

# Preventing Cardiovascular Disease and Diabetes

## A call to action from the American Diabetes Association and the American Heart Association

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**E**xcess body weight has become a major public health problem in the U.S., with nearly two-thirds of adults either overweight or obese (1). The steady gain in the prevalence of obesity over the last 25 years has affected our entire population—no racial or ethnic group, no region of the country, and no socioeconomic group has been spared (2). Perhaps most worrisome is the observation that the rise in the rate of obesity has been greatest in children and minorities, which suggests that future generations of Americans, and our fastest growing populations, may bear the ultimate burden of this condition (3).

Overweight or obesity results in a wide range of elevated risk factors and many fatal and nonfatal conditions (4). Paradoxically, although we have witnessed decades in which heart disease and stroke have steadily declined and cancer mortality has at worst remained stable (5), the prevalence of diabetes has soared (6). The increase in diabetes can largely be attributed to weight gain (7,8), and it threatens the enormous advances in disease prevention we have seen (3,9,10).

Among individuals with diabetes, cardiovascular disease (CVD) is the leading cause of morbidity and mortality (9,11); adults with diabetes have a two- to fourfold higher risk of CVD compared with those without diabetes (12,13). Diabetes is also accompanied by a significantly increased prevalence of hypertension and dyslipidemia (14).

It is reasonable to postulate that in many individuals, excess weight gives rise to diabetes, hypertension, and dyslipidemia, thereby leading to frank CVD (15–17). This seemingly simple algorithm is undoubtedly more complex because 1) many studies show that hyperglycemia at pre-diabetic levels is an independent risk factor for CVD (18–22), 2) central obesity (i.e., intra-abdominal or visceral fat) may have a greater detrimental effect than overall weight/BMI (8,23,24), and 3) there is a complex relationship between lipid metabolism and hyperglycemia (25,26). Moreover, obesity in the absence of glucose intolerance is associated with CVD, including coronary heart disease, stroke, and heart failure (27).

The association among diabetes, hypertension, and dyslipidemia has been known for many decades, but the seminal paper by Reaven (28) ascribing much of the etiology of these risk factors to insulin resistance ushered in a new era of research and awareness (29) and the call for a better appreciation of the impact of obesity on CVD. Also, the concept that these “metabolic” abnormalities can cluster in many individuals gave rise to the term “metabolic syndrome,” and this construct has been the subject of many thousands of publications and extensive reviews. Although the metabolic syndrome has been embraced by many individuals and organizations (29–33), others have questioned its clinical utility (34–38).

Unfortunately, some of the medical

press have positioned the scientific issues related to the metabolic syndrome as a “battle” (39,40) between the American Diabetes Association and the American Heart Association, implicitly suggesting that CVD risk factor identification and treatment is now questionable. We are concerned that the presumed dispute will lead to a reduction in the favorable trend of many aspects of CVD risk factor reduction (41).

The intent of this article is to clarify and reinforce the notion that our organizations remain unified and committed to reducing the burden of diabetes and CVD. The importance of identifying and treating a core set of risk factors (pre-diabetes, hypertension, dyslipidemia, and obesity) cannot be overstated, and our commitment is evidenced by other previous joint publications (42,43). While unrelated to an underlying metabolic abnormality, tobacco use also deserves special attention. Moreover, since recent evidence suggests that risk assessment and adherence to national guidelines remains woefully suboptimal (44–46), we call for a renewed effort to prevent and treat these conditions.

### Risk assessment

Although there are many approaches for estimating the risk of diabetes and CVD (47–49), virtually none have been validated much beyond the population from which they were constructed. There is one such tool, however (available free on the Internet at <http://www.diabetes.org/diabetesphd>), that has been extensively validated across many widely differing clinical trials, and it incorporates virtually all known CVD risk factors. Although it can be used to predict the risk of developing CVD/diabetes or the effects of treatment after developing diabetes/CVD, this tool and other risk-assessment algorithms are rarely used in clinical practice.

Conversely, emerging evidence suggests that simply ascertaining a person's blood glucose level, blood pressure, LDL cholesterol level, and tobacco use and noting the presence of obesity may be suf-

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ficient to initiate the appropriate interventions to prevent or identify diabetes and emerging CVD (22,24,50,51). Even borderline abnormalities, especially if they are multiple, may well presage future problems and should be addressed. Certainly, a number of intriguing scientific questions remain regarding the relative impact of each risk factor, the hierarchy of risk factors, the inclusion of other risk factors, and the relationships among all of them; however, at the very least, we encourage providers to be cognizant of these key parameters.

### Risk factor management

Numerous studies have shown that attention to lifestyle modification can dramatically reduce progression to type 2 diabetes (52–54). Weight loss of as little as 7% of body weight during the 1st year of intervention, with lesser amounts to follow, is extremely effective and well within the capability of most patients. Weight reduction also improves all cardiometabolic risk factors (55,56), although there has been no controlled clinical trial evidence documenting the effect of weight loss on CVD events. Current guidelines also recommend regular, moderate physical activity, and here too, all cardiometabolic risk factors improve with sustained physical activity (57). Other strategies for the early detection and treatment of diabetes and CVD have been published by our organizations (43).

### Summary

Both the American Heart Association and the American Diabetes Association remain jointly committed to a reduction in heart disease, stroke, and new-onset diabetes. We strongly recommend that all providers assess patients for their global risk for CVD and diabetes. Despite many unresolved scientific issues, a number of cardiometabolic risk factors have been clearly shown to be closely related to diabetes and CVD: fasting/postprandial hyperglycemia, overweight/obesity, elevated systolic and diastolic blood pressure, and dyslipidemia. Although pharmacologic therapy is often indicated when overt disease is detected, in the early stages of these conditions, lifestyle modification with attention to weight loss and physical activity may well be sufficient.

It must be remembered that obesity is far more than an unattractive appearance but can be prevented. Moreover, it is often a visible marker of other underlying risk

factors that can be addressed. Thus, the overweight or obese patient deserves major clinical attention. The growing prevalence of this condition threatens to undermine all of our recent gains to prevent and control chronic disease.

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