Exploring Ethnic Disparities in Diabetes, Diabetes Care, and Lifestyle Behaviors: The Nashville REACH 2010 Community Baseline Survey

Stephania T. Miller, PhD; David G. Schlundt, PhD; Celia Larson, PhD; Ronald Reid; James W. Pichert, PhD; Margaret Hargreaves, PhD; Anne Brown, ANPc; Linda McClellan, MPH; Michelle Marrs, EdM

In order to gain a better understanding of diabetes-related health disparities, Nashville REACH 2010 conducted a community baseline survey on health status. A total of 3204 randomly selected African-American (AA) and Caucasian (C) residents of North Nashville, and a comparison sample of residents living in Nashville/Davidson County were interviewed using a computer-assisted telephone interviewing system. Diabetes prevalence was determined, and similarities/differences relative to access to health care, co-morbid conditions, diabetes care, and lifestyle behaviors, were examined. Age-adjusted prevalence of diabetes was 1.7 times higher among AAs. Increasing age ($P<.0001$) and being AA ($P<.01$) were predictive of diabetes status in a regression model. African Americans were more likely to be uninsured ($P<.01$), while Cs had to travel farther to get medical care ($P<.0002$). Compared to Caucasians, African Americans were 1.6 times more likely to have co-morbid hypertension ($P<.004$). Reported insulin use was higher ($P<.0001$) in AAs, and more Cs (25.5% vs 9.1%, respectively) reported taking no medications. African Americans were more likely to report ($P<.0001$) daily glucose self-monitoring, while more Cs ($P<.04$) reported having had an eye exam in the last 1 to 2 years. Caucasians reported more ($P<.05$) active lifestyle behaviors, while AA reported more ($P<.001$) fat-increasing behaviors.

In conclusion, interventions addressing diabetes disparities in the target population should focus on insuring equitable awareness of, and access to, insurance options; managing co-morbidities; improving provider adherence to standards of care; and establishing multi-level supports for lifestyle modifications. (*Ethn Dis.* 2004;14[suppl 1]:S1-38–S1-45)

Key Words: Access to Healthcare, Diabetes Care, Diabetes Disparities, Health Disparities, Lifestyle Behaviors, Nashville REACH 2010

From the Department of Surgery (STM), Department of Internal Medicine (MH), Meharry Medical College; Diabetes Research and Training Center, Vanderbilt University (DGS, JWP, AB); Metropolitan Health Department of Nashville/Davidson County (CL); Project REACH 2010, Matthew Walker Comprehensive Community Health Center (RR, LM, MM); Nashville, Tennessee.

Address correspondence and reprint requests to Stephania T. Miller, PhD; Department of Surgery; Meharry Medical College; 1005 D.B. Todd Blvd.; Nashville, TN 37208; 615-327-5666; 615-327-5579 (fax); smiller@mmc.edu

Introduction

The Racial and Ethnic Approaches to Community Health (REACH) 2010 initiative was created by the Centers for Disease Control and Prevention (CDC) in response to the national goal of eliminating racial and ethnic health disparities.[1] A major requirement of the REACH initiative was the establishment of broad-based, local coalitions that can develop and test potentially innovative strategies. Thirty-one CDC-funded coalitions were established across the country to develop community-based approaches to eliminating these disparities in various disease conditions.[1]

The Nashville REACH 2010, with Matthew Walker Comprehensive Health Center as lead agency, was designed to reduce, and eventually eliminate, cardiovascular disease (CVD) and diabetes health disparities among African Americans living, working, worshiping, or attending school in North Nashville, Tennessee. North Nashville, a predominantly African-American area (population 42,000, 85% African-American) just north of downtown Nashville, Tennessee, was chosen as the target community based on data indicating that African-American residents had significantly higher age-adjusted death rates due to cardiovascular disease (CVD) and diabetes, compared to Whites in the same county.[2]

A baseline telephone survey was conducted, as part of a comprehensive needs assessment for the Nashville REACH 2010 project. The survey was designed to estimate the prevalence rates of CVD, diabetes, and risk factors, and to assess health behaviors, in a sample of residents living in North Nashville, and in a comparison sample of residents living in the rest of Nashville/Davidson County. Barriers to healthy eating, exercise, and healthcare access were also assessed.

This paper focuses on diabetes, describing its prevalence among African-American and Caucasian residents of Nashville. Our analysis highlights similarities and differences between African Americans and Caucasians with diabetes, comparing access to health care, presence of co-morbid conditions, diabetes care, and lifestyle behaviors.

Methods

The Questionnaire

A 155-item survey was developed to assess access to care, co-morbid illnesses, health practices, socioeconomic status, and an individual's health status. Items were selected from previously used and validated questionnaires whenever possible, including the Behavioral Risk Factor Surveillance System,[3] the SF-12,[4] the Eating Behavior Patterns Questionnaire,[5] and the Eating Styles Questionnaire.[6] The scale was pretested on a small sample, and revised for clarity and length. A copy of the survey can be downloaded at: http://healthbehavior.psy.vanderbilt.edu/survey.pdf.

Sampling Strategy

Sixteen thousand two hundred randomly selected residential telephone

Table 1. Cases of diabetes identified during the community telephone survey by gender, ethnicity, and location

Age Range	NN-Black	NN-White	DC-Black	DC-White	Black-Male	Black-Female	White-Male	White-Female	All-Black	All-White
18–29	2.41	0.00*	0.00	0.77	2.33	1.69	0.58	1.14	1.96	0.58
30–39	7.10	7.32	6.98	0.57	5.40	7.97	1.84	2.68	7.08	1.84
40–49	10.40	13.11	11.11	5.99	8.94	11.66	7.89	8.94	10.49	7.89
50–59	14.53	6.82	7.14	9.68	11.43	15.82	9.10	9.30	13.88	9.13
60–69	22.39	10.00	35.29	15.33	25.71	21.67	14.21	9.90	23.16	14.21
70–79	22.86	30.30	38.46	13.24	18.31	25.67	16.57	16.38	23.64	16.57
80+	13.39	5.88	33.33	6.00	6.90	16.28	5.97	4.00	13.91	5.97
Sample size	1499	279	178	995	628	1049	555	719	1677	1274
Raw prevalence†	14.34	10.39	11.80	7.44	11.94	15.35	8.08	8.07	14.07	8.08
Age-adjusted prevalence‡	10.92	8.88	12.82	4.00	9.46	11.68	6.48	6.49	10.90	6.48

NN = North Nashville; DC = Davidson County.
* Percent with diabetes for each age group.
† Percent with diabetes (number with diabetes divided by sample size times 100).
‡ Prevalence estimate age-adjusted to the 2000 population.[15]

numbers were purchased from SDR Sampling Services, Inc. (Atlanta, Ga.). The sample was stratified by 2 geographic areas of interest: North Nashville (NN), and the rest of Nashville/Davidson County (NDC). Nine thousand residential numbers in NN, and 7,200 numbers in all other areas of NDC, were randomly selected. Only household members who were at least 18 years of age were eligible to participate. The adult in each household with the closest approaching birthday was selected to be interviewed, further ensuring randomization.

Telephone Interviews

Telephone interviews, conducted by trained interviewers using a computer-assisted telephone interviewing system (CATI), occurred between 4:00 PM and 8:00 PM, Monday through Friday. The system was programmed to randomly select telephone numbers for dialing. Each number dialed was coded and automatically stored in a database, with information including the number of attempted calls, scheduled times for callbacks to achieve completed interviews, and the outcome of attempts to reach each number. This method of tracking data allowed an exact characterization of response rates.

RESULTS

Response Rate

Overall, this process yielded a 32% response rate, after adjusting for the following: disconnected numbers, reaching a fax/modem, non-private residence, respondents physically unable to answer the survey, and ineligible respondents. The adjusted response rate for NN was 38%, and 26% for NDC.

Identification of Diabetes Cases

Table 1 presents the number of cases of diabetes identified by gender, ethnicity, and location, along with the raw prevalence of diabetes, and the age-adjusted prevalence of diabetes. The age-adjusted prevalence of diabetes in African Americans was 1.7 times higher than the prevalence in Whites, which is similar to national data on disparities in diabetes.[7]

A logistic regression was conducted to predict diabetes status (Yes–No) by age, gender, location, and ethnicity. The model accounted for 4.0% of the variance in diabetes status, with the beta weights for age ($P<.0001$) and race ($P<.01$), but not gender ($P<.62$) and location ($P<.41$), contributing significantly to the prediction of diabetes status. Results indicate that rates of diabetes increase with age, and are more prevalent in Blacks than in Whites.

Table 2 presents characteristics of persons with diabetes, and compares them to the survey respondents who reported never being diagnosed with diabetes. An analysis of variance using diabetes status (yes, no), gender (male, female), ethnicity (Black, White), and location (NN, NDC), was conducted on years of education, reported family income, age, and body mass index (kg/m^2). Among both NN and NDC groups, individuals without diabetes tended to be more educated compared to those with diabetes ($P<.01$), and among those with diabetes, education levels were lower for those in NN, compared to those in NDC ($P<.01$). There were no differences in reported family income as a function of diabetes status. Those with diabetes had a higher BMI than those without ($P<.0001$), especially Blacks ($P<.005$) in NN ($P<.03$). Table 2 summarizes other main effects and interaction effects that did not involve diabetes status.

Because location (NN vs NDC) did not contribute to the prevalence of diabetes, and because the numbers of diabetic African Americans in NDC, and diabetic Caucasians in NN were small, the remaining analyses will compare Af-

Table 2. Characteristics of study participants with and without diabetes

		Years of Education*		Income†		Age‡		BMI§	
	N	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Diabetes	344	12.5	2.5	30200	20300	61.3	13.6	30.2	7.2
Male	123	12.8	2.5	35700	23800	59.9	12.2	29.1	5.6
Black	79	12.6	2.6	32100	21500	59.1	12.2	29.6	5.2
NN	74	12.7	2.5	31400	21400	59.2	12.2	29.7	5.3
NDC	5	11.6	3.6	43100	22900	58.2	14.5	28.8	3.8
White	44	13.1	2.2	42300	26600	61.0	12.2	28.2	6.3
NN	8	13.5	1.8	36100	18400	60.4	12.8	34.7	9.1
NDC	36	13.1	2.3	43800	28400	61.2	12.2	26.9	4.8
Female	221	12.3	2.5	26800	16900	62.1	14.3	30.9	8.0
Black	162	12.2	2.6	25500	15000	62.6	14.5	31.1	8.0
NN	146	12.2	2.6	25300	15000	63.1	14.5	31.3	7.9
NDC	16	12.4	2.4	27000	16200	57.6	13.8	29.3	8.8
White	59	12.6	2.4	30400	21000	60.9	13.9	30.3	8.1
NN	21	12.0	2.3	25800	14900	58.3	15.1	31.7	8.8
NDC	38	12.9	2.4	32900	23400	62.2	13.2	29.5	7.6
Without diabetes	2643	13.1	2.5	37700	23100	51.0	18.1	27.3	6.0
Male	1069	13.4	2.5	41700	23900	48.8	17.0	27.5	5.4
Black	559	13.0	2.6	35400	21200	50.2	17.4	27.9	5.8
NN	497	13.0	2.5	34600	20800	51.2	17.5	27.8	5.7
NDC	62	13.4	2.7	42200	22600	41.7	13.4	29.2	6.2
White	510	13.9	2.3	48000	24800	47.4	16.5	27.0	5.0
NN	109	13.3	2.7	39000	24200	45.4	15.5	27.4	5.5
NDC	401	14.1	2.1	50600	24300	47.9	16.7	26.8	4.8
Female	1574	12.9	2.5	34800	22100	52.6	18.7	27.2	6.4
Black	904	12.7	2.5	29600	19000	53.0	18.9	28.4	6.6
NN	808	12.7	2.5	29400	19100	54.4	18.8	28.3	6.6
NDC	96	13.2	2.3	31300	18400	41.6	16.3	28.7	7.0
White	670	13.1	2.4	41900	24100	52.0	18.3	25.6	5.9
NN	145	11.9	2.5	30600	17200	51.9	19.3	26.5	6.9
NDC	525	13.4	2.3	45100	24800	52.0	18.1	25.4	5.5

NN=North Nashville; NDC=Nashville/Davidson County.
* Main effects: gender $P<.03$, diabetes $P<.01$; Interaction effects: location by diabetes $P<.04$.
† Main effects: gender $P<.0001$, location $P<.0001$, ethnicity $P<.03$; interaction effects: none.
‡ Main effects: diabetes $P<.0001$; interaction effects: ethnicity by location $P<.005$.
§ Main effects: location $P<.009$, diabetes $P<.0001$; interaction effects: ethnicity by location $P<.03$, ethnicity by diabetes $P<.01$, location by diabetes $P<.006$.

rican Americans with Caucasians, to better understand ethnic disparities in diabetes without breaking responses down by location.

Black-White Differences

Access to Health Care

Table 3 presents the responses by ethnic group to questions about access to health care and healthcare utilization, for all identified cases of diabetes. African Americans and Whites differed significantly on being insured (91.4% vs 98.2%, respectively, $\chi^2(1)=5.75$, $P<.01$) and distance traveled to see a doctor (Whites traveled farther, $\chi^2(1)=16.78$, $P<.002$).

Table 4 presents the responses of persons with diabetes to 9 questions about barriers to healthcare access by ethnicity. Overall, few barriers to healthcare access were reported. Only one question, addressing the expense associated with health care, showed a difference by ethnicity. White respondents rated this as a more difficult problem ($P<.02$) than did African Americans.

Co-morbid Conditions

Table 5 compares African Americans and Whites on self-reported prevalence rates of obesity, hypertension, high cholesterol, or heart disease. Body mass index (BMI=kg/m^2) was computed using self-reported heights and weights. Individuals with a BMI≥30 kg/m^2 were classified as obese. Hypertension was the only significant difference by ethnicity, with African Americans being 1.26 times more likely to report co-morbid hypertension ($P<.004$).

Diabetes Care

Table 6 compares African Americans and Whites on selected aspects of self-reported diabetes care. Groups did not differ on number of medications, ability

Table 3. Ethnic difference in access to care for persons reporting a diagnosis of diabetes

Question	Response	Black	White	χ^2; $P<$†
Seen a Dr. in past year?				.9
	yes	244 (99.5%)	109 (99.1%)*	
	no	1 (0.5%)	1 (0.9%)	
Do you have a primary care physician?				.21
	yes	224 (91.4%)	104 (94.5%)	
	no	21 (8.6%)	6 (5.5%)	
How many visits in last year?				.91
	0 visits	4 (1.7%)	1 (0.9%)	
	1 visit	7 (3.1%)	3 (2.8%)	
	2–4 visits	88 (38.4%)	37 (34.6%)	
	5–9 visits	72 (31.4%)	35 (32.7%)	
	10 or more	58 (25.3%)	31 (29.0%)	
Stayed in hospital overnight?				.12
	yes	66 (27.1%)	22 (20.6%)	
	no	177 (72.9%)	85 (79.4%)	
Do you have insurance?				.01
	yes	223 (91.4%)	108 (98.2%)	
	no	21 (8.6%)	2 (1.8%)	
How far from home to Dr.?				.002
	0–2 miles	30 (14.5%)	9 (9.0%)	
	2–5 miles	82 (39.6%)	20 (20.2%)	
	5–10 miles	60 (29.0%)	45 (45.5%)	
	10–15 miles	25 (12.1%)	18 (18.2%)	
	more than 15 miles	10 (4.8%)	7 (7.1%)	
Rating of healthcare quality				.14
	excellent	84 (24.6%)	40 (37.4%)*	
	very good	87 (35.8%)	41 (38.3%)	
	good	53.0 (21.8%)	19.0 (17.8%)	
	fair	19 (7.8%)	5 (46.7%)	
	poor	0 (0.0%)	2 (1.9%)	

* Frequency with percent of total in parentheses.
† *P* value associated with a chi-square test of independence between the question and ethnicity.

to pay for testing supplies, number of healthcare visits in the past year, number of HbA_{1c} tests in the past year, and number of foot exams in the past year. African Americans were more likely ($P<.0001$) to report taking insulin than Whites (35.4% vs 20.9%, respectively), while Whites were more likely to report taking no medications (25.5% vs 9.1%, respectively). African Americans were more likely ($P<.0001$) to report daily self-monitoring of blood glucose

Table 4. Ethnic differences in barriers to healthcare access

	Black		White	
Barrier to Healthcare Access	Mean†	SD	Mean	SD
Transportation to health care	1.3	0.8	1.3	0.8
Availability of the type of care needed	1.3	0.8	1.2	0.7
Hours of healthcare facilities	1.2	0.7	1.2	0.6
Having enough time to get health care	1.2	0.6	1.3	0.7
Location of healthcare facilities	1.2	0.6	1.1	0.5
Healthcare services being too expensive*	2.0	1.3	2.4	1.4
Getting time off work	1.1	0.5	1.2	0.7
Caring for child and/or elder	1.1	0.5	1.2	0.7
Do you experience any other problems in getting health care?	1.9	0.3	1.8	0.4

* $P<.02$.
† Mean derived from ratings where 1=not a problem, 2=a small problem, 3=an average problem, and 4=above average problem.

Table 5. Frequency and percent reporting comorbidities by ethnic group

Comorbid Condition	Black		White	
	Frequency	Percent	Frequency	Percent
Hypertension*	179	73.7%	64	58.2%
High cholesterol	90	43.3%	50	52.6%
Heart disease	66	27.0%	34	30.1%
Obesity	103	42.0%	39	35.5%

* $P<.004$.

(67.9% vs 55.1%, respectively), while more Whites said they tested only on a yearly basis, or never (20.5% vs 5.6%, respectively). Differences in the timing of the most recent eye exam were significant ($P<.04$), with Whites more likely to report their last exam as being one to two years ago, and African Americans slightly more likely to report never having had an eye exam.

Lifestyle Behaviors

Ethnic differences in lifestyle behaviors relevant to diabetes care are presented in Table 7. Whites reported more active lifestyle behaviors (eg, shopping, child care, household chores, yard work) ($P<.05$). African Americans reported engaging in more fat-increasing behaviors (eg, frequent fast food meals, snacks from vending machines, large Sunday meals, snacking when not hungry) than Whites ($P<.001$). There were no differences in exercise frequency and intensity, stage of change for increasing fruits and vegetables consumption, or decreasing fat intake, eating problems, emotional eating, environmental barriers or psychological barriers to reducing fat intake, and current use of tobacco.

DISCUSSION

A random telephone survey of residents of Nashville/Davidson County, Tennessee was conducted to better understand local ethnic disparities in diabetes. The design of the survey resulted in small numbers of both Whites with diabetes in North Nashville ($N=29$), and African Americans with diabetes outside of North Nashville ($N=21$). Therefore, our analyses looked at differences between Blacks and Whites who reported being diagnosed with diabetes. Here we outline relevant and practical approaches to addressing the disparities that our analysis revealed.

Strategic Approaches to Decrease Disparities

Access to Care

It is believed that poor access to care is a major cause of chronic disease disparities among minority groups.[8] In our sample, more African Americans than Whites reported being uninsured, thereby indicating limited access to care, and a greater burden of chronic disease. Despite this obviously important difference, no other differences were observed on access-related issues, such as having a primary care provider, or number of recent doctor visits or hospital stays.

Self-reported barriers to healthcare access were also similar for African Americans and Whites with diabetes. Transportation, child care, getting time off work, healthcare facility hours and locations, and other logistical issues, were not considered barriers by most respondents with diabetes, although Whites rated the affordability of health care as more of a problem than did African Americans. We conclude that access-related barriers may be very important for some persons with diabetes in Davidson County, Tennessee, but that those barriers are not differentially associated with race or ethnicity.

The only obvious access-related issue that might be targeted for intervention to reduce racial disparities was lack of insurance for 9% of African-American respondents. Of the African Americans without insurance, 5% were unemployed, 29% were employed, 57% were retired, and 10% were disabled, with none of the self-employed or home makers reporting being without insurance. At the time the survey was conducted, most of these individuals would have qualified for health insurance under Tennessee's Medicaid program, called TennCare, or for Medicare (58% of those retired without insurance were over the age of 65 years). Therefore, the best focus for intervention efforts may be the identification of non-insured individuals with diabetes, who should then be assisted in getting insurance. This is now being done as part of the REACH 2010 program in Nashville.

Co-Morbidities and Lifestyle Behaviors

Substantially more African Americans (74% vs 58%) said they had hypertension in addition to diabetes. These findings give credence to the metabolic syndrome theory, which asserts that those with diabetes are at greater risk for developing other diseases, such as cardiovascular disease and stroke.[9,10] Interventions to reduce diabetes-related racial disparities should therefore also be designed to combat and reduce risk factors related to hypertension, and to insure that co-morbid hypertension is being appropriately managed.

An examination of eating and exercise habits provided strategic clues to behaviors to target for change. While both African Americans and Whites were largely sedentary, Whites reported engaging in a greater number of active lifestyle behaviors, which can be important contributors to health and fitness.[11] While both groups reported behaviors that increase dietary fat, African Americans reported more of these fat-increasing eating habits. If racial health disparities in diabetes and its complications

Table 6. Ethnic differences in diabetes care

Element of Diabetes Care	Black		White		χ^2; $P<$
	Frequency	Percent	Frequency	Percent	
Number of medications					.56
None	8	3.3%	6	5.5%	
1 to 2	52	21.7%	18	16.5%	
3 to 5	88	36.7%	40	36.7%	
more than 5	92	41.3%	45	38.3%	
Type of diabetes medication					.0001
Not taking meds	22	9.1%	28	25.5%	
Pills only	133	55.4%	59	53.6%	
Insulin only	66	27.5%	16	14.5%	
Insulin and pills	19	7.9%	7	6.4%	
Frequency of blood glucose testing					.0001
Daily	157	67.9%	59	55.1%	
Weekly	47	20.3%	15	14.1%	
Monthly	14	6.1%	11	10.2%	
Yearly	2	1.0%	4	3.7%	
Never	11	4.6%	18	16.8%	
Can't pay for testing supplies					.9
Yes	89	37.2%	41	38.0%	
No	150	62.8%	67	62.0%	
Last eye exam					.04
Past month	57	23.9%	24	22.0%	
Past year	119	50.0%	54	48.6%	
Past 2 years	11	4.6%	14	12.8%	
More than 2 years ago	36	15.1%	16	14.7%	
Never	15	6.3%	2	1.8%	
	African American		White		
	Mean	SD	Mean	SD	F $P<$
Number of diabetes visits in last year	6.46	10.47	6.38	8.33	.95
Number of HbA_{1c} checks in last year	3.15	2.74	3.24	5.02	.88
Number of time feet checked by provider in last year	3.95	3.40	5.74	20.26	.32

Table 7. Ethnic comparison on lifestyle behaviors

Lifestyle Behaviors	Black		White		$P<$*
	Mean	SD	Mean	SD	
Exercise index: MET min/wk	1.1	5.3	1.0	4.6	.72
Sedentary lifestyle behaviors	5.8	2.0	5.9	2.4	.69
Active lifestyle behaviors	3.8	2.2	4.3	2.3	.05
Hours per day driving	0.7	1.3	1.1	1.4	.009
Stage of change (fruits and vegetables)	2.6	1.7	3.0	1.8	.09
Stage of change (low-fat diet)	3.7	1.6	3.4	1.8	.19
Eating problems	11.3	2.5	11.6	2.8	.29
Fat reducing behaviors	9.4	3.8	9.3	4.0	.79
Emotional eating	11.9	2.2	12.3	3.4	.17
Fat increasing behaviors	13.5	2.9	12.3	3.1	.001
Psychological barriers to reducing fat intake	6.1	2.8	6.6	3.2	.11
Environmental barriers to reducing fat intake	7.9	3.2	8.2	3.8	.46
Currently uses tobacco	9.4%		14.5%		.15

* *P* value from a one-way analysis of variance comparing African Americans with Whites.

arise from these issues alone, interventions should be aimed at promoting the value of voluntary exercise (both directly and indirectly, via advocacy for safer streets and parks), reducing sedentary pursuits (eg, watching television), increasing active pastimes (eg, gardening), and modifying eating behaviors to lower fat intake. Even small changes in such factors might have big effects across the target population. While there is nothing novel about this recommendation, the salutary effect of small changes may motivate some segments of the population at highest risk. These modest recommendations are made with the recognition that glycemic and lipid control within a self-management program are difficult to achieve.[12,13]

Diabetes Care

Several differences between African and Caucasian Americans emerged. First, more than a third of African Americans with diabetes reported taking insulin, compared with only about 20% of Whites. Perhaps African-American respondents had previously been in poorer control, or exhibited more symptoms of chronic complications, leading their physicians to treat them more aggressively and quickly with insulin. Or, perhaps, physicians were more willing to try diet-and-exercise regimens in Whites. We do not have measures of metabolic control for survey respondents, but the results suggest the need for further investigation into the standards of medication management being applied, and whether racial biases exist among providers.

Perhaps because more African Americans were taking insulin, more also reported greater frequencies of blood glucose monitoring. While blood glucose monitoring can be helpful for diabetes self-management, regardless of medication management, many physicians recommend it more often for their patients taking insulin. Hemoglobin A_{1c} testing was reportedly common in both groups, but the standard deviations were large. Foot checks and eye exams were also fairly common in both groups, but eye exams were reportedly somewhat more recent among African Americans. The reported rates for nearly every element of diabetes care was far from those recommended by national organizations, however.[14] In summary, interventions to reduce and eliminate diabetes-related racial health disparities might be most effective by focusing more on the quality of care delivered, rather than on access to care. This conclusion would change, however, if any conditions affecting access, such as eligibility criteria for subsidized insurance (TennCare) changed substantially.

Study Limitations

Our data have several important limitations. First, only individuals with a telephone listing could participate. Although having ongoing telephone service may be a marker for social stability and income levels, the study design suffers from some selection bias. Our data must be interpreted only in light of the interviewing method, and can be generalized only to diabetic individuals with telephones in the target population.

Second, not surprisingly, many potential respondents refused to participate. Persons willing to respond to a lengthy interview over the telephone may differ systematically from those who refuse. However, the proportions of persons in both the African-American and White samples reporting a diagnosis of diabetes, after adjusting for age, were similar to other estimates of prevalence in these populations.[7]

Another limitation is that self-reports are subject to errors in accuracy, especially on items where norms of self-presentation predispose respondents to respond in ways that reflect on them favorably. To the extent that this bias prevented respondents from identifying barriers, or encouraged them to over-report their use of diabetes-related health-care services, real rates may be obscured. Nevertheless, if such biases are equally distributed across groups, identified racial disparities are likely to be real.

CONCLUSIONS

In conclusion, the Nashville REACH 2010 coalition conducted a community survey, in part, to identify diabetes-related racial disparities. Our data make it apparent that many levels of intervention are required to relieve disparities in diabetes care and prevention, and that these intervention efforts will require different types and levels of energy for success. Perhaps most importantly, the data presented here will serve as the baseline against which the success or failures of all our future interventions can be judged.

ACKNOWLEDGMENTS

Supported by CDC REACH 2010 U50/CCU417280-0 and NIH Grant P01 DK 20593.

REFERENCES

1. Centers for Disease Control and Prevention. *Racial and Ethnic Approaches to Community Health (REACH 2010): Addressing Disparities in Health.* Washington, DC: Department of Health and Human Services; 2002.
2. National Center for Health Statistics. *Health United States 1999, With Health and Aging Chartbook.* Hyattsville, Md: National Center for Health Statistics; 1999.
3. Bolen JC, Rhodes L, Powell-Griner EE, Bland SD, Holtzman D. State-specific prevalence of selected health behaviors, by race and ethnicity—Behavioral Risk Factor Surveillance System, 1997. *MMWR CDC Surveill Summ.* 2000;49(2):1–60.
4. Ware J Jr, Kosinski M, Keller SD. A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. *Med Care.* 1996;34(3):220–233.
5. Schlundt DG, Hargreaves MK, Buchowski M. The eating behavior patterns questionnaire predicts dietary fat intake in African-American women. *J Am Diet Assoc.* In press.
6. Hargreaves MK, Schlundt DG, Buchowski MS, Hardy RE, Rossi SR, Rossi JS. Stages of change and the intake of dietary fat in African-American women: improving stage assignment using the Eating Styles Questionnaire. *J Am Diet Assoc.* 1999;99(11):1392–1399.
7. Harris MI, Flegal KM, Cowie CC, et al. Prev-

alence of diabetes, impaired fasting glucose, and impaired glucose tolerance in US adults. The Third National Health and Nutrition Examination Survey, 1988–1994. *Diabetes Care.* 1998;21(4):518–524.
8. Politzer RM, Yoon J, Shi L, Hughes RG, Regan J, Gaston MH. Inequality in America: the contribution of health centers in reducing and eliminating disparities in access to care. *Med Care Res Rev.* 2001;58(2):234–248.
9. Mensah GA. The global burden of hypertension: good news and bad news. *Cardiol Clin.* 2002;20(2):181–185, v.
10. Clark LT, Ferdinand KC, Flack JM, et al. Coronary heart disease in African Americans. *Heart Dis.* 2001;3(2):97–108.
11. National Center for Health Statistics. *Physical Activity and Health: A Report of the Surgeon General.* Hyattsville, Md: National Center for Health Statistics; 1999.
12. Gregg EW, Geiss LS, Saaddine J, et al. Use of diabetes preventive care and complications risk in two African-American communities. *Am J Prev Med.* 2001;21(3):197–202.
13. Harris MI, Eastman RC, Cowie CC, Flegal KM, Eberhardt MS. Racial and ethnic differences in glycemic control of adults with type 2 diabetes. *Diabetes Care.* 1999;22(3):403–408.
14. American Diabetes Association. Standards of medical care for patients with diabetes mellitus. *Diabetes Care.* 2003;26(suppl 1):S33–S50.
15. Klein RJ, Schoenborn CA. Age adjustment using the 2000 projected US population. *Healthy People 2000 Stat Notes.* 2001;20:1–9.