one in Social Determinants of Health: Relevance and Training score, the odds of practicing in a more participatory style are 1.062 times greater relative to those who do not have an increase of one. The odds ratio for Gender (i.e., being male) was .664, meaning the odds of practicing in a more participatory style are .664 times as great for those who are male relative to those who are female (i.e., female physicians are more participative). The odds ratio for Work Setting (i.e., being in private practice) was .600, meaning the odds of practicing in a more participatory style are .600 times as great for those in private practice relative to those who are not in private practice. None of the patient race or SES variables were statistically significant.

CHAPTER 6

DISCUSSION

This dissertation investigated physicians' perceptions of patients with diabetes, examining (a) how perceptions of and strategies to promote patient adherence were associated with patients' race and SES; (b) how physicians reporting fewer resources to manage diabetes differed in terms of their personal demographics, professional background, practice setting, and patient populations when compared to those reporting more resources; and (c) how physicians reporting a more patient-oriented participatory decision making style differed in terms of background, practice setting, and patient population when compared to those reporting a less participatory decision making style. This chapter will summarize results, including the outcome of each hypothesis. Moreover, this chapter will describe how findings fit into the existing literature; identify future research opportunities to either clarify or expand upon findings; and discuss the relationship between findings and policies that could work toward improving the provision of healthcare for populations experiencing racial, ethnic, and socioeconomic disparities in both care and outcomes.

Question One

Physicians' perceptions of patients—disease management barriers. Given African Americans' poorer social and economic standing when compared to the general population, it was hypothesized (Q_1H_1) that physicians would perceive African American patients and patients lower in SES as facing more disease management barriers when compared to patients taken as a whole. This line of reasoning was informed by the statistical discrimination hypothesis which suggests that physicians' perceptions of patients are organized around generalized prior knowledge or information about groups of patients and then applied to patients during the process of clinical decision making (Balsa & McGuire, 2001). Findings from this dissertation showed that physicians with larger African American patient populations or with patients lower in SES perceived patients as facing more disease management barriers; however, neither the questionnaire type (General versus African American) nor the city-based indicators (proportion of a city's population that is African American and the city-based SES index) were statistically significant. Providing partial support to Q_1H_1, these findings suggest physicians' perceptions of patients' disease management barriers are less informed by generalized prior knowledge about African Americans or information about the community being served and are instead more specific to the composition of patients making up physicians' panels.

As reported, the patient-specific SES indicator was the most significant predictor of physicians' perceptions of patients' disease management barriers, explaining nearly three times the amount of unique variance when compared to the proportion of patients who are African American. This finding suggests that while the racial composition of physicians' patient panel matters, patients' SES matters even more. Because so many risk factors co-vary with patients' race and SES, it is possible that race-based differences in physician's perceptions of patients reflect, in large part, these SES-related covariates rather than race per-se (Connolly, Unwin, Sherriff, Bilous, & Kelly, 2000; Link &

Phelan, 1995; Link & McKinlay, 2009; Signorello et al., 2007). Future research should disentangle the relationships between physicians' perceptions of patients, patient race, and the numerous SES-related risk factors that co-vary with patient race (e.g., access to disease management resources, insurance status, employment status, education level, residential segregation, etc.). In contrast to current policy leanings that tend to favor modifying the interaction between patients and physicians at the point of the clinical encounter (e.g., patient-centered care, cultural competency), the evidence produced by this emerging research could help to bolster the development of social policies that target more upstream determinants of health including how disease management barriers are sustained at the meso- and macro-levels. This assertion is not meant to discount the value of and need for patient-centered and culturally competent care; rather, the point is that downstream strategies are likely to be in and of themselves insufficient to reverse the longstanding and seemingly ubiquitous quality- and outcome-related gaps between African American patients and those from the white majority.

Several other covariates were positively associated with physicians' perceptions of patients' disease management barriers including having a DO, practicing in or close to the City of Detroit, and relevance and training for social determinants of health. As predicted (Q_1H_{5a}), female physicians were also more likely to perceive patients' disease management barriers. This finding is consistent with previous research suggesting female physicians are more likely than their male counterparts to identify and attend to the psychosocial needs of their patients (Cooper-Patrick, et al., 1999; Cooper & Roter, 2003; Roter & Hall, 2004; Roter, Hall, & Aoki, 2002). While research shows that female physicians tend to fare better than males in measures associated with the patient-physician partnership and interpersonal communication, this advantage does not uniformly translate into an improvement in patient outcomes (Kim et al., 2005; Roter & Hall, 2004; Schmittdiel, Grumbach, Selby, & Quesenberry, 2000). Linking physicians' interpersonal communication and partnership building activities to patient outcomes should be a priority of future research. Future research should also seek to identify the specific knowledge, attitudes, and skills associated with female physicians' apparent communication-related advantage. Once identified, physician education could be tailored to include these qualities and taught to *both* female *and* male physicians alike.

Given that female physicians are more likely than their male counterparts to practice in metropolitan and urban settings (Dussault & Franceschini, 2006; Fordyce, Chen, Doescher, & Hart, 2007; Health Resources and Services Administration, 2008), serve low income patients (Bickel & Ruffin, 1995; McMurray et al., 2000; Perloff, Kletke, Fossett, & Banks, 1997; Weissman, Campbell, Gokhale, & Blumenthal, 2001), and provide care to patients from racial and ethnic minority groups (Bach, et al., 2004; Franks & Bertakis, 2003; Reschovsky & O'Malley, 2008), policy makers should consider the employment preferences of female physicians in the labor force when developing policies that influence the delivery of care to economically disadvantaged and urban populations. This is not to suggest that policies should target or benefit female physicians at the exclusion of males, nor should they stratify the physician workforce by gender or any other demographic characteristic. Rather, policies should seek to optimize the participation of the existing physician workforce through incentives—economic or otherwise—that encourage the recruitment and retention of physicians who serve the urban poor. In addition to those policies that create economic rewards (e.g., loan repayment programs), creating incentives for employers to be more aggressive in the implementation of guidelines that address workplace inequity (e.g., income disparities), career satisfaction/burnout (e.g., work/family balance, sexual and gender-based harassment) and promote more professional autonomy (e.g., control of time spent on professional responsibilities) may be effective in attracting and keeping more physicians—female and male—in high need areas (Dorsey, Jarjoura, & Rutecki, 2005; Frank, McMurray, Linzer, & Elon, 1999; Hauer et al., 2008; Lo Sasso, Richards, Chou, & Gerber, 2011; McMurray, et al., 2000; Schwartz et al., 1989).

Physicians' perceptions of patients—disease management attitudes. Results did not support the hypothesis that physicians would perceive African American patients and patients lower in SES as having more negative attitudes about managing diabetes when compared to patients generally or those higher in SES (Q_1H_2). Like Sabin, Rivara, and Greenwald (2008)—who found physicians were more likely to associate explicit concepts of "compliant patient" and "preferred medical care" with African American versus white patients—results from this dissertation show that physicians perceived African American patients as having *more* positive attitudes about disease management when compared to patients generally. These findings run counter to Balsa and McGuire's (2001) statistical discrimination hypothesis and contradict van Ryn and Burke (2000) who found physicians were more likely to perceive African American patients and those with lower SES more negatively than whites or those with higher SES.

An important distinction between Sabin, Riveara, and Greenwald's research and that of van Ryn and Burke's is that Sabin and colleagues had physicians assess clinical vignettes that varied by race while van Ryn and Burke had physicians evaluate actual patients from clinical encounters. It may be that when physicians are evaluating fictional patients (i.e., clinical vignettes) or are asked to think about patients generally (as in the research contained within this dissertation) they are more likely to provide responses shaped by social desirability bias, but when evaluating an actual patient—where many more details about the patient are known—the activation of this bias is inhibited. Findings from Lutfey et al. (2008) support the idea that generalized and patient-specific assessment of patients capitalize on different sets of information: they found that physicians used patient demographic characteristics only as an initial starting point when making patient assessments, noting that physicians preferred to rely on more detailed and patient-specific factors (e.g., cognitive ability, motivation, social support) believed to be better indicators of adherence to treatment. Future research should strive to dissect the seemingly contradictory effects of social desirability bias and statistical discrimination. Doing so would help to clarify how race influences physicians' perceptions of patients and the subsequent delivery of health care.

Physicians' strategies to promote patient adherence. Results provided mixed support for the hypothesis that physicians would perceive using more strategies to promote patient adherence when considering African American patients and patients with lower SES when compared to patients generally or those with higher SES (Q_1H_4). While physicians responding to the African American Questionnaire and those who described their patients as lower in SES perceived using *more* disease management strategies, as the SES of the city where the physicians' practice was located decreased physicians' perceived using *fewer* resources. There was no evidence to support a perceived difference in the use of strategies to promote patient adherence based on the proportion of a physicians' practice that was African American or the proportion of African Americans in the city where the physicians' practice was located. While these findings suggest physicians may treat African American patients and those lower in SES differently than patients generally or those higher in SES—in this case using more disease management strategies with more marginalized populations—future research should clarify whether the use of more disease management strategies is sufficiently high to actually meet patients' increased needs, as well as whether using more disease management strategies improves patient outcomes (e.g., improved adherence to treatment, improved HbA1c).

The findings described above appear to contradict Bach et al. (2004) who found that physicians serving disadvantaged populations reported having poorer access to resources when compared to physicians serving more privileged populations; however, there are important distinctions between Bach et al. and this dissertation. Whereas Bach et al. measured physicians' access to high-cost medical services (e.g., high-quality subspecialists, high-quality diagnostic imaging, and nonemergency admission to the hospital), this dissertation measured relatively low-cost disease management strategies such as the use of medication diaries and food/nutrition charts, shortening the interval between return visits, changing medications to cheaper or generic brands, and discussing with patients the medications they should definitely not skip. It may be that findings from this dissertation reflect an attempt by physicians' who serve disadvantaged populations to compensate for deficits in other areas of the healthcare system; for example, if physicians practicing in low SES urban settings have more difficulty accessing high cost services (e.g., subspecialists, imaging, admission to hospital) they may utilize more strategies within their own clinical bailiwick to try and overcome the deficit and still meet their patients' needs.

Perceiving social determinants of health as relevant to one's day-to-day practice and having had training in these areas explained more unique variance in the use of strategies to promote patient adherence when compared to all other covariates. This suggests that those who are aware of or who have had training in areas related to social determinants of health may be more sensitive to these issues and hence more proficient at identifying and employing strategies to counter patients' psychosocial problems when compared to those without such awareness or training (Beach et al., 2005; Klein et al., 2011; Roter et al., 1995). Promoting physician awareness and training in areas related to social determinants of health may be an effective strategy to help physicians identify patients' disease management barriers and encourage the use of strategies to promote patient adherence.

Being a US medical graduate was the second most significant predictor of physicians' perceived use of strategies to promote patient adherence, with USMGs perceiving the use of fewer strategies to promote patient adherence when compared to IMGs. This finding supports previous research suggesting that IMGs are more likely than USMGs to utilize healthcare resources for their patients (Morris, et al., 2006; Norcini et al., 2010). Like the comparison to Bach et al. (2004), an important difference between previous research and results in this dissertation are the *kind* of healthcare resources being utilized by the physician. Morris et al. (2006) and Norcini et al. (2010) described physicians' use of healthcare services in the proper sense (e.g., length of hospital stay, ordering medical tests, referring patients to specialists), whereas this dissertation measured largely non-medical services such as patient consultation and adherence-related resources such as pill-boxes, medication diaries, and food/nutrition charts. Findings from this dissertation compliment previous findings and add to them by suggesting that that IMGs use more non-medical/low-tech disease management strategies when compared to their US trained counterparts. While identifying the reason for the difference between USMGs and IMGs is beyond the scope of this dissertation, several possible explanations warrant further investigation: IMGs may practice in healthcare environments that have more non-medical/low-tech resources on hand to employ; IMGs may be more likely to discuss non-medical disease management strategies with patients; IMGs may be better able to identify disease management barriers and therefore more likely to perceive the need to recommend disease management strategies; or IMGs and USMGs may only a *perceive* a difference in the use of strategies to promote patient adherence because of their different training backgrounds.

Results showed that female physicians were also more likely than their male counterparts to perceive using more strategies to promote patient adherence (Q_1H_{5c}). If perceiving more barriers is a necessary antecedent to using more strategies, this outcome makes sense given the previously discussed finding that female physicians were also more likely to perceive patients' disease management barriers. Unanswered by this dissertation, however, is why such gendered differences exist. Viewed through a socio-cultural lens, these findings may reflect gender-specific patterns of communication and behavior as defined by the social positions historically occupied by men and women and as maintained by expectations within the present-day cultural milieu (Burleson, 2003; Hall, 2006; Wood, 1994; Wood & Inman, 1993). For women, this set of expectations fosters affective-oriented behaviors that nurture close interpersonal relationships with others, where “talk is the primary vehicle through which intimacy and connectedness are created and maintained (Maltz & Borker, 1982)” and where communication is “associated with the provision of emotional support” (Burleson, 2003p. 5). For men, this set of expectations fosters instrumental-oriented behaviors that are focused on tasks—e.g., directing, persuading, or informing—and where information is conveyed for the purpose of getting things done (Burleson, 2003; Wood & Inman, 1993). Applying these two communication styles to physicians, Dimatteo, Taranta, and Prince (1980) describe affective (female) communication as the expression of “caring, concern, sincerity, compassion and respect” and instrumental (male) communication as “that which is important in order to inspire patient confidence in the physician” (p.377).

Clearly both affective and instrumental forms of communication are important, and neither male nor female physicians monopolize one kind of communication to the exclusion of the other. Moreover, the literature on gender-related differences in physician communication and practice style are not entirely consistent, suggesting there is still much to learn about the association between physician gender, communication style, and the delivery of healthcare (Hall & Roter, 1998; Roter, Geller, Bernhardt, Larson, & Doksum, 1999; Schmittdiel, et al., 2000; Street, 2002). Given the broad set of challenges associated with the effective management of diabetes—both in terms of developing and implementing a patient-centered disease management plan as well as monitoring and adjusting the plan over time—ensuring effective communication between patients and physicians is crucial for both male and female physicians alike; indeed, patient-physician communication is the principal mechanism through which disease management barriers are identified and strategies to overcome them are employed. One often cited strategy to help physicians' improve their communication with patients is communication skills training (Aspegren, 1999; Brown, Stewart, & Ryan, 2003; Cegala & Lenzmeier Broz, 2002; Hulsman, Ros, Winnubst, & Bensing, 1999; Stewart, 1995). Because the social and cultural influences that shape how men and women communicate are likely to be deeply ingrained, future research investigating the potential benefits of communication skills training should account for these entrenched patterns. For example, researchers investigating communication skills training might benefit from employing intensive training techniques such as the use of multiple teaching modalities (e.g., instruction, modeling, experiential, feedback) and reinforcing the training's content over an extended period of time (e.g., initial training sessions with periodic follow-up sessions) (Hulsman, et al., 1999; Roter et al., 2004; Street, 2002).

Physicians' perceptions of patients—efficacy and control. Contrary to the hypothesis that physicians would perceive less efficacy and control when working with African American patients and patients lower in SES when compared to patients generally and those higher in SES (Q_1H_3), neither the patient-based SES indicator nor the city-based SES index were significant predictors of physicians' perceived efficacy and control. Of the three predictors related to patient race, only the proportion of the population African American in the city where the physicians' practice was located was found to be a significant, but not in the anticipated direction. Contrary to Balsa and McGuire's (2001) statistical discrimination hypothesis which suggests that physicians would be less knowledgeable about the everyday lives and experiences of those from target minority groups, and consequently, would be less confident in interpreting minority patients' symptoms, needs, and wishes, results showed that physicians who practiced in cities with larger African American populations reported *more* efficacy and control than those practicing in cities with smaller African American populations.

It is not clear why working in a city with a larger African American population would yield more confidence in physicians' ability to interpret patients' symptoms, needs, and wishes, but it may be that physicians were more willing to rely on preconceived notions about patients (whether the preconceived notions were actually right or wrong) and therefore less likely to question their interpretation of patients' clinical presentation. Because areas with large African American populations are more likely to be characterized by concentrated poverty, have fewer disease management resources, and have a larger proportion of the population with poorly managed diabetes, physicians may have been more confident in making assumptions about their patients' ability to adhere to treatment—that is, assuming adherence would be a problem. Conversely, in majority white areas where the population is more economically well-off, physicians may feel less confident in their ability to make assumptions about adherence and therefore may hesitate about raising adherence related topics for fear of offending the patient and damaging the patient-physician partnership. If so, this would be a case of statistical discrimination in reverse, where preconceived notions and reliance on population-based likelihoods yields more certainty and confidence—whether right or wrong—about the group of minority patients being served.

An alternate explanation for this finding is that physicians working in communities characterized by large African American populations perceive themselves as having a particular skill set (e.g., specialized knowledge about the population being served such as increased cultural competency, communication skills, or expertise in social determinants of health) that distinguishes them from those who work in the suburbs. This skill set, then, translates into more confidence in interpreting the population's symptoms, needs, and wishes, and facilitates an increased sense of efficacy and control. Post-hoc analyses provide some support for this thesis, revealing that physicians who practice in the top quartile of cities in terms of the proportion of their population that is African American were significantly more likely than physicians working in the bottom three quartile of cities to perceive social determinants of health as relevant to their day-to-day clinical practice or to have had training in such areas. Physicians who practice in the top quartile were also much more likely to identify as a racial or ethnic minority group (versus non-Hispanic white), which may add to the perception of having specialized knowledge or a skill set that facilitates a perceived increase in efficacy and control when serving a large African American population. These propositions are consistent with findings from others who have shown that (a) cultural competency training or training in social determinants of health increases health care providers' confidence when providing care to patients from racial or ethnic minorities (Jenkins & Fallowfield, 2002; Klein, et al., 2011; Majumdar, Browne, Roberts, & Carpio, 2004; Schim, Doorenbos, & Borse, 2006; Sequist et al., 2010; Yedidia et al., 2003), (b) physicians with a propensity for cultural competency are more likely to work in areas characterized by large African American populations (Komaromy et al., 1996; Li, Williams, & Scammon, 1995; Reschovsky & O'Malley, 2008), (c) that African American physicians are more likely to practice in areas characterized by large African American populations (Bach, et al., 2004; Basco, Cull, O'Connor, & Shipman, 2010;

Komaromy, et al., 1996), and (d) that racially concordant patient-physician pairs—African American patients with African American physicians—tend to have better patient-physician communication, patient satisfaction, and more patient positive affect than racially discordant pairs (Cooper, et al., 2003; Laveist & Nuru-Jeter, 2002; Saha, et al., 1999).

Once more consistent with previous research suggesting female physicians may be better at tasks involving interpersonal communication with patients (Cooper & Roter, 2003; Roter & Hall, 2004; Roter, et al., 2002), findings from this dissertation showed that female physicians perceived more efficacy and control in managing patients with diabetes (e.g., being able to tell which patients are having difficulty adhering to treatment) when compared to their male counterparts (Q_1H_{5d}). Also positively associated with an increase in perceived efficacy and control were being a USMG and Social Determinants of Health: Relevance and Training. Social Determinants of Health: Relevance and Training explained more unique variance when compared to all other covariates in the model, suggesting that those who are aware of or who have had training in these areas may be more effective at identifying patients who face disease management barriers or who struggle with the rigors of managing their diabetes.

Question Two

Resource constraints—high quality, culturally competent care. In contrast to findings from previous research (Bach, et al., 2004; Cromwell, McCall, Burton, & Urato, 2005; Gornick et al., 1996; Lutfey & Reese, 2005; Varkey, et al., 2009), results showed no association between race and SES and physicians' perceived resource constraints and the ability to provide high quality, culturally competent care (Q_2H_1 and Q_2H_2). This finding is surprising given the growing body of research suggesting both patients' and physicians' race and patients' SES influence physicians' perceptions of patients, cultural competency, and the delivery of health care (Balsa & McGuire, 2005; Brown et al., 2004; Ciechanowski, et al., 2001; Hausmann, et al., 2010; Piette, et al., 2006; Schmittdiel et al., 2010; Schulman, et al., 1999; Smedley, et al., 2003; van Ryn, 2002; van Ryn, et al., 2006; Woo, Ghorayeb, Lee, Sangha, & Richter, 2004). As noted previously, this finding may stem from differences between physicians' generalized versus patient-specific assessments of patients, or activation of different cognitive processes (i.e., social desirability bias versus statistical discrimination) related to the study's design. While neither the race nor SES variables were associated with physicians' perceptions of resource constraints as it relates to the provision of high quality and culturally competent care, results provided partial support for the hypothesis that being a female physician, an IMG, or a physician from a racial or ethnic minority group would be positively associated with reporting more resource constraints (Q_2H_3).

Consistent with others who have found that physician gender can significantly impact both clinical and interpersonal processes of care (Cooper-Patrick, et al., 1999; Cooper & Roter, 2003; Elderkin-Thompson & Waitzkin, 1999; Roter & Hall, 2004; Roter, et al., 2002; Street, et al., 2007; Street, 2002), findings from this dissertation show that female physicians perceived more resource constraints as it relates to the provision of high quality and culturally competent care when compared to their male peers (Q_2H_3). One explanation for this finding is that by showing more interest in psychosocial aspects of patients' health, female physicians identify more needs and solicit the description of more problems from patients and are therefore confronted with more issues to address within the confines of the clinical encounter; with more issues to address, it follows that female physicians would perceive more resource constraints. This possibility is consistent with previous research suggesting female physicians are more likely to engage in active partnership behaviors and to provide more preventive services, as well as evidence suggesting female physicians may be more likely to provide care to patients with more complex psychosocial problems or to patients who have greater expectations from their physician (Bertakis, Helms, Callahan, Azari, & Robbins, 1995; Bickel & Ruffin, 1995; Health Resources and Services Administration, 2008; McMurray, et al., 2000; Rosenblatt & Hart, 2000; Schmittdiel, et al., 2000; Street, 1991).

Contrary to that which was hypothesized ($Q_2H_{3)}$, USMGs perceived *more* resource constraints as it relates to the provision of diabetes-related care when compared to IMGs. This finding was unexpected because, like female physicians, evidence suggests IMGs are more likely to provide care to lower-income patients in urban environments where the population is in poorer health, where healthcare resources are more scarce, and where more intensive healthcare services are often required (Fossett & Perloff, 1995; Howard et al., 2006; Morris, et al., 2006; Norcini, et al., 2010). This finding may be partially explained by this dissertation having measured physicians' *perceptions* of resource constraints as it relates to the provision of high quality and culturally competent care rather than the actual provision of healthcare services. It may be that only the perceptions of IMGs are different than USMGs, stemming in part from IMGs having received a significant portion of their training outside of the US. Moreover, given that IMGs are themselves more likely than USMGs to identify as a racial or ethnic minority, they may perceive fewer barriers as it relates to the provision culturally competent care. Similar to the research design employed by Norcini et al. (2010), future research should discern between US-born and foreign-born USMGs and IMGs to help identify how race, ethnicity, nativity, and place of training may be related to physicians' perceptions of resource constraints in the provision of high quality and culturally competent care.

Physicians' board certification status was also associated with physicians' perceptions of resource constraints as it relates to the provision of high quality and culturally competent care. Contrary to previous research suggesting physicians with board certification may be more likely to work in resource rich healthcare settings (Bach, et al., 2004; Gardner & Vishwasrao, 2010), board certified physicians in this dissertation reported *more* resource constraints. Unanswered by this research is whether board certified physicians actually have fewer resources or, relative to those without board certification, simply *perceive* a deficit. It is possible that board certified physicians know more and wish to do more as it relates to the provision of diabetes care, and as a consequence, more readily notice the absence resources. This would be consistent with previous research indicating that board certified physicians are more likely than those without board certification to provide health care in concordance with recommended practice guidelines (Chen, Rathore, Wang, Radford, & Krumholz, 2006; Ramsey et al., 1989; Tamblyn et al., 2002; Turchin, Shubina, Chodos, Einbinder, & Pendergrass, 2008). To better understand the relationships between board certification and the provision of diabetes care, future research should seek to distinguish between perceived and actual resource constraints and how board certification influences *both* physicians' assessment *and* use of available resources.

Controlling for covariates, DOs perceived fewer resource constraints as it relates to the provision of high quality and culturally competent health care when compared to MDs. This may be related to the philosophy of osteopathic medicine that tends to place a greater emphasis on treating the whole patient (e.g., discussing preventive measures; inquiring about patient's emotional state; raising topics related to family life, social activities, and work) when compared to allopathic medicine (Carey, et al., 2003; Johnson & Kurtz, 2002; Licciardone, 2007; Peters, et al., 1999). As such, it is possible that DOs may be better prepared to provide culturally competent care or may be better prepared to negotiate cultural differences with patients when conflicts arise. Similar to osteopathic medicine, Family Practice training also emphasizes the whole patient, including prevention, addressing patients psychosocial needs, and understanding individual and group dynamics as applied to families (Bertakis et al., 1998; Bertakis, Robbins, Callahan, Helms, & Azari, 1999; Paasche-Orlow & Roter, 2003); however, unlike DOs, being in Family Practice was associated with perceiving *more* resource constraints. While explaining this difference is beyond the scope of this dissertation, it is possible that those with a DO and those that specialize in Family Practice may work in different kinds of settings not accounted for by covariates, or that DOs and Family Practice physicians merely *perceive* resource constraints differently when they are actually similar. By disentangling the relationships between physician demographics and training, practice setting, and perceived resource constraints as it relates to the provision of high quality and culturally competent care, future research can help to create a clearer picture of which physicians are experiencing difficulty in providing high quality and culturally competent care, thus enabling better targeting of healthcare resources (e.g., continuing education, practice management support) to those physicians and practice settings that would benefit from them the most.

Minutes spent per-patient. Given the increase in clinical demands commonly associated with providing care in areas characterized by a large African American population or to those who are socioeconomically disadvantaged, it was predicted that as the African American population increased or as the SES of the population decreased the time spent per-patient would increase (Q_2H_1); however, of the five race- and SES-related predictor variables only the patient-based SES indicator was significant, with physicians serving patients lower in SES reporting slightly longer office visits than physicians serving higher SES patients. While statistically significant, the difference in minutes spent per-patient between physicians with the lowest SES patients and those with the highest SES patients was small: physicians serving the lowest SES group were observed to have, on average, only a 7.49 ranked percentile advantage over those serving the highest SES group. Unanswered by this dissertation, however, is whether this modest time advantage is sufficient to meet the expected increase in disease-management needs associated with patients who are low SES. Moreover, it is not clear as to why a similar time advantage was not observed for African American patients who, as a group, are also likely to have an increase in disease management needs. An inability to meet African American patients' disease management needs within the time-span of the clinical encounter may be a contributor to race-based disparities in diabetes care.

When physicians are simultaneously confronted with clinical complexity (e.g., patients with multiple health concerns, psychosocial difficulties, interpersonal barriers between patient and physician, etc.) and time constraints they may be more likely to rely on preconceived notions about patients (i.e., stereotypes), and, as a result, communicate less effectively or provide biased or inappropriate care (Burgess, et al., 2004; Fiscella & Epstein, 2008; Parchman, Pugh, Romero, & Bowers, 2007; Parchman, Romero, & Pugh, 2006; Phillips et al., 2001; Phillips & Twombly, 2008). Policies that support increased reimbursement for physicians serving higher need or higher risk populations—such as risk-adjusted capitation levels—might help to mitigate some of the financial related pressures that lead to shorter visits, and as a result, improve the quality of care. Examples of such policies include adjusting baseline reimbursement or capitation payments upward for healthcare services in regions (e.g., cities, zip codes, boroughs) characterized by an increase in disease acuity; adjusting pay for performance quality improvement initiatives based on patients' SES; focusing pay for performance initiatives on populations at greatest risk (e.g., African Americans, groups identified as low SES); modifying relative value units to account for the increase in time required to care for patients with serious (and multiple) chronic conditions; expanding the range of billable services to include focused disease management or case management tasks for high risk populations; and increasing subsidies for private practices or community health centers in low-income and high-minority communities (Berenson & Horvath, 2003; Fiscella, Franks, Gold, & Clancy, 2000; Franks & Fiscella, 2002; Hood, 2007; Leichter, 2001; Perloff, et al., 1997; Rosenbaum & Teitelbaum, 2005). Future research should seek to measure the potential efficacy of these policy options not only in terms of their financial costs but also in terms of improving quality and health outcomes and reducing racial and SES-related disparities in care.

It was predicted that female physicians would perceive more resource constraints than their male counterparts, including having shorter office visits (Q_2H_3); however, consistent with previous research (Roter, Lipkin, & Korsgaard, 1991; Roter & Hall, 2004; Roter, et al., 2002), results showed female physicians as having office visits that were slightly longer than their male peers. It is noteworthy that female physicians both reported healthcare visits as longer *and* perceived more resource constraints as it relates to the provision of high quality, culturally competent care. This suggests lengthening the healthcare visit may not be sufficient in and of itself to improve the quality of health care. While this dissertation did not measure the provision of healthcare services or the content of the clinical encounter directly, findings reported by others suggest the female physicians studied in this dissertation may have perceived more resource constraints and reported longer office visits because they were trying to do more within a single clinical visit, such as attending to the interpersonal dynamics of the patient-physician encounter or addressing patients' psychosocial needs (Franks & Bertakis, 2003; Roter, et al., 1991; Roter & Hall, 2004).

Having a DO, being board certified, and seeing more patients per-week were each significantly associated with spending less time with patients during the clinical encounter, with patients per-week explaining more unique variance when compared to all other covariates in the model. The finding that DOs spend less time with patients when compared to MDs contrasts with Liccardone (2007) who found no difference between osteopathic and allopathic physicians; however, Liccardone did not account for patients' SES or the proportion of a physician's patient population that was African American. Because osteopathic physicians are less likely than allopathic physicians to provide care to African American patients, and because time spent with African American patients and with patients in socioeconomically impoverished settings tend to vary from time spent with the majority population or patients in more socioeconomically privileged areas, Liccardone’s findings may not reflect accurately those physicians serving areas characterized by large African American and low SES populations (Cooper, et al., 2003; Fiscella & Epstein, 2008; Licciardone, 2007; Licciardone, Clearfield, & Guillory, 2009).

After controlling for covariates, board certified physicians in this dissertation reported spending less time per-patient than those without board certification. This finding contradicts previous research suggesting board certified physicians tend to spend more time with patients than those lacking board certification (Mitchell, Schurman, & Cromwell, 1988; Pham, Schrag, Hargraves, & Bach, 2005). It is possible that the board certified physicians in this dissertation were better prepared to make diagnoses and treatment recommendations and could simply do so more quickly than their non-certified counterparts; however, it seems more likely that those lacking board certification required additional time because they are more likely to treat uninsured or publically insured patients who face an increased myriad of psychosocial problems (stress and anxiety, lack of social support, familial issues) commonly associated with racial segregation and concentrated poverty (Cukor, Cohen, Peterson, & Kimmel, 2007; Perloff, Kletke, & Fossett, 1995; Perloff, et al., 1997; Varkey, et al., 2009; Williams & Collins, 2001).

Not surprisingly, the most significant predictor of minutes spent per-patient was the number of patients seen by the physician per-week. Given previous research suggesting physicians serving low SES or high minority populations are more likely to experience resource constraints and to perceive more challenges delivering high quality care (Bach, et al., 2004; Gemson, Elinson, & Messeri, 1988; Perloff, et al., 1997; Reschovsky & O'Malley, 2008; Varkey, et al., 2009; Zhang, et al., 2009), and because time spent with patients during the clinical encounter is associated with both physician and patient satisfaction and the quality care (Geraghty, Franks, & Kravitz, 2007; Kaplan, Gandek, Greenfield, Rogers, & Ware, 1995; Ostbye, et al., 2005; Sirovich, Woloshin, & Schwartz, 2011), policies that ease the financial pressures of physicians (and health systems) in low income/high minority areas—such as those discussed previously—could help to reduce the number of patients seen per-day and thereby enable longer clinical visits. However, it is not merely the time spent with patients that matters: the content of the clinical encounter must ensure the provision of appropriate and high quality services that meet patients' needs (Fiscella & Epstein, 2008; Oliver, Goodwin, Gotler, Gregory, & Stange, 2001; Tai-Seale, McGuire, & Zhang, 2007). Providing care within systems characterized as a patient-centered medical home—where patients' needs are met through primary care teams as opposed to a single physician or practice, and where care is both coordinated and integrated throughout the health system and within the community—may prove to be an effective way to organize primary care, as evidence suggests such models enhance access and quality, improve patient satisfaction, and increase the efficiency of managing healthcare resources over time (Fiscella & Epstein, 2008; Patient-Centered Primary Care Collaborative, 2011; Rittenhouse & Shortell, 2009; Stange et al., 2010).

Ancillary service providers. Unlike previous research indicating a relationship between patient race, SES, and physicians' access to ancillary service providers (Bach, et al., 2004; Forrest, Nutting, von Schrader, Rohde, & Starfield, 2006; Shi & Stevens, 2005; Varkey, et al., 2009), neither the percentage of physicians' patients that were African

American nor the patient-based SES indicator were significant predictors in this dissertation. Of the five race- and SES-related variables, only the questionnaire type (African American or General) was significant, but not in the hypothesized direction. Contrary to the expectation that physicians responding to the African American Questionnaire would perceive poorer access to ancillary service providers (Q_2H_1), African American Questionnaire respondents reported *better* access to on- and off-site ancillary service providers compared to those responding to the General Questionnaire. This result compliments findings from Basu (2001) who reported non-white patients eligible for both Medicare and Medicaid were more likely than corresponding white patients to access ancillary care.

When compared to patients generally, it may be that physicians judge African American patients as having increased disease management needs, and as such, are more likely to consider accessing ancillary service providers when considering their African American patients. This observed difference may also reflect physicians' beliefs about patients' preferences, with physicians believing that African American patients are more amenable to using or prefer to use ancillary service providers when compared to patients generally. Basu (2001) suggests the increased use of ancillary service providers among low-income minority patients may reflect a poor fit between patients' needs and providers' ability to accommodate to those needs. If so, then the increase in perceived access to ancillary providers when considering African American patients may indicate physicians' attempt to compensate for this lack of fit. Future research should investigate the mechanisms that facilitate physicians' use of and patients' access to ancillary service providers, including how these mechanisms may vary depending on the patient population being served.

Controlling for other covariates, physicians who are male, have a DO, or work in private practice each reported having poorer access to on- and off-site ancillary service providers when compared females, those with a MD, or those who work in a setting other than private practice. If an awareness of patients' needs facilitates knowledge of resources to meet those needs, the perceived increase in access to on- and off-site ancillary service providers among female physicians (Q_2H_3) may be attributable to their increased awareness of patients' disease management barriers or greater sensitivity to patients psychosocial needs (Cooper & Roter, 2003; Roter & Hall, 2004; Roter, et al., 2002). It is also possible that female physicians and MDs work in settings that are objectively different than males and DOs, but not accounted for by the set of covariates in the analysis. For example, it is possible female physicians and MDs are a self-selected group who actively seek out clinical environments where ancillary care is better integrated into the processes of care (e.g., environments characterized by patient-centered primary care). Female physicians and MDs may also be more likely to work within healthcare systems that utilize disease management support systems (e.g., chart reminders, disease management teams) that include clinical pathways leading to referrals to ancillary care. To help explain the observed differences further research is required.

Given the opportunity to pool resources and benefit from economies of scale in group practice settings, it was not surprising that those in private practice reported poorer access to on- and off-site ancillary service providers when compared to those in group practice (Casalino, Devers, Lake, Reed, & Stoddard, 2003; Pham, et al., 2005). If group practice physicians have better access to ancillary service providers, it follows that they would be better able to delegate some disease management tasks to ancillary providers (e.g., patient education provided by nutritionists or nurse educators, and psychosocial assessments provided by social workers) and thus be better positioned to utilize the clinical encounter to address the medical aspects of disease management such as identifying, monitoring, and modifying the most appropriate medication and dosing schedule; monitoring blood-glucose levels; and assessing for and treating comorbid conditions. The availability of ancillary service providers in group practice settings, then, likely produces a degree of patient management efficiency not present among private practice settings. To help private practice physicians organize their practice to promote better access to ancillary service providers, payers could incentivize collaboration among physicians by rewarding those who pool resources, form healthcare teams, or implement other resource sharing strategies intended to improve quality and other outcome-related goals (Bodenheimer, Grumbach, & Berenson, 2009; Grumbach & Bodenheimer, 2004). To help healthcare service providers develop and implement such strategies, the Agency for Healthcare Research and Quality offers policymakers, healthcare administrators, physicians, and researchers access to evidence-based tools on how to create patient-centered medical homes that provide accessible, comprehensive, and coordinated care with goal of improving healthcare quality and safety (Agency for Healthcare Research and Quality, 2012).

Controlling for covariates, physicians who were board certified or USMGs were also more likely to perceive having better access to on- and off-site ancillary service providers when compared to those without board certification or IMGs (Q_2H_3). These findings likely reflect the growing trend among well-established health systems and large payers (e.g., insurance companies) to require physicians to be board certified as a condition of employment/contractual agreement (Brennan et al., 2004; Sharp, Bashook, Lipsky, Horowitz, & Miller, 2002) and an increased propensity for IMGs to work in low SES urban clinics with large Medicaid populations (Council on Graduate Medical Education, 1998; Hing & Lin, 2009; Weissman, et al., 2001) . The consequence of this pattern is a moderately tiered network of healthcare providers, with board certified and USMG physicians being more likely to provide care in resource rich healthcare settings (i.e., those that enable physicians to have access to ancillary service providers) such as hospital affiliated clinics, and those lacking certification or IMG physicians being more likely to provide care in resource poor clinics serving relatively large Medicaid patient populations (Bach, et al., 2004; Baer, Konrad, & Miller, 1999; Jeffe & Andriole, 2011; Mullan, 1997; Perloff, et al., 1997; Varkey, et al., 2009). Future research should seek not only to evaluate the relationships between physician training (e.g., USMG versus IMG, board certified versus not board certified), the stratification of healthcare resources (access to ancillary staff), and gaps in the quality of care, but also strive to uncover the specific mechanisms—e.g., selective recruitment of medical staff—that lead to the stratification of healthcare providers in the first place.

Physicians scoring higher in Social Determinants of Health: Relevance and Training reported better access to ancillary service providers when compared to those with lower scores, suggesting that awareness and training in areas related to Social Determinants of Health may prime physicians to make better use of the services offered by ancillary providers. If so, policies that support training to help physicians recognize and respond to patients psychosocial needs, including better utilization of ancillary service providers, may help to improve the quality of diabetes care and enhance patients' adherence to recommended treatment (Cranor, Bunting, & Christensen, 2003; Davidson, 2009; Wagner, Austin, & Von Korff, 1996; Willens, Cripps, Wilson, Wolff, & Rothman, 2011).

Question Three

Contrary to that which was hypothesized (Q_3H_1 and Q_3H_2), neither the questionnaire type, proportion of patients African American, proportion of the population that is African American in the city where the physicians' practice is located, the patient-based SES indicator, nor the city-based SES index were significant predictors of physicians' participatory decision making style. This finding does not correspond to Kaplan et al.'s (1995) finding that minority patients and those with less education had the least participatory visits with their physicians, Cooper-Patrick et al.'s (1999) finding that African American patients experiences less participatory physicians encounters when compared with whites, and Gordon et al.'s (2006) finding that physicians provide less information to African American patients when compared to whites. However, each of these studies assessed either patients' perceptions of their interactions with physicians or actual patient-physician encounters, whereas the research in this dissertation assessed physicians' perceptions of their own interactions with patients generally or with their African American patients specifically. It is possible that the physicians in this dissertation overestimated the degree to which they involved African American patients in decision making, perhaps providing the response they perceived to be most the socially desirable. It is also possible that the physicians overestimated the degree to which

African American patients or those lower in SES wished to be involved in decision making, applying the same participation standard to African American patients or lower SES patients as to whites and higher SES patients. Findings from Levinson et al. (2004) and others (Ashton et al., 2003; Benbassat, Pilpel, & Tidhar, 1998; Murray, Pollack, White, & Lo, 2007) suggest that because patients differ in their preferences for participation in decision making that treating all patients equally could itself contribute to disparities in care. Future studies should assess what factors are most salient for physicians when assessing patients' desire or interest to participate in decision making, and whether physicians' assessments and observed decision making style are related to patients' adherence to treatment.

As predicted (Q_3H_3), male physicians were less likely than their female counterparts to describe themselves as using a participatory decision making style. This result corresponds with Cooper-Patrick et al. (1999) who found that patients of female physicians had more participatory visits and Roter and Hall (2004) who found that female physicians engaged in more patient-centered communication. While a growing body of evidence suggests an association between a more participatory decision making style, patient activation, adherence to treatment, and health outcomes, the specific mechanisms or pathways linking physicians' practice style to outcomes remains unclear (Epstein, Alper, & Quill, 2004; Parchman, Zeber, & Palmer, 2010; Roter & Hall, 2004; Stewart, 1995). Elucidating these mechanism or pathways should be a research priority.

Physicians scoring higher in Social Determinants of Health: Relevance & Training were also more likely to report a participatory decision making style when compared to those with lower scores. This finding is consistent with Brach and

Fraserirector (2000), who in their review of the cultural competency literature conclude that training that increases physicians' understanding of the social lives of their patients can improve physicians' attitudes toward marginalized populations, improve knowledge about those who are socially or economically disadvantaged, and help build communication skills when working with minority or other disadvantaged patients. While this dissertation did not assess cultural competency training specifically, the nine content areas making up the Social Determinants of Health: Relevance and Training variable overlaps significantly with content typically included in cultural competency training (Betancourt, 2003; Betancourt, Green, Carrillo, & Ananeh-Firempong, 2003; Brach & Fraserirector, 2000; Green, Betancourt, & Carrillo, 2002). Green, Betancourt, and Carillo (2002), among others (Betancourt, et al., 2003; Chokshi, 2010; Kripalani, Bussey-Jones, Katz, & Genao, 2006; Royal College of Physicians, 2010), argue that training that addresses social determinants of health should be a fundamental component of the cultural competency curriculum for medical students and residents, as the social fabric of patients' lives—that is, the conditions and circumstances in which people live over time (e.g., social and economic policies, stressors and support networks, the built and natural environments, the ability to garner resources)—directly impacts the provision of health care and how patients will (or will not) adhere to recommended treatment.

Similar to Paez et al. (2008), who found that physicians who worked in clinics with minority staff were more likely to display culturally appropriate behavior, findings from this dissertation show that physicians who worked in group settings—regardless of the racial or ethnic make-up of staff—were more likely than those in private practice to embrace a more participatory decision making style. While displaying culturally appropriate behavior and practicing in a participatory decision making style are not analogous, they are similar in that both require a patient centered approach to providing care (Betancourt, 2003; Cooper, et al., 2006; Ferguson & Candib, 2002). Group settings likely influence physicians' behaviors through several pathways, including peer pressure or role modeling by other physicians within the group (physician champions, clinical leaders, influential peers); economies of scale that enable investment into quality improvement resources, continuing education, and adoption of best practice recommendations; and improved administrative systems that can be used to monitor and reward physicians for adherence to best practices (Casalino, et al., 2003; Crabtree et al., 2005; Eisenberg, 1979; Institute of Medicine, 2001; Sax, Uckay, Richet, Allegranzi, & Pittet, 2007). While economies of scale offer some advantages in terms of material resources, providing diabetes care in manner that involves patients in diagnostic and treatment decision making does not have to involve large capital investments or a high-technology approach. In *Crossing the Quality Chasm*, the Institute of Medicine (2001) asserts there are many low-cost ways to activate patients and to practice in a more patient centered manner. Two examples cited by the Institute of Medicine include providing patients with information/reminders during check-in on how to effectively communicate with their physician, or distributing disease-specific tip-sheets to patients to help prompt conversation with their physician about how to best manage their disease. Establishing a clearinghouse of such strategies and promoting its use among private practice physicians could be an effective way to help facilitate a more participatory decision making style among those physicians whose practice is in a relatively isolated setting.

CHAPTER 7

LIMITATIONS

There are several limitations to this dissertation. First, the research relied on physicians' self-reported data. Physicians, like people generally, may not always accurately perceive their own actions or attitudes, and are therefore at risk of providing biased responses. Montaño and Phillips (1995), for example, found physicians tended to overestimate their performance as it related to the provision of cancer screenings, and Leaf et al. (1995) found physicians' perceptions of their preventive cardiology practices to be significantly higher than that indicated by chart audit. When responding to the questionnaires used in this research it is possible that physicians overestimated their performance, incorrectly assessed patients' disease management barriers, or selectively recalled their most memorable patients rather than accurately representing their patients generally or African American patients specifically. It is not clear, however, how drawing upon such selective memories would have influenced results. On the one hand, it is possible that the most difficult or non-adherent patients would be most salient for physicians, resulting in a more negative representation of one's patients and perceived efficacy. On the other hand, physicians may have instead favored memories reflecting their most adherent patients or those who most effectively manage their diabetes; if so, this would bias results toward a more positive representation of patients and of physicians' practice patterns. Given these concerns results should be interpreted cautiously.

In addition to relying on physicians' self-reported data, this research was limited by the absence of data assessing actual patient satisfaction or clinical outcomes. If additional measures of physicians' performance, patient satisfaction, or clinical outcomes had been available it would have been possible to evaluate, for example, whether physicians' perceptions of patients, perceived efficacy and control, or perceived access to disease management resources are related to practice patterns and patient outcomes. Linking physicians' perceptions to objectively measured outcomes is an important next step to the findings reported in this dissertation.

Second, because this dissertation examined cross-sectional data the causal direction of observed relationships cannot be confirmed. It is possible, for example, that physicians who are more sensitive to the experiences and needs of African Americans or low income patients are more likely to practice in areas where these populations are more heavily concentrated (Moy & Bartman, 1995; Weeks, Wallace, & Wallace, 2009); likewise, it is possible that African American patients seek out care from a subset of physicians who are perceived as being more sensitive to their experiences and needs (Komaromy, et al., 1996; Saha, Taggart, Komaromy, & Bindman, 2000). The causal direction, however, is not relevant to the questions this dissertation answers—that is, how physicians' perceptions of patients and strategies to promote patient adherence are related to patient race and SES, how physicians reporting fewer resources and more barriers to provide diabetes care differ from those reporting more resources and fewer barriers, and how physician and patient demographics are associated with physicians' decision-making style. To identify the mechanisms that explain some of the associations described in this dissertation, future research may benefit from using in-depth qualitative or ethnographic methods such as those employed by Lutfey and Freese (2005) or Hinder and Greenhalgh (2012).

Third, over the past decade physicians have been under increased scrutiny regarding their role in contributing to race-based disparities in healthcare and outcomes (American College of Physicians, 2010; Burgess, et al., 2004; Smedley, et al., 2003; van Ryn, 2002). It is possible, therefore, that participants may have responded to the questionnaires in a manner that introduced a form of social desirability bias. For example, respondents may have answered questionnaires in a purposeful manner so as to avoid marginalizing African Americans or to limit the likelihood of being perceived as biased or discriminatory. To minimize the possible influence of social desirability bias several steps were taken, including ensuring respondent confidentiality, framing the research within the context of quality improvement, limiting contamination between General and African American Questionnaire respondents (e.g., ensuring that all physicians at the same address received either the General or African American Questionnaire), and excluding language in the questionnaires that could be perceived as threatening. Despite these steps, social desirability may still have affected how some respondents answered the questionnaires. The likely result of this bias would be an underreporting of the strength of the association between questionnaire type and the outcomes of interest; hence, observed differences between General and African American Questionnaire respondents are likely conservative estimates.

Fourth, while the final response rate for this research is respectable, at 55.1%, it is possible that physicians who did not return a questionnaire differed systematically from those who did. As discussed previously, non-respondents were more likely to be MDs (versus DOs), more likely to be from the PhysicianDatabases.com mailing list, less likely to specialize in Family Practice, and more likely to specialize in Internal Medicine. While the risk of non-response bias cannot be ruled out, a comparison of the demographic profile of General and African American Questionnaire respondents to respondents from the 2008 Michigan Department of Community Health's Survey of physicians revealed many similarities, suggesting the 637 physician sample used in this dissertation reasonably reflects the larger physician population from which it was drawn.

Fifth, because this research was conducted in the greater-Southeast MI area—a region characterized by racial segregation and concentrated poverty—findings may not be generalizable to other regions of the country; this said, racial segregation and the concentration of poverty is not unique to Detroit, MI and its suburbs (Massey, 2007; Massey & Denton, 1993). Logan and Stults (2011) report, for example, that eight US Metropolitan Statistical Areas (MSAs) fall within 10 points of the Detroit-Livonia-Dearborn MSA on the black-white dissimilarity index. Nonetheless, while many African Americans have relocated from Detroit to the city's first ring of suburbs, relatively few have relocated to the city’s majority white and more affluent suburbs; likewise, relatively few whites from the affluent suburbs have relocated to the urban center of Detroit. Care should be taken, therefore, before applying results from this research to physicians from other areas of the country.

Sixth, while each predictor variable measured a theoretically distinct construct, several predictor variables were significantly correlated; specifically, the relationships between a number of variables measuring race, class, and place ranged from moderate (absolute value greater than 0.3 but less than 0.5) to large (absolute value greater than 0.5 but less than 0.7). While coefficients of this size are sufficiently small for the purpose of multiple and logistic regression (as confirmed by acceptably low variance inflation factor scores), it underscores the complexity of investigating populations that are negatively impacted by race-based residential segregation and concentrated poverty. As described by Massey and Denton (1993) and observed by others (Massey, 2004; Mechanic, 2005; Schulz, et al., 2002; Williams & Collins, 2001; Zenk, et al., 2005), an uptick in poverty within a given population produces a remarkable increase in the concentration of poverty when it occurs against the backdrop of residential segregation. The result of this concentration is a systematic isolation of large numbers of people from resources and institutions that aid in the maintenance of health, which, as noted by Massey and Denton, “builds deprivation structurally into [the population’s]…social and economic environments” (p. 355). Given that race-based residential segregation links race to place, place to class, and class to race, isolating the independent effects of a given variable without introducing error stemming from the other variables is nearly impossible while employing regression-based methods. Results, therefore, should be interpreted cautiously and understood to represent imperfect models of complex social phenomenon.

And last, while efforts were taken to include a number covariates to minimize the risk of model misspecification, limitations with the dataset—both in terms of size and substance—prohibited inclusion of several possible cofounders. If the sample size had been much larger, for example, more covariates could have been included in the regression analyses. Also, missing from the questionnaire were data related to comorbidity and disease severity, both factors that more negatively impact African Americans with diabetes when compared to whites. If the physicians in this research had African American patients who were, on average, sicker and are more complex to treat than white patients, then one could expect physicians to rate African American patients more negatively across a number of the dependent variables. Notwithstanding, van Ryn and Burke (2000) found patient-level covariates assessing patient sickness/frailty and mental health status had little influence on physicians' perceptions of patients, suggesting such measures may have had little impact on the findings reported in this dissertation.

CHAPTER 8

CONCLUSIONS

Using an innovative design, this research contributes to the health policy and practice literature by explaining how physicians perceive patients with diabetes and how these perceptions are related to physician and patient demographics. The research also explains how physician and patient demographics are associated with physician decision making and strategies to manage diabetes. Given that current health policy solutions often emphasize physicians and the healthcare system as important levers for reducing disparities, this contribution is both timely and needed. To my knowledge, the research strategy associated with this dissertation has not been employed before. While previous research has measured and aggregated data linked to specific patient-physician encounters, this research measured physicians' global sense of themselves, their practice, and their patients, with some physicians limiting their frame of reference to encounters with African American patients and the rest considering encounters with patients regardless of race. This research approach captured a slightly different aspect of physicians' attitudes and behaviors toward patients—it delineated how physicians orient themselves to groups of patients based on race, and established how race influenced physicians' perceptions about disease management resources and the provision of care. This final chapter draws

several overarching conclusions about the research conducted for this dissertation, describing how the intersections between patient and physician demographics are related to physicians' perceptions of patients and the management of diabetes.
Both research and policy priorities are discussed.

Race

The dependent variables accounting for race—whether measured by questionnaire type, the proportion of African Americans in ones' patient panel or in the city where ones' practice is located, or the physicians' racial or ethnic identity—were predicted to be significantly associated with physicians' attitudes toward patients, access to disease management resources, and decision-making when working with patients with diabetes. Taken as a whole, however, the race variables tended to be unrelated or only weakly related with the dependent variables in this research. While questionnaire type proved to be a significant predictor in three analyses, its magnitude was generally small and the direction of the relationships was not always consistent with hypotheses. Physicians perceived using slightly *more* strategies to manage their patients' diabetes and perceived having *better* access to ancillary service providers when responding to the African American Questionnaire. If physicians were drawing upon prior knowledge that African American patients were more likely than the population generally to have an increased need for disease management resources (due in part to an increased likelihood of economic insecurity and poorer access to healthcare), this finding fits with Balsa and McGuire's (2001) statistical discrimination hypothesis which suggests physicians modify their attitudes and actions toward patients based on prior knowledge about that group of patients. The statistical discrimination hypothesis does not, however, explain why physicians responding to the African American Questionnaire perceived patients as having more positive disease management attitudes when compared to those responding to the General Questionnaire. Indeed, this finding contradicts the statistical discrimination hypothesis which suggests physicians responding to the African American Questionnaire should have perceived patients as having more negative disease management attitudes. It also contradicts previous research showing physicians perceived African American patients less favorably in terms of intelligence, communication abilities, disease management skills, and behavioral tendencies when compared to the majority population (Street, et al., 2007; van Ryn, 2002; van Ryn & Burke, 2000).

One interpretation of this finding is that physicians, as a group, truly perceive African Americans as having more positive disease management attitudes when compared to the population generally. If so, this would indicate a shift in physicians' perceptions of African American patients over the past decade, perhaps a function of increased cultural competency. A dramatic improvement in physicians' cultural competency, however, is not supported by research suggesting that many physicians still lack adequate preparation to provide culturally competent care to racial and ethnic minority patients (Greer, Park, Green, Betancourt, & Weissman, 2007; Park et al., 2005; Park et al., 2006; Weissman et al., 2005). A more plausible explanation, as noted above, is that the design of this research tapped into a form of social desirability bias where physicians responding to the African American Questionnaire answered in a manner that reduced observable racial bias or discrimination. If physicians responded to social pressures when assessing their African American patients, with the result being a more favorable outlook on African American patients' disease management attitudes, this may represent a learned response that promotes correct or normative behaviors. The question remains, however, as to whether such social pressures translate into improved patient care. While perceiving patients more favorably could help to promote a better patient-physician relationship, and thereby positively influence adherence, it could also obstruct the identification of patient attitudes that work against effective disease management. The possible influence of social desirability bias on physician performance when providing care to racially and ethnically diverse populations warrants further investigation.

Because responding to the African American Questionnaire was related to physicians' perceptions about patients' disease management attitudes, strategies, and resources, and because evidence suggests that African Americans are more likely to experience disease management barriers and have poorer glycemic control when compared to the majority population (Auslander, Thompson, Dreitzer, White, & Santiago, 1997; Brown, et al., 2004; Fiscella & Shin, 2005; Massey, 2004; Schectman, Nadkarni, & Voss, 2002; Schulz, et al., 2002; Shenolikar, Balkrishnan, Camacho, Whitmire, & Anderson, 2006), one would expect that the concentration of African Americans in ones' practice or the concentration of African Americans in the city where ones' practice is located would be appreciably related to physicians' perceptions of patients and their practice environment. Results showed, however, these variables were largely unrelated or only moderately related to the dependent variables in this research. The relative absence of significant relationships contradicts previous research suggesting physicians perceive African American patients or healthcare environments characterized by large African American populations less favorably than white patients or healthcare systems that serve the majority population (Bach, et al., 2004; Smedley, et al., 2003; van Ryn, 2002; van Ryn & Burke, 2000; Varkey, et al., 2009).

One explanation for this finding, and contrary to the statistical discrimination hypothesis, is that physicians either do not hold or do not apply a decision making rule based on generalized prior knowledge or information about race unless explicitly prompted to do so—e.g., responding to the African American Questionnaire, reacting to a clinical vignette where race is specified, or assessing the clinical encounter with a specific African American patient. In the absence of such a prompt, such as when responding to the General Questionnaire, race may simply not be an immediately salient or discriminating factor (Sabin, et al., 2008). Another explanation is that the proportion of African Americans in ones' patient population or the concentration of African Americans in the city where ones' practice is located is simply not that relevant or a matter of consideration for many physicians. Given the stark differences between African Americans and the general population in terms of diabetes prevalence, excess morbidity, and access to disease management resources, the absence of race as a salient factor could, in this case, actually contribute to a gap between the services a population needs and services being delivered. In other words, perceiving populations equally when differences actually exist could lead to an inadequate assessment of patients' needs and the inappropriate provision of care—equal treatment in the presence of unequal needs does not mean equality in quality. Further research documenting the relationships between patients' race and healthcare needs, and physician perceptions of patients' needs and the provision of health care is needed. This research could help to improve our understanding of the salience of patients' race in physicians' decision making.

Despite previous research suggesting physicians' race (Burgess, van Ryn, Crowley-Matoka, & Malat, 2006; Cooper-Patrick, et al., 1999; Cooper, et al., 2003) and age (Choudhry, Fletcher, & Soumerai, 2005; Doroodchi et al., 2008; Ely et al., 1999; Kenny, Smith, Goldschmid, Newman, & Herman, 1993) influence physicians' perceptions of patients and the provision of care, neither of these variables were significant predictors for any of the dependent variables in this dissertation. This finding is consistent with van Ryn, Burgess, Malat, and Griffin (2006), who found no significant relationship between physicians' race/ethnicity or age and treatment recommendations for men with coronary artery disease. Like van Ryn et al., the research contained within this dissertation stratified physician race into two groups: a white category versus non-white category. Because different racial and ethnic groups have different histories and perceive the construct of race through their own cultural lens, variation within the "non-white" category may exist. For example, Street, Gordon, and Haidet (2007) found that compared to white or African American physicians, Asian physicians perceived African American patients as poorer communicators, and, when compared to Asian physicians, African American physicians perceived African American patients as more satisfied with their health care. Future research should undertake a more nuanced analysis and investigate differences between physicians in the majority white population and those from multiple racial and ethnic minority groups. A more nuanced approach might also reveal differences as it relates to age; for example, Doroodchi et al. (2008) found that physicians who had been in practice for a decade or less were more likely to make practice choices that concurred with guideline recommendations when compared to physicians who had been in practice for more than a decade. Given the mixed results in the literature and in this dissertation, further investigation into the possible effects of physician race/ethnicity and age on attitudes toward patients and treatment is warranted.

Patient Socioeconomic Status

To identify the unique contribution of SES on outcomes, two distinct SES predictor variables were utilized—the first measuring physicians' perceptions of the SES of the physicians' patient population and the second measuring the SES of the population in the city where the physicians' practice was located. In the analysis using physician strategies to promote patient adherence as the dependent variable an interesting pattern emerged. Results showed that as physicians' perceptions of patients' SES decreased, physicians' perceived use of strategies to promote patient adherence *increased*; however, as the SES of the population in the city where each physician's practice was located decreased, physicians perceived use of strategies to promote patient adherence *decreased*. While the former suggests that physicians' access to strategies to promote patient adherence was better for those physicians having lower SES patients, the latter suggests that lower SES patients may need to travel greater distances to receive care from a physician who employs such strategies. For lower SES populations in the greater-Southeast Michigan area, where rates of automobile ownership are low and efficient and accessible public transportation systems are lacking, the geographic distribution of physicians with better access to disease management resources may not fit the distribution of patients in greatest need. This lack of fit may have worsened over the past couple of decades as healthcare providers face increasing pressures to reduce the provision of unprofitable services (e.g., time consuming disease management tasks associated with chronic disease) and as hospitals relocate from lower income and more poorly insured inner-city neighborhoods to more financially stable communities in the suburbs (Bernet, Moises, & Valdmanis, 2011; Bodenheimer, Wagner, & Grumbach, 2002; Lubell, 2008; Martinez, 2008; Schlesinger, Bentkover, Blumenthal, Musacchio, & Willer, 1987; Wagner et al., 2001). When assessing the relationships between SES and physicians' ability to meet the needs of their patients, future research should not only account for the social and economic position of their patients but the distance patients must travel to have their healthcare needs met.

Physician Gender

Physician gender, significant in all but one analysis, proved to be the most consistent predictor variable in this research. Female physicians were more likely than their male counterparts to report (a) a patient-centered practice style, (b) longer office visits, (c) increased access to ancillary service providers, (d) stronger endorsement of strategies to promote patient adherence, and (e) an increased sense of efficacy and control. Female physicians also perceived more disease management barriers faced by patients, and more resource constraints as it relates to the provision of high quality and culturally competent health care. Given the extensive list of controls used in this research (e.g., patient and physician demographics, physician training, work setting) these findings are likely very robust, and as such, they bolster existing literature showing gender differences in physicians' practice style and orientation to patient care (Cooper-Patrick, et al., 1999; Cooper & Roter, 2003; Franks & Bertakis, 2003; Kim, et al., 2005; Lurie et al., 1993; Roter & Hall, 2004; Roter, et al., 2002; Street, 2002; Tabenkin et al., 2010).

Importantly, the results of this research do not suggest that female physicians are inherently more patient centered than males, nor do they indicate that male physicians are ineffective communicators, less capable at identifying or addressing patients' needs, or less likely to have patients who are satisfied with the quality of the patient-physician partnership. Rather, these findings point toward the need to better understand the complexities of the interpersonal milieu between patients and physicians—including the mechanisms that reflect differences based on physicians' gender—and how the encounter between patients and physicians, whether female or male, can be improved to increase patient satisfaction, enhance the quality of care, and enable better health outcomes. Determining the precise knowledge, attitudes, and skills that lead to possible differences in communication between male and female physicians should be a focus of future research, as findings could be used to help improve interpersonal skills and disease management techniques for all physicians.

Because female physicians are more likely than males to practice in economically disadvantaged urban areas characterized by large racial and ethnic minority populations, it is important that workforce policies do not deter women from continuing to practice in such areas. To ensure the stability—and growth—of the physician workforce in urban health profession shortage areas, policy makers should weigh the employment preferences of the existing workforce, consider the special needs of the population being served, and reward healthcare systems that both develop their workforce and improve healthcare quality. One strategy to support the physician workforce and improve the quality of care is through the adoption of policies that support the creation of patient-centered medical homes (Agency for Healthcare Research and Quality, 2012; Epstein, et al., 2004; Geraghty, et al., 2007; Kaplan, et al., 1995; Ostbye, et al., 2005; Parchman, et al., 2010; Roter & Hall, 2004; Sirovich, et al., 2011; Stewart, 1995). To support the development of patient-centered medical homes, payment polices must account for the increase in labor associated with this model of care, as well as the increase in time and resources required to provide services to a population with an elevated case-mix complexity. Several strategies that could be used to meet the increase in costs include (a) compensating health systems and small group/private practice physicians for adopting tools that improve disease management (e.g., information technology systems that manage work flow, monitor utilization, and track quality indicators); (b) an expansion of billable services to include those that enhance clinical capacity and patient-centered care (e.g., comprehensive assessment, case management/care coordination, expanded primary care team); and (c) the implementation and support of programs/ancillary services that coordinate and collaborate with physicians and health systems to improve clinical capacity (e.g., case managers or care coordinators, on-call triage services, community health workers) (Agency for Healthcare Research and Quality, 2012). Health systems serving the urban poor can also attract more primary care physicians—both male and female—by implementing policies that address commonly cited career satisfaction concerns such as work/family balance, control of work environment, equitable pay, and sexual/gender-based harassment (Dorsey, et al., 2005; Frank, et al., 1999; Hauer, et al., 2008; McMurray, et al., 2000; Schwartz, et al., 1989). The implementation of policies such as those cited above would not only help to improve the quality of care and improve primary care physicians' working environments, but would help to mitigate against wage deflation for those physicians serving low-income and high-need populations, thus making a career serving the urban poor a more attractive option to the primary care physician workforce.

Social Determinants of Health

Taken collectively, the five predictor variables accounting for physicians' training—credential (MD versus DO), medical school (USMG versus IMG), social determinants of health: relevance and training, specialty (Family Practice versus others), and board certification—proved to be significantly associated with physicians' perceptions of patients, access to disease management resources, and decision making style. Physicians' endorsement of and training in areas associated with social determinants of health was particularly salient in this research, being the most significant predictor in three of the eight analyses. While establishing the cause for these relationships is beyond the scope of this dissertation, a growing body of evidence suggests that improving physicians' knowledge about social determinants of health shapes the way physicians' think about their practice and patients, as well as how physicians orient themselves within the patient-physician partnership and subsequent provision of care (Beach, et al., 2006; Beach, et al., 2005; Burgess, et al., 2007; Chokshi, 2010; Klein, et al., 2011).

Despite the growing commitment within medical education to ensure that physicians are adequately prepared to provide care to patients from diverse backgrounds, many physician training programs continue to struggle with developing and implementing an effective cultural competency curricula into their existing programs (Betancourt, 2004; Chokshi, 2010; Cuff & Vanselow, 2004; Smedley, et al., 2003; Weissman, et al., 2005). One factor hypothesized to contribute to this struggle is medicine's hidden curriculum (Beagan, 2003; Hafferty & Franks, 1994; Hafler et al., 2011; Smedley, et al., 2004; Weissman, et al., 2005); that is, implicit messages reflecting the cultural mores of the trainers or training institution that contradict with the stated or formally recognized curriculum. As it relates to cultural competency training within medical education, the Institute of Medicine describes that the hidden curriculum can produce a "disconnect between early clinical skills training where students learn about the importance of cultural competence and later clinical training where they learn that patients' social and cultural contexts are irrelevant to competent medical practice"(Smedley, et al., 2004p. 376).

Compared to cultural competency training, training that focuses on social determinants of health may be more agreeable to physicians as it generally removes the physician as the primary focal point and instead focuses on the broad range of ecological conditions and how these conditions impact patients' health over time—e.g., individual traits and biology; social, family, and community networks; environmental conditions (working and living); socio-economic status and access to resources; and historical conditions, legal codes, and social/cultural institutions. As such, training that focuses on social determinants of health, as opposed to the cultural competency of the physicians, may be less likely to be perceived as a threat and marginalized by means of the hidden curriculum.

Another limitation of current instruction on health disparities within the US medical education system is that it frequently emphasizes differences based on race and ethnicity at the exclusion of other and more fundamental social factors that directly impact health (e.g., SES) (Chokshi, 2010). While the nation's long history of racism justifies a continued focus on racial and ethnic disparities, medical education might be improved if it expanded its perspective to better incorporate the root causes producing racial and ethnic disparities in the first place. As noted by the World Health Organization, social determinants of health reach far beyond race and ethnicity to include "the circumstances in which people grow, live, work, and age, and the [political, social, and economic] systems put in place to deal with illness" (Commission on Social Determinants of Health, 2008p. 3).

To mitigate medicine's hidden culture and to help physicians understand the link between social determinants, health, and disease management, new standards concentrating on social determinants of health could be incorporated into medical education, core competencies for undergraduate and graduate training, and standards for board certification or recertification. These standards could help to transform physicians' understanding of illness beyond the disease-based model to one that better encompasses the concepts of health and well-being within the broader context of a patient's life over time. Under such standards physicians' training would include not only how to recognize and address the signs and symptoms of disease, but how and when events over the life course may have contributed to the current condition. Armed with such knowledge, physicians would be better prepared not only to treat disease but act as agents to prevent disease and preserve health for both patients and their families.

Under the Umbrella of the Ecological Model

Surprisingly, neither physicians' race (non-Hispanic white versus all others) nor age were significantly related to any of the outcome variables in this research. It was also a surprise to find that the proportion of African American patients in the physicians' practice and the density of the African American population in the city where the physicians' practice was located had either no effect or only a small effect on results. Do these findings imply that race, as it relates to the provision of health care, no longer matters? While a definitive answer to this question is clearly beyond the scope of this dissertation, a very large body of literature concludes not. Rather, what this dissertation suggests is that the *perceptions* of physicians in this sample do not vary substantially as the density of the African American population changes. This finding may reflect physicians' desires or intentions to treat patients equally, independent of whether or not they actually do so in practice. It may also reflect an anomaly associated with the geographically limited sample of physicians from the greater-Southeast Michigan area. An important follow-up to this research would be to measure both physicians' perceptions of patients and their actual behaviors during clinical encounters, sampling physicians from Southeast Michigan as well as other regions of the country. Such an analysis would not only help to establish how physicians' self-assessments actually correlate with their clinical performance, but would improve generalizability and enable researchers to test for regional differences. Where self-assessments are found to not match performance, then interventions designed to improve patient-physician partnerships and the quality of care could be tailored to help physicians more accurately evaluate their interactions with patients.

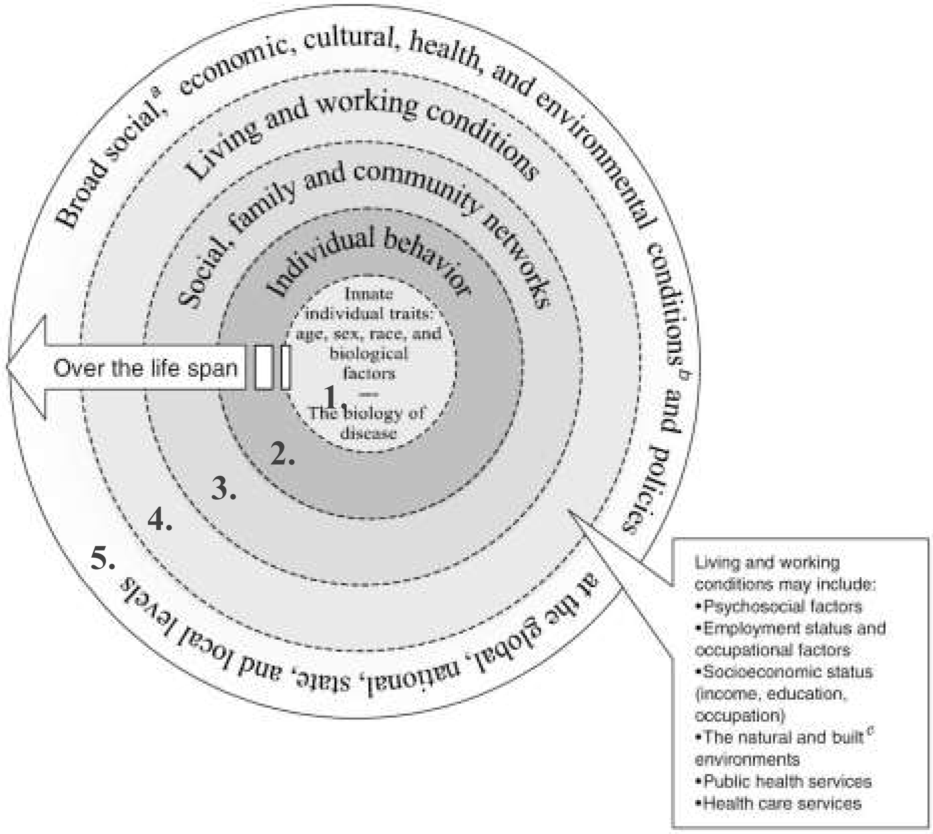
An important contribution of this dissertation was the finding that physicians' perceptions appear to be shaped more by their gender and professional training than by patient's race. While there is little (if any) evidence in the literature to indicate that female physicians are inherently better at fostering effective patient-physician partnerships, an affective-oriented communication style—where emotional support and close interpersonal relationships are actively supported—may explain a significant portion of the observed gender-based differences. Investigating gendered communication styles among physicians' and their relationship to effective disease management may be a promising line of inquiry for future research, as findings could be used to inform communication skills training within medical education. Also warranting further investigation is role of physicians' training in shaping how physicians perceive themselves, their patients, and their clinical settings. Studying the effects of having been trained in the US, being a doctor of osteopathic medicine, or competency in areas related to social determinants of health may be particularly promising as these predictors remained significant in a number of analyses even after controlling for a broad set of covariates.

Summary

This dissertation explored physicians' perceptions of patients with diabetes, how these perceptions were associated to patients' and physicians' demographics, and how patients' and physicians' demographics were correlated with physicians' decision making and strategies to manage diabetes. An overarching principle guiding this research was the notion that successful management of diabetes requires more than the provision of medical care; it requires balancing input from multiple influences across the ecological spectrum. Findings from this dissertation suggest that when physicians assess patients or when they make decisions on how to provide care they take into account not only information about patients' illness or disease but are influenced by patients' demographics, their own demographic and professional backgrounds, and the settings in which care is provided. After controlling for a broad set of covariates, physicians' gender and training background proved to be the most salient predictors of physicians' perceptions of patients, strategies to manage diabetes, and decision making style; results were not consistent with the notion that physicians respond more negatively or with biased attitudes when working with African American patients versus patients generally (i.e., without regard to their race). Findings from this research indicate that (a) increasing physicians' competency in areas associated with social determinant of health, (b) promoting policies that finance the development of patient centered medical homes, and (c) rewarding health systems that grow the primary care physician workforce in urban health professional shortage areas may help to improve the quality of diabetes care for the populations living in such areas.

FIGURES

Figure 1. *A Guide to Thinking About the Determinants of Population Health*



NOTES: Adapted from Dahlgren and Whitehead, 1991. The dotted lines between levels of the model denote interaction effects between and among the various levels of health determinants (Worthman, 1999).

[a] Social conditions include, but are not limited to: economic inequality, urbanization, mobility, cultural values, attitudes and policies related to discrimination and intolerance on the basis of race, gender, and other differences.

[b] Other conditions at the national level might include major sociopolitical shifts, such as recession, war, and governmental collapse.

[c] The built environment includes transportation, water and sanitation, housing, and other dimensions of urban planning.

SOURCE: Who Will Keep the Public Healthy? Educating Public Health Professionals for the 21st Century (Gebbie, Rosenstock, and Hernandez 2003)

Figure 2. *Managing Diabetes: Under the Umbrella of the Ecological Model*

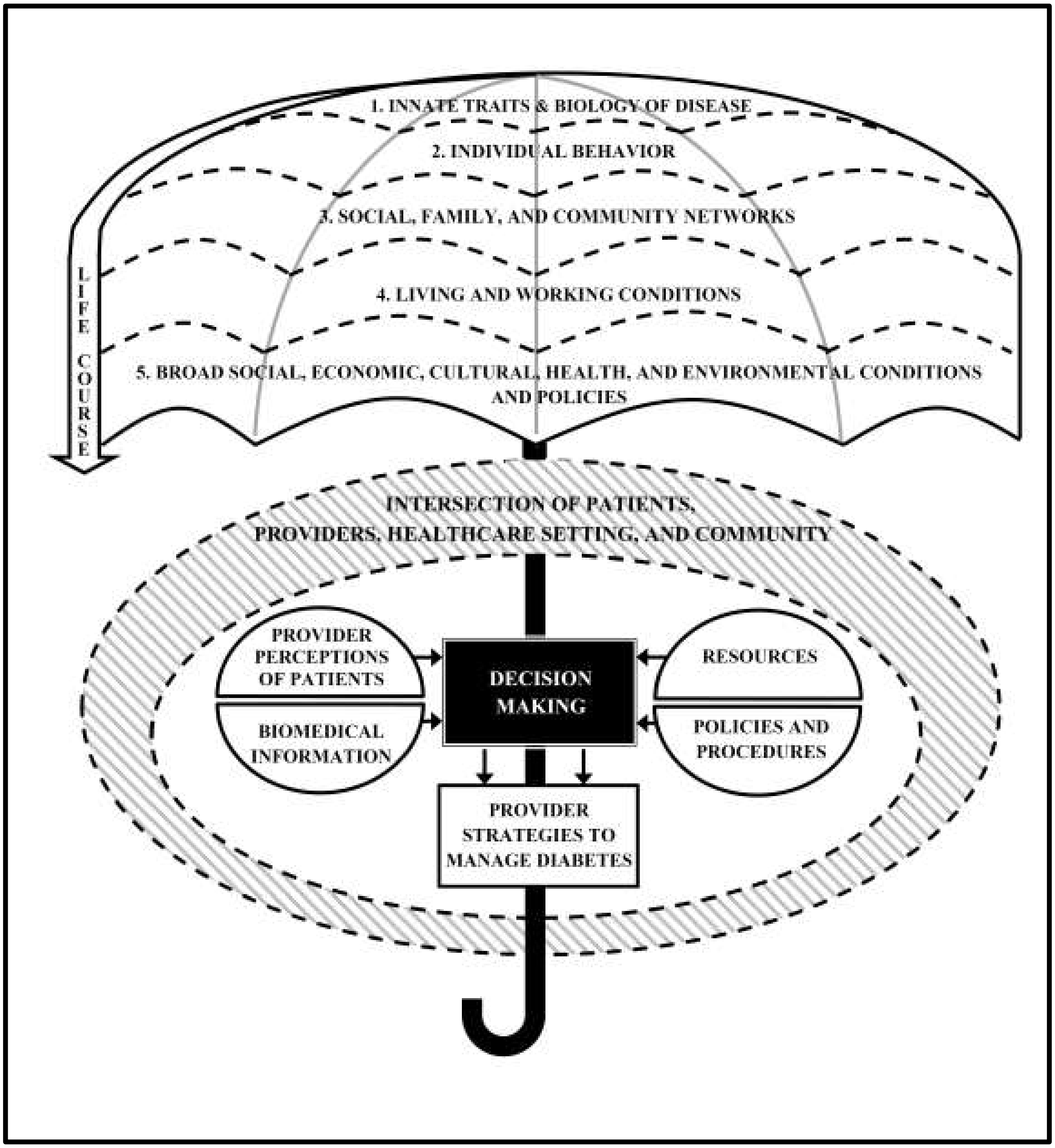


Figure 3. *Managing Diabetes: Under the Umbrella of the Ecological Model--Research Questions and the Theoretical Framework*

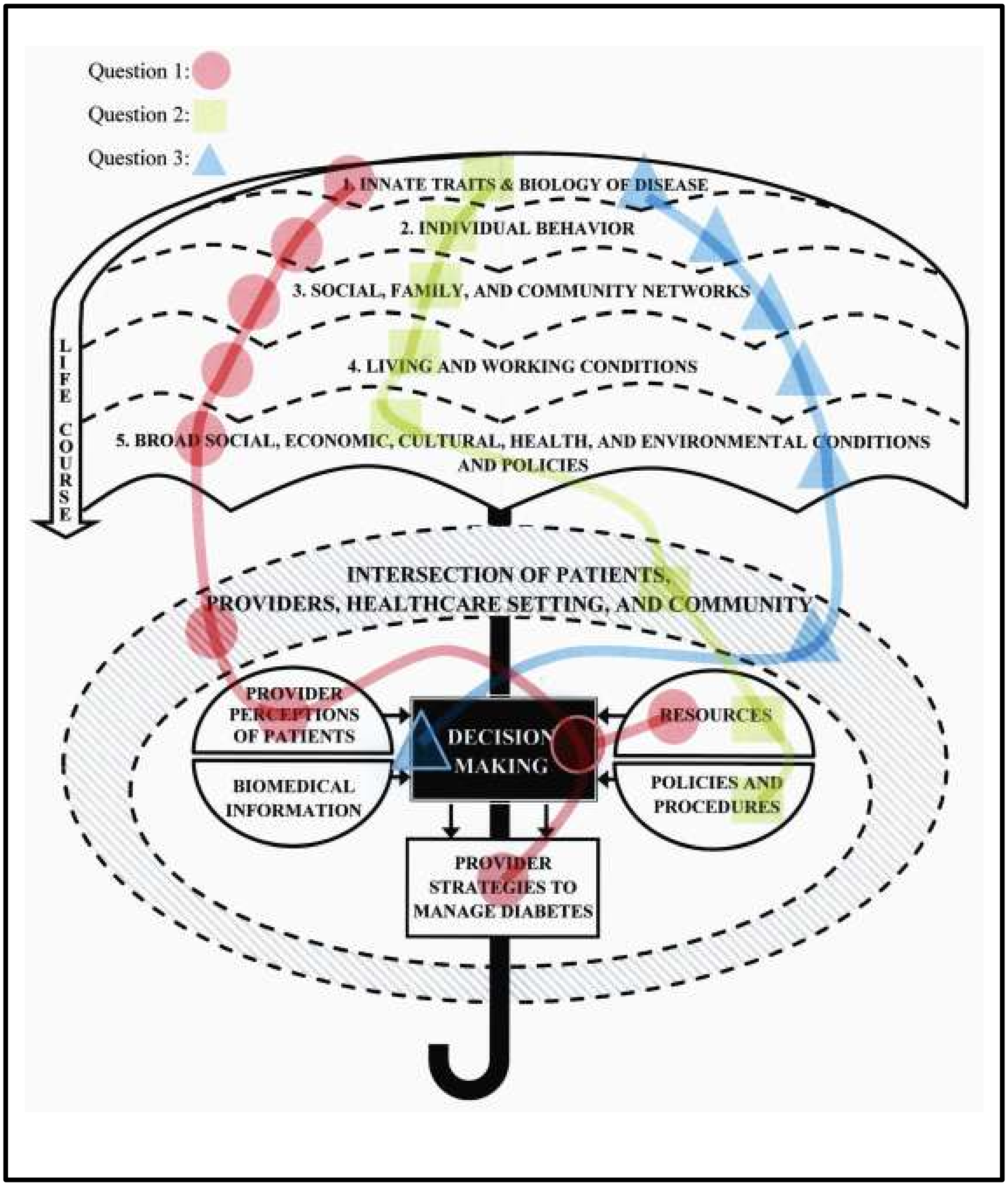


Figure 4a. *Histogram of Regression Derived Component Scores Standardized on a Scale from 0 to 100: Component One—Physicians' Perceptions of Patients' Disease Management Barriers*

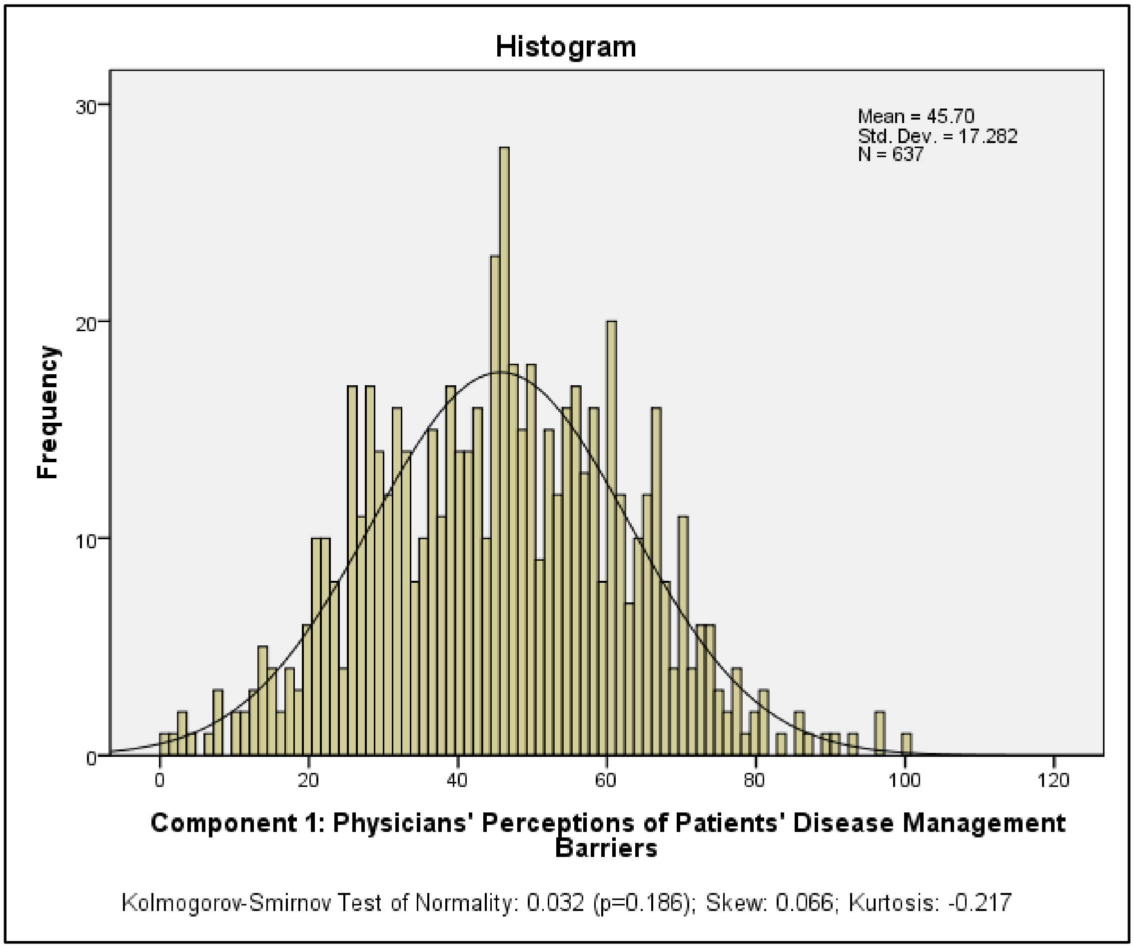


Figure 4b. *Histogram of Regression Derived Component Scores Standardized on a Scale from 0 to 100: Component 3—Physicians' Perceptions of Patients' Disease Management Attitudes*

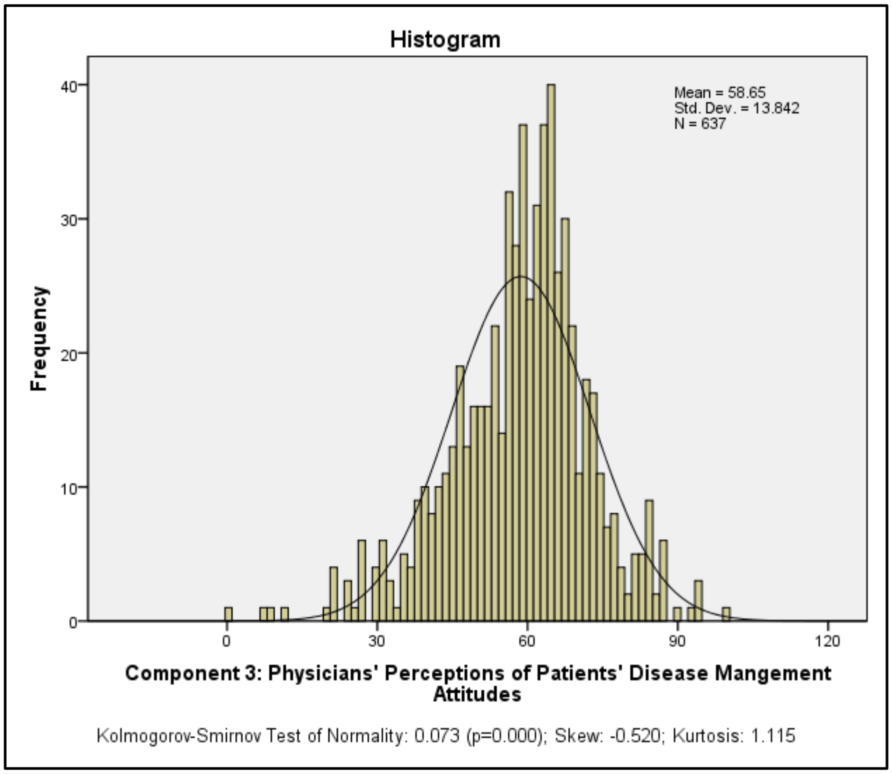


Figure 4b.2. *Normal Probability Plots: Component Three—Physicians' Perceptions of Patients' Disease Management Attitudes*

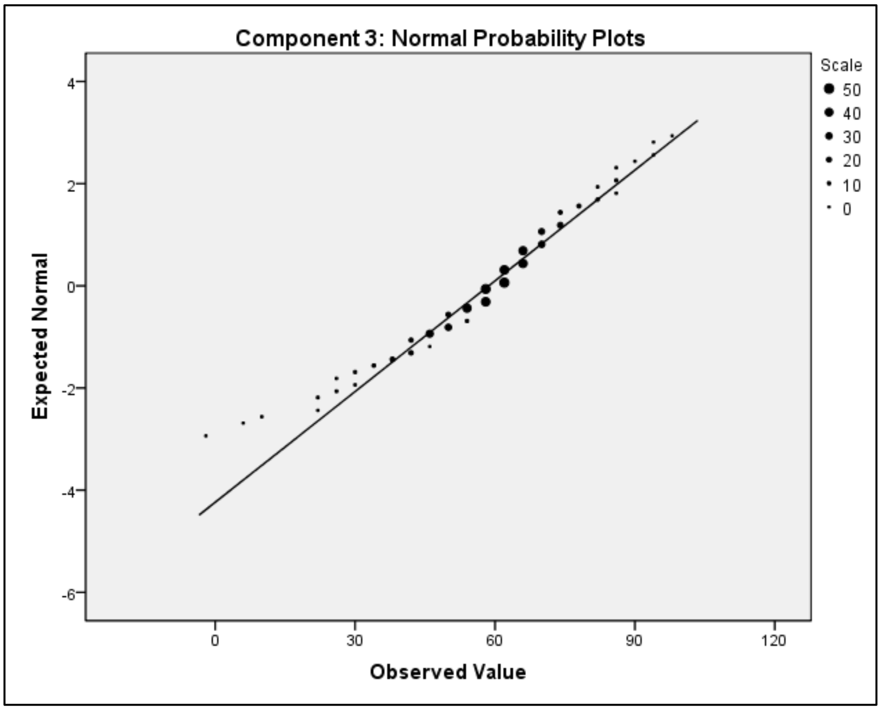
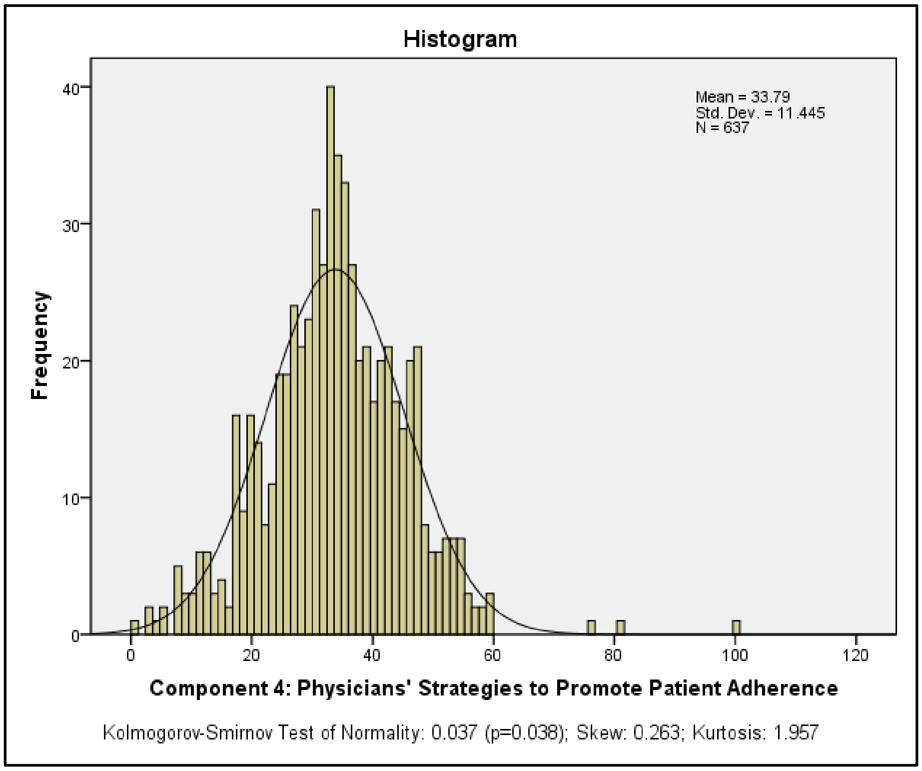


Figure 4c. *Histogram of Regression Derived Component Scores Standardized on a Scale from 0 to 100: Component 4—Physicians' Strategies to Promote Patient Adherence*



Kolmogorov-Smirnov Test of Normality: 0.037 (p=0.038); Skew: 0.263; Kurtosis: 1.957

Figure 4c.2. *Normal Probability Plots: Component Four—Physicians' Strategies to Promote Patient Adherence*

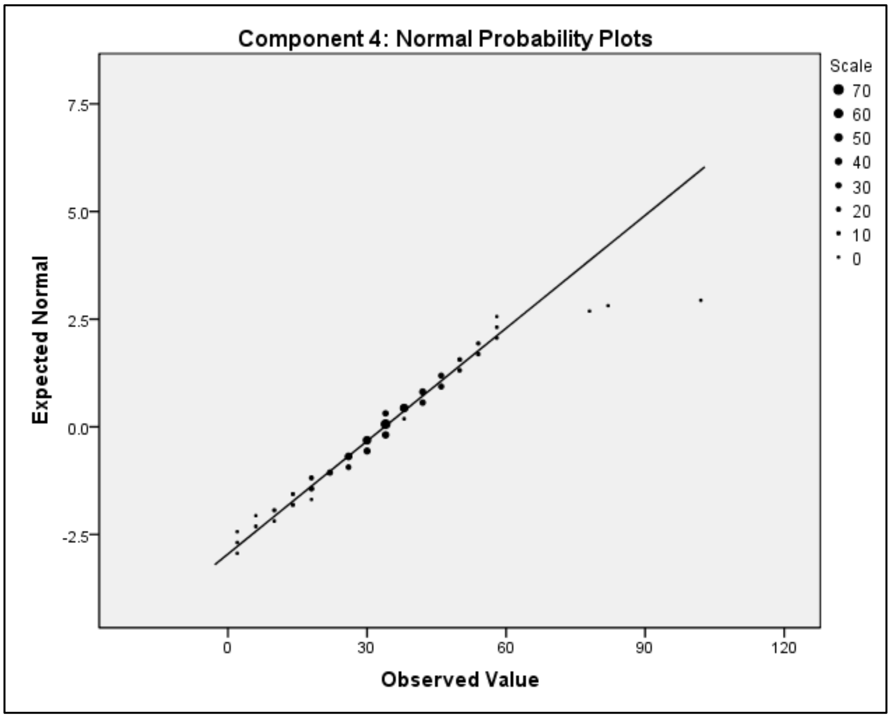


Figure 4d. *Histogram of Regression Derived Component Scores Standardized on a Scale from 0 to 100: Component 5—Physicians' Perceived Efficacy and Control*

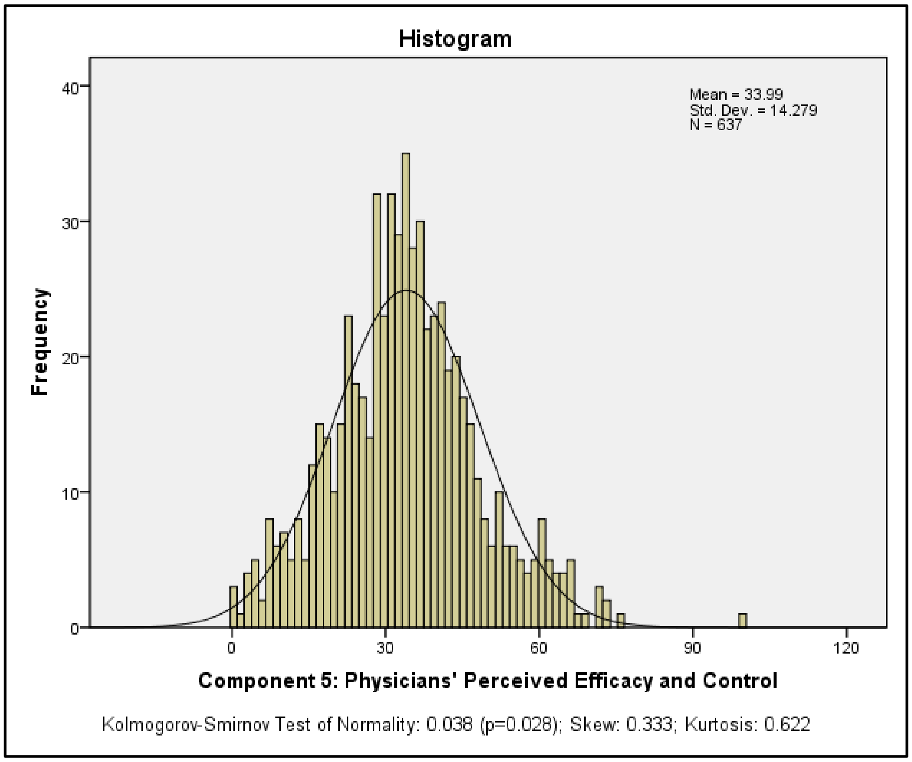


Figure 4d.2. *Normal Probability Plots: Component Five—Physicians' Perceived Efficacy and Control*

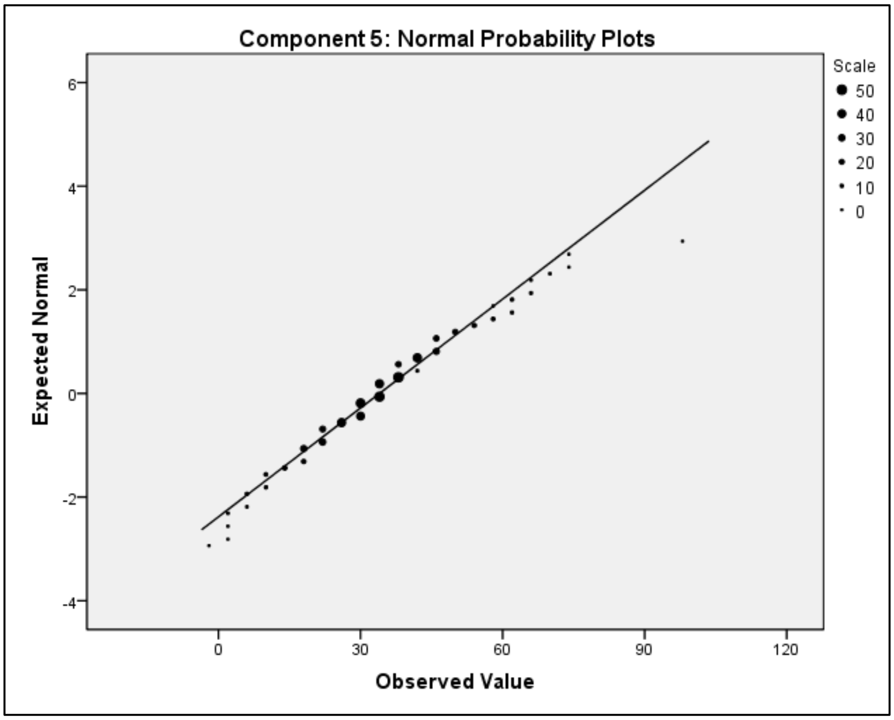


Figure 4e. *Histogram of Regression Derived Component Scores Standardized on a Scale from 0 to 100: Component 2—Physicians' Perceived Resource Constraints*

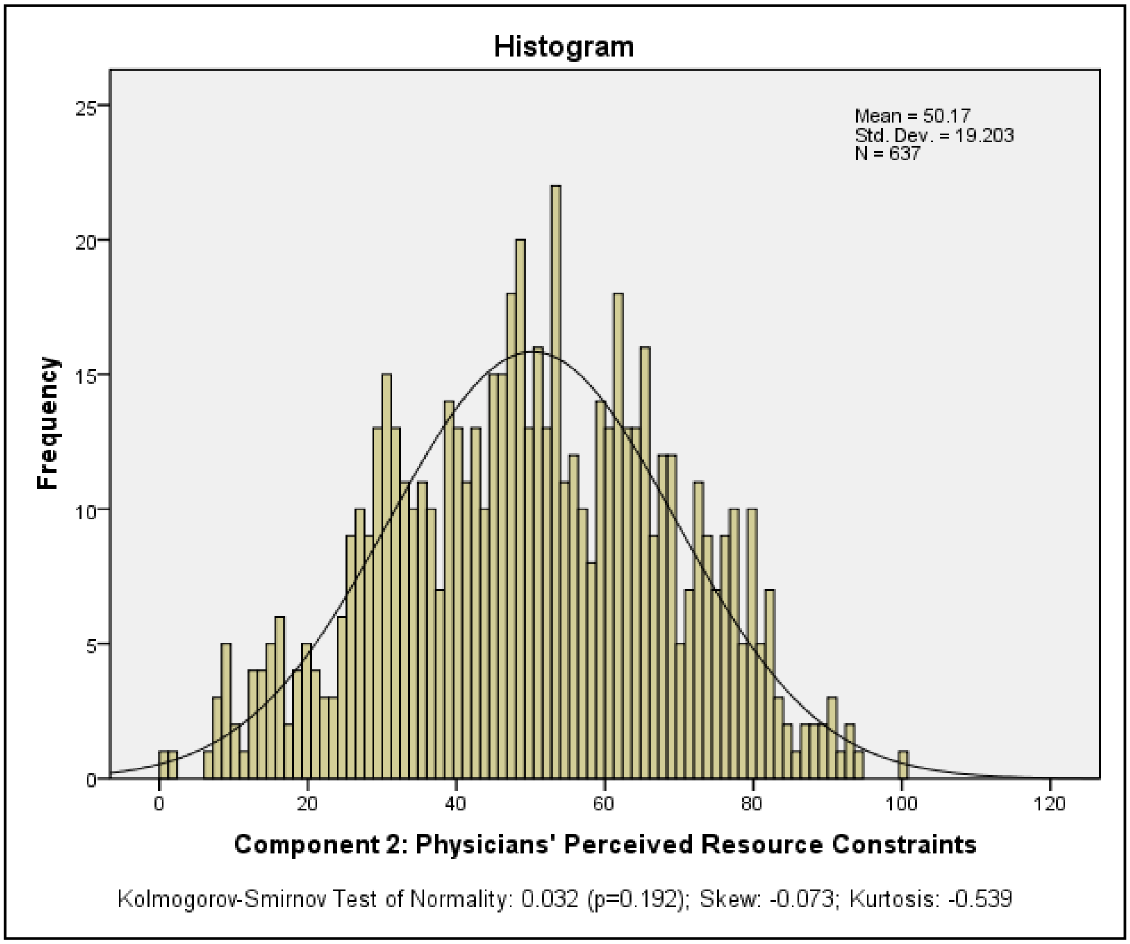


Figure 4f. *Histogram of Natural Log of Minutes Spent Per-Patient, Standardized to Scale from 1 to 100*

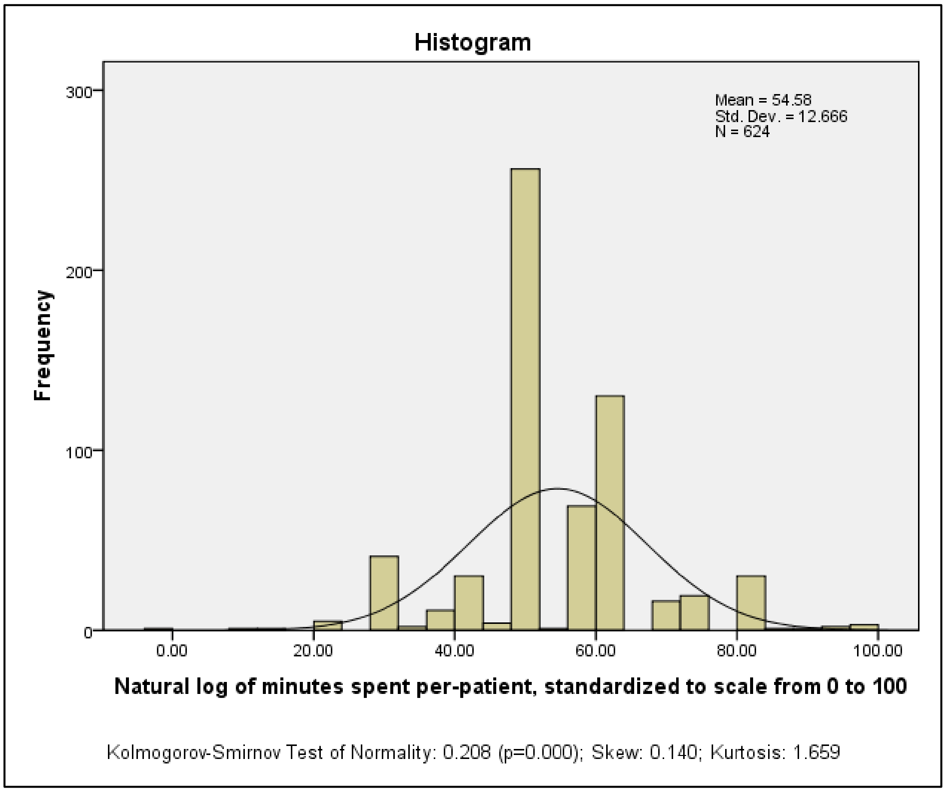


Figure 4f.2. *Normal Probability Plots: Natural Log of Minutes Spent Per-Patient, Standardized to Scale from 1 to 100*

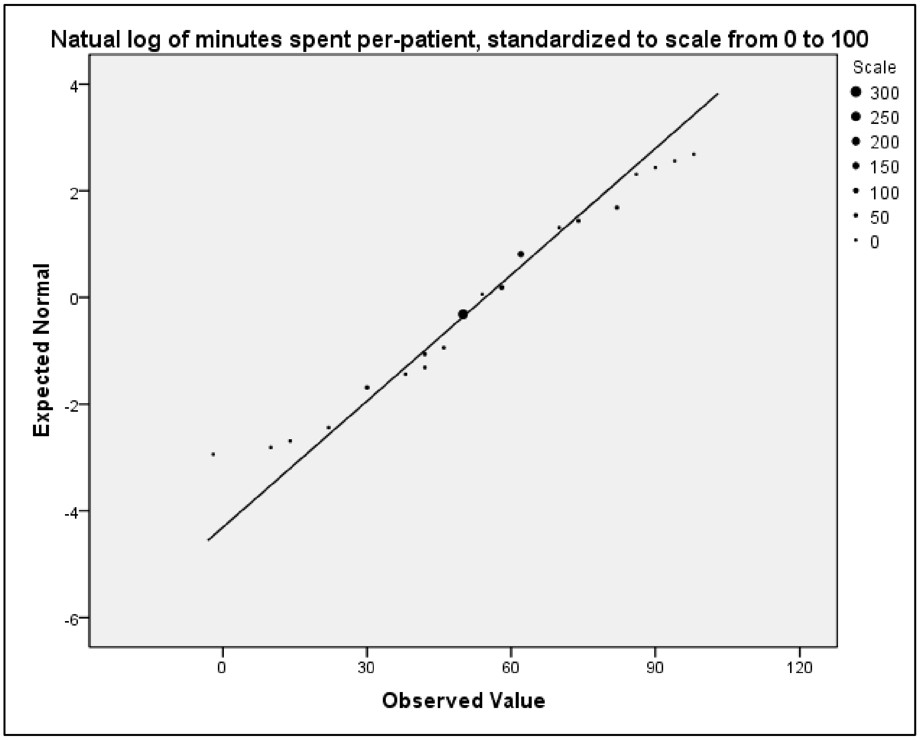


Figure 4g. *Histogram of Natural Log of Physicians' Access to On and Off-Site Ancillary Service Providers, Standardized to Scale from 0 to 100*

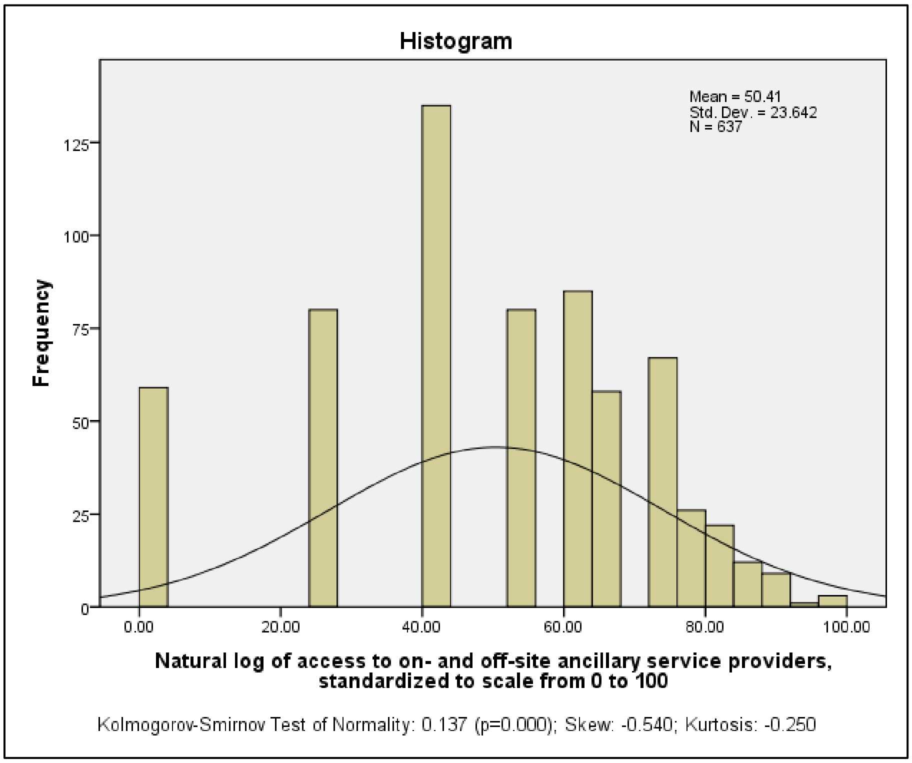


Figure 4g.2. *Normal Probability Plots: Natural Log of Physicians' Access to On and Off-Site Ancillary Service Providers, Standardized to Scale from 0 to 100*

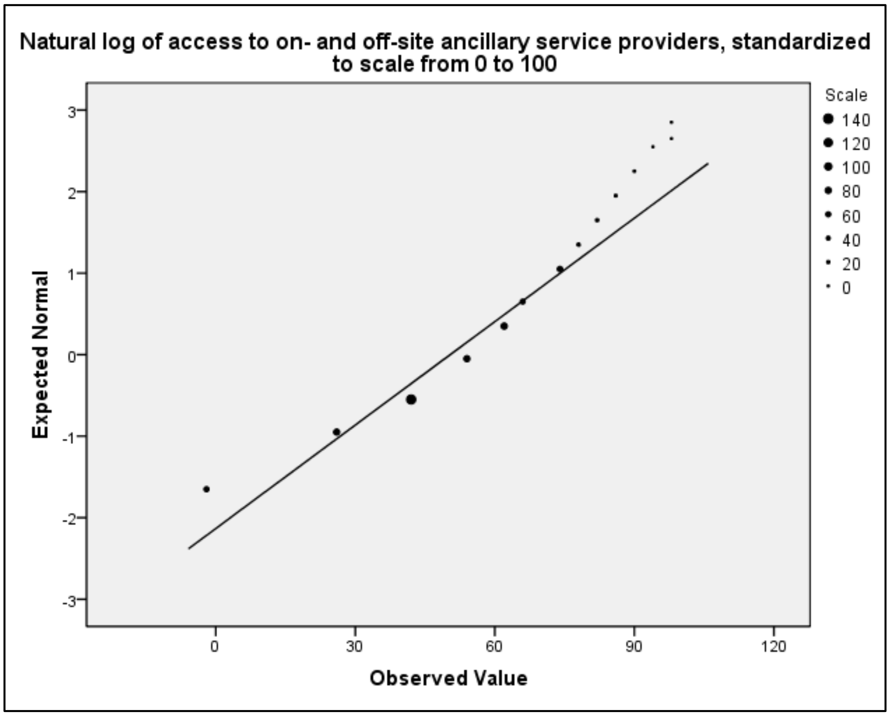


Figure 5a. *Histogram of General and African American Questionnaires (dummy variable)*

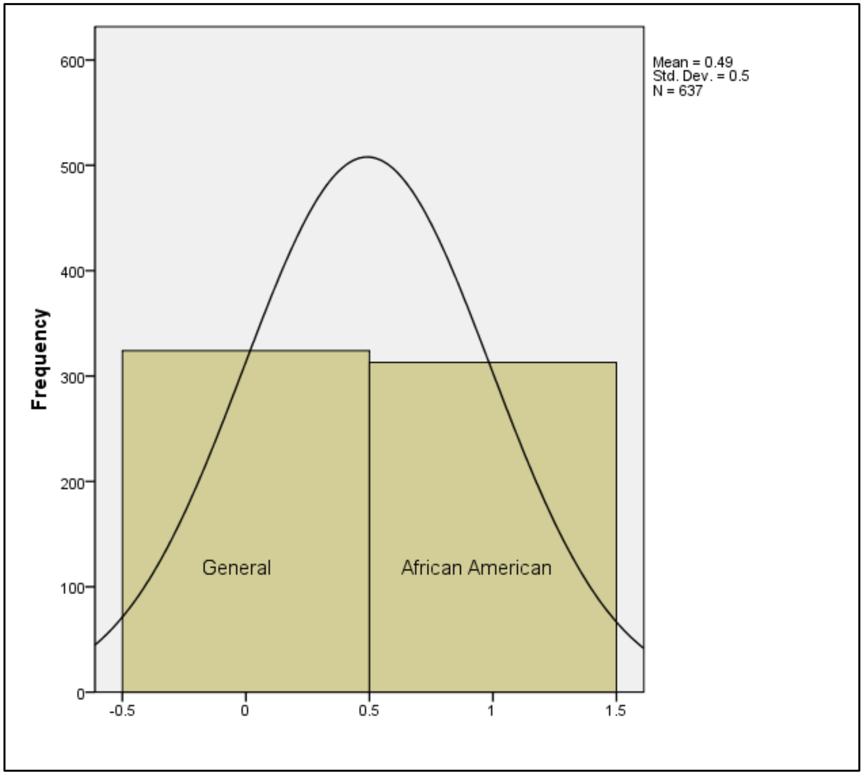


Figure 5b. *Histogram of Natural Log of the Proportion of Physicians' Patients that are African American, Standardized from 0 to 100*

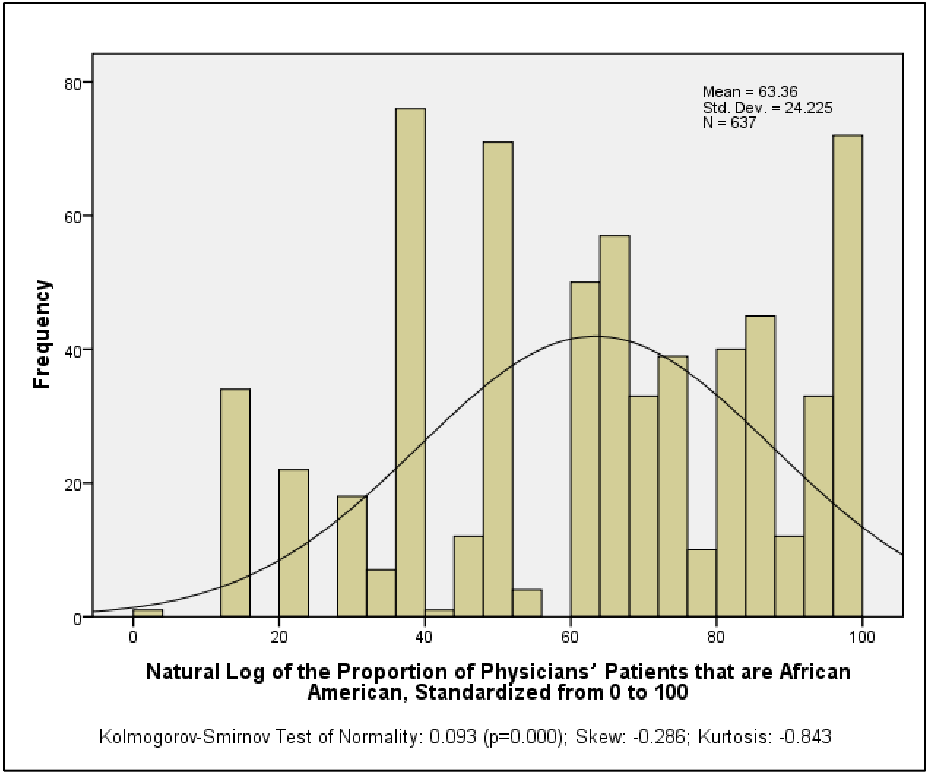


Figure 5b.2. *Normal Probability Plots: Natural Log of the Proportion of Physicians' Patients that are African American, Standardized from 0 to 100*

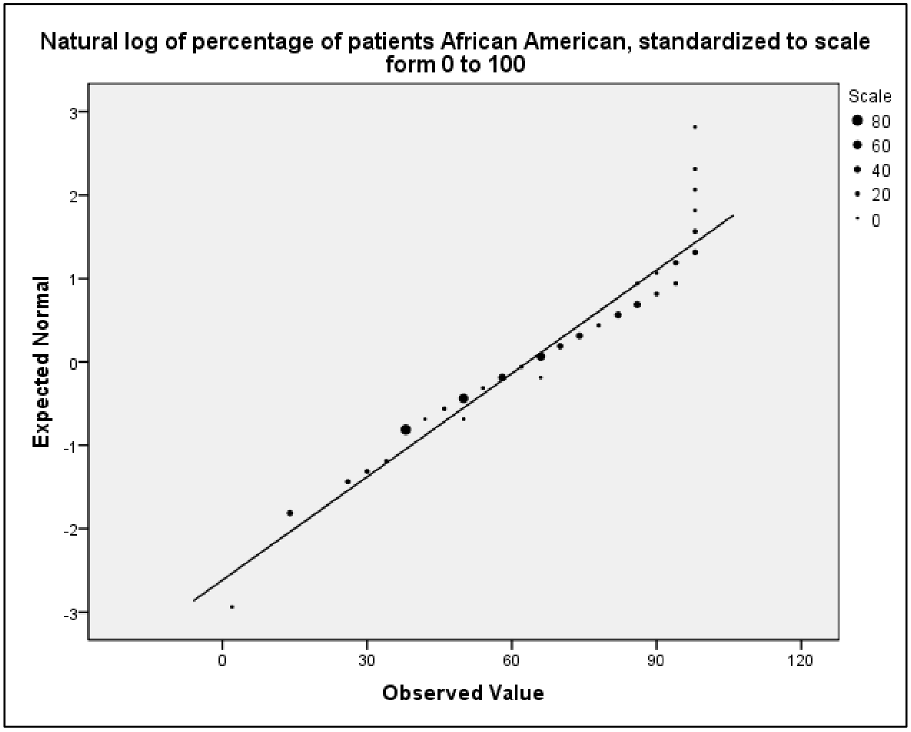


Figure 5c. *Histogram of Natural Log of the Proportion of City that is African American, Standardized from 0 to 100*

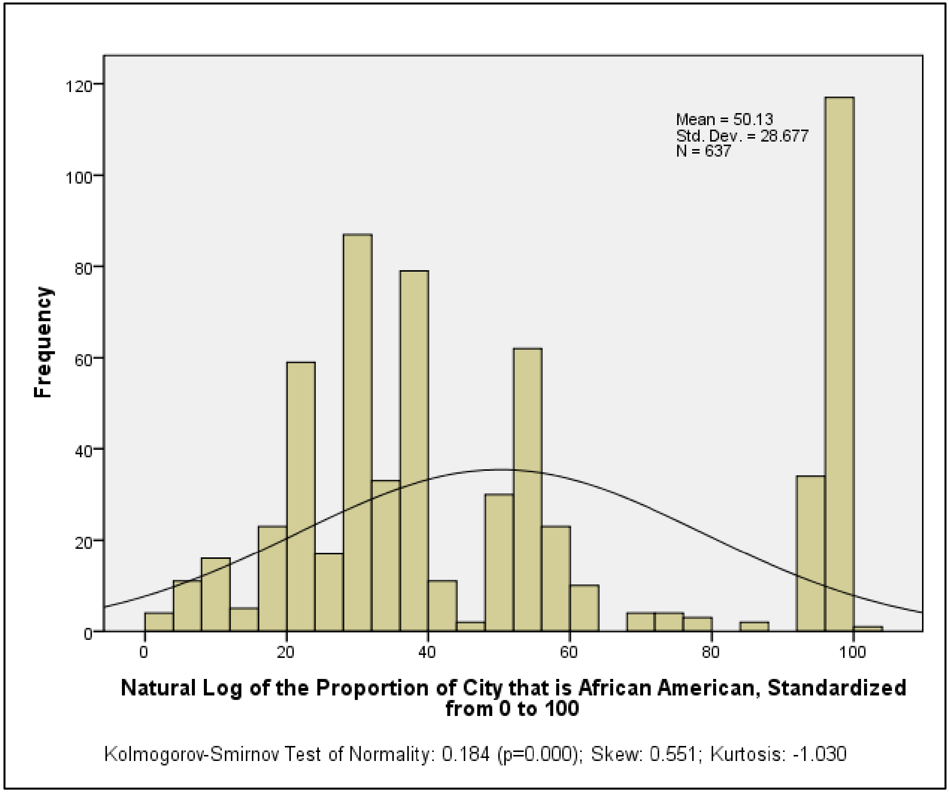


Figure 5c.2. *Normal Probability Plots: Natural Log of the Proportion of City that is African American, Standardized from 0 to 100*

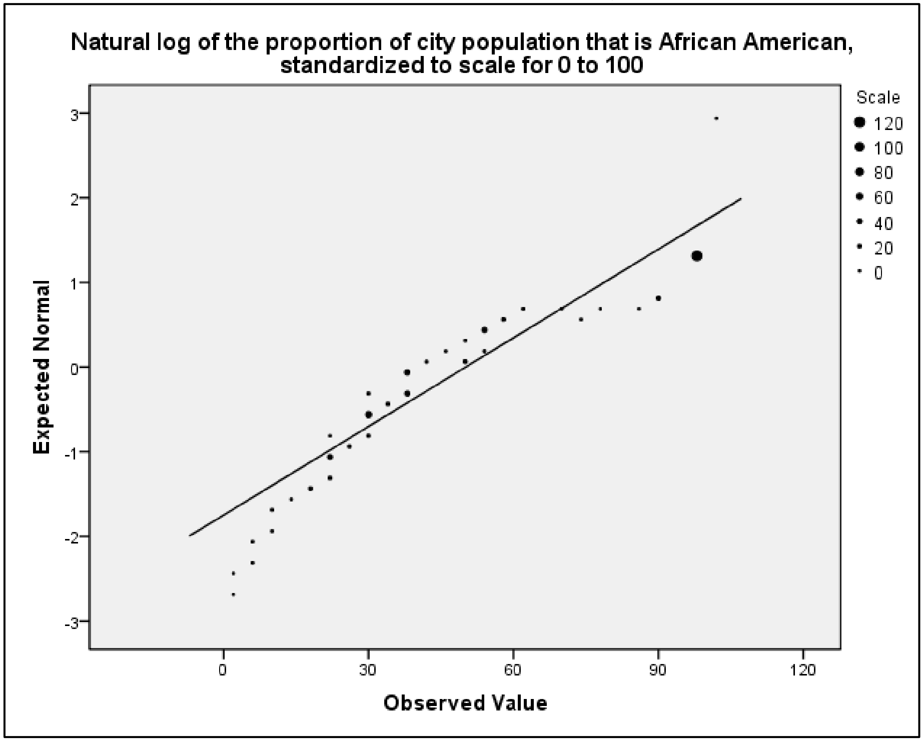
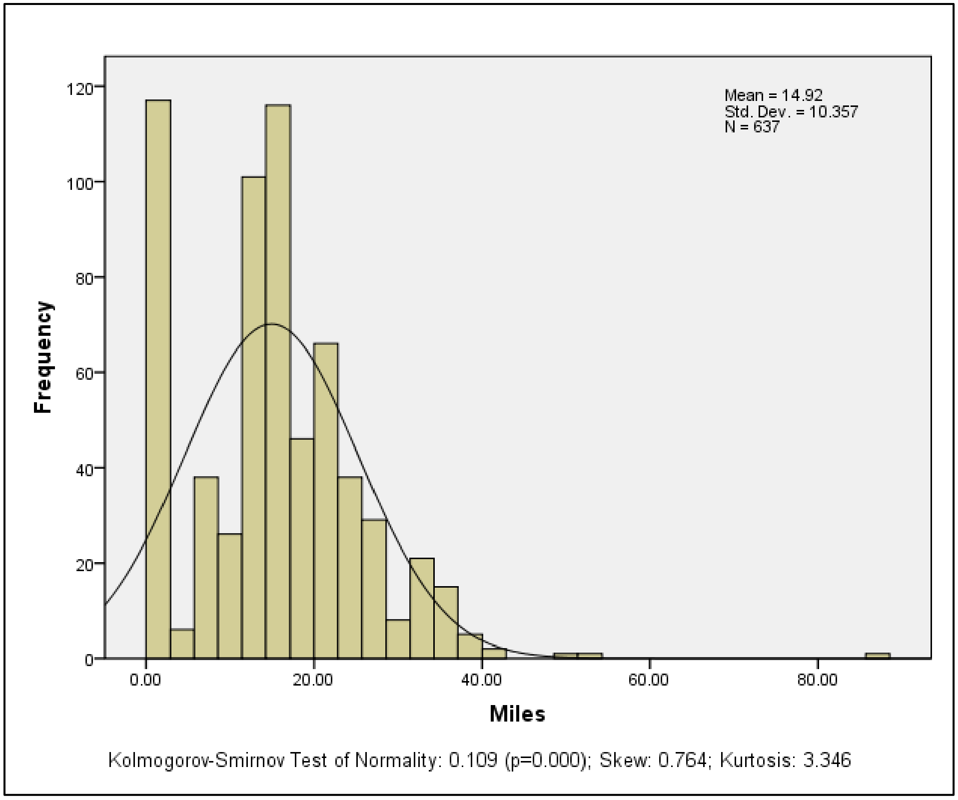


Figure 5d. *Histogram of Driving Distance in Miles from Detroit's City Center to City Where Physician's Practice is Located*



Kolmogorov-Smirnov Test of Normality: 0.109 (p=0.000); Skew: 0.764; Kurtosis: 3.346

Figure 5d.2. *Normal Probability Plots: Driving Distance in Miles from Detroit's City Center to City Where Physician's Practice is Located*

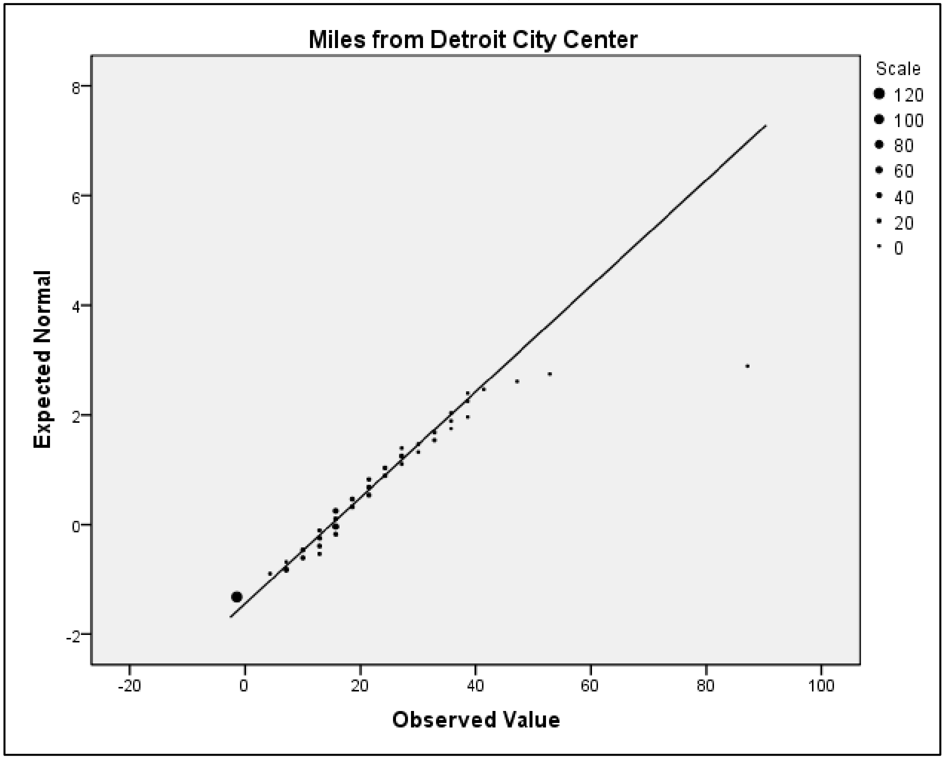


Figure 5e. *Histogram of Patient-Based SES Indicator*

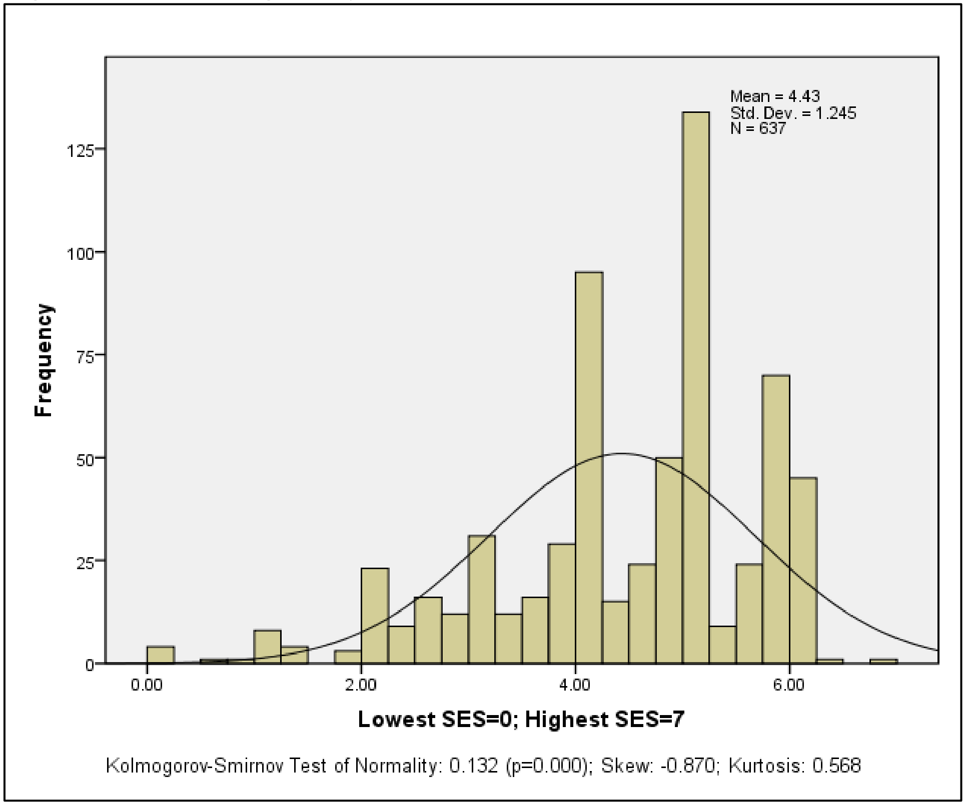


Figure 5e.2. *Normal Probability Plots: Patient-Based SES Indicator*

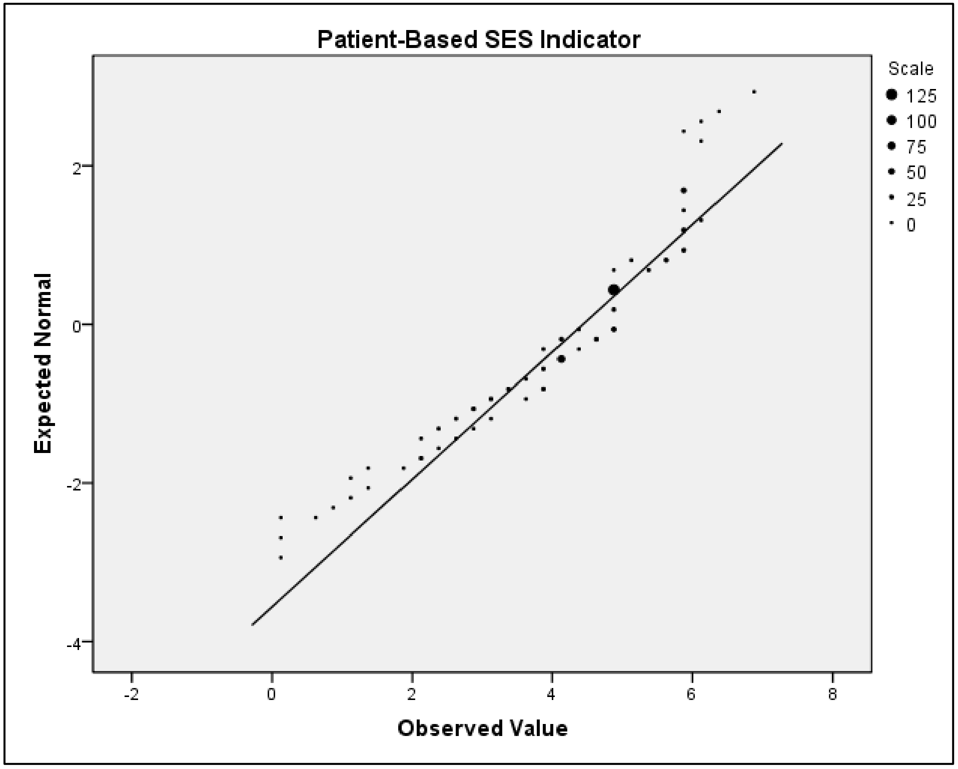
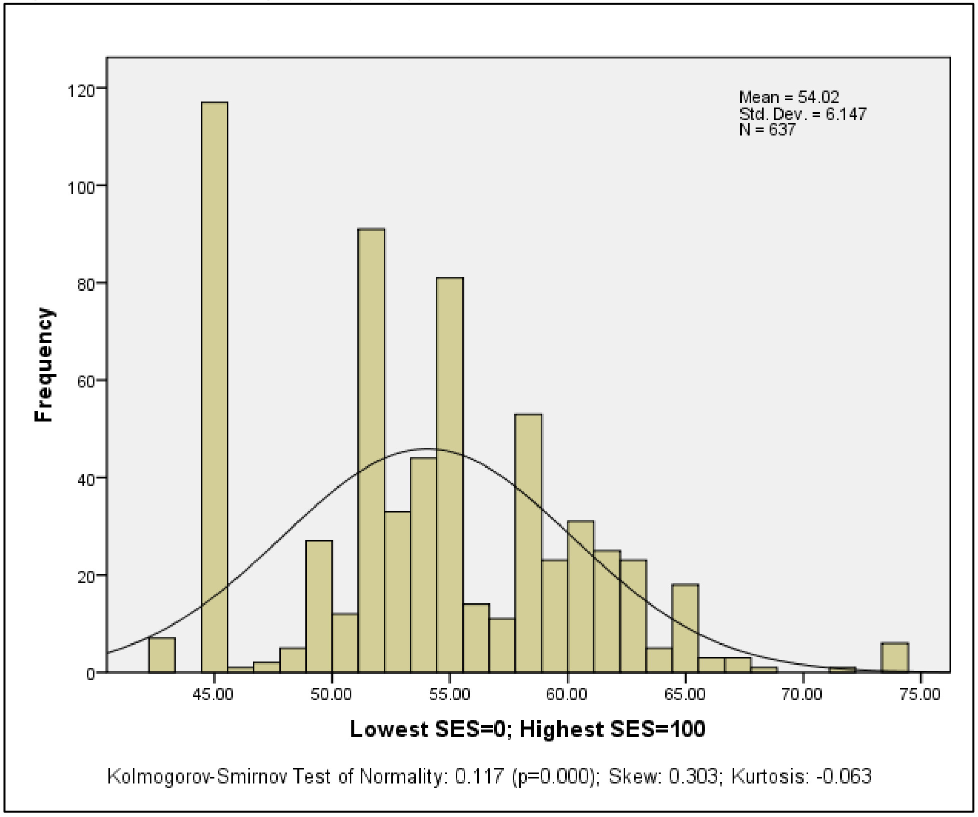


Figure 5f. *Histogram of City-Based SES Index*



Kolmogorov-Smirnov Test of Normality: 0.117 (p=0.000); Skew: 0.303; Kurtosis: -0.063

Figure 5f.2. *Normal Probability Plots: City-Based SES Index*

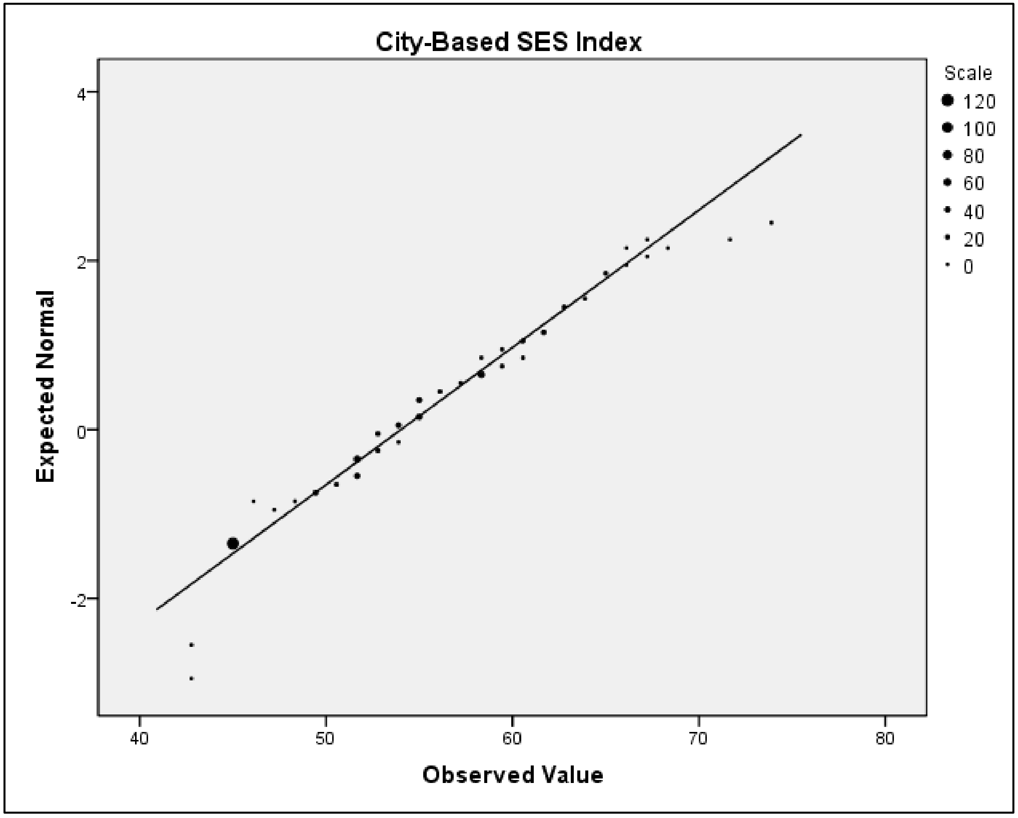


Figure 5g. *Histogram of Physicians' Age in Years*

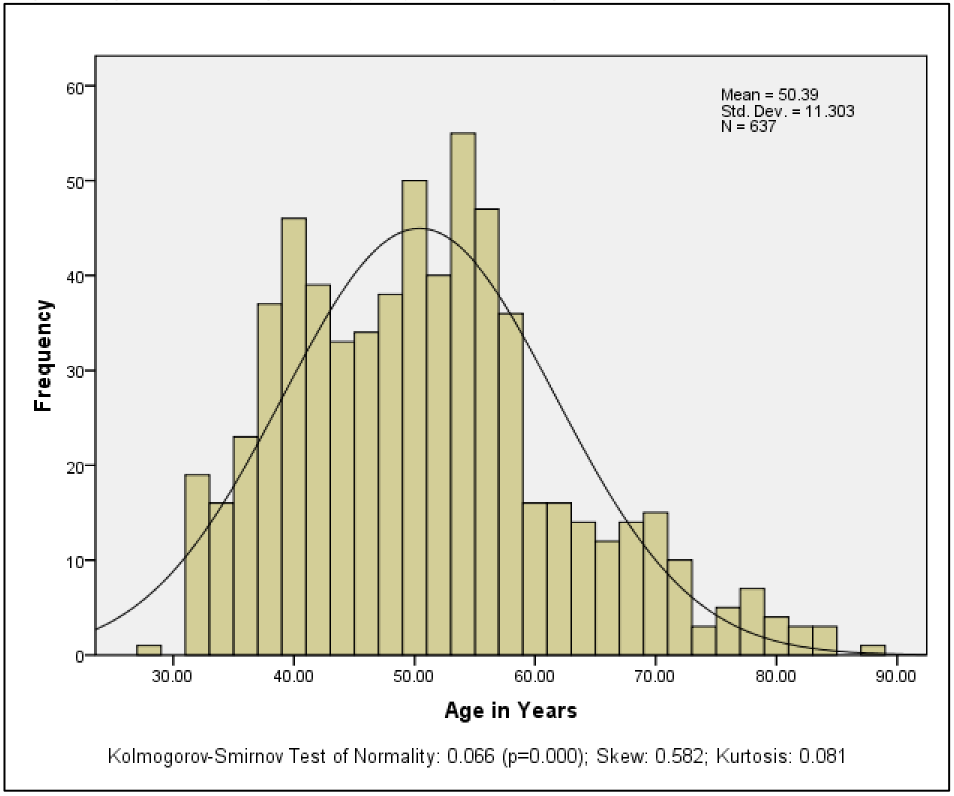


Figure 5g.2. *Normal Probability Plots: Physicians' Age in Years*

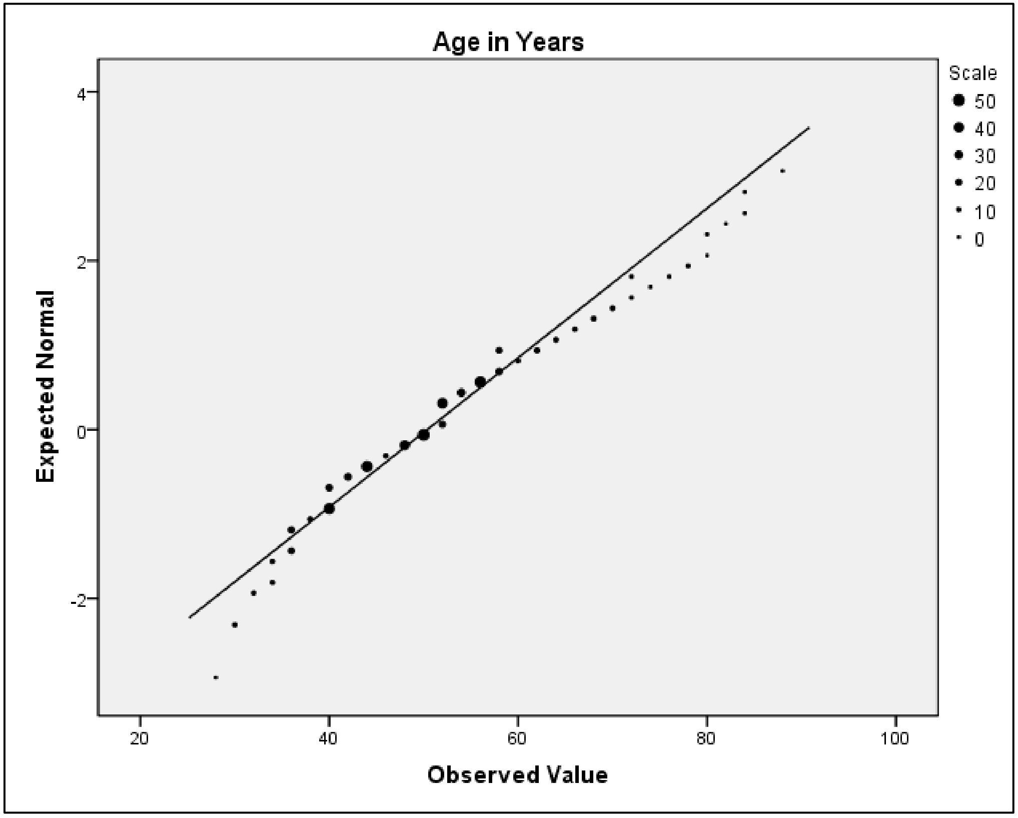


Figure 5h. *Histogram of Physicians' Gender (dummy variable)*

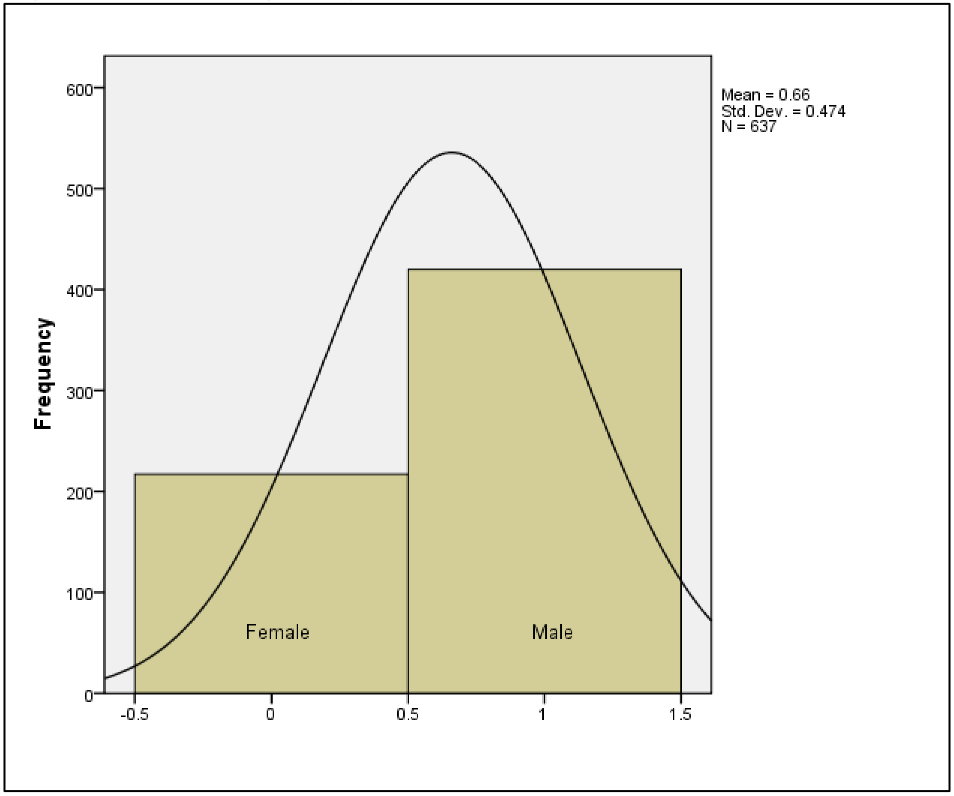


Figure 5i. *Histogram of Physicians' Race (dummy variable)*

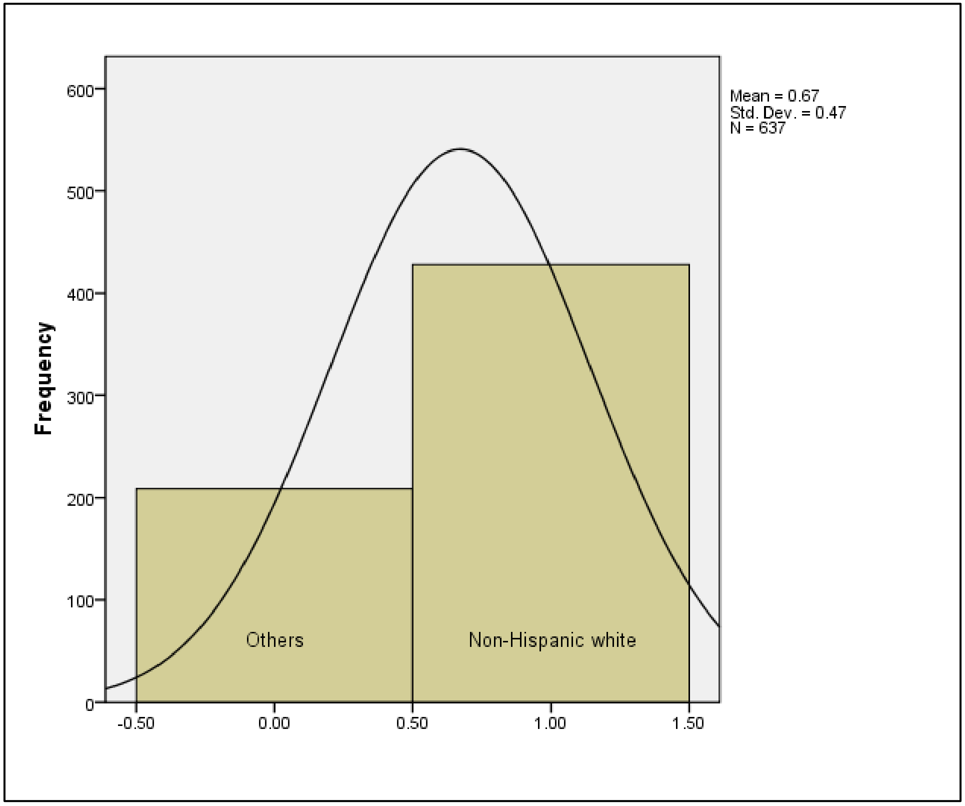


Figure 5j. *Histogram of Physicians' Credential (dummy variable)*

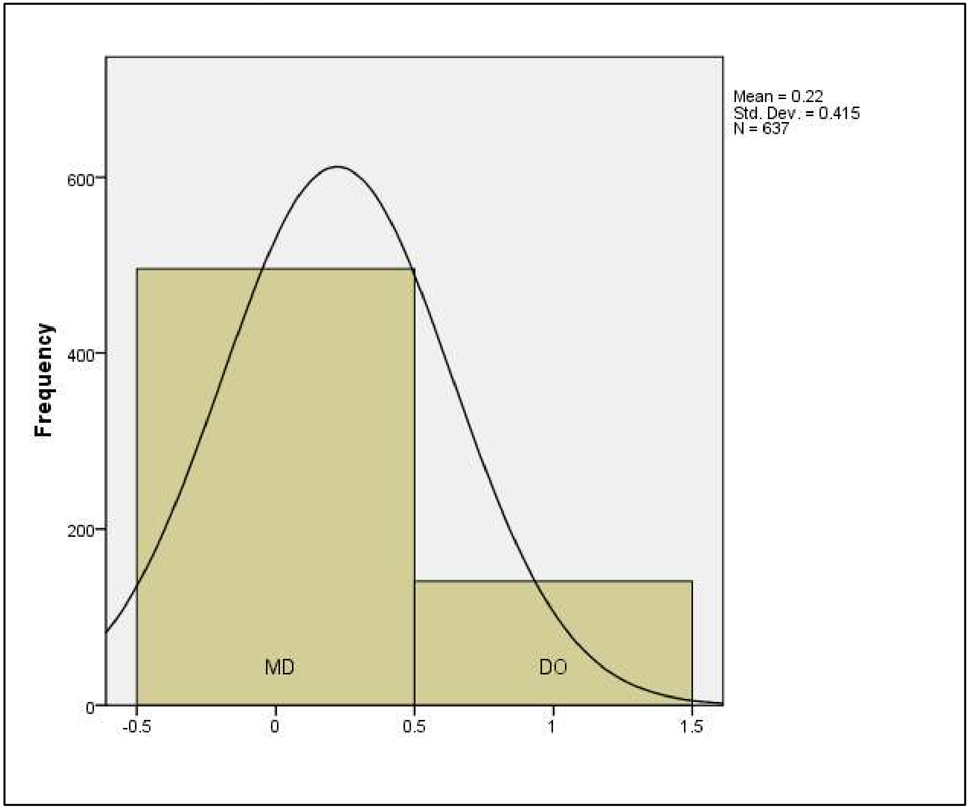


Figure 5k. *Histogram of US Medical Graduates and International Medical Graduates (dummy variable)*

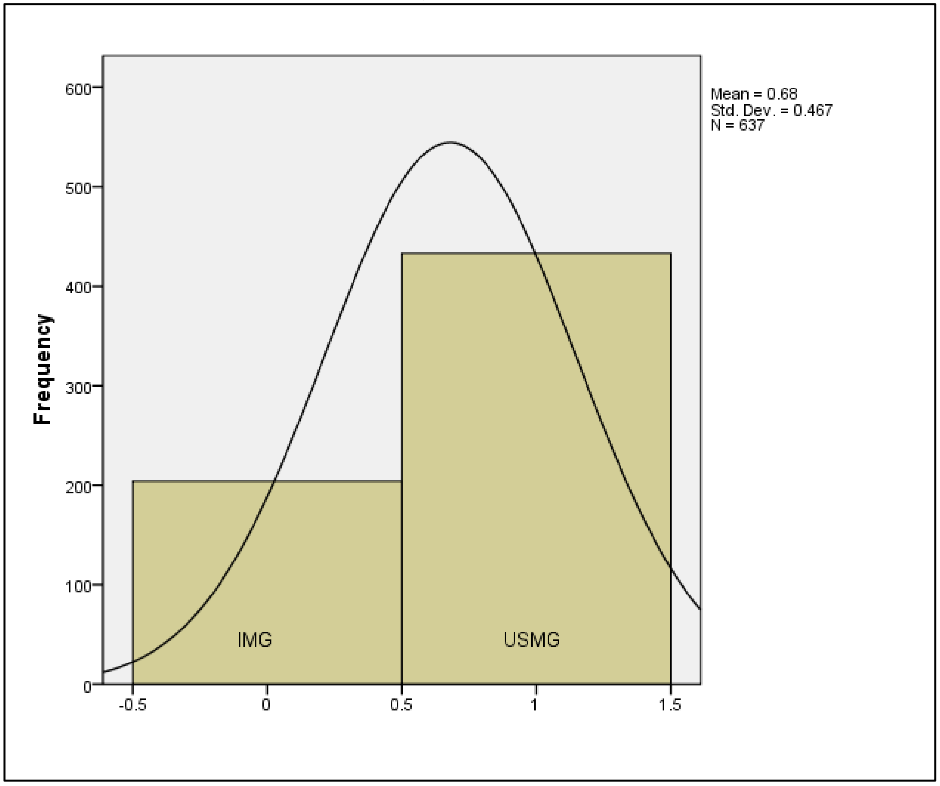


Figure 5l. *Histogram of Social Determinants of Health: Relevance plus Training*

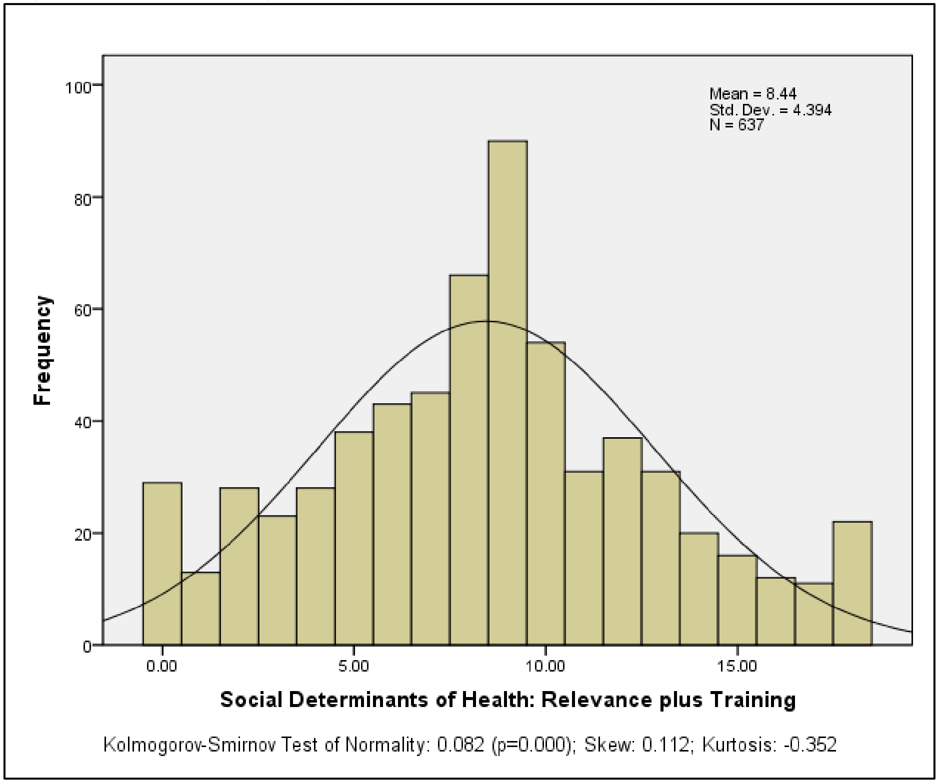


Figure 51.2. *Normal Probability Plots: Social Determinants of Health: Relevance plus Training*

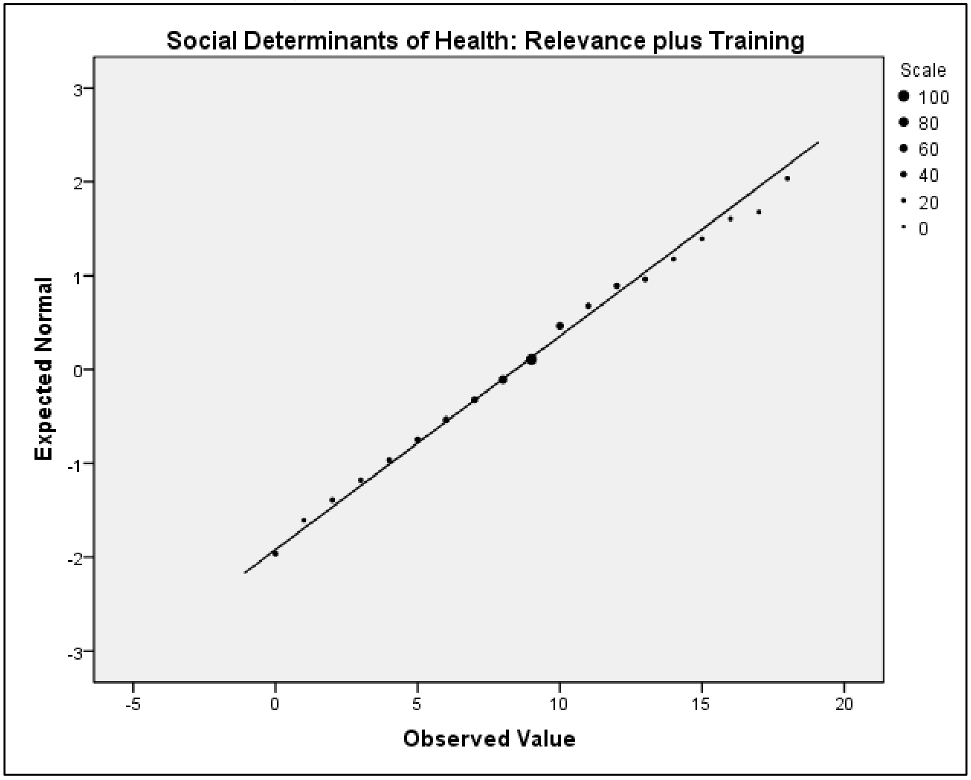


Figure 5m. *Histogram of Practice Specialty (dummy variable)*

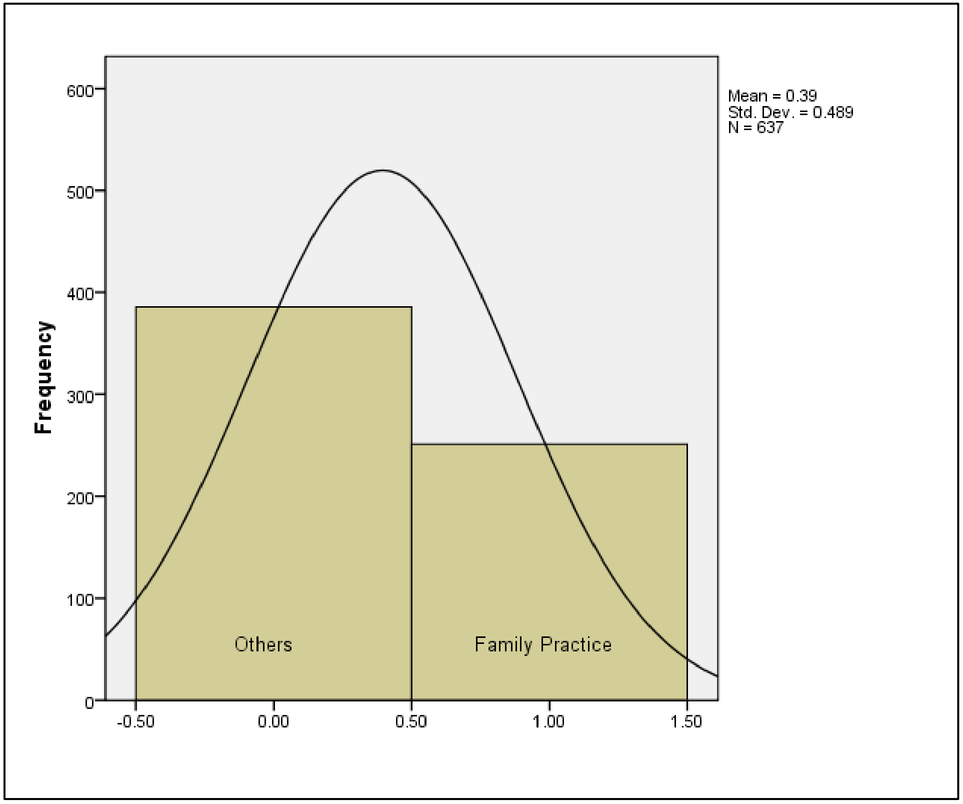


Figure 5n. *Histogram of Board Certification (dummy variable)*

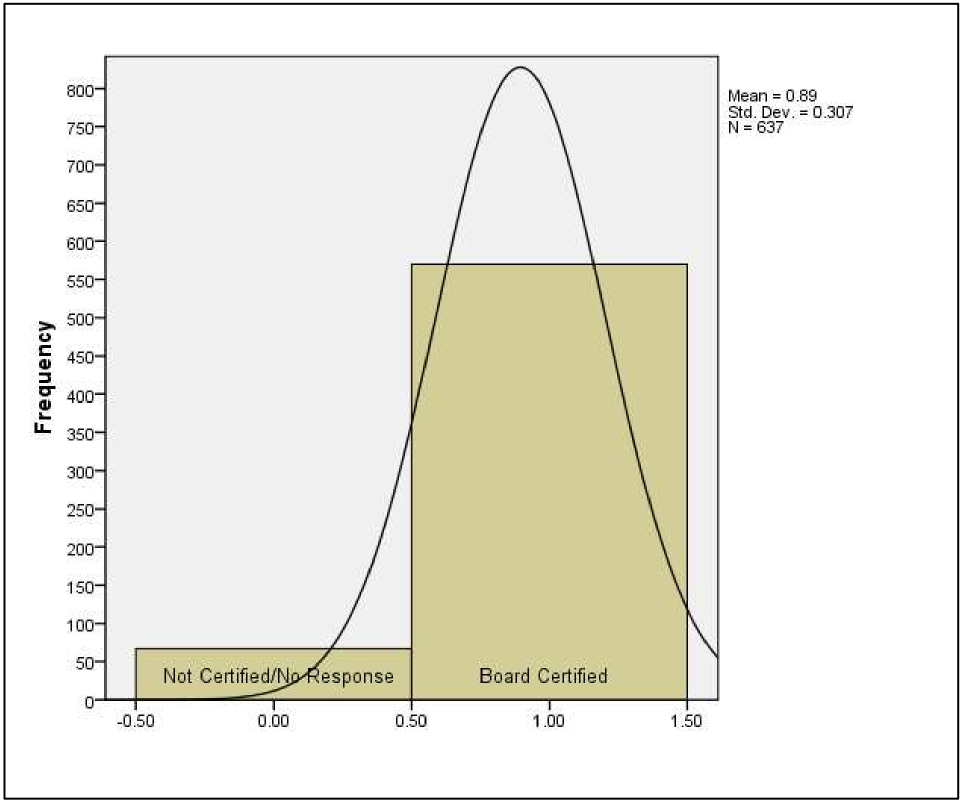


Figure 5o. *Histogram of Working Environment (dummy variable)*

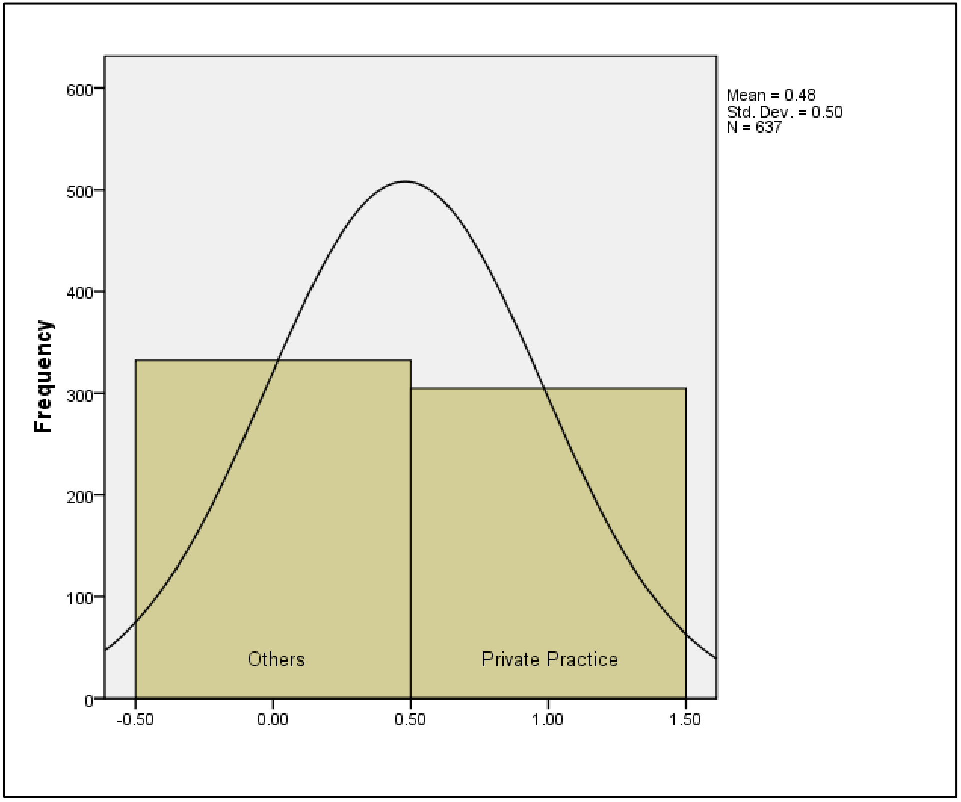


Figure 5p. *Histogram of Number Patients Seen by the Physician Per-Week*

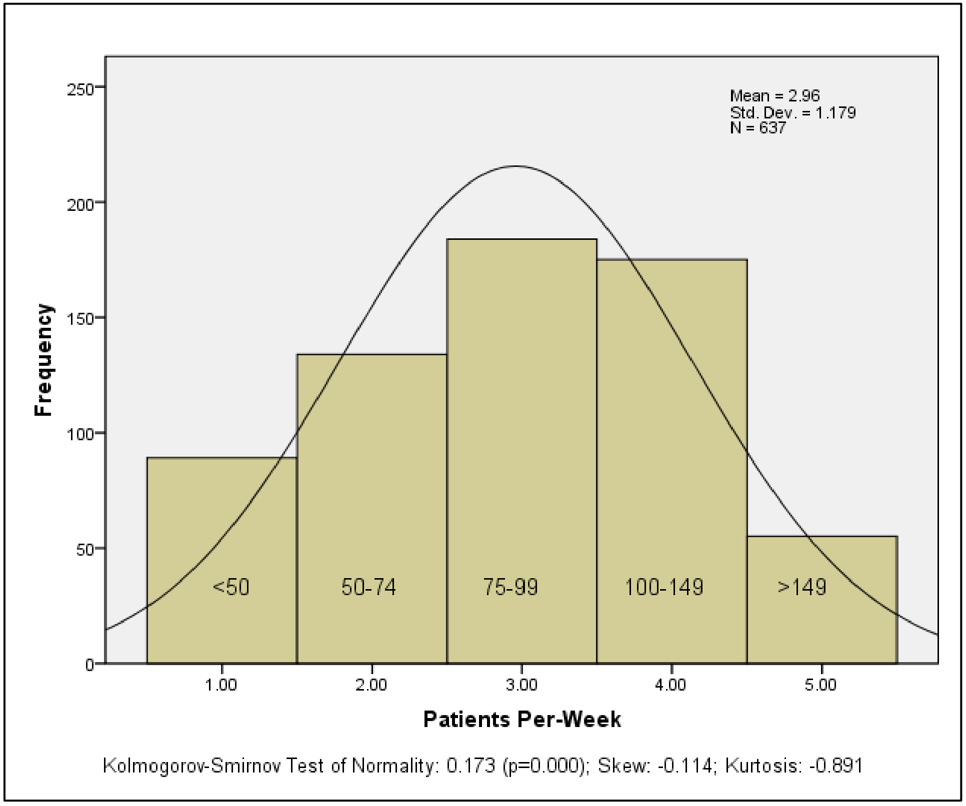
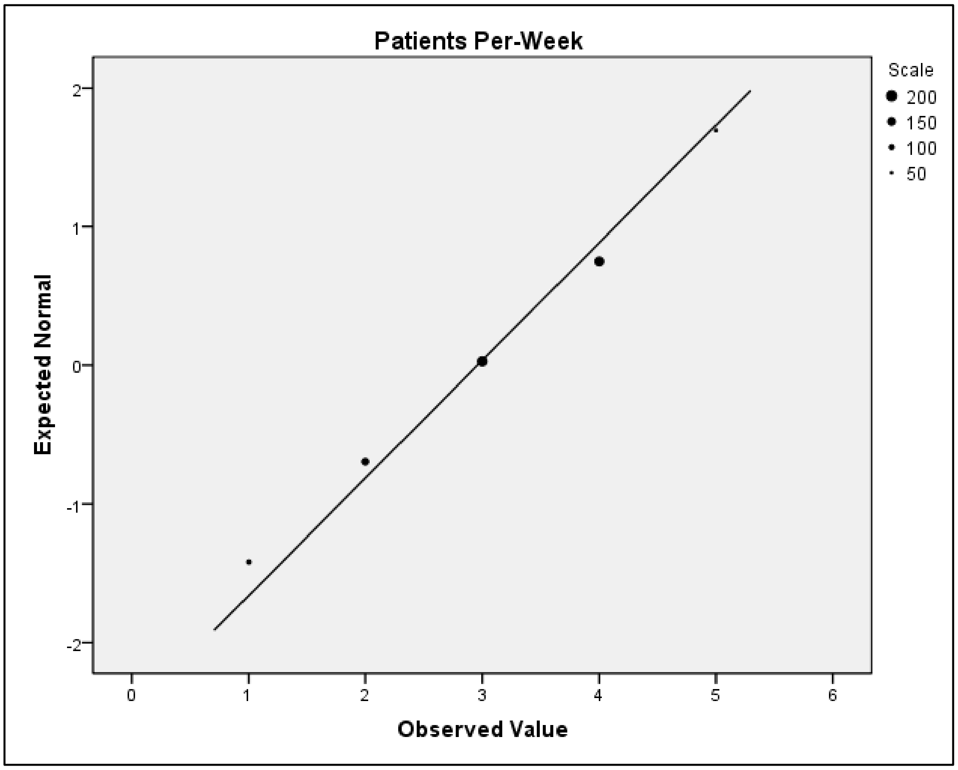


Figure 5p.2. *Normal Probability Plots: Number Patients Seen by the Physician Per-Week*



TABLES

Table 1. *Race and Ethnicity by Nation, State, SEM, and City: 2005-2007 Estimate*

	US	MI	SEM	SEM minus Detroit	Detroit
Total (in thousands)	298,757	10,094	4,489	3,651	838
Race					
%White	74.13	79.56	70.60	84.42	10.40
%African American	13.38	14.12	22.76	10.65	82.77
%Asian	4.34	2.33	3.16	3.64	1.09
Ethnicity					
%Hispanic	14.73	3.91	3.54	2.94	6.14
Non-Hispanic					
%White	66.26	77.63	68.87	82.73	8.44
%African American	12.16	14.02	22.65	8.92	82.49
%Asian	4.28	2.31	3.15	3.62	1.09

Source: U.S. Census Bureau, 2005-2007 American Community Survey 3-Year estimates

Table 2. *Education by Race and Ethnicity by Nation, State, SEM, and City: 2005-2007 Estimate for population 25 Years and Over*

	US	MI	SEM	SEM minus Detroit (Detroit's Suburbs)	Detroit
Total (in thousands)	195,646	6,634	2,978	2,465	513
% High school grad (includes equivalency)	84.03	87.02	86.41	88.70	75.42
% Bachelor's degree	27.02	24.47	26.09	29.17	11.31
% Graduate degree	9.91	9.32	10.09	11.31	4.20
Non-Hispanic white total (in thousands)	137,729	5,337	2,142	2,090	52
% High school grad. (includes equivalency)	88.89	88.96	88.88	89.20	76.18
% Bachelor's degree	29.96	25.49	28.17	28.43	17.93
% Graduate degree	11.08	9.46	10.61	10.68	7.73
African American total (in thousands)	21,846	846	620	198	422
% High school grad. (includes equivalency)	79.28	80.22	80.28	87.02	77.12
% Bachelor's degree	16.82	14.15	14.23	22.55	10.33
% Graduate degree	5.66	5.24	5.28	8.75	3.64
Hispanic total (in thousands)	23,964	205	86	59	27
% High school grad. (includes equivalency)	59.92	65.01	66.73	76.72	45.04
% Bachelor's degree	12.28	13.99	16.61	21.97	4.97
% Graduate degree	3.87	5.06	5.84	7.73	1.74
Asian Total (in thousands)	8,816	151	95	89	6
% High school grad. (includes	85.42	88.31	89.04	89.83	76.44

equivalency)					
% Bachelor's degree	48.85	63.04	65.27	66.82	40.59
% Graduate degree	19.49	34.06	33.59	34.39	20.77

Source: U.S. Census Bureau, 2005-2007 American Community Survey 3-Year estimates

Table 3. *2005-2007 Unemployment, Household Income, and All Person Poverty by Race/Ethnicity*

	United States	Michigan	SEM	SEM minus Detroit (Detroit's Suburbs)	Detroit
Unemployment (age 16 years and older)	6.55%	9.39%	10.41%	8.39%	21.59%
Non-Hispanic White	5.27%	7.77%	7.80%	7.66%	15.20%
African American	12.65%	18.85%	19.48%	14.27%	22.46%
Asian	5.31%	6.04%	6.31%	5.55%	18.55%
Hispanic	7.78%	12.59%	13.76%	12.46%	17.06%
Median Household Income	$50,007	$48,642	$53,593	$58,580	$29,109
Non-Hispanic White	$54,189	$51,794	$60,511	$61,262	$29,515
African American	$33,407	$31,534	$33,225	$41,788	$28,883
Asian	$65,429	$68,611	$79,268	$82,039	$33,259
Hispanic	$39,852	$38,187	$43,405	$48,766	$31,019
All Person Poverty Rate	13.66%	13.68%	13.67%	8.89%	32.50%
Non-Hispanic White	9.18%	10.01%	7.90%	7.38%	30.74%
African American	25.26%	30.55%	28.61%	19.67%	32.79%
Asian	11.00%	12.30%	8.79%	7.61%	26.08%
Hispanic	21.52%	23.27%	19.55%	14.65%	29.78%

Source: U.S. Census Bureau, 2005-2007 American Community Survey 3-Year Estimate

Table 4. *Housing Tenure, Home Value, and Vehicle Availability for the US, Michigan, SEM, and Detroit*

	US	MI	SEM	SEM minus Detroit (Detroit's Suburbs)	Detroit
Housing units (in thousands)	126,238	4,503	1,890	1,522	368
% Occupied	88.41	85.81	89.41	92.23	77.76
% Owner-occupied housing units	67.26	75.10	74.50	78.40	55.32
Median home value	$181,800	$152,200	$171,800	$183,626	$89,500
% No vehicle	3.36	2.91	3.34	2.41	9.81
%Renter-occupied housing units	32.74	24.90	25.50	21.60	44.68
Median monthly rent	$647	$572	$623	$665	$523
% No vehicle	19.87	17.81	20.48	14.71	34.13
Housing tenure by race/ethnicity					
Non-Hispanic white: % own / % rent	73.90 / 26.10	80.21 / 19.79	82.21 / 17.79	82.55 / 17.45	67.89 / 32.11
African American: % own / % rent	46.29 / 53.71	50.12 / 49.88	51.77 / 48.23	47.00 / 53.00	54.21 / 45.79
Asian: % own / % rent	60.11 / 39.89	60.64 / 39.36	65.82 / 34.18	66.53 / 33.47	54.09 / 45.91
Hispanic: % own / % rent	49.47 / 50.53	58.51 / 41.49	61.30 / 38.70	66.84 / 33.16	48.50 / 51.50

Source: U.S. Census Bureau, 2005-2007 American Community Survey 3-Year Estimate

Table 5. *2007 Healthcare, Retail, and Recreation Establishments and Reported Crime Incidents per 100,000 Residents by US, Michigan, SEM, and Detroit*

	US	MI	SEM	SEM minus Detroit (Detroit's Suburbs)	Detroit	Ratio expressed as quotient: Detroit ÷ US	Ratio expressed as quotient: Detroit ÷ (SEM minus Detroit)
Retail Trade							
Supermarkets & other grocery stores	21.27	23.13	24.55	23.52	28.57	1.34	1.21
Convenience stores	9.34	15.00	14.77	15.10	13.52	1.45	.90
Beer/wine/liquor stores	10.09	11.44	15.74	13.83	23.12	2.29	1.67
Pharmacies & drug stores	14.01	15.58	17.71	18.95	12.87	.92	.68
Tobacco stores	2.14	3.57	4.90	5.91	.98	.46	.17
Health Care & Social Assistance							
Offices of physicians (except mental health specialists)	69.28	64.64	73.62	87.53	19.74	.28	.23
Offices of mental health specialist physicians	3.66	3.92	4.99	6.11	.65	.18	.11
Offices of mental health practitioners (except physicians)	5.31	5.56	6.04	7.37	.87	.16	.12
Offices of dentists	41.90	43.07	48.19	57.68	11.45	.27	.20
Home health care establishments	8.10	10.87	12.89	15.35	3.38	.42	.22
General medical & surgical hospitals	1.79	1.48	0.96	1.01	.76	.42	.75
Free standing ambulatory surgical & emergency centers	1.55	1.28	1.39	1.58	.65	.42	.41
Child day care establishments	24.79	22.98	21.62	23.01	16.25	.66	.71

Recreation							
Fitness & recreational sports centers	10.43	9.78	9.36	11.27	1.96	.19	.17
Housing Units							
% Vacant	11.59	14.19	10.59	7.77	22.24	1.92	2.86
Violent crime							
Murder & non-negligent manslaughter	5.61	6.71	10.92	2.56	45.76	8.16	17.88
Forcible rape	29.98	45.46	31.40	29.44	39.61	1.32	1.35
Robbery	147.57	133.18	208.82	75.78	763.67	5.17	10.08
Aggravated assault	283.75	350.67	458.52	223.17	1440.00	5.07	6.45
Burglary	722.48	748.90	811.35	511.07	2063.60	2.86	4.04
Larceny-theft	2177.76	1898.33	1852.26	1713.82	2429.58	1.12	1.42
Property crime	3263.48	3065.73	*	*	6771.66	2.07	*
Motor vehicle theft	363.29	418.50	*	*	2278.47	6.27	*

* Missing data

Sources: U.S. Census Bureau, 2007 North American Industry Classification System; U.S. Department of Justice, 2007 Crime in the United States

Table 6. *Differences between Respondents and Non-respondents*

	General Question-naire Respondents n=324	General Question-naire Non-respondents n=238	African American Question-naire Respondents n=313	African American Question-naire Non-respondents n=272
Credential:				
MD	78.1%	90.8%†	77.6%	87.1%†
DO	21.9%	9.2%†	22.4%	12.9%†
Site:				
Detroit Medical Center Mailing List	25.9%	19.3%**	24.3%	15.8%†
Henry Ford Health System Mailing List	15.7%	8.4%†	18.8%	14.0%*
Oakwood Health System Mailing List	16.4%	17.6%	20.8%	22.4%
PhysicianData-bases.com Mailing List	42.0%	54.6%†	36.1%	47.8%†
Specialty:				
Endocrinology	0.9%	2.5%**	5.8%	4.0%
Family Practice	36.4%	27.3%†	42.2%	27.6%†
General Practice	2.5%	2.5%	2.6%	1.8%†
Internal Medicine	59.0%	67.6%**	48.9%	66.5%†
other	1.2%	-	0.6%	-
Gender				
Male	68.2%	70.0	63.6%	68.9%
Female	31.8%	30.0	36.4%	31.1%
(Not known)		(n=35)		(n=37)

* Mean difference significant at the .05 level

** Mean difference significant at the .01 level

† Mean difference significant at the .001 level

Table 7. *The Distribution of DOs Among Respondents and Non-Respondents*

	DOs
Respondents (n=637)	22.1% (n=141)
Detroit Medical Center (n=160)	28.1% (n=45)
Henry Ford Health Center (n=110)	7.3% (n=8)
Family Practice (n=251)	37.5% (n=94)
Non-Respondents (n=510)	11.2% (n=57)
Detroit Medical Center (n=93)	19.4% (n=18)
Henry Ford Health Center (n=57)	5.3% (n=3)
Family Practice (n=140)	24.3% (n=34)
Female Respondents to African American Questionnaire (n=114)	15.8 (n=18)
Female Non-Respondents to African American Questionnaire (n=73)	13.8 (n=10)

Table 8. *Respondent Demographics compared to 2009 MDCH Survey of Physicians*

	General and African American Questionnaire Respondents (2007) *	Michigan Department of Community Health Survey of Physicians (2008)
n	637	4,546
(response rate)	(55.1%)	(36.3%)
Median Age	50	45-54 **
% Male	66[††]	72 **
Race/Ethnicity:		
White, Non-Hispanic	67	70 **
Af. Am, Non-Hispanic	7[††]	4 **
Asian / Pacific Islander	21[††]	17 **
Hispanic	2[††]	3 **
Other/ Unknown	3[††]	6 **
% DO	22[††]	17***
% US Medical Graduate	68[††]	72**
% Private Practice	48[††]	35 [†]

* Sample limited to primary care physicians and endocrinologists who have completed their medical residency and are actively providing patient care in the greater-Southeast Michigan area

** Based on a subset of approximately 3135 respondents who are active Michigan physicians from all medical specialties, including those currently enrolled in a graduate medical education program and those working as a physician but spending no time in patient care

*** Based on all fully licensed Michigan Medical License holders in 2008

[†] Based on the 2009 Michigan Department of Community Health Survey of Physicians

[††] Mean difference significant at the .05 level or greater

Table 9. *Missing Values Summary for Independent Variables*

Variable	# of Missing Values	% of Cases with Missing Values (# of missing values ÷ 637)
Year of Birth	1	0.2
About what percentage of your patients do you identify as white/European American	4	0.6
Number of patients seen per week.	5	0.8
About what percentage of your patients do you identify as African American?	12	1.9
About what percentage of your African American patients have trouble meeting their medical expenses?	12	1.9
About what percentage of your white/European American patients have trouble meeting their medical expenses?	14	2.2
Which income category best describes the majority of your African American patients?	28	4.4
Which income category best describes the majority of your white/European American patients?	32	5.0
Total:	108	

Table 10. *Testing for Differences Between Cases With and Without Missing Values Using Independent-Samples T-Test—Independent Variables*

Questionnaire (General vs. African American)	t (df)	-.276 (635)
	p-value	.783
Female vs. Male	t (df)	-.316 (635)
	p-value	.752
Year of Birth	t (df)	1.350 (634)
	p-value	.178
Non-Hispanic White vs. All Others	t (df)	.477 (635)
	p-value	.633
U.S. Medical Graduate vs. International Medical Graduate	t (df)	-.262 (635)
	p-value	.794
Private Practice vs. not Private Practice	t (df)	-.205 (635)
	p-value	.838
% Patients African American (<50% of patients African American vs. ≥50% of patients African American)	t (df)	*-2.429 (623)*
	p-value	*.015*
MD vs. DO	t (df)	*-3.295 (635)*
	p-value	*.001*

Table 11a. *Missing Values Pattern for % Patients African American*

Variable with Missing Values	# of Missing Values	# of Missing Values for % Patients African American
Year of Birth	1	<50%: 1 ≥50%: 0
About what percentage of your patients do you identify as white/European American	4	<50%: - ≥50%: - (Missing: 4)
Number of patients seen per week.	5	<50%: 2 ≥50%: 2 (Missing: 1)
About what percentage of your patients do you identify as African American?	12	<50%: - ≥50%: - (Missing: 12)
About what percentage of your African American patients have trouble meeting their medical expenses?	12	<50%: 4 ≥50%: 3 (Missing: 5)
About what percentage of your white/European American patients have trouble meeting their medical expenses?	14	<50%: 4 ≥50%: 6 (Missing: 4)
Which income category best describes the majority of your African American patients?	28	<50%: 14 ≥50%: 10 (Missing: 4)
Which income category best describes the majority of your white/European American patients?	32	<50%: 18 ≥50%: 9 (Missing: 5)
Total:	108	<50%: 43 ≥50%: 30 (Missing: 35)

Table 11b. *Missing Values Pattern for MDs versus DOs*

Variable with Missing Values	# of Missing Values	# of Missing Values Accounted for by Credential
Year of Birth	1	DO: 0 MD: 1
About what percentage of your patients do you identify as white/European American	4	DO: 1 MD: 3
Number of patients seen per week.	5	DO: 0 MD: 5
About what percentage of your patients do you identify as African American?	12	DO: 6 MD: 6
About what percentage of your African American patients have trouble meeting their medical expenses?	12	DO: 4 MD: 8
About what percentage of your white/European American patients have trouble meeting their medical expenses?	14	DO: 4 MD: 10
Which income category best describes the majority of your African American patients?	28	DO: 11 MD: 17
Which income category best describes the majority of your white/European American patients?	32	DO: 11 MD: 21
Total:	108	DO: 37 MD: 71

Table 12. *Missing Values Summary for the 57 Variables to be used in Principle Component Analysis—General Questionnaires only (n=324)*

# of Missing Values (%)	# of Variables	% of Variables	Cumulative %
0 (0)	13	22.8	22.8
1 (1/324 = 0.3%)	13	22.8	45.6
2 (0.6%)	16	28.1	73.7
3 (0.9%)	8	14.0	87.7
4 (1.2%)	2	3.5	91.2
5 (1.5%)	2	3.5	94.7
6 (1.9%)	1	1.8	96.5
7 (2.2%)	1	1.8	98.3
9 (2.8%)	1	1.8	100
Totals:	57	100	100

Table 13. *Testing for Differences Between Cases With and Without Missing Values Using Independent-Samples T-Test—57 variables to be used in PCA, General Questionnaires Only*

Female vs. Male	t (df)	-1.710 (322)
	p-value	.088
Year of Birth	t (df)	1.180 (322)
	p-value	.239
Non-Hispanic White vs. All Others	t (df)	.323 (322)
	p-value	.747
U.S. Medical Graduate vs. International Medical Graduate	t (df)	*2.118 (322)*
	p-value	*.035*
Private Practice vs. not Private Practice	t (df)	-1.199 (322)
	p-value	.231
% Patients African American (<50% of patients African American vs. ≥50% of patients African American)	t (df)	.306 (316)
	p-value	.759
MD vs. DO	t (df)	-.303 (322)
	p-value	.762

Table 14. *Principle Components Analysis—57 Variables, Direct Oblimin Structure Matrix Solution*

Component Structure and Loading Scores:
57 variables, General Questionnaire Respondents only, missing values replaced using regression,
Oblique Direct Oblimin rotation, structure matrix

Component 1 PHYSICIANS' PERCEPTIONS OF PATIENTS—DISEASE MANAGEMENT BARRIERS 1	**Component 7 PHYSICIANS' PERCEPTIONS OF PATIENTS—DISEASE MANAGEMENT BARRIERS 2**	**Component 8 PHYSICIANS' PERCEPTIONS OF PATIENTS—DISEASE MANAGEMENT BARRIERS 3**	**Component 5 RESOURCE CONSTRAINTS 1**	**Component 6 RESOURCE CONSTRAINTS 2**	**Component 2 PHYSICIANS' STRATEGIES TO PROMOTE PATIENT ADHERENCE**	**Component 3 PHYSICIANS' PERCEPTIONS OF PATIENTS—DISEASE MANAGEMENT ATTITUDES**	**Component 4 PHYSICIANS' PERCEPTIONS OF PATIENTS—ASSESSMENT EFFICACY AND CONTROL**
% of Variance Explained: 15.88	% of Variance Explained: 2.89	% of Variance Explained: 2.81	% of Variance Explained: 3.90	% of Variance Explained: 3.35	% of Variance Explained: 8.54	% of Variance Explained: 5.88	% of Variance Explained: 4.69
PATADHBAR.9 …does not have adequate access to community resources (e.g., grocery stores, places to exercise). .765 PATADHBAR.10. …is uninsured/under-insured. .659 PATADHBAR.13. ...does not have enough support from employer/has work-related constraints. .626 PATADHBAR.4. …has problems with personal finances. .607 PATADHBAR.11. …has cognitive limitations. .588 PATADHBAR.8. ….does not have enough family support. .569 **PATADHBAR.5. …does not understand my directions because of cultural differences between me and the**	*PATLIKETO.4 …have financial problems? -.770* PATLIKETO.1...live in a neighborhood that is unsafe. -.685 ***PATLIKETO.3. …complain about physical discomfort? -.626*** PATLIKETO.2. …live in a neighborhood with inadequate access to healthy foods. -.618	PATLIKTO.7…have significant care-taking demands/family-related responsibilities that impede disease management? -.846 PATLIKETO.6…have significant career demands/work-related responsibilities that impede disease management? -.833 PATLIKETO.11...be overwhelmed with the demands of managing the disease. -.593 PATLIKETO.8…use home remedies in place of prescribed medications to treat their diabetes? -.568 PATADHBAR.7…has too many competing demands. -.540 PATLIKETO.10. …lack social support. -.538 PATLIKETO.9…not trust the information you give them? -.445	CHALANDRES.10 There is not enough time during office visits to discuss adherence-related barriers. -.663 CHALANDRES.8 I have too few resources available to help me improve patients' adherence. -.575 CHALANDRES.11. My patients have more important issues they would like to discuss with me. -.552 CHALANDRES.6. I do not have adequate training to resolve the array of barriers that my patients face. -.546	PRRESCC.reverseorder. I have all the resources I need to provide culturally sensitive care. -.700 GETSPECCARE.reverseorder. My patients with diabetes are always able to get the diabetes-related specialty care they need. -.655 PRCCCOST. Providing culturally sensitive care is NOT always realistic in my working environment given the cost constraints related to my clinical practice. -.647 PRCCTIME. Providing culturally sensitive care is NOT always realistic in my working environment given the time constraints related to my clinical practice. -.641 GETMEDS.reverseorder. My patients with diabetes are always able to get the	STRATPATADH.6.reverseorder. I give the patient adherence-related resources such as pill-boxes, medication diaries, food/nutrition charts, etc. .688 STRATPATADH.5.reverseorder. I make recommendations to the patient about what they should do to improve their adherence. .608 STRATPATADH.10.reverseorder. I talk with the patient about which medications they should definitely not skip. .572 STRATPATADH.4.reverseorder. I ask the patient what they think I could do to improve their adherence. .538 PRASKABT.reverseorder. How often would you say you ask your patients about the barriers they face in managing their diabetes? .530	PATADHBAR.2 …does not worry enough about complications. .716 PATADHBAR.12 …makes bad choices (e.g., choosing unhealthy foods even though healthy foods are available). .693 PATADHBAR.1 ...does not have enough will-power. .661 PATADHBAR.6 …is in denial about seriousness of disease. .638 PATADHBAR.14 …does not seem to care enough about the future and instead is mainly focused on the present day. .631 PATLIKETO.5…not tell you the truth regarding their adherence with their treatment plan? .498	CHALANDRES.1. I cannot tell who has difficulty adhering to their diabetes regimen. -.665 CHALANDRES.7. I am concerned that raising adherence-related barriers might offend the patient. -.644 CHALANDRES.3. Even when I ask, patients rarely admit to adherence problems. -.632 CHALANDRES.2. Patients do not see it as my role to discuss treatment-related barriers. -.606 CHALANDRES.4. I believe it is the patient's responsibility to bring such topics (i.e., treatment-related barriers) up. -.591 CHALANDRES.5. I do not have adequate training to assess the array of barriers that my patients face. -.547 CHALANDRES.9.

patient. .481 *PATADHBAR.3. …has not learned enough about diabetes. .429*				diabetes-related medications they need. -.589 WILLING. I am not financially rewarded for spending the time required to adhere to best-practice guidelines & recommendations. -.498 FREQEDURES.reverseorder. How often would you say you have enough resources to provide the kind of diabetes-related education that you think your patients need? -.451 READY. I do not believe that practice guidelines are entirely applicable to my clinical setting because they do not adequately account for my practice environment. -.450 ABLE. My working environment is structured such that I cannot adhere to practice guidelines. -.410 ***STRATPATADH.1.reverse order. I arrange for the patient to meet with a social worker, nurse, or other professional so they can work together to find a solution. -.314***	STRATPATADH.9.reverseorder. I change medication(s) to a cheaper/generic brand. .488 STRATPATADH.2.reverseorder. I shorten the interval for the patient's return visit so I can follow-up on their progress. .477 *STRATPATADH.7.reverseorder. I give the patient medical equipment such as lancets, test strips, glucometer, syringes, etc. .471* *STRATPATADH.8.reverseorder. I give the patient free samples of medication from a drug company or another source. .448* STRATPATADH.3.reverseorder. I express sympathy about the patient's situation. .441		My patients' poor health literacy makes discussing adherence-related barriers difficult. -.449

Cronbach's alpha: .788 Mean inter-item Correlation: .315 AFTER REMOVING PATADHBAR.5: Cronbach's alpha: .778 Mean inter-item Correlation: .332 AFTER REMOVING PATADHBAR.5 and PATADHBAR.3: Cronbach's alpha: .783 Mean inter-item Correlation: .372	Cronbach's alpha: .800 Mean inter-item Correlation: .500 AFTER REMOVING PATLIKETO.3: Cronbach's alpha: .827 Mean inter-item Correlation: .616 AFTER REMOVING PATLIKETO.3 and PATLIKTO.4: Cronbach's alpha: .841 Mean inter-item Correlation: .727	Cronbach's alpha: .812 Mean inter-item Correlation: .379	Cronbach's alpha: .740 Mean inter-item Correlation: .415	Cronbach's alpha: .758 Mean inter-item Correlation: .243 AFTER REMOVING STRATPATADH.1: Cronbach's alpha: .768 Mean inter-item Correlation: .279	Cronbach's alpha: .705 Mean inter-item Correlation: .213 AFTER REMOVING STRATPATADH.8: Cronbach's alpha: .707 Mean inter-item Correlation: .228 AFTER REMOVING STRATPATADH.8 and STRATPATADH.7: Cronbach's alpha: .711 Mean inter-item Correlation: .239	Cronbach's alpha: .738 Mean inter-item Correlation: .329	Cronbach's alpha: .738 Mean inter-item Correlation: .295

Variable not included in component structure due to failure to load on any component: CHALANDRES.12reverseorder. What I say can make a big difference in improving my patients' adherence to treatment.

Variables in italic text, if removed, improve their respective component's Cronbach's alpha.

Variables in bold text are being removed from their respective component to improve the component's interpretability.

Table 15. *Strongly Correlated Variables as Measured by the Pearson Product-Moment Correlation Coefficient*

	Pearson Correlation (two-tailed significance)	Variable
BLOCK 1	0.727 (.000)	**PATLIKETO.1...live in a neighborhood that is unsafe.** PATLIKETO.2. …live in a neighborhood with inadequate access to healthy foods.
	0.728 (.000)	**PATLIKETO.6…have significant career demands/work-related responsibilities that impede disease management?** PATLIKTO.7…have significant care-taking demands/family-related responsibilities that impede disease management?
	0.770 (.000)	PRCCTIME. Providing culturally sensitive care is NOT always realistic in my working environment given the time constraints related to my clinical practice. **PRCCCOST. Providing culturally sensitive care is NOT always realistic in my working environment given the cost constraints related to my clinical practice.**
	0..639 (000)	**CHALANDRES.5. I do not have adequate training to assess the array of barriers that my patients face.** CHALANDRES.6. I do not have adequate training to resolve the array of barriers that my patients face.
	0..600 (.000)	**PATLIKETO.1...live in a neighborhood that is unsafe.** *PATLIKETO.4 ...have financial problems?*
	0.633 (.000)	GETMEDS.reverseorder. My patients with diabetes are always able to get the diabetes-related medications they need. **GETSPECCARE.reverseorder. My patients with diabetes are always able to get the diabetes-related specialty care they need.**
BLOCK 2	0.507 (.000)	CHALANDRES.10 There is not enough time during office visits to discuss adherence-related barriers. **CHALANDRES.11. My patients have more important issues they would like to discuss with me.**
	0.520 (.000)	PATLIKETO.2. …live in a neighborhood with inadequate access to healthy foods. ***PATLIKETO.4 …have financial problems?***
	0.527 (.000)	PATLIKETO.9…not trust the information you give them? **PATLIKETO.10. …lack social support.**
	0.559 (.000)	**PATLIKETO.10. …lack social support.** PATLIKETO.11...be overwhelmed with the demands of managing the disease.

Variables in bold text removed from Principle Component Analysis to produce an uncorrelated component structure.

Table 16. *Component Correlation Matrices Using 57 Variables, After Removing Block 1, and After Removing Block Two (8 and 6 Component Solutions)*

Component Correlation Matrix Using Full Sample (57 Variables)[a]

Component	1	2	3	4	5	6	7	8
1	1.000	-.029	.069	-.042	-.094	-.119	-.220	-.315
2	-.029	1.000	-.056	-.140	-.031	-.199	.030	-.010
3	.069	-.056	1.000	-.109	-.072	-.081	-.003	-.111
4	-.042	-.140	-.109	1.000	.133	.159	.058	.110
5	-.094	-.031	-.072	.133	1.000	.121	.014	.186
6	-.119	-.199	-.081	.159	.121	1.000	.097	.154
7	-.220	.030	-.003	.058	.014	.097	1.000	.178
8	-.315	-.010	-.111	.110	.186	.154	.178	1.000

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

a. Only cases for which Survey Type = General Survey are used in the analysis phase.

Component Correlation Matrix After Removing Block 1 (52 Variables)[a]

Component	1	2	3	4	5	6	7
1	1.000	.002	.089	-.066	-.190	.098	-.307
2	.002	1.000	-.041	-.125	-.206	-.091	.010
3	.089	-.041	1.000	-.090	-.123	.051	-.038
4	-.066	-.125	-.090	1.000	.183	-.022	.097
5	-.190	-.206	-.123	.183	1.000	-.053	.170
6	.098	-.091	.051	-.022	-.053	1.000	-.022
7	-.307	.010	-.038	.097	.170	-.022	1.000

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

a. Only cases for which Survey Type = General Survey are used in the analysis phase.

Component Correlation Matrix After Removing Blocks 1 and 2 (49 Variables)--6 Component Solution

Component	1	2	3	4	5	6
1	1.000	-.021	.123	-.075	-.262	.083
2	-.021	1.000	-.052	-.096	-.182	-.037
3	.123	-.052	1.000	-.079	-.136	.025
4	-.075	-.096	-.079	1.000	.155	-.005
5	-.262	-.182	-.136	.155	1.000	-.055
6	.083	-.037	.025	-.005	-.055	1.000

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

a. Only cases for which Survey Type = General Survey are used in the analysis phase.

Component Correlation Matrix After Removing Blocks 1 and 2 (49 Variables)—

5 Component Solution

Component	1	2	3	4	5
1	1.000	-.017	.111	-.059	-.286
2	-.017	1.000	-.059	-.083	-.181
3	.111	-.059	1.000	-.063	-.126
4	-.059	-.083	-.063	1.000	.125
5	-.286	-.181	-.126	.125	1.000

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

a. Only cases for which Survey Type = General Survey are used in the analysis phase.

Table 17. *Principle Components Analysis—49Variables, Varimax Rotated Component Matrix Solution*

Component Structure and Loading Scores:
49 variables, General Questionnaire Respondents only, missing values replaced using using regression, Varimax rotation, rotated component matrix

Component 1: PHYSICIANS' PERCEPTIONS OF PATIENTS—DISEASE MANAGEMENT BARRIERS	**Component 2: RESOURCE CONSTRAINTS**	**Component 3: PHYSICIANS' STRATEGIES TO PROMOTE PATIENT ADHERENCE**	**Component 4: PHYSICIANS' PERCEPTIONS OF PATIENTS—DISEASE MANAGEMENT ATTITUDES**	**Component 5: PHYSICIANS' PERCEPTIONS OF PATIENTS—EFFICACY AND CONTROL**
% of Variance Explained: 14.93	% of Variance Explained: 8.47	% of Variance Explained: 6.21	% of Variance Explained: 4.86	% of Variance Explained: 4.20
PATADHBAR.9 …does not have adequate access to community resources (e.g., grocery stores, places to exercise). .728 PATADHBAR.10. ….is uninsured/under-insured. .694 PATLIKETO.2. …live in a neighborhood with inadequate access to healthy foods. .675 PATADHBAR.11. ….has cognitive limitations. .640 PATADHBAR.13. ...does not have enough support from employer/has work-related constraints. .632 PATADHBAR.4. …has problems with personal finances. .591 PATLIKETO.8…use home remedies in place of prescribed medications to treat their diabetes? .587 PATLIKTO.7…have significant care-taking demands/family-related responsibilities that impede disease management? .566 PATLIKETO.9…not trust the information you give them? .490 PATLIKETO.11...be overwhelmed with the demands of managing the disease. .490 PATADHBAR.8. ….does not have enough family support. .483 PATADHBAR.5. …does not understand my directions because of	CHALANDRES.8 I have too few resources available to help me improve patients' adherence. .708 CHALANDRES.10 There is not enough time during office visits to discuss adherence-related barriers. .634 WILLING. I am not financially rewarded for spending the time required to adhere to best-practice guidelines & recommendations. .606 ABLE. My working environment is structured such that I cannot adhere to practice guidelines. .562 PRRESCC.reverseorder. I have all the resources I need to provide culturally sensitive care. .540 PRCCTIME. Providing culturally sensitive care is NOT always realistic in my working environment given the time constraints related to my clinical practice. .529 CHALANDRES.6. I do not have adequate training to *resolve* the array of barriers that my patients face. .521 READY. I do not believe that practice guidelines are entirely applicable to my clinical setting because they do not adequately account for my practice environment. .519 FREQEDURES.reverseorder. How often would you say you have enough resources to provide the kind of diabetes-related education that you	STRATPATADH.6.reverseorder. I give the patient adherence-related resources such as pill-boxes, medication diaries, food/nutrition charts, etc. .624 STRATPATADH.5.reverseorder. I make recommendations to the patient about what they should do to improve their adherence. .592 STRATPATADH.3.reverseorder. I express sympathy about the patient's situation. .546 STRATPATADH.9.reverseorder. I change medication(s) to a cheaper/generic brand. .544 STRATPATADH.4.reverseorder. I ask the patient what they think I could do to improve their adherence. .535 STRATPATADH.10.reverseorder. I talk with the patient about which medications they should definitely not skip. .534 STRATPATADH.2.reverseorder. I shorten the interval for the patient's return visit so I can follow-up on their progress. .498 PRASKABT.reverseorder. How often would you say you ask your patients about the barriers they face in managing their diabetes? .474 *STRATPATADH.7.reverseorder. I give the patient medical equipment such as lancets, test strips, glucometer,*	PATADHBAR.2 …does not worry enough about complications. .708 PATADHBAR.1 ..does not have enough will-power. .685 PATADHBAR.12 …makes bad choices (e.g., choosing unhealthy foods even though healthy foods are available). .672 PATADHBAR.14 …does not seem to care enough about the future and instead is mainly focused on the present day. .635 PATADHBAR.6 …is in denial about seriousness of disease. .623 PATLIKETO.5…not tell you the truth regarding their adherence with their treatment plan? .487	CHALANDRES.1. I cannot tell who has difficulty adhering to their diabetes regimen. .675 CHALANDRES.3. Even when I ask, patients rarely admit to adherence problems. .632 CHALANDRES.7. I am concerned that raising adherence-related barriers might offend the patient. .614 CHALANDRES.4. I believe it is the patient's responsibility to bring such topics (i.e., treatment-related barriers) up. .590 CHALANDRES.2. Patients do not see it as my role to discuss treatment-related barriers. .588

cultural differences between me and the patient. .458 CHALANDRES.9. My patients' poor health literacy makes discussing adherence-related barriers difficult. .447 PATLIKETO.3. …complain about physical discomfort? .403 PATADHBAR.7…has too many competing demands. .397 PATADHBAR.3. …has not learned enough about diabetes. .311	think your patients need? .458	*syringes, etc. .445* STRATPATADH.1.reverse order. I arrange for the patient to meet with a social worker, nurse, or other professional so they can work together to find a solution. .386 *STRATPATADH.8.reverseorder. I give the patient free samples of medication from a drug company or another source. .309*		
Cronbach's alpha: .860 Mean inter-item Correlation: .276	Cronbach's alpha: .794 Mean inter-item Correlation: .304	Cronbach's alpha: .703 Mean inter-item Correlation: .196 AFTER REMOVING STRATPATADH.8: Cronbach's alpha: .708 Mean inter-item Correlation: .210 AFTER REMOVING STRATPATADH.8 AND STRATPATADH.1: Cronbach's alpha: .707 Mean inter-item Correlation: .228 AFTER REMOVING STRATPATADH.8, STRATPATADH.1, and STRATPATADH.7: Cronbach's alpha: .711 Mean inter-item Correlation: .239	Cronbach's alpha: .738 Mean inter-item Correlation: .329	Cronbach's alpha: .701 Mean inter-item Correlation: .322

Variables not included in component structure due to failure to load on any component: CHALANDRES.12reverseorder. What I say can make a big difference in improving my patients' adherence to treatment.
GETMEDS.reverseorder. My patients with diabetes are always able to get the diabetes-related medications they need.

Variables in italic text, if removed, improve their respective component's Cronbach's alpha.

Table 18. *Principle Components Analysis—42Variables, Varimax Rotated Component Matrix Solution*

Component Structure and Loading Scores:
42 variables, General Questionnaire Respondents only, missing values replaced using using regression, Varimax rotation, rotated component matrix

Component 1: **PHYSICIANS' PERCEPTIONS OF PATIENTS—DISEASE MANAGEMENT BARRIERS**	**Component 2:** **RESOURCE CONSTRAINTS**	**Component 3:** **PHYSICIANS' PERCEPTIONS OF PATIENTS—DISEASE MANAGEMENT ATTITUDES**	**Component 4:** **PHYSICIANS' STRATEGIES TO PROMOTE PATIENT ADHERENCE**	**Component 5:** **PHYSICIANS' PERCEPTIONS OF PATIENTS—EFFICACY AND CONTROL**
% of Variance Explained: 15.82	% of Variance Explained: 8.88	% of Variance Explained: 6.93	% of Variance Explained: 5.04	% of Variance Explained: 4.62
PATADHBAR.9 …does not have adequate access to community resources (e.g., grocery stores, places to exercise). .731 PATADHBAR.10. …is uninsured/under-insured. .697 PATLIKETO.2. …live in a neighborhood with inadequate access to healthy foods. .671 PATADHBAR.13. ...does not have enough support from employer/has work-related constraints. .638 PATADHBAR.11. …has cognitive limitations. .637 PATADHBAR.4. …has problems with personal finances. .590 PATLIKETO.8…use home remedies in place of prescribed medications to treat their diabetes? .586 PATLIKTO.7…have significant care-taking demands/family-related responsibilities that impede disease management? .572 PATADHBAR.8. ….does not have enough family support. .489 PATLIKETO.11...be overwhelmed with the demands of managing the disease. .489 PATLIKETO.9…not trust the information you give them? .479 PATADHBAR.5. …does not understand my directions because of	CHALANDRES.8 I have too few resources available to help me improve patients' adherence. .695 CHALANDRES.10 There is not enough time during office visits to discuss adherence-related barriers. .645 WILLING. I am not financially rewarded for spending the time required to adhere to best-practice guidelines & recommendations. .636 ABLE. My working environment is structured such that I cannot adhere to practice guidelines. .600 PRCCTIME. Providing culturally sensitive care is NOT always realistic in my working environment given the time constraints related to my clinical practice. .562 PRRESCC.reverseorder. I have all the resources I need to provide culturally sensitive care. .549 READY. I do not believe that practice guidelines are entirely applicable to my clinical setting because they do not adequately account for my practice environment. .518 FREQEDURES.reverseorder. How often would you say you have enough resources to provide the kind of diabetes-related education that you think your patients need? .463	PATADHBAR.2 …does not worry enough about complications. .709 PATADHBAR.12 …makes bad choices (e.g., choosing unhealthy foods even though healthy foods are available). .688 PATADHBAR.1 ...does not have enough will-power. .683 PATADHBAR.14 …does not seem to care enough about the future and instead is mainly focused on the present day. .639 PATADHBAR.6 …is in denial about seriousness of disease. .625 PATLIKETO.5…not tell you the truth regarding their adherence with their treatment plan? .480	STRATPATADH.5.reverseorder. I make recommendations to the patient about what they should do to improve their adherence. .624 STRATPATADH.10.reverseorder. I talk with the patient about which medications they should definitely not skip. .590 STRATPATADH.6.reverseorder. I give the patient adherence-related resources such as pill-boxes, medication diaries, food/nutrition charts, etc. .584 STRATPATADH.3.reverseorder. I express sympathy about the patient's situation. .583 STRATPATADH.9.reverseorder. I change medication(s) to a cheaper/generic brand. .556 STRATPATADH.4.reverseorder. I ask the patient what they think I could do to improve their adherence. .540 STRATPATADH.2.reverseorder. I shorten the interval for the patient's return visit so I can follow-up on their progress. .502 PRASKABT.reverseorder. How often would you say you ask your patients about the barriers they face in managing their diabetes? .465	CHALANDRES.1. I cannot tell who has difficulty adhering to their diabetes regimen. .690 CHALANDRES.3. Even when I ask, patients rarely admit to adherence problems. .648 CHALANDRES.7. I am concerned that raising adherence-related barriers might offend the patient. .627 CHALANDRES.4. I believe it is the patient's responsibility to bring such topics (i.e., treatment-related barriers) up. .616 CHALANDRES.2. Patients do not see it as my role to discuss treatment-related barriers. .602

cultural differences between me and the patient. .453 PATADHBAR.7…has too many competing demands. .408 PATLIKETO.3. …complain about physical discomfort? .406 PATADHBAR.3. …has not learned enough about diabetes. .302				
Cronbach's alpha: .854 Mean inter-item Correlation: .279	Cronbach's alpha: .779 Mean inter-item Correlation: .309	Cronbach's alpha: .738 Mean inter-item Correlation: .329	Cronbach's alpha: .711 Mean inter-item Correlation: .239	Cronbach's alpha: .701 Mean inter-item Correlation: .322

Table 19a. *Component Correlation Matrix: 42 variables (n=637)*

Component	1	2	3	4	5
1. Physicians' Perceptions of Patients—Disease Management Barriers	1.000				
2, Physician Resource Constraints	-.070	1.000			
3. Physicians' Perceptions of Patients—Disease Management Attitudes	.137	-.097	1.000		
4. Physicians' Strategies to Promote Patient Adherence	-.276	-.110	-.094	1.000	
5. Physicians' Perceptions of Patients—Efficacy and Control	-.096	-.175	-.064	.145	1.000

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

Table 19b. *Pearson Product-Moment Correlations Between Component Regression Scores and Weighted Summed Scores*

		Component.1_regression.score	Component.2_regression.score	Component.3_regression.score	Component.4_regression.score	Component.5_regression.score	Component.1_weighted.summed.score	Component.2_weighted.summed.score	Component.3_weighted.summed.score	Component.4_weighted.summed.score	Component.5_weighted.summed.score
Component.1_regression.score	Pearson Correlation	1									
	Sig. (2-tailed)										
Component.2_regression.score	Pearson Correlation	.069	1								
	Sig. (2-tailed)	.081									
Component.3_regression.score	Pearson Correlation	.012	-.033	1							
	Sig. (2-tailed)	.767	.409								
Component.4_regression.score	Pearson Correlation	-.092*	-.047	-.027	1						
	Sig. (2-tailed)	.021	.235	.489							
Component.5_regression.score	Pearson Correlation	-.099*	-.011	-.034	.139**	1					

	Sig. (2-tailed)	.012	.788	.391	.000						
Component.1_ weighted.summed. score	Pearson Correlation	***.972*****	.251**	.095*	-.109**	-.036	1				
	Sig. (2-tailed)	***.000***	.000	.016	.006	.368					
Component.2_ weighted.summed. score	Pearson Correlation	.199**	***.941*****	.033	.066	.110**	.374**	1			
	Sig. (2-tailed)	.000	***.000***	.409	.098	.005	.000				
Component.3_ weighted.summed. score	Pearson Correlation	.103**	.033	***.968*****	-.082*	-.002	.192**	.113**	1		
	Sig. (2-tailed)	.009	.403	***.000***	.038	.960	.000	.004			
Component.4_ weighted.summed. score	Pearson Correlation	-.155**	.061	-.050	***.960*****	.248**	-.138**	.163**	-.101*	1	
	Sig. (2-tailed)	.000	.124	.212	***.000***	.000	.000	.000	.011		
Component.5_ weighted.summed. score	Pearson Correlation	.027	.151**	.056	.189**	***.936*****	.114**	.276**	.081*	.292**	1
	Sig. (2-tailed)	.499	.000	.159	.000	***.000***	.004	.000	.041	.000	

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Table 20. *Descriptive Characteristics and Differences Between General and African American Questionnaire Respondents*

	Full Sample n=637	General Questionnaire Respondents n=324 (50.9%)	African American Questionnaire Respondents n=313 (49.1%)	Independent-Samples T-Test t
μ Age (years)	50.4	50.5	50.2	0.335
% Male	65.9	68.2	63.6	1.233
Race				
% non-Hispanic White (includes those of Middle Eastern Descent)	67.2	66.7	67.7	-0.286
% non-Hispanic African American	6.9	6.8	7.0	-0.119
% Asian	21.0	21.0	21.1	-0.030
% Hispanic	1.6	1.5	1.6	-0.055
% Other	3.3	4.0	2.6	1.028
% US Medical Graduate	68.0	67.6	68.4	-0.210
% DO	22.1	21.9	22.4	-0.137
Specialty				
Internal Medicine	54.8	59.9	49.5	2.636**
Family Practice	39.4	36.7	42.2	-1.406
General Practice	2.5	2.5	2.6	-0.070
Endocrinology	3.3	0.9	5.8	-3.436†
% Board Certified	89.5	90.1	88.8	0.536
Work Environment				
Hospital	7.5	5.9	9.3	-1.627
Group Practice	38.9	37.7	40.3	-0.672
Private Practice	47.9	53.1	42.5	2.687**
Other	5.7	3.4	8.0	-2.518*
% of Patients White	60.3	61.2	59.5	0.741
% of Patients African American	30.6	29.4	31.8	-0.991

* Significant at 0.05 level; ** Significant at 0.01 level; † Significant at 0.001 level

Table 21. *Pearson Product-Moment Correlation Coefficients Among Dependent Variables—Two-Tailed Test (n=637)*

	Question-naire (1=AA)	Ln % of Patients AA, 0-100	Ln % of City AA, 0-100	Dist. From Det. City Center (Miles)	SES Index (higher score = higher SES)	SES Indicator (higher score = higher SES)	Age	Gender (1=male)	Race: White vs. Others (1=white)	Credential: MD vs.DO (1=DO)	USG vs. IMG (1=USMG)	Social Determi-nants of Health: Relevence plus Training (higher score = more R. & T.)	Family Practice vs. Others (1=FP)	Board Certified (1=BC)	Private Practice vs. Others (1=PP)	Patients Per-Week (higher score = more patients)
Questionnaire	1															
Natural Log of the % of Patients AA, Standardized 0-100	.060	1														
Natural Log of the % of City AA, Standardized 0-100	.014	**.601****	1													
Distance From Detroit City Center (Miles)	-.071	**-.541****	**-.602****	1												
SES Index	-.086*	-.443**	**-.632****	**-.694****	1											
SES Indicator	-.088*	-.483**	-.431**	.398**	.495**	1										
Age	-.013	-.039	.065	-.014	-.010	.077	1									
Gender	-.049	-.122**	-.061	.063	.033	.074	.315**	1								
Race (White vs. Others)	.011	-.280**	-.216**	.165**	.181**	.190**	.055	.154**	1							
Credential (MD vs.DO)	.005	-.183**	-.126**	.128**	.034	-.001	.121**	.088*	.228**	1						
USMG vs. IMG	.008	-.104**	-.017	.120**	.147**	.096*	.054	.053	.359**	.366**	1					
Social Determinants of Health: Relevance plus Training	.064	.282**	.220**	-.254**	-.263**	-.277**	-.229**	-.095*	-.083*	-.109**	-.005	1				
Family Practice vs. Others	.056	-.141**	-.107**	.054	-.055	.020	.098*	.017	.119**	.297**	.078*	.085*	1			
Board Certified	-.021	-.078*	-.081*	.081*	.060	.033	-.311**	-.106**	.109**	.109**	.094*	.014	.046	1		
Private Practice vs. Others	-.106**	-.192**	-.163**	.140**	.154**	.125**	.179**	.152**	.027	.095*	-.043	-.200**	-.033	-.122**	1	
Patients Per-Week	-.021	-.144**	-.109**	.046	.073	.064	-.020	.151**	.083*	.141**	.018	-.077	.059	.070	.088*	1

Bold text indicates correlations exceeding an absolute value of .500

* Correlation is significant at the .05 level

** Correlation is significant at the .01 level

Table 22. *Multiple Regression Associations of Physicians' Perceptions of Patients' Disease Management Barriers Scores (Component 1), Standardized to Scale from 0 to 100, with Patient Race and SES, Controlling for Physician Demographics, Training, Work Setting, and Spatial Proximity to Detroit, MI (n=637)*

Model Summary: $R^2 = 0.319$, F (16,620) = 18.18, $p < 0.0005$	Unstandardized Coefficients		t	Sig.	Squared Part Correlation Coefficient (%)
	β	SE			
(constant)	52.68	9.42	5.591	0.000	
Questionnaire (African American)	1.32	1.16	1.138	0.256	
Ln % Patients Af. Am. (Standardized 0-100)	**0.14**	**0.03**	**4.148**	**0.000**	**1.88**
Ln % City Af. Am. (Standardized 0-100)	0.01	0.03	0.269	0.788	
Patient-Based SES Indicator (0-7)	**-3.99**	**0.58**	**-6.951**	**0.000**	**5.29**
City-Based SES Index (0-100)	0.16	0.15	1.028	0.304	
Physician Age (Years)	-0.07	0.06	-1.194	0.233	
Physician Gender (Male)	**-4.76**	**1.31**	**-3.621**	**0.000**	**1.44**
Physician Race (White)	0.40	1.38	0.288	0.773	
Credential (DO)	**4.10**	**1.63**	**2.522**	**0.012**	**0.71**
Medical School (USMG)	0.01	1.43	0.004	0.997	
Social Determinants of Health: Relevance & Training (0-18)	**0.50**	**0.15**	**3.423**	**0.001**	**1.28**
Specialty (Family Practice)	-0.96	1.28	-0.753	0.452	
Board Certification (Yes)	-1.87	2.02	-0.927	0.354	
Work Setting (Private Practice)	-1.43	1.22	-1.171	0.242	
Patients Per-Week (5-pt Scale)	-0.33	0.50	-0.656	0.512	
Distance from Detroit City Center (Miles)	**-0.17**	**0.08**	**-1.970**	**0.049**	**4.23**

Bold text = statistically significant independent variable

Table 23. *Multiple Regression Associations of Physicians' Perceptions of Patients' Disease Management Attitudes (Component 3), Standardized to Scale from 0 to 100, with Patient Race and SES, Controlling for Physician Demographics, Training, Work Setting, and Spatial Proximity to Detroit, MI (n=637)*

Model Summary: $R^2 = 0.072$, F (16,620) = 3.015, $p < .0005$	Unstandardized Coefficients		t	Sig.	Squared Part Correlation Coefficient (%)
	β	SE			
(constant)	52.33	8.81	5.940	0.000	
Questionnaire (African American)	**-5.79**	**1.09**	**-5.331**	**0.000**	**4.24**
Ln % Patients Af. Am. (Standardized 0-100)	-0.01	0.03	-0.301	0.763	
Ln % City Af. Am. (Standardized 0-100)	0.01	0.03	0.437	0.662	
Patient-Based SES Indicator (0-7)	0.45	0.54	0.843	0.400	
City-Based SES Index (0-100)	0.05	0.14	0.322	0.747	
Physician Age (Years)	0.03	0.06	0.448	0.654	
Physician Gender (Male)	0.61	1.23	0.495	0.621	
Physician Race (White)	-1.16	1.29	-0.897	0.370	
Credential (DO)	**4.33**	**1.52**	**2.847**	**0.005**	**1.21**
Medical School (USMG)	-2.48	1.34	-1.848	0.065	
Social Determinants of Health: Relevance & Training (0-18)	0.18	0.14	1.342	0.180	
Specialty (Family Practice)	-0.68	1.19	-0.572	0.567	
Board Certification (Yes)	1.71	1.87	0.908	0.364	
Work Setting (Private Practice)	-1.20	1.14	-1.052	0.293	
Patients Per-Week (5-pt Scale)	0.44	0.47	0.941	0.347	
Distance from Detroit City Center (Miles)	0.07	0.08	0.837	0.403	

Bold text = statistically significant independent variable

Table 24. *Multiple Regression Associations of Physicians' Strategies to Promote Patient Adherence (Component 4), Standardized to Scale from 0 to 100, with Patient Race and SES, Controlling for Physician Demographics, Training, Work Setting, and Spatial Proximity to Detroit, MI (n=637)*

Model Summary: $R^2 = 0.128$, F (16,620) = 5.704, $p < .0005$	Unstandardized Coefficients		t	Sig.	Squared Part Correlation Coefficient (%)
	β	SE			
(constant)	39.43	7.06	5.584	0.000	
Questionnaire (African American)	**-1.81**	**0.87**	**-2.080**	**0.038**	**0.61**
Ln % Patients Af. Am. (Standardized 0-100)	0.02	0.03	0.969	0.333	
Ln % City Af. Am. (Standardized 0-100)	0.01	0.02	0.502	0.616	
Patient-Based SES Indicator (0-7)	**0.91**	**0.43**	**2.121**	**0.034**	**0.64**
City-Based SES Index (0-100)	**-0.27**	**0.11**	**-2.423**	**0.016**	**0.83**
Physician Age (Years)	0.04	0.04	0.969	0.333	
Physician Gender (Male)	**2.44**	**0.98**	**2.476**	**0.014**	**0.96**
Physician Race (White)	1.11	1.03	1.069	0.286	
Credential (DO)	-2.27	1.22	-1.864	0.063	
Medical School (USMG)	**4.47**	**1.07**	**4.160**	**0.000**	**2.43**
Social Determinants of Health: Relevance & Training (0-18)	**-0.52**	**0.11**	**-4.781**	**0.000**	**3.04**
Specialty (Family Practice)	0.62	0.96	0.651	0.515	
Board Certification (Yes)	0.23	1.51	0.150	0.880	
Work Setting (Private Practice)	-0.96	0.92	-1.042	0.298	
Patients Per-Week (5-pt Scale)	-0.47	0.38	-1.231	0.219	
Distance from Detroit City Center (Miles)	**0.17**	**0.06**	**2.760**	**0.006**	**1.06**

Bold text = statistically significant independent variable

Table 25. *Multiple Regression Associations of Physicians' Efficacy and Control (Component 5), Standardized to Scale from 0 to 100, with Patient Race and SES, Controlling for Physician Demographics, Training, Work Setting, and Spatial Proximity to Detroit, MI (n=637)*

Model Summary: $R^2 = 0.082$, F (16,620) = 3.443, $p < .0005$	Unstandardized Coefficients β	Unstandardized Coefficients SE	t	Sig.	Squared Part Correlation Coefficient (%)
(constant)	50.67	9.04	5.607	.000	
Questionnaire (African American)	1.13	1.12	1.011	0.313	
Ln % Patients Af. Am. (Standardized 0-100)	0.05	0.03	1.565	0.118	
Ln % City Af. Am. (Standardized 0-100)	**-0.09**	**0.03**	**-2.968**	**0.003**	**1.30**
Patient-Based SES Indicator (0-7)	0.36	0.55	0.649	0.517	
City-Based SES Index (0-100)	-0.14	0.15	-0.999	0.318	
Physician Age (Years)	-0.10	0.06	-1.771	0.077	
Physician Gender (Male)	**4.25**	**1.26**	**3.367**	**0.001**	**1.69**
Physician Race (White)	1.27	1.33	0.961	0.337	
Credential (DO)	-0.95	1.56	-0.605	0.545	
Medical School (USMG)	**-3.02**	**1.38**	**-2.199**	**0.028**	**0.72**
Social Determinants of Health: Relevance & Training (0-18)	**-0.55**	**0.14**	**-3.892**	**0.000**	**2.25**
Specialty (Family Practice)	0.25	1.23	0.207	0.836	
Board Certification (Yes)	-1.86	1.94	-0.961	0.337	
Work Setting (Private Practice)	0.68	1.17	0.575	0.565	
Patients Per-Week (5-pt Scale)	0.18	0.48	0.367	0.713	
Distance from Detroit City Center (Miles)	-.06	0.08	-0.731	0.465	

Bold text = statistically significant independent variable

Table 26. *Multiple Regression Associations of Physicians' Resource Constraints (Component 2), Standardized to Scale from 0 to 100, with Patient Race and SES, Controlling for Physician Demographics, Training, Work Setting, and Spatial Proximity to Detroit, MI (n=637)*

Model Summary: $R^2 = 0.116$, F (16,620) = 5.078, $p < .0005$	Unstandardized Coefficients β	Unstandardized Coefficients SE	t	Sig.	Squared Part Correlation Coefficient (%)
(constant)	57.24	11.93	4.798	0.000	
Questionnaire (African American)	1.09	1.47	0.743	0.458	
Ln % Patients Af. Am. (Standardized 0-100)	-0.04	0.04	-0.977	0.329	
Ln % City Af. Am. (Standardized 0-100)	-0.01	0.04	-0.293	0.770	
Patient-Based SES Indicator (0-7)	-1.35	0.73	-1.856	0.064	
City-Based SES Index (0-100)	0.06	0.19	0.308	0.758	
Physician Age (Years)	-0.14	0.08	-1.814	0.070	
Physician Gender (Male)	**-3.67**	**1.66**	**-2.205**	**0.028**	**0.69**
Physician Race (White)	1.34	1.75	0.768	0.443	
Credential (DO)	**-7.24**	**2.06**	**-3.514**	**0.000**	**1.77**
Medical School (USMG)	**7.86**	**1.81**	**4.333**	**0.000**	**2.69**
Social Determinants of Health: Relevance & Training (0-18)	-0.21	0.19	-1.154	0.249	
Specialty (Family Practice)	**4.66**	**1.62**	**2.884**	**0.004**	**1.19**
Board Certification (Yes)	**6.41**	**2.55**	**2.509**	**0.012**	**0.90**
Work Setting (Private Practice)	**-4.35**	**1.55**	**-2.807**	**0.005**	**1.12**
Patients Per-Week (5-pt Scale)	0.02	0.64	0.038	0.970	
Distance from Detroit City Center (Miles)	-0.05	0.11	-0.451	0.652	

Bold text = statistically significant independent variable

Table 27. *Multiple Regression Associations of Natural Log of Minutes Spent Per-Patient, Standardized to Scale from 0 to 100, with Patient Race and SES, Controlling for Physician Demographics, Training, Work Setting, and Spatial Proximity to Detroit, MI (n=624)*

Model Summary: $R^2 = 0.168$, F (16,607) = 7.634, $p < .0005$	Unstandardized Coefficients β	SE	t	Sig.	Squared Part Correlation Coefficient (%)
(constant)	75.86	7.72	9.830	0.000	
Questionnaire (African American)	-0.57	0.95	-0.594	0.553	
Ln % Patients Af. Am. (Standardized 0-100)	-0.05	0.03	-1.790	0.074	
Ln % City Af. Am. (Standardized 0-100)	0.03	0.03	1.342	0.180	
Patient-Based SES Indicator (0-7)	**-1.07**	**0.47**	**-2.276**	**0.023**	**0.71**
City-Based SES Index (0-100)	0.06	0.12	0.458	0.647	
Physician Age (Years)	-0.03	0.05	-0.616	0.538	
Physician Gender (Male)	**-2.16**	**1.08**	**-2.007**	**0.045**	**0.55**
Physician Race (White)	0.67	1.13	0.590	0.556	
Credential (DO)	**-3.08**	**1.33**	**-2.309**	**0.021**	**0.74**
Medical School (USMG)	-1.84	1.17	-1.568	0.117	
Social Determinants of Health: Relevance & Training (0-18)	0.02	0.12	0.190	0.849	
Specialty (Family Practice)	-1.09	1.05	-1.039	0.299	
Board Certification (Yes)	**-4.60**	**1.65**	**-2.782**	**0.006**	**1.06**
Work Setting (Private Practice)	1.06	1.00	1.056	0.291	
Patients Per-Week (5-pt Scale)	**-3.25**	**0.41**	**-7.860**	**0.000**	**8.47**
Distance from Detroit City Center (Miles)	-0.00	0.07	-0.008	0.993	

Bold text = statistically significant independent variable

Table 28. *Multiple Regression Associations of Natural Log of Physicians' Access to Off- and On-Site Ancillary Service Providers, Standardized to Scale from 0 to 100, with Patient Race and SES, Controlling for Physician Demographics, Training, Work Setting, and Spatial Proximity to Detroit, MI (n=637)*

Model Summary: $R^2 = 0.143$, F (16,620) = 6.462, $p < .0005$	Unstandardized Coefficients		t	Sig.	Squared Part Correlation Coefficient (%)
	β	SE			
(constant)	25.67	14.46	1.775	0.076	
Questionnaire (African American)	**5.24**	**1.78**	**2.938**	**0.003**	**1.19**
Ln % Patients Af. Am. (Standardized 0-100)	0.04	0.05	0.711	0.477	
Ln % City Af. Am. (Standardized 0-100)	0.02	0.05	0.332	0.740	
Patient-Based SES Indicator (0-7)	1.48	0.88	1.678	0.094	
City-Based SES Index (0-100)	-0.17	0.23	-0.717	0.474	
Physician Age (Years)	0.12	0.09	1.285	0.199	
Physician Gender (Male)	**-4.65**	**2.02**	**-2.308**	**0.021**	**0.74**
Physician Race (White)	-1.98	2.12	-0.934	0.351	
Credential (DO)	**-5.73**	**2.50**	**-2.296**	**0.022**	**0.72**
Medical School (USMG)	**9.29**	**2.20**	**4.222**	**0.000**	**2.46**
Social Determinants of Health: Relevance & Training (0-18)	**0.65**	**0.22**	**2.910**	**0.004**	**1.17**
Specialty (Family Practice)	-0.75	1.96	-0.384	0.701	
Board Certification (Yes)	**9.25**	**3.10**	**2.989**	**0.003**	**1.23**
Work Setting (Private Practice)	**-8.65**	**1.88**	**-4.603**	**0.000**	**2.92**
Patients Per-Week (5-pt Scale)	1.11	0.77	1.432	0.153	
Distance from Detroit City Center (Miles)	0.15	0.13	1.187	0.236	

Bold text = statistically significant independent variable

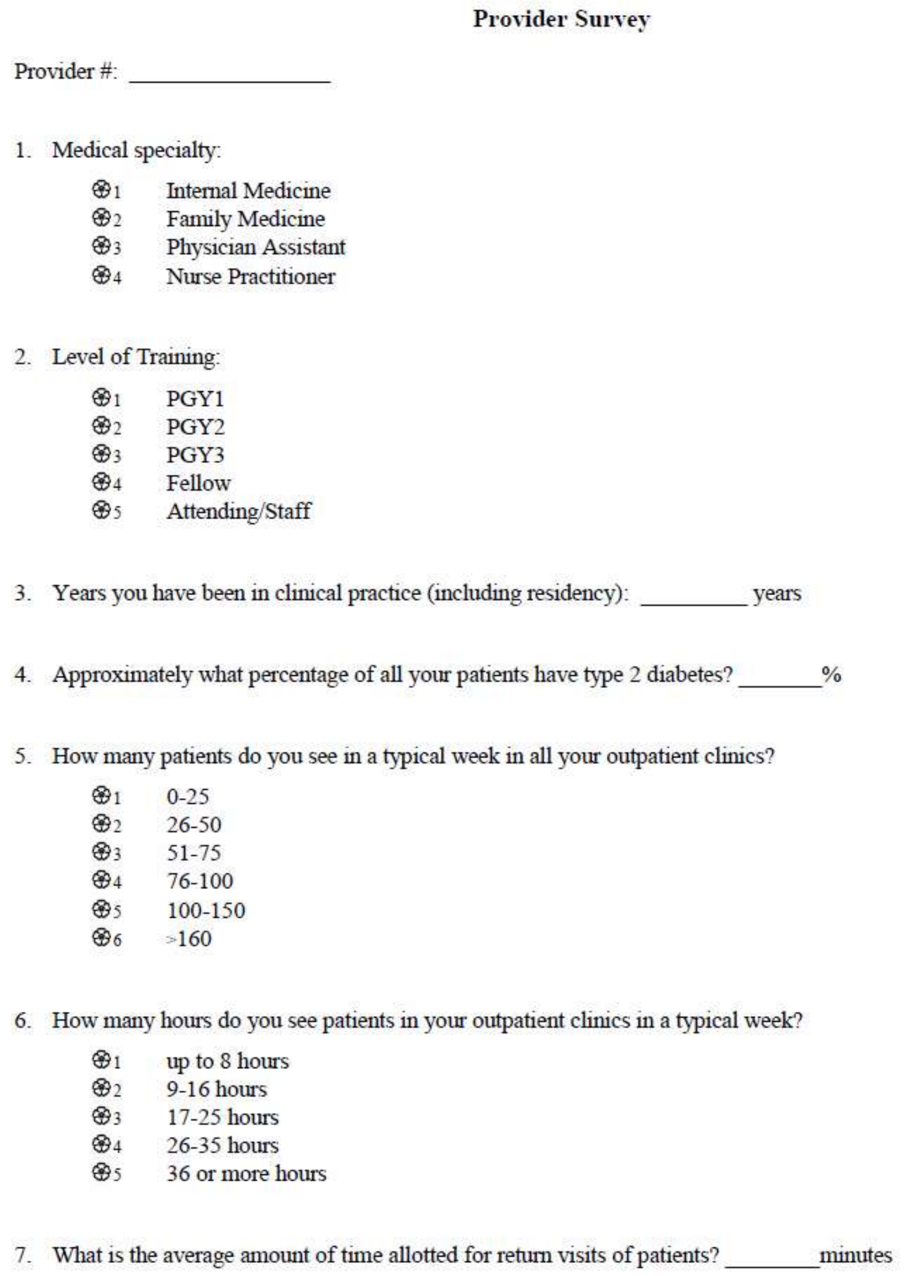
Table 29. *Multivariate Logistic Regression Model Predicting the Impact of Physician Demographics, Practice Setting, and Patient Demographics on the Likelihood of a More Participatory Decision Making Style (n=624)*

Model Summary: X^2 (16, N=624) = 50.42, p < .0005	β	SE	Wald (df)	Sig.	Odds Ratio	95% CI	
						Lower	Upper
Questionnaire (African American)	.115	.169	.459 (1)	.498	1.121	.805	1.562
Ln % Patients Af. Am. (Standardized 0-100)	-.004	.005	.634 (1)	.426	.996	.987	1.006
Ln % City Af. Am. (Standardized 0-100)	-.003	.004	.539 (1)	.463	.997	.988	1.005
Patient-Based SES Indicator (0-7)	.040	.084	.228 (1)	.633	1.041	.882	1.228
City-Based SES Index (0-100)	-.025	.022	1.277 (1)	.258	.975	.933	1.019
Physician Age (Years)	-.015	.009	3.022 (1)	.082	.985	.968	1.002
Physician Gender (Male)	**-.410**	**.193**	**4.519 (1)**	**.034**	**.664**	**.455**	**.969**
Physician Race (White)	.071	.203	.121 (1)	.728	1.073	.721	1.597
Credential (DO)	-.239	.235	1.034 (1)	.309	.787	.496	1.249
Medical School (USMG)	.035	.210	.028 (1)	.868	1.036	.686	1.563
Social Determinants of Health: Relevance & Training (0-18)	**.060**	**.022**	**7.722 (1)**	**.005**	**1.062**	**1.018**	**1.107**
Specialty (Family Practice)	.270	.187	2.100 (1)	.147	1.310	.909	1.889
Board Certification (Yes)	-.126	.294	.185 (1)	.667	.881	.496	1.567
Work Setting (Private Practice)	**-.511**	**.177**	**8.371 (1)**	**.004**	**.600**	**.424**	**.848**
Patients Per-Week (5-pt Scale)	-.067	.074	.805 (1)	.369	.935	.809	1.082
Distance from Detroit City Center (Miles)	.008	.012	.451 (1)	.502	1.008	.984	1.033
Constant	2.469	1.397	3.123 (1)	.077	11.807		

Bold text = statistically significant independent variable

APPENDICES

Appendix 1. *Provider Survey*



Provider Survey

Provider #: ________________

1. Medical specialty:
   - ⊕1 Internal Medicine
   - ⊕2 Family Medicine
   - ⊕3 Physician Assistant
   - ⊕4 Nurse Practitioner

2. Level of Training:
   - ⊕1 PGY1
   - ⊕2 PGY2
   - ⊕3 PGY3
   - ⊕4 Fellow
   - ⊕5 Attending/Staff

3. Years you have been in clinical practice (including residency): _________ years

4. Approximately what percentage of all your patients have type 2 diabetes? _______%

5. How many patients do you see in a typical week in all your outpatient clinics?
   - ⊕1 0-25
   - ⊕2 26-50
   - ⊕3 51-75
   - ⊕4 76-100
   - ⊕5 100-150
   - ⊕6 >160

6. How many hours do you see patients in your outpatient clinics in a typical week?
   - ⊕1 up to 8 hours
   - ⊕2 9-16 hours
   - ⊕3 17-25 hours
   - ⊕4 26-35 hours
   - ⊕5 36 or more hours

7. What is the average amount of time allotted for return visits of patients? ________minutes

8. What resources do you have available for providing education/assistance to your patients in diabetes self-care?

YES	NO		
○1	○2	a.	Nurse in my clinic
○1	○2	b.	Educator or dietician in my clinic
○1	○2	c.	Educators or dieticians offsite but within the health system

9. How do the majority of your diabetic patients receive their education on diabetes self-care?

○1 I provide all education on self-management myself.
○2 I provide most of it myself.
○3 I refer patients to others (e.g. nurse, dietician, educator) but try to reinforce main points in each area.
○4 I focus on medications management, but refer to another health professional for other counseling.
○5 Currently no good provision of diabetes education.

10. If you do not do all patient education yourself, what resources for referral do you usually use?

○1 Refer to health professional (e.g. nurse, educator) in my own clinic.
○2 Refer to health professional (e.g. nurse, educator) outside my clinic.

11. Which of the following is most important in "good diabetes control"? (Please check one only)

○1 My patients have few or no symptoms.
○2 My patients are able to manage their diabetes without interfering too much with their lives.
○3 My patients show improvement in lab values like hemoglobin A1cs.
○4 My patients have good blood glucose levels on their home monitors.

12. In general, how would you PREFER to make decisions about treatment for your patients' diabetes? Please mark one box:

○1 I prefer to make decisions regarding treatment based on my medical judgment.
○2 I prefer to make the final decision about treatment, but seriously consider the patient's opinion.
○3 I prefer to share responsibility with patients for deciding which treatment is best for them.
○4 I prefer for patients to make final selection of treatment after seriously considering my opinion.
○5 I prefer patients to make the final selection about treatment with little input from me.

13. If a patient's HbA1c remains continually high, how frequent are each of the following as the principal explanation for the continued high HbA1c?

	Some-	Almost

	Never	Rarely	times	Always	Always
a. The patient is not following my treatment plan closely enough.	○1	○2	○3	○4	○5
b. Medication dosage needs to be increased or new medications need to be added due to worsening of diabetes.	○1	○2	○3	○4	○5
c. The patient is reluctant to take any new medications.	○1	○2	○3	○4	○5
d. The patient is not willing to start needed insulin.	○1	○2	○3	○4	○5
e. The patient's disease is severe and hard to control.	○1	○2	○3	○4	○5
f. Other illnesses are affecting the hbA1c.	○1	○2	○3	○4	○5
g. The patient's comorbidities limit his/her ability to manage diabetes.	○1	○2	○3	○4	○5
h. Other (Please specify):________________________________	○1	○2	○3	○4	○5

14. What is your best guess as to the percentage of your type 2 patients who always or almost always follow your recommendations for:

a. Self-monitoring of blood glucose _______%
b. Taking insulin or medications _______%
c. Food/eating changes _______%
d. Increasing exercise/physical activity _______%
e. Regular foot care _______%

15. Of your patients who are NOT adequately following your self-care recommendations, which of the following factors are most important in explaining this discrepancy? We realize that these may vary greatly from one patient to the next, but are interested in your global sense of how these factors may contribute to poor self-management in your patient population.

	Not at all Important	Slightly Important	Moderately Important	Very Important	Extremely Important
a. Not enough will-power	○1	○2	○3	○4	○5
b. Not worried enough about complications	○1	○2	○3	○4	○5
c. Have not learned enough	○1	○2	○3	○4	○5
d. In denial about seriousness of disease	○1	○2	○3	○4	○5
e. Problems with personal finances	○1	○2	○3	○4	○5
f. Too many competing demands	○1	○2	○3	○4	○5
g. Not enough family support	○1	○2	○3	○4	○5
h. Not enough community resources	○1	○2	○3	○4	○5
i. Overly restrictive health insurance	○1	○2	○3	○4	○5
j. Cognitive limitations	○1	○2	○3	○4	○5
k. Need more support from health system	○1	○2	○3	○4	○5
l. Regimen is too complex or difficult	○1	○2	○3	○4	○5
m. OTHER_____________________	○1	○2	○3	○4	○5

16. How long do you personally spend in total counseling your patients on self-management issues at clinic visits?

○1 Don't counsel unless the patient has questions or problems
○2 1-2 minutes
○3 3-4 minutes
○4 5 or more minutes

17. If you don't provide counseling yourself, how long does another health professional (e.g., nurse) spend at your clinic in total counseling your patients on self-management issues at clinic visits?

○1 Clinic does not have available nurses for routine counseling
○2 1-2 minutes
○3 3-4 minutes
○4 5 or more minutes

18. How important do you think the role of the PHYSICIAN is in counseling patients on their diabetes self-care activities?

○1 Not at all important
○2 Minimally important
○3 Moderately important
○4 Very important
○5 Extremely important

19. How would you PREFER that counseling patients on their diabetes self-care activities be handled in your clinic?

○1 Would prefer to be able to do most counseling myself
○2 Would prefer to have sufficient available personnel so that they would provide most counseling

20. How often do you personally ask patients about problems they may be facing in managing their diabetes?

○1 All Visits
○2 Most visits
○3 Many visits
○4 Rare visits
○5 Never

21. Do you personally make recommendations for things to do in the following areas?

YES	NO	
○1	○2	a. How to take medications
○1	○2	b. When and how to check blood sugar
○1	○2	c. How to time meals
○1	○2	d. What to eat
○1	○2	e. How to increase physical activity
○1	○2	f. How to make changes in medications
○1	○2	g. How to deal with the emotional demands of diabetes
○1	○2	h. Where to find community resources to help with diabetes

22. To what extent do you feel your training has prepared you to counsel your patients in the following areas of self-management?

		Not at all Prepared	Slightly Prepared	Moderately Prepared	Very Prepared	Extremely Prepared
a.	On medications?	○1	○2	○3	○4	○5
b.	On blood glucose monitoring?	○1	○2	○3	○4	○5
c.	On diet?	○1	○2	○3	○4	○5
d.	On exercise?	○1	○2	○3	○4	○5

e.	On weight control?	⊛1	⊛2	⊛3	⊛4	⊛5

In the following areas, please indicate how close you are to counseling patients the way you would like:

23. about medications:

⊛1 Just where I would like to be

⊛2 Very close
⊛3 Moderately close
⊛4 Not very close
⊛5 Not at all close

23a. Please pick the most important reason you are not where you would like to be counseling about medications:

⊛1 I have not received enough training in this area.
⊛2 Counseling in this area is not my role.
⊛3 Patients often do not follow my recommendations in this area.
⊛4 I have too many other more important areas to cover in visits.
⊛5 There is not enough time in office visits.
⊛6 I don't have enough support to provide counseling in this area.
⊛7 Other (Please specify):____

24. about a diabetes eating plan:

⊛1 Just where I would like to be

⊛2 Very close
⊛3 Moderately close
⊛4 Not very close
⊛5 Not at all close

24a. Please pick the most important reason you are not where you would like to be counseling about a diabetes eating plan:

⊛1 I have not received enough training in this area.
⊛2 Counseling in this area is not my role.
⊛3 Patients often do not follow my recommendations in this area.
⊛4 I have too many other more important areas to cover in visits.
⊛5 There is not enough time in office visits.
⊛6 I don't have enough support to provide counseling in this area.
⊛7 Other (Please specify):____

25. about exercise:

⊛1 Just where I would like to be

⊛2 Very close
⊛3 Moderately close
⊛4 Not very close
⊛5 Not at all close

25a. Please pick the most important reason you are not where you would like to be counseling about exercise:

⊛1 I have not received enough training in this area.
⊛2 Counseling in this area is not my role.
⊛3 Patients often do not follow my recommendations in this area.
⊛4 I have too many other more important areas to cover in visits.
⊛5 There is not enough time in office visits.
⊛6 I don't have enough support to provide counseling in this area.
⊛7 Other (Please specify):____________________________________

26. about blood glucose monitoring:

⊛1 Just where I would like to be

⊛2 Very close
⊛3 Moderately close
⊛4 Not very close
⊛5 Not at all close

26a. Please pick the most important reason you are not where you would like to be counseling about blood glucose monitoring:

⊛1 I have not received enough training in this area.
⊛2 Counseling in this area is not my role.
⊛3 Patients often do not follow my recommendations in this area.
⊛4 I have too many other more important areas to cover in visits.
⊛5 There is not enough time in office visits.
⊛6 I don't have enough support to provide counseling in this area.
⊛7 Other (Please specify):____________________________________

27. How many of your patients with type 2 diabetes are frustrating in one way or another?

⊛1 Almost all
⊛2 Most
⊛3 Many
⊛4 Some
⊛5 Few
⊛6 None

28. What do you find most frustrating in caring for people with type 2 diabetes (Please mark one):

○1 Many don't follow my treatment recommendations
○2 Inadequate time for clinic visits
○3 Lack of adequate support to fully address their needs
○4 Inadequacy of current medications/treatments
○5 Complexity of illness
○6 I don't find it frustrating

29. Thinking about your ability to care for your patients with diabetes, how satisfied are you with the following:

		Not at all Satisfied	Slightly Satisfied	Moderately Satisfied	Very Satisfied	Extremely Satisfied
a.	The length of time available for you to meet with these patients during office visits?	○1	○2	○3	○4	○5
b.	The frequency with which you see these patients?	○1	○2	○3	○4	○5
c.	Available personnel in your clinic to help support patients in their diabetes management?	○1	○2	○3	○4	○5
d.	Current reimbursement to enable you to spend enough time counseling patients?	○1	○2	○3	○4	○5
e.	Current structures in place to provide follow-up and support for patients?	○1	○2	○3	○4	○5
f.	The quality of care you currently are able to provide for your patients with diabetes?	○1	○2	○3	○4	○5
g.	Your practice in general on a daily basis?	○1	○2	○3	○4	○5

30. How would you grade yourself on helping your patients manage diabetes in the **past SIX Months?**

○1 A+
○2 A
○3 A-
○4 B+
○5 B
○6 B-
○7 C
○8 D
○9 F

31. How would your grade your practice environment (e.g. Nursing support, available diabetes educators) in helping your patients manage diabetes in the **past SIX Months**?

○1 A+
○2 A
○3 A-
○4 B+
○5 B
○6 B-
○7 C
○8 D
○9 F

32. What year were you born? ____________

33. Sex:

☐1 Male
☐2 Female

34. What is your ethnic origin? (Check all that apply):

☐1 White
☐2 Black
☐3 Hispanic
☐4 Native American
☐5 Asian or Pacific Islander
☐6 Arabic
☐7 Other (specify:)_____________

35. Please write here any recommendations you have for changes in your practice or in the organization of health care that would help you in providing care for patients with type 2 diabetes (and other chronic diseases)

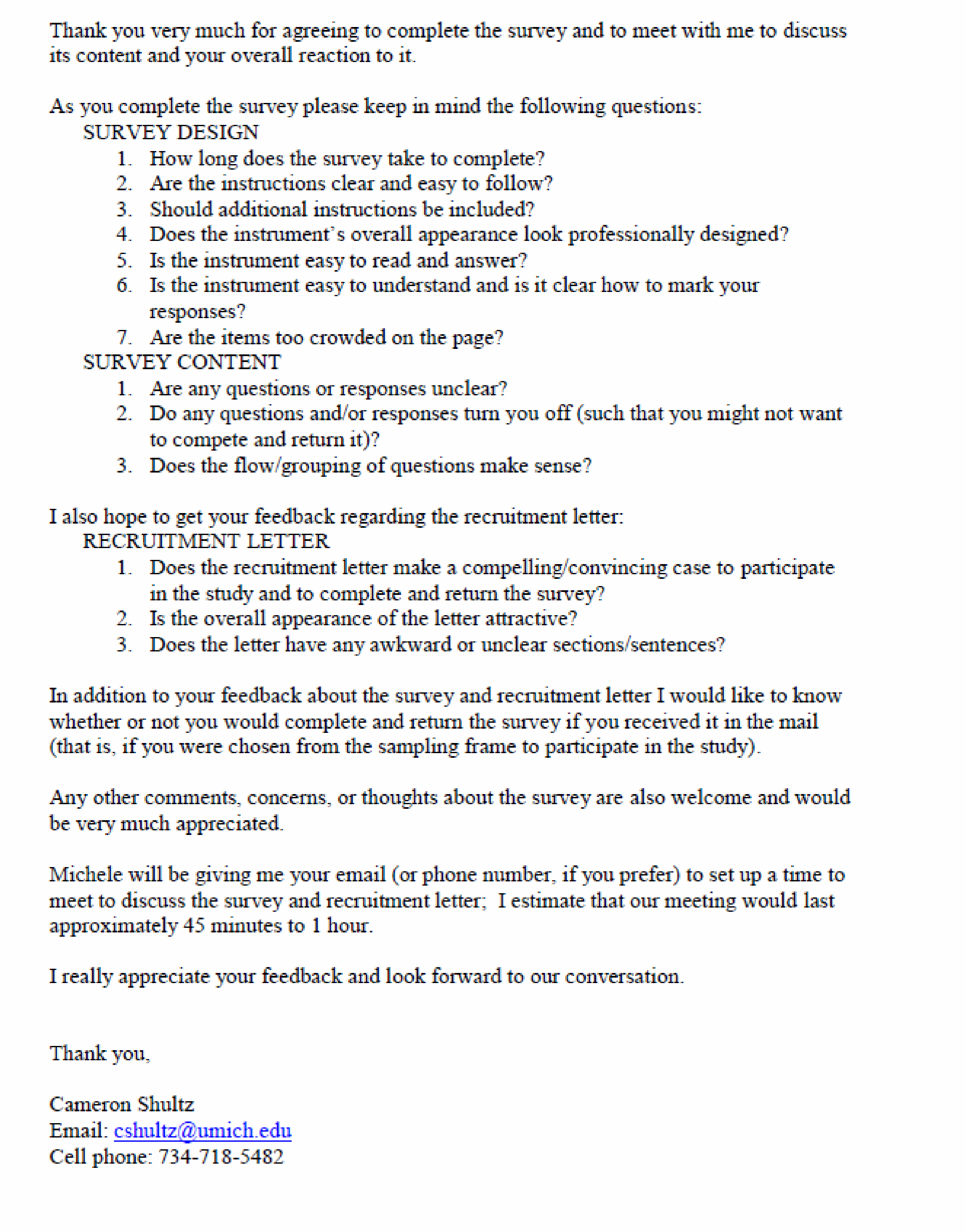
____
_

____
_

____
_

THANK YOU AGAIN FOR YOUR HELP. YOUR CONTRIBUTION WILL MAKE AN IMPORTANT DIFFERENCE.

Appendix 2. *Instructions for Piloting Physicians*



Thank you very much for agreeing to complete the survey and to meet with me to discuss its content and your overall reaction to it.

As you complete the survey please keep in mind the following questions:

SURVEY DESIGN

1. How long does the survey take to complete?
2. Are the instructions clear and easy to follow?
3. Should additional instructions be included?
4. Does the instrument's overall appearance look professionally designed?
5. Is the instrument easy to read and answer?
6. Is the instrument easy to understand and is it clear how to mark your responses?
7. Are the items too crowded on the page?

SURVEY CONTENT

1. Are any questions or responses unclear?
2. Do any questions and/or responses turn you off (such that you might not want to compete and return it)?
3. Does the flow/grouping of questions make sense?

I also hope to get your feedback regarding the recruitment letter:

RECRUITMENT LETTER

1. Does the recruitment letter make a compelling/convincing case to participate in the study and to complete and return the survey?
2. Is the overall appearance of the letter attractive?
3. Does the letter have any awkward or unclear sections/sentences?

In addition to your feedback about the survey and recruitment letter I would like to know whether or not you would complete and return the survey if you received it in the mail (that is, if you were chosen from the sampling frame to participate in the study).

Any other comments, concerns, or thoughts about the survey are also welcome and would be very much appreciated.

Michele will be giving me your email (or phone number, if you prefer) to set up a time to meet to discuss the survey and recruitment letter; I estimate that our meeting would last approximately 45 minutes to 1 hour.

I really appreciate your feedback and look forward to our conversation.

Thank you,

Cameron Shultz
Email: cshultz@umich.edu
Cell phone: 734-718-5482

Appendix 3. *General and African American Questionnaires*

Control #:__________

UNDERSTANDING HEALTH OUTCOMES AMONG BLACK/AFRICAN AMERICAN PATIENTS WITH DIABETES

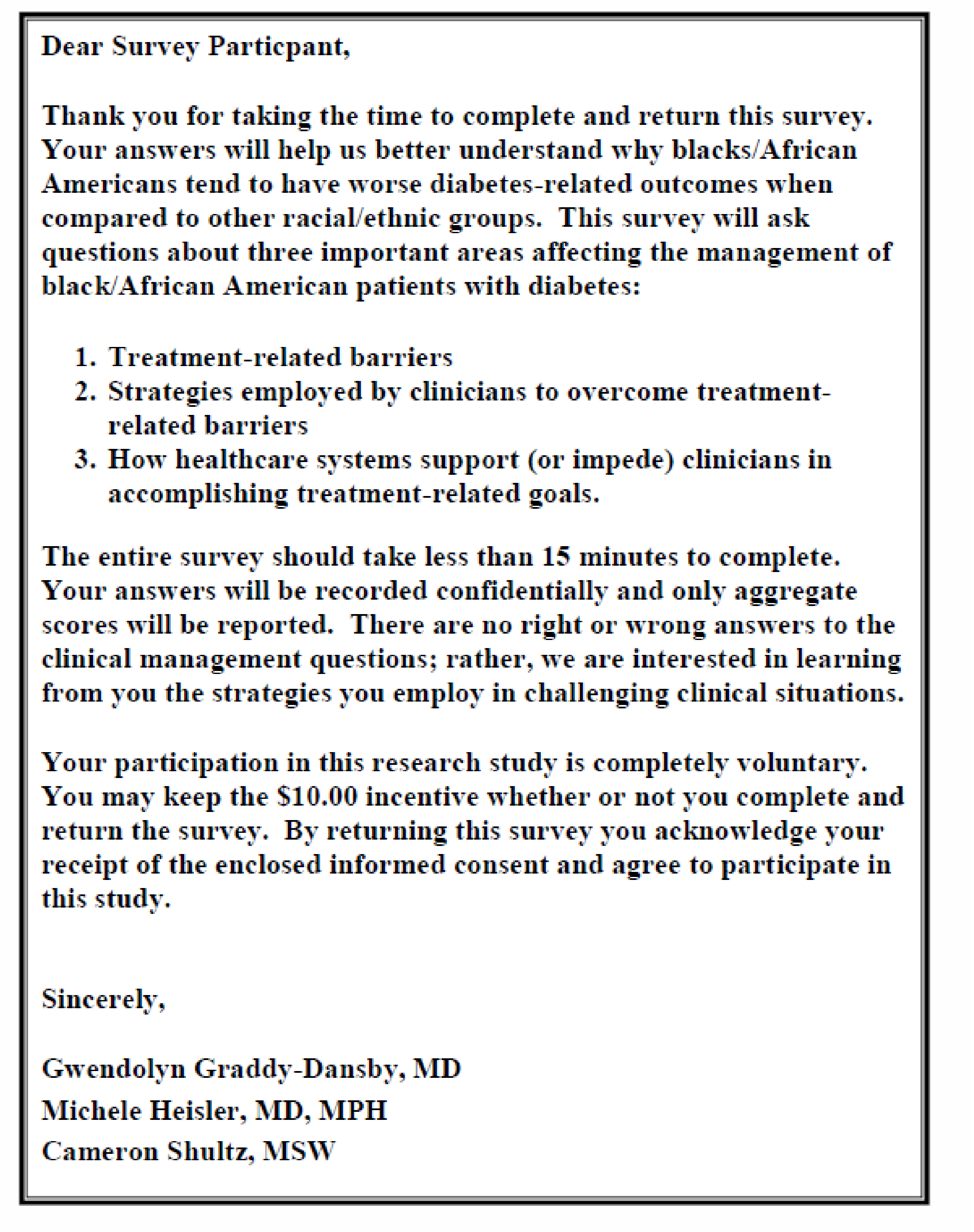
SURVEY

A COLLABORATIVE INITIATIVE BETWEEN
THE HENRY FORD HEALTH SYSTEM,
THE UNIVERSITY OF MICHIGAN HEALTH SYSTEM,
AND THE UNIVERSITY OF MICHIGAN SCHOOL OF PUBLIC HEALTH

Henry Ford Health System

University of Michigan
Health System

University of Michigan School of Public Health



Dear Survey Particpant,

Thank you for taking the time to complete and return this survey. Your answers will help us better understand why blacks/African Americans tend to have worse diabetes-related outcomes when compared to other racial/ethnic groups. This survey will ask questions about three important areas affecting the management of black/African American patients with diabetes:

1. Treatment-related barriers
2. Strategies employed by clinicians to overcome treatment-related barriers
3. How healthcare systems support (or impede) clinicians in accomplishing treatment-related goals.

The entire survey should take less than 15 minutes to complete. Your answers will be recorded confidentially and only aggregate scores will be reported. There are no right or wrong answers to the clinical management questions; rather, we are interested in learning from you the strategies you employ in challenging clinical situations.

Your participation in this research study is completely voluntary. You may keep the $10.00 incentive whether or not you complete and return the survey. By returning this survey you acknowledge your receipt of the enclosed informed consent and agree to participate in this study.

Sincerely,

Gwendolyn Graddy-Dansby, MD
Michele Heisler, MD, MPH
Cameron Shultz, MSW

I. DEMOGRAPHICS

A) Physician Demographics:

1. Year of Birth: __________

2. Gender (check one): __M __F

3. Racial/Ethnic Identity (check one):

__African American __White

__Native American __Hispanic

__Asian/Pacific Islander

__Indian

__Middle Eastern/Arabic

__Other:__________________

4. Practice Area/Specialty (check the one category that best describes your work):

___ Endocrinology

___ Family Practice

___ General Practice

___ Internal Medicine

___ Other:_____________

4a. Are you Board Certified in this area? ___YES ___NO

4b. If applicable, please specify additional Board Certifications:

____

5. # of years practicing post-residency: _______

☐ Please check here if currently in residency training, and indicate # of residency years competed:

____

6. Credentials (check all that apply): ___ MD

___ DO

___ PhD

___ MPH

___ Other(s):__________

7. Did you attend medical school in the United States? ___Yes ___No

8. Do you currently provide direct care to adult patients with diabetes? (i.e., you have some portion of your time devoted to the direct provision of patient care):

___YES (If YES, *please continue the survey*)

___NO (If NO, *please stop the survey here and return it to project investigators in the pre-addressed and stamped envelope provided. Thank you.*)

9. Which *one* category *best* describes your current working environment? (please check only one):

___Hospital-based practice ___Group-Based Practice ___HMO

___Self-Employed (private practice) ___Medical School ___State/Local Government

___Other:____________________

10. In what city is your practice located? ____

B) Patient Demographics (***please just make your best estimate***)**:**

1. About how many patients do you see in a typical week? (check one):

___1-24 ___25-49

___50-74 ___75-99

___100-149 ___more than 149

2. About how many minutes are you able to spend with each patient during a typical office visit (i.e., a regularly scheduled appointment): ________minutes

3. Approximately what percentage of your patients do you identify as being *white/European American**? (please just make your best estimate): ________%

   3a. Approximately what percentage of your white/European American patients have type 2 diabetes? (please just make your best estimate): ________%

   3b. Approximately what proportion of your white/European American patients have difficulty meeting their medical expenses—e.g., including medications, co-pays, deductibles, etc. (please just make your best estimate):

   ___0-25%   ___26-50%
   ___51-75%   ___76-100%

   3c. Which income category *best* describes the majority of your white/European American patients? (check one):

   __Poverty
   __Low income
   __Low middle income
   __High middle income
   __High income

4. Approximately what percentage of your patients do you identify as being *black/African American**? (please just make your best estimate): ________%

   4a. Approximately what percentage of your black/African American patients have type 2 diabetes? (please just make your best estimate): ________%

   4b. Approximately what proportion of your black/African American patients have difficulty meeting their medical expenses—e.g., including medications, co-pays, deductibles, etc. (please just make your best estimate):

   ___0-25%   ___26-50%
   ___51-75%   ___76-100%

   4c. Which income category *best* describes the majority of your black/African American patients? (check one):

   __Poverty
   __Low income
   __Low middle income
   __High middle income
   __High income

---

* We recognize that some clinicians in Southeast Michigan provide care in multi-ethnic, racially diverse communities; however, because approximately 93% of the population in Southeast Michigan identify as either black or white, we request demographic characteristics for these two groups only.

II. DIABETES EDUCATION AND TREATMENT BARRIERS WITH BLACK/AFRICAN AMERICAN PATIENTS

A) What resources do you have at your disposal to assist you in providing education/disease management assistance to your black/African American patients with diabetes?

I have a (please check all that apply)…

☐ …nurse *in my clinic*
☐ …educator *in my clinic*
☐ …dietician/nutritionist *in my clinic*
☐ …social worker *in my clinic*
☐ …clinical pharmacist *in my clinic*
☐ …nurse *offsite*
☐ …educator *offsite*
☐ …dietician/nutritionist *offsite*
☐ …social worker *offsite*
☐ …clinical pharmacist *offsite*

B) How do the majority of your black/African American patients with diabetes receive their education on diabetes self-care? (please check the one that best describes your practice pattern)

☐ **1.** I provide *all* education on self-management myself—*please skip to question "D" below.*
☐ **2.** I provide *most* of it myself.
☐ **3.** I refer patients to others (e.g., nurse, dietician, educator) but try to reinforce main points in each area (e.g., diet, exercise. etc.).
☐ **4.** I focus on medication management, but refer to another health professional for other counseling.
☐ **5.** I currently have no good provision of diabetes education.

C) If you do not do *all* patient education yourself, what resources for referral do you usually use? (Please check the one that best fits your practice pattern)

☐ **1.** Refer to health professional (e.g., nurse, educator) *in* my own clinic.
☐ **2.** Refer to health professional (e.g., nurse, educator) *outside* my clinic.
☐ **3.** Other(s): ____

D) How often would you say you have enough resources to provide the kind of diabetes-related education that you think your black/African American patients need? (check one only)

__Never __Rarely __Sometimes __Regularly __Often __Always

E) In general, how do you tend to make decisions about treatment for your black/African American patients with diabetes? (Please check the one that best fits your practice pattern):

☐ **1.** I tend to make decisions regarding treatment based on my medical judgment.
☐ **2.** I tend to make the final decision about treatment, but seriously consider the patient's opinion.
☐ **3.** I tend to share responsibility with patients when deciding which treatment is best for them.
☐ **4.** I tend to let patients make final selection of treatment after seriously considering my opinion.
☐ **5.** I tend to let patients make the final selection about treatment with little input from me.

F) In a typical week, how often would you say you ask your black/African American patients about the barriers they face in managing their diabetes? (check one only)

__Never __Rarely __Sometimes __Regularly __Often __Always

III. CHALLENGES AND RESOURCES ASSOCIATED WITH CARING FOR BLACK/AFRICAN AMERICAN PATIENTS WITH DIABETES

We want to know more about the things that influence you when talking about adherence-related barriers with your black/African American patients with diabetes. We realize these things may vary greatly from one patient to the next, but we are interested in *your global sense* of how they relate generally to your everyday practice.

A) For each item below, please specify your level of agreement regarding whether or not it plays an important role when discussing a disease management plan (e.g., diet, medications, exercise) with your black/African American patients with diabetes:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. I cannot tell who has difficulty adhering to their diabetes regimen.	☐	☐	☐	☐	☐
2. Patients do not see it as my role to discuss treatment-related barriers.	☐	☐	☐	☐	☐
3. Even when I ask, patients rarely admit to adherence problems.	☐	☐	☐	☐	☐
4. I believe it is the patient's responsibility to bring such topics (i.e., treatment-related barriers) up.	☐	☐	☐	☐	☐
5. I do not have adequate training to *assess* the array of barriers that my patients face.	☐	☐	☐	☐	☐
6. I do not have adequate training to *resolve* the array of barriers that my patients face.	☐	☐	☐	☐	☐
7. I am concerned that raising adherence-related barriers might offend the patient.	☐	☐	☐	☐	☐
8. I have too few resources available to help me improve patients' adherence.	☐	☐	☐	☐	☐
9. My patients' poor health literacy makes discussing adherence-related barriers difficult.	☐	☐	☐	☐	☐
10. There is not enough time during office visits to discuss adherence-related barriers.	☐	☐	☐	☐	☐
11. My patients have more important issues they would like to discuss with me.	☐	☐	☐	☐	☐
12. What I say can make a big difference in improving my patients' adherence to treatment.	☐	☐	☐	☐	☐

B) Please specify how often you employ each of the following strategies to help your black/African American patients address adherence-related barriers?

	Never	Rarely	Some-times	Very often	Always
1. I arrange for the patient to meet with a social worker, nurse, or other professional so they can work together to find a solution.	☐	☐	☐	☐	☐
2. I shorten the interval for the patient's return visit so I can follow-up on their progress.	☐	☐	☐	☐	☐
3. I express sympathy about the patient's situation.	☐	☐	☐	☐	☐
4. I ask the patient what they think I could do to improve their adherence.	☐	☐	☐	☐	☐
5. I make recommendations to the patient about what they should do to improve their adherence.	☐	☐	☐	☐	☐
6. I give the patient adherence-related resources such as pill-boxes, medication diaries, food/nutrition charts, etc.	☐	☐	☐	☐	☐
7. I give the patient medical equipment such as lancets, test strips, glucometer, syringes, etc.	☐	☐	☐	☐	☐
8. I give the patient free samples of medication from a drug company or another source.	☐	☐	☐	☐	☐
9. I change medication(s) to a cheaper/generic brand.	☐	☐	☐	☐	☐
10. I talk with the patient about which medications they should definitely not skip.	☐	☐	☐	☐	☐

IV. ADHERENCE TO TREATMENT AMONG BLACK/AFRICAN AMERICAN PATIENTS WITH DIABETES

A) Please indicate your level of agreement regarding possible reasons why you think your black/African American patients may not follow your self-care recommendations:

Again, we realize that possible reasons may vary greatly from one patient to the next, but we are interested in *your global sense* of how these factors may contribute to patients' poor self-management.

Among my black/African American patients who are NOT following my self-care recommendations, this is because the patient…	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. …does not have enough will-power.	☐	☐	☐	☐	☐
2. …does not worry enough about complications.	☐	☐	☐	☐	☐
3. …has not learned enough about diabetes.	☐	☐	☐	☐	☐
4. …has problems with personal finances.	☐	☐	☐	☐	☐
5. …does not understand my directions because of cultural differences between me and the patient.	☐	☐	☐	☐	☐

(cont.)	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
6. …is in denial about seriousness of disease.	☐	☐	☐	☐	☐
7. …has too many competing demands.	☐	☐	☐	☐	☐
8. …does not have enough family support.	☐	☐	☐	☐	☐
9. …does not have adequate access to community resources (e.g., grocery stores, places to exercise).	☐	☐	☐	☐	☐
10. …is uninsured/under-insured.	☐	☐	☐	☐	☐
11. …has cognitive limitations.	☐	☐	☐	☐	☐
12. …makes bad choices (e.g., choosing unhealthy foods even though healthy foods are available).	☐	☐	☐	☐	☐
13. ...does not have enough support from employer/has work-related constraints.	☐	☐	☐	☐	☐
14. …does not seem to care enough about the future and instead is mainly focused on the present day.	☐	☐	☐	☐	☐

B) In general, how likely are your black/African American patients with diabetes to…

	Not at all likely	**A little likely**	**Somewhat likely**	**Very likely**	**Extremely likely**
1. …live in a neighborhood that is unsafe?	☐	☐	☐	☐	☐
2. …live in a neighborhood with inadequate access to healthy foods.	☐	☐	☐	☐	☐
3. …complain about physical discomfort?	☐	☐	☐	☐	☐
4. …have financial problems?	☐	☐	☐	☐	☐
5. …not tell you the truth regarding their adherence with their treatment plan?	☐	☐	☐	☐	☐
6. …have significant career demands/work-related responsibilities that impede disease management?	☐	☐	☐	☐	☐
7. …have significant care-taking demands/family-related responsibilities that impede disease management?	☐	☐	☐	☐	☐
8. …use home remedies in place of prescribed medications to treat their diabetes?	☐	☐	☐	☐	☐
9. …not trust the information you give them?	☐	☐	☐	☐	☐
10. …lack social support?	☐	☐	☐	☐	☐
11. …be overwhelmed with the demands of managing the disease?	☐	☐	☐	☐	☐

V. IMPEDIMENTS TO STICKING TO PRACTICE GUIDELINES

Please score each of the following statements on a scale from "1" to "10" to specify your level of agreement as to whether or not the circumstance affects your adherence to practice guidelines when providing care to black/African American patients with diabetes:

1 = I strongly *disagree*; that is, it has no affect on my adherence to practice guidelines.

10 = I strongly *agree*; that is, it has an enormous affect on my adherence to practice guidelines.

A) My working environment is structured such that I can not adhere to practice guidelines (e.g., I am required to see too many patients in a single day, I do not have enough support staff to assist with ancillary care services such as patient education and nutrition counseling, I am too busy, etc.). (circle one)

1 2 3 4 5 6 7 8 9 10

Strongly disagree……………………….Neutral…………..……..Strongly agree

B) I am not financially rewarded for spending the time required to adhere to best-practice guidelines & recommendations (e.g., the method of reimbursement for my clinical services makes guideline adherence unfeasible & impractical, it would hurt my practice if I spent the amount of time it would take to adhere to best-practice guidelines, etc.). (circle one)

1 2 3 4 5 6 7 8 9 10

Strongly disagree…………….………..Neutral…………..……..Strongly agree

C) I do not believe that practice guidelines are entirely applicable to my clinical setting because they do not adequately account for my practice environment (e.g., guidelines do not sufficiently consider the complex & multiple needs of my patients, they encourage a form of "cookbook" medicine that goes against my training & experience, etc). (circle one)

1 2 3 4 5 6 7 8 9 10

Strongly disagree…………….…..……Neutral…………..……..Strongly agree

VI. PROVIDING MEDICAL CARE

A) Mark the one answer that best describes when you first discuss insulin with your black/African American patients with Type 2 diabetes. I first discuss insulin…

____1. …when a patient is diagnosed with diabetes.

____2. …when a patient's HbA1c level first rises above the recommended level.

____3. …when a patient's HbA1c level is consistently above the recommended level.

____4. …when a patient starts oral mono-therapy.

____5. …when a patient starts combination oral therapy.

____6. …about the time the patient needs to start using insulin.

B) If a black/African American patient with diabetes requires a medication change to achieve glycemic control, how do you time your discussion of the needed change with the patient when the change involves the addition of insulin?

When the change involves the addition of insulin, I tend to (check one answer only)…

_____ 1. …wait longer than when intensifying with oral agents only.

_____ 2. …wait about the same amount of time as when intensifying with oral agents only

_____ 3. …wait less time than when intensifying with oral agents only

C) Please rate your level of agreement as it relates to each of the following areas:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. My black/African American patients with diabetes are always able to get the diabetes-related *medications* they need.	☐	☐	☐	☐	☐
2. My black/African American patients with diabetes are always able to get the diabetes-related *specialty care* they need.	☐	☐	☐	☐	☐
3. I have all the resources I need to provide culturally sensitive care to my black/African American patients.	☐	☐	☐	☐	☐
4. Providing culturally sensitive care to my black/African American patients is NOT always realistic in my working environment given the *time* constraints related to my clinical practice.	☐	☐	☐	☐	☐
5. Providing culturally sensitive care to my black/African American patients is NOT always realistic in my working environment given the *cost* constraints related to my clinical practice.	☐	☐	☐	☐	☐

VII. MEDICAL EDUCATION

For each training area below, please indicate if…

A) …it has *clinical relevance* to your day-to-day practice

B) …whether or not you have received *formal training* in the area, and

C) …if you have had formal training in the area, *was it helpful* as it relates to your day-to-day practice when working with black/African American patients

Training Area	**A) This area is relevant to my day-to-day practice…**	**B) I have received formal training in this area…**	**C) *If YES to "B"*, this training was helpful as it relates to my day-to-day practice…**
1. The health effects of poverty	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
2. Patient-provider communication skills	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
3. The resource constraints associated with segregation/social exclusion	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
4. Racism, healthcare, & health outcomes	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
5. Cultural competency/diversity training	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
6. Genetics and diabetes	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
7. Barriers to accessing health care	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
8. Environmental exposure(s) and health	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
9. Healthcare of the homeless	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
10. Health literacy	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No

NOTE: This page will be detached from the rest of the survey immediately upon receipt by project investigators.

We would like to interview approximately 40 physicians from across the greater-Southeast Michigan area to learn more about providers' challenges and solutions as it relates to providing diabetes care.

If you agree and are interviewed you will be provided with a $75.00 cash stipend for your time.

May we contact you to set up a time to talk more about diabetes-related care? ____YES ____NO

Follow-up interviews will take approximately 1 hour, and will be scheduled at a time and location convenient for you.

Please be assured that responses contained in this survey are confidential and will not be directly connected to any subsequent conversation if you decide to participate in an interview.

THANK YOU for taking the time to complete this questionnaire.

Please return it in the postage-paid envelope we have provided.

DIRECT CORRESPONDENCE TO:

Cameron Shultz, MSW
Department of Health Management and Policy
School of Public Health
University of Michigan
109 Observatory St.
Ann Arbor, MI 48109-2029

Email: cshultz@umich.edu
Telephone: 734-718-5482

Control #:____________

Control #:__________

UNDERSTANDING HEALTH OUTCOMES AMONG PATIENTS WITH DIABETES

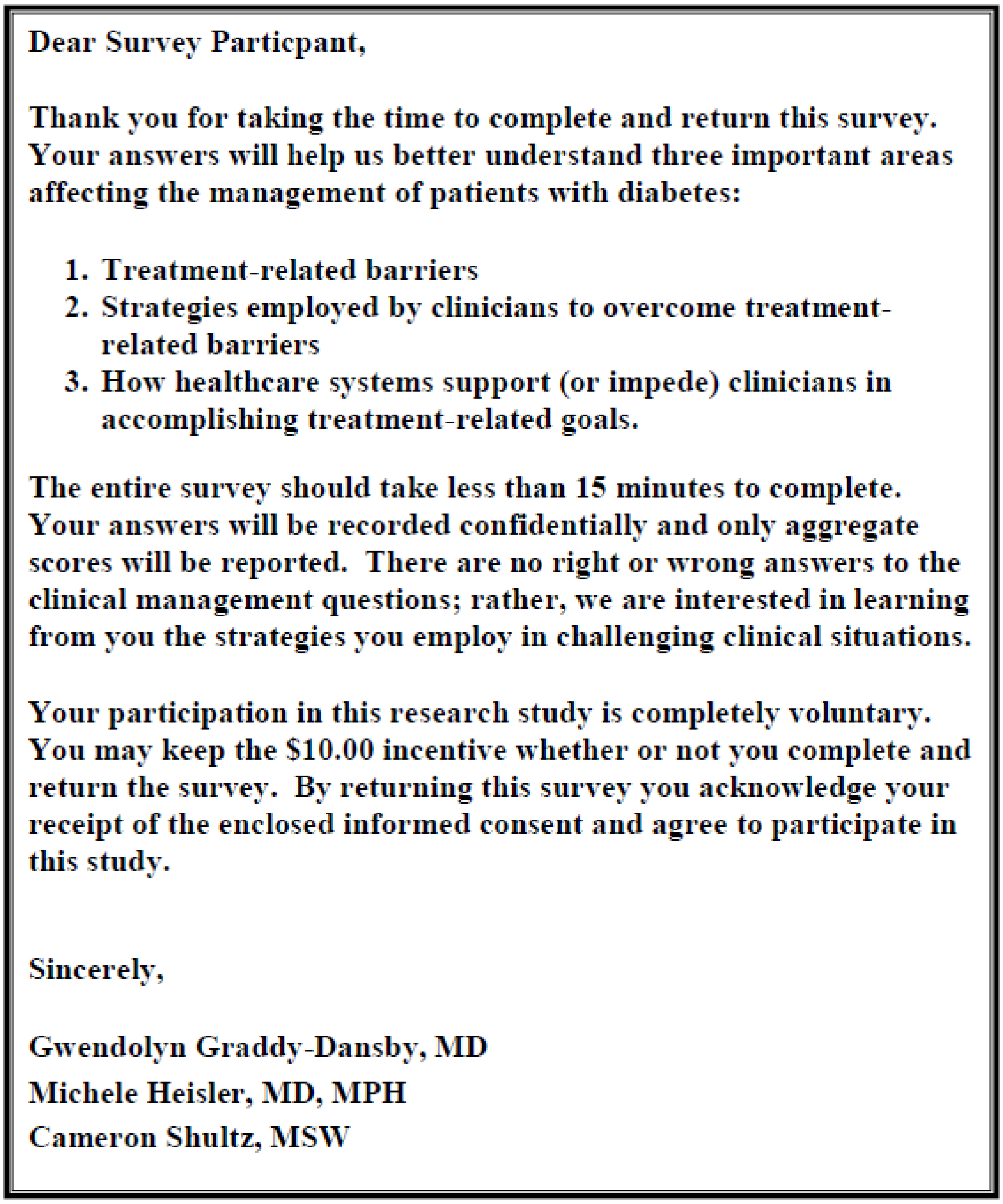
SURVEY

A COLLABORATIVE INITIATIVE BETWEEN
THE HENRY FORD HEALTH SYSTEM,
THE UNIVERSITY OF MICHIGAN HEALTH SYSTEM,
AND THE UNIVERSITY OF MICHIGAN SCHOOL OF PUBLIC HEALTH

Henry Ford Health System

University of Michigan Health System

University of Michigan School of Public Health



Dear Survey Particpant,

Thank you for taking the time to complete and return this survey. Your answers will help us better understand three important areas affecting the management of patients with diabetes:

1. Treatment-related barriers
2. Strategies employed by clinicians to overcome treatment-related barriers
3. How healthcare systems support (or impede) clinicians in accomplishing treatment-related goals.

The entire survey should take less than 15 minutes to complete. Your answers will be recorded confidentially and only aggregate scores will be reported. There are no right or wrong answers to the clinical management questions; rather, we are interested in learning from you the strategies you employ in challenging clinical situations.

Your participation in this research study is completely voluntary. You may keep the $10.00 incentive whether or not you complete and return the survey. By returning this survey you acknowledge your receipt of the enclosed informed consent and agree to participate in this study.

Sincerely,

Gwendolyn Graddy-Dansby, MD
Michele Heisler, MD, MPH
Cameron Shultz, MSW

I. DEMOGRAPHICS

A) Physician Demographics:

1. Year of Birth: __________

2. Gender (check one): __M __F

3. Racial/Ethnic Identity (check one):

__African American __White

__Native American __Hispanic

__Asian/Pacific Islander

__Indian

__Middle Eastern/Arabic

__Other:_________________

4. Practice Area/Specialty (check the one category that best describes your work):

___ Endocrinology

___ Family Practice

___ General Practice

___ Internal Medicine

___ Other:____________

4a. Are you Board Certified in this area? ___YES ___NO

4b. If applicable, please specify additional Board Certifications:

____

5. # of years practicing post-residency: _______

☐ Please check here if currently in residency training, and indicate # of residency years competed:

____

6. Credentials (check all that apply): ___ MD

___ DO

___ PhD

___ MPH

___ Other(s):_________

7. Did you attend medical school in the United States? ___Yes ___No

8. Do you currently provide direct care to adult patients with diabetes? (i.e., you have some portion of your time devoted to the direct provision of patient care):

___YES (If YES, *please continue the survey*)

___NO (If NO, *please stop the survey here and return it to project investigators in the pre-addressed and stamped envelope provided. Thank you.*)

9. Which *one* category *best* describes your current working environment? (please check only one):

___Hospital-based practice ___Group-Based Practice ___HMO

___Self-Employed (private practice) ___Medical School ___State/Local Government

___Other:___________________

10. In what city is your practice located? ____

B) Patient Demographics (***please just make your best estimate***):

1. About how many patients do you see in a typical week? (check one):

___1-24 ___25-49

___50-74 ___75-99

___100-149 ___more than 149

2. About how many minutes are you able to spend with each patient during a typical office visit (i.e., a regularly scheduled appointment): _______minutes

3. Approximately what percentage of your patients do you identify as being *white/European American**? (please just make your best estimate): ________%

3a. Approximately what percentage of your white/European American patients have type 2 diabetes? (please just make your best estimate): ________%

3b. Approximately what proportion of your white/European American patients have difficulty meeting their medical expenses—e.g., including medications, co-pays, deductibles, etc. (please just make your best estimate):

___0-25% ___26-50%
___51-75% ___76-100%

3c. Which income category *best* describes the majority of your white/European American patients? (check one):

__Poverty
__Low income
__Low middle income
__High middle income
__High income

4. Approximately what percentage of your patients do you identify as being *black/African American**? (please just make your best estimate): ________%

4a. Approximately what percentage of your black/African American patients have type 2 diabetes? (please just make your best estimate): ________%

4b. Approximately what proportion of your black/African American patients have difficulty meeting their medical expenses—e.g., including medications, co-pays, deductibles, etc. (please just make your best estimate):

___0-25% ___26-50%
___51-75% ___76-100%

4c. Which income category *best* describes the majority of your black/African American patients? (check one):

__Poverty
__Low income
__Low middle income
__High middle income
__High income

---

* We recognize that some clinicians in Southeast Michigan provide care in multi-ethnic, racially diverse communities; however, because approximately 93% of the population in Southeast Michigan identify as either black or white, we request demographic characteristics for these two groups only.

II. DIABETES EDUCATION AND TREATMENT BARRIERS

A) What resources do you have at your disposal to assist you in providing education/disease management assistance to your patients with diabetes?

I have a (please check all that apply)…

☐ …nurse *in my clinic*	☐ …nurse *offsite*
☐ …educator *in my clinic*	☐ …educator *offsite*
☐ …dietician/nutritionist *in my clinic*	☐ …dietician/nutritionist *offsite*
☐ …social worker *in my clinic*	☐ …social worker *offsite*
☐ …clinical pharmacist *in my clinic*	☐ …clinical pharmacist *offsite*

B) How do the majority of your patients with diabetes receive their education on diabetes self-care? (please check the one that best describes your practice pattern)

☐ **1.** I provide *all* education on self-management myself—*please skip to question "D" below.*

☐ **2.** I provide *most* of it myself.

☐ **3.** I refer patients to others (e.g., nurse, dietician, educator) but try to reinforce main points in each area (e.g., diet, exercise. etc.).

☐ **4.** I focus on medication management, but refer to another health professional for other counseling.

☐ **5.** I currently have no good provision of diabetes education.

C) If you do not do *all* patient education yourself, what resources for referral do you usually use? (Please check the one that best fits your practice pattern)

☐ **1.** Refer to health professional (e.g., nurse, educator) *in* my own clinic.

☐ **2.** Refer to health professional (e.g., nurse, educator) *outside* my clinic.

☐ **3.** Other(s): ____

D) How often would you say you have enough resources to provide the kind of diabetes-related education that you think your patients need? (check one only)

__Never __Rarely __Sometimes __Regularly __Often __Always

E) In general, how do you tend to make decisions about treatment for your patients with diabetes? (Please check the one that best fits your practice pattern):

☐ **1.** I tend to make decisions regarding treatment based on my medical judgment.

☐ **2.** I tend to make the final decision about treatment, but seriously consider the patient's opinion.

☐ **3.** I tend to share responsibility with patients when deciding which treatment is best for them.

☐ **4.** I tend to let patients make final selection of treatment after seriously considering my opinion.

☐ **5.** I tend to let patients make the final selection about treatment with little input from me.

F) In a typical week, how often would you say you ask your patients about the barriers they face in managing their diabetes? (check one only)

__Never __Rarely __Sometimes __Regularly __Often __Always

III. CHALLENGES AND RESOURCES ASSOCIATED WITH CARING FOR PATIENTS WITH DIABETES

We want to know more about the things that influence you when talking about adherence-related barriers with your patients with diabetes. We realize these things may vary greatly from one patient to the next, but we are interested in *your global sense* of how they relate generally to your everyday practice.

A) For each item below, please specify your level of agreement regarding whether or not it plays an important role when discussing a disease management plan (e.g., diet, medications, exercise) with your patients with diabetes:

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
1. I cannot tell who has difficulty adhering to their diabetes regimen.	☐	☐	☐	☐	☐
2. Patients do not see it as my role to discuss treatment-related barriers.	☐	☐	☐	☐	☐
3. Even when I ask, patients rarely admit to adherence problems.	☐	☐	☐	☐	☐
4. I believe it is the patient's responsibility to bring such topics (i.e., treatment-related barriers) up.	☐	☐	☐	☐	☐
5. I do not have adequate training to *assess* the array of barriers that my patients face.	☐	☐	☐	☐	☐
6. I do not have adequate training to *resolve* the array of barriers that my patients face.	☐	☐	☐	☐	☐
7. I am concerned that raising adherence-related barriers might offend the patient.	☐	☐	☐	☐	☐
8. I have too few resources available to help me improve patients' adherence.	☐	☐	☐	☐	☐
9. My patients' poor health literacy makes discussing adherence-related barriers difficult.	☐	☐	☐	☐	☐
10. There is not enough time during office visits to discuss adherence-related barriers.	☐	☐	☐	☐	☐
11. My patients have more important issues they would like to discuss with me.	☐	☐	☐	☐	☐
12. What I say can make a big difference in improving my patients' adherence to treatment.	☐	☐	☐	☐	☐

B) Please specify how often you employ each of the following strategies to help your patients address adherence-related barriers?

	Never	Rarely	Some-times	Very often	Always
1. I arrange for the patient to meet with a social worker, nurse, or other professional so they can work together to find a solution.	☐	☐	☐	☐	☐
2. I shorten the interval for the patient's return visit so I can follow-up on their progress.	☐	☐	☐	☐	☐
3. I express sympathy about the patient's situation.	☐	☐	☐	☐	☐
4. I ask the patient what they think I could do to improve their adherence.	☐	☐	☐	☐	☐
5. I make recommendations to the patient about what they should do to improve their adherence.	☐	☐	☐	☐	☐
6. I give the patient adherence-related resources such as pill-boxes, medication diaries, food/nutrition charts, etc.	☐	☐	☐	☐	☐
7. I give the patient medical equipment such as lancets, test strips, glucometer, syringes, etc.	☐	☐	☐	☐	☐
8. I give the patient free samples of medication from a drug company or another source.	☐	☐	☐	☐	☐
9. I change medication(s) to a cheaper/generic brand.	☐	☐	☐	☐	☐
10. I talk with the patient about which medications they should definitely not skip.	☐	☐	☐	☐	☐

IV. ADHERENCE TO TREATMENT AMONG PATIENTS WITH DIABETES

A) Please indicate your level of agreement regarding possible reasons why you think your patients may not follow your self-care recommendations:

Again, we realize that possible reasons may vary greatly from one patient to the next, but we are interested in *your global sense* of how these factors may contribute to patients' poor self-management.

Among my patients who are NOT following my self-care recommendations, this is because the patient…	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. …does not have enough will-power.	☐	☐	☐	☐	☐
2. …does not worry enough about complications.	☐	☐	☐	☐	☐
3. …has not learned enough about diabetes.	☐	☐	☐	☐	☐
4. …has problems with personal finances.	☐	☐	☐	☐	☐
5. …does not understand my directions because of cultural differences between me and the patient.	☐	☐	☐	☐	☐

(cont.)	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
6. …is in denial about seriousness of disease.	☐	☐	☐	☐	☐
7. …has too many competing demands.	☐	☐	☐	☐	☐
8. …does not have enough family support.	☐	☐	☐	☐	☐
9. …does not have adequate access to community resources (e.g., grocery stores, places to exercise).	☐	☐	☐	☐	☐
10. …is uninsured/under-insured.	☐	☐	☐	☐	☐
11. …has cognitive limitations.	☐	☐	☐	☐	☐
12. …makes bad choices (e.g., choosing unhealthy foods even though healthy foods are available).	☐	☐	☐	☐	☐
13. ...does not have enough support from employer/has work-related constraints.	☐	☐	☐	☐	☐
14. …does not seem to care enough about the future and instead is mainly focused on the present day.	☐	☐	☐	☐	☐

B) In general, how likely are your patients with diabetes to…

	Not at all likely	A little likely	Somewhat likely	Very likely	Extremely likely
1. …live in a neighborhood that is unsafe?	☐	☐	☐	☐	☐
2. …live in a neighborhood with inadequate access to healthy foods?	☐	☐	☐	☐	☐
3. …complain about physical discomfort?	☐	☐	☐	☐	☐
4. …have financial problems?	☐	☐	☐	☐	☐
5. …not tell you the truth regarding their adherence with their treatment plan?	☐	☐	☐	☐	☐
6. …have significant career demands/work-related responsibilities that impede disease management?	☐	☐	☐	☐	☐
7. …have significant care-taking demands/family-related responsibilities that impede disease management?	☐	☐	☐	☐	☐
8. …use home remedies in place of prescribed medications to treat their diabetes?	☐	☐	☐	☐	☐
9. …not trust the information you give them?	☐	☐	☐	☐	☐
10. …lack social support?	☐	☐	☐	☐	☐
11. …be overwhelmed with the demands of managing the disease?	☐	☐	☐	☐	☐

V. IMPEDIMENTS TO STICKING TO PRACTICE GUIDELINES

Please score each of the following statements on a scale from "1" to "10" to specify your level of agreement as to whether or not the circumstance affects your adherence to practice guidelines when providing care to patients with diabetes:

1 = I strongly *disagree*; that is, it has no affect on my adherence to practice guidelines.

10 = I strongly *agree*; that is, it has an enormous affect on my adherence to practice guidelines.

A) My working environment is structured such that I can not adhere to practice guidelines (e.g., I am required to see too many patients in a single day, I do not have enough support staff to assist with ancillary care services such as patient education and nutrition counseling, I am too busy, etc.). (circle one)

1 2 3 4 5 6 7 8 9 10
Strongly disagree……………………….Neutral……………………..Strongly agree

B) I am not financially rewarded for spending the time required to adhere to best-practice guidelines & recommendations (e.g., the method of reimbursement for my clinical services makes guideline adherence unfeasible & impractical, it would hurt my practice if I spent the amount of time it would take to adhere to best-practice guidelines, etc.). (circle one)

1 2 3 4 5 6 7 8 9 10
Strongly disagree……………………….Neutral……………………..Strongly agree

C) I do not believe that practice guidelines are entirely applicable to my clinical setting because they do not adequately account for my practice environment (e.g., guidelines do not sufficiently consider the complex & multiple needs of my patients, they encourage a form of "cookbook" medicine that goes against my training & experience, etc). (circle one)

1 2 3 4 5 6 7 8 9 10
Strongly disagree……………………….Neutral……………………..Strongly agree

VI. PROVIDING MEDICAL CARE

A) Mark the one answer that best describes when you first discuss insulin with your patients with Type 2 diabetes. I first discuss insulin…

____1. …when a patient is diagnosed with diabetes.

____2. …when a patient's HbA1c level first rises above the recommended level.

____3. …when a patient's HbA1c level is consistently above the recommended level.

____4. …when a patient starts oral mono-therapy.

____5. …when a patient starts combination oral therapy.

____6. …about the time the patient needs to start using insulin.

B) If a patient with diabetes requires a medication change to achieve glycemic control, how do you time your discussion of the needed change with the patient when the change involves the addition of insulin?

When the change involves the addition of insulin, I tend to (check one answer only)…

_____ 1. …wait longer than when intensifying with oral agents only.

_____ 2. …wait about the same amount of time as when intensifying with oral agents only

_____ 3. …wait less time than when intensifying with oral agents only

C) Please rate your level of agreement as it relates to each of the following areas:

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
1. My patients with diabetes are always able to get the diabetes-related *medications* they need.	☐	☐	☐	☐	☐
2. My patients with diabetes are always able to get the diabetes-related *specialty care* they need.	☐	☐	☐	☐	☐
3. I have all the resources I need to provide culturally sensitive care.	☐	☐	☐	☐	☐
4. Providing culturally sensitive care is NOT always realistic in my working environment given the *time* constraints related to my clinical practice.	☐	☐	☐	☐	☐
5. Providing culturally sensitive care is NOT always realistic in my working environment given the *cost* constraints related to my clinical practice.	☐	☐	☐	☐	☐

VII. MEDICAL EDUCATION

For each training area below, please indicate if…

A) …it has *clinical relevance* to your day-to-day practice
B) …whether or not you have received *formal training* in the area, and
C) …if you have had formal training in the area, *was it helpful* as it relates to your day-to-day practice

Training Area	**A) This area is relevant to my day-to-day practice…**	**B) I have received formal training in this area…**	**C) *If YES to "B"*, this training was helpful as it relates to my day-to-day practice…**
1. The health effects of poverty	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
2. Patient-provider communication skills	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
3. The resource constraints associated with segregation/social exclusion	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
4. Racism, healthcare, & health outcomes	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
5. Cultural competency/diversity training	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
6. Genetics and diabetes	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
7. Barriers to accessing health care	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
8. Environmental exposure(s) and health	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
9. Healthcare of the homeless	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
10. Health literacy	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No

NOTE: This page will be detached from the rest of the survey immediately upon receipt by project investigators.

We would like to interview approximately 40 physicians from across the greater-Southeast Michigan area to learn more about providers' challenges and solutions as it relates to providing diabetes care.

If you agree and are interviewed you will be provided with a $75.00 cash stipend for your time.

May we contact you to set up a time to talk more about diabetes-related care? _____YES _____NO

Follow-up interviews will take approximately 1 hour, and will be scheduled at a time and location convenient for you.

Please be assured that responses contained in this survey are confidential and will not be directly connected to any subsequent conversation if you decide to participate in an interview.

THANK YOU for taking the time to complete this questionnaire.

Please return it in the postage-paid envelope we have provided.

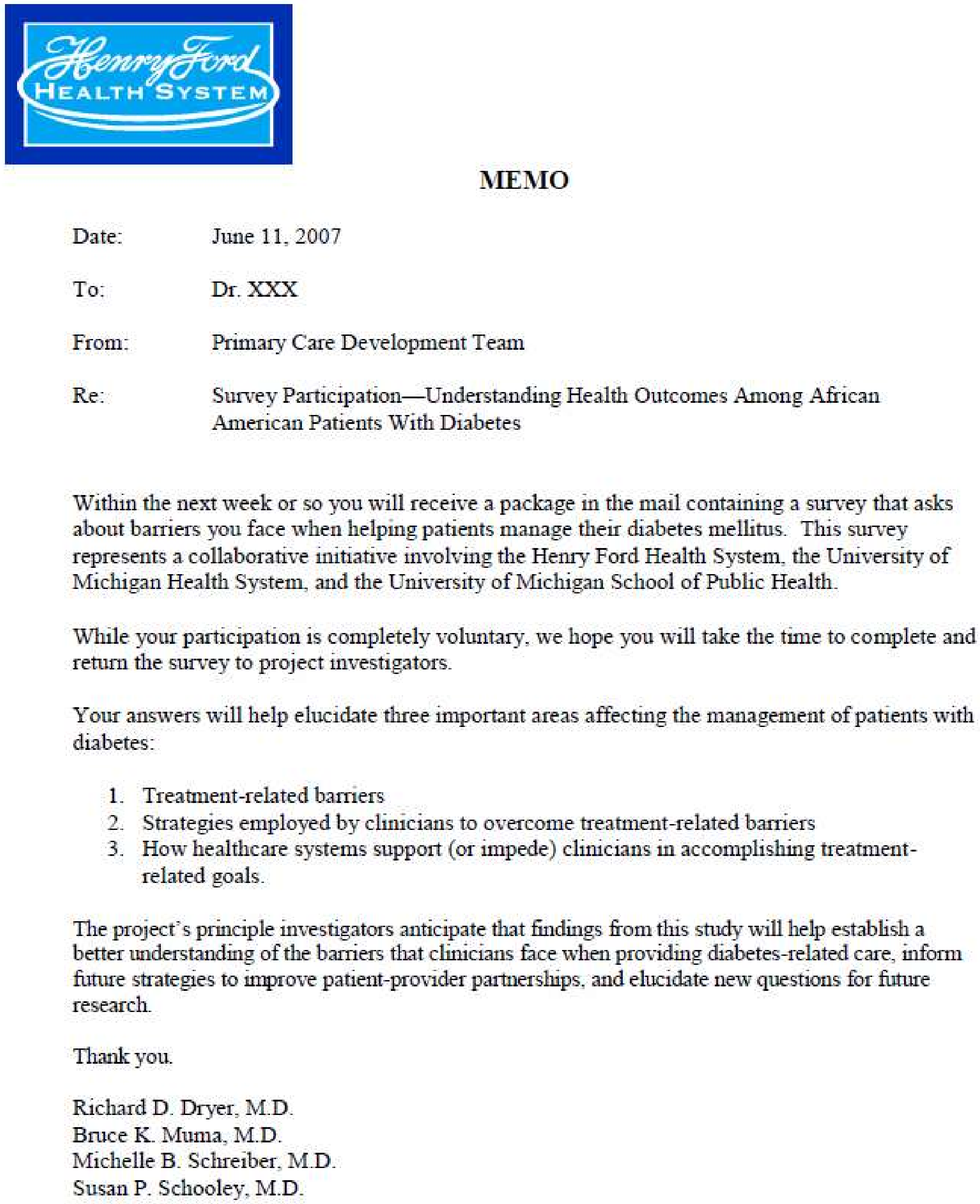
DIRECT CORRESPONDENCE TO:

Cameron Shultz, MSW
Department of Health Management and Policy
School of Public Health
University of Michigan
109 Observatory St.
Ann Arbor, MI 48109-2029

Email: cshultz@umich.edu
Telephone: 734-718-5482

Control #:____________

Appendix 4. *Memo to Henry Ford Health System Primary Care Development Team*



Henry Ford
HEALTH SYSTEM

MEMO

Date: June 11, 2007

To: Dr. XXX

From: Primary Care Development Team

Re: Survey Participation—Understanding Health Outcomes Among African American Patients With Diabetes

Within the next week or so you will receive a package in the mail containing a survey that asks about barriers you face when helping patients manage their diabetes mellitus. This survey represents a collaborative initiative involving the Henry Ford Health System, the University of Michigan Health System, and the University of Michigan School of Public Health.

While your participation is completely voluntary, we hope you will take the time to complete and return the survey to project investigators.

Your answers will help elucidate three important areas affecting the management of patients with diabetes:

1. Treatment-related barriers
2. Strategies employed by clinicians to overcome treatment-related barriers
3. How healthcare systems support (or impede) clinicians in accomplishing treatment-related goals.

The project's principle investigators anticipate that findings from this study will help establish a better understanding of the barriers that clinicians face when providing diabetes-related care, inform future strategies to improve patient-provider partnerships, and elucidate new questions for future research.

Thank you.

Richard D. Dryer, M.D.
Bruce K. Muma, M.D.
Michelle B. Schreiber, M.D.
Susan P. Schooley, M.D.

Henry Ford
HEALTH SYSTEM

MEMO

Date: June 11, 2007

To: Dr. PHYSICIAN SURNAME INSERTED HERE

From: Primary Care Development Team

Re: Survey Participation—Understanding Health Outcomes Among Patients With Diabetes

Within the next week or so you will receive a package in the mail containing a survey that asks about barriers you face when helping patients manage their diabetes mellitus. This survey represents a collaborative initiative involving the Henry Ford Health System, the University of Michigan Health System, and the University of Michigan School of Public Health.

While your participation is completely voluntary, we hope you will take the time to complete and return the survey to project investigators.

Your answers will help elucidate three important areas affecting the management of patients with diabetes:

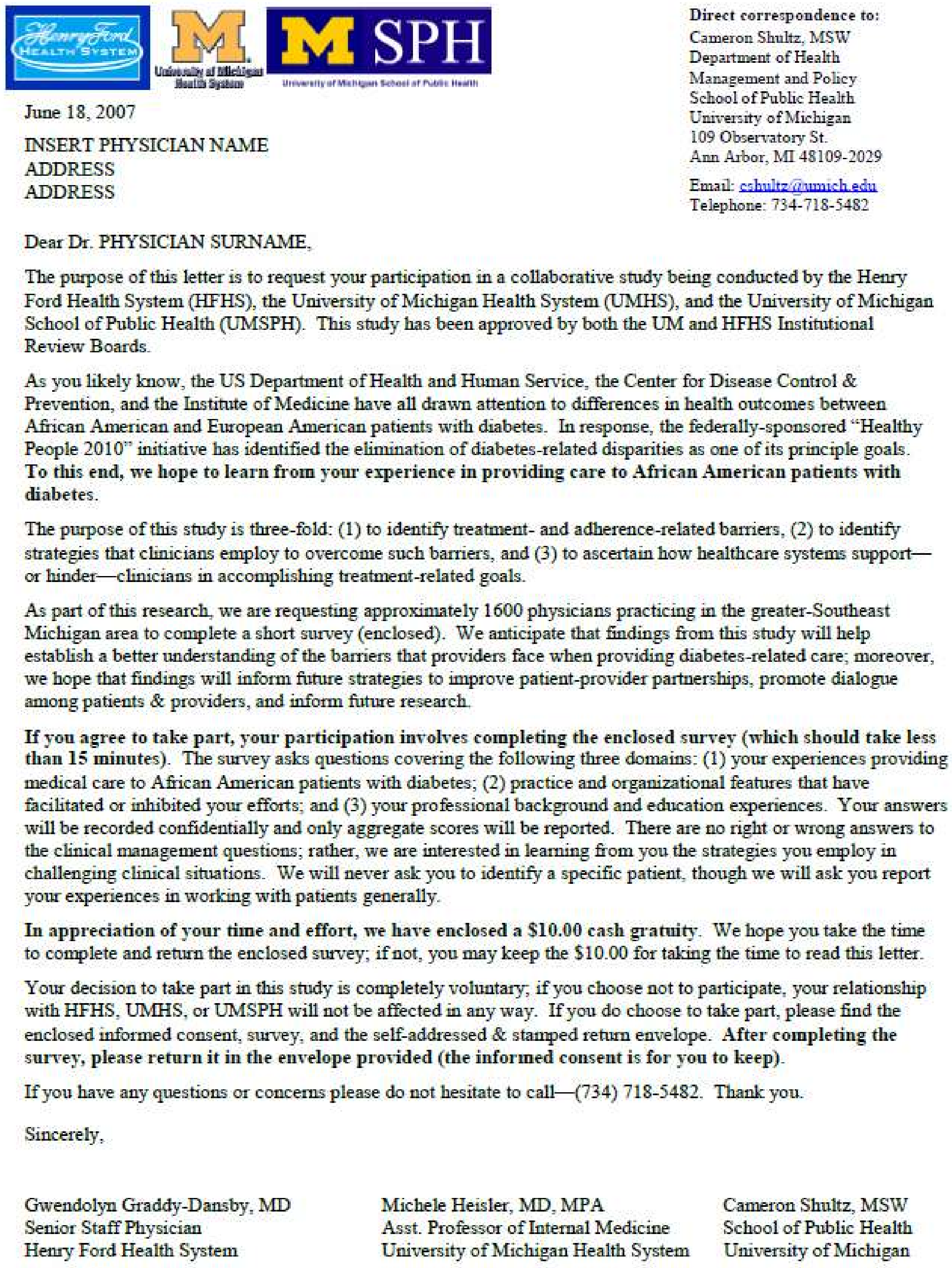
1. Treatment-related barriers
2. Strategies employed by clinicians to overcome treatment-related barriers
3. How healthcare systems support (or impede) clinicians in accomplishing treatment-related goals.

The project's principle investigators anticipate that findings from this study will help establish a better understanding of the barriers that clinicians face when providing diabetes-related care, inform future strategies to improve patient-provider partnerships, and elucidate new questions for future research.

Thank you.

Richard D. Dryer, M.D.
Bruce K. Muma, M.D.
Michelle B. Schreiber, M.D.
Susan P. Schooley, M.D.

Appendix 5. *Cover Letter for First Mailing*



Direct correspondence to:
Cameron Shultz, MSW
Department of Health
Management and Policy
School of Public Health
University of Michigan
109 Observatory St.
Ann Arbor, MI 48109-2029

Email: cshultz@umich.edu
Telephone: 734-718-5482

June 18, 2007

INSERT PHYSICIAN NAME
ADDRESS
ADDRESS

Dear Dr. PHYSICIAN SURNAME,

The purpose of this letter is to request your participation in a collaborative study being conducted by the Henry Ford Health System (HFHS), the University of Michigan Health System (UMHS), and the University of Michigan School of Public Health (UMSPH). This study has been approved by both the UM and HFHS Institutional Review Boards.

As you likely know, the US Department of Health and Human Service, the Center for Disease Control & Prevention, and the Institute of Medicine have all drawn attention to differences in health outcomes between African American and European American patients with diabetes. In response, the federally-sponsored "Healthy People 2010" initiative has identified the elimination of diabetes-related disparities as one of its principle goals. **To this end, we hope to learn from your experience in providing care to African American patients with diabetes.**

The purpose of this study is three-fold: (1) to identify treatment- and adherence-related barriers, (2) to identify strategies that clinicians employ to overcome such barriers, and (3) to ascertain how healthcare systems support—or hinder—clinicians in accomplishing treatment-related goals.

As part of this research, we are requesting approximately 1600 physicians practicing in the greater-Southeast Michigan area to complete a short survey (enclosed). We anticipate that findings from this study will help establish a better understanding of the barriers that providers face when providing diabetes-related care; moreover, we hope that findings will inform future strategies to improve patient-provider partnerships, promote dialogue among patients & providers, and inform future research.

If you agree to take part, your participation involves completing the enclosed survey (which should take less than 15 minutes). The survey asks questions covering the following three domains: (1) your experiences providing medical care to African American patients with diabetes; (2) practice and organizational features that have facilitated or inhibited your efforts; and (3) your professional background and education experiences. Your answers will be recorded confidentially and only aggregate scores will be reported. There are no right or wrong answers to the clinical management questions; rather, we are interested in learning from you the strategies you employ in challenging clinical situations. We will never ask you to identify a specific patient, though we will ask you report your experiences in working with patients generally.

In appreciation of your time and effort, we have enclosed a $10.00 cash gratuity. We hope you take the time to complete and return the enclosed survey; if not, you may keep the $10.00 for taking the time to read this letter.

Your decision to take part in this study is completely voluntary; if you choose not to participate, your relationship with HFHS, UMHS, or UMSPH will not be affected in any way. If you do choose to take part, please find the enclosed informed consent, survey, and the self-addressed & stamped return envelope. **After completing the survey, please return it in the envelope provided (the informed consent is for you to keep).**

If you have any questions or concerns please do not hesitate to call—(734) 718-5482. Thank you.

Sincerely,

Gwendolyn Graddy-Dansby, MD	Michele Heisler, MD, MPA	Cameron Shultz, MSW
Senior Staff Physician	Asst. Professor of Internal Medicine	School of Public Health
Henry Ford Health System	University of Michigan Health System	University of Michigan

Direct correspondence to:
Cameron Shultz, MSW
Department of Health
Management and Policy
School of Public Health
University of Michigan
109 Observatory St.
Ann Arbor, MI 48109-2029

Email: cshultz@umich.edu
Telephone: 734-718-5482

DATE

NAME
ADDRESS
ADDRESS

Dear NAME,

The purpose of this letter is to request your participation in a collaborative study being conducted by the Henry Ford Health System (HFHS), the University of Michigan Health System (UMHS), and the University of Michigan School of Public Health (UMSPH). This study has been approved by both the UM and HFHS Institutional Review Boards.

As you likely know, the US Department of Health and Human Service, the Center for Disease Control & Prevention, and the Institute of Medicine have recently drawn attention to the growing prevalence of diabetes in the United States. In response, the federally-sponsored "Healthy People 2010" initiative has made diabetes one of its principle disease prevention and health promotion focus areas; the specific Healthy People 2010 goal is to "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." **To this end, we hope to learn from your experience in providing care to patients with diabetes.**

The purpose of this study is three-fold: (1) to identify treatment- and adherence-related barriers, (2) to identify strategies that clinicians employ to overcome such barriers, and (3) to ascertain how healthcare systems support—or hinder—clinicians in accomplishing treatment-related goals.

As part of this research, we are requesting approximately 1600 physicians practicing in the greater-Southeast Michigan area to complete a short survey (enclosed). We anticipate that findings from this study will help establish a better understanding of the barriers that providers face when providing diabetes-related care; moreover, we hope that findings will inform future strategies to improve patient-provider partnerships, promote dialogue among patients & providers, and inform future research.

If you agree to take part, your participation involves completing the enclosed survey (which should take less than 15 minutes). The survey asks questions covering the following three domains: (1) your experiences providing medical care to patients with diabetes; (2) practice and organizational features that have facilitated or inhibited your efforts; and (3) your professional background and education experiences. Your answers will be recorded confidentially and only aggregate scores will be reported. There are no right or wrong answers to the clinical management questions; rather, we are interested in learning from you the strategies you employ in challenging clinical situations. We will never ask you to identify a specific patient, though we will ask you to report your experiences in working with patients generally.

In appreciation of your time and effort, we have enclosed a $10.00 cash gratuity. We hope you take the time to complete and return the enclosed survey; if not, you may keep the $10.00 for taking the time to read this letter.

Your decision to take part in this study is completely voluntary; if you choose to not participate your relationship with HFHS, UMHS, or UMSPH will not be affected in any way. If you do choose to take part, please find the enclosed informed consent, survey, and the self-addressed & stamped return envelope. **After completing the survey, please return it in the envelope provided (the informed consent is for you to keep).**

If you have any questions or concerns please do not hesitate to call—(734) 718-5482. Thank you.

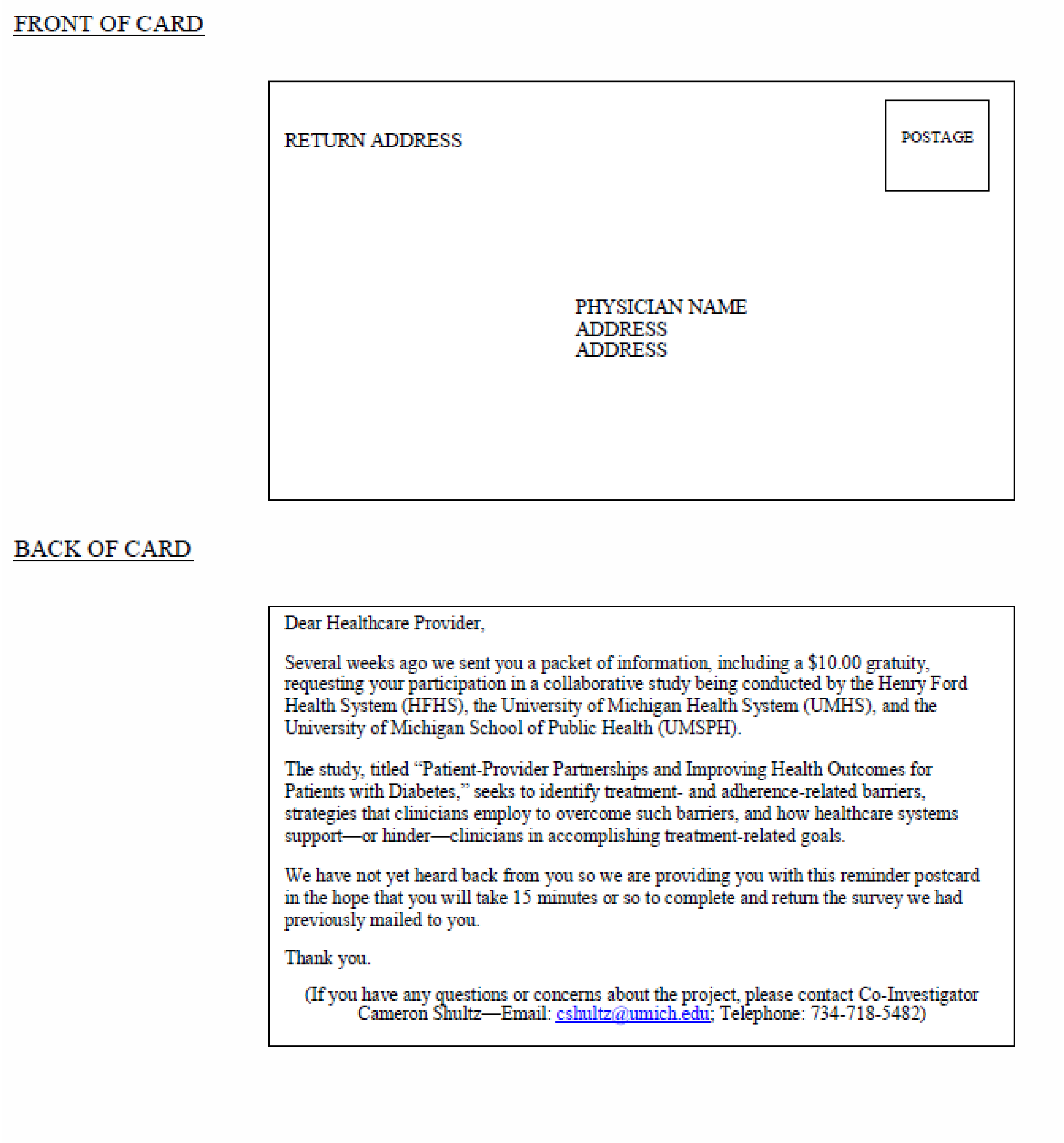
Sincerely,

Gwendolyn Graddy-Dansby, MD
Senior Staff Physician
Henry Ford Health System

Michele Heisler, MD, MPA
Asst. Professor of Internal Medicine
University of Michigan Health System

Cameron Shultz, MSW
School of Public Health
University of Michigan

Appendix 6. *Follow-up Postcards After First Mailing*



FRONT OF CARD

RETURN ADDRESS

POSTAGE

PHYSICIAN NAME
ADDRESS
ADDRESS

BACK OF CARD

Dear Healthcare Provider,

Several weeks ago we sent you a packet of information, including a $10.00 gratuity, requesting your participation in a collaborative study being conducted by the Henry Ford Health System (HFHS), the University of Michigan Health System (UMHS), and the University of Michigan School of Public Health (UMSPH).

The study, titled “Patient-Provider Partnerships and Improving Health Outcomes for Patients with Diabetes,” seeks to identify treatment- and adherence-related barriers, strategies that clinicians employ to overcome such barriers, and how healthcare systems support—or hinder—clinicians in accomplishing treatment-related goals.

We have not yet heard back from you so we are providing you with this reminder postcard in the hope that you will take 15 minutes or so to complete and return the survey we had previously mailed to you.

Thank you.

(If you have any questions or concerns about the project, please contact Co-Investigator Cameron Shultz—Email: cshultz@umich.edu; Telephone: 734-718-5482)

Appendix 7. *Revised Cover Letter for Second Mailing*

Direct correspondence to:
Cameron Shultz, MSW
Department of Health
Management and Policy
School of Public Health
University of Michigan
109 Observatory St.
Ann Arbor, MI 48109-2029

Email: cshultz@umich.edu
Telephone: 734-718-5482

DATE

NAME
ADDRESS
ADDRESS

Dear NAME,

Several weeks ago we sent you a packet of information, including a $10.00 gratuity, requesting your participation in a collaborative study being conducted by the Henry Ford Health System (HFHS), the University of Michigan Health System (UMHS), and the University of Michigan School of Public Health (UMSPH). We have not yet heard back from you so we are providing you with this second packet in the hope that you will take 15 minutes or so to complete and return the enclosed survey.

As you likely know, the US Department of Health and Human Service, the Center for Disease Control & Prevention, and the Institute of Medicine have all drawn attention to differences in health outcomes between African American and European American patients with diabetes. In response, the federally-sponsored "Healthy People 2010" initiative has identified the elimination of diabetes-related disparities as one of its principle goals. **To this end, we hope to learn from your experience in providing care to African American patients with diabetes.**

The purpose of this study is three-fold: (1) to identify treatment- and adherence-related barriers, (2) to identify strategies that clinicians employ to overcome such barriers, and (3) to ascertain how healthcare systems support—or hinder—clinicians in accomplishing treatment-related goals.

As part of this research, we are requesting approximately 1600 physicians practicing in the greater-Southeast Michigan area to complete a short survey (enclosed). We anticipate that findings from this study will help establish a better understanding of the barriers that providers face when providing diabetes-related care; moreover, we hope that findings will inform future strategies to improve patient-provider partnerships, promote dialogue among patients & providers, and inform future research.

If you agree to take part, your participation involves completing the enclosed survey (which should take less than 15 minutes). The survey asks questions covering the following three domains: (1) your experiences providing medical care to African American patients with diabetes; (2) practice and organizational features that have facilitated or inhibited your efforts; and (3) your professional background and education experiences. Your answers will be recorded confidentially and only aggregate scores will be reported. There are no right or wrong answers to the clinical management questions; rather, we are interested in learning from you the strategies you employ in challenging clinical situations. We will never ask you to identify a specific patient, though we will ask you report your experiences in working with patients generally. This study has been approved by both the UM and HFHS Institutional Review Boards.

Your decision to take part in this study is completely voluntary; if you choose not to participate, your relationship with HFHS, UMHS, or UMSPH will not be affected in any way. If you do choose to take part, please find the enclosed informed consent, survey, and the self-addressed & stamped return envelope. **After completing the survey, please return it in the envelope provided (the informed consent is for you to keep).**

If you have any questions or concerns please do not hesitate to call—(734) 718-5482. Thank you.

Sincerely,

Gwendolyn Graddy-Dansby, MD	Michele Heisler, MD, MPA	Cameron Shultz, MSW
Senior Staff Physician	Asst. Professor of Internal Medicine	School of Public Health
Henry Ford Health System	University of Michigan Health System	University of Michigan

University of Michigan Health System
University of Michigan School of Public Health

Direct correspondence to:
Cameron Shultz, MSW
Department of Health
Management and Policy
School of Public Health
University of Michigan
109 Observatory St.
Ann Arbor, MI 48109-2029

Email: cshultz@umich.edu
Telephone: 734-718-5482

DATE

NAME
ADDRESS
ADDRESS

Dear NAME,

Several weeks ago we sent you a packet of information, including a $10.00 gratuity, requesting your participation in a collaborative study being conducted by the Henry Ford Health System (HFHS), the University of Michigan Health System (UMHS), and the University of Michigan School of Public Health (UMSPH). We have not yet heard back from you so we are providing you with this second packet in the hope that you will take 15 minutes or so to complete and return the enclosed survey.

As you likely know, the US Department of Health and Human Service, the Center for Disease Control & Prevention, and the Institute of Medicine have recently drawn attention to the growing prevalence of diabetes in the United States. In response, the federally-sponsored "Healthy People 2010" initiative has made diabetes one of its principle disease prevention and health promotion focus areas; the specific Healthy People 2010 goal is to "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." **To this end, we hope to learn from your experience in providing care to patients with diabetes.**

The purpose of this study is three-fold: (1) to identify treatment- and adherence-related barriers, (2) to identify strategies that clinicians employ to overcome such barriers, and (3) to ascertain how healthcare systems support—or hinder—clinicians in accomplishing treatment-related goals.

As part of this research, we are requesting approximately 1600 physicians practicing in the greater-Southeast Michigan area to complete a short survey (enclosed). We anticipate that findings from this study will help establish a better understanding of the barriers that providers face when providing diabetes-related care; moreover, we hope that findings will inform future strategies to improve patient-provider partnerships, promote dialogue among patients & providers, and inform future research.

If you agree to take part, your participation involves completing the enclosed survey (which should take less than 15 minutes). The survey asks questions covering the following three domains: (1) your experiences providing medical care to patients with diabetes; (2) practice and organizational features that have facilitated or inhibited your efforts; and (3) your professional background and education experiences. Your answers will be recorded confidentially and only aggregate scores will be reported. There are no right or wrong answers to the clinical management questions; rather, we are interested in learning from you the strategies you employ in challenging clinical situations. We will never ask you to identify a specific patient, though we will ask you to report your experiences in working with patients generally. This study has been approved by both the UM and HFHS Institutional Review Boards.

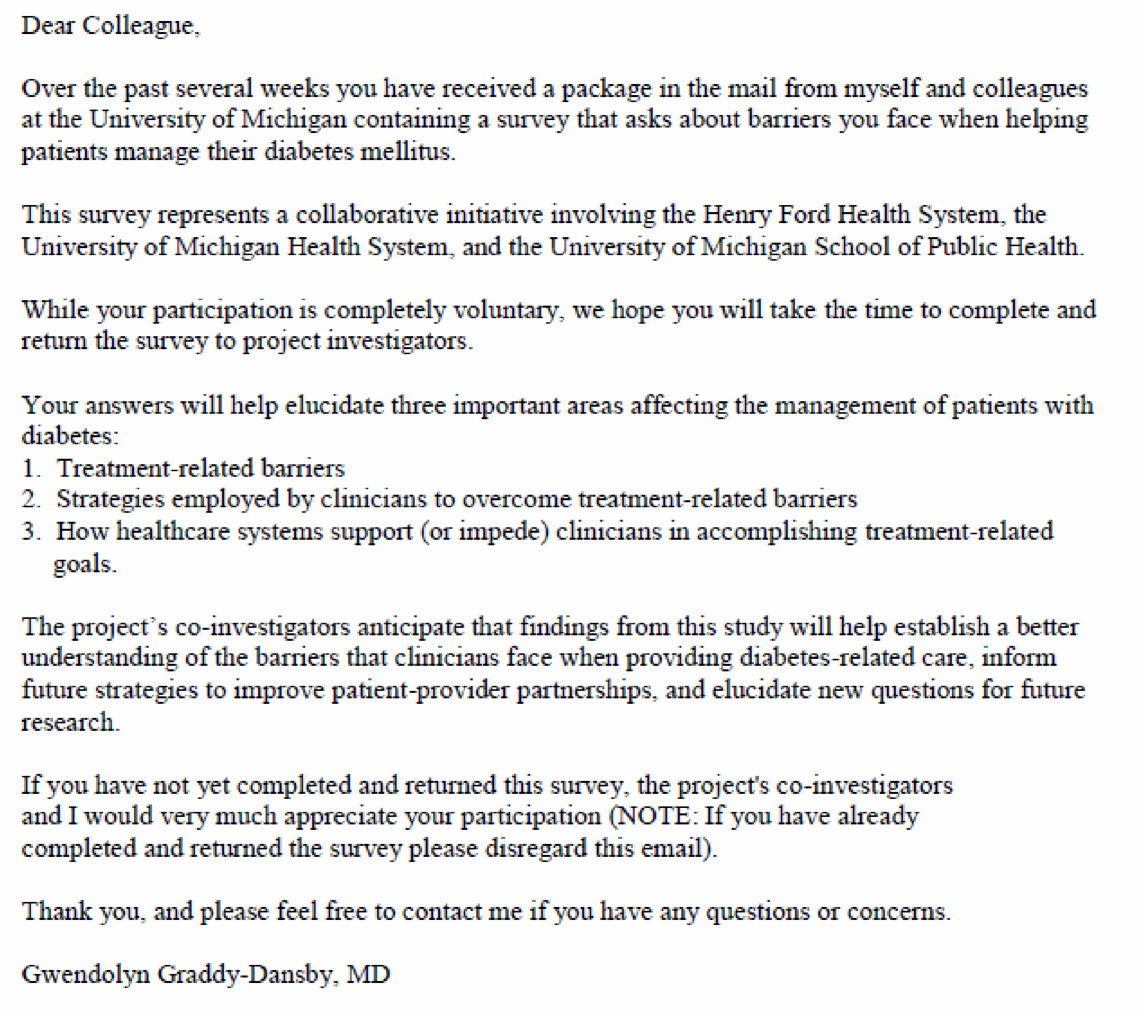
Your decision to take part in this study is completely voluntary; if you choose to not participate your relationship with HFHS, UMHS, or UMSPH will not be affected in any way. If you do choose to take part, please find the enclosed informed consent, survey, and the self-addressed & stamped return envelope. **After completing the survey, please return it in the envelope provided (the informed consent is for you to keep).**

If you have any questions or concerns please do not hesitate to call—(734) 718-5482. Thank you.

Sincerely,

Gwendolyn Graddy-Dansby, MD	Michele Heisler, MD, MPA	Cameron Shultz, MSW
Senior Staff Physician	Asst. Professor of Internal Medicine	School of Public Health
Henry Ford Health System	University of Michigan Health System	University of Michigan

Appendix 8. *Reminder Email Sent to Henry Ford Health System Physicians*



Dear Colleague,

Over the past several weeks you have received a package in the mail from myself and colleagues at the University of Michigan containing a survey that asks about barriers you face when helping patients manage their diabetes mellitus.

This survey represents a collaborative initiative involving the Henry Ford Health System, the University of Michigan Health System, and the University of Michigan School of Public Health.

While your participation is completely voluntary, we hope you will take the time to complete and return the survey to project investigators.

Your answers will help elucidate three important areas affecting the management of patients with diabetes:

1. Treatment-related barriers
2. Strategies employed by clinicians to overcome treatment-related barriers
3. How healthcare systems support (or impede) clinicians in accomplishing treatment-related goals.

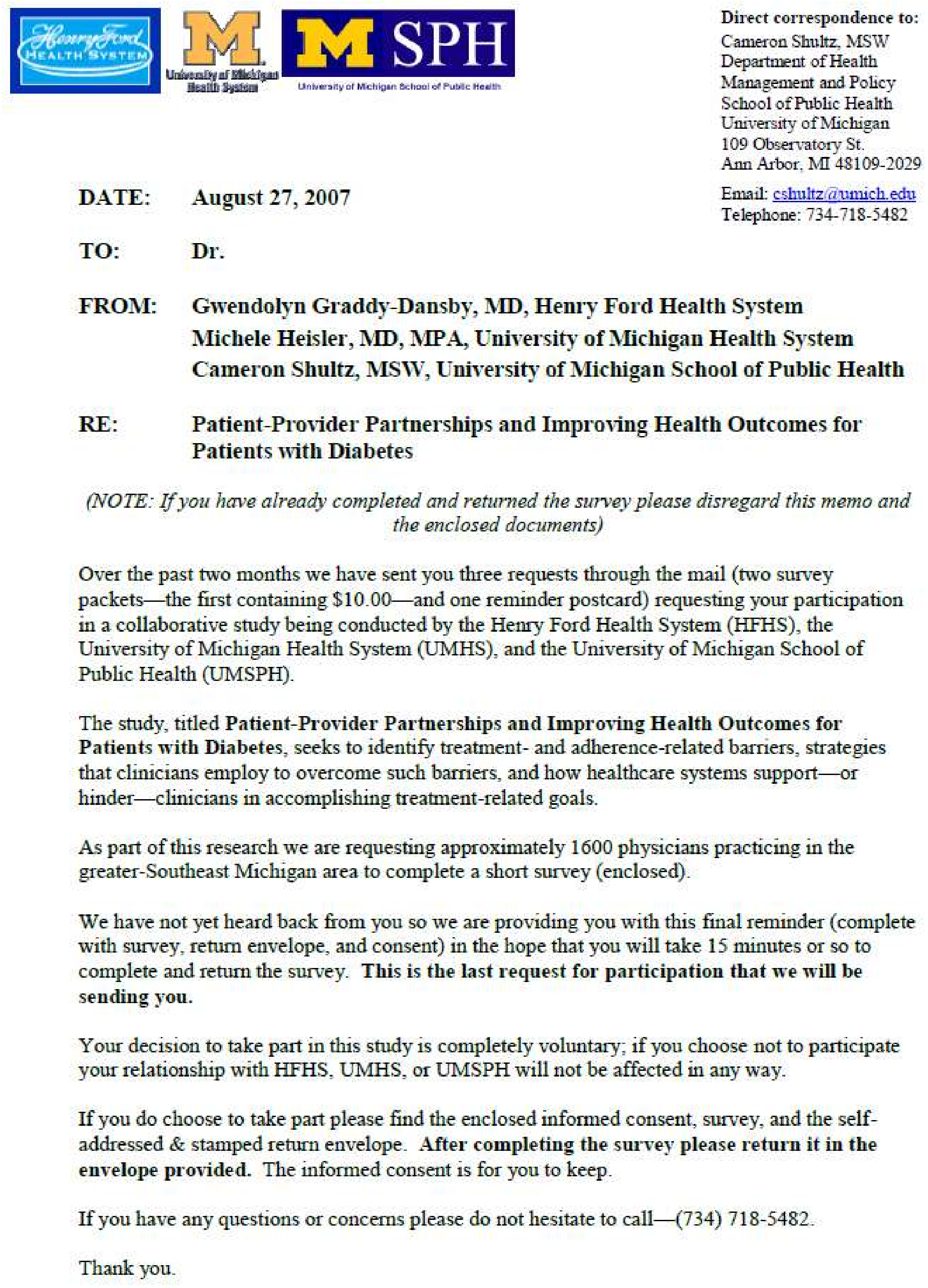
The project's co-investigators anticipate that findings from this study will help establish a better understanding of the barriers that clinicians face when providing diabetes-related care, inform future strategies to improve patient-provider partnerships, and elucidate new questions for future research.

If you have not yet completed and returned this survey, the project's co-investigators and I would very much appreciate your participation (NOTE: If you have already completed and returned the survey please disregard this email).

Thank you, and please feel free to contact me if you have any questions or concerns.

Gwendolyn Graddy-Dansby, MD

Appendix 9. *Revised Cover Letter for Third Mailing*



Direct correspondence to:
Cameron Shultz, MSW
Department of Health
Management and Policy
School of Public Health
University of Michigan
109 Observatory St.
Ann Arbor, MI 48109-2029

Email: cshultz@umich.edu
Telephone: 734-718-5482

DATE: **August 27, 2007**

TO: **Dr.**

FROM: **Gwendolyn Graddy-Dansby, MD, Henry Ford Health System**
Michele Heisler, MD, MPA, University of Michigan Health System
Cameron Shultz, MSW, University of Michigan School of Public Health

RE: **Patient-Provider Partnerships and Improving Health Outcomes for Patients with Diabetes**

(NOTE: If you have already completed and returned the survey please disregard this memo and the enclosed documents)

Over the past two months we have sent you three requests through the mail (two survey packets—the first containing $10.00—and one reminder postcard) requesting your participation in a collaborative study being conducted by the Henry Ford Health System (HFHS), the University of Michigan Health System (UMHS), and the University of Michigan School of Public Health (UMSPH).

The study, titled **Patient-Provider Partnerships and Improving Health Outcomes for Patients with Diabetes**, seeks to identify treatment- and adherence-related barriers, strategies that clinicians employ to overcome such barriers, and how healthcare systems support—or hinder—clinicians in accomplishing treatment-related goals.

As part of this research we are requesting approximately 1600 physicians practicing in the greater-Southeast Michigan area to complete a short survey (enclosed).

We have not yet heard back from you so we are providing you with this final reminder (complete with survey, return envelope, and consent) in the hope that you will take 15 minutes or so to complete and return the survey. **This is the last request for participation that we will be sending you.**

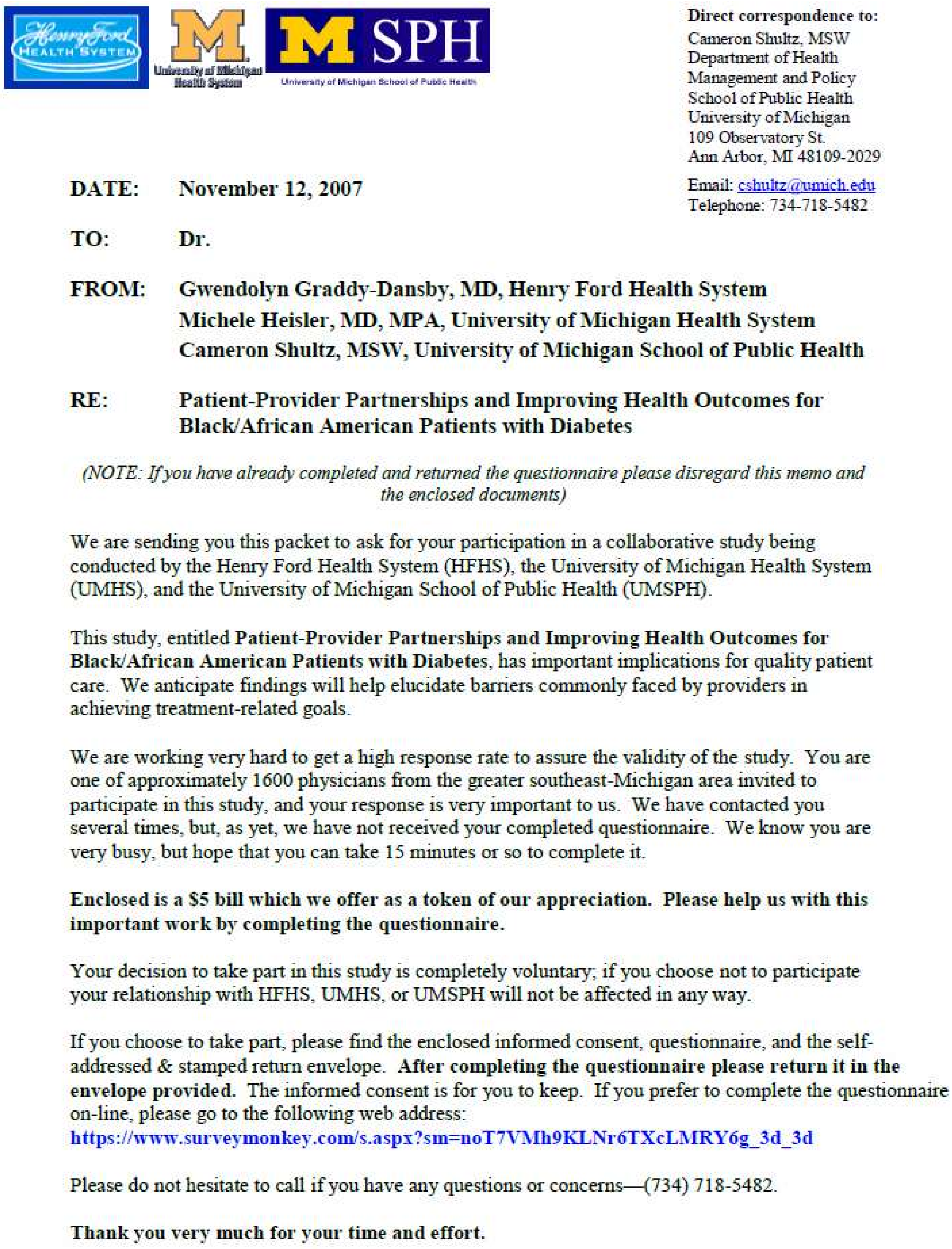
Your decision to take part in this study is completely voluntary; if you choose not to participate your relationship with HFHS, UMHS, or UMSPH will not be affected in any way.

If you do choose to take part please find the enclosed informed consent, survey, and the self-addressed & stamped return envelope. **After completing the survey please return it in the envelope provided.** The informed consent is for you to keep.

If you have any questions or concerns please do not hesitate to call—(734) 718-5482.

Thank you.

Appendix 10. *Revised Cover Letter for Fourth Mailing*



Direct correspondence to:
Cameron Shultz, MSW
Department of Health
Management and Policy
School of Public Health
University of Michigan
109 Observatory St.
Ann Arbor, MI 48109-2029

Email: cshultz@umich.edu
Telephone: 734-718-5482

DATE: **November 12, 2007**

TO: **Dr.**

FROM: **Gwendolyn Graddy-Dansby, MD, Henry Ford Health System**
Michele Heisler, MD, MPA, University of Michigan Health System
Cameron Shultz, MSW, University of Michigan School of Public Health

RE: **Patient-Provider Partnerships and Improving Health Outcomes for Black/African American Patients with Diabetes**

(NOTE: If you have already completed and returned the questionnaire please disregard this memo and the enclosed documents)

We are sending you this packet to ask for your participation in a collaborative study being conducted by the Henry Ford Health System (HFHS), the University of Michigan Health System (UMHS), and the University of Michigan School of Public Health (UMSPH).

This study, entitled **Patient-Provider Partnerships and Improving Health Outcomes for Black/African American Patients with Diabetes**, has important implications for quality patient care. We anticipate findings will help elucidate barriers commonly faced by providers in achieving treatment-related goals.

We are working very hard to get a high response rate to assure the validity of the study. You are one of approximately 1600 physicians from the greater southeast-Michigan area invited to participate in this study, and your response is very important to us. We have contacted you several times, but, as yet, we have not received your completed questionnaire. We know you are very busy, but hope that you can take 15 minutes or so to complete it.

Enclosed is a $5 bill which we offer as a token of our appreciation. Please help us with this important work by completing the questionnaire.

Your decision to take part in this study is completely voluntary; if you choose not to participate your relationship with HFHS, UMHS, or UMSPH will not be affected in any way.

If you choose to take part, please find the enclosed informed consent, questionnaire, and the self-addressed & stamped return envelope. **After completing the questionnaire please return it in the envelope provided.** The informed consent is for you to keep. If you prefer to complete the questionnaire on-line, please go to the following web address:
https://www.surveymonkey.com/s.aspx?sm=noT7VMh9KLNr6TXcLMRY6g_3d_3d

Please do not hesitate to call if you have any questions or concerns—(734) 718-5482.

Thank you very much for your time and effort.

Direct correspondence to:
Cameron Shultz, MSW
Department of Health
Management and Policy
School of Public Health
University of Michigan
109 Observatory St.
Ann Arbor, MI 48109-2029
Email: cshultz@umich.edu
Telephone: 734-718-5482

DATE: **October 29, 2007**

TO: **Dr.**

FROM: **Gwendolyn Graddy-Dansby, MD, Henry Ford Health System**
Michele Heisler, MD, MPA, University of Michigan Health System
Cameron Shultz, MSW, University of Michigan School of Public Health

RE: **Patient-Provider Partnerships and Improving Health Outcomes for Patients with Diabetes**

(NOTE: If you have already completed and returned the questionnaire please disregard this memo and the enclosed documents)

We are sending you this packet to ask for your participation in a collaborative study being conducted by the Henry Ford Health System (HFHS), the University of Michigan Health System (UMHS), and the University of Michigan School of Public Health (UMSPH).

This study, entitled **Patient-Provider Partnerships and Improving Health Outcomes for Patients with Diabetes**, has important implications for quality patient care. We anticipate findings will help elucidate barriers commonly faced by providers in achieving treatment-related goals.

We are working very hard to get a high response rate to assure the validity of the study. You are one of approximately 1600 physicians from the greater southeast-Michigan area invited to participate in this study, and your response is very important to us. We have contacted you several times, but, as yet, we have not received your completed questionnaire. We know you are very busy, but hope that you can take 15 minutes or so to complete it.

Enclosed is a $5 bill which we offer as a token of our appreciation. Please help us with this important work by completing the questionnaire.

Your decision to take part in this study is completely voluntary; if you choose not to participate your relationship with HFHS, UMHS, or UMSPH will not be affected in any way.

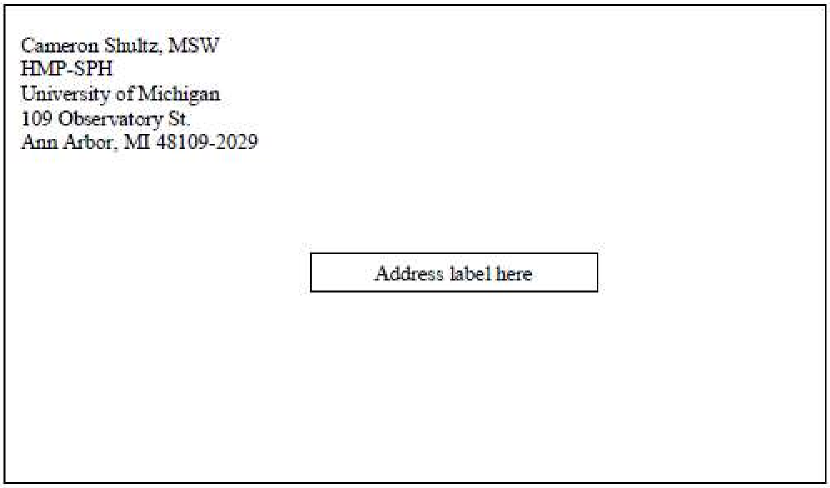
If you choose to take part, please find the enclosed informed consent, questionnaire, and the self-addressed & stamped return envelope. **After completing the questionnaire please return it in the envelope provided.** The informed consent is for you to keep. If you prefer to complete the questionnaire on-line, please go to the following web address:
https://www.surveymonkey.com/s.aspx?sm=PQr03saHzKEj9ALarKBuFw_3d_3d

Please do not hesitate to call if you have any questions or concerns—(734) 718-5482.

Thank you very much for your time and effort.

Appendix 11. *Follow-Up Postcard for PhysicianDatabases.com Mailing List Physicians*

FRONT OF CARD



Cameron Shultz, MSW
HMP-SPH
University of Michigan
109 Observatory St.
Ann Arbor, MI 48109-2029

Address label here

BACK OF CARD

Dear Healthcare Provider: Control #: __________

We are sending you this reminder postcard to ask for your participation in a collaborative study being conducted by the Henry Ford Health System (HFHS), the University of Michigan Health System (UMHS), and the University of Michigan School of Public Health (UMSPH).

This study, entitled **Patient-Provider Partnerships and Improving Health Outcomes for Black/African American Patients with Diabetes**, has important implications for quality patient care. We anticipate findings will help elucidate barriers commonly faced by providers in achieving treatment-related goals.

We have contacted you through the mail several times, but, as yet, we have not received your completed questionnaire. We know you are very busy, but hope that you can take 15 minutes or so to complete it. If you prefer, you can also complete an on-line version using the following web link: **https://www.surveymonkey.com/s.aspx?sm=noT7VMh9KLNr6TXcLMRY6g_3d_3d**

Thank you, and if you have any questions or concerns about the project please contact Co-Investigator Cameron Shultz (Email: cshultz@umich.edu; Telephone: 734-718-5482).

FRONT OF CARD

Cameron Shultz, MSW
HMP-SPH
University of Michigan
109 Observatory St.
Ann Arbor, MI 48109-2029

Address label here

BACK OF CARD

Henry Ford Health System

University of Michigan Health System

M SPH
University of Michigan School of Public Health

Dear Healthcare Provider: Control #: __________

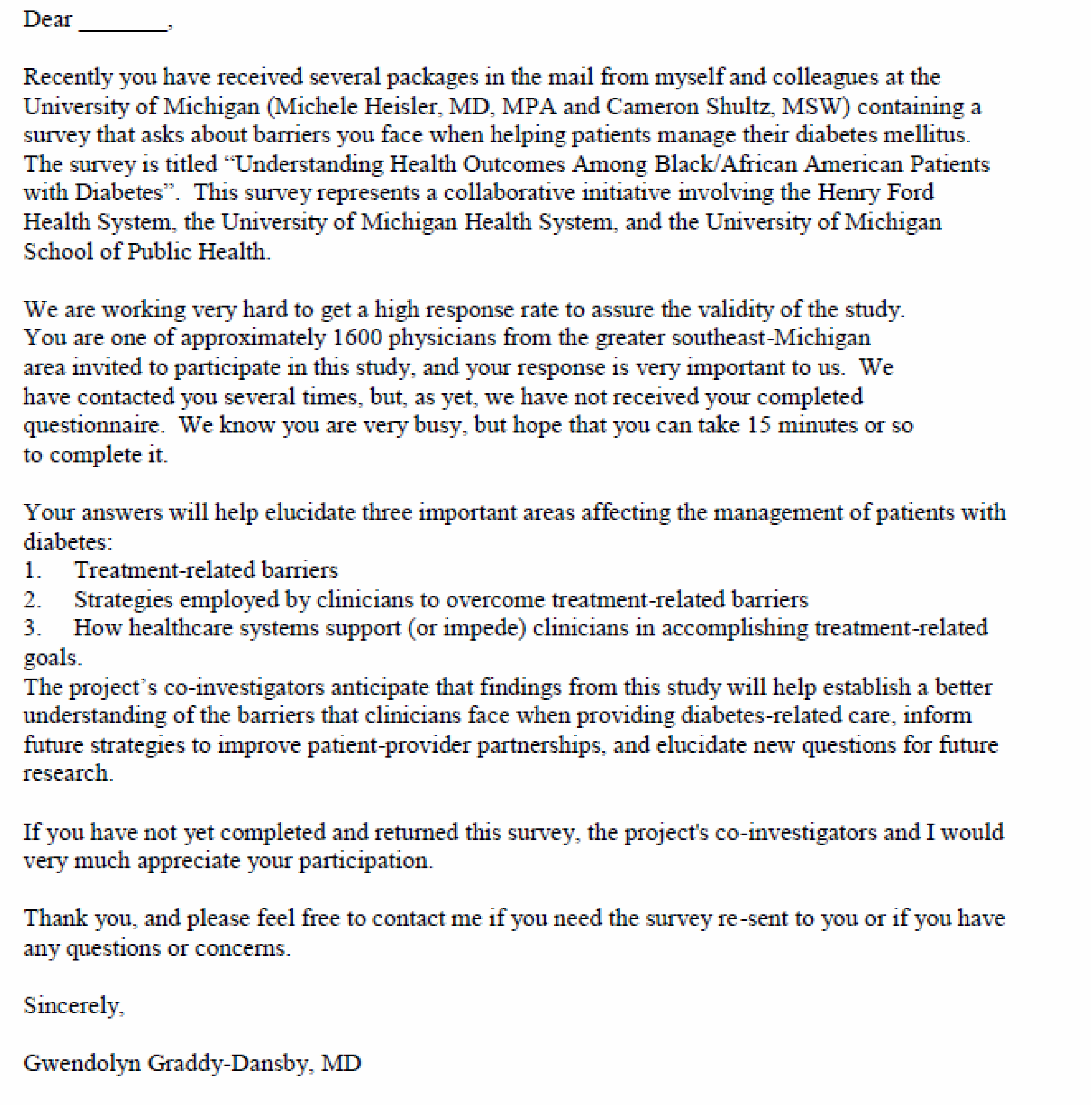
We are sending you this reminder postcard to ask for your participation in a collaborative study being conducted by the Henry Ford Health System (HFHS), the University of Michigan Health System (UMHS), and the University of Michigan School of Public Health (UMSPH).

This study, entitled **Patient-Provider Partnerships and Improving Health Outcomes for Patients with Diabetes**, has important implications for quality patient care. We anticipate findings will help elucidate barriers commonly faced by providers in achieving treatment-related goals.

We have contacted you through the mail several times, but, as yet, we have not received your completed questionnaire. We know you are very busy, but hope that you can take 15 minutes or so to complete it. If you prefer, you can also complete an on-line version using the following web link: **https://www.surveymonkey.com/s.aspx?sm=PQr03saHzKEj9ALarKBuFw_3d_3d**

Thank you, and if you have any questions or concerns about the project please contact Co-Investigator Cameron Shultz (Email: cshultz@umich.edu; Telephone: 734-718-5482).

Appendix 12. Second *Reminder Email Sent to Henry Ford Health System Physicians*



Dear _______,

Recently you have received several packages in the mail from myself and colleagues at the University of Michigan (Michele Heisler, MD, MPA and Cameron Shultz, MSW) containing a survey that asks about barriers you face when helping patients manage their diabetes mellitus. The survey is titled "Understanding Health Outcomes Among Black/African American Patients with Diabetes". This survey represents a collaborative initiative involving the Henry Ford Health System, the University of Michigan Health System, and the University of Michigan School of Public Health.

We are working very hard to get a high response rate to assure the validity of the study. You are one of approximately 1600 physicians from the greater southeast-Michigan area invited to participate in this study, and your response is very important to us. We have contacted you several times, but, as yet, we have not received your completed questionnaire. We know you are very busy, but hope that you can take 15 minutes or so to complete it.

Your answers will help elucidate three important areas affecting the management of patients with diabetes:

1. Treatment-related barriers
2. Strategies employed by clinicians to overcome treatment-related barriers
3. How healthcare systems support (or impede) clinicians in accomplishing treatment-related goals.

The project's co-investigators anticipate that findings from this study will help establish a better understanding of the barriers that clinicians face when providing diabetes-related care, inform future strategies to improve patient-provider partnerships, and elucidate new questions for future research.

If you have not yet completed and returned this survey, the project's co-investigators and I would very much appreciate your participation.

Thank you, and please feel free to contact me if you need the survey re-sent to you or if you have any questions or concerns.

Sincerely,

Gwendolyn Graddy-Dansby, MD

Dear ________,

Recently you have received several packages in the mail from myself and colleagues at the University of Michigan (Michele Heisler, MD, MPA and Cameron Shultz, MSW) containing a survey that asks about barriers you face when helping patients manage their diabetes mellitus. The survey is titled "Understanding Health Outcomes Among Patients with Diabetes". This survey represents a collaborative initiative involving the Henry Ford Health System, the University of Michigan Health System, and the University of Michigan School of Public Health.

We are working very hard to get a high response rate to assure the validity of the study. You are one of approximately 1600 physicians from the greater southeast-Michigan area invited to participate in this study, and your response is very important to us. We have contacted you several times, but, as yet, we have not received your completed questionnaire. We know you are very busy, but hope that you can take 15 minutes or so to complete it.

Your answers will help elucidate three important areas affecting the management of patients with diabetes:

1. Treatment-related barriers
2. Strategies employed by clinicians to overcome treatment-related barriers
3. How healthcare systems support (or impede) clinicians in accomplishing treatment-related goals.

The project's co-investigators anticipate that findings from this study will help establish a better understanding of the barriers that clinicians face when providing diabetes-related care, inform future strategies to improve patient-provider partnerships, and elucidate new questions for future research.

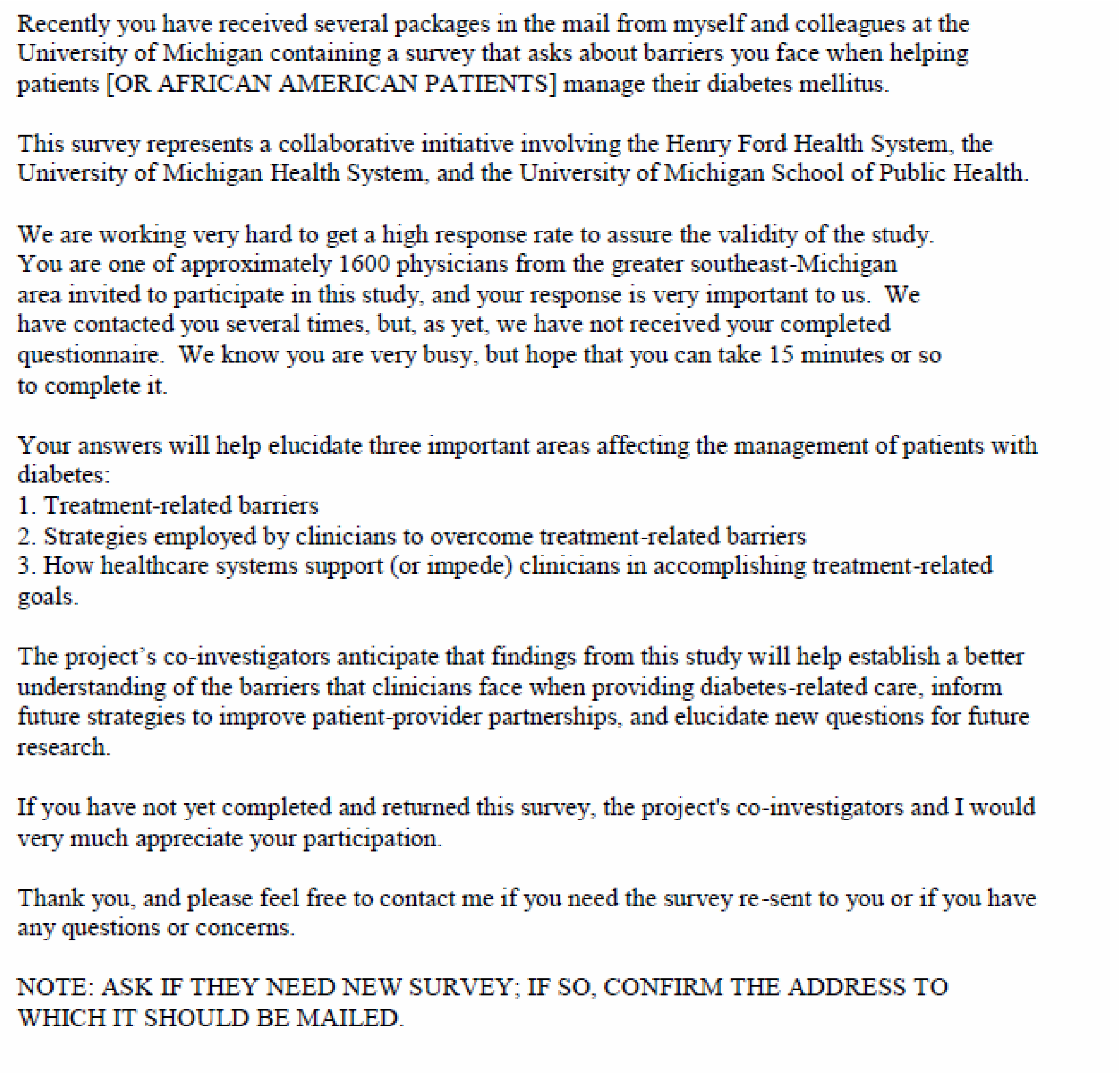
If you have not yet completed and returned this survey, the project's co-investigators and I would very much appreciate your participation.

Thank you, and please feel free to contact me if you need the survey re-sent to you or if you have any questions or concerns.

Sincerely,

Gwendolyn Graddy-Dansby, MD

Appendix 13. *Phone Script for Follow-Up Call to Henry Ford Health System Physicians*



Recently you have received several packages in the mail from myself and colleagues at the University of Michigan containing a survey that asks about barriers you face when helping patients [OR AFRICAN AMERICAN PATIENTS] manage their diabetes mellitus.

This survey represents a collaborative initiative involving the Henry Ford Health System, the University of Michigan Health System, and the University of Michigan School of Public Health.

We are working very hard to get a high response rate to assure the validity of the study. You are one of approximately 1600 physicians from the greater southeast-Michigan area invited to participate in this study, and your response is very important to us. We have contacted you several times, but, as yet, we have not received your completed questionnaire. We know you are very busy, but hope that you can take 15 minutes or so to complete it.

Your answers will help elucidate three important areas affecting the management of patients with diabetes:

1. Treatment-related barriers
2. Strategies employed by clinicians to overcome treatment-related barriers
3. How healthcare systems support (or impede) clinicians in accomplishing treatment-related goals.

The project's co-investigators anticipate that findings from this study will help establish a better understanding of the barriers that clinicians face when providing diabetes-related care, inform future strategies to improve patient-provider partnerships, and elucidate new questions for future research.

If you have not yet completed and returned this survey, the project's co-investigators and I would very much appreciate your participation.

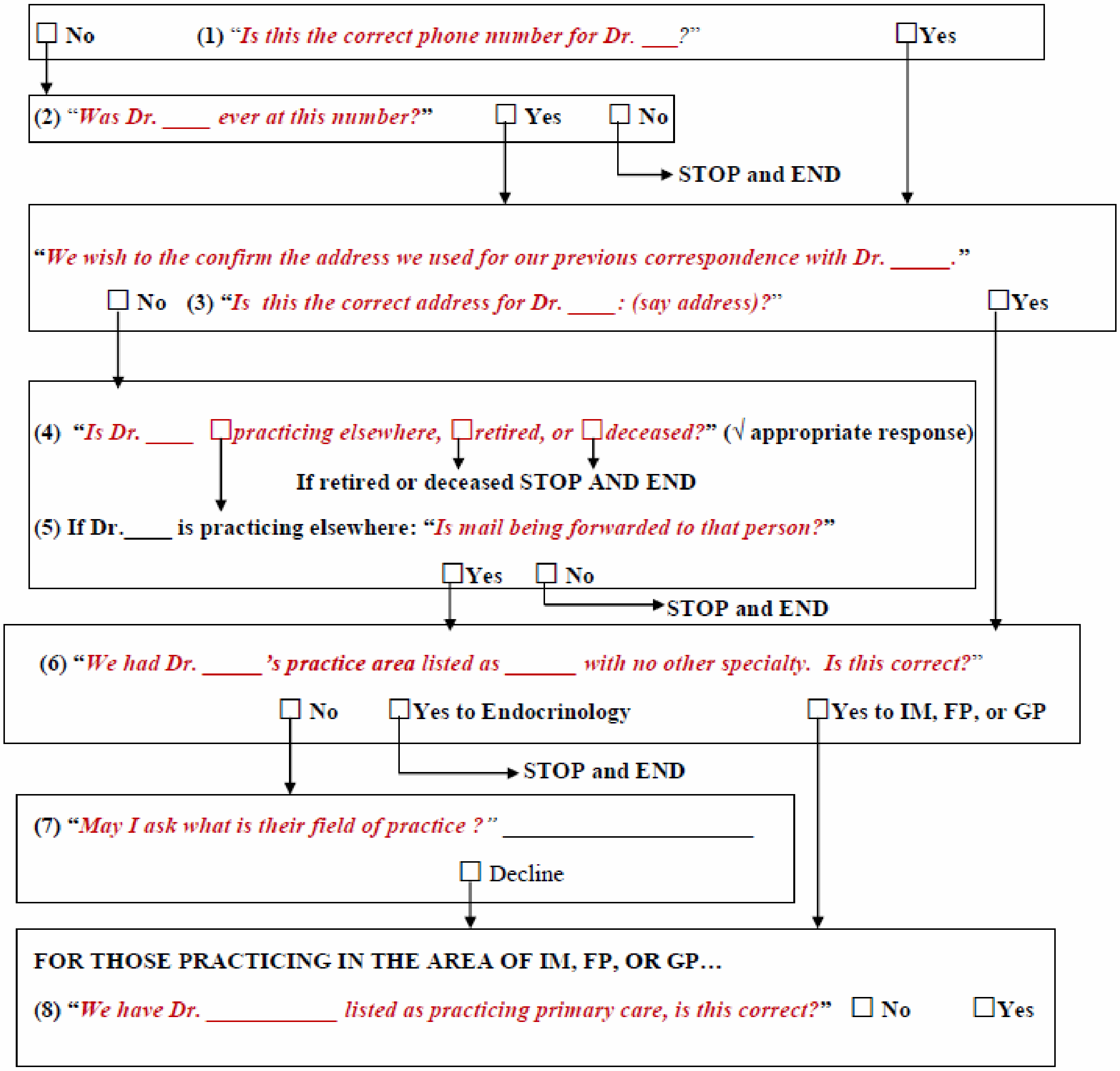
Thank you, and please feel free to contact me if you need the survey re-sent to you or if you have any questions or concerns.

NOTE: ASK IF THEY NEED NEW SURVEY; IF SO, CONFIRM THE ADDRESS TO WHICH IT SHOULD BE MAILED.

Appendix 14. *Phone Script for Confirming Address of Non-Respondents*

Name: phone number: Practice area:
Address:

"Hello. My name is (name of RA) and I am calling on behalf of Dr. Heisler who had sent (Dr. ____) a survey through the mail several months ago. The purpose of this call is not to solicit a response nor to send further correspondence, but rather to remove (Dr. ____) from our sampling frame if (Dr. ____) is not treating patients at this site of care.



☐ **No** **(1)** *"Is this the correct phone number for Dr. ___?"* ☐ **Yes**

(2) *"Was Dr. ____ ever at this number?"* ☐ **Yes** ☐ **No**

STOP and END

"*We wish to the confirm the address we used for our previous correspondence with Dr. _____.***"**

☐ **No** **(3)** *"Is this the correct address for Dr. ____: (say address)?"* ☐ **Yes**

(4) *"Is Dr. ____* ☐ *practicing elsewhere,* ☐ *retired, or* ☐ *deceased?"* **(√ appropriate response)**

If retired or deceased STOP AND END

(5) If Dr.____ is practicing elsewhere: "*Is mail being forwarded to that person?***"**

☐ **Yes** ☐ **No**

STOP and END

(6) "*We had Dr. _____'s practice area listed as ______ with no other specialty. Is this correct?"*

☐ **No** ☐ **Yes to Endocrinology** ☐ **Yes to IM, FP, or GP**

STOP and END

(7) "*May I ask what is their field of practice ?"* ________________________

☐ Decline

FOR THOSE PRACTICING IN THE AREA OF IM, FP, OR GP…

(8) "*We have Dr. ___________ listed as practicing primary care, is this correct?***"** ☐ **No** ☐ **Yes**

Thank you for your time.

Appendix 15. *Fifty-Seven Variables Used in Principle Components Analysis*

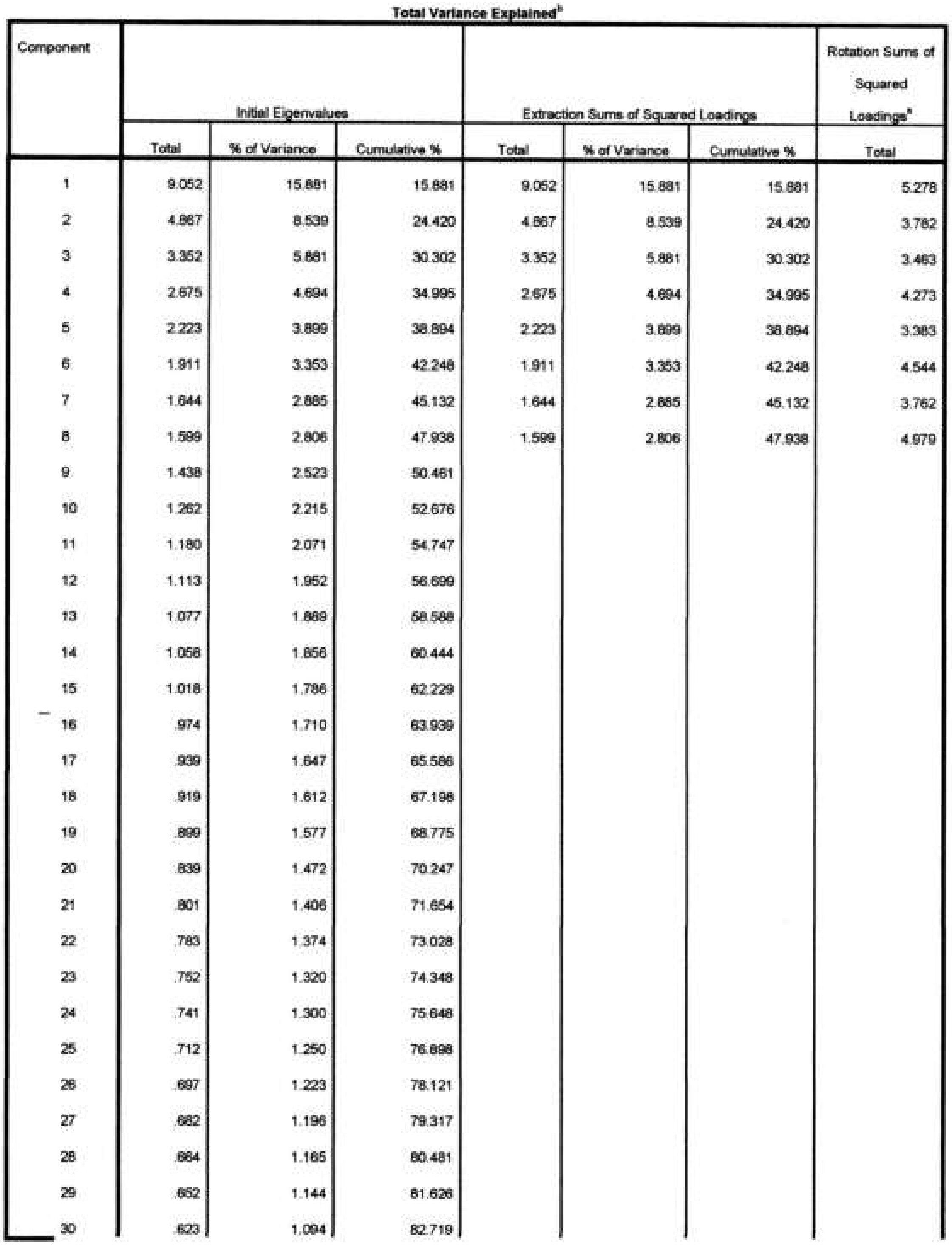
VARIABLE NAME (CODE)	VARIABLE
1. Education Resources (FREQEDURES.IId)	How often would you say you have enough resources to provide the kind of diabetes-related education that you think your patients need?
2. Barrier Frequency (PRASKABTBAR.IIf)	In a typical week, how often would you say you ask your patients about the barriers they face in managing their diabetes?
3. Adherence Recognition (CHALandRES.IIIa1)	I cannot tell who has difficulty adhering to their diabetes regimen.
4. Physician Role (CHALandRES.IIIa2)	Patients do not see it as my role to discuss treatment-related barriers.
5. Admit Adherence (CHALandRES.IIIa3)	Even when I ask, patients rarely admit to adherence problems.
6. Patient Responsibility (CHALandRES.IIIa4)	I believe it is the patient's responsibility to bring such topics (i.e., treatment-related barriers) up.
7. Training to Assess (CHALandRES.IIIa5)	I do not have adequate training to assess the array of barriers that my patients face.
8. Training to Resolve (CHALandRES.IIIa6)	I do not have adequate training to resolve the array of barriers that my patients face.
9. Concern to Offend (CHALandRES.IIIa7)	I am concerned that raising adherence-related barriers might offend the patient.
10. Few Resources (CHALandRES.IIIa8)	I have too few resources available to help me improve patients' adherence.
11. Health Literacy (CHALandRES.IIIa9)	My patients' poor health literacy makes discussing adherence-related barriers difficult.
12. Office Time (CHALandRES.IIIa10)	There is not enough time during office visits to discuss adherence-related barriers.
13. Important Issues (CHALandRES.IIIa11)	My patients have more important issues they would like to discuss with me.
14. Big Difference (CHALandRES.IIIa12)	What I say can make a big difference in improving my patients' adherence to treatment.

15. Other Professional (STRATPATADH.IIIb1)	I arrange for the patient to meet with a social worker, nurse, or other professional so they can work together to find a solution.
16. Shorten Interval (STRATPATADH.IIIb2)	I shorten the interval for the patient's return visit so I can follow-up on their progress.
17. Express Sympathy (STRATPATADH.IIIb3)	I express sympathy about the patient's situation.
18. Ask Patient (STRATPATADH.IIIb4)	I ask the patient what they think I could do to improve their adherence.
19. Make Recommendation (STRATPATADH.IIIb5)	I make recommendations to the patient about what they should do to improve their adherence.
20. Adherence Resources (STRATPATADH.IIIb6)	I give the patient adherence-related resources such as pill-boxes, medication diaries, food/nutrition charts, etc.
21. Medical Equipment (STRATPATADH.IIIb7)	I give the patient medical equipment such as lancets, test strips, glucometer, syringes, etc.
22. Free Samples (STRATPATADH.IIIb8)	I give the patient free samples of medication from a drug company or another source.
23. Change Medication (STRATPATADH.IIIb9)	I change medication(s) to a cheaper/generic brand.
24. Not Skip (STRATPATADH.IIIb10)	I talk with the patient about which medications they should definitely not skip.
25. Will-Power (PATADHBAR.IVa1)	does not have enough will-power
26. Worry (PATADHBAR.IVa2)	does not worry enough about complications
27. Learned Enough (PATADHBAR.IVa3)	not learned enough about diabetes
28. Personal Finances (PATADHBAR.IVa4)	problems with personal finances
29. Cultural Differences (PATADHBAR.IVa5)	does not understand my directions because of cultural differences between me and the patient
30. Denial (PATADHBAR.IVa6)	is in denial about seriousness of disease

31. Competing Demands (PATADHBAR.IVa7)	has too many competing demands
32. Family Support (PATADHBAR.IVa8)	does not have enough family support
33. Community Resources (PATADHBAR.IVa9)	does not have adequate access to community resources (e.g., grocery stores, places to exercise)
34. Insurance (PATADHBAR.IVa10)	is uninsured/under-insured
35. Cognitive Limitations (PATADHBAR.IVa11)	has cognitive limitations
36. Choices (PATADHBAR.IVa12)	makes bad choices (e.g., choosing unhealthy foods even though healthy foods are available)
37. Employer Support (PATADHBAR.IVa13)	does not have enough support from employer/has work-related constraints
38. Care About Future (PATADHBAR.IVa14)	does not seem to care enough about the future and instead is mainly focused on the present day
39. Neighborhood Safety (PATLIKTO.IVb1)	live in a neighborhood that is unsafe
40. Healthy Foods (PATLIKTO.IVb2)	live in a neighborhood with inadequate access to healthy foods
41. Physical Discomfort (PATLIKTO.IVb3)	complain about physical discomfort
42. Financial Problems (PATLIKTO.IVb4)	have financial problems
43. Truth (PATLIKTO.IVb5)	not tell you the truth regarding their adherence with their treatment plan
44. Career Demands (PATLIKTO.IVb6)	have significant career demands/work-related responsibilities that impede disease management
45. Family Demands (PATLIKTO.IVb7)	have significant care-taking demands/family-related responsibilities that impede disease management
46. Home Remedies (PATLIKTO.IVb8)	use home remedies in place of prescribed medications to treat their diabetes
47. Trust Information (PATLIKTO.IVb9)	not trust the information you give them

48. Social Support (PATLIKTO.IVb10)	lack social support
49. Overwhelmed (PATLIKTO.IVb11)	be overwhelmed with the demands of managing the disease
50. Able (ABLE.Va)	My working environment is structured such that I can not adhere to practice guidelines.
51. Willing (WILLING.Va)	I am not financially rewarded for spending the time required to adhere to best-practice guidelines & recommendations.
52. Ready (READY.Va)	I do not believe that practice guidelines are entirely applicable to my clinical setting because they do not adequately account for my practice environment.
53. Get Medications (GETMEDS.VIc1)	My patients with diabetes are always able to get the diabetes-related medications they need.
54. Get Specialty Care (GETSPECCARE.VIc2)	My patients with diabetes are always able to get the diabetes-related specialty care they need.
55. Resources CC Care (PRRESCC.VIc3)	I have all the resources I need to provide culturally sensitive care.
56. CC Time Constraints (PRCCTIME.VIc4)	Providing culturally sensitive care is NOT always realistic in my working environment given the time constraints related to my clinical practice.
57. CC Cost Constraints (PRCCOST.VIc5)	Providing culturally sensitive care is NOT always realistic in my working environment given the cost constraints related to my clinical practice.

Appendix 16. *Parallel Analysis and Scree Plot Test—57 Variables*



Total Variance Explained[b]

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	9.052	15.881	15.881	9.052	15.881	15.881	5.278
2	4.867	8.539	24.420	4.867	8.539	24.420	3.782
3	3.352	5.881	30.302	3.352	5.881	30.302	3.463
4	2.675	4.694	34.995	2.675	4.694	34.995	4.273
5	2.223	3.899	38.894	2.223	3.899	38.894	3.383
6	1.911	3.353	42.248	1.911	3.353	42.248	4.544
7	1.644	2.885	45.132	1.644	2.885	45.132	3.762
8	1.599	2.806	47.938	1.599	2.806	47.938	4.979
9	1.438	2.523	50.461				
10	1.262	2.215	52.676				
11	1.180	2.071	54.747				
12	1.113	1.952	56.699				
13	1.077	1.889	58.588				
14	1.058	1.856	60.444				
15	1.018	1.786	62.229				
16	.974	1.710	63.939				
17	.939	1.647	65.586				
18	.919	1.612	67.198				
19	.899	1.577	68.775				
20	.839	1.472	70.247				
21	.801	1.406	71.654				
22	.783	1.374	73.028				
23	.752	1.320	74.348				
24	.741	1.300	75.648				
25	.712	1.250	76.898				
26	.697	1.223	78.121				
27	.682	1.196	79.317				
28	.664	1.165	80.481				
29	.652	1.144	81.626				
30	.623	1.094	82.719				

31	.586	1.028	83.747				
32	.577	1.013	84.760				
33	.558	.978	85.738				
34	.533	.936	86.674				
35	.512	.899	87.573				
36	.496	.871	88.443				
37	.489	.859	89.302				
38	.471	.826	90.128				
39	.444	.779	90.907				
40	.426	.747	91.654				
41	.400	.702	92.357				
42	.390	.684	93.041				
43	.370	.650	93.691				
44	.351	.616	94.307				
45	.341	.598	94.905				
46	.327	.574	95.479				
47	.311	.546	96.024				
48	.303	.531	96.556				
49	.290	.509	97.064				
50	.269	.472	97.537				
51	.243	.426	97.963				
52	.234	.411	98.374				
53	.215	.377	98.751				
54	.200	.351	99.102				
55	.195	.343	99.445				
56	.168	.294	99.739				
57	.149	.261	100.000				

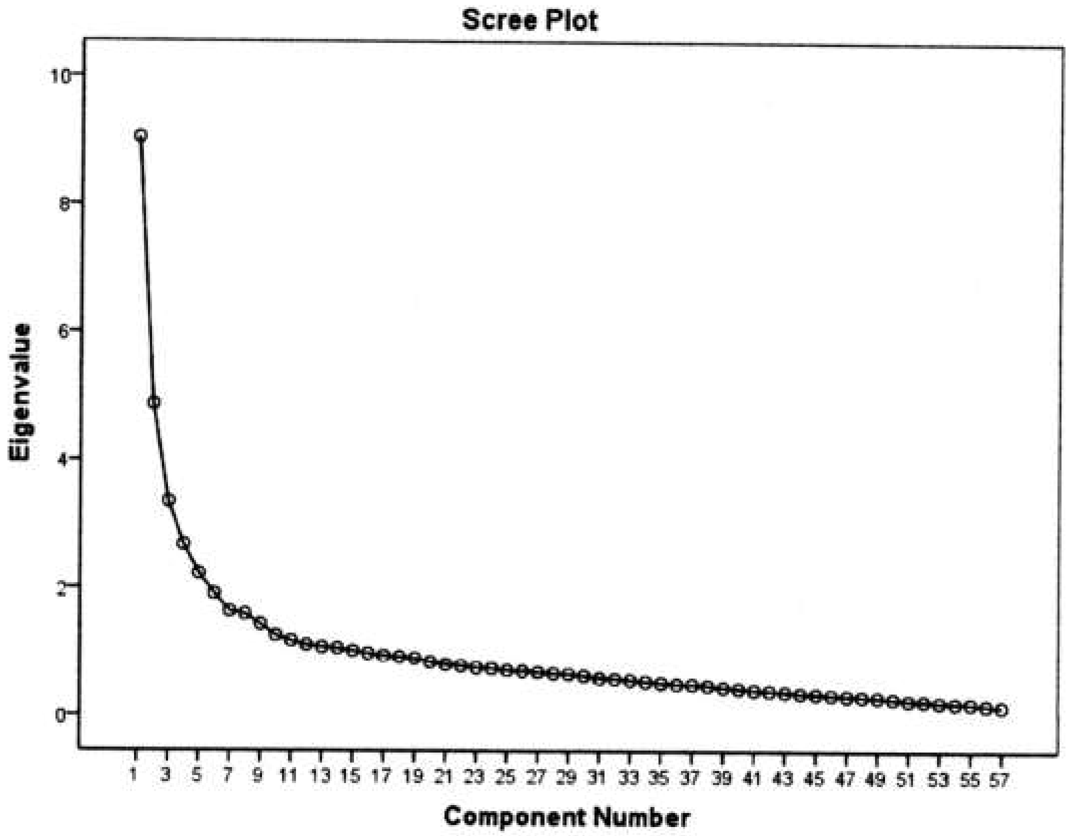
Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

b. Only cases for which Survey Type = General Survey are used in the analysis phase.

Monte Carlo PCA for Parallel Analysis

```
2/11/2012   12:07:43 PM
Number of variables:     57
Number of subjects:     324
Number of replications: 100

+++++++++++++++++++++++++++++++++++++++++++++++++++++++
Eigenvalue #     Random Eigenvalue     Standard Dev
+++++++++++++++++++++++++++++++++++++++++++++++++++++++
      1               1.9305              .0479
      2               1.8399              .0397
      3               1.7736              .0315
      4               1.7181              .0286
      5               1.6718              .0261
      6               1.6247              .0241
      7               1.5873              .0220
      8               1.5431              .0223
      9               1.5062              .0195
     10               1.4689              .0208
     11               1.4319              .0214
     12               1.3988              .0192
     13               1.3676              .0187
     14               1.3351              .0196
     15               1.3047              .0174
     16               1.2756              .0154
     17               1.2476              .0169
     18               1.2150              .0157
     19               1.1879              .0150
     20               1.1615              .0144
     21               1.1368              .0135
     22               1.1111              .0153
     23               1.0845              .0149
     24               1.0623              .0153
     25               1.0360              .0150
     26               1.0115              .0161
     27               0.9886              .0155
     28               0.9655              .0163
     29               0.9438              .0146
     30               0.9207              .0139
     31               0.8979              .0158
     32               0.8782              .0154
     33               0.8558              .0132
     34               0.8348              .0132
     35               0.8143              .0141
     36               0.7932              .0135
     37               0.7731              .0144
     38               0.7528              .0135
     39               0.7316              .0132
     40               0.7123              .0121
     41               0.6938              .0128
     42               0.6730              .0129
     43               0.6542              .0104
     44               0.6354              .0111
     45               0.6162              .0116
     46               0.5975              .0121
     47               0.5790              .0111
     48               0.5592              .0125
     49               0.5396              .0132
     50               0.5217              .0125
     51               0.4998              .0117
     52               0.4801              .0124
     53               0.4581              .0132
     54               0.4374              .0131
     55               0.4139              .0139
     56               0.3884              .0151
```


Scree Plot
Eigenvalue
10
8
6
4
2
0
Component Number
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57

Appendix 17. *Pattern and Structure Matrices, the Component Correlation Matrix, and the Mean Communality for the Fifty-Seven Variable Direct Oblimin Solution*

Pattern Matrix[a,b]

	Component							
	1	2	3	4	5	6	7	8
Mm.does not have adequate access to community resources (e.g., grocery stores, places to exercise)	**.716**	.009	-.036	-.014	-.045	-.032	-.045	-.105
Mm.is uninsured/under-insured	**.609**	-.100	-.068	-.006	.207	-.049	-.228	-.048
Mm.has problems with personal finances	**.560**	-.040	.023	.123	-.068	-.068	-.200	.037
Mm.has cognitive limitations	**.535**	-.091	-.041	-.225	.173	.002	-.175	-.070
Mm.does not have enough support from employer/has work-related constraints	**.523**	.046	.069	-.040	-.014	-.066	.097	-.349
Mm.does not have enough family support	**.523**	-.002	.246	.087	-.146	-.027	.176	-.173
Mm.does not understand my directions because of cultural differences between me and the patient	**.455**	.164	-.038	-.239	.046	-.044	.076	-.123
Mm.has not learned enough about diabetes	**.418**	.048	.223	-.027	-.349	-.052	.033	.112
Mm.reversed.I give the patient adherence-related resources such as pill-boxes, medication diaries, food/nutrition charts, etc.	.060	**.688**	-.044	.018	-.136	.007	-.051	-.020
Mm.reversed.I talk with the patient about which medications they should definitely not skip.	-.019	**.566**	-.139	.049	-.012	-.024	-.020	-.068
Mm.reversed.I make recommendations to the patient about what they should do to improve their adherence.	.126	**.553**	-.151	-.229	.005	-.080	.083	.050
Mm.reversed.I ask the patient what they think I could do to improve their adherence.	-.152	**.526**	.229	-.057	.009	-.064	.029	.061

Mm.reversed.I give the patient free samples of medication from a drug company or another source.	.236	**.505**	-.086	.138	-.356	.222	-.118	-.128
Mm.reversed.condensed.In a typical week, how often would you say you ask your patients about the barriers they face in managing their diabetes?	-.122	**.497**	.102	-.192	-.136	-.029	-.049	.099
Mm.reversed.I change medication(s) to a cheaper/generic brand.	-.087	**.484**	-.106	.000	.313	-.011	.063	-.140
Mm.reversed.I give the patient medical equipment such as lancets, test strips, glucometer, syringes, etc.	.028	**.481**	.006	.097	-.080	.010	.126	-.040
Mm.reversed.I shorten the interval for the patient's return visit so I can follow-up on their progress.	.026	**.476**	.087	-.034	.136	-.055	-.133	.082
Mm.does not worry enough about complications	.047	.019	**.734**	.065	-.027	-.051	.000	.167
Mm.makes bad choices (e.g., choosing unhealthy foods even though healthy foods are available)	-.043	.020	**.704**	.058	-.145	.135	-.096	.002
Mm.does not have enough will-power	-.189	-.004	**.676**	.010	.066	-.001	.052	-.037
Mm.does not seem to care enough about the future and instead is mainly focused on the present day	.198	.096	**.623**	-.022	.104	.036	.045	-.073
Mm.is in denial about seriousness of disease	.094	-.138	**.621**	.036	-.020	-.065	-.037	-.001
Mm.not tell you the truth regarding their adherence with their treatment plan	-.181	-.045	**.458**	-.195	.213	-.126	-.402	-.289
Mm.I cannot tell who has difficulty adhering to their diabetes regimen.	.085	.005	-.127	**-.687**	.004	.083	-.058	.021

Mm.Even when I ask, patients rarely admit to adherence problems.	.084	-.157	.273	**-.644**	.115	.028	-.050	.062
Mm.I am concerned that raising adherence-related barriers might offend the patient.	.077	.002	-.116	**-.627**	-.104	-.041	.054	-.073
Mm.Patients do not see it as my role to discuss treatment-related barriers.	.024	.097	-.091	**-.587**	-.085	-.047	.008	.035
Mm.I believe it is the patient's responsibility to bring such topics (i.e., treatment-related barriers) up.	-.070	.070	.152	**-.571**	-.074	.165	.116	-.177
Mm.I do not have adequate training to assess the array of barriers that my patients face.	-.216	.175	-.065	**-.463**	-.379	-.119	-.061	-.027
Mm.My patients' poor health literacy makes discussing adherence-related barriers difficult.	.289	-.055	.124	**-.394**	-.085	-.073	-.337	.048
Mm.What I say can make a big difference in improving my patients' adherence to treatment.	.163	-.244	-.026	**.247**	-.074	.172	.235	-.027
Mm.There is not enough time during office visits to discuss adherence-related barriers.	.081	.109	.120	-.187	**-.576**	-.158	-.003	-.122
Mm.I have too few resources available to help me improve patients' adherence.	-.005	.021	-.053	-.103	**-.520**	-.427	-.149	.047
Mm.I do not have adequate training to resolve the array of barriers that my patients face.	-.144	.170	-.007	-.365	**-.486**	-.134	-.085	-.015
Mm.My patients have more important issues they would like to discuss with me.	.026	-.023	.059	-.336	**-.474**	.039	.023	-.177
Mm.reversed.I express sympathy about the patient's situation.	.030	.400	.014	-.187	**.409**	-.130	.147	.100

Mm.condensed.My working environment is structured such that I can not adhere to practice guidelines.	.144	.171	-.006	-.123	**-.312**	-.293	.088	-.113
Mm.revesed..My patients with diabetes are always able to get the diabetes-related specialty care they need.	.147	.017	-.145	.219	.093	**-.679**	-.138	-.002
Mm.reversed.I have all the resources I need to provide culturally sensitive care.	-.033	.166	.045	.147	-.060	**-.663**	.018	-.142
Mm.reversed.My patients with diabetes are always able to get the diabetes-related medications they need.	.123	.050	-.066	.331	.063	**-.607**	-.240	.001
Mm.Providing culturally sensitive care is NOT always realistic in my working environment given the cost constraints related to my clinical practice.	-.004	.008	.179	-.217	.014	**-.600**	.192	-.114
Mm.Providing culturally sensitive care is NOT always realistic in my working environment given the time constraints related to my clinical practice.	.011	.015	.212	-.221	-.066	**-.578**	.130	-.073
Mm.condensed.I do not believe that practice guidelines are entirely applicable to my clinical setting because they do not adequately account for my practice environment.	-.001	-.267	-.039	-.118	-.228	**-.463**	.074	-.026
Mm.condensed.I am not financially rewarded for spending the time required to adhere to best-practice guidelines & recommendations.	.055	.019	.035	-.077	-.276	**-.444**	.238	-.121

Mm.reversed.condensed.How often would you say you have enough resources to provide the kind of diabetes-related education that you think your patients need?	-.099	.231	-.128	-.029	-.195	**-.367**	-.308	-.018
Mm.reversed.I arrange for the patient to meet with a social worker, nurse, or other professional so they can work together to find a solution.	-.011	.233	.027	.050	.241	**-.327**	.037	.126
Mm.have financial problems	.273	-.032	.012	.040	.080	-.028	**-.693**	-.095
Mm.complain about physical discomfort	-.097	-.032	.099	.134	-.265	.083	**-.617**	-.231
Mm.live in a neighborhood that is unsafe	.413	.035	-.035	-.067	-.011	.047	**-.592**	-.024
Mm.live in a neighborhood with inadequate access to healthy foods	.434	.086	-.040	-.095	-.033	.172	**-.519**	-.094
Mm.have significant career demands/work-related responsibilities that impede disease management	-.064	.057	-.089	-.005	.058	.048	.049	**-.889**
Mm.have significant care-taking demands/family-related responsibilities that impede disease management	.028	-.018	-.068	.019	.042	-.007	-.075	**-.841**
Mm.use home remedies in place of prescribed medications to treat their diabetes	.133	-.072	.023	-.170	.168	-.117	-.240	**-.476**
Mm.be overwhelmed with the demands of managing the disease	.023	-.085	.075	-.003	-.201	-.132	-.250	**-.476**
Mm.has too many competing demands	.202	.129	.205	.216	-.175	-.081	.135	**-.455**
Mm.lack social support	.283	-.114	.073	-.035	-.100	-.210	-.304	**-.333**
Mm.not trust the information you give them	.216	-.081	.064	-.122	.092	-.252	-.145	**-.309**

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 45 iterations.

b. Only cases for which Survey Type = General Survey are used in the analysis phase.

Structure Matrix^{a}

	Component							
	1	2	3	4	5	6	7	8
Mm.does not have adequate access to community resources (e.g., grocery stores, places to exercise)	**.765**	.000	.032	-.067	-.136	-.144	-.226	-.350
Mm.is uninsured/under-insured	**.659**	-.116	-.024	-.009	.139	-.102	-.375	-.241
Mm.does not have enough support from employer/has work-related constraints	**.626**	.053	.152	-.122	-.147	-.196	-.088	-.521
Mm.has problems with personal finances	**.607**	-.061	.059	.072	-.111	-.151	-.320	-.190
Mm.has cognitive limitations	**.588**	-.083	.022	-.225	.083	-.083	-.318	-.256
Mm.does not have enough family support	**.569**	-.026	.305	.006	-.235	-.122	.030	-.355
Mm.does not understand my directions because of cultural differences between me and the patient	**.481**	.197	.024	-.287	-.058	-.171	-.058	-.274
Mm.has not learned enough about diabetes	**.429**	.048	.269	-.116	-.394	-.156	-.050	-.115
Mm.reversed.I give the patient adherence-related resources such as pill-boxes, medication diaries, food/nutrition charts, etc.	.066	**.688**	-.069	-.099	-.161	-.155	-.048	-.072
Mm.reversed.I make recommendations to the patient about what they should do to improve their adherence.	.084	**.608**	-.148	-.298	-.043	-.213	.060	-.001
Mm.reversed.I talk with the patient about which medications they should definitely not skip.	-.011	**.572**	-.165	-.031	-.031	-.132	-.014	-.077
Mm.reversed.I ask the patient what they think I could do to improve their adherence.	-.174	**.538**	.191	-.148	-.009	-.162	.082	.088

Mm.reversed.condensed.In a typical week, how often would you say you ask your patients about the barriers they face in managing their diabetes?	-.126	**.530**	.086	-.282	-.159	-.158	-.006	.061
Mm.reversed.I change medication(s) to a cheaper/generic brand.	-.107	**.488**	-.146	-.025	.287	-.066	.075	-.038
Mm.reversed.I shorten the interval for the patient's return visit so I can follow-up on their progress.	.017	**.477**	.052	-.101	.115	-.149	-.116	.048
Mm.reversed.I give the patient medical equipment such as lancets, test strips, glucometer, syringes, etc.	.002	**.471**	-.021	.022	-.090	-.078	.132	-.035
Mm.reversed.I give the patient free samples of medication from a drug company or another source.	.282	**.448**	-.091	.034	-.368	.048	-.152	-.235
Mm.reversed.I express sympathy about the patient's situation.	-.060	**.441**	-.017	-.193	.373	-.165	.153	.147
Mm.What I say can make a big difference in improving my patients' adherence to treatment.	.102	**-.307**	-.034	.306	-.028	.252	.217	.009
Mm.does not worry enough about complications	.050	-.023	**.716**	-.013	-.051	-.087	.016	.064
Mm.makes bad choices (e.g., choosing unhealthy foods even though healthy foods are available)	.021	-.052	**.693**	-.023	-.169	.062	-.074	-.080
Mm.does not have enough will-power	-.148	-.038	**.661**	-.047	.030	-.023	.086	-.030
Mm.is in denial about seriousness of disease	.157	-.169	**.638**	-.032	-.073	-.099	-.069	-.115

Mm.does not seem to care enough about the future and instead is mainly focused on the present day	.238	.050	**.631**	-.098	.026	-.054	-.007	-.175
Mm.not tell you the truth regarding their adherence with their treatment plan	.034	-.029	**.498**	-.278	.098	-.221	-.438	-.356
Mm.I cannot tell who has difficulty adhering to their diabetes regimen.	.101	.088	-.056	**-.665**	-.073	-.029	-.104	-.064
Mm.I am concerned that raising adherence-related barriers might offend the patient.	.122	.108	-.024	**-.644**	-.204	-.159	-.018	-.170
Mm.Even when I ask, patients rarely admit to adherence problems.	.112	-.096	.341	**-.632**	.021	-.057	-.096	-.047
Mm.Patients do not see it as my role to discuss treatment-related barriers.	.040	.196	-.024	**-.606**	-.161	-.159	-.027	-.049
Mm.I believe it is the patient's responsibility to bring such topics (i.e., treatment-related barriers) up.	-.020	.118	.217	**-.591**	-.168	.032	.083	-.203
Mm.I do not have adequate training to assess the array of barriers that my patients face.	-.135	.284	.001	**-.547**	-.442	-.252	-.057	-.104
Mm.My patients' poor health literacy makes discussing adherence-related barriers difficult.	.392	-.009	.198	**-.449**	-.177	-.205	-.426	-.187
Mm.There is not enough time during office visits to discuss adherence-related barriers.	.206	.176	.208	-.334	**-.663**	-.318	-.074	-.315
Mm.I have too few resources available to help me improve patients' adherence.	.113	.135	.024	-.240	**-.575**	-.512	-.193	-.147
Mm.My patients have more important issues they would like to discuss with me.	.136	.029	.149	-.415	**-.552**	-.100	-.037	-.306

Mm.I do not have adequate training to resolve the array of barriers that my patients face.	-.048	.265	.061	-.475	**-.546**	-.278	-.092	-.137
Mm.reversed.I have all the resources I need to provide culturally sensitive care.	.084	.279	.091	-.007	-.152	**-.700**	-.061	-.232
Mm.revesed. My patients with diabetes are always able to get the diabetes-related specialty care they need.	.230	.118	-.111	.123	.033	**-.655**	-.221	-.120
Mm.Providing culturally sensitive care is NOT always realistic in my working environment given the cost constraints related to my clinical practice.	.081	.154	.261	-.332	-.119	**-.647**	.102	-.212
Mm.Providing culturally sensitive care is NOT always realistic in my working environment given the time constraints related to my clinical practice.	.104	.155	.295	-.347	-.194	**-.641**	.045	-.203
Mm.reversed.My patients with diabetes are always able to get the diabetes-related medications they need.	.222	.115	-.052	.224	.022	**-.589**	-.304	-.119
Mm.condensed.I am not financially rewarded for spending the time required to adhere to best-practice guidelines & recommendations.	.124	.132	.115	-.192	-.367	**-.498**	.154	-.228
Mm.reversed.condensed.How often would you say you have enough resources to provide the kind of diabetes-related education that you think your patients need?	.022	.315	-.098	-.148	-.240	**-.451**	-.322	-.126

Mm.condensed.I do not believe that practice guidelines are entirely applicable to my clinical setting because they do not adequately account for my practice environment.	.077	-.147	.045	-.179	-.292	**-.450**	.007	-.132
Mm.condensed.My working environment is structured such that I can not adhere to practice guidelines.	.224	.256	.066	-.247	-.402	**-.410**	.001	-.260
Mm.reversed.I arrange for the patient to meet with a social worker, nurse, or other professional so they can work together to find a solution.	-.050	.282	.003	.011	.224	**-.314**	.044	.131
Mm.have financial problems	.451	-.063	.037	-.013	.029	-.120	**-.770**	-.290
Mm.live in a neighborhood that is unsafe	.545	.008	.001	-.117	-.064	-.079	**-.685**	-.258
Mm.complain about physical discomfort	.128	-.078	.120	.048	-.285	-.013	**-.626**	-.343
Mm.live in a neighborhood with inadequate access to healthy foods	.559	.041	-.003	-.139	-.091	.022	**-.618**	-.310
Mm.have significant care-taking demands/family-related responsibilities that impede disease management	.301	-.011	.024	-.065	-.111	-.130	-.230	**-.846**
Mm.have significant career demands/work-related responsibilities that impede disease management	.186	.064	-.006	-.080	-.091	-.074	-.088	**-.833**
Mm.be overwhelmed with the demands of managing the disease	.270	-.069	.161	-.115	-.314	-.247	-.359	**-.593**
Mm.use home remedies in place of prescribed medications to treat their diabetes	.344	-.038	.106	-.231	.027	-.223	-.375	**-.568**
Mm.has too many competing demands	.343	.111	.258	.089	-.276	-.191	.016	**-.540**
Mm.lack social support	.499	-.082	.165	-.140	-.225	-.326	-.453	**-.538**

Mm.not trust the information you give them	.378	-.027	.146	-.197	-.037	-.337	-.280	**-.445**

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

a. Only cases for which Survey Type = General Survey are used in the analysis phase.

Component Correlation Matrix[a]

Component	1	2	3	4	5	6	7	8
1	1.000	-.029	.069	-.042	-.094	-.119	-.220	-.315
2	-.029	1.000	-.056	-.140	-.031	-.199	.030	-.010
3	.069	-.056	1.000	-.109	-.072	-.081	-.003	-.111
4	-.042	-.140	-.109	1.000	.133	.159	.058	.110
5	-.094	-.031	-.072	.133	1.000	.121	.014	.186
6	-.119	-.199	-.081	.159	.121	1.000	.097	.154
7	-.220	.030	-.003	.058	.014	.097	1.000	.178
8	-.315	-.010	-.111	.110	.186	.154	.178	1.000

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

a. Only cases for which Survey Type = General Survey are used in the analysis phase.

Communalities[a]

	Initial	Extraction
Mm.reversed.condensed.How often would you say you have enough resources to provide the kind of diabetes-related education that you think your patients need?	1.000	.401
Mm.reversed.condensed.In a typical week, how often would you say you ask your patients about the barriers they face in managing their diabetes?	1.000	.375
Mm.I cannot tell who has difficulty adhering to their diabetes regimen.	1.000	.475
Mm.Patients do not see it as my role to discuss treatment-related barriers.	1.000	.397
Mm.Even when I ask, patients rarely admit to adherence problems.	1.000	.527
Mm.I believe it is the patient's responsibility to bring such topics (i.e., treatment-related barriers) up.	1.000	.443
Mm.I do not have adequate training to assess the array of barriers that my patients face.	1.000	.536
Mm.I do not have adequate training to resolve the array of barriers that my patients face.	1.000	.538
Mm.I am concerned that raising adherence-related barriers might offend the patient.	1.000	.455
Mm.I have too few resources available to help me improve patients' adherence.	1.000	.565
Mm.My patients' poor health literacy makes discussing adherence-related barriers difficult.	1.000	.480
Mm.There is not enough time during office visits to discuss adherence-related barriers.	1.000	.594
Mm.My patients have more important issues they would like to discuss with me.	1.000	.462
Mm.What I say can make a big difference in improving my patients' adherence to treatment.	1.000	.264
Mm.reversed.I arrange for the patient to meet with a social worker, nurse, or other professional so they can work together to find a solution.	1.000	.242
Mm.reversed.I shorten the interval for the patient's return visit so I can follow-up on their progress.	1.000	.279
Mm.reversed.I express sympathy about the patient's situation.	1.000	.422
Mm.reversed.I ask the patient what they think I could do to improve their adherence.	1.000	.382
Mm.reversed.I make recommendations to the patient about what they should do to improve their adherence.	1.000	.459
Mm.reversed.I give the patient adherence-related resources such as pill-boxes, medication diaries, food/nutrition charts, etc.	1.000	.503
Mm.reversed.I give the patient medical equipment such as lancets, test strips, glucometer, syringes, etc.	1.000	.253
Mm.reversed.I give the patient free samples of medication from a drug company or another source.	1.000	.495
Mm.reversed.I change medication(s) to a cheaper/generic brand.	1.000	.361

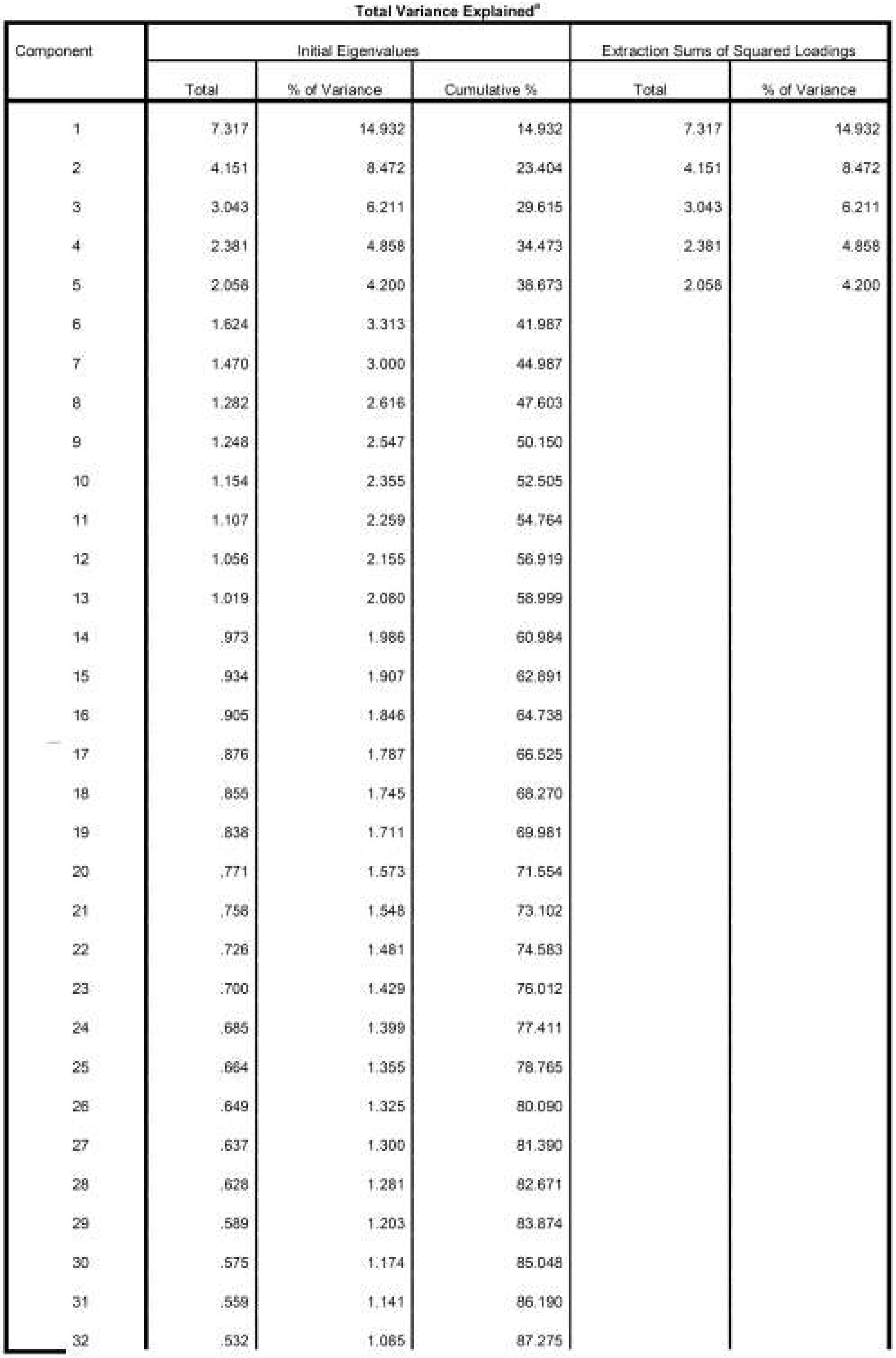
Mm.reversed.I talk with the patient about which medications they should definitely not skip.	1.000	.356
Mm.does not have enough will-power	1.000	.482
Mm.does not worry enough about complications	1.000	.543
Mm.has not learned enough about diabetes	1.000	.376
Mm.has problems with personal finances	1.000	.430
Mm.does not understand my directions because of cultural differences between me and the patient	1.000	.352
Mm.is in denial about seriousness of disease	1.000	.444
Mm.has too many competing demands	1.000	.467
Mm.does not have enough family support	1.000	.477
Mm.does not have adequate access to community resources (e.g., grocery stores, places to exercise)	1.000	.605
Mm.is uninsured/under-insured	1.000	.545
Mm.has cognitive limitations	1.000	.459
Mm.makes bad choices (e.g., choosing unhealthy foods even though healthy foods are available)	1.000	.524
Mm.does not have enough support from employer/has work-related constraints	1.000	.534
Mm.does not seem to care enough about the future and instead is mainly focused on the present day	1.000	.461
Mm.live in a neighborhood that is unsafe	1.000	.642
Mm.live in a neighborhood with inadequate access to healthy foods	1.000	.617
Mm.complain about physical discomfort	1.000	.548
Mm.have financial problems	1.000	.691
Mm.not tell you the truth regarding their adherence with their treatment plan	1.000	.605
Mm.have significant career demands/work-related responsibilities that impede disease management	1.000	.720
Mm.have significant care-taking demands/family-related responsibilities that impede disease management	1.000	.731
Mm.use home remedies in place of prescribed medications to treat their diabetes	1.000	.481
Mm.not trust the information you give them	1.000	.377
Mm.lack social support	1.000	.576
Mm.be overwhelmed with the demands of managing the disease	1.000	.492
Mm.condensed.My working environment is structured such that I can not adhere to practice guidelines.	1.000	.381
Mm.condensed.I am not financially rewarded for spending the time required to adhere to best-practice guidelines & recommendations.	1.000	.414
Mm.condensed.I do not believe that practice guidelines are entirely applicable to my clinical setting because they do not adequately account for my practice environment.	1.000	.337

Mm.reversed.My patients with diabetes are always able to get the diabetes-related medications they need.	1.000	.542
Mm.revesed..My patients with diabetes are always able to get the diabetes-related specialty care they need.	1.000	.558
Mm.reversed.I have all the resources I need to provide culturally sensitive care.	1.000	.562
Mm.Providing culturally sensitive care is NOT always realistic in my working environment given the time constraints related to my clinical practice.	1.000	.547
Mm.Providing culturally sensitive care is NOT always realistic in my working environment given the cost constraints related to my clinical practice.	1.000	.560

Extraction Method: Principal Component Analysis.

a. Only cases for which Survey Type = General Survey are used in the analysis phase.

Appendix 18. *Eigenvalues, the Proportion of Variance Explained by Each Component, the Scree Plot and Parallel Analysis, and the Rotated Component Matrix from Forty-Nine Variables Using Varimax Rotation*



Total Variance Explained[a]

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %	Total	% of Variance
1	7.317	14.932	14.932	7.317	14.932
2	4.151	8.472	23.404	4.151	8.472
3	3.043	6.211	29.615	3.043	6.211
4	2.381	4.858	34.473	2.381	4.858
5	2.058	4.200	38.673	2.058	4.200
6	1.624	3.313	41.987		
7	1.470	3.000	44.987		
8	1.282	2.616	47.603		
9	1.248	2.547	50.150		
10	1.154	2.355	52.505		
11	1.107	2.259	54.764		
12	1.056	2.155	56.919		
13	1.019	2.080	58.999		
14	.973	1.986	60.984		
15	.934	1.907	62.891		
16	.905	1.846	64.738		
17	.876	1.787	66.525		
18	.855	1.745	68.270		
19	.838	1.711	69.981		
20	.771	1.573	71.554		
21	.758	1.548	73.102		
22	.726	1.481	74.583		
23	.700	1.429	76.012		
24	.685	1.399	77.411		
25	.664	1.355	78.765		
26	.649	1.325	80.090		
27	.637	1.300	81.390		
28	.628	1.281	82.671		
29	.589	1.203	83.874		
30	.575	1.174	85.048		
31	.559	1.141	86.190		
32	.532	1.085	87.275		

33	.494	1.008	88.283		
34	.486	.992	89.274		
35	.468	.955	90.229		
36	.454	.926	91.156		
37	.432	.882	92.037		
38	.409	.835	92.872		
39	.404	.824	93.696		
40	.380	.775	94.471		
41	.367	.749	95.220		
42	.356	.726	95.946		
43	.341	.696	96.642		
44	.325	.664	97.306		
45	.303	.619	97.925		
46	.282	.576	98.501		
47	.269	.548	99.050		
48	.245	.501	99.550		
49	.220	.450	100.000		

Extraction Method: Principal Component Analysis.

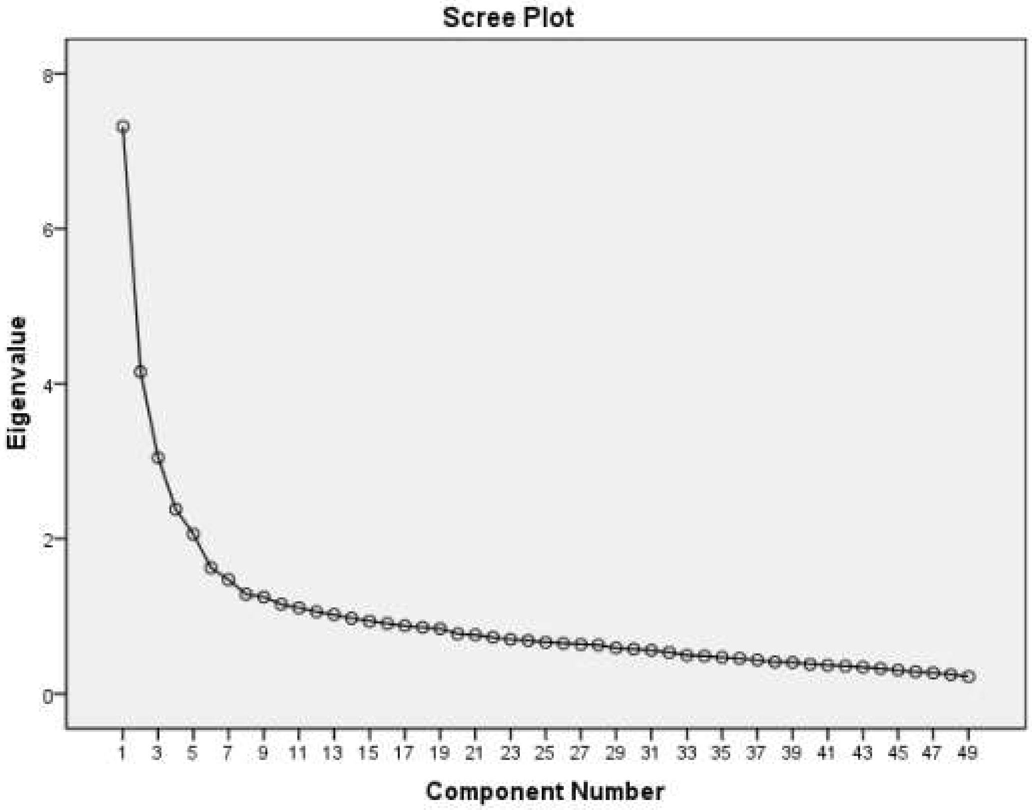
a. Only cases for which Survey Type = General Survey are used in the analysis phase.

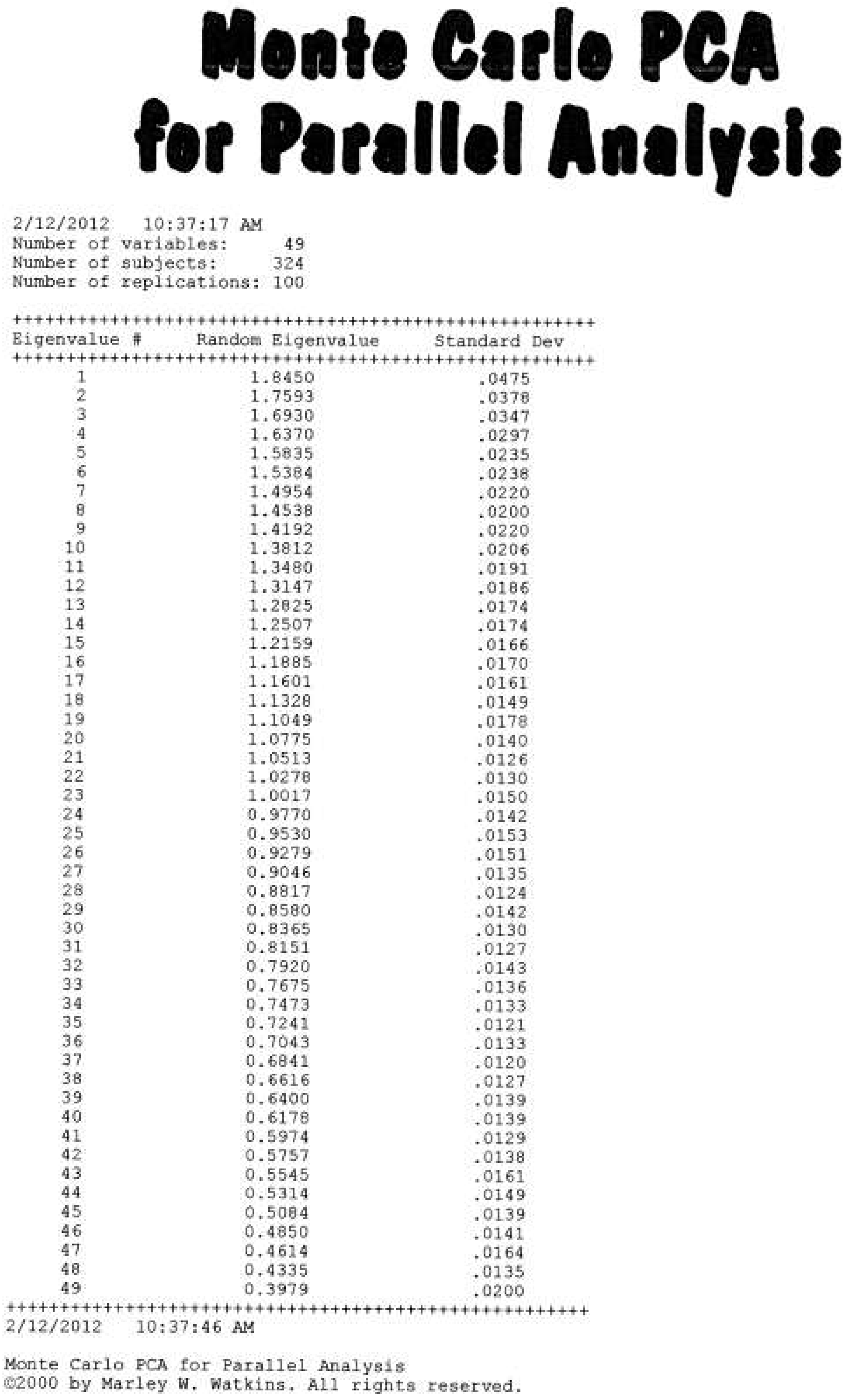
Total Variance Explained[a]

Component	Extraction Sums of Squared Loadings	Rotation Sums of Squared Loadings		
	Cumulative %	Total	% of Variance	Cumulative %
1	14.932	5.454	11.131	11.131
2	23.404	3.955	8.071	19.202
3	29.615	3.405	6.948	26.150
4	34.473	3.108	6.343	32.493
5	38.673	3.028	6.180	38.673
6				
7				
8				
9				
10				
11				
12				

Extraction Method: Principal Component Analysis.

a. Only cases for which Survey Type = General Survey are used in the analysis phase.


Scree Plot
Eigenvalue
8
6
4
2
0
1
3
5
7
9
11
13
15
17
19
21
23
25
27
29
31
33
35
37
39
41
43
45
47
49
Component Number



Monte Carlo PCA for Parallel Analysis

```
2/12/2012   10:37:17 AM
Number of variables:      49
Number of subjects:      324
Number of replications: 100

+++++++++++++++++++++++++++++++++++++++++++++++++++++++
Eigenvalue #     Random Eigenvalue      Standard Dev
+++++++++++++++++++++++++++++++++++++++++++++++++++++++
      1               1.8450                .0475
      2               1.7593                .0378
      3               1.6930                .0347
      4               1.6370                .0297
      5               1.5835                .0235
      6               1.5384                .0238
      7               1.4954                .0220
      8               1.4538                .0200
      9               1.4192                .0220
     10               1.3812                .0206
     11               1.3480                .0191
     12               1.3147                .0186
     13               1.2825                .0174
     14               1.2507                .0174
     15               1.2159                .0166
     16               1.1885                .0170
     17               1.1601                .0161
     18               1.1328                .0149
     19               1.1049                .0178
     20               1.0775                .0140
     21               1.0513                .0126
     22               1.0278                .0130
     23               1.0017                .0150
     24               0.9770                .0142
     25               0.9530                .0153
     26               0.9279                .0151
     27               0.9046                .0135
     28               0.8817                .0124
     29               0.8580                .0142
     30               0.8365                .0130
     31               0.8151                .0127
     32               0.7920                .0143
     33               0.7675                .0136
     34               0.7473                .0133
     35               0.7241                .0121
     36               0.7043                .0133
     37               0.6841                .0120
     38               0.6616                .0127
     39               0.6400                .0139
     40               0.6178                .0139
     41               0.5974                .0129
     42               0.5757                .0138
     43               0.5545                .0161
     44               0.5314                .0149
     45               0.5084                .0139
     46               0.4850                .0141
     47               0.4614                .0164
     48               0.4335                .0135
     49               0.3979                .0200
+++++++++++++++++++++++++++++++++++++++++++++++++++++++
2/12/2012   10:37:46 AM

Monte Carlo PCA for Parallel Analysis
©2000 by Marley W. Watkins. All rights reserved.
```

Rotated Component Matrix[a,b]

	Component				
	1	2	3	4	5
Mm.does not have adequate access to community resources (e.g., grocery stores, places to exercise)	**.728**	.069	.002	-.017	-.003
Mm.is uninsured/under-insured	**.694**	-.159	-.046	-.040	-.029
Mm.live in a neighborhood with inadequate access to healthy foods	**.675**	-.038	-.003	-.073	.138
Mm.has cognitive limitations	**.640**	-.111	-.037	-.005	.191
Mm.does not have enough support from employer/has work-related constraints	**.632**	.161	.050	.124	.027
Mm.has problems with personal finances	**.591**	.052	-.045	.020	-.122
Mm.use home remedies in place of prescribed medications to treat their diabetes	**.587**	.120	-.033	.075	.161
Mm.have significant care-taking demands/family-related responsibilities that impede disease management	**.566**	.217	-.064	.000	-.011
Mm.not trust the information you give them	**.490**	.227	.001	.120	.103
Mm.be overwhelmed with the demands of managing the disease	**.490**	.371	-.132	.097	.040
Mm.does not have enough family support	**.483**	.171	-.028	.273	-.088
Mm.does not understand my directions because of cultural differences between me and the patient	**.458**	.101	.191	-.008	.225
Mm.My patients' poor health literacy makes discussing adherence-related barriers difficult.	**.447**	.162	-.022	.124	.400
Mm.complain about physical discomfort	**.403**	.190	-.183	.045	-.039

Mm.has too many competing demands	**.397**	.321	.074	.234	-.200
Mm.has not learned enough about diabetes	**.311**	.283	-.013	.201	.097
Mm.I have too few resources available to help me improve patients' adherence.	.114	**.708**	.034	-.043	.146
Mm.There is not enough time during office visits to discuss adherence-related barriers.	.200	**.634**	.038	.118	.251
Mm.condensed.I am not financially rewarded for spending the time required to adhere to best-practice guidelines & recommendations.	.056	**.606**	.091	.075	.037
Mm.condensed.My working environment is structured such that I can not adhere to practice guidelines.	.188	**.562**	.173	.000	.141
Mm.reversed.I have all the resources I need to provide culturally sensitive care.	.144	**.540**	.301	.096	-.181
Mm.Providing culturally sensitive care is NOT always realistic in my working environment given the time constraints related to my clinical practice.	.095	**.529**	.173	.243	.163
Mm.I do not have adequate training to resolve the array of barriers that my patients face.	.006	**.521**	.136	.004	.402
Mm.condensed.I do not believe that practice guidelines are entirely applicable to my clinical setting because they do not adequately account for my practice environment.	.043	**.519**	-.155	.016	.052
Mm.reversed.condensed.How often would you say you have enough resources to provide the kind of diabetes-related education that you think your patients need?	.138	**.458**	.272	-.130	.042

Mm.reversed.I give the patient adherence-related resources such as pill-boxes, medication diaries, food/nutrition charts, etc.	.089	.181	**.624**	-.100	.048
Mm.reversed.I make recommendations to the patient about what they should do to improve their adherence.	.057	.138	**.592**	-.158	.239
Mm.reversed.I express sympathy about the patient's situation.	-.095	-.159	**.546**	.033	.111
Mm.reversed.I change medication(s) to a cheaper/generic brand.	-.042	-.141	**.544**	-.104	-.025
Mm.reversed.I ask the patient what they think I could do to improve their adherence.	-.180	.098	**.535**	.196	.090
Mm.reversed.I talk with the patient about which medications they should definitely not skip.	.035	.113	**.534**	-.173	-.008
Mm.reversed.I shorten the interval for the patient's return visit so I can follow-up on their progress.	.036	.018	**.498**	.060	.030
Mm.reversed.condensed.In a typical week, how often would you say you ask your patients about the barriers they face in managing their diabetes?	-.123	.195	**.474**	.071	.256
Mm.reversed.I give the patient medical equipment such as lancets, test strips, glucometer, syringes, etc.	-.022	.088	**.445**	-.024	-.065
Mm.reversed.I arrange for the patient to meet with a social worker, nurse, or other professional so they can work together to find a solution.	-.071	.031	**.386**	.056	-.129
Mm.reversed.I give the patient free samples of medication from a drug company or another source.	.308	.192	**.309**	-.160	-.025
Mm.What I say can make a big difference in improving my patients' adherence to treatment.	-.008	-.154	-.305	-.008	-.244

Mm.does not worry enough about complications	-.033	.054	-.001	**.708**	-.005
Mm.does not have enough will-power	-.147	.018	-.011	**.685**	.018
Mm.makes bad choices (e.g., choosing unhealthy foods even though healthy foods are available)	.034	.054	-.086	**.672**	.044
Mm.does not seem to care enough about the future and instead is mainly focused on the present day	.202	-.020	.085	**.635**	.034
Mm.is in denial about seriousness of disease	.162	.081	-.137	**.623**	-.024
Mm.not tell you the truth regarding their adherence with their treatment plan	.297	.083	-.003	**.487**	.204
Mm.I cannot tell who has difficulty adhering to their diabetes regimen.	.111	.043	.049	-.094	**.675**
Mm.Even when I ask, patients rarely admit to adherence problems.	.122	-.004	-.082	.312	**.632**
Mm.I am concerned that raising adherence-related barriers might offend the patient.	.119	.222	.059	-.064	**.614**
Mm.I believe it is the patient's responsibility to bring such topics (i.e., treatment-related barriers) up.	.007	.086	.063	.209	**.590**
Mm.Patients do not see it as my role to discuss treatment-related barriers.	.017	.199	.154	-.063	**.588**
Mm.reversed.My patients with diabetes are always able to get the diabetes-related medications they need.	.298	.305	.178	-.018	-.344

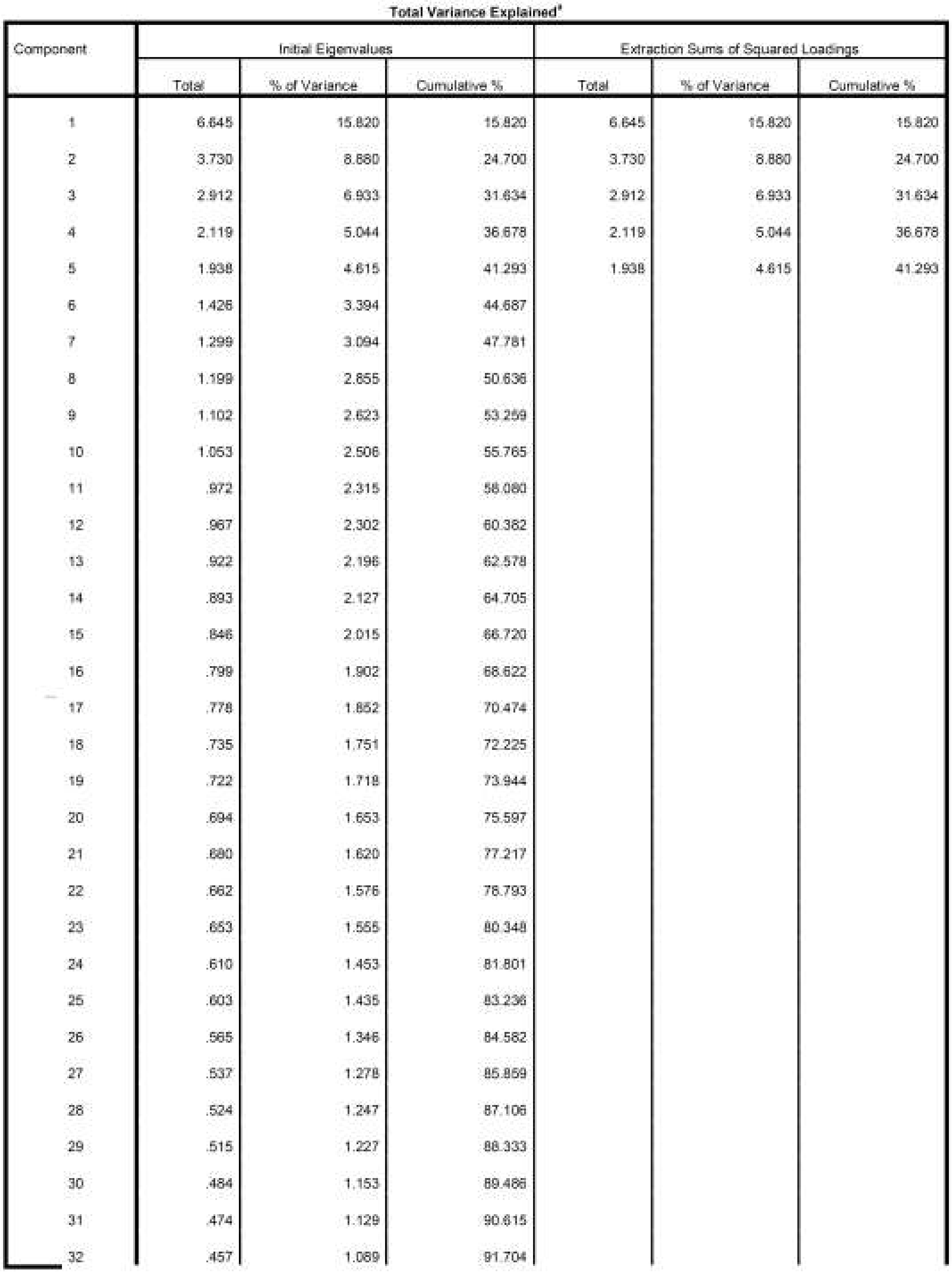
Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

b. Only cases for which Survey Type = General Survey are used in the analysis phase.

Appendix 19. *Eigenvalues, the Proportion of Variance Explained by Each Component, the Scree Plot and Parallel Analysis, and the Rotated Component Matrix from Forty-Two Variables Using Varimax Rotation*



Total Variance Explained[a]

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.645	15.820	15.820	6.645	15.820	15.820
2	3.730	8.880	24.700	3.730	8.880	24.700
3	2.912	6.933	31.634	2.912	6.933	31.634
4	2.119	5.044	36.678	2.119	5.044	36.678
5	1.938	4.615	41.293	1.938	4.615	41.293
6	1.426	3.394	44.687			
7	1.299	3.094	47.781			
8	1.199	2.855	50.636			
9	1.102	2.623	53.259			
10	1.053	2.506	55.765			
11	.972	2.315	58.080			
12	.967	2.302	60.382			
13	.922	2.196	62.578			
14	.893	2.127	64.705			
15	.846	2.015	66.720			
16	.799	1.902	68.622			
17	.778	1.852	70.474			
18	.735	1.751	72.225			
19	.722	1.718	73.944			
20	.694	1.653	75.597			
21	.680	1.620	77.217			
22	.662	1.576	78.793			
23	.653	1.555	80.348			
24	.610	1.453	81.801			
25	.603	1.435	83.236			
26	.565	1.346	84.582			
27	.537	1.278	85.859			
28	.524	1.247	87.106			
29	.515	1.227	88.333			
30	.484	1.153	89.486			
31	.474	1.129	90.615			
32	.457	1.089	91.704			

33	.434	1.032	92.736			
34	.409	.974	93.711			
35	.394	.937	94.648			
36	.387	.921	95.569			
37	.354	.843	96.412			
38	.344	.820	97.232			
39	.328	.782	98.014			
40	.311	.740	98.754			
41	.288	.685	99.438			
42	.236	.562	100.000			

Extraction Method: Principal Component Analysis.

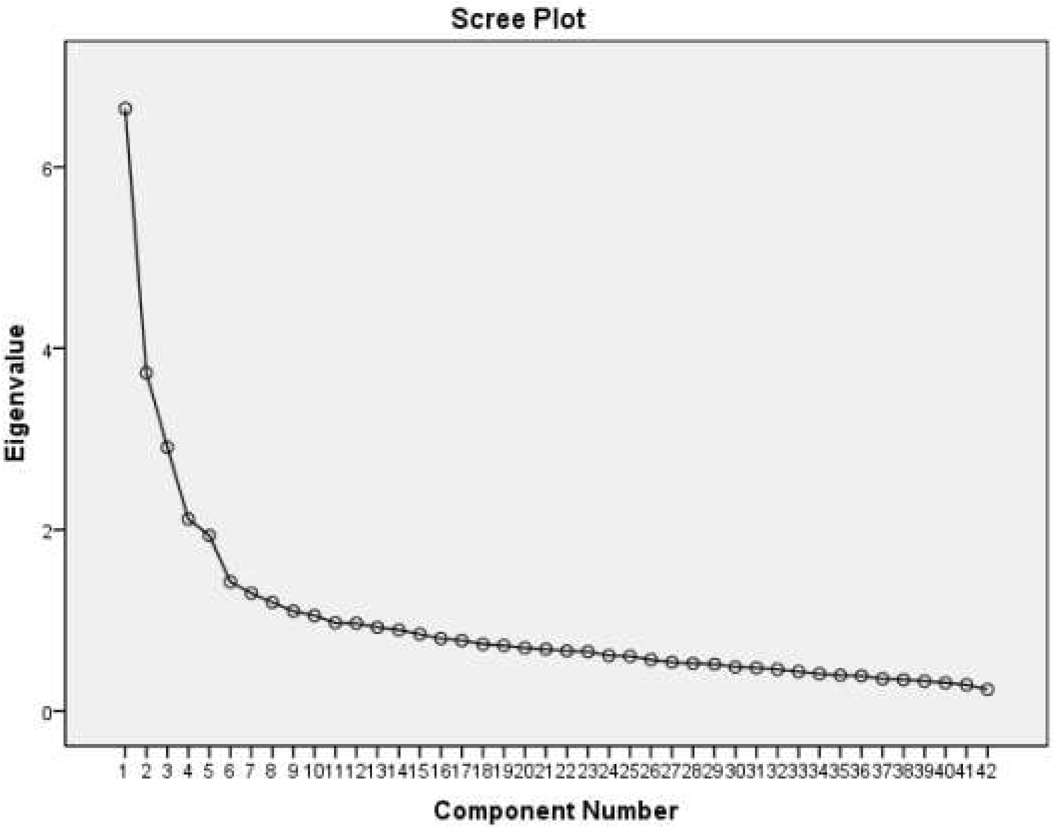
a. Only cases for which Survey Type = General Survey are used in the analysis phase.

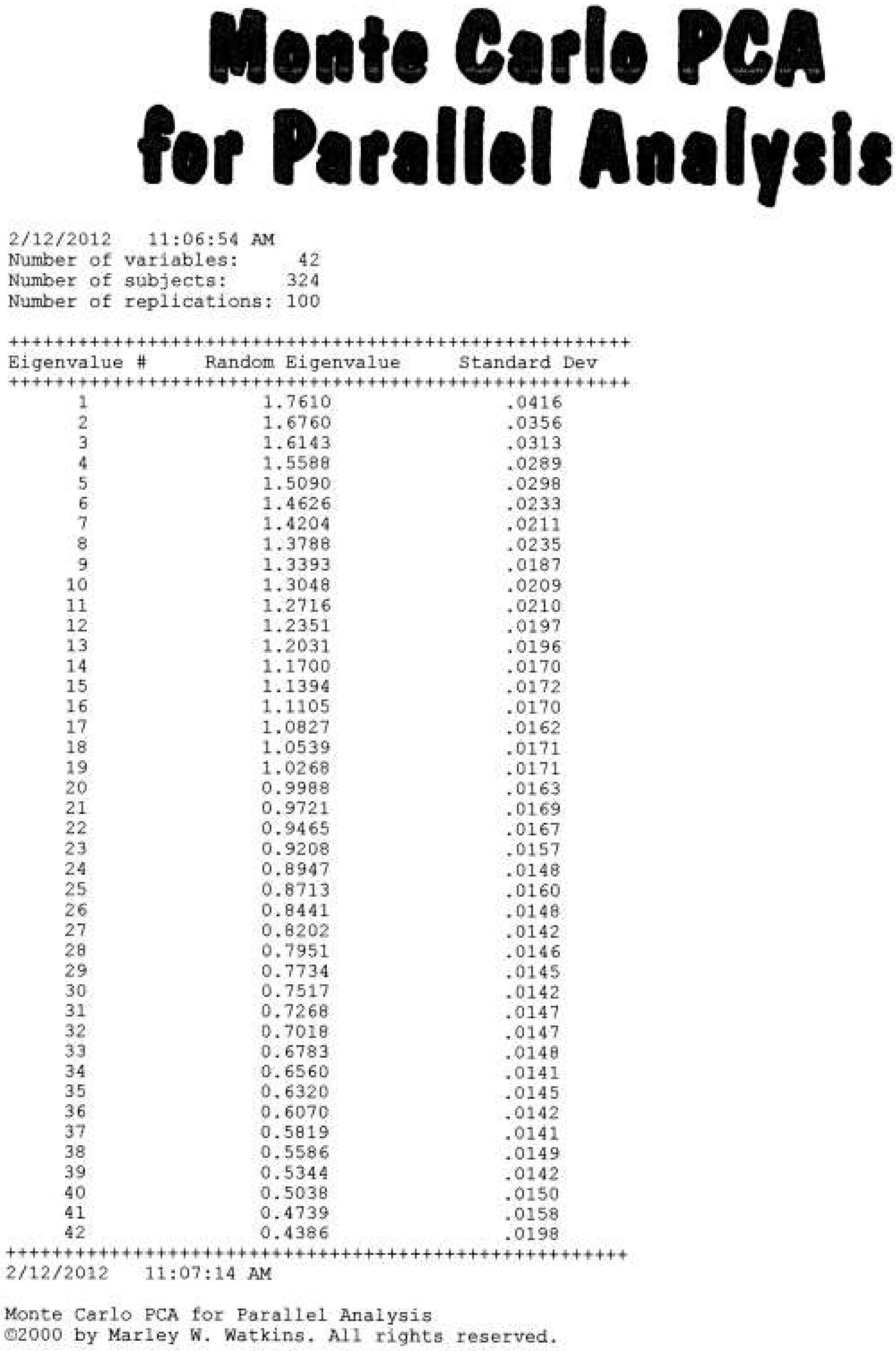
Total Variance Explained[a]

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	5.046	12.014	12.014
2	3.680	8.763	20.776
3	3.076	7.324	28.100
4	2.924	6.963	35.063
5	2.617	6.230	41.293

Extraction Method: Principal Component Analysis.

a. Only cases for which Survey Type = General Survey are used in the analysis phase.


Scree Plot
Eigenvalue
0
2
4
6
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42
Component Number



Monte Carlo PCA for Parallel Analysis

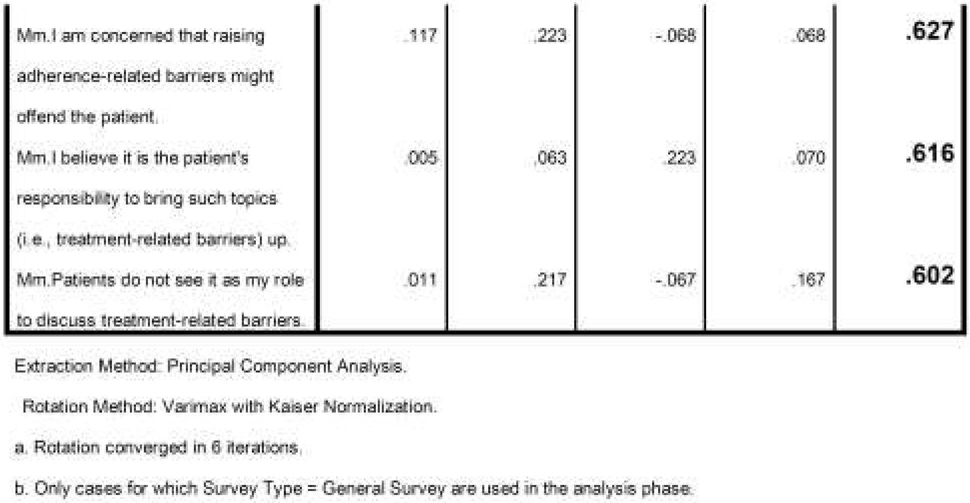
```
2/12/2012   11:06:54 AM
Number of variables:     42
Number of subjects:     324
Number of replications: 100

+++++++++++++++++++++++++++++++++++++++++++++++++++++
Eigenvalue #     Random Eigenvalue      Standard Dev
+++++++++++++++++++++++++++++++++++++++++++++++++++++
      1                 1.7610              .0416
      2                 1.6760              .0356
      3                 1.6143              .0313
      4                 1.5588              .0289
      5                 1.5090              .0298
      6                 1.4626              .0233
      7                 1.4204              .0211
      8                 1.3788              .0235
      9                 1.3393              .0187
     10                 1.3048              .0209
     11                 1.2716              .0210
     12                 1.2351              .0197
     13                 1.2031              .0196
     14                 1.1700              .0170
     15                 1.1394              .0172
     16                 1.1105              .0170
     17                 1.0827              .0162
     18                 1.0539              .0171
     19                 1.0268              .0171
     20                 0.9988              .0163
     21                 0.9721              .0169
     22                 0.9465              .0167
     23                 0.9208              .0157
     24                 0.8947              .0148
     25                 0.8713              .0160
     26                 0.8441              .0148
     27                 0.8202              .0142
     28                 0.7951              .0146
     29                 0.7734              .0145
     30                 0.7517              .0142
     31                 0.7268              .0147
     32                 0.7018              .0147
     33                 0.6783              .0148
     34                 0.6560              .0141
     35                 0.6320              .0145
     36                 0.6070              .0142
     37                 0.5819              .0141
     38                 0.5586              .0149
     39                 0.5344              .0142
     40                 0.5038              .0150
     41                 0.4739              .0158
     42                 0.4386              .0198
+++++++++++++++++++++++++++++++++++++++++++++++++++++
2/12/2012   11:07:14 AM

Monte Carlo PCA for Parallel Analysis
©2000 by Marley W. Watkins. All rights reserved.
```

Rotated Component Matrix[a,b]

	Component				
	1	2	3	4	5
Mm.does not have adequate access to community resources (e.g., grocery stores, places to exercise)	**.731**	.083	-.014	.012	-.008
Mm.is uninsured/under-insured	**.697**	-.157	-.051	-.052	.002
Mm.live in a neighborhood with inadequate access to healthy foods	**.671**	-.034	-.057	.018	.102
Mm.does not have enough support from employer/has work-related constraints	**.638**	.183	.123	.051	.043
Mm.has cognitive limitations	**.637**	-.104	-.010	-.027	.206
Mm.has problems with personal finances	**.590**	.060	.017	-.036	-.100
Mm.use home remedies in place of prescribed medications to treat their diabetes	**.586**	.128	.078	-.011	.191
Mm.have significant care-taking demands/family-related responsibilities that impede disease management	**.572**	.232	-.001	-.073	.004
Mm.does not have enough family support	**.489**	.181	.279	-.009	-.109
Mm.be overwhelmed with the demands of managing the disease	**.489**	.368	.105	-.124	.031
Mm.not trust the information you give them	**.479**	.237	.109	-.016	.139
Mm.does not understand my directions because of cultural differences between me and the patient	**.453**	.130	-.009	.196	.246
Mm.has too many competing demands	**.408**	.331	.233	.068	-.218
Mm.complain about physical discomfort	**.406**	.181	.061	-.179	-.074
Mm.has not learned enough about diabetes	**.302**	.295	.210	-.020	.093

Mm.I have too few resources available to help me improve patients' adherence.	.094	**.695**	-.046	.001	.153
Mm.There is not enough time during office visits to discuss adherence-related barriers.	.175	**.645**	.129	.041	.217
Mm.condensed.I am not financially rewarded for spending the time required to adhere to best-practice guidelines & recommendations.	.050	**.636**	.064	.075	.039
Mm.condensed.My working environment is structured such that I can not adhere to practice guidelines.	.167	**.600**	.002	.168	.129
Mm.Providing culturally sensitive care is NOT always realistic in my working environment given the time constraints related to my clinical practice.	.079	**.562**	.224	.160	.141
Mm.reversed.I have all the resources I need to provide culturally sensitive care.	.133	**.549**	.083	.289	-.160
Mm.condensed.I do not believe that practice guidelines are entirely applicable to my clinical setting because they do not adequately account for my practice environment.	.043	**.518**	-.006	-.206	.085
Mm.reversed.condensed.How often would you say you have enough resources to provide the kind of diabetes-related education that you think your patients need?	.134	**.463**	-.138	.259	.040
Mm.does not worry enough about complications	-.044	.056	**.709**	-.002	.002
Mm.makes bad choices (e.g., choosing unhealthy foods even though healthy foods are available)	.033	.042	**.688**	-.078	.013
Mm.does not have enough will-power	-.155	.021	**.683**	-.031	.047

Mm.does not seem to care enough about the future and instead is mainly focused on the present day	.194	-.005	**.639**	.086	.035
Mm.is in denial about seriousness of disease	.171	.071	**.625**	-.140	-.032
Mm.not tell you the truth regarding their adherence with their treatment plan	.294	.085	**.480**	-.012	.214
Mm.reversed.I make recommendations to the patient about what they should do to improve their adherence.	.054	.167	-.158	**.624**	.230
Mm.reversed.I talk with the patient about which medications they should definitely not skip.	.029	.110	-.147	**.590**	-.067
Mm.reversed.I give the patient adherence-related resources such as pill-boxes, medication diaries, food/nutrition charts, etc.	.075	.201	-.089	**.584**	.049
Mm.reversed.I express sympathy about the patient's situation.	-.100	-.123	.020	**.583**	.081
Mm.reversed.I change medication(s) to a cheaper/generic brand.	-.044	-.124	-.104	**.556**	-.042
Mm.reversed.I ask the patient what they think I could do to improve their adherence.	-.193	.128	.196	**.540**	.049
Mm.reversed.I shorten the interval for the patient's return visit so I can follow-up on their progress.	.029	.043	.058	**.502**	-.004
Mm.reversed.condensed.In a typical week, how often would you say you ask your patients about the barriers they face in managing their diabetes?	-.137	.208	.080	**.465**	.257
Mm.I cannot tell who has difficulty adhering to their diabetes regimen.	.099	.048	-.091	.048	**.690**
Mm.Even when I ask, patients rarely admit to adherence problems.	.111	.002	.309	-.067	**.648**



Mm.I am concerned that raising adherence-related barriers might offend the patient.	.117	.223	-.068	.068	**.627**
Mm.I believe it is the patient's responsibility to bring such topics (i.e., treatment-related barriers) up.	.005	.063	.223	.070	**.616**
Mm.Patients do not see it as my role to discuss treatment-related barriers.	.011	.217	-.067	.167	**.602**

Extraction Method: Principal Component Analysis.

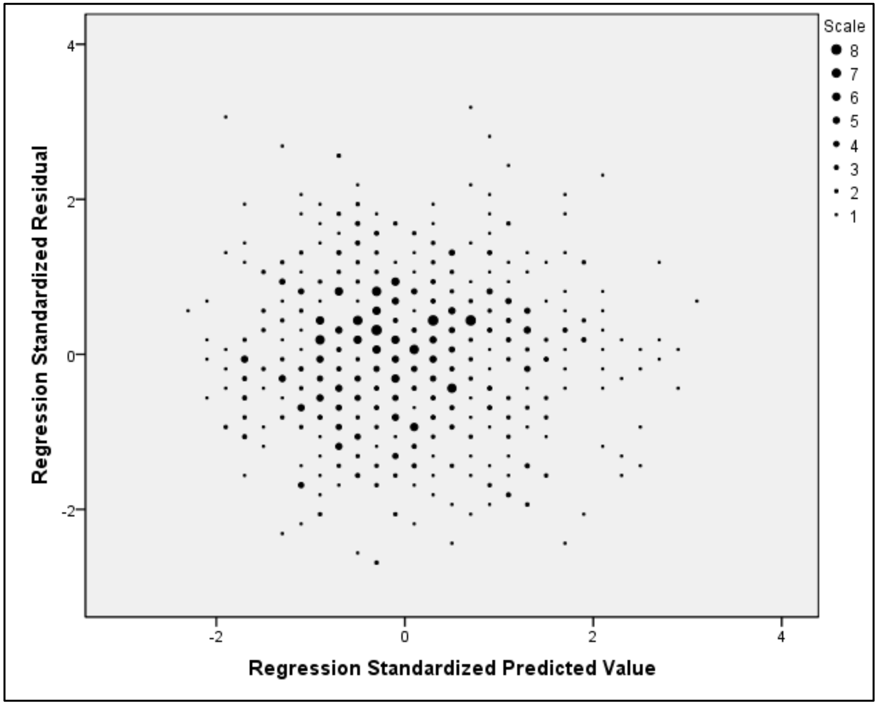
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

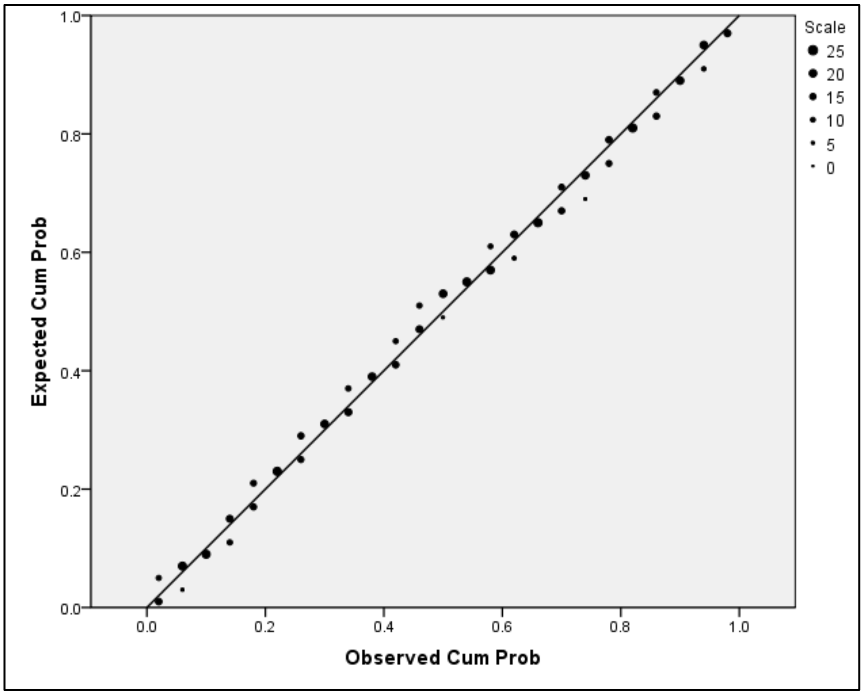
b. Only cases for which Survey Type = General Survey are used in the analysis phase.

Appendix 20. Scatterplot of Standardized Residuals and Normal Probability Plots of the Regression Standardized Residuals for Continuous Dependent Variables

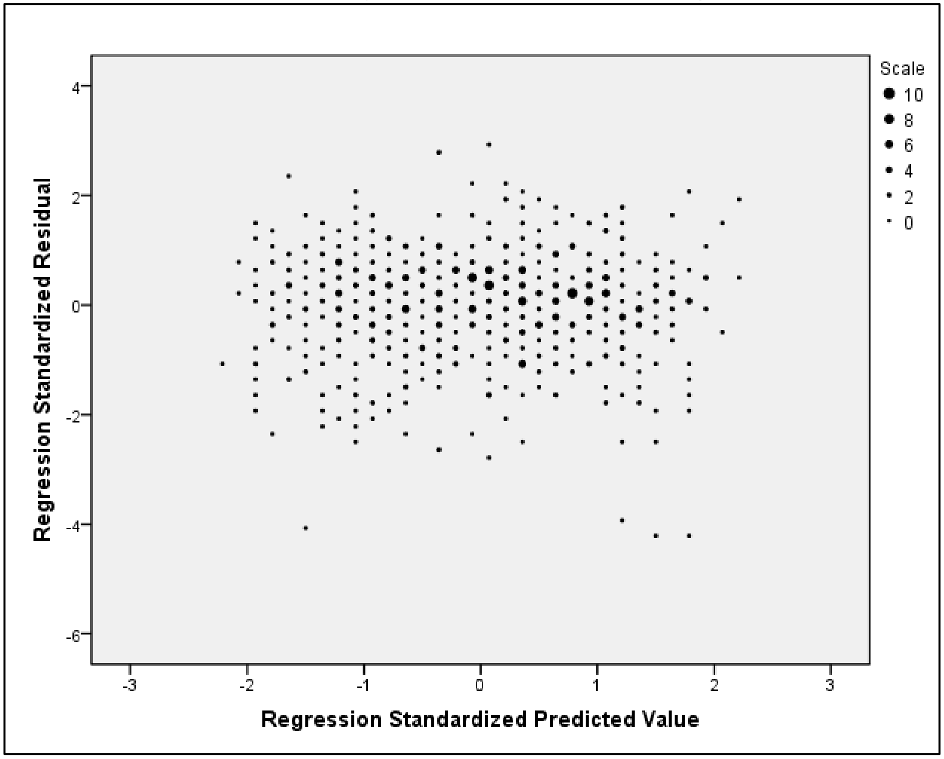
1. *Scatterplot of Standardized Residuals for Component 1—Physicians' Perceptions of Patients' Disease Management Barriers*



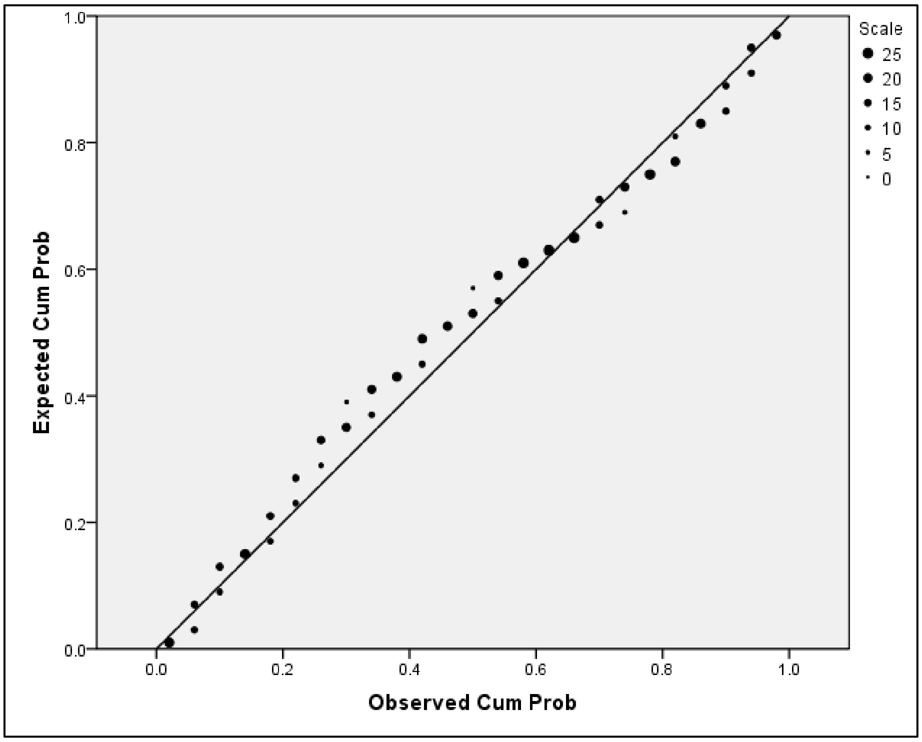
2. *Normal Probability Plots of the Regression Standardized Residuals for Component 1—Physicians' Perceptions of Patients' Disease Management Barriers*



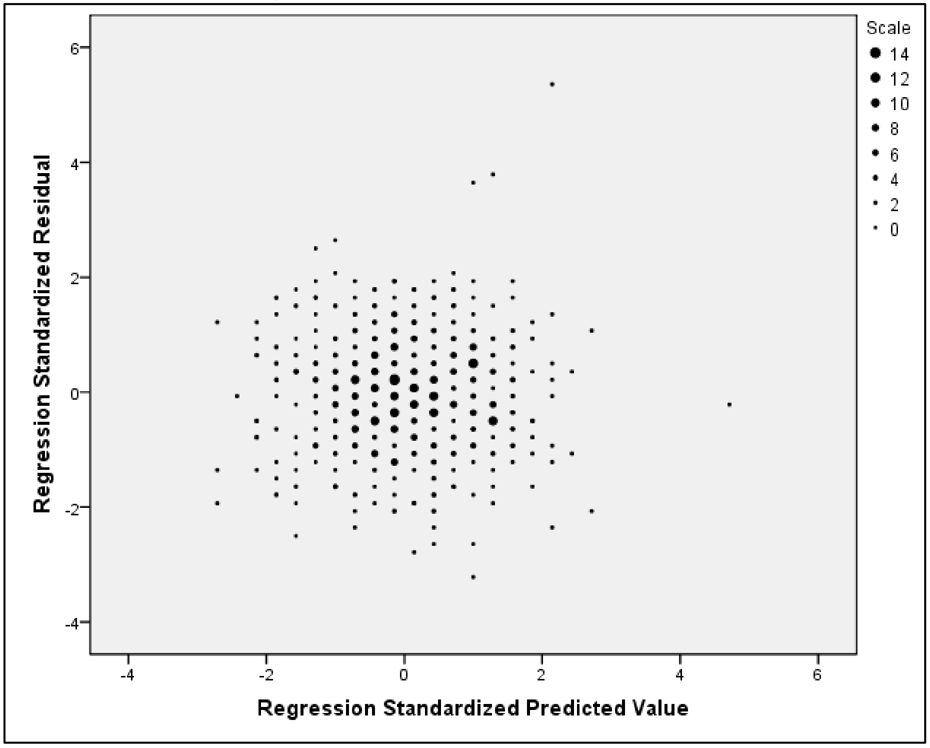
3. *Scatterplot of Standardized Residuals for Component 3—Physicians' Perceptions of Patients' Disease Management Attitudes*



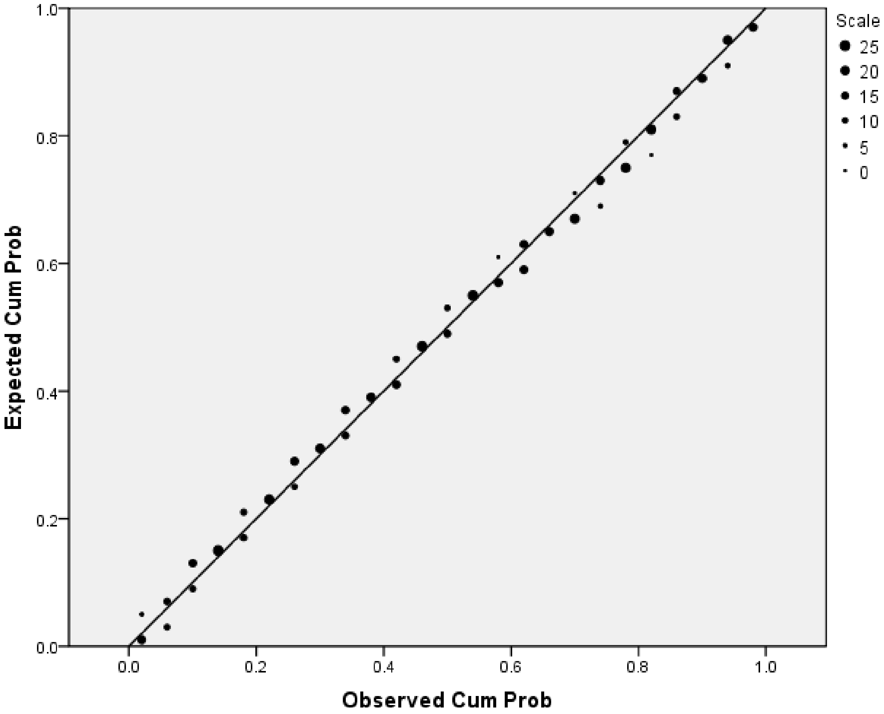
4. *Normal Probability Plots of the Regression Standardized Residuals for Component 3—Physicians' Perceptions of Patients' Disease Management Attitudes*



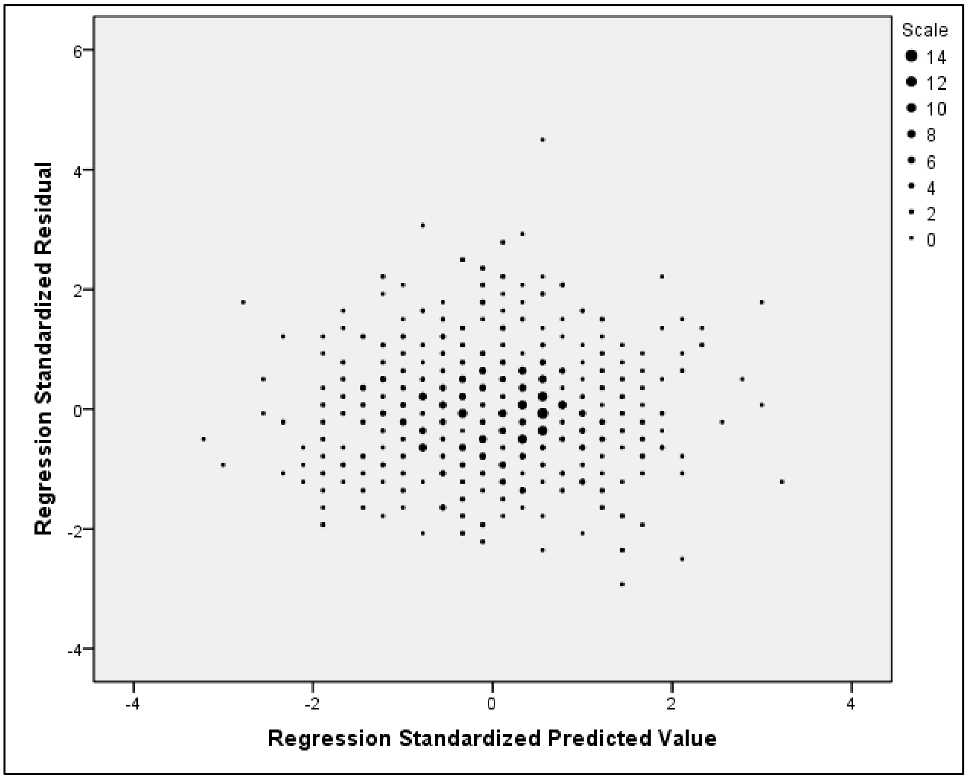
5. *Scatterplot of Standardized Residuals for Component 4—Physicians' Strategies to Promote Patient Adherence*



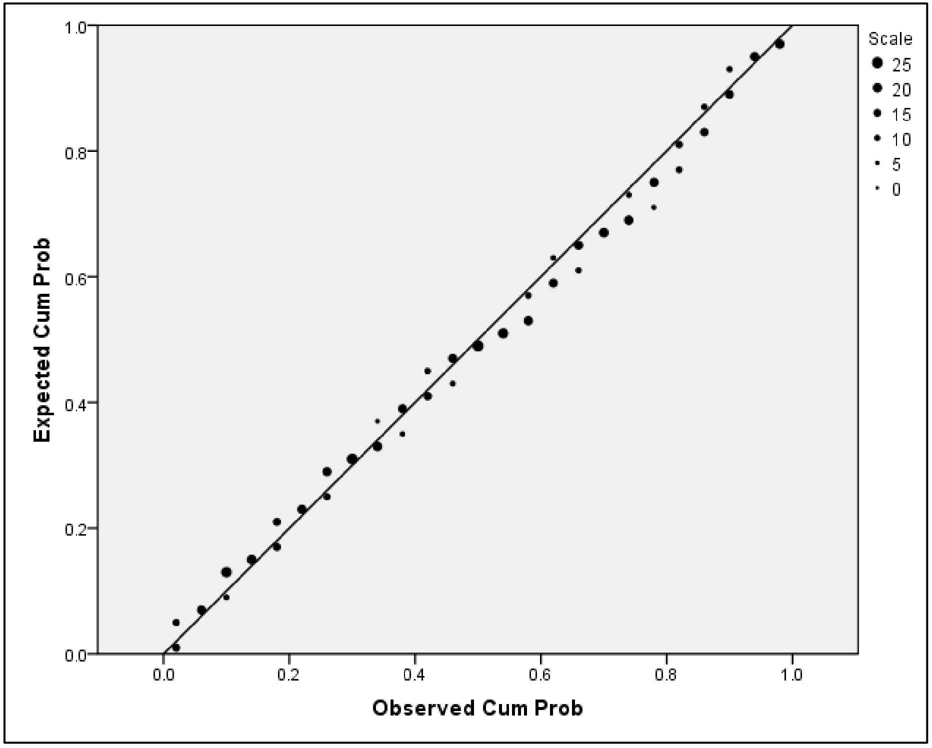
6. *Normal Probability Plots of the Regression Standardized Residuals for Component 4— Physicians' Strategies to Promote Patient Adherence*



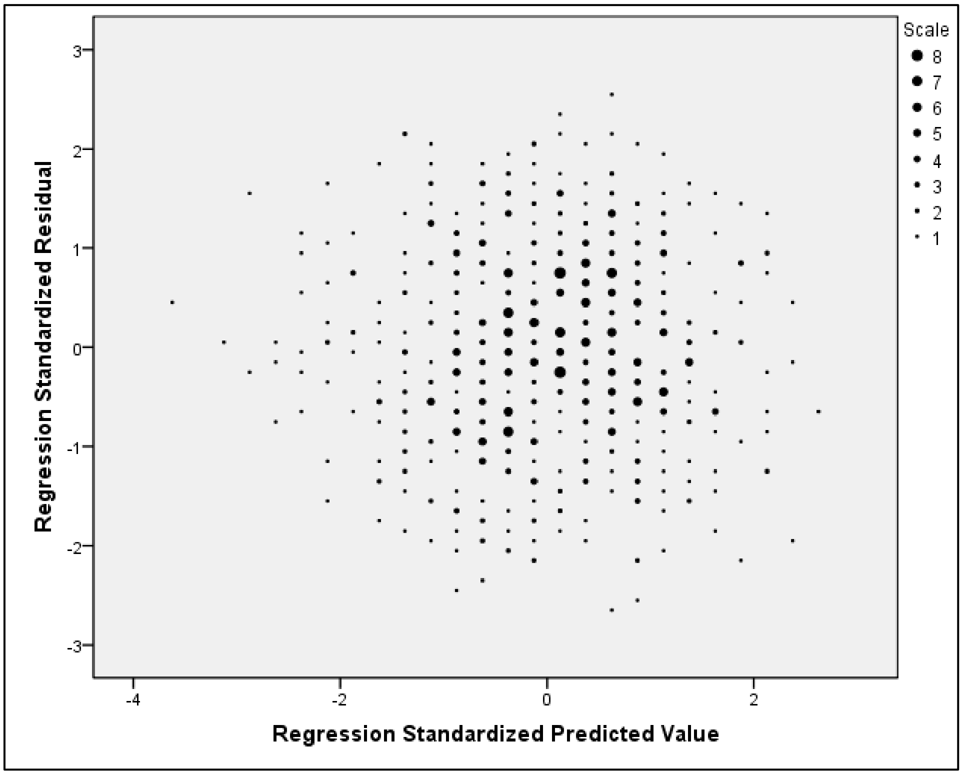
7. *Scatterplot of Standardized Residuals for Component 5—Efficacy and Control*



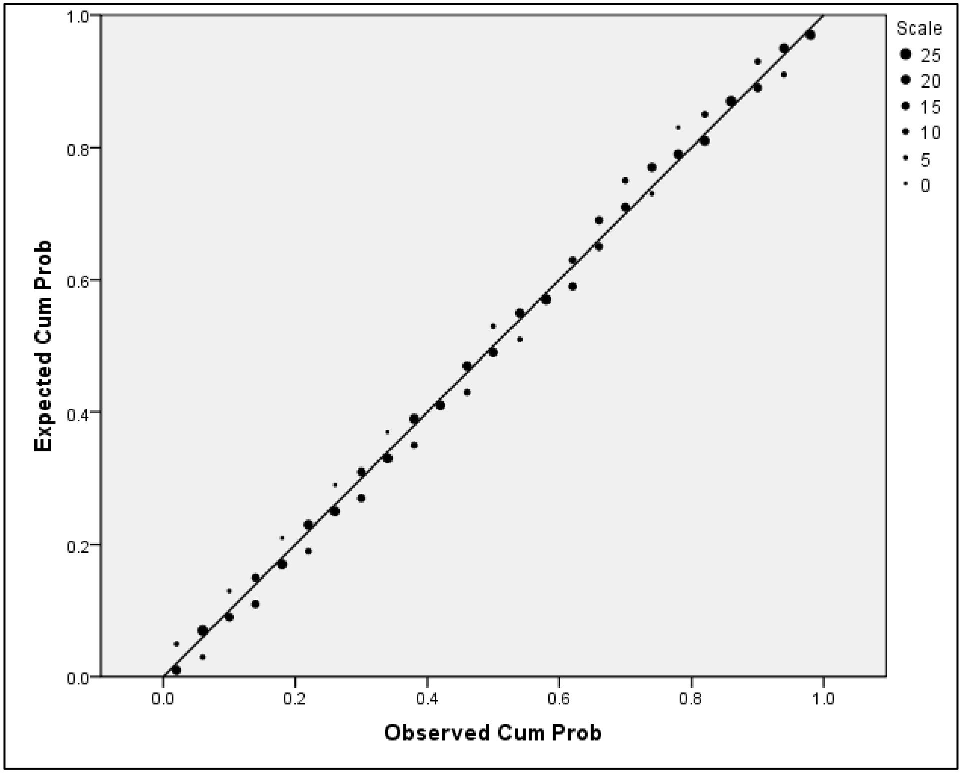
8. *Normal Probability Plots of the Regression Standardized Residuals for Component 5— Physicians' Efficacy and Control*



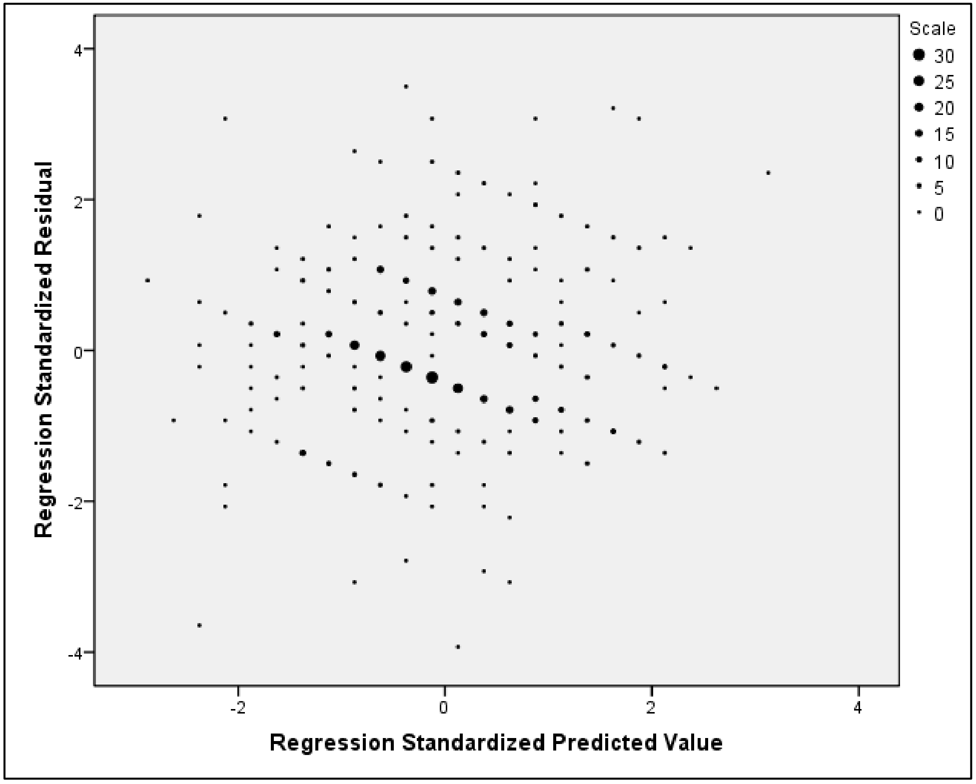
9. *Scatterplot of Standardized Residuals for Component 2—Physicians' Resource Constraints*



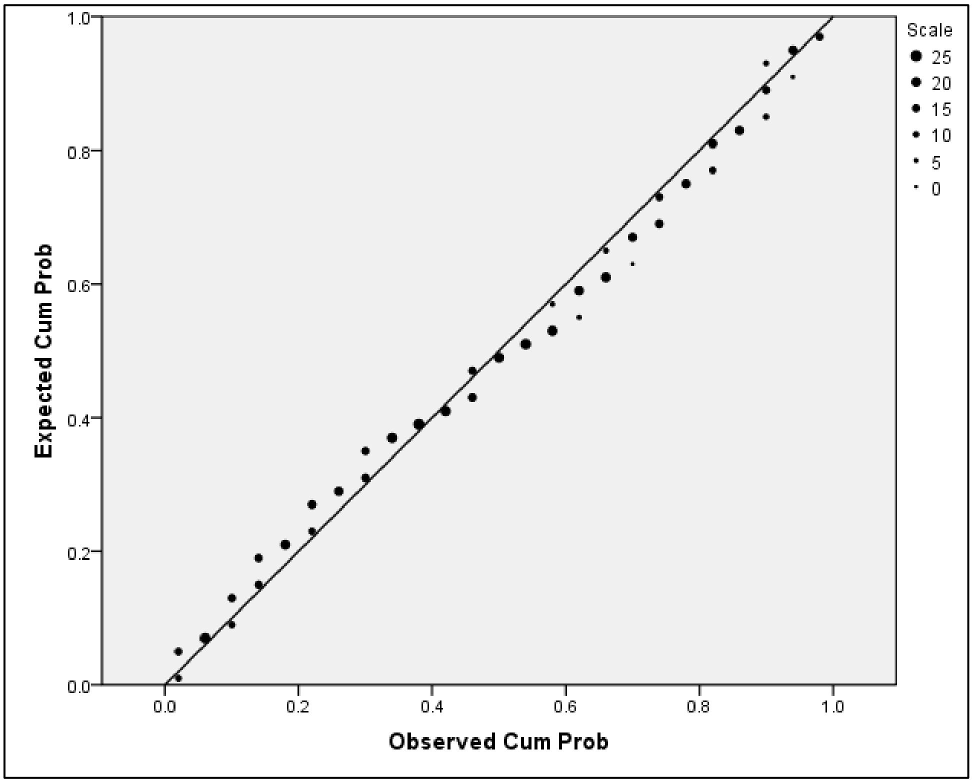
10. *Normal Probability Plots of the Regression Standardized Residuals for Component 2— Physicians' Resource Constraints*



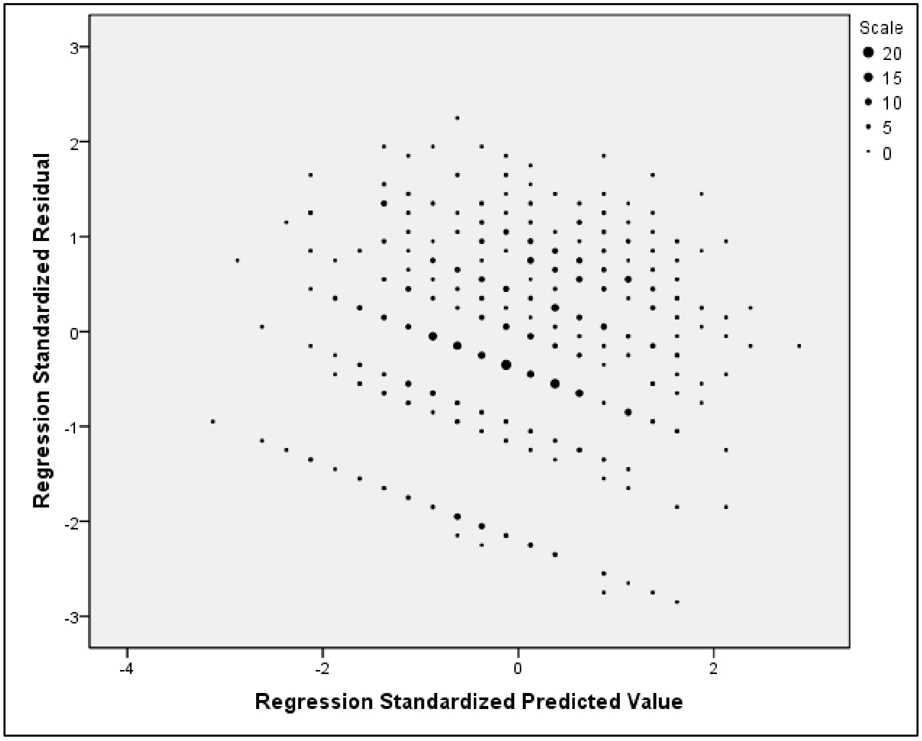
11. *Scatterplot of Standardized Residuals for Minutes Per-Patient*



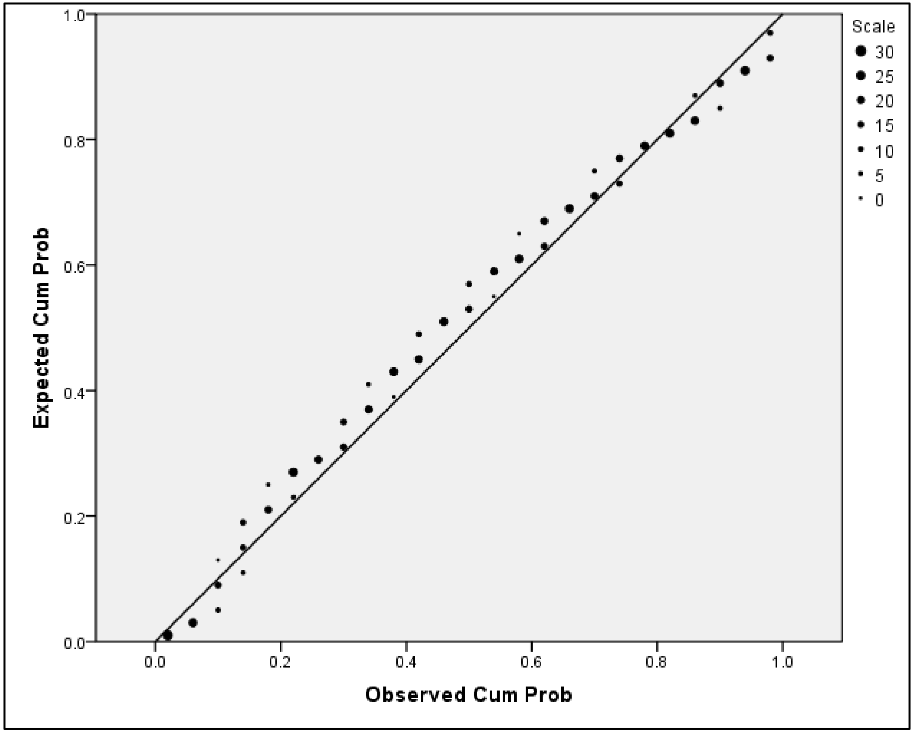
12. *Normal Probability Plots of the Regression Standardized Residuals for Minutes Per-Patient*



13. *Scatterplot of Standardized Residuals for Physicians' Access to Off- and On-Site Ancillary Service Providers*



14. *Normal Probability Plots of the Regression Standardized Residuals for Physicians' Access to Off- and On-Site Ancillary Service Providers*



REFERENCES

Acuña, E., & Rodriguez, C. (2004). The treatment of missing values and its effect on classifier accuracy. *Classification, Clustering, and Data Mining Applications, 0*(7), 639-648.

Agency for Healthcare Research and Quality. (2009). *National healthcare disparities report, 2008*.

Agency for Healthcare Research and Quality. (2012). Patient-centered medical home resource center. Retrieved September 6, 2012, from http://www.pcmh.ahrq.gov/portal/server.pt/community/pcmh__home/1483/pcmh_defining_the_pcmh_v2

AHRQ. (2008). National Healthcare Disparities Report, 2007. *U.S Department of Health and Human Services, National Institutes of Health*.

Akins, S. (2007). Racial residential segregation and crime. *Sociology Compass, 1*(1), 81-94.

Alba, R. D., Logan, J. R., & Bellair, P. E. (1994). Living with crime: The implications of racial/ethnic differences in suburban location. *Social Forces, 73*(2), 395-434.

Allison, P. D. (2009). Missing data. In R. E. Millsap & A. Maydeu-Olivares (Eds.), *The SAGE handbook of quantitative methods in psychology* (pp. 72-89). Los Angeles, CA: SAGE.

American College of Physicians. (2010, May). *Racial and ethnic disparities in healthcare, updated 2010* (No. 520701000). Philadelphia, PA: American College of Physicians.

American Diabetes Association. (2003). Economic costs of diabetes in the U.S. in 2002. *Diabetes Care, 26*(3), 917-932.

American Diabetes Association. (2008). Economic costs of diabetes in the U.S. In 2007. *Diabetes Care, 31*(3), 596-615.

American Diabetes Association. (2011). Standards of medical care in diabetes--2011. *Diabetes Care, 34 Suppl 1*, S11-61.

Arber, S., McKinlay, J., Adams, A., Marceau, L., Link, C., & O'Donnell, A. (2006). Patient characteristics and inequalities in doctors' diagnostic and management strategies relating to CHD: A video-simulation experiment. *Social Science & Medicine, 62*(1), 103-115.

Arrindell, W. A., & Van Der Ende, J. (1985). An empirical test of the utility of the observations-to-variables ratio in factor and components analysis. *Applied Psychological Measurement, 9*(2), 14.

Asch, D. A., Christakis, N. A., & Ubel, P. A. (1998). Conducting physician mail surveys on a limited budget. A randomized trial comparing $2 bill versus $5 bill incentives. *Medical Care, 36*(1), 95-99.

Asch, D. A., Jedrziewski, M. K., & Christakis, N. A. (1997). Response rates to mail surveys published in medical journals. *Journal of Clinical Epidemiology, 50*(10), 1129-1136.

Ashton, C. M., Haidet, P., Paterniti, D. A., Collins, T. C., Gordon, H. S., O'Malley, K., et al. (2003). Racial and ethnic disparities in the use of health services: Bias, preferences, or poor communication? *Journal of General Internal Medicine, 18*(2), 146-152.

Aspegren, K. (1999). BEME Guide No. 2: Teaching and learning communication skills in medicine-a review with quality grading of articles. *Medical Teacher, 21*(6), 563-570.

Auslander, W. F., Thompson, S., Dreitzer, D., White, N. H., & Santiago, J. V. (1997). Disparity in glycemic control and adherence between African-American and Caucasian youths with diabetes. Family and community contexts. *Diabetes Care, 20*(10), 1569-1575.

Ayanian, J. Z., Cleary, P. D., Keogh, J. H., Noonan, S. J., David-Kasdan, J. A., & Epstein, A. M. (2004). Physicians' beliefs about racial differences in referral for renal transplantation. *American Journal of Kidney Diseases, 43*(2), 350-357.

Bach, P. B., Pham, H. H., Schrag, D., Tate, R. C., & Hargraves, J. L. (2004). Primary care physicians who treat blacks and whites. *New England Journal of Medicine, 351*(6), 575-584.

Baer, L. D., Konrad, T. R., & Miller, J. S. (1999). The need of community health centers for international medical graduates. *American Journal of Public Health, 89*(10), 1570-1574.

Balsa, A. I., & McGuire, T. G. (2001). Statistical discrimination in health care. *Journal of Health Economics, 20*, 881-907.

Balsa, A. I., & McGuire, T. G. (2005). Testing for Statistical Discrimination in Health Care. *Health Services Research, 40*(1), 227-253.

Balsa, A. I., McGuire, T. G., & Meredith, L. S. (2005). Testing for statistical discrimination in health care. *Health Services Research, 40*(1), 227-252.

Barnato, A. E., Berhane, Z., Weissfeld, L. A., Chang, C. C., Linde-Zwirble, W. T., & Angus, D. C. (2006). Racial variation in end-of-life intensive care use: A race or hospital effect? *Health Services Research, 41*(6), 2219-2237.

Basco, W. T., Jr., Cull, W. L., O'Connor, K. G., & Shipman, S. A. (2010). Assessing trends in practice demographics of underrepresented minority pediatricians, 1993-2007. *Pediatrics, 125*(3), 460-467.

Bass, P. F., 3rd, Wilson, J. F., Griffith, C. H., & Barnett, D. R. (2002). Residents' ability to identify patients with poor literacy skills. *Academic Medicine, 77*(10), 1039-1041.

Beach, M. C., Gary, T. L., Price, E. G., Robinson, K., Gozu, A., Palacio, A., et al. (2006). Improving health care quality for racial/ethnic minorities: A systematic review of the best evidence regarding provider and organization interventions. *BMC Public Health, 6*(104), 1-11.

Beach, M. C., Price, E. G., Gary, T. L., Robinson, K. A., Gozu, A., Palacio, A., et al. (2005). Cultural competence: A systematic review of health care provider educational interventions. *Medical Care, 43*(4), 356-373.

Beagan, B. L. (2003). Teaching social and cultural awareness to medical students: "It's all very nice to talk about it in theory, but ultimately it makes no difference". *Academic Medicine, 78*(6), 605-614.

Beal, A., Doty, M., Hernandez, S., Shea, K., & Davis, K. (2007). *Closing the divide: How medical homes promote equity in health care—Results from the Commonwealth Fund 2006 health care quality survey* (No. 1035). New York, NY: The Commonwealth Fund.

Benbassat, J., Pilpel, D., & Tidhar, M. (1998). Patients' preferences for participation in clinical decision making: A review of published surveys. *Behavioral Medicine, 24*(2), 81-88.

Bennett, C. (2000). Racial categories used in the decennial census, 1790 to the present. *Governmant Information Quarterly, 17*(2), 161-181.

Berenson, R. A., & Horvath, J. (2003). Confronting the barriers to chronic care management in Medicare. *Health Affairs, Suppl Web Exclusives*(W3), 37-53.

Berger, J. T. (2008). The influence of physicians' demographic characteristics and their patients' demographic characteristics on physician practice: Implications for education and research. *Academic Medicine, 83*(1), 100-105.

Bernet, P. M., Moises, J., & Valdmanis, V. G. (2011). Social efficiency of hospital care delivery: Frontier analysis from the consumer's perspective. [Review]. *Medical Care Research and Review, 68*(1 Suppl), 36S-54S.

Bertakis, K. D., Callahan, E. J., Helms, L. J., Azari, R., Robbins, J. A., & Miller, J. (1998). Physician practice styles and patient outcomes: Differences between family practice and general internal medicine. *Medical Care, 36*(6), 879-891.

Bertakis, K. D., Helms, L. J., Callahan, E. J., Azari, R., & Robbins, J. A. (1995). The influence of gender on physician practice style. *Medical Care, 33*(4), 407-416.

Bertakis, K. D., Robbins, J. A., Callahan, E. J., Helms, L. J., & Azari, R. (1999). Physician practice style patterns with established patients: Determinants and differences between family practice and general internal medicine residents. *Family Medicine, 31*(3), 187-194.

Betancourt, J. R. (2003). Cross-cultural medical education: Conceptual approaches and frameworks for evaluation. *Academic Medicine, 78*(6), 560-569.

Betancourt, J. R. (2004). Cultural competence--marginal or mainstream movement? *The New England Journal of Medicine, 351*(10), 953-955.

Betancourt, J. R., Green, A. R., Carrillo, J. E., & Ananeh-Firempong, O., 2nd. (2003). Defining cultural competence: A practical framework for addressing racial/ethnic disparities in health and health care. *Public Health Reports, 118*(4), 293-302.

Bickel, J., & Ruffin, A. (1995). Gender-associated differences in matriculating and graduating medical students. *Academic Medicine, 70*(6), 552-559.

Blendon, R. J., Buhr, T., Cassidy, E. F., Perez, D. J., Sussman, T., Benson, J. M., et al. (2008). Disparities in physician care: Experiences and perceptions of a multi-ethnic America. *Health Affairs, 27*(2), 507-517.

Bodenheimer, T., Grumbach, K., & Berenson, R. A. (2009). A lifeline for primary care. *New England Journal of Medicine, 360*(26), 2693-2696.

Bodenheimer, T., Wagner, E. H., & Grumbach, K. (2002). Improving primary care for patients with chronic illness: The chronic care model, part 2. *Journal of the American Medical Association, 288*(15), 1909-1914.

Boehm, T. P., & Schlottmann, A. M. (2001). *Housing and wealth accumulation: Intergenerational impacts* (No. LIHO-01.15). Cambridge, MA: Joint Center for Housing Studies of Harvard University.

Bonham, V. L., Sellers, S. L., Gallagher, T. H., Frank, D., Odunlami, A. O., Price, E. G., et al. (2009). Physicians' attitudes toward race, genetics, and clinical medicine. *Genetics in Medicine, 11*(4), 279-286.

Bonilla-Silva, E. (2003). *Racism without racists*. Oxford, UK: Rowman & Littlefield Publishers, Inc.

Bonito, A. J., Bann, C., Eicheldinger, C., & Carpenter, L. (2008). *Creation of new race-ethnicity codes and socioeconomic status (SES) indicators for Medicare beneficiaries. Final report, sub-task 2*.

Bornstein, B. H., Marcus, D., & Cassidy, W. (2000). Choosing a doctor: An exploratory study of factors influencing patients' choice of a primary care doctor. *Journal of Evaluation in Clinical Practice, 6*(3), 255-262.

Boukus, E. R., Cassil, A., & O'Malley, A. (2009). A snapshot of U.S. physicians: Key findings from the 2008 health tracking physician survey. *Center for Studying Health System Change: Data Bulletin* Retrieved February 8, 2012, 35, from http://www.hschange.org/CONTENT/1078/

Brach, C., & Fraserirector, I. (2000). Can cultural competency reduce racial and ethnic health disparities? A review and a conceptual model. *Medical Care Research and Review, 57*(Supplement 1), 181-217.

Brennan, T. A., Horwitz, R. I., Duffy, F. D., Cassel, C. K., Goode, L. D., & Lipner, R. S. (2004). The role of physician specialty board certification status in the quality movement. *Journal of the American Medical Association, 292*(9), 1038-1043.

Brown, A. F., Ettner, S. L., Piette, J., Weinberger, M., Gregg, E., Shapiro, M. F., et al. (2004). Socioeconomic position and health among persons with diabetes mellitus: A conceptual framework and review of the literature. *Epidemiologic Reviews, 26*, 63-77.

Brown, E. R., Ojeda, V. D., Wyn, R., & Levan, R. (2000). *Racial and ethnic disparities in access to health insurance and health care* (No. 1525). Los Angeles, CA: UCLA Center for Health Policy Research and The Henry J. Kaiser Family Foundation.

Brown, J. B., Stewart, M., & Ryan, B. L. (2003). Outcomes of patient-provider interaction. In T. L. Thompson, A. Dorsey, K. L. Miller & R. Parrot (Eds.), *Handbook of Health Communication* (pp. 141-161). MahWah, NJ: Lawrence Erlbaum Associates, Inc.

Bureau of Justice Statistics. (2010). Crime trends. Retrieved September 9, 2010, from http://bjs.ojp.usdoj.gov/dataonline/Search/Crime/Crime.cfm

Burgess, D., van Ryn, M., Dovidio, J., & Saha, S. (2007). Reducing racial bias among health care providers: Lessons from social-cognitive psychology. *Journal of General Internal Medicine, 22*(6), 882-887.

Burgess, D. J., Crowley-Matoka, M., Phelan, S., Dovidio, J. F., Kerns, R., Roth, C., et al. (2008). Patient race and physicians' decisions to prescribe opioids for chronic low back pain. *Social Science & Medicine, 67*(11), 1852-1860.

Burgess, D. J., Fu, S. S., & van Ryn, M. (2004). Why do providers contribute to disparities and what can be done about it? *Journal of General Internal Medicine, 19*(11), 1154-1159.

Burgess, D. J., van Ryn, M., Crowley-Matoka, M., & Malat, J. (2006). Understanding the provider contribution to race/ethnicity disparities in pain treatment: Insights from dual process models of stereotyping. *Pain Medicine, 7*(2), 119-134.

Burleson, B. R. (2003). The experience and effects of emotional support: What the study of cultural and gender differences can tell us about close relationships, emotion, and interpersonal communication. *Personal Relationships, 10*, 1-23.

Carey, T., Motyka, T., Garrett, J., & Keller, R. (2003). Do osteopathic physicians differ in patient interaction from allopathic physicians? An empirically derived approach. *Journal of the American Osteopathic Association, 103*(7), 313-319.

Carrier, E. R., Schneider, E., Pham, H. H., & Bach, P. B. (2011). Association between quality of care and the sociodemographic composition of physicians' patient panels: A repeat cross-sectional analysis. *Journal of General Internal Medicine, 26*(9), 987-994.

Casalino, L. P., Devers, K. J., Lake, T. K., Reed, M., & Stoddard, J. J. (2003). Benefits of and barriers to large medical group practice in the United States. *Archives of Internal Medicine, 163*(16), 1958-1964.

Cegala, D. J., & Lenzmeier Broz, S. (2002). Physician communication skills training: A review of theoretical backgrounds, objectives and skills. *Medical Education, 36*(11), 1004-1017.

CensusScope. (2001). Segregation: Dissimilarity indices. Retrieved June 03, 2010, from http://www.censusscope.org/segregation.html

Centers for Disease Control and Prevention. (2008). Behavioral risk factor surveillance system, prevalence and trends data. Retrieved October 4, 2010, from http://apps.nccd.cdc.gov/brfss/

Centers for Disease Control and Prevention. (2010). Number (in millions) of civilian, non-institutionalized adults with diagnosed diabetes, United States, 1980–2008. Retrieved April 20, 2011, from http://www.cdc.gov/diabetes/statistics/prev/national/figadults.htm

Centers for Disease Control and Prevention. (2011). National diabetes fact sheet: National estimates and general information on diabetes and prediabetes in the United States, 2011. In U. S. D. o. H. a. H. Services (Ed.). Atlanta, GA.

Chaturvedi, N., Stephenson, J. M., & Fuller, J. H. (1996). The relationship between socioeconomic status and diabetes control and complications in the EURODIAB IDDM complications study. *Diabetes Care, 19*(5), 423-430.

Chemerinsky, E. (2003). The segregation and resegregation of american public education: The courts' role. *North Carolina Law Review, 18*, 1597-1623.

Chen, J., Rathore, S. S., Wang, Y., Radford, M. J., & Krumholz, H. M. (2006). Physician board certification and the care and outcomes of elderly patients with acute myocardial infarction. *Journal of General Internal Medicine, 21*(3), 238-244.

Chokshi, D. A. (2010). Teaching about health disparities using a social determinants framework. *Journal of General Internal Medicine, 25 Suppl 2*, S182-185.

Choudhry, N. K., Fletcher, R. H., & Soumerai, S. B. (2005). Systematic review: The relationship between clinical experience and quality of health care. *Annals of Internal Medicine, 142*(4), 260-273.

Christopher, A. J. (2001). Urban segregation in post-apartheid South Africa. *Urban Studies, 38*(3), 449-466.

Ciechanowski, P. S., Katon, W. J., Russo, J. E., & Walker, E. A. (2001). The patient-provider relationship: Attachment theory and adherence to treatment in diabetes. *American Journal of Psychiatry, 158*(1), 29-35.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: L. Erlbaum Associates.

Collins, K. S., Hughes, D. L., Doty, M. M., Ives, B. L., Edwards, J. N., & Tenney, K. (2002). *Diverse communities, common concerns: Assessing health care quality for minority Americans* (No. 523). Washington, D.C.: The Commonwealth Fund.

Commission on Social Determinants of Health. (2008). *Closing the gap in a generation: Health equity through action on the social determinants of health.* Geneva, CH: World Health Organization.

Connolly, V., Unwin, N., Sherriff, P., Bilous, R., & Kelly, W. (2000). Diabetes prevalence and socioeconomic status: A population based study showing increased prevalence of type 2 diabetes mellitus in deprived areas. *Journal of Epidemiology and Community Health, 54*(3), 173-177.

Cooper-Patrick, L., Gallo, J. J., Gonzales, J. J., Thi Vu, H., Powe, N. R., Nelson, C., et al. (1999). Race, gender, and partnership in the patient-physician relationship. *Journal of the American Medicial Assoication, 282*, 583-589.

Cooper, L. A., Beach, M. C., Johnson, R. L., & Inui, T. S. (2006). Delving below the surface. Understanding how race and ethnicity influence relationships in health care. *Journal of General Internal Medicine, 21 Suppl 1*, S21-27.

Cooper, L. A., & Roter, D. L. (2003). Patient-provider communication: The effect of race and ethnicity on process and outcomes of healthcare. In B. D. Smedley, A. Y. Stith & A. R. Nelson (Eds.), *Unequal treatment: confronting racial and ethnic disparities in health care* (pp. 552-593). Washington, D.C.: National Academies Press.

Cooper, L. A., Roter, D. L., Johnson, R. L., Ford, D. E., Steinwachs, D. M., & Powe, N. R. (2003). Patient-centered communication, ratings of care, and concordance of patient and physician race. *Annals of Internal Medicine, 139*(11), 907-915.

Council on Graduate Medical Education. (1998). *Tenth report: Physician distribution and health care challenges in rural and inner-city areas*. Washington, D.C.: U.S. Department of Health & Human Services.

Crabtree, B. F., Miller, W. L., Tallia, A. F., Cohen, D. J., DiCicco-Bloom, B., McIlvain, H. E., et al. (2005). Delivery of clinical preventive services in family medicine offices. *Annals of Family Medicine, 3*(5), 430-435.

Cranor, C. W., Bunting, B. A., & Christensen, D. B. (2003). The Asheville project: Long-term clinical and economic outcomes of a community pharmacy diabetes care program. *Journal of the American Pharmaceutical Association, 43*(2), 173-184.

Cromwell, J., McCall, N. T., Burton, J., & Urato, C. (2005). Race/ethnic disparities in utilization of lifesaving technologies by Medicare ischemic heart disease beneficiaries. *Medical Care, 43*(4), 330-337.

Cuff, P. A., & Vanselow, N. A. (2004). *Improving medical education: Enhancing the behavioral and social science content of medical school curricula*. Washington, D.C.: National Academies Press.

Cukor, D., Cohen, S. D., Peterson, R. A., & Kimmel, P. L. (2007). Psychosocial aspects of chronic disease: ESRD as a paradigmatic illness. *Journal of the American Society of Nephrology, 18*(12), 3042-3055.

Davidson, M. B. (2009). How our current medical care system fails people with diabetes. *Diabetes Care, 32*(2), 370-373.

de la Cruz, P. G., & Brittingham, A. (2003). *The Arab Population: 2000* (No. C2KBR-23). Washington, D.C.

Detroit Fresh Food Access Initiative. (2008). Report of taskforce findings. Retrieved September 14, 2010, from http://socialcompact.org/images/uploads/Detroit_Fresh_Food_Access_Initiative_report.pdf

Diez Roux, A. V. (2003). The examinaiton of neighborhood effects on health: Conceptual and methodological issues related to the presence of multiple levels of organization. In I. Kawachi & L. F. Berkman (Eds.), *Neighborhoods and Health* (pp. 45-64). New York, NY: Oxford University Press.

Dillman, D. A. (1991). The design and administration of mail surveys. *Annual Review of Sociology, 17*, 225-249.

Dillman, D. A., Smith, J. D., & Christian, L. M. (2009). *Internet, mail, and mixed-mode surveys: The tailored design method*. Hoboken, NJ: John Wiley & Sons, Inc.

DiMatteo, M. R., Taranta, A., Friedman, H. S., & Prince, L. M. (1980). Predicting patient satisfaction from physicians' nonverbal communication skills. *Medical Care, 18*(4), 376-387.

DiStefano, C., Zhu, M., & Mîndrilă, D. (2009). Understanding and using factor scores: Considerations for the applied researcher. *Practical Assessment, Research, & Evaluation, 14*(20), 1-11.

Doroodchi, H., Abdolrasulnia, M., Foster, J. A., Foster, E., Turakhia, M. P., Skelding, K. A., et al. (2008). Knowledge and attitudes of primary care physicians in the management of patients at risk for cardiovascular events. *BMC Family Practice, 9*(42), 1-9.

Dorsey, E. R., Jarjoura, D., & Rutecki, G. W. (2005). The influence of controllable lifestyle and sex on the specialty choices of graduating U.S. medical students, 1996-2003. *Academic Medicine, 80*(9), 791-796.

Dussault, G., & Franceschini, M. C. (2006). Not enough there, too many here: Understanding geographical imbalances in the distribution of the health workforce. *Human Resources for Health, 4*(12), 1-16.

Eisenberg, J. M. (1979). Sociologic influences on decision-making by clinicians. *Annals of Internal Medicine, 90*(6), 957-964.

Elashoff, J. D. (2007). *nQuery advisor version 7.0 user's guide*. Los Angeles, CA: Statistical Solutions Ltd.

Elderkin-Thompson, V., & Waitzkin, H. (1999). Differences in clinical communication by gender. *Journal of General Internal Medicine, 14*(2), 112-121.

Ely, J. W., Osheroff, J. A., Ebell, M. H., Bergus, G. R., Levy, B. T., Chambliss, M. L., et al. (1999). Analysis of questions asked by family doctors regarding patient care. *BMJ, 319*(7206), 358-361.

Epstein, R. M., Alper, B. S., & Quill, T. E. (2004). Communicating evidence for participatory decision making. *Journal of the American Medical Association, 291*(19), 2359-2366.

Everitt, B. S. (1975). Multivariate analysis: The need for data, and other problems. *British Journal of Psychiatry, 126*, 237-240.

Farley, R., Danziger, S., & Holzer, H. J. (2000). *Detroit divided*. New York, NY: Russell Sage Foundation.

Farley, R., Steeh, C., Krysan, M., Jackson, T., & Reeves, K. (1994). Sterotypes and segregation: Neighborhoods in the Detroit area. *The American Journal of Sociology, 100*(3), 750-780.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*(4), 1149-1161.

Feagin, J., & O'Brien, E. (2003). *White men on race: Power, privilege, and the shaping of cultural consciousness*. Boston, MA: Beacon Press.

Ferguson, W. J., & Candib, L. M. (2002). Culture, language, and the doctor-patient relationship. *Family Medicine, 34*(5), 353-361.

Fichman, M., & Cummings, J. N. (2003). Multiple imputation for missing data: Making the most of what you know. *Organizational Reseach Methods, 6*(3), 282-309.

Field, A. P. (2009). *Discovering statistics using SPSS (and sex, drugs and rock 'n' roll)* (3rd ed.). Los Angeles, CA: SAGE Publications.

Fiscella, K., & Epstein, R. M. (2008). So much to do, so little time: Care for the socially disadvantaged and the 15-minute visit. *Archives of Internal Medicine, 168*(17), 1843-1852.

Fiscella, K., Franks, P., Doescher, M. P., & Saver, B. G. (2002). Disparities in health care by race, ethnicity, and language among the insured: Findings from a national sample. *Medical Care, 40*(1), 52-59.

Fiscella, K., Franks, P., Gold, M. R., & Clancy, C. M. (2000). Inequality in quality: Addressing socioeconomic, racial, and ethnic disparities in health care. *Journal of the American Medical Association, 283*(19), 2579-2584.

Fiscella, K., & Shin, P. (2005). The inverse care law: Implications for healthcare of vulnerable populations. *Journal of Ambulatory Care Management, 28*(4), 304-312.

Fitzpatrick, A. L., Powe, N. R., Cooper, L. S., Ives, D. G., & Robbins, J. A. (2004). Barriers to health care access among the elderly and who perceives them. *American Journal of Public Health, 94*(10), 1788-1794.

Fordyce, M. A., Chen, F. M., Doescher, M. P., & Hart, L. G. (2007). *2005 physician supply and distribution in rural areas of the United States* (No. 116). Seattle, WA: University of Washington Health Research Center.

Forrest, C. B., Nutting, P. A., von Schrader, S., Rohde, C., & Starfield, B. (2006). Primary care physician specialty referral decision making: Patient, physician, and health care system determinants. *Medical Decision Making, 26*(1), 76-85.

Fossett, J. W., & Perloff, J. D. (1995). *The "new" health reform and access to care: The problem of the inner city*. Washington, D.C.: Kaiser Family Foundation.

Frank, E., McMurray, J. E., Linzer, M., & Elon, L. (1999). Career satisfaction of US women physicians: Results from the Women Physicians' Health Study. *Archives of Internal Medicine, 159*(13), 1417-1426.

Franks, P., & Bertakis, K. D. (2003). Physician gender, patient gender, and primary care. *Journal of Women's Health, 12*(1), 73-80.

Franks, P., & Fiscella, K. (2002). Effect of patient socioeconomic status on physician profiles for prevention, disease management, and diagnostic testing costs. *Medical Care, 40*(8), 717-724.

Freeman, H. P., & Payne, R. (2000). Racial injustice in healthcare. *New England Journal of Medicine, 342*(14), 1045-1048.

Frey, W. H. (2011). Analysis of 1990, 2000, and 2010 censuses: Black/white segregation indicies. Retrieved April 4, 2012, from http://www.psc.isr.umich.edu/dis/census/segregation2010.html

Gardner, L., & Vishwasrao, S. (2010). Physician quality and health care for the poor and uninsured. *Inquiry, 47*(1), 62-80.

Gebbie, K. M., Rosenstock, L., & Hernandez, L. M. (2003). *Who will keep the public healthy? Educating public health professionals for the 21st century*. Washington, D.C.: National Academy Press.

Gemson, D. H., Elinson, J., & Messeri, P. (1988). Differences in physician prevention practice patterns for white and minority patients. *Journal of Community Health, 13*(1), 53-64.

Geraghty, E. M., Franks, P., & Kravitz, R. L. (2007). Primary care visit length, quality, and satisfaction for standardized patients with depression. *Journal of General Internal Medicine, 22*(12), 1641-1647.

Gibson, C., & Jung, K. (2002). Historical census statistics on population totals by race, 1790 to 1990, and by Hispanic origin, 1970 to 1990, for the United States, regions, divisions, and states. Retrieved June 11, 2010, from http://www.census.gov/population/www/documentation/twps0056/twps0056.html

Gobillon, L., Selod, H., & Zenou, Y. (2007). The mechanisms of spatial mismatch. *Urban Studies, 44*(12), 2401-2427.

Google Maps. (2012). Get directions. Retrieved April 9, 2012, from http://maps.google.com/

Gordon, H. S., Street, R. L., Jr., Kelly, P. A., Souchek, J., & Wray, N. P. (2005). Physician-patient communication following invasive procedures: An analysis of post-angiogram consultations. *Social Science & Medicine, 61*(5), 1015-1025.

Gordon, H. S., Street, R. L., Jr., Sharf, B. F., & Souchek, J. (2006). Racial differences in doctors' information-giving and patients' participation. *Cancer, 107*(6), 1313-1320.

Gornick, M. E., Eggers, P. W., Reilly, T. W., Mentnech, R. M., Fitterman, L. K., Kucken, L. E., et al. (1996). Effects of race and income on mortality and use of services among Medicare beneficiaries. *The New England Journal of Medicine, 335*(11), 791-799.

Gorsuch, R. L. (1974). *Factor analysis*. Philadelphia, PA: Saunders.

Gossett, T. F. (1997). *Race: The history of an idea in America*. New York, NY: Oxford Univeristy Press.

Grant, R. W., Wexler, D. J., Watson, A. J., Lester, W. T., Cagliero, E., Campbell, E. G., et al. (2007). How doctors choose medications to treat type 2 diabetes: A national survey of specialists and academic generalists. *Diabetes Care, 30*(6), 1448-1453.

Green, A. R., Betancourt, J. R., & Carrillo, J. E. (2002). Integrating social factors into cross-cultural medical education. *Academic Medicine, 77*(3), 193-197.

Green, S. B. (1991). How many subjects does it take to do a regression analysis? . *Multivariate Behavioral Research, 26*(3), 499-511.

Greer, J. A., Park, E. R., Green, A. R., Betancourt, J. R., & Weissman, J. S. (2007). Primary care resident perceived preparedness to deliver cross-cultural care: An examination of training and specialty differences. *Journal of General Internal Medicine, 22*(8), 1107-1113.

Grengs, J. (2010). Job accessibility and the modal mismatch in detroit. *Journal of Transport Geography, 18*(1), 42-54.

Grumbach, K., & Bodenheimer, T. (2004). Can health care teams improve primary care practice? *Journal of the American Medical Association, 291*(10), 1246-1251.

Grumbach, K., Vranizan, K., & Bindman, A. B. (1997). Physician supply and access to care in urban communites. *Health Affairs, 16*(1), 71-87.

Haas, J. S., Phillips, K. A., Sonneborn, D., McCulloch, C. E., Baker, L. C., Kaplan, C. P., et al. (2004). Variation in access to health care for different racial/ethnic groups by the racial/ethnic composition of an individual's county of residence. *Medical Care, 42*(7), 707-714.

Hafferty, F. W., & Franks, R. (1994). The hidden curriculum, ethics teaching, and the structure of medical education. *Academic Medicine, 69*(11), 861-871.

Hafler, J. P., Ownby, A. R., Thompson, B. M., Fasser, C. E., Grigsby, K., Haidet, P., et al. (2011). Decoding the learning environment of medical education: A hidden curriculum perspective for faculty development. *Academic Medicine, 86*(4), 440-444.

Hall, J. A. (2006). Women's and men's nonverbal communications: Similarities, differences, stereotypes, and origins. In V. Manusov & M. Patterson (Eds.), *The SAGE handbook of nonverbal communication* (pp. 201-218). Thousand Oaks, CA: Sage Publications.

Hall, J. A., & Roter, D. L. (1998). Medical communication and gender: A summary of research. *The Journal of Gender-Specific Medicine, 1*(2), 39-42.

Halpern, S. D., Ubel, P. A., Berlin, J. A., & Asch, D. A. (2002). Randomized trial of 5 dollars versus 10 dollars monetary incentives, envelope size, and candy to increase physician response rates to mailed questionnaires. *Medical Care, 40*(9), 834-839.

Hargraves, J. L., & Hadley, J. (2003). The contribution of insurance coverage and community resources to reducing racial/ethnic disparities in access to care. *Health Services Research, 38*(3), 809-829.

Harris, M. I. (1999). Racial and ethnic differences in health insurance coverage for adults with diabetes. *Diabetes Care, 22*(10), 1679-1682.

Harris, M. I. (2001). Racial and ethnic differences in health care access and health outcomes for adults with type 2 diabetes. *Diabetes Care, 24*(3), 454-459.

Hauer, K. E., Durning, S. J., Kernan, W. N., Fagan, M. J., Mintz, M., O'Sullivan, P. S., et al. (2008). Factors associated with medical students' career choices regarding internal medicine. *Journal of the American Medical Association, 300*(10), 1154-1164.

Hausmann, L. R., Kressin, N. R., Hanusa, B. H., & Ibrahim, S. A. (2010). Perceived racial discrimination in health care and its association with patients' healthcare experiences: Does the measure matter? *Ethnicity & Disease, 20*(1), 40-47.

Health Resources and Services Administration. (2008). *The physician workforce: Projections and research into current issues affecting supply and demand*. Retrieved from http://bhpr.hrsa.gov/healthworkforce/reports/physwfissues.pdf.

Healthgrades.com. (2012). Frequently asked questions. Retrieved Feburary 14, 2012, from http://www.healthgrades.com/business/information/faqs.aspx

Henley, J. R., & Lyons, S. (2000). The negotiation of child care and employment demands among low-income parents. *Journal of Social Issues, 56*(4), 683-706.

Hinder, S., & Greenhalgh, T. (2012). "This does my head in". Ethnographic study of self-management by people with diabetes. *BMC Health Services Research, 12*(83), 1-16.

Hing, E., & Lin, S. (2009). *Role of international medical graduates providing office-based medical care: United States 2005-2006.*

Hipp, J. R. (2007). Income inequality, race,and place: Does the distribution of race and class within neighborhoods affect crime rates? *Criminology, 45*(3), 665-698.

Hood, R. G. (2007). Pay-for-performance: Financial health disparities and the impact on healthcare disparities. [Editorial]. *Journal of the National Medical Association, 99*(8), 953-958.

Howard, D. L., Bunch, C. D., Mundia, W. O., Konrad, T. R., Edwards, L. J., Ahinee Amamoo, M., et al. (2006). Comparing United States versus international medical school graduate physicians who serve African- American and white elderly. *Health Services Research, 41*(6), 2155-2181.

Howie, J. G., Porter, A. M., Heaney, D. J., & Hopton, J. L. (1991). Long to short consultation ratio: A proxy measure of quality of care for general practice. *The British Journal of General Practice, 41*(343), 48-54.

Hsieh, C. C., & Pugh, M. D. (1993). Poverty, income inequlaity, and violent crime: A meta-analysis of recent aggregate data studies. *Criminal Justice Review, 18*(2), 182-203.

Huizinga, M. M., Bleich, S. N., Beach, M. C., Clark, J. M., & Cooper, L. A. (2010). Disparity in physician perception of patients' adherence to medications by obesity status. *Obesity, 18*(10), 1932-1937.

Hulsman, R. L., Ros, W. J., Winnubst, J. A., & Bensing, J. M. (1999). Teaching clinically experienced physicians communication skills. A review of evaluation studies. *Medical Education, 33*(9), 655-668.

Iceland, J., Weinberg, D. H., & Steinmetz, E. (2002). *Racial and ethnic residential segregation in the United States: 1980-2000* (No. CENSR-3). Washington, D.C.

Institute of Medicine. (2001). *Crossing the quality chasm: A new health system for the 21st century*. Washington, D.C.: National Academy Press.

Jeffe, D. B., & Andriole, D. A. (2011). Factors associated with American Board of Medical Specialties member board certification among US medical school graduates. *Journal of the American Medical Association, 306*(9), 961-970.

Jenkins, V., & Fallowfield, L. (2002). Can communication skills training alter physicians' beliefs and behavior in clinics? *Journal of Clinical Oncology, 20*(3), 765-769.

Johnson, R. L., Roter, D., Powe, N. R., & Cooper, L. A. (2004). Patient race/ethnicity and quality of patient-physician communication during medical visits. *American Journal of Public Health, 94*(12), 2084-2090.

Johnson, R. L., Saha, S., Arbelaez, J. J., Beach, M. C., & Cooper, L. A. (2004). Racial and ethnic differences in patient perceptions of bias and cultural competence in health care. *Journal of General Internal Medicine, 19*(2), 101-110.

Johnson, S. M., & Kurtz, M. E. (2002). Perceptions of philosophic and practice differences between US osteopathic physicians and their allopathic counterparts. *Social Science & Medicine, 55*(12), 2141-2148.

Kantor, A. C., & Nystuen, J. D. (1982). De Facto Redlining a Geographic View. *Economic Geography, 58*(4), 309-335.

Kaplan, S. H., Gandek, B., Greenfield, S., Rogers, W., & Ware, J. E. (1995). Patient and visit characteristics related to physicians' participatory decision-making style. Results from the medical outcomes study. *Medical Care, 33*(12), 1176-1187.

Kapoor, J. R., Fonarow, G. C., Zhao, X., Kapoor, R., Hernandez, A. F., & Heidenreich, P. A. (2011). Diabetes, quality of care, and in-hospital outcomes in patients hospitalized with heart failure. *American Heart Journal, 162*(3), 480-486.

Kapoor, J. R., Kapoor, R., Hellkamp, A. S., Hernandez, A. F., Heidenreich, P. A., & Fonarow, G. C. (2011). Payment source, quality of care, and outcomes in patients hospitalized with heart failure. *Journal of the American College of Cardiology, 58*(14), 1465-1471.

Kellerman, S. E., & Herold, J. (2001). Physician response to surveys. A review of the literature. *American Journal of Preventive Medicine, 20*(1), 61-67.

Kelly, P. A., & Haidet, P. (2007). Physician overestimation of patient literacy: A potential source of health care disparities. *Patient Education and Counseling, 66*(1), 119-122.

Kenny, S. J., Smith, P. J., Goldschmid, M. G., Newman, J. M., & Herman, W. H. (1993). Survey of physician practice behaviors related to diabetes mellitus in the U.S. Physician adherence to consensus recommendations. *Diabetes Care, 16*(11), 1507-1510.

Kieffer, E. C., Willis, S. K., Odoms-Young, A. M., Guzman, R., Allen, A. J., Two Feathers, J., et al. (2004). Reducing disparities in diabetes among African-American and Latino residents of Detroit: The essential role of community planning focus groups. *Ethnicity & Disease, 14*(S1), 27-38.

Kieffer, K. M. (1998). *Orthoginal versus oblique factor rotations: A review of the literature regarding the pros and cons*. Paper presented at the Annual Meeting of the Mid-South Educational Research Association.

Kiel, P. J., & McCord, A. D. (2005). Pharmacist impact on clinical outcomes in a diabetes disease management program via collaborative practice. *The Annals of Pharmacotherapy, 39*(11), 1828-1832.

Kim, C., McEwen, L. N., Gerzoff, R. B., Marrero, D. G., Mangione, C. M., Selby, J. V., et al. (2005). Is physician gender associated with the quality of diabetes care? *Diabetes Care, 28*(7), 1594-1598.

Klein, M. D., Kahn, R. S., Baker, R. C., Fink, E. E., Parrish, D. S., & White, D. C. (2011). Training in social determinants of health in primary care: Does it change resident behavior? *Academic Pediatrics, 11*(5), 387-393.

Koerber, A., Gajendra, S., Fulford, R. L., BeGole, E., & Evans, C. A. (2004). An exploratory study of orthodontic resident communication by patient race and ethnicity. *Journal of Dental Education, 68*(5), 553-562.

Komaromy, M., Grumbach, K., Drake, M., Vranizan, K., Lurie, N., Keane, D., et al. (1996). The role of black and Hispanic physicians in providing health care for underserved populations. *The New England Journal of Medicine, 334*(20), 1305-1310.

Kripalani, S., Bussey-Jones, J., Katz, M. G., & Genao, I. (2006). A prescription for cultural competence in medical education. *Journal of General Internal Medicine, 21*(10), 1116-1120.

Lake Snell Perry & Associates. (2003). Americans speak out on disparities in health care: Results from a national poll. Retrieved September 14, from www.phsi.harvard.edu/health_reform/poll_media_report_disparities.pdf

Lantz, P. M., House, J. S., Lepkowski, J. M., Williams, D. R., Mero, R. P., & Chen, J. (1998). Socioeconomic factors, health behaviors, and mortality: Results from a nationally representative prospective study of US adults. *Journal of the American Medical Association, 279*(21), 1703-1708.

Laveist, T. A., & Nuru-Jeter, A. (2002). Is doctor-patient race concordance associated with greater satisfaction with care? *Journal of Health & Social Behavior, 43*(3), 296-306.

Leaf, D. A., Neighbor, W. E., Schaad, D., & Scott, C. S. (1995). A comparison of self-report and chart audit in studying resident physician assessment of cardiac risk factors. *Journal of General Internal Medicine, 10*(4), 194-198.

Leichter, S. B. (2001). Cost and reimbursement as determinants of the quality of diabetes care: I. direct cost determinants. *Clinical Diabetes, 19*(3), 142-145.

Levinson, W., Kao, A., Kuby, A., & Thisted, R. A. (2005). Not all patients want to participate in decision making. A national study of public preferences. *Journal of General Internal Medicine, 20*(6), 531-535.

Li, L. B., Williams, S. D., & Scammon, D. L. (1995). Practicing with the urban underserved. A qualitative analysis of motivations, incentives, and disincentives. *Archives of Family Medicine, 4*(2), 124-134.

Licciardone, J. C. (2007). A comparison of patient visits to osteopathic and allopathic general and family medicine physicians: Results from the national ambulatory medical care survey, 2003-2004. *Osteopathic Medicine and Primary Care, 1*(2), 1-12.

Licciardone, J. C., Clearfield, M. B., & Guillory, V. J. (2009). Clinical practice characteristics of osteopathic and allopathic primary care physicians at academic health centers: Results from the National Ambulatory Medical Care Survey. *Academic Medicine, 84*(6), 744-750.

Lindau, S. T., Tomori, C., Lyons, T., Langseth, L., Bennett, C. L., & Garcia, P. (2002). The association of health literacy with cervical cancer prevention knowledge and health behaviors in a multiethnic cohort of women. *American Journal of Obstetrics and Gynecology, 186*(5), 938-943.

Lindenmeyer, A., Hearnshaw, H., Vermeire, E., Van Royen, P., Wens, J., & Biot, Y. (2006). Interventions to improve adherence to medication in people with type 2 diabetes mellitus: A review of the literature on the role of pharmacists. *Journal of Clinical Pharmacy and Therapeutics, 31*(5), 409-419.

Link, B. G., & Phelan, J. (1995). Social conditions as fundamental causes of disease. *Journal of Health & Social Behavior, Spec No*, 80-94.

Link, C. L., & McKinlay, J. B. (2009). Disparities in the prevalence of diabetes: Is it race/ethnicity or socioeconomic status? Results from the Boston Area Community Health (BACH) survey. *Ethnicity & Disease, 19*(3), 288-292.

Lo Sasso, A. T., Richards, M. R., Chou, C. F., & Gerber, S. E. (2011). The $16,819 pay gap for newly trained physicians: The unexplained trend of men earning more than women. *Health Affairs, 30*(2), 193-201.

Logan, J. R., & Stults, B. (2011). The persistence of segregation in the metropolis: New findings from the 2010 Census. Retrieved November 22, 2011, from www.s4.brown.edu/us2010/Data/Report/report2.pdf

Lubell, J. (2008). ERs in distress: ACEP. Report cites states for not enough support, resources. [News]. *Modern Healthcare, 38*(50), 12-13.

Lucas, F. L., Stukel, T. A., Morris, A. M., Siewers, A. E., & Birkmeyer, J. D. (2006). Race and surgical mortality in the United States. *Annals of Surgery, 243*(2), 281-286.

Lurie, N., Slater, J., McGovern, P., Ekstrum, J., Quam, L., & Margolis, K. (1993). Preventive care for women. Does the sex of the physician matter? *The New England Journal of Medicine, 329*(7), 478-482.

Lutfey, K., & Reese, J. (2005). Toward some fundamentals of fundamental causality: Socioeconomic status and health in the routine clinic visit for diabetes. *American Journal of Sociology, 110*(5), 1326-1372.

Lutfey, K. E., Campbell, S. M., Renfrew, M. R., Marceau, L. D., Roland, M., & McKinlay, J. B. (2008). How are patient characteristics relevant for physicians' clinical decision making in diabetes? An analysis of qualitative results from a cross-national factorial experiment. *Social Science & Medicine, 67*(9), 1391-1399.

Lutfey, K. E., & Ketcham, J. D. (2005). Patient and provider assessments of adherence and the sources of disparities: Evidence from diabetes care. *Health Services Research, 40*(6 Pt 1), 1803-1817.

Lutfey, K. E., Link, C. L., Grant, R. W., Marceau, L. D., & McKinlay, J. B. (2009). Is certainty more important than diagnosis for understanding race and gender disparities? An experiment using coronary heart disease and depression case vignettes. *Health Policy, 89*(3), 279-287.

MacCallum, R., Widaman, K., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. *Psychological Methods, 4*(1), 84-100.

Mackelprang, A. J. (1970). Missing data in factor analysis and multiple regression. *Midwest Journal of Political Science, 14*(3), 493-506.

Macrae, C. N., & Bodenhausen, G. V. (2001). Social cognition: Categorical person perception. *British Journal of Psychology, 92*(Pt 1), 239-255.

Majumdar, B., Browne, G., Roberts, J., & Carpio, B. (2004). Effects of cultural sensitivity training on health care provider attitudes and patient outcomes. *Journal of Nursing Scholarship, 36*(2), 161-166.

Mari Gallagher Research & Consulting Group. (2007). Examining the impact of food deserts on public health in Detroit. Retrieved September 10, 2010, from http://marigallagher.com/site_media/dynamic/project_files/1_DetroitFoodDesertReport_Full.pdf

Martinez, B. (2008, October 14). Nonprofit hospitals leave the city for greener pastures. *Wall Street Journal*. Retrieved from http://online.wsj.com/article/SB122393747851830485.html

Massey, D. S. (2004). Segregation and stratification: A biosocial perspective. *Du Bois Review, 1*(1), 7-25.

Massey, D. S. (2007). *Categorically unequal: The American stratification system*. New York: Russell Sage Foundation.

Massey, D. S., & Denton, N. A. (1993). *American apartheid: Segregation and the making of the underclass*. Cambridge, MA: Harvard University Press.

Massey, D. S., & Denton, N. A. (2001). American apartheid: Segregation and the making of the underclass. In D. B. Grusky (Ed.), *Social stratification: Race, class, & gender in sociological perspective* (pp. 660-671). Boulder, CO: Westview Press.

Maxwell, S. E. (2000). Sample size and multiple regression analysis. *Psychological Methods, 5*(4), 434-458.

Mayberry, R. M., Mili, F., & Ofili, E. (2000). Racial and ethnic differences in access to medical care. *Medical Care Research and Review, 57 Suppl 1*, 108-145.

McMurray, J. E., Linzer, M., Konrad, T. R., Douglas, J., Shugerman, R., & Nelson, K. (2000). The work lives of women physicians results from the physician work life study. The SGIM Career Satisfaction Study Group. *Journal of General Internal Medicine, 15*(6), 372-380.

meaning-of-names.com. (2011). Retrieved November 22, 2011, from http://www.meaning-of-names.com/

Mechanic, D. (2001). How should hamsters run? Some observations about sufficient patient time in primary care. *BMJ, 323*(7307), 266-268.

Mechanic, D. (2005). Policy challenges in addressing racial disparities and improving population health. *Health Affairs, 24*(2), 335-338.

MedCalc. (2011, November 4, 2011). Version 12.1.0. Retrieved November 19, 2011, from http://www.medcalc.org/manual/logistic_regression.php

Meduru, P., Helmer, D., Rajan, M., Tseng, C. L., Pogach, L., & Sambamoorthi, U. (2007). Chronic illness with complexity: Implications for performance measurement of optimal glycemic control. *Journal of General Internal Medicine, 22 Suppl 3*, 408-418.

Merchant, R. M., Becker, L. B., Yang, F., & Groeneveld, P. W. (2011). Hospital racial composition: A neglected factor in cardiac arrest survival disparities. *American Heart Journal, 161*(4), 705-711.

Meyers, D. S., Mishori, R., McCann, J., Delgado, J., O'Malley, A. S., & Fryer, E. (2006). Primary care physicians' perceptions of the effect of insurance status on clinical decision making. *Annals of Family Medicine, 4*(5), 399-402.

Michigan Department of Community Health. (2009). Health indicators and risk estimates by community health assessment regions & local health departments: Michigan behavioral risk factor survey, 2006-2008 combined. Retrieved October 5, 2010, from http://www.michigan.gov/documents/mdch/2006-2008_MiBRFS_Reg__LHD_Tables_8.4.09_287959_7.pdf

Michigan Department of Technology Management & Budget. (2003). Metropolitan and micropolitan statistical areas in michigan based on the 2000 census. Retrieved September 26, 2010, from http://www.michigan.gov/documents/Hal_lm_census_MetropolitanDesignations061003_67117_7.pdf

Michigan Diabetes Prevention and Control Program. (2008). Diabetes in Michigan--2008. Retrieved October 4, 2010, from http://www.michigan.gov/documents/mdch/Diabetes_Fact_Page-2008_274978_7.pdf

Mick, S. S., & Lee, S. Y. (1999). International and US medical graduates in US cities. *Journal of Urban Health, 76*(4), 481-496.

Minkler, M., & Fuller-Thomson, E. (1999). The health of grandparents raising grandchildren: Results of a national study. *American Journal of Public Health, 89*(9), 1384-1390.

Mitchell, J. B., Schurman, R., & Cromwell, J. (1988). The changing nature of physicians' office visits. *Health Services Research, 23*(4), 575-591.

Montaño, D. E., & Phillips, W. R. (1995). Cancer screening by primary care physicians: A comparison of rates obtained from physician self-report, patient survey, and chart audit. *American Journal of Public Health, 85*(6), 795-800.

Morrell, D. C., Evans, M. E., Morris, R. W., & Roland, M. O. (1986). The "five minute" consultation: Effect of time constraint on clinical content and patient satisfaction. *British Medical Journal, 292*(6524), 870-873.

Morris, A. L., Phillips, R. L., Fryer, G. E., Jr., Green, L. A., & Mullan, F. (2006). International medical graduates in family medicine in the United States of America: an exploration of professional characteristics and attitudes. *Human Resources for Health, 4*(17), 1-8.

Moy, E., & Bartman, B. A. (1995). Physician race and care of minority and medically indigent patients. *Journal of the American Medical Association, 273*(19), 1515-1520.

Mullan, F. (1997). The national health service corps and inner-city hospitals. *The New England Journal of Medicine, 336*(22), 1601-1604.

Muni, S., Engelberg, R. A., Treece, P. D., Dotolo, D., & Curtis, J. R. (2011). The influence of race/ethnicity and socioeconomic status on end-of-life care in the ICU. *Chest, 139*(5), 1025-1033.

Murray, E., Pollack, L., White, M., & Lo, B. (2007). Clinical decision-making: Patients' preferences and experiences. *Patient Education and Counseling, 65*(2), 189-196.

Nath, C. (2007). Literacy and diabetes self-management. [Review]. *The American Journal of Nursing, 107*(6 Suppl), 43-49.

National Institute of Diabetes and Digestive and Kidney Diseases. (2008a). National diabetes information clearinghouse, diagnosis of diabetes. Retrieved September 29, 2010, from http://diabetes.niddk.nih.gov/dm/pubs/diagnosis/#test

National Institute of Diabetes and Digestive and Kidney Diseases. (2008b). National diabetes statistics, 2007. Retrieved September 29, 2010, from http://diabetes.niddk.nih.gov/dm/pubs/statistics/index.htm

Norcini, J. J., Boulet, J. R., Dauphinee, W. D., Opalek, A., Krantz, I. D., & Anderson, S. T. (2010). Evaluating the quality of care provided by graduates of international medical schools. *Health Affairs, 29*(8), 1461-1468.

O'Connor, A., Tilly, C., & Bobo, L. D. (Eds.). (2001). *Urban inequality: Evidence from four cities*. New York, NY: Russel Sage Foundation.

Office of Management and Budget. (1997). Federal register notice: Revisions to the standards for the classification of federal data on race and ethnicity. Retrieved June 11, 2010, from http://www.whitehouse.gov/omb/fedreg_1997standards/

Oliver, M. L., & Shapiro, T. M. (1997). *Black wealth/white wealth: A new perspective on racial inequality*. New York, NY: Routledge.

Oliver, M. N., Goodwin, M. A., Gotler, R. S., Gregory, P. M., & Stange, K. C. (2001). Time use in clinical encounters: Are African-American patients treated differently? *Journal of the National Medical Association, 93*(10), 380-385.

Orfield, G. (2001). *Schools more separate: Consequences of a decade of resegregation*. Cambridge: Harvard Civil Rights Project.

Ostbye, T., Yarnall, K. S., Krause, K. M., Pollak, K. I., Gradison, M., & Michener, J. L. (2005). Is there time for management of patients with chronic diseases in primary care? *Annals of Family Medicine, 3*(3), 209-214.

Paasche-Orlow, M., & Roter, D. (2003). The communication patterns of internal medicine and family practice physicians. *Journal of the American Board of Family Medicine, 16*(6), 485-493.

Paez, K. A., Allen, J. K., Carson, K. A., & Cooper, L. A. (2008). Provider and clinic cultural competence in a primary care setting. *Social Science & Medicine, 66*(5), 1204-1216.

Pamboukian, S. V., Funkhouser, E., Child, I. G., Allison, J. J., Weissman, N. W., & Kiefe, C. I. (2006). Disparities by insurance status in quality of care for elderly patients with unstable angina. *Ethnicity & Disease, 16*(4), 799-807.

Parchman, M. L., Pugh, J. A., Romero, R. L., & Bowers, K. W. (2007). Competing demands or clinical inertia: The case of elevated glycosylated hemoglobin. *Annals of Family Medicine, 5*(3), 196-201.

Parchman, M. L., Romero, R. L., & Pugh, J. A. (2006). Encounters by patients with type 2 diabetes--complex and demanding: An observational study. *Annals of Family Medicine, 4*(1), 40-45.

Parchman, M. L., Zeber, J. E., & Palmer, R. F. (2010). Participatory decision making, patient activation, medication adherence, and intermediate clinical outcomes in type 2 diabetes: A STARNet study. *Annals of Family Medicine, 8*(5), 410-417.

Park, E. R., Betancourt, J. R., Kim, M. K., Maina, A. W., Blumenthal, D., & Weissman, J. S. (2005). Mixed messages: Residents' experiences learning cross-cultural care. *Academic Medicine, 80*(9), 874-880.

Park, E. R., Betancourt, J. R., Miller, E., Nathan, M., MacDonald, E., Ananeh-Firempong, O., 2nd, et al. (2006). Internal medicine residents' perceptions of cross-cultural training. Barriers, needs, and educational recommendations. *Journal of General Internal Medicine, 21*(5), 476-480.

Patient-Centered Primary Care Collaborative. (2011). *Practice in the spotlight: The medical home and diabetes care*. Washington, DC.

Patterson, E. B. (1991). Poverty, income inequality, and community crime rates. *Criminology, 29*(4), 755-777.

Peduzzi, P., Concato, J., Kemper, E., Holford, T. R., & Feinstein, A. R. (1996). A simulation study of the number of events per variable in logistic regression analysis. *Journal of Clinical Epidemiology, 49*(12), 1373-1379.

Penner, L. A., Dovidio, J. F., West, T. V., Gaertner, S. L., Albrecht, T. L., Dailey, R. K., et al. (2010). Aversive racism and medical interactions with black patients: A field study. *Journal of Experimental Social Psychology, 46*(2), 436-440.

Perloff, J. D., Kletke, P., & Fossett, J. W. (1995). Which physicians limit their Medicaid participation, and why. *Health Services Research, 30*(1), 7-26.

Perloff, J. D., Kletke, P. R., Fossett, J. W., & Banks, S. (1997). Medicaid participation among urban primary care physicians. *Medical Care, 35*(2), 142-157.

Peters, A. S., Clark-Chiarelli, N., & Block, S. D. (1999). Comparison of osteopathic and allopathic medical schools' support for primary care. *Journal of General Internal Medicine, 14*(12), 730-739.

Pham, H. H., Schrag, D., Hargraves, J. L., & Bach, P. B. (2005). Delivery of preventive services to older adults by primary care physicians. *Journal of the American Medical Association, 294*(4), 473-481.

Phillips, L. S., Branch, W. T., Cook, C. B., Doyle, J. P., El-Kebbi, I. M., Gallina, D. L., et al. (2001). Clinical inertia. *Annals of Internal Medicine, 135*(9), 825-834.

Phillips, L. S., & Twombly, J. G. (2008). It's time to overcome clinical inertia. [Comment

Editorial]. *Annals of Internal Medicine, 148*(10), 783-785.

Piette, J. D., Bibbins-Domingo, K., & Schillinger, D. (2006). Health care discrimination, processes of care, and diabetes patients' health status. *Patient Education and Counseling, 60*(1), 41-48.

Probst, J. C., Laditka, S. B., Wang, J. Y., & Johnson, A. O. (2007). Effects of residence and race on burden of travel for care: Cross sectional analysis of the 2001 US national household travel survey. *BMC Health Services Research, 7*(40), 1-13.

Pruchno, R. (1999). Raising grandchildren: The experiences of black and white grandmothers. *Gerontologist, 39*(2), 209-222.

Public Policy Associates. (2005). The future supply and demand for physicians in michigan. Retrieved October 6, 2010, from http://www.msms.org/AM/Template.cfm?Section=Reports_and_Summaries1&Template=/CM/ContentDisplay.cfm&ContentFileID=3111

Public Sector Consultants, & Michigan Department of Community Health. (2008). Survey of physicians: Survey findings, 2008. Retrieved February 5, 2012, from http://www.mhc.org/file_archive/physiciansurvey2008_revised_2_11_09.pdf

Ramsey, P. G., Carline, J. D., Inui, T. S., Larson, E. B., LoGerfo, J. P., & Wenrich, M. D. (1989). Predictive validity of certification by the American Board of Internal Medicine. *Annals of Internal Medicine, 110*(9), 719-726.

Reschovsky, J. D., & O'Malley, A. S. (2008). Do primary care physicians treating minority patients report problems delivering high-quality care? *Health Affairs, 27*(3), w222-231.

Rittenhouse, D. R., & Shortell, S. M. (2009). The patient-centered medical home: Will it stand the test of health reform? *Journal of the American Medical Association, 301*(19), 2038-2040.

Roland, M. O., Bartholomew, J., Courtenay, M. J., Morris, R. W., & Morrell, D. C. (1986). The "five minute" consultation: Effect of time constraint on verbal communication. *British Medical Journal, 292*(6524), 874-876.

Rosenbaum, S., & Teitelbaum, J. (2005). Addressing racial inequality in health care. In D. Mechanic, L. B. Rogut, D. C. Colby & J. R. Knickman (Eds.), *Policy challenges in modern health care* (pp. 135-147). New Brunswick, NJ: Rutgers University Press.

Rosenblatt, R. A., & Hart, L. G. (2000). Physicians and rural America. *The Western Journal of Medicine, 173*(5), 348-351.

Rosenthal, M. B., Zaslavsky, A., & Newhouse, J. P. (2005). The geographic distribution of physicians revisited. *Health Services Research, 40*(6 Pt 1), 1931-1952.

Roter, D., Lipkin, M., Jr., & Korsgaard, A. (1991). Sex differences in patients' and physicians' communication during primary care medical visits. *Medical Care, 29*(11), 1083-1093.

Roter, D. L., Geller, G., Bernhardt, B. A., Larson, S. M., & Doksum, T. (1999). Effects of obstetrician gender on communication and patient satisfaction. *Obstetrics and Gynecology, 93*(5 Pt 1), 635-641.

Roter, D. L., & Hall, J. A. (2004). Physician gender and patient-centered communication: A critical review of empirical research. [Review]. *Annual Review of Public Health, 25*, 497-519.

Roter, D. L., Hall, J. A., & Aoki, Y. (2002). Physician gender effects in medical communication: A meta-analytic review. *Journal of the American Medical Association, 288*(6), 756-764.

Roter, D. L., Hall, J. A., Kern, D. E., Barker, L. R., Cole, K. A., & Roca, R. P. (1995). Improving physicians' interviewing skills and reducing patients' emotional distress. A randomized clinical trial. *Archives of Internal Medicine, 155*(17), 1877-1884.

Roter, D. L., Larson, S., Shinitzky, H., Chernoff, R., Serwint, J. R., Adamo, G., et al. (2004). Use of an innovative video feedback technique to enhance communication skills training. *Medical Education, 38*(2), 145-157.

Royal College of Physicians. (2010). *Policy statement 2010: How doctors can close the gap--Tackling the social determinants of health through culture change, advocacy and education* (No. ISBN 978-1-86016-383-8). London.

Sabin, J. A., Rivara, F. P., & Greenwald, A. G. (2008). Physican implicit attitudes and stereotypes about race and quality of medical care *Medical Care, 46*(7), 678-686.

Saha, S., Freeman, M., Toure, J., Tippens, K. M., Weeks, C., & Ibrahim, S. (2008). Racial and ethnic disparities in the VA health care system: A systematic review. *Journal of General Internal Medicine, 23*(5), 654-671.

Saha, S., Komaromy, M., Koepsell, T. D., & Bindman, A. B. (1999). Patient-physician racial concordance and the perceived quality and use of health care. *Archives of Internal Medicine, 159*(9), 997-1004.

Saha, S., Taggart, S. H., Komaromy, M., & Bindman, A. B. (2000). Do patients choose physicians of their own race? *Health Affairs, 19*(4), 76-83.

Salisbury, C. J. (1989). How do people choose their doctor? *BMJ, 299*(6699), 608-610.

Sax, H., Uckay, I., Richet, H., Allegranzi, B., & Pittet, D. (2007). Determinants of good adherence to hand hygiene among healthcare workers who have extensive exposure to hand hygiene campaigns. *Infection Control and Hospital Epidemiology, 28*(11), 1267-1274.

Schectman, J. M., Nadkarni, M. M., & Voss, J. D. (2002). The association between diabetes metabolic control and drug adherence in an indigent population. *Diabetes Care, 25*(6), 1015-1021.

Schillenger, D., Barton, L. R., Karter, A. J., Wang, F., & Adler, N. (2006). Does literacy mediate the relationship between education and health outcomes? A study of a low-income population with diabetes. *Public Health Reports, 121*(3), 145-155.

Schim, S. M., Doorenbos, A. Z., & Borse, N. N. (2006). Enhancing cultural competence among hospice staff. *The American Journal of Hospice & Palliative Care, 23*(5), 404-411.

Schlesinger, M., Bentkover, J., Blumenthal, D., Musacchio, R., & Willer, J. (1987). The privatization of health care and physicians' perceptions of access to hospital services. *The Milbank Quarterly, 65*(1), 25-58.

Schmittdiel, J., Grumbach, K., Selby, J. V., & Quesenberry, C. P., Jr. (2000). Effect of physician and patient gender concordance on patient satisfaction and preventive care practices. *Journal of General Internal Medicine, 15*(11), 761-769.

Schmittdiel, J. A., Steers, N., Duru, O. K., Ettner, S. L., Brown, A. F., Fung, V., et al. (2010). Patient-provider communication regarding drug costs in Medicare Part D beneficiaries with diabetes: A TRIAD study. *BMC Health Services Research, 10*(164), 1-7.

Schulman, K. A., Berlin, J. A., Harless, W., Kerner, J. F., Sistrunk, S., Gersh, B. J., et al. (1999). The effect of race and sex on physicians' recommendations for cardiac catheterization. *New England Journal of Medicine, 340*(8), 618-626.

Schulz, A. J., Williams, D. R., Israel, B. A., & Lempert, L. B. (2002). Racial and spatial relations as fundamental determinants of health in Detroit. *The Milbank Quarterly, 80*(4), 677-707.

Schwartz, R. W., Jarecky, R. K., Strodel, W. E., Haley, J. V., Young, B., & Griffen, W. O., Jr. (1989). Controllable lifestyle: A new factor in career choice by medical students. *Academic Medicine, 64*(10), 606-609.

Scott, A., Shiell, A., & King, M. (1996). Is general practitioner decision making associated with patient socio-economic status? *Social Science & Medicine, 42*(1), 35-46.

Sequist, T. D., Fitzmaurice, G. M., Marshall, R., Shaykevich, S., Marston, A., Safran, D. G., et al. (2010). Cultural competency training and performance reports to improve diabetes care for black patients: A cluster randomized, controlled trial. *Annals of Internal Medicine, 152*(1), 40-46.

Shannon, G. W., Skinner, J. L., & Bashshur, R. L. (1973). Time and distance: The journey for medical care. *International Journal of Health Services, 3*(2), 237-244.

Shapiro, T. M. (2004). *The hidden cost of being African American: How wealth perpetuates inequality*. New York, NY: Oxford University Press.

Shapiro, T. M. (2006). Race, homeownership and wealth. *Washington University Journal of Law and Policy 20*, 53-74.

Sharp, L. K., Bashook, P. G., Lipsky, M. S., Horowitz, S. D., & Miller, S. H. (2002). Specialty board certification and clinical outcomes: The missing link. *Academic Medicine, 77*(6), 534-542.

Shenolikar, R. A., Balkrishnan, R., Camacho, F. T., Whitmire, J. T., & Anderson, R. T. (2006). Race and medication adherence in Medicaid enrollees with type-2 diabetes. *Journal of the National Medical Association, 98*(7), 1071-1077.

Shi, L., & Stevens, G. D. (2005). Vulnerability and unmet health care needs. The influence of multiple risk factors. *Journal of General Internal Medicine, 20*(2), 148-154.

Shosteck, H., & Fairweather, W. R. (1979). Physician response rates to mail and personal interview surveys. *Public Opinion Quarterly, 43*(2), 206-217.

Signorello, L. B., Schlundt, D. G., Cohen, S. S., Steinwandel, M. D., Buchowski, M. S., McLaughlin, J. K., et al. (2007). Comparing diabetes prevalence between African Americans and whites of similar socioeconomic status. *American Journal of Public Health, 97*(12), 2260-2267.

Siminoff, L. A., Graham, G. C., & Gordon, N. H. (2006). Cancer communication patterns and the influence of patient characteristics: Disparities in information-giving and affective behaviors. *Patient Education and Counseling, 62*(3), 355-360.

Sirovich, B. E., Woloshin, S., & Schwartz, L. M. (2011). Too little? Too much? Primary care physicians' views on US health care: A brief report. *Archives of Internal Medicine, 171*(17), 1582-1585.

Skinner, J., Chandra, A., Staiger, D., Lee, J., & McClellan, M. (2005). Mortality after acute myocardial infarction in hospitals that disproportionately treat black patients. *Circulation, 112*(17), 2634-2641.

Smedley, B. D., Butler, A. S., & Bristow, L. R. (Eds.). (2004). *In the nation's compelling interest: Ensuring diveristy in the health-care workforce*. Washington, D.C.: National Academies Press.

Smedley, B. D., Stith, A. Y., & Nelson, A. R. (Eds.). (2003). *Unequal treatment: Confronting racial and ethnic disparities in health care*. Washington, D.C.: National Academy Press.

Smelser, N. J., Wilson, W. J., Mitchell, F., & National Research Council. (2001). *America becoming: Racial trends and their consequences*. Washington, D.C.: National Academy Press.

Southeast Michigan Council of Governments. (2010). Community Profiles. Retrieved May 14, 2010, from http://www.semcog.org/Data/Apps/comprof/people.cfm?cpid=8999

SPSS. (2008). *Missing Values 17.0 [Manual]*. Chicago, IL.

Stange, K. C., Nutting, P. A., Miller, W. L., Jaen, C. R., Crabtree, B. F., Flocke, S. A., et al. (2010). Defining and measuring the patient-centered medical home. *Journal of General Internal Medicine, 25*(6), 601-612.

Stewart, M. A. (1995). Effective physician-patient communication and health outcomes: A review. *Canadian Medical Association Journal, 152*(9), 1423-1433.

Stone, V. E. (2005). Physician contributions to disparities in HIV/AIDS care: The role of provider perceptions regarding adherence. *Current HIV/AIDS Reports, 2*(4), 189-193.

Street, R. L., Gordon, H., & Haidet, P. (2007). Physicians' communication and perceptions of patients: Is it how they look, how they talk, or is it just the doctor? *Social Science and Medicine, 65*(3), 586-593.

Street, R. L., Jr. (1991). Information-giving in medical consultations: The influence of patients' communicative styles and personal characteristics. *Social Science & Medicine, 32*(5), 541-548.

Street, R. L., Jr. (2002). Gender differences in health care provider-patient communication: Are they due to style, stereotypes, or accommodation? *Patient Education and Counseling, 48*(3), 201-206.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston, MA: Pearson/Allyn & Bacon.

Tabenkin, H., Eaton, C. B., Roberts, M. B., Parker, D. R., McMurray, J. H., & Borkan, J. (2010). Differences in cardiovascular disease risk factor management in primary care by sex of physician and patient. *Annals of Family Medicine, 8*(1), 25-32.

Tai-Seale, M., McGuire, T. G., & Zhang, W. (2007). Time allocation in primary care office visits. *Health Services Research, 42*(5), 1871-1894.

Tamblyn, R., Abrahamowicz, M., Dauphinee, W. D., Hanley, J. A., Norcini, J., Girard, N., et al. (2002). Association between licensure examination scores and practice in primary care. *Journal of the American Medical Association, 288*(23), 3019-3026.

Tambor, E. S., Chase, G. A., Faden, R. R., Geller, G., Hofman, K. J., & Holtzman, N. A. (1993). Improving response rates through incentive and follow-up: The effect on a survey of physicians' knowledge of genetics. *American Journal of Public Health, 83*(11), 1599-1603.

Turchin, A., Shubina, M., Chodos, A. H., Einbinder, J. S., & Pendergrass, M. L. (2008). Effect of board certification on antihypertensive treatment intensification in patients with diabetes mellitus. *Circulation, 117*(5), 623-628.

Turner, M. A., & Skidmore, F. (Eds.). (1999). *Mortgage lending discrimination: A review of existing evidence*. Washington, D.C.: The Urban Institute Press.

U.S. Census Bureau. (1952). *Census tract statistics: Detroit Michigan and adjacent area, 1950 population census report*. Retrieved from http://www2.census.gov/prod2/decennial/documents/41557421v3p2ch02.pdf.

U.S. Census Bureau. (1977). Directive no. 15: Race and ethnic standards for federal statistics and administrative reporting. Retrieved June11, 2010, from http://wonder.cdc.gov/wonder/help/populations/bridged-race/Directive15.html

U.S. Census Bureau. (1998). Population of the 100 largest urban places: 1990. Retrieved June 03, 2010, from http://www.census.gov/population/www/documentation/twps0027/tab13.txt

U.S. Census Bureau. (2000). Racial and ethnic classifications used in census 2000 and beyond. Retrieved June 11, 2010, from http://www.census.gov/population/www/socdemo/race/racefactcb.html

U.S. Census Bureau. (2007). Business patterns, North American industry classification system. Retrieved September 3, 2010, 2010, from http://censtats.census.gov/cbpnaic/cbpnaic.shtml

U.S. Census Bureau. (2008a). 2005-2007 American community survey 3-year estimates. Retrieved June 4, 2010, from http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&_submenuId=&_lang=en&_ts=

U.S. Census Bureau. (2008b). 2007 American community survey 1-year estimates. Retrieved September 20, 2010, from http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&_submenuId=&_lang=en&_ts=

U.S. Census Bureau. (2009). 2008 American community survey 1-year estimates. Retrieved July 5, 2010, from http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&_submenuId=&_lang=en&_ts=

U.S. Census Bureau. (2010). Current population survey table creator for the annual social and economic supplement. Retrieved September 16, 2010, from http://www.census.gov/hhes/www/cpstc/cps_table_creator.html

U.S. Census Bureau. (2011). American community survey 2005-2009 5-year estimates Retrieved October 29, 2011, from http://factfinder.census.gov/home/saff/main.html?_lang=en

U.S. Census Bureau. (2012). 2010 American community survey 1-year estimates. Retrieved February 29, 2012, from http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_10_1YR_C04001&prodType=table

U.S. Department of Justice. (2007). Crime in the United States. Retrieved September 8, 2010, from http://www.fbi.gov/ucr/cius2007/data/table_01.html

U.S. Environmental Protection Agency. (2009). Human population growth and distribution in Southeast Michigan. Retrieved June 03, 2010, from http://www.epa.gov/med/grosseile_site/indicators/population.html#fig2

U.S. Government Accountability Office. (2003). *Physican workforce: Physician supply increased in metropolitan and nonmetropolitan areas but geographic disparities persisted*. Retrieved from http://www.gao.gov/assets/250/240513.pdf.

U.S. Government Accountablity Office. (2007). Poverty in America: Consequences for individuals and the economy. Retrieved September 13, 2010, from http://www.gao.gov/new.items/d07343t.pdf

van Ryn, M. (2002). Research on the provider contribution to race/ethnicity disparities in medical care. *Medical Care, 40*(1 Suppl), I140-151.

van Ryn, M., Burgess, D., Malat, J., & Griffin, J. (2006). Physicians' perceptions of patients' social and behavioral characteristics and race disparities in treatment recommendations for men with coronary artery disease. *American Journal of Public Health, 96*(2), 351-357.

van Ryn, M., & Burke, J. (2000). The effect of patient race and socio-economic status on physicians' perceptions of patients. *Social Science & Medicine, 50*(6), 813-828.

Varkey, A. B., Manwell, L. B., Williams, E. S., Ibrahim, S. A., Brown, R. L., Bobula, J. A., et al. (2009). Separate and unequal: Clinics where minority and nonminority patients receive primary care. *Archives of Internal Medicine, 169*(3), 243-250.

Wagner, E. H., Austin, B. T., Davis, C., Hindmarsh, M., Schaefer, J., & Bonomi, A. (2001). Improving chronic illness care: Translating evidence into action. *Health Affairs, 20*(6), 64-78.

Wagner, E. H., Austin, B. T., & Von Korff, M. (1996). Organizing care for patients with chronic illness. *The Milbank Quarterly, 74*(4), 511-544.

Watkins, M. (2000). Monte Carlo PCA for Parallel Analysis [Computer software]. State College, PA: Ed & Psych Associates.

Wayne State University Institute of Gerontology. (2002). Facing the future: 2002 City of Detroit needs assessment of older adults. Retrieved October 5, 2010, from http://www.daaa1a.org/DAAA/media/Detroit%20Needs%20Assessment%20Excerpt.pdf

Weeks, W. B., Wallace, T. A., & Wallace, A. E. (2009). How do race and sex affect the earnings of primary care physicians? *Health Affairs, 28*(2), 557-566.

Weinick, R. M., Zuvekas, S. H., & Cohen, J. W. (2000). Racial and ethnic differences in access to and use of health care services, 1977 to 1996. *Medical Care Research and Review, 57 Suppl 1*, 36-54.

Weissman, J. S., Betancourt, J., Campbell, E. G., Park, E. R., Kim, M., Clarridge, B., et al. (2005). Resident physicians' preparedness to provide cross-cultural care. *Journal of the American Medical Association, 294*(9), 1058-1067.

Weissman, J. S., Campbell, E. G., Gokhale, M., & Blumenthal, D. (2001). Residents' preferences and preparation for caring for underserved populations. *Journal of Urban Health, 78*(3), 535-549.

Whitley, D. M., Kelley, S. J., & Sipe, T. A. (2001). Grandmothers raising grandchildren. *Health and Social Work, 26*(2), 105-115.

Willens, D., Cripps, R., Wilson, A., Wolff, K., & Rothman, R. (2011). Interdisciplinary team care for diabetic patients by primary care physicians, advanced practice nurses, and clinical pharmacists. *Clinical Diabetes, 29*(2), 60-69.

Williams, D. R., & Collins, C. (2001). Racial residential segregation: A fundamental cause of racial disparities in health. *Public Health Reports, 116*(5), 404-416.

Woo, J. K., Ghorayeb, S. H., Lee, C. K., Sangha, H., & Richter, S. (2004). Effect of patient socioeconomic status on perceptions of first- and second-year medical students. *Canadian Medical Association Journal, 170*(13), 1915-1919.

Wood, J. (1994). Engendered identities: Shaping voice and mind through gender. In D. Vocate (Ed.), *Intrapersonal communication: Different voices, different minds* (pp. 145-167). Hillsdale, NJ: Erlbaum.

Wood, J., & Inman, C. (1993). In a different mode: Masculine styles of communicating closeness. *Journal of Applied Communication Research, 21*(3), 279-297.

Woodard, L. D., Hernandez, M. T., Lees, E., & Petersen, L. A. (2005). Racial differences in attitudes regarding cardiovascular disease prevention and treatment: A qualitative study. *Patient Education and Counseling, 57*(2), 225-231.

Yarnall, K. S., Pollak, K. I., Ostbye, T., Krause, K. M., & Michener, J. L. (2003). Primary care: Is there enough time for prevention? *American Journal of Public Health, 93*(4), 635-641.

Yedidia, M. J., Gillespie, C. C., Kachur, E., Schwartz, M. D., Ockene, J., Chepaitis, A. E., et al. (2003). Effect of communications training on medical student performance. *Journal of the American Medical Association, 290*(9), 1157-1165.

Zax, J. S., & Kain, J. F. (1996). Moving to the suburbs: Do relocating companies leave their black employees behind? *Journal of Labor Economics, 14*(3), 472-504.

Zenk, S. N., Schulz, A. J., Israel, B. A., James, S. A., Bao, S., & Wilson, M. L. (2005). Neighborhood racial composition, neighborhood poverty, and the spatial accessibility of supermarkets in metropolitan Detroit. *American Journal of Public Health, 95*(4), 660-667.

Zhang, J. X., Huang, E. S., Drum, M. L., Kirchhoff, A. C., Schlichting, J. A., Schaefer, C. T., et al. (2009). Insurance status and quality of diabetes care in community health centers. *American Journal of Public Health, 99*(4), 742-747.

Zippay, A., & Rangarajan, A. (2007). Child care "packaging" among TANF recipients: Implications for social work *Child and Adolescent Social Work Journal, 24*(2), 153-172.