

Health Care Disparities and Diabetes Care: Practical Considerations for Primary Care Providers

Richard O. White, MD, Bettina M. Beech, DrPH, MPH, and Stephania Miller, PhD

Ever since the Institute of Medicine issued its 2002 report titled, “Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care,”¹ there has been a steady increase in the awareness, measurement, and documentation of disparate health care trends across America. Health care disparities have been defined as, “[differences] in the overall rate of disease incidence, prevalence, morbidity, mortality, or survival rates in [a given subpopulation] as compared to the health status of the general population.”² Health care disparities can be broadly classified as either differences in the quality of care received or in access to care. In general, these disparities encompass a broad spectrum of disease processes and result from a complex interplay of multiple factors.

Despite some recent successes in narrowing disparate gaps in care among select populations,³ the reduction or elimination of most health disparities has remained elusive to providers, researchers, and policy-makers. The Agency for Healthcare Research and Quality (AHRQ) has recognized several priority groups as targets for addressing disparities. These include racial and ethnic minorities, women, children, low-income groups, the elderly, residents of rural areas, and individuals with disabilities.⁴

Diabetes care represents an important area of national focus as efforts continue toward eliminating health care disparities and

improving the overall health of all Americans. With that in mind, the goals of this article are to: 1) provide an overview of disparities specific to the care of patients with diabetes, 2) highlight some of the potential causes of these disparities while providing an overview of past and current efforts to address them, and 3) provide considerations for the primary care provider’s role in helping to reduce and eliminate disparate trends in diabetes care.

The current prevalence of diabetes in the United States is startling, with nearly 24 million affected individuals (~ 8% of the U.S. population) and another 57 million individuals (~ 19% of the U.S. population) believed to be at considerable clinical risk of developing diabetes (i.e., having pre-diabetes).⁵ Racial and ethnic minorities are known to carry a disproportionate burden of diabetes, with the prevalence

among African Americans at ~ 12% and that of non-white Hispanics at ~ 11%, compared to whites, whose overall prevalence is ~ 7%.⁵

As the population continues to age and becomes increasingly diverse, the number of individuals with diabetes is expected to increase unless the current trajectory is interrupted. This is an important consideration because diabetes has been identified as the sixth-leading cause of death nationally,⁶ and the annual costs directly attributed to the care of patients with diabetes are estimated to be \$174 billion.⁷

Significant disparities in both the processes of care and health outcomes relevant to diabetes management persist across the country. According to the most recent National Healthcare Disparities Report (NHDR), the proportion of patients with diabetes who had all three annual services recommended by the American Diabetes Association (i.e., appropriate measurement of A1C, retinal eye exams, and foot exams) in the past year was significantly lower for poor to middle-income individuals, Hispanics, and those without at least some college education compared to their respective comparison groups. Lower-extremity amputation rates among patients with diabetes have also been consistently higher among African Americans, Hispanics, and those who live in communities with median incomes < \$45,000.³

IN BRIEF

Disparities in diabetes care are prevalent in the United States. This article provides an overview of these disparities and discusses both potential causes and efforts to address them to date. The authors focus the discussion on aspects relevant to the patient-provider dyad and provide practical considerations for the primary care provider’s role in helping to diminish and eliminate disparities in diabetes care.

As a nation in general, we are doing poorly in terms of the overall quality of glycemic, blood pressure, and lipid control among patients with diabetes.⁸⁻¹⁰ For example, during the years 1999–2004, only 48.7% of patients with diabetes met the recommended A1C goal of < 7%, and 56.6% of patients reported blood pressures < 140/80 mmHg. Within this context, nonetheless, both African Americans and Mexican Americans had significantly less likelihood of having an A1C < 7% compared to whites, and African Americans and those classified as poor to middle income had significantly fewer individuals at goal blood pressure.

It should be noted that blood pressure estimates for this period were based on previous recommendations that have since been updated (i.e., a blood pressure goal of < 135/80 mmHg),¹¹ suggesting a potential underestimate of the current disparate gap in blood pressure control.³ On a brighter note, when cholesterol control was examined for the same time period, there were no longer any statistically significant racial differences, and the previous gap between high-income and poor individuals with diabetes had been closed. Nonetheless, the overall rates of cholesterol control (i.e., total cholesterol < 200 mg/dl) also remain poor, with only 48.2% of adults meeting recommended goals.^{12,13}

Most practicing clinicians know that dietary and physical activity counseling are imperative to the care of patients with diabetes. Unfortunately, the NHDR in 2007 also showed that significantly fewer Hispanics, African Americans, lower-income individuals, and individuals with less than a high school education were told by their physician that they were overweight. Similarly, obese individuals who were Hispanic, poor, had less than a

high school education, or were uninsured were significantly less likely to be given instructions from their physician on physical activity.³ These results, although not specific to the population with diabetes, should be taken into consideration when thinking about disparities in diabetes care. Table 1 provides a brief list of selected studies that further highlight disparities in diabetes care that affect each of the aforementioned AHRQ priority groups.

The U.S. health care system seems to be moving increasingly toward a model in which health organizations and, to a certain extent, individual providers will be judged based on their ability to provide care that is effective, safe, timely, patient-centered, equitable, and efficient.¹⁴ “Equitable” refers to the non-differential delivery of care regardless of patient characteristics. Addressing all six of these factors may seem like an impractically tall order for busy practitioners who have existed to date in an environment where revenue is primarily based on volume and fee-for-service as opposed to being based on performance. Nonetheless, these new potential standards reflect a growing recognition of the need for change in the way health care delivery is provided and evaluated.

What are some of the potential causes of disparities in diabetes care, and what has been done to address them? To answer these questions, this discussion focuses on both components of a patient-provider dyad, highlighting characteristics that may partially explain the observed disparate trends in diabetes care. Both members of this dyad have been shown conceptually to have an important and interrelated impact on disparities within the larger context in which health disparities are believed to exist.¹⁵ These two entities are also most relevant to those who

regularly attend to patients with diabetes, whether in primary care or specialty care settings.

Patients with diabetes are known to play a vital role in their individual care in that much of their success hinges on the daily self-management of their chronic illness. Although it is true that differential access to care and patient-specific demographic factors such as education and income level partially account for disparate trends in care, there are still residual disparities in quality even after controlling for these variables.¹ From a practical standpoint, when individual patients are nonadherent to treatment regimens, scheduled appointments, and instructions regarding diet and exercise, they are obviously more likely to have poorer diabetes-related outcomes.

However, what providers often attribute to someone being a “difficult patient” very well could represent a manifestation of other intrinsic patient factors such as self-efficacy, disease knowledge, or health literacy or quantitative skills (i.e., numeracy). In 2004, the Institute of Medicine defined health literacy as “the degree to which individuals have the capacity to obtain, process, and understand basic information and services needed to make appropriate decisions regarding their health.”¹⁶ Numeracy is a component of health literacy and has simply been defined as “the ability to understand and use numbers in daily life.”¹⁷ There are more than 90 million Americans with basic or below-basic literacy skills and more than 110 million with basic or poor quantitative skills.¹⁸ Both health literacy and numeracy are important skills needed for successful diabetes self-management because patients are often required to interpret and apply dietary instructions, measure and dispense insulin, and quantify carbohydrate intake, among other tasks.¹⁹

Several studies have linked low health literacy and numeracy to poorer diabetes knowledge and symptom recognition, poorer glycemic control, and lower self-efficacy or confidence in one's ability to self-manage.^{20–22} Also, low health literacy has been shown to be an independent predictor of how much patients benefit from a comprehensive diabetes management program.²³ These “other” patient factors are not intuitively obvious,

particularly during routine clinic visits, but they can be easily measured even in the time-pressured clinical setting.^{24–26} Additionally, patients have been shown to be amenable to such assessments without subsequent decreases in satisfaction.²⁷

Peek et al.²⁸ recently published a comprehensive review of the literature summarizing interventions targeted at each of the two aforementioned members of our diabetes care dyad with the overall goal of reduc-

ing disparities in diabetes care. Each of the patient-targeted interventions in their analysis was an educational program centered on improving self-management behaviors, physical activity, or dietary practices.

For example, Piette et al.²⁹ enrolled English- and Spanish-speaking adult patients with diabetes into a randomized controlled trial in a primary care setting. They compared to usual care the added benefit of an automated telephone

Table 1: AHRQ-Defined Vulnerable Populations and Selected Studies Demonstrating Disparities in Diabetes Care

<p>Racial/Ethnic Minorities</p> <ul style="list-style-type: none"> Hosler et al. 2005, <i>Diabetes Educ</i> Boltri et al. 2005, <i>Ethn Dis</i> 	<ul style="list-style-type: none"> Despite similar access to care and frequency of provider visits, Puerto Ricans had significantly less screening of A1C and cholesterol, blood pressure-lowering medication use, and pneumococcal vaccination rates. Analysis of National Health and Nutrition Examination Survey 1999–2000 data revealed significant racial/ethnic differences in A1C for individuals with both diagnosed and undiagnosed diabetes.
<p>Women</p> <ul style="list-style-type: none"> Chou et al. 2007, <i>Womens Health Issues</i> Ferrara et al. 2008, <i>Diabetes Care</i> 	<ul style="list-style-type: none"> Significant sex differences in cholesterol control were observed among Medicare enrollees with diabetes. Cross-sectional analysis from 10 U.S. managed health plans found significant sex differences in systolic blood pressure and cholesterol control among patients with diabetes.
<p>Children</p> <ul style="list-style-type: none"> <i>MMWR</i> 2007 Rothman et al. 2008, <i>Pediatrics</i> 	<ul style="list-style-type: none"> Centers for Disease Control and Prevention analysis of diabetes-related death rates among people 1–19 years of age from 1979 to 2004; during that period, death rates for African-American youth were twice that of whites. Analysis of self-management behaviors among a cohort of adolescents with type 2 diabetes. In multivariable, adjusted analysis, nonwhite race was associated with poorer glycemic control and worse dietary and exercise behavior.
<p>Low-income groups</p> <ul style="list-style-type: none"> Brown et al. 2005, <i>Diabetes Care</i> Figaro et al. 2009, <i>J Natl Med Assoc</i> 	<ul style="list-style-type: none"> Patients with lower socioeconomic position had significantly lower rates of dilated eye exams. Qualitative analysis demonstrating that outcome expectations and self-efficacy among patients with diabetes were related to variations in socioeconomic status.
<p>Elderly (≥ 65 years of age)</p> <ul style="list-style-type: none"> Cook et al. 2006, <i>Ethn Dis</i> 	<ul style="list-style-type: none"> Cross-sectional analysis of diabetes-related hospitalizations demonstrating that elderly patients had significantly greater discharge rates, longer stays, and higher hospital-related charges.
<p>Rural residents</p> <ul style="list-style-type: none"> Tessaro et al. 2005, <i>Prev Chronic Dis</i> 	<ul style="list-style-type: none"> Qualitative study of a rural Appalachian population with diabetes identified several cultural and economic barriers to diabetes care and early detection.
<p>Individuals with disabilities</p> <ul style="list-style-type: none"> Jones et al. 2008, <i>Disabil Rehabil</i> 	<ul style="list-style-type: none"> Analysis of U.S. National Health Interview Survey data (1997–2004) demonstrating that minorities with mobility limitations had greater odds of several health outcomes including diabetes compared to those with minority status or mobility limitation alone.

assessment system with nurse-guided patient follow-up to address identified barriers to self-care. Patients in their intervention arm demonstrated greater self-management activities, less frequent problems with medication adherence, and better glycemic control compared to the control group. In a brief subanalysis, the Spanish-speaking intervention patients in this study demonstrated even greater benefit (i.e., improvement in A1C, success in reaching goal A1C, and fewer diabetes-related symptoms) compared to the Spanish-speaking controls, suggesting ethnicity as a potential effect modifier.²⁸

Anderson-Loftin et al.³⁰ evaluated the effect of an educational intervention among a small cohort of rural African Americans with type 2 diabetes. Their dietary intervention incorporated culturally tailored educational sessions and follow-up by a nurse case manager. Recipients of their intervention demonstrated significant improvement in BMI, with a net weight difference of 3.7 kg at 6 months compared to the control group. There were also significant reductions in dietary fat intake, with nonsignificant trends towards improvement in A1C and lipids.²⁸

Overall, Peek et al. found that patient-centered educational interventions that used peer support or one-on-one interactions were more likely to yield positive results, and those interventions that were culturally tailored resulted in greater reductions in A1C compared to interventions geared for the general patient population.

Primary care physicians are known to care for the majority of U.S. patients with diabetes.^{31,32} They are, therefore, logical targets for advancing efforts to eliminate disparities in diabetes care. But could they also be a source of the problem? A national survey of physicians

conducted by the Kaiser Family Foundation in 2001 found that physicians were less likely than the general public to believe that disparities in health care occur “somewhat often” in all areas except insurance status.^{33,34} Even when physicians agree that disparities in care are ubiquitous, they are more likely to attribute the causes to patient factors and less likely to believe these problems exist among their own patients or are related to provider factors such as trust and communication. This has been dubbed the “not me” phenomenon.^{35–37}

Still, there is growing evidence that even well-meaning providers can be subject to unintentional and unconscious biases that manifest in differential care of patients. Sequist et al.³⁸ examined a cohort of primary care physicians representing 14 ambulatory care centers and caring for nearly 300,000 adult patients with diabetes in eastern Massachusetts. Embedded within their electronic medical record system were components such as physician-directed support tools, capacity for team management, and the ability to generate patient mailings regarding needed health services, such as cholesterol screenings. They sought to determine whether variations in diabetes outcomes by race occurred at the level of individual providers.

The researchers observed that white patients were significantly more likely to achieve A1C, LDL cholesterol, and blood pressure control than African-American patients. Interestingly, a greater proportion of these differences were explained by within-physician effects (i.e., differences within the same physician’s panel) rather than socio-demographic factors, and these differences were not linked to overall provider performance or the number of African-American patients in a given panel. Although not explic-

itly clear, it is plausible that these observed differences were the result of unconscious racial bias or perhaps differential levels of communication between patients and providers.

Unconscious biases and stereotyping have been postulated to manifest in the clinical setting as “cognitive shortcuts” that occur during the decision-making process inherent within the patient-provider encounter. These heuristic tools are thought to be more likely to occur in situations in which there is time pressure, fatigue, stress, or the need for multitasking—all hallmarks of the day-to-day environment in busy medical practices.³⁹ Although the majority of physicians are aware of their egalitarian responsibilities as providers of health care, many do in fact unconsciously categorize patients based on stereotypes, and there is evidence to suggest that this behavior can potentially influence both the quality of the encounter and physician behavior (i.e., recommendations, counseling, ordering of tests, and prescribing patterns).^{40–43}

Several conceptual frameworks have been put forth in the literature as explanations of how physicians may contribute to disparities in health care.^{40,42} One important element that is potentially remediable is that of communication. Ashton et al.⁴⁰ have proposed that differential communication between patients and providers is often the result of differing levels of congruence in each member’s “explanatory model” of illness. For example, if a patient believes that his diabetes was caused by stress or a traumatic event, he may be less likely to adhere solely to the dietary or medication recommendations of his provider.^{40,44–47}

Racial and ethnic concordance between patients and providers has been shown to be associated with improved communication as well as increased satisfaction, trust, and

perception of the quality of care.^{48–51} Although diversification of our provider workforce is important, it is impractical to believe that complete racial/ethnic concordance between patients and providers in our health care system is necessary or that it would completely alleviate patient-provider barriers in communication. Interestingly, Street et al.⁵² reported that physicians who employed greater patient-centered communication skills were able to overcome the barriers of racial/ethnic discordance in terms of patient satisfaction, trust, and intent to adhere. Furthermore, physicians' knowledge of their patients' limited health literacy can aid providers in tailoring their delivery of health information and potentially affect both diabetes management and outcomes.⁵³ Therefore, providers of diabetes care would be prudent to consider and evaluate the quality of the communication that occurs during their clinical interactions, particularly with minority patients and regardless of racial/ethnic concordance.

All of the interventions geared toward providers of diabetes care in Peek's analysis used reminder systems and provider education, such as practice guidelines, personal feedback, and continuing medical education programs. These

studies demonstrated significant improvement in several process measures, such as measurement of microalbumin, foot care, and exercise counseling. Only one study met inclusion criteria for the meta-analysis on reduction in A1C, and this study showed a nonsignificant reduction in A1C of 0.47% using problem-based learning as an intervention. Surprisingly, none of these intervention studies used cultural competency or Spanish-language training.²⁸

What can providers do for their patients and themselves to aid in the reduction and eventual elimination of disparities in diabetes care? We have seen that patients' underlying health literacy and numeracy levels can be associated with worse diabetes outcomes. Providers should not hesitate to assess these skills in their patients,^{25,27,54} which can provide useful information and serve as a guide for how to best disseminate information to patients with diabetes. In addition to what is already available through organizations such as the American Diabetes Association, many researchers have developed and validated patient educational materials specifically designed for patients with diabetes and sensitive to the issues of literacy and numeracy.^{26,54–56} Furthermore, many of

these materials are both well-suited to and practical for use in the clinical setting. There are also resources available for providers to learn skills to improve their communication style, particularly with low-literacy patients.^{23,57–61}

It has been shown that providers often experience uncertainty and apprehension when attempting to care for and respond to the needs of patients with racial/ethnic backgrounds that differ from their own.⁶² This can potentiate clinical inertia, which has been shown to be more prevalent regarding minority patients.^{63–66} Providers should be aware of the possibility of clinical inertia, especially with regard to their racial/ethnic minority patients and should, for example, consider adjustments to therapy, such as earlier addition of insulin, when clinically appropriate.^{65,66}

Improved cultural competency can also serve as a means of addressing the uncertainty often experienced during clinical encounters. Beach et al.⁶⁷ showed that cross-cultural training can improve provider attitudes, knowledge, and skills, although there has been less evidence to support the positive impact that this has on patient outcomes.^{67,68} Nonetheless, with time and more rigorous research in this

Table 2: Provider Approaches to Addressing Disparities in Diabetes Care

<p>Patient Factors</p> <ul style="list-style-type: none"> • Diabetes knowledge and behavior • Health literacy and numeracy • Limited English proficiency • Trust and perceived cultural competence 	<ul style="list-style-type: none"> • Use diabetes self-management education, nurse educators/case management, community health workers, and/or patients as peer role models. • Consider measuring these skills and providing literacy- and numeracy-sensitive educational materials to your patients. • Improve the use of interpretation services; provide language-specific educational materials. • Use patient-centered interviewing; consider measuring these constructs in your patient population.
<p>Provider Factors</p> <ul style="list-style-type: none"> • Unconscious bias/stereotyping • Cultural competency • Communication 	<ul style="list-style-type: none"> • Use patient-centered interviewing and care, case managers, and algorithm-based clinical guidelines, and incorporate feedback. • Consider practice-based training and Internet seminars and seek and incorporate patient/colleague feedback. • Use patient-centered interviewing, teach-back technique, motivational interviewing, and cultural leverage.

area, we are confident that improvements in the delivery of culturally competent care will prove to be a useful tool in addressing disparities in diabetes care.

Providers are encouraged to incorporate these recommendations into their quality improvement projects, which are now requirements of accreditation entities such as the American Board of Family Physicians and the American Board of Internal Medicine. A summary of provider approaches to addressing disparities in diabetes care is provided in Table 2. Finally, providers must continue to lobby collectively for necessary changes in the larger health systems in which they work and which often hinder them in providing and hinder patients in receiving the highest possible quality of care.

In conclusion, disparities in diabetes care continue despite significant clinical advances in understanding the management of this chronic illness. Providers of diabetes care can play a key role in diminishing these disparities through understanding and addressing patient factors such as health literacy and focusing on improved patient communication and cultural competence. If this is done, the U.S. health care system very well may begin to turn the tide and make important strides toward equitable diabetes care and improved outcomes for all.

ACKNOWLEDGMENTS

Dr. White is supported by Pfizer's Fellowship in Health Literacy & Clear Health Communication and Meharry Medical College's Clinical Research Education and Career Development Program (NIH NCCR CRECD 1R25RR17577). Dr. Beech is supported by Vanderbilt University's Diabetes Research and Training Center (P60 DK020593).

Dr. Miller is supported by a Building Interdisciplinary Research Careers in Women's Health (BIRCWH) award (5 K12 HD043483-05).

REFERENCES

- ¹Nelson A: Unequal treatment: confronting racial and ethnic disparities in health care. *J Natl Med Assoc* 94:666–668, 2002
- ²Minority Health and Health Disparities Research and Education Act; Public Law 106–525, Title I, section 101 (42 USC 287c-31). Washington, D.C., U.S. Government Printing Office, Superintendent of Documents, 22 November 2000
- ³U.S. Department of Health and Human Services Agency for Healthcare Research and Quality: 2007 National Healthcare Disparities Report. Rockville, Md., U.S. Department of Health and Human Services Agency for Healthcare Research and Quality, 2008
- ⁴Kelley E, Moy E, Stryer D, Burstin H, Clancy C: The national healthcare quality and disparities reports: an overview. *Med Care* 43:13–18, 2005
- ⁵Centers for Disease Control and Prevention: National diabetes fact sheet. Atlanta, Ga., Centers for Disease Control and Prevention, 2005, p. 8
- ⁶Kung HC, Hoyert DL, Xu J, Murphy SL: Deaths: final data for 2005. *Natl Vital Stat Rep* 56:1–120, 2008
- ⁷American Diabetes Association: Economic costs of diabetes in the U.S. In 2007. *Diabetes Care* 31:596–615, 2008
- ⁸McGlynn EA, Asch SM, Adams J, Keesey J, Hicks J, DeCristofaro A, Kerr EA: The quality of health care delivered to adults in the United States. *N Engl J Med* 348:2635–2645, 2003
- ⁹Saadine JB, Cadwell B, Gregg EW, Engelgau MM, Vinicor F, Imperatore G, Narayan KM: Improvements in diabetes processes of care and intermediate outcomes: United States, 1988–2002. *Ann Intern Med* 144:465–474, 2006
- ¹⁰Saydah SH, Fradkin J, Cowie CC: Poor control of risk factors for vascular disease among adults with previously diagnosed diabetes. *JAMA* 291:335–342, 2004
- ¹¹Vijan S, Hayward RA: Treatment of hypertension in type 2 diabetes mellitus: blood pressure goals, choice of agents, and setting priorities in diabetes care. *Ann Intern Med* 138:593–602, 2003
- ¹²National Health and Nutrition Examination Survey, National Center for Health Statistics: National Health and Nutrition Examination Survey, III, 1988–94. Available online from http://www.cdc.gov/nchs/products/elec_prods/subject/nhanes3.htm. Accessed 5 June 2009
- ¹³Ong KL, Cheung BM, Wong LY, Wat NM, Tan KC, Lam KS: Prevalence, treatment, and control of diagnosed diabetes in the U.S. National Health and Nutrition Examination Survey 1999–2004. *Ann Epidemiol* 18:222–229, 2008
- ¹⁴Institute of Medicine Committee on Quality of Health Care in America: *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, D.C., National Academy Press, 2001
- ¹⁵Chin MH, Walters AE, Cook SC, Huang ES: Interventions to reduce racial and ethnic disparities in health care. *Med Care Res Rev* 64:7S–28S, 2007
- ¹⁶Nielsen-Bohman L, Institute of Medicine Committee on Health Literacy: *Health Literacy: A Prescription to End Confusion*. Washington, D.C., National Academies Press, 2004
- ¹⁷Rothman RL, Housam R, Weiss H, Davis D, Gregory R, Gebretsadik T, Shintani A, Elasy TA: Patient understanding of food labels: the role of literacy and numeracy. *Am J Prev Med* 31:391–398, 2006
- ¹⁸Kutner MA, U.S. Department of Education, National Center for Education Statistics: *The Health Literacy of America's Adults: Results from the 2003 National Assessment of Adult Literacy*. Washington, D.C., U.S. Department of Education, National Center for Education Statistics, 2006
- ¹⁹Montori VM, Rothman RL: Weakness in numbers: the challenge of numeracy in health care. *J Gen Intern Med* 20:1071–1072, 2005
- ²⁰Rothman R, Malone R, Bryant B, Dewalt D, Pignone M: Health literacy and diabetic control. *JAMA* 288:2687–2688, 2002
- ²¹Schillinger D, Grumbach K, Piette J, Wang F, Osmond D, Daher C, Palacios J, Sullivan GD, Bindman AB: Association of health literacy with diabetes outcomes. *JAMA* 288:475–482, 2002
- ²²Cavanaugh K, Huizinga MM, Wallston KA, Gebretsadik T, Shintani A, Davis D, Gregory RP, Fuchs L, Malone R, Cherrington A, Pignone M, DeWalt DA, Elasy TA, Rothman RL: Association of numeracy and diabetes control. *Ann Intern Med* 148:737–746, 2008
- ²³Rothman RL, DeWalt DA, Malone R, Bryant B, Shintani A, Crigler B, Weinberger M, Pignone M: Influence of patient literacy on the effectiveness of a primary care-based diabetes disease management program. *JAMA* 292:1711–1716, 2004
- ²⁴Wallston KA, Rothman RL, Cherrington A: Psychometric properties of the Perceived Diabetes Self-Management Scale (PDSMS). *J Behav Med* 30:395–401, 2007
- ²⁵Weiss BD, Mays MZ, Martz W, Castro KM, DeWalt DA, Pignone MP, Mockbee J, Hale FA: Quick assessment of literacy in primary care: the newest vital sign. *Ann Fam Med* 3:514–522, 2005
- ²⁶Huizinga MM, Elasy TA, Wallston KA, Cavanaugh K, Davis D, Gregory RP, Fuchs LS, Malone R, Cherrington A, Dewalt DA, Buse J, Pignone M, Rothman RL: Development and validation of the Diabetes Numeracy Test (DNT). *BMC Health Serv Res* 8:96, 2008

- ²⁷Ryan JG, Leguen F, Weiss BD, Albury S, Jennings T, Velez F, Salibi N: Will patients agree to have their literacy skills assessed in clinical practice? *Health Educ Res* 23:603–611, 2008
- ²⁸Peek ME, Cargill A, Huang ES: Diabetes health disparities: a systematic review of health care interventions. *Med Care Res Rev* 64:101S–156S, 2007
- ²⁹Piette JD, Weinberger M, McPhee SJ, Mah CA, Kraemer FB, Crapo LM: Do automated calls with nurse follow-up improve self-care and glycemic control among vulnerable patients with diabetes? *Am J Med* 108:20–27, 2000
- ³⁰Anderson-Loftin W, Barnett S, Bunn P, Sullivan P, Hussey J, Tavakoli A: Soul food light: culturally competent diabetes education. *Diabetes Educ* 31:555–563, 2005
- ³¹Middleton K, Hing E: National Hospital Ambulatory Medical Care Survey: 2003 outpatient department summary. *Adv Data* 366:1–36, 2005
- ³²Hing E, Cherry DK, Woodwell DA: National Ambulatory Medical Care Survey: 2004 summary. *Adv Data* 374:1–33, 2006
- ³³Henry J. Kaiser Family Foundation: *Race, Ethnicity & Medical Care: A Survey of Public Perceptions and Experiences*. Menlo Park, Calif., Henry J. Kaiser Family Foundation, 1999
- ³⁴Henry J. Kaiser Family Foundation: *National Survey of Physicians. Part 1, Doctors on Disparities in Medical Care: Highlights and Chartpack*. Menlo Park, Calif., Henry J. Kaiser Family Foundation, 2002
- ³⁵Sequist TD, Ayanian JZ, Marshall R, Fitzmaurice GM, Safran DG: Primary-care clinician perceptions of racial disparities in diabetes care. *J Gen Intern Med* 23:678–684, 2008
- ³⁶Ayanian JZ, Cleary PD, Keogh JH, Noonan SJ, David-Kasdan JA, Epstein AM: Physicians' beliefs about racial differences in referral for renal transplantation. *Am J Kidney Dis* 43:350–357, 2004
- ³⁷Lurie N, Fremont A, Jain AK, Taylor SL, McLaughlin R, Peterson E, Kong BW, Ferguson TB Jr: Racial and ethnic disparities in care: the perspectives of cardiologists. *Circulation* 111:1264–1269, 2005
- ³⁸Sequist TD, Fitzmaurice GM, Marshall R, Shaykevich S, Safran DG, Ayanian JZ: Physician performance and racial disparities in diabetes mellitus care. *Arch Intern Med* 168:1145–1151, 2008
- ³⁹Aberegg SK, Terry PB: Medical decision-making and healthcare disparities: the physician's role. *J Lab Clin Med* 144:11–17, 2004
- ⁴⁰Ashton CM, Haidet P, Paterniti DA, Collins TC, Gordon HS, O'Malley K, Petersen LA, Sharf BF, Suarez-Almazor ME, Wray NP, Street RL Jr: Racial and ethnic disparities in the use of health services: bias, preferences, or poor communication? *J Gen Intern Med* 18:146–152, 2003
- ⁴¹Schulman KA, Berlin JA, Harless W, Kerner JF, Sistrunk S, Gersh BJ, Dube R, Taleghani CK, Burke JE, Williams S, Eisenberg JM, Escarce JJ: The effect of race and sex on physicians' recommendations for cardiac catheterization. *N Engl J Med* 340:618–626, 1999
- ⁴²van Ryn M: Research on the provider contribution to race/ethnicity disparities in medical care. *Med Care* 40:140–151, 2002
- ⁴³Burgess DJ, Fu SS, van Ryn M: Why do providers contribute to disparities and what can be done about it? *J Gen Intern Med* 19:1154–1159, 2004
- ⁴⁴Sullivan LV, Hicks P, Salazar G, Robinson CK: Patient beliefs and sense of control among Spanish-speaking patients with diabetes in Northeast Colorado. *J Immigr Minor Health* [Published online ahead of print. DOI: 10.1007/s10903-008-9184-9]
- ⁴⁵Jezewski MA, Poss J: Mexican Americans' explanatory model of type 2 diabetes. *West J Nurs Res* 24:840–858; discussion 858–867, 2002
- ⁴⁶Hatcher E, Whittemore R: Hispanic adults' beliefs about type 2 diabetes: clinical implications. *J Am Acad Nurse Pract* 19:536–545, 2007
- ⁴⁷Caban A, Walker EA: A systematic review of research on culturally relevant issues for Hispanics with diabetes. *Diabetes Educ* 32:584–595, 2006
- ⁴⁸Cooper LA, Roter DL, Johnson RL, Ford DE, Steinwachs DM, Powe NR: Patient-centered communication, ratings of care, and concordance of patient and physician race. *Ann Intern Med* 139:907–915, 2003
- ⁴⁹Stepanikova I: Patient-physician racial and ethnic concordance and perceived medical errors. *Soc Sci Med* 63:3060–3066, 2006
- ⁵⁰Saha S, Komaromy M, Koepsell TD, Bindman AB: Patient-physician racial concordance and the perceived quality and use of health care. *Arch Intern Med* 159:997–1004, 1999
- ⁵¹Laveist TA, Nuru-Jeter A: Is doctor-patient race concordance associated with greater satisfaction with care? *J Health Soc Behav* 43:296–306, 2002
- ⁵²Street RL Jr, O'Malley KJ, Cooper LA, Haidet P: Understanding concordance in patient-physician relationships: personal and ethnic dimensions of shared identity. *Ann Fam Med* 6:198–205, 2008
- ⁵³Seligman HK, Wang FF, Palacios JL, Wilson CC, Daher C, Piette JD, Schillinger D: Physician notification of their diabetes patients' limited health literacy: a randomized, controlled trial. *J Gen Intern Med* 20:1001–1007, 2005
- ⁵⁴Rothman RL, Malone R, Bryant B, Wolfe C, Padgett P, DeWalt DA, Weinberger M, Pignone M: The Spoken Knowledge in Low Literacy in Diabetes scale: a diabetes knowledge scale for vulnerable patients. *Diabetes Educ* 31:215–224, 2005
- ⁵⁵Wallace AS, Seligman HK, Davis TC, Schillinger D, Arnold CL, Bryant-Shilliday B, Freburger JK, Dewalt DA: Literacy-appropriate educational materials and brief counseling improve diabetes self-management. *Patient Educ Couns* 75:328–333, 2009
- ⁵⁶Seligman HK, Wallace AS, DeWalt DA, Schillinger D, Arnold CL, Shilliday BB, Delgadillo A, Bengal N, Davis TC: Facilitating behavior change with low-literacy patient education materials. *Am J Health Behav* 31 (Suppl. 1):S69–S78, 2007
- ⁵⁷Dewalt DA, Davis TC, Wallace AS, Seligman HK, Bryant-Shilliday B, Arnold CL, Freburger J, Schillinger D: Goal setting in diabetes self-management: taking the baby steps to success. *Patient Educ Couns*. In press. Corrected proof available online from http://www.sciencedirect.com/science?_ob=MIimg&_imagekey=B6TBC-4W1BFM9-8-1&_cdi=5139&_user=4147898&_orig=search&_coverDate=04%2F08%2F2009&_sk=999999999&view=c&wchp=dGLbVtz-zSkWA&md5=abad48ac95e06710071a32d327a32ca8&ie=/sdarticle.pdf
- ⁵⁸Lorenzen B, Melby CE, Earles B: Using principles of health literacy to enhance the informed consent process. *AORN J* 88:23–29, 2008
- ⁵⁹Wilson FL, Baker LM, Nordstrom CK, Legwand C: Using the teach-back and Orem's Self-care Deficit Nursing theory to increase childhood immunization communication among low-income mothers. *Issues Compr Pediatr Nurs* 31:7–22, 2008
- ⁶⁰Doak CC, Doak LG, Friedell GH, Meade CD: Improving comprehension for cancer patients with low literacy skills: strategies for clinicians. *CA Cancer J Clin* 48:151–162, 1998
- ⁶¹Schillinger D, Piette J, Grumbach K, Wang F, Wilson C, Daher C, Leong-Grotz K, Castro C, Bindman AB: Closing the loop: physician communication with diabetic patients who have low health literacy. *Arch Intern Med* 163:83–90, 2003
- ⁶²Kai J, Beavan J, Faull C, Dodson L, Gill P, Beighton A: Professional uncertainty and disempowerment responding to ethnic diversity in health care: a qualitative study. *PLoS Med* 4:e323(1766–1775), 2007
- ⁶³Ziemer DC, Miller CD, Rhee MK, Doyle JP, Watkins C Jr, Cook CB, Gallina DL, El-Kebbi IM, Barnes CS, Dunbar VG, Branch WT Jr, Phillips LS: Clinical inertia contributes to poor diabetes control in a primary care setting. *Diabetes Educ* 31:564–571, 2005
- ⁶⁴Appel SJ, Giger JN: The nurse's role in discouraging clinical inertia in diabetes management: optimizing cardiovascular health among African-Americans. *J Natl Black Nurses Assoc* 18:vii–viii, 2007
- ⁶⁵McEwen LN, Bilik D, Johnson SL, Halter JB, Karter AJ, Mangione CM, Subramanian U, Waitzfelder B, Crosson JC, Herman WH: The predictors and impact of intensification of antihyperglycemic therapy in type 2 diabetes: Translating Research into Action for Diabetes (TRIAD). *Diabetes Care* 32:971–976, 2009
- ⁶⁶Hsu WC: Consequences of delaying progression to optimal therapy in patients with

type 2 diabetes not achieving glycemc goals. *South Med J* 102:67–76, 2009

⁶⁷Beach MC, Price EG, Gary TL, Robinson KA, Gozu A, Palacio A, Smarth C, Jenckes MW, Feuerstein C, Bass EB, Powe NR, Cooper LA: Cultural competence: a systematic review of health care provider educational interventions. *Med Care* 43:356–373, 2005

⁶⁸Thom DH, Tirado MD, Woon TL, McBride MR: Development and evaluation

of a cultural competency training curriculum. *BMC Med Educ* 6:38, 2006

Richard O. White, MD, is an assistant professor in the Division of General Internal Medicine, Department of Medicine, and Stephania Miller, PhD, is an assistant professor in the Department of Surgery at Meharry

Medical College, in Nashville, Tenn. Bettina M. Beech, DrPH, MPH, is an associate professor in the Division of General Internal Medicine and Public Health, Department of Medicine, Institute of Medicine and Public Health, at Vanderbilt University Medical Center, in Nashville, Tenn.
