



Chronic Disease Management and Control Branch

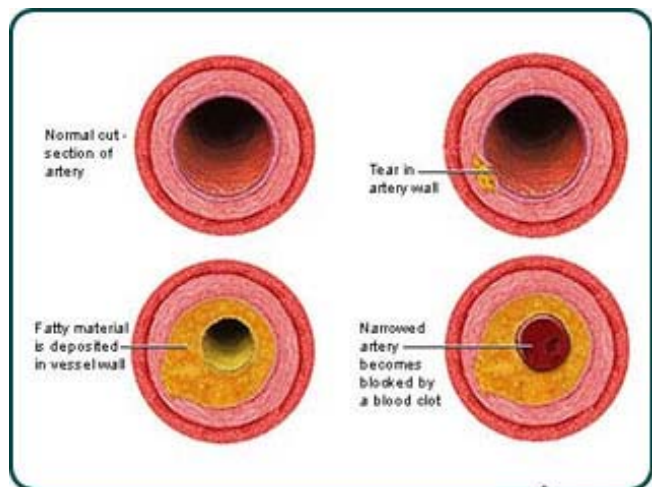
Heart Disease and Stroke Prevention Program

2012 Coronary Heart Disease Fact Sheet

What is a Coronary Heart Disease?^{1,2}

Coronary heart disease (CHD), also known as coronary artery disease (CAD), is caused by the build-up of plaque in the arteries that supply oxygen-rich blood to the heart. Plaque, a mixture of fat, cholesterol, and calcium deposits, can build up in the arteries over many years. Over time, this plaque can cause the narrowing and hardening of the coronary arteries, a condition called atherosclerosis (Figure 1). Coronary heart disease can often be symptom-free but people with CHD have an increased risk of angina (chest pain or discomfort), heart attack, heart failure, and cardiac arrhythmias. Angina and heart attacks are caused by reduced or blocked blood flow to the heart. Stable angina will typically intensify with physical exertion and subside with rest but a heart attack can cause heart muscle death and requires emergency attention.

Figure 1 (Centers for Disease Control and Prevention)



Information about family history, medical history, and certain tests can aid in diagnosing CHD. Some tests doctors may use to diagnose CHD include:

- Electrocardiogram (EKG or ECG): measures the heart's electrical activity
- Echocardiogram: uses sound waves to see if the heart is working properly
- Exercise stress test: looks at heart functioning during exercise
- Chest X-ray: uses X-rays to take a picture of the heart
- Cardiac catheterization: blood flow in the arteries can be detected by threading a small catheter into the artery
- Coronary angiogram: the use of special X-rays that can detect a dye injected into the coronary arteries by the cardiac catheter

¹ National Heart Lung and Blood Institute. Diseases and Conditions Index. Coronary Heart Disease. http://www.nhlbi.nih.gov/health/dci/Diseases/Cad/CAD_Whats.html. Accessed August 22, 2011.

² Centers for Disease Control and Prevention. Heart Disease. http://www.cdc.gov/heartdisease/coronary_ad.htm. Accessed August 22, 2011.

Risk Factors for Coronary Heart Disease

Conditions such as high blood pressure, high blood cholesterol, and diabetes can raise your risk of CHD. Behaviors such as unhealthy diet and low levels of physical activity can contribute to the conditions that can cause CHD. Smoking contributes to CHD by damaging the lining of the coronary arteries thus starting the atherosclerotic process. Some factors, such as age and family history of heart disease, cannot be modified but are associated with a higher risk of CHD.

The Impact of Coronary Heart Disease³

CHD is the leading major cause of death in the United States and accounts for about one out of every six deaths. Each year, 785,000 Americans experience a new coronary event and 470,000 will have a recurrent event. On average, one person in the U.S. has a coronary event every 25 seconds and one person dies from a coronary event every second. Coronary heart disease is more common in men than women. It is estimated that the lifetime risk of developing CHD after 40 years of age is 49% for men and 32% for women.

The Economic Impact of CHD

The indirect and direct costs of heart disease, of which a major proportion is CHD, are estimated to be \$177.5 billion in the U.S. in 2007.³ Heart disease is among the top 15 conditions that cause functional disabilities in Americans which leads to indirect costs caused by loss of productivity.³

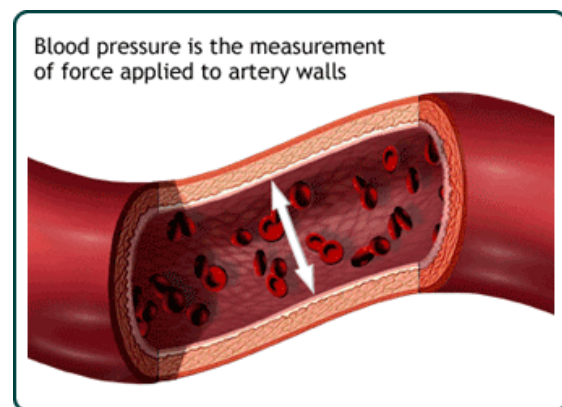
In Hawaii, heart disease was responsible for \$240 million in direct costs and \$620 million in indirect impacts (lost work days and lower productivity of CHD patients and caregivers) in 2003.⁴ At the current pace, these figures are projected to reach \$360 million and \$1.12 billion, respectively by 2023.⁴

Prevalence of Preventable Risk Factors in Hawaii

High Blood Pressure:

Blood pressure is the force of blood pushing against the artery walls (Figure 2). Chronic high blood pressure can cause hardening of the artery walls which can eventually cause decreased blood flow. High blood pressure is often referred to as a “silent killer.” In Hawaii, 30.2% of adults reported that they have been told by a health care professional that they have high blood pressure (Figure 3). High blood pressure is more common in people with lower educational attainment, lower household income, people older than 55 years, retirees and residents unable to work, and people of Native Hawaiian or Japanese ethnicity.

Figure 2 (Centers for Disease Control and Prevention)



³ Roger VL, et al. Heart disease and stroke statistics 2011 update: A report from the American Heart Association. *Circulation* 2011;123:e18-e209; published online Dec 15, 2010. DOI: 10.1161/CIR.0b013e3182009701

⁴ Milken Institute. An Unhealthy America: The Economic Burden of Chronic Disease. Charting a New Course to Save Lives and Increase Productivity and Economic Growth. October 2007.

High Blood Cholesterol:

Blood cholesterol is a waxy, fat-like substance that is made in the body and is present in many foods. Too much cholesterol in the blood can cause a build-up on the artery walls (called plaque) that can narrow the artery allowing less blood to pass through. In Hawaii, 38.9% of adults reported that they were told by a health care professional they had high blood cholesterol (Figure 3). The prevalence of high blood cholesterol increases with age but is common across ethnicities, counties, and people of all educational and household income categories. High blood cholesterol is particularly common in retirees and those unable to work, Japanese, and older Hawaii residents.

Diabetes:

Diabetes is a group of diseases characterized by high levels of blood glucose or blood sugar that results from improper production or use of the hormone insulin. High blood sugar can lead to hardening of the blood vessels and is also linked to increases in blood pressure. In Hawaii, 8.3% of adults reported that they have diabetes (Figure 3). However, diabetes increases with age and is present in 17.9% of adults aged 65 or more and in 18.3% of retirees and those unable to work. Native Hawaiians and those with low educational attainment or low household income tend to have a higher prevalence of diabetes. There is little difference in prevalence between genders or among counties.

Smoking:

Smoking speeds up the process of atherosclerosis and increases the likelihood of a blood clot by causing platelets to clump together.⁵ In Hawaii, 14.5% of adults reported that they are current smokers (Figure 3) and 10.7% of adults say they smoke every day. Smoking is most common in the 25 to 34 year old age group, Native Hawaiians, adults with less than a high school education, those with lower household income, and in residents of Hawaii County compared to Honolulu County. Unemployed residents of Hawaii are more likely to smoke than students or homemakers and retirees (23.0% vs. 12.1% and 10.9%, respectively).

Physical Inactivity:

Not getting regular physical activity is a risk factor for high blood pressure, high cholesterol, and diabetes, all of which are the primary risk factors for CHD. In Hawaii, 19.2% of adults reported that they participated in no leisure time exercise or physical activity in the past 30 days. Some groups that tend to report lower levels of physical activity include older adults, Japanese, Filipinos, females, those with less than a high school education, those who are retired or can't work, and those with lower household incomes. There was little difference in prevalence of physical inactivity by county.



Overweight and Obesity:

Body Mass Index (BMI), a surrogate indicator of body fat, is often used as a measure of overweight and obesity. Overweight and obesity results from consuming more calories than are expended and strain the cardiovascular system by increasing the risk of high blood pressure, high blood cholesterol, and diabetes. There is some research that suggests other measures of fat distribution, such as waist circumference and waist-to-hip ratio, may be more closely associated with increased risk of poor

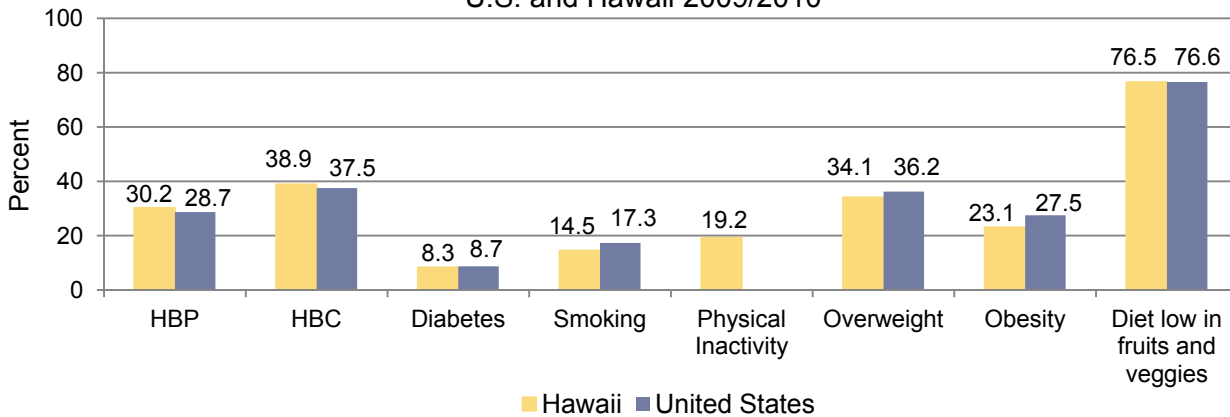
⁵ The 2004 Surgeon General's Report. *The Health Consequences of Smoking*. http://www.cdc.gov/tobacco/data_statistics/sgr/2004/pdfs/whatitmeanstoyou.pdf. Accessed March 6, 2012.

health outcomes.⁶ In Hawaii, 34.1% of adults are overweight and 23.1% are obese (Figure 3). This means 57.2% of Hawaii's adults are carrying excess weight. Overweight is more common in men compared to women. Overweight is common across age groups, household incomes, and counties. Native Hawaiians and those of lower educational attainment and household income tend to have a higher prevalence of obesity. Obesity is also high among those aged 25 to 44 years and the unemployed.

Low Fruit and Vegetable Consumption:

Diets rich in fruits, vegetables, whole grains, fat free or 1% milk, lean meats, poultry, fish, beans, eggs, and nuts and low in saturated fats, trans fats, cholesterol, salt (sodium), and added sugars are optimal for maintaining a healthy weight. Consumption of five or more servings of fruits and vegetables every day is recommended to achieve a healthy diet. In Hawaii, 76.5% of adults fail to eat fruits or vegetables at least five times per day (Figure 3). This is more commonly seen among males, people in the 18 to 24 year age group, and the Japanese.

Figure 3: Adult Prevalence of Select Chronic Conditions and Risk Factors, U.S. and Hawaii 2009/2010



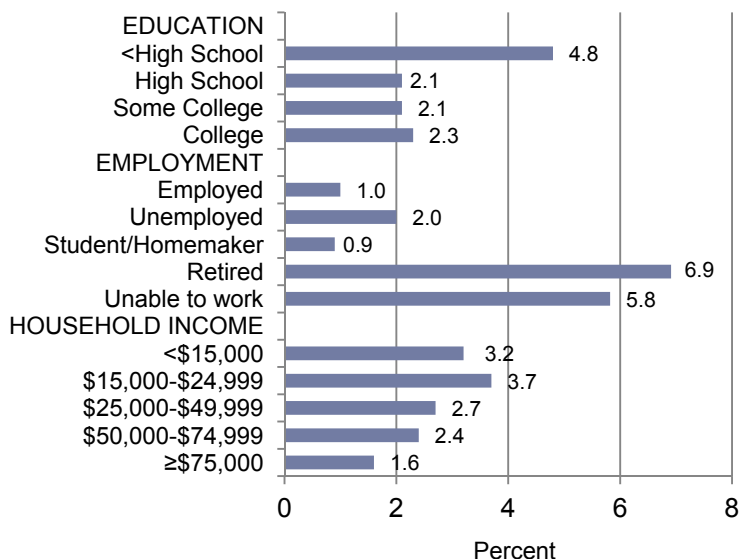
Source: Hawaii Behavioral Risk Factor Surveillance System, U.S. Behavioral Risk Factor Surveillance System, 2009/2010
 Note: Prevalence of diabetes does not include gestational diabetes; U.S. includes the 50 states and the District of Columbia; data on HBP (high blood pressure), HBC (high blood cholesterol), and diet low in fruits and veggies comes from 2009 BRFSS; data on diabetes, smoking, physical inactivity, overweight, and obesity comes from 2010 BRFSS

Prevalence of CHD in Hawaii

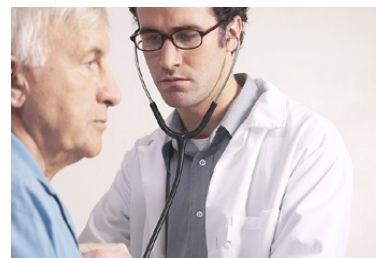
In 2010, 2.3% of Hawaii adults reported that a health care professional told them they had angina or CHD. The prevalence of CHD was higher among Whites (3.0%) than the other ethnic groups and increases with age. The prevalence of CHD is disproportionately higher in Hawaii residents with low socioeconomic status, or the social and economic conditions that can determine a person's risk for disease. The prevalence of CHD is highest in Hawaii residents that are the most vulnerable: those with less than a high school education, those with lower household income, and those that are unemployed, retired, or unable to work (Figure 4). The prevalence of CHD among retirees is three times greater than the state average (6.9% vs. 2.3%, respectively). Males had almost double the CHD prevalence of females (3.0% vs. 1.6%) while there was little difference in prevalence among the counties.

⁶ Lewis CE, McTigue KM, Burke LE, et al. Mortality, health outcomes, and body mass index in the overweight range. A science advisory from the American Heart Association. *Circulation*. 2009;119. <http://circ.ahajournals.org/content/119/25/3263.full.pdf+html>. Accessed January 19, 2012.

Figure 4: Adult CHD Prevalence by Socioeconomic Status, Hawaii 2010



Source: Hawaii Behavioral Risk Factor Surveillance System

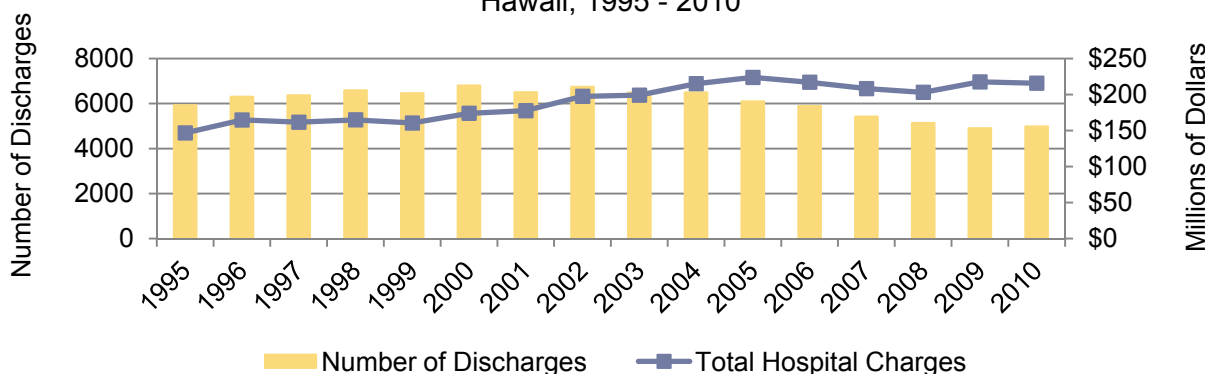


CHD Hospitalizations in Hawaii⁷

In 2010, CHD was the primary cause of 4,983 inpatient hospital visits in Hawaii. Patients hospitalized for CHD spend an average of 4.5 days in the hospital. Although the number of hospital discharges with a primary diagnosis of CHD has been decreasing since 2002, hospital charges have continued to climb (Figure 5). In Hawaii, CHD resulted in \$216 million in hospital

charges (Figure 5) at an average of \$44,285 per hospital visit in 2009. In Hawaii, the average charge per CHD discharge increased from \$24,733 in 1995 to \$43,285 in 2010, an increase of 75%. Patients who suffer from CHD often require medical follow-up so these costs underestimate the true cost.

Figure 5: CHD Hospital Discharges and Hospital Charges (in Millions) in Hawaii, 1995 - 2010



Source: Hawaii Health Information Corporation

CHD Hospital Costs in Hawaii⁷

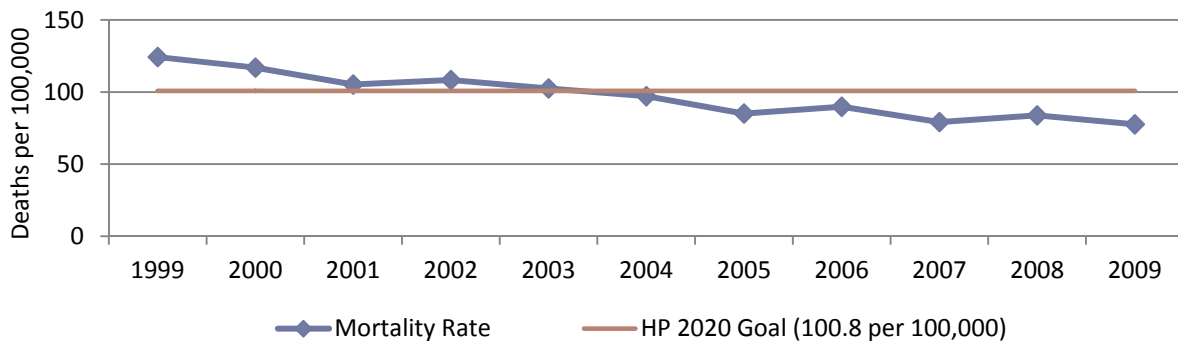
- Every year CHD costs \$215,689,257
 - Every day CHD costs \$590,929
 - Every hour CHD costs \$24,622

⁷ Data Source: Hawaii Health Information Corporation

Coronary Heart Disease Mortality in Hawaii⁸

Each year, CHD is responsible for over 1,200 deaths in Hawaii. In 2009, CHD caused 13% of all deaths. The age-adjusted mortality rate for CHD has been decreasing since 1999 and has already surpassed the Healthy People 2020 goal of 100.8 deaths per 100,000 (Figure 6). The Healthy People 2020 project is a national initiative to improve the health of Americans and eliminate disparities.

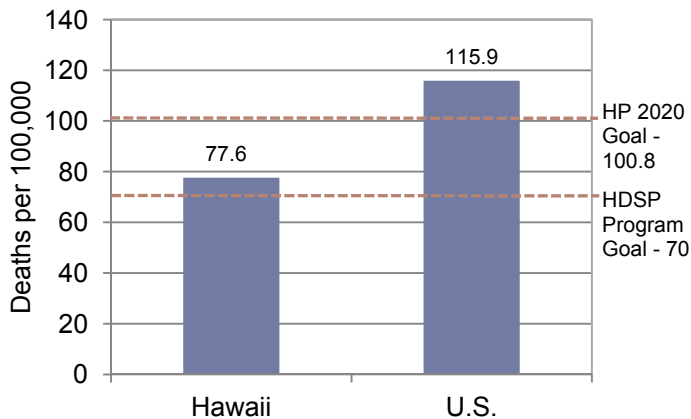
Figure 6: Age-Adjusted CHD Mortality Rates per 100,000, Hawaii 1999 - 2009



Source: Hawaii State Department of Health Office of Health Status Monitoring
 Note: Age-adjusted to year 2000 U.S. Standard Population

In 2009, the CHD age-adjusted mortality rate was 77.6 per 100,000 in Hawaii (Figure 7). Hawaii experiences a lower age-adjusted CHD mortality rate compared to the United States (Figure 7) but there is room for improvement. The Hawaii Heart Disease and Stroke Prevention Program (HDSP)

Figure 7: Age-Adjusted CHD Mortality Rates per 100,000, U.S. and Hawaii 2009



Source: Hawaii State Department of Health Office of Health Status Monitoring and Kochanek KD, Xu JQ, Murphy SL, Minino AM, Hsiang-Ching K. Deaths: Preliminary data for 2009. National vital statistics reports; vol 59 no 4. Hyattsville, MD: National Center for Health Statistics. 2011.
 Note: Age-adjusted to year 2000 U.S. Standard Population; U.S. data is preliminary but represents 96% of all death records

has set a statewide goal to reduce the age-adjusted CHD mortality rate by 10% from 78 to 70 per 100,000 (Figure 7). The state of Hawaii is unique in geography and ethnic composition and mortality data is analyzed by many variables such as by county, age, and ethnicity to identify vulnerable populations. The age-specific CHD mortality rate, similar to other chronic diseases, increases with age with a rate of 1,360.6 per 100,000 among those aged 85+ (Figure 8). With the aging of Hawaii's population, the burden of CHD is expected to increase. Neighbor Island counties, whose residents collectively made up 30% of the state population in 2010⁹, have unique issues of access to and quality of care. Maui, Hawaii, and Kauai counties have higher CHD mortality rates than the state average (Figure 9).

⁸ Data Source: Hawaii State Department of Health Office of Health Status Monitoring

⁹ 2010 State of Hawaii Data Book. Table 1.08. Department of Business, Economic Development & Tourism.
<http://hawaii.gov/dbedt/info/economic/databook/db2010/section01.pdf>. Accessed March 6, 2012.

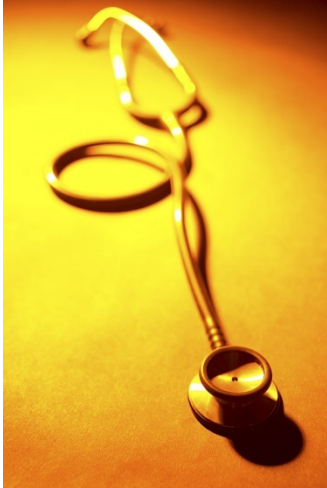
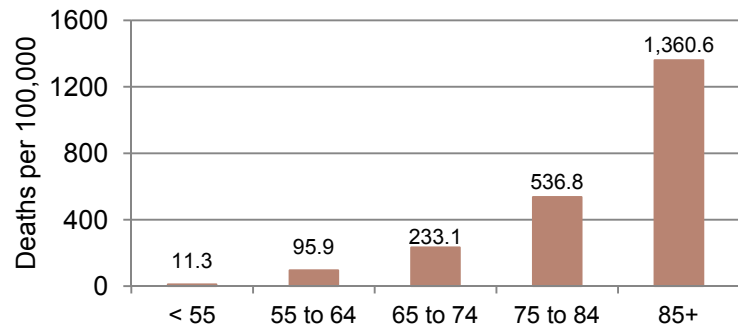
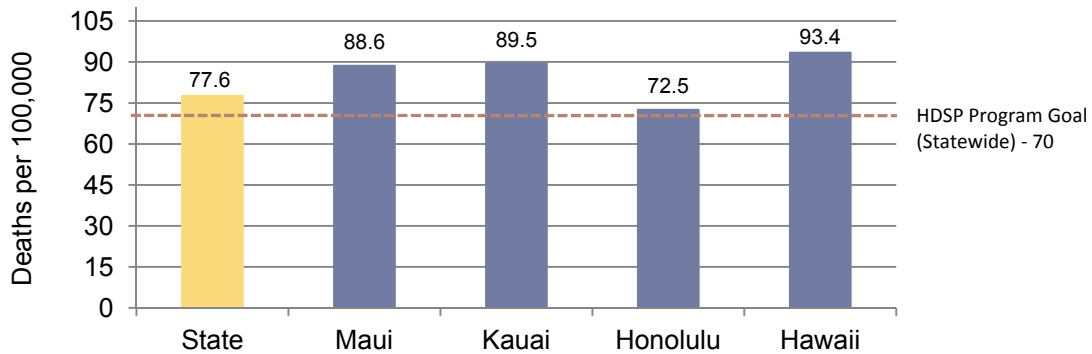


Figure 8: Age-Specific CHD Mortality Rates by Age Group, Hawaii 2009



Source: Hawaii State Department of Health Office of Health Status Monitoring
 Note: Age-adjusted to year 2000 U.S. Standard Population

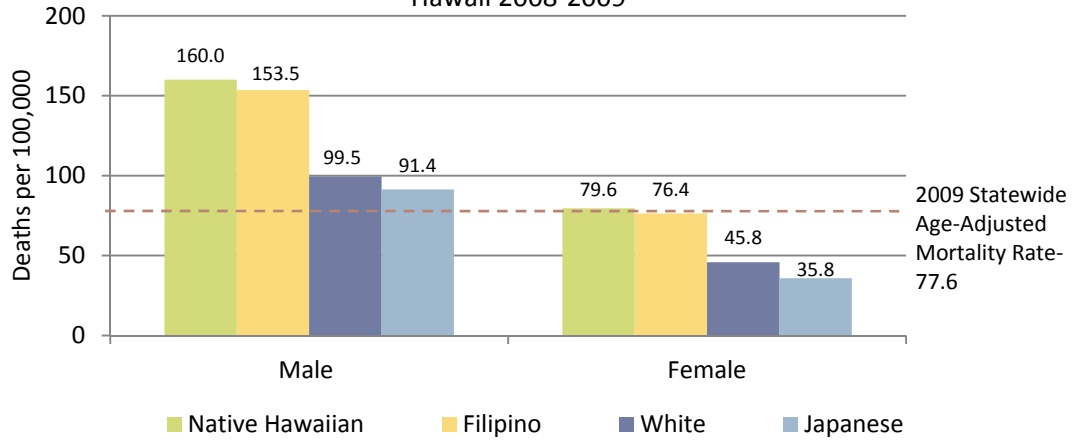
Figure 9: CHD Age-Adjusted Mortality Rates by County, Hawaii 2009



Source: Hawaii State Department of Health Office of Health Status Monitoring
 Note: Age-adjusted to year 2000 U.S. Standard Population

Disparities exist among ethnic groups in CHD mortality rates. The 2008-2009 CHD mortality rate was highest among Native Hawaiian and Filipino men and women (Figure 10). Native Hawaiian and Filipino men have CHD mortality rates above the Healthy People 2020 goal of 100.8 deaths per 100,000.

Figure 10: CHD Age-adjusted Mortality Rates by Gender and Ethnicity, Hawaii 2008-2009



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