Leveling-off of declining trend of cardiovascular disease-related mortality in the USA: the challenge to rein in obesity and diabetes epidemic

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Although cardiovascular disease (CVD) has remained the number one cause of death in the USA since 1921, the morbidity and mortality related to CVD has markedly declined over the last five decades, representing one of the greatest public health achievements of the last century. The two major reasons of this reduction have been advances in the treatment of CVD and more aggressive control of modifiable risk factors [1]. However, this year's American Heart Association Heart Disease and Stroke Statistics are sobering, as the CVD-related mortality rates, which had progressively been declining, show clear evidence of leveling off [2]. This is likely related to the growing epidemic of obesity and diabetes, which, left unabated, poses a tremendous threat to what has been achieved (Figs 1 and 2).

While several modifiable CVD risk factors, including smoking, hypertension, elevated serum cholesterol, and physical inactivity, appear to have temporally decreased,

obesity and diabetes have significantly increased. Using a wide array of US data, Ford *et al.* [1] explained the decline in coronary disease-related mortality from 1980 to 2000 through reduction in CVD risk factors and increased use of evidence-based medical therapies, though in their analysis increases in BMI and prevalence of diabetes appeared to offset some of this benefit. Fox *et al.* [5] also showed that the proportion of CVD attributable to diabetes has increased over the 50 years (1952–1998) in Framingham Heart Study.

Currently, 30.3 million people (9.4% of US population) have diabetes. Moreover, nearly 33.9% (84.1 million) of US adults of 18 years or older have 'prediabetes', a condition which places them at an increased risk of developing diabetes and CVD [3]. It has been projected that by 2050, over 25% of the US adult population will be diabetic [6].

Fig. 1

Age-adjusted, county-level prevalence of diagnosed diabetes among adults aged 20 years or more in the USA in 2013 [3].

Fig. 2

Prevalence of obesity in adults aged 18 years or older in the USA in 2016 [4].

Increasing body mass is undoubtedly the primary driver of diabetes. According to recent Center of Disease Control and Prevention data, 29.6% of adults aged 18 years and older in 2016 were obese [4]. It is projected that by 2030 obesity will contribute to six million new cases of diabetes and five million new cases of coronary heart disease and stroke [7]. Rises in obesity and diabetes are not only a threat to cardiovascular health but also carry a huge economic impact. The total cost of diagnosed diabetes in the USA in 2012 was \$245 billion, an increase of 41% from 2007 [8]; and this is projected to increase further (by >100%) to \$514 billion by 2025, an expenditure comparable to the total Medicare budget [9]. A great share of this money will be spent managing CVD complications.

The good news is that much of obesity and diabetes appears preventable through education and simple life-style modifications. Interventions such as regular exercise and a healthy diet leading to weight-loss have proven effective in the prevention and management of diabetes [10]. Unfortunately, data suggest that many of these favorable behaviors are not regularly practiced. This makes it imperative to identify the factors hindering the application of obesity and diabetes prevention programs and address them accordingly.

Efforts to control the health and cost-related consequences of diabetes should target at least two large groups of patients. First, in people with diagnosed diabetes, appropriate blood glucose management through diet, regular exercise, and appropriate medications is essential to prevent microvascular and macrovascular complications such as CVD. Appropriate education and close surveillance is critical in this endeavor. Second, early identification of patients with prediabetes, many of whom are currently unrecognized, is extremely important. Life-style interventions should be emphasized to

these patients to prevent them from progressing to diabetes. Insurance coverage and easy access to exercise programs and dietary counseling can prove extremely cost-effective in the long-term.

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Conflicts of interest

There are no conflicts of interest.

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