Diabetes on the Rise in California

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Nearly 1.7 million California adults age 18 and over (6.6%) have been diagnosed with diabetes, up from 1.5 million (6.2%) in 2001.[1] The prevalence of diabetes nationally (6.6%) is similar to that in California.[2]

Diabetes mellitus, a chronic medical condition in which the body either makes too little insulin or does not use it effectively, is a significant and growing health problem in this country among both adults and children. The complications of diabetes include blindness, end-stage kidney disease, cardiovascular disease, amputation and even death.

Of the 1.7 million adults in California diagnosed with this condition, most—1.4 million (84.3%)—have Type 2 diabetes, and over 260,000 (15.7%) have Type 1 diabetes.[3] Type 1 diabetes, in which the body does not produce enough insulin, develops most commonly during childhood. Until recently, Type 2 diabetes, which is due to both insulin resistance and relative insulin deficiency, overwhelmingly affected older adults. Nationally, Type 2 diabetes has increased considerably in recent years among adults under the age of 50, both in the absolute number of cases and as a proportion of all adults with this condition.[4] Also alarming is the growing number of cases of Type 2 diabetes being diagnosed among adolescents and children. In California in 2001 nearly 15,000 teens ages 12-17 (0.5%) reported being diagnosed with either Type 1 or Type 2 diabetes, while in 2003 nearly 27,000 (0.8%) had been diagnosed; however the increase is not statistically significant.[5] The sample size of adolescents in California with diagnosed diabetes is too small to permit further analysis.

This policy brief examines the prevalence of diagnosed diabetes in California based on data from the 2003 California Health Interview Survey (CHIS 2003). It also describes how the prevalence has changed since 2001 based on data from CHIS 2001. The brief concludes with public policy recommendations intended to reduce the risk of diabetes and its related complications.

Disparities in Diabetes Prevalence by Race/Ethnicity and Socioeconomic Status

In California, the prevalence of diabetes increased significantly among men (from 6.4% to 7.1%), but remained constant among women (6%) from 2001 to 2003. Although the proportion of adults ages 18 to 64 with diabetes has remained relatively stable from 2001 to 2003, the prevalence of diabetes among California adults age 65 and over increased from 15.1% to 16.5%, paralleling an even greater increase nationally from 14.6% to 16.6%.[6]

The prevalence of diabetes varies by race/ethnicity. In California, American Indian/Alaska Natives (AI/ANs) and African Americans have the highest prevalence of diabetes, and whites have the lowest (Exhibit 1).

Exhibit 1

Diabetes Prevalence by Race/Ethnicity, Adults Age 18 and Over, California, 2003

Race/Ethnicity	Diabetes Prevalence %	Percentage Point Change from 2001
White	5.6	0
Latino	7.5	+0.7
Asian	6.4	+1.4*
African American	9.3	-1.2
American Indian/Alaska Native	9.9	+0.9
All Adults	**6.6**	**+0.4***

* Significant change from 2001   Source: 2001-R and 2003 California Health Interview Surveys
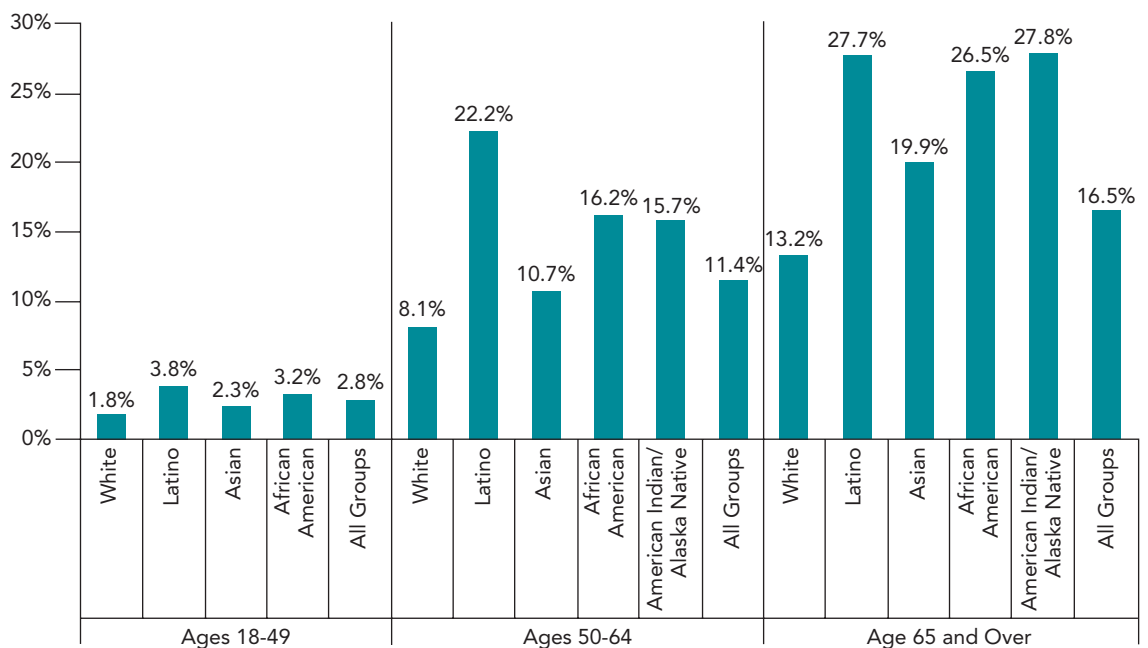
Diabetes prevalence is significantly higher among African Americans than Latinos, whites and Asians, and higher among AI/ANs and Latinos than whites. Although most racial/ethnic groups showed small changes in diabetes prevalence between 2001 and 2003, the only statistically significant increase was for Asians.

When diabetes prevalence is age adjusted, a somewhat different picture emerges. Although African Americans and AI/ANs have the highest prevalence overall, Latinos have the highest prevalence within each age group, in part because many Latinos are diagnosed

with diabetes at younger ages than other groups. Among adults ages 18 to 49, diabetes prevalence is higher among Latinos than whites and Asians, and higher among African Americans than whites (Exhibit 2). For adults ages 50 to 64, Latinos have the highest prevalence of diabetes, followed by African Americans, AI/ANs, Asians and whites. Among adults 65 years of age and older, the prevalence of diabetes is higher among Latinos than whites and Asians, and higher among African Americans and Asians than whites. AI/ANs age 65 and over also have a rate of diabetes significantly higher than whites.

Exhibit 2

Diabetes Prevalence by Age and Race/Ethnicity, Adults Age 18 and Over, California, 2003

Note: Diabetes prevalence estimates for American Indian/Alaska   Source: 2003 California Health Interview Survey
        Natives below age 50 are not statistically reliable and are
        not presented.

Diabetes Prevalence by Education and Income, Adults Age 18 and Over, California, 2003   Exhibit 3

	Diabetes Prevalence %	Percentage Point Change from 2001
Education		
Eighth Grade or Less	12.0	+1.6
Some High School	9.5	+1.2
High School Diploma	6.1	+0.3
Some College	6.1	-0.2
College Graduate or Higher	4.5	+0.3
Family Income as Percent of Federal Poverty Level (FPL)		
Below 100%	8.8	+0.3
100-199%	8.8	+1.1*
200-299%	6.4	-0.7
300% and above	5.1	+0.5*
All Adults	**6.6**	**+0.4***

* Significant change from 2001

Note: The 2003 FPL was $12,384 for a family of two, $14,680 for a family of three, and $18,810 for a family of four, *http://www.census.gov/hhes/poverty/threshld/thresh03.html* (accessed November 7, 2005).

Source: 2001-R and 2003 California Health Interview Surveys

Latinos and Asians are heterogeneous populations and examining them as a whole might mask variations between ethnic groups. The prevalence of diabetes varies between Asian ethnic groups, with the highest prevalence among Japanese (13.2%) followed by Filipinos (8.2%), Vietnamese (6.7%), Chinese (4.8%), Koreans (4.4%) and South Asians (3.9%). Diabetes prevalence is higher among Japanese than among Vietnamese, Chinese and Koreans. Diabetes prevalence is also higher among Filipinos than Chinese and Koreans.

Diabetes prevalence varies minimally between the Latino ethnic groups ranging from a low of 6.8% among Salvadorans to a high of 9.3% among Latino Europeans, and the differences are not statistically significant. Diabetes prevalence among Mexican/Mexican-Americans is 7.5%. Diabetes estimates for Guatemalans, Other Central Americans, South Americans and Puerto Ricans were not statistically reliable and therefore are not presented.

Among non-U.S. born adults in California the prevalence of diabetes increases with the number of years they have lived in the United States. The prevalence of diabetes is more than three times as high among adults who have lived in the U.S. 15 years or more (8.9%) as among those who have lived here four years or less (2.4%). Approximately 4% of adults who have lived in the U.S. between five and 14 years have been diagnosed with diabetes.

Diabetes is strongly related to social and economic factors. It is more than twice as common among adults who either did not attend or did not graduate from high school, compared to college graduates (Exhibit 3). Similarly, diabetes is more common among adults living below 200% of the federal poverty level (FPL) than among those at or above 200% FPL. Although adults with household incomes of at least 300% FPL have the lowest rate of diabetes, this income group showed a statistically significant increase in diabetes prevalence from 2001 to 2003.

Diabetes Prevalence Varies by County of Residence

Even after adjusting for age, diabetes prevalence differs by county, ranging from 3.9% in Nevada, Plumas and Sierra counties to 10.9% in Imperial County (Exhibit 4). California counties vary in terms of

Exhibit 4

Diabetes Prevalence by Region and County or County Group, Adults Age 18 and Over, California, 2003

	2003 Diabetes Prevalence (95% CI)	2003 Age-Adjusted Diabetes Prevalence (95% CI)	Percentage Point Change in Age-Adjusted Prevalence from 2001
Northern and Sierra Counties	**6.5 (5.7, 7.4)**	**6.5 (5.7, 7.4)**	**-0.5**
Butte	4.3 (2.5, 6.1)	4.3 (2.6, 6.1)	-1.6*
Shasta	9.0 (6.2, 11.7)	9.0 (6.4, 11.6)	+2.4*
Humboldt, Del Norte	6.0 (3.8, 8.1)	6.0 (3.9, 8.0)	-2.4*
Siskiyou, Lassen, Trinity, Modoc	6.7 (4.1, 9.4)	6.7 (4.1, 9.4)	-0.8
Mendocino, Lake	6.4 (3.7, 8.9)	6.3 (3.7, 8.9)	-1.1
Tehama, Glenn, Colusa	7.6 (4.8, 10.4)	7.6 (4.9, 10.2)	+0.1
Sutter, Yuba	8.7 (5.8, 11.6)	8.7 (5.9, 11.4)	+0.1
Nevada, Plumas, Sierra	3.9 (1.9, 5.8)	3.9 (2.0, 5.7)	-1.6
Tuolumne, Calaveras, Amador, Inyo, Mariposa, Mono, Alpine	7.0 (4.0, 10.0)	7.0 (4.1, 10.0)	0
Greater Bay Area	**5.6 (4.9, 6.2)**	**5.6 (4.9, 6.2)**	**+0.1**
Santa Clara	5.5 (4.1, 7.0)	5.5 (4.2, 6.9)	-0.1
Alameda	5.1 (4.1, 6.1)	5.1 (4.1, 6.1)	-0.6
Contra Costa	5.8 (3.8, 7.9)	5.9 (3.9, 7.8)	0
San Francisco	6.5 (4.6, 8.3)	6.5 (4.6, 8.3)	+2.5*
San Mateo	5.4 (3.2, 7.6)	5.4 (3.3, 7.5)	+0.1
Sonoma	5.2 (3.2, 7.3)	5.3 (3.3, 7.2)	+0.5
Solano	6.5 (3.8, 9.3)	6.5 (4.0, 9.1)	-0.9
Marin	3.7 (1.5, 5.9)**	3.7 (1.7, 5.7)	+0.3
Napa	5.1 (2.9, 7.3)	5.1 (3.0, 7.2)	-2.6*
Sacramento	**7.3 (5.9, 8.6)**	**7.3 (6.0, 8.6)**	**+1.6***
Sacramento	8.2 (6.4, 10.1)	8.3 (6.5, 10.0)	+2.0*
Placer	5.5 (3.0, 8.0)	5.5 (3.2, 7.9)	+0.2
Yolo	6.2 (3.6, 8.8)	6.2 (3.7, 8.6)	+1.6
El Dorado	4.3 (2.2, 6.4)	4.3 (2.2, 6.3)	+0.6
San Joaquin Valley	**7.7 (6.6, 8.8)**	**7.7 (6.6, 8.7)**	**0**
Fresno	7.6 (4.9, 10.3)	7.6 (5.1, 10.1)	+0.5
Kern	7.3 (4.6, 10.0)	7.3 (4.7, 10.0)	-0.4
San Joaquin	7.6 (4.9, 10.4)	7.6 (4.9, 10.4)	-0.1
Stanislaus	5.9 (3.6, 8.3)	6.0 (3.7, 8.2)	-0.7
Tulare	8.7 (6.1, 11.4)	8.7 (6.2, 11.2)	-1.7
Merced	9.7 (6.7, 12.7)	9.7 (6.9, 12.5)	+2.5*
Kings	8.1 (5.2, 11.1)	8.1 (5.3, 10.9)	-0.1
Madera	9.8 (6.7, 13.0)	9.8 (6.8, 12.9)	+3.1*
Central Coast	**5.2 (4.2, 6.2)**	**5.2 (4.2, 6.2)**	**0**
Ventura	5.1 (3.1, 7.2)	5.1 (3.2, 7.1)	+0.5
Santa Barbara	5.4 (3.2, 7.6)	5.4 (3.3, 7.5)	-0.7
Santa Cruz	4.1 (2.1, 6.1)	4.1 (2.1, 6.1)	-0.1
San Luis Obispo	4.2 (2.3, 6.1)	4.2 (2.4, 6.0)	-1.9*
Monterey, San Benito	6.2 (3.9, 8.4)	6.2 (4.0, 8.3)	+0.8
Los Angeles	**6.9 (6.3, 7.5)**	**6.9 (6.3, 7.5)**	**+0.3**
Los Angeles	6.9 (6.3, 7.5)	6.9 (6.3, 7.5)	+0.3
Other Southern California Counties	**6.7 (6.0, 7.5)**	**6.7 (6.0, 7.4)**	**+0.6**
Orange	6.6 (5.3, 8.0)	6.6 (5.3, 7.9)	+2.0*
San Diego	6.0 (4.8, 7.2)	6.0 (4.8, 7.2)	+0.5
San Bernardino	8.5 (6.4, 10.5)	8.5 (6.7, 10.3)	+0.6
Riverside	6.1 (4.6, 7.6)	6.1 (4.6, 7.5)	-2.3*
Imperial	10.9 (7.2, 14.6)	10.9 (7.7, 14.1)	+0.9
California	**6.6 (6.2, 6.9)**	**6.6 (6.2, 6.9)**	**+0.4***

  * Significant change from 2001
** Estimate is not statistically reliable

Source: 2001-R and 2003 California Health Interview Surveys

race/ethnicity, education, income, insurance status and obesity (data not shown), and these differences likely contribute to the variation in diabetes prevalence.

High Blood Pressure, Smoking and Overweight/Obesity Increase Risk of Complications Among Adults with Diabetes

High blood pressure (hypertension) among people with diabetes can contribute to the development of serious medical complications, such as end-stage kidney disease, cardiovascular disease and stroke. High blood pressure is much more common among people with diabetes (60.9%) than among those not diagnosed (20.6%).[7] Moreover, the prevalence of high blood pressure among adults with diabetes increased from 56.7% in 2001 to 60.9% in 2003, putting these adults at greater risk of developing serious complications.

Among people with diabetes there is considerable variation in the prevalence of hypertension by race and ethnicity (Exhibit 5). African Americans with diabetes have the highest prevalence of hypertension (74%) while Latinos have the lowest (50.2%). The prevalence of hypertension among adults with diabetes increased significantly among whites (from 59.8% to 64.4%), and Asians (from 52.8% to 67.2%) between 2001 and 2003.

For people with diabetes, smoking increases the risk of complications including cardiovascular disease, kidney disease and amputation. Although the prevalence of smoking decreased significantly from 2001

to 2003 among people not diagnosed with diabetes (17.2% to 16.6%), there was actually a slight increase among those with diabetes (14.5% to 15.0%) but the change was not statistically significant.[8] In addition, smoking prevalence among adults with diabetes varies by race and ethnicity, with the lowest rate among whites (12.2%) and the highest rate among AI/ANs (39.8%; Exhibit 5).

Obesity is a major risk factor for the development of diabetic complications, including cardiovascular disease and stroke. In California, three out of four adults with diabetes have an increased risk of developing complications because they are overweight or obese. Over one-third of adults with diabetes (34%) are overweight and over two-fifths (40.6%) are obese.[9] Obesity is also a major risk factor for developing diabetes. The prevalence of diabetes is more than twice as high among adults who are obese (13%) as it is among those who are overweight (6.3%), and three times as high as it is among those who are normal weight (3.7%) or underweight (4.4%).

Overweight and Obese Adults at Risk for Diabetes

Among adults not diagnosed with diabetes, over one-third (35.2%) are overweight and an additional one-fifth (18.8%) are obese. These 12.8 million adults who have not been diagnosed with diabetes are at risk for developing diabetes and some may already have the condition.[10]
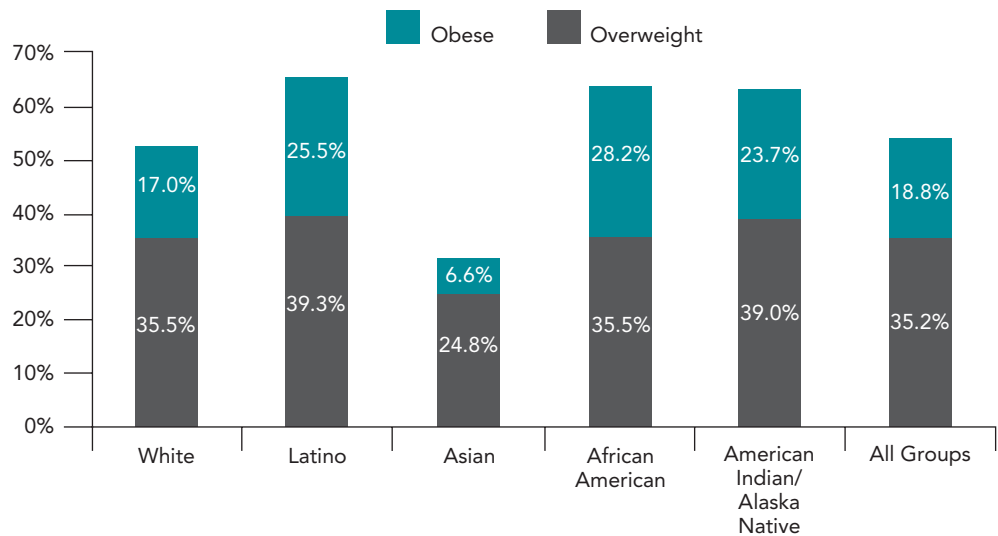

Prevalence of High Bood Pressure and Current Smoking by Race/Ethnicity, Adults Age 18 and Over Diagnosed with Diabetes, California, 2003

Exhibit 5

Race/Ethnicity	High Blood Pressure %	Current Smoking %
White	64.4	12.2
Latino	50.2	15.2
Asian	67.2	16.1
African American	74.0	20.7
American Indian/Alaska Native	61.0	39.8
All Adults Diagnosed with Diabetes	**60.9**	**15.0**

Source: 2003 California Health Interview Survey

Exhibit 6

Prevalence of Overweight and Obesity by Race/Ethnicity, Adults Age 18 and Over Not Diagnosed with Diabetes, California, 2003

Legend: ■ Obese   ■ Overweight

Race/Ethnicity	Overweight	Obese
White	35.5%	17.0%
Latino	39.3%	25.5%
Asian	24.8%	6.6%
African American	35.5%	28.2%
American Indian/Alaska Native	39.0%	23.7%
All Groups	35.2%	18.8%

Source: 2003 California Health Interview Survey

There is considerable variation in the prevalence of overweight and obesity by race and ethnicity (Exhibit 6). Among adults not diagnosed with diabetes, approximately one in four African Americans, Latinos and AI/ANs, and more than one in six whites are obese, compared to one in sixteen Asians. As a result, some of the groups who currently have the highest prevalence of diabetes are also at the greatest risk of developing diabetes.

Conclusions and Policy Recommendations

Nearly 1.7 million California adults have been diagnosed with diabetes, and at least 12.8 million more (54%) are at significant risk for developing diabetes due to being overweight or obese. Based on national estimates, some of these at-risk individuals currently have diabetes but have not yet been diagnosed. In addition, nearly 27,000 adolescents ages 12 to 17 have been diagnosed with diabetes. In California, as obesity rates increase, the risk for diabetes increases among all populations, with some groups at elevated risk for developing the condition.

Preventing Diabetes

Obesity is a major risk factor for developing Type 2 diabetes. Therefore, obesity prevention among adolescents and adults should be a focus in the fight against diabetes. Regular physical activity in conjunction with a nutritionally balanced diet is the key to preventing obesity. Efforts to promote and encourage physical activity and healthful eating should take into account multiple factors—including cultural diversity, the environment and existing structures—to encourage healthy behaviors among individuals and families.

- *Promote environments that encourage nutritious eating.* Policies can be developed to encourage children and adults to eat culturally appropriate healthful diets, including more fruits and vegetables, and food with lower fat content.

- *Promote environments that encourage regular physical activity.* Lack of physical activity is a risk factor for obesity and should be addressed via policies to help

adults and children live more active lives, including access to safe parks, walking-friendly neighborhoods, and quality physical education in grades K-12. Physical activity should receive more emphasis in college curricula. Additionally, programs are necessary that focus on reducing sedentary behavior in the work place.

Reducing Complications of Diabetes

When diabetes is undiagnosed or poorly controlled, the risk of serious and preventable complications, such as blindness, kidney failure, heart disease and amputation, is greatly increased. Four strategies can help reduce the likelihood of developing these health-threatening complications:

• *Promote early detection and appropriate management of diabetes.* Policies are needed to guarantee access to health care to ensure that diabetes is diagnosed early and managed appropriately.

• *Reduce the prevalence of overweight and obesity among people with diabetes.* Among people with diabetes, there should be a focus on reducing rates of obesity in an attempt to better manage and control blood sugar, and limit diabetic complications. Partnerships between health care providers and insurers to provide weight loss options, as well as the development of culturally appropriate nutritional resources, should be emphasized.

• *Reduce the prevalence of smoking among people with diabetes.* Policies to provide help to people with diabetes for smoking cessation can be developed and should be strongly advised by health care providers.

• *Reduce the prevalence of hypertension among people with diabetes.* Health care providers should be further educated on the need for early diagnosis and the appropriate treatment and control of hypertension among patients with diabetes.

Data Source

All statements in this report that compare rates for one group with another group reflect statistically significant differences (p<0.10) unless otherwise noted. The findings in this brief are based on data from the 2001 and 2003 California Health Interview Surveys (CHIS 2001 and CHIS 2003). CHIS 2003 completed interviews with over 42,000 adults, drawn from every county in the state, in English, Spanish, Chinese (both Mandarin and Cantonese), Vietnamese and Korean. CHIS 2001 data were re-weighted to be consistent with the weighting methodology adopted for CHIS 2003. As a result, CHIS 2001 estimates may differ from previously published estimates. CHIS is a collaboration of the UCLA Center for Health Policy Research, the California Department of Health Services, and the Public Health Institute. Funding for CHIS 2003 was provided by the California Department of Health Services, The California Endowment, the National Cancer Institute, the Centers for Disease Control and Prevention (CDC), the Robert Wood Johnson Foundation, the California Office of the Patient Advocate, Kaiser Permanente, L.A. Care Health Plan, and the Alameda County Health Care Agency. For more information on CHIS, visit *www.chis.ucla.edu*.

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Notes

1 Respondents were asked "Other than during pregnancy, has a doctor ever told you that you have diabetes or sugar diabetes?" As a result, estimates of diabetes prevalence do not include gestational diabetes.

2 Based on data from the 2003 National Health Interview Survey.

3 Respondents who indicated that a doctor told them they had diabetes were asked "Were you told that you had Type 1 or Type 2 diabetes?"

4 Centers for Disease Control and Prevention. National diabetes fact sheet: general information and national estimates on diabetes in the United States, 2005. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2005.

5 Respondents were asked "Has a doctor ever told you or your parents that you have diabetes or sugar diabetes?"

6 Based on data from the 2003 National Health Interview Survey.

7 Respondents were asked "Has a doctor ever told you that you have high blood pressure?"

8 Respondents who indicated that they had smoked at least 100 cigarettes in their lifetime and that they currently smoked on some days or every day were considered current smokers.

9 Body Mass Index (BMI), a ratio of weight in kilograms (kg) divided by height in meters (m) squared, was calculated based on respondents' reported height and weight. BMIs below 18.5 kg/m^2 are considered underweight; BMIs of 18.5-24.9 kg/m^2 are considered normal weight; BMIs of 25.0–29.9 kg/m^2 are considered overweight, and BMIs of 30.0 kg/m^2 or greater are considered obese.

10 The Centers for Disease Control and Prevention estimate that nationally nearly 30% of adults who currently have diabetes are undiagnosed. See: Centers for Disease Control and Prevention. National diabetes fact sheet: general information and national estimates on diabetes in the United States, 2005. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2005.

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