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ORIGINAL RESEARCH

Evaluating Progress Toward *Healthy People 2010* National Diabetes Objectives

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Abstract

Introduction

In 1999, the National Diabetes Prevention and Control Program at the Centers for Disease Control and Prevention and its 59 Diabetes Prevention and Control Programs adopted five *Healthy People 2010* objectives. These objectives aim to improve the rates of preventive care services among people with diabetes and include annual foot examinations, hemoglobin A1c tests, and annual dilated eye examinations. This paper examines progress toward meeting these three objectives.

Methods

Questions from the diabetes module of the Behavioral Risk Factor Surveillance System (BRFSS) were used to evaluate changes in age-adjusted rates for annual foot examinations, hemoglobin A1c tests, and annual dilated eye examinations of 44 jurisdictions between 2000 and 2003. Questions from the diabetes module were also used to compare percentage rates of 47 jurisdictions in 2003 with *Healthy People 2010* percentage targets.

Results

From 2000 to 2003, for the 44 jurisdictions, the aggregate, age-adjusted rate of annual foot examinations increased from 63.7% to 69.3% ($P < .001$); the rate of self-reported hemoglobin A1c tests increased from 68.3% to 69.5% ($P = .35$); and the rate of annual dilated eye examinations decreased from 67.7% to 65.2% ($P = .05$). In 2003, 20 of 47 jurisdictions met the *Healthy People 2010* target for foot or eye examinations, and all 47 jurisdictions met the target for hemoglobin A1c tests. An inverse association was found between baseline rates in 2000 and the magnitude of change from 2000 to 2003 for all three national diabetes objectives.

Conclusion

The National Diabetes Prevention and Control Program should consider adopting additional *Healthy People 2010* objectives. Baseline rates should be considered in 1) selecting objectives, 2) setting percentage targets, and 3) evaluating current or future objectives. Program-related information should be linked with traditional data sources such as BRFSS so that we can understand the role of environmental factors and evaluate progress of jurisdictions toward national diabetes objectives.

Introduction

Diabetes and its associated burden are continuously evolving (1). More than 18 million adults in the United States have diabetes (2). People with diabetes are at increased risk of developing complications such as blindness, lower extremity amputations, end-stage renal disease, and cardiovascular disease (2). Although recommended preventive care services can prevent or delay the development of these serious health complications (3-6), the proportion of adults with diabetes who report receiving preventive care services is less than what we hope for (7-8).

Increasing the rates of preventive care services among people with diabetes is an objective of *Healthy People 2010*

(*HP2010*), a program established by the U.S. Department of Health and Human Services (9). In 1999, the National Diabetes Prevention and Control Program (NDPCP), established by the Centers for Disease Control and Prevention (CDC), adopted three of the 17 *HP2010* diabetes objectives and two of the *HP2010* immunization objectives. The five objectives adopted include percentage targets for annual hemoglobin A1c (HbA1c) tests, annual dilated eye examinations, annual foot examinations, and influenza and pneumococcal vaccinations (Table 1). Hereafter, we refer to these objectives as *national diabetes objectives*. This report focuses on the following three national diabetes objectives and their percentage targets for the U.S. population with diabetes: 1) 50% receive an HbA1c measurement at least twice each year, 2) 75% receive an annual dilated eye examination, and 3) 75% receive an annual foot examination. Implementation strategies used to help achieve these objectives are described elsewhere (10).

The NDPCP supports a Diabetes Prevention and Control Program (DPCP) in each of the 50 U.S. states, 8 territories, and the District of Columbia (10), or *jurisdictions*. The 59 DPCPs strive to reduce the preventable burden of diabetes and its associated complications in their jurisdictions by building collaborations and working closely with their partners. These partners include managed care organizations, policy makers, and the American Diabetes Association and its local affiliates (10). When the NDPCP adopted the five national diabetes objectives, it asked the DPCPs to increase target percentage rates for each objective within their jurisdiction. The NDPCP itself did not set these targets because it recognized that DPCPs vary in capacity and funding.

Methods

To evaluate progress toward national diabetes objectives, we analyzed data on diabetes preventive care services from the Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is a state-based, randomized telephone survey of the noninstitutionalized U.S. population aged 18 years and older. BRFSS surveys are conducted in each of 50 U.S. states, the District of Columbia, and three U.S. territories (the U.S. Virgin Islands, Puerto Rico, and Guam). The optional diabetes module contains 12 diabetes-specific questions; these questions are asked of people who identify themselves as having diabetes (11). People with diabetes were defined as those who answered yes to the core BRFSS question, "Has a doctor ever told you that you have diabetes?" Women who were told that they had diabetes only during pregnancy were excluded from the analysis. Individuals who refused to answer or had missing or unknown values for any variable were also excluded from the analysis. In addition, data from Guam and the U.S. Virgin Islands were excluded from the analysis.

We analyzed responses to three preventive care practice questions from the diabetes module: 1) "When was the last time you had an eye examination in which the pupils were dilated?" 2) "About how many times in the last year has a health professional checked your feet for any sores or irritations?" and 3) "A test for hemoglobin 'A one C' measures the average level of blood sugar over the past 3 months. About how many times in the past 12 months has a doctor, nurse, or other health professional checked you for hemoglobin 'A one C'?" People with diabetes who reported receipt of at least one dilated eye examination, one foot examination, or two or more HbA1c tests in the past year were defined as having received these preventive care services.

Forty-four jurisdictions used the diabetes module in both 2000 and 2003 (10); 47 used the diabetes module in 2003. First, we calculated the percentage of people with diabetes who reported receipt of the three selected preventive care services for the 44 jurisdictions. Second, we compared the percentages for 47 jurisdictions that used the module in 2003 with *HP2010* percentage targets. All rates were age-adjusted to the 2000 U.S. standard population. T-tests were used to determine whether differences between 2000 and 2003 were statistically significant. No correction was made for multiple testing of the three outcomes. We used simple linear regression to assess the association between baseline rates in 2000 and the magnitude of change between 2000 and 2003 rates. Analyses were conducted using SAS 9.1 (SAS Institute Inc, Cary, NC) and SUDAAN 9.0 (RTI International, Research Triangle Park, NC).

Results

From 2000 to 2003, the aggregate age-adjusted rate for foot examinations increased from 63.7% to 69.3% (Table 2); the rate for HbA1c tests increased from 68.3% to 69.5% (Table 3), and the rate for dilated eye examinations decreased from 67.7% to 65.2%(Table 4). Only the increase

in the rate for foot examinations was statistically significant ($P < .001$).

Age-adjusted rates for foot examinations increased in 26 (59%) jurisdictions (Table 2), rates for HbA1c tests increased in 33 (75%) jurisdictions (Table 3), and rates for dilated eye examinations increased in 15 (34%) jurisdictions (Table 4). Compared with interquartile ranges for all three tests in 2000, interquartile ranges are smaller in 2003 (Figure 1). However, overall ranges are large for both 2000 and 2003. In 2003, rates for foot examinations ranged from 47.0% to 82.4%, rates for HbA1c tests ranged from 53.6% to 85.5%, and rates for eye examinations ranged from 45.8% to 81.6% (Figure 1). These ranges are similar to ranges for 2000. The ranges for 2000 were 42.1% to 85.1% for foot examinations, 40.5% to 80.5% for HbA1c tests, and 51.0% to 89.0% for eye examinations (Figure 1).

Compared with *HP2010* targets, the 2003 data from 47 jurisdictions showed that 11 (23%) jurisdictions met the 75% target for foot examination (Table 2), nine (19%) met the 75% target for dilated eye examination (Table 4), and all jurisdictions met the 50% target of at least two HbA1c tests per year (Table 3).The following five states were at or above the *HP2010* targets for all three objectives: Delaware, Hawaii, Massachusetts, Minnesota, and New Hampshire (Tables 2-4).

An inverse association was found between the baseline rate in 2000 and the magnitude of change between 2000 and 2003. Jurisdictions that had relatively low baseline rates in 2000 were more likely to show an increase in 2003 or to maintain their baseline rates. Jurisdictions with relatively high baseline rates in 2000 were more likely to show a decrease in 2003. For every unit increase in the baseline percentage rate in 2000, the predicted 2003 rate decreased as follows: for foot examination by 0.66% (Figure 2; F value = 52.4; $P < .001$); for HbA1c tests by 0.69% (Figure 3; F value = 34.7; $P < .001$), and for eye examination by 0.46% (Figure 4; F value = 9.7; $P = .003$).

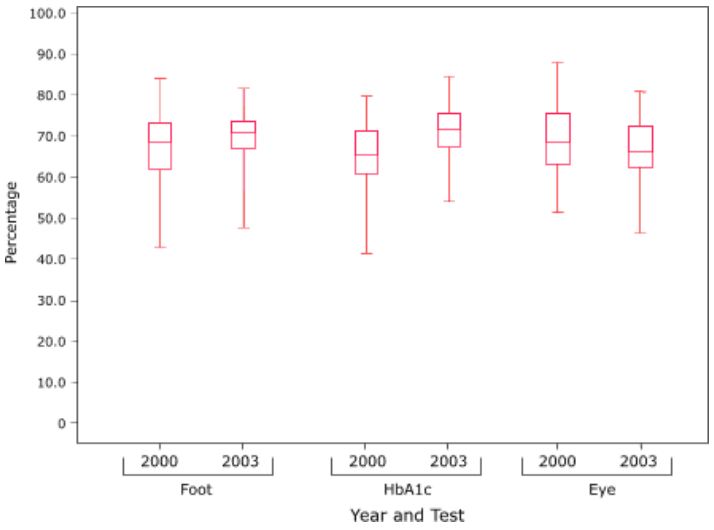

Figure 1. Percentage rates for annual foot examination, two or more annual hemoglobin A1c (HbA1c) tests, and annual dilated eye examination for 47 jurisdictions, Behavioral Risk Factor Surveillance System, 2000 and 2003. Overall range, interquartile range, and median are indicated.

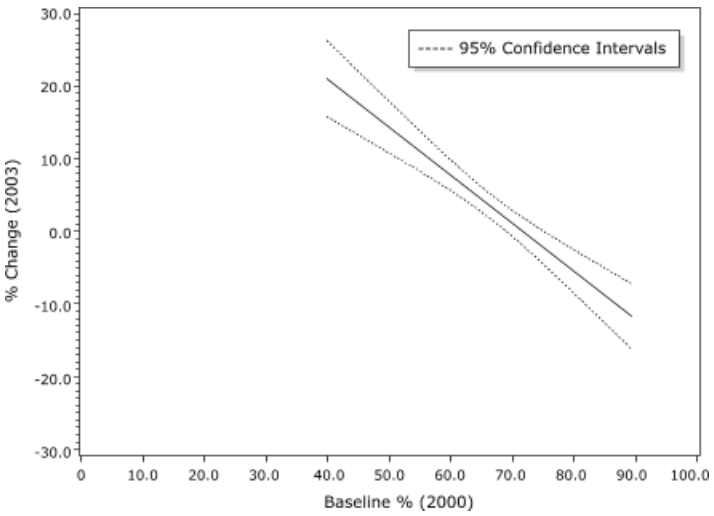

Figure 2. Regression of change in 2003 rates for annual foot examinations on 2000 baseline rates for 44 jurisdictions, Behavioral Risk Factor Surveillance System data.

Discussion

Factors affecting the rate of receipt of preventive care services are numerous and include an individual's knowledge about the importance of obtaining the recommended tests and examinations, access to diabetes care, availability of health insurance, extent of health insurance coverage for diabetes care services, and the adherence of health care providers to recommended diabetes care guidelines (10).

Our findings show an inverse association between the baseline rates of the three selected preventive care services and the magnitude of change in rates from 2000 to 2003. This negative association may result from the statistical

phenomenon known as *regression toward the mean*. In regression toward the mean, rates that are initially high or initially low eventually move toward the average because the initial performance occurred by chance (e.g., as a result of measurement error) or was caused by a factor unrelated to the intervention (12). A *ceiling effect* could also explain the negative association. With a ceiling effect, the initial impact of an intervention on rates may be large, but once rates reach a certain threshold, the intervention does not yield the same rate increases; rates may then reach a plateau or even decrease. The negative association between baseline rates and magnitude in change should be studied further.

The inverse association between baseline rates in 2000 and the predicted rates for 2003 confirms that it would not be appropriate for the NDPCP to evaluate the performance of a jurisdiction exclusively on the basis of rate increases or decreases. Moreover, 20 (42%) of 47 jurisdictions have already reached the *HP2010* target of 75% for foot or eye examinations, and an additional 27 (57%) jurisdictions have rates between 70% and 75%. These jurisdictions are likely to experience a ceiling effect. Additionally, other revisions to the *HP2010* targets are being considered. The proposed targets are as follows: 91% of people with diagnosed diabetes receive an annual foot examination, 76% of people with diagnosed diabetes receive an annual dilated eye examination, and 65% of people with diagnosed diabetes receive at least two HbA1c tests annually (13). In 2003, the highest rate for foot examinations was 82.5%; jurisdictions are likely to struggle to reach the 91% target.

Regardless of whether new *HP2010* revisions are adopted, the NDPCP should consider setting multilevel objectives instead of expecting all jurisdictions to show continuous rate increases. For example, jurisdictions below or at certain rates could aim to increase rates while jurisdictions with high rates (e.g., above 75%) could strive to maintain these rates and adopt new objectives. The idea of setting multilevel objectives is supported by evidence of the disparity in rates for national diabetes objectives among jurisdictions (Figure 1).

In addition to considering multilevel targets, the NDPCP should consider moving from the process-focused objective of increasing the percentage of people with diabetes who receive at least two HbA1c tests to an outcome-focused objective such as reducing the percentage of people with poor glycemic control assessed through measuring HbA1c

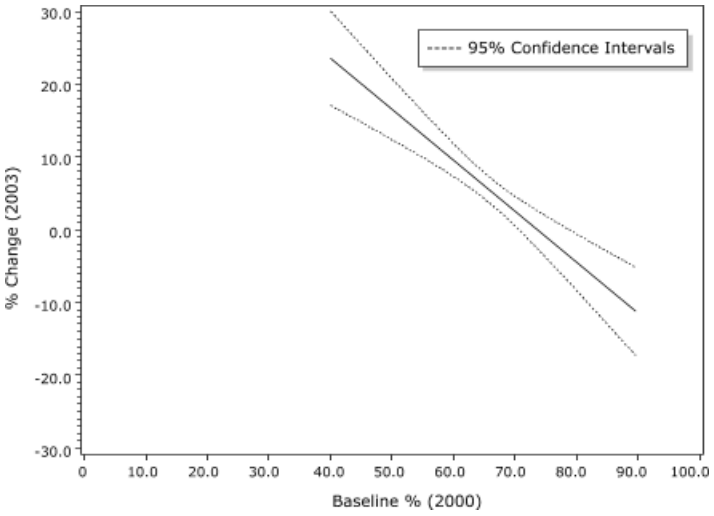

Figure 3. Regression of change in 2003 rates for two or more annual hemoglobin A1c tests on 2000 baseline rates for 44 jurisdictions, Behavioral Risk Factor Surveillance System data.

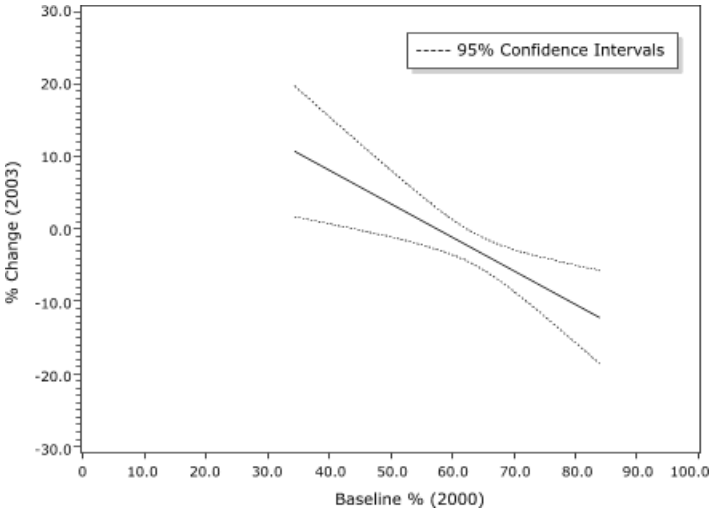

Figure 4. Regression of change in 2003 rates for annual dilated eye examinations on 2000 baseline rates for 44 jurisdictions, Behavioral Risk Factor Surveillance System data.

values. Currently, all 47 jurisdictions analyzed in this study have achieved the *HP2010* objective of 50% for at least two HbA1c tests, and 32 (68%) jurisdictions have achieved a rate of more than 70% (Table 3). Strong evidence supports a significant correlation between glycemic control and microvascular and cardiovascular disease risk and mortality rates (5). For example, in the U.K. Prospective Diabetes Study, each 1% reduction in HbA1c

levels was associated with a 37% reduction in risk for diabetic peripheral neuropathy, diabetic retinopathy, and diabetic nephropathy, conditions responsible for lower-extremity amputation, blindness, and end-stage renal disease (5).

State-level data on HbA1c values are available through the Health Plan Employer Data and Information Set (HEDIS). Currently, few jurisdictions use this data source; possible barriers to use include lack of access to the data, cost, not having an epidemiologist on staff, and complexity of data analysis (14).

Findings from this study have important implications for the NDPCP and its partners, especially as the CDC moves to align its priorities toward health promotion and prevention of disease, injury, and disability outcomes through improving quality of health by stages of life (15). The NDPCP and its partners will have opportunities to revise and add new national diabetes objectives to reduce the preventable burden of diabetes. Jurisdictions that are close to meeting or have already met the *HP2010* objectives will be good candidates to pioneer new objectives. New national diabetes objectives could be selected from existing *HP2010* diabetes objectives, or entirely new objectives could be developed and adopted.

Program-related information should be linked with traditional data sources such as the BRFSS so that we can understand the role of environmental factors as we evaluate the progress of jurisdictions toward national diabetes objectives. For program evaluation, it is imperative to understand why some jurisdictions perform better than others. It is especially important to examine jurisdictions that had high baseline rates in 2000 and showed rate increases in 2003. A range of environmental factors are likely to influence jurisdiction performance. These factors include budget, resources, leadership, partnerships, public health infrastructure, policies, and specific interventions. We need to understand how the adoption and sustainability of clinical and community-based interventions are effective in increasing preventive care services. To evaluate the impact of the effort of a jurisdiction on national diabetes objectives, we must identify and possibly modify existing data sources that contain program-related information.

For several years, the NDPCP has been building capacity to capture program-related information in its own electronic management information system (MIS). The MIS is a Web-based system designed to facilitate the collection and sharing of program-related information among state-based diabetes prevention and control programs and the NDPCP. The NDPCP is refining the MIS to link it with traditional data sources such as the BRFSS. When it is completed, the MIS will enable NDPCP to measure the association between the effort of each jurisdiction and its impact on rates of preventive care services. Enhancing the MIS will allow the NDPCP and jurisdictions to gain a better understanding of the influence of environmental factors.

Our findings are subject to several limitations. The BRFSS collects data through telephone surveys that exclude institutionalized people (e.g., nursing home residents) and people without telephones. The exclusion of these populations, particularly people without telephones, could result in overestimation of people receiving the three preventive care services, assuming that such people are likely to be less educated, poor, and therefore less likely to receive preventive care (16,17). The BRFSS data are also self-reported and subject to recall bias.

Additionally, the BRFSS data reflect statewide changes; they do not reflect changes that are taking place in special populations. Additional data sources such as Medicare and Medicaid records are needed for a more robust analysis of progress in achieving national diabetes objectives for such populations. Finally, comparing single-year data (2000 with 2003) could be a possible limitation, but if we had pooled years (i.e., 2000 and 2001 compared with 2002 and 2003), we would not have had a sufficient time lag for comparison.

Conclusion

The progress of jurisdictions toward achieving national diabetes objectives cannot be evaluated based on simple increases or decreases in their rates of preventive care services. Baseline rates should be considered in evaluating their progress toward achieving national diabetes objectives. There is a need for developing and adopting new objectives, especially for the jurisdictions that have already met or are close to reaching *HP2010* objectives. Gaining better understanding of the environmental factors that affect each jurisdiction — such as budget, policy, and health care coverage — is critical for appreciating and evaluating progress. To evaluate the impact of the effort of a jurisdiction on rates of national diabetes objectives, we

must identify and modify existing data sources (e.g., the MIS) that contain program-related information. Linking this system with traditional data sets such as the BRFSS could help identify and quantify the underlying factors vital to progress toward national diabetes objectives.

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Tables

Table 1. Selected *Healthy People 2010* Objectives Adopted by the National Diabetes Prevention and Control Program (NDPCP) as National Diabetes Objectives, 1999

Selected *Healthy People 2010* Diabetes Objectives			National Diabetes Objectives
Objective	Target	No. (%) of Jurisdictions at or Above Target[a] (n = 47)	
5-12. Persons with diabetes have a glycosylated hemoglobin (HbA1c) measurement at least twice per year.	50%	47 (100)	By 2004, demonstrate an increase in percentage of persons with diabetes who receive the recommended HbA1c measurements.
5-13. Persons with diabetes have an annual dilated eye examination.	75%	9 (19)	By 2004, demonstrate an increase in percentage of persons with diabetes who receive the recommended dilated eye examination.
5-13. Persons with diabetes have an annual foot examination.	75%	11 (23)	By 2004, demonstrate an increase in percentage of persons with diabetes who receive the recommended foot examination.
14-29: a-b. To increase the proportion of noninstitutionalized adults aged 65 or older who are vaccinated annually against influenza and ever against pneumococcal disease.	90%	NA[b]	By 2004, demonstrate an increase in percentage of persons with diabetes who receive the recommended flu and pneumococcal vaccination.
14-29: c-d. To increase the proportion of noninstitutionalized adults aged 18-64 who are vaccinated annually against influenza and ever against pneumococcal disease.	60%	NA[b]	By 2004, demonstrate an increase in percentage of persons with diabetes who receive the recommended flu and pneumococcal vaccination.

[a]Based on data from the Behavioral Risk Factor Surveillance System, 2003.
[b]NA indicates not applicable; these objectives were not measured as part of this study.

Table 2. Age-Adjusted Data on Prevalence of Annual Foot Examination Among Adults Aged 18 and Older With Diabetes, Behavioral Risk Factor Surveillance System, United States[a]

Jurisdiction	2000 % (95% CI[b]) N[c] = 47	2003 (95% CI[b]) N[d] = 47	Change N[e] = 44	t_1	*P* value
All jurisdictions	63.7 (61.6-65.8)	69.3 (67.8-70.8)	5.7	4.31	<.001
Alabama	68.5 (60.8-76.2)	69.9 (63.2-76.7)	1.4	0.28	.78
Alaska	85.1 (76.0-94.1)	66.8 (54.8-78.8)	–18.2	2.37	.01
Arizona	69.6 (52.2.-87.0)	67.2 (56.8-77.5)	–2.4	0.24	.81
Arkansas	48.1 (39.1-57.2)	57.8 (51.3-64.2)	9.6	1.70	.08
California	62.2 (52.3-72.0)	62.4 (55.3-69.5)	0.2	0.04	.96
Colorado	52.1 (38.3-65.9)	70.9 (63.5-78.2)	18.8	2.35	.01
Connecticut	70.1 (62.2-78.0)	70.5 (63.8-77.1)	0.4	0.07	.94
Delaware	NA[f]	77.7 (71.4-84.0)	—-	—-	—-
District of Columbia	71.1 (60.3-81.9)	NA[f]	—-	—-	—-
Florida	60.2 (52.8-67.5)	72.2 (65.6-78.8)	12.0	2.39	.01
Georgia	65.8 (58.7-72.9)	75.7 (71.1-80.2)	9.9	2.30	.02
Hawaii	75.2 (67.9-82.4)	81.4 (75.5-87.3)	6.3	1.32	.18
Idaho	56.0 (48.4-63.6)	67.9 (61.4-74.4)	11.9	2.34	.01
Illinois	NA[f]	NA[f]	—-	—-	—-
Indiana	58.3 (49.3-67.3)	70.2 (65.1-75.3)	11.9	2.26	.02
Iowa	62.0 (52.4-71.6)	71.9 (65.6-78.2)	9.9	1.68	.09
Kansas	62.9 (55.3-70.4)	69.5 (63.0-76.0)	6.6	1.31	.19
Kentucky	63.8 (57.1-70.5)	63.5 (57.7-69.3)	–0.3	0.07	.94
Louisiana	70.3 (64.2-76.5)	71.8 (66.3-77.4)	1.5	0.36	.72
Maine	84.0 (77.2-90.7)	73.0 (64.4-81.6)	–10.9	1.96	.04
Maryland	NA[f]	71.2 (63.6-78.8)	—-	—-	—-
Massachusetts	69.2 (63.3-75.0)	79.1 (73.7-84.5)	9.9	1.94	.01
Michigan	56.9 (48.8-64.9)	NA[f]	—-	—-	—-
Minnesota	82.0 (74.0-89.9)	82.4 (76.3-88.5)	0.4	0.08	.93
Mississippi	70.1 (62.1-78.1)	NA[f]	—-	—-	—-
Missouri	63.1 (54.1-72.1)	76.5 (69.6-83.3)	13.3	2.31	.02

(Continued on next page)

[a]Data from Guam and U.S. Virgin Islands not included.
[b]CI indicates confidence interval.
[c]Number of jurisdictions with 2000 data.
[d]Number of jurisdictions with 2003 data.
[e]Number of jurisdictions with data for 2000 and 2003.
[f]NA indicates data not available.

Table 2. (continued) Age-Adjusted Data on Prevalence of Annual Foot Examination Among Adults Aged 18 and Older With Diabetes, Behavioral Risk Factor Surveillance System, United States[a]

Jurisdiction	2000 % (95% CI[b]) N[c] = 47	2003 (95% CI[b]) N[d] = 47	Change N[e] = 44	t_1	*P* value
Montana	80.3 (72.0-88.5)	74.8 (67.4-82.2)	–5.4	0.96	.33
Nebraska	73.9 (65.1-82.6)	71.5 (65.2-77.8)	–2.4	0.44	.66
Nevada	80.6 (69.1-92.1)	64.4 (53.9-75.0)	–16.1	2.03	.04
New Hampshire	73.7 (62.1-85.3)	79.0 (73.2-84.7)	5.3	0.80	.42
New Jersey	57.1 (48.8-65.4)	69.6 (65.1-74.1)	12.5	2.59	<.001
New Mexico	70.6 (62.9-78.3)	78.4 (73.3-83.4)	7.8	1.66	.09
New York	NA[f]	79.8 (74.4-85.1)	—-	—-	—-
North Carolina	70.7 (62.8-78.6)	77.2 (72.6-81.7)	6.4	1.38	.16
North Dakota	81.1 (71.7-90.6)	72.9 (64.4-81.4)	–8.3	1.28	.20
Ohio	65.0 (54.6-75.4)	63.6 (55.6-71.7)	–1.4	0.21	.83
Oklahoma	63.5 (54.9-72.1)	64.0 (59.2-68.8)	0.5	0.10	.91
Oregon	NA[f]	NA[f]	—-	—-	—-
Pennsylvania	71.5 (63.6-79.4)	78.1 (72.1-84.1)	6.6	1.29	.19
Rhode Island	74.2 (66.4-81.9)	65.4 (57.4-73.4)	–8.7	1.54	.12
South Carolina	72.4 (65.4-79.4)	70.1 (65.1-75.1)	–2.3	0.52	.60
South Dakota	75.7 (69.4-79.4)	73.0 (67.4-78.7)	–2.6	0.61	.54
Tennessee	60.3 (51.6-69.0)	65.8 (58.4-73.2)	5.6	0.95	.33
Texas	58.5 (52.0-65.0)	61.6 (56.2-66.9)	3.0	0.71	.48
Utah	66.1 (54.7-77.6)	73.3 (65.5-81.2)	7.2	1.02	.30
Vermont	68.8 (59.7-77.8)	72.1 (65.3-78.9)	3.4	0.58	.55
Virginia	51.9 (37.7-66.1)	73.0 (66.9-79.0)	21.0	2.67	.007
Washington	72.9 (65.9-80.2)	71.5 (68.2-74.9)	–1.4	0.34	.73
West Virginia	74.0 (67.1-80.8)	64.0 (57.9-70.2)	–9.9	2.11	.03
Wisconsin	64.8 (55.8-73.8)	71.1 (63.1-79.0)	6.2	1.02	.30
Wyoming	61.5 (50.5-72.4)	70.8 (64.3-77.4)	9.4	1.45	.14
Puerto Rico	42.1 (34.8-49.4)	47.0 (41.0-53.1)	4.9	1.01	.31

[a]Data from Guam and U.S. Virgin Islands not included.
[b]CI indicates confidence interval.
[c]Number of jurisdictions with 2000 data.
[d]Number of jurisdictions with 2003 data.
[e]Number of jurisdictions with data for 2000 and 2003.
[f]NA indicates data not available.

Table 3. Age-Adjusted Data on Prevalence of Two or More Annual Hemoglobin A1c Tests Among Adults Aged 18 and Older With Diabetes, Behavioral Risk Factor Surveillance System, United States[a]

Jurisdiction	2000 % (95% CI[b]) N[c] = 47	2003 % (95% CI[b]) N[d] = 47	Change N[e] = 44	t_1	*P* value
All jurisdictions	68.3 (66.2-70.4)	69.5 (67.8-71.2)	1.2	0.91	.35
Alabama	71.7 (63.2-80.1)	73.7 (67.1-80.2)	2.0	0.40	.71
Alaska	68.5 (53.1-83.8)	70.9 (59.8-82.1)	2.5	0.26	.79
Arizona	40.5 (24.7-56.3)	63.9 (52.1-75.8)	23.4	2.30	.02
Arkansas	61.0 (51.1-71.0)	67.4 (61.0-73.8)	6.4	1.05	.29
California	78.7 (71.0-86.4)	53.6 (45.8-61.4)	–25.1	4.49	<.001
Colorado	57.2 (43.2-71.2)	67.8 (60.1-75.5)	10.6	1.30	.19
Connecticut	74.4 (66.6-82.2)	76.1 (69.5-82.7)	1.7	0.32	.74
Delaware	NA[f]	70.3 (62.7-77.9)	—-	—-	—-
District of Columbia	64.9 (52.6-77.3)	NA[f]	—-	—-	—-
Florida	70.2 (63.0-77.3)	67.3 (59.3-75.4)	–2.8	0.51	.60
Georgia	58.6 (50.2-66.9)	70.4 (64.7-76.1)	11.8	2.30	.02
Hawaii	80.5 (73.9-87.0)	85.5 (80.4-90.7)	5.1	1.2	.23
Idaho	57.3 (49.4-65.3)	57.3 (49.7-65.0)	0.0	—-	.99
Illinois	NA[f]	NA[f]	—-	—-	—-
Indiana	73.2 (65.3-81.1)	71.3 (65.9-76.8)	–1.9	0.38	.70
Iowa	60.9 (50.5-71.2)	76.1 (70.1-82.0)	15.2	2.51	.01
Kansas	59.4 (51.3-67.5)	74.8 (68.5-81.1)	15.4	2.90	.003
Kentucky	72.1 (65.2-79.0)	70.4 (65.1-75.7)	–1.7	0.38	.70
Louisiana	57.4 (65.2-64.7)	62.9 (56.6-69.1)	5.4	1.11	.27
Maine	73.3 (63.3-83.3)	78.2 (56.6-86.5)	4.9	0.73	.46
Maryland	NA[f]	72.6 (64.8-80.5)	—-	—-	—-
Massachusetts	71.7 (65.7-77.7)	78.3 (72.7-83.9)	6.6	1.56	.11
Michigan	72.6 (64.8-80.5)	NA[f]	—-	—-	—-
Minnesota	70.9 (60.8-81.0)	77.7 (71.1-84.3)	6.9	1.12	.26
Mississippi	62.6 (53.0-72.2)	NA[f]	—-	—-	—-
Missouri	65.9 (56.7-75.1)	76.9 (70.3-83.4)	10.9	1.90	.05

(Continued on next page)

[a]Data from Guam and U.S. Virgin Islands not included.
[b]CI indicates confidence interval.
[c]Number of jurisdictions with 2000 data.
[d]Number of jurisdictions with 2003 data.
[e]Number of jurisdictions with data for 2000 and 2003.
[f]NA indicates data not available.

Table 3. (continued) Age-Adjusted Data on Prevalence of Two or More Annual Hemoglobin A1c Tests Among Adults Aged 18 and Older With Diabetes, Behavioral Risk Factor Surveillance System, United States[a]

Jurisdiction	2000 % (95% CI[b]) N[c] = 47	2003 (95% CI[b]) N[d] = 47	Change N[e] = 44	t_1	*P* value
Montana	59.9 (47.4-72.4)	69.8 (61.6-78.0)	9.9	1.31	.19
Nebraska	67.4 (56.2-78.5)	72.6 (66.3-79.0)	5.3	0.81	.42
Nevada	60.7 (41.0-80.3)	64.2 (52.8-75.6)	3.5	0.31	.76
New Hampshire	78.7 (68.2-89.1)	77.8 (71.7-83.8)	–0.9	0.15	.88
New Jersey	74.1 (66.1-82.1)	74.5 (70.2-78.9)	0.4	0.10	.92
New Mexico	60.4 (50.6-70.2)	67.4 (60.5-74.3)	7.0	1.14	.25
New York	NA[f]	81.3 (75.8-86.9)	—-	—-	—-
North Carolina	62.3 (53.7-70.8)	73.9 (68.6-79.2)	11.6	2.27	.02
North Dakota	72.8 (59.5-86.1)	63.0 (53.5-72.4)	–9.8	1.17	.24
Ohio	63.2 (52.3-74.1)	74.1 (66.3-81.8)	10.9	1.59	.11
Oklahoma	61.1 (51.8-70.3)	65.7 (60.6-70.7)	4.6	0.85	.39
Oregon	NA[f]	NA[f]	—-	—-	—-
Pennsylvania	69.0 (60.1-78.0)	79.0 (72.6-85.5)	10.0	1.77	.07
Rhode Island	69.6 (61.0-78.3)	70.3 (61.8-78.8)	0.7	0.11	.91
South Carolina	65.9 (57.7-74.1)	72.4 (67.7-77.2)	6.5	1.35	.18
South Dakota	71.3 (64.2-78.4)	80.1 (74.9-85.4)	8.8	1.96	.04
Tennessee	60.7 (52.0-69.3)	73.1 (66.7-79.6)	12.5	2.26	.02
Texas	64.8 (58.1-71.5)	64.4 (58.8-69.9)	–0.4	0.08	.93
Utah	57.6 (44.8-70.3)	73.4 (66.0-80.7)	15.8	2.11	.03
Vermont	65.0 (55.6-74.4)	72.6 (65.5-79.7)	7.6	1.26	.21
Virginia	74.0 (62.7-85.3)	70.2 (63.7-76.6)	–3.8	0.58	.56
Washington	64.8 (56.6-73.1)	72.0 (68.5-75.5)	7.2	1.57	.11
West Virginia	68.1 (60.1-76.1)	81.3 (75.8-86.7)	13.1	2.66	.008
Wisconsin	63.2 (53.9-72.6)	76.9 (69.4-84.4)	13.7	2.23	.02
Wyoming	61.6 (50.6-72.6)	66.2 (58.9-73.6)	4.7	0.69	.49
Puerto Rico	58.5 (50.0-67.1)	67.7 (61.6-73.8)	9.1	1.71	.08

[a]Data from Guam and U.S. Virgin Islands not included.
[b]CI indicates confidence interval.
[c]Number of jurisdictions with 2000 data.
[d]Number of jurisdictions with 2003 data.
[e]Number of jurisdictions with data for 2000 and 2003.
[f]NA indicates data not available.

Table 4. Age-Adjusted Data on Prevalence of Dilated Eye Examination Among Adults Aged 18 and Older With Diabetes, Behavioral Risk Factor Surveillance System, United States[a]

Jurisdiction	2000 % (95% CI[b]) N[c] = 47	2003 % (95% CI[b]) N[d] = 47	Change N[e] = 44	t_1	*P* value
All jurisdictions	67.7 (65.6-69.8)	65.2 (63.6-66.8)	–2.6	1.92	.05
Alabama	67.3 (59.1,75.5)	61.9 (55.0-68.8)	–5.5	1.00	.31
Alaska	82.6 (71.5-93.7)	63.3 (50.6-76.1)	–19.3	2.24	.02
Arizona	73.9 (57.9-89.9)	64.8 (53.7-75.8)	–9.2	0.93	.35
Arkansas	62.2 (53.5-71.0)	57.6 (51.2-64.1)	–4.6	0.83	.40
California	64.4 (54.8-74.1)	54.6 (47.2-62.0)	–9.8	1.59	.11
Colorado	65.8 (53.0-78.7)	63.2 (55.2-71.2)	–2.6	0.34	.73
Connecticut	76.8 (69.7-83.9)	77.3 (71.1-83.5)	0.5	0.10	.91
Delaware	NA[f]	75.0 (68.0-81.9)	—-	—-	—-
District of Columbia	78.0 (68.1-87.9)	NA[f]	—-	—-	—-
Florida	66.7 (59.7-73.7)	72.3 (65.6-79.0)	5.6	1.12	.26
Georgia	61.6 (54.4-68.8)	62.4 (56.8-68.1)	0.8	0.18	.85
Hawaii	79.2 (72.2-86.2)	81.2 (74.3-88.0)	2.0	0.39	.69
Idaho	51.0 (43.4-58.6)	59.4 (52.3-66.5)	8.4	1.58	.11
Illinois	NA[f]	NA[f]	—-	—-	—-
Indiana	62.8 (53.8-71.7)	56.3 (50.7-62.0)	–6.5	1.20	.23
Iowa	69.8 (61.4-78.2)	72.5 (66.1-78.9)	2.7	0.50	.61
Kansas	62.3 (54.5-70.2)	72.2 (65.8-78.6)	9.9	1.91	.05
Kentucky	73.7 (67.7-79.7)	63.2 (57.5-68.8)	–10.5	2.51	.01
Louisiana	63.6 (57.2-69.9)	66.3 (60.6-71.9)	2.7	1.91	.53
Maine	62.0 (50.9-73.2)	66.4 (57.5-75.2)	4.3	2.50	.55
Maryland	NA[f]	78.4 (72.4-84.5)	—-	—-	—-
Massachusetts	73.3 (67.6-79.0)	81.6 (76.6-86.6)	8.3	0.60	.03
Michigan	77.0 (70.2-83.7)	NA[f]	—-	—-	—-
Minnesota	73.6 (63.2-84.0)	81.5 (75.1-87.9)	8.0	2.16	.20
Mississippi	54.8 (45.8-63.9)	NA[f]	—-	—-	—-
Missouri	65.3 (56.4-74.1)	66.1 (58.6-73.7)	0.9	0.15	.88

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[a]Data from Guam and U.S. Virgin Islands not included.
[b]CI indicates confidence interval.
[c]Number of jurisdictions with 2000 data.
[d]Number of jurisdictions with 2003 data.
[e]Number of jurisdictions with data for 2000 and 2003.
[f]NA indicates data not available.

Table 4. (continued) Age-Adjusted Data on Prevalence of Dilated Eye Examination Among Adults Aged 18 and Older With Diabetes, Behavioral Risk Factor Surveillance System, United States[a]

Jurisdiction	2000 % (95% CI[b]) N[c] = 47	2003 (95% CI[b]) N[d] = 47	Change N[e] = 44	t_1	*P* value
Montana	76.2 (66.2-86.1)	73.8 (66.0-81.7)	–2.4	0.36	.71
Nebraska	81.9 (72.9-90.9)	72.4 (66.1-78.8)	–9.4	1.68	.09
Nevada	74.1 (61.2-87.0)	45.8 (35.6-55.9)	–28.4	3.38	<.000
New Hampshire	89.0 (82.1-95.8)	78.4 (72.8-84.0)	–10.5	2.33	.01
New Jersey	75.8 (69.0-82.6)	69.7 (65.4-74.0)	–6.1	1.49	.13
New Mexico	69.0 (61.0-76.9)	70.2 (64.1-76.3)	1.2	0.24	.81
New York	NA[f]	73.5 (67.7-79.2)	—-	—-	—-
North Carolina	68.4 (60.7-76.0)	72.8 (68.0-77.7)	4.5	0.97	.33
North Dakota	67.9 (54.5-81.3)	63.7 (54.4-73.1)	–4.2	0.50	.61
Ohio	70.5 (60.3-80.7)	63.0 (55.1-70.9)	–7.5	1.14	.25
Oklahoma	64.9 (56.3-73.5)	62.4 (57.6-67.1)	–2.6	0.51	.60
Oregon	NA[f]	NA[f]	—-	—-	—-
Pennsylvania	76.2 (68.5-84.0)	67.1 (59.7-74.5)	–9.1	1.67	.09
Rhode Island	77.5 (70.4-84.6)	69.8 (62.6-77.1)	–7.7	1.48	.13
South Carolina	66.1 (58.4-73.8)	63.7 (58.6-68.9)	–2.3	0.50	.61
South Dakota	76.2 (69.4-83.0)	79.4 (74.4-84.5)	3.3	0.75	.45
Tennessee	70.3 (62.3-78.4)	80.9 (75.5-86.2)	10.6	2.14	.03
Texas	61.2 (54.9-67.6)	57.6 (52.2-62.9)	–3.7	0.87	.38
Utah	75.1 (65.5-84.6)	58.9 (50.0-67.7)	–16.2	2.44	.01
Vermont	76.6 (68.7-84.4)	64.1 (56.9-71.4)	–12.5	2.28	.02
Virginia	59.9 (45.0-74.8)	63.0 (56.6-69.5)	3.2	0.38	.70
Washington	66.6 (58.7-74.6)	67.8 (64.2-71.3)	1.1	0.25	.80
West Virginia	61.9 (54.0-69.7)	61.8 (55.4-68.1)	–0.1	0.02	.98
Wisconsin	75.0 (67.0-82.9)	67.9 (59.6-76.1)	–7.1	1.21	.22
Wyoming	62.8 (52.0-73.6)	61.6 (54.2-69.0)	–1.2	0.18	.86
Puerto Rico	59.7 (52.5-66.9)	50.6 (44.5-56.7)	–9.1	1.90	.05

[a]Data from Guam and U.S. Virgin Islands not included.
[b]CI indicates confidence interval.
[c]Number of jurisdictions with 2000 data.
[d]Number of jurisdictions with 2003 data.
[e]Number of jurisdictions with data for 2000 and 2003.
[f]NA indicates data not available.