

Heart Disease and Stroke In Arizona:

2019 Burden Report



ARIZONA DEPARTMENT
OF HEALTH SERVICES

~ Health and Wellness for all Arizonans ~



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State of Arizona

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DEAR ARIZONA RESIDENTS:

Heart disease is the number one killer in Arizona. Each year there are more than 50,000 hospitalizations and almost 10,000 deaths related to heart disease in Arizona. More than 30% of Arizonans reported that a doctor had informed them they had hypertension i.e., high blood pressure. Additionally, 1 in 3 (33%) Arizonans indicated they had been told they had high cholesterol. As frightening as those statistics are, even more startling is that only about half of those with hypertension or high cholesterol are aware of their risk factors. Of those who have been made aware by a doctor, many do not have these risk factors under control. Studies have shown that only 50% of hypertension patients take their medication as prescribed. Arizonans can improve their odds of preventing and beating heart disease by understanding the risks and taking simple steps to address them.

High blood pressure increases your risk of heart disease and stroke. It can also cause permanent damage to the heart before you even notice any symptoms. High blood pressure is often referred to as the “silent killer.” Your healthcare provider can help you find precautionary treatments, medications, and lifestyle changes that are best suited for you. The first step is getting your blood pressure checked regularly. Regular check-ups will allow you to notify your doctor of any changes within your health, which will guarantee safety as your doctor makes necessary adjustments to your treatment or diagnosis plan. Even if you don’t have high blood pressure, you should have your blood pressure checked periodically.

Data reports show that the death rate for heart disease has been increasing. Unfortunately, the diagnosis and discharge rates for hospitalizations relating to heart disease and stroke are also still climbing. Smoking is one of the top risk factors related to heart disease and stroke. The decline in adult smoking rates in Arizona is promising but more must be done to eliminate this risk in adults and underage smokers. Diabetes, physical inactivity, and obesity have all been on the rise in Arizona. In these areas there is still much to do.

Key point for prevention: It is extremely important to visit your physician regularly so that you can have your risk of heart disease assessed. Making a habit of assessing and tracking your risk factors is something your heart will thank you for.



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EXECUTIVE SUMMARY

Heart disease is the leading preventable cause of death in Arizona, and stroke is the 7th.

The 2017 death rate (mortality) in Arizona for diseases of the heart was reported at 141.9 per 100,000 people, and stroke was reported at 30.7 per 100,000 people. For cardiovascular disease (CVD), which includes both heart disease and stroke, the 2017 death rate in Arizona was reported at 189.9 per 100,000 people. When compared to other counties in Arizona in 2017, Mohave County had the highest death rate of CVD (264.9) and heart disease (218.6), while Graham County had the highest death rate of stroke (42.9).

From 2005 to 2017, death rates associated with heart disease and stroke have declined. The highest rates of death due to CVD and heart disease are among Blacks/African Americans while the lowest are among Asian/Pacific Islanders (A/PI). From 2005 to 2017, rates of heart disease and stroke among American Indian/Alaska Natives (AI/AN) have decreased. Among A/PIs, stroke death rates increased by 28 percent. Males have higher CVD and heart disease death rates than females. In 2017, males and females had the same stroke death rates.

Among hospital discharges in Arizona during 2017, diagnoses for CVD, stroke, heart attacks, and congestive heart failure were mostly linked to those aged 65 and older. Heart disease is the most commonly diagnosed hospitalization for adults 20 years of age and older. Males were diagnosed with heart disease, stroke, heart attack, and congestive heart failure more often than females. Among hospital discharges for all races/ethnicities, most were among Whites with 42,517 linked to heart disease, 14,379 strokes, 8,738 heart attacks, and 2,287 related to congestive heart failure. Among all race/ethnicities, heart disease is the most commonly diagnosed hospitalization. In 2017 data, A/PIs have the least number of hospital diagnoses related to heart disease and congestive heart failure, and AI/ANs have the least number of hospital diagnoses related to heart attack and stroke.

Risk factors for heart disease and stroke include high cholesterol, high blood pressure, lack of physical activity, smoking, diabetes, obesity, and low fruit and vegetable intake. Rates of high cholesterol are decreasing but rates of high blood pressure are increasing. More Arizonans are meeting physical activity guidelines and increasing fruit and vegetable consumption. Smoking rates have declined, but rates of diabetes and obesity are increasing.

The American Heart Association and American Stroke Association work together to fund research and provide education and prevention efforts to reduce CVD and stroke. The National Million Heart Initiative works with partners to carry out the Initiative's action, which is to prevent 1 million heart attacks and strokes. In Arizona, public health partners and the Arizona Department of Health Services developed the Arizona Health Improvement Plan, which focuses on the leading health priorities. CVD, heart disease, and stroke is an identified priority area within the plan.

This document, as well as additional data related to heart disease, can help guide the actions and interventions of the state, local health departments, and community organizations that conduct activities related to heart disease treatment and prevention.

This report will cover data related to CVD, in addition to looking at heart disease and stroke individually.

Chapter 1: Overview

I. OVERVIEW: CARDIOVASCULAR DISEASE (CVD)

Cardiovascular disease (CVD) refers to conditions and diseases of the heart and blood vessels, including but not limited to coronary artery disease, stroke, and congenital heart defects, and peripheral artery disease. CVD is the umbrella term that includes diseases of the heart and stroke conditions and diseases.

CVD is common. It affects 121.5 million people in the U.S., more than 1 in every 3 Americans (AHA, 2019).

CVD is serious. It is the leading cause of death in the U.S., listed as the main cause in approximately 1 of every 3 deaths (AHA, 2019); worldwide, CVD claimed the lives of 17.9 million people in 2016, or 31% of all deaths (WHO, 2017).

CVD is costly. Costs exceed \$351 billion in the U.S. (AHA 2019).

CVD is manageable. CVD can be managed by close blood pressure, blood cholesterol, and blood sugar management. A combination of medication and healthy lifestyle modifications are effective in helping manage CVD (AHA 2019).

CVD is preventable. The American College of Cardiology and American Heart Association guidelines outline evidence-based strategies for prevention, including the promotion of a healthy lifestyle, which includes not smoking, physical activity, balanced nutrition, maintaining a healthy weight, and administering one's blood pressure, blood cholesterol, and blood sugar (ACC/AHA 2019).

II. TYPES OF CARDIOVASCULAR DISEASE (CVD): HEART DISEASE AND STROKE

a. Heart Disease Overview

In the United States, about 1 in 4 deaths are linked to heart disease with about 610,000 deaths each year. Annually, about 735,000 Americans have a heart attack. Of those, 525,000 are a first heart attack. Heart disease is the leading cause of death for both men and women. It is also the leading cause of death for African Americans, Hispanics, and Whites. Among all ethnicities, 23.5 percent of deaths are linked to heart disease. Costs related to healthcare, medications, and lost productivity due to heart disease reach \$500 billion annually in the United States.

Heart disease is a type of cardiovascular disease (CVD). The most common type of heart disease in the United States is coronary artery disease, also known as coronary heart disease. Heart disease is caused when the arteries harden or get clogged with fatty deposits and cholesterol. Blockages and clogs are a problem because arteries supply blood to the heart and body. Heart disease is diagnosed by measuring blood pressure, cholesterol, and glucose levels. Risk factors for heart disease include being overweight or obese, lack of physical activity, unhealthy eating, and smoking. Advanced testing methods for heart disease include electrocardiogram (ECG or EKG), echocardiogram, exercise stress test, chest x-ray, cardiac catheterization, and coronary angiogram.

A heart attack is when the heart artery becomes blocked, “stopping the flow of blood to the heart muscle and damaging it.” The most common symptom is angina or chest pain. To reduce the risk for heart attack, recommendations include following a healthy, low-sodium, low-fat diet; increasing physical activity; and refraining from smoking. Medications can treat the risk factors of heart disease such as high cholesterol, high blood pressure, irregular heartbeat, and low blood flow. Surgical procedures can help restore blood flow to the heart.

b. Stroke Overview

In the United States, stroke is the fifth leading cause of death with about 795,000 occurring every year. Stroke causes death for 140,000 Americans, which is 1 out of every 20 deaths. About 87 percent of all strokes are ischemic strokes. Strokes account for \$34 billion in costs each year nationwide.

Stroke is also known as a brain attack. The brain uses 20 percent of the oxygen you breathe. When the flow of blood to the brain is blocked, brain cells start to die within minutes causing a stroke. A stroke can lead to brain damage, long-term disability, or death.

There are two types of stroke, ischemic and hemorrhagic. Ischemic stroke is caused by blockages related to blood clots or other particles, which can be fatty deposits known as plaque. A hemorrhagic stroke is caused by a blood vessel bursting in the brain leading to blood buildup which damages surrounding tissue.

Risk factors for stroke include high blood pressure, high cholesterol, smoking, obesity, and diabetes. Controlling blood pressure, cholesterol, and refraining from smoking are the best ways to reduce the risk of stroke.

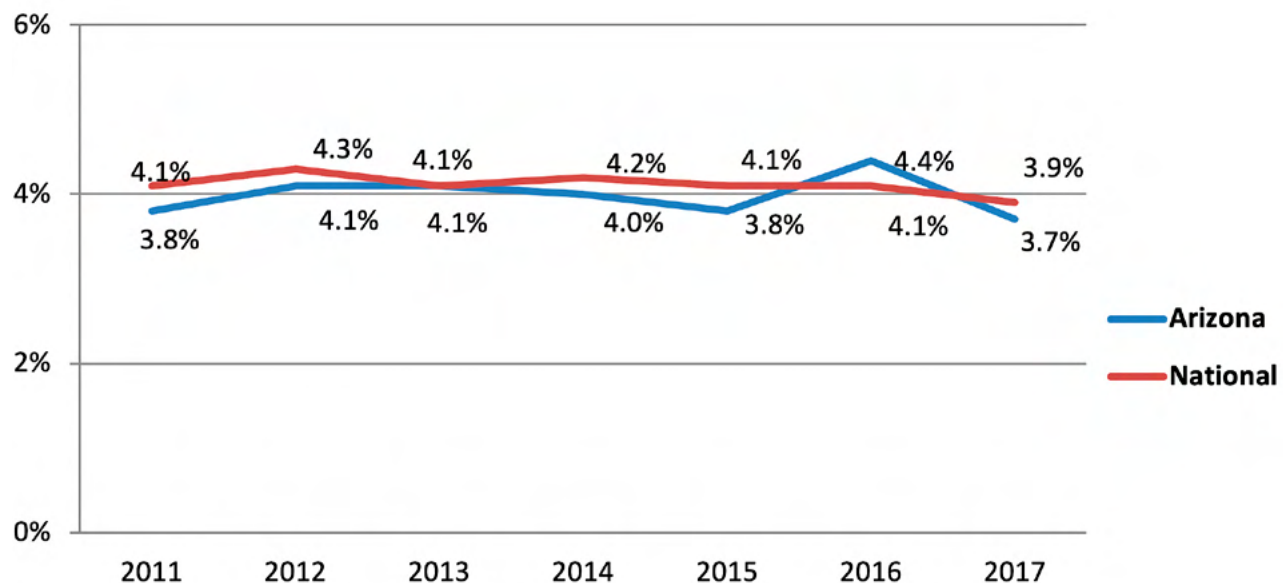
Chapter 2: Cardiovascular Disease Morbidity and Mortality

I. CARDIOVASCULAR DISEASE (HEART DISEASE AND STROKE) MORBIDITY

The number of people who are living with heart disease, have experienced a heart attack and/or stroke is determined by using data from the Behavioral Risk Factor Surveillance Survey (BRFSS). BRFSS is conducted annually in all states among adults. The information collected is based on self-reported data through a phone survey to those who are 18 years of age and older. According to the 2017 BRFSS survey, Arizonans have slightly higher rates of heart disease, heart attack, and stroke when compared to national rates.

In the BRFSS survey, respondents are asked whether they have been told by a doctor that they have angina or coronary heart disease. In 2017, 3.7 percent of Arizonans indicated that they had been diagnosed with heart disease. See Figure 1 for Arizona and national rates for heart disease from 2011 to 2017.

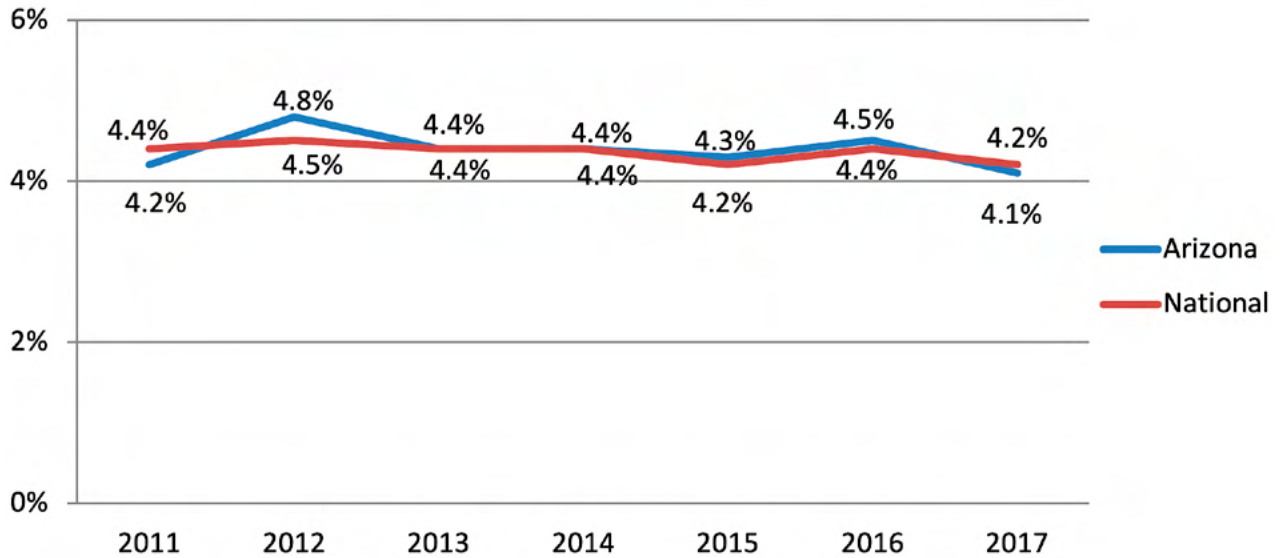
Figure 1: Percentage of Arizona Adults that Have Been Told by a Doctor That They Have Angina or Coronary Heart Disease, 2011-2017



Source: Arizona Behavioral Risk Factor Surveillance System

In the BRFSS survey, respondents are asked whether they have been told by a doctor that they have had a heart attack. In 2016, 4.5 percent of Arizonans and 4.4 percent of the national population indicated that they had a heart attack. Among Arizonans in 2017, the percentage of Arizonans that had a heart attack dropped to 4.1. See Figure 2 for Arizona and national rates for heart attack from 2011 to 2017.

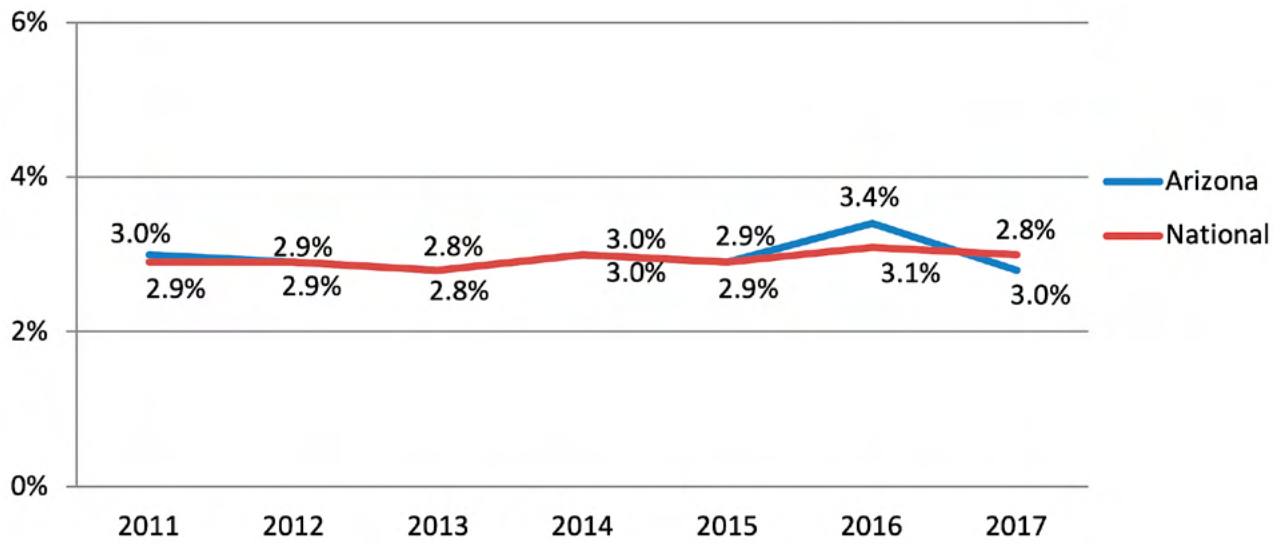
Figure 2: Percentage of Arizona Adults That Have Been Told by a Doctor That They Have Had a Heart Attack, 2011-2017



Source: Arizona Behavioral Risk Factor Surveillance System

In the BRFSS survey, respondents are asked whether they have been told by a doctor that they have had a stroke. In 2016, 3.4 percent of Arizonans and 3.1 percent of the national population indicated that they had a stroke. Among Arizonans in 2017, the percentage of Arizonans that had a stroke dropped to 3.0 percent. See Figure 3 for Arizona and national rates for stroke from 2011 to 2017.

Figure 3: *Percentage of Arizona Adults That Have Been Told by a Doctor That They Have Had a Stroke, 2011-2017*

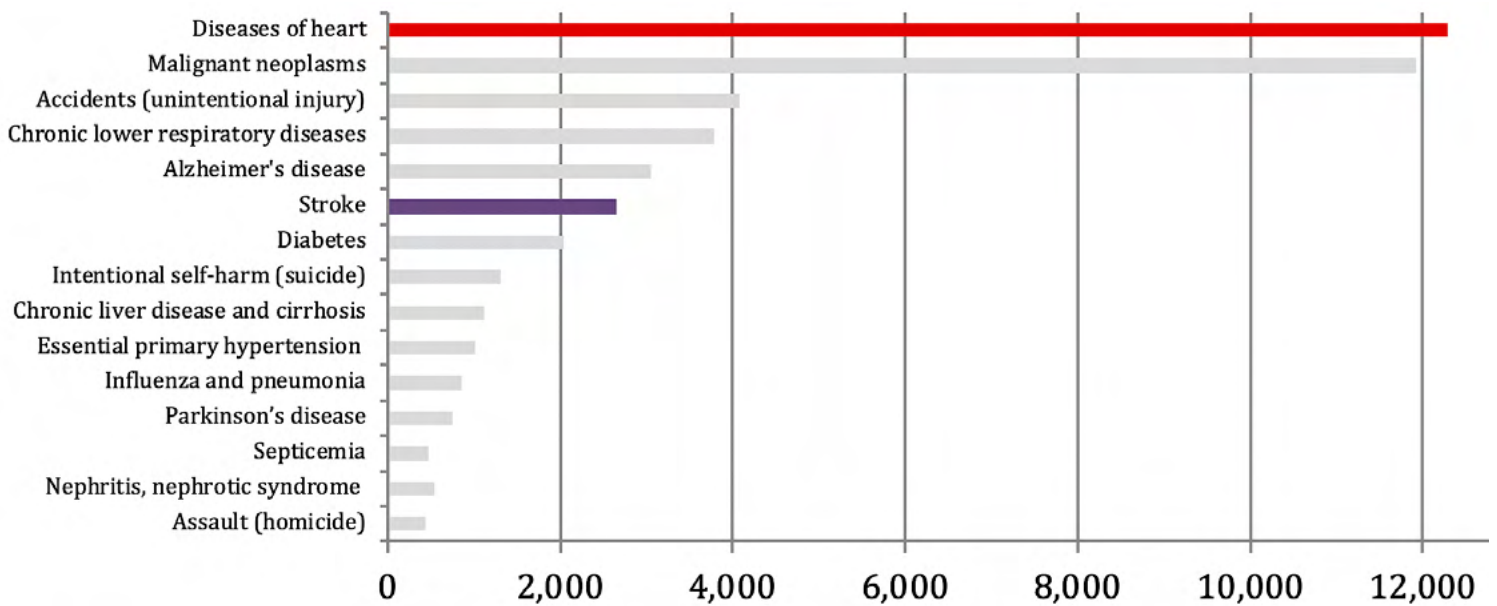


Source: Arizona Behavioral Risk Factor Surveillance System

II. CARDIOVASCULAR DISEASE (HEART DISEASE AND STROKE) MORTALITY

In Arizona, heart disease is the leading cause of death. In 2017, 12,285 deaths were linked to heart disease, followed by 11,197 deaths that were related to cancer. Accidents (unintentional injuries) (4,085), chronic lower respiratory disease (3,779), Alzheimer's disease (3,050), and stroke (2,647) round out the top six leading causes of death in Arizona. See Figure 4 for leading causes of death in Arizona in 2017.

Figure 4: Leading Causes of Death, Arizona, 2017



Source: Arizona Vital Statistics, 2017

For all races/ethnicities, heart disease is the leading cause of death except among Asian/Pacific Islanders (A/PI). With 169.6 out of every 100,000 deaths, Blacks/African Americans (Black/AA) have the highest rate of death related to heart disease. Stroke is the fourth leading cause of death for Blacks/AA (49.2) and A/PI (23.6). Cancer is the second leading cause of death for Whites, Hispanics, and Black/AA. See Table 1 for the top five leading causes of death and the death rates by race/ethnicity ranked in order from greatest to least for 2017.

Table 1: Leading Causes of Death by Race/Ethnicity, Arizona, 2017

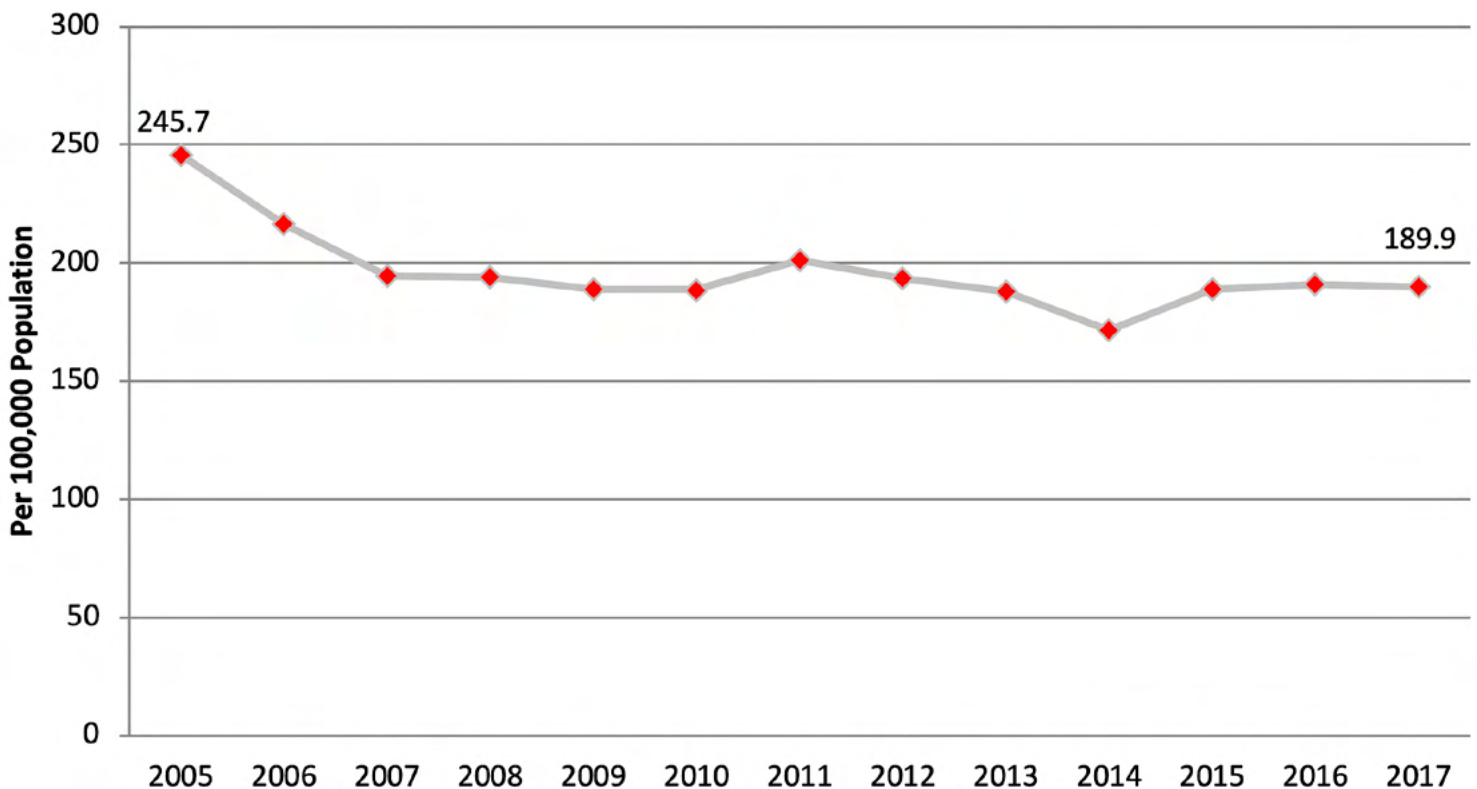
Rank	White	Hispanic	Black/ African American	American Indian/ Alaska Native	Asian/ Pacific Islander
1	Heart disease 146.1	Heart disease 112.5	Heart disease 169.6	Heart disease 150.9	Cancer 99.4
2	Cancer 141.4	Cancer 110.9	Cancer 158.5	Unintentional Injuries 142.0	Heart disease 87.2
3	Unintentional Injuries 54.5	Unintentional Injuries 45.9	Unintentional Injuries 60.3	Cancer 117.1	Unintentional Injuries 24.3
4	Chronic Lower Respiratory Diseases 48.0	Diabetes 39.4	Stroke 49.2	Diabetes 81.6	Stroke 23.6
5	Alzheimer's Disease 36.1	Stroke 34.5	Diabetes 45.9	Chronic liver disease and cirrhosis 74.0	Diabetes 21.3

Source: Arizona Vital Statistics, 2017

From 2005 to 2017, death rates due to CVD, declined by 23 percent. In 2005, death rates due to CVD were reported at 245.7 per 100,000 population. Over the last twelve years the rate has declined, and in 2017 the death rate was 189.9 per 100,000 population. The lowest death rate due to CVD was recorded in 2014 at 171.6 per 100,000 population. See Figure 5 for CVD age-adjusted mortality in Arizona, 2017. Several improvements have been made in the state that could be linked to the decline in CVD death rates including:

- Improved emergency response for heart disease and stroke through the development of specialized systems of care to better assess and treat acute heart disease and stroke. This includes the reach and impact of Primary Stroke Centers, ST-Elevation Myocardial Infarction (STEMI) Receiving Centers, and Chest Pain Centers.
- Faster identification of signs and symptoms and 911 activation.
- Reduction in smoking and exposure to second-hand smoke.
- Effective risk-factor management through medications and procedures.
- Improved public awareness, and early identification of risk factors and healthy living.

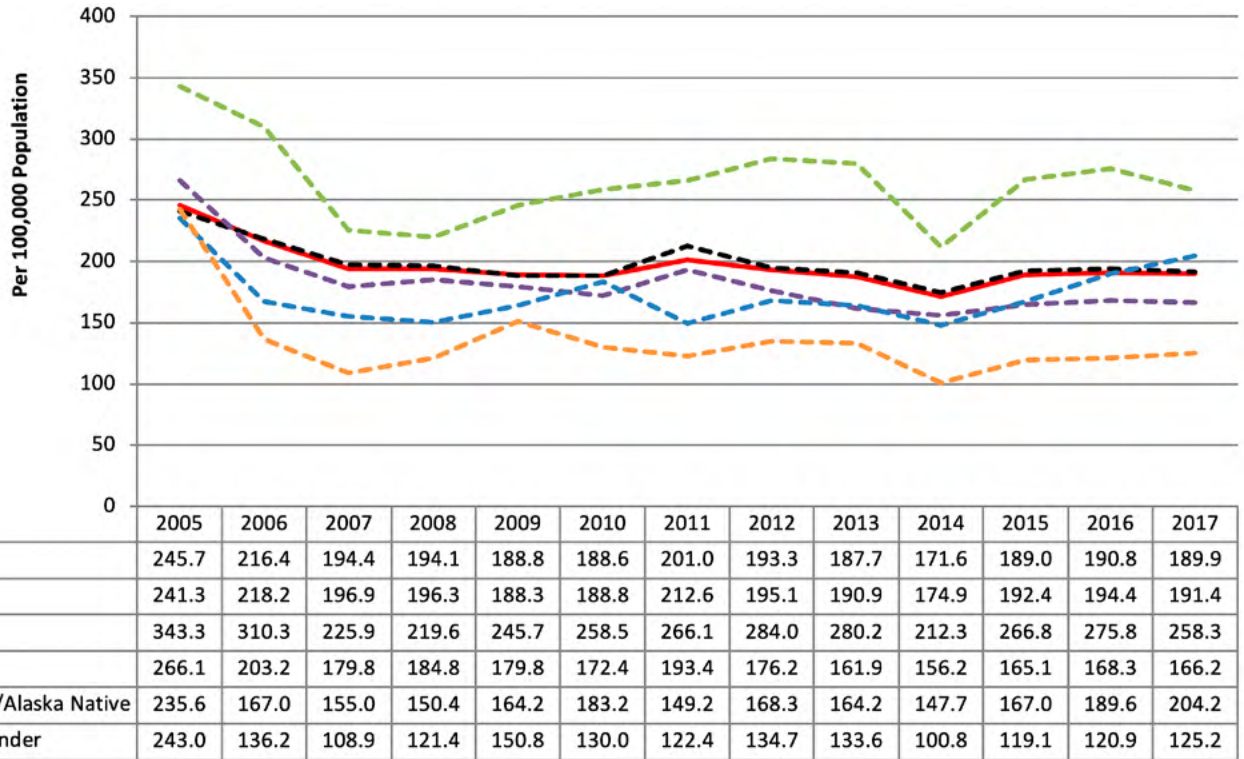
Figure 5: Cardiovascular Disease Age-Adjusted Mortality, Arizona 2005-2017



Source: Arizona Vital Statistics, 2017

Of all races/ethnicities, Black/AA had the highest rate of death due to CVD at 343.3 per 100,000 population in 2005. In 2017, the death rate dropped to 258.3 per 100,000 population, but remains the highest among all races/ethnicities. Death rates among AI/AN had a 22.3 percent increase from 235.6 per 100,000 population in 2005 to 204.2 per 100,000 population in 2017. A/PI had the lowest death rates in 2017. See Figure 6 for all CVD death rates by race/ethnicity from 2005 to 2017.

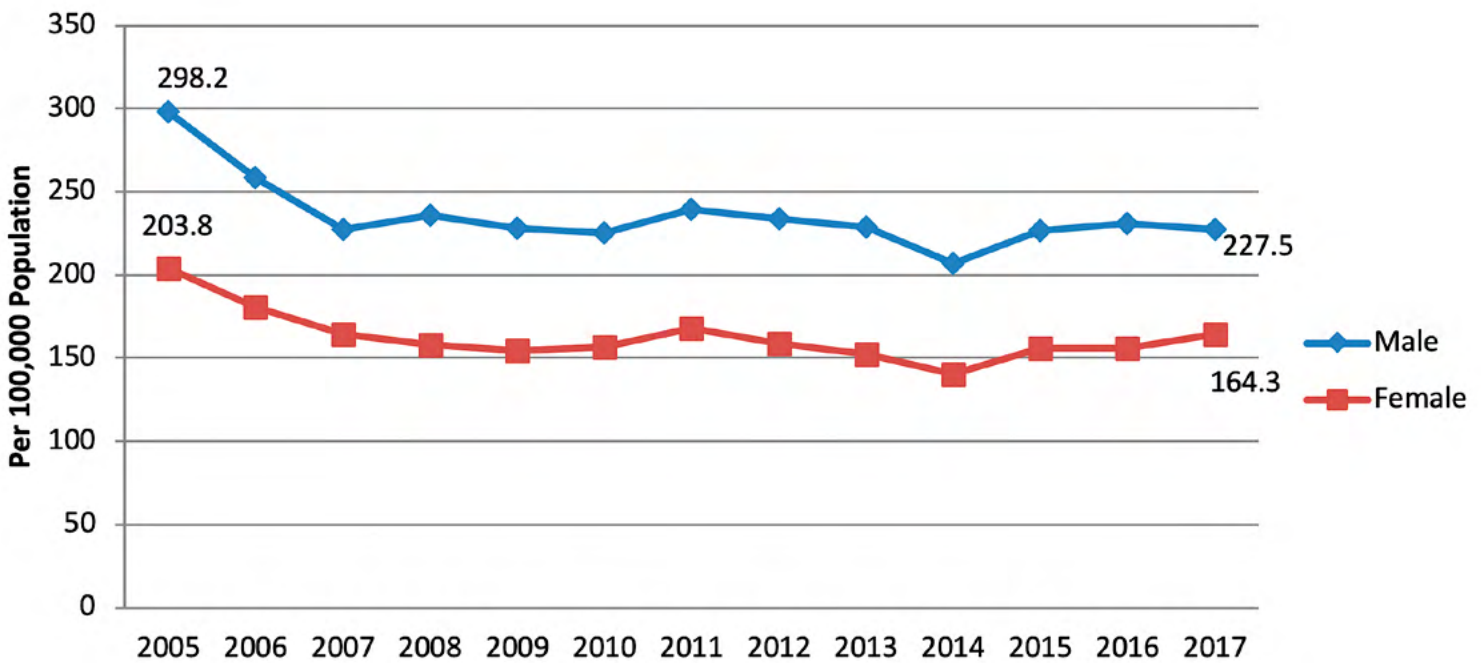
Figure 6: Cardiovascular Disease Age-Adjusted Mortality Rate by Race/Ethnicity in Arizona, 2005-2017



Source: Arizona Vital Statistics, 2017

From 2005 to 2017, males were more likely than females to die from CVD. Both males and females have seen a decline in death rates due to CVD. In 2005, the CVD death rate for males was 298.2 per 100,000 population. In 2017, the death rate dropped to 227.5 per 100,000 population for males. In 2005, the CVD death rate for females was 203.8 per 100,000 population. In 2017, the CVD death rate dropped to 164.3 per 100,000 population for females. See Figure 7 for all CVD death rates by gender from 2005 to 2017.

Figure 7: Cardiovascular Disease Age-Adjusted Mortality Rate by Gender, Arizona, 2005-2017

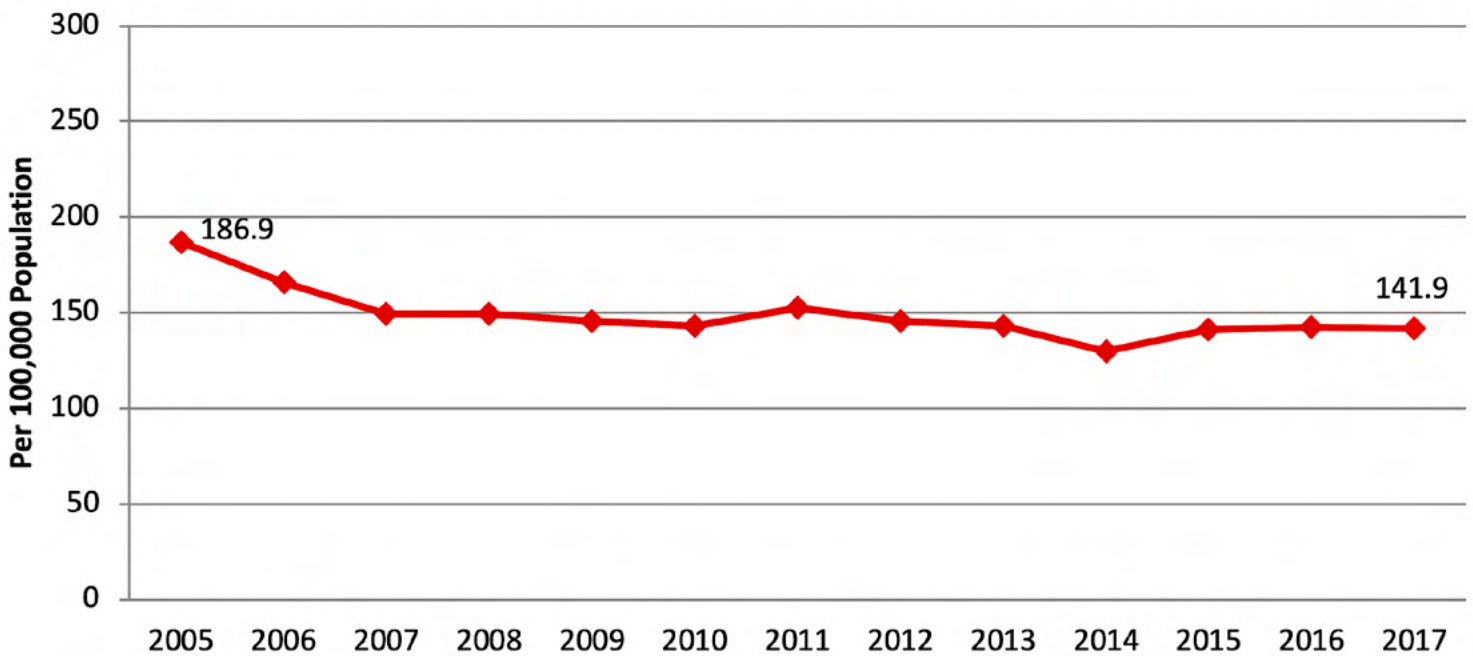


Source: Arizona Vital Statistics, 2017

III. HEART DISEASE MORTALITY

From 2005 to 2017, death rates due to heart disease declined by 24 percent. In 2005, 186.9 deaths out of 100,000 population were related to heart disease. Twelve years later in 2017, the death rate dropped to 141.9 per 100,000 population. The lowest death rate due to heart disease was in 2014 at 129.9 per 100,000 population. See Figure 8 for all heart disease death rates from 2005 to 2017

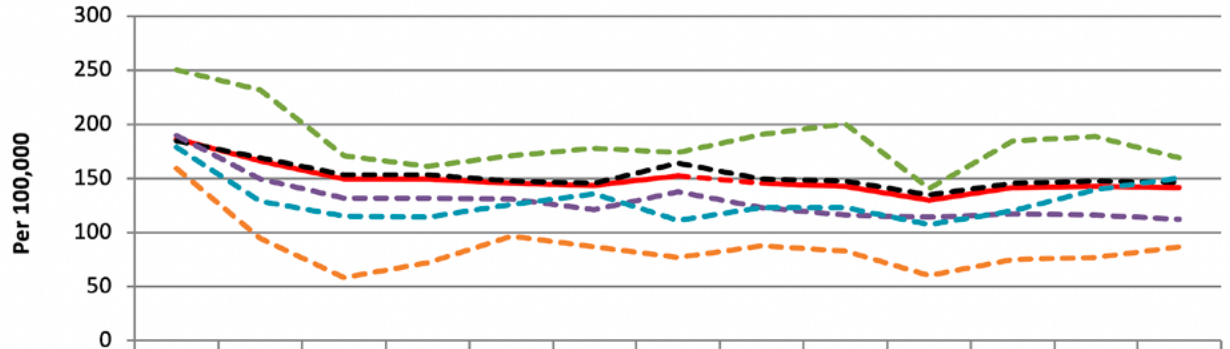
Figure 8: Diseases of the Heart Age-Adjusted Mortality Rate, Arizona 2005-2017



Source: Arizona Vital Statistics, 2017

Of all races/ethnicities, Black/AA had the highest rate of death due to heart disease at 250.3 per 100,000 population in 2005. In 2017, the death rate for Black/AA dropped to 169.6 per 100,000 population but it remains the highest among all races/ethnicities. Death rates among AI/AN had an 16.6 percent decrease from 179.1 in 2005 to 150.9 in 2017. A/PI had the lowest death rates in 2017. See Figure 9 for all heart disease death rates by race/ethnicity from 2005 to 2017.

Figure 9: Diseases of the Heart Age-Adjusted Mortality
Rate by Race/Ethnicity, Among Residents in Arizona, 2005-2017

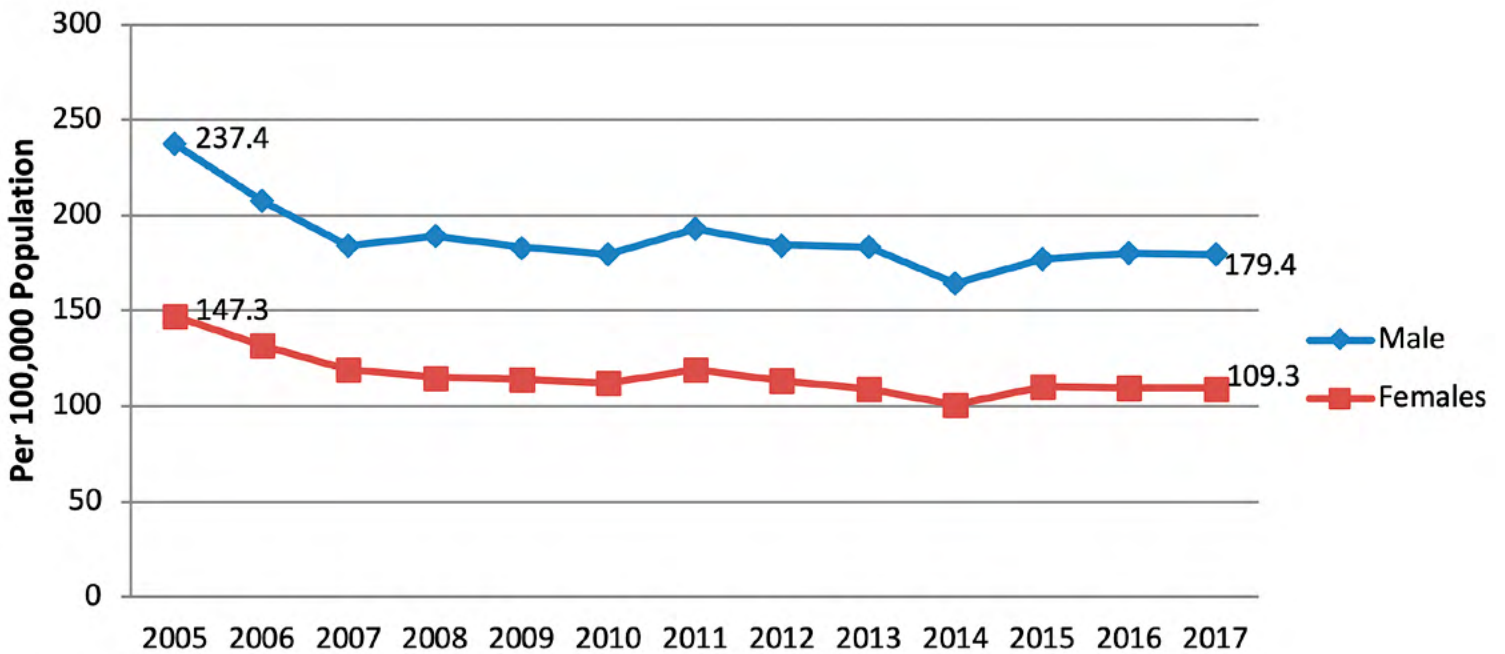


	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
— Arizona	186.9	166.1	149.5	149.3	145.9	143.3	152.7	145.8	143.0	129.9	141.3	142.5	141.9
- - - White	185.2	168.8	153.2	153.1	147.5	145.4	164.3	150.0	147.6	134.4	146.0	147.7	146.1
- - - Black/African American	250.3	231.9	171.3	161.7	171.3	177.7	174.0	190.5	200.5	140.9	184.4	188.3	169.6
- - - Hispanic	189.6	149.8	131.5	132.0	130.5	121.3	137.4	123.4	116.1	114.0	117.6	116.3	112.5
- - - American Indian/Alaska Native	179.1	129.4	115.2	114.6	125.8	135.9	111.1	122.7	122.9	107.5	119.9	139.9	150.9
- - - Asian/Pacific Islander	159.8	94.7	58.6	71.8	96.7	86.8	77.0	87.9	82.5	60.3	75.0	76.6	87.2

Source: Arizona Vital Statistics, 2017

From 2005 to 2017, males were more likely than females to die from heart disease. Both males and females have seen a decline in death rates due to heart disease. In 2005, 237.4 deaths out of 100,000 males were linked to heart disease. This number dropped 24 percent to 179.4 per 100,000 population in 2017. In 2005, 147.3 deaths out of 100,000 females were linked to heart disease. In 2017, this number dropped 26 percent to 109.3 per 100,000 population. See Figure 10 for all heart disease death rates by gender from 2005 to 2017.

Figure 10: Diseases of the Heart Age-Adjusted Mortality Rate by Gender in Arizona 2005-2017

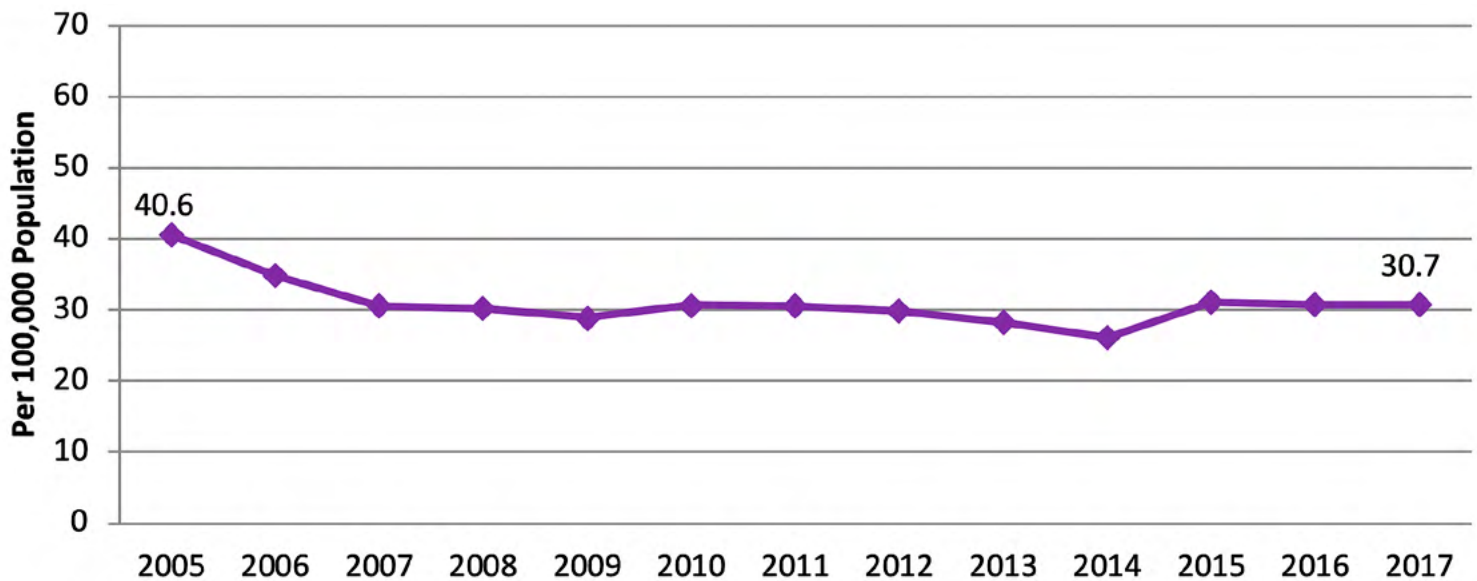


Source: Arizona Vital Statistics, 2017

IV. STROKE MORTALITY

From 2005 to 2017, death rates due to stroke declined by 24 percent. In 2005, 40.6 deaths per 100,000 population were related to stroke. Twelve years later in 2017, the death rate dropped to 30.7 per 100,000 population. The lowest death rate due to stroke was recorded in 2014 at 26.2 per 100,000 population. See Figure 11 for all stroke death rates from 2005 to 2017.

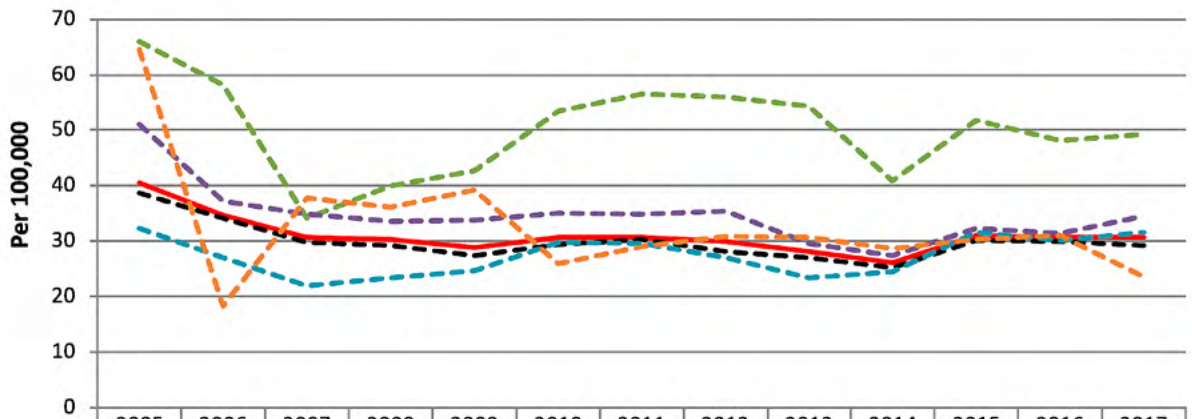
Figure 11: Stroke Age-Adjusted Mortality Rates, Arizona 2005-2017



Source: Arizona Vital Statistics, 2017

Like CVD and heart disease, Black/AA had the highest rate of death due to stroke at 64.6 per 100,000 population in 2005. In 2017, the death rate for Black/AA dropped to 49.2 per 100,000 population but it remained the highest among all races/ethnicities. Death rates among Hispanics and AI/AN have been increasing. The death rates in 2017 due to stroke were 31.7 per 100,000 population for AI/AN, and 34.5 per 100,000 population for Hispanics. See Figure 12 for all stroke death rates by race/ethnicity from 2005 to 2017.

Figure 12: Stroke Age-Adjusted Mortality Rate, Among Residents in Arizona, 2005-2017

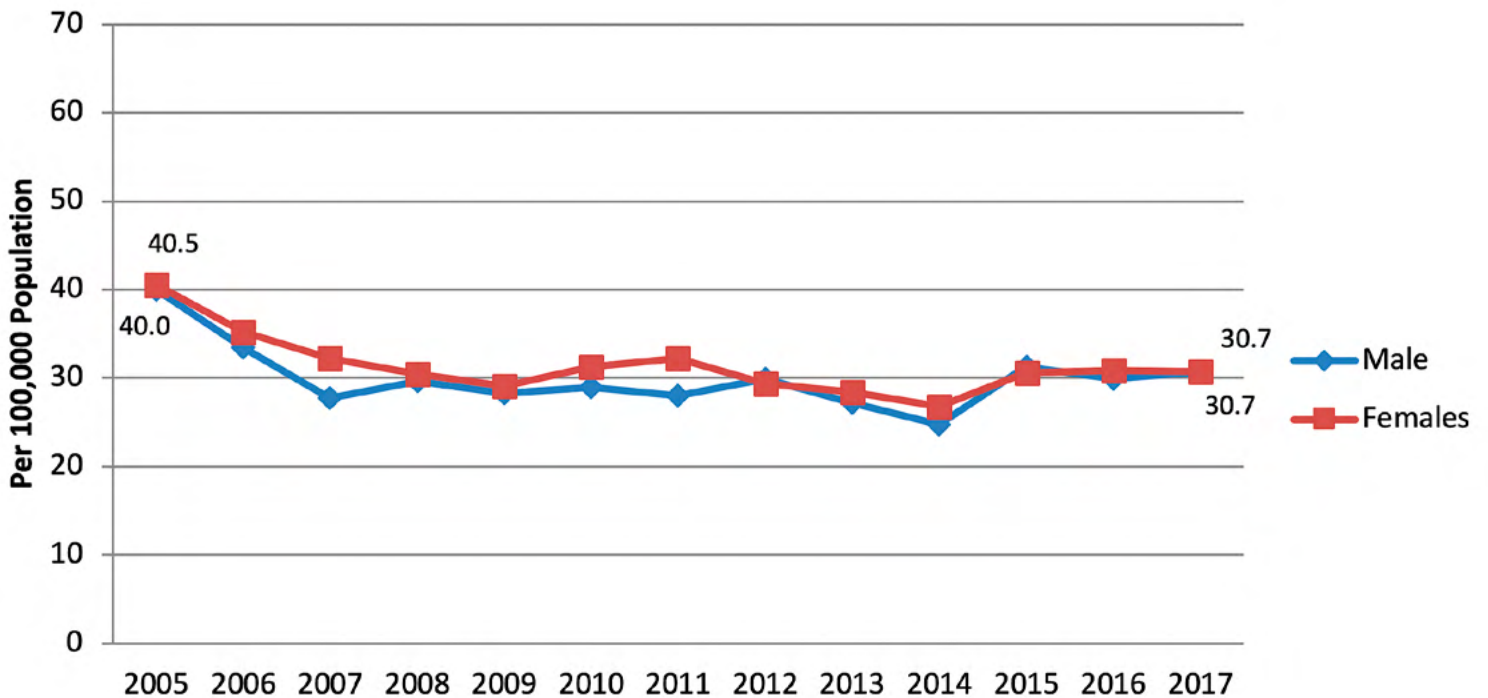


	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
— Arizona	40.6	34.8	30.6	30.3	28.9	30.7	30.6	29.9	28.2	26.2	31.1	30.7	30.7
- - White	38.8	34.1	29.7	29.2	27.5	29.4	30.4	28.1	27.1	25.3	30.1	30	29.2
- - Black/African American	66.0	58.2	34.1	40.0	42.8	53.5	56.5	56.0	54.4	40.8	51.8	48.1	49.2
- - Hispanic	51.0	37.3	34.9	33.6	33.8	35.1	34.9	35.5	29.7	27.4	32.4	31.5	34.5
- - American Indian/Alaska Native	32.3	27.0	22.0	23.5	24.7	29.8	29.7	27.1	23.4	24.5	31.6	30.1	31.7
- - Asian/Pacific Islander	64.6	18.4	37.7	36.2	39.2	26.0	29.1	30.9	30.7	28.7	30.4	31.1	23.6

Source: Arizona Vital Statistics, 2017

From 2005 to 2017, death rates due to stroke were about the same among females and males. Both males and females have seen a decline in death rates due to stroke. In 2005, the death rate for males due to stroke was 40.0 per 100,000 population. The death rate for females dropped by 24 percent to 30.7 per 100,000 population in 2017. In 2005, the death rate for males due to stroke was 40.0 per 100,000 population. The death rates for males dropped 23 percent to 30.7 per 100,000 population in 2017. See Figure 13 for all stroke death rates by gender from 2005 to 2017.

Figure 13: Stroke Age-Adjusted Mortality Rates by Gender, Arizona 2005-2017



Source: Arizona Vital Statistics, 2017

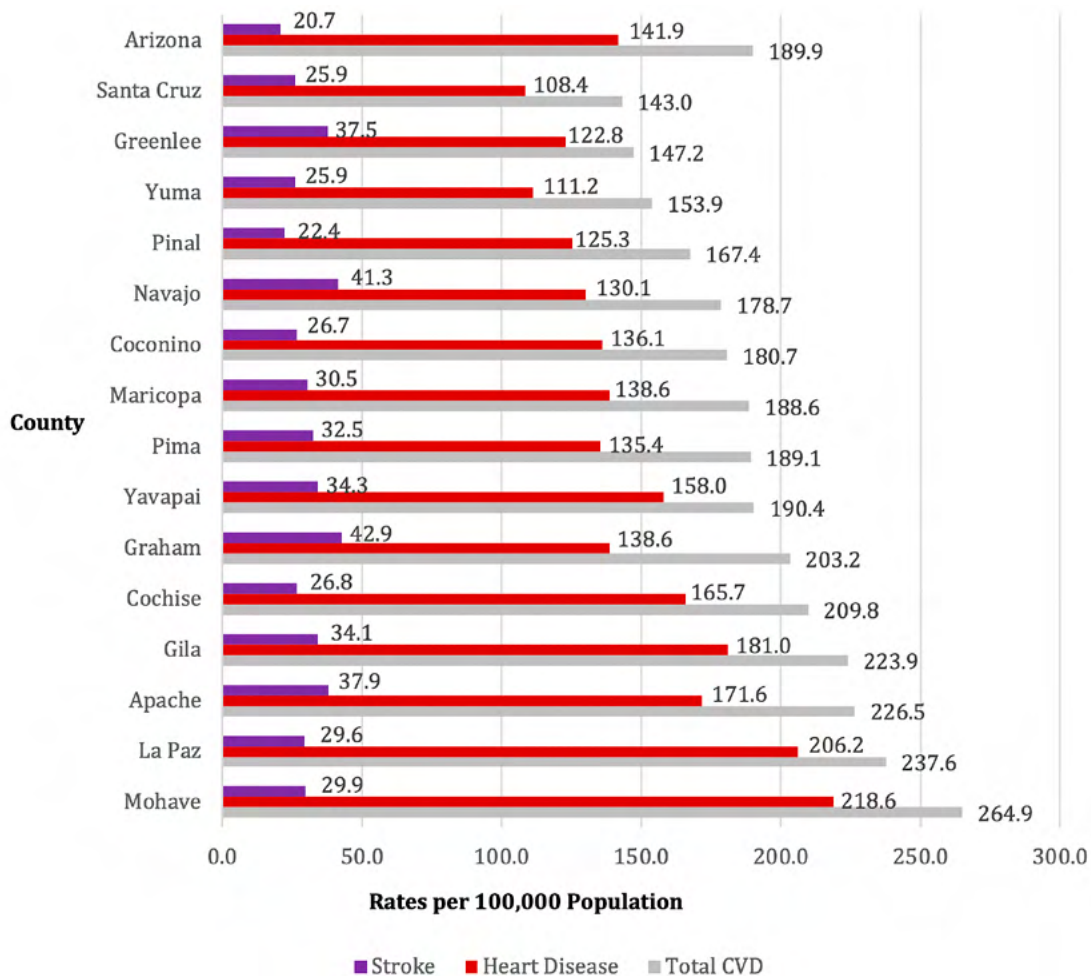
V. COUNTY SECTION OF CARDIOVASCULAR DISEASE, HEART DISEASE, AND STROKE MORBIDITY AND MORTALITY

In 2017, seven Arizona counties, Mohave (264.9), La Paz (237.6), Apache (226.5), Gila (223.9), Cochise (209.8), Graham (203.2), and Yavapai (190.4) had higher CVD death rates than the Arizona state rate (189.9).

In 2017, stroke was attributed to 20.7 deaths per 100,000 population in Arizona. Graham County had the highest stroke death rate in Arizona at 42.9. Six Arizona counties, Mohave (218.6), La Paz (206.2), Gila (181.0), Apache (171.6), Cochise (165.7), and Yavapai (158.0), had higher heart disease death rates than the Arizona heart disease death rate (141.9).

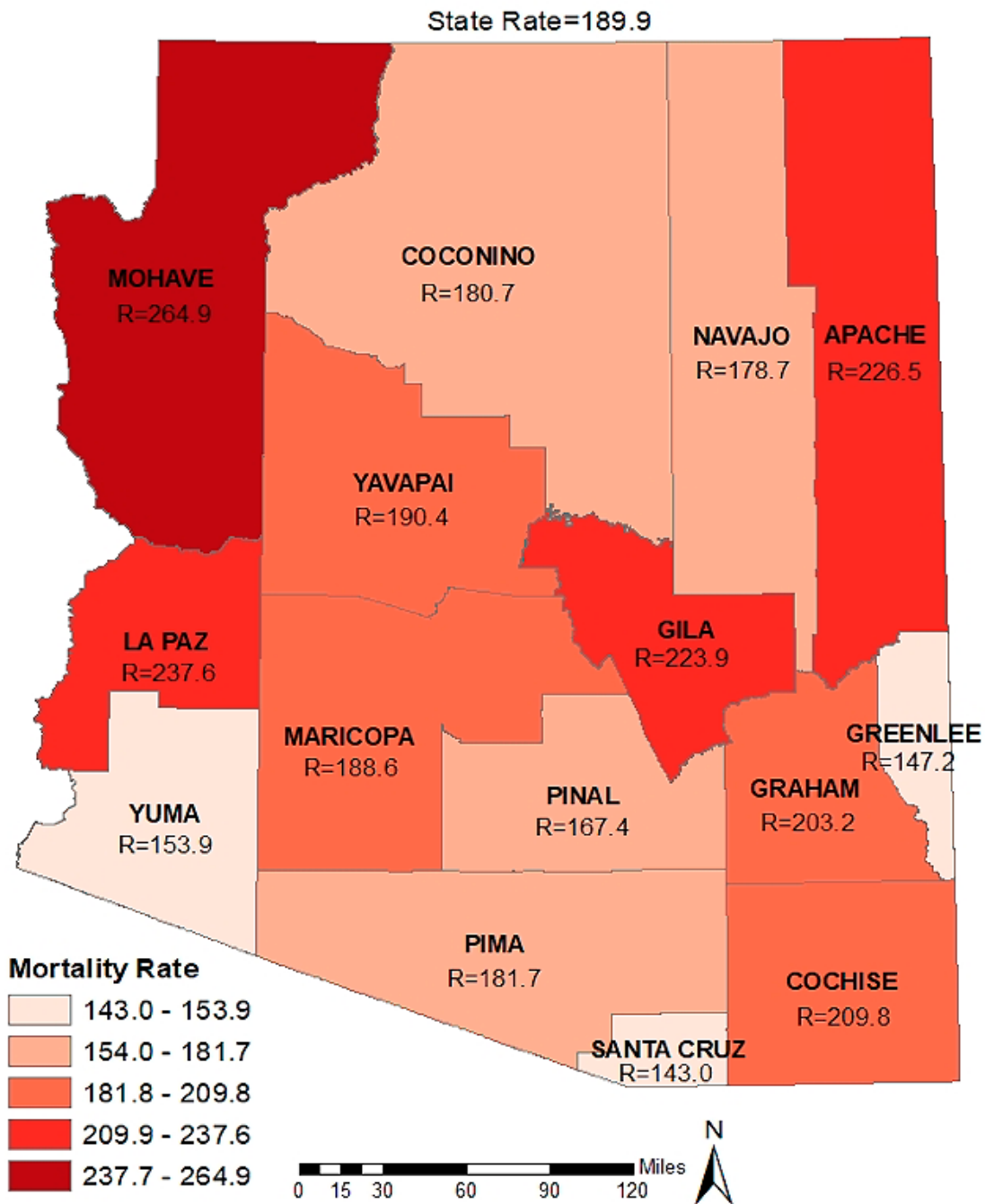
See Figure 14 for a comparison of the CVD, heart disease, and stroke death rates for all Arizona counties in 2017.

Figure 14: *Cardiovascular Disease, Heart Disease, Stroke Age-Adjusted Mortality by Counties in Arizona, 2017*



By county in 2017, Mohave (264.9) and La Paz (237.6) had the highest CVD death rates per 100,000 population. The lowest death rates were in Santa Cruz (143.0), Greenlee (147.2), and Yuma (153.9) counties. See Map 1 for cardiovascular disease death rates in 2017 by county.

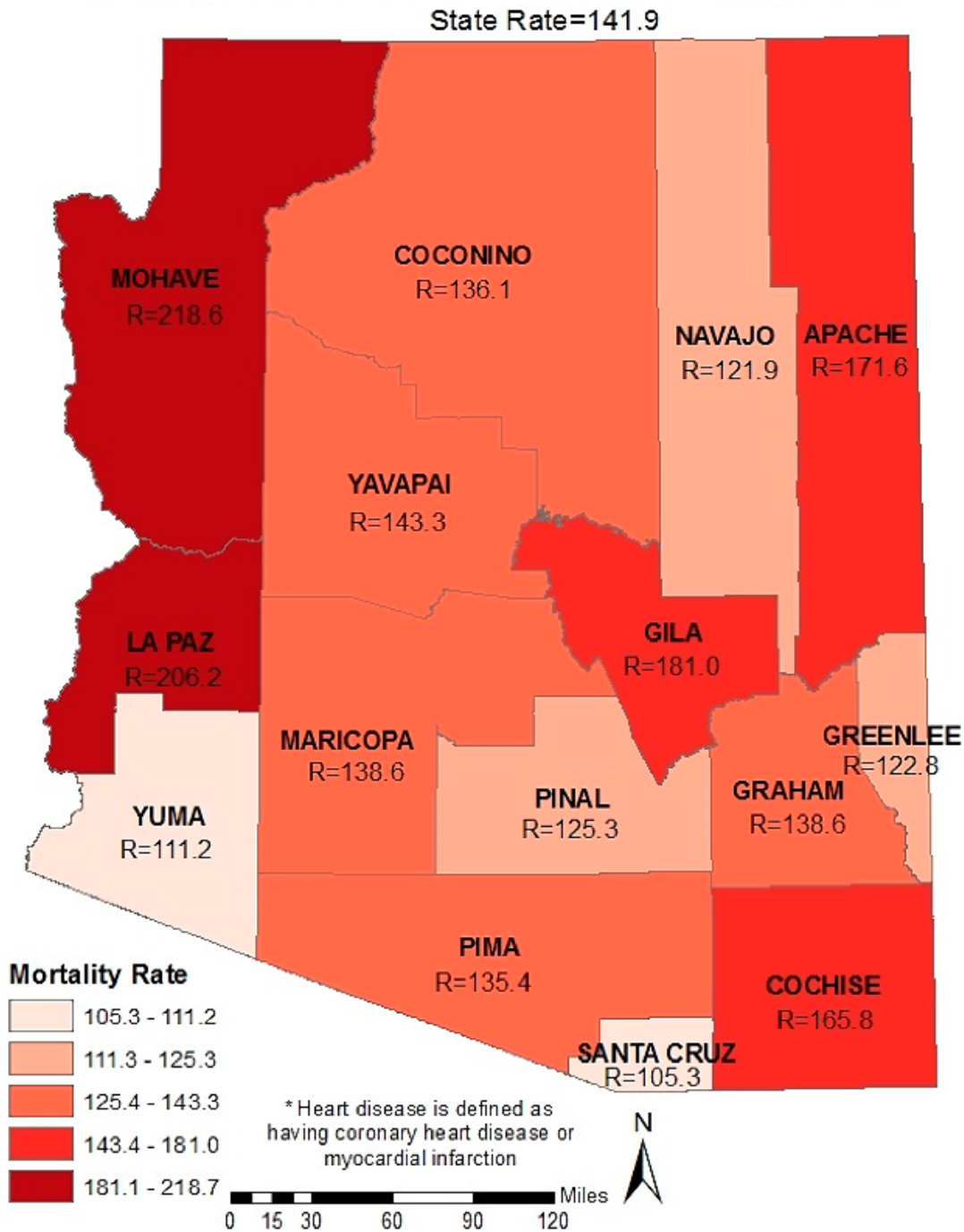
Map 1: Age-Adjusted Cardiovascular Disease Mortality by County, 2017



Source: Arizona Department of Health Services, Bureau of Vital Records

By county in 2017, Mohave (218.6) and La Paz (206.2) had the highest heart disease death rates per 100,000 population. The lowest heart disease death rates were in Santa Cruz (105.3) and Yuma (111.2) counties. See Map 2 for heart disease death rates in 2017 by county.

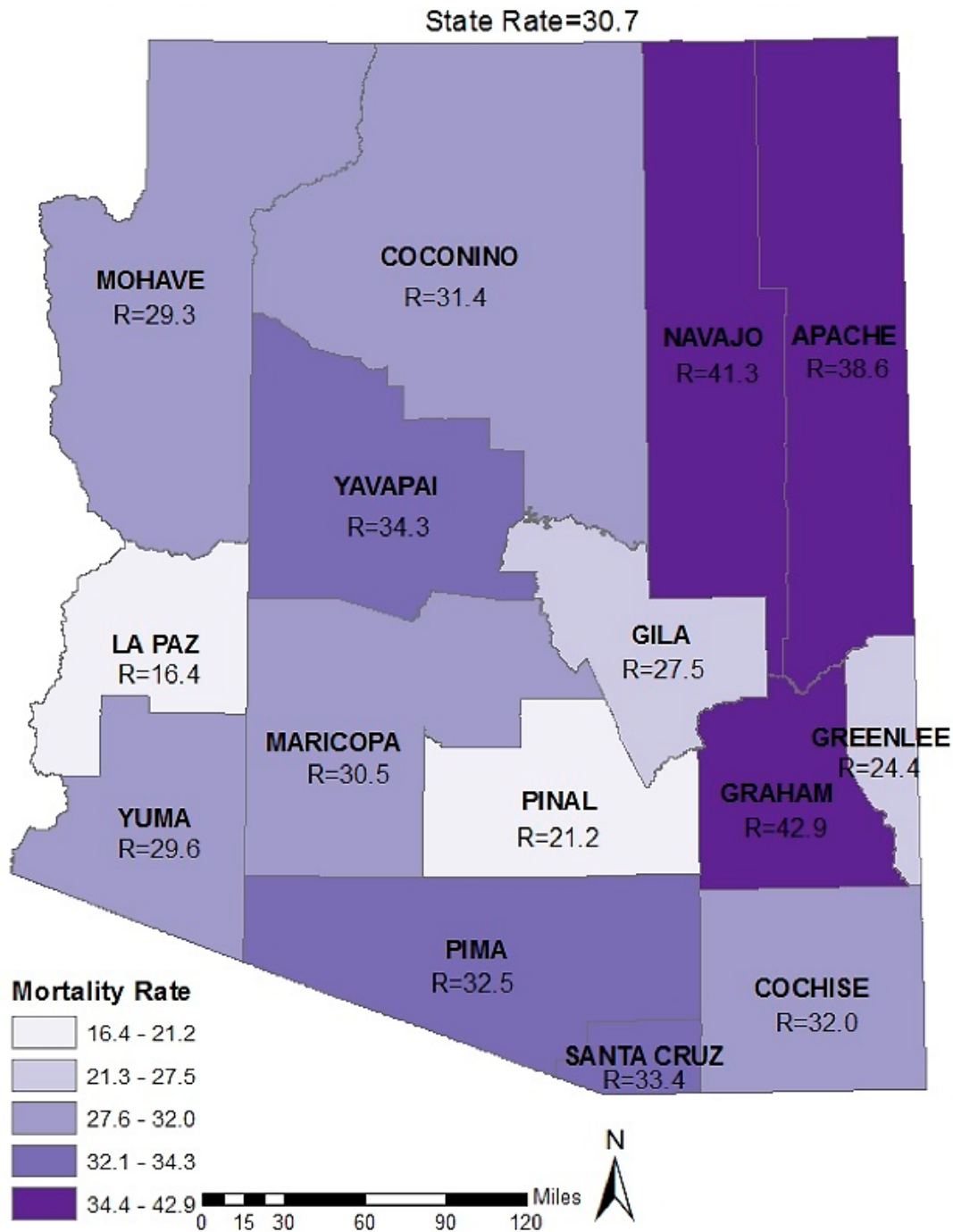
Map 2: Age-Adjusted Heart Disease Mortality by County, 2017



Source: Arizona Department of Health Services, Bureau of Vital Records

By county in 2017, Graham (42.9), Navajo (41.3), and Apache (38.6) had the highest rates of deaths per 100,000 population due to stroke. The lowest stroke death rates were in La Paz (16.4) and Pinal (21.2) counties. See Map 3 stroke death rates in 2017 by county.

Map 3: Age-Adjusted Stroke Mortality by County, 2017



Source: Arizona Department of Health Services, Bureau of Vital Records

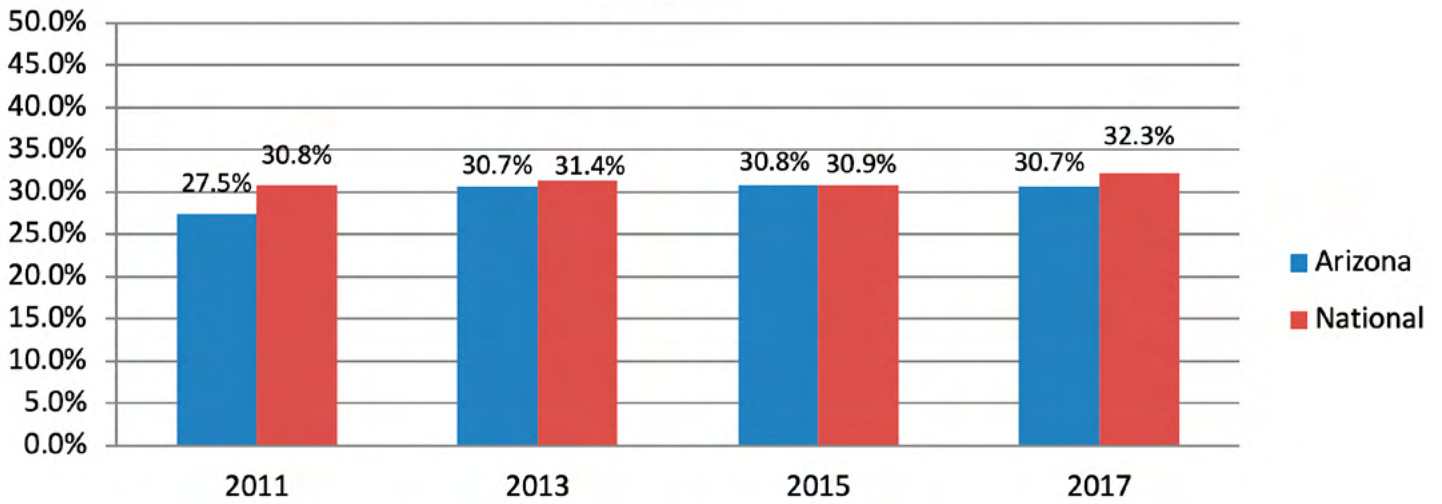
Chapter 3: Risk Factors for Cardiovascular Disease in Arizona

Data from the BRFSS provides information on several risk factors that can contribute to CVD, as well as heart disease and stroke. High cholesterol, high blood pressure, diabetes, smoking, physical inactivity, lack of fruit and vegetable consumption, and obesity are some risk factors associated with heart disease and stroke.

I. HIGH CHOLESTEROL AND HIGH BLOOD PRESSURE

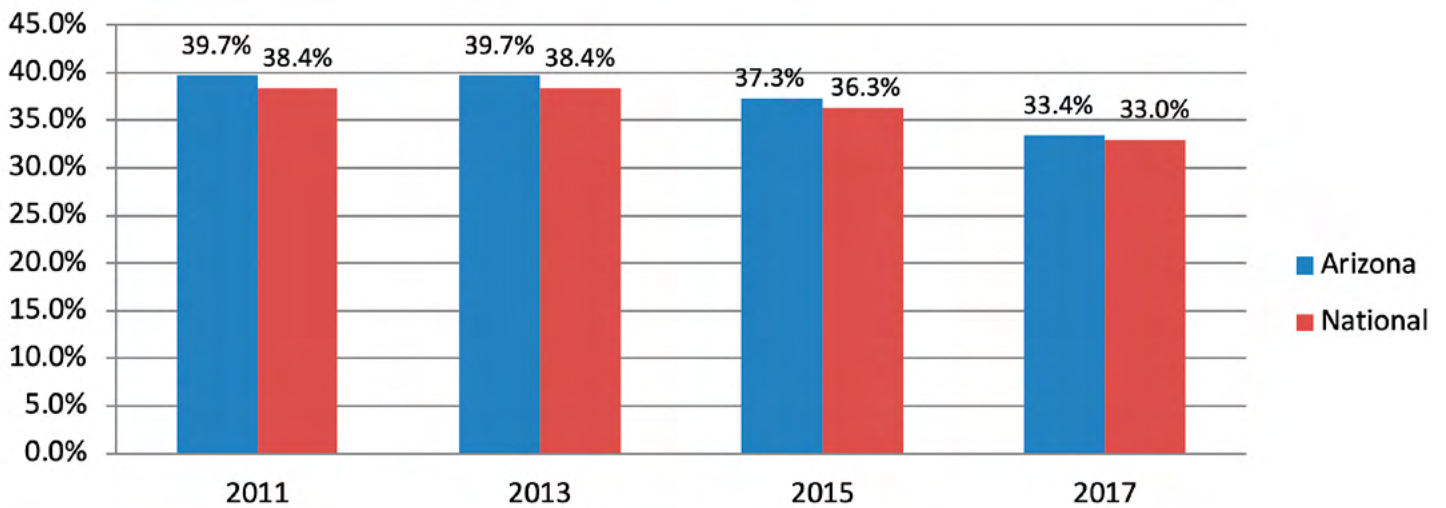
In the BRFSS survey, respondents are asked whether they have been told by a doctor that they have high cholesterol or high blood pressure. In 2017, 30.7 percent of Arizona adults indicated a diagnosis of high blood pressure (Figure 15) and 33.4 percent indicated that they had been diagnosed with high cholesterol (Figure 16). While high blood pressure diagnoses have been slightly increasing, high cholesterol diagnoses have been decreasing. For all state and national rates from 2011 to 2017 for high blood pressure, see Figure 15, and for high cholesterol, see Figure 16.

Figure 15: Arizona Adults Who Have Been Told They Have High Blood Pressure, 2011-2017*



Source: Arizona Behavioral Risk Factor Surveillance System
 *High blood pressure question is only asked every other year

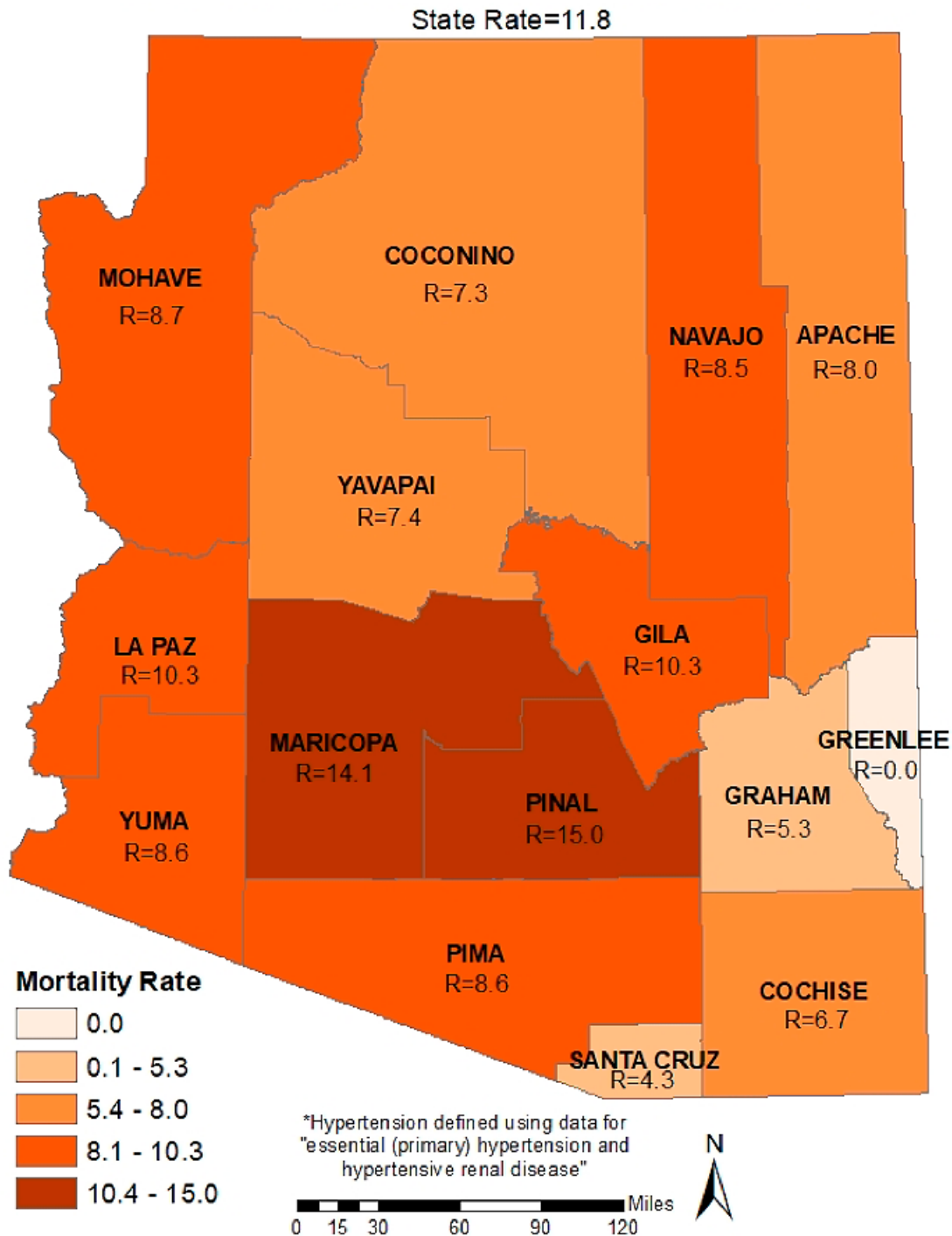
Figure 16: Arizona Adults Who Have Had Their Blood Cholesterol Checked and Have Been Told It was High, 2011-2017*



Source: Arizona Behavioral Risk Factor Surveillance System
 *Blood Cholesterol question is only asked every other year

In 2017, Pinal (15.0) and Maricopa (14.1) counties had the highest rates of deaths per 100,000 people linked to high blood pressure. The lowest death rates were in Graham (5.3) and Santa Cruz (4.3) counties. See Map 4 for high blood pressure death rates in 2016 by county.

Map 4: Age-Adjusted Hypertension Mortality by County, 2017

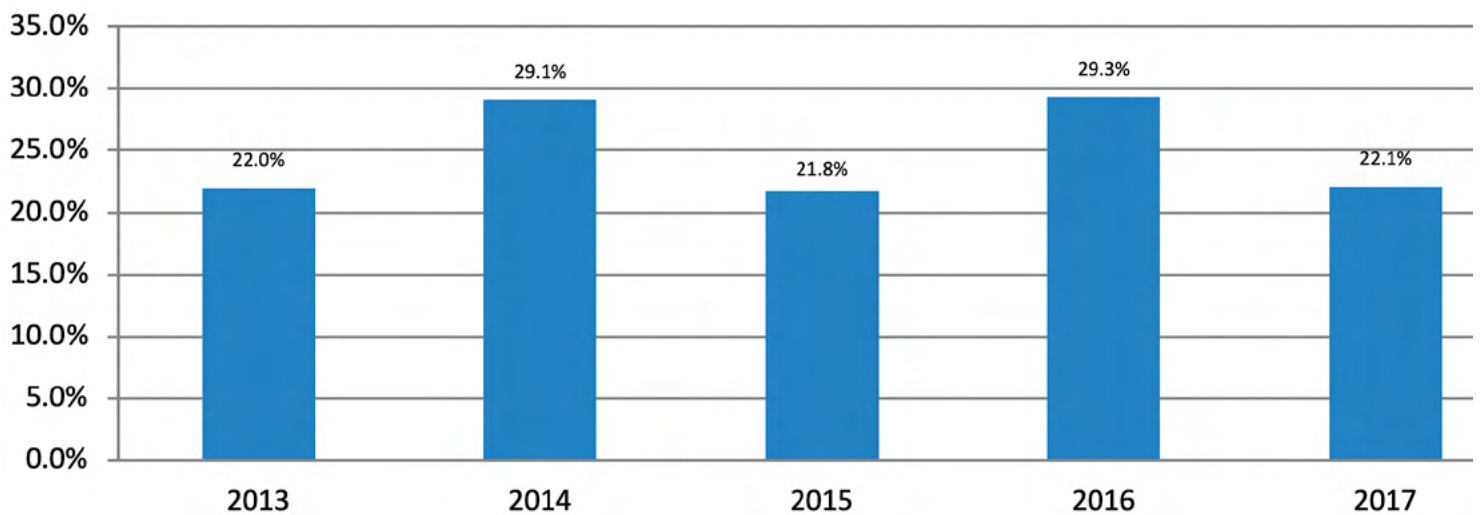


Source: Arizona Department of Health Services, Bureau of Vital Records

II. PHYSICAL ACTIVITY

The Centers for Disease Control and Prevention (CDC) recommends at least 150 minutes of physical activity a week of moderate-intensity for adults ([health.gov/paguidelines/second-edition/pdf/Physical_Activity_Guidelines_2nd_edition.pdf#page=55](https://www.health.gov/paguidelines/second-edition/pdf/Physical_Activity_Guidelines_2nd_edition.pdf#page=55)). The BRFSS survey asks whether respondents have achieved this goal. Since 2013, slightly more Arizonans were meeting this recommendation, but there was a decline from 29.3 percent in 2016 to 22.1 percent in 2017. See Figure 17 for the percentage of Arizona Adults who met physical activity guidelines.

Figure 17: Percentage of Arizona Adults Who Met Physical Activity Guidelines, 2013-2017

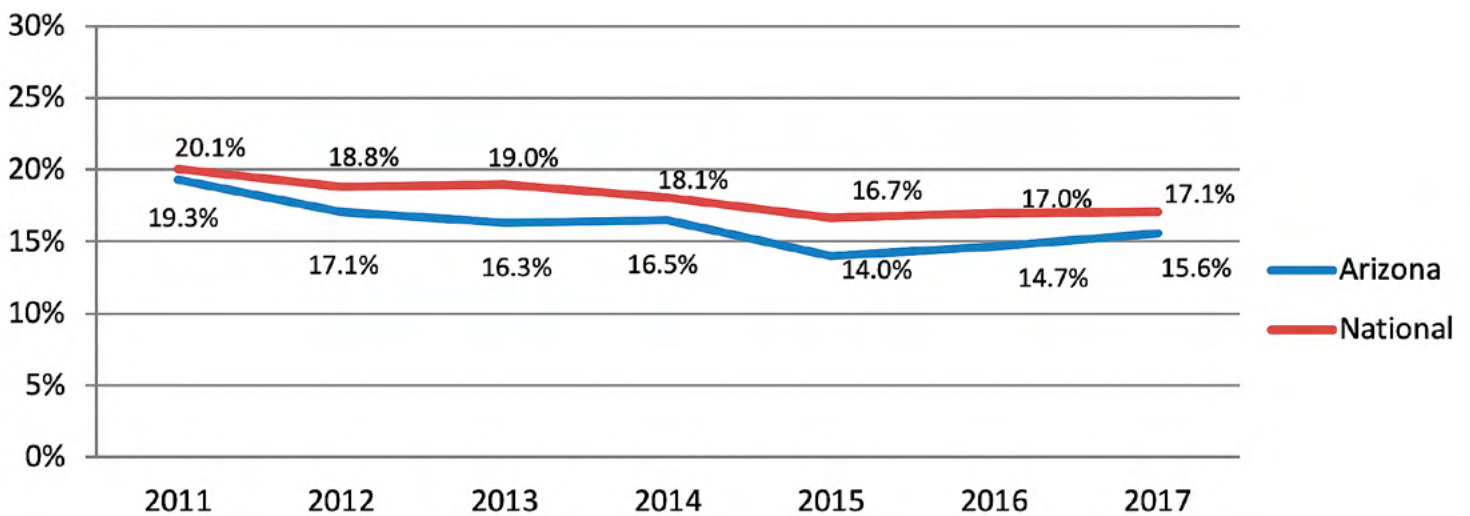


Source: Arizona Behavioral Risk Factor Surveillance System

III. SMOKING

A decrease in smoking among adults can have an impact on reducing cardiovascular diseases including heart disease and stroke. Among Arizonans, the smoking rate was 19.3 percent in 2011 and decreased to 15.6 percent in 2017 (Figure 18). The lowest rate of 14.0 percent was reported in 2015 (Figure 18). A decrease in smoking among adults can have an impact on reducing cardiovascular diseases including heart disease and stroke. See Figure 18 for all smoking rates among Arizona adults from 2011 to 2017.

Figure 18: *Percentage of Arizona Adults That Are Current Smokers, 2011-2017*

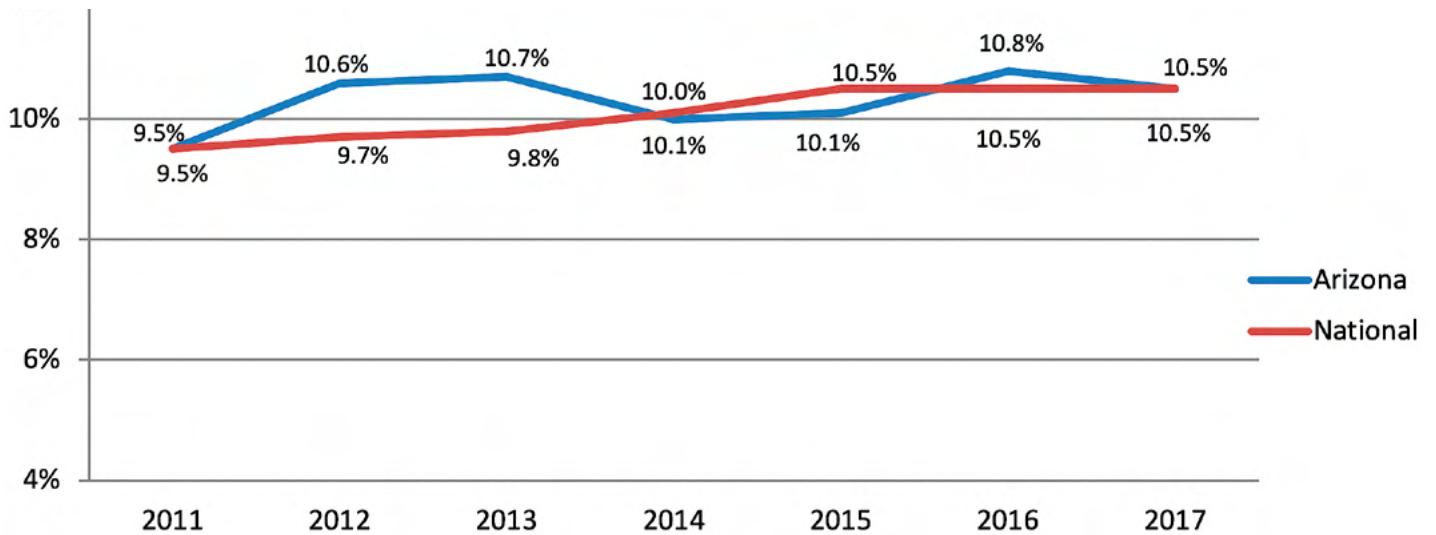


Source: Arizona Behavioral Risk Factor Surveillance System

IV. DIABETES

The BRFSS survey collects information from respondents by asking whether they have ever been told by a doctor that they have diabetes. From 2011 to 2017, rates of diabetes among Arizona adults increased from 9.5 percent to 10.5 percent. See Figure 19 for all rates from 2011 to 2017.

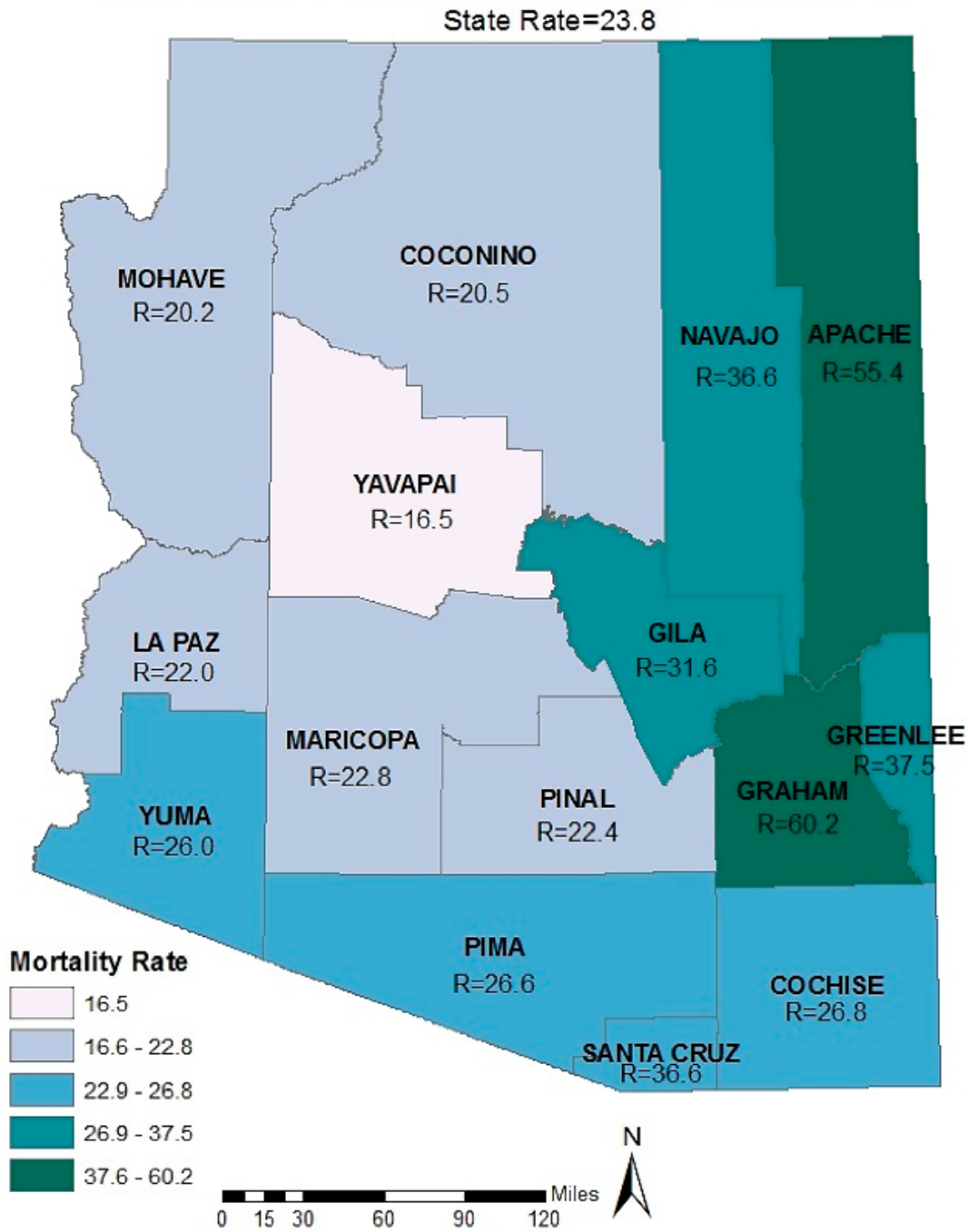
Figure 19: Percentage of Adults that Have Been Told by a Doctor That They Have Diabetes, 2011-2017



Source: Arizona Behavioral Risk Factor Surveillance System

In 2017, Graham (60.2) and Apache (55.4) counties had the highest rates of deaths per 100,000 people due to diabetes. The lowest rate was in Yavapai County (16.5). See Map 5 for age adjusted diabetes mortality by county.

Map 5: Age Adjusted Diabetes Mortality by County, 2017

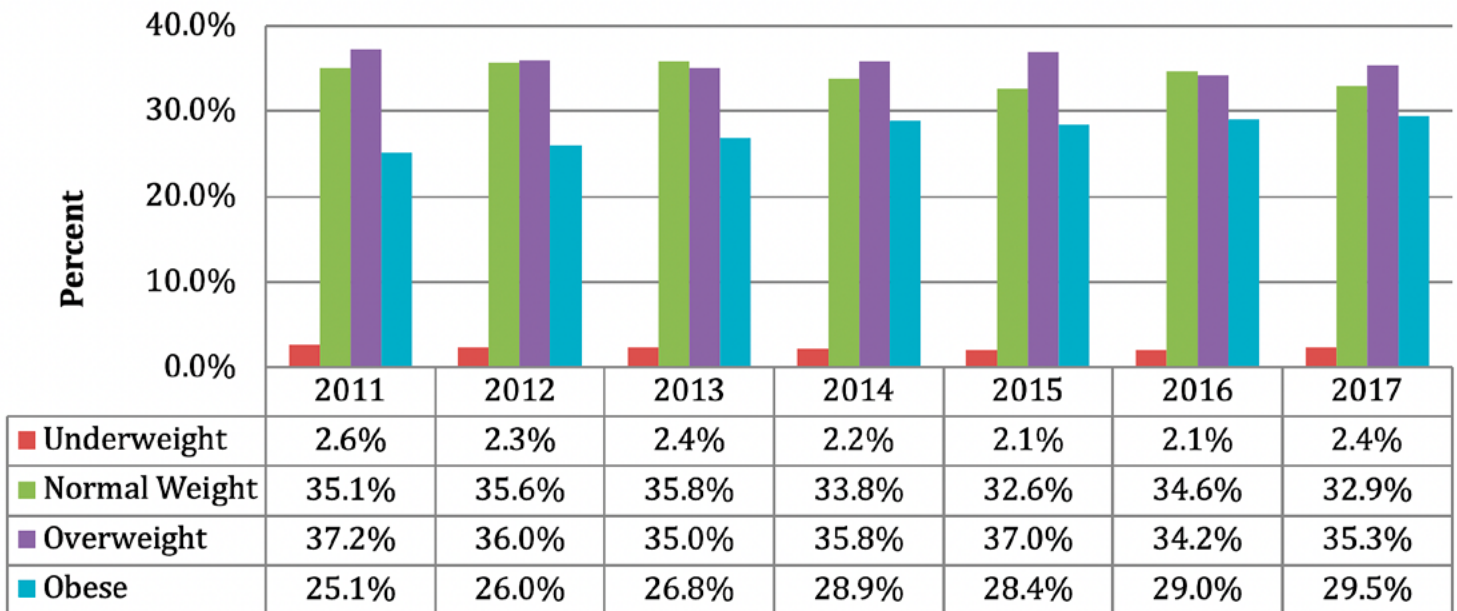


Source: Arizona Department of Health Services, Bureau of Vital Records

V. OBESITY

The BRFSS survey collects information from respondents to identify their weight status. From 2011 to 2017, obesity rates among Arizona adults increased from 25.1 percent to 29.5 percent, which is a 4.4 percent increase in seven years. See Figure 20 for all underweight, normal weight, overweight and obesity rates from 2011 to 2017.

Figure 20: Arizona Weight Status from 2011-2017

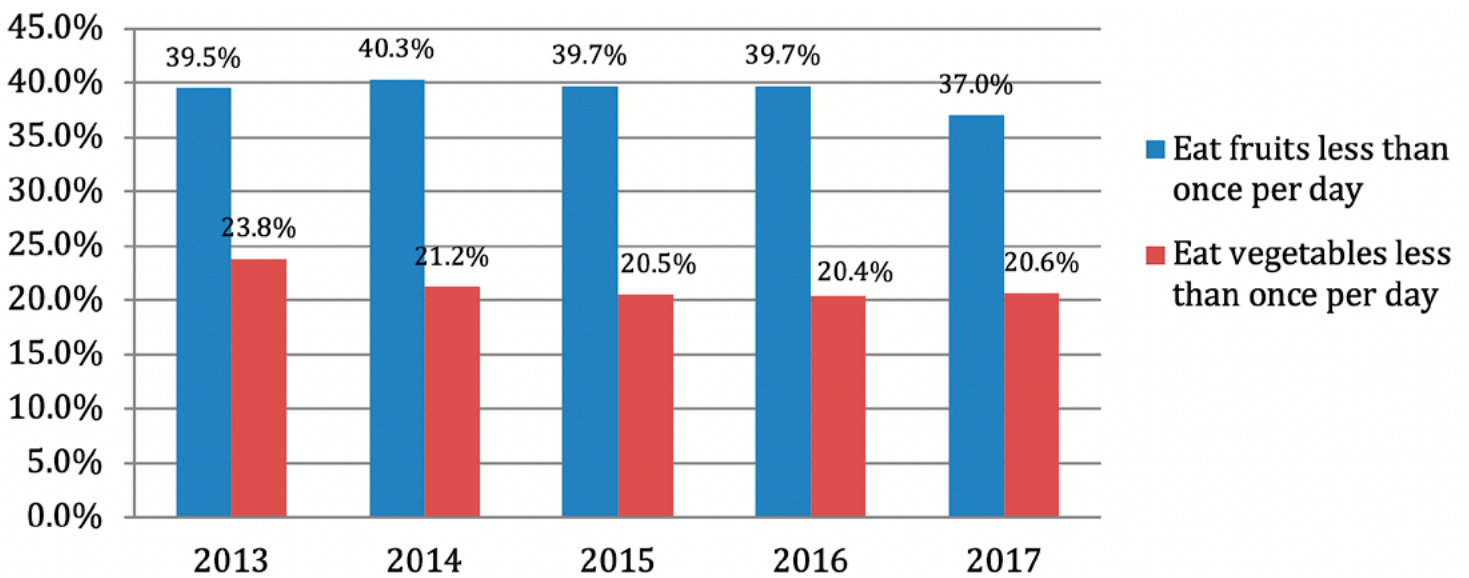


Source: Arizona Behavioral Risk Factor Surveillance System

VI. LOW FRUIT AND VEGETABLE CONSUMPTION

Meeting the recommendations for fruit and vegetable consumption can reduce the risk for heart disease, diabetes, some cancers, and obesity. For adults, the recommendation is to consume 1 ½ to 2 cups of fruits and 2 to 3 cups of vegetables per day. The BRFSS survey collects information from respondents to identify how often adults eat fruits and vegetables. In 2013, 39.5 percent of adults indicated consuming fruits less than once per day and 23.8 percent were getting less than one vegetable per day. In 2017, the percent of Arizonans consuming vegetables less than once per day decreased to 20.6 percent. See Figure 21 for those consuming fruits and vegetables less than once per day.

*Figure 21: Consumption of Fruits and Vegetables
Per Day Among Arizona Adults, 2013-2017*



Source: Arizona Behavioral Risk Factor Surveillance System

Chapter 4: Economic and Hospitalization Impact of Cardiovascular Disease in Arizona

I. DIRECT AND INDIRECT COSTS

According to the American Heart Association, nationally, the estimated direct and indirect cost of heart disease and stroke in 2016 was over \$555 billion. Nationally, this number is expected to pass 1 trillion dollars annually by 2035.

In 2016, coronary artery disease and stroke were ranked 3rd and 4th overall in chronic disease costs in Arizona, totaling almost 3 billion dollars. See Table 2 for chronic disease costs in Arizona.

Table 2: Charges Related to Chronic Disease Hospitalizations, Arizona, 2016

Disease	Charges
Diabetes	\$7,887,188,974
Lung Disease	\$3,810,191,045
Coronary Heart Disease	\$1,652,315,698
Stroke	\$1,231,308,005
TOTAL	\$14,581,004,073

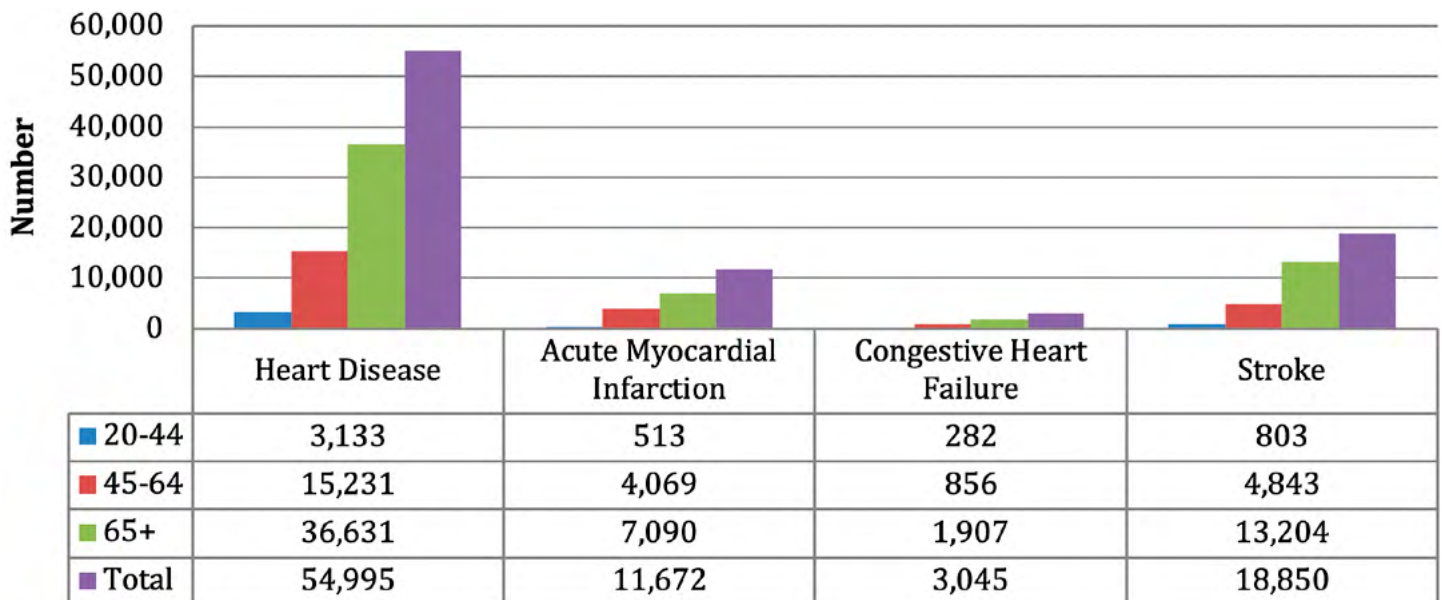
II. DEMOGRAPHICS OF HOSPITAL DISCHARGES BY CARDIOVASCULAR DISEASE

Arizona hospital discharge data provides information on hospitalizations based on the first listed hospital diagnosis. Information is provided in the following graphs for the following cardiovascular diseases: heart disease, stroke, congestive heart failure, and heart attack by age group, gender, and race/ethnicity.

a. Age Group

Among those aged 65 and older, heart disease, stroke, and congestive heart failure occurs more than twice as often compared to those aged 45-64. Of all hospital diagnoses of heart disease in 2017, 36,631 were among those aged 65 and older. Heart disease was the most common cardiovascular disease hospital diagnosis among adults 20 years of age and older followed by stroke as the second most common hospital diagnosis. See Figure 22 for all hospital discharge diagnoses by age group in 2017.

Figure 22: Number of Hospital Discharges by First-Listed Diagnosis and Age Group, Arizona, 2017



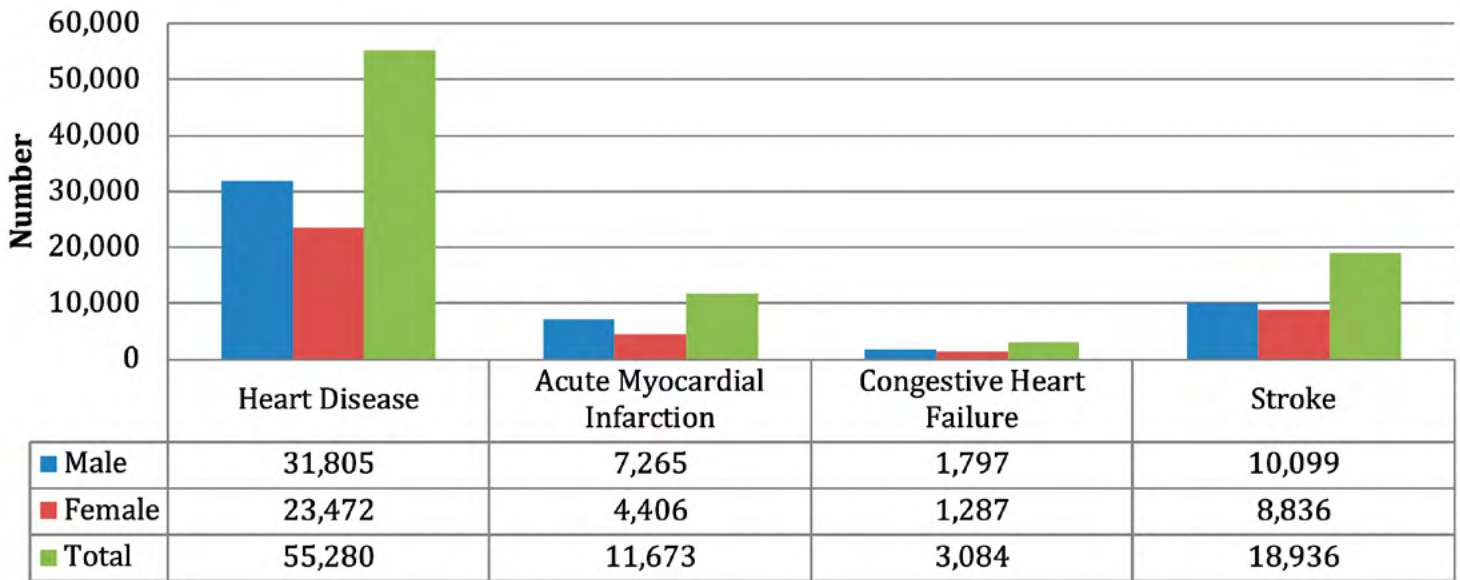
Source: Arizona Vital Statistics, 2017

b. Gender

In 2017, males were diagnosed with heart disease, stroke, heart attack, and congestive heart failure more often than females. Of the total hospital discharges due to Acute Myocardial Infarction (AMI), 7,265 were among males compared to 4,406 among females. Of the total 55,280 heart disease hospital diagnoses, 31,805 were among males and 23,472 among females. See Figure 23 for all hospital discharge diagnoses by gender.

Figure 23: Number of Hospital Discharges by First-Listed Diagnosis and Gender, Arizona, 2017

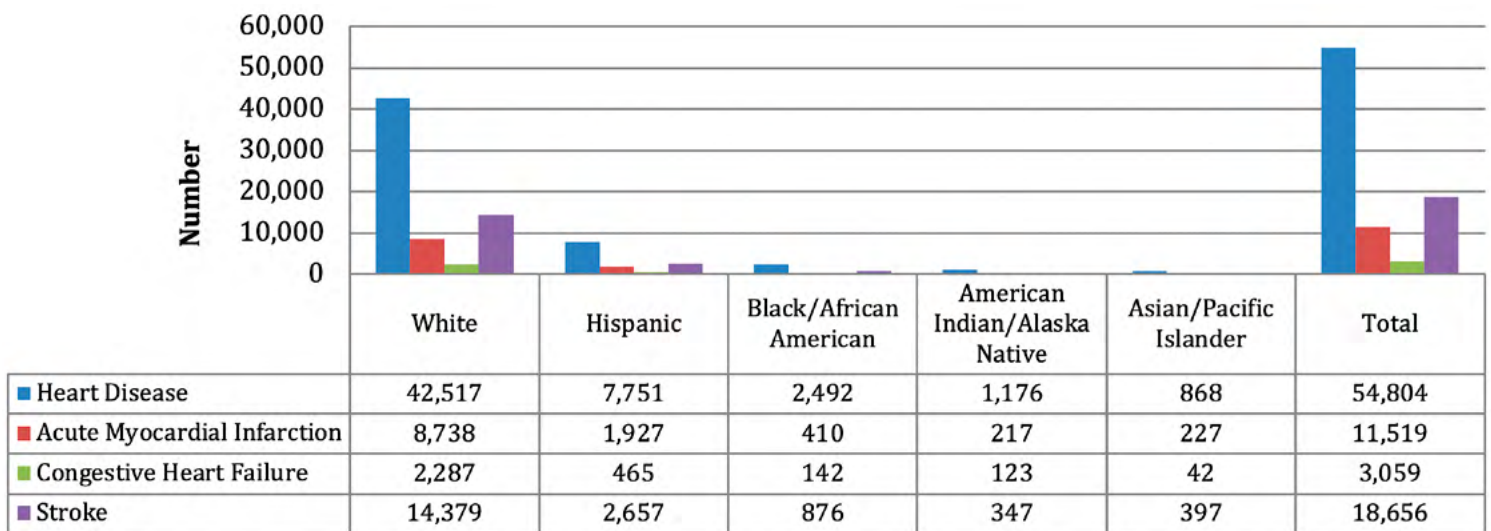
c. Race/Ethnicity



Source: Arizona Vital Statistics, 2017

Among all race/ethnicities, heart disease was the most common hospital diagnosis. The A/PI had the least number of hospital diagnoses related to heart disease and congestive heart failure. Among hospital discharges for Whites in 2017, there were 42,517 linked to heart disease, 14,379 linked to stroke, 8,738 linked to AMI, and 2,287 related to congestive heart failure. See Figure 24 for all hospital discharge diagnoses by race/ethnicity.

Figure 24: Number of Hospital Discharges by First-Listed Diagnosis and Race/Ethnicity, Arizona, 2017



Source: Arizona Vital Statistics, 2017

III. HOSPITAL DISCHARGE DATA TRENDS IN MORBIDITY

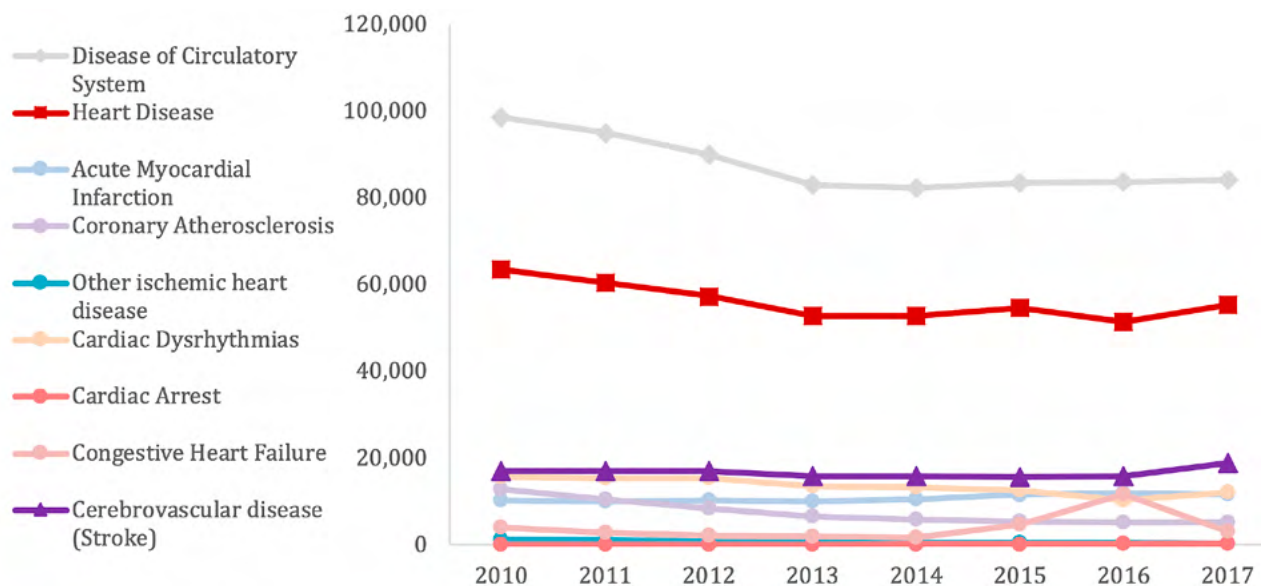
Hospital discharge data illuminates segments of the population who are not captured in the morbidity (death rate-related) data. Understandably there is a focus on death rates from cardiovascular disease, yet, morbidity rates (those who have disease but whose condition has not yet resulted in death) is a far larger number that is not decreasing as uniformly as death rates. Table 3 provides the number of diagnoses by year and Figure 25 provides an illustration on the trend changes from 2010 to 2017.

Table 3: Number of Discharges by First Listed Diagnosis, Arizona, 2010–2017

CVD category of First-Listed Diagnoses	Year							
	2010	2011	2012	2013	2014	2015	2016	2017
Disease of Circulatory System	98,621	94,959	90,000	83,100	82,268	83,452	83,719	84,222
Heart Disease	63,546	60,509	57,351	52,832	52,756	54,583	51,356	55,280
Acute Myocardial Infarction	10,240	10,090	10,270	10,010	10,480	11,580	11,920	11,670
Coronary Atherosclerosis	12,976	10,524	8,410	6,661	5,819	5,340	5,210	5,110
Other ischemic heart disease	1,190	1,120	880	680	560	560	450	394
Cardiac Dysrhythmias	15,683	15,513	15,418	13,591	13,242	12,590	10,283	12,114
Cardiac Arrest	170	150	181	173	220	210	260	290
Congestive Heart Failure	4,042	2,930	2,190	2,030	1,770	4,660	11,746	3,080
Cerebrovascular disease (Stroke)	16,999	17,010	17,013	15,936	15,860	15,659	15,955	18,936

Source: Arizona Vital Statistics, 2017

Figure 25: Number of Discharges by First-Listed Diagnosis, Arizona 2017



Source: Arizona Vital Statistics, 2017

Chapter 5: Evidence Base Strategies for the Prevention and Management of Cardiovascular Disease

Evidence Based Strategies for the Prevention and Management of Cardiovascular Disease

Team Based Care

Team Based Care includes a multidisciplinary group of health care providers (e.g., physicians, nurses, pharmacists, first responders, dietitians, etc.) working with patients in education, risk factor identification, and disease management of CVD. There is strong evidence of effectiveness for improving both control of high blood pressure and adherence to hypertensive medication by patients.

Successful team-based care implementation has occurred in various settings including, patient-centered medical homes, federally qualified health centers, and managed health care systems. In addition to health impact, team-based care is both cost-effective and effective in racially diverse and low-income patient populations. For health care systems and practices, implementation guidelines for adoption of appropriate policies and protocols are available, including the STEPS Forward practice improvement initiative from the American Medical Association and the Practice Facilitation Handbook's Implementing Care Teams module from the Agency for Healthcare Research and Quality.

Community Health Workers	This approach includes a trained, trusted community member engaging patients with CVD in culturally competent outreach, education, counseling, social support, and advocacy. The use of Community Health Workers has strong evidence of effectiveness for lowering levels of blood pressure and cholesterol while increasing medication adherence and knowledge of patients with CVD, along with other health gains such as reduction of blood sugar levels, increase in physical activity, and smoking cessation. The community health worker model is cost-effective and effective in addressing populations with health disparities.
Collaborative Drug Therapy Management and Medication Therapy Management services	This approach includes pharmacists in CVD treatment and prevention either through formal agreements or informal arrangements. The strategy has strong evidence of effectiveness for lowering levels of blood pressure, cholesterol, and blood sugar, while increasing medication adherence and knowledge of patients. Both collaborative drug therapy management and medication therapy management services also have evidence of being cost-effective.
Self-Measured Blood Pressure Monitoring and Self-Management Support and Education	This approach has strong evidence of effectiveness for blood pressure control and medication adherence. When patients use personal devices to measure their own blood pressure, usually at home, outcomes are enhanced in cases where self-management support and education further facilitates development of skills to manage CVD. Telehealth interventions such as telephone, text-message, or web-based interactions also have been found to facilitate self-measured blood pressure monitoring and self-management support.

Chapter 6: How to Get Involved

I. ARIZONA HEALTH IMPROVEMENT PLAN (AZHIP) HEART DISEASE AND STROKE WORK GROUP

The development of the Arizona State Health Improvement Plan (AzHIP) is the result of the diligent work of numerous public health professionals, advocates and community stakeholders at the state, county and community levels. The AzHIP is a plan for the entire public health system. Stakeholders include state and local government, healthcare providers and health plans, employers, community groups, schools, universities, and many more. The AzHIP provides a structure and a venue to bring together a loosely networked system of partners to align resources and efforts to improve the health of communities and individuals across Arizona. Fifteen health priorities were identified in the AzHIP, with heart disease and stroke listed as a priority.

For more information on AzHIP, visit the following website: www.azhealth.gov/azhip.

**ARIZONA HEALTH IMPROVEMENT PLAN (AZHIP) HEART DISEASE AND WORKGROUP
2020 GOAL: REDUCE DEATHS ATTRIBUTABLE TO HEART DISEASE AND STROKE BY 10%.**

High Impact Strategy: Increase public awareness of risk factors, chain of survival prevention, and treatment measures.

- **Tactics:** Develop an integrated and comprehensive communication plan.
- **Action Items:**
 1. Identify innovative partners, strategies, and approaches to reach target audiences.
 2. Assess and compile resources to align and coordinate efforts.
 3. Prepare a health brief to address disparities among target populations.
 4. Collaborate and coordinate with organizations who are implementing awareness campaigns for consistent messaging.
 5. Engage stakeholders to promote campaign through organization and member communications.
 6. Promote participation in current initiatives including Million Hearts™, to prevent cardiovascular disease.

High Impact Strategy: Increase the number of Arizonans who are trained to perform Hands-Only CPR.

- **Tactics:** Increase the number of people who perform Hands-Only CPR.
- **Action Items:**
 1. Engage innovative partners to reach target audiences (e.g., Department of Motor Vehicles, Public Transit, CPR Kiosks, and Movie Theaters).
 2. Train Dispatchers to provide engaging telephone CPR and measure performance
- **Tactics:** Increase the number of school districts implementing Hands-Only CPR training.
- **Action Items:**
 1. Collaborate with the American Heart Association's CPR in Schools Initiative.
 2. Increase awareness of reimbursement mechanisms for diabetes self-management education programs.
 3. Explore partnership opportunities with the Arizona Department of Education.

High Impact Strategy: Increase the number of quality improvement health systems participating in Cardiovascular Systems of Care.

- **Tactics:** Strengthen systems of care and improve outcomes in pre-hospital, hospital, and post-hospital settings for patients suffering acute cardiac events.
- **Action Items:**
 1. Ensure that local 911 centers provide guideline-based telephone basic life support (CPR and AED Instructions).
 2. Increase the proportion of Emergency Medical Services agencies utilizing current national
 3. Recommendations for pre-hospital ECG utilization.
- **Tactics:** Implement systems of care and improve outcomes in pre-hospital, hospital and post-hospital settings for stroke events.
- **Action Items:**
 1. Increase the number of agencies utilizing pre-hospital stroke assessment.
 2. Increase the number of stroke care centers in Arizona.
- **Tactics:** Increase access to trained professionals in rural Arizona.
- **Action Items:**
 1. Implement treatment models to impact cost and critical gaps in rural systems of care.
 2. Enhance and better utilize systems of telemedicine in rural areas.

II. RESOURCES

a. American Heart Association and American Stroke Association

The American Heart Association is the nation's oldest and largest voluntary organization dedicated to fighting heart disease and stroke. The American Heart Association's mission is to be a relentless force for a world of longer, healthier lives. The organization has invested more than \$4.1 billion in research to support a world free of cardiovascular disease and stroke. See the links below for more information about the national association and the local affiliate in Arizona.

The American Stroke Association is a division of the American Heart Association. The American Stroke Association seeks to educate people about stroke prevention and treatment. See the links below for more information.

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- healthmetrics.heart.org
- www.heart.org
- www.heart.org/en/affiliates/arizona/phoenix
- www.strokeassociation.org/STROKEORG

b. Million Hearts Initiative

The Million Hearts initiative, co-led by the Centers for Disease Control and Prevention (CDC) and the Centers for Medicare and Medicaid Services (CMS), was established in 2012 by the United States Department of Health and Human Services (HHS). The original five-year initiative aligned national cardiovascular disease prevention efforts around evidence-based public health and clinical goals and strategies. The Million Hearts 2022 seeks to build off the experience, expertise, and partnerships of the first five years to carry out priority actions to prevent one million heart attacks and strokes. See the link below for more information.

- millionhearts.hhs.gov

c. Arizona Health Improvement Plan (AzHIP)

AzHIP, was developed by public health professionals, advocates, and community stakeholders at the state, county, and community levels. The AzHIP provides a structure and a venue to link partners to align resources and efforts to improve the health of communities and individuals across Arizona. Of the 15 leading health priorities, cardiovascular disease and stroke is a priority. For information about the AzHIP, see the information at the link below.

- azdhs.gov/documents/operations/managing-excellence/azhip.pdf

III. DATA SOURCES

a. Behavioral Risk Factor Surveillance System (BRFSS)

In partnership with the CDC and Arizona Department of Health Services, BRFSS is an on-going annual national data collection system gathering information on adult health-related behaviors of non-institutionalized residents 18 years of age and older. A standardized questionnaire with approximately 75 questions is used each year. Questions are determined by the state BRFSS coordinator and the CDC. Only one adult per household is interviewed and participants do not receive compensation. Methodology includes random sampling telephone survey, using disproportionate stratified sampling, random digit dialing, and a Computer Assisted Telephone Interviewing (CATI) system. Data is weighted based on Arizona population demographics. The survey accounts for the number of adults and telephone lines in the household, cluster size, stratum size and age/race/sex distribution of the general population. See the links below for more information.

BRFSS Questions

1. Core Question: Heart Attack also called a Myocardial Infarction (asked every year)

Has a doctor, nurse, or other health professional ever told you that you had any of the following? (Ever told) you that you had a heart attack also called a myocardial infarction?

- Yes
- No
- Don't know / Not sure
- Refused

2. Core Question: Angina or Coronary Heart Disease? (asked every year)

Has a doctor, nurse, or other health professional ever told you that you had any of the following? (Ever told) you that you had a angina or coronary heart disease?

- Yes
- No
- Don't know / Not sure
- Refused

3. Core Question: Stroke (asked every year)

Has a doctor, nurse, or other health professional ever told you that you had any of the following? (Ever told) you that you had a stroke?

- Yes
- No
- Don't know / Not sure
- Refused

4. Module: High Cholesterol (asked every other year)

Have you EVER been told by a doctor, nurse or other health professional that your blood cholesterol is high? (Ever told) you that you had high cholesterol?

- Yes
- No
- Don't know / Not sure
- Refused

5. Module: High Blood Pressure (asked every other year)

Have you EVER been told by a doctor, nurse, or other health professional that you have high blood pressure?

- Yes
- Yes, but female told only during pregnancy
- No
- Told borderline high or pre-hypertensive
- Don't know/Not sure

6. Core Question: Diabetes (asked every year)

Has a doctor, nurse, or other health professional ever told you that you had any of the following? (Ever told) you have diabetes?

- Yes
- Yes, but female told only during pregnancy
- No
- No, pre-diabetes or borderline diabetes
- Don't know/Not sure
- Refused

7. Core Question: Tobacco Use (asked every year)

7 a. Have you smoked at least 100 cigarettes in your entire life?

- Yes
- No
- Don't know/Not sure
- Refused

7 b. Do you now smoke cigarettes every day, some days, or not at all?

- Every day
- Some days
- Not at all
- Don't know / Not sure
- Refused

7 c. How long has it been since you last smoked a cigarette, even one or two puffs?

- Within the past month (less than 1 month ago)
- Within the past 3 months (1 month but less than 3 months ago)
- Within the past 6 months (3 months but less than 6 months ago)
- Within the past year (6 months but less than 1 year ago)
- Within the past 5 years (1 year but less than 5 years ago)
- Within the past 10 years (5 years but less than 10 years ago)
- 10 years or more
- Never smoked regularly
- Don't know/Not sure
- Refused

7 d. Do you currently use chewing tobacco, snuff, or snus every day, some days, or not at all?

- Every day
- Some days
- Not at all

8. Core Question: Weight Status (asked every year):

8 a. About how much do you weigh without shoes?

8 b. About how tall are you without shoes?

9. Core Question: Physical Activity (asked every year):

9 a. During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?

9 b. What type of physical activity or exercise did you spend the most time doing during the past month?

9 c. How many times per week or per month did you take part in this activity during the past month?

9 d. And when you took part in this activity, for how many minutes or hours did you usually keep at it?

9 e. During the past month, how many times per week or per month did you do physical activities or exercises to STRENGTHEN your muscles? Do NOT count aerobic activities like walking, running, or bicycling. Count activities using your own body weight like yoga, sit-ups or push-ups and those using weight machines, free weights, or elastic bands

10. Core Question: Consumption of Fruit (asked every year):

10 a. Now think about the foods you ate or drank during the past month, that is, the past 30 days, including meals and snacks. Not including juices, how often did you eat fruit? You can tell me times per day, times per week or times per month.

10 b. Not including fruit-flavored drinks or fruit juices with added sugar, how often did you drink 100% fruit juice such as apple or orange juice?

11. Core Question: Consumption of Vegetables (asked every year):

11 a. How often did you eat a green leafy or lettuce salad, with or without other vegetables?

11 b. How often did you eat any kind of fried potatoes, including french fries, home fries, or hash browns?

11 c. How often did you eat any other kind of potatoes, or sweet potatoes, such as baked, boiled, mashed potatoes, or potato salad?

11 d. Not including lettuce salads and potatoes, how often did you eat other vegetables?

- www.cdc.gov/brfss
- azdhs.gov/preparedness/public-health-statistics/behavioral-risk-factor-surveillance

b. Arizona Department of Health Services (ADHS)— Bureau of Vital Statistics

The ADHS Bureau of Vital Statistics manages the records of births, deaths, and fetal deaths from original documents filed with the ADHS and from transcripts of original certificates affecting Arizona residents in any other states. Death records/certificates of Arizonans who have died outside the U.S. are not included.

Cost Reporting and Discharge Data Review collect information about both hospital inpatient discharges and emergency room visits. The Bureau of Public Health Statistics requires short-stay nonfederal hospitals to submit uniform data to ADHS every six months. A limitation to this approach is that it excludes patient information from federal, territorial, or other small hospitals/hospices (e.g. Indian Health Services).

Population Denominators are projections from Arizona Department of Economic Security (DES).

See the links below for more information.

- pub.azdhs.gov/health-stats/menu/info/pop
- azdhs.gov/preparedness/public-health-statistics
- pub.azdhs.gov/health-stats/hip/index.php?pg=diagnosis

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