Impact of Heart Disease and Quality of Care on Minority Populations in the United States

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Heart disease is a leading cause of death across all populations in the United States. In 1985, the Secretary's Task Force on Black and Minority Health recognized the existence of widespread health disparities for heart disease and related risk factors among minorities in America. Inequalities in heart health and healthcare continue to exist. This review compares measures of heart disease and healthcare for white, African-American, Asian/Pacific Islander, American-Indian/Alaska-Native and Hispanic/Latino populations. Lack of healthcare data for minorities continues to be a barrier to understanding the nature and extent of heart disease and related risk factors for these groups. In combination with programs that address preventive measures to reduce risk factors for heart disease, the integration of quality improvement measures has developed as an important strategy for reducing cardiovascular health disparities. Improved data collection and reporting, enhanced use of information technology, and promotion of cultural competency hold potential for improving the quality of cardiac care and reducing health disease for all Americans.

Key words: heart disease ■ minorities ■ quality of care

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Cardiovascular diseases—primarily heart disease and stroke—are the leading causes of death among men and women in the United States, averaging one death every 34 seconds in this country.[1-3] In 2006, the estimated direct and indirect cost for all cardiovascular diseases was $403.1 billion. Of that, the three most common cardiovascular diseases—coronary heart disease, hypertension, and stroke—are estimated to have cost $142.5-, $63.5- and $57.9 billion, respectively.[2] These diseases and their related risk factors have a disparate adverse impact in minority populations.[2-8] In addition to primary and secondary preventive healthcare efforts, improvements in the quality of care for cardiovascular diseases have significant potential for reducing disparities.[9,10]

Overview

As early as 1985, with the first Department of Health and Human Services report on minority health disparities,[11] cardiovascular disease was identified as one of six areas of particular concern and continues to be a targeted disparity for governmental aid and intervention.[12,13]

Since reaching peak levels in the 1960s and 1970s, mortality rates for cardiovascular disease have declined for all populations in the United States.[3,14] Death rates for heart disease have fallen at an age-adjusted rate of about 2–3% per year since the 1970s.[3,14] Early in this decline, these death rates decreased in parallel for all populations.[3] However, all demographic groups were not equally affected by this trend, with changes diverging since the mid-1980s along racial and gender lines.[3,15] For example, the declines in heart disease mortality rates were lowest for American Indians/Alaska Natives and African Americans during the period 1990–1998 (Table 1).

Diseases of the heart strike hard in minority and white populations (Tables 1–3), although the impact of various heart disease indicators varies among populations. African Americans have the highest death rate for heart disease, a high percentage of premature deaths from heart disease and a high prevalence of cardiovascular diseases.[5,16-18] Hispanic/Latinos have a higher percentage of premature deaths from heart disease than do whites.[16] Heart disease death rates for American Indians/Alaska Natives and Asians/Pacific Islanders are known to be underestimated because of inadequate and inaccurate information[5] (see discussion below). Cardiovascular disease is rising and is a serious problem in

American-Indian/Alaska-Native populations.[19] American Indians/Alaska Natives have the highest percentage of premature deaths from heart disease and high prevalences of heart disease and coronary heart disease.[16,20] Native Hawaiians/Pacific Islanders have the highest prevalences of heart disease and coronary heart disease.[20]

Unhealthy lifestyle choices, such as overeating and inactivity, continue to fuel the prevalence of cardiovascular diseases. Heart disease risk factors, such as high blood pressure, smoking, obesity, type-2 diabetes, lack of exercise and high cholesterol, which were at one time considered primarily adult problems, are now appearing in children and teens.[5] These risk factors are significant issues for minority communities.[3,4,8,21-24]

While the prevalence of some heart disease risk factors such as hypertension, high blood cholesterol and smoking have generally decreased in the U.S. adult population since the 1960s, other risk factors such as obesity, inactivity and diabetes have increased.[2,3] Disparities in these risk factors continue to exist.[2,3,5,6] As shown in Table 4, African Americans have the highest prevalence of hypertension. American Indians/Alaska Natives and Native Hawaiians/Pacific Islanders have high prevalences of hypertension and smoking. The prevalences of obesity, inactivity and diabetes are higher in all minority groups compared to whites.[20]

Factors such as access to healthcare, genetics and cultural issues play a role in racial/ethnic- and socioeconomic-related heart disease disparities.[25-27] Programs and interventions that address primary and secondary preventive care measures to reduce heart disease and the associated risk factors are crucial.[3,22,28-31] In addition, given that a proportion of adverse cardiovascular outcomes may be attributed to disparities in quality of care,[4,9,10,32-34] improvements in quality of care measures hold potential for reducing heart disease disparities in the United States. The 2003 Institute of Medicine report, "Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care,"[34] established race/ethnicity as a major determinant of difference in the delivery of medical services within the United States. As the national dialogue on health disparities has continued, the conversation has included, to an increasing extent, the integration of quality improvement measures as a strategy for dealing with disparities. Efforts to measure and improve quality of care and outcomes can serve as key tools in the toolbox used to advance health and health equity in America. The creation of the federal Agency for Healthcare Research and Quality (AHRQ), its targeting of underserved populations and its publication of yearly report cards on the quality of health and healthcare for the general and for minority populations underscore the importance of quality-of-care issues within the federal government.[35-39]

Heart Disease in African-American Populations

Heart disease is the leading cause of death and a major contributor to disability among African Americans. Compared with whites and most other minorities, African Americans experience higher mortality rates and earlier death from heart disease[2,5,40-42] (Table 1). Since the 1980s, the death rates for coronary heart disease for African-American men and women have declined less readily than those for white men and women. In the 1980s, black men had notably lower age-adjusted rates than did whites. By 1997, black men had "caught up" with white men, and their death rates from coronary heart disease were similar. Rates for African-American women surpassed those of white women.[3,15]

The 2004 prevalence of total cardiovascular diseases (including stroke) was markedly higher in African-American men and women compared to whites or Mexican Americans (Table 2). The overall prevalence for all types of heart disease and for coronary heart disease was reported to be lower for African Americans than for

Table 1. Heart disease deaths in the United States by race and ethnicity

Race/Ethnicity	Age-Adjusted Death Rate[1] (2003)	Percent of Total Deaths[2] (2003)	Rank Order among All Causes of Death[2]	Percent Decline in Death Rate (1990–1998)[3]	Percent Premature Deaths (2001)[4]
All persons	232.3	28.0	1	16.3	16.8
Whites	228.2	28.3	1	14.9	14.7
African Americans	300.2	26.6	1	11.2	31.5
Hispanics/Latinos	173.2	23.2	1	17.0	23.5
American Indians/Alaska Natives	160.2[5]	20.6	1	8.4	36.0
Asians/Pacific Islanders	127.6[5]	25.3	2[6]	13.6	21.1

1: Heart disease deaths in 2003 per 100,000 population, age-adjusted to the year 2000 standard: Data are from Table 29 of *Health, United States, 2005* (reference 5); 2: Heart disease deaths in 2003 compared to all causes of death: Data are from Table 31 of *Health, United States, 2005* (reference 5); 3: Negative percentage change, 1990-1998, of age-adjusted death rates from heart disease: Data are from Table 1 of *Healthy People 2000* (reference 14); 4: Percentage of all 2001 deaths attributed to heart disease that occurred among persons aged <65 years: Data are from Table 1 of reference 16; 5: Death rates are known to be underestimated, especially for American-Indian/Pacific Islanders; see discussion in body of this article, and on pages 516–517 of reference 5; 6: Leading cause of death is malignant neoplasm (26.2% of all deaths).

whites and some other minorities in 2003[43] and 2004[20] (Table 3). However, the prevalence of coronary heart disease and myocardial infarction was greater for African-American females than for white or Mexican-American females[18] (Table 2).

Disparities of heart health in African Americans likely arise from disparities in risk factors (Table 4). The prevalence of hypertension, obesity, inactivity and diabetes is high in African-American populations. The 2003 Behavioral Risk Factor Surveillance System (BRFSS) survey found that 37% of the general population had ≥2 risk factors for heart disease and stroke. In contrast, non-Hispanic blacks had the highest prevalence (48.7%) of multiple risk factors among all populations surveyed.[44]

Cardiovascular Research Studies in African Americans

In the past, most significant clinical trials related to cardiovascular health have failed to include representative numbers of African Americans.[41,45] These deficiencies of data collection and meaningful participation may have contributed to disparities in cardiovascular disease prevention, diagnosis and treatment. Only recently has ethnicity related cardiovascular research been performed to determine the extent and nature of cardiovascular disease in African-American populations.

Building on the 1999 Atherosclerosis Risk in Communities Study, the landmark, federally sponsored Jackson Heart Study began in 2000 as a single-site epidemiological examination of cardiovascular disease in African Americans.[45] Congruous to the Framingham Heart Study of predominantly white individuals, the comprehensive Jackson Heart Study examines and identifies environmental, genetic and risk factors that influence the development of cardiovascular diseases in African-American men and women.

The Antihypertensive and Lipid Lowering Treatment to Prevent Heart Attack Trial (ALL-HAT)[46] and the African-American Heart Failure Trial (A-HeFT)[47] have attempted to incorporate meaningful representation of African Americans and other racial and ethnic minorities in studies that advance overall knowledge of cardiovascular health.

An important issue related to racial/ethnic concerns in heart disease treatment revolves around the role that genetics play in cardiovascular disease disparities, and in the potentially variable responses to standard therapies for heart disease.[41,48] For example, various gene loci have been linked to early-onset hypertension or to risk of heart failure in African Americans.[41,49] Further, genetic variants in the enzymes that metabolize nitric oxide may contribute to cardiovascular disease in African Americans, and black patients may benefit from nitric oxide enhancement.[41,48] Genetic variants in cytochrome P450 enzymes may be involved in the quality of response to beta-blocker therapy by blacks.[41,50]

Clarification of the extent to which genetics influences heart disease incidence and outcomes has considerable clinical significance. For example, there is debate regarding the efficacy of beta-blockers in African Americans who have cardiovascular disease.[41,51,52] According to American Heart Association and American College of Cardiology standards,[53] the initiation and continuation of beta-blockade is recommended as a secondary prevention of myocardial infarction and death. Though these guidelines suggest appropriate treatment for all postinfarct patients, some studies indicate that African Americans may respond less favorably than whites to beta-blocker inhibitors, while other studies suggest that they may significantly benefit.[51,52] Although adequate evidence linking genetic variables to differences in therapeutic response is lacking, some clinicians have been less likely to use beta-blockers in the treatment of African-American patients. Preliminary data of genetic differences in response to treatment for cardiovascular disease must be verified and clarified. This particular controversy serves as an example of the critical need for cardiovascular-related clinical studies that consider race and ethnicity as variables.

Heart Disease in Asian and Pacific-Islander Populations

Despite the fact that Asians and Pacific Islander Americans come from very diverse backgrounds, this population—one of the fastest growing minority groups in the

Table 2. Prevalence of cardiovascular diseases in the United States (from 2003 NHANES data)[1]

	Males			Females		
Disease	Whites	African Americans	Mexican Americans	Whites	African Americans	Mexican Americans
Total CVD[2]	34.3	41.1	29.2	32.4	44.7	29.3
Coronary Heart disease	8.9	7.4	5.6	5.4	7.5	4.3
Myocardial infarction	5.1	4.5	3.4	2.4	2.7	1.6

Data are from Tables 2A, 3A, 15C of reference 18; 1: Age-adjusted percentages for individuals (ages 20 and over) who self-report these diseases; 2003 estimates based on data from National Health and Nutrition Examination Survey (NHANES) 1999-2002; 2: Total cardiovascular disease (CVD) is defined as all "diseases of the circulatory system" (see reference 17)

United States—is generally classified as one group for the purposes of statistics and discussion.[6,54] This grouped population, compared to other populations, including whites, is statistically healthier with reference to heart disease[6] (Table 1). As such, Asian and Pacific-Islander Americans have been called "the healthy minority."[6] However, significant variability and disparities in heart health exist among subpopulations within this group. Lack of adequate ethnic-specific data on heart disease for this group as a whole, or for its many subpopulations, as well as inconsistencies of classification and misclassification of ethnicity data, confound the understanding of heart disease for this group.[5,39,54]

Heart disease follows malignant neoplasms as the second leading cause of death (25.3% of all deaths) in Asians/Pacific Islanders. However, this population suffers more premature death rates and a smaller decline in death rates from heart disease than do whites[5,54,55] (Table 1).

Looking beyond the aggregate grouping of Asian/Pacific-Islander Americans as "the healthy minority," it is apparent that there are subgroups of this population that suffer from elevated levels of heart disease. For example, full, Native Hawaiians have a 382% higher death rate from heart disease than non-Hawaiians and are among the highest death rates for heart disease in the nation.[6,54] In recent years, government standards have included collection of data that distinguishes between populations that self-identify as "Asian" or "Native Hawaiian/Pacific Islander."[5,20] When this distinction is made (Table 3), large differences are apparent. As shown in Table 3, Native Hawaiians/Pacific Islanders have the highest prevalence of heart disease and coronary heart disease compared to other identified minority groups, a prevalence that is markedly higher than the "Asian-only" group.

Other research has identified varying percentages for heart disease as a cause of death in different Asian subpopulations: Asian Indian: 34.6%, Hawaiian: 33.9%, Guamanian: 33.7%, Filipino: 31.7%, Samoan: 30.4%, Japanese: 29.4%, Chinese: 27.1%, Korean: 21.8%, Vietnamese: 19.5% (percentage of all deaths).[6] The prevalence of coronary artery disease in Asian Indians living in the United States is fourfold higher than for whites, and Asian-American males have higher stroke mortality rates than do white males.[54]

Further, Asians living in the United States tend to demonstrate less healthy lifestyles in contrast to their cohorts living in their native countries. In a study that compared ethnic Japanese living in Japan with Japanese-Americans, the latter tended to have less heart-healthy diets and an increased prevalence and incidence of type-2 diabetes.[56] Other risk factors for heart disease are present in Asian populations (Table 4).

Heart Disease in Native-American Populations

Heart disease and related risk factors have considerable impact in American-Indian/Alaska-Native populations[57] (Tables 1, 3 and 4). However, cardiovascular disease was not considered a major health problem for American Indians/Alaska Natives until the latter part of the 20th century. In the past, cardiovascular disease mortality rates for this population were significantly underreported because of miscoding of race on death certificates.[58-60] For example, the age-adjusted mortality rate for cardiovascular disease in American Indians was reported as 132.4 per 100,000 for the period 1994–1996, which is less than the rate for all races (138.3) or for whites (133.1) in the United States during that period.[58] Following adjustments for such miscoding, Rhoades reports an adjusted, estimated rate for Native Americans that is substantially higher (156.0 per 100,000) and greater than that for other races.[58,60] Between 1989 and 1998, the average annual percent change in cardiovascular mortality increased for American Indians/Alaska Natives (0.4%) while decreasing for other populations (-1.8%), including whites.[58]

Twenty-five years ago, the secretary's report on black and minority health[11] recognized that information on cardiovascular disease in American Indians was inadequate and recommended that additional studies be conducted. In response, the Strong Heart Study[61,62] was initiated in 1988 and has been continuously supported

Table 3. Prevalence of heart diseases in the United States (from 2004 NHIS data)[1]

Race/Ethnicity	All Types of Heart Disease	Coronary Heart Disease
All persons	11.6	6.4
Whites	11.9	6.6
African Americans	9.6	5.2
Hispanics/Latinos	9.2	6.0
Mexicans/Mexican Americans	9.6	6.5
American Indians/Alaska natives	11.6	7.6[2]
Asians	6.7	4.2
Native Hawaiians/other Pacific Islanders	13.8	13.8

Data are from Table 2 of reference 20; 1: Age-adjusted percentages of individuals (ages ≥18) who report, via the National Health Interview Survey (NHIS), 2004 that they have been told by a health professional that they have heart disease (includes coronary heart disease, angina pectoris, heart attack, or any other heart disease), or coronary heart disease (includes coronary heart disease, angina pectoris, or heart attack); 2: Data are highly variable (30%<relative standard error ≤50%)

by the National Heart, Lung and Blood Institute since then. The study examines cardiovascular disease and its risk factors among 13 American-Indian tribes and communities in Arizona, Oklahoma, and North and South Dakota. The data from the Strong Heart Study demonstrated a different picture than did national statistics—one of serious cardiovascular disparities for American Indians. The Strong Heart Study was partially responsible for the growing recognition of errors in national data that presented an inaccurate picture of heart disease among American Indians and Alaska Natives.[19,58]

Heart Disease in Hispanic and Latino Populations

Death rates have declined more rapidly for Hispanics/Latinos in America than for whites and other minorities,[63] although premature death from heart disease is high in this population (Table 1). Prevalences of cardiovascular disease, heart disease and coronary heart disease are also lower for this population than for whites and some other minorities (Tables 2 and 3).

However, Hispanic/Latino/Mexican-American populations display a high prevalence of the heart disease risk factors of obesity, inactivity and diabetes (Table 4). In a 2003 study, 39.6% of Hispanics reported having ≥2 risk factors for heart disease—a higher percentage than for non-Hispanic whites (35.5%) or Asians (25.9%).[44] Recent data show that Hispanic/Latino men have higher cholesterol levels than do whites or blacks.[2,64]

Quality-of-Care Issues

Disparities in the treatment of cardiovascular diseases in the United States have been well documented. Studies monitoring trends in cardiac care over time have demonstrated that some improvements have been made, but that, for many quality measures, there has been little change.[65] The landmark 2003 Institute of Medicine report[34] noted that racial disparities in cardiovascular healthcare exist, even when contributing factors such as income, age, insurance status and severity of conditions are similar. A Kaiser Family Foundation and American College of Cardiology Foundation report reviewed and analyzed 81 studies (1984–2001) of cardiac procedures and treatments in relation to race/ethnicity.[66] The majority of these studies (84%) found racial/ethnic differences in cardiac care. Most of the 81 studies provided data comparing African Americans and whites. For example, African Americans are less likely to receive diagnostic or revascularization procedures, or thrombolytic therapy compared to white patients. About half of the 21 studies reported on Latino populations and found that Latinos were less likely than whites to receive cardiac procedures and treatments. This review identified only five reliable studies of Asians, and no disparities were noted. Only one reliable study of American Indians/Alaska Natives was identified. As has been discussed elsewhere in this review, the lack of adequate health information on Asian/Pacific-Islander and American-Indian/Alaska-Native populations continues to be a barrier to analysis of healthcare for these populations.

The 2005 National Healthcare Disparity Report (NHDR) also noted disparities of care. For example, hospital treatment for heart attack has worsened for American Indians/Native Americans compared to whites, and for Hispanics compared to non-Hispanics.[39] Numerous other studies report disparities in the treatment of cardiovascular disease in minorities.[32,33,67,68]

Given the existence of disparities in cardiovascular healthcare, it seems likely that efforts to decrease such disparities will be effective in improving cardiovascular health. In fact, recent data from Trivedi et al. suggest that improvements in quality of care may be associated with reductions in health disparities. These researchers analyzed nine Health Plan Employer Data and Information Set (HEDIS) measures for elderly white and black beneficiaries in Medicare managed care plans (1997–2003) and found that the racial disparity gap decreased for seven of the nine quality-of-care measures. Coincident with quality-

Table 4. Prevalence of heart disease risk factors in the United States (from 2004 NHIS data)[1]

Race/Ethnicity	Hypertension[2]	Smoking[3]	Obesity[4]	Inactivity[5]	Diabetes[6]
All persons	22.0	16.9	23.8	61.6	7.1
Whites	21.2	17.3	23.1	60.3	6.5
African Americans	29.2	15.3	33.6	69.6	11.2
Hispanics/Latinos	19.6	9.7	26.8	72.0	10.4
Mexicans/Mexican Americans	20.1	8.5	28.6	72.1	11.0
American Indians/Alaska natives	25.4	24.2	35.9	72.2	15.8
Asians	16.9	8.2	6.8	65.3	7.5
Native Hawaiians/other Pacific Islanders	20.7	28.8	28.1	64.9	20.9[7]

Data are from reference 20; 1: Age-adjusted percentages of individuals (ages ≥18) who report, via the National Health Interview Survey (NHIS), 2004, that they have the indicated conditions; 2: From Table 2 (reference 20); Information received at least twice from a health professional; 3: From Table 25 (reference 20); Current smokers who smoke cigarettes every day; 4: From Table 31 (reference 20); Body mass index ≥30.0; 5: From Table 29 (reference 20); Never perform vigorous physical activity for at least 10 minutes/week during leisure periods; 6: From Table 8 (reference 20); Information received from a health professional; 7: Data are highly variable (30%<relative standard error ≤50%).

of-care improvement, clinical performance improved on all measures for all enrollees.[9]

Governmental efforts to reduce health disparities and improve quality of care are ongoing and extensive. The Federal Department of Health and Human Services (DHHS), and programs such as Racial and Ethnic Approaches to Community Health (REACH) 2010 have identified cardiovascular disease in minorities as one of several key areas for intervention.[12,13,69] The congressionally mandated AHRQ, via the National Healthcare Quality Report (NHQR) and the NHDR,[38,39] tracks quality-of-care measures for heart disease and correlates them to racial/ethnic/socioeconomic parameters.[70] Since health disparities vary by geography and population, local and state input also play an important role in eliminating heart disease disparities. The federal Office of Minority Health identifies cardiovascular disease as a priority health area for states,[71] and continues to advise and support states in collecting data that correlate healthcare information to data about race, ethnicity and socioeconomic status.[72]

Federal and state governments support improved data collection as one strategy for improving quality of care and reducing disparities.[73] As far back as 1985, the secretary's report on minority health identified data collection as a "major area" of importance for reducing health disparities.[11] In recent years, it has become apparent that inadequate health data exists for Native Hawaiians/Pacific Islanders, Asians and American Indians/Alaska Natives.[5,38,70] Efforts continue for improvement in this area. The collection of health statistics, and the use of tools such as the HEDIS and the Diabetes Quality Improvement Project (DQIP) now link data points or quality measures to information on race, ethnicity and socioeconomic status.[9,10,73]

The means to collect, organize, store and distribute vast quantities of ever-increasing health and healthcare-related data require increasing attention to the use of information technology. In 2004, the federal AHRQ established the National Resource Center for Health Information Technology as a vital presence in this important field.[74] In 2005, the DHHS released a report[75] in conjunction with representatives of the business sector, identifying information technology as a "pivotal part of transforming our healthcare system," with the potential to "drive changes that will lead to fewer medical errors, lower costs, less hassle and better care." Collection of information linking cardiovascular health data to race/ethnicity/socioeconomic parameters will support research into healthcare quality and access.

Cultural competency, the ability to understand, work with and communicate with populations who have specific cultural and language identities, has emerged as a necessary element in improving quality of care among minority populations,[76] especially as the American population becomes increasingly diverse, and as healthcare providers frequently interact with patients from differing social and cultural backgrounds. Governmental involvement in cultural competency issues continues to expand. The Center for Linguistic and Cultural Competence in Health Care collaborates with federal agencies and public and private entities to promote research on removing language and cultural barriers to healthcare, and to provide technical assistance for enhancement of cultural and linguistic competencies among healthcare providers.[77]

The conclusions of the 2005 NHDR report[39] on overall health disparities are applicable to summarize this review of heart health and healthcare disparities among minorities in the United States: disparities exist and are widespread, although some are diminishing. Gaps in information exist, especially for specific populations. We must continue to strive for improvement. The elimination of health disparities is not only possible but also necessary.

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