Time to End the Mixed—and Often Incorrect—Messages About Prevention and Treatment of Atherosclerotic Cardiovascular Disease*

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Medical research has revealed enough about the causes and prevention of heart attacks that they could be nearly eliminated. Yet nearly 16 million Americans are living with coronary heart disease, and nearly half a million die from it each year. It’s not that prevention doesn’t work, and it’s not that once someone has a heart attack there is little to be done. In fact, said Dr. Elizabeth Nabel, director of the National Heart, Lung and Blood Institute at the National Institutes of Health, age-adjusted death rates for heart disease dropped precipitously in the past few decades, and prevention and better treatment are major reasons why. But the concern, Dr. Nabel and others say, is that much more could be done. In many ways, scientists’ hard-won and increasingly detailed understanding of what causes heart disease and what to do for it often goes unknown or ignored (1).

While we were preparing this editorial, the above quote appeared on the front page of the April 8, 2007 issue of the New York Times (1). How stark the contrast between this rather glum view of the progress of cardiovascular research over the past 50 years versus the triumphant editorial in Science in 1996 proclaiming the “end of heart attacks by the century” (2). The latter, by Brown and Goldstein (2), Nobel Prize winners for their brilliant work on the mechanics and role of the low-density lipoprotein (LDL) receptor in cholesterol regulation and control, predicted that current knowledge, if fully applied, could end heart attacks within a short time. Which view is the correct one: the failure of our research to reach full translation, or the great potential based on the accomplishments of cardiovascular research that turned the heart attack epidemic around? Of course, both are true—the potential is there, but the reality is not, for, as Dr. Nabel said, our great knowledge of the causes and treatment of heart disease often goes unknown or ignored.

The paper by Ford and Capewell (3) in this issue of the Journal demonstrates that the battle is not over, and, in fact, if we are not careful, the enemy will rise again. Although we have prided ourselves on the continuing decline in age-adjusted mortality rates from coronary heart disease (CHD), we have missed until now the fact that younger people, as demonstrated by Ford and Capewell (3), have reached a nadir and the death rate seems to be on the increase again. These are the best data that we have in this country given that we lack a true national surveillance system (4). They are, indeed, the same data upon which we have based our conclusions about the fall in age-adjusted mortality over the past 2 to 3 decades. The ominous finding of a possible increase in the age-specific CHD death rate in young adults should not be ignored. It is time to stop giving the mixed message that “we are winning the war on heart disease, but pay attention to your risk factors anyway.”

The new data by Ford and Capewell (3) suggest that the message should immediately be revised: we are now starting to lose the battle against heart disease, and if we continue to ignore what we already know about prevention and treatment of risk factors, we will suffer the consequences with increased morbidity, increased mortality, and reduced longevity among America’s men and women now in their 30s, 40s, and 50s. As Olshansky et al. (5) predicted in 2005, the steady rise in life expectancy during the past 2 centuries may soon come to an end. It is time to give a straight message to our young people, and to ourselves as cardiologists and cardiovascular researchers, that our first priority must be to apply the knowledge that we already have. In the paragraphs that follow, we will summarize what we think the prevention message must be if we are to capitalize on the achievements of our research and also benefit from the warning of important papers like the one published in this issue of the Journal (3).

1. Heart attacks rarely occur in the absence of the major risk factors (adverse levels of blood cholesterol, blood pressure, smoking, diabetes). In the past, it was commonly held that only one-half of myocardial infarctions occurred in people with elevations of the traditional risk factors. This incorrect belief started appearing in the cardiovascular literature around 1974 (6) and occasionally still appears in contemporary journal articles. However, as demonstrated by 2 back-to-back articles in 2003 (7,8), myocardial infarction or coronary death is uncommon in the absence of concurrent or antecedent risk factor exposure to adverse levels of 1 or more of the major risk factors. In fact,
in the Framingham Heart study, where multiple antecedent risk factor measures were available in all study participants, 90% to 100% of all CHD events occurred in people with at least 1 CHD risk factor present before the event (7).

2. Absence of the major cardiovascular risk factors is highly protective against cardiovascular morbidity and mortality. Several major studies have demonstrated the remarkable protection from cardiovascular morbidity and mortality afforded to people who have reached middle age without any of the major CHD risk factors being present. For example, Stamler et al. (9) reported in 1999 that age-adjusted risks of CHD mortality were 77% to 92% lower among cohorts of men and women without any major CHD risk factor versus the entire balance of the cohort with at least 1 risk factor. In addition, the all-cause mortality rates ranged from 40% to 58% lower for those without any major risk factor compared with all others. Estimated greater life expectancy for low-risk groups ranged from 5.8 to 9.5 years, suggesting the marked benefits of reaching middle age without any major risk factor prevalent. These findings have now also been confirmed and extended using the technique of lifetime risk estimation in both the Framingham (10) and the Chicago Heart Association (11) studies. Thus, a formula starts to emerge that preventing the occurrence of the risk factors in early life could potentially prevent the vast majority of CHD and truly put an end to the CHD epidemic.

3. Unfortunately, very few people in America have no major risk factors present. In an analysis of the Third National Health and Nutrition Examination (NHANES-3) data, Vasan et al. (12) reported that <1% of men between the ages of 35 and 74 years of age had all optimal risk factors (defined as systolic blood pressure <120 mm Hg and diastolic blood pressure <80 mm Hg, LDL cholesterol <100 mg/dl, high-density lipoprotein cholesterol >59 mg/dl, fasting glucose level <110 mg/dl or 2-h glucose level <140 mg/dl, and never smoking). For women, between ages 35 and 44, 8.9% had all optimal risk factors, whereas by age 55 to 74 years, <1% of women still had all CHD risk factors in the optimal ranges.

4. Elevated risk factors in young adulthood appear to be a major consequence of weight gain. In a recent analysis from the CARDIA (Coronary Artery Risk Development in Young Adults) study, white and black adults 18 to 30 years of age at the initial examination in 1985 to 1986 were stratified into groups by baseline body mass index (BMI) and by change in BMI (stable/decreased, increased or fluctuating) across 6 examinations between years 0 and 15 of the study. Changes in metabolic syndrome components were compared between groups. Among 1,358 men and 1,321 women, only 16.3% maintained a stable BMI, 73.9% had an increased BMI, and 9.8% had a fluctuating BMI. Over 15 years, participants with stable BMI had essentially unchanged levels of metabolic syndrome components, regardless of baseline BMI, whereas those with increased BMI had progressively worsening levels of all metabolic syndrome components. The incidence of metabolic syndrome at year 15 was lower in the stable BMI group (2.2%) compared with that seen in the increased BMI group (18.8%; p < 0.001). The commonly held view that adverse progression of metabolic syndrome components with advancing age is inevitable was not confirmed by this study. Young adults who maintained stable BMI over time had minimal progression of risk factors and a lower incidence of metabolic syndrome, regardless of baseline BMI. However, weight gain, accompanied by adverse risk factor progression was all too common, occurring in nearly 3 of 4 people. Clearly, weight gain has many behavioral components that are not easily addressed by medical therapy. Further research is desperately needed to discover effective methods for behavior modification at the individual and public health levels, in order at least to achieve weight maintenance in larger segments of the population. And even more urgently needed is research on prevention of weight gain in larger numbers of people.

A reasonable conclusion from the data presented in the preceding text is that prevention of major CHD risk factors, most particularly through better efforts to prevent weight gain in young adulthood, could lead to a further marked reduction in CHD morbidity, mortality, and an even further improvement in overall life expectancy in the U.S. Conversely, the continuing obesity epidemic, with its associated adverse effects on multiple cardiovascular risk factors, is a highly likely explanation for the newly reversed decline in age-specific CHD mortality rates among younger Americans, as shown by Ford and Capewell (3). Although this analysis can readily be criticized for its over-simplification of the rather complex problem that is atherosclerotic cardiovascular disease, its simplicity is perhaps just the message that we now need to turn the tide once again against the enemy of coronary heart disease. The message that must be now promulgated is not the mixed message (“we have made great progress, but pay attention to your risk factors anyway”).

Instead, the message should be straight and clear: we know what the major causes of CHD are, and they consist of adverse levels of blood pressure, LDL cholesterol, diabetes, overweight and obesity, and cigarette smoking. These risk factors are generally preventable through smoking abstinence or cessation and appropriate attention to diet, exercise, and avoidance of weight gain and obesity, the latter emerging as increasingly important if we want to continue to win against CHD. Indeed, there is extensive evidence that the gains against CHD mortality that were observed in the U.S. and many countries from 1965 to 2000 were overwhelmingly due to improvements in population levels of risk factors (themselves a result of dietary changes, smoking cessation, and other public health programs) rather than due to invasive procedures or new medications (14,15). Without increased and concerted vigilance toward risk factor prevention in early life and young adulthood, we will witness increasing losses in the battle against health enemy...
#1—cardiovascular disease—a battle that we have been poised to win for more than a decade.

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REFERENCES