Obesity has reached epidemic proportions in the industrialized world. In parallel, the prevalence rates of hypertension and cardiovascular disease have increased dramatically. Most unfortunately, these increases have not been limited to adults, because obesity and hypertension have also been found to have risen substantially in children and adolescents as well. It seems that the rate of increasing body mass is directly related to the occurrence of hypertension in the pediatric population, because secondary forms of hypertension have not been reported to have increased recently.

It has long been recognized that a direct and continuous relationship exists between dietary sodium intake and blood pressure, as well as the prevalence of hypertension and associated cardiovascular disorders. However, this connection has generally been reported for adults but not demonstrated for the pediatric age group. A recent report suggests that such a relationship can even be found among individuals between the ages of 4 and 18 years. In addition, fluid consumption and, particularly, the consumption of sweetened beverages, have been linked to childhood obesity. The cross-sectional data cited by He et al demonstrated a decrease in low-calorie soft drink consumption in the pre-adult population. Using the 1997 National Diet and Nutrition Survey of Great Britain composed of 7-day dietary records for ~1700 subjects ranging in age between 4 and 18 years (the same data set used in Reference 3), the authors observed a significant relationship between salt intake and fluid intake, as well as sweetened beverage consumption. They hypothesize, based in part on their earlier studies, that a reduction in salt intake would decrease sugar-sweetened beverage and, thus, calorie intake, obesity, increases in blood pressure, and consequent cardiovascular disease. It is curious that the cross-sectional data cited by He et al demonstrated a decrease in low-calorie soft drink consumption in the teen years, whereas the consumption of sugar-sweetened soft drinks seemed to remain relatively constant at 30% from ages 4 to 18 years. Is it possible that taste sensation is dulled with increasing salt intake, thus leading to a hedonistic preference for greater gustatory stimulation, partially satisfied by ingestion of flavored or sweetened drinks? It would certainly be informative if investigation of such mechanisms could be pursued. The observations reported in the article by He et al and the conclusions that they draw are provocative but largely speculative based on currently available evidence.

Are dietary sodium intake, calorie, and sweetened beverage consumption the only culprits contributing to the rise in childhood and adolescent obesity and hypertension? Obviously the answer is no! A recent report of obese children between the ages of 4 and 17 years observed that both the severity of obesity and the amount of television watching time were independent predictors of hypertension. Thus, a clear picture of increased salt, calorie, and sweetened beverage intake, coupled with reduced and largely passive activity emerges as a major contributor to obesity and increased blood pressure in childhood. It is also reasonable to assume that these behaviors, when carried to adulthood, could lead to hypertension and associated cardiovascular disorders.

How then can we combat this vicious cycle? The simple answer lies in the reduction of these nonessential dietary components and an increase in activity to curtail the obesity epidemic. Such an approach is easier to prescribe than to achieve. A recent report by the American Medical Association Council on Science and Public Health has estimated that, in adults, a reduction in lifetime sodium intake of 1.3 g/d would translate to a 5-mm Hg smaller rise in blood pressure over the age progression from 25 to 55 years and a reduction in 150 000 deaths annually in the United States. Because well over 80% of sodium intake is from processed and prepared foods, the admonition to avoid the use of the salt shaker is less effective than informed food purchases in the grocery store or restaurants. Moreover, motivating food preparers and commercial sources of food and drink to reduce salt and calorie content of their foods has been very challenging and relatively ineffective.

Several recent efforts outside the United States to decrease the sodium content of foods over the recent past have demonstrated the feasibility of doing this gradually without perceptible taste or dietary impact. Finland has achieved a 30% reduction in average sodium consumption over the past 3 decades associated with a dramatic, 60% reduction in death from stroke and heart disease. More recently, joint governmental and industrial efforts in England, Ireland, New Zealand, Australia, and France have been directed toward reducing dietary sodium intake. To date, the emphasis has been on adults and particularly those with, or at high risk for, hypertension and cardiovascular disease. Little effort has been focused on children. Because dietary and activity habits are formulated in childhood, attention to the pediatric population, as well as to adults, would seem prudent.

Primary prevention of obesity, rises in blood pressure, and the other precursors of cardiovascular disease begins in childhood. A previous report by He et al suggests that a reduction of 1 g/d in salt intake is associated with a substantial reduction in systolic and diastolic blood pressure in...
growing children. These observations, coupled with a potential similar reduction in sweetened beverage intake predicted by the present cross-sectional analyses, could be expected to reduce both blood pressure and obesity and, thus, attenuate the rapidly rising association of both with adulthood obesity and hypertension. Such efforts, coupled with an increase in activity, could go a long way in reducing the present scourge of cardiovascular disease in our industrialized society. Obviously, each step in this progression requires further definition and confirmation. This presents a formidable challenge as we move into the 21st century.

Disclosures
None.

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Are Children Doomed by What They Eat and Drink?
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