Lewis H. Kuller, MD, DrPH

The paper by Liao and Cooper describes an important public health issue, the apparent widening differences in CHD mortality between blacks and whites *(1)*. The recently completed report on Epidemiology and Prevention of Cardiovascular Disease *(2)*, August 1994, noted that the decline in cardiovascular mortality has been much smaller for the less educated and less affluent Americans. The greater decline in CHD mortality for white men compared with black men was also documented in that report *(2)*.

Several key questions need to be considered in evaluating the implications of the Liao-Cooper paper. First, is the difference in CHD mortality rates between blacks and whites real or due to differences in the quality of the classification of causes of death? Second, if the differences are substantiated, are they due to a specific type or characteristic of CHD deaths, such as sudden, out-of-hospital deaths after myocardial infarction or related to long-term complications such as increasing morbidity and mortality due to congestive heart failure.

Not Genes, Not Medical Care, but How People Live

Third, what are the reasons for the disparity in the rates between blacks and whites, such as *(a)* differences in levels of risk factors; *(b)* identification and treatment of risk factors; *(c)* quality of acute medical care including out-of-hospital emergency medical services; *(d)* in-hospital treatment of CHD; and *(e)* quality of post-hospital medical care, such as the use of coronary bypass or angioplasty, drugs for the prevention of long-term complications of myocardial infarction and angina pectoris, especially lipid lowering drugs, antiplatelet aggregating agents, and antihypertensive therapy.

The authors of this paper have made two mistakes. First, they present age-adjusted rates. Coronary heart disease mortality increases substantially with age. Using age-adjusted rates tends to lump together a cohort of men who were born in 1920 and who are now in their 60s and 70s and contribute the majority of deaths and the younger cohort of individuals born in the 1960s who contribute relatively few deaths but may reflect the current environment in the United States. Age-adjusted rates will almost always measure the changes that are occurring in the older age groups and are less likely to reflect the current situation especially with regards to levels and treatment of risk factors. We have, for example, evaluated CHD mortality among black and white men ages 35–44 in Allegheny County, Pennsylvania, in recent years *(3)*. The differences in CHD mortality between blacks and whites in this younger age group is substantially greater, more than a two-fold difference between black and white men than reported in this paper. Similar data have been reported recently from the National Heart, Lung, and Blood Institute *(4)*. The authors of this paper have almost certainly underestimated the substantial difference in CHD between blacks and whites by using the age-adjusted rates.

Second, the use of only International Classification of Disease (ICD) codes 410–414 is unfortunate. Many of the out-of-hospital deaths are listed as ICD code 429.2, especially by coroner or medical examiner's offices *(5)*. Excluding ICD code 429.2 substantially underestimates the CHD mortality rates. More blacks than whites are likely to die without medical care or outside the hospital and be certified by the coroner as 429.2. Therefore, the authors have underestimated both the CHD rates and have biased their data so that the differences between black and white mortality rates are probably underestimated. It is likely that the use of age-adjusted rates and the failure to include ICD code 429.2 have probably underestimated the growing difference in CHD mortality between black and white men.

Are the death rates accurate? The answer is, we really don't know. What we do know is that the quality of the certification of causes of death leaves much to the imagination and little less to science. At least 60 percent of CHD deaths, except perhaps in the very oldest age groups, occur outside of the hospital, or in the first few minutes in the emergency room *(6)*. The cause of death for these out-of-hospital deaths is often based on minimal to non-existent information. The death certificates are often signed as due to CHD because of a lack of better diagnoses.

The autopsy percentages even in the younger age groups, maybe 40–50 percent in the best communities in the 35–44 age groups, is still too low. The quality of the autopsy may also be suspect, especially if the primary purpose is to determine whether the death is due to violence or are so called natural versus non-natural deaths. More blacks, especially in younger age groups, die outside the hospital and therefore become at high risk, being classified as CHD deaths for the lack of better

information. The majority of out-of-hospital deaths among black men, if carefully studied, are not due to CHD. In Pittsburgh, Pennsylvania, for example, 33 percent of sudden, natural, out-of-hospital deaths among black men, ages 35–44, were due to CHD. Misclassification of 25 percent of the other causes of sudden death as due to CHD would increase the CHD death rates in black men by close to 50 percent at least in the younger age groups.

The problem of classification of causes of death especially for black and white men has been repeatedly evaluated. A detailed study of sudden death and myocardial infarction among black and white men in 1970–72 in Baltimore questioned the quality of mortality statistics for arteriosclerotic heart disease even in a large urban area with high quality medical care *(7)*. CHD mortality rates for blacks were higher than for whites in 1970–72 in Baltimore based on the vital statistics and were similar in the 55–64 age group. The rates based on careful review of all information including autopsy noted that a much higher percentage of deaths certified as arteriosclerotic heart disease among black men were misclassified, 33 percent compared with 18 percent for white men. The conclusion in 1972 was, we should be suspicious of the value of using reported mortality statistics for arteriosclerotic heart disease for black men without careful review of the clinical data.

...that will not be solved by the delivery of more high technology medical care...

The pilot study of the Community Cardiovascular Surveillance System evaluated both fatal and non-fatal cases of CHD in 12 communities in the United States *(6)*. The age-adjusted mortality rate for myocardial infarction was higher in black than white men. The percentage of CHD deaths classified as sudden was higher in black men—69 percent compared with 54 percent among white men. Non-fatal myocardial infarction, on the other hand, was much higher among white than black men. This was similar to the experience in 1970–72 in Baltimore. The authors suggested that either a higher case-fatality rate or misclassification of causes of sudden death may contribute to the higher CHD mortality rates among black men compared with white men.

If the CHD death rates are higher among black men than white men, what is the possible reason? The vast majority of CHD deaths, especially in the younger age groups, occur outside the hospital and are sudden, and it is unlikely that these differences could be explained by quality of medical care at the time of a myocardial infarction, or the medical care following a myocardial infarction. The 16-year followup of the Multiple Risk Factor Intervention Trial (MRFIT) screenees ages 40–44 at screening in 1972–74 showed that the odds ratio per unit change in risk factor such as systolic blood pressure, serum cholesterol, smoking, and history of diabetes were similar for black men and white men *(8)*.

Black men, however, had much higher CHD mortality rates than white men, or Hispanic or Asian American men ages 35–57. The much higher CHD rates among black men were primarily due to the higher prevalence of risk factors, rather than to any unique attribute related to the risk factors. Blacks do have a higher prevalence of left ventricular hypertrophy, and this may contribute to the possible higher incidence of sudden CHD deaths. Hypertension, smoking, and diabetes in the presence of an elevated LDL cholesterol for both black men and white men is a major reason for the higher risk of CHD.

Is the difference in CHD mortality between black men and white men due to unique genetic or specific environmental attributes, or is it primarily related to social class? In the MRFIT screening study, socioeconomic class was an important determinant of CHD mortality among both black men and white men. The socioeconomic gradient of CHD mortality as noted, is increasing, that is the rates are declining faster in the upper social class than in the lower. Most likely, socioeconomic factors that contribute to differences in risk factors rather than pure racial or genetic factors are the primary factors related to the higher CHD mortality rates among black men.

What are the implications of the paper by Liao and Cooper? At least for the younger age groups, CHD mortality is almost certainly much higher for black men than for white men, and the differences may be increasing. The problem is most likely a higher prevalence of risk factors for cardiovascular disease that will not be solved by the delivery of more high technology medical care in the community for black men, rather by an aggressive approach to identification and modification of risk factors for cardiovascular disease. There needs to be a better organized public health effort to reduce a preventable disease, coronary heart disease, by identifying and aggressively treating the risk factors.

The report on the Epidemiology and Prevention of Cardiovascular Disease noted that the coronary heart disease mortality rate in 1990 for black men was 246 per 100,000. If the rate declined at two percent a year from 1990–2000, the rate in the year 2000 would be 201 per 100,000, but if the decline could be increased to six percent a year, the rate would decline to 132 per 100,000, a substantial saving of life, decreased morbidity and disability and likely health care costs for treatment of cardiovascular disease.

Commentary

Dr. Kuller is Professor and Chair, Department of Epidemiology, University of Pittsburgh, School of Public Health.

Tearsheet requests to Dr. Lewis Kuller, School of Public Health, University of Pittsburgh, Pittsburgh PA 15261. Tel. 412-624-3054; FAX 412-624-7397. E-mail <kuller@vms.cis.pitt.edu>.

References

1. Liao, Y., and Cooper, R. S.: Continued adverse trends in coronary heart disease mortality among blacks, 1980–1991. Public Health Rep 110: 572–579, September–October 1995.
2. Report of the Task Force on Research in Epidemiology and Prevention of Cardiovascular Disease. National Heart, Lung, and Blood Institute, Bethesda, MD, August 1994.
3. Traven, N. D., et al.: Coronary heart disease mortality and sudden death: trends and patterns in 35 to 44 year old white males, 1970–1990. Am J Epidemiol 142: 45–52 (1995).
4. Morbidity and mortality: chartbook on cardiovascular, lung, and blood diseases. National Heart, Lung, and Blood Institute, Bethesda, MD, 1994.
5. Sorlie, P. D., and Gold, E. B.: The effect of physician terminology preference on coronary heart disease mortality: an artifact uncovered by the 9th Revision ICD. Am J Public Health 77: 148–152 (1987).
6. Lee, M. H., Borhani, N. O., and Kuller, L. H.: Validation of reported myocardial infarction mortality in blacks and whites: a report from the Community Cardiovascular Surveillance Program. Ann Epidemiol 1: 1–12 (1990).
7. Kuller, L., Perper, J., and Cooper, M.: Demographic characteristics and trends in arteriosclerotic heart disease mortality: sudden death and myocardial infarction. Circulation 52 (supp.3): 1–15 (1975).
8. Kuller, L. H., Neaton, J. D., Wentworth, D. N., and Cutler, J. A. for the Multiple Risk Factor Intervention Trial Research Group: Risk factors and all-cause, cardiovascular disease, and coronary heart disease mortality in blacks, whites, Hispanics and Asian Pacific men age 35–57. (Poster presentation). American Heart Association 35th Annual Conference on Cardiovascular Disease Epidemiology and Prevention, San Antonio, Texas, March 1995.

SCIENTIFIC CONTRIBUTION

Youlian Liao, MD
Richard S. Cooper, MD

Both the authors are with the Department of Preventive Medicine and Epidemiology, Loyola University Medical Center. Dr. Liao is Assistant Professor and Dr. Cooper is Professor and Chairman.

Tearsheet requests to Youlian Liao, MD, Department of Preventive Medicine and Epidemiology, Loyola University Medical Center, 2160 South First Ave., Maywood, IL 60153; tel. 708-327-9008; FAX 708-327-9009.

Continued Adverse Trends in Coronary Heart Disease Mortality among Blacks, 1980–91

SYNOPSIS

AN ABRUPT DOWNTURN in mortality rates from coronary heart disease occurred in the United States in the mid-1960s, and for the next decade all four major sex-race groups experienced virtually identical rates of decline. Beginning around the mid-1970s, however, trends for blacks and whites began to diverge, with a deceleration in the annual fall in rates for blacks. The recent release of mortality data extending through 1991, with correction of the denominator estimates in the 1980s using the 1990 census, demonstrate a striking linearity of this trend over the entire decade.

In 1989, for the first time since the category of coronary heart disease has been recorded in vital statistics, the age-adjusted death rate for it among black men exceeded that of whites. As a result of the divergent trends among men, an excess of 4,000 deaths of blacks were recorded in 1991 alone. Among women, coronary heart disease mortality was higher