

# Cardiovascular Disease Mortality in Asian Americans



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## ABSTRACT

**BACKGROUND** Asian Americans are a rapidly growing racial/ethnic group in the United States. Our current understanding of Asian-American cardiovascular disease mortality patterns is distorted by the aggregation of distinct subgroups.

**OBJECTIVES** The purpose of the study was to examine heart disease and stroke mortality rates in Asian-American subgroups to determine racial/ethnic differences in cardiovascular disease mortality within the United States.

**METHODS** We examined heart disease and stroke mortality rates for the 6 largest Asian-American subgroups (Asian Indian, Chinese, Filipino, Japanese, Korean, and Vietnamese) from 2003 to 2010. U.S. death records were used to identify race/ethnicity and cause of death by International Classification of Diseases-10th revision coding. Using both U.S. Census data and death record data, standardized mortality ratios (SMRs), relative SMRs (rSMRs), and proportional mortality ratios were calculated for each sex and ethnic group relative to non-Hispanic whites (NHWs).

**RESULTS** In this study, 10,442,034 death records were examined. Whereas NHW men and women had the highest overall mortality rates, Asian Indian men and women and Filipino men had greater proportionate mortality burden from ischemic heart disease. The proportionate mortality burden of hypertensive heart disease and cerebrovascular disease, especially hemorrhagic stroke, was higher in every Asian-American subgroup compared with NHWs.

**CONCLUSIONS** The heterogeneity in cardiovascular disease mortality patterns among diverse Asian-American subgroups calls attention to the need for more research to help direct more specific treatment and prevention efforts, in particular with hypertension and stroke, to reduce health disparities for this growing population. (J Am Coll Cardiol 2014;64:2486-94) © 2014 by the American College of Cardiology Foundation.

Asian Americans are the fastest growing racial/ethnic group in the United States, with a population of more than 18 million that is projected to reach nearly 34 million by 2050 (1,2). The 6 largest Asian-American subgroups in the United States are Asian Indians, Chinese, Filipinos, Japanese, Koreans, and Vietnamese; these 6 subgroups make up 84% of the Asians in the United States, on the basis of 2010 Census data (3). Asian Americans have seen a 46% growth in population from 2000 to 2010, more than any other major race group (3). It is estimated that the majority of future growth in the

Asian-American population (94%) will come from immigrants who arrived after 2005 and their descendants (4). Whereas in 2005 most Asians living in the United States were foreign born (58%), by 2050 these individuals will account for less than one-half (47%) of the Asian-American population in the country (4). Current understanding of Asian-American cardiovascular disease (CVD) mortality patterns is distorted by the underrepresentation and aggregation of Asian Americans in epidemiologic surveys that mask the heterogeneity of CVD and survival among diverse Asian-American subgroups (5-7).

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Although the U.S. Census first started disaggregating Asian subgroups in 1980, explicit disaggregation of Asian subgroups on national death records did not occur until 2003. As of 2010, 34 of the 50 U.S. states have mortality data explicitly disaggregated by the 6 largest Asian subgroups (8-10). Previous mortality data from the State of California and New York City have demonstrated that Asian Indians and Filipinos have higher ischemic heart disease mortality, whereas Chinese and Japanese persons have higher stroke mortality compared with non-Hispanic whites (NHWs) (11-14).

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There is currently a knowledge gap on the cardiovascular health of these rapidly expanding populations, with little evidence to create public health policy, to offer appropriate clinical guidelines, and to recommend research agendas. In this study, we examined heart disease and stroke mortality rates in Asian-American subgroups to determine racial/ethnic differences in CVD mortality within the United States.

## METHODS

We examined CVD mortality rates from 2003 to 2010 and assessed the Multiple Cause of Death mortality database from the National Center for Health Statistics (NCHS) by Asian subgroup (Asian Indian, Chinese, Filipino, Japanese, Korean, or Vietnamese) in the 34 states that, as of 2010, had adopted the 2003 revision of the U.S. Standard Certificate of Death. Before the 2003 standard, reporting of Asian races on death certificates took a fill-in-the-blank approach, whereas the 2003 standard provides a specific check box for each Asian subgroup. Although all states reported Asian subgroups to varying degrees across the time studied, we believe that states that adopted the 2003 standard had increased accuracy for subgroup reporting. The states included Arkansas, California, Connecticut, Delaware, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Kansas, Maine, Michigan, Minnesota, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, South Dakota, Texas, Utah, Vermont, Washington, Wisconsin, Wyoming, and the District of Columbia. Mortality data for the NHW population came from the same 34 states.

The primary cause of death was identified on mortality records by using the International Classification of Diseases-10th revision (ICD-10), focusing on cardiovascular (I00 to I09, I11, I13, I20 to I51.9, I60 to I69) diseases (15). The underlying cause listed on

the death certificate was used as the primary cause of death. No other cardiac diseases, if listed as sequential conditions, were used in the analysis.

Race/ethnicity was recorded on death certificates by the funeral director or medical examiner; questions regarding race and ethnicity on the 2003 U.S. Standard Certificate of Death match those on the 2010 U.S. Census form. We selected only the Asian subgroups represented explicitly on both the 2003 U.S. Standard Certificate of Death and the 2010 U.S. Census form. We derived population data for the years 2003 to 2010 by using linear interpolation from the 2000 and 2010 U.S. Census. We calculated yearly mean age-standardized heart disease and stroke mortality rates per 100,000 population using direct standardization to the NHW population in 2007. We calculated mortality rates for all heart disease as per NCHS classification ("Diseases of Heart") and also broken down by specific etiology (ischemic, hypertensive, rheumatic, and heart failure) (16). Similarly, we examined mortality rates from all-cause cerebrovascular disease, as well as for ischemic and hemorrhagic stroke separately.

We calculated standardized mortality ratios (SMRs), relative SMRs (rSMRs), and proportional mortality ratios (PMRs) for each sex and ethnic group relative to NHWs (definitions and interpretation are given in Table 1). We calculated SMRs as the age-standardized, sex-specific death rate from the primary cause of death in each subgroup divided by the expected sex-specific death rate, which was the comparable rate for the NHW population. Our approach is a useful modification of the standard approach to SMRs, in which the observed mortality of the Asian subgroup would be divided by the expected mortality for the NHW population. Here, we divide the expected mortality for Asian subgroup by the expected mortality for NHWs. Intuitively, our approach and the standard approach should yield similar results, and divergences between the 2 approaches were minimal, on the basis of our results. The rSMR is calculated by dividing the cause-specific SMR by the all-cause SMR, and it expresses the cause-specific mortality experience of a population relative to its overall mortality experience.

The PMR is calculated by taking the proportion of observed deaths from a specified cause in each Asian subgroup divided by the proportion of deaths observed in the referent population (NHW). PMRs are unadjusted risk ratios and serve as an unstandardized measure of relative overall disease burden. They estimate the relative importance of a specific cause, such as ischemic heart disease, as a cause of death in

## ABBREVIATIONS AND ACRONYMS

NHW = non-Hispanic white

PMR = proportional mortality ratio

SMR = standardized mortality ratio

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