5. Cardiovascular Disease & Stroke

Heart disease (also known as cardiovascular disease, ischemic heart disease or coronary artery disease) is the leading cause of death in the United States. AI/AN have similar rates of self-reported and diagnosed heart disease compared to Non-Hispanic Whites (NHW) but higher rates of hospitalization and death due to these causes. Risk factors for heart disease include smoking, sedentary lifestyle and obesity. Other medical conditions that increase the risk of developing heart disease include hypertension, diabetes and hyperlipidemia. Heart disease is more common in men compared to women and increases with age.

Efforts to prevent heart disease in AI/AN include smoking cessation, dietary counseling, exercise programs and control of blood pressure, blood sugar and cholesterol. The Department of Health and Human Services launched a campaign in 2011 to prevent 1 million heart attacks and strokes by 2017 - the Million Hearts campaign. Many of the efforts outlined by this campaign to prevent heart disease are tracked by IHS through the Government Performance and Reporting Act. IHS is working to prevent heart disease by setting goals for the control of blood pressure, diabetes, cholesterol, and obesity, and increasing smoking cessation. Concerted effort has led to improvements in all of these risk factors in Washington Tribes.

Despite efforts at all levels of care, mortality rates for heart disease among AI/AN in Washington remain significantly higher than for NHW. The health disparity is currently increasing, as the reduction in mortality from heart disease for AI/AN is outpaced by reduction in heart disease mortality for NHW.

Hospitalizations and mortality for stroke (cerebrovascular disease) are higher for Washington AI/AN than for NHW. Improvements in early recognition of stroke and early treatment of stroke have had a positive impact on decreasing mortality from stroke over the past ten years. Although there is still a disparity for stroke mortality, the rate of decrease in stroke mortality for AI/AN is much closer to that for NHW than it is for heart disease mortality.

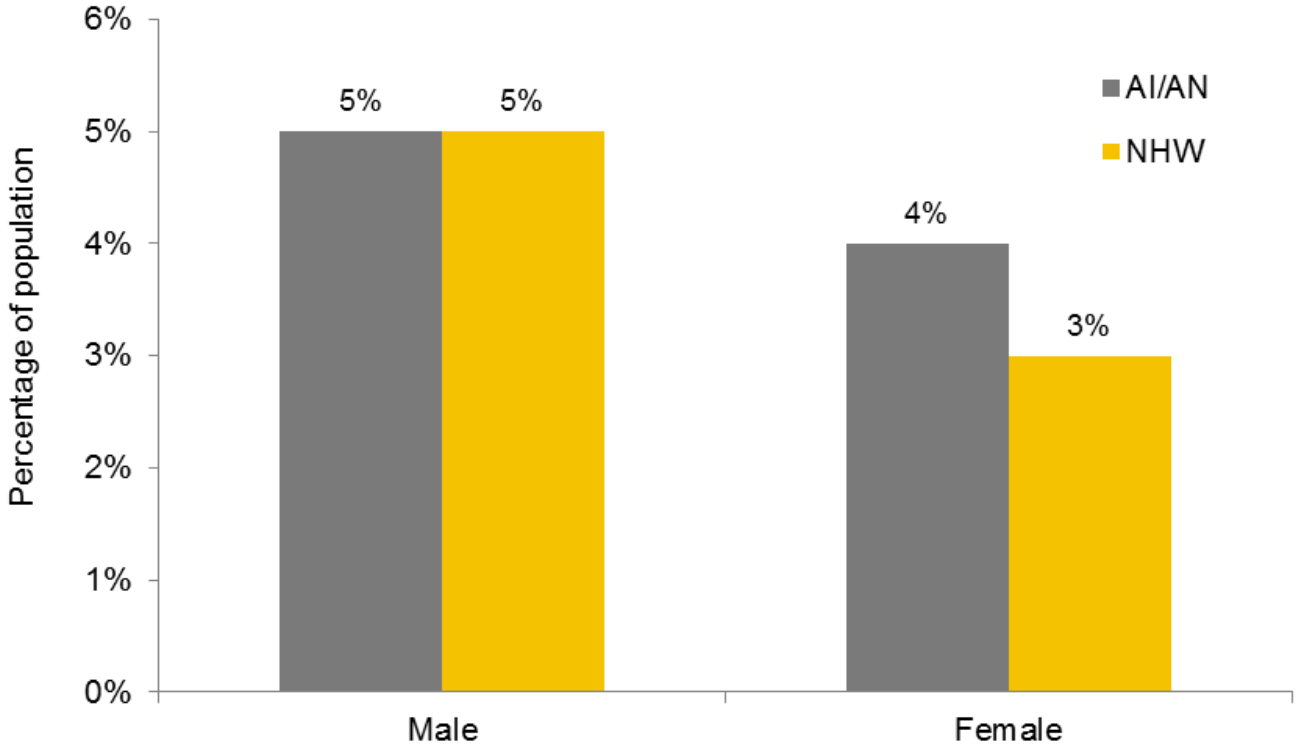
Self-Reported Heart Disease

Figure 5.1 shows the percentage of AI/AN and NHW adults who had ever been told they had angina or coronary heart disease by a health care provider. From 2006-2012, AI/AN and NHW males in Washington had similar rates of self-reported heart disease (5%). The prevalence of heart disease in AI/AN females was slightly higher than NHW females in Washington (4% vs. 3%).

Data Source: CDC Behavioral Risk Factor Surveillance System (BRFSS), 2006-2012.

Data Notes: The BRFSS prevalence estimates (shown as a percentage) are weighted to make the survey responses representative of the Washington population. The sample sizes shown below the figures are the unweighted number of people who answered this question for the indicated years.

Figure 5.1: Prevalence of self-reported heart disease by race and sex, Washington, 2006-2012.



Sample sizes (n): AI/AN males=783; AI/AN females=1,148; NHW males=49,342; NHW females=77,177.

Heart Disease Management

IHS has a performance goal for the percentage of adult heart disease patients who receive a comprehensive cardiovascular disease (CVD) assessment. Prior to 2012, IHS measured the percentage of AI/AN patients ages 22 and older with ischemic heart disease who received a comprehensive CVD assessment. In 2013, IHS changed the definition to the percentage of AI/AN patients ages 22 and older with coronary heart disease who received a CVD assessment. A comprehensive CVD assessment includes having the following:

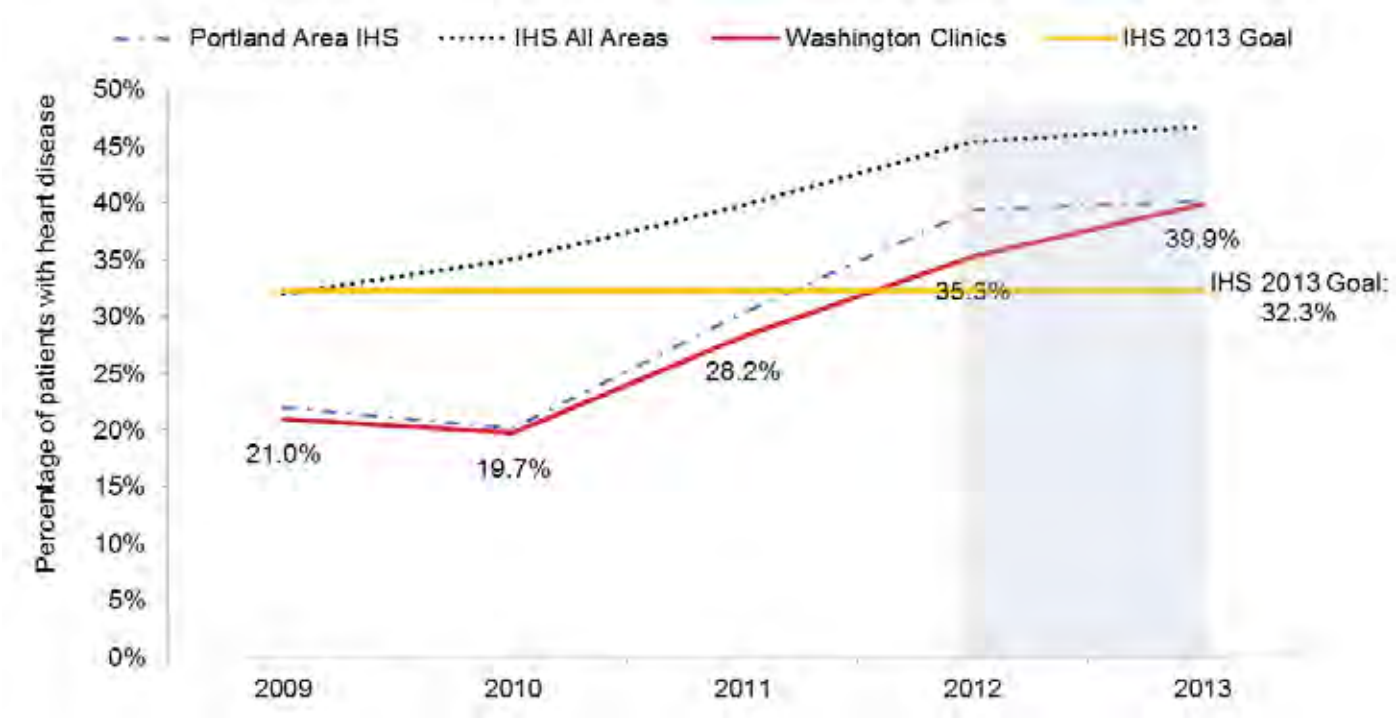
- blood pressure measured at least twice in the past two years;
- low-density lipoprotein (LDL) cholesterol measured in the past year;
- tobacco use screened in the past year;
- BMI calculated in the past year; and,
- lifestyle adaptation counseling (e.g., nutrition counseling, exercise education) in past year.

Since 2010, the percentage of at-risk patients who received a comprehensive CVD assessment has increased for Washington clinics, the Portland Area IHS, and the national IHS (Figure 5.2). In 2013, all three areas exceeded the IHS goal of 32.3%.

Data Source: Portland Area Indian Health Service.

Data Notes: Data labels only shown for Washington clinics. Washington clinics include non-urban federal and tribal Indian health facilities in Washington. Portland Area IHS clinics include non-urban federal and tribal Indian health facilities in Idaho, Oregon, and Washington.

Figure 5.2: Percentage of IHS AI/AN patients (ages 22 years and older) with heart disease who received a comprehensive CVD assessment, 2009-2013.



Note: The shaded area shows the year when the definition for comprehensive CVD assessment changed.

Hospitalizations for Hypertension

In 2011, there were 65 hospitalizations with a principal diagnosis of hypertension among AI/AN in Washington. The percentage of AI/AN inpatient hospitalizations for hypertension was the same as that of NHW (Table 5.1). AI/AN females had significantly higher hypertension hospitalization rates than their NHW counterparts (Figure 5.3). The age-adjusted hypertension hospitalization rate was three times higher for AI/AN females compared to NHW females.

Data Source: Washington state hospital discharge data (CHARS), 2011, corrected for misclassified AI/AN race by the IDEA-NW Project.

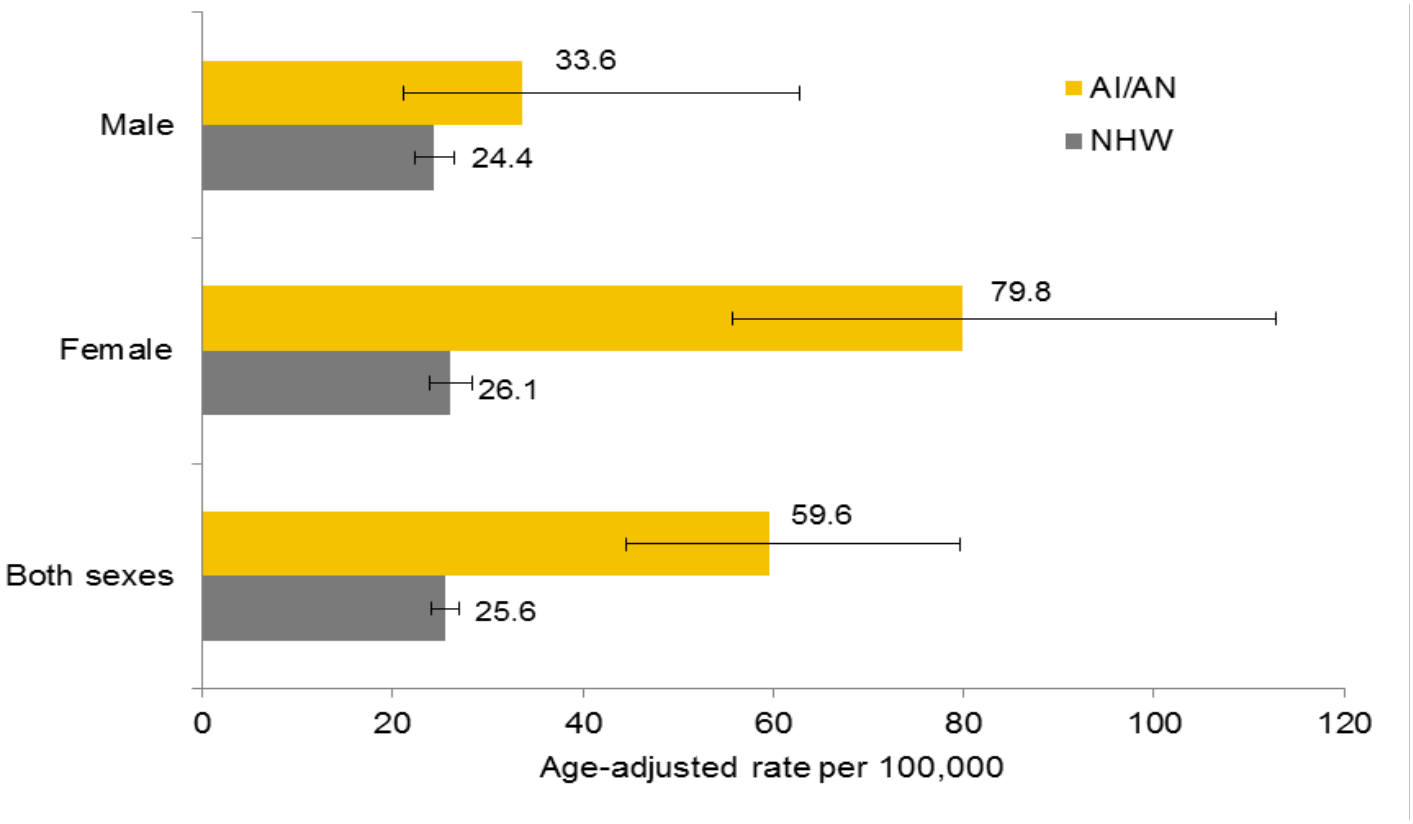
Data Notes: Principal diagnosis codes categorized using the Agency for Healthcare Research and Quality's Clinical Classification Software. The following level-2 principal diagnosis codes were included: 7.1 (hypertension).

Table 5.1: Inpatient hospital discharges for hypertension by race and sex, Washington, 2011.

Sex	AI/AN N (%)†	NHW N (%)†
Male	23 (0.4%)	693 (0.4%)
Female	42 (0.5%)	845 (0.4%)
Both Sexes	65 (0.4%)	1,538 (0.4%)

†N = number of inpatient hospitalizations. The percentages were calculated using the total inpatient hospitalizations for each group: AI/AN male (5,731), AI/AN female (8,741), AI/AN total (14,472), NHW male (159,142), NHW female (212,276), NHW Total (371,418)

Figure 5.3: Age-adjusted hospital discharge rates for hypertension by race and sex, Washington,



Hospitalizations for Heart Disease

In 2011, there were 872 hospitalizations for heart disease among AI/AN in Washington. The percentage of total hospitalizations for heart disease was lower for AI/AN compared to NHW (6.0% vs. 9.5% for both sexes, Table 5.2). However, after adjusting for differences in age distributions, heart disease hospitalization rates were higher for AI/AN compared to NHW (Figure 5.4). While AI/AN males had higher heart disease hospitalization rates than AI/AN females, the disparity compared to NHW was larger for AI/AN females.

Data Source: Washington state hospital discharge data (CHARS), 2011, corrected for misclassified AI/AN race by the IDEA-NW Project.

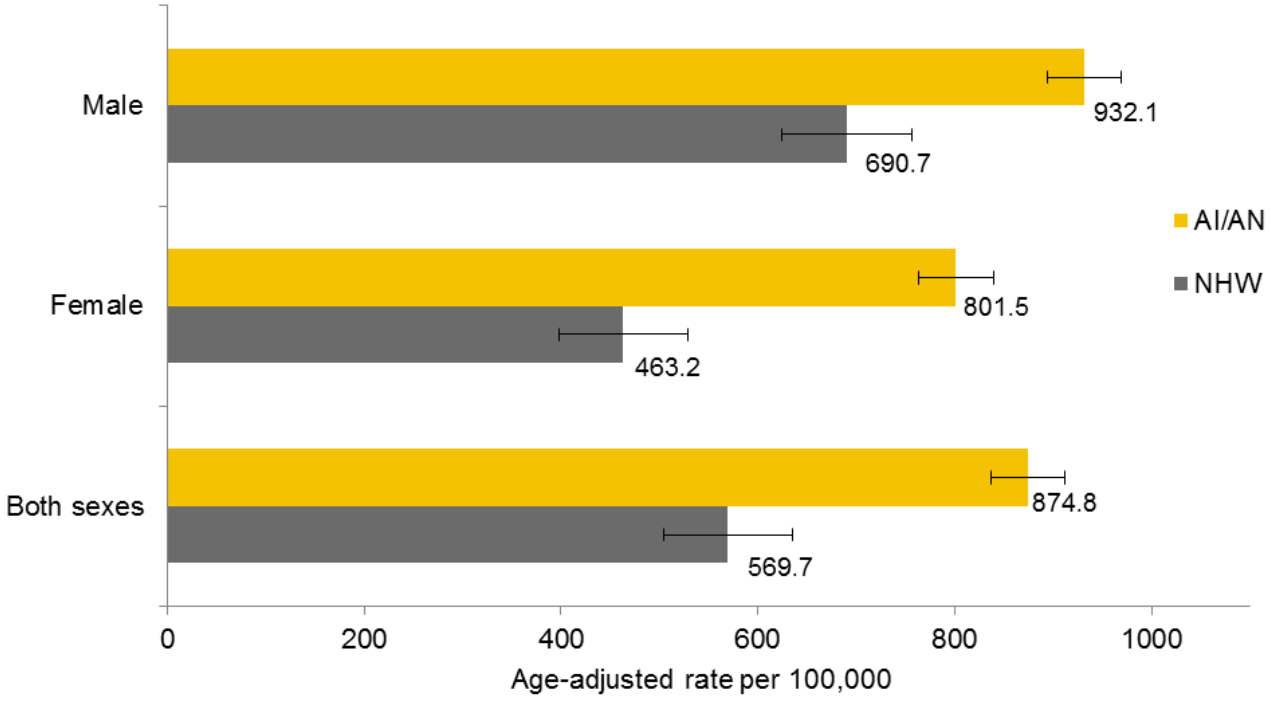
Data Notes: Principal diagnosis codes categorized using the Agency for Healthcare Research and Quality's Clinical Classification Software. The following level-2 principal diagnosis codes were included: 7.2 (diseases of the heart).

Table 5.2: Inpatient hospital discharges for heart disease by race and sex, Washington, 2011.

Sex	AI/AN N (%)†	NHW N (%)†
Male	474 (8.3%)	19,613 (12.3%)
Female	398 (4.6%)	15,810 (7.4%)
Both Sexes	872 (6.0%)	35,423 (9.5%)

†N = number of inpatient hospitalizations. The percentages were calculated using the total inpatient hospitalizations for each group: AI/AN male (5,731), AI/AN female (8,741), AI/AN total (14,472), NHW male (159,142), NHW female (212,276), NHW Total (371,418)

Figure 5.4: Age-adjusted hospital discharge rates for heart disease by race and sex, Washington, 2011.



Hospitalizations for Cerebrovascular Disease

Cerebrovascular disease (which includes stroke) was the principal diagnosis for 1.6% (N=231) of hospitalized AI/AN in Washington, which was lower than NHW (2.6%, Table 5.3). After adjusting for differences in age distributions, AI/AN of both sexes had higher cerebrovascular disease hospitalization rates than NHW (Figure 5.5). AI/AN females had higher hospitalization rates than AI/AN males, and a larger disparity when compared to their NHW counterparts in the state.

Data Source: Washington state hospital discharge data (CHARS), 2011, corrected for misclassified AI/AN race by the IDEA-NW Project.

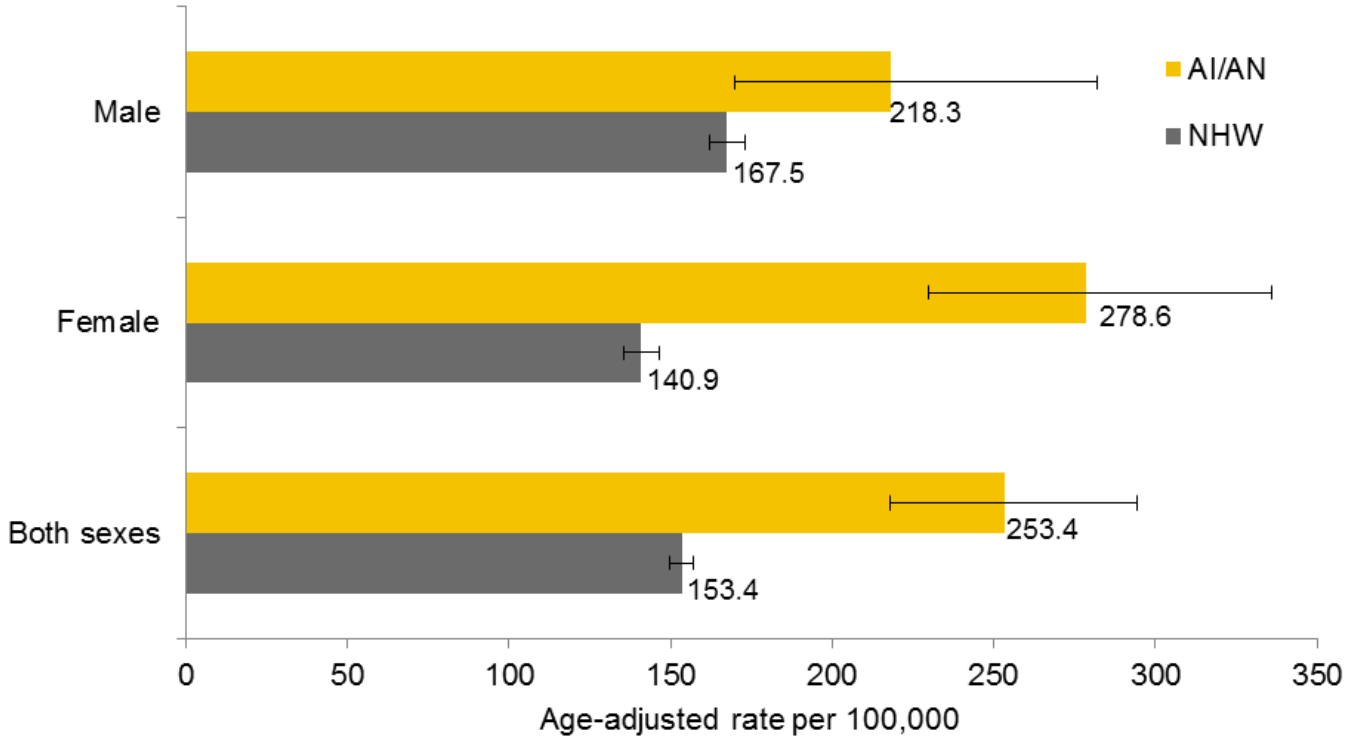
Data Notes: Principal diagnosis codes categorized using the Agency for Healthcare Research and Quality's Clinical Classification Software. The following level-2 principal diagnosis codes were included: 7.3 (cerebro-vascular disease [stroke]).

Table 5.3: Inpatient hospital discharges for cerebrovascular disease by race and sex, Washington, 2011.

Sex	AI/AN N (%)†	NHW N (%)†
Male	94 (1.6%)	4,679 (2.9%)
Female	137 (1.6%)	4,878 (2.3%)
Both Sexes	231 (1.6%)	9,557 (2.6%)

†N = number of inpatient hospitalizations. The percentages were calculated using the total inpatient hospitalizations for each group: AI/AN male (5,731), AI/AN female (8,741), AI/AN total (14,472), NHW male (159,142), NHW female (212,276), NHW Total (371,418)

Figure 5.5: Age-adjusted hospital discharge rates for cerebrovascular disease by race and sex, Washington, 2011.



Heart Disease Mortality

Heart disease was the leading cause of death for AI/AN in Washington from 2006-2010. Figure 5.6 shows the age-adjusted mortality rates for heart disease among AI/AN and NHW in Washington. AI/AN males were about 35% more likely to die of heart disease than females. Compared to NHW, AI/AN heart disease mortality rates were 67% higher (Table 5.4). AI/AN living in Washington had higher mortality rates for heart disease compared to AI/AN living in Idaho and Oregon.

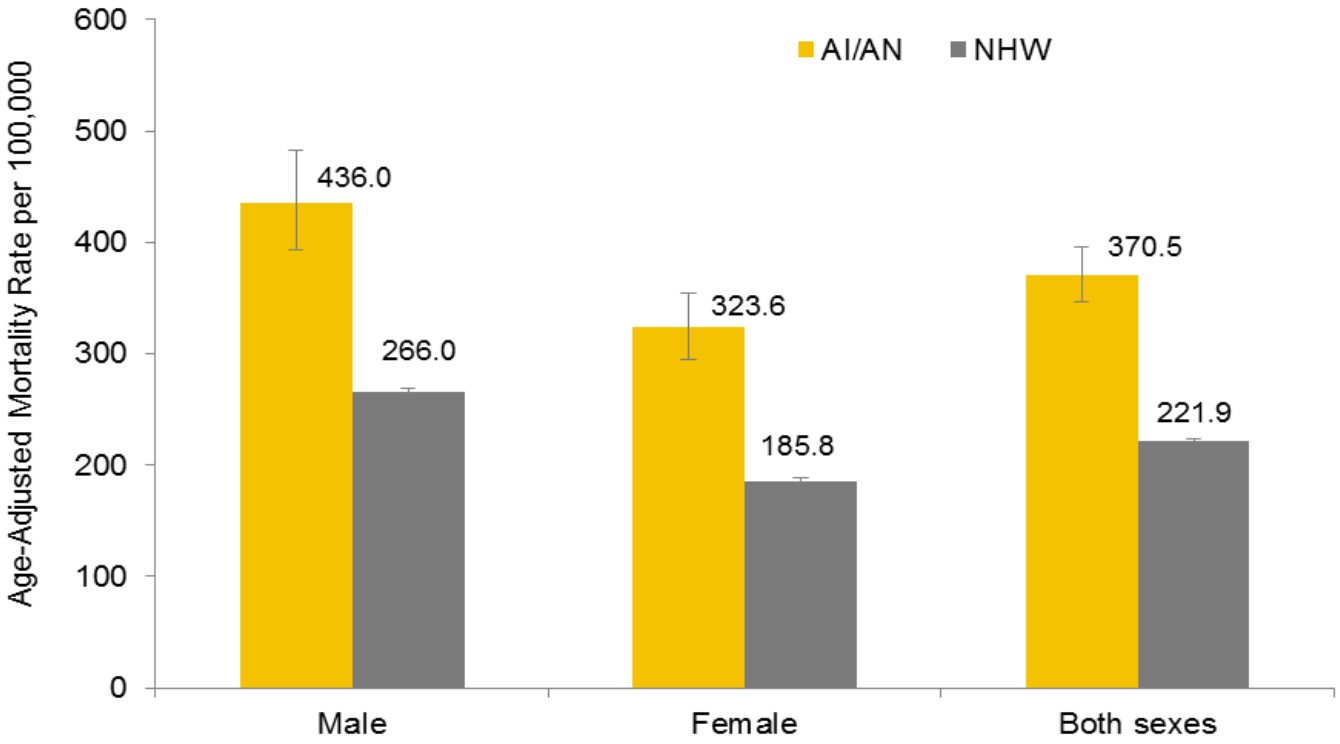
Data Source: Washington state death certificates, 2006-2010, corrected for misclassified AI/AN by the IDEA-NW Project.

Table 5.4: Age-adjusted heart disease mortality rates by race and sex, Washington, 2006-2010.

Sex	AI/AN Rate (95% CI)	NHW Rate (95% CI)	AI/AN vs. NHW Rate Ratio (95% CI)
Male	436.0 (393.7, 482.3)	266.0 (263.1, 268.9)	1.64 (1.51, 1.78)‡
Female	323.6 (294.6, 354.9)	185.8 (182.9, 188.7)	1.74 (1.60, 1.90)‡
Both Sexes	370.5 (346.4, 396.0)	221.9 (219.8, 223.9)	1.67 (1.57, 1.77)‡

CI = confidence interval
‡ Indicates a statistically significant difference (p<.05).

Figure 5.6: Age-adjusted heart disease mortality rates by race and sex, Washington, 2006-2010.



Heart Disease Mortality Trends

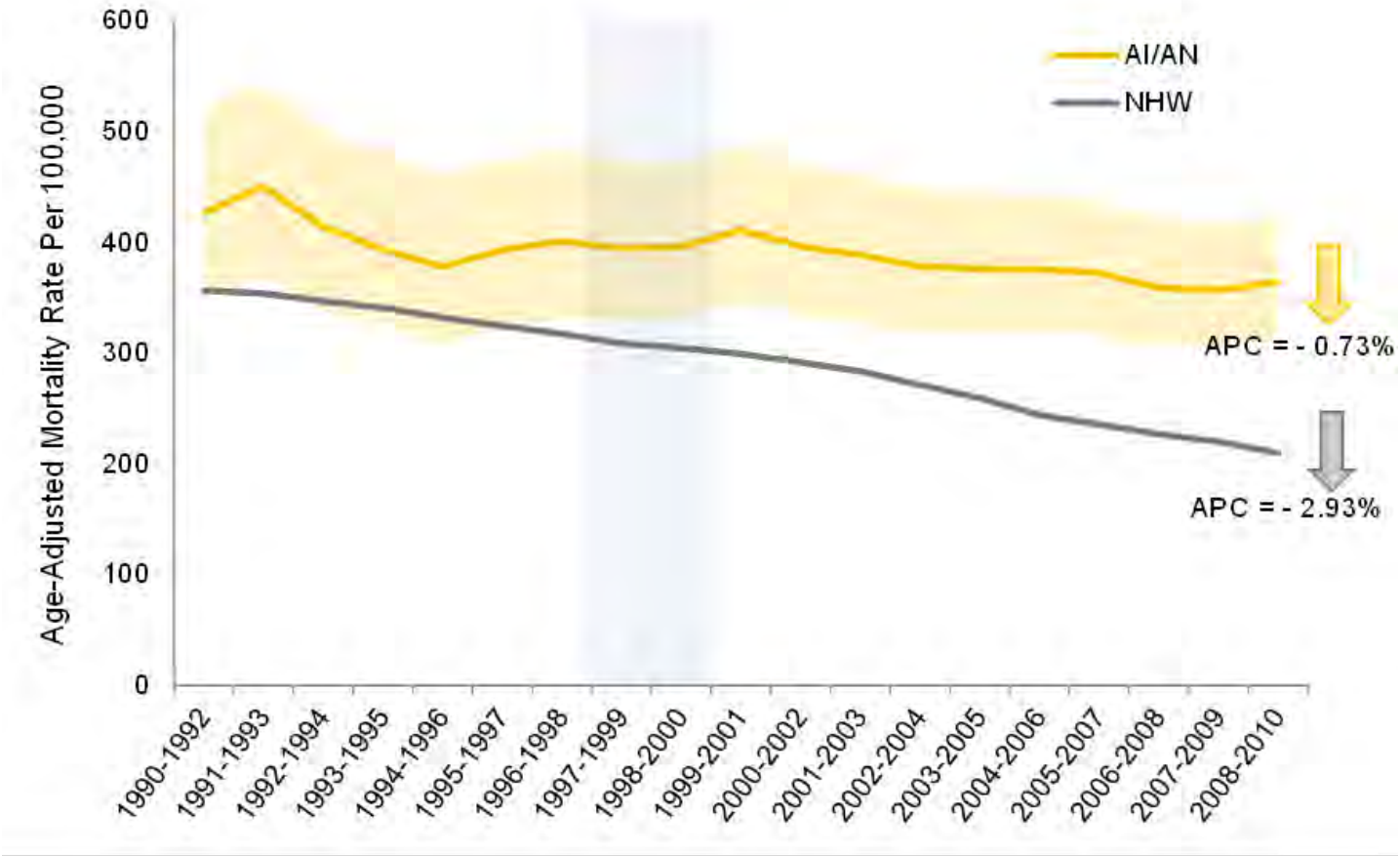
Figure 5.7 shows heart disease mortality trends for the AI/AN and NHW population in Washington between 1990 and 2010. The yellow shaded section around the AI/AN line represents a 95% confidence interval band.

AI/AN heart disease mortality rates were consistently higher than NHW rates throughout the time period, and the disparity increased in the latter decade. Both populations saw significant decreases in rates of heart disease mortality over the time period. AI/AN rates decreased at an average of 0.73% per year, while NHW rates dropped more rapidly at an average of 2.93% per year. Decreases in AI/AN heart disease mortality rates arose from changes in male rates; female AI/AN heart disease rates did not show significant change during the time period.

Data Source: Washington state death certificates, 2006-2010, corrected for misclassified AI/AN race by the IDEA-NW Project.

Data Notes: APC = Annual Percentage Change. Cause of death coding on death certificates underwent a change from ICD-9 to ICD-10 between 1998 and 1999. Data shown in the trend charts in this report have not been adjusted to reflect this change. Comparability ratios for the broad categories reported here show that the change did not have a large impact for these statistics, however any abrupt changes between 1998 and 1999 should be interpreted with caution.

Figure 5.7: Age-adjusted heart disease mortality rates, three year rolling averages, by race, Washington, 1990-2010.



Note: The shaded rectangle indicates the year cause of death coding changed from ICD-9 to ICD-10. Any abrupt changes between 1998 and 1999 should be interpreted with caution.

Stroke Mortality

Stroke was the seventh leading cause of death among Washington AI/AN. Figure 5.8 shows the age-adjusted mortality rates for stroke among AI/AN and NHW in Washington. Female AI/AN were about 12% more likely to die from stroke than males. Compared to NHW, AI/AN stroke mortality rates were 58% higher (Figure 5.5). AI/AN living in Washington had higher mortality rates for stroke than AI/AN living in Idaho and Oregon.

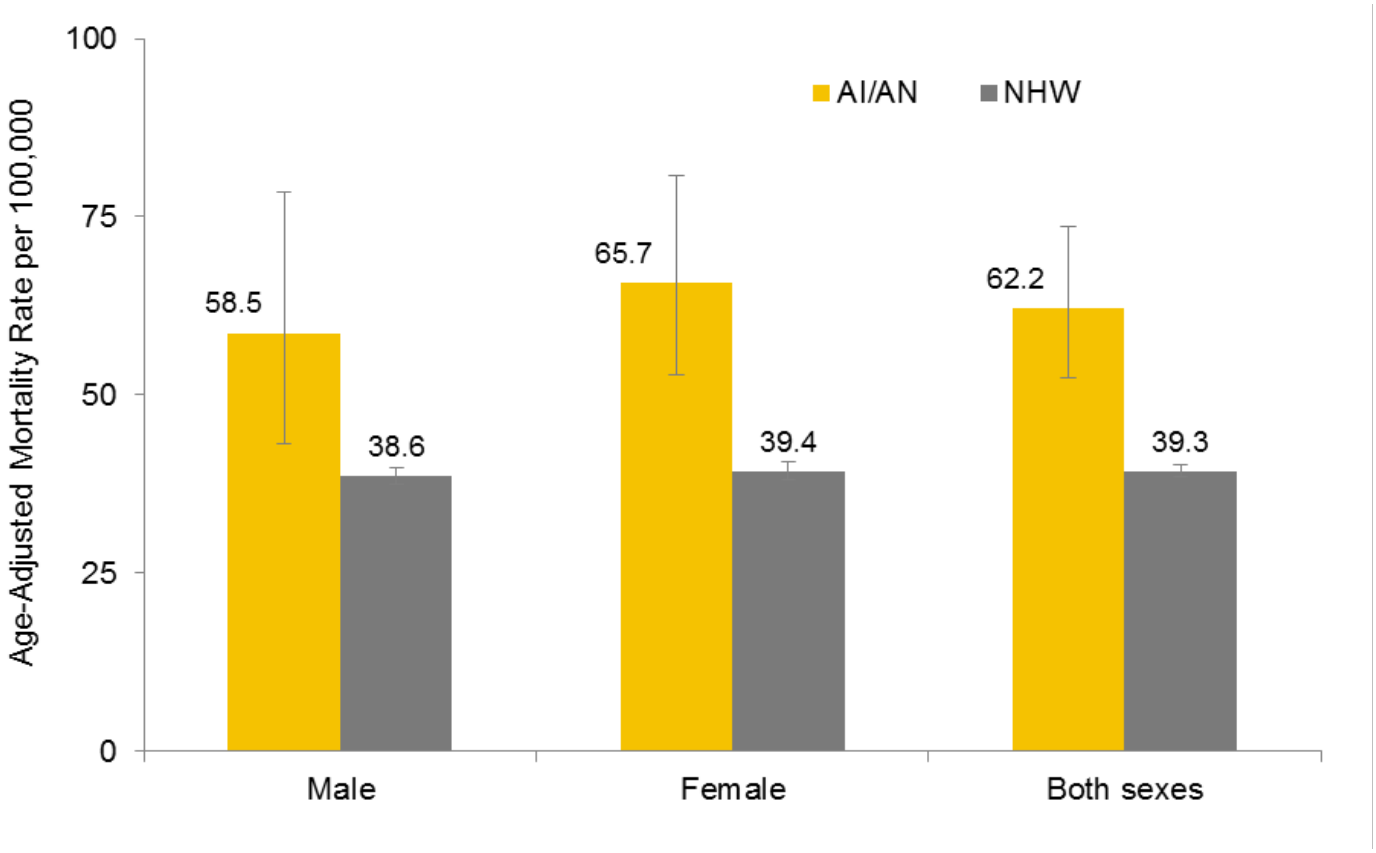
Data Source: Washington state death certificates, 2006-2010, corrected for misclassified AI/AN by the IDEA-NW Project.

Table 5.5: Age-adjusted stroke mortality rates by race and sex, Washington, 2006-2010.

Sex	AI/AN Rate (95% CI)	NHW Rate (95% CI)	AI/AN vs. NHW Rate Ratio (95% CI)
Male	58.5 (43.1, 78.5)	38.6 (37.6, 39.7)	1.51 (1.19, 1.93)‡
Female	65.7 (52.9, 80.8)	39.4 (38.0, 40.7)	1.67 (1.38, 2.02)‡
Both Sexes	62.2 (52.3, 73.6)	39.3 (38.5, 40.2)	1.58 (1.36, 1.84)‡

CI = confidence interval
‡ Indicates a statistically significant difference (p<.05).

Figure 5.8: Age-adjusted stroke mortality rates by race and sex, Washington, 2006-2010.



Stroke Mortality Trends

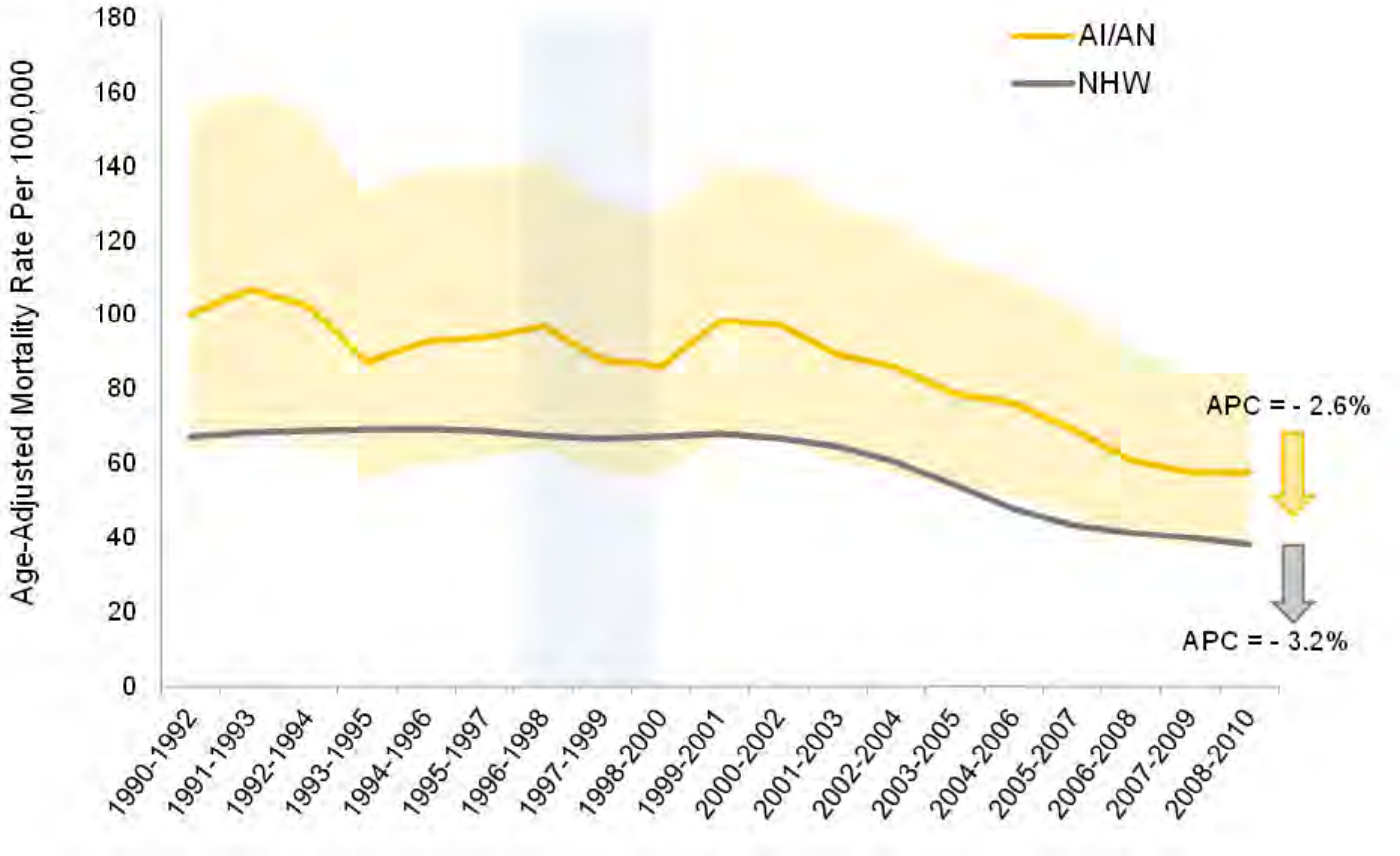
Figure 5.9 shows stroke mortality trends for the AI/AN and NHW population in Washington between 1990 and 2010. The yellow shaded section around the AI/AN line represents a 95% confidence interval band.

The AI/AN population in Washington has seen encouraging improvements in deaths from stroke with a consistent downward trend throughout the time period. AI/AN rates decreased on average 2.6% per year. While AI/AN stroke mortality rates were higher than NHW rates throughout the time period, the disparity between the two races did not increase. Female AI/AN stroke deaths have been declining even more rapidly in the past decade; between 1999 and 2010, female AI/AN rates decreased on average 7.1% per year.

Data Source: Washington state death certificates, 2006-2010, corrected for misclassified AI/AN race by the IDEA-NW Project.

Data Notes: APC = Annual Percentage Change. Cause of death coding on death certificates underwent a change from ICD-9 to ICD-10 between 1998 and 1999. Data shown in the trend charts in this report have not been adjusted to reflect this change. Comparability ratios for the broad categories reported here show that the change did not have a large impact for these statistics, however any abrupt changes between 1998 and 1999 should be interpreted with caution.

Figure 5.9: Age-adjusted stroke mortality rates, three year rolling averages, by race, Washington, 1990-2010.



Note: The shaded rectangle indicates the year cause of death coding changed from ICD-9 to ICD-10. Any abrupt changes between 1998 and 1999 should be interpreted with caution.