

## Prevalence of Self-Reported Cardiovascular Disease Among Persons Aged $\geq 35$ Years with Diabetes --- United States, 1997--2005

Adults with diabetes are at greater risk for dying from heart disease than adults without diabetes (1). Heart disease and stroke account for approximately 65% of deaths among persons with diabetes (1). During 1997--2005, the age-adjusted prevalence of diagnosed diabetes in the United States increased 43%, from 3.7% in 1997 to 5.3% in 2005 (2). To assess trends in prevalence of heart disease, stroke, and other cardiovascular diseases (CVDs) among persons with diabetes, CDC analyzed data from the National Health Interview Survey (NHIS). This report summarizes the results of that assessment, which indicated that although the number of persons aged  $\geq 35$  years with diagnosed diabetes who reported having CVD increased 36% during 1997--2005, the age-adjusted prevalence decreased 11%; however, the decrease in CVD prevalence did not occur in all subpopulations with diabetes. The decrease in CVD prevalence indicates that the increase in the number of persons with diagnosed diabetes exceeded the increase in the number of persons with diagnosed diabetes who reported having a CVD. Continued interventions are needed to reduce modifiable CVD risk factors among persons with diabetes, better control diabetes, and decrease CVD prevalence further.

NHIS is an annual, in-person household survey of the civilian, noninstitutionalized U.S. population. The survey provides information on the health of the U.S. population, including information on prevalence and incidence of disease, extent of disability, and use of health-care services (3). NHIS data for 1997--2005 were used to estimate the number of persons with and the prevalence of self-reported CVD among persons aged  $\geq 35$  years with diagnosed diabetes; the questionnaire was administered to a nationally representative sample of adults (range: 31,000 to 36,000 during the study period), and adult response rates ranged from 69% to 80% (3). Diagnosed diabetes was defined as a "yes" response to the question: "Have you ever been told by a doctor or health professional that you have diabetes or sugar diabetes?" Women who only had diabetes during pregnancy were excluded. CVD was defined as a "yes" response to any of five questions.\* Responses from participants who responded "don't know" or "refused" or who did not respond to any of the five CVD questions were excluded from these analyses.

During 1997--2005, the annual number of survey respondents aged  $\geq 35$  years with self-reported diabetes and CVD ranged from approximately 3,700 in 1997 to 6,800 in 2004. Data

were analyzed by age, sex, race (black or white), and ethnicity (Hispanic or non-Hispanic). Race and ethnicity were analyzed separately; Hispanic persons might have been of any race. To represent annual estimates, 3-year averages were calculated for 1998--2004, and 2-year averages were calculated for 1997 and 2005; 95% confidence intervals (CIs) were calculated for the averages using the standard error of the mean. Estimates were age adjusted to the 2000 U.S. standard population. Trends were assessed using linear regression analysis based on single years of data.

During 1997--2005, the estimated number of persons in the United States aged  $\geq 35$  years with self-reported diabetes and CVD increased 36%, from 4.2 million in 1997 to 5.7 million in 2005 ([Figure 1](#)). However, the age-adjusted prevalence of self-reported CVD among persons aged  $\geq 35$  years with diagnosed diabetes decreased 11.2%, from 36.6% (CI = 34.6%--38.6%) in 1997 to 32.5% (CI = 30.9%--34.1%) in 2005 ( $p=0.02$ ).

During 1997--2005, the age-specific prevalence of self-reported CVD among persons aged 35--64 years who had diagnosed diabetes decreased by 14.1%, from 31.1% (CI = 28.6%--33.6%) in 1997 to 26.7% (CI = 24.7%--28.7%) in 2005 ( $p=0.006$ ) ([Figure 2](#)). In older age groups, trends in prevalence did not change significantly during 1997--2005, ranging from 45.7% to 50.9% for persons aged 65--74 years ( $p=0.56$ ) and from 52.8% to 57.2% for those aged  $\geq 75$  years ( $p=0.99$ ).

During 1997--2005, the age-adjusted CVD prevalence was higher among men than women, higher among whites than blacks, and higher among non-Hispanics than Hispanics ([Figure 3](#)). Among women, the age-adjusted prevalence decreased by 11.2%, from 33.8% (CI = 31.3%--36.3%) in 1997 to 30.0% (CI = 27.8%--32.2%) in 2005 ( $p=0.02$ ). Among men, the age-adjusted prevalence did not decrease significantly, with rates of 39.8% (CI = 36.7%--42.9%) in 1997 and 35.1% (CI = 32.6%--37.5%) in 2005 ( $p=0.10$ ). The age-adjusted prevalence of self-reported CVD decreased by 25.3% among blacks, with rates ranging from 36.3% (CI = 32.3%--40.4%) in 1997 to 27.1% (CI = 23.5%--30.7%) in 2005 ( $p=0.03$ ). Among whites, no significant decrease occurred, with rates ranging from 37.4% (CI = 35.0%--39.8%) in 1997 to 33.7% (CI = 31.9%--35.5%) in 2005 ( $p=0.06$ ). Among non-Hispanics, the rate decreased by 12%, from 37.9% (CI = 35.7%--40.1%) in 1997 to 33.3% (CI = 31.5%--35.0%) in 2005 ( $p=0.02$ ). No clear trends were detected among Hispanics.

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### **Editorial Note:**

In 2005, CVD affected approximately 6 million adults aged  $\geq 35$  years with diabetes and was a major cause of morbidity and mortality (2,4). Risk factors for heart disease among persons with diabetes include hyperglycemia, hyperinsulinemia, hyperlipidemia, hypertension, obesity, and microalbuminuria, which often precede the onset and diagnosis of diabetes (5). The findings in this report indicate that overall, the number of U.S. persons aged  $\geq 35$  years with both self-reported diabetes and CVD increased during 1997--2005. However, the prevalence of CVD among persons with diabetes decreased, indicating that the increase in the number of persons with diabetes exceeded the increase in the number of persons with both

diabetes and CVD. The decrease in CVD prevalence among persons with diabetes is consistent with the trend in the age-adjusted rate for CVD hospitalizations among persons with diabetes; after peaking in 1996, the rate decreased (2). In the general population, rates of hospitalization for two CVDs, coronary atherosclerosis and acute myocardial infarction, also have decreased since 1996 (6).

The decrease in self-reported CVD prevalence in persons with diagnosed diabetes might be a result of decreasing rates of certain CVD risk factors (e.g., high total blood cholesterol, high blood pressure, and smoking), development of new pharmacologic agents such as statins, or of increasing use of preventive treatments, such as daily aspirin therapy (4,7). An additional possible reason for the decreasing rate of self-reported CVD among persons with diagnosed diabetes includes shorter duration of diabetes; national diabetes surveillance data indicate that the median duration of diabetes has decreased significantly overall and among women, but not among men (2). Continued interventions (e.g., control of blood lipid levels, blood pressure [8,9], and blood glucose) are needed to reduce modifiable risk factors among persons with diabetes, better control diabetes, and decrease CVD prevalence further.

The findings in this report are subject to at least three limitations. First, because NHIS excludes persons in nursing homes and other institutions, the number of persons with CVD and diabetes is an underestimate. Second, NHIS data on history of diabetes and CVD were self-reported; therefore, changes in awareness of CVD over time or diagnostic practices associated with CVD might influence trends in prevalence. Finally, approximately one third of persons with diabetes were unaware they have diabetes because their disease has not been diagnosed (10), which likely resulted in an underestimate of diabetes prevalence.

CDC provides resources and technical assistance to diabetes prevention and control programs in all 50 states, eight current and former territories, and the District of Columbia (DC) for activities, including 1) diabetes education, 2) improvements in and monitoring quality of diabetes care, and 3) promotion of early detection of diabetes complications.<sup>†</sup> CDC also funds health departments in 32 states and DC to develop effective strategies for reducing the effects of heart disease and stroke and associated risk factors, such as high blood pressure.<sup>§</sup> The National Diabetes Education Program (NDEP), which is sponsored by CDC and the National Institutes of Health, aims to educate the public about controlling diabetes and preventing its complications. An NDEP campaign, Be Smart About Your Heart: Control the ABCs of Diabetes, addresses risk factors for CVD among persons with diabetes, such as poorly controlled hyperglycemia, hypertension, and hyperlipidemia.<sup>¶</sup>

CDC continues to work with public and private partners to reduce rates of diabetes and other risk factors for CVD and improve care of persons with these conditions. Continued surveillance of CVD using NHIS data will help public health officials monitor and assess progress in reducing CVD and its risk factors.

## References

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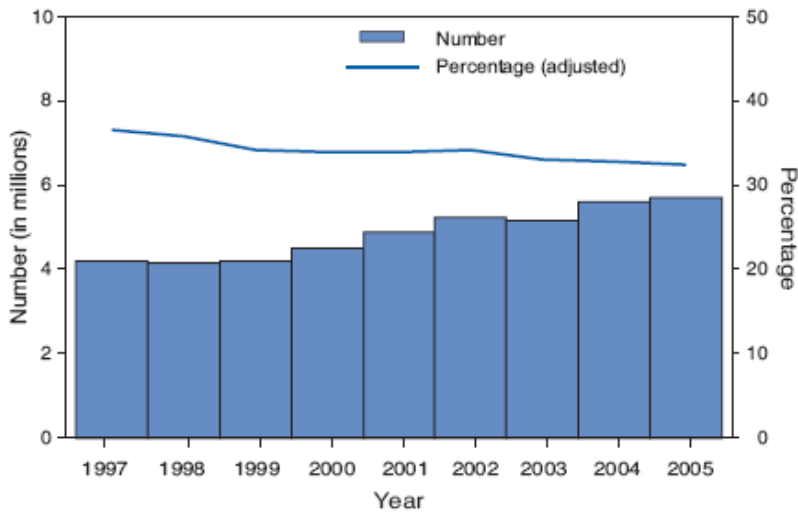
\* "Have you ever been told by a doctor or other health professional that you had coronary heart disease? Have you ever been told by a doctor or other health professional that you had angina, also called angina pectoris? Have you ever been told by a doctor or other health professional that you had a heart attack (also called myocardial infarction)? Have you ever been told by a doctor or other health professional that you had any kind of heart condition or heart disease (other than the ones I just asked about)? Have you ever been told by a doctor or other health professional that you had a stroke?"

† Additional information available at <http://www.cdc.gov/nccdphp/publications/aag/ddt.htm>.

§ Available at [http://www.cdc.gov/dhdsp/state\\_program/index.htm](http://www.cdc.gov/dhdsp/state_program/index.htm).

¶ Available at [http://www.ndep.nih.gov/campaigns/besmart/besmart\\_index.htm](http://www.ndep.nih.gov/campaigns/besmart/besmart_index.htm).

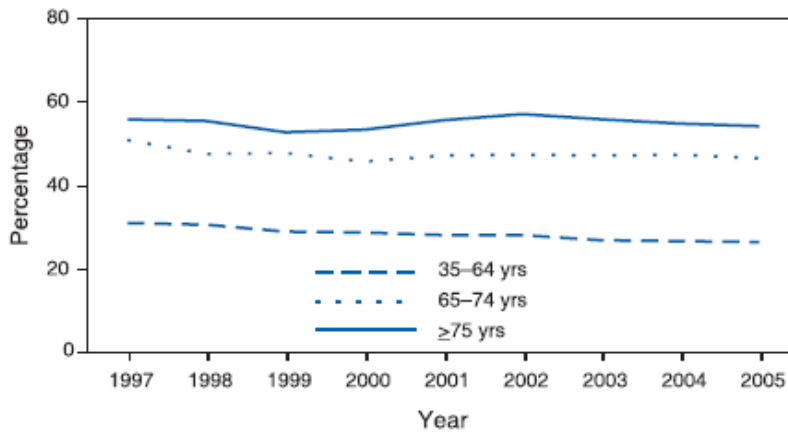
**FIGURE 1. Estimated number of persons with and prevalence\* of self-reported cardiovascular disease† among persons aged  $\geq 35$  years with diagnosed diabetes — National Health Interview Survey, United States, 1997–2005**



\* 3-year averages for 1998–2004, 2-year averages for 1997 and 2005. Age adjusted based on the 2000 U.S. standard population.

† Coronary heart disease, angina, myocardial infarction, any other kind of heart condition, or stroke.

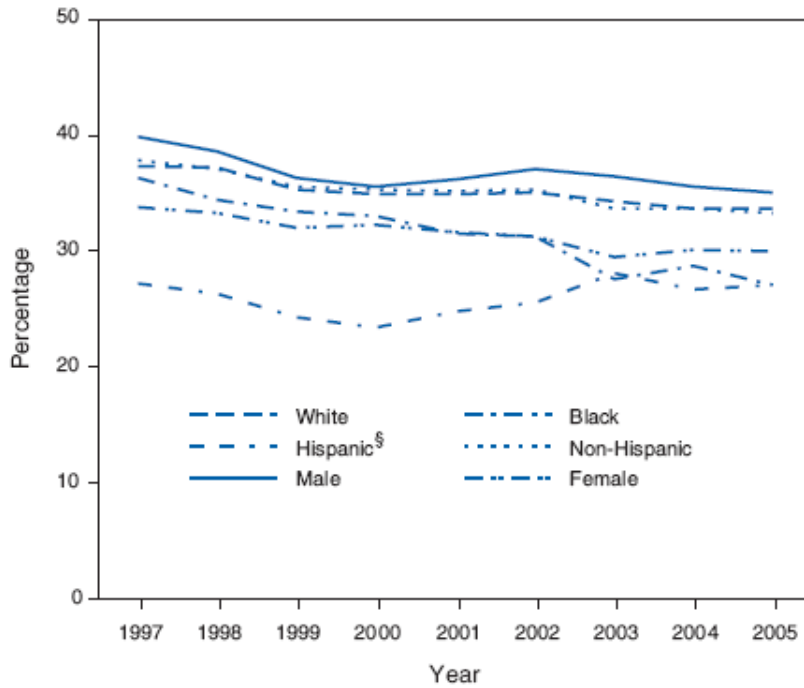
**FIGURE 2. Estimated prevalence\* of self-reported cardiovascular disease† among persons aged  $\geq 35$  years with diagnosed diabetes, by age group — National Health Interview Survey, United States, 1997–2005**



\* 3-year averages for 1998–2004, 2-year averages for 1997 and 2005.

† Coronary heart disease, angina, myocardial infarction, any other kind of heart condition, or stroke.

**FIGURE 3. Estimated age-adjusted prevalence\* of self-reported cardiovascular disease† among persons aged  $\geq 35$  years with diagnosed diabetes, by sex and race/ethnicity — National Health Interview Survey, United States, 1997–2005**



\* 3-year averages for 1998–2004, 2-year averages for 1997 and 2005. Age adjusted based on the 2000 U.S. standard population.

† Coronary heart disease, angina, myocardial infarction, any other kind of heart condition, or stroke.

§ Might be of any race.