Serum Total Cholesterol Concentrations and Awareness, Treatment, and Control of Hypercholesterolemia Among US Adults

To the Editor:

The report by Ford et al\(^1\) showed, disappointingly, that the average serum total cholesterol concentration of US adults in the National Health and Nutrition Examination Surveys (NHANES) declined by only 0.4 mmol/L (2 mg/dL) between 1988 to 1994 and 1999 to 2000. Ford et al\(^1\) commented that “the epidemic of obesity may have slowed the trend” but did not quantify the degree to which this speculation might be true.

Between 1988 to 1994 and 1999 to 2000, the mean weight of adults in NHANES increased 4.1 kg, from 7.5 to 80.0 kg (Dr. Earl Ford, personal communication, May 15, 2003). A pooled estimate from clinical trials indicates that a 1-kg weight loss lowers total cholesterol 1.9 mg/dL.\(^2\) Assuming weight gain has an opposite effect, the 4.1-kg increase in the weight of US adults may have otherwise prevented a 7.8-mg/dL additional decline in total cholesterol beyond the 2 mg/dL observed. A 7.8-mg/dL cholesterol decrement potentially could have reduced coronary heart disease mortality by an additional 11.7% and total mortality by 8.6%, based on an estimate that a 1-mg/dL decrease in total cholesterol translates to a 1.5% fall in coronary heart disease mortality and a 1.1% fall in total mortality.\(^3\)

Thus, the increase in weight in the US population in the 1990s indeed very likely had a major blunting effect on the serum cholesterol trend and possibly on mortality trends as well.

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Response

In our article,\(^1\) we suggested that the increase in the prevalence of obesity in the United States that occurred during the 1990s probably affected the trend in total cholesterol concentration. Dr Folsom explores the issue in further detail and concludes that the obesity epidemic may indeed have played an important role.

We examined this issue in a different way by comparing the change in mean age-adjusted total cholesterol concentrations with that of age- and body mass index–adjusted concentrations. We created 3 age groups (20 to 39, 40 to 59, and ≥60 years) and 3 body mass index groups (<25, 25–<30, and ≥30 kg/m\(^2\)) using the age or age and body mass index distribution from the Third National Health and Nutrition Examination Survey to make these adjustments. Among all participants, the decrease in the age-adjusted mean total cholesterol concentration was 0.04 mmol/L (\(P=0.249\)) and that in the age- and body mass index–adjusted mean concentration was 0.06 mmol/L (\(P=0.055\)). However, the effect was greatest among white women and was present to a lesser degree among white men. Adjusting for age and body mass index had almost no effect on the change in total cholesterol concentration among African Americans, but this adjustment resulted in smaller changes than that produced by age adjustment alone among Mexican Americans.

We should note that the likely effect of obesity is probably greater than we estimated because sample size considerations led us to use relatively broad categories of age and body mass index to adjust. Finer adjustment for body mass index would likely have accentuated the difference between the change in the mean age-adjusted and age- and body mass index–adjusted total cholesterol concentrations.

Two different approaches reach the same conclusion, as follows: the obesity epidemic likely reduced the change in total cholesterol concentration that might have occurred in the absence of this epidemic. Although the disappointingly small change in mean total cholesterol concentration could affect the future incidence and mortality of coronary heart disease in the United States, trends in smoking, hypertension, physical activity, and other risk factors for coronary heart disease need to be considered as well.

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