

RACIAL AND ETHNIC DISPARITIES IN SELF-MONITORING OF BLOOD GLUCOSE AMONG US ADULTS: A QUALITATIVE REVIEW

Objective: To review existing data to determine whether racial/ethnic disparities exist for self-monitoring of blood glucose (SMBG) among adults in the United States.

Study Design: A literature search of diabetes-related studies published from 1970 through June 2005 was conducted. Our search strategy included SMBG in minority populations with diabetes.

Methods: Studies were selected for review if they reported SMBG rates from a specific racial/ethnic minority group or if there were comparisons of SMBG rates across racial/ethnic groups.

Results: Twenty-two studies were reviewed that met the search criteria. Twelve studies included data from a single racial/ethnic minority group, and 10 studies included comparisons between non-Hispanic Whites and at least one racial/ethnic minority group. Data represented studies conducted in a variety of settings, such as healthcare facilities in a state or region of the United States and nationally representative surveys. Most of the data indicate that SMBG rates are generally low, regardless of the population. In comparative studies, some racial/ethnic differences overall were found in SMBG rates among all racial/ethnic minority groups when compared to non-Hispanic Whites. Across studies, patients taking insulin performed

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SMBG more frequently than did those not taking insulin.

Conclusions: Despite widespread recommendations for self-monitoring of blood glucose, compliance is reported to be low in all groups in the United States, especially among racial/ethnic minorities. (*Ethn Dis.* 2007;17:135–142)

Key Words: African Americans, American Indians, Asian Americans, Blood Glucose Self Monitoring, Diabetes, Hispanic, Latino, Mexican Americans, Non-Hispanic Whites, Review

INTRODUCTION

Self-monitoring of blood glucose (SMBG) by persons with diabetes is an integral part of intensive glycemic treatment and is widely believed to improve the control of blood glucose levels and health outcomes. The results of the Diabetes Control and Complications Trial (DCCT) among persons with type 1 diabetes showed that intensive glycemic control slowed the progression of diabetes complications significantly.¹ The DCCT protocol required SMBG at least four times each day and multiple injections of insulin. Furthermore, the United Kingdom Prospective Diabetes Study (UKPDS) found that a reduction in hemoglobin A1C (HbA1C) was associated with a decreased risk of microvascular complications in persons with type 2 diabetes. In the UKPDS, persons who were on >14 units of insulin per day or those on short-acting insulin performed SMBG regularly.²

The American Diabetes Association (ADA) first set forth guidelines for

SMBG in 1987, and current recommendations suggest persons with diabetes perform regular SMBG.^{3,4} The recommendations include the use of SMBG by a person with diabetes to develop a longitudinal glucose profile and as an aid in making day-to-day decisions.³ One objective of *Healthy People 2010* is to increase the proportion of all adults with any type of diabetes who perform SMBG at least once daily.⁶ The baseline value from the 1998 Behavioral Risk Factor Surveillance System (BRFSS), representing data from 39 US states, was reported to be 42%. The *Healthy People 2010* SMBG target is 60%.

Lack of regular SMBG predicts hospitalization for diabetes-related complications.⁵ Although health practitioners are skeptical about the effectiveness of SMBG as a self-management tool for persons with type 2 diabetes who are not taking insulin, a recent meta-analysis of SMBG in 2005 indicated a significant decrease of HbA1C in favor of SMBG compared to the control group.⁷

An evaluation of racial/ethnic differences in SMBG among ethnic minority individuals has not been conducted. Minority populations with diabetes are more likely than non-Hispanic Whites to develop complications such as neuropathy, nephropathy, and retinopathy and are also more likely to require amputations than are non-Hispanic Whites with diabetes.^{8–11} The cause for these disparities is unknown, but one possible explanation is poor glycemic control, which is improved by SMBG. This qualitative systematic re-

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This qualitative systematic review of the literature evaluates whether differences exist in rates of SMBG among racial/ethnic groups in the United States.

view of the literature evaluates whether differences exist in rates of SMBG among racial/ethnic groups in the United States. We obtained data from both single racial/ethnic group and comparative studies to assess SMBG in minority populations.

METHODS

Data Sources

Articles were selected for this review from a MEDLINE search using PubMed. Articles were also obtained from a previously conducted comprehensive literature search of diabetes-related studies regarding diabetes and preventive care.¹² Additional databases searched were the Cochrane Library, Combined Health Information Database, Education Resources Information Center, and Web of Science from 1970 through June 2005. References were then imported into a computer library (EndNote, version 8, Thomson ISI ResearchSoft, Berkeley, Calif).

We also reviewed websites from the National Center for Chronic Disease Prevention and Health Promotion of the Centers for Disease Control and Prevention (CDC) and from *Healthy People 2010*.⁶ Both of these are sources of national data based on the BRFSS of the CDC for which annual rates of SMBG are reported.

Identification of Studies

Our initial search using the medical subject headings (MeSH) “diabetes

mellitus” and “blood glucose self-monitoring,” including all subheadings, identified 1738 citations. The search was then limited to publications that included ethnic or minority populations that were published in the United States from 1970 through June 2005, which resulted in 179 articles. Two reviewers (JK and CH) independently inspected titles and abstracts of references to assess potential eligibility. Abstracts of references were retrieved to locate 81 studies that met the specific inclusion criteria (studies of adults ≥ 19 years of age with diabetes that described information regarding SMBG and racial/ethnic minority groups). The complete article was retrieved and reviewed if the abstract did not provide enough information or was not available. Forty-six citations were found that mentioned SMBG and minorities but were useful only for background data because they did not include specific information about rates of SMBG in any racial/ethnic group.

Study Selection

Thirteen studies contained data on rates of SMBG in specific racial/ethnic groups. Hand searches of reference lists resulted in an additional nine references that met inclusion criteria. In all, 22 studies were found that reported rates of SMBG among minority populations. For this review, the authors categorized the racial/ethnic groups as non-Hispanic White (Caucasian), African American (Black or non-Hispanic Black), Asian/Pacific Islander, American Indian/Alaska Native (Native American), and Hispanic (Mexican American, Puerto Rican, Cuban, Caribbean Latino, and Latino).

RESULTS

Single Ethnic Minority Group Studies

Table 1 presents a summary of 12 studies that reported SMBG rates in single racial/ethnic minority groups.^{13–24}

Four studies included Hispanics,^{13–16} seven included African Americans,^{17–23} and one included American Indians.²⁴ Results showed that 8%–76% performed any SMBG, whether daily, weekly, or occasionally.

The sample sizes in the Hispanic population ranged from 30 to 606, with a variable performance rate of 13% to 60% for SMBG. For African Americans, sample sizes ranged from 98 to 817. Rates of SMBG ranged from 29% to 76% (the higher percentage was among insulin users). One study in African Americans showed increasing rates of SMBG at each subsequent clinic visit.²¹ The only study among American Indians²⁴ was conducted in the Navajo tribe; of 157 participants with diabetes, 92% had never performed SMBG.

ETHNIC MINORITY GROUP STUDIES

We found 10 studies that contained comparative data on SMBG among racial/ethnic groups (Table 2).^{25–34} Overall, six studies showed a statistically significant difference ($P < .05$) in rates of SMBG between groups.^{25,27,29,31,33,34} One study reported a difference only among patients who were being treated with insulin and found little difference in rates of SMBG among racial/ethnic minority groups in patients who were not being treated with insulin.²⁷

Among those studies that showed differences between racial/ethnic groups in rates of SMBG, all showed that non-Hispanic Whites perform SMBG more than any other racial/ethnic group. The one exception involved patients with type 1 diabetes and showed American Indians performed SMBG more often than non-Hispanic Whites. However, the result was not statistically significant.³¹

Rates of SMBG for African Americans and Hispanics

Our search located six studies that compared rates of SMBG in both

Table 1. Single ethnic group studies of SMBG

Author and Year	N	Age (years) Mean \pm SD	Population Year of Data Collection	Study Design	SMBG
Hispanics with Type 2 Diabetes					
Brunt MJ, et al (1998) ¹³	70	55 (median)	Patients, hospital and primary care clinics, Boston, Massachusetts 59% insulin use, 46% oral meds, 5% both	Face-to-face interview at the clinic done in Spanish or English	89% reported SMBG, 13% SMBG daily
Hosler AS, Melnik TA (2005) ¹⁴	606 PR	55	Data collection period NR New York City Puerto Rican adults with diabetes Data collected from July 1999–June 2000	Random-digit dialing telephone survey	53.4% SMBG daily
Lipton R, et al (1996) ¹⁵	55 MA 37 PR 9 other	56.1 \pm 12.6	Three primary care clinics, Chicago, Illinois 53% insulin use Data collected in 1994	Face to face interview done in Spanish or English done at the clinic	50% SMBG \geq weekly
von Goeler DS, et al (2003) ¹⁶	30 PR	34–80	Health and elder centers, community outreach database, western Massachusetts 23% insulin use, 63% oral use, 13% both Data collection period NR	Telephone survey done in Spanish or English	60% SMBG 1 \times to 2 \times daily
African Americans with Type 1 or Type 2 Diabetes					
Anderson RM, et al (2002) ¹⁷	817	53.9 \pm 12.2	43 community eye-screening clinics, southeastern Michigan 1.8% type 1, 39.9% type 2 insulin use and 58.3 type 2, no insulin Data collected from 1995–1999	Questionnaire as part of a study protocol	61.7% reported SMBG
Batts ML, et al (2001) ¹⁸	119	35–75	Adults 35–75 years, 2 clinics in Baltimore, Maryland Type 2 patients, 49% insulin use, 41% oral meds Data collected from 1998–1999	Questionnaire as part of a study protocol (Project Sugar, a randomized controlled trial)	29% SMBG daily
Gary TL, et al (2000) ¹⁹	183	59 \pm 9	Two primary care clinics, East Baltimore, Maryland 44% insulin use, 50% oral meds Data collected from 1998–1999	Review of outpatient medical records Baseline data from Project Sugar	30% SMBG daily
Gary TL, et al (2004) ²⁰	542	57.6 \pm 11.2	5 managed care sites, East Baltimore, Maryland 56% insulin use, 37% oral meds Data collected from 2002–2004	Questionnaire as part of a study protocol (Project Sugar 2, a randomized controlled trial)	40% SMBG \geq daily
Gillard ML, et al (2004) ²¹	98	56.5	5 managed care sites East Baltimore, Maryland 56% insulin use, 37% oral meds Data collection from 2002–2004	Self-report at each visit as part of a study involving eye disease screening	61% SMBG at visit 1 71% SMBG at visit 2 76% SMBG at visit 3
Gregg EW, et al (2001) ²²	625	58.4	Population-based sample, Greensboro and Raleigh, North Carolina 48% insulin use, 47% oral meds, 5% no meds Data collected in 1997	Questionnaire as part of Project DIRECT (Diabetes Interventions Reaching and Educating Communities Together)	40% SMBG \geq daily
Keyserling TC, et al (2000) ²³	200 women	59	7 practices, central North Carolina, patients with type 2 diabetes 42% insulin use, 57.3% oral meds, 10% both Data collected from 1995–1996	Questionnaire by self-report as part of a study (New Leaf)	71% SMBG

Table 1. Continued

Author and Year	N	Age (years) Mean \pm SD	Population Year of Data Collection	Study Design	SMBG
Will JC, et al (1997) ²⁴	575 Navajo Indians, 157 with diabetes	>20	American Indians with Diabetes Navajo tribal nation data, Arizona 12% insulin use Data collected from 1991–1992	Interview as part of the Navajo Health and Nutrition Survey	92% never SMBG

MA=Mexican American; NR=not reported; PR=Puerto Rican; SD=standard deviation; SMBG=self-monitoring blood glucose.

African American and Hispanic participants to rates in non-Hispanic Whites.^{25–28,30,31} Two studies^{27,31} found little difference in rates of SMBG between African American and Hispanic participants with insulin-treated type 2 diabetes, but they found a statistically significant difference for both when compared to non-Hispanic Whites. For insulin-treated Hispanic participants with type 1 diabetes, the difference was statistically significant ($P<.01$) in comparison to non-Hispanic Whites.²⁷

Two studies^{25,30} showed similar rates of SMBG among Mexican Americans and non-Hispanic Whites, with a significantly lower rate for African Americans. One study²⁹ that compared only African Americans and non-Hispanic Whites also found a difference that was statistically significant. Two other studies that did not report significance^{26,28} generally showed lower rates of SMBG in both African American and Hispanic participants than in non-Hispanic Whites.

Rates of SMBG for Asian Americans and American Indians

Two studies included Asian Americans in their analyses,^{28,31} and both of these reported lower rates of SMBG among Asian Americans than among non-Hispanic Whites, African Americans, or Hispanics. The difference was statistically significant in one study.³¹

For American Indians, two studies assessed SMBG among persons with diabetes.^{31,32} Karter et al³¹ found almost no difference between American

Indians and non-Hispanic Whites. A comparative analysis by Skelly et al among African Americans, Native Americans, and non-Hispanic Whites found no statistically significant difference in testing at least weekly, three to five times weekly, and six to seven times weekly.³²

SMBG Based on English Fluency

Three studies examined the related topic of English fluency and SMBG (Table 2).^{31,33,34} Karter et al³¹ found no statistically significant difference in SMBG based on English fluency for persons with type 1 diabetes who were Hispanic or Asian/Pacific Islander. On the other hand, the investigators noted a statistically significant ($P<.05$) difference for both Hispanic and Asian/Pacific Islanders with type 2 diabetes based on English fluency.³¹ Piette found that 82.4% of English speakers of multiple racial/ethnic groups performed SMBG “daily” or “almost daily,” but only 59.4% of the Spanish speakers ($P<.001$) followed the same regimen.³⁴ Brown et al³³ found a statistically significant ($P<.0001$) difference between both English-speaking and Spanish-speaking Latinos in comparison to non-Hispanic Whites but no difference based on English fluency in comparison to each other.

National BRFSS Data

The BRFSS was developed in the early 1980s when the relationship between personal health behaviors and chronic disease morbidity and mortality

became evident. Data from the BRFSS are collected by random-digit-dialed telephone surveys of non-institutionalized US adults. The surveys were developed and conducted to monitor state- and national-level prevalence of behavioral risks among adults ≥ 18 years of age.³⁵

Evaluating rates of SMBG from 2000, in which 47 states used the diabetes module of the BRFSS survey, rates varied across racial/ethnic groups, from 28.1% for Hispanics to 51.5% for African Americans and 47.6% for non-Hispanic Whites. Rates for all three groups have risen to a 2003 rate of 50.3% for Hispanics, 62.9% for African Americans, and 59.4% for non-Hispanic Whites.³⁵ Rates of SMBG in Asian/Pacific Islanders and American Indian/Alaska Natives were available from the BRFSS only in 1998. In that year, 30% of Asian/Pacific Islanders with diabetes performed SMBG at least once a day while 53% of American Indian/Alaska Natives performed SMBG at least once daily. This number represents the low and high rate of SMBG across racial/ethnic groups for that year. From 1994 through 2003, the Hispanic population performed daily SMBG less than African Americans and non-Hispanic Whites.

DISCUSSION

Documenting racial and ethnic differences in SMBG may be an important step in addressing components of diabetes self-management and formulat-

This comprehensive review of the available literature included studies with participants in a variety of settings[and] enhances the generalizability of our findings.

ing interventions to reduce potential disparities. Our review of the literature indicates that many factors affect how often persons with diabetes perform SMBG. For example, persons who were using insulin performed SMBG more often than did those who were not treated with insulin. These data do not differentiate by diabetes type or therapy. However, the investigators of two large comparative studies^{25,27} found that African American adults who were treated with insulin performed SMBG less often than did non-Hispanic Whites treated with insulin (Table 2). This comprehensive review of the available literature included studies with participants in a variety of settings (health maintenance organizations, survey data, community health centers, and outpatient clinics). The inclusion of multiple practice settings enhances the generalizability of our findings. National data from BRFSS are also included, which captures a representative sample of the US population.

Many reasons explain why patients do not engage in SMBG. Behavioral barriers to SMBG, such as lifestyle interference, inconvenience, and pain, have been identified.³⁵ Other barriers include socioeconomic position, level of education, social class, and living in a high poverty area.³⁷ For example, a report of telephone interviews with 939 persons with diabetes living in East Harlem revealed that 27% of African

Americans and 21% of Hispanics skipped SMBG because of money concerns. This number represents a statistically significant difference between these two ethnic groups ($P < .05$); however, no data were reported regarding SMBG rates.³⁸

One limitation of this review is that detail about the frequency of SMBG was lacking in most of the studies reviewed and varied widely from any report of SMBG to reports of weekly or daily SMBG. Many of the studies did not categorize patients by whether or not they were using insulin. Although the recommendations for SMBG among insulin-treated patients are higher (three or more times per day), and most patients who take insulin test their blood glucose more frequently, these differences are not taken into account by many of the studies that look at rates of SMBG. The use of data from studies that evaluated only a single racial/ethnic minority group without a comparative group may lead to participant selection bias. However, most of the studies were observational and conducted in outpatients with diabetes. The variability of populations studied (eg, enrollees in a health maintenance organization versus those reported in a Medicare dataset or survey data) may affect the overall results. Also, data collected in a clinical setting may be more likely to be subject to compliance bias than data collected elsewhere.

The self-reporting nature of the data in this review may also be a potential bias. Opinion differs as to whether or not self-reported data are reliable. The method of questionnaire administration, wording, time period of recall, and response options could affect the results we found in this review. Additionally, a positive correlation between the number of test strips purchased and SMBG has been reported.³¹ One study found that persons who self-reported SMBG significantly overestimated actual adherence to a SMBG regimen and that compliance decreased over the

course of a 37-week program.³⁹ Another limitation to this qualitative review is the terminology reported for various ethnic groups. "Hispanic," "Latino," or "Mexican American" may not provide enough differentiation among subgroups of this population.

The SMBG data obtained from BRFSS include a wide variability (between 22 and 47) in the number of states reporting rates of SMBG between 1994 and 2003.³⁵ This finding could account for the different results seen in specific years. For example, in 1996 (37 states reporting), 2000 (47 states reporting), and 2003 (47 states reporting), the rates of SMBG among African Americans were higher than among non-Hispanic Whites. This finding was unexpected given the results we found in this review. A possible explanation may be related to the racial composition of the population in the states that reported each year. Differences also exist in the methods of data collection (telephone vs face-to-face interview) and the size of the samples between BRFSS and most of the studies in Tables 1 and 2.

SUMMARY

Diabetes requires self-management and adherence to treatment guidelines such as those recommended by the ADA. Among these is regular SMBG to monitor success with the diabetes treatment plan. Approximately half of adults with diabetes report regular adherence to SMBG.^{35,36} The likelihood of SMBG at least once daily has been shown to increase three-fold among those who have successfully completed a diabetes education class.³⁰ However, long-term adherence to routine glucose monitoring is not usually maintained, even among persons who attended a diabetes education program.³⁰

This review focused on literature that evaluated rates of SMBG among

Table 2. Multiple ethnic group studies of SMBG

Author and Year	N	Age (years) Mean ± SD	Population Year of Data Collection	Study Design	SMBG Rate	P value
Studies comparing rates of SMBG ≥1×/day						
Cowie CC, et al (1997) ²⁵	1468 NHW 588 AA 114 MA	≥18	National Health Interview Survey (NHIS) Insulin and non-insulin treated Data collected in 1989	Cross-sectional survey, self-administered questionnaire	Insulin-Treated 29.8% NHW 14.0% AA 29.0% MA	P<.0001 for AA
Harris MI, et al (1999) ²⁶	590 NHW 278 M 312 W 405 AA 166 M 239 W 450 MA 189 M 261 M	≥20	National Health and Nutrition Examination Survey (NHANES) III Insulin and non-insulin treated Data collected from 1988–1994	Cross-sectional survey, self-administered questionnaire	NHW (M) 11.5% NHW (W) 19.6% AA (M) 14.8% AA (W) 12.6% MA (M) 10.1% MA (W) 8.0%	NR
Harris MI (2001) ²⁷	590 NHW 405 AA 450 MA	63.4 59.5 56.1	National Health and Nutrition Examination Survey (NHANES) III Insulin and non-insulin treated Data collected from 1988–1994	Cross-sectional survey, self-administered questionnaire	Insulin-Treated 44.2% NHW 26.7% AA 27.3% MA Non Insulin-Treated 5.8% NHW 3.9% AA 2.4% MA	P<.01 for both AA and MA NS
Karter AJ, et al (2002) ²⁸	40025 NHW 8496 AA 6279 Hispanic 7632 A/PI	61.0 ± 13.1 58.8 ± 12.6 56.7 ± 12.3 57.0 ± 11.9	Patients, Kaiser Permanente, Oakland, California 28% NHW, 30% AA, 23% Hispanic, 16% A/PI insulin-treated Data collected from 1995–1998	Longitudinal observational study, self-administered questionnaire or computerized telephone interview	34% NHW 30% AA 25% Hispanic 20% A/PI	NR
Studies comparing odds ratio of SMBG						
Adams AS, et al (2003) ²⁹	652 NHW 305 AA	51 ± 14.1	HMO patients, Boston, Massachusetts 31% insulin use or insulin and oral, 39% oral, 30% nothing Data collected from 1992–1993	Cross-sectional study using automated medical records	1.0 NHW (reference) .46 AA (CI: .26–.81)†	P<.05
Harris MI, et al (1993) ³⁰	1690 NHW 465 AA 109 MA	≥ 18	National Health Interview Survey (NHIS) data Data collected in 1989	Cross-sectional survey, self-administered questionnaire	1.0 NHW (reference) 1.0 MA .40 AA* (CI: .26–.61)	
Karter AJ, et al (2000) ³¹	Type 1 2178 NHW 211 AA 217 Hispanic 110 A/PI 79 AI Type 2 23121 NHW 5501 AA 6080 Hispanic 4963 A/PI 1282 AI	39.8 ± 13.0 60.5 ± 11.8	Pharmacologically treated patients, Kaiser Permanente, Oakland, California Data collected from 1994–1997	Cross-sectional study using self-administered questionnaires or computerized telephone interview	Type 1 (<3×/day) 1.0 NHW (reference) 1.5 AA (.9–2.2) 1.2 Hispanic (.8–1.7) 1.8 A/PI* (1.0–3.3) .8 AI (.4–1.4) Type 2 (<1×/day) 1.0 NHW (reference) 1.2 AA* (CI: 1.1–1.3) 1.2 Hispanic* (CI: 1.1–1.3) 1.5 A/PI* (CI: 1.4–1.6) 1.1 AI (.9–1.3)	P<.05
Skelly AH, et al (2005) ³²	297 NHW 220 AA 181 NA	74.1 ± 5.4	Medicare recipients ≥65 years with diabetes, central North Carolina 27.5% insulin or insulin + orals, 60.2% orals, 12.3% no meds Data collected from 2001–2002	Interview as part of the Evaluating Long-term Diabetes Self-management Among Elderly Rural Adults (ELDER) study	1.0 NHW (reference) .91 AA (CI: .62–1.3) .78 NA (CI: .53–1.2)	P=.64 P=.23

Table 2. Continued

Author and Year	N	Age (years) Mean \pm SD	Population Year of Data Collection	Study Design	SMBG Rate	P value
Studies comparing rates of daily SMBG based on English fluency						
Brown AF, et al (2003) ³³	2941 NHW	62.4 \pm 13	Participants, multi-center study of diabetes in managed care Data collected from 2000–2001	Interview, phone or written or medical records as part of the Translating Research into Action for Diabetes (TRIAD) study	49.1% NHW†	<i>P</i> <.0001 <i>P</i> =.0001
	1453 ESL	60.8 \pm 13			38.5% ESL†	
	289 SSL	66.6 \pm 12			36.8% SSL†	
Karter AJ, et al (2000) ³¹	4192 A/PI	58.8 \pm 12.6	Pharmacologically treated patients, Kaiser Permanente, Oakland, California Data collected from 1994–1997	Cross-sectional study using self-administered questionnaires or computerized telephone interview	Type 1 ($\geq 3 \times / \text{day}$)	<i>P</i> =.201 <i>P</i> =.989 <i>P</i> =.001 <i>P</i> =.001
	5204 Hispanic				A/PI (fluent) 27%	
					A/PI (non-fluent) 9%	
					Type 2 ($\geq 1 \times / \text{day}$)	
					A/PI (fluent) 26%	
					A/PI (non-fluent) 20%	
					Hispanic (fluent) 31%	
					Hispanic (non-fluent) 33%	
Piette JD, et al (1999) ³⁴	226 English speaking	57.7	Outpatient clinics in Palo Alto, California 40.6% insulin, English speaking, 34.4% insulin, Spanish speaking Data collection period NR	Self report via structured phone interviews	English speakers 82.4%	<i>P</i> <.001
	112 NHW	61.3			Spanish speakers 59.4%	
	38 AA					
	47 Hispanic					
	30 Spanish speaking					
	30 Hispanic					

AI=American Indian; A=Asian; AA=African American; BRFSS=Behavioral Risk Factor Surveillance System; CI=95% confidence interval; ESL=English-speaking Latino; HMO=health maintenance organization; L=Latino; M=men; MA=Mexican American; NHANES=National Health and Nutrition Examination Survey; NA=Native American; NHW=Non-Hispanic White; NR=not reported; NS=not significant; PI=Pacific Islander; SMBG=self-monitoring blood glucose; SSL=Spanish-speaking Latino (SSL); W=women.

* Statistically significant.

† Adjusted predicted rate.

different racial/ethnic groups. Most patients with diabetes, however, do not adhere to the recommended treatment guidelines, and SMBG is underutilized. The cost-effectiveness of SMBG coupled with the economic benefit has also been questioned.⁴⁰ A number of managed care organizations have provided SMBG devices and found improvement in rates of SMBG.⁴¹

The data from this review indicate that SMBG rates are low across populations and at the current rate will not meet the *Healthy People 2010* goals for any group.⁶ The trend appears to be toward less SMBG by patients who belong to racial/ethnic minority groups. The discrepancy between recommended and actual practices should compel us to

look more carefully at reasons why patients do not follow SMBG guidelines. The gap between actual glucose monitoring practice and the recommended standard is wide among individuals with diabetes with a disproportionately lower rate among racial/ethnic minority populations.

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