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# REVIEW ARTICLES

# Obesity in Childhood: Introduction and General Considerations

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Obesity in childhood is perhaps the most major clinical and public health problem in the United States and most developed countries and is rapidly becoming so in developing countries. The National Health and Nutrition Examination Survey (NHANES) is a federally funded periodic survey of a random sample of the U.S. population. In NHANES data over the past several decades, there is a 3-fold increase in the prevalence of obesity in childhood (1–4). These data are alarming but, perhaps not surprising.

The landmark Framingham Heart Study, which enrolled and followed over 5000 residents of a single community in Massachusetts for over 40 years, has demonstrated that in middle age the average American gains about seven pounds per decade of life. Thus, for these and other cogent reasons, it appears that, at present, the adult population of the U.S. is the fattest society in the world and likely to be the fattest in the history of the world (5). Further, there are even more alarming trends in obesity in childhood in developing countries (6,7). Thus, the epidemic of obesity in childhood in the United States and most developed countries is now becoming a pandemic.

This emerging pandemic results from genetic and environmental factors, chiefly increased caloric intake and physical inactivity (3,6,8–12). Further, and also not surprisingly, childhood obesity has contributed to marked increases in metabolic syndrome and type 2 diabetes in U.S. children (13–15). The increasing prevalence of metabolic syndrome and type 2 diabetes in childhood has also been well documented in developing countries, including China (16,17).

Among most middle-aged adult populations, smokers tend to be thinner due to the effects of smoking on decreasing appetite and increasing basal metabolic rate. Among adolescents in both developed and developing countries, the rise in cigarette consumption is associated with increasing obesity perhaps due, at least in part, to increasing levels of physical inactivity (12,18–20).

At present, most of the remarkable decline in mortality from coronary heart disease in the United States over the past several decades is currently due to diagnosis and treatment rather than primary prevention. Further, the rate of decline is decreasing and coronary heart disease will increase as the current generation of U.S. children and adolescents reach middle age (18). For all these reasons, cardiovascular disease (CVD) is and will remain the leading killer in the United States and most developed countries. Thus, the long-term consequences of childhood obesity could cause our current generation of children to become the first in the history of the United States to have a decreased life expectancy than their parents (13,21). In addition, however, the alarming increases in obesity and tobacco consumption in developing countries has led the World Health Organization to estimate that CVD will rise from number 5 to number 1, the leading killer in the entire world after another decade (6,7).

There is increasing evidence that atherosclerosis begins in childhood. In the Bogalusa Heart Study, autopsy studies of children showed a clear relationship between the number and severity of risk factors, principally obesity, with atherosclerosis in both the aorta and coronary arteries (14,22). Thus, the need for primary prevention of cardiovascular disease beginning in childhood is clear (7,13–15,23), but there is no consensus regarding the best approach that includes therapeutic lifestyle changes as well as pharmacologic therapies. While further research is certainly warranted, so too are clinical and health policy measures (24–29).

In this issue of the journal, new predictors of metabolic syndrome in children, epidemiology of childhood obesity, and the relation to subsequent cardiovascular disease are addressed. All these issues underscore the crucial need for primary prevention of obesity in children throughout the world.

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