

Chronic Disease Burden Report

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1. Executive Summary

Chronic diseases are a major cause of disability and death in the United States (US) and Pennsylvania (PA). At present, the seven leading causes of death in PA are heart disease, cancer, unintentional injuries, stroke, chronic lower respiratory disease (CLRD), Alzheimer’s disease, and diabetes. They account for approximately 66% of all deaths each year in PA.¹ These seven diseases are also the leading causes of death in the country.² In 2017, health care spending increased to \$3.5 trillion, or \$10,739 per person in the country, and 90% of the health care expenditures are for people with chronic or mental health conditions.³

According to the US Census, PA is the fifth largest state in the country, with an estimated population of 12,801,989 in 2019.⁴ In PA, 18.2% of the population were 65 years of age or older in 2019, higher than 15.4% in 2010.⁴ With Pennsylvania’s aging population and improved longevity, the burden of chronic diseases and the associated cost are both likely to increase. Loss of work productivity, decrease in quality of life, and increased disability may also result from chronic conditions.

Modifiable health risk behaviors, especially tobacco use, excessive alcohol consumption, lack of physical activity, and poor nutrition, are responsible for most chronic conditions.⁵ An effective public health program targeting modifiable risk factors is important in controlling and preventing chronic diseases in PA. The Pennsylvania Department of Health (Department) has implemented several chronic disease prevention programs funded by the Centers for Disease Control and Prevention (CDC). The Department is working toward a collaborative and comprehensive approach to chronic disease prevention and management. The purpose of this report is to facilitate a comprehensive approach to chronic disease control and prevention in PA and provide information to stakeholders on Pennsylvania’s chronic disease burden. This report can also be used to identify unmet needs and assist in cost-effective program planning.

Heart disease, cancer, stroke, CLRD, asthma, diabetes, and oral health issues were selected for this report as they were either the leading causes of death or major chronic conditions in PA. This report’s content provides information on deaths, hospitalizations, and prevalence over the past several years. The following areas are included for each of these diseases in this report: general description, mortality, hospitalization, and prevalence from the Behavioral Risk Factor Surveillance System (BRFSS).

The following are the highlights of the findings from this report:

- In 2019, 32,250 Pennsylvanians died of heart diseases. The age-adjusted death rate was 172.7 per 100,000, ranking 14th in the country.
- In 2019, 27,703 Pennsylvanians died of cancer. The age-adjusted death rate was 153.2 per 100,000, ranking 16th in the country.
- In 2019, 6,645 Pennsylvanians died of a stroke. The age-adjusted death rate was 35.3 per 100,000, ranking 30th in the country.
- In 2019, 6,337 Pennsylvanians died of chronic lower respiratory disease. The age-adjusted death rate was 34.2 per 100,000, ranking 38th in the country.
- In 2019, 3,652 Pennsylvanians died of diabetes. The age-adjusted death rate was 20.4 per 100,000, ranking 28th in the country.

Everyday in PA:
88 people die from heart disease
76 people die from cancer
18 people die from stroke
17 people die from CLRD
10 people die from diabetes

2. Methods

2.1 Data Sources

2.1.1 Demographic Data

Population data in this report were retrieved from the US Census. Additional demographic data were retrieved from the American Community Survey (ACS). ACS is an ongoing survey that provides vital information on demographics, socioeconomics, housing, employment and occupation, educational attainment, veterans, and other important topics about the US population on a yearly basis. Every year, the US Census Bureau contacts over 3.5 million addresses across the country to participate in the ACS. The survey questions can be answered by mail, phone, and in-person interview. Additional information about the ACS can be found at www.census.gov/programs-surveys/acs.

2.1.2 Mortality Data

In PA, death data are collected and managed by the Bureau of Health Statistics and Registries at the PA Department of Health. The death data are compiled from death certificates for PA residents. The mortality rate for a disease was calculated based on the number of deaths from a disease in a year over the general population in PA in the same year. In this report, mortality rates were retrieved from the Enterprise Data Dissemination Informatics Exchange (EDDIE), which is managed by the Division of Health Informatics at the PA Department of Health. EDDIE is an interactive health statistics dissemination web tool that provides customized data tables, charts and maps for a wide variety of health-related topics, including population, births, hospitalization discharges, deaths, behavioral health, and reproductive health. Mortality rates were all age adjusted in this report. Additional information about EDDIE can be found at www.health.pa.gov/topics/HealthStatistics/EDDIE/Pages/EDDIE.aspx.

2.1.3 Hospitalization Data

Hospitalization data in PA are collected and managed by the PA Health Care Cost and Containment Council (PHC4). The PHC4 collects statewide inpatient discharge data as well as outpatient and freestanding ambulatory surgery center data. The hospitalization rate is calculated based on the number of hospitalizations, not the distinct number of patients. A patient who is hospitalized more than once in the time period will be counted multiple times in the rate calculation. In addition, the hospitalization rate is calculated based on the general population, not the patient population with the defined disease. Hospitalized patients with residence not in PA were excluded from the analysis. In this report, hospitalization rates were all age adjusted and were retrieved from EDDIE. Additional information about hospitalization data and PHC4 can be found at www.phc4.org.

2.1.4 Cancer Incidence Data

Cancer incidence refers to new cancer cases that are diagnosed and reported each year. Evaluation of new cancer cases provides insights on risk factors for the occurrence of cancers in a population. In PA, cancer incidence data are collected and managed by the PA Cancer Registry (PCR). The PCR began collecting statewide cancer incidence data in 1985. Only

cases diagnosed among PA residents are counted. Reporting hospitals and other facilities are required to submit all cancer cases newly diagnosed and/or treated. If an individual had more than one primary tumor, each tumor is reported and counted. As such, counts of cases are calculated based on the number of primary sites of cancer rather than the number of individuals with cancer. All statistics in this report include only invasive cancers, with the exception that in situ bladder cancers were combined with invasive bladder cancers. In this report, cancer incidence rates were all age adjusted and were retrieved from the PA Cancer Statistics Dashboard, which can be accessed at www.health.pa.gov/topics/HealthStatistics/CancerStatistics/dashboard/Pages/Cancer-Dashboard.aspx.

2.1.5 Data for Behavioral Health, Modifiable Conditions, and Preventive Health Services

In this report, data for behavioral health, modifiable conditions, and preventive health services are from the Behavioral Risk Factor Surveillance System (BRFSS) or the Youth Risk Behavior Surveillance (YRBS). BRFSS is a telephone-based survey that collects data in all 50 states as well as the District of Columbia and three US territories regarding the health-related risk behaviors, chronic health conditions, and use of preventive services. BRFSS is the largest continuously conducted health survey system in the world, with more than 400,000 adult interviews each year. In the survey, telephone interviews are conducted to collect self-reported information from a random sample of non-institutionalized adults 18 years or older. In this report, statistics on behavioral health, modifiable conditions, and preventive health services were retrieved from EDDIE and the CDC BRFSS Prevalence and Trends Data website at www.cdc.gov/brfss/brfssprevalence. Additional information about BRFSS is available at www.cdc.gov/brfss/index.html.

The Youth Risk Behavior Surveillance (YRBS) is a system of biennial surveys that includes school-based surveys conducted by the CDC and states and local surveys conducted by state, territorial, and local agencies and tribal governments. YRBS monitors health-related behaviors among the youth population, including tobacco use, alcohol and other substance use, physical activity, dietary behaviors, sexual behaviors, and behaviors that contribute to injuries and violence. YRBS also measures health conditions such as obesity and asthma. In PA, the survey is conducted among high school students in selected schools. YRBS statistics were retrieved from the CDC YRBS website at www.cdc.gov/healthyyouth/data/yrbs/results.htm. Additional information on YRBS can be found at www.cdc.gov/healthyyouth/data/yrbs/index.htm.

2.2 Age adjustment

Age adjustment is a method used to ensure comparability of estimates (e.g. mortality rates) accounting for age. The age distribution of a population may change over time and differ from place to place. Because some health conditions are more common in certain age groups, it can be misleading to compare estimates across populations if the age distribution of these populations is different. Age adjustment takes into account age-specific rates in a population, using the US 2000 Census population as the standard population. Age-adjusted rates are relative and are more for comparison purposes across populations. They should not be considered as real rates that represent the true burden of a disease in a population.

2.3 Subgroup data

Subgroup data are presented when sufficient data are available for reliable analysis. Data are typically categorized by sex, race/ethnicity, age group, education, and annual household income if data are available. Race/ethnicity includes non-Hispanic Whites (referred as Whites), non-Hispanic Blacks or African Americans (referred as Blacks), Hispanics, and Asians/Pacific Islanders.

2.4 International Classification of Diseases, Ninth and Tenth Revisions (ICD-9 and ICD-10)

Before October 1, 2015, ICD-9 was used for disease diagnosis. Effective October 1, 2015, ICD-10 replaced ICD-9 and was used for disease diagnosis. Compared to ICD-9, ICD-10 offers greater specificity on disease classification. Therefore, case count and rate calculation might be different for the same conditions using ICD-9 and ICD-10. Cautions are needed in comparing case counts and rates for years before and after 2015.

3. Demographic Profile of Pennsylvania

Pennsylvania (PA) is the fifth largest state in the US, with an estimated population of 12,801,989 in 2019.⁴ The two major cities in PA are Philadelphia and Pittsburgh, which have a population of approximately 1,584,138 and 301,048, respectively.^{6,7} There are 67 counties in PA, which include 2,560 municipalities.⁸ Thirty-one counties have populations over 100,000.¹ There are 500 school districts in PA with a total of 1,724,454 public school enrollments and 232,575 private and non-public enrollments in the 2019 – 2020 school year.⁹ PA has a large rural population, with nearly 3.4 million (26%) residents residing in 48 rural counties in 2018.^{1,10}

3.1 General Pennsylvania Population Characteristics

Table 1 displays the estimated population by sex and race/ethnicity in PA in 2019 based on the American Community Survey (ACS) from the US Census.¹¹ Among the total population of 12,801,989 in PA in 2019, there were more females (51%) than males (49%); 92% of the PA population were non-Hispanic and 8% were Hispanic; 98% were one race and 2% were two or more races. Among the non-Hispanic population that was a single race, 84% were Whites, 12% were Blacks, 4% were Asians, 0.2% were American Indians or Alaska Natives, and 0.03% were Native Hawaiians and Other Pacific Islanders. Among the Hispanic population that was a single race, 80% were Whites, 15% were Blacks, 3% were American Indians or Alaska Natives, 1% were Asians, and 0.6% were Native Hawaiians and Other Pacific Islanders.¹¹

Table 1. Estimated Population by Sex and Race/Ethnicity, PA, July 1, 2019*

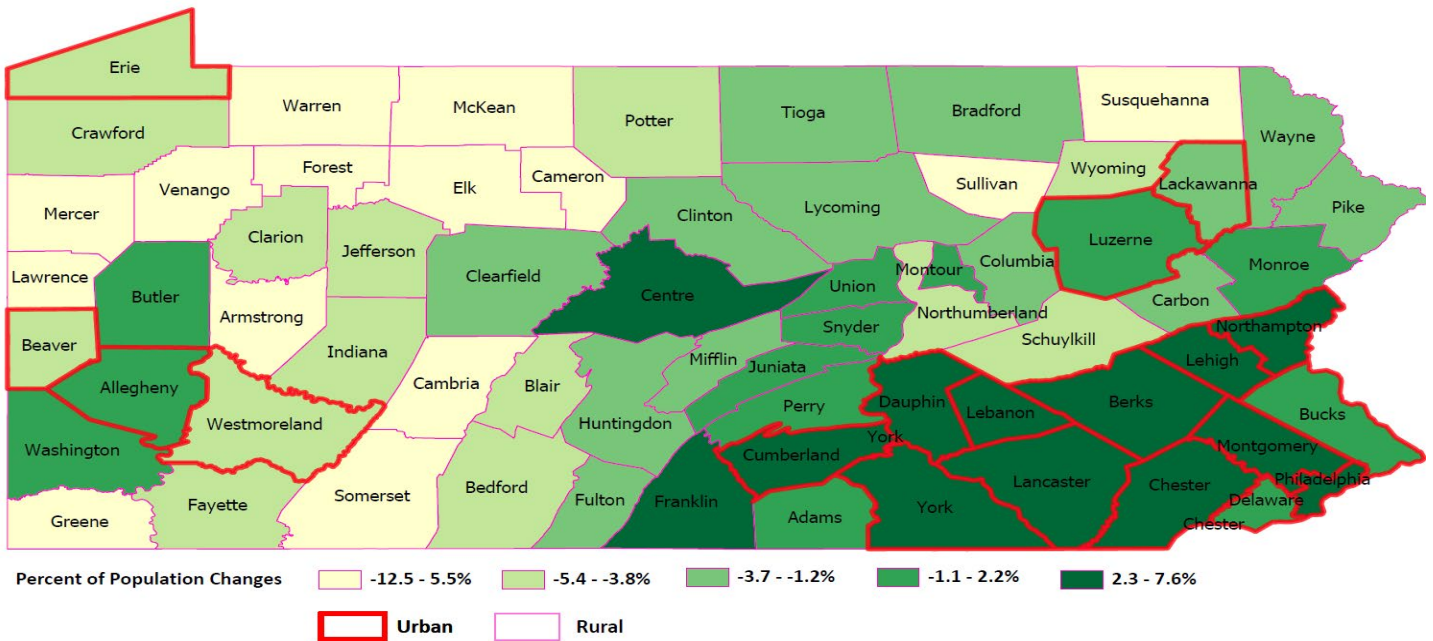
Race	Hispanic Origin								
	All			Non-Hispanic			Hispanic		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
	12,801,989	6,274,361	6,527,628	11,801,839	5,766,178	6,035,661	1,000,150	508,183	491,967
One Race	12,529,712	6,140,569	6,389,143	11,582,549	5,658,865	5,923,684	947,163	481,704	465,459
White	10,447,062	5,133,036	5,314,026	9,693,578	4,748,155	4,945,423	753,484	384,881	368,603
Black	1,540,092	744,108	795,984	1,394,630	671,718	722,912	145,462	72,390	73,072
AIAN	50,687	25,700	24,987	18,846	9,352	9,494	31,841	16,348	15,493
Asian	481,877	232,848	249,029	471,559	227,757	243,802	10,318	5,091	5,227
NHPI	9,994	4,877	5,117	3,936	1,883	2,053	6,058	2,994	3,064
Two or more Races	272,277	133,792	138,485	219,290	107,313	111,977	52,987	26,479	26,508

AIAN: American Indian/Alaska Native; NHPI: Native Hawaiian and Other Pacific Islander

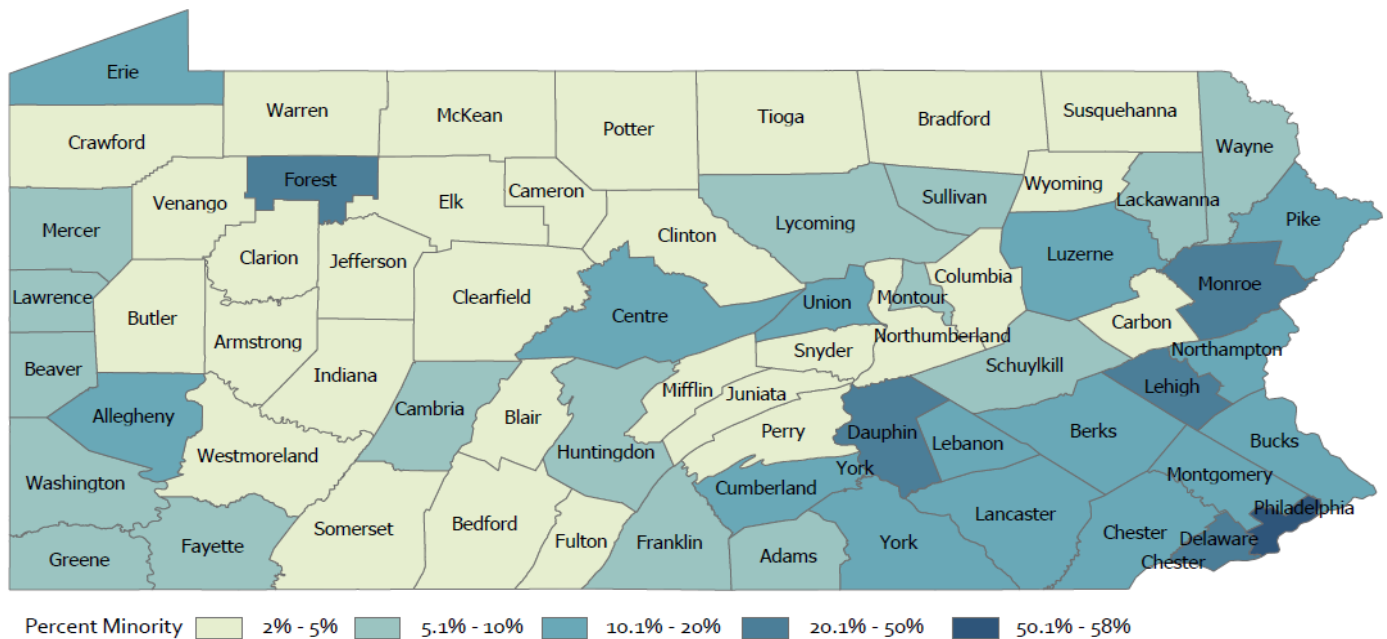
* Source: <https://www.census.gov/data/tables/time-series/demo/popest/2010s-state-detail.html>

In 2019, the total PA population decreased by 0.04% compared to 2018, but up 0.8% from 2010. The increase in population mainly occurred in the southeast urban counties. The following 10 counties had the largest increase in population from 2010 to 2019: Cumberland (urban, 7.6%), Lebanon (urban, 6.2%), Lehigh (urban, 5.7%), Centre (rural, 5.5%), Chester (urban, 5.2%), Lancaster (urban, 5.1%), Montgomery (urban, 3.9%), Philadelphia (urban, 3.8%), Dauphin (urban, 3.8%), and Franklin (rural, 3.6%). In contrast, the following 10 counties had the greatest decrease in population from 2010 to 2019: Cameron (rural, -12.5%), Cambria (rural, -9.4%), Venango (rural, -7.8%), Susquehanna (rural, -7.0%), McKean (rural, -6.5%), Elk (rural, -6.4%), Greene (rural, -6.3%), Warren (rural, -6.3%), Mercer (rural, -6.2%), and Lawrence (rural, -6.1%) (Map 1 and Map 2).

Map 1. County Population Changes in PA from 2010 to 2019[†]



Map 2. Non-White Population by County in PA, 2013 – 2017[†]



[†] Source: <https://www.phaim1.health.pa.gov/EDD/>

3.2 Projected Population by Age Group in the United States and Pennsylvania

Table 2 shows the Census population for the US and PA in 2010 and the projected population in 2020, 2030, and 2040. Compared to the US, the population growth in PA from 2010 to 2040 is small (0.8% in PA vs. 22.9% in the US). The percent of population 65 years or older was higher in PA in 2010 (15% in PA vs. 13% in the US), and this pattern will continue throughout 2040 (21% in PA vs. 19% in the US). The percent of population 65 years or older in PA will increase by 40% in 2040 compared to 2010. In addition, the median age in the PA population was higher than the US population in 2010 (40.1 years in PA vs. 37.2 years in the US) and this trend will continue throughout 2040 (41.9 years in PA vs. 38.6 years in the US).

Table 2. Population in 2010 and Projected Population in PA and US[‡]

US					
Age Group	Census 2010	Projection 2020	Projection 2030	Projection 2040	% Change 2010 -2040
Total	308,745,538	332,527,548	357,975,719	379,392,779	22.9%
Under 20	83,267,556	85,759,176	91,242,548	97,172,971	16.7%
20 – 44	103,720,553	109,941,285	118,303,618	123,530,656	19.1%
45 – 64	81,489,445	83,050,361	80,617,132	87,563,790	7.5%
65 & Older	40,267,984	53,776,726	67,812,421	71,125,362	76.6%
% 65 & Older	13%	16%	19%	19%	46.2%
Median Age	37.2	37.9	38.5	38.6	3.8%
PA					
Age Group	Census 2010	Projection 2020	Projection 2030	Projection 2040	% Change 2010 -2040
Total	12,702,379	12,844,885	12,946,245	12,809,150	0.8%
Under 20	3,179,390	3,056,457	3,048,096	3,026,716	-4.8%
20 – 44	4,000,934	4,008,059	4,039,422	3,870,235	-3.3%
45 – 64	3,562,748	3,414,881	3,049,852	3,178,649	-10.8%
65 and Older	1,959,307	2,365,487	2,808,875	2,733,551	39.5%
% 65 & Older	15%	18%	22%	21%	40.0%
Median Age	40.1	40.7	41.5	41.9	4.5%

According to the American Community Survey (ACS), there were 5,119,249 households in PA in 2019, up 3.7% from 4,936,030 households in 2010.¹² In 2019, of the 5,119,249 households, 63.1% (3,228,224) were family households (Note: a family household is a household maintained by a householder who is in a family. A family household includes all related or unrelated people in a house), which was slightly lower than the 64.8% (3,197,710) family households in 2010. There were 1,891,025 (36.9%) non-family households in 2019 (Note: a non-family household consists of a householder living alone or a householder living with people to whom they are not related), which was slightly higher than the 1,738,320 (35.2%) non-family households in 2010. In 2019, there were 1,689,074 (33.0%) households with one or more people 65 years and over, which was higher than the 1,377,697 (27.9%) households with one or more people 65 years and over in 2010.¹²

ACS data also show that among the 9,028,036 Pennsylvanians who were age 25 and older in 2019, 9.0% had less than a high school degree, 34.4% had completed high school, 24.3% had some college education and 32.3% had a college degree or higher.¹² During 2015 – 2019, the percentage of Pennsylvanians with a high school degree or higher was 90.5%, slightly higher than the national level of 88.0%.^{13, 14}

According to the 2019 ACS estimate, 90.9% of Pennsylvanians were born in the US. Of the foreign-born

[‡] Source: 1) <https://www.census.gov/data/datasets/2017/demo/popproj/2017-popproj.html>; 2) https://www.rural.palegislature.us/demographics_population_projections.html

population, 55.7% were naturalized citizens, with 17.7% from Europe, 40.2% from Asia, 8.9% from Africa, 31.0% from Latin America, 1.8% from other parts of North America, and 0.4% from Oceania.¹² In the country, 84.7% of Americans were born in the US. Of the foreign-born population, 51.6% were naturalized citizens, with 10.4% from Europe, 31.4% from Asia, 5.5% from Africa, 50.3% from Latin America, 1.8% from other parts of North America, and 0.7% from Oceania.¹⁵

Among individuals 5 years of age or older living in PA in 2019, 88.3% spoke English only, lower than 90.4% in 2009. The percent of population who spoke a language other than English at home rose from 9.6% in 2009 to 11.7% in 2019. Of those speaking a language other than English at home, 44.7% spoke Spanish and 55.3% spoke other languages.¹² For the same year in the country, 78.0% spoke English only. Of those speaking a language other than English at home, 43.7% spoke Spanish and 56.3% spoke other languages.¹⁵

According to the ACS estimates in 2019, 12.0% of Pennsylvanians lived below poverty (i.e., below the poverty thresholds set by the federal government), slightly down from 12.5% in 2009. For children under 18 years old, 16.9% lived below poverty, similar to 16.8% in 2009. For people age 65 and older, 8.3% lived below poverty, slightly down from 8.8% in 2009. More women than men lived below poverty in 2019 (13.0% vs. 10.9%). By race, Blacks had the highest percentage of population living below poverty (24.9%), followed by American Indians (20.4%), Asians (12.7%), and Whites (9.3%). In addition, 26.2% of the population of Hispanic origin lived below poverty, compared to 8.7% among non-Hispanic Whites in 2019. Among populations 25 years of age or older, 25.1% of those with less education than a high school diploma lived below poverty, followed by those who were high school graduates (11.9%), those with some college education (9.1%), and those with college or higher education (3.9%). The median household income was \$63,463 in 2019, substantially higher than the median household income of \$49,520 in 2009.¹²

In the country, 12.3% of Americans lived below poverty in 2019. For children under 18 years old, 16.8% lived below poverty. For people age 65 and older, 9.4% lived below poverty. Similar to PA, more women than men lived below poverty in the country in 2019 (13.5% vs. 11.1%). By race and ethnicity, American Indians had the highest percentage of population living below poverty (23.0%), followed by Blacks (21.2%), Hispanics (17.2%), Whites (10.3%), and Asians (9.6%). Among populations 25 years of age or older, 23.4% of those with less education than a high school diploma lived below poverty, followed by those who were high school graduates (13.1%), those with some college education (9.1%), and those with college or higher education (4.1%). The median household income was \$65,712 in the country in 2019, slightly higher than the median household income of \$63,463 in PA.¹⁵

For health insurance coverage, in PA, 5.8% of the civilian non-institutionalized population (note: civilian non-institutionalized population refers to persons not on active duty in the Armed Forces, persons not living in a congregate facility such as a nursing home, or the like) had no health insurance coverage in 2019, lower than 9.9% in 2009. Private insurance coverage was 71.9%, down from 74.4% in 2009 (note: private health insurance refers to any health insurance coverage that is offered by a private entity instead of a state or federal government). Public health insurance coverage was 37.6% in 2019, up from 31.1% in 2009 (note: public health insurance plans are plans provided by the government for low income individuals, older adults, and other individuals that qualify. Such plans include Medicare, Medicaid, and Children's Health Insurance Program). The percentage of the civilian non-institutionalized population under age 19 years with no health insurance coverage was 17.6% in PA in 2019.¹³

In the country, 9.2% of the civilian non-institutionalized population had no health insurance coverage in 2019. Private insurance coverage was 67.4% and public health insurance coverage was 35.4%. The percentage of the civilian non-institutionalized population under age 19 years with no health insurance coverage was 14.8% in the US in 2019.¹⁵

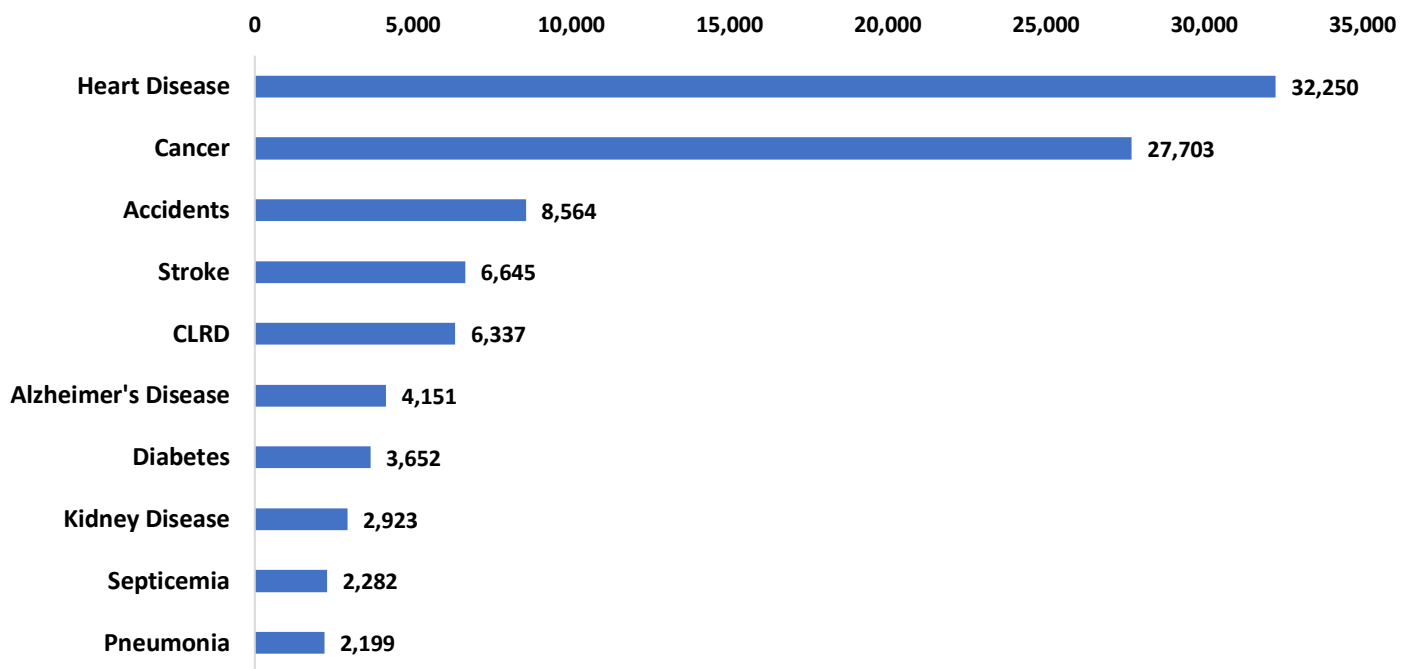
4. General Chronic Disease Overview

Chronic diseases are defined broadly as conditions that last one year or more and require ongoing medical attention or limit activities of daily living or both. Heart disease, cancer, stroke, chronic lower respiratory disease, and diabetes are major chronic diseases and the leading causes of death and disability in the US and PA. Other common chronic diseases include Alzheimer’s disease and dementia, arthritis, and chronic kidney disease. Chronic diseases are the leading drivers of the nation’s \$3.5 trillion in annual health care costs. The primary risk factors for chronic diseases are tobacco use (including exposure to secondhand smoke), lack of physical activity, poor nutrition (including diets low in fruits and vegetables and high in sodium and saturated fats), and excessive alcohol use.⁵

Figure 1 shows the 10 leading causes of death in PA in 2019, which are heart disease, cancer, accidents, stroke, chronic lower respiratory disease (CLRD), Alzheimer's disease, diabetes, kidney disease, septicemia, and pneumonia. These 10 causes contributed to 96,706 deaths in PA in 2019, almost three quarters (72.2%) of all deaths (133,932). Among these 10 causes, heart disease, cancer, stroke, CLRD, and diabetes are chronic diseases, which are potentially controllable and preventable through risk reduction and behavioral changes. These five diseases resulted in over half of all deaths in PA (57.2%).

6 out of 10 Americans have a chronic disease.

Figure 1. 10 Leading Causes of Death by Number in PA, 2019



CDC estimates that six out of 10 Americans (approximately 197 million) have a chronic disease, and four out of 10 Americans (approximately 131 million) have two or more chronic diseases.¹⁶ Ten of the 15 leading causes of death in the US in 2017 were chronic diseases and they contributed to 88.1% of total deaths (2.5 million) in the country.¹⁷ Heart disease, cancer, and stroke each contributed to 23%, 21.3%, and 5.2% of total deaths, respectively. These three diseases account for half of all deaths in 2019.^{2, 16}

Heart disease is the leading cause of death in the US. Every year, approximately 659,000 Americans die from heart disease, which constitutes approximately one quarter of all deaths in the country.² Medical costs for heart disease and stroke are approximately \$200 billion per year and lost productivity on the job is approximately \$131 billion.¹⁸ In

addition to heart disease, cancer is the second leading cause of death in the US. Approximately 1.6 million people are diagnosed with cancer and 600,000 people die from cancer each year. The cost of cancer care continues to rise and is estimated to be \$174 billion in 2020.¹⁹

In the US, diabetes is the seventh leading cause of death. Each year, approximately 87,000 people die from diabetes.² In 2018, more than 34.2 million Americans had diabetes and another 88 million adults had prediabetes. Diabetes can cause serious complications such as heart disease, kidney failure, and blindness. In 2017, the total estimated cost of diagnosed diabetes was \$327 billion in medical costs and lost productivity in the country.^{20, 21}

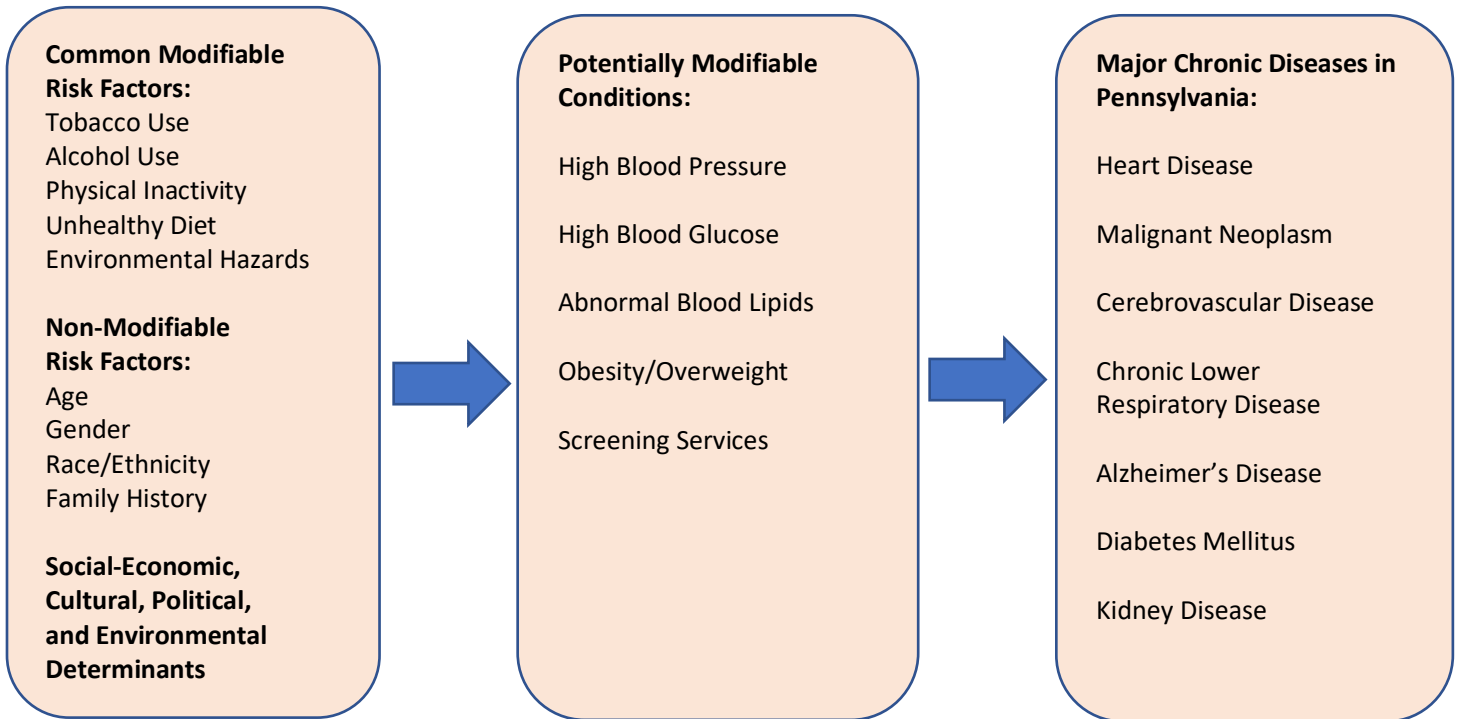
At present, obesity affects almost 20% of children and 33% of adults in the US, putting people at risk for chronic diseases such as heart disease, diabetes, and some cancers. Obesity costs the US health care system \$147 billion a year.²²

There are a number of risk factors associated with chronic diseases, as displayed in Figure 2. Among these, cigarette smoking is the leading cause of preventable deaths and diseases in the US. More than 16 million Americans have at least one disease caused by smoking. Smoking and the related conditions induce \$170 billion in direct medical costs.²³

In addition to smoking, lack of physical activity is a major risk factor for chronic diseases, especially for heart disease, cancer, type 2 diabetes, and obesity. Lack of physical activity costs approximately \$117 billion in health care annually in the country.²⁴ Poor diet coupled with physical inactivity represents the second leading preventable cause of death in the US.

Excessive alcohol use is another major risk factor for chronic diseases. Each year, approximately 88,000 deaths (62,000 in men and 26,000 in women) are attributable to alcohol use, making it the third leading preventable cause of death in the US. Binge drinking is responsible for over half of the alcohol-related deaths and three-quarters of the costs related to excessive alcohol use.²⁵

Figure 2. Risk factors and Major Chronic Diseases



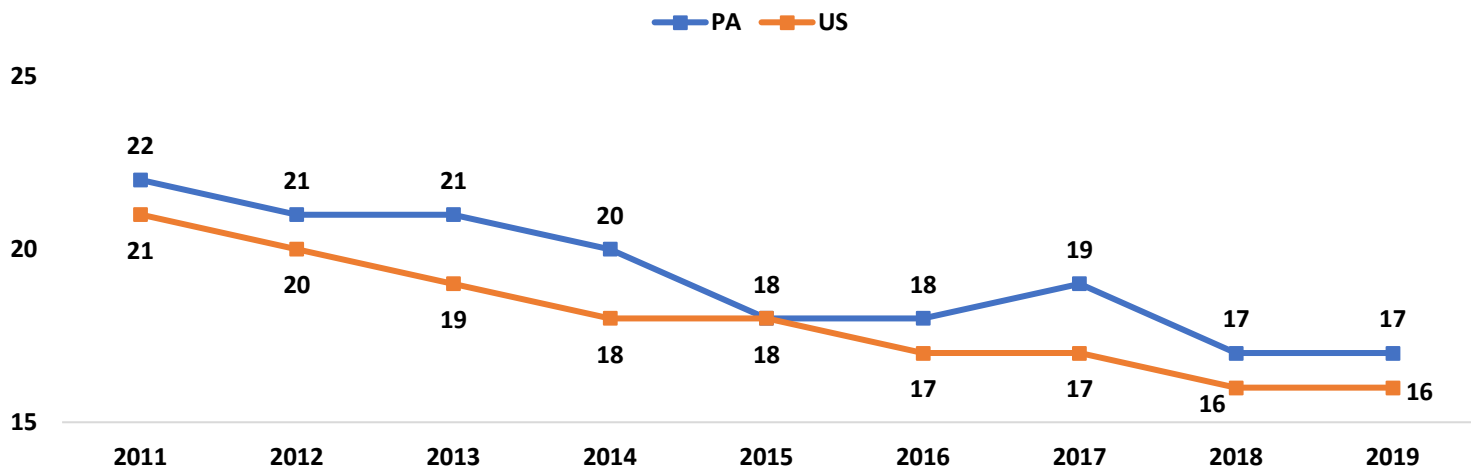
5. Modifiable Behaviors and Conditions

5.1 Cigarette Smoking in Pennsylvania

Figure 3 shows the trend for current smoking prevalence in PA and the US from 2011 to 2019, based on the Behavioral Risk Factor Surveillance System (BRFSS). Overall, the current smoking prevalence in PA was approximately one percentage point higher than the prevalence in the country over the nine-year period. The current smoking prevalence in PA and in the country consistently showed a downward trend, with a 23% drop in PA and a 24% drop in the country from 2011 to 2019.

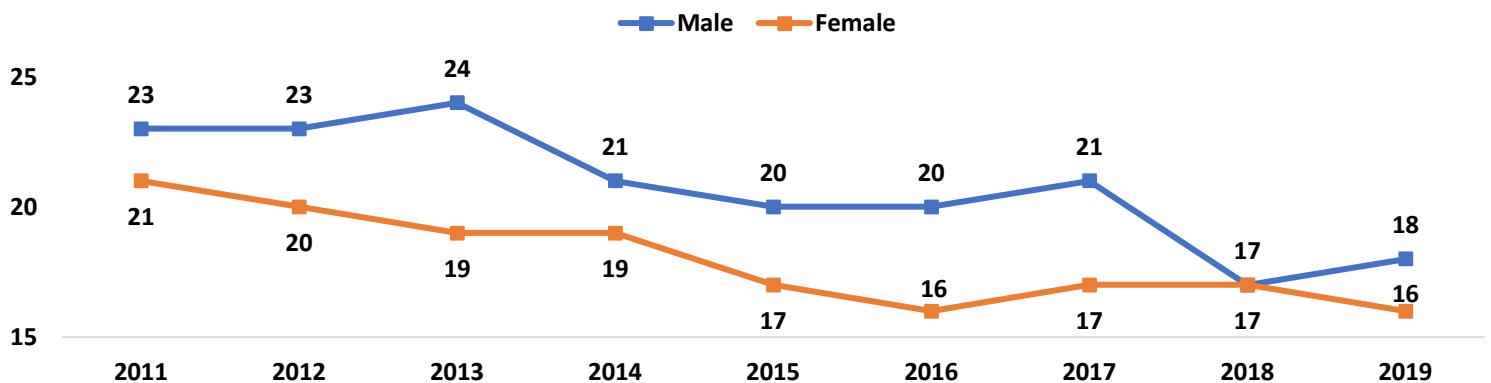
About 2 out of 10 adults smoke in PA.

Figure 3. Current Smoking Prevalence (%) among Adults 18 Years or Older, PA vs. US, 2011 - 2019



Stratified by sex, the prevalence of current smoking was consistently higher in males than in females in PA from 2011 to 2019. Despite some fluctuations, the prevalence of current smoking dropped 22% in males, down from 23% in 2011 to 18% in 2019. The prevalence of current smoking dropped 24% in females, down from 21% in 2011 to 16% in 2019 (Figure 4).

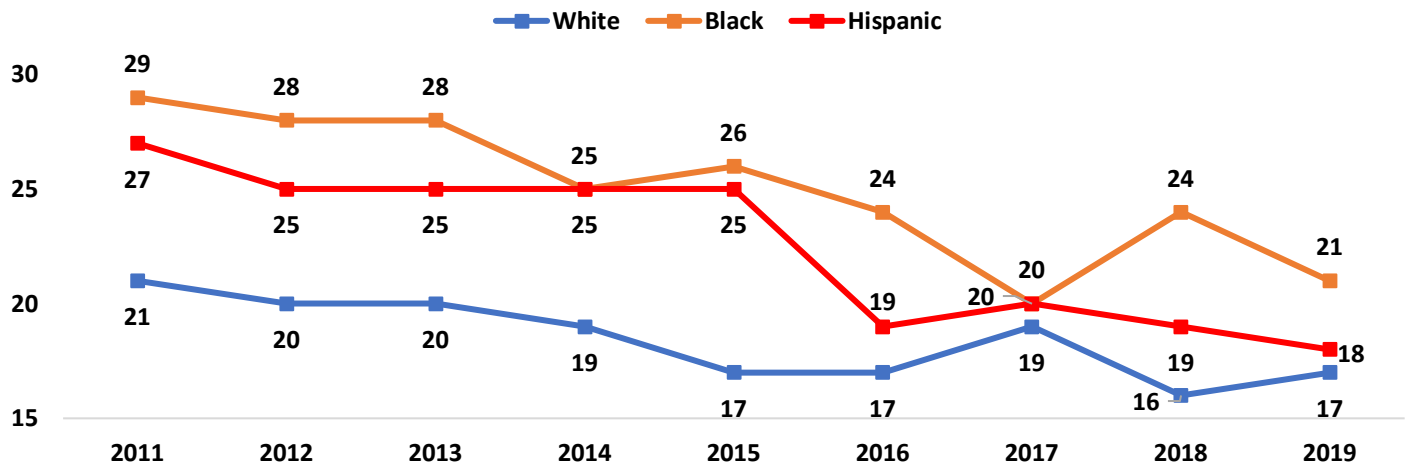
Figure 4. Current Smoking Prevalence (%) among Adults 18 Years or Older by Sex, PA, 2011 - 2019



By race/ethnicity, the prevalence of current smoking was highest in Blacks in PA from 2011 to 2019, followed by Hispanics and Whites. The trend for the prevalence of current smoking generally showed a decline in all racial/ethnic populations, with some fluctuations over years. The prevalence dropped 28% in Blacks, down from 29% in 2011 to 21%

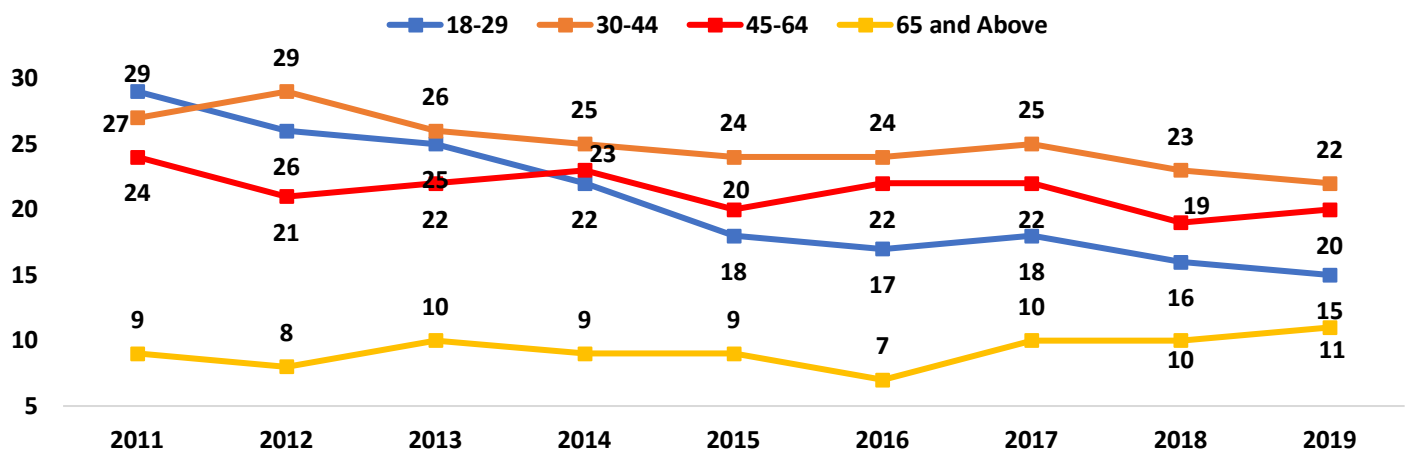
in 2019. In Hispanics, the prevalence dropped 33%, down from 27% in 2011 to 18% in 2019. In Whites, the prevalence dropped from 21% in 2011 to 17% in 2019, equivalent to a 19% decrease (Figure 5).

Figure 5. Current Smoking Prevalence (%) among Adults 18 Years or Older by Race/Ethnicity, PA, 2011 - 2019



In PA, the prevalence of current smoking changed across the age groups between 2011 and 2019. For all years except 2011, the prevalence was highest among adults aged 30 to 44 years. In this age group, the prevalence dropped from 27% in 2011 to 22% in 2019, equivalent to a 19% decrease. In 2011, the prevalence was highest among young adults aged 18 to 29 years, yet the prevalence dropped substantially from 29% in 2011 to 15% in 2019, decreasing by almost half (48%). The prevalence of current smoking in adults 45 to 64 years of age ranked third from 2011 to 2013, yet became the second highest from 2014 to 2019. The prevalence in this age group decreased 17%, down from 24% in 2011 to 20% in 2019. Among the four age groups, although the prevalence was lowest among the elderly adults aged 65 years or older, over the nine-year period, this was the only age group in which the current smoking prevalence showed an increasing trend. For this group, the prevalence increased 22%, up from 9% in 2011 to 11% in 2019 (Figure 6).

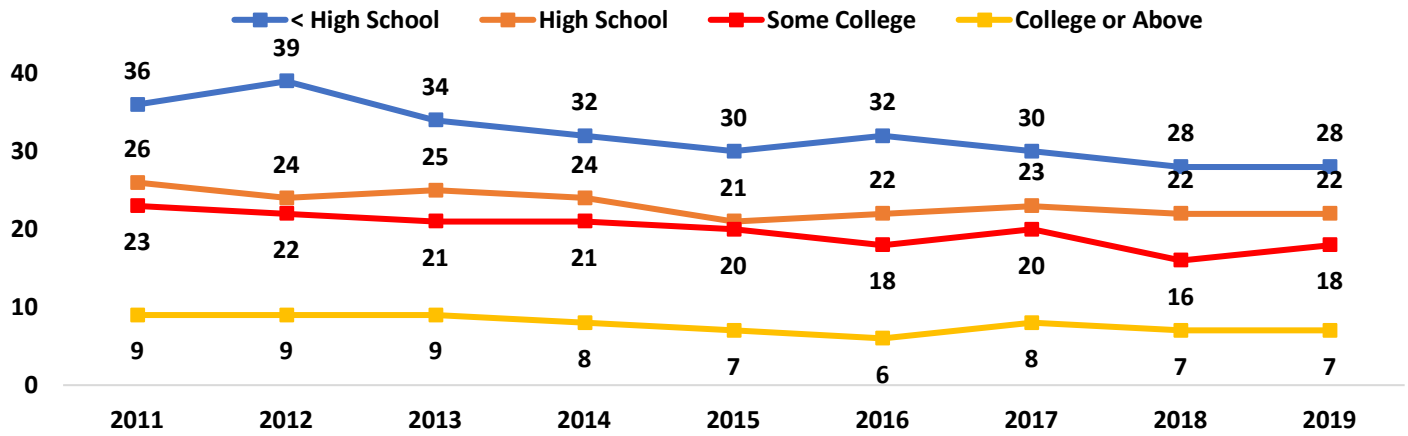
Figure 6. Current Smoking Prevalence (%) among Adults 18 Years or Older by Age Group, PA, 2011 - 2019



As shown in Figure 7, the current smoking prevalence had an inverse relationship with years of education from 2011 to 2019. The prevalence was highest among adults with less education than a high school diploma, followed by adults with a high school diploma, some college, and college or higher education. Across all adults with different educational attainments, the current smoking prevalence declined universally over the nine-year period. Specifically, in adults with

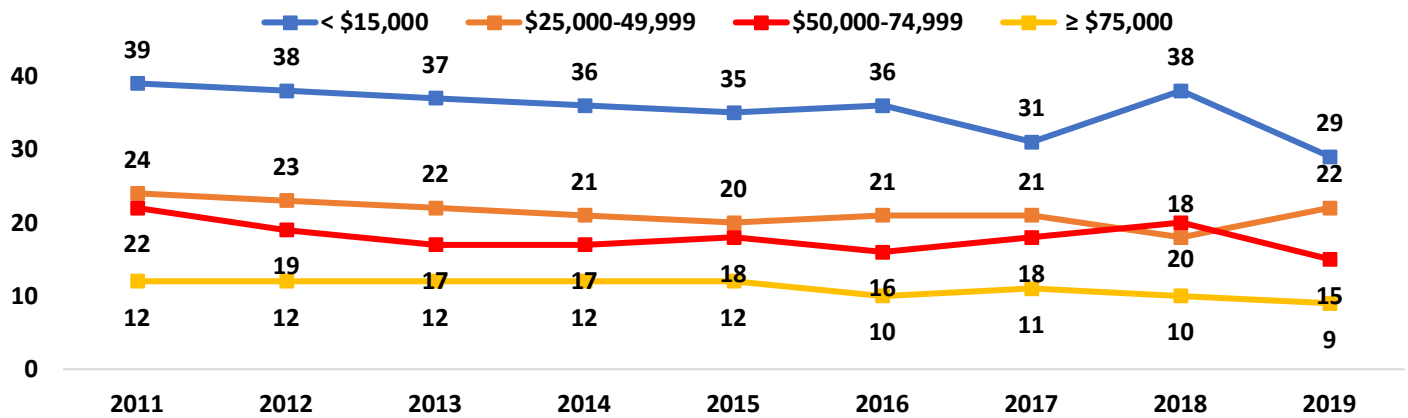
less education than a high school diploma, the prevalence declined 22%, down from 36% in 2011 to 28% in 2019. In adults with a high school diploma, the prevalence declined 15%, down from 26% in 2011 to 22% in 2019. In adults with some college education, the prevalence declined 22%, down from 23% in 2011 to 18% in 2019. In adults with college or higher education, the prevalence declined 22%, down from 9% in 2011 to 7% in 2019.

Figure 7. Current Smoking Prevalence (%) among Adults 18 Years or Older by Education, PA, 2011 - 2019



Similar to education, there was an inverse relationship between current smoking prevalence and income in PA between 2011 and 2019. As shown in Figure 8, the prevalence of current smoking was highest among adults with less than \$15,000 of an annual household income, followed by adults with an annual income of \$25,000 to \$49,999 and \$50,000 to \$74,999. Adults with the highest annual income level (\$75,000 or more) had the lowest prevalence of current smoking. The current smoking prevalence declined in all adults with different levels of income: 26% in adults with the lowest income (<\$15,000), 8% in adults with an annual income of \$25,000 to \$49,999, 32% in adults with an annual income of \$50,000 to \$74,999, and 25% in adults with an annual income of \$75,000 or more. It is noteworthy to point out that the current smoking prevalence increased in three income groups (except the highest income group) in one or two years between 2016 and 2019. It is unclear if this reflected the true increase or was a result of sampling issues in the BRFSS survey.

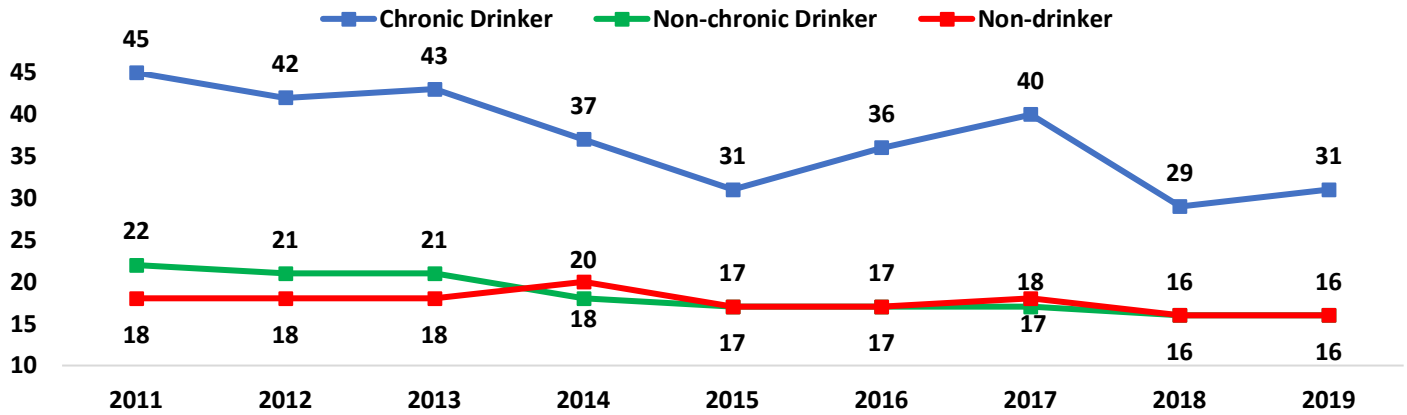
Figure 8. Current Smoking Prevalence (%) among Adults 18 Years or Older by Annual Household Income, PA, 2011 - 2019



The relationship between current smoking prevalence and drinking is shown in Figure 9. The prevalence of current smoking was substantially higher in chronic drinkers than in non-chronic drinkers or non-drinkers between 2011 and 2019. Current smoking prevalence was initially higher in non-chronic drinkers than in non-drinkers from 2011 to 2013,

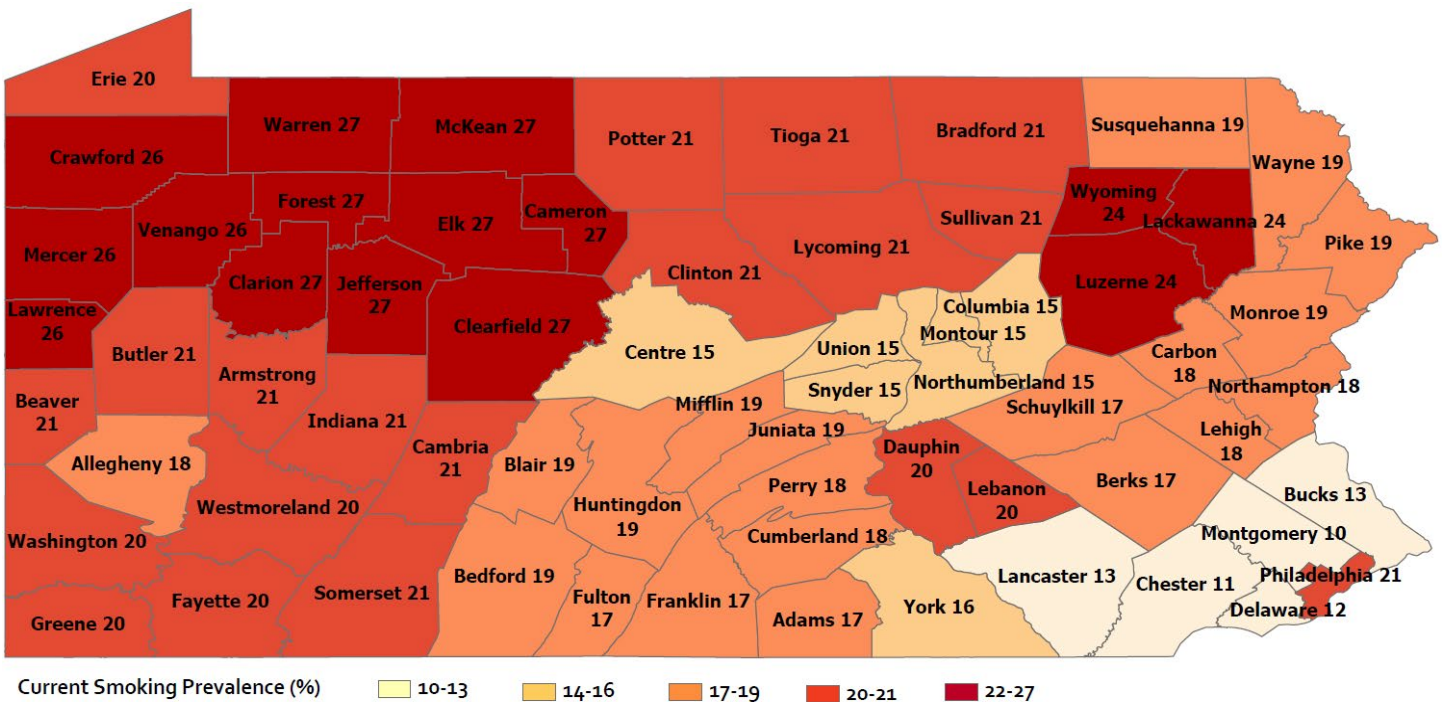
but from 2014 to 2019 the prevalence in these two groups was generally the same. Over the nine-year period, the prevalence decreased 31% in chronic drinkers, 27% in non-chronic drinkers, and 11% in non-drinkers, respectively.

Figure 9. Current Smoking Prevalence (%) among Adults 18 Years or Older by Drinking Status, PA, 2011 - 2019



Map 3 displays the current smoking prevalence by county in Pennsylvania for years of 2017 to 2019.²⁶ More counties in the northwest area were at the highest level of smoking prevalence (22% – 27%), while more counties in the southeast area were at the lowest level of smoking prevalence (10% – 13%). The top 10 counties with the highest level of smoking prevalence (22% – 27%) during 2017 – 2019 were all in the Northwest Region. These 10 counties were Cameron, Clarion, Clearfield, Crawford, Elk, Forest, Jefferson, Lawrence, McKean, and Warren. The following were the top 10 counties with the lowest level of smoking prevalence (10% – 13%) by region during 2017 – 2019: Columbia (Northcentral Region), Montour (Northcentral Region), Northumberland (Northcentral Region), Snyder (Northcentral Region), Union (Northcentral Region), Bucks (Southeast Region), Chester (Southeast Region), Delaware (Southeast Region), Lancaster (Southeast Region), and Montgomery (Southeast Region).

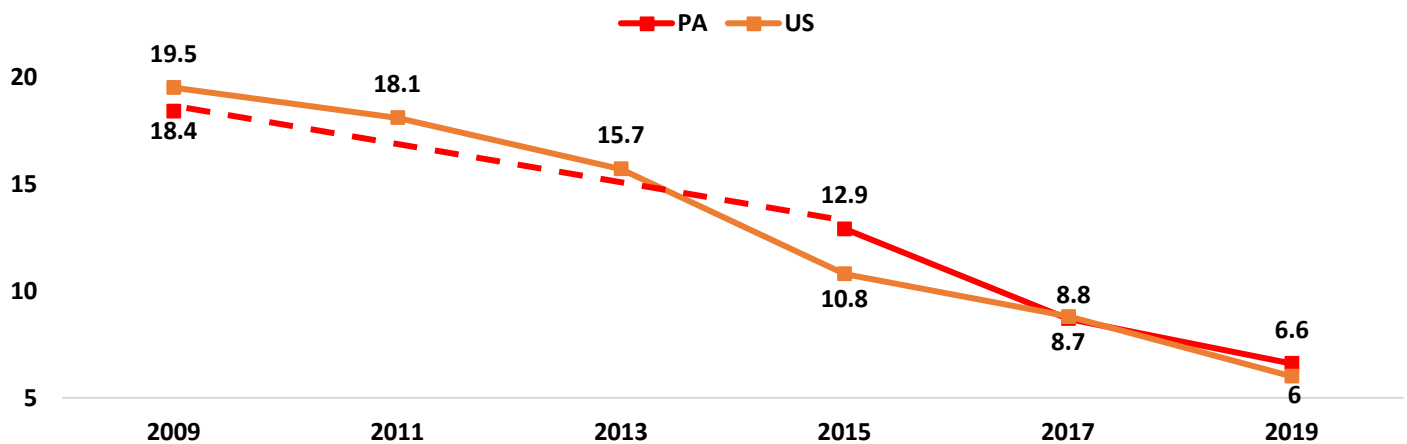
Map 3. Current Smoking Prevalence (%) by County in Pennsylvania, 2017 – 2019



Figures 10 to 13 show current cigarette smoking prevalence among high school students in PA between 2009 and 2019, based on the Youth Risk Behavior Surveillance (YRBS).²⁷ Data on current cigarette smoking were collected every other year in the US. In PA, data on current cigarette smoking were not available in 2011 and 2013. The dashed lines in Figures 10 to 13 represent missing data for the corresponding years. Figure 10 shows current cigarette smoking prevalence among high school students in PA and in the nation. In general, the trends in the prevalence of current cigarette smoking in PA and in the nation are similar in terms of prevalence and change over time. The current smoking prevalence in PA declined from 18.4% in 2009 to 6.6% in 2019, representing a 64% decrease. Similarly, the current smoking prevalence in the country decreased 69%, dropping from 19.5% in 2009 to 6% in 2019.

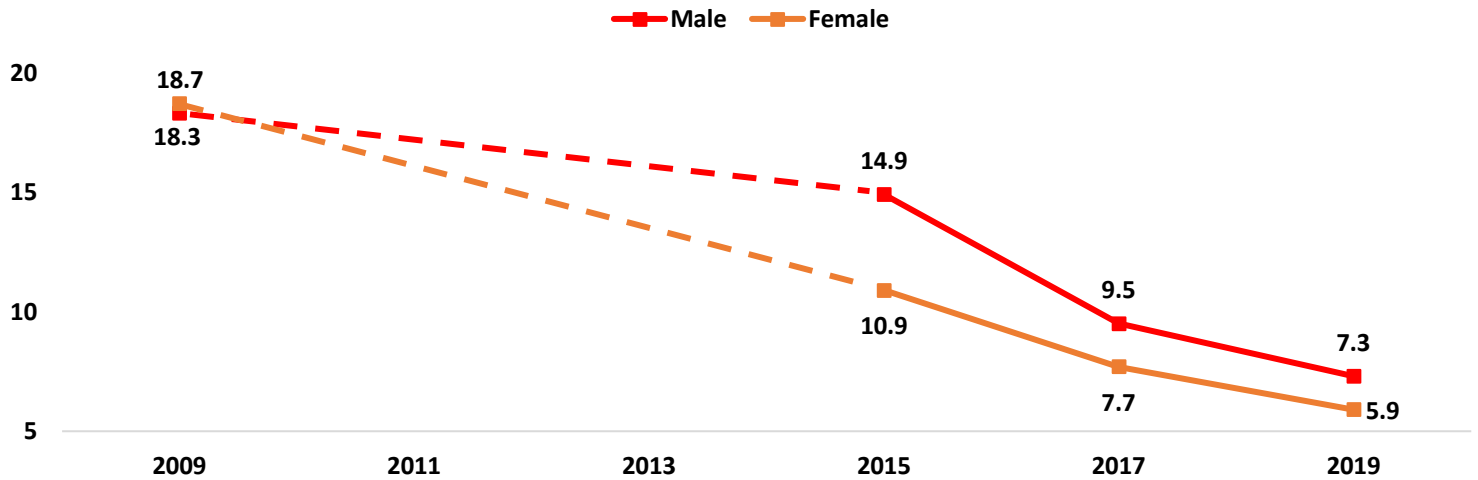
**About 1 out of 10
Pennsylvanian high
school students smoke.**

Figure 10. Current Smoking Prevalence (%) among High School Students, PA vs. US, 2009 - 2019



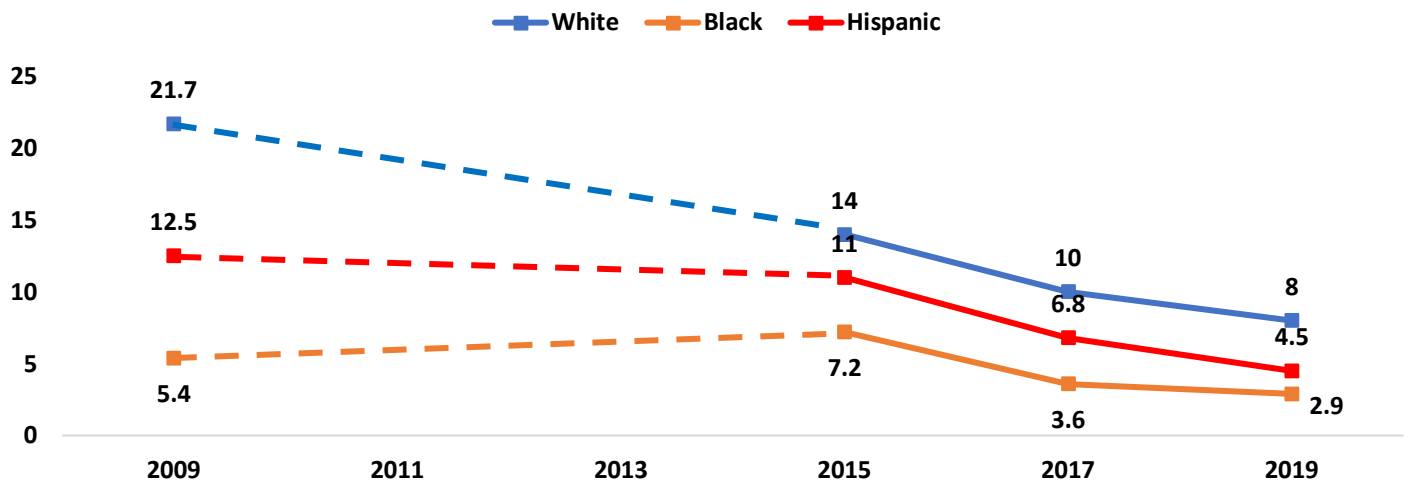
In general, current cigarette smoking prevalence was higher in male students than in female students in PA. In 2019, 7.3% of male students were current smokers, compared to 5.9% in female students. Current smoking prevalence declined in both male and female high school students in PA from 2009 to 2019. The decrease was 60% in male students and 68% in female students (Figure 11).

Figure 11. Current Smoking Prevalence (%) among High School Students by Sex, PA, 2009 - 2019



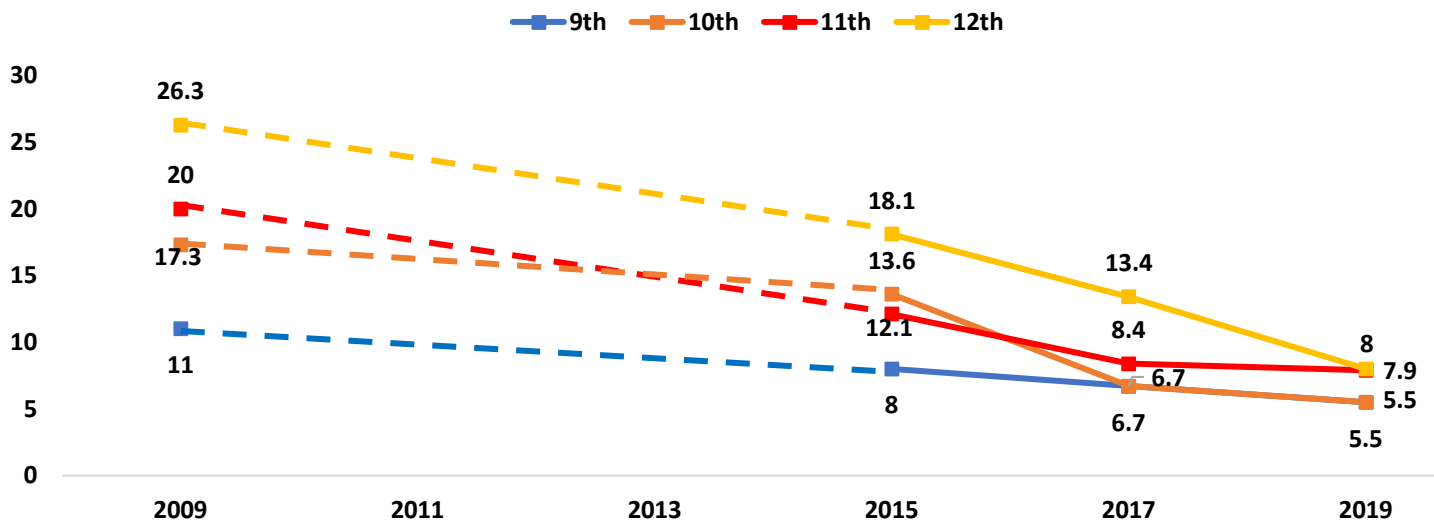
By race/ethnicity, the prevalence of current cigarette smoking was highest among White students, followed by Hispanic students and Black students. In 2019, 8% of White students were current smokers, while only 4.5% of Hispanic students and 2.9% of Black students were current smokers. The prevalence of current smoking declined in all students across all categories of race/ethnicity. The decline was 63% in White students, 46% in Hispanic students, and 64% in Black students (Figure 12).

Figure 12. Current Smoking Prevalence (%) among High School Students by Race/Ethnicity, PA, 2009 - 2019



By grade, the prevalence of current cigarette smoking appeared to be higher among students in higher grades. In 2019, approximately 8% of students in the 11th and 12th grades were current smokers, while 6% of students in the ninth and 10th grades were current smokers. The prevalence of current smoking declined in all students by grade. The decline was 70% in the 12th graders, 61% in the 11th graders, 68% in the 10th graders, and 50% in the ninth graders (Figure 13).

Figure 13. Current Smoking Prevalence (%) among High School Students by Grade, PA, 2009 - 2019

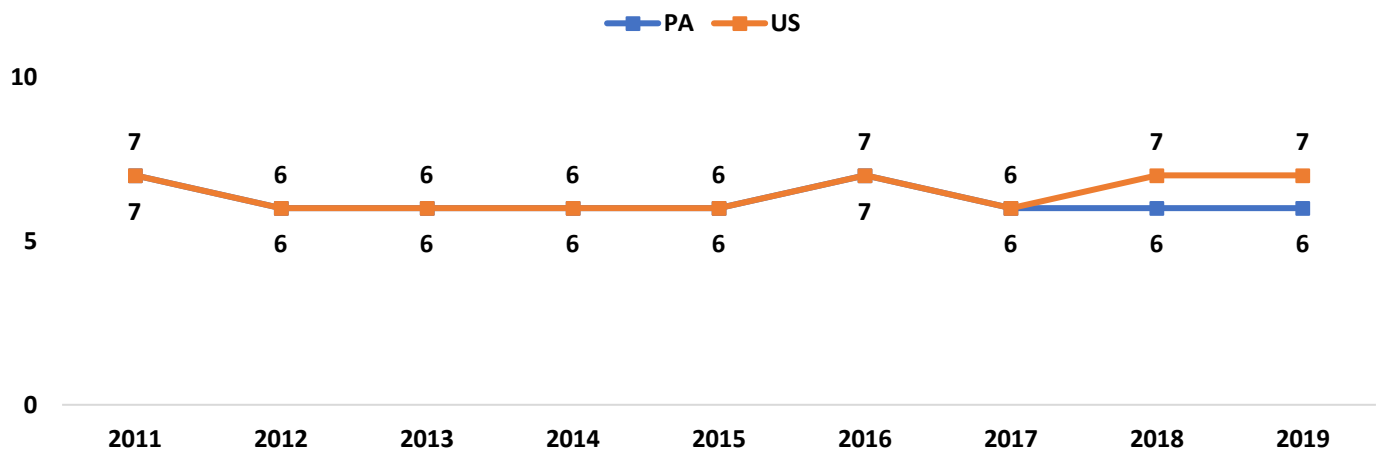


In summary, the current smoking prevalence among adults showed a trend of continuous decline in PA from 2011 to 2019. There were disparities in the trending of smoking prevalence in adults by sex, race, age group, education, and household income. In youths, the current smoking prevalence also showed a trend of continuous decline from 2009 to 2019. There were disparities in the trending of smoking prevalence in youth by sex, race, and grade.

5.2 Excessive Alcohol Use in Pennsylvania

Excessive alcohol use includes heavy drinking, binge drinking, and any alcohol use by pregnant women or anyone younger than 21 years of age. Heavy drinking is defined as consuming 15 or more drinks per week for a man and eight or more drinks per week for a woman. According to BRFSS, approximately 6% to 7% of Pennsylvanian adults were heavy drinkers from 2011 to 2019, which was similar to the national level. The prevalence of heavy drinking remained relatively unchanged in both PA and the country over the nine-year period (Figure 14).

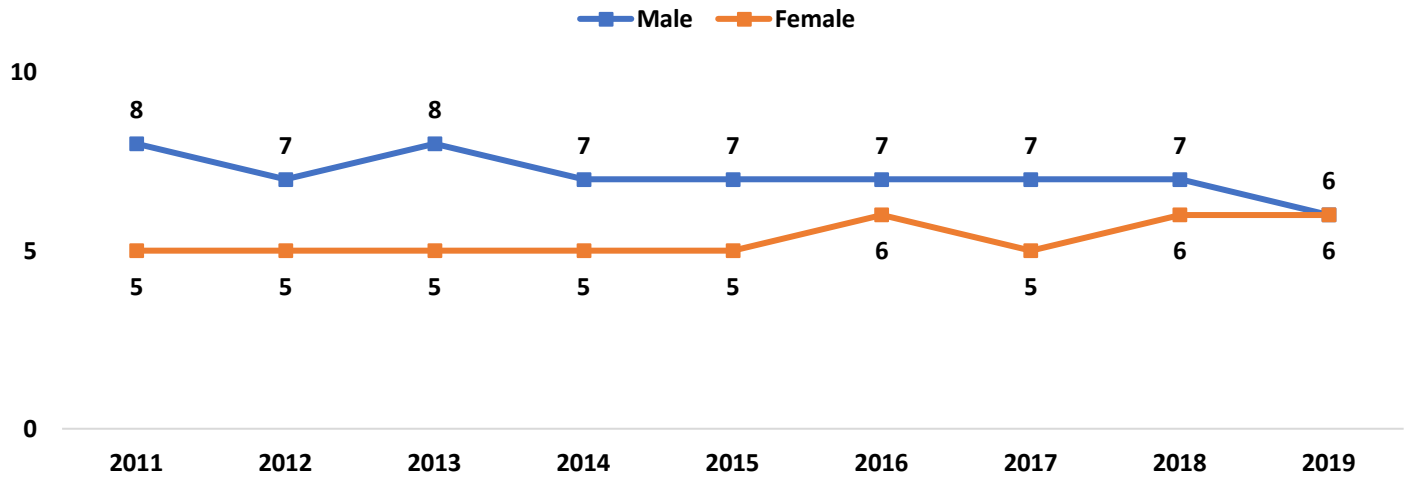
Figure 14. Percent Heavy Drinking (>14 Drinks/Week in Men and >7 Drinks/Week in Women) among Adults 18 Years or Older, PA vs. US, 2011 - 2019



By sex, more men were heavy drinkers than women in PA from 2011 to 2019. However, over the nine-year period, the percentage of heavy drinking in men declined while the percentage slightly increased in women. In 2011, 8% of men

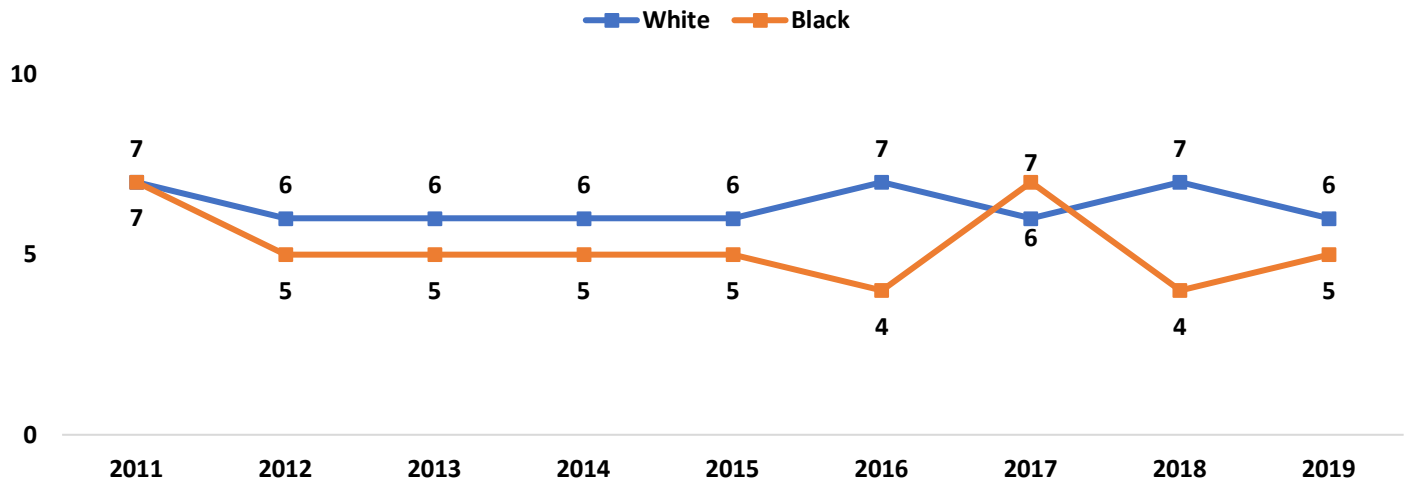
were heavy drinkers and this percentage dropped to 6% in 2019. Conversely, 5% of women were heavy drinkers in 2011 and this percentage increased to 6% in 2019 (Figure 15).

Figure 15. Percent of Heavy Drinking (>14 Drinks/Week in Men and >7 Drinks/Week in Women) among Adults 18 Years or Older by Sex, PA, 2011 - 2019



By race and ethnicity, the prevalence of heavy drinking was higher in Whites than in Blacks in PA. Approximately 6% to 7% of Whites were heavy drinkers, compared to 4% to 7% of Blacks were heavy drinkers from 2011 to 2019. Although the prevalence was lower in both Whites and Blacks in 2019 than in 2011, the prevalence remained relatively stable for most of the nine-year period (Figure 16). Drinking data were not presented for other racial/ethnic groups as there were inadequate sample sizes for analysis.

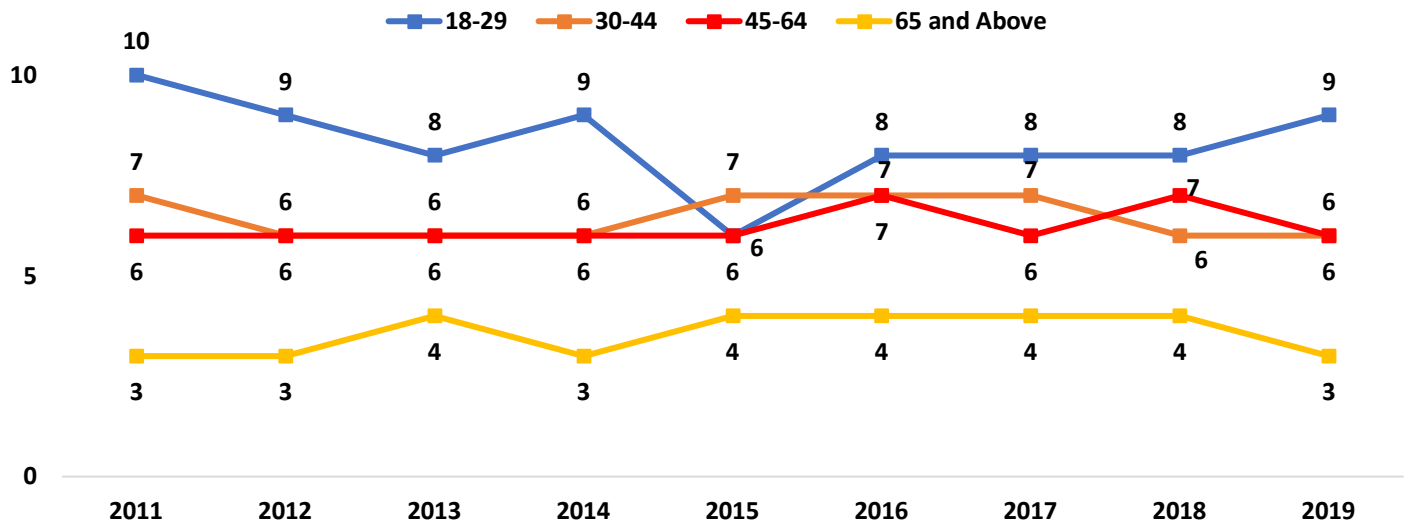
Figure 16. Percent of Heavy Drinking (>14 Drinks/Week in Men and >7 Drinks/Week in Women) among Adults 18 Years or Older by Race/Ethnicity, PA, 2011 - 2019



By age group, the prevalence of heavy drinking was highest in younger adults, followed by mid-aged adults and the elderly. The prevalence remained relatively unchanged in all groups despite some fluctuations from 2011 to 2019. The level of heavy drinking was approximately 8% to 10% in the younger adults aged 18 to 29 years, 6% to 7% in mid-aged adults (30 to 64 years of age), and 3% to 4% in adults aged 65 years or older (Figure 17).

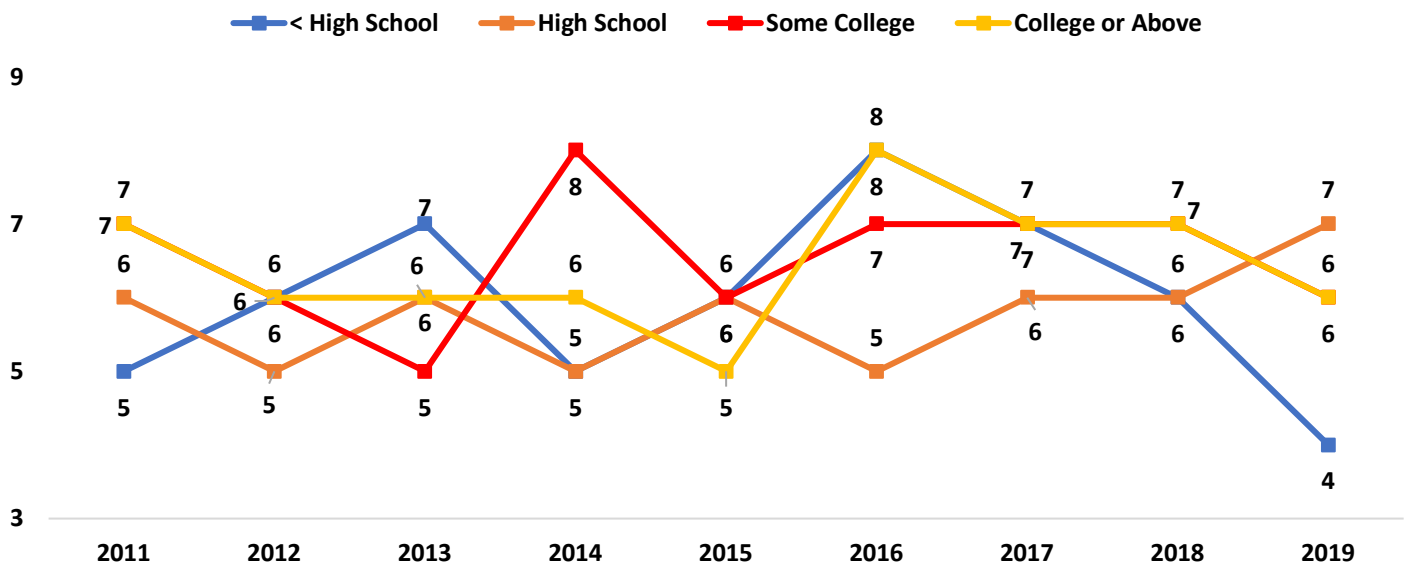
1 out of 10 young adults are heavy drinkers in PA.

Figure 17. Percent of Heavy Drinking (>14 Drinks/Week in Men and >7 Drinks/Week in Women) among Adults 18 Years or Older by Age Group, PA, 2011 - 2019



By education, despite some fluctuations over the nine-year period, there was no clear distinction in the prevalence of heavy drinking among adults with different educational attainment levels in PA from 2011 to 2019 (Figure 18).

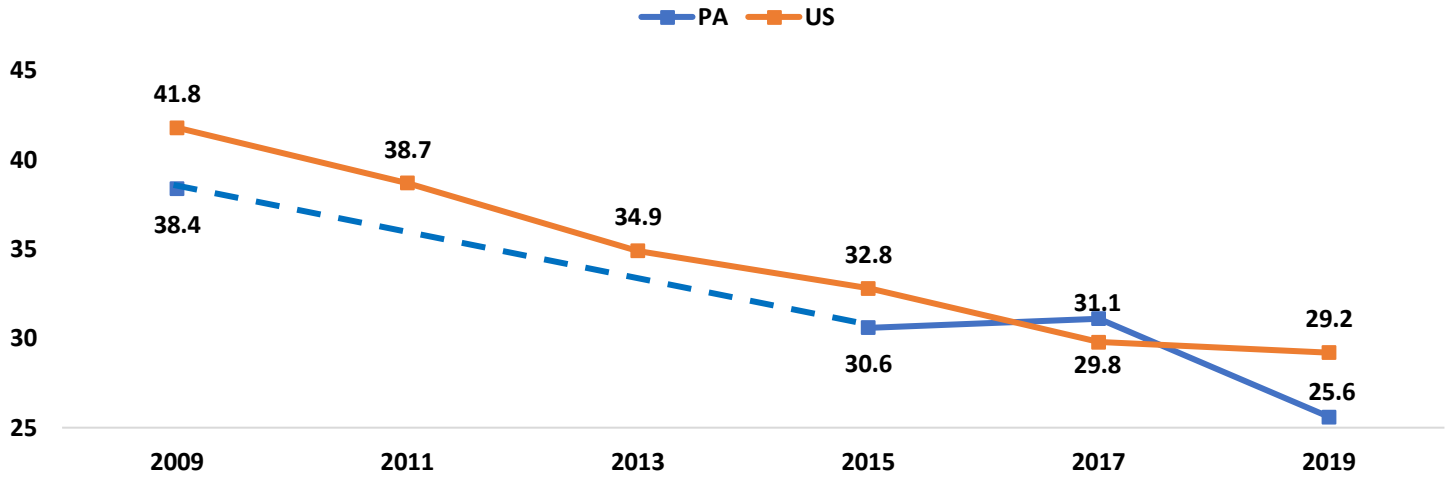
Figure 18. Percent of Heavy Drinking (>14 Drinks/Week in Men and >7 Drinks/Week in Women) among Adults 18 Years or Older by Education, PA, 2011 - 2019



Current drinking status in high school students was measured in the YRBS and was defined as having at least one drink of alcohol in the past 30 days before the survey. As shown in Figure 19, the prevalence of current drinking in high school students in PA was generally lower than the national average. The prevalence decreased steadily in PA and in the country from 2009 to 2019. The decrease in the current drinking prevalence was 33% in PA, dropping from 38.4% in 2009 to 25.6% in 2019. In the country, the decrease was 30%, dropping from 41.8% in 2009 to 29.2% in 2019.

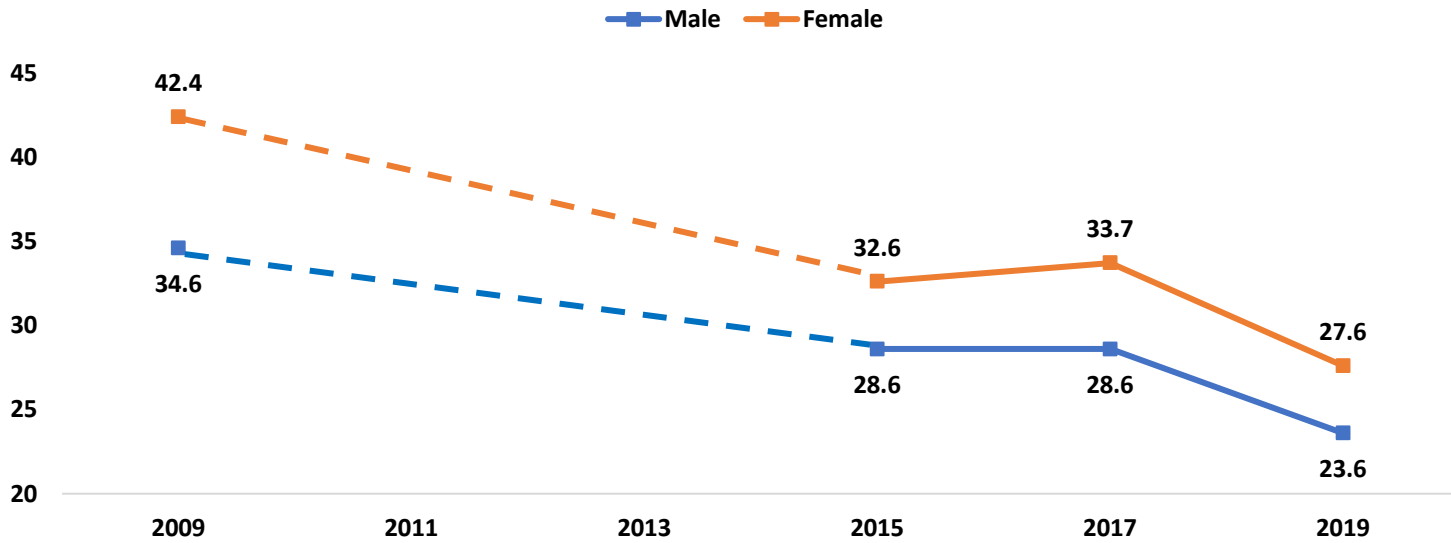
1 out of 4 high school students are current drinkers in PA.

Figure 19. Current Drinking Prevalence (%) among High School Students, PA vs. US, 2009 - 2019



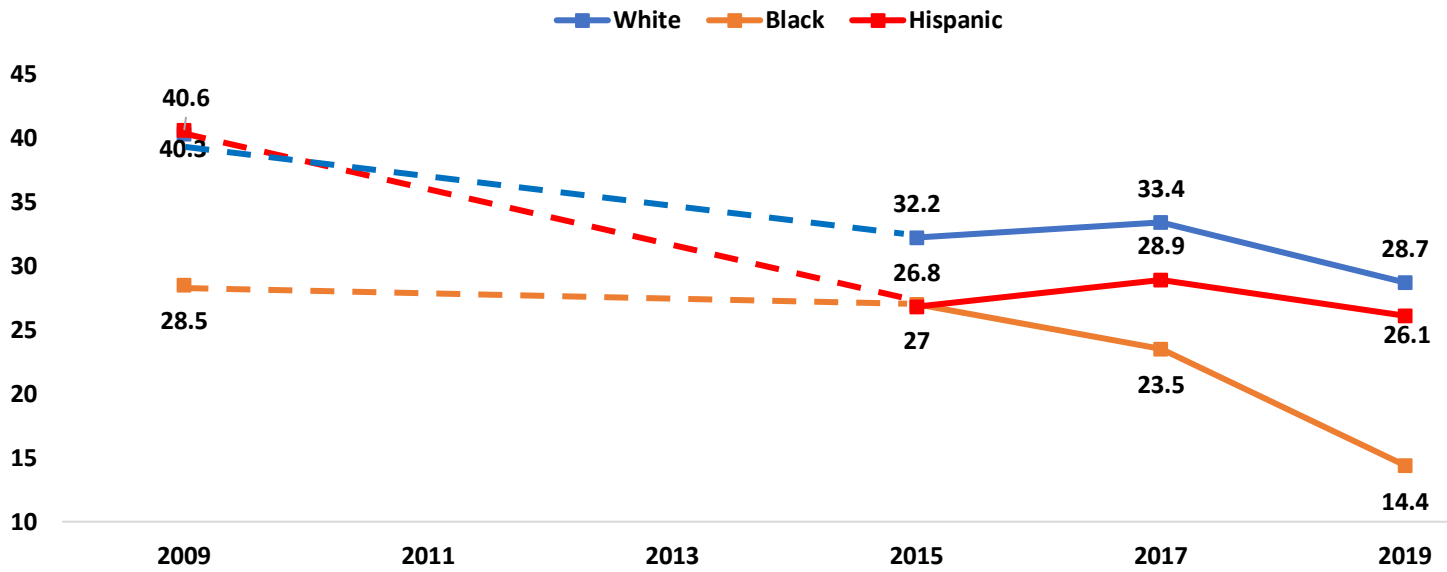
By sex, current drinking prevalence was higher in female students than in male students in PA. The prevalence declined in both female and male students from 2009 to 2019. In 2009, approximately 42.4% of female students were current drinkers, which dropped to 27.6% in 2019, reflecting a 35% decline. Similarly, approximately 34.6% of male students were current drinkers in 2009, which dropped to 23.6% in 2019, reflecting a 32% decline (Figure 20).

Figure 20. Current Drinking Prevalence (%) among High School Students by Sex, PA, 2009 - 2019



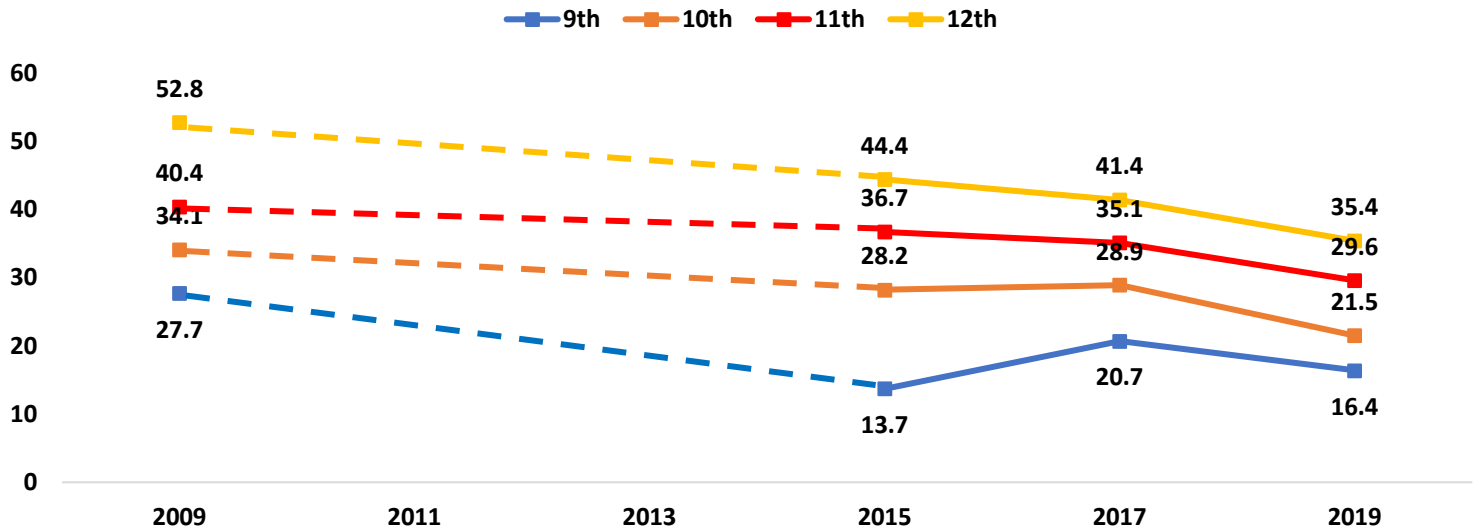
By race and ethnicity, the prevalence of current drinking was higher in White students than in Hispanic students and Black students in PA. From 2009 to 2019, the prevalence declined in all three racial and ethnic groups. The drop was 29% among White students, 36% among Hispanic students, and 49% among Black students (Figure 21).

Figure 21. Current Drinking Prevalence (%) among High School Students by Race/Ethnicity, PA, 2009 - 2019



By grade, the prevalence of current drinking increased as grade increased. The highest prevalence was among students in the 12th grade, followed by the students in the 11th, 10th, and ninth grades. In 2009, over half of 12th grade students were current drinkers. The prevalence dropped to approximately one in three students in 2019. There were similar declines in the other grades. Over the 11-year period, the prevalence dropped 27%, 37%, and 41% in the 11th, 10th, and ninth grade students, respectively (Figure 22).

Figure 22. Current Drinking Prevalence (%) among High School Students by Grade, PA, 2009 - 2019



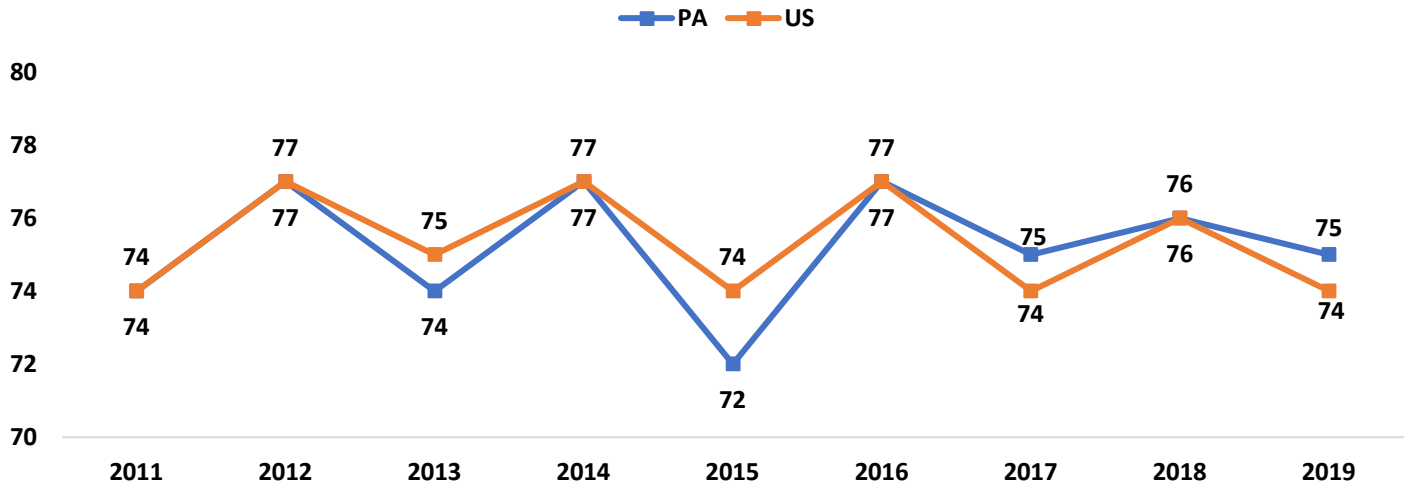
In summary, the prevalence of heavy drinking among adults remained largely unchanged in PA from 2011 to 2019. In youths, the prevalence of current drinking declined continuously from 2009 to 2019. The disparities in drinking were more remarkable in younger adults and in students at higher grades. Education on the harm of excessive alcohol use should continue among younger populations.

5.3 Physical Activity in Pennsylvania

Figure 23 displays the percentage of adults 18 years or older who participated in physical activities in the past month in PA and in the US from 2011 to 2019. In general, there was little difference in this measure between PA and the country, except that the fluctuation was greater in PA over the nine-year period, which was likely due to the smaller sample size compared to the country. Despite the fluctuations, the percentage of adults who participated in physical activities in the past month in PA and in the US remained largely unchanged from 2011 to 2019.

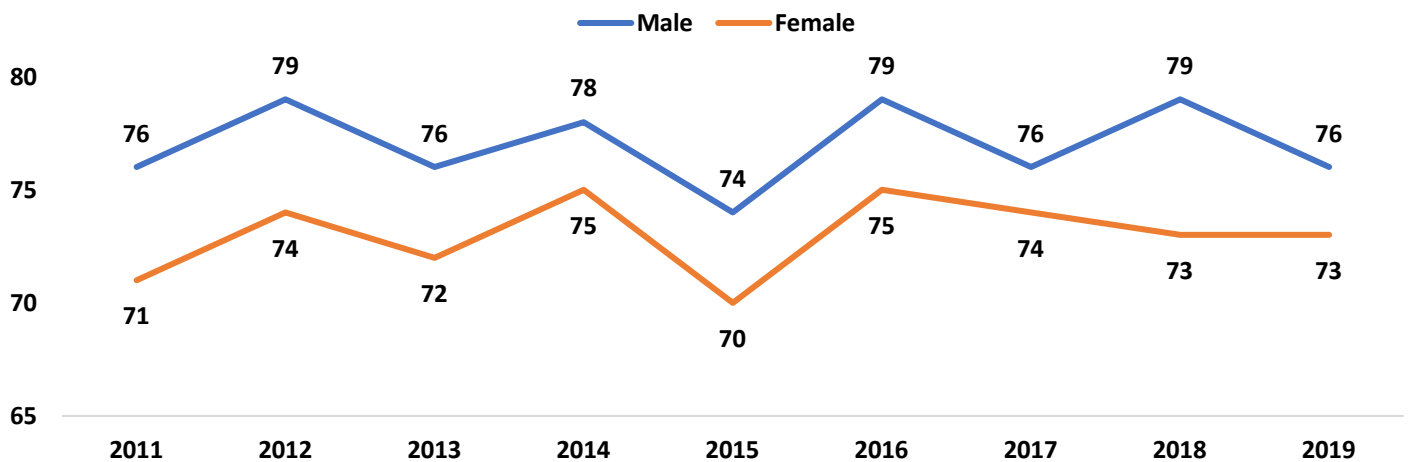
1 out of 4 Pennsylvanian adults did not exercise last month.

Figure 23. Percent of Adults 18 Years or Older Who Participated in Physical Activities in the Past Month, PA vs. US, 2011 - 2019



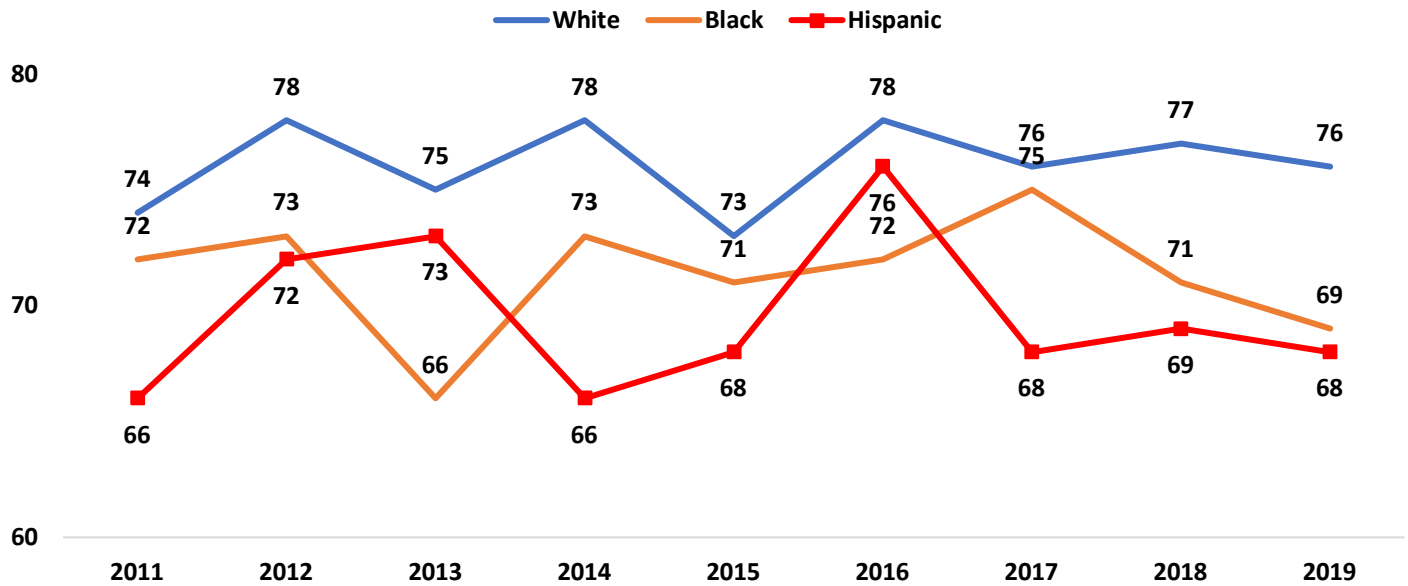
In PA, males generally participated more in physical activities than females from 2011 to 2019. Over the nine-year period, approximately 74% to 79% of males participated in physical activities in the past month, compared to 70% to 75% of females who participated in physical activities in the past month. The trend of this measure remained largely unchanged in both males and females from 2011 to 2019, despite the fluctuations in some years (Figure 24).

Figure 24. Percent of Adults 18 Years or Older Who Participated in Physical Activities in the Past Month by Sex, PA, 2011 - 2019



By race/ethnicity, Whites generally exercised more than Blacks and Hispanics in PA. Approximately 73% to 78% of Whites participated in physical activities in the past month from 2011 to 2019. This measure generally remained at the same level in Whites over the nine-year period. In Blacks and Hispanics, this measure fluctuated from 2011 to 2019, which might be due to sampling issues (Figure 25).

Figure 25. Percent of Adults 18 Years or Older Who Participated in Physical Activities in the Past Month by Race/Ethnicity, PA, 2011 - 2019



By age group, younger adults exercised more than older adults in PA. Approximately 80% to 88% of adults aged 18 to 24 years participated in physical activities in the past month. In adults aged 25 to 34 years, 76% to 85% participated in physical activities in the past month. The percentage gradually decreased in adults of older ages. This measure appeared stable in all age groups from 2011 to 2019 (Figure 26).

Figure 26. Percent of Adults 18 Years or Older Who Participated in Physical Activities in the Past Month by Age Group, PA, 2011 - 2019

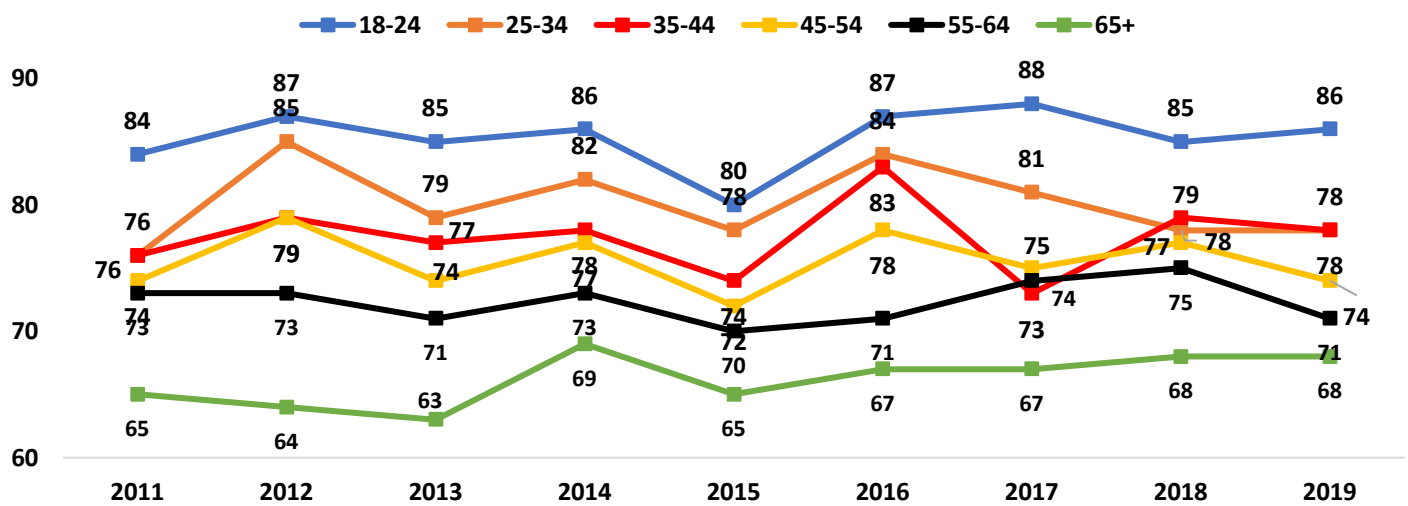
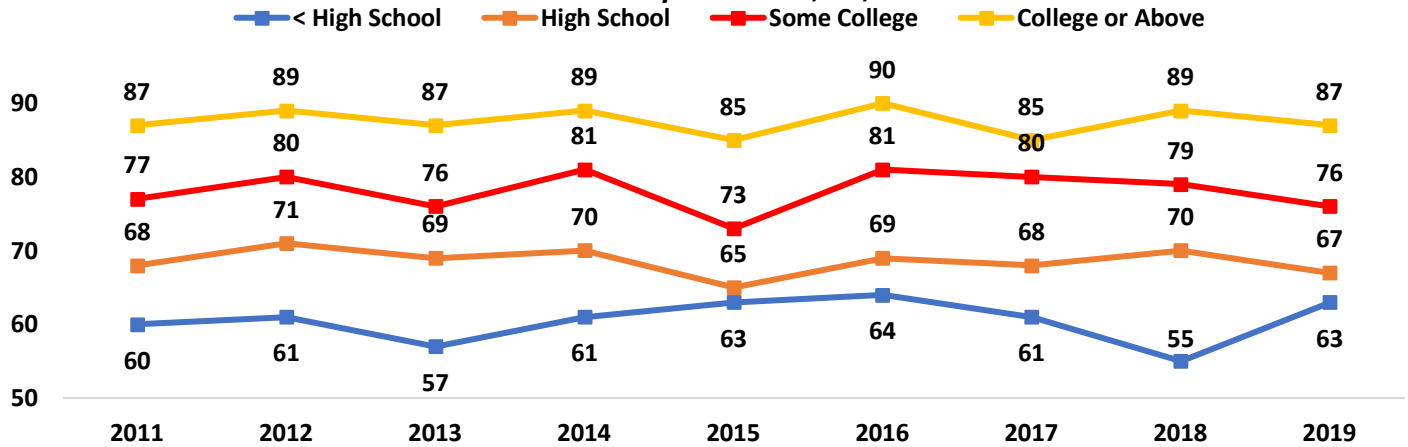


Figure 27 shows exercise in adults by educational attainment in PA. There was an inverse relationship between education and exercise. Adults with college or higher education exercised the most (85% to 90%), followed by adults

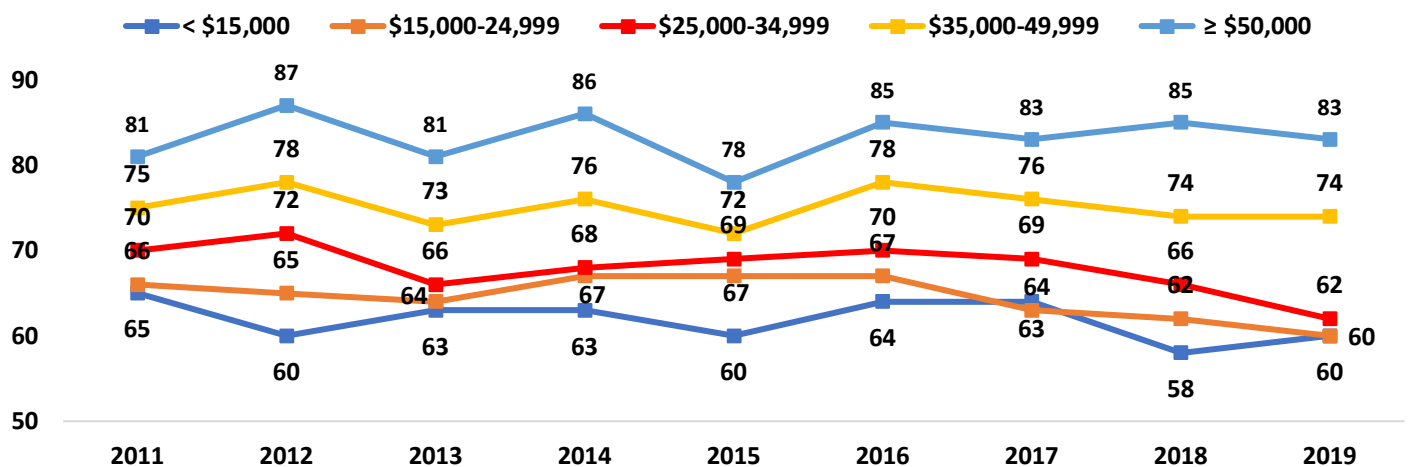
with some college education (73% to 81%), and adults with a high school diploma (65% to 71%). Adults with less education than a high school diploma exercised the least (55% to 64%). The trend of exercise remained relatively stable for all adults with different education levels from 2011 to 2019.

Figure 27. Percent of Adults 18 Years or Older Who Participated in Physical Activities in the Past Month by Education, PA, 2011 - 2019



The relationship between exercise and income follows the same inverse relationship between exercise and education, as shown in Figure 28. The percentage of adults who participated in physical activities in the past month was highest among those with the highest income ($\geq \$50,000$), followed by each of the income hierarchy in descending order. For the highest income group, 78% to 87% adults participated in physical activities in the past month. The percentage was 72% to 78% in adults at the income level of \$35,000 to \$49,999, 62% to 72% in adults at the income level of \$25,000 to \$34,999, 60% to 67% in adults at the income level of \$15,000 to \$24,999, and 58% to 65% in adults at the income level of less than \$15,000. It is noteworthy to point out that the percentage remained relatively unchanged or increased slightly in adults at the highest two levels of income, but the percentage declined approximately 10% in each of the three lowest income groups from 2011 to 2019.

Figure 28. Percent of Adults 18 Years or Older Who Participated in Physical Activities in the Past Month by Annual Household Income, PA, 2011 - 2019



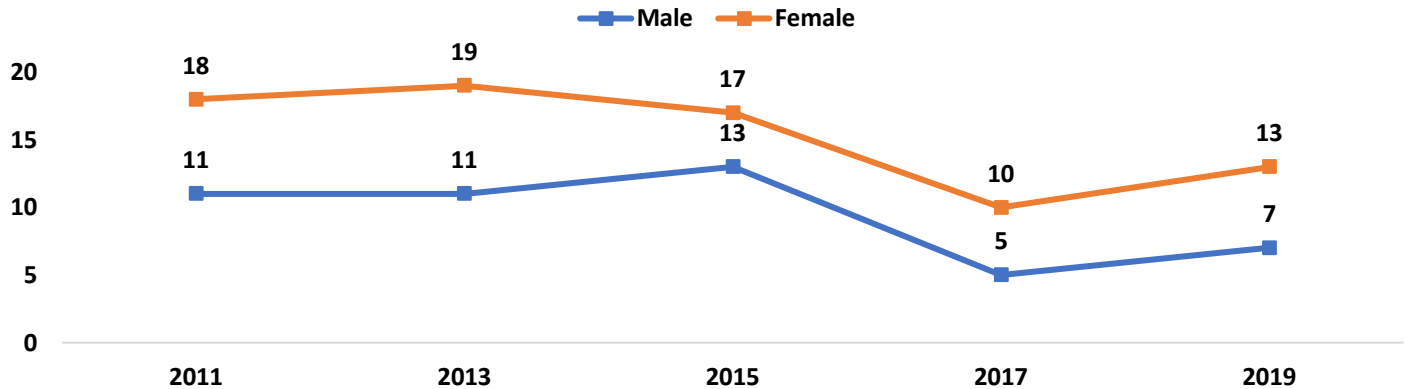
In summary, the percentage of adults who participated in physical activities in the past month remained relatively stable in PA from 2011 to 2019. There were disparities in participating in physical activities by sex, race, age group, education, and household income.

5.4 Fruit and Vegetable Consumption in Pennsylvania

According to BRFSS, the percentage of adults who consumed at least five servings of fruits and/or vegetables every day was not high in PA. As shown in Figure 29, only 18% of women and 11% of men reached this recommendation in 2011, and the levels of consumption declined in both women and men from 2011 to 2019. In women, the percentage declined from 18% in 2011 to 13% in 2019, and in men, the percentage dropped from 11% in 2011 to 7% in 2019 (Figure 29).

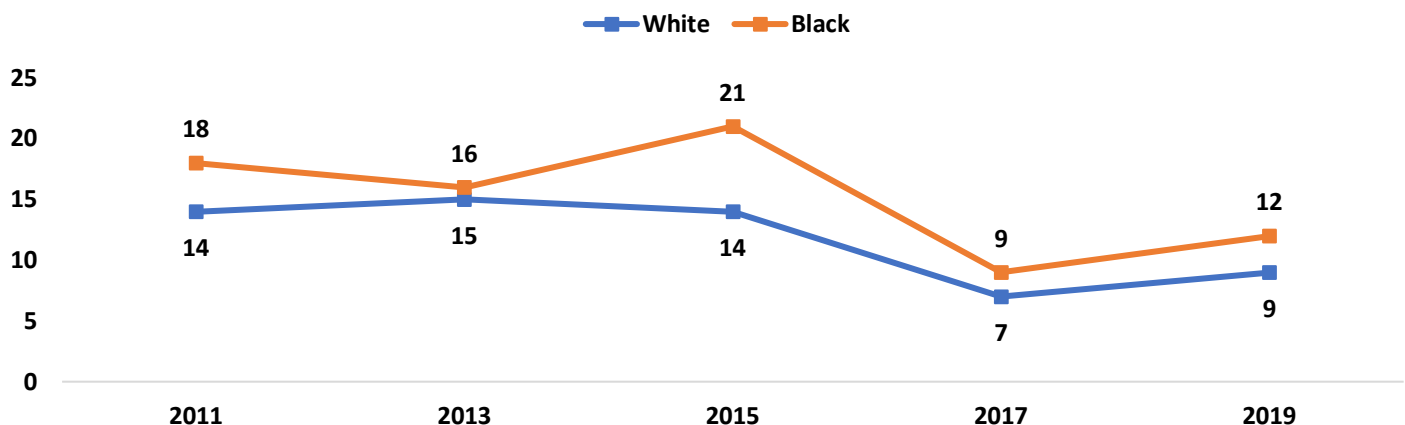
9 out of 10 adults do not consume enough fruits and vegetables in PA.

Figure 29. Percent of Adults 18 Years or Older Who Consumed at Least Five Servings of Fruits and/or Vegetables Every Day by Sex, PA, 2011 - 2019



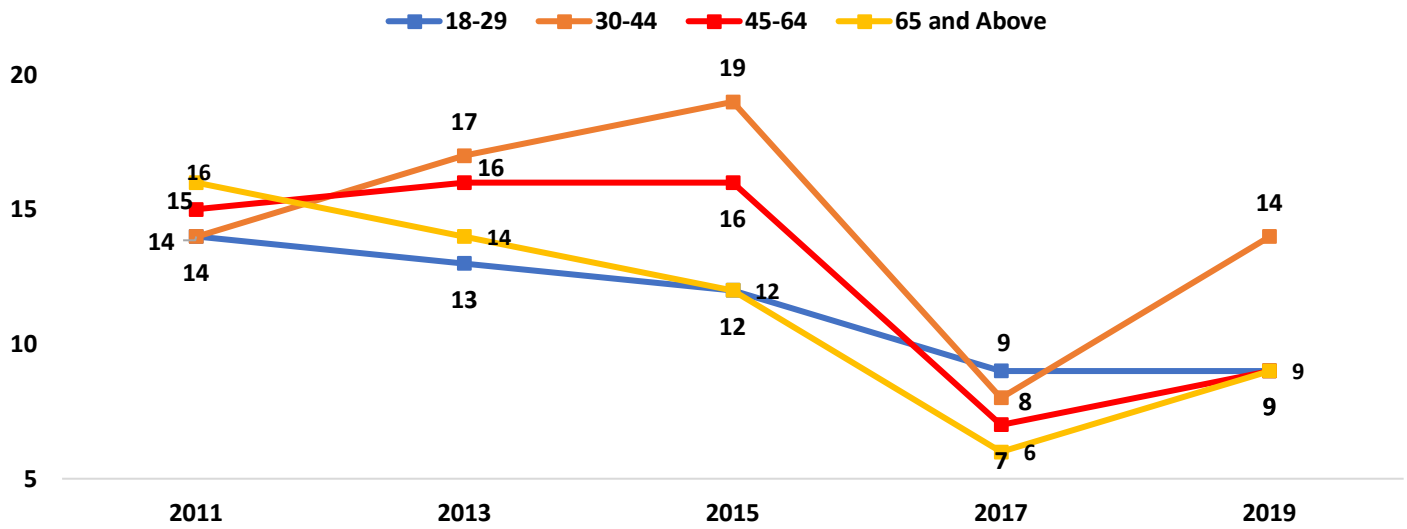
By race and ethnicity, the percentage of adults consuming at least five servings of fruits and/or vegetables every day was higher in Blacks than in Whites in PA. Approximately 12% to 18% of Blacks and 9% to 14% of Whites reached this recommendation. Over the 9-year period, the percentage declined in both Blacks and Whites. In Blacks, the percentage declined from 18% in 2011 to 12% in 2019, and in Whites, the percentage dropped from 14% in 2011 to 9% in 2019 (Figure 30).

Figure 30. Percent of Adults 18 Years or Older Who Consumed at Least Five Servings of Fruits and/or Vegetables Every Day by Race/Ethnicity, PA, 2011 - 2019



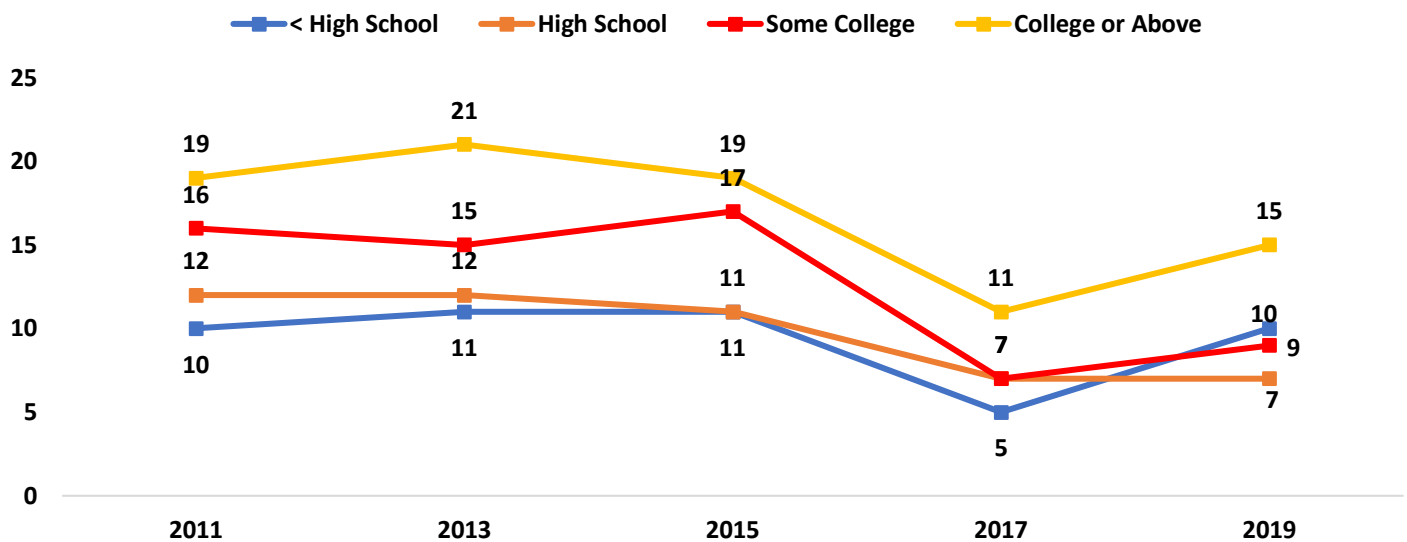
By age group, the percentage of adults consuming at least five servings of fruits and/or vegetables every day appeared to be higher in mid-aged adults than in younger and elderly adults in PA. Over the 9-year period from 2011 to 2019, the percentage consuming at least five servings of fruits and/or vegetables every day decreased in all age groups except in adults aged 30 to 44 years. The decline was 44% in adults 65 years or older, 40% in adults aged 45 to 64 years, and 36% in adults aged 18 to 29 years (Figure 31).

Figure 31. Percent of Adults 18 Years or Older Who Consumed at Least Five Servings of Fruits and/or Vegetables Every Day by Age Group, PA, 2011 - 2019



By education, adults with higher education consumed more fruits and/or vegetables in PA. The percentage consuming at least five servings of fruits and/or vegetables every day was highest among adults with college or higher education attainment, followed by adults with some college education, adults with a high school diploma, and adults with less education than a high school diploma. Over the nine-year period from 2011 to 2019, the percentage consuming at least five servings of fruits and/or vegetables every day decreased in all groups except in adults with less education than a high school diploma. The decline was 21% in adults with college or higher education attainment, 44% in adults with some college education, and 42% in adults with a high school diploma (Figure 32).

Figure 32. Percent of Adults 18 Years or Older Who Consumed at Least Five Servings of Fruits and/or Vegetables Every Day by Education, PA, 2011 - 2019



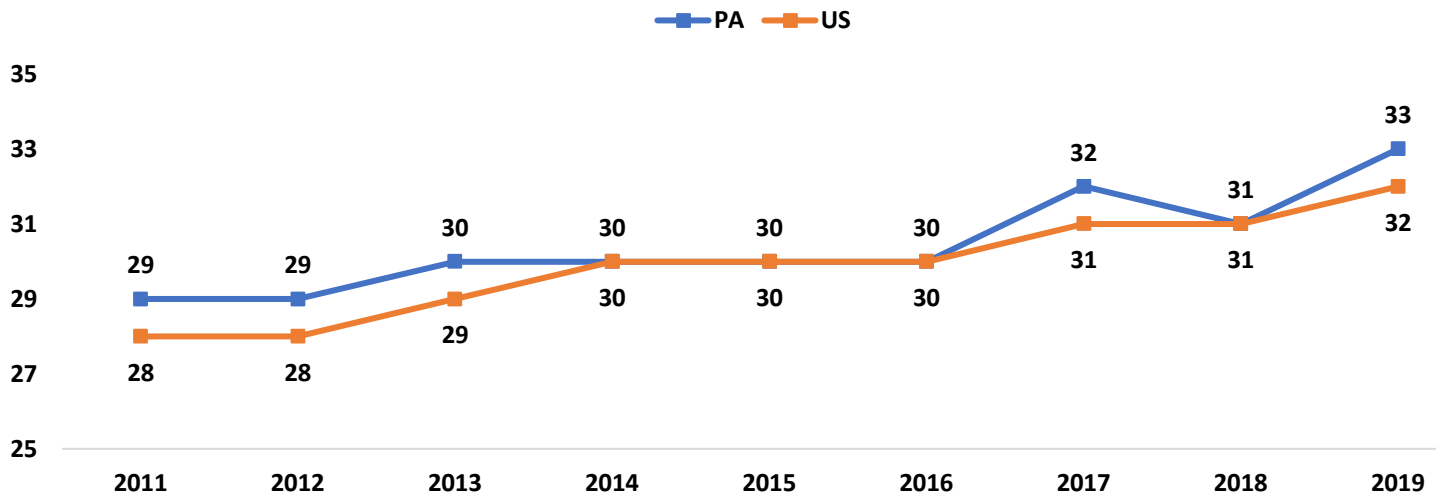
In summary, consumption of fruits and vegetables appeared to be decreasing among adults in PA from 2011 to 2019. There were some disparities in the consumption of fruits and vegetables by sex, race, age group, and education. The importance of a healthy diet should continue to be a major focus in health promotion and risk reduction in PA.

5.5 Obesity in Pennsylvania

Obesity is defined as a value of 30 or higher in body mass index, which is a person's weight in kilograms divided by the square of height in meters. Figure 33 shows the trend of obesity prevalence among adults 18 years or older in PA and the US from 2011 to 2019. Overall, obesity prevalence was slightly higher in PA than in the country. Over the nine-year period, obesity prevalence increased from 29% in 2011 to 33% in 2019 in PA, up 14%. Obesity prevalence also increased in the country, up 14% from 28% in 2011 to 32% in 2019.

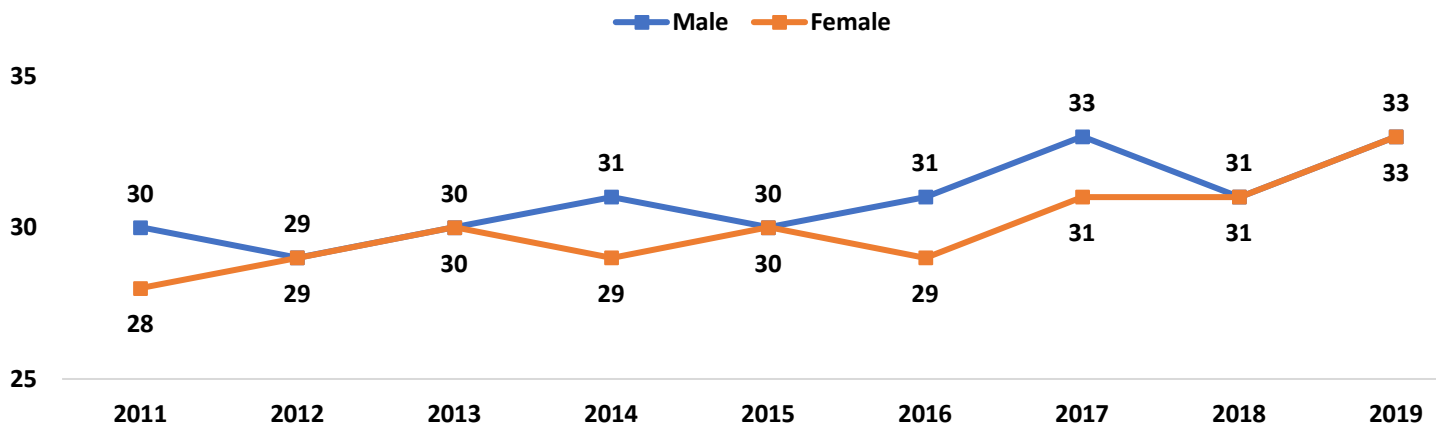
1 in 3 adults have obesity in PA.

Figure 33. Obesity Prevalence (%) among Adults 18 Years or Older, PA vs. US, 2011 - 2019



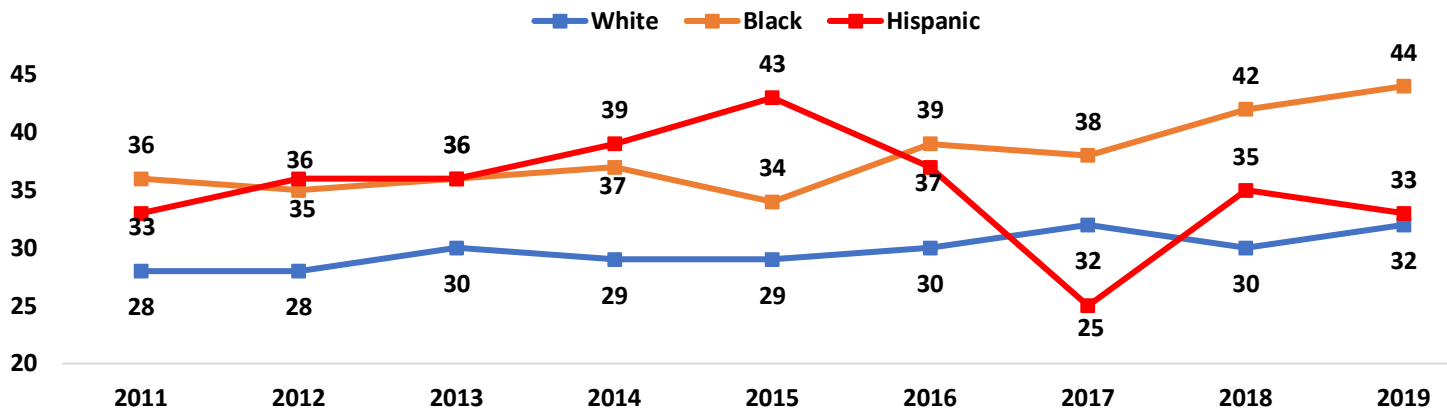
In PA, the prevalence of obesity was slightly higher in males than in females for most of the time period from 2011 to 2019; however, in 2018 and 2019 the prevalence in females has reached the same level as in males. Over the nine-year period, obesity prevalence in males increased 10%, up from 30% in 2011 to 33% in 2019, while in females, obesity prevalence increased 18%, up from 28% in 2011 to 33% in 2019 (Figure 34).

Figure 34. Obesity Prevalence (%) among Adults 18 Years or Older by Sex, PA, 2011 - 2019



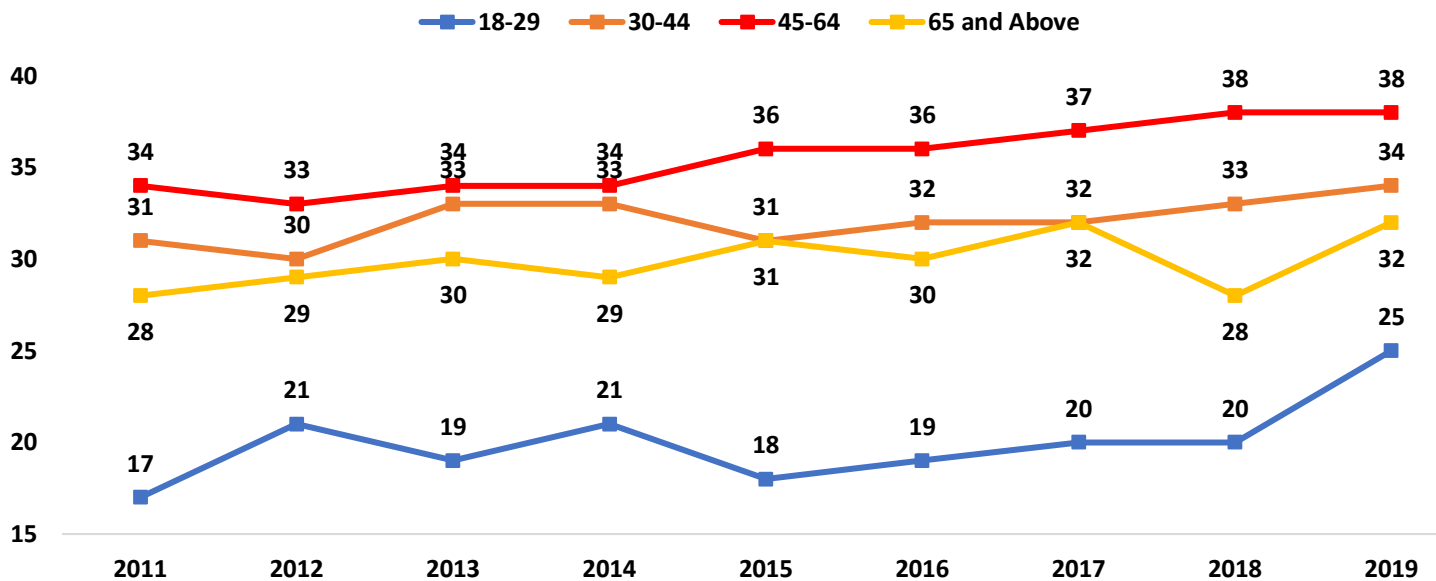
By race/ethnicity, the prevalence of obesity was generally higher in Blacks and Hispanics than in Whites in PA from 2011 to 2015. From 2015 to 2019, the prevalence steadily increased in Blacks while the prevalence fluctuated greatly in Hispanics. Over the nine-year period, obesity prevalence increased 22% in Blacks, up from 36% in 2011 to 44% in 2019. The prevalence also increased in Whites, up from 28% in 2011 to 32% in 2019, equivalent to a 14% increase. The prevalence in Hispanics fluctuated over years and remained at the same level in 2019 as in 2011 (Figure 35).

Figure 35. Obesity Prevalence (%) among Adults 18 Years or Older by Race/Ethnicity, PA, 2011 - 2019



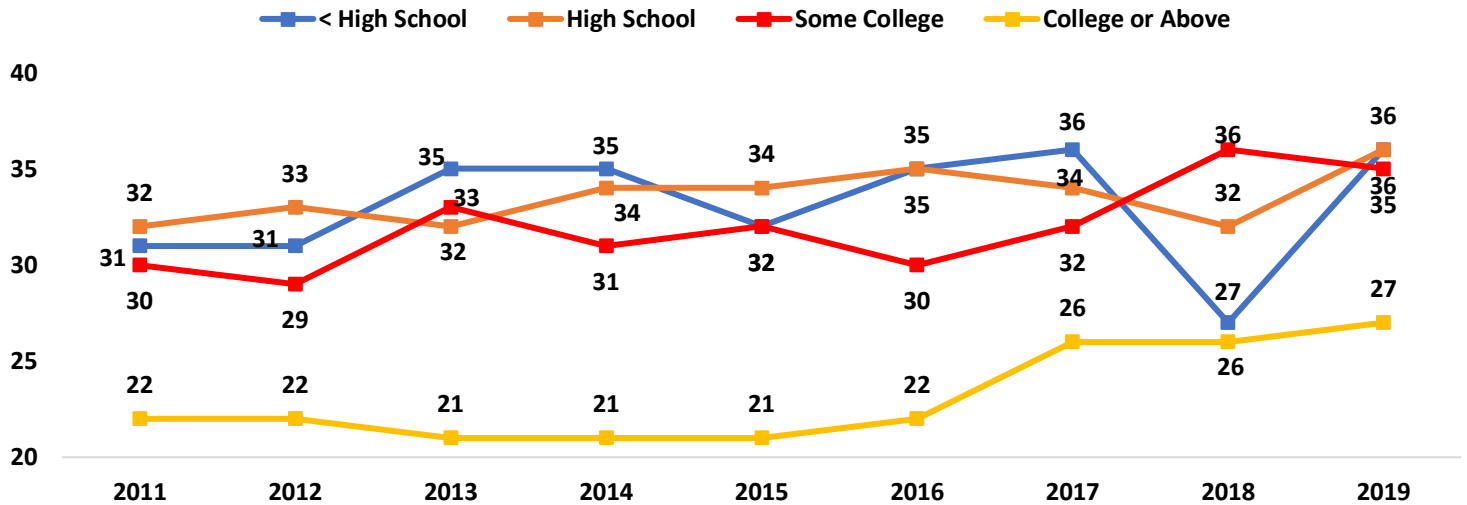
By age group, obesity prevalence was clearly different across age groups in PA. The prevalence was highest among middle-aged adults, followed by older adults. Young adults had the lowest prevalence of obesity. Over the nine-year period, obesity prevalence increased universally in all age groups. Notably, although obesity prevalence was lowest in young adults aged 18 to 29 years, it increased substantially by 47%, up from 17% in 2011 to 25% in 2019. Following young adults, older adults had the second greatest increase of 14% in obesity, up from 28% in 2011 to 32% in 2019. The prevalence in adults aged 45 to 64, which was the highest among all groups, increased 12%, up from 34% in 2011 to 38% in 2019. The prevalence in adults aged 30 to 44 years increased 10%, up from 31% in 2011 to 34% in 2019 (Figure 36).

Figure 36. Obesity Prevalence (%) among Adults 18 Years or Older by Age Group, PA, 2011 - 2019



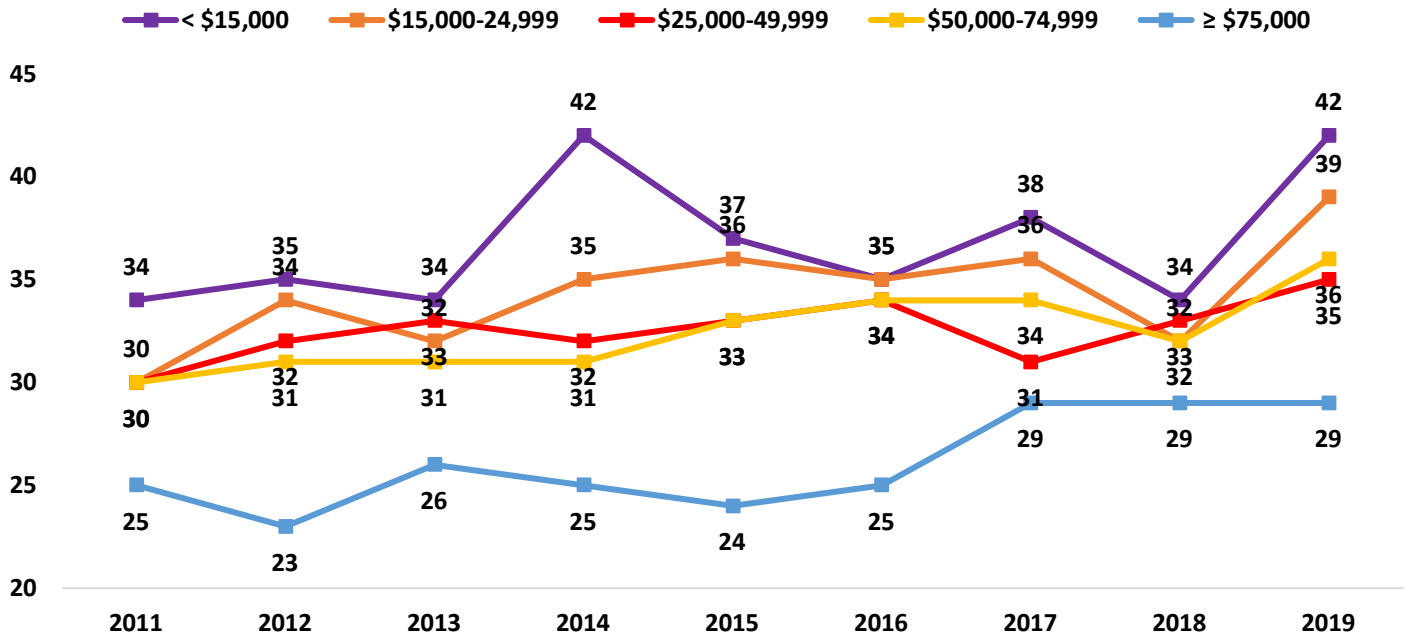
In PA, adults with the highest level of education (college and above) had the lowest prevalence of obesity. The prevalence was largely the same in adults with educational attainment of less than high school, high school, and some college during the period of 2011 to 2019. Over the nine-year period, obesity prevalence increased in all adults with different education levels. Notably, adults with college or higher education, who had the lowest obesity prevalence, experienced the greatest increase. In these adults, obesity prevalence increased 23%, up from 22% in 2011 to 27% in 2019. For adults with educational attainment of less than high school, high school, and some college, the increase was 16%, 13%, and 17%, respectively (Figure 37).

Figure 37. Obesity Prevalence (%) among Adults 18 Years or Older by Education, PA, 2011 - 2019



The pattern of obesity prevalence by income was shown in Figure 38. Adults with the highest level of income had the lowest prevalence of obesity and adults with lower levels of income usually had higher prevalence of obesity. Over the nine-year period from 2011 to 2019, obesity prevalence increased in all adults despite levels of income. From the lowest to the highest hierarchy of income, the prevalence increased 24%, 30%, 17%, 20%, and 16%, respectively (Figure 38).

Figure 38. Obesity Prevalence (%) among Adults 18 Years or Older by Annual Household Income, PA, 2011 - 2019



In the Youth Risk Behavior Surveillance System (YRBS), obesity was defined as body mass index being 95th percentile or greater in a student, based on sex- and age-specific reference data from the 2000 CDC growth charts. Figure 39 shows the obesity trend among high school students in PA and in the country. In general, the prevalence of obesity in high school students in PA was at the same level as in the country, and the prevalence in PA shared the same increasing pattern as in the country. In 2009, approximately 11.7% of high school students had obesity in PA, compared to 11.8% in

the country. In 2019, the obesity prevalence increased to 15.4%, up 32% in PA. In the country, the prevalence increased 32%, up from 11.8% in 2009 to 15.5% in 2019 (Figure 39).

Figure 39. Obesity Prevalence (%) among High School Students, PA vs. US, 2009 - 2019

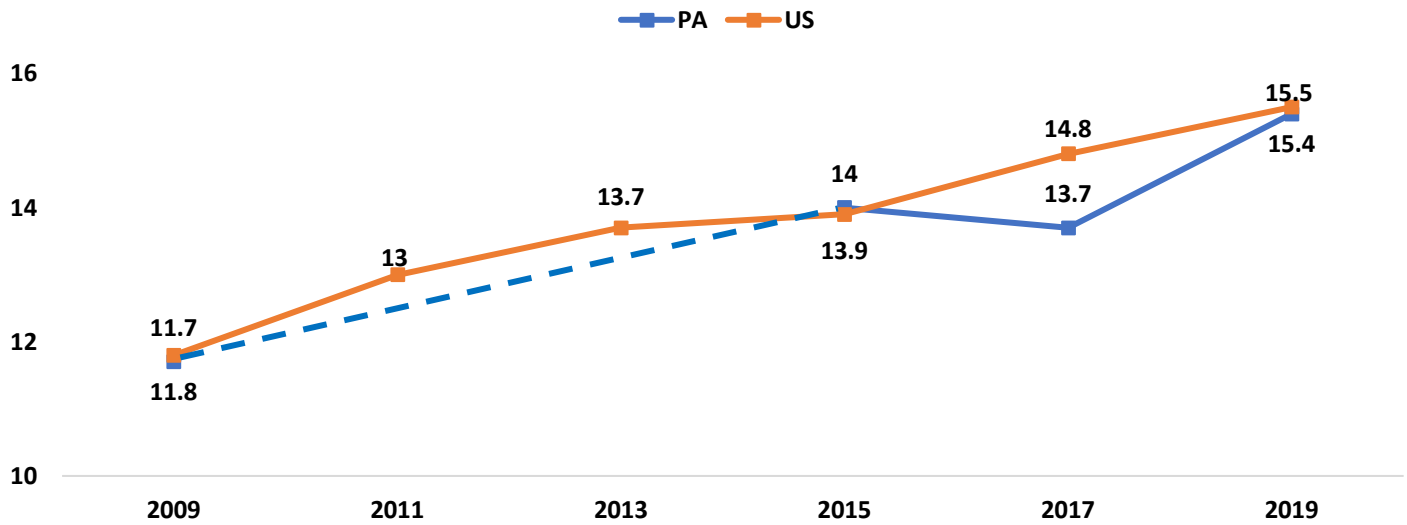


Figure 40 shows the prevalence of obesity in high school students by sex in PA from 2009 to 2019. In general, the prevalence was higher in male students than in female students, and the prevalence increased in all students over the 11-year period. In 2009, 13.5% of male students had obesity and the percentage increased to 17.9% in 2019, up 33%. Similarly, the prevalence of obesity increased 27% in female students, up from 9.9% in 2009 to 12.6% in 2019 (Figure 40).

1 in 5 high school students have obesity in PA.

Figure 40. Obesity Prevalence (%) among High School Students by Sex, PA, 2009 - 2019

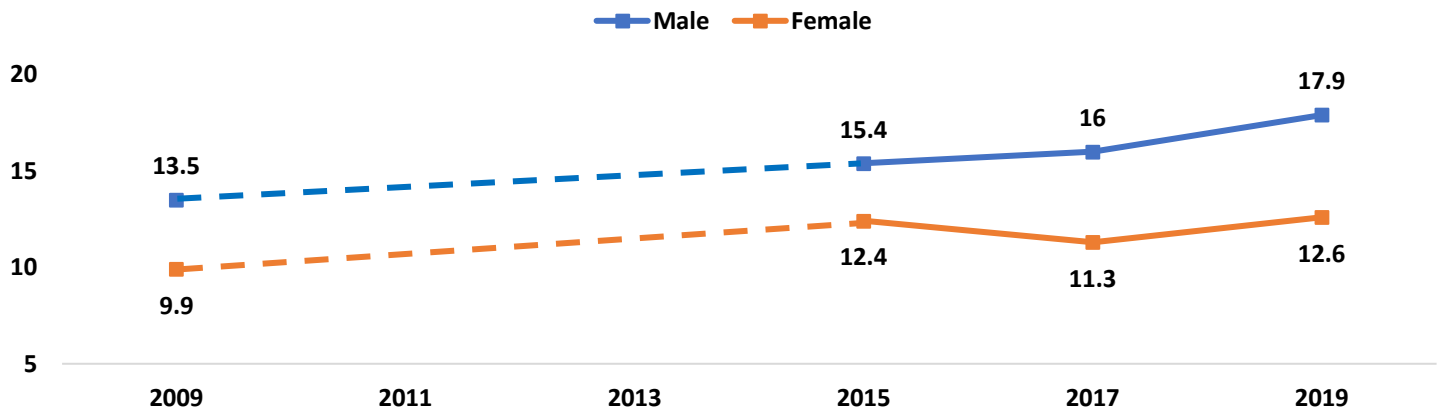


Figure 41 shows the prevalence of obesity in high school students by race and ethnicity in PA from 2009 to 2019. Obesity prevalence was consistently lowest in White students over the 11-year period. The prevalence was highest in Hispanic students in 2009 and 2019, and the prevalence was highest in Black students in 2015. Although the prevalence of obesity was lowest in White students, the increase of obesity prevalence was the greatest in White students. The prevalence increased from 10.5% in 2009 to 14.8% in 2019, up 41%. The increase in obesity prevalence in Hispanic students and Black students was 10% and 3%, respectively, over the 11-year period (Figure 41).

Figure 41. Obesity Prevalence (%) among High School Students by Race/Ethnicity, PA, 2009 - 2019

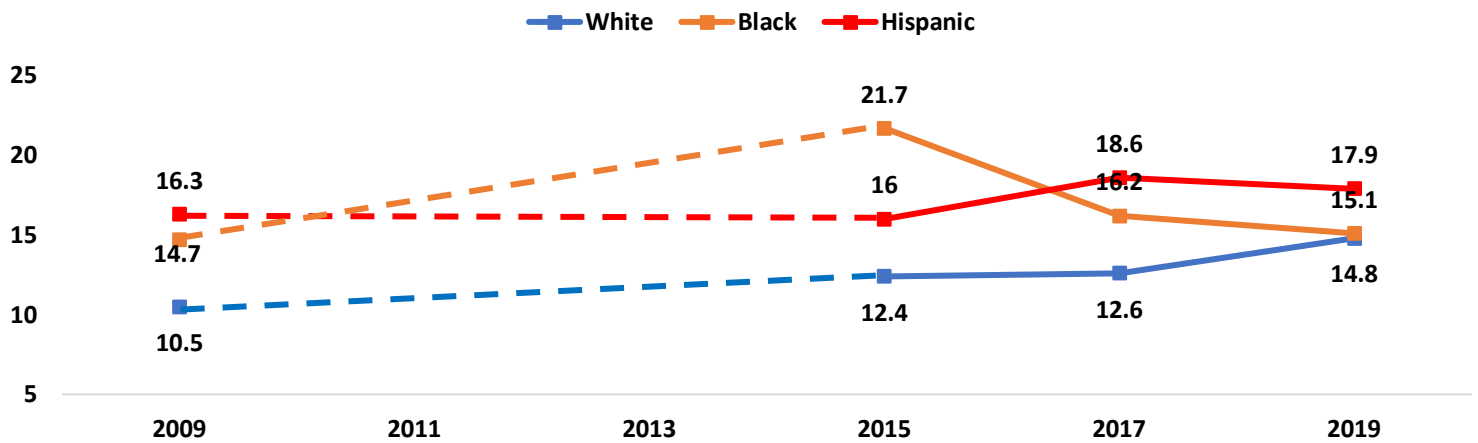
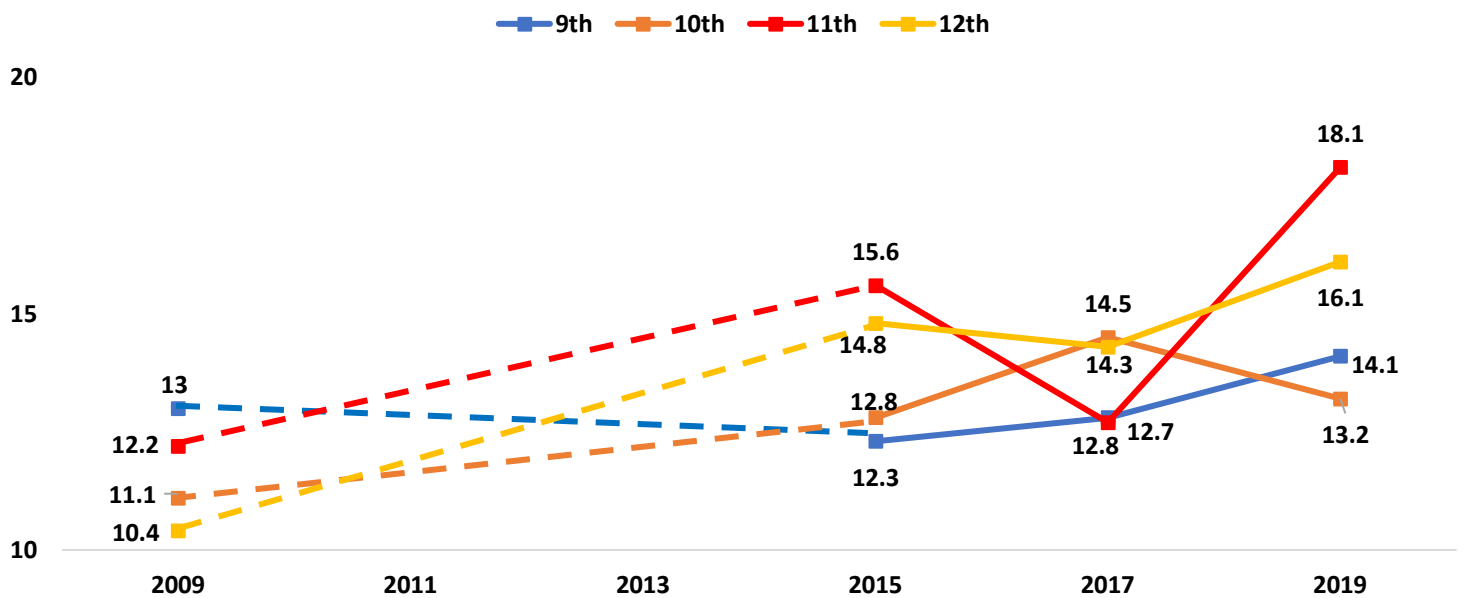


Figure 42 shows the prevalence of obesity in high school students by grade in PA from 2009 to 2019. In 2009, the prevalence of obesity did not differ much among students in different grades, but the scale of increase in obesity differed over the 11-year period, with the greatest increase in students in the highest grade and the least increase in students in the lowest grade. Specifically, the prevalence of obesity increased 55% in the 12th grade students, up from 10.4% in 2009 to 16.1% in 2019; the prevalence increased 48% in the 11th grade students, up from 12.2% in 2009 to 18.1% in 2019; the prevalence increased 19% in the 10th grade students, up from 11.1% in 2009 to 13.2% in 2019; and the prevalence increased 8% in the 9th grade students, up from 13% in 2009 to 14.1% in 2019 (Figure 42).

Figure 42. Obesity Prevalence (%) among High School Students by Grade, PA, 2009 - 2019



In summary, obesity has become a major health issue in both adult and youth populations in PA, as the prevalence of obesity continued to increase in both populations over the past decade. This increase continued in most adults categorized by sex, race/ethnicity, age group, education, and household income, and in all high school students categorized by sex, race/ethnicity, and grade. As obesity is closely related to many chronic diseases and quality of life, disease prevention should prioritize reducing obesity through promoting opportunities for physical activity and a healthy diet.

5.6 Hypertension in Pennsylvania

1 in 3 adults had high blood pressure in PA.

Hypertension (i.e., high blood pressure) is defined as having a systolic blood pressure of 130 mm Hg or higher, or a diastolic blood pressure of 80 mm Hg or higher.²⁸ Normal blood pressure is defined as having a systolic blood pressure of less than 120 mm Hg or a diastolic blood pressure of less than 80 mm Hg.²⁹ Hypertension usually has no warning signs or symptoms. Measuring blood pressure is the only way to know if a person has high blood pressure. Hypertension can damage health in many ways and is associated with heart disease, stroke, and chronic kidney disease. Lifestyle changes can effectively prevent hypertension, which include getting at least 150 minutes of physical activity each week (about 30 minutes a day, 5 days a week), not smoking, eating a healthy diet (e.g., limiting the intake of sodium (salt) and alcohol), maintaining a healthy weight, and managing stress.³⁰ Hypertension was measured every other year in BRFSS.

Figure 43 shows the prevalence of hypertension in PA and in the US from 2011 to 2019, which was measured as the percent of adults reporting that they were told by their doctors that they had hypertension. In general, the prevalence of hypertension was higher in PA than in the country. Over the nine-year period, the prevalence of hypertension increased 6% in PA, greater than the 3% increase in the country.

Figure 43. Percent of Adults Aged 18 Years or Older Who Were Told That They Had Hypertension, PA vs. US, 2011–2019

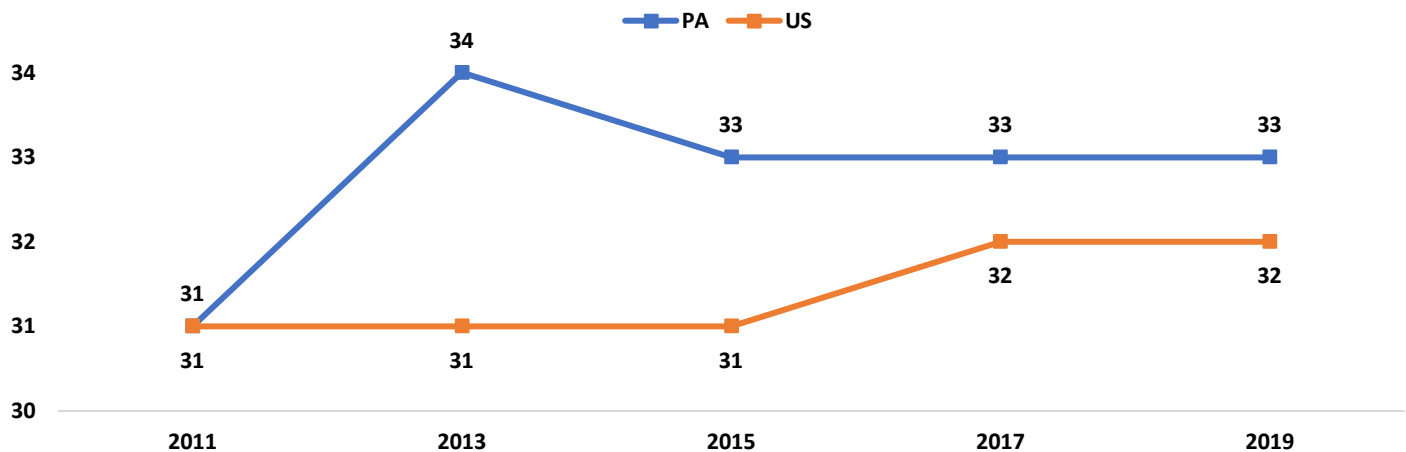


Figure 44 shows the prevalence of hypertension by sex in PA from 2011 to 2019. Throughout the nine-year period, the prevalence of hypertension was higher in males than in females, and the prevalence increased in both males and females. In males, the prevalence increased 9%, up from 32% in 2011 to 35% in 2019. In females, the prevalence

increased 7%, up from 30% in 2011 to 32% in 2019.

Figure 44. Percent of Adults Aged 18 Years or Older Who Were Told That They Had Hypertension by Sex, PA, 2011–2019

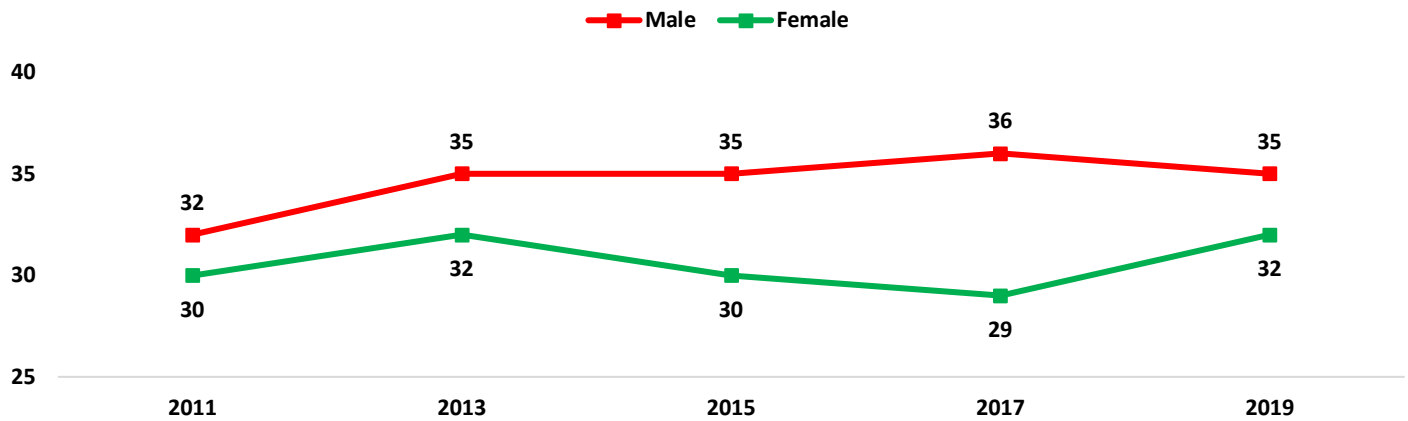


Figure 45 shows the prevalence of hypertension by race/ethnicity in PA from 2011 to 2019. The pattern was clear across the racial/ethnic groups. Throughout the nine-year period, the prevalence of hypertension was highest in Blacks, followed by Whites and Hispanics. The prevalence increased 16% in Blacks, up from 37% in 2011 to 43% in 2019. The prevalence also increased in Whites, up from 31% in 2011 to 34% in 2019, reflecting a 10% increase. Contrary to what was seen among Blacks and Whites, the prevalence of hypertension decreased in Hispanics, down from 25% in 2011 to 19% in 2019, equivalent to a 24% decrease.

Figure 45. Percent of Adults Aged 18 Years or Older Who Were Told That They Had Hypertension by Race/Ethnicity, PA, 2011–2019

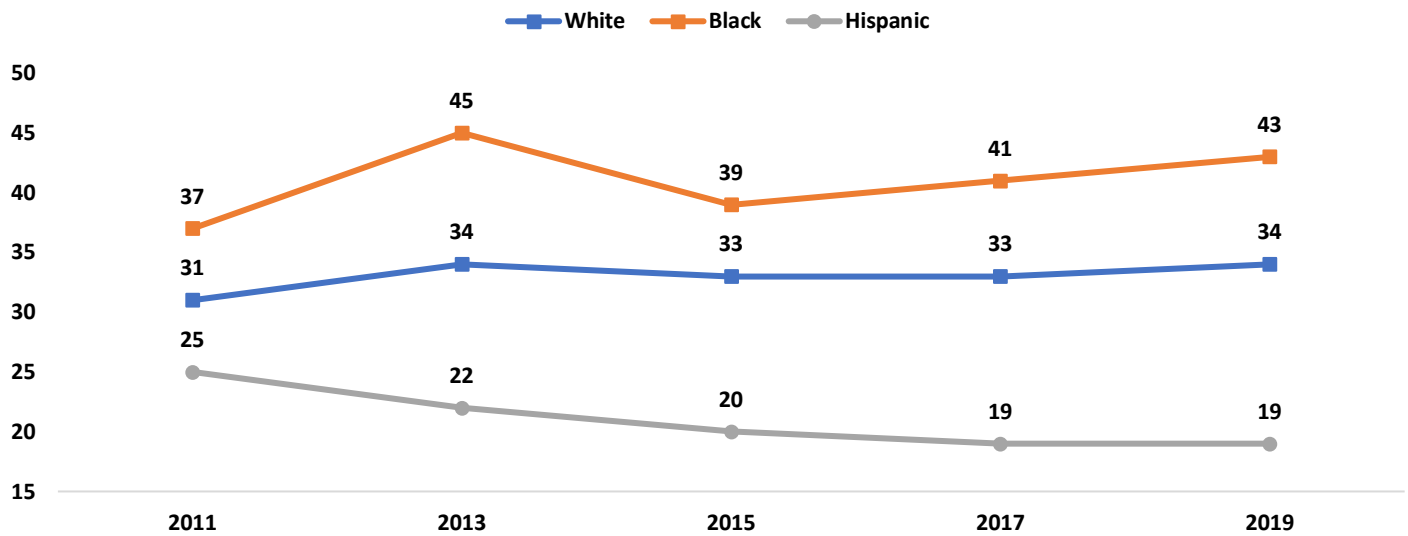


Figure 46 shows the prevalence of hypertension by age group in PA from 2011 to 2019. The difference in the prevalence of hypertension was clear across the age groups, with higher prevalence in adults with older ages. Specifically, from 2011 to 2019, 58% to 61% of adults aged 65 years or older had hypertension. The prevalence was 38% to 39% in adults aged 45 to 64 years, 17% to 20% in adults aged 30 to 44 years, and 6% to 9% in the younger adults aged 18 to 29 years. The prevalence remained relatively stable in each group from 2011 to 2019.

Figure 46. Percent of Adults Aged 35 Years or Older Who Were Told That They Had Hypertension by Age Group, PA, 2011–2019

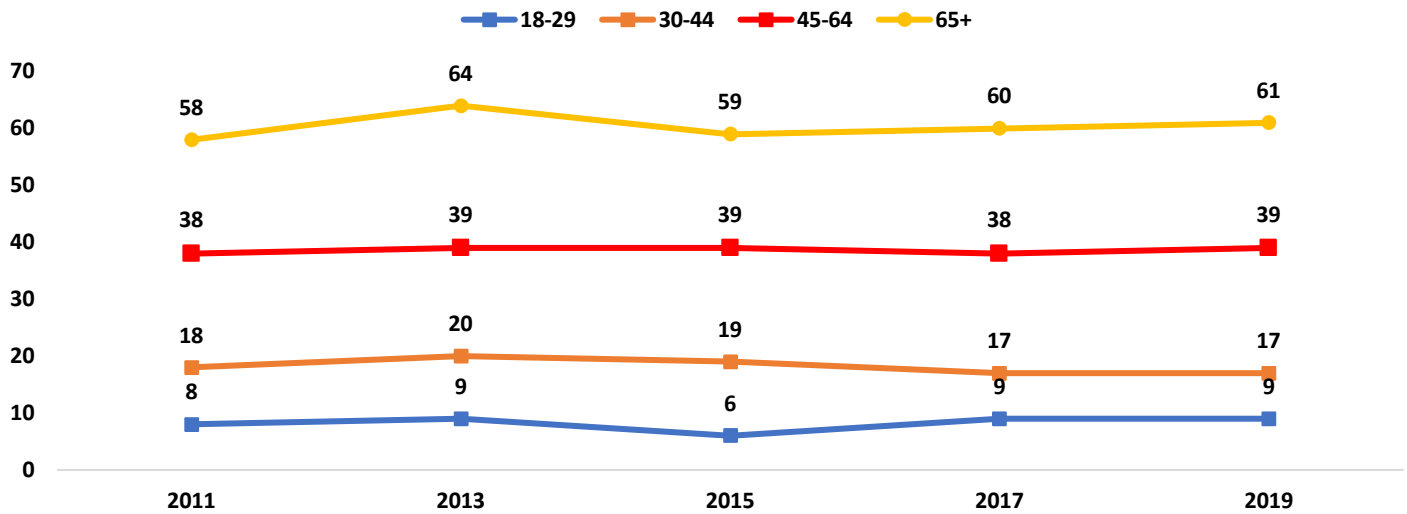
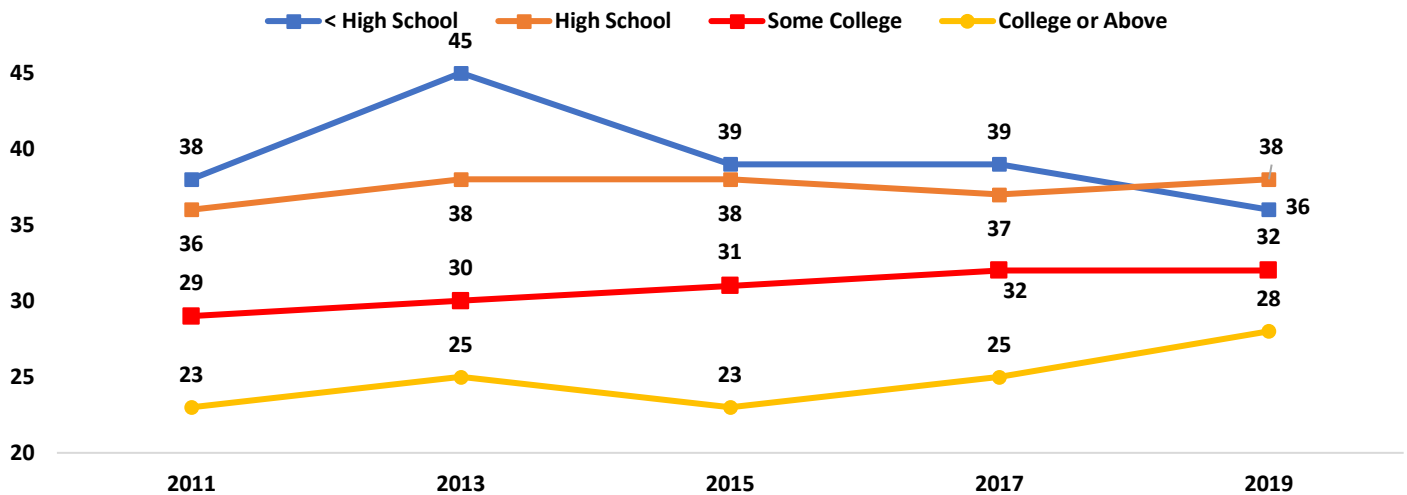


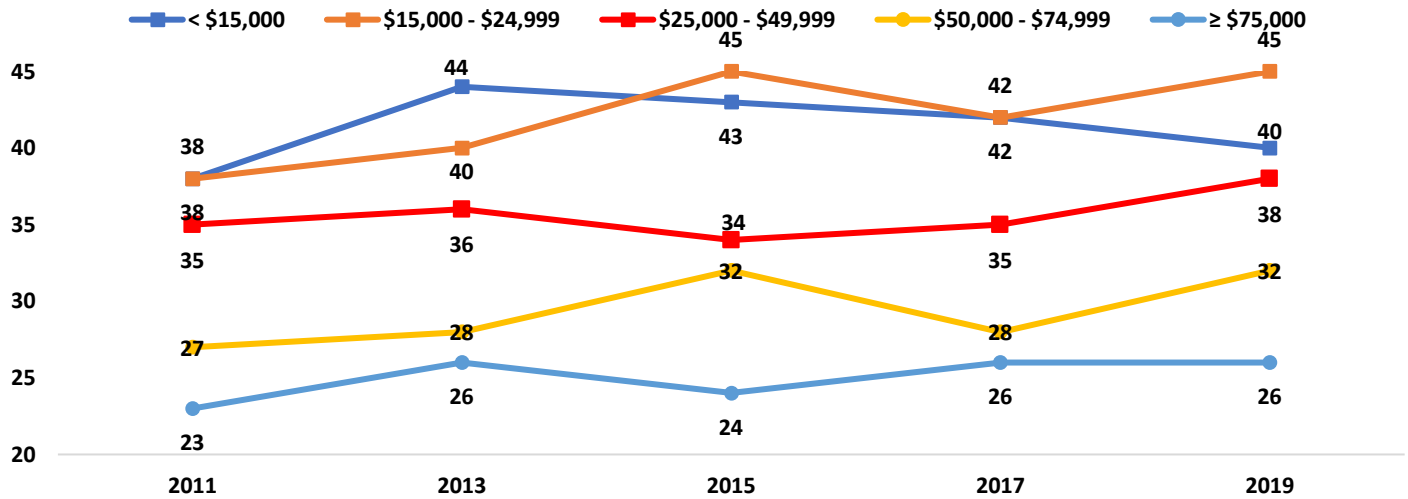
Figure 47 shows the prevalence of hypertension by educational level in PA from 2011 to 2019. In general, there was an inverse relationship between the prevalence of hypertension and education, with the highest prevalence in adults with the lowest level of education and the lowest prevalence in adults with the highest level of education. Over the nine-year period, the prevalence of hypertension increased in all adults except in adults with less education than a high school diploma. The prevalence increased 22% in adults with an educational level of college or above, 10% in adults with some college education, and 6% in adults with a high school diploma. In adults with less education than a high school diploma, the prevalence decreased 5%.

Figure 47. Percent of Adults Aged 35 Years or Older Who Were Told That They Had Hypertension by Education, PA, 2011–2019



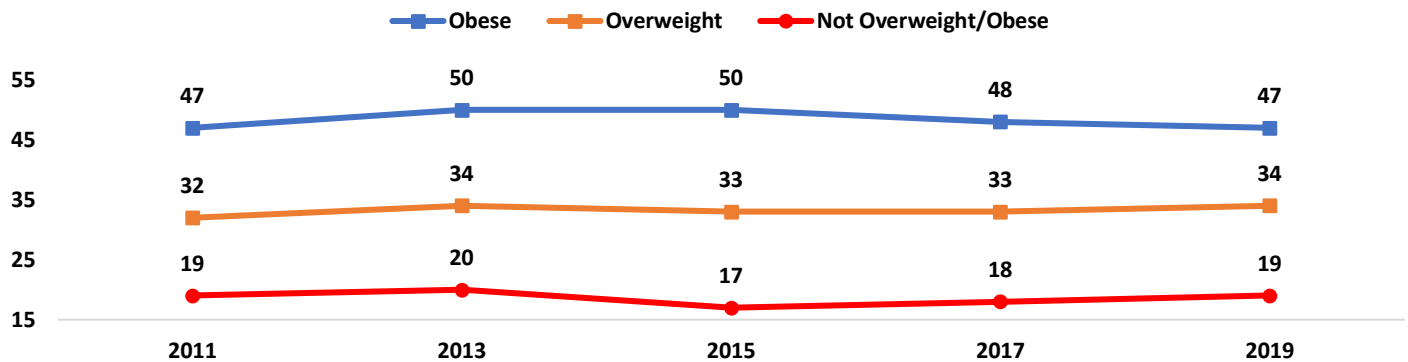
Similar to what was seen by educational level, there was an inverse relationship between the prevalence of hypertension and income, with higher prevalence in adults with lower level of income and lower prevalence in adults with higher level of income, as shown in Figure 48. Over the nine-year period, the prevalence of hypertension increased in all adults across different income levels. The prevalence was up 19% in adults with an income of \$50,000 - \$74,999, 18% in adults with an income of \$15,000 - \$24,999, 13% in adults with an income of \$75,000 or more, 9% in adults with an income of \$25,000 - \$49,999, and 5% in adults with an income of less than \$15,000.

Figure 48. Percent of Adults Aged 35 Years or Older Who Were Told That They Had Hypertension by Annual Household Income, PA, 2011–2019



By body weight status, the pattern of hypertension prevalence differed for adults with different body weights in PA. The prevalence was highest among adults with obesity, followed by adults with overweight. The prevalence was lowest among adults who were neither obese nor overweight. From 2011 to 2019, the prevalence was relatively unchanged across all three groups of adults (Figure 49).

Figure 49. Percent of Adults Aged 18 Years or Older Who Were Told That They Had Hypertension by Body Weight Status, PA, 2011–2019



In summary, the prevalence of high blood pressure among adults increased slightly in PA from 2011 to 2019. The increase was remarkable in some subgroup populations and less remarkable in other subgroups. As high blood pressure is highly related to cardiovascular and cerebrovascular diseases, which are the leading causes of death in PA, health education about the control of blood pressure should continue and should target populations at high risk of developing high blood pressure.

6. Preventive Health Screenings in Pennsylvania

Preventive health screenings are tests that can identify the risks of developing diseases or detect diseases before symptoms develop. Through preventive health screenings, actions can be taken to reduce the risks of developing diseases or intervene when a disease is at an early stage. In BRFSS, information was collected from adult respondents for several preventive health screenings such as blood cholesterol test, colorectal cancer screening, and mammogram and pap test in women.

1 in 3 adults have high blood cholesterol in PA.

6.1 Blood Cholesterol Screening in Pennsylvania

Figure 50 shows the percent of adults who ever had their blood cholesterol checked and was told by their doctor that it was high, in PA and in the country from 2011 to 2019. The percentage was slightly higher in PA than in the country between 2011 and 2015 but between 2015 and 2019, the percentage was lower in PA than in the country. Over the nine-year period, the percentage decreased 18% in PA and 13% in the country.

Figure 50. Percent of Adults Aged 18 Years or Older Who Ever Had Their Blood Cholesterol Checked and Were Told It Was High, PA vs. US, 2011–2019

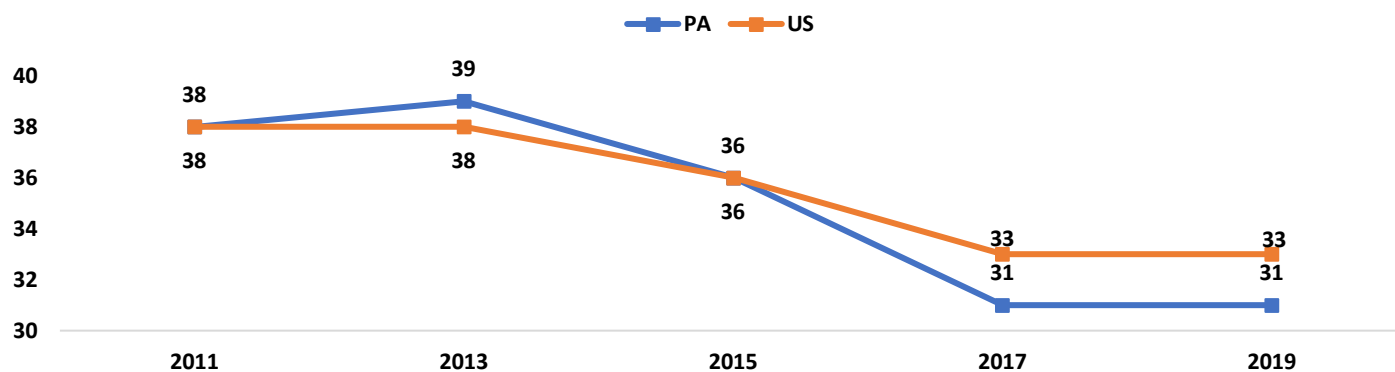


Figure 51 shows the percent of adults who were told by their doctor that they had high cholesterol by sex, in PA from 2011 to 2019. Over the nine-year period, the percentage of men were told that they had high cholesterol were higher than in women. The percentage declined in both men and women, with a 20% decrease in men and a 17% decrease in women.

Figure 51. Percent of Adults Aged 18 Years or Older Who Had Their Blood Cholesterol Checked and Were Told It Was High by Sex, PA, 2011–2019

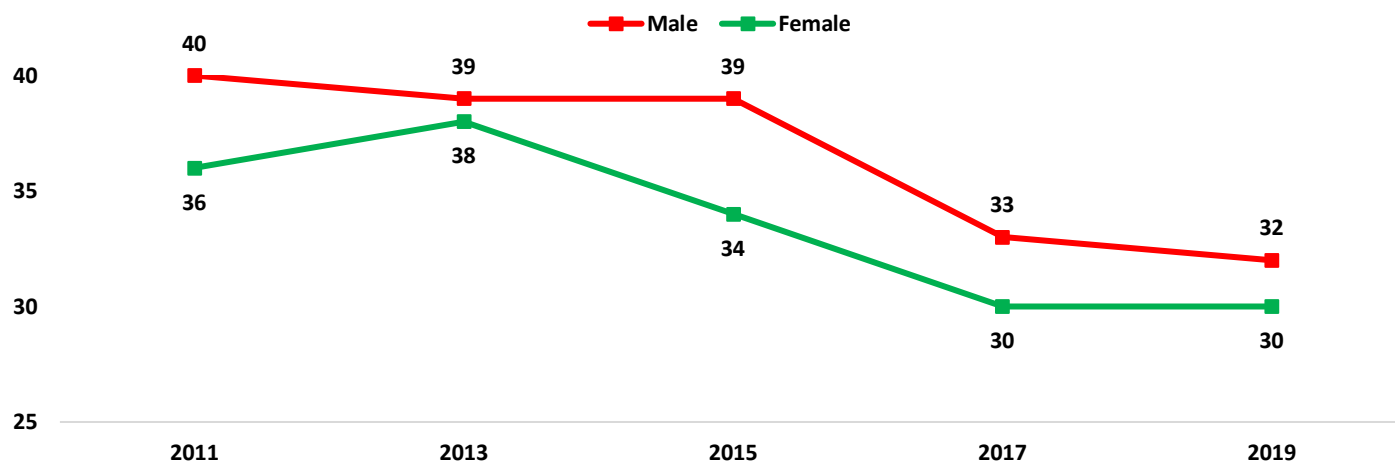


Figure 52 shows the percentage of adults who were told by their doctor that they had high cholesterol by race and ethnicity, in PA from 2011 to 2019. Over the nine-year period, a higher percentage of Whites than Blacks were told that they had high cholesterol than Blacks. The percentage declined in both Whites and Blacks, with a 15% decrease in Whites and a 13% decrease in Blacks.

Figure 52. Percent of Adults Aged 18 Years or Older Who Had Their Blood Cholesterol Checked and Were Told It Was High by Race/Ethnicity, PA, 2011–2019

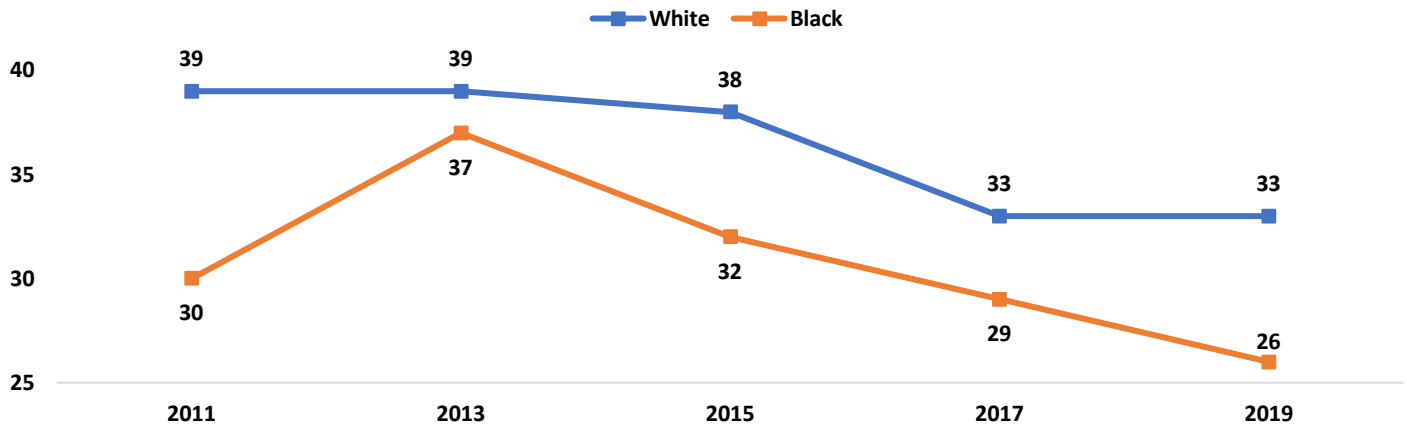


Figure 53 shows the percent of adults who were told by their doctor that they had high cholesterol by age group, in PA from 2011 to 2019. The pattern regarding high cholesterol was clear among adults of different ages. The percentage of adults with high cholesterol was highest among adults aged 65 years or older, and the percentage decreased as age decreased. In general, approximately one in two adults aged 65 years or older had high cholesterol and one in 10n adults aged 18 to 29 years had high cholesterol. Over the nine-year period, the percentage of adults with high cholesterol declined in all age groups, with 6%, 13%, 30%, and 9% decreases from the oldest age group to the youngest group, respectively.

Figure 53. Percent of Adults Aged 18 Years or Older Who Had Their Blood Cholesterol Checked and Were Told It Was High by Age Group, PA, 2011–2019

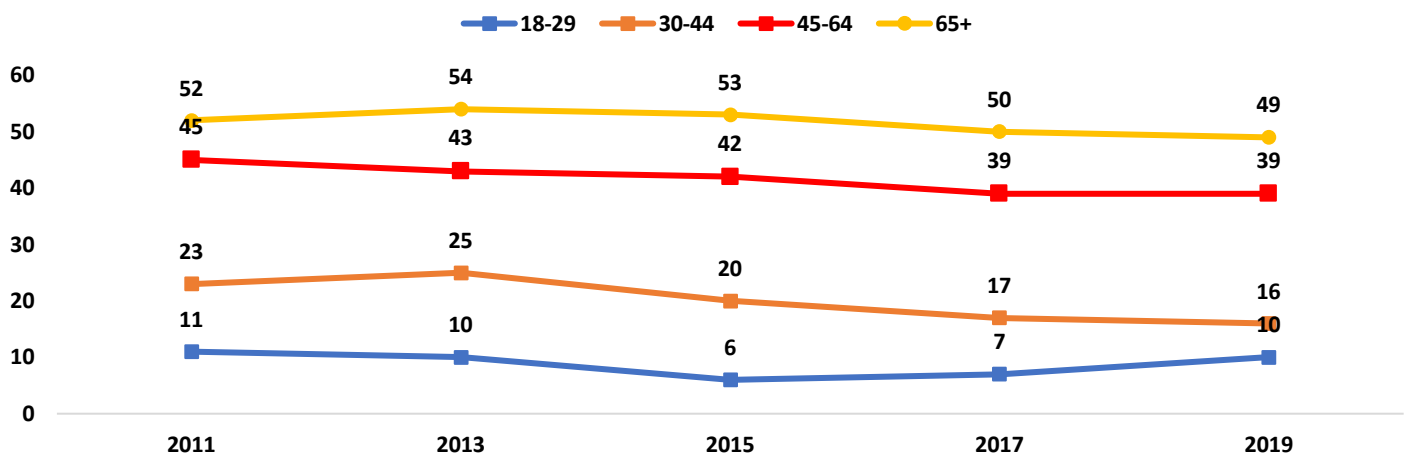


Figure 54 shows the percent of adults who were told by their doctor that they had high cholesterol by educational level in PA from 2011 to 2019. The pattern regarding high cholesterol among adults with different educational attainment is clear. In general, the percentage of high cholesterol was highest among adults with the lowest educational level, and the percentage decreased as educational level increased. Over the nine-year period, the percentage of adults with high

cholesterol declined in all groups at all levels of educational attainment. The decrease was 21%, 21%, 14%, and 12% from the lowest educational level to the highest educational level. Notably, the difference between the lowest and the highest education group was 30% in 2011 and, the difference reduced to 17% in 2019.

Figure 54. Percent of Adults Aged 18 Years or Older Who Had Their Blood Cholesterol Checked and Was Told It Was High by Education, PA, 2011–2019

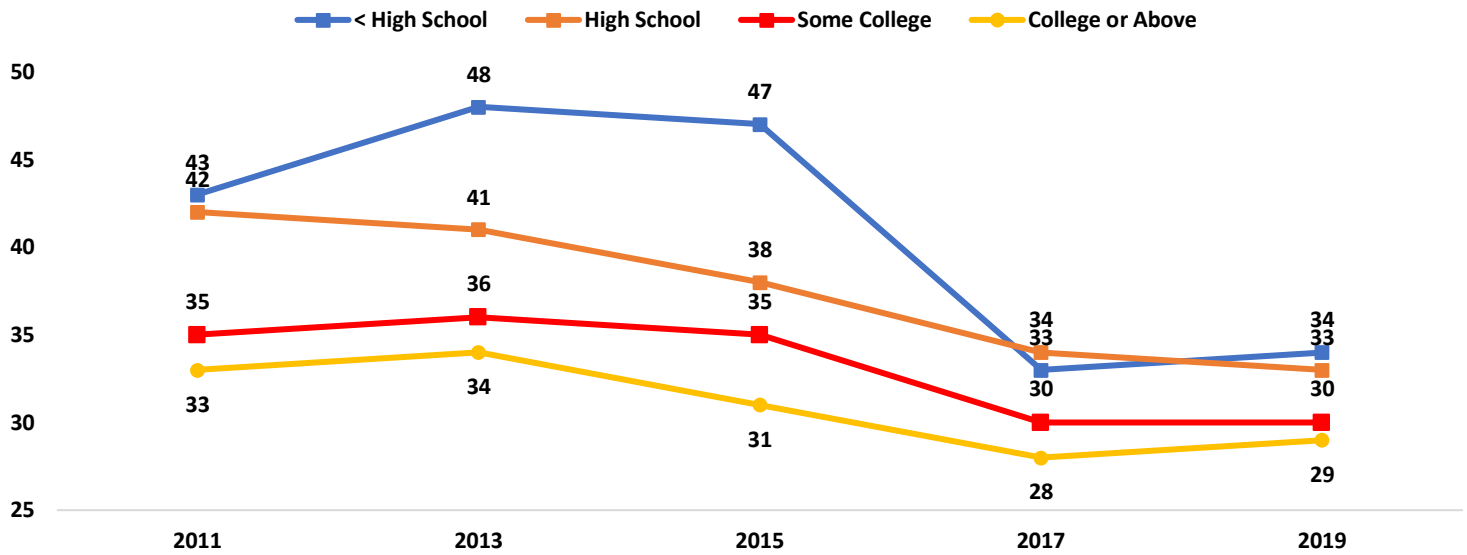
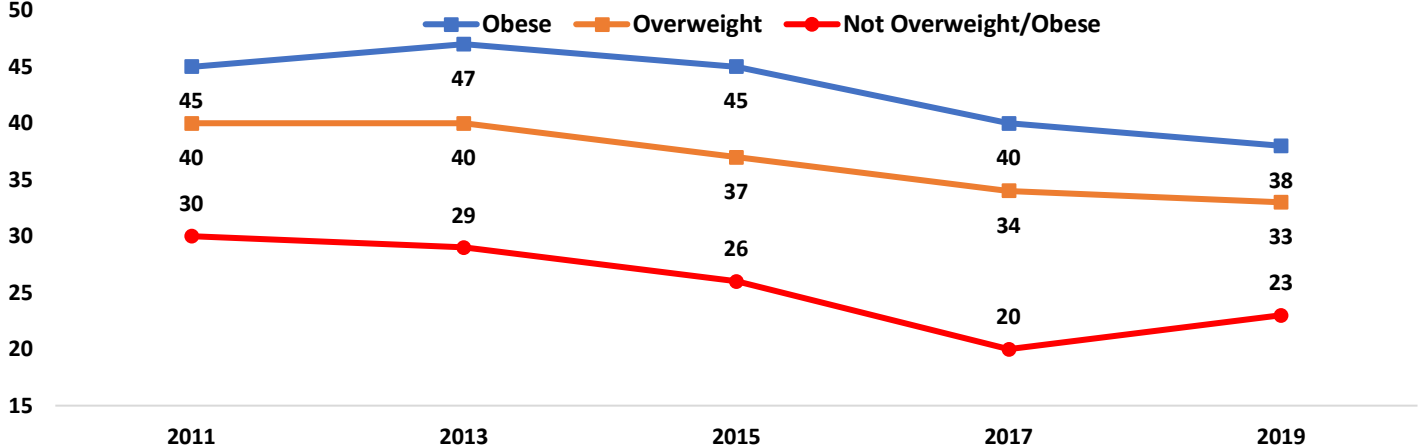


Figure 55 shows the percent of adults who were told by their doctor that they had high cholesterol by body weight status in PA from 2011 to 2019. In general, the percent of adults diagnosed with high cholesterol was highest among adults who had obesity, followed by adults who were overweight, then adults who had no obesity nor overweight. Over the nine-year period, the percentage of adults with high cholesterol declined in all groups across different body weights. The decrease was 16%, 18%, and 23% from the highest body weight group to the lowest body weight group.

Figure 55. Percent of Adults Aged 18 Years or Older Who Had Their Blood Cholesterol Checked and Was Told It Was High by Body Weight, PA, 2011–2019



In summary, the percentage of adults who had high blood cholesterol decreased in PA from 2011 to 2019, but men, Whites, older adults, people with lower educational attainment, and people with obesity had higher percentage of high blood cholesterol compared to their counterparts. Disease prevention efforts should continue to focus on promoting physical activity and healthy diet to lower blood cholesterol and other modifiable conditions associated with chronic diseases.

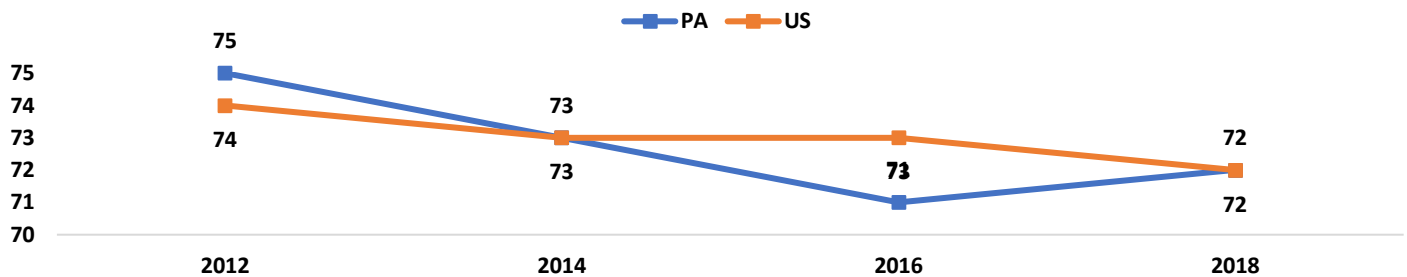
1 in 4 women 40 years or older did not have a mammogram exam in the past 2 years in PA.

6.2 Mammograms among Women in Pennsylvania

A mammogram is an X-ray examination of the breast, which can detect breast cancer at an early stage. At present, a mammogram is the best way to find breast cancer for most women. The United States Preventive Services Task Force (USPSTF) recommends that women who are 50 to 74 years old and are at average risk for breast cancer get a mammogram every two years. Women who are 40 to 49 years old should talk to their doctor or other health care professional about when to start and how often to get a mammogram. Women should weigh the benefits and risks of screening tests when deciding whether to begin getting mammograms before age 50. In addition to USPSTF, several other organizations also provide recommendations on mammograms.^{25, 31}

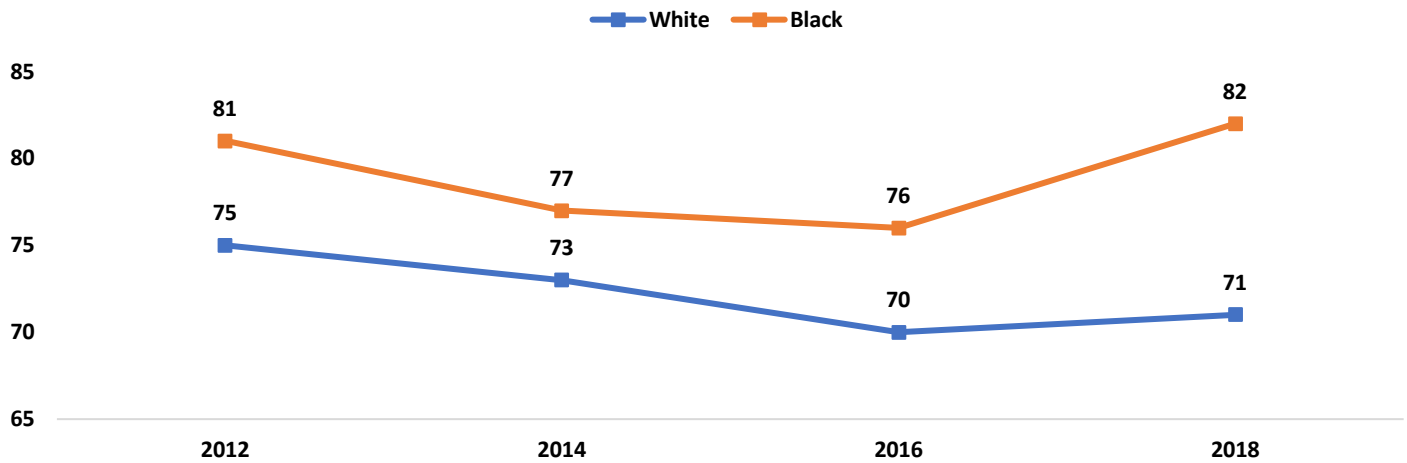
According to BRFSS, approximately three quarters of women aged 40 years or older had received a mammogram within the past two years in PA as well as in the country from 2012 to 2018. However, over the seven-year period, there was an approximately 3% decrease in this measure in both PA and the country (Figure 56). It should be noted that BRFSS telephone survey coverage is lower for population subgroups such as people with low incomes, people in rural areas, people with less than 12 years of education, people in poor health, and heads of households younger than 25 years of age.³²

Figure 56. Percent of Women Aged 40 Years or Older Who Have Had a Mammogram Within the Past Two Years, PA vs. US, 2012–2018



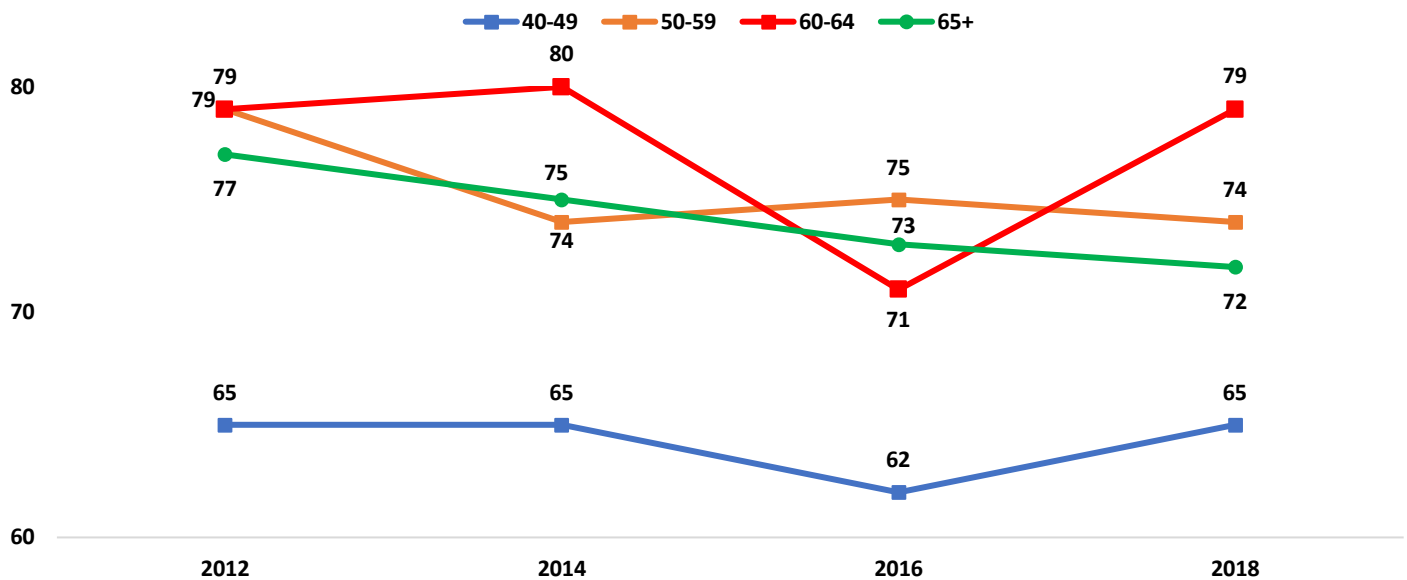
In PA, a higher percentage of Black than White women aged 40 years or older had received a mammogram within the past two years, from 2012 to 2018. Over the seven-year period, the percentage in Black women initially declined from 2012 to 2016 and then increased from 2016 to 2018; while in White women, the percentage generally declined from 2012 to 2016 and then increased slightly from 2016 to 2018. Overall, the percentage largely remained unchanged in Black women but decreased 5% in White women from 2012 to 2018 (Figure 57).

Figure 57. Percent of Women Aged 40 Years or Older Who Have Had a Mammogram Within the Past Two Years by Race/Ethnicity, PA, 2012–2018



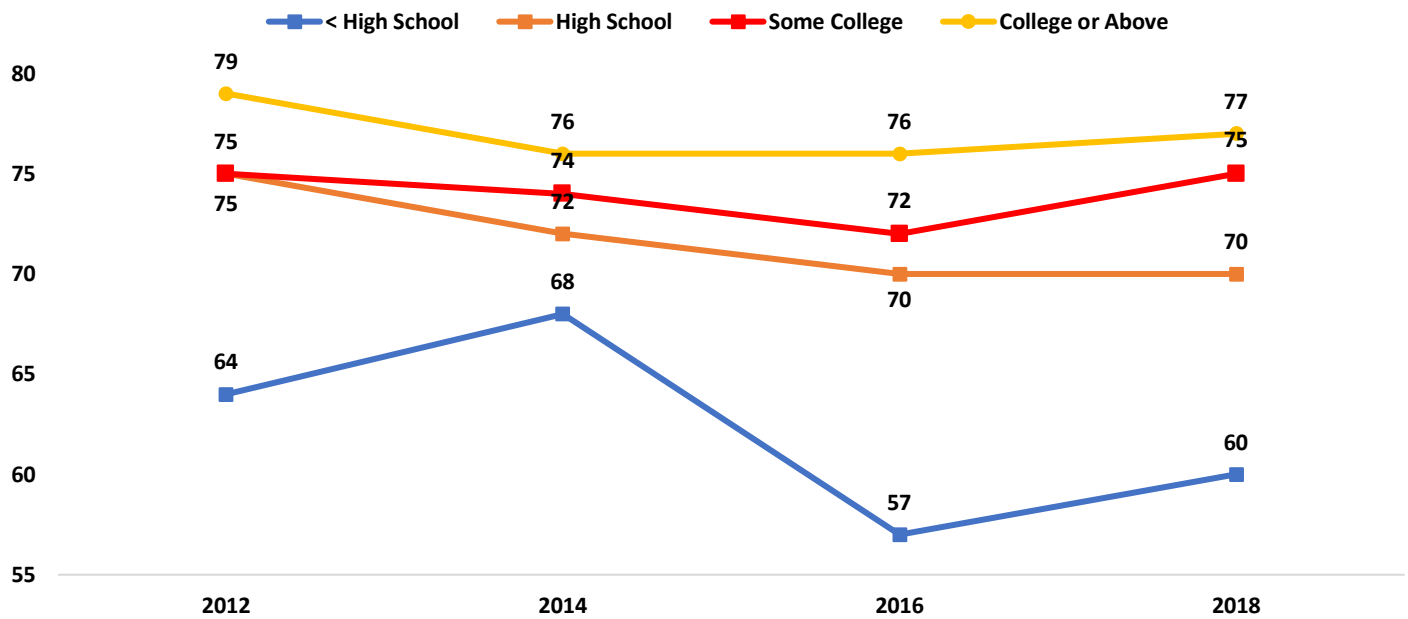
By age group, the percentage of women receiving a mammogram within the past two years was generally higher in women aged 60 to 64 years, followed by women aged 50 to 59 years and women aged 65 years or older. The percentage was lowest in the younger group of women aged 40 to 49 years. Over the seven-year period, the percentage remained unchanged in women aged 60 to 64 years and in women aged 40 to 49 years. The percentage dropped 6% in women aged 65 years or older and in women aged 50 to 59 years (Figure 58).

Figure 58. Percent of Women Aged 40 Years or Older Who Have Had a Mammogram Within the Past Two Years by Age Group, PA, 2012–2018



Mammogram frequency by educational level is shown in Figure 59. The percentage of women receiving a mammogram within the past two years was highest among women with a college education or above, followed by those with some college, high school, and less education than a high school diploma. Over the seven-year period, the percentage largely remained stable among women with higher education (some college or above), but declined 7% and 6% in women with a high school diploma and in women with less education than a high school diploma, respectively (Figure 59).

Figure 59. Percent of Women Aged 40 Years or Older Who Have Had a Mammogram Within the Past Two Years by Education, PA, 2012–2018



In summary, the percentage of women aged 40 years or older who had a mammogram within the past two years declined slightly in PA from 2012 to 2018. The decline was more notable in White women, women aged 65 years or older, and women with lower educational attainment. Breast cancer prevention programs should focus on promoting mammograms among high risk women. With the Affordable Care Act effective January 1, 2014, and Medicaid expansion on January 1, 2015, more Pennsylvanians had access to health care including breast, cervical and colorectal coverage^{18 19}. However, it is difficult to quantify the effect of as a result of these changes. In addition, greater access to screening does not automatically lead to an increase in screening.

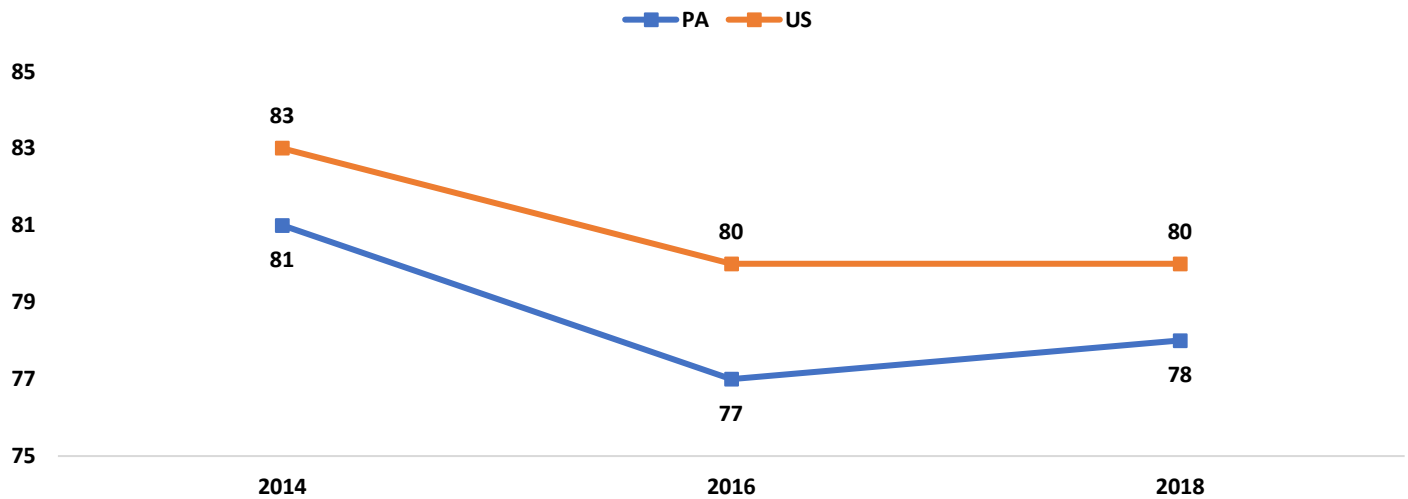
1 in 4 women aged 21-65 did not have a Pap test in the past 3 years in PA.

6.3 Pap Tests among Women in Pennsylvania

Pap tests (or Pap smear) identify cell changes on the cervix that might become cervical cancer if appropriate treatments are not initiated in a timely manner. Pap tests and Human papillomavirus (HPV) tests are important tests in cervical cancer prevention. CDC has issued Pap tests guidelines depending on age.³³ For women aged 21 to 29 years, the Pap test is recommended every three years if the test result is normal. For women aged 30 to 65 years, the Pap test is recommended every three years if the test result is normal, every five years if they receive both of HPV test and Pap test and the result is normal, or the HPV test alone for every five years and the result is normal. For women older than 65 years, Pap test is generally not needed if they have had normal test results for several years.³³

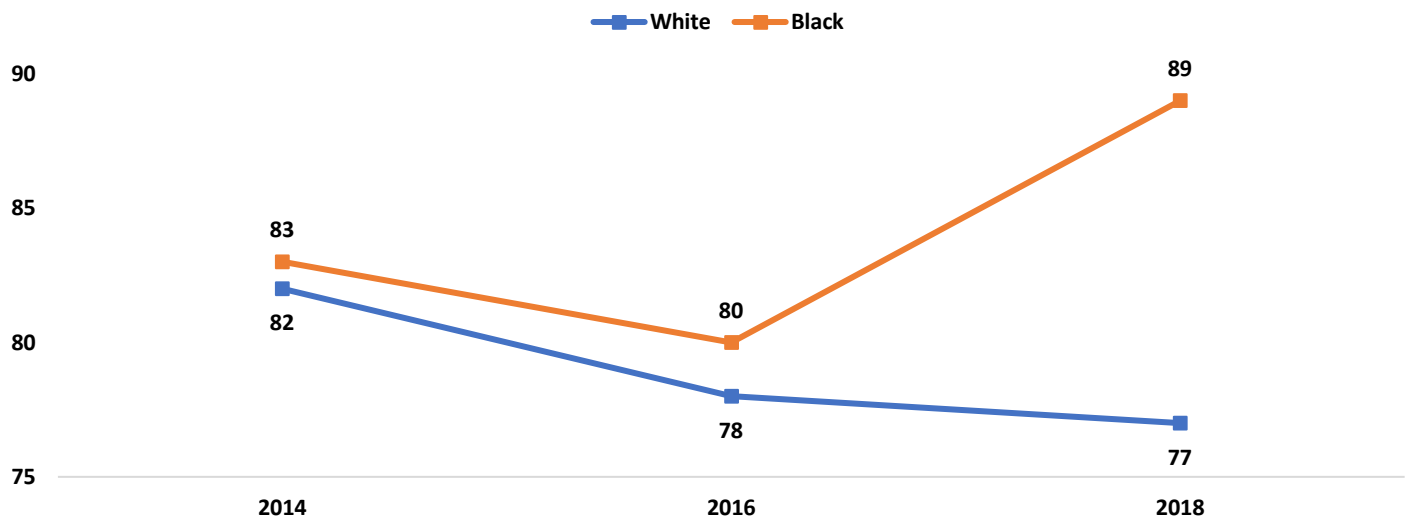
Information on Pap tests was collected every other year in BRFSS. Figure 60 shows the percentage of women aged 21 to 65 years who have had a Pap test in the past three years in PA and in the US from 2014 to 2018. Overall, the percentage was slightly lower in PA compared to the national average. Over the five-year period, the percentage dropped 4% in both PA and the country.

Figure 60. Percent of Women Aged 21-65 Years Who Have Had a Pap Test in the Past Three Years, PA vs. US, 2014–2018



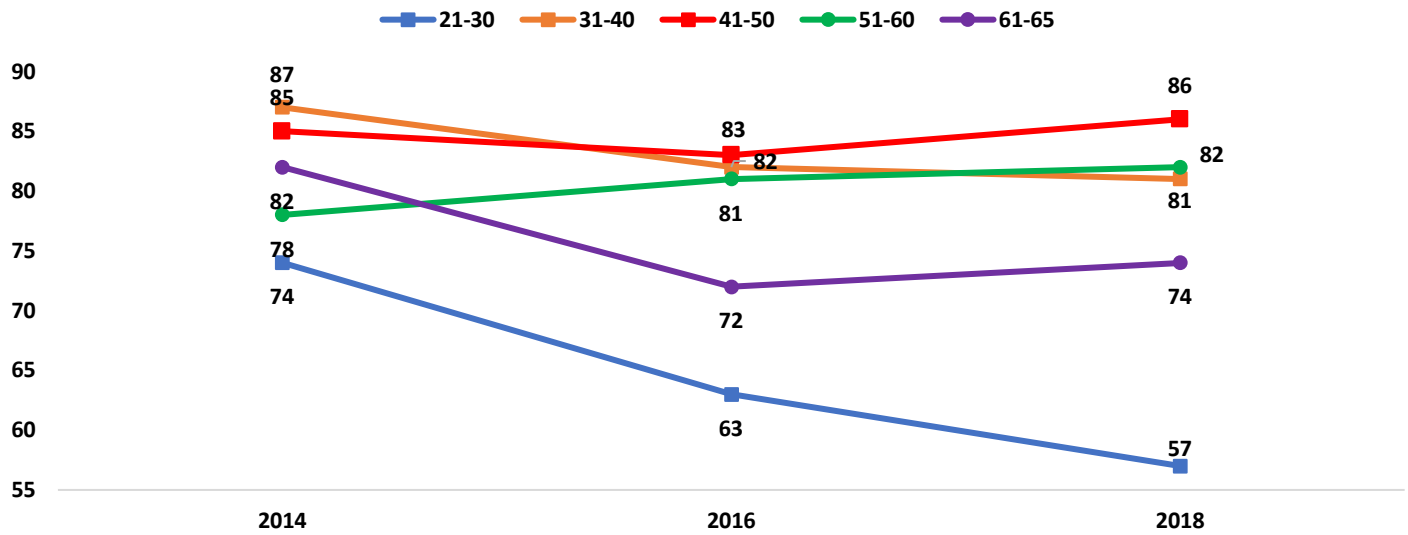
The percentage of Pap tests within the past three years for women aged 21-65 by race and ethnicity is shown in Figure 61. The percentage of Black women aged 21 to 65 years who have had a Pap test in the past three years was higher than among White women in PA from 2014 to 2018. Over the five-year period, the percentage in Black women dropped between 2014 and 2016 but then increased between 2016 and 2018. The overall increase was 7% in Black women. For White women, the percentage dropped 6% between 2014 and 2018 (Figure 61).

Figure 61. Percent of Women Aged 21-65 Years Who Have Had a Pap Test in the Past Three Years by Race/Ethnicity, PA, 2014–2018



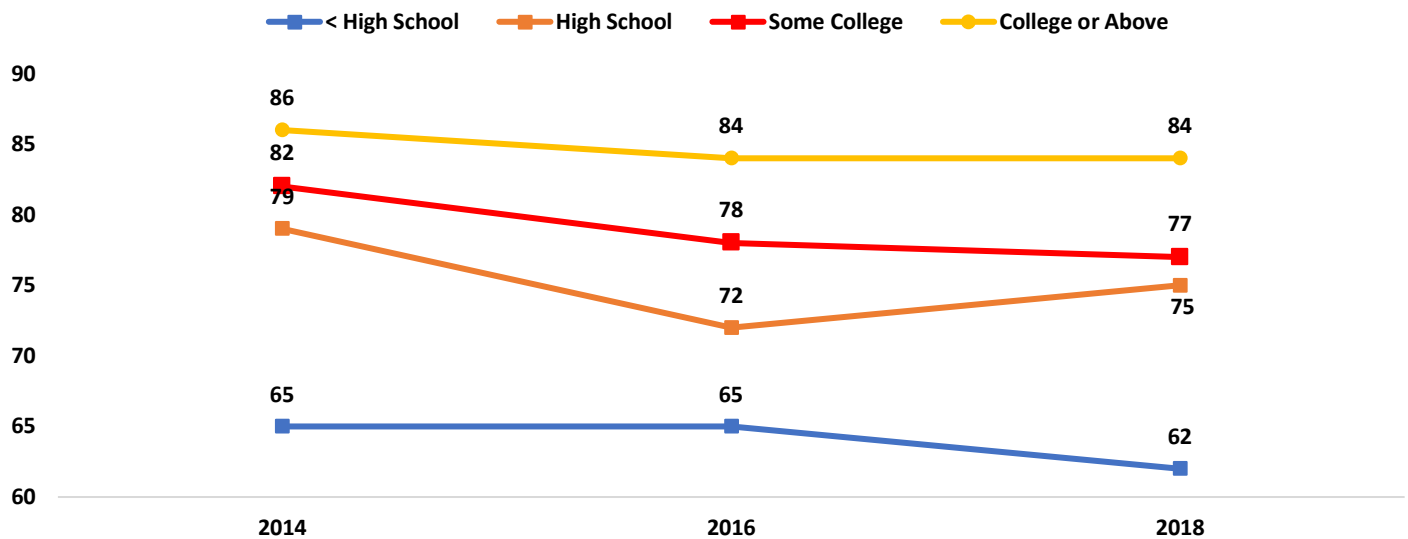
The percentage of Pap tests in women aged 21 to 65 years by age group from 2014 to 2018 is shown in Figure 62. In general, the percentage of women who had a pap test differed by age group. Specifically, the percentage of women who had a pap test in the past three years was higher among the mid-aged women (31-60 years) than in the youngest group (21-30 years) or the older age group (61-65 years). Over the five-year period, there was a 5% increase in the percentage among women aged 51 to 60 years. The percentage increased slightly in women aged 41 to 50 years (1%). The percentage decreased 10% in women aged 61 to 65 years and 7% in women aged 31 to 40 years. Notably, the percentage decreased 23% in the youngest group over the 5-year period (Figure 62).

Figure 62. Percent of Women Aged 21-65 Years Who Have Had a Pap Test in the Past Three Years by Age Group, PA, 2014–2018



By educational level, there were differences in the percentage of women who had a Pap test by educational level in PA. The percentage of women who had Pap test in the past three years increased as the level of education increased. Specifically, the percentage was highest in women with college or higher education, followed by those with some college, high school, and less education than a high school diploma. Over the five-year period, the percentage decreased among all women regardless of educational attainment. The decrease was 2%, 6%, 5%, and 5% among women with educational attainment of college or above, some college, high school, and less than high school (Figure 63).

Figure 63. Percent of Women Aged 21-65 Years Who Have Had a Pap Test in the Past Three Years by Education, PA, 2014–2018



In summary, the percentage of women who were 21 to 64 years of age and had a Pap test in the past three years declined slightly in PA from 2014 to 2018. The decline was more notable among White women and younger women aged 21 to 30 years. As the Pap test is an important tool to identify cervical cancer, health programs should target these subgroup women to increase the screening of cervical cancer through the Pap test.

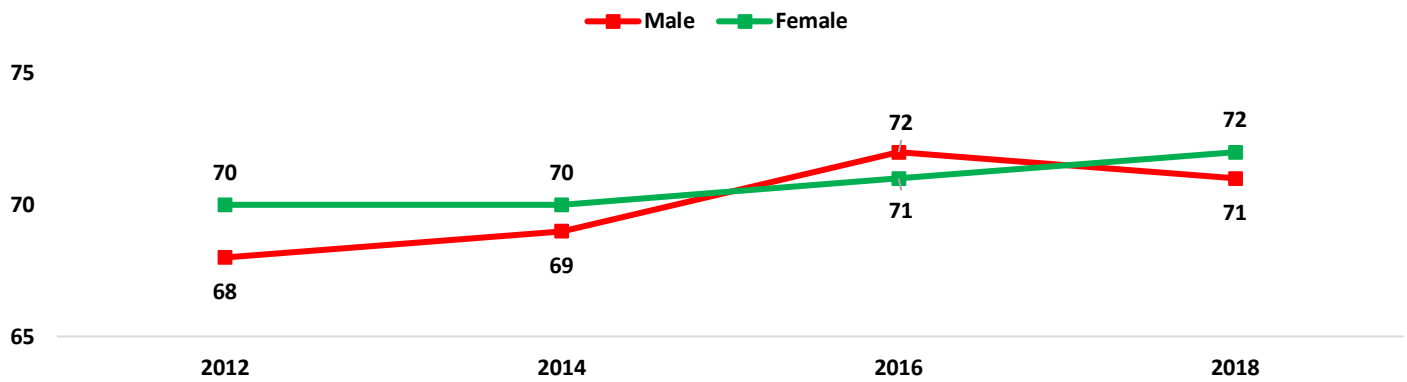
6.4 Colorectal Cancer Screening in Pennsylvania

1 in 4 adults aged 50 or older have not had sigmoidoscopy and colonoscopy in PA.

Colorectal cancer is the third leading cause of cancer-related death in the US and the second leading cause of cancer-related death in PA. Colorectal cancer risk factors include inflammatory bowel disease such as Crohn’s disease or ulcerative colitis, family history of colorectal cancer or colorectal polyps, genetic syndrome such as familial adenomatous polyposis, lack of regular physical activity, diet low in fruit and vegetables and high in fat and processed meats, overweight or obesity, alcohol consumption, and tobacco use.³⁴ The US Preventive Services Task Force recommends that adults aged 50 to 75 years be screened for colorectal cancer. People older than 75 years should talk to their doctor if colorectal cancer screening is needed. People at an increased risk of getting colorectal cancer should talk to their doctor about when to begin screening. Sigmoidoscopy and colonoscopy are two commonly used tests for colorectal cancer screening.³⁵

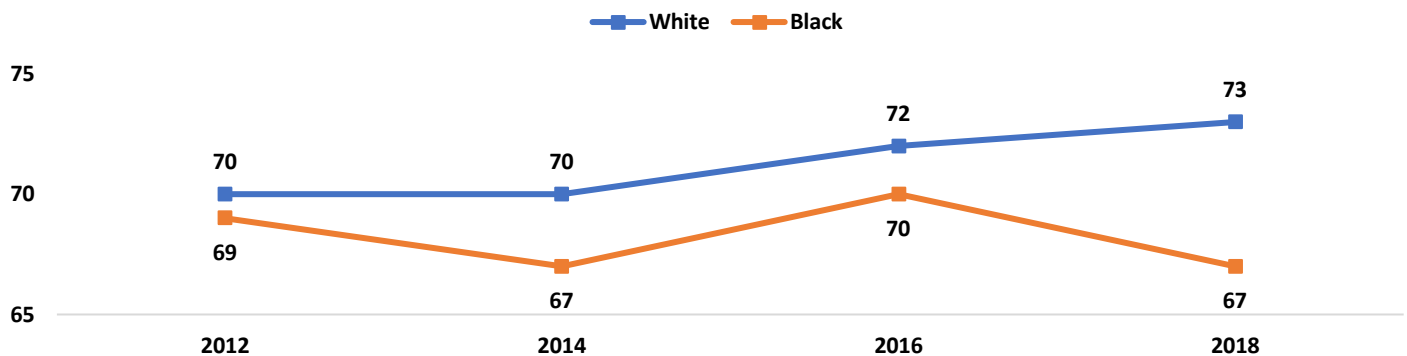
Information on sigmoidoscopy and colonoscopy was collected every other year in BRFSS. Figure 64 shows the percentage of adults aged 50 years or older who have ever had a sigmoidoscopy or colonoscopy in PA from 2012 to 2018. In general, the percentage did not differ much between men and women. Over the seven-year period, the percentage increased slightly in both men and women, with a 4% increase in men and a 3% increase in women.

Figure 64. Percent of Adults Aged 50 Years or Older Who Have Ever Had a Sigmoidoscopy or Colonoscopy by Sex, PA, 2012–2018



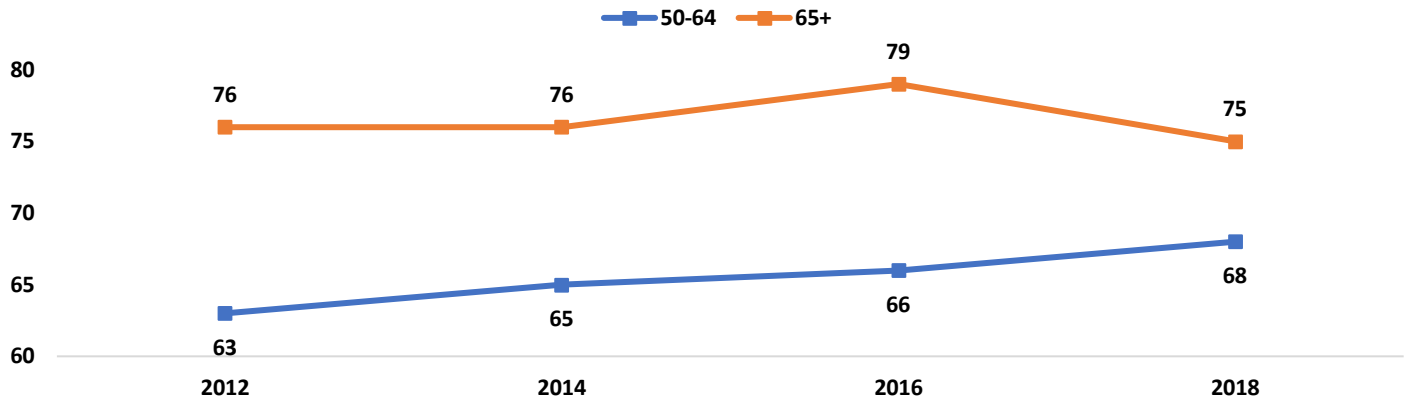
By race and ethnicity, the percentage of adults who have ever had a sigmoidoscopy or a colonoscopy was higher in Whites than in Blacks in PA. Over the seven-year period, the percentage increased 4% in Whites but decreased 3% in Blacks (Figure 65).

Figure 65. Percent of Adults Aged 50 Years or Older Who Have Ever Had a Sigmoidoscopy or Colonoscopy by Race/Ethnicity, PA, 2012–2018



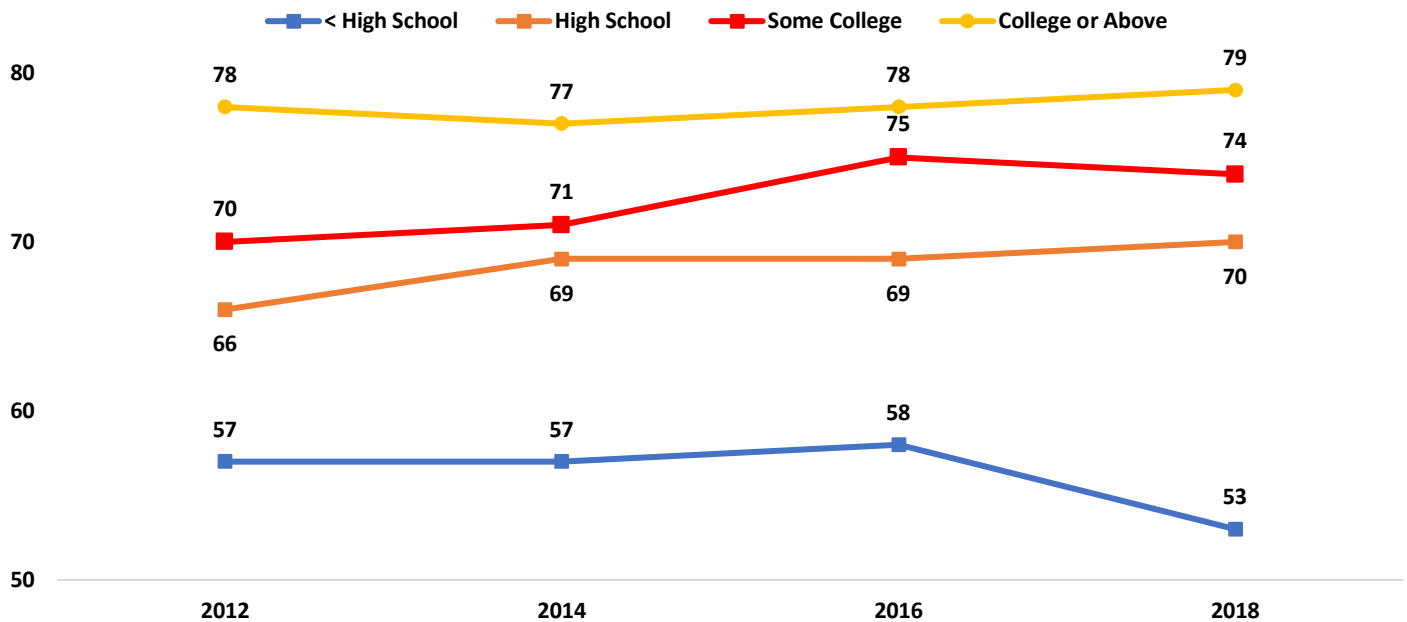
By age group, adults aged 65 years or older were more likely to have had a sigmoidoscopy or colonoscopy than the younger group (50-64 years) in PA. Over the seven-year period, the percentage remained relatively unchanged in adults aged 65 years or older, but the percentage increased 8% in the younger adults (50-64 years) (Figure 66).

Figure 66. Percent of Adults Aged 50 Years or Older Who Have Ever Had a Sigmoidoscopy or Colonoscopy by Age Group, PA, 2012–2018



By educational level, there were differences in the percentage of adults receiving sigmoidoscopy or colonoscopy in PA. The percentage of adults having a sigmoidoscopy or colonoscopy increased as the level of education increased. Specifically, the percentage was highest in adults with college or higher education, followed by those with some college education, a high school diploma, and less education than a high school diploma. Over the seven-year period, the percentage increased in all groups except in the group with less education than a high school diploma, which had a 7% drop in the percentage of adults receiving a sigmoidoscopy or a colonoscopy (Figure 67).

Figure 67. Percent of Adults Aged 50 Years or Older Who Have Ever Had a Sigmoidoscopy or Colonoscopy by Education, PA, 2012–2018



In summary, the percentage of adults aged 50 or older who have ever had a sigmoidoscopy or colonoscopy increased slightly in PA from 2012 to 2018. However, in some subgroups such as Blacks, people aged 65 years or older, and those

with less than high school education, screening by sigmoidoscopy or colonoscopy either declined or did not improve much. In PA, colorectal cancer ranks the second in cancer incidence in both men and women. Screening for colorectal cancer through sigmoidoscopy or colonoscopy should be a priority among the high risk population.

7. Heart Disease

7.1 General Description of Heart Disease

Heart disease refers to a broad range of heart conditions. The most common heart disease is coronary heart disease (CHD) or coronary artery disease, which can cause a heart attack. Other types of heart disease include cardiomyopathy, heart failure, hypertensive heart disease, inflammatory heart disease, pulmonary heart disease, cardiac dysrhythmias, and valve heart disease. In general, heart disease refers to issues and deformities in the heart itself, different from cardiovascular disease, which describes problems with the blood vessels and circulatory system as well as the heart. Risk of heart disease can be reduced through a number of modifiable behaviors, such as smoking cessation, healthy diet, and physical activity.

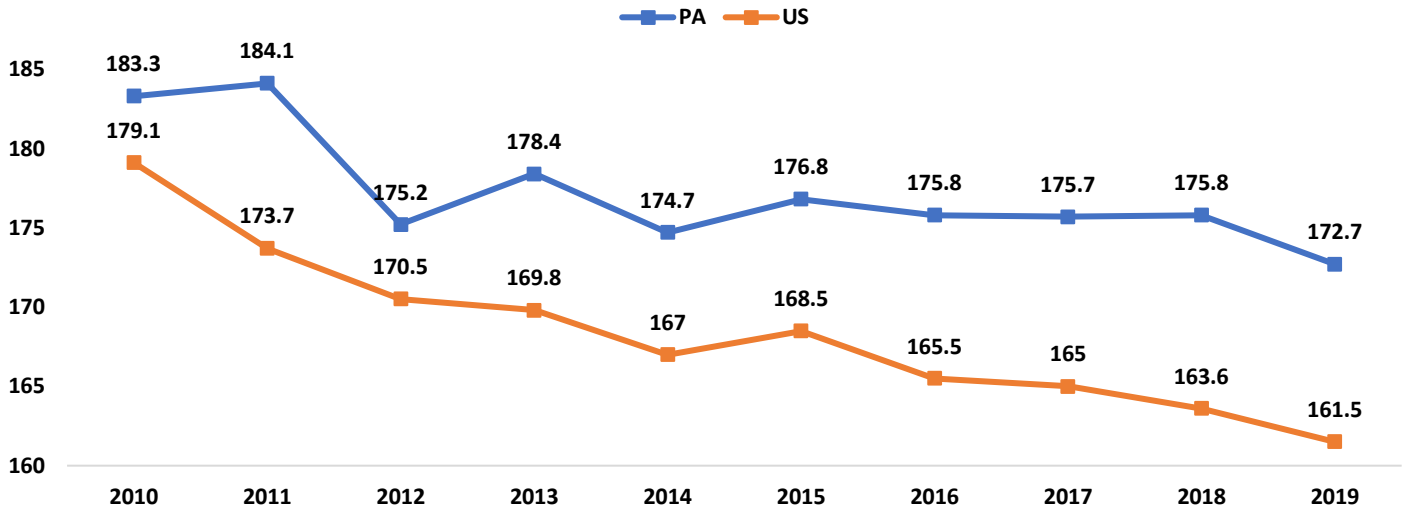
Heart disease is the leading cause of death in PA. In 2019, there were 32,250 deaths caused by heart disease in PA, accounting for 24.1% of 133,932 deaths in total. The age-adjusted death rate for heart disease in PA ranked 15th among all states, higher than the national average in 2019.³⁶

Heart disease affects more men than women in PA. In 2019, 16,718 men and 15,532 women died from heart disease, with an age-adjusted death rate of 218.6 per 100,000 in men and 136.6 per 100,000 in women. Among all races, Blacks had the highest heart mortality rate of 220.8 per 100,000, followed by Whites (168.0 per 100,000), Hispanics (103.9 per 100,000), and Asians and Pacific Islanders (75.3 per 100,000). By sex and race, Black men had the highest heart mortality rate of 289.9 per 100,000 and Asian women had the lowest heart mortality rate of 64.9 per 100,000. Heart disease mortality rate dropped from 185.3 per 100,000 in 2010 to 172.7 per 100,000 in 2019.¹

7.2 Mortality Trend for Heart Disease in Pennsylvania

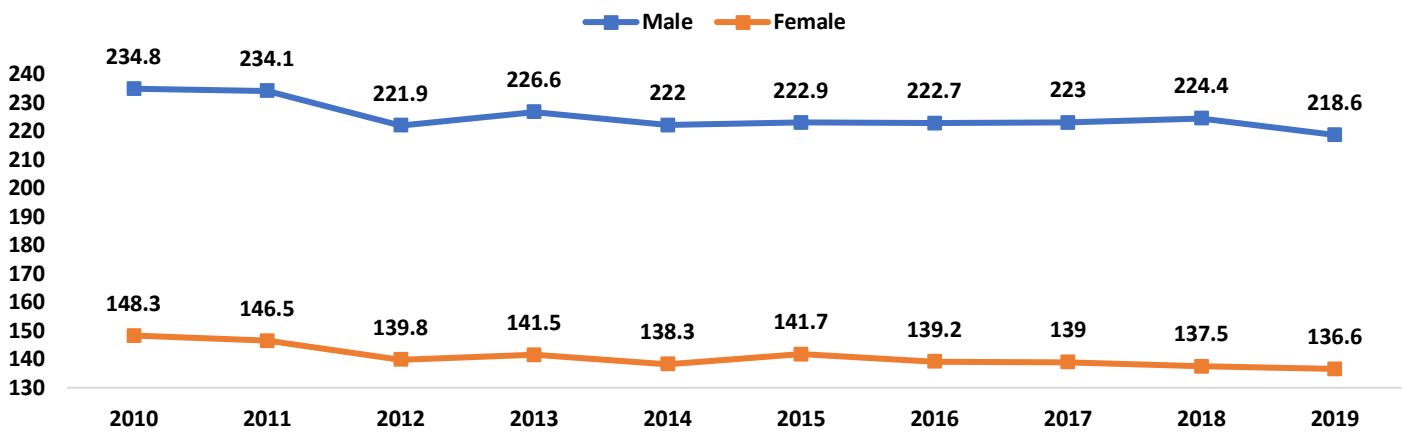
Figure 68 shows the age-adjusted heart disease mortality rate in PA and the country from 2010 to 2019. In general, the mortality was consistently higher in PA than in the country. The mortality rate declined 6% in PA and 10% in the country during the nine-year period.

Figure 68. Age-adjusted Heart Disease Mortality Rate (per 100,000), PA vs. US, 2010-2019



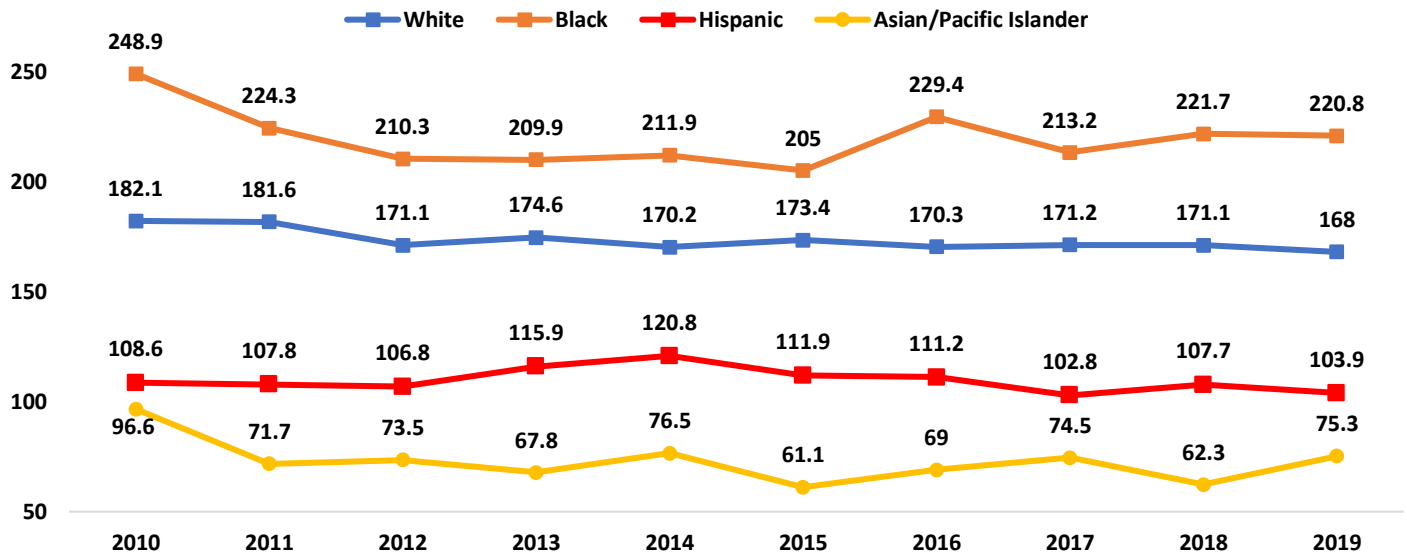
By sex, the age-adjusted heart disease mortality rate was approximately 60% higher in men than in women in PA from 2010 to 2019. The mortality rate decreased in both men and women during the nine-year period, with a 7% drop in men and an 8% drop in women, respectively (Figure 69).

Figure 69. Age-adjusted Heart Disease Mortality Rates (per 100,000) by Sex, PA, 2010-2019



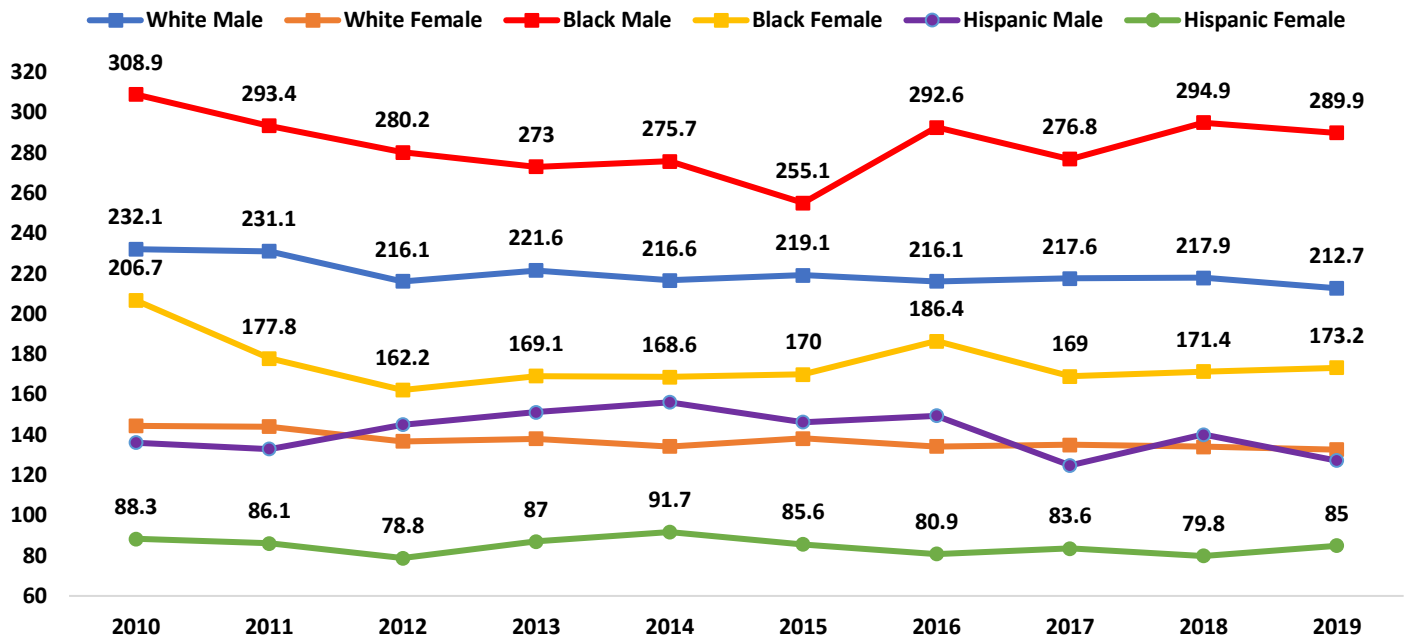
By race and ethnicity, the age-adjusted heart disease mortality rate was highest in Blacks, followed by Whites, Hispanics, and Asians and Pacific Islanders in PA. The mortality rate decreased across all racial and ethnic groups from 2010 to 2019, with decreases of 8%, 11%, 4%, and 22% in Whites, Blacks, Hispanics, and Asians and Pacific Islanders, respectively (Figure 70).

Figure 70. Age-adjusted Heart Disease Mortality Rates (per 100,000) by Race/Ethnicity, PA, 2010-2019



By sex and race/ethnicity, the age-adjusted heart disease mortality rate was highest in Black men, followed by White men and Black women. The rates were largely at the same level among White women and Hispanic men, and the rate was lowest in Hispanic women. From 2010 to 2019, the age-adjusted heart disease mortality rate dropped 6% in Black men, 8% in White men, 16% in Black women, 8% in White women, 7% in Hispanic men, and 4% in Hispanic women. Data were insufficient for analysis for Asians and Pacific Islanders (Figure 71).

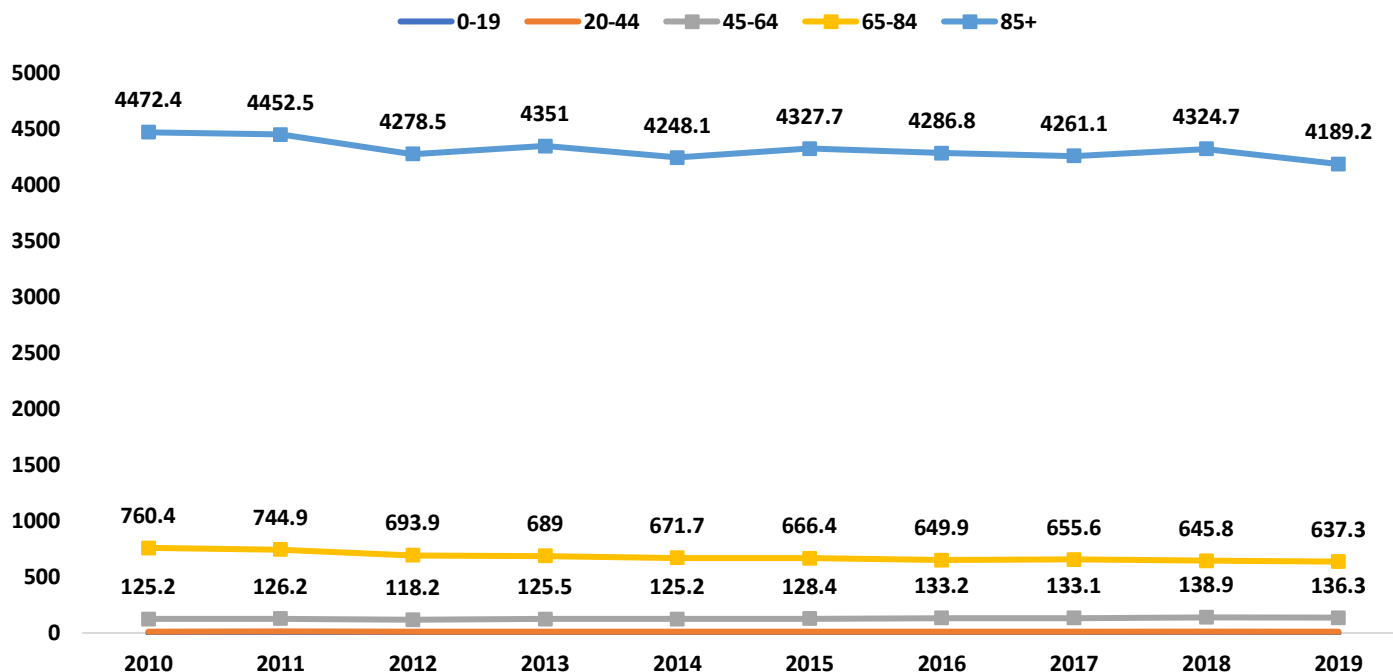
Figure 71. Age-adjusted Heart Disease Mortality Rate (per 100,000) by Sex and Race/Ethnicity, PA, 2010-2019



Heart disease deaths were inversely related to age, as shown in Figure 72 and Figure 73. Among all the heart disease deaths in 2019, deaths in people aged 65 years or older constitute 84% of all heart disease deaths. By age group, heart disease mortality rate was highest among those aged 85 years or older, followed by each of the subsequent younger

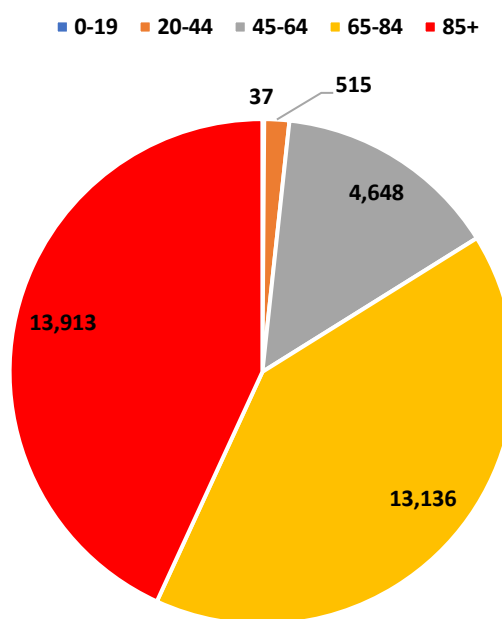
age groups. Notably, the heart disease mortality rate increased 9% in young people less than 20 years of age and also 9% among people aged 45 to 64 years from 2010 to 2019, while the mortality rate decreased in the other three age groups. The decrease was 6% in people aged 85 years or older, 16% in people aged 65 to 84 years, and 4% in people aged 20 to 44 years.

Figure 72. Heart Disease Mortality Rate (per 100,000) by Age Group, PA, 2010-2019

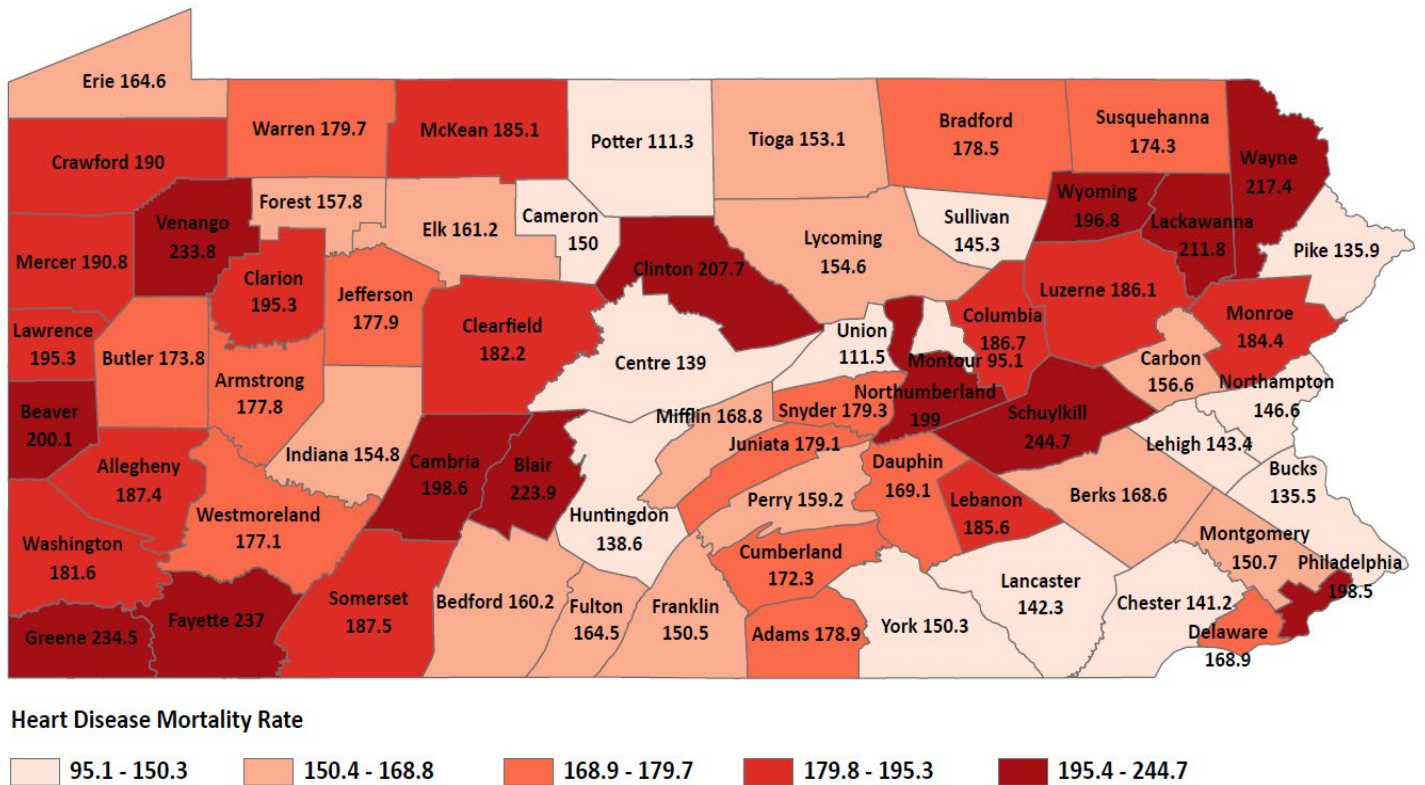


The age-adjusted heart disease mortality rate was geographically different in PA, as shown in Map 3. By region, the following counties had the highest heart disease mortality rate (195.4 – 244.7 per 100,000) in 2019: Clinton and Northumberland (Northcentral Region); Lackawanna, Wayne and Wyoming (Northeast Region); Lawrence and Venango (Northwest Region); Blair (Southcentral Region); Philadelphia and Schuylkill (Southeast Region); and Beaver, Cambria, Fayette, and Greene (Southwest Region). Conversely, the following counties had the lowest heart disease mortality rate (95.1 – 150.3 per 100,000) in 2019: Centre, Montour, Potter, Sullivan, and Union (Northcentral Region); Lehigh, Northampton, and Pike (Northeast Region); Cameron (Northwest Region); Huntingdon and York (Southcentral Region); and Bucks, Chester, and Lancaster (Southeast Region).

Figure 73. Heart Disease Death Cases (N=32,249) by Age Group, PA, 2019



Map 3. Age-adjusted Heart Disease Mortality Rates (per 100,000) by County in PA, 2019



From 2010 to 2019, the age-adjusted heart disease mortality rate increased in 20 counties, as shown in Figure 74. The top 10 counties in which age-adjusted heart disease mortality rate increased the most are Venango (52.1%), Juniata (21.9%), Forest (20.5%), Bradford (15.6%), Lawrence (12.4%), Snyder (12.1%), Monroe (10.4%), Blair (9.2%), Fulton (8.6%), and Lebanon (7.0%). Conversely, the age-adjusted heart disease mortality rate decreased in 47 counties from 2010 to 2019, as shown in Figure 75. The top 10 counties in which age-adjusted heart disease mortality rate decreased the most are Montour (52.9%), Union (46.6%), Sullivan (33.0%), Potter (29.4%), Perry (27.2%), Carbon (25.0%), Indiana (24.1%), McKean (23.6%), Centre (23.1%) and Tioga (18.5%). Of note, counties with the most increases in heart disease mortality rate also usually have higher prevalence of risk factors. For example, Venango County had a 52.1% of increase in heart disease mortality rate and the prevalence of cigarette smoking (26.0% during 2017 – 2019) and the prevalence of obesity (35.0% during 2017 – 2019) were higher than the state average.²⁶ This pattern has been observed in other counties as well.²⁶

Figure 74. Percent Increase in Age-adjusted Heart Disease Mortality Rate by County, PA, 2010-2019

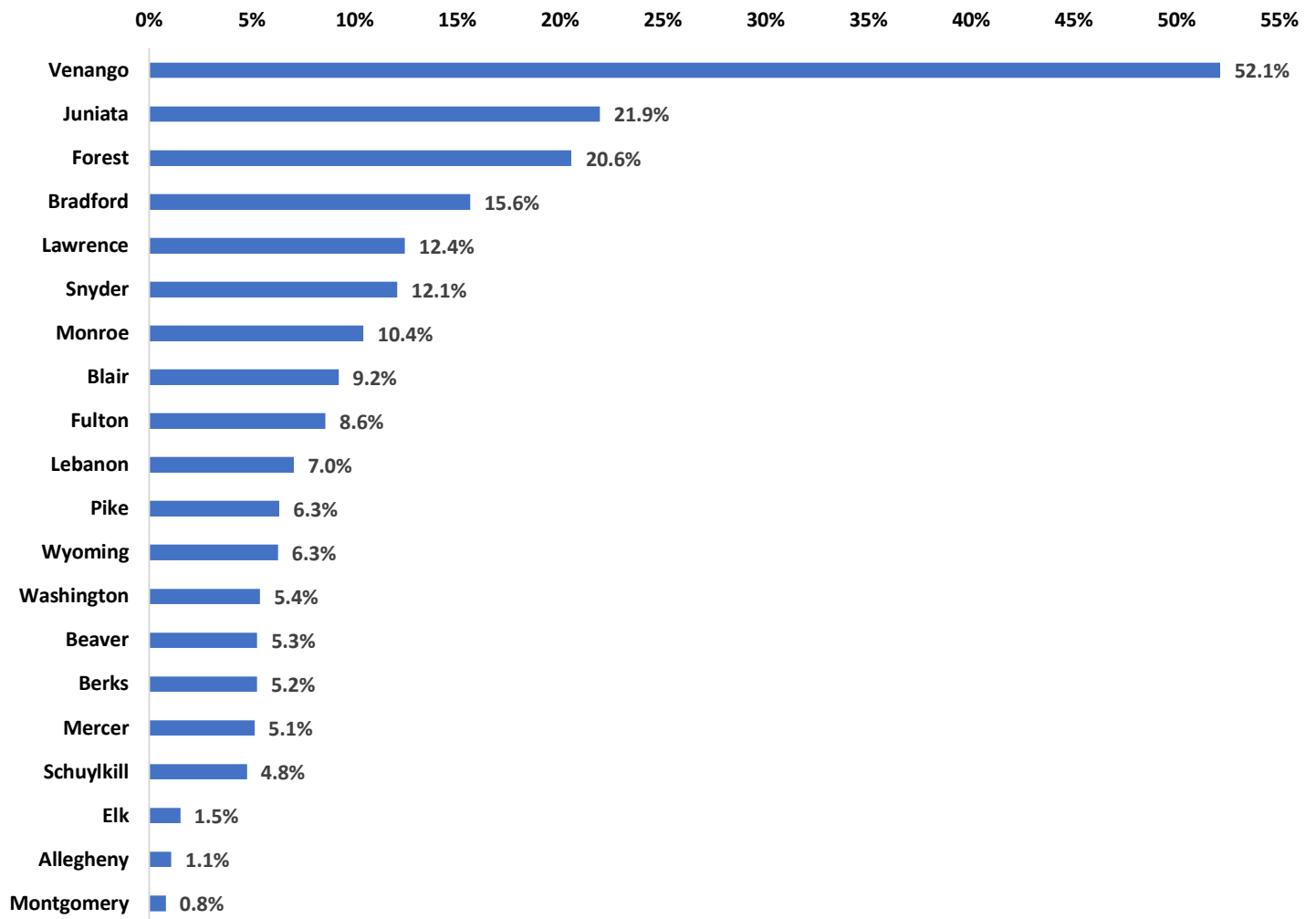
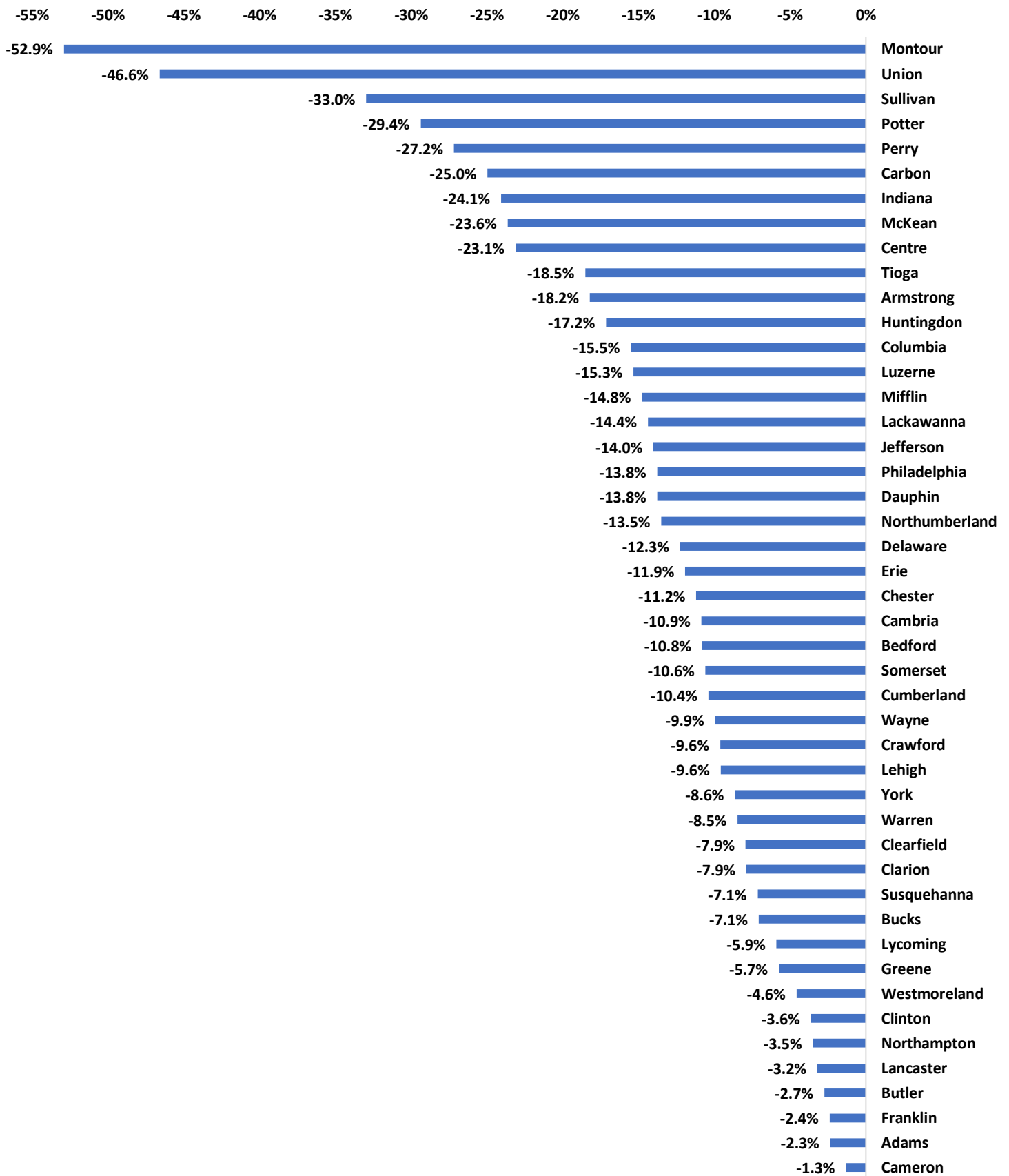


Figure 75. Percent Decrease in Age-adjusted Heart Disease Mortality Rate by County, PA, 2010-2019

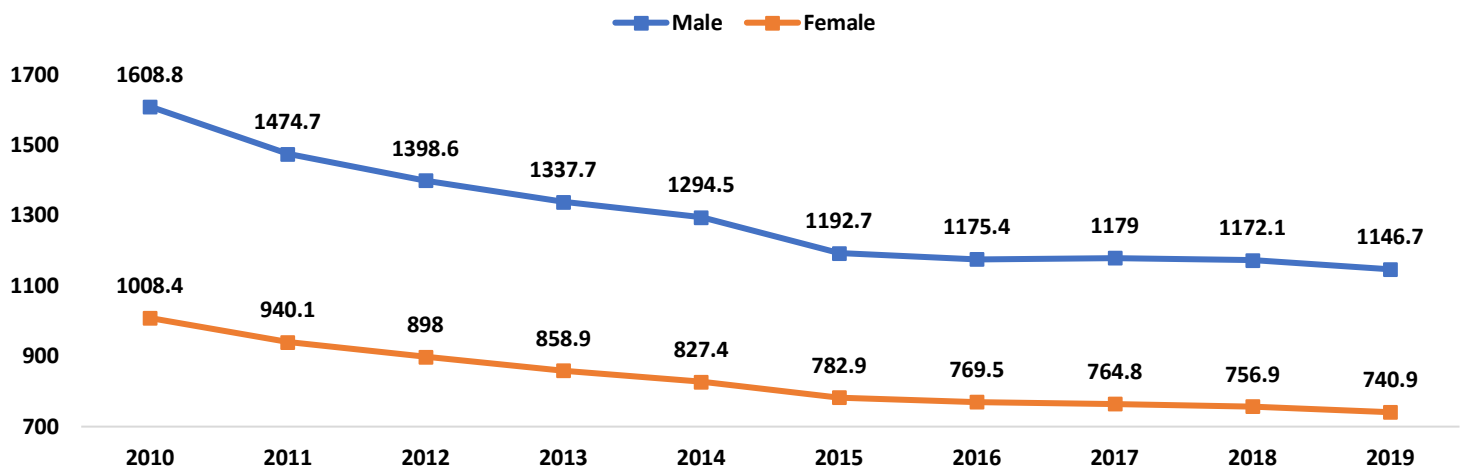


In summary, the heart disease mortality rate in PA declined 5.8% from 2010 to 2019. There were some disparities in heart disease mortality rate by sex, race/ethnicity, age group, and county. The mortality rate was higher in males, Blacks (in particular, Black males), people aged 85 years or older, and some specific counties. As deaths from heart disease are the first leading cause of death in PA, the control and prevention of heart disease should be a priority area in promoting health among residents in PA.

7.3 Hospitalization Trend for Heart Disease in Pennsylvania

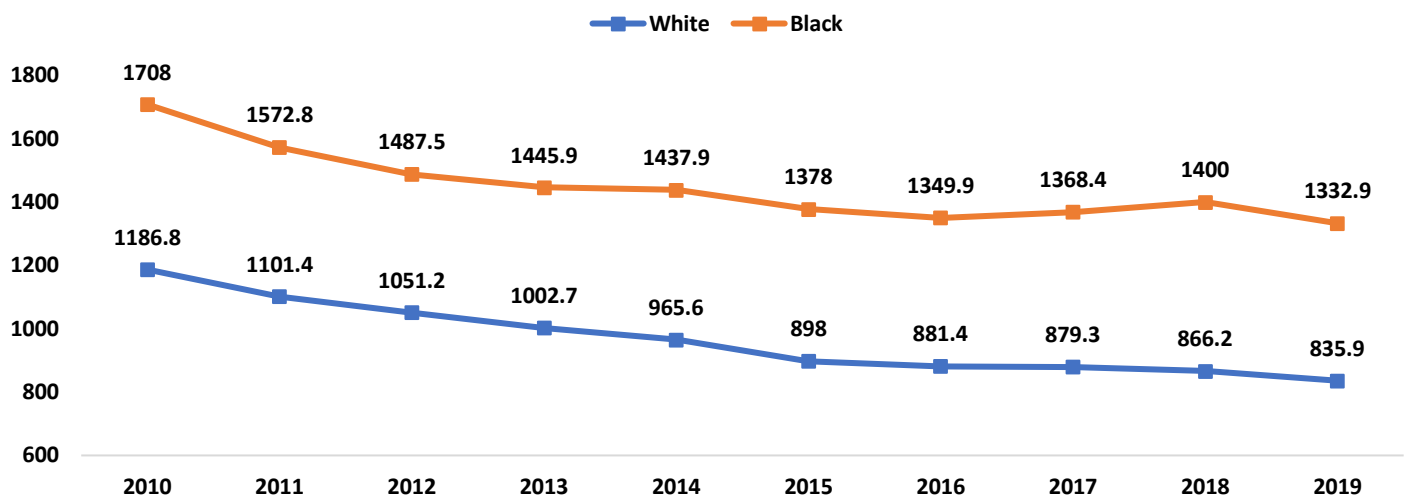
Figure 76 shows the age-adjusted hospitalization rate for heart disease by sex in PA from 2010 to 2019. Overall, the hospitalization rate in men was higher than in women, and the hospitalization rate declined steadily in both men and women over the 10-year period. The decrease was 29% in men and 27% in women.

Figure 76. Age-adjusted Heart Disease Hospitalization Rate (per 100,000) by Sex, PA, 2010-2019



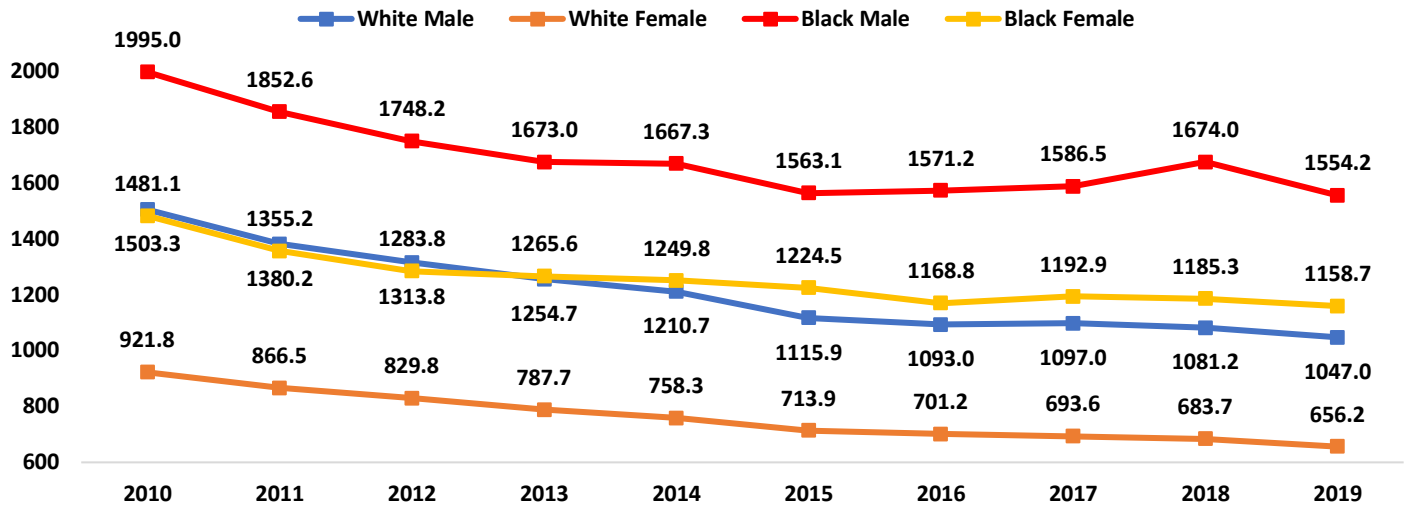
By race and ethnicity, the age-adjusted hospitalization rate in Blacks was higher than that in Whites in PA from 2010 to 2019. Over the 10-year period, the hospitalization rate declined in both Whites and Blacks, with a 30% decrease in Whites and a 22% decrease in Blacks (Figure 77). Hospitalization data were inadequate for analysis in the other racial and ethnic groups.

Figure 77. Age-adjusted Heart Disease Hospitalization Rates (per 100,000) by Race/Ethnicity, PA, 2010-2019



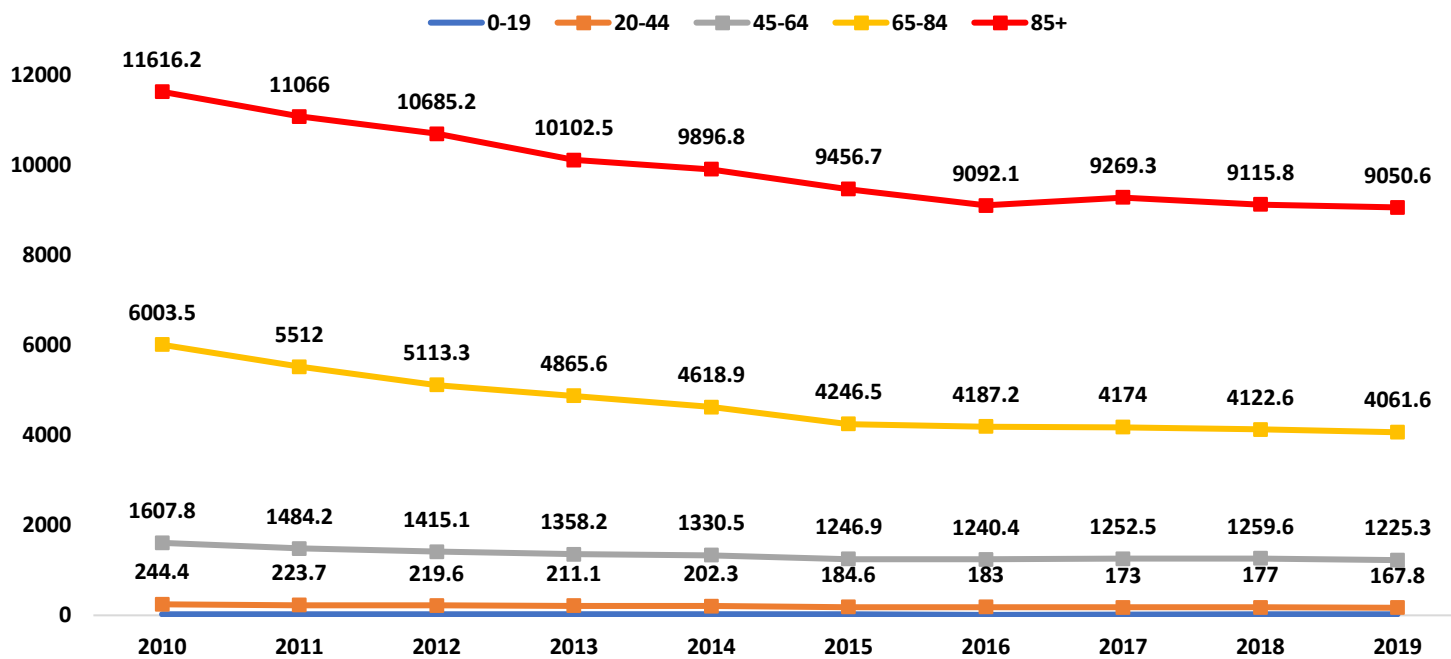
By sex and race/ethnicity, the age-adjusted hospitalization rate was highest in Black males, followed by Black females and White males. The age-adjusted hospitalization rate was lowest in White females. The age-adjusted hospitalization rate dropped in all four racial/ethnic groups from 2010 to 2019. The rate declined 22% in both Black males and Black females, 30% in White males, and 29% in White females (Figure 78).

Figure 78. Age-adjusted Heart Disease Hospitalization Rate (per 100,000) by Sex and Race/ethnicity, PA, 2010-2019



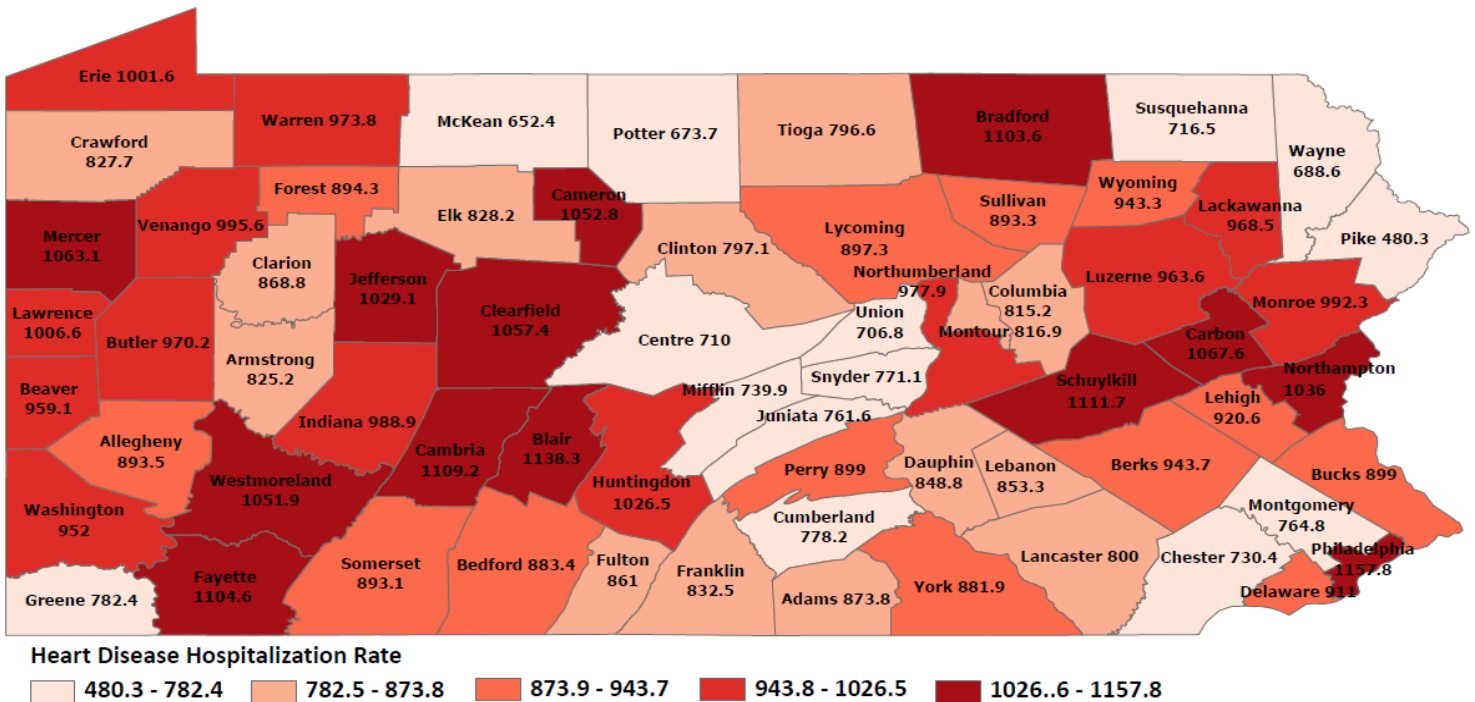
By age group, the hospitalization rate was highest among people aged 85 years or older, followed by people 65 to 84 years of age and people 45 to 64 years of age. The hospitalization rate was low in the younger population less than 45 years of age. Over the 10-year period, the hospitalization rate declined in all age groups. The rate dropped 22% in people aged 85 years or older, 32% in people aged 65 to 84 years, 24% in people aged 45 to 64 years, 31% in people aged 20 to 44, and 23% in people less than 20 years of age (Figure 79).

Figure 79. Heart Disease Hospitalization Rate (per 100,000) by Age Group, PA, 2010-2019



Geographically, there are disparities in the age-adjusted hospitalization rate based on county of residence in PA. As shown in Map 4, counties in the northeast and west areas had higher hospitalization rates than the other areas in 2019. By region, the following counties had the highest age-adjusted hospitalization rates (1026.6 - 1157.8 per 100,000) for heart disease: Bradford in the Northcentral Region; Carbon and Northampton in the Northeast Region; Cameron, Clearfield, Jefferson, and Mercer in the Northwest Region; Blair in the Southcentral Region; Philadelphia and Schuylkill in the Southeast Region; and Cambria, Fayette, and Westmoreland in the Southwest Region.

Map 4. Age-adjusted Heart Disease Hospitalization Rate (per 100,000) by County, PA, 2019



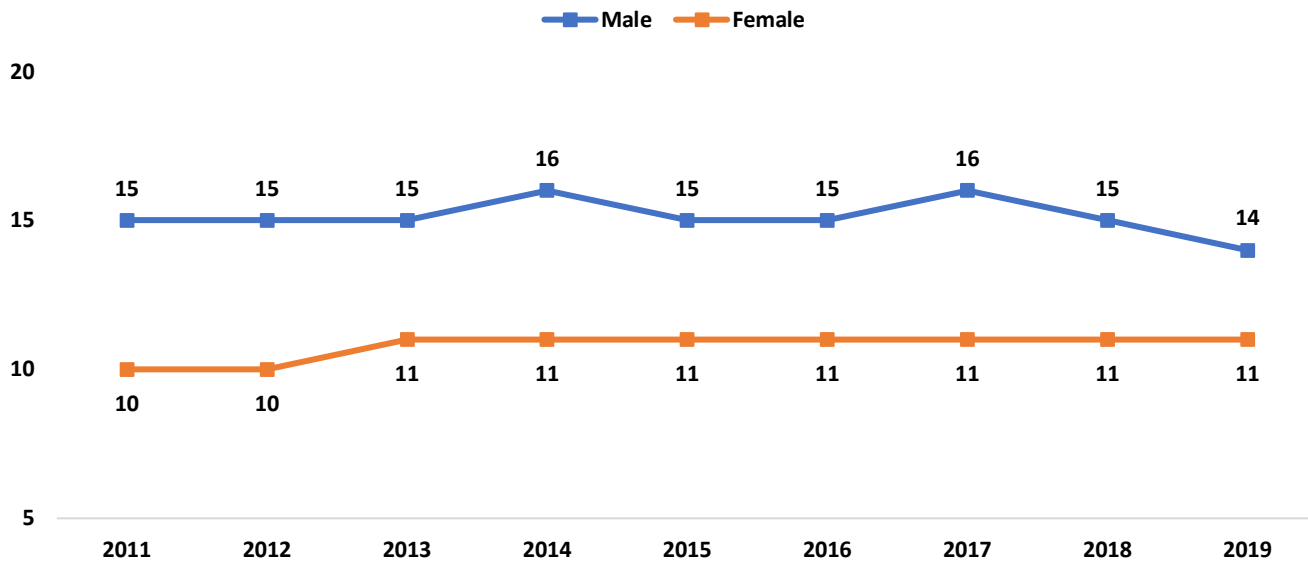
In summary, the heart disease hospitalization rate in PA declined from 2010 to 2019. However, the hospitalization rate was higher in males (especially Blacks males) and in the elderly in comparison to their counterparts. In addition, the hospitalization rate due to heart disease was higher in some specific counties. Health care resources should be evaluated to ensure that access to in-patient services for heart disease is available to vulnerable populations.

7.4 Heart Disease Indicators in Pennsylvania from BRFSS

In the BRFSS, data were collected from adults aged 35 years or older with regards to if they had ever been told by their doctors that they had a heart attack, heart disease or a stroke. Figure 80 shows the percentage of men and women who had been told by their doctors that they had one or more of these conditions in PA from 2010 to 2019. In general, the percentage was higher in men than in women. The percentage in both men and women remained relatively stable over the nine-year period.

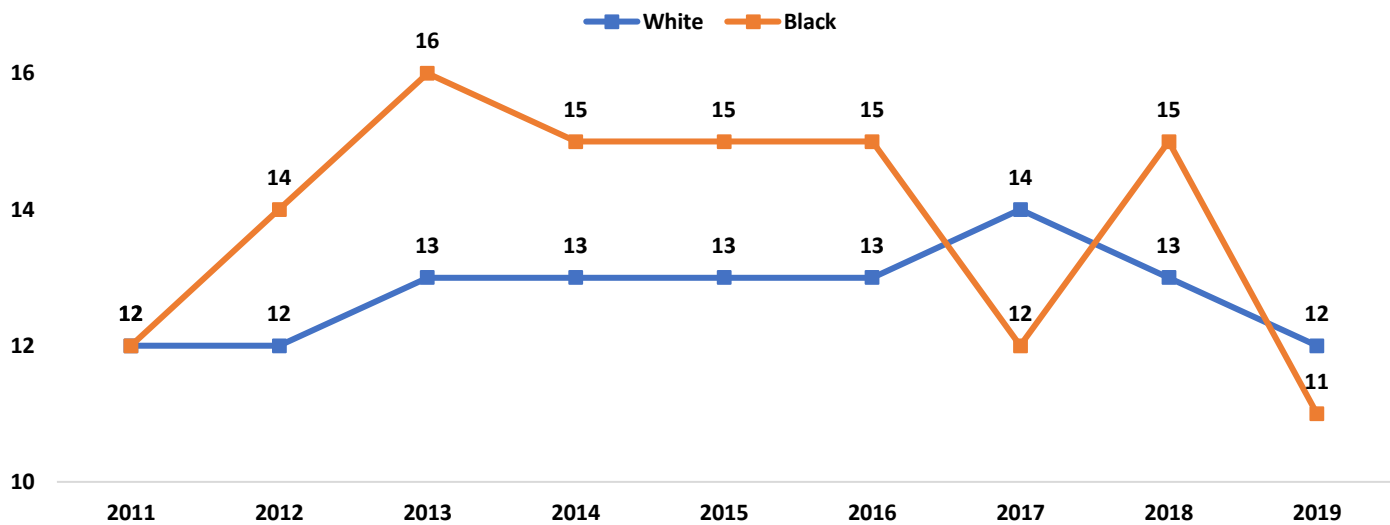
1 in 10 adults aged 35 or older have some type of cardiovascular or cerebrovascular diseases in PA.

Figure 80. Percent of Adults 35 Years or Older Who Have Ever Been Told that They Had a Heart Attack, Heart Disease or a Stroke by Sex, PA, 2011-2019



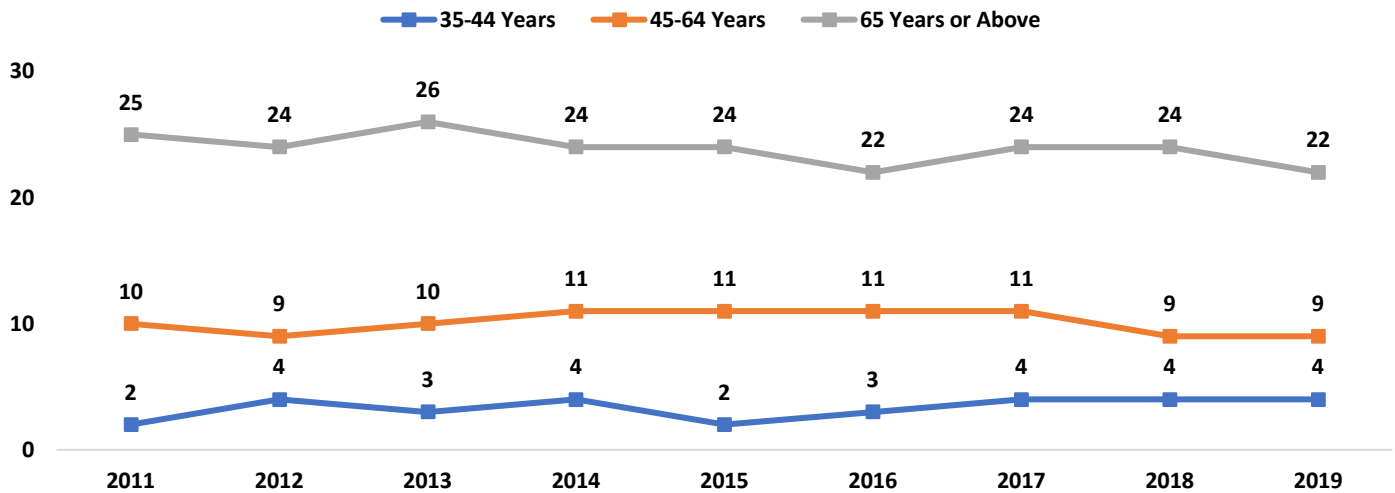
By race/ethnicity, Blacks generally reported more often than Whites that they had ever been told by their health care providers that they had a heart attack, heart disease or a stroke from 2011 to 2019 except in 2017 (Figure 81). The percentage remained relatively stable in Whites and fluctuated more among Blacks over the years. Data for the other racial/ethnic groups were insufficient to produce stable statistics.

Figure 81. Percent of Adults 35 Years or Older Who have Ever Been Told that They Had a Heart Attack, Heart Disease or a Stroke by Race/Ethnicity, PA, 2011-2019



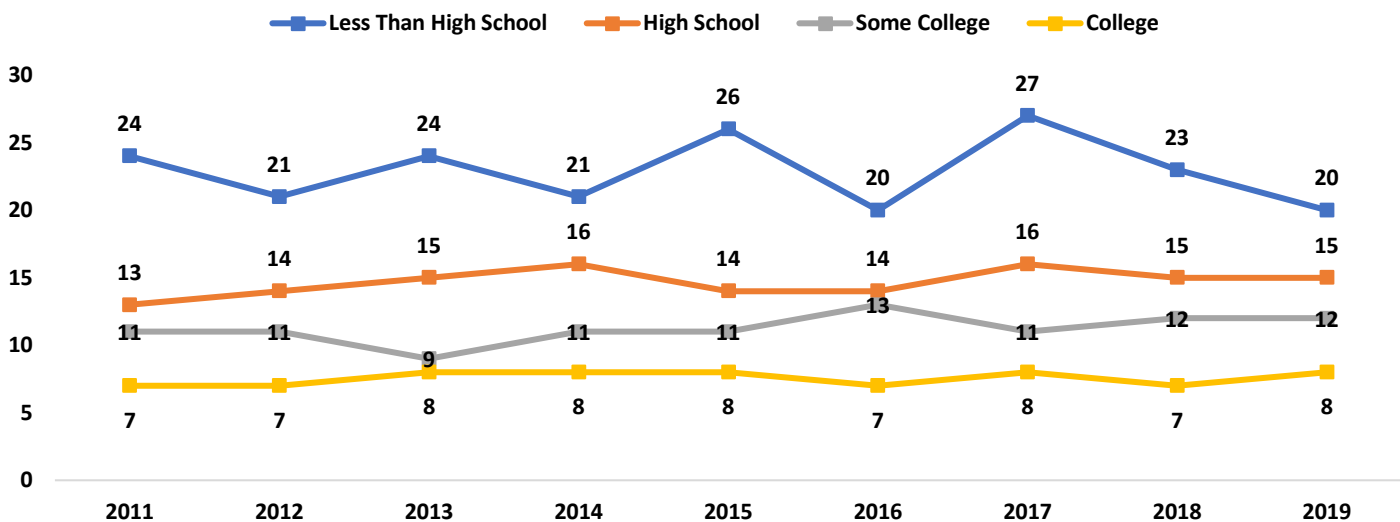
By age group, older people reported more often that they had ever been told by their health care provider that they had a heart attack, heart disease or a stroke from 2011 to 2019 (Figure 82). Overall, the percentage of adults aged 45 to 64 years and adults 65 years or older who had been told that they had a heart attack, heart disease or a stroke declined slightly during the nine-year period; the percentage increased slightly in the younger age group of 35 to 44 years old.

Figure 82. Percent of Adults 35 Years or Older Who Have Ever Been Told that They Had a Heart Attack, Heart Disease or a Stroke by Age Group, PA, 2011-2019



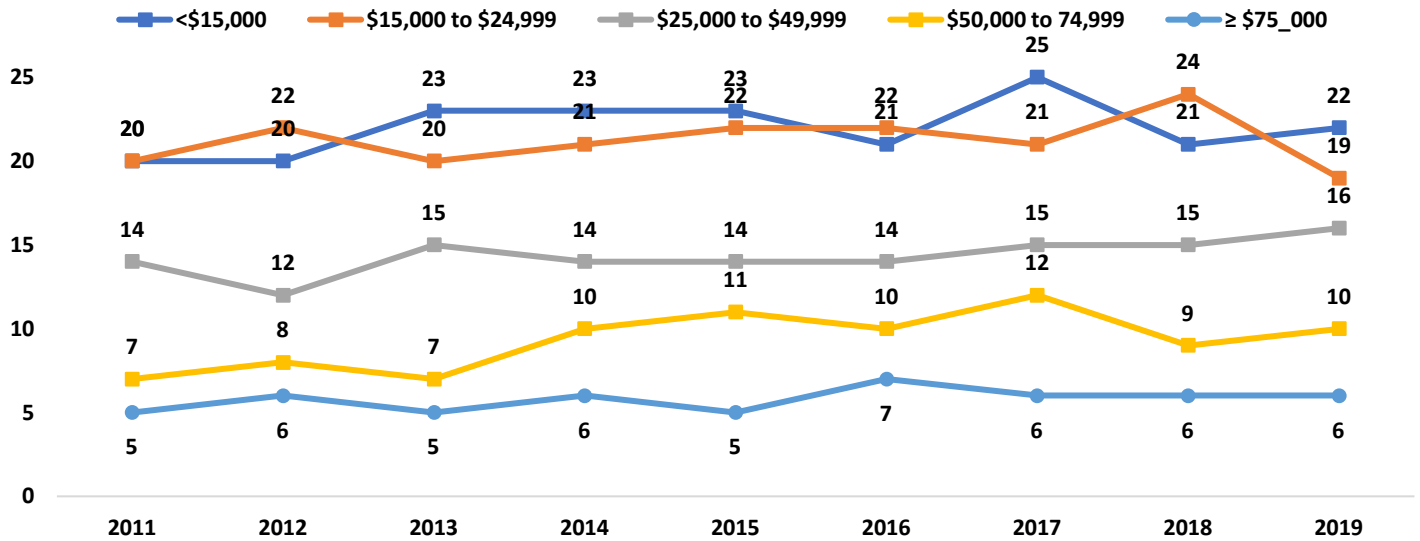
By education, people with lower educational levels reported more often that they had ever been told by their health care provider that they had a heart attack, heart disease, or a stroke from 2011 to 2019 (Figure 83). Over the nine-year period, among those with college degree or above, 7% to 8% reported that they had ever been told to have these conditions, while 20% to 27% reported these conditions among people with less education than a high school diploma. Among people with some college degree, 9% to 13% reported that they had ever been told to have these conditions, and among those with high school diploma, 13% to 15% reported these conditions.

Figure 83. Percent of Adults 35 Years or Older Who Have Ever Been Told that They Had a Heart Attack, Heart Disease or a Stroke by Educational Level, PA, 2011-2019



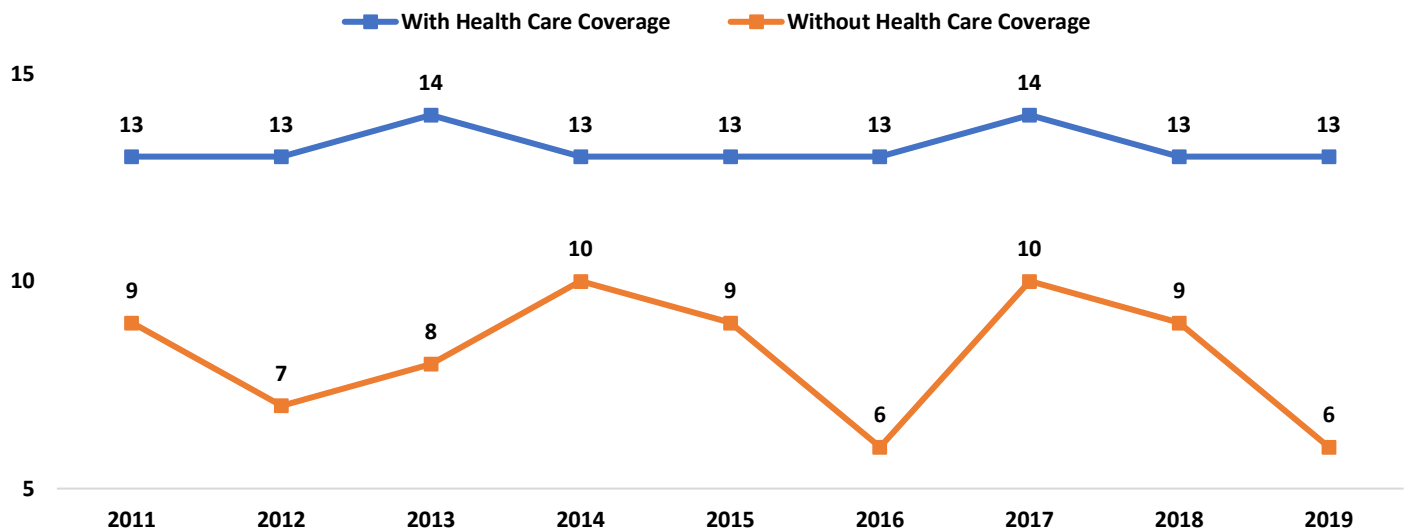
Similar to education, those with lower household income reported more often that they had ever been told by their health care provider that they had a heart attack, heart disease or a stroke from 2011 to 2019 (Figure 84). Over the nine-year period, among people whose annual household income was \$75,000 or more, only 5% to 7% reported having been told that they had these conditions. In comparison, among people whose annual household income was less than \$25,000, 20% to 23% reported having been told that they had a heart attack, heart disease or a stroke, approximately four times higher than those with an annual household income of \$75,000 or more.

Figure 84. Percent of Adults 35 Years or Older Who Have Ever Been Told that They Had a Heart Attack, Heart Disease or a Stroke by Annual Household Income, PA, 2011-2019



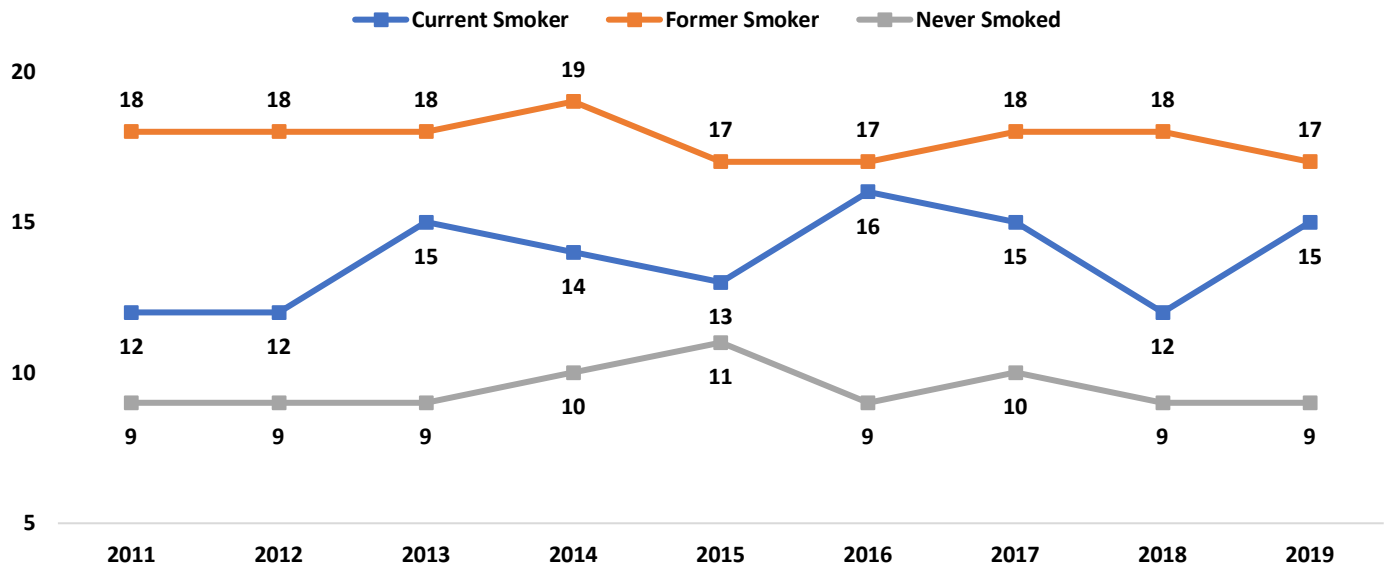
By health care coverage, those with coverage consistently reported more often that they had ever been told that they had a heart attack, heart disease or a stroke by their health care provider (range: 13% to 14%) from 2011 to 2019. While among those without health care coverage, only 6% to 10% reported that they had ever been told that they had a heart attack, heart disease or a stroke by their health care providers from 2011 to 2019. Because this question is related to visiting health care providers, it is reasonable to assume that those with health care coverage were more likely to visit their health care provider and as a result, reported more often that they had ever been told that they had a heart attack, heart disease or a stroke (Figure 85).

Figure 85. Percent of Adults 35 Years or Older Who Have Ever Been Told that They Had a Heart Attack, Heart Disease or a Stroke by Health Care Coverage, PA, 2011-2019



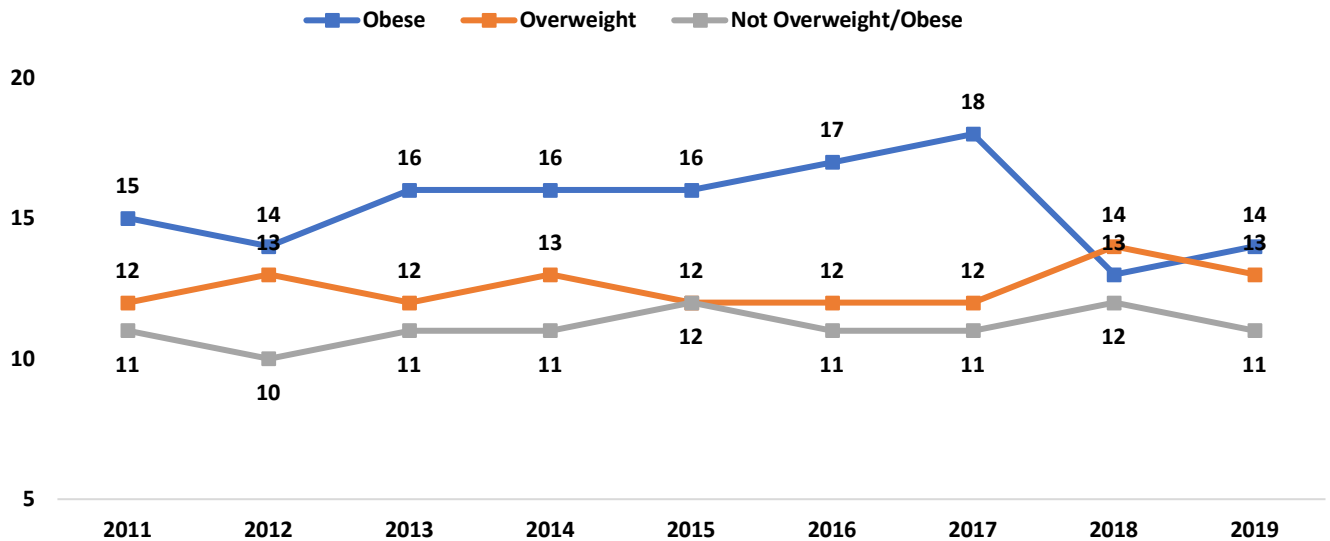
By smoking status, former smokers, followed by current smokers, reported most frequently that they had ever been told by their health care provider that they had a heart attack, heart disease or a stroke from 2011 to 2019 (Figure 86). People who never smoked reported less often being told of these conditions. The percentage remained relatively stable among former and never smokers, and increased slightly among current smokers.

Figure 86. Percent of Adults 35 Years or Older Who Have Ever Been Told that They Had a Heart Attack, Heart Disease or a Stroke by Smoking Status, PA, 2011-2019



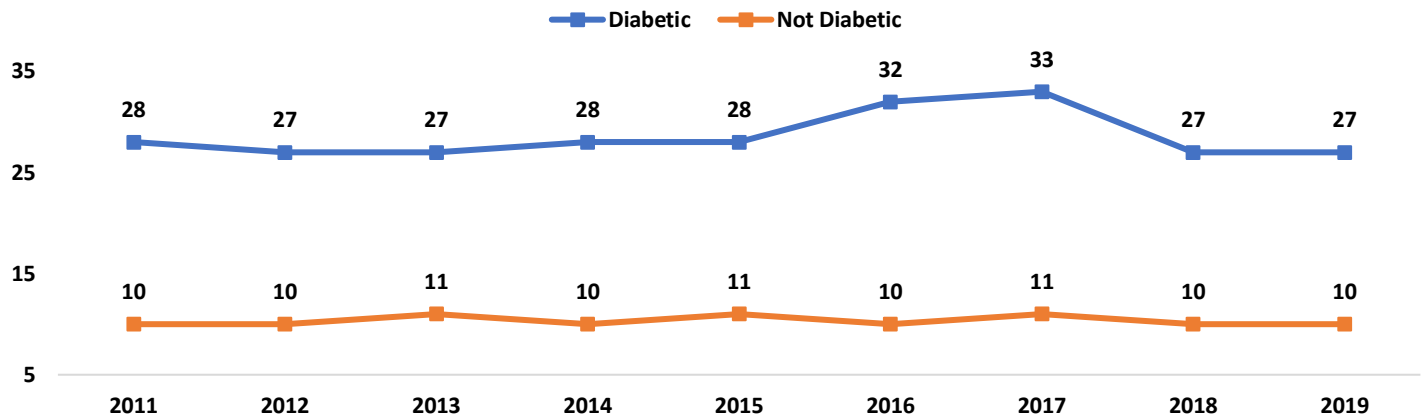
By body weight status, people who had obesity reported most frequently that they had ever been told that they had a heart attack, heart disease or a stroke, ranging from 13% to 18% over the nine-year period (Figure 87). People who were overweight reported these conditions less often and people whose body weight was neither obese nor overweight reported these conditions the least. The percentage remained relatively stable among all groups categorized by body weight despite some fluctuations over years.

Figure 87. Percent of Adults 35 Years or Older Who Have Ever Been Told that They Had a Heart Attack, Heart Disease or a Stroke by Body Weight, PA, 2011-2019



By diabetic status, people with diabetes reported more often that they had ever been told that they had a heart attack, heart disease or a stroke from 2011 to 2018, ranging from 27% to 33% in the 9-year period (Figure 88). Among people without diabetes, 10% to 11% reported that they had ever been told that they had a heart attack, heart disease or a stroke from 2011 to 2018. The percentage remained relatively stable for both groups.

Figure 88. Percent of Adults 35 Years or Older Who Have Ever Been Told that They Had a Heart Attack, Heart Disease or a Stroke by Diabetic Status, PA, 2011-2019



In summary, for the indicator of ever having been told that they had a heart attack, heart disease or a stroke, the percentage remained largely unchanged among adults aged 35 years or older in PA from 2011 to 2019. The percentage was higher among males, Blacks, the elderly, people with lower educational attainment, people with lower income, people with health care coverage, former smokers, and people with obesity or diabetes.

8. Cancer (Malignant Neoplasm)

8.1 General Description of Cancer

Cancer in this section is defined as having ICD-10 codes of C00 – C97, having ICD-9 codes of 140 – 208, or having an ICD-O-3 code of C000 – C809.

Cancer is a group of diseases characterized by the uncontrollable growth of abnormal cells which infiltrate and destroy normal body tissues. Cancer cells can spread to other parts of the body through the blood and lymph systems. There are more than 100 types of cancer. Cancer types can be grouped into broad categories. Based on where cancer begins, cancer can be classified into the following four categories:

- **Carcinoma** — A carcinoma begins in the skin or the tissue that covers the surface of internal organs and glands. Carcinomas usually develop into solid tumors. They are the most common type of cancer. Examples of carcinomas include lung cancer, colorectal cancer, prostate cancer, and breast cancer.
- **Sarcoma** — A sarcoma begins in the tissues that support and connect the body, such as bone, cartilage, muscle, fat, nerves, tendons, joints, blood vessels, and lymph vessels.
- **Leukemia** — Leukemia is a blood cancer and begins when abnormal blood cells grow uncontrollably.
- **Lymphoma** — Lymphoma is a cancer that begins in the lymphatic system. The lymphatic system is a network of vessels and glands that help fight infection.

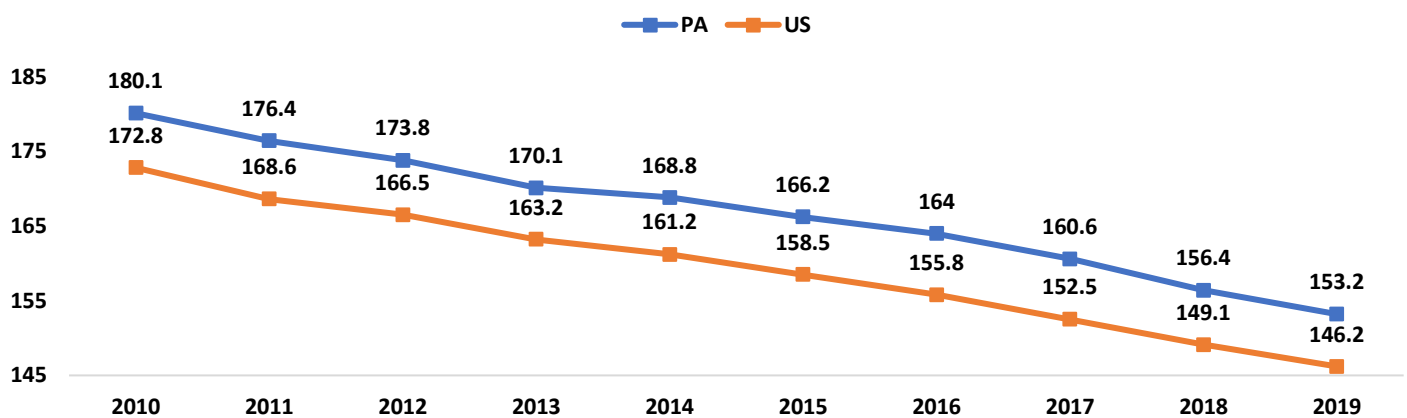
Cancer is the second leading cause of death in the US. Each year, close to 600,000 deaths are attributable to cancer in the US. In PA, approximately 28,000 deaths are attributable to cancer each year. The direct medical costs (i.e., total of all

health care costs) for cancer in the US are approximately \$150 billion and lost productivity due to cancer diagnosis is around \$135 billion in the country¹⁹. Common risk factors for cancer include age, family history, tobacco use, excessive use of alcohol, lack of physical activity, exposure to chemicals or cancer-causing substances, unhealthy diet, radiation, and excessive exposure to sunlight. Certain health conditions, such as obesity, chronic inflammation, immunosuppression, exposure to infectious agents, are also associated with cancer. Although some risk factors are uncontrollable, such as age and family history, the majority of cancer risk factors are modifiable or avoidable, such as tobacco use, excessive use of alcohol, lack of physical activity, and unhealthy diet.

8.2 Mortality Trend for Cancer in Pennsylvania

Figure 89 shows the age-adjusted cancer mortality rate in PA and in the US from 2010 to 2019. In general, mortality was higher in PA than in the country throughout the 9-year period. The mortality rate declined in both PA and the country, with a 15 drop in both PA and the country, respectively.

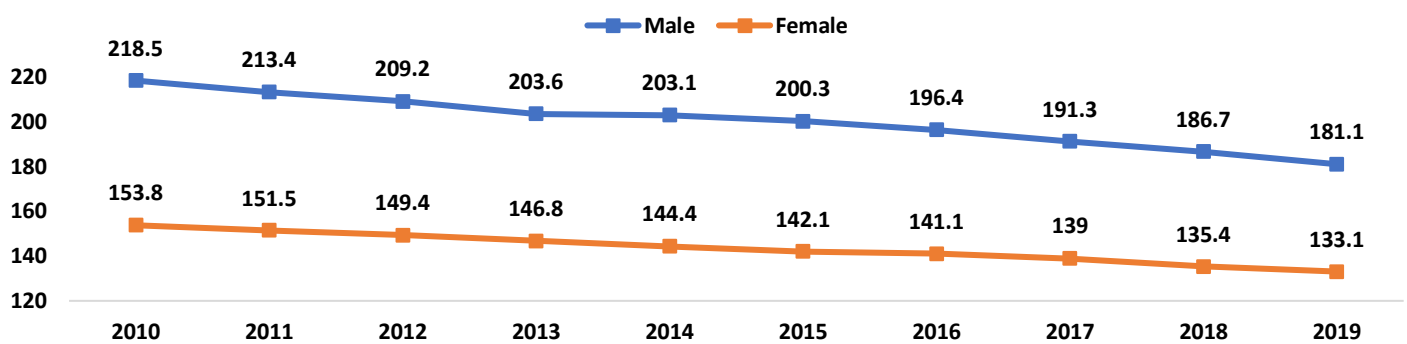
Figure 89. Age-adjusted Cancer Mortality Rates (per 100,000), PA vs. US, 2010-2019



In PA, age-adjusted cancer mortality rates were higher in males than in females from 2010 to 2019. Mortality rates decreased in both males and females over the nine-year span. In males, the mortality rate decreased from 218.5 per 100,000 in 2010 to 181.1 per 100,000 in 2019, which was a 17% reduction. Likewise, the mortality rate in females decreased from 153.8 per 100,000 in 2010 to 133.1 per 100,000, reflecting a 13% reduction in the mortality rate. In 2010, the cancer mortality rate was 42% higher in males than in females. This difference became narrower in 2019, in which the cancer mortality rate in males was 36% higher than in females (Figure 90).

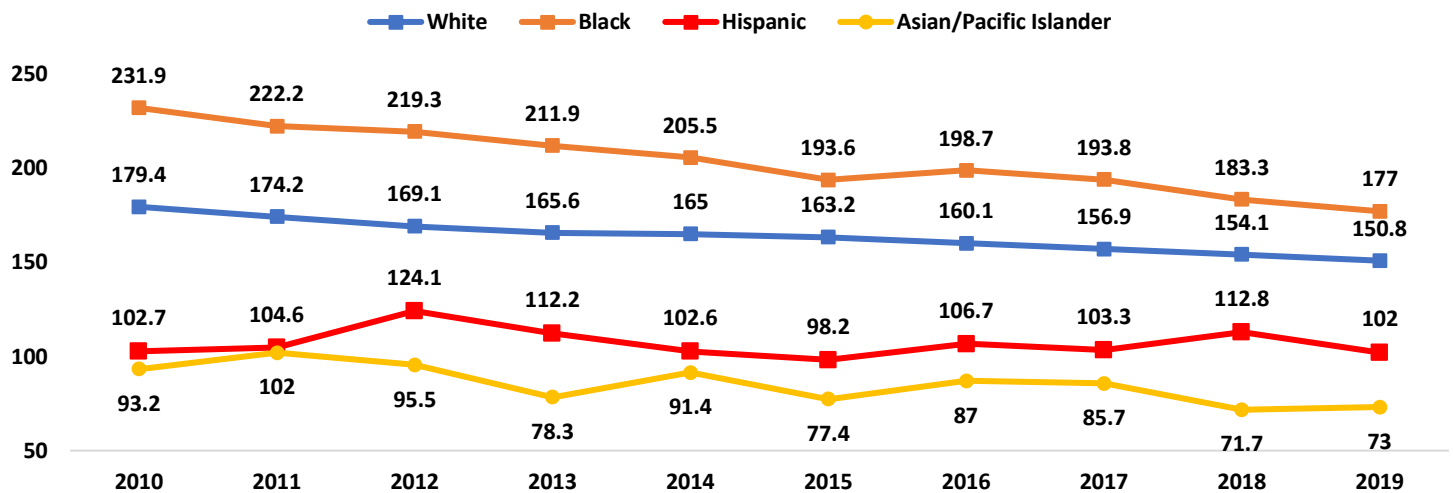
More men than women die from cancer each year in PA.

Figure 90. Age-adjusted Cancer Mortality Rate (per 100,000) by Sex, PA, 2010-2019



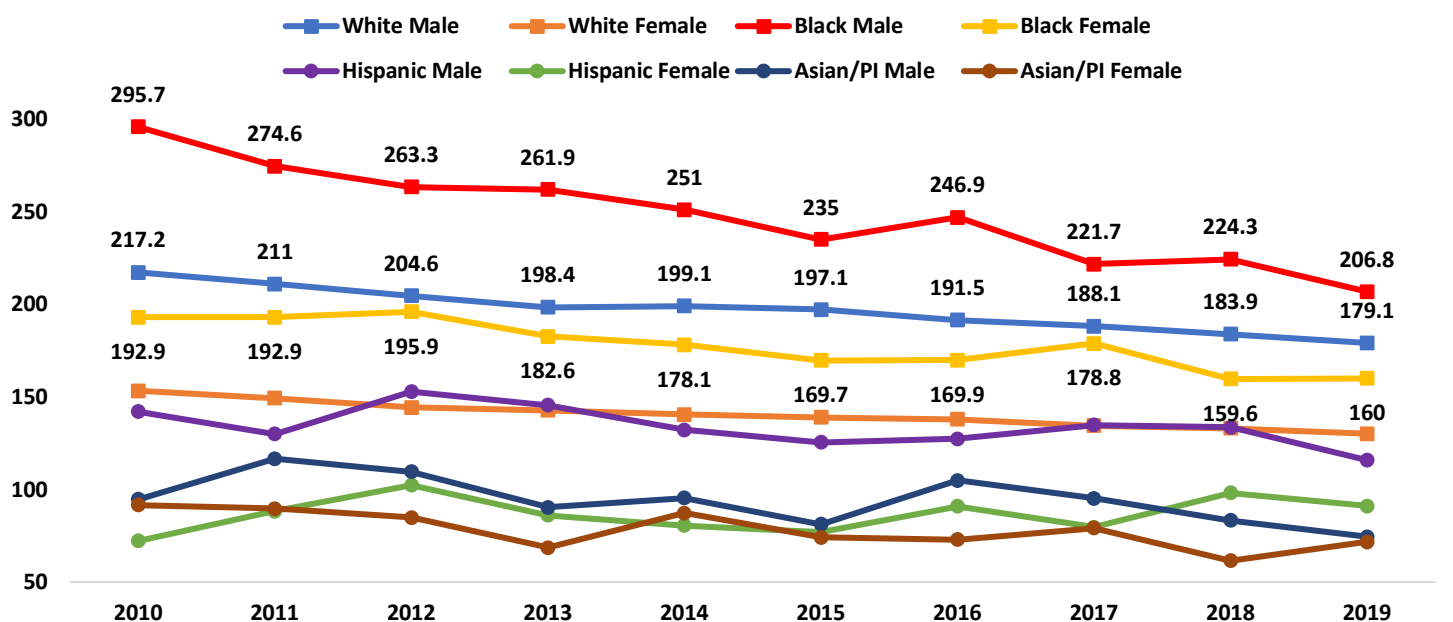
By race and ethnicity, age-adjusted cancer mortality rates were highest in Blacks, followed by Whites, Hispanics and Asians/Pacific Islanders. From 2010 to 2019, cancer mortality rates decreased in Blacks, Whites, and Asians/Pacific Islanders but remained largely unchanged in Hispanics. The rate decreased 24% in Blacks, 16% in Whites, and 22% in Asians/Pacific Islanders (Figure 91).

Figure 91. Age-adjusted Cancer Mortality Rates (per 100,000) by Race/ethnicity, PA, 2010-2019



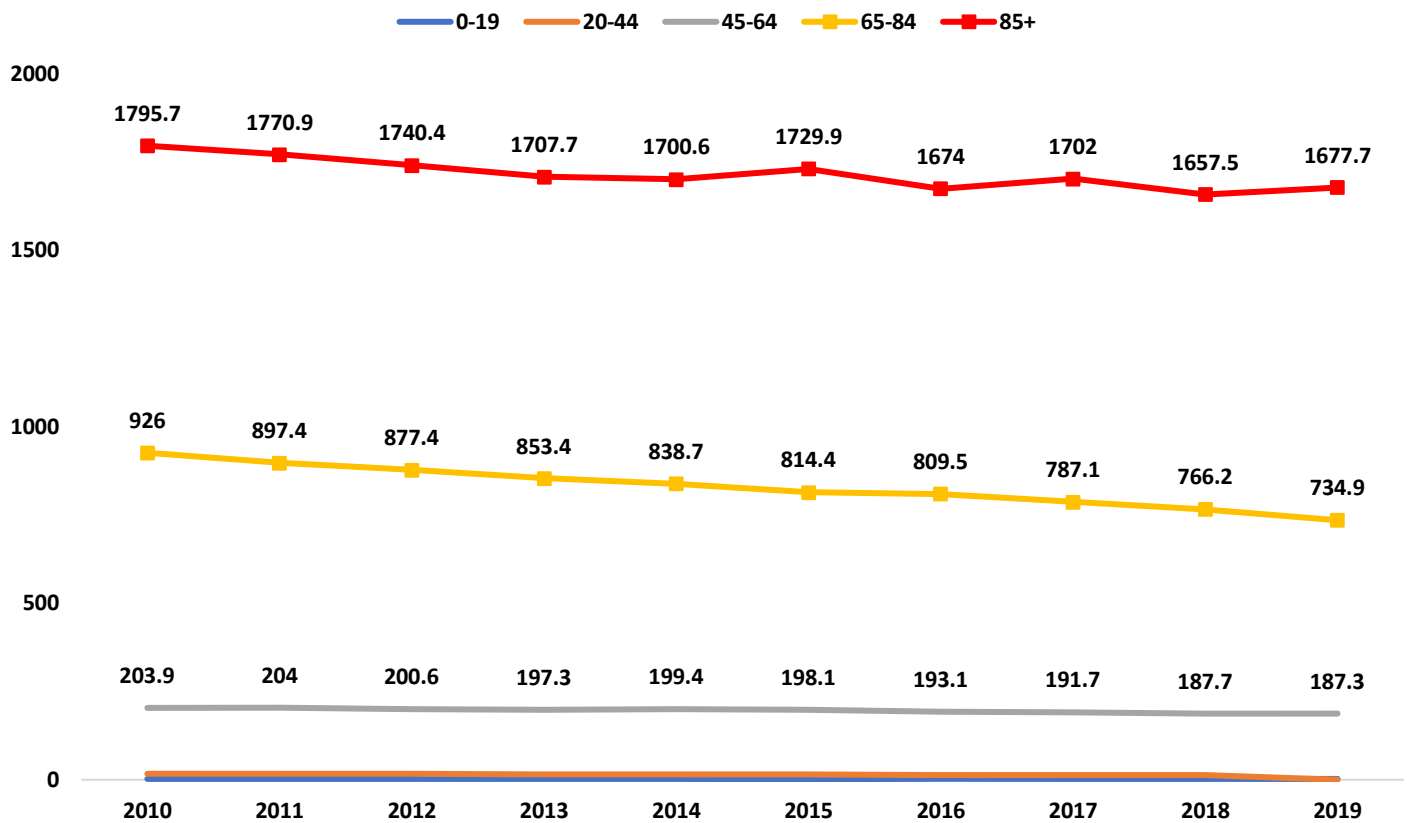
By sex and race/ethnicity, age-adjusted cancer mortality rates were highest in Black males, followed by White males, and Black females. Mortality rates in White females were close to the mortality rates in Hispanic males, and the mortality rates in Hispanic females were close to the mortality rates in Asian males and Asian females. From 2010 to 2019, cancer mortality rates decreased in all subgroups by sex and race/ethnicity except in Hispanic females. Specifically, the rate decreased 30% in Black males, 18% in White males, 17% in Black females, 15% in White females, 18% in Hispanic males, 21% in Asian/Pacific Islander males and 22% in Asian/Pacific Islander females. In Hispanic females, the cancer mortality rate increased from 72.2 per 100,000 in 2010 to 91.1 per 100,000 in 2019, representing a 26% increase in cancer mortality rate (Figure 92).

Figure 92. Age-adjusted Cancer Mortality Rates (per 100,000) by Sex and Race/ethnicity, PA, 2010-2019



Cancer mortality rates increased along with age. The highest cancer mortality rate was among people 85 years or older, followed by those who were 65 to 84 years and 45 to 64 years of age. People 44 years and younger had very low cancer mortality rates. From 2010 to 2019, cancer mortality decreased from 1795.7 per 100,000 in 2010 to 1677.7 per 100,000 in 2019 among people 85 years of age or older, representing a 7% decrease. Likewise, the cancer mortality rate decreased from 926 per 100,000 in 2010 to 734.9 per 100,000 in 2019, dropping 21% among those 65 to 84 years of age. In the next younger group (45 – 64 years of age), the cancer mortality rate decreased from 203.9 per 100,000 to 187.3 per 100,000 from 2010 to 2019, dropping 8%. The cancer mortality rate dropped from 16.9 per 100,000 in 2010 to 13.0 per 100,000 in 2019 among people 20 to 44 years of age, reflecting a 23% decrease (Figure 93).

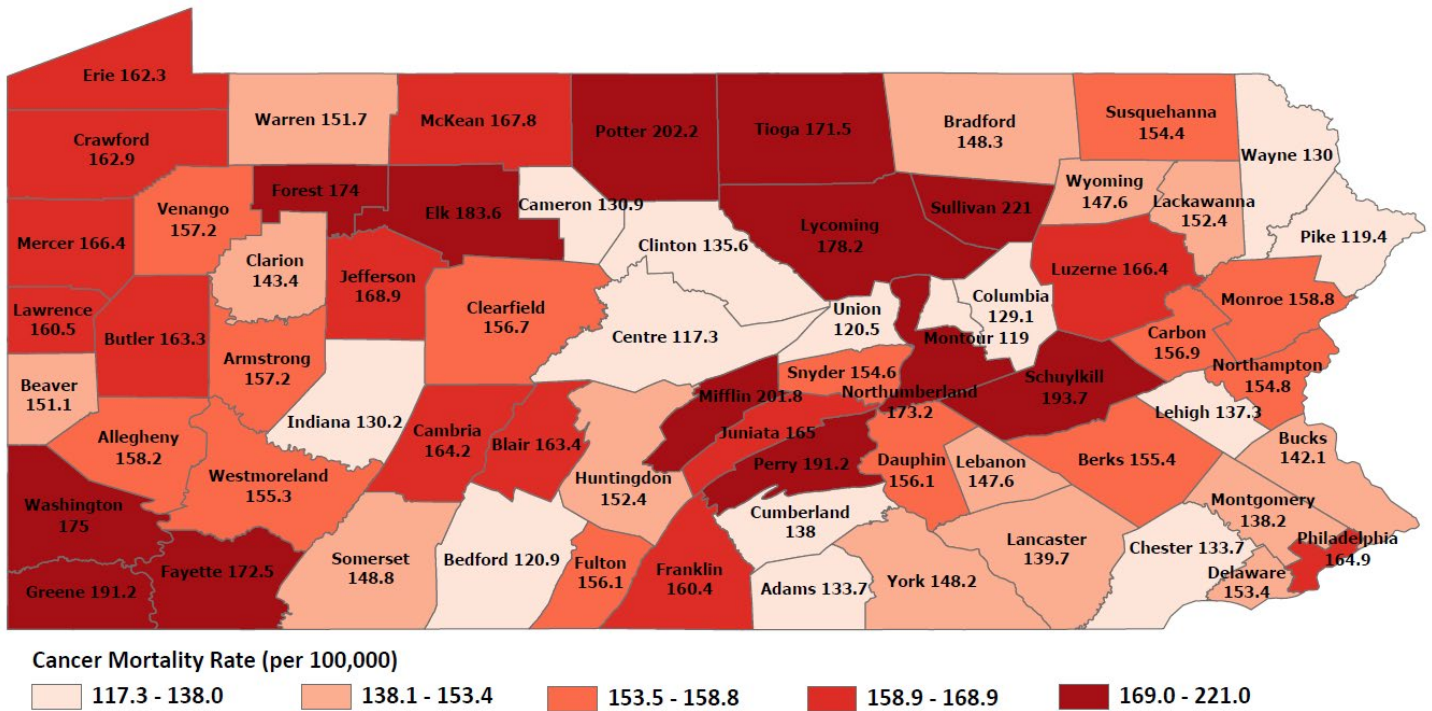
Figure 93. Cancer Mortality Rates (per 100,000) by Age Group, PA, 2010-2019



Geographically, age-adjusted cancer mortality rates reflected disparities across PA. As shown in Map 5, the highest age-adjusted cancer mortality rates (169.0-221.0 per 100,000) were observed in the following counties: Lycoming, Northumberland, Potter, Sullivan, and Tioga in the Northcentral Region; Elk and Forest in the Northwest Region; Mifflin and Perry in the Southcentral Region; Schuylkill in the Southeast Region; and Fayette, Greene, and Washington in the Southwest Region (Map 5).

In summary, age-adjusted cancer mortality declined steadily in PA from 2010 to 2019, following the same trend as in the country. The mortality rate for cancer was higher in males, Blacks (especially Black males), and people at older ages. Geographically, the mortality rate for cancer was higher in some counties. Despite the decrease in cancer mortality in the past decade, cancer remains the second leading cause of death in PA. Prevention efforts should continue and should target high risk populations.

Map 5. Age-adjusted Cancer Mortality Rate (per 100,000) by County in PA, 2019

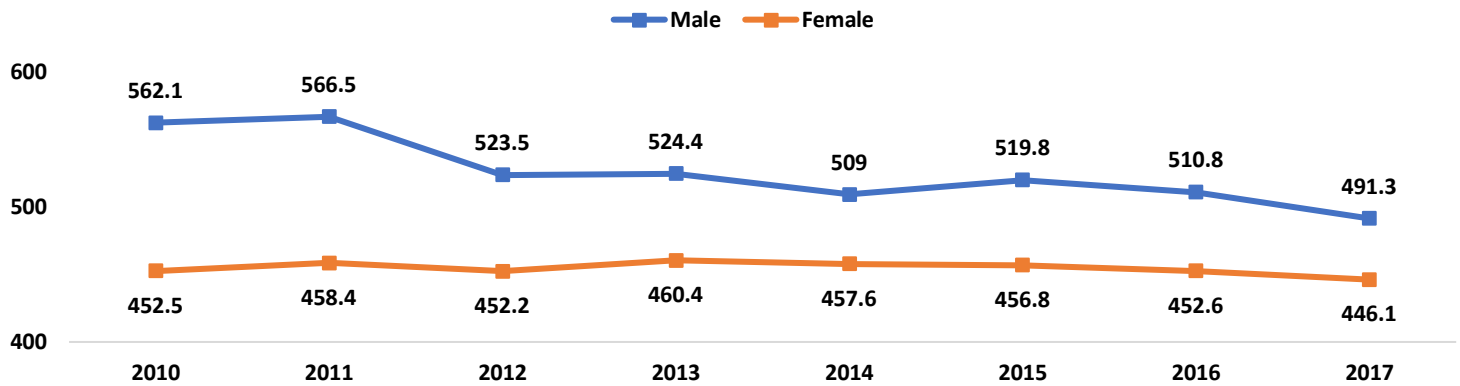


8.3 Incidence Trend for Cancer in Pennsylvania

From 2010 to 2017, the age-adjusted incidence rates for invasive cancers declined in the general population as well as in males and females. The overall decline was 7% for the general population, with the incidence rate dropping from 497.3 per 100,000 in 2010 to 462.1 per 100,000 in 2017. The age-adjusted incidence rates in males declined from 562.1 per 100,000 in 2010 to 491.3 per 100,000 in 2017, which was a 13% decrease. Similarly, the age-adjusted incidence rates in females declined from 452.5 per 100,000 in 2010 to 446.1 per 100,000 in 2017, representing a 1% decline (Figure 94).

More men than women are diagnosed with cancer each year in PA.

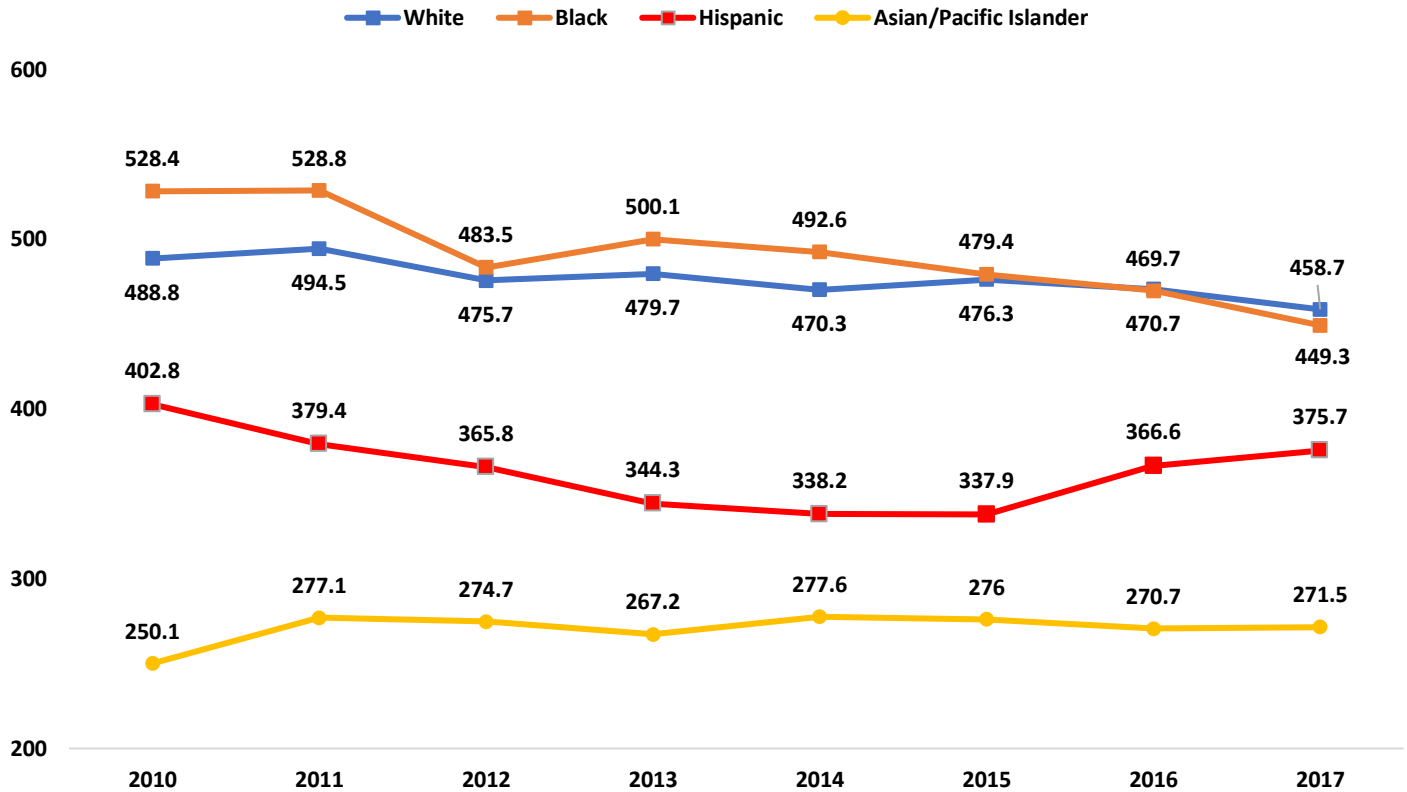
Figure 94. Age-adjusted Invasive Cancer Incidence Rates (per 100,000) by Sex, PA, 2010-2017



Disparities in cancer incidence were observed across racial/ethnic groups from 2010 to 2017. In general, the age-adjusted cancer incidence rate was high among Blacks. From 2010 to 2015, the incidence rate was highest among Blacks, but from 2016 to 2017, the rate was highest among Whites. Following Blacks and Whites, Hispanics ranked third in

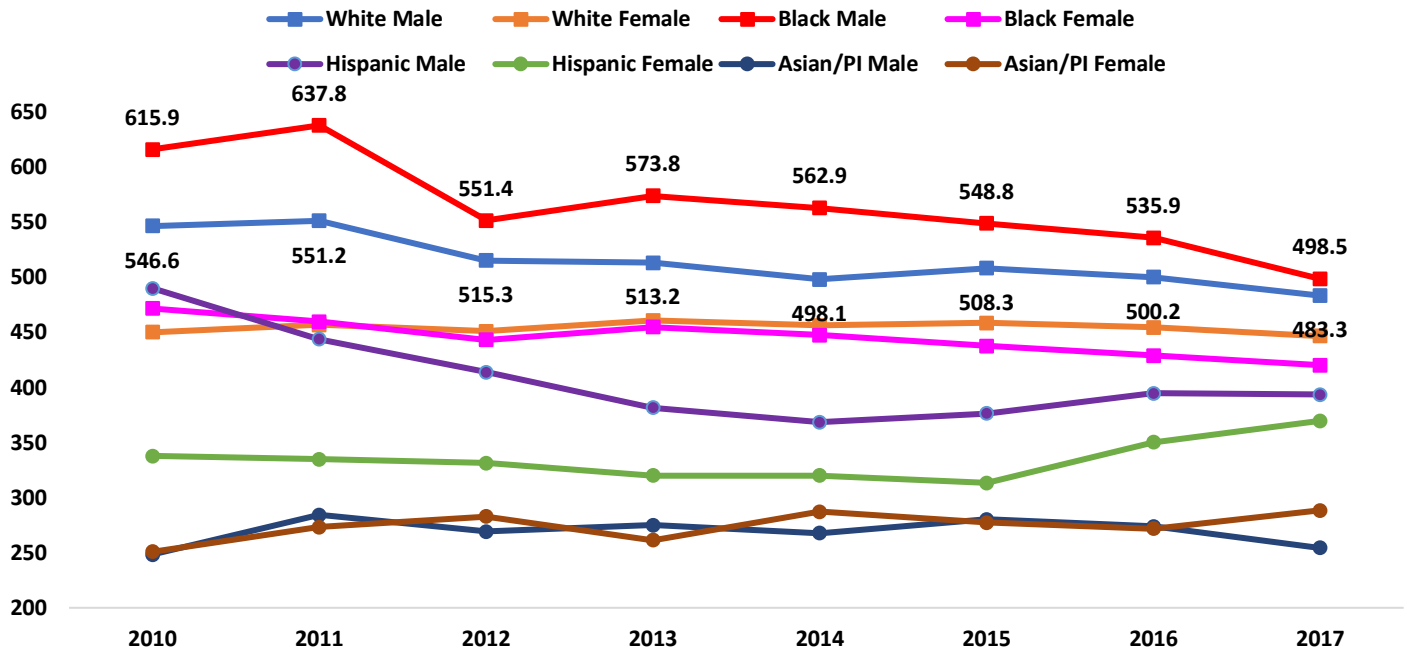
cancer incidence rate during the same period. Asians and Pacific Islanders had the lowest cancer incidence from 2010 to 2017. Over the eight-year period, the age-adjusted cancer incidence rate dropped 15% (528.4 per 100,000 in 2010 vs. 449.3 per 100,000 in 2018) in Blacks, the greatest decrease among the four racial/ethnic groups. The incidence rate dropped 6% in Whites and 7% in Hispanics. Notably, the incidence rate in Hispanics decreased continuously from 2010 to 2015, but the rate increased in 2016 and 2017. It is also noteworthy that Asians/Pacific Islanders were the only racial/ethnic group that experienced an increase in cancer incidence rate among the four groups for which adequate data were available for analysis. From 2010 to 2017, the age-adjusted cancer incidence rate increased from 250.1 per 100,000 in 2010 to 271.5 per 100,000 in 2017, reflecting a 9% increase (Figure 95).

Figure 95. Age-adjusted Invasive Cancer Incidence Rates (per 100,000) by Race/Ethnicity, PA, 2010-2017



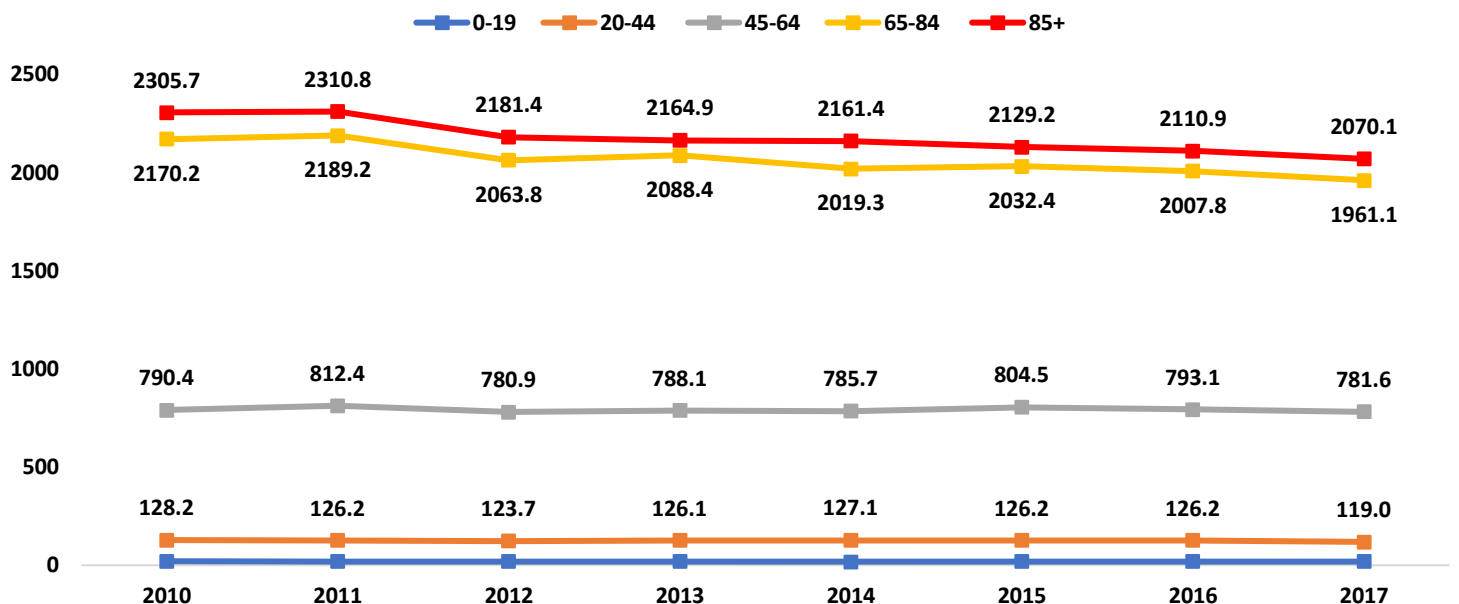
Stratification by sex and race/ethnicity provides further details on the trend of cancer incidence rate across subgroups of the population. From 2010 to 2017, the age-adjusted cancer incidence rate was consistently highest in Black males, followed by White males. Although the cancer incidence rate was higher in Black females than in White females in 2010 and 2011, the rate in White females started to surpass the rate in Black females in 2013 and in the following years, contrary to the rate comparison between Black males and White males. Compared to these four groups, the age-adjusted cancer incidence rate was lower in Hispanic males and females. Asian/Pacific Islander males and females had the lowest cancer incidence rate. With regards to the trend, the cancer incidence rate dropped 19% in Black males, 12% in White males, 11% in Black females, 1% in White females, and 19% in Hispanic males. It is noteworthy that the cancer incidence rate increased in the following three groups by the extent of increase: 15% in Asian/Pacific Islander females, 9% in Hispanic females, and 2% in Asian/Pacific Islander males (Figure 96).

Figure 96. Age-adjusted Cancer Incidence Rates (per 100,000) by Sex and Race/Ethnicity, PA, 2010-2017



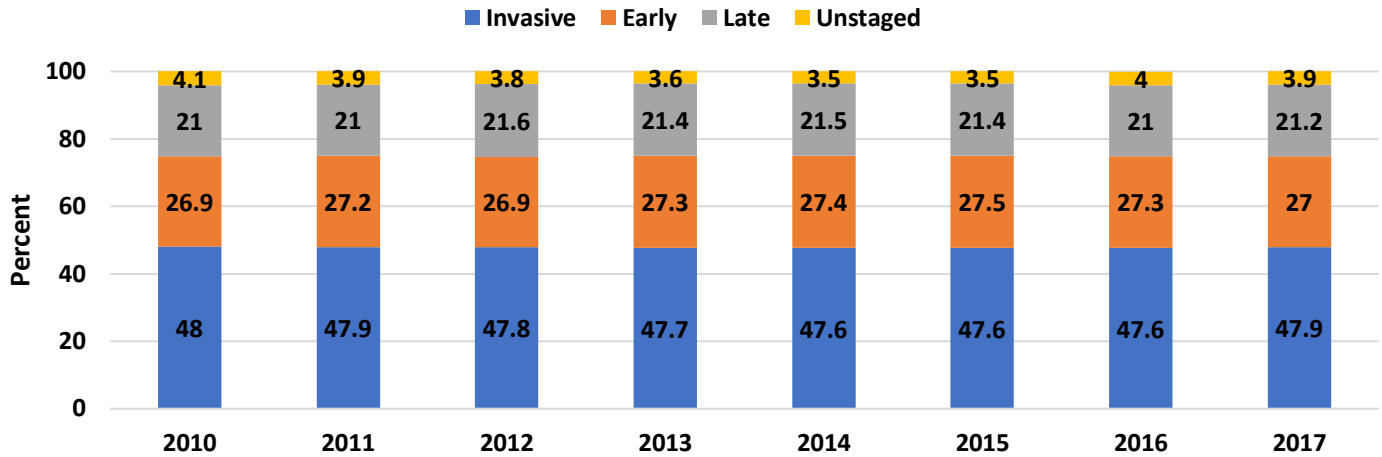
Age has been known as an uncontrollable risk factor for cancer. As shown in Figure 97, the cancer incidence rate generally increased as age increased. By age group, however, people aged 75 to 84 years rather than 85 years or older had the highest age-adjusted cancer incidence rate. This may be due to the various cancer screening programs performed after people reach certain ages, such as age 50 for colorectal cancer. High mortality rates from multiple diseases may also contribute to a lower cancer incidence rate among people aged 85 years or older compared to people 75 to 84 years old. Following the above mentioned two age groups, the age-adjusted cancer incidence rate was lower in each tier of the subsequent age groups. Over the 8-year period from 2010 to 2017, the cancer incidence rate universally declined in each age group, with an extent of 5% to 10% in general (Figure 97).

Figure 97. Cancer Incidence Rates (per 100,000) by Age Group, PA, 2010-2017



The stage of cancer represents how advanced a cancer is upon diagnosis. As shown in Figure 98, the stage distribution for invasive cancer, early stage, late stage and unstaged cancer remained largely unchanged from 2010 to 2017. Invasive cancer consistently constituted the majority of cancers upon diagnosis, which was approximately 48% of all cancers diagnosed each year from 2010 to 2017. Early and late stage cancers each constituted approximately 27% and 21% of all cancers diagnosed each year. Unstaged cancer was around 4% each year (Figure 98).

Figure 98. Cancer Stage Distribution, PA, 2010 - 2017



Geographically, there were disparities in the occurrence of cancer across different counties in PA. In 2017, the eastern area and the northern area had more counties with the highest age-adjusted cancer incidence rate (> 485.8 per 100,000). The geographical distribution of counties with the highest age-adjusted cancer incidence rate is as follows: four counties in the Northeast Region (Lehigh, Luzerne, Monroe, and Northampton); three counties in the Northcentral Region (Columbia, Montour, and Tioga); three counties in the Northwest Region (Cameron, Lawrence, and Warren); two counties in the Southcentral Region (Blair and Perry), and one county in the Southeast Region (Schuylkill). Southwest Region is the only region without a county reaching the highest level of age-adjusted cancer incidence rate (Map 6).

Map 6. Age-adjusted Cancer Incidence Rates (per 100,000) by County, PA, 2017

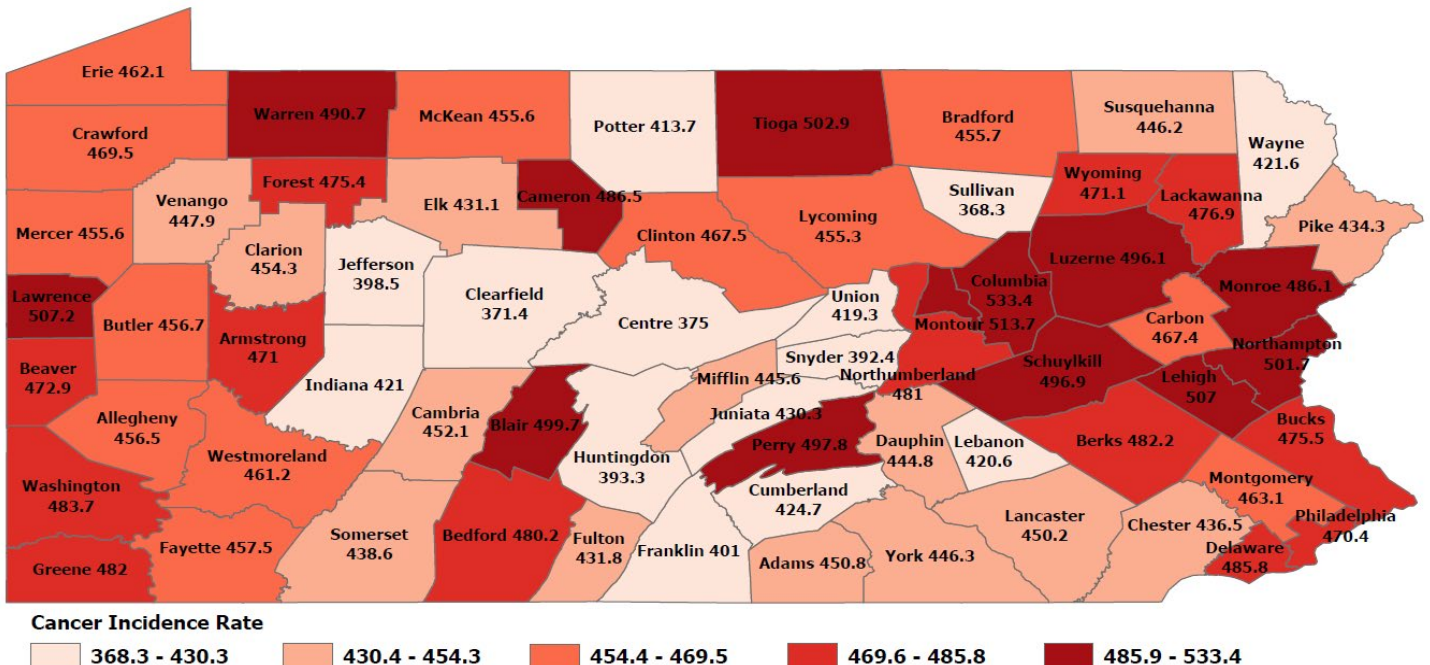


Figure 99 shows the age-adjusted cancer incidence rate by cancer site in the order of the highest to the lowest in 2010. The top ten cancers were prostate cancer in men (141.3 per 100,000), breast cancer in women (126.9 per 100,000), cancer of the lung and bronchus (67.3 per 100,000), cancer of the colon and rectum (44.6 per 100,000), cancer of the uterine corpus in women (32.1 per 100,000), bladder cancer (25.5 per 100,000), non-Hodgkin lymphoma (21.4 per 100,000), melanoma of the skin (21 per 100,000), thyroid cancer (20.7 per 100,000), and cancer of the kidney and renal pelvis (16.7 per 100,000).

Figure 100 shows the age-adjusted cancer incidence rate by cancer site in the order of the highest to the lowest in 2017. The top 10 cancers were breast cancer in women (131.2 per 100,000), prostate cancer in men (102.4 per 100,000), cancer of the lung and bronchus (61.6 per 100,000), cancer of the colon and rectum (39.2 per 100,000), cancer of the uterine corpus in women (32.0 per 100,000), bladder cancer (22.7 per 100,000), melanoma of the skin (21.4 per 100,000), non-Hodgkin lymphoma (19.9 per 100,000), cancer of the kidney and renal pelvis (18.0 per 100,000), and thyroid cancer (17.9 per 100,000).

Compared to 2010, the top ten cancers in 2010 still remained on the top 10 list in 2017, however, breast cancer in women replaced prostate cancer in men as the top cancer for cancer incidence rate in PA in 2017. Among these 10 cancers, incidence rate increased in three cancers: breast cancer (3% increase, from 126.9 per 100,000 in 2010 to 131.2 per 100,000 in 2017), melanoma (2% increase, from 21.0 per 100,000 in 2010 to 21.4 per 100,000 in 2017), and kidney (8% increase, from 16.7 per 100,000 to 18.0 per 100,000). Over the same period of time, the incidence rate dropped in seven cancers: prostate cancer (28% decrease, from 141.3 per 100,000 in 2010 to 102.4 per 100,000 in 2017), cancer of the lung and bronchus (8% decrease, from 67.3 per 100,000 in 2010 to 61.6 per 100,000 in 2017), cancer of the colon and rectum (12% decrease, from 44.6 per 100,000 in 2010 to 39.2 per 100,000 in 2017), cancer of the uterine corpus in women (0.3% decrease, 32.1 per 100,000 in 2010 to 32.0 per 100,000 in 2017), bladder cancer (11% decrease, from 25.5 per 100,000 in 2010 to 22.7 per 100,000 in 2017), non-Hodgkin lymphoma (7% decrease, from 21.4 per 100,000 in 2010 to 19.9 per 100,000 in 2017), and thyroid cancer (14% decrease, 20.7 per 100,000 in 2010 to 17.9 per 100,000 in 2017).³⁷

Prostate cancer in men and breast cancer in women are the leading cancers in PA.

Figure 99. Age-adjusted Cancer Incidence per 100,000 by Site, PA, 2010

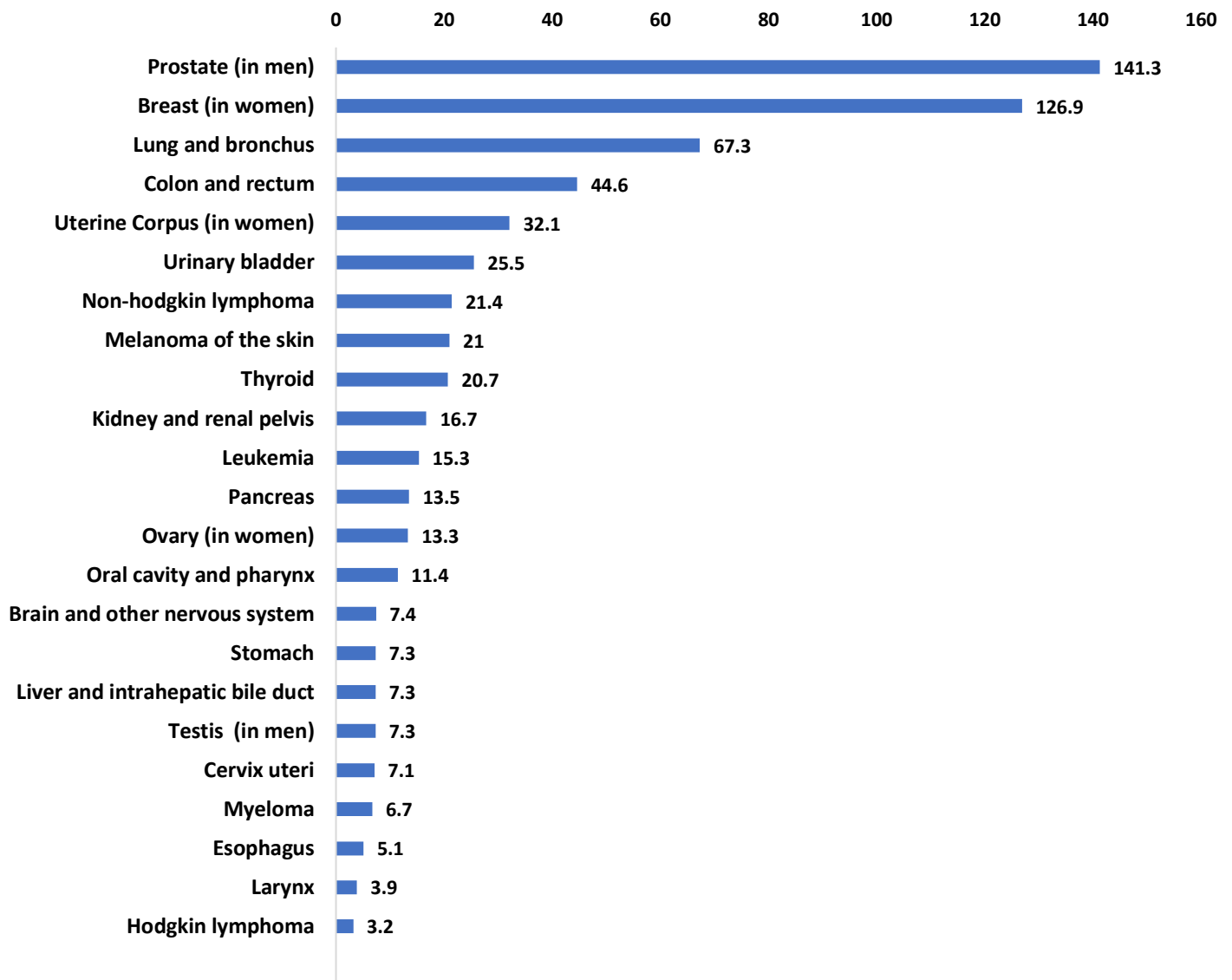


Figure 100. Age-adjusted Cancer Incidence per 100,000, PA, 2017

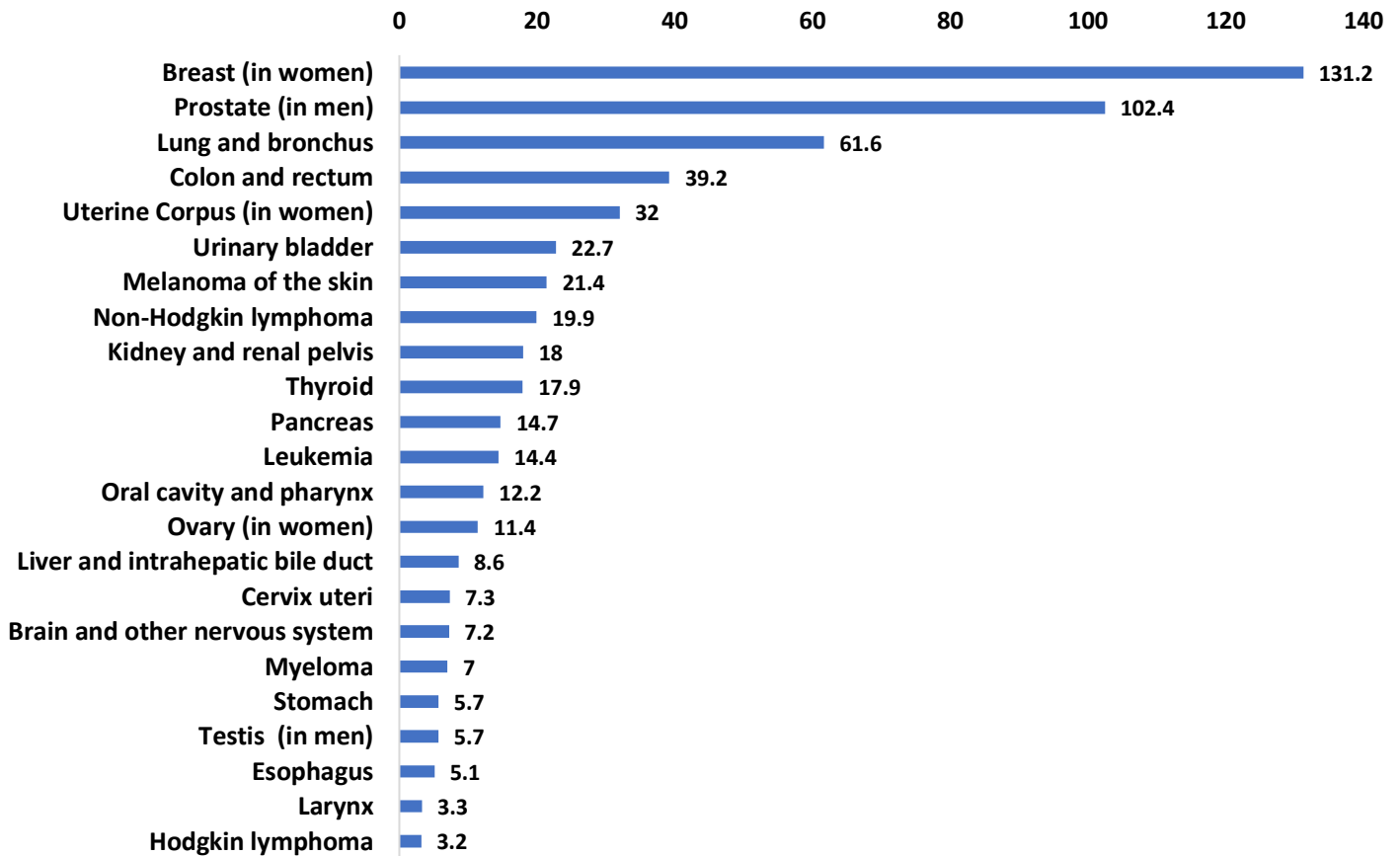


Figure 101 displays cancers for which the age-adjusted incidence rate increased from 2010 to 2017. Over these eight years, the age-adjusted cancer incidence increased in eight cancers: 17.8% in cancer of the liver and intrahepatic bile duct, 8.9% in cancer of the pancreas, 7.8% in cancer of the kidney and renal pelvis, 7.0% in cancer of the oral cavity and pharynx, 4.5% in myeloma, 3.4% in breast cancer among women, 2.8% in cancer of the cervix uteri, and 1.9% in melanoma of the skin.

Liver cancer has the most increase in PA.

Figure 101. Percent Increase in Incidence Rate by Cancer Site, PA, 2010 - 2017

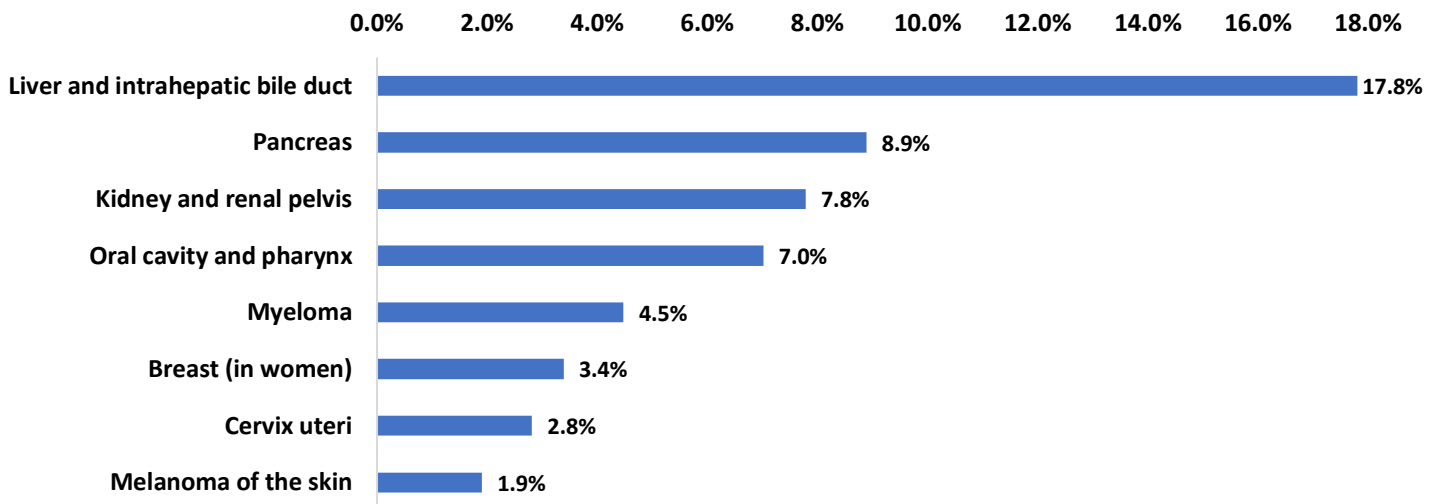
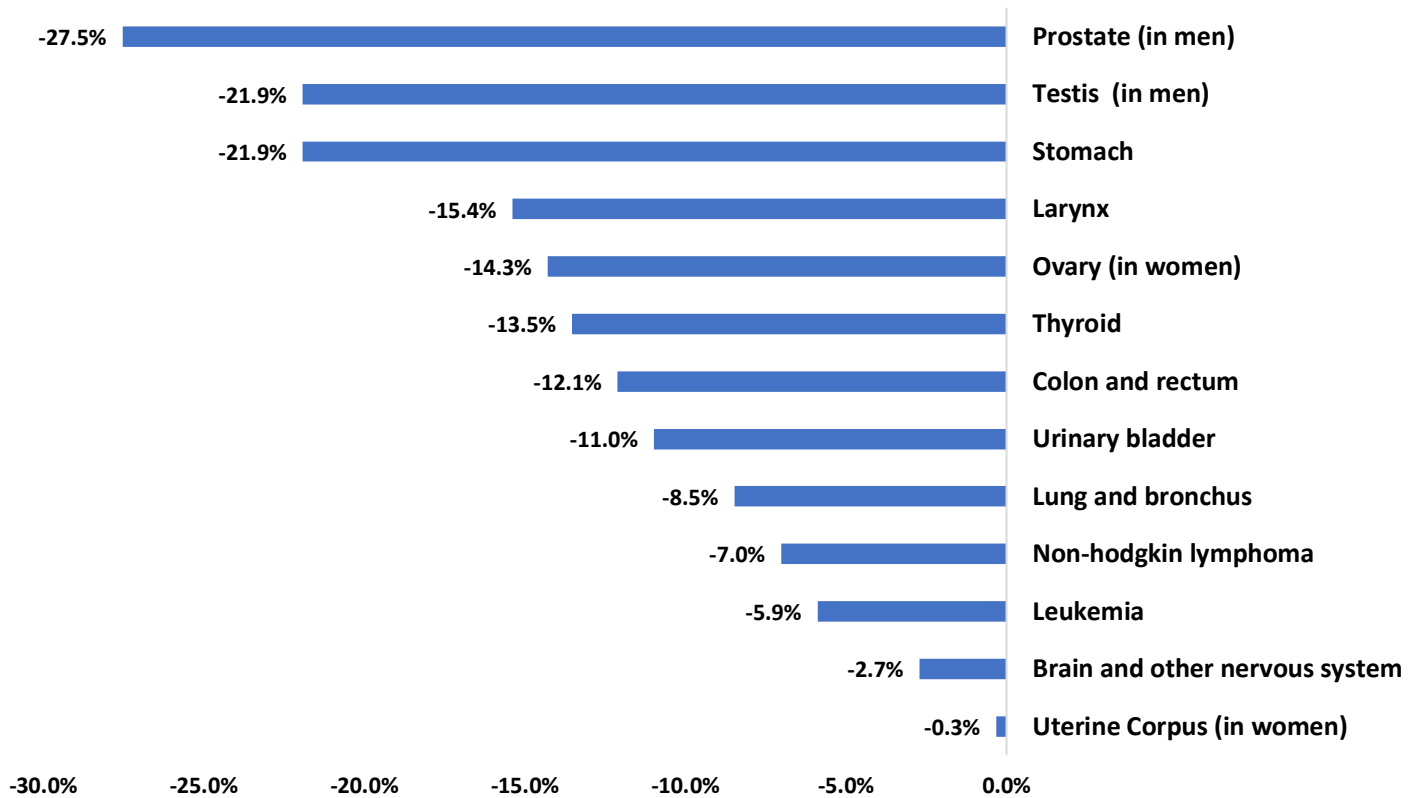


Figure 102 displays cancers for which the age-adjusted incidence rate decreased from 2010 to 2017. Over these eight years, the age-adjusted incidence decreased in thirteen cancers: 27.5% in prostate cancer (in men), 21.9% in testicular cancer (in men), 21.9% in stomach cancer, 15.4% in cancer of the larynx, 14.3% in ovarian cancer, 13.5% in thyroid cancer, 12.1% in colorectal cancer, 11% in bladder cancer, 8.5% in cancer of the lung and bronchus, 7% in non-Hodgkin lymphoma, 5.9% in leukemia, 2.7% in brain cancer, and 0.3% in cancer of the uterine corpus (in women). The age-adjusted incidence of esophagus cancer (5.1 per 100,000) and Hodgkin lymphoma (3.2 per 100,000) remained unchanged from 2010 to 2017.

Figure 102. Percent Decrease in Incidence Rate by Cancer Site, PA, 2010 - 2017



In summary, the age-adjusted cancer incidence rate declined steadily in PA from 2010 to 2017. The incidence rate was higher in males, Blacks (especially Black males), and people at older ages. The percentage of cancer diagnosed at various stages remained relatively stable over years. Geographically, the incidence rate was higher in some counties, especially in the eastern area of PA. In men, prostate cancer remained the cancer of highest incidence, and breast cancer remained the cancer of highest incidence in women. In addition, liver cancer had the greatest increase and prostate cancer had the greatest decrease in cancer incidence from 2010 to 2017.

Prostate cancer in men and ovarian cancer in women decreased the most in PA.

9. Cerebrovascular Disease

9.1 General Description of Cerebrovascular Disease

Cerebrovascular disease, also referred to as a stroke, is a group of diseases related to the brain's blood vessels. There are primarily three types of cerebrovascular disease: ischemic stroke, hemorrhagic stroke, and transient ischemic attack, which is also called a "mini-stroke" or a warning of a stroke. An ischemic stroke happens when blood flow through the artery that supplies oxygen-rich blood to the brain becomes blocked. Most strokes are ischemic strokes. Blood clots often cause the blockages that lead to ischemic strokes. A hemorrhagic stroke happens when an artery in the brain leaks blood or ruptures. High blood pressure and excessive enlargement of an artery are examples of conditions that can cause a hemorrhagic stroke. There are two types of hemorrhagic strokes: intracerebral hemorrhage and subarachnoid hemorrhage. Intracerebral hemorrhage is the most common type of hemorrhagic stroke. It occurs when an artery in the brain bursts, flooding the surrounding tissue with blood. Subarachnoid hemorrhage is a less common type of hemorrhagic stroke. It occurs when bleeding happens in the area between the brain and the thin tissues that cover the brain. A transient ischemic attack (TIA) is a "mini-stroke" and refers to a short time (usually a few minutes) of blockage in blood flow to the brain. A TIA is a warning sign of a future stroke and 10% to 15% of people with a TIA have a major stroke within the next three months.

Common symptoms of stroke include severe and sudden headache, paralysis or weakness on one side of the body, confusion, difficulty communicating (including slurred speech), losing vision, loss of balance, and unconsciousness. The F.A.S.T. acronym is a useful aid in recognizing stroke and acting quickly: Face drooping, Arm weakness, Speech difficulty, and Time to call 911.

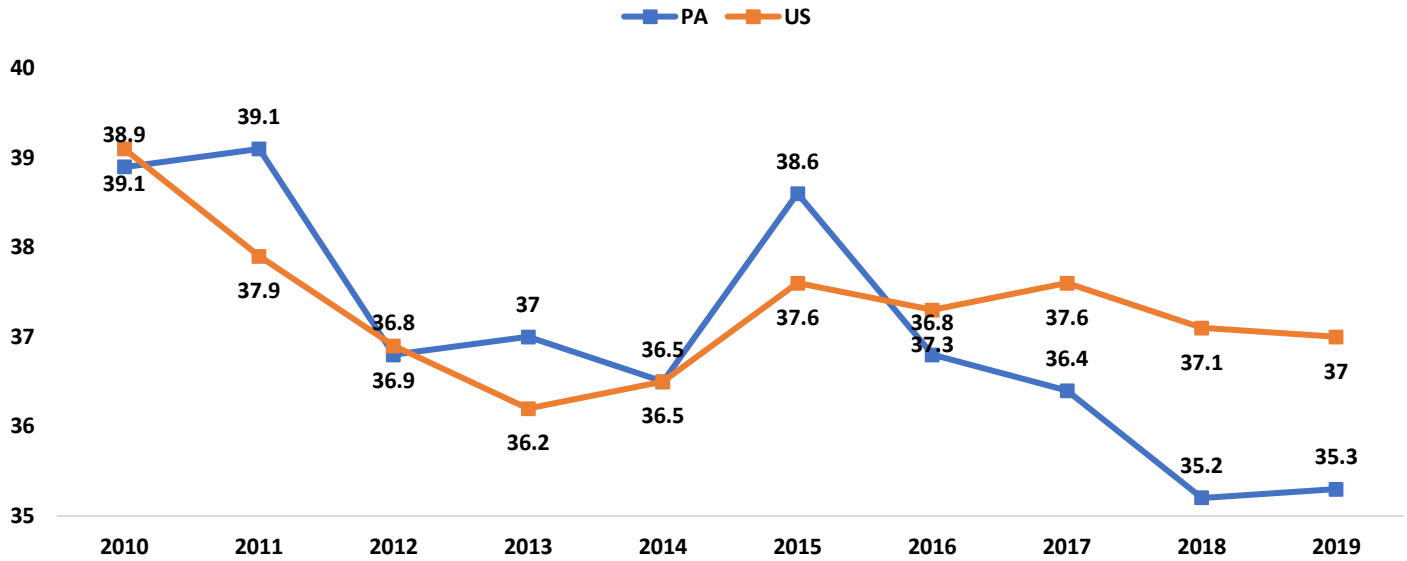
Stroke usually occurs in people of older ages, but it can occur at any age. Atherosclerosis, which refers to the buildup of fats, cholesterol, and other substances in and on the artery walls and subsequently restricting blood flow, is the underlying cause of stroke. Risk factors for stroke include high blood pressure (i.e., 130/80 mm Hg or higher), high blood cholesterol (i.e., 240 milligrams per deciliter (mg/dl) or higher), smoking, obesity, poor diet, lack of exercise, and diabetes. One in three US adults has at least one of these risk factors.

In the US, stroke is the fifth leading cause of death and is a major cause of serious disability for adults. In 2017, it caused 146,383 deaths (45 per 100,000) in the country. Approximately 3% of adults (7.8 million) in the US ever had a stroke. About 795,000 people in the US have a stroke each year, and 2.2 million visits to physician offices and half a million visits to emergency departments are due to stroke as the primary diagnosis. The annual cost of stroke, including health care cost, medicines, and missed days of work, is approximately \$34 billion.

9.2 Mortality Trend for Stroke in Pennsylvania

Figure 103 shows the age-adjusted stroke mortality rate in PA and the country from 2010 to 2019. In general, the mortality rate was higher in PA than in the country from 2010 to 2015. Since 2015, the mortality rate declined more in PA than in the country and the rate was lower than in the country from 2016 to 2019. Stroke mortality was up and down in PA between 2010 and 2015, after which the mortality continued to decline from 2015 to 2019. In the US, stroke mortality declined steadily between 2010 and 2013 but increased from 2013 to 2015, and then dropped slightly from 2015 to 2019. Overall from 2010 to 2019, the stroke mortality rate dropped 9% and 5% in PA and in the country, respectively.

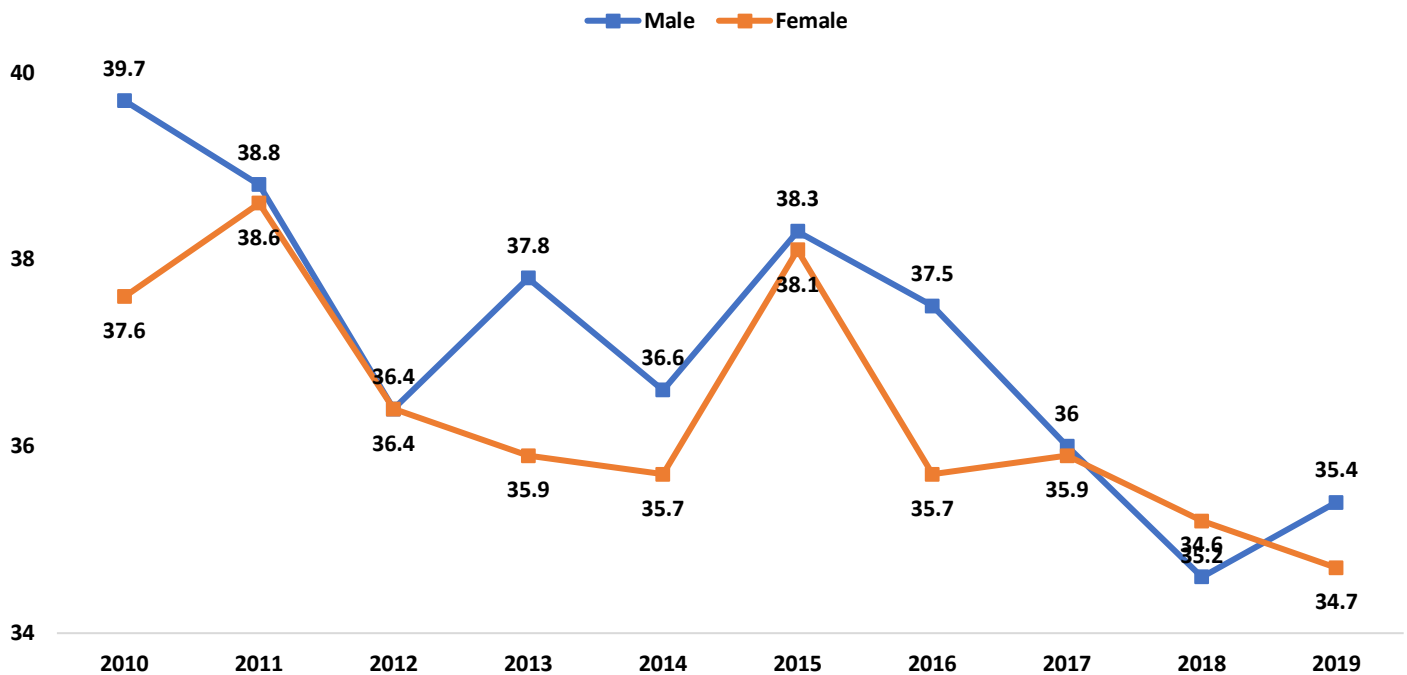
Figure 103. Age-adjusted Stroke Mortality Rates (per 100,000), PA vs. US, 2010-2019



The overall age-adjusted stroke mortality rates decreased in both males and females from 2010 to 2019. The rate in males decreased from 39.7 per 100,000 in 2010 to 35.4 per 100,000, equivalent to a 11% decrease. The rate in females decreased from 37.6 per 100,000 in 2010 to 34.7 per 100,000, which was an 8% decrease. Males generally had slightly higher age-adjusted stroke mortality rates than females from 2010 to 2019 (Figure 104).

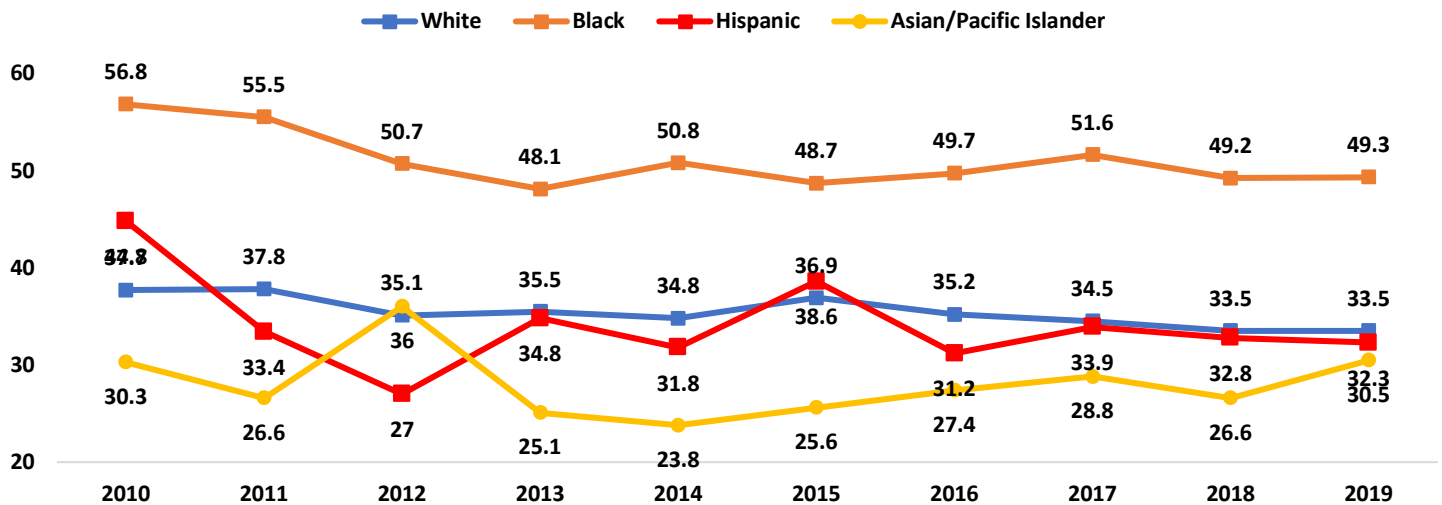
Deaths from stroke do not differ much in men and women in PA.

Figure 104. Age-adjusted Stroke Mortality Rates (per 100,000) by Sex, PA, 2010-2019



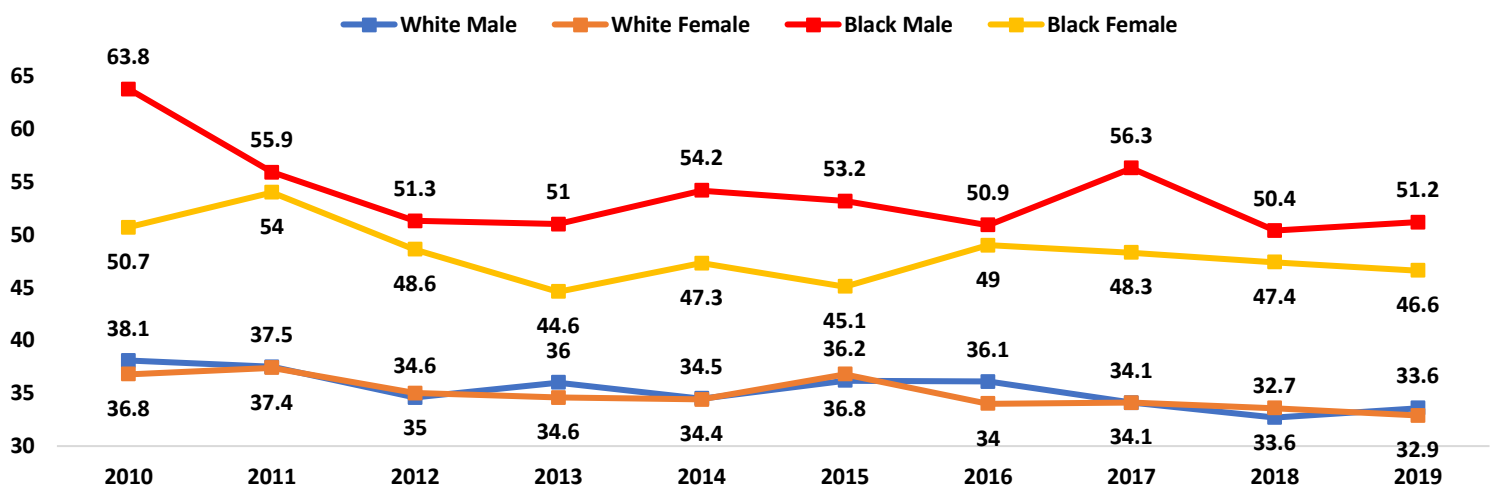
There were disparities in age-adjusted stroke mortality rates across racial/ethnic groups. The mortality rate in Blacks ranged from 48.1 per 100,000 to 56.8 per 100,000, substantially higher than the rates in Whites, Hispanics and Asians/Pacific Islanders from 2010 to 2019. The mortality rates in Whites and Hispanics were comparable, which were generally higher than the rate in Asians/Pacific Islanders. Despite some fluctuations over the years, mortality rates in all four racial/ethnic groups generally declined from 2010 to 2019. The rate declined from 56.8 per 100,000 in 2010 to 49.3 per 100,000 in 2019 in Blacks, reflecting a 13% decrease. The rate declined from 37.7 per 100,000 in 2010 to 33.5 per 100,000 in 2019 in Whites, equivalent to an 11% decrease. In Hispanics, the decline was 28% after the rate dropped from 44.8 per 100,000 in 2010 to 32.3 per 100,000 in 2019. The rate in Asians/Pacific Islanders remained largely unchanged after some fluctuations over the years (Figure 105).

Figure 105. Age-adjusted Stroke Mortality Rates (per 100,000) by Race/Ethnicity, PA, 2010-2019



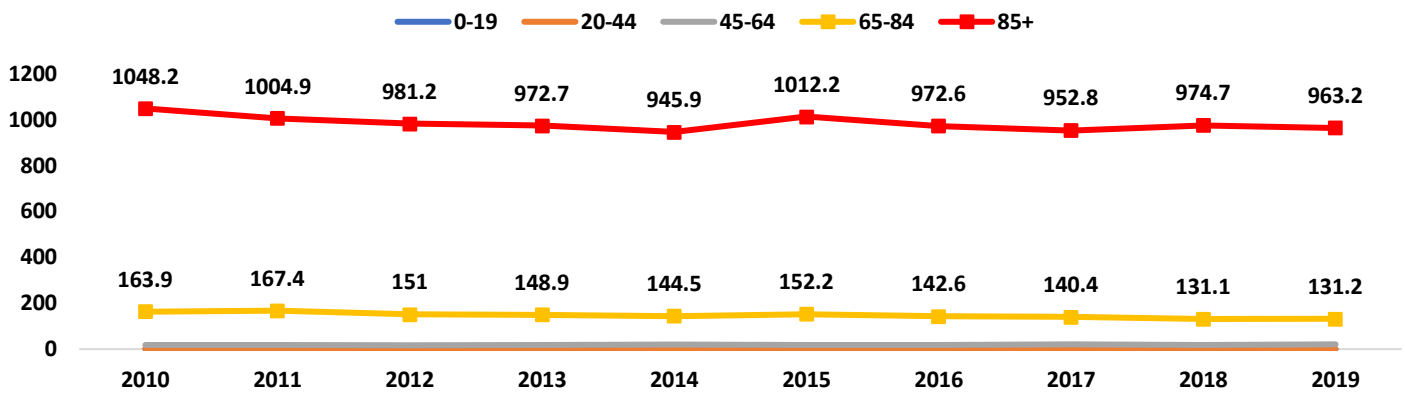
After stratification by sex and race/ethnicity, the age-adjusted stroke mortality rate was highest in Black males, followed by Black females from 2010 to 2019. For Black males, the rate was highest at 63.8 per 100,000 in 2010. In 2019, the rate among Black males declined to 51.2 per 100,000. The mortality rate in Black females declined 8% over the years. The mortality rate for White males and White females did not differ substantially. The rate among White males and White females declined 12% and 11%, respectively, from 2010 to 2019 (Figure 106).

Figure 106. Age-adjusted Stroke Mortality Rates (per 100,000) by Sex and Race/ethnicity, PA, 2010-2019



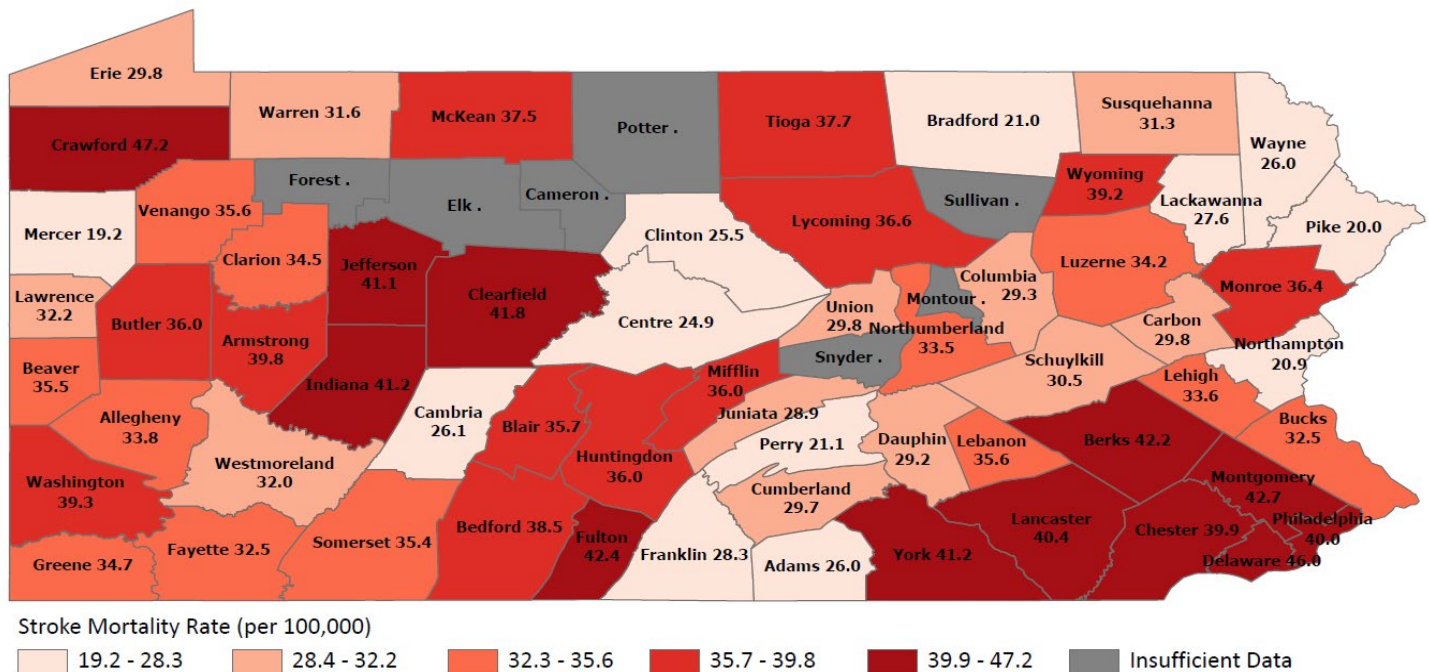
By age group, as would be expected, there were significant differences in the age-adjusted stroke mortality rate between the younger population and older population. The rate was highest among people who were 85 years of age or older, ranging from 945.9 per 100,000 to 1048.2 per 100,000 during 2010 and 2019. The rate was also high among people who were 65 to 84 years old, ranging from 131.1 per 100,000 to 167.4 per 100,000 during the 10-year period. Stroke mortality rate was much lower among people who were less than 64 years of age, however, in these younger age groups, stroke mortality rate increased 9% among people 45 to 64 years of age and 6% among people 20 to 44 years of age. Conversely, stroke mortality rate decreased 8% among people 85 years of age or older and 20% in people 65 to 84 years of age, respectively, from 2010 to 2019 (Figure 107).

Figure 107. Stroke Mortality Rates (per 100,000) by Age Group, PA, 2010-2019



Geographically, there are disparities in the age-adjusted stroke mortality rate in PA. As shown in Map 7, more counties in the west and southeast areas had higher stroke mortality rates than the other areas in 2019. Specifically, the following 12 counties had the highest age-adjusted stroke mortality rate (39.9 – 47.2 per 100,000) by region: Clearfield, Crawford, and Jefferson in the Northwest Region; Fulton and York in the Southcentral Region; Berks, Chester, and Delaware in the Southeast Region; Lancaster, Montgomery, and Philadelphia in the Southeast Region; and Indiana in the Southwest Region (Map 7).

Map 7. Age-adjusted Stroke Mortality Rate (per 100,000) in PA, 2019



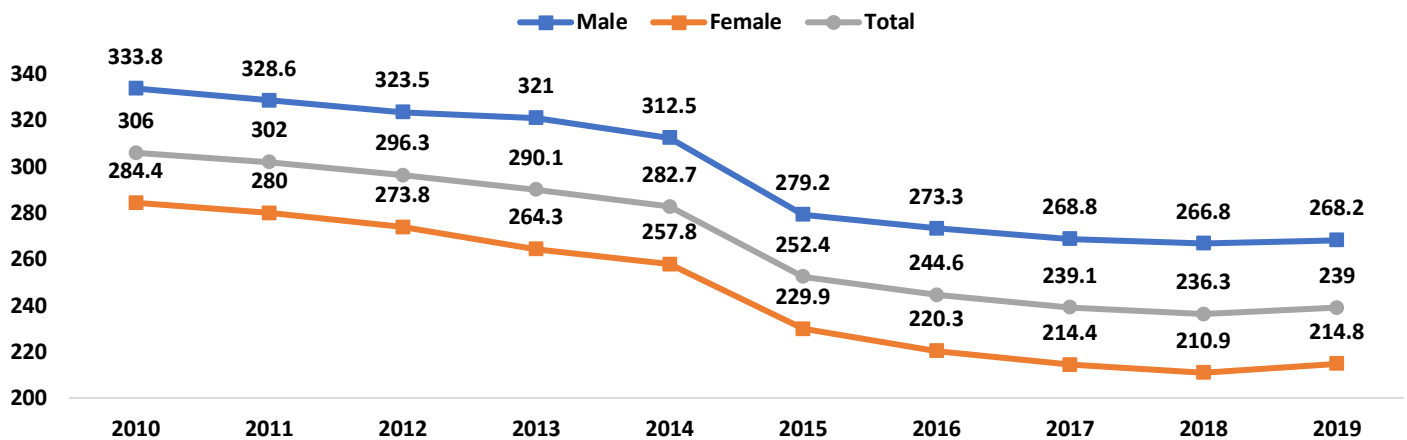
In summary, the age-adjusted stroke mortality rate declined in PA from 2010 to 2019. The mortality rate was higher in Blacks (especially Black males) and among people 85 years of age or older. Geographically, the incidence rate was higher in some counties. As stroke is the fourth leading cause of death in PA, health promotion and risk reduction should focus on reducing risks through modifying behaviors such as smoking cessation and being physically active and improving intermediate conditions such as high blood pressure and high blood cholesterol.

9.3 Hospitalization Trend for Stroke in Pennsylvania

Each year, more men than women are hospitalized for stroke in PA.

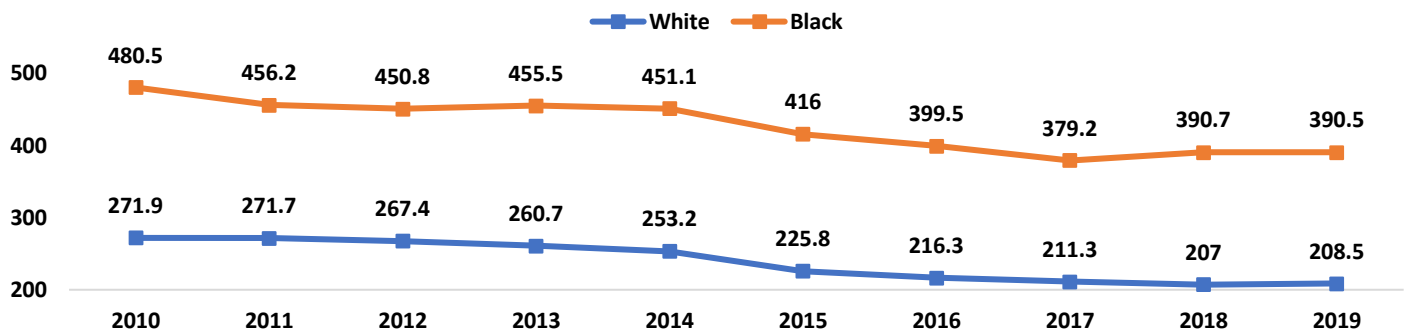
The age-adjusted stroke hospitalization rate decreased in PA from 2010 to 2019. In 2010, on average 306 per 100,000 people were hospitalized for stroke. This rate dropped to 239 per 100,000 in 2019, reflecting a 22% decrease in the stroke hospitalization rate. In general, the hospitalization rate for stroke was higher in males than in females. The stroke hospitalization rate dropped in both males (20% decrease) and females (24% decrease) from 2010 to 2019 (Figure 108). Notably, the stroke hospitalization rate dropped substantially between 2014 and 2015 in the 10-year period, which might be due to the transition of the ICD-9 code to the ICD-10 code, which was implemented on October 1, 2015.

Figure 108. Age-adjusted Stroke Hospitalization Rate (per 100,000), PA, 2010-2019



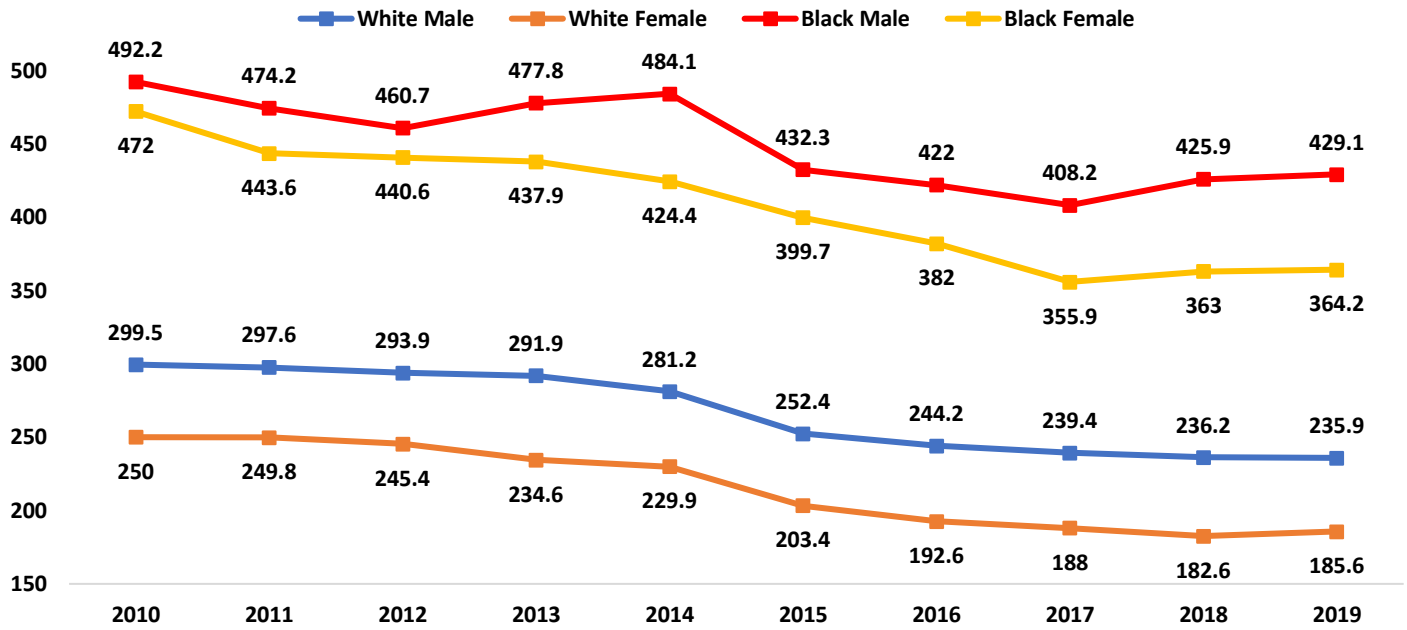
By race and ethnicity, the age-adjusted stroke hospitalization rate was higher in Blacks than in Whites from 2010 to 2019. Overall, the stroke hospitalization rate showed a trend of decline in both Whites and Blacks in the 10-year period. The decrease was 23% in Whites and 19% in Blacks. However, in recent years from 2017 to 2019, the hospitalization rate was up 3% in Blacks (Figure 109). Hospitalization data for the other racial and ethnic groups were inadequate for analysis.

Figure 109. Age-adjusted Stroke Hospitalization Discharge Rates (per 100,000) by Race/Ethnicity, PA, 2010-2019



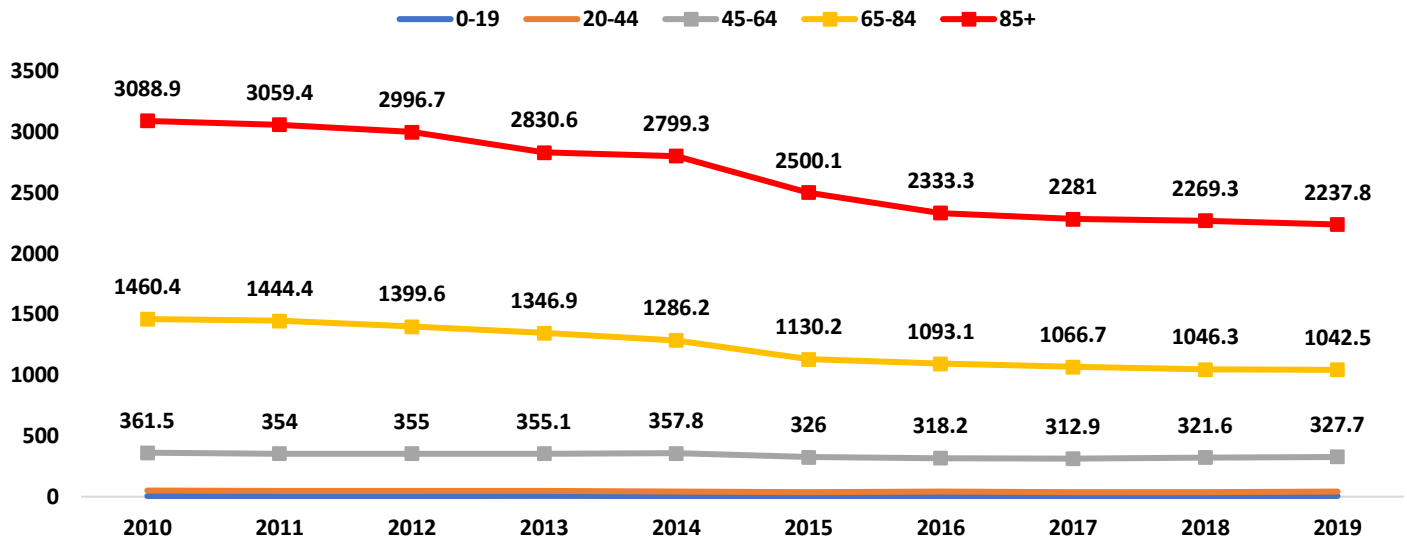
By sex and race/ethnicity, the age-adjusted stroke hospitalization rate was highest in Black males, followed by Black females, White males, and White females. In general, the stroke hospitalization rate declined in all four groups. The decrease was 13% in Black males, 23% in Black females, 21% in White males, and 26% in White females. However, it should be noted that the hospitalization rate for stroke increased 5% in Black males and 2% in Black females from 2017 to 2019 (Figure 110).

Figure 110. Age-adjusted Stroke Hospitalization Discharge Rates (per 100,000) by Sex and Race/Ethnicity, PA, 2010-2019



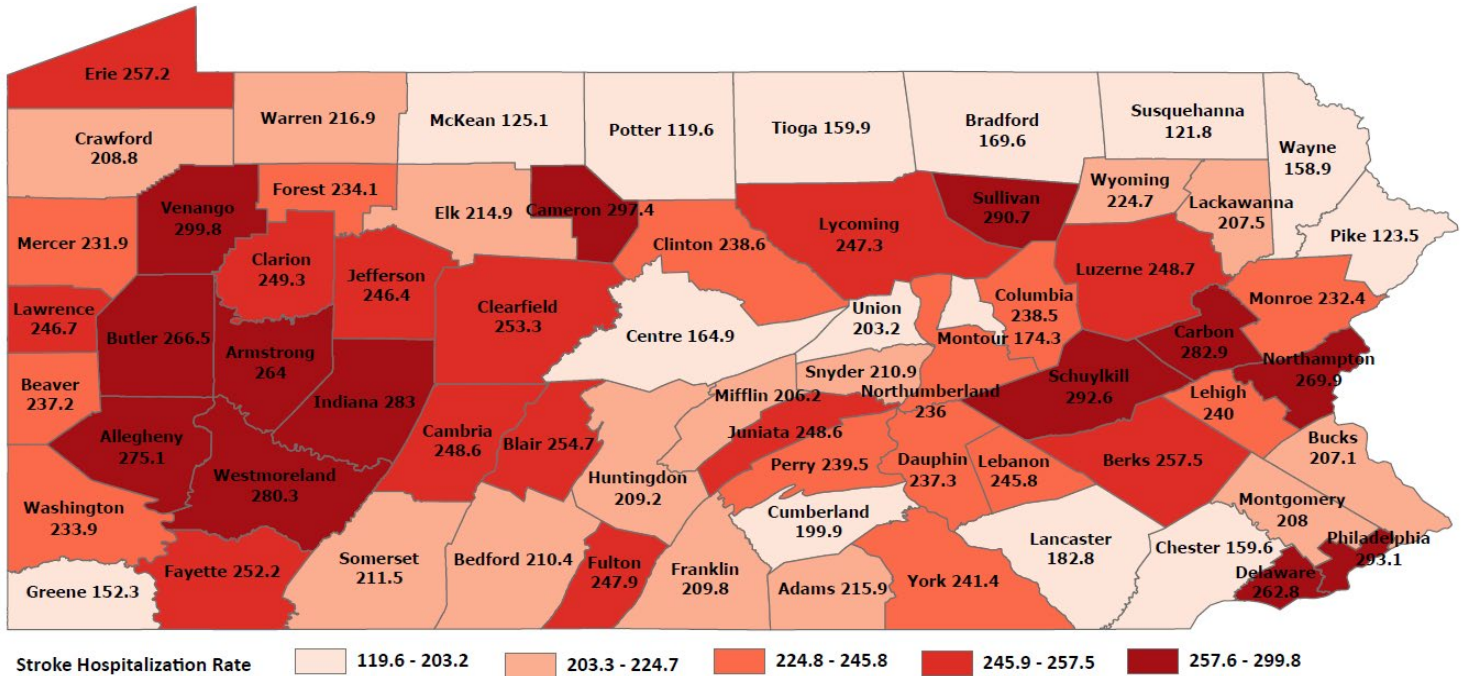
By age group, the stroke hospitalization rate was highest among people 85 years of age or older in PA, and the rate was proportionally lower at each of the lower age groups. From 2010 to 2019, the rate decreased 28% in people aged 85 years or older, 29% in people aged 65 to 84 years, 9% in people aged 45 to 64 years, 15% in people aged 20 to 44 years, and 13% in those less than 20 years of age (Figure 111).

Figure 111. Stroke Hospitalization Rate (per 100,000) by Age Group, PA, 2010-2019



Geographically, the age-adjusted stroke hospitalization rate was higher in the western and eastern parts of PA. In 2019, the following 13 counties had the highest age-adjusted stroke hospitalization rate (257.6 – 299.8 per 100,000): Sullivan in the Northcentral Region; Carbon and Northampton in the Northeast Region; Cameron and Venango in the Northwest Region; Delaware, Philadelphia and Schuylkill in the Southeast Region; and Allegheny, Armstrong, Butler, Indiana, and Westmoreland in the Southwest Region (Map 8).

Map 8. Age-adjusted Stroke Hospitalization Rate (per 100,000) by County in PA, 2019



In summary, the age-adjusted stroke hospitalization rate declined in PA from 2010 to 2019. Over the 10-year period, the hospitalization rate was higher in Blacks (especially Black males) and higher among older age groups. Geographically, the incidence rate was higher in some counties in the western and eastern parts of PA.

9.4 Prevalence Trend for Stroke in Pennsylvania from BRFSS

In the BRFSS survey, questions about stroke were asked among adults aged 35 years or older from 2011 to 2019. Figure 112 shows the percentage of adults aged 35 years or older who were told that they had had a stroke by their doctors in PA and in the country. In general, 4% to 5% of adults in PA reported that they had ever been told by their doctors that they had a stroke, higher than the average of 3% in the country from 2011 to 2019.

Figure 112. Percent of Adults Aged 35 Years or Older Who Were Told That They Had Had a Stroke, PA vs. US, 2011–2019

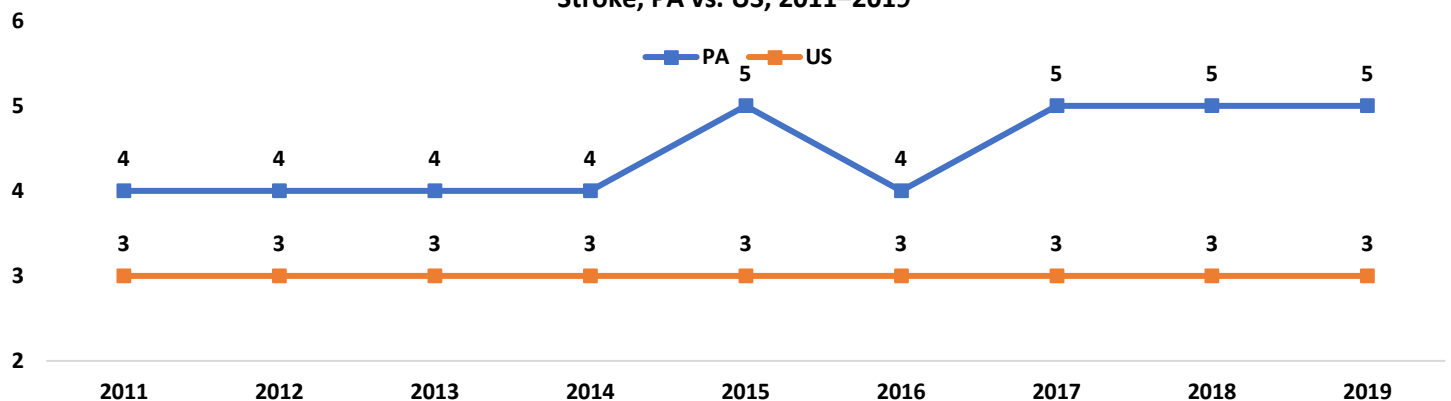
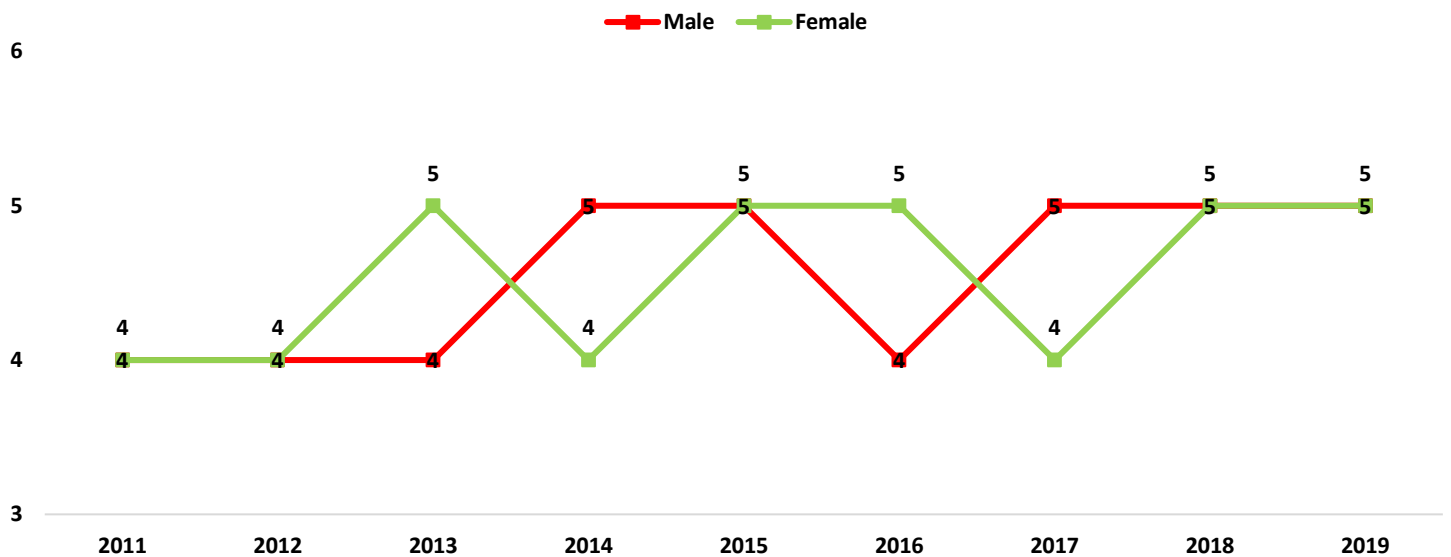


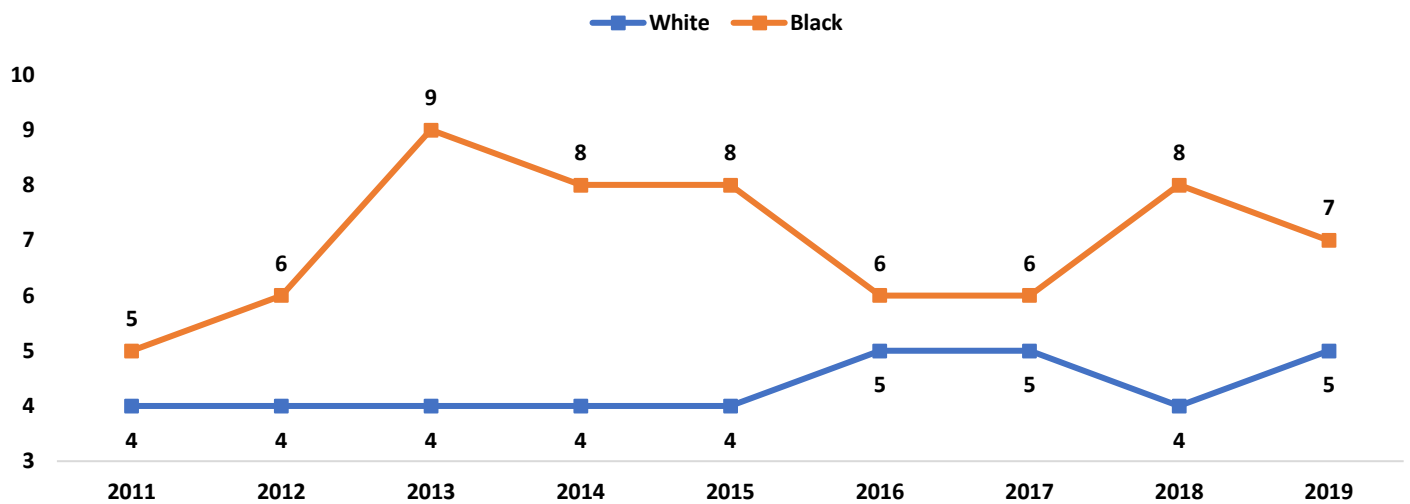
Figure 113 shows the percent of males and females who were ever told by their doctors that they had a stroke. On average, 4% to 5% of male and female adults reported that they had been told that they had had a stroke based on the BRFSS surveys from 2011 to 2019 and the trend remained relatively stable in both males and females (Figure 113).

Figure 113. Percent of Adults Aged 35 Years or Older Who Were Told That They Had Had a Stroke by Sex, PA, 2011–2019



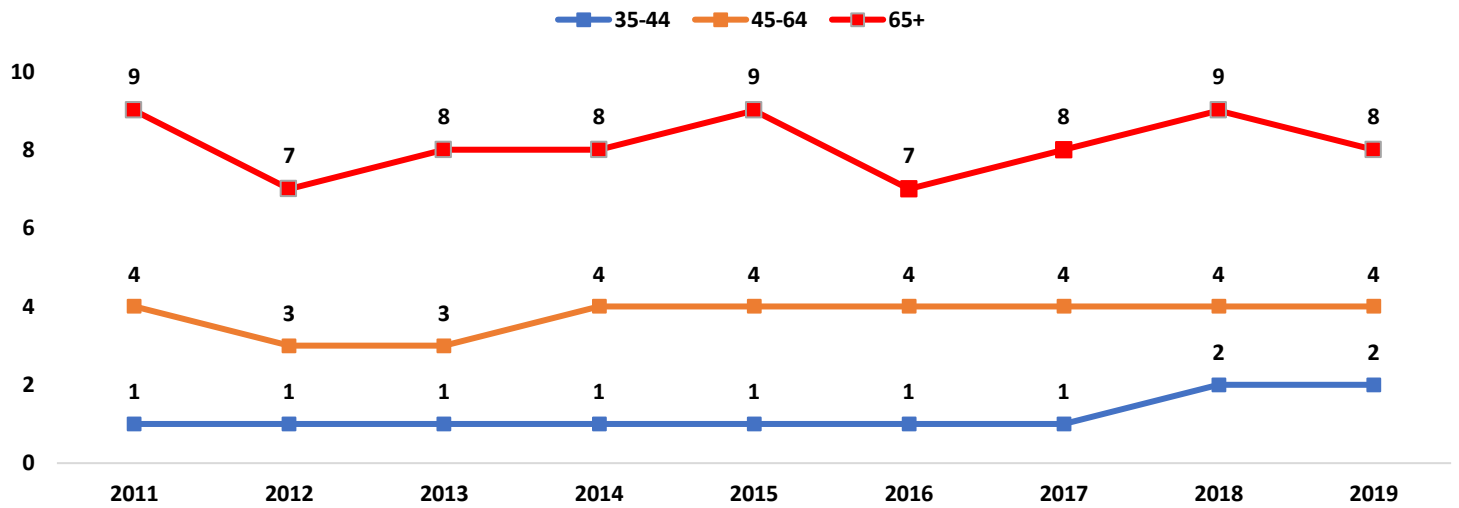
By race and ethnicity, the percentage was higher in Blacks than in Whites with regards to ever being told by their doctors that they had a stroke. Overall, the percentage increased from 5% in 2010 to 7% in 2017 in Black adults, despite some fluctuations over the nine-year period. The percentage increased from 4% in 2011 to 5% in 2019. Data for the other racial and ethnic groups were inadequate for analysis (Figure 114).

Figure 114. Percent of Adults Aged 35 Years or Older Who Were Told That They Had Had a Stroke by Race/Ethnicity, PA, 2011–2019



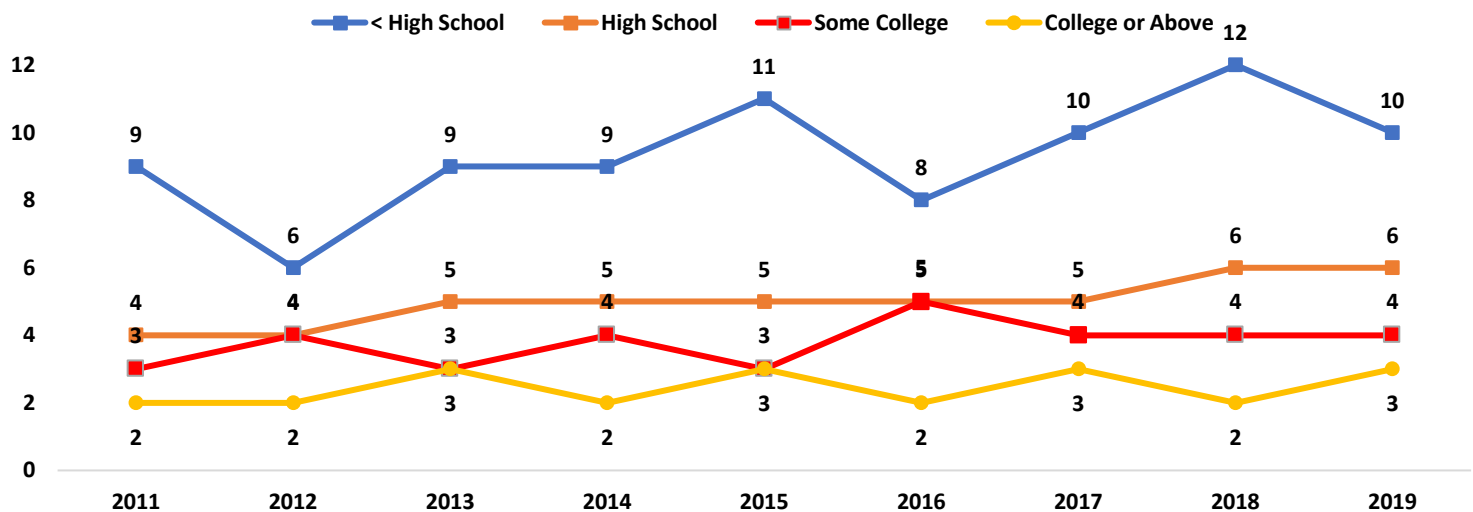
By age group, approximately 7% to 9% of adults aged 65 years or older, 3% to 4% of adults aged 45 to 64 years, and 1% to 2% adults aged 35 to 44 years reported that they had been told that they had had a stroke from 2011 to 2019. The trend in all age groups remained relatively unchanged over the 9-year period (Figure 115).

Figure 115. Percent of Adults Aged 35 Years or Older Who Were Told That They Had Had a Stroke by Age Group, PA, 2011–2019



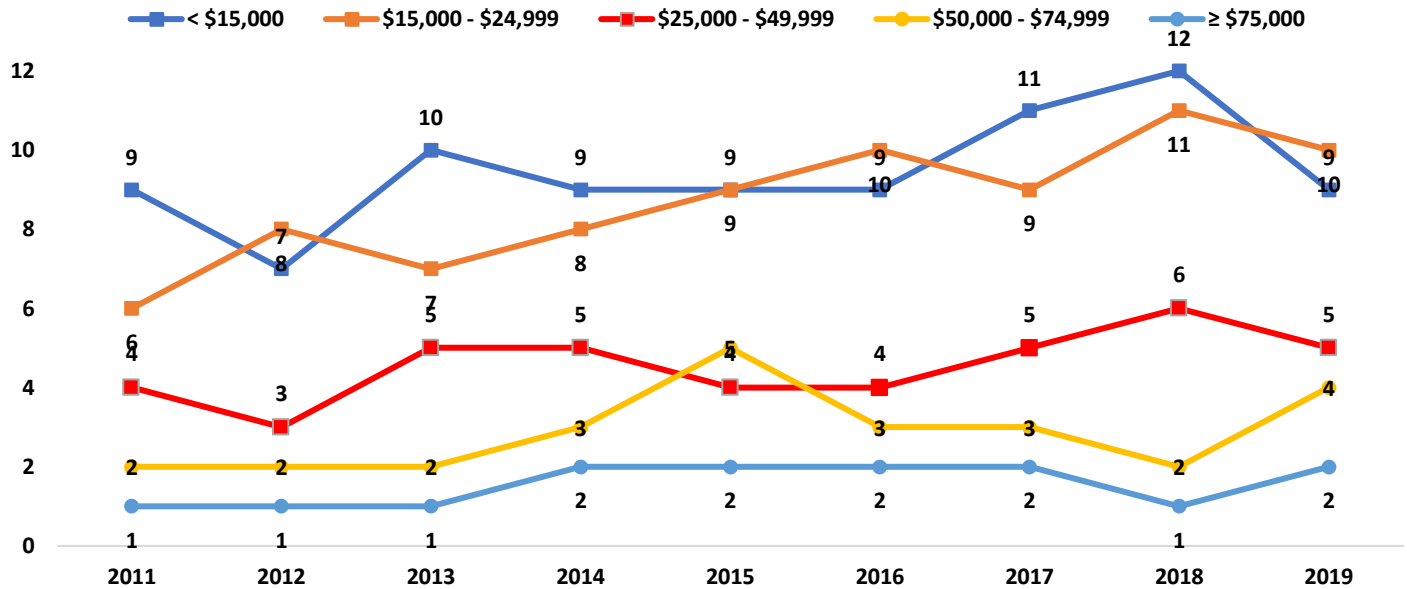
By education, the percentage of adults who were told that they had had a stroke was highest in adults with less education than a high school diploma, followed by adults with a high school diploma, adults with some college education, and adults with a college degree or higher education (Figure 116).

Figure 116. Percent of Adults Aged 35 Years or Older Who Were Told That They Had Had a Stroke by Education, PA, 2011–2019



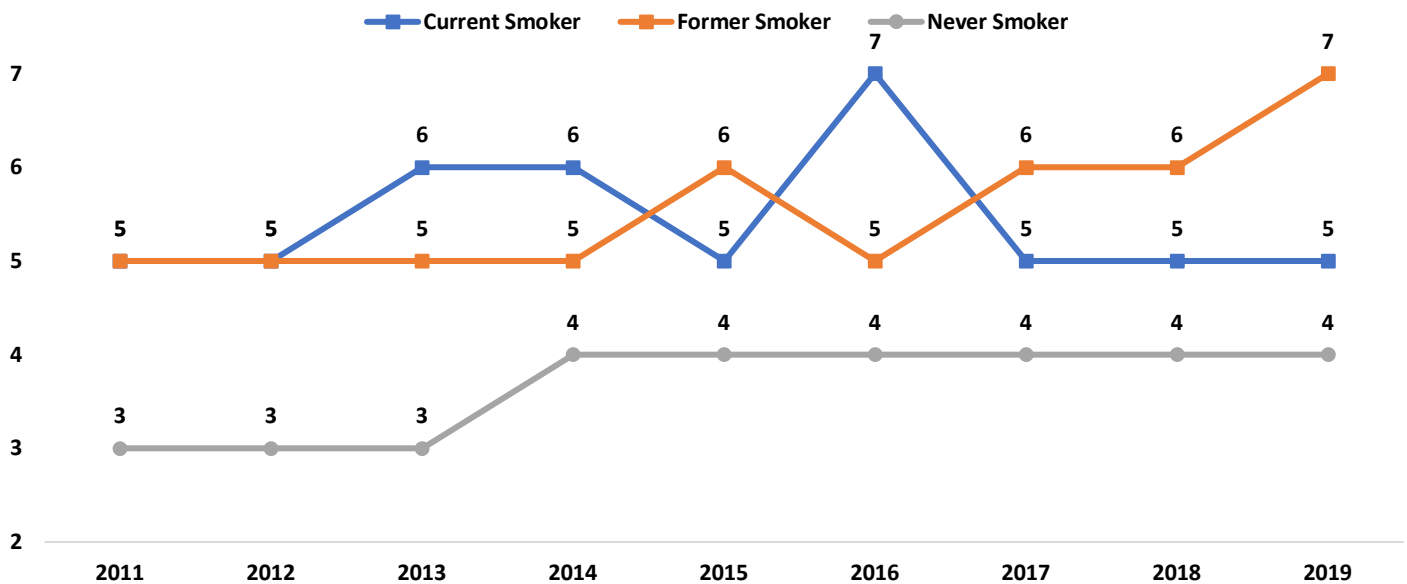
By annual household income, the percentage of adults being told that they had had a stroke was highest in adults with the lowest income (<\$15,000), followed by adults with increasing levels of income. In comparison, 8% to 12% of adults with an annual income below \$15,000 reported ever being told that they had had a stroke, while only 1% to 2% of adults with an annual income of \$75,000 or higher reported ever being told that they had had a stroke (Figure 117).

Figure 117. Percent of Adults Aged 35 Years or Older Who Were Told That They Had Had a Stroke by Annual Household Income, PA, 2011–2019



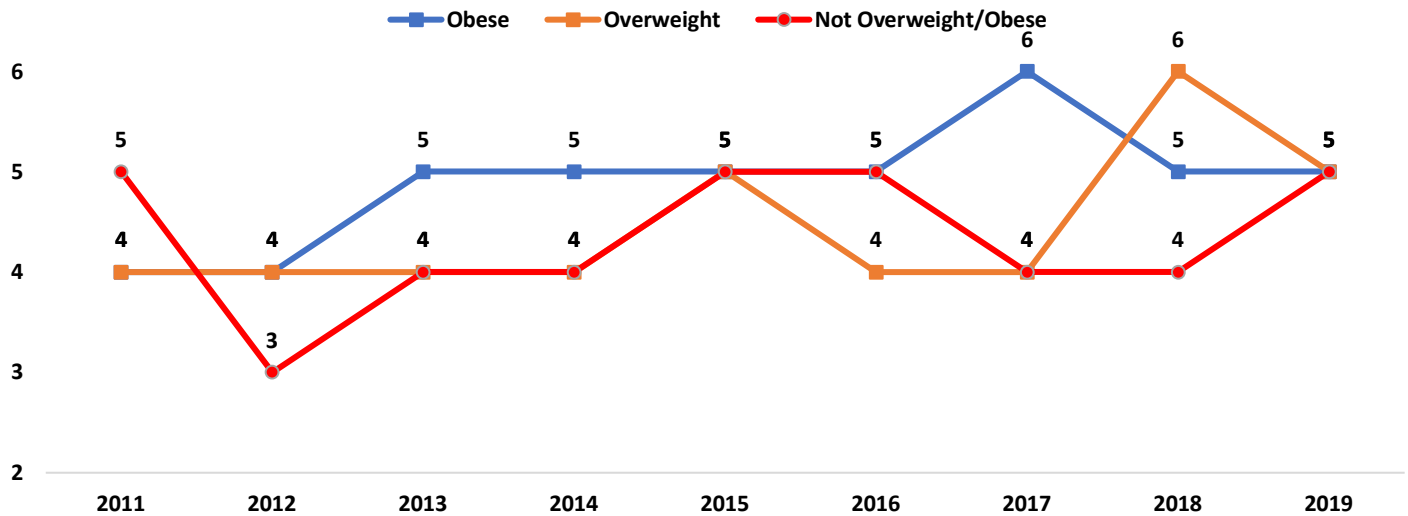
By smoking status, the percentage of adults aged 35 years or older who were told that they had had a stroke was higher in smokers than in non-smokers. The percentage did not differ much between current smokers and former smokers, but since 2016, the percentage climbed among former smokers, while the percentage dropped or plateaued among current smokers. Overall, the percentage increased from 3% to 7% in former smokers, from 3% to 4% in never smokers, and remained unchanged in current smokers (Figure 118).

Figure 118. Percent of Adults Aged 35 Years or Older Who Were Told That They Had Had a Stroke by Smoking Status, PA, 2011–2019



By body weight status, there was no substantial difference among adults with different weights regarding the percentage of adults who were told that they had had a stroke. In most years between 2011 and 2019, the percentage of adults who had been told that they had a stroke was slightly higher among those who had obesity (Figure 119).

Figure 119. Percent of Adults Aged 35 Years or Older Who Were Told That They Had Had a Stroke by Body Weight Status, PA, 2011–2019



In summary, the percentage of adults aged 35 years or older who were told that they had had a stroke by their doctor was slightly higher in PA than in the country from 2011 to 2019. The percentage did not differ much by sex or body weight status, but was higher among Blacks, people at older ages, people with lower educational attainment or income, and smokers.

10. Chronic Lower Respiratory Disease

10.1 General Description of Chronic Lower Respiratory Disease (CLRD)

Chronic lower respiratory disease in this section is defined as a condition associated with ICD-10 codes of J40 – J47 or ICD-9 codes of 490 – 496. Specific conditions of CLRD include bronchitis, emphysema, asthma, bronchiectasis, status asthmaticus, and other chronic obstructive pulmonary disease.

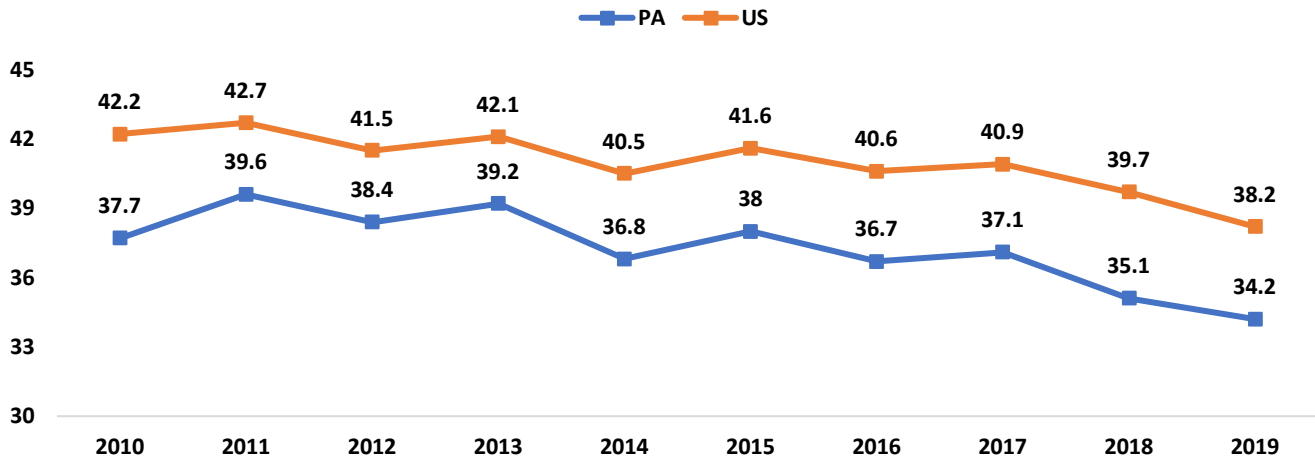
Chronic lower respiratory disease is the fourth and fifth leading cause of death in the US and in PA, respectively. It is characterized by airflow obstruction due to damage in the lungs that is not fully reversible. It results in breathing-related symptoms such as chronic cough, exertional shortness of breath, excess sputum and wheeze. Before 1999, CLRD was called Chronic Obstructive Pulmonary Disease (COPD). Starting in 1999, with the use of the 10 version of the International Classification of Diseases (ICD-10), COPD refers to chronic bronchitis and emphysema only, and CLRD includes COPD and other chronic respiratory conditions such as asthma.

Tobacco smoke is the primary cause of CLRD and is associated with approximately 75% of CLRD. Second-hand smoking, environmental exposures to dust, fumes, gases, or chemicals, and genetic factors can also contribute to the development of CLRD. Asthma appears to have a strong genetic basis, with 30 to 50 percent of all cases being attributable to an inherited predisposition, although exposure to air pollutants in the home and workplace and respiratory infections also play a role. Signs and symptoms of CLRD include chronic or smoker’s cough, chronic phlegm production, shortness of breath, and wheezing. A breathing test can measure lung function and detect COPD among people with higher risks. Prevention of CLRD should emphasize smoking cessation, avoiding second-hand smoke, and reducing environmental exposure by removing air pollutants from the home and at work.

10.2 Mortality Trend for Chronic Lower Respiratory Disease in Pennsylvania

Figure 120 shows the age-adjusted CLRD mortality rate in PA and the country from 2010 to 2019. In general, mortality was consistently lower in PA than in the country throughout the 10-year period. The mortality rate declined in both PA and the country, with a 9% drop in both PA and the country, respectively.

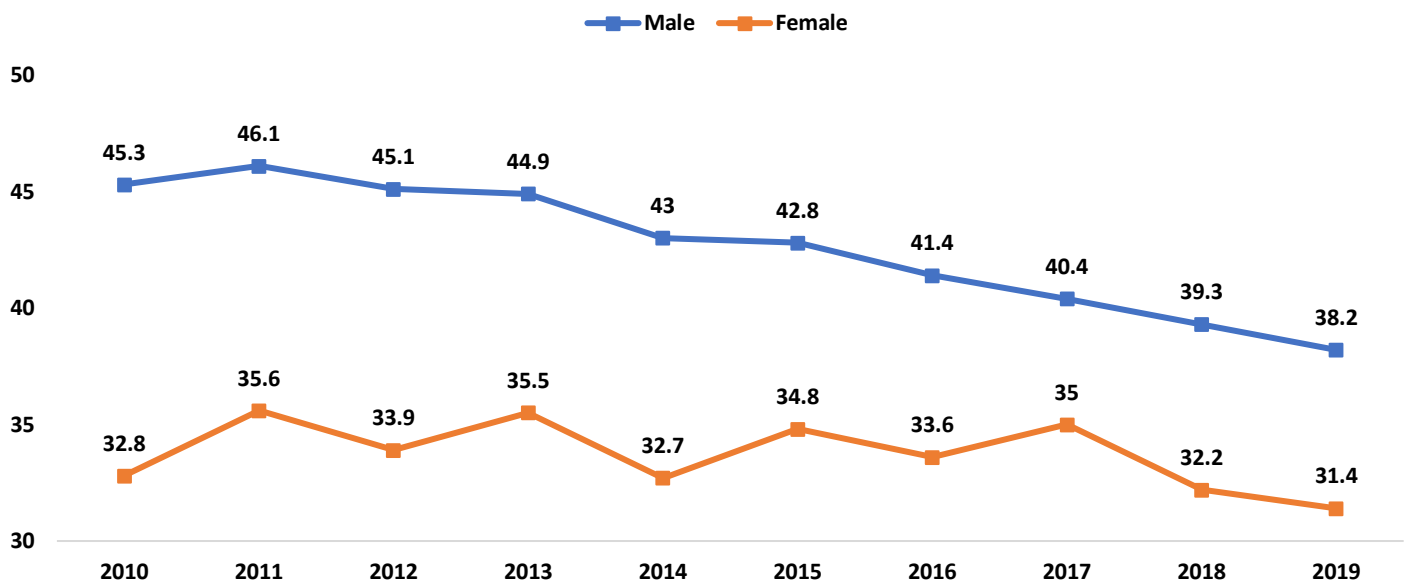
Figure 120. Age-adjusted Chronic Lower Respiratory Disease Mortality Rate (per 100,000), PA vs. US, 2010-2019



By sex, the age-adjusted CLRD mortality rate was consistently higher in males than in females in PA from 2010 to 2019. However, the CLRD mortality rate declined to a greater extent in males than in females over the 10-year period. The rate declined 16% in males, dropping from 45.3 per 100,000 in 2010 to 38.2 per 100,000 in 2019, while the rate decreased 4% in females, dropping from 32.8 per 100,000 in 2010 to 31.4 per 100,000 in 2019 (Figure 121).

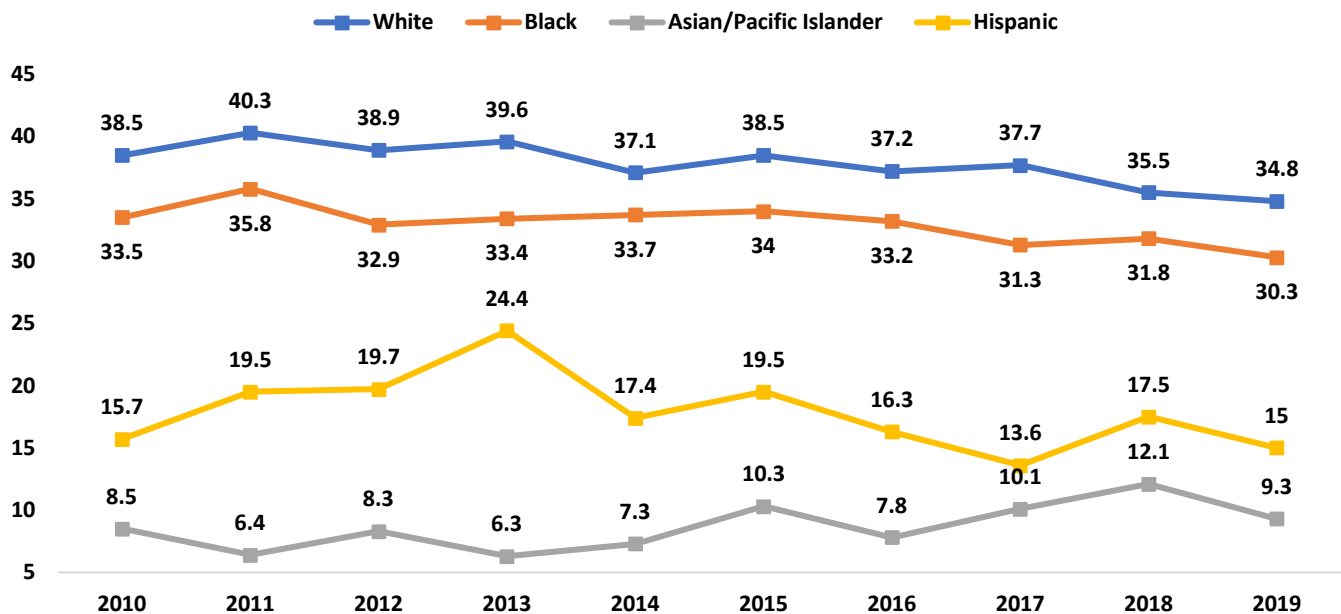
Each year, more men than women die from CLRD in PA.

Figure 121. Age-adjusted Chronic Lower Respiratory Disease Mortality Rate (per 100,000) by Sex, PA, 2010-2019



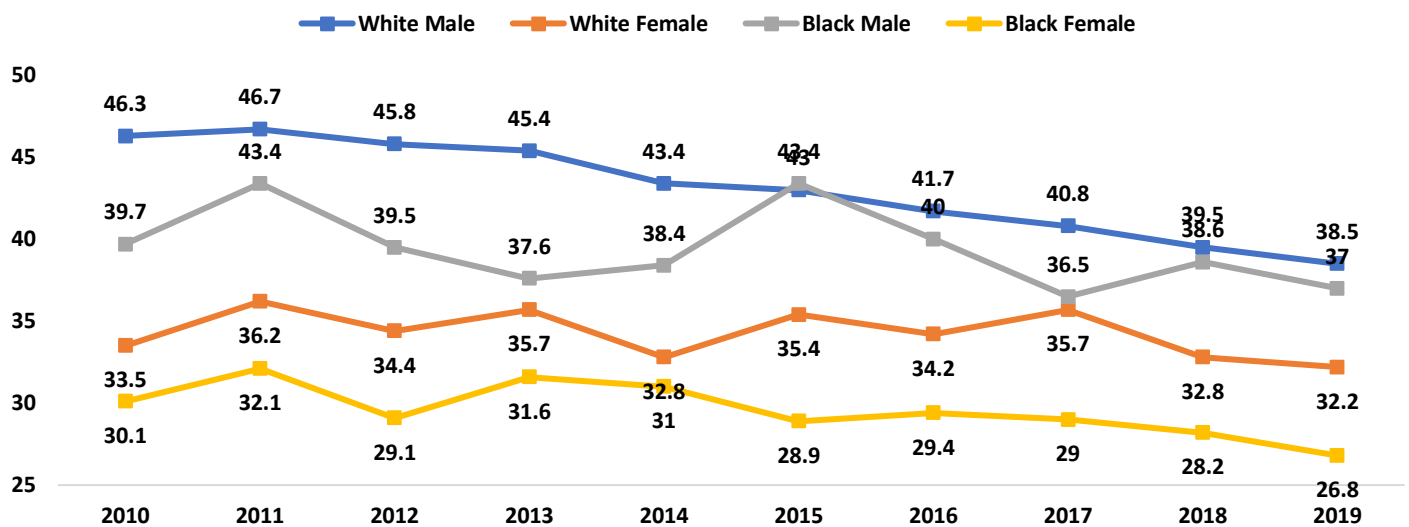
By race and ethnicity, the age-adjusted CLRD mortality rate was highest in Whites, followed by Blacks, Hispanics, and Asians/Pacific Islanders from 2010 to 2019. Over the 10-year period, the age-adjusted CLRD mortality rate declined in Whites (10%), Blacks (10%), and Hispanics (4%) but increased in Asians/Pacific Islanders (9%) (Figure 122).

Figure 122. Age-adjusted Chronic Lower Respiratory Disease Mortality Rate (per 100,000) by Race, PA, 2010-2019



By sex and race/ethnicity, White males had the highest mortality from chronic lower respiratory disease, followed by Black males, White females, and Black females from 2010 to 2019. The age-adjusted mortality rates decreased in all four subgroups over the 10-year period. The decrease was 17% in White males, 7% in Black males, 4% in White females, and 11% in Black females. The mortality data were insufficient for analysis for the other racial/ethnic groups (Figure 123).

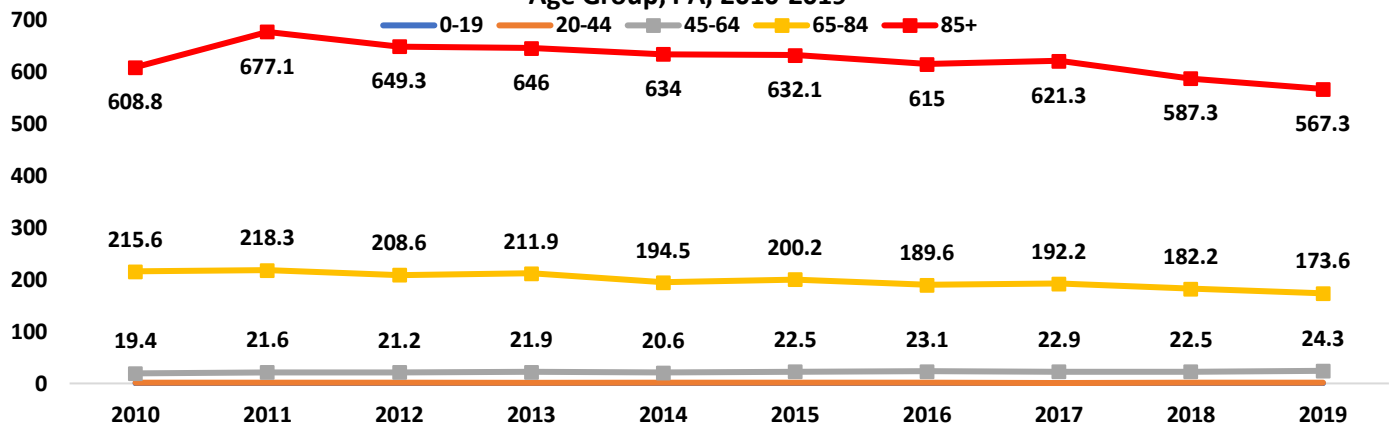
Figure 123. Age-adjusted Chronic Lower Respiratory Disease Mortality Rate (per 100,000) by Sex and Race/Ethnicity, PA, 2010-2019



By age group, the CLRD mortality rate shows a clear association with age in PA. The mortality rate was highest among people aged 85 years or older, followed by people in each of the subsequent younger age groups. Over the 10-year

period, the mortality rate increased 25% in adults aged 45 to 64 years, up from 19.4 per 100,000 in 2010 to 24.3 per 100,000 in 2019. While in adults aged 20 to 44 years, 65 to 84 years, and 85 years or older, the mortality rate decreased 10%, 19%, and 7%, respectively (Figure 124).

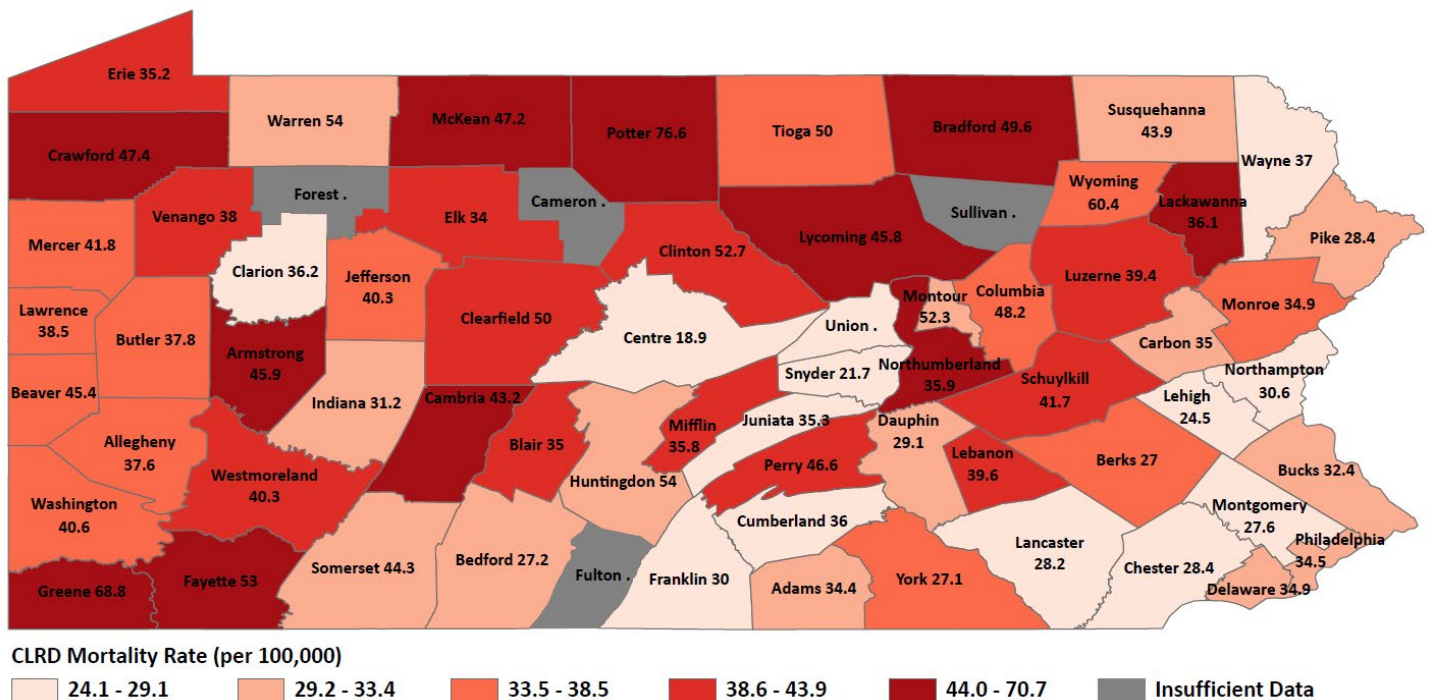
Figure 124. Age-adjusted Chronic Lower Respiratory Disease Mortality Rate (per 100,000) by Age Group, PA, 2010-2019



Geographically, there are disparities in the age-adjusted chronic lower respiratory disease mortality rate in PA. As shown in Map 9, more counties in the northcentral and west areas had higher mortality rates than the other areas in 2019. Specifically, the following 11 counties had the highest mortality rate (44.0-70.7 per 100,000) by region: Bradford, Lycoming, Northumberland, and Potter in the Northcentral Region; Lackawanna in the Northeast Region; Crawford and Mckean in the Northwest Region; Armstrong, Cambria, Fayette, and Greene in the Southwest Region.

In summary, the CLRD mortality rate was higher in PA than the national average from 2010 to 2019. The mortality rate declined in PA as in the country over the 10-year period. In PA, the CLRD mortality rate was higher in males, Whites (especially White males), and people at older ages. There were geographic discrepancies in the CLRD mortality rate across counties in PA.

Map 9. Age-adjusted Chronic Lower Respiratory Disease Mortality Rate (per 100,000) by County, PA, 2019

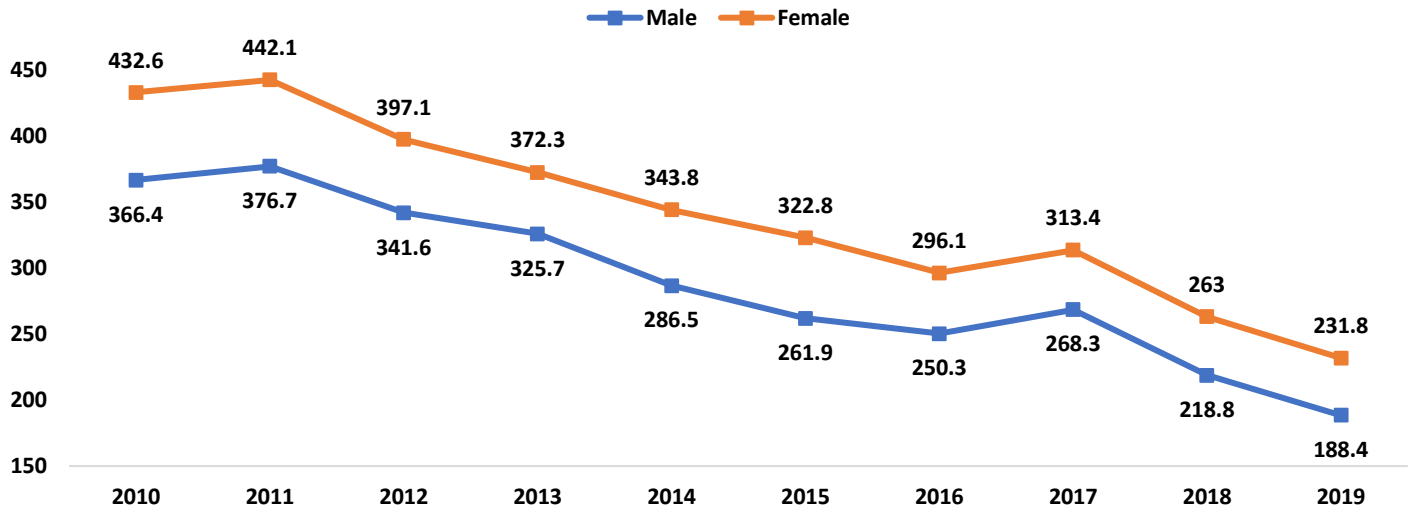


10.3 Hospitalization Trend for Chronic Lower Respiratory Disease in Pennsylvania

In PA, the age-adjusted hospitalization rate for chronic lower respiratory disease was higher in women than in men from 2010 to 2019. The rates decreased in both men and women over the 10-year period. The rate was 432.6 per 100,000 in women in 2010, which dropped to 231.8 per 100,000 in 2019, reflecting a 46% decrease in hospitalization rate. The rate was 366.4 per 100,000 in men in 2010, which dropped to 188.4 per 100,000 in 2019, reflecting a 49% decrease in hospitalization rate (Figure 125).

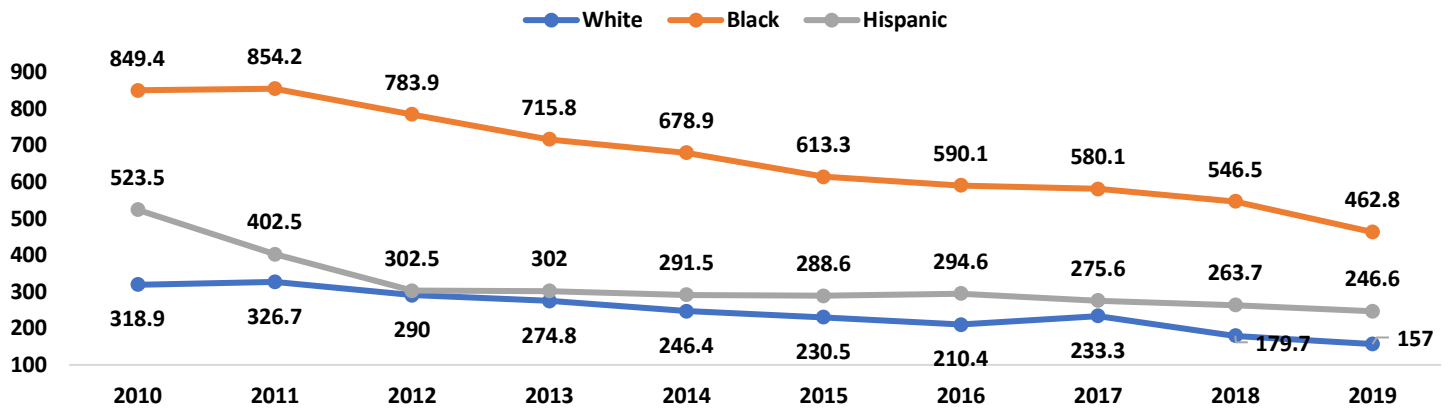
Each year, more women than men are hospitalized for CLRD in PA.

Figure 125. Age-adjusted Chronic Lower Respiratory Disease Hospitalization Rate (per 100,000) by Sex, PA, 2010-2019



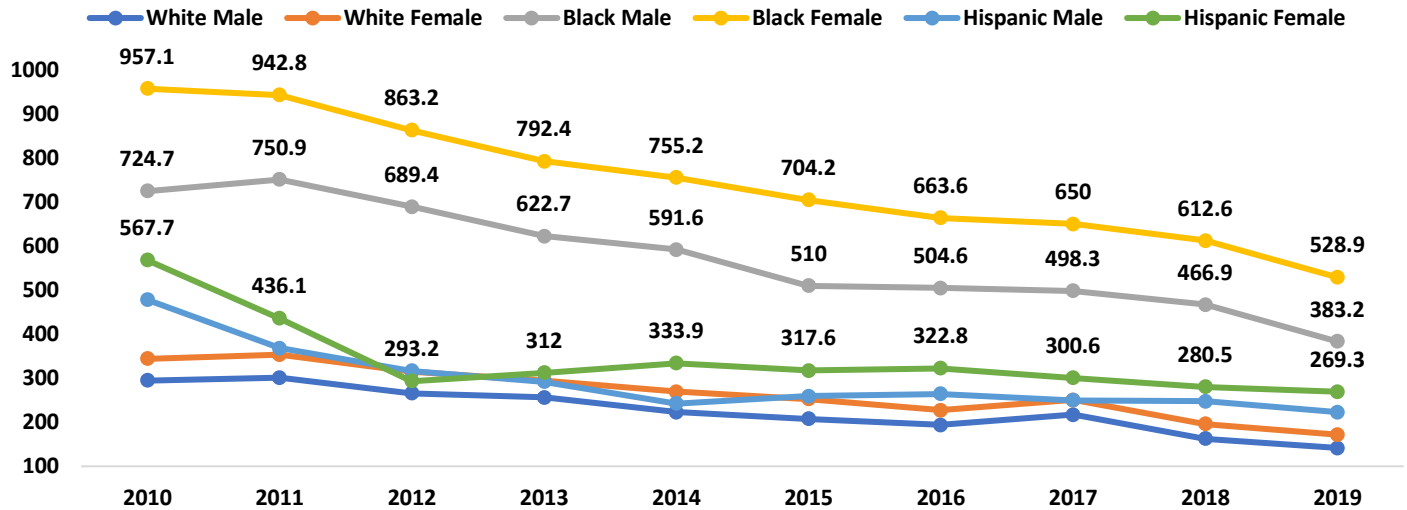
By race and ethnicity, the age-adjusted hospitalization rate for chronic lower respiratory disease was highest among Blacks, followed by Hispanics and Whites. The rates decreased in all three racial/ethnic groups for which data were adequate for analysis from 2010 to 2019. The rate was 849.4 per 100,000 in Blacks in 2010, which dropped to 462.8 per 100,000 in 2019, reflecting a 66% reduction in hospitalization rate. The rate was 523.5 per 100,000 in Hispanics in 2010 and the rate dropped to 246.6 per 100,000 in 2019, decreasing 53% in hospitalization rate. In Whites, the rate decreased 51% from 318.9 per 100,000 in 2010 to 157 per 100,000 in 2019 (Figure 126).

Figure 126. Age-adjusted Chronic Lower Respiratory Disease Hospitalization Rate (per 100,000) by Race/Ethnicity, PA, 2010-2019



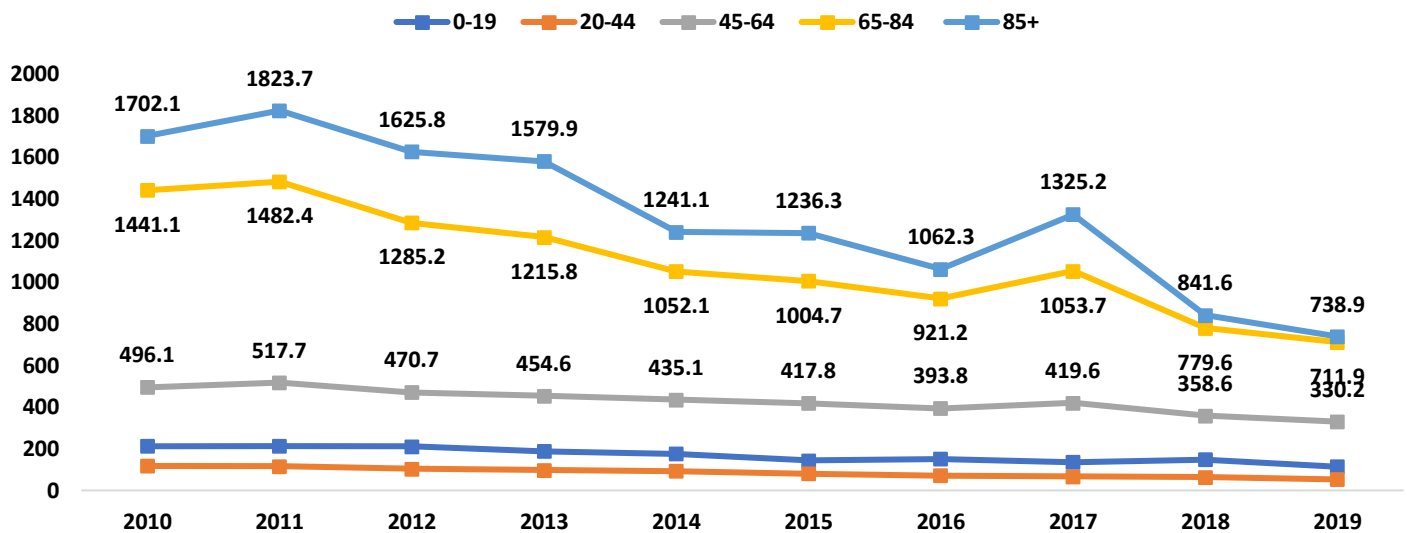
By sex and race/ethnicity, the age-adjusted hospitalization rate for chronic lower respiratory disease was highest among Black females, followed by Black males. For most of the years, the age-adjusted hospitalization rate was comparable in Hispanic females, Hispanic males, White males and White females. Over the 10-year period, the age-adjusted hospitalization rate declined around 50% in all racial and ethnic groups (Figure 127).

Figure 127. Age-adjusted Chronic Lower Respiratory Disease Hospitalization Rate (per 100,000) by Sex and Race/Ethnicity, PA, 2010-2019



By age group, the hospitalization rate for chronic lower respiratory disease was highest among people aged 85 years or older in PA, followed by people aged 65 to 84 years, 45 to 64 years, and then those less than 20 years of age. The CLRD hospitalization rate was lowest among adults aged 20 to 44 years. The hospitalization rate declined in all age groups over the 10-year period. From the highest age group to the lowest age group, the decrease was 57%, 51%, 33%, 55%, and 46%, respectively (Figure 128).

Figure 128. Chronic Lower Respiratory Disease Hospitalization Rate (per 100,000) by Age Group, PA, 2010-2019

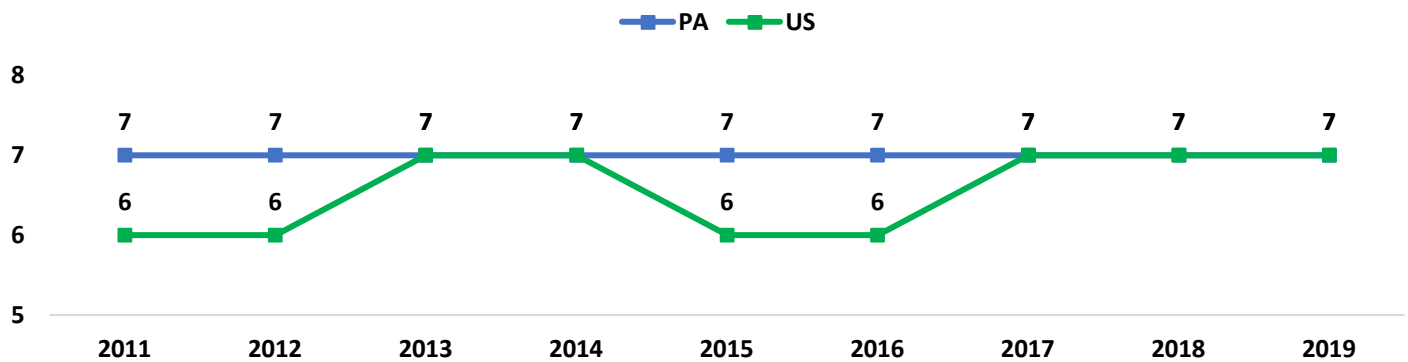


In summary, the CLRD hospitalization rate declined almost 50% in PA from 2010 to 2019. The hospitalization rate was higher in females, Blacks (especially Black females), and people at older ages over the 10-year period.

10.4 Trend for Prevalence Chronic Obstructive Pulmonary Disease (COPD), Emphysema or Chronic Bronchitis in Pennsylvania from BRFSS

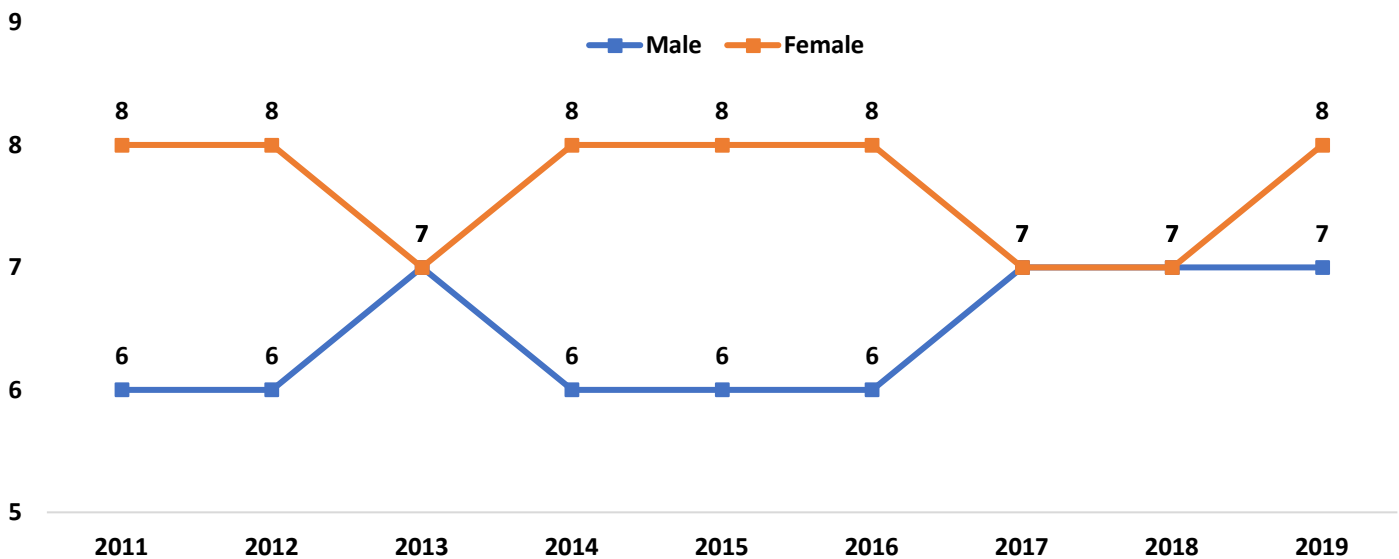
In BRFSS, adults were asked if they had ever been told by their doctors that they had COPD, emphysema or chronic bronchitis. Figure 129 shows the percentage of adults who had ever been told that they had these conditions in PA and in the country from 2010 to 2019. In general, the percentage in PA was just slightly higher than the percentage in the country in some years. The percentage remained steady in both PA and the country (Figure 129).

Figure 129. Percent of Adults 18 Years or Older Told by Doctors that They Had COPD, Emphysema or Chronic Bronchitis, PA vs. US, 2011 - 2019



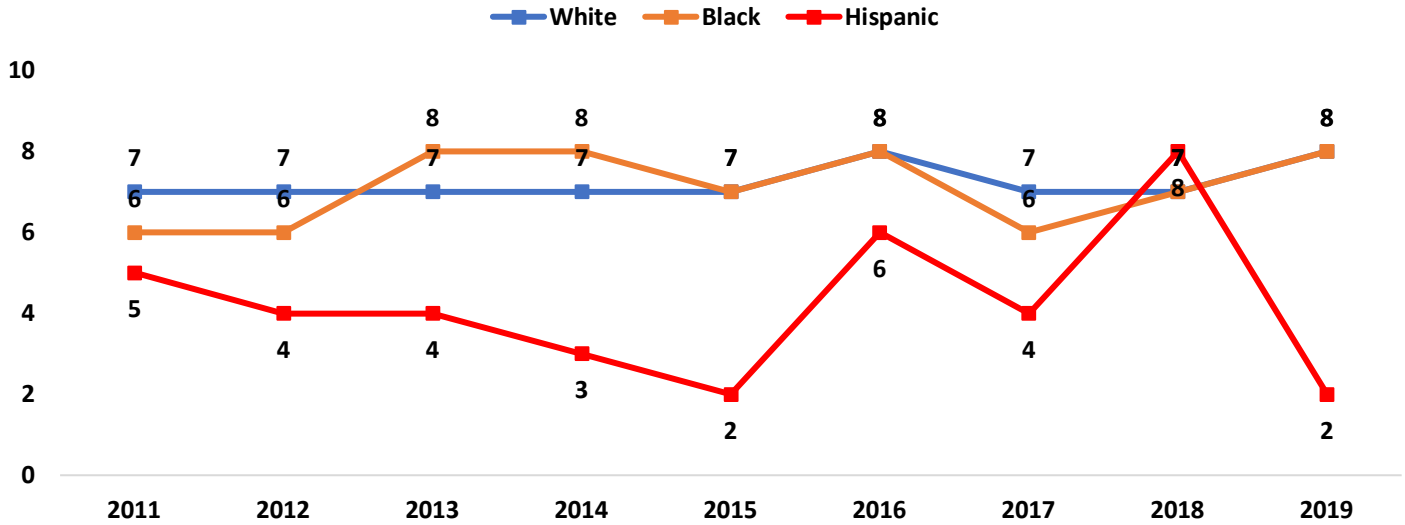
By sex, the percentage was slightly higher in women than in men in reporting that they had ever been told by their doctors that they had COPD, emphysema or chronic bronchitis in PA from 2011 to 2019. Overall, the percentage remained stable in both men and women over the nine-year period (Figure 130).

Figure 130. Percent of Adults 18 Years or Older Told by Doctors that They Had COPD, Emphysema or Chronic Bronchitis by Sex, PA, 2011 - 2019



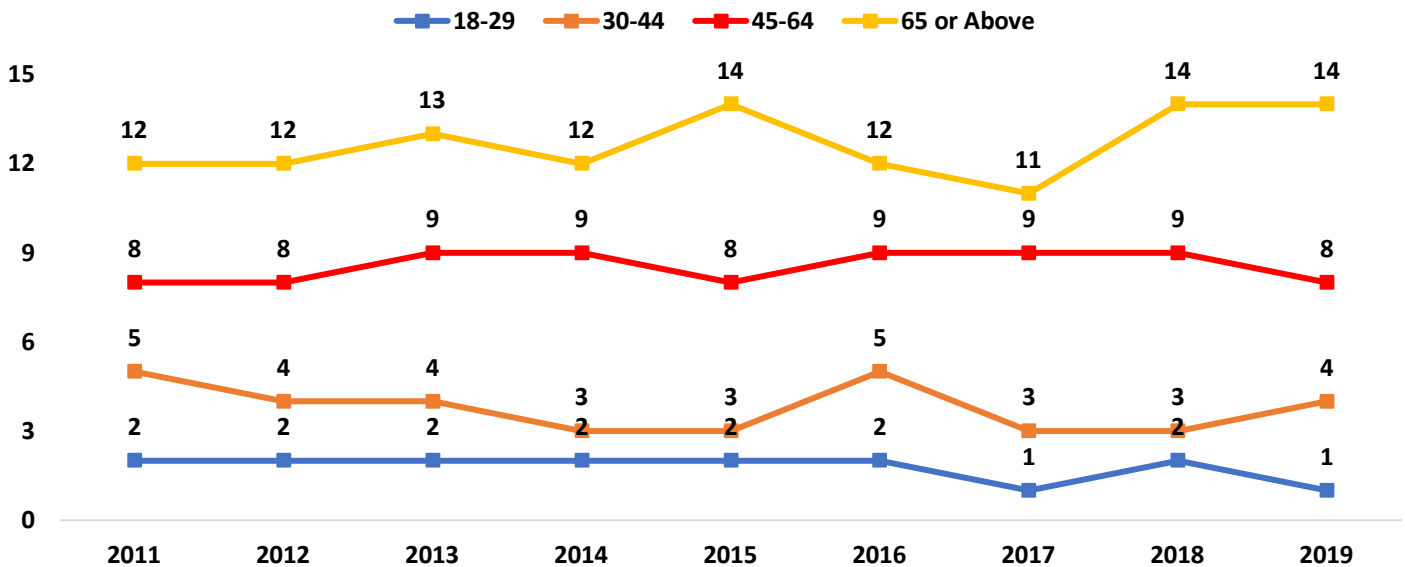
By race and ethnicity, the percentage of adults reporting that they had ever been told by their doctors that they had COPD, emphysema or chronic bronchitis was comparable in Whites and Blacks in PA from 2011 to 2019. The percentage was lower in Hispanics than in Whites and Blacks. Over the nine-year period, the percentage remained largely at the same level for Whites and Blacks, despite some fluctuations in some years. The percentage appeared to be lower in 2019 than in 2011 in Hispanics, but the fluctuation was substantial throughout these years (Figure 131).

Figure 131. Percent of Adults 18 Years or Older Told by Doctors that They Had COPD, Emphysema or Chronic Bronchitis by Race/Ethnicity, PA, 2011 - 2019



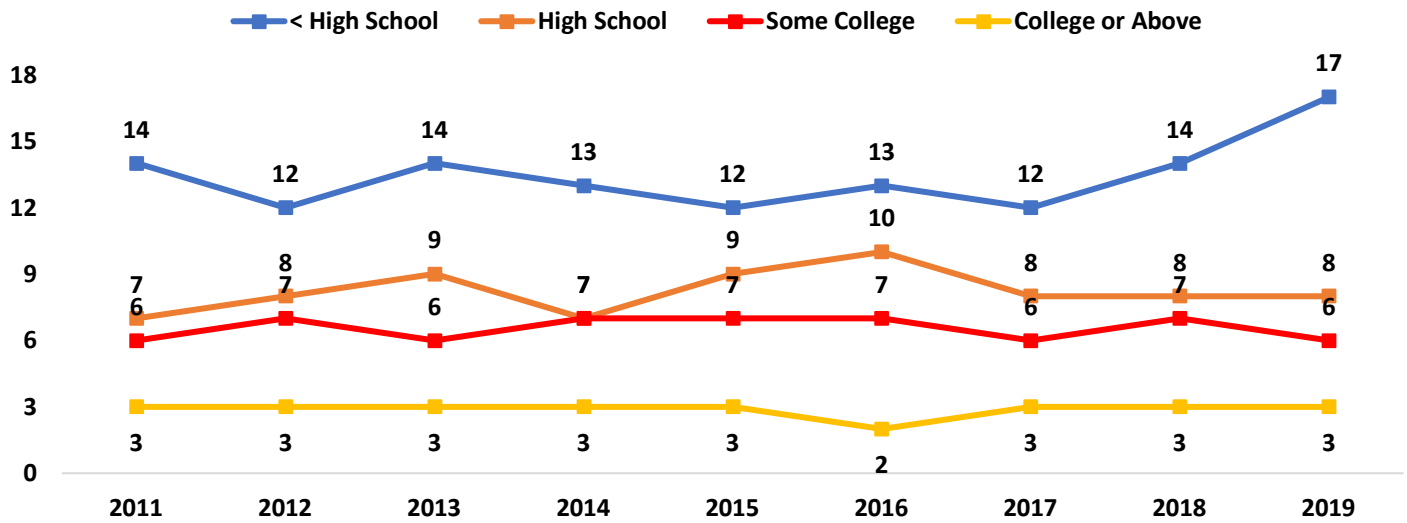
By age group, the percentage was highest in adults aged 65 years or older with regards to being told that they had COPD, emphysema or chronic bronchitis in PA from 2011 to 2019. The percentage was subsequently lower in each of the younger age groups. With regards to trending, the percentage appeared at the same level for each age group when fluctuation was taken into account (Figure 132).

Figure 132. Percent Adults 18 Years or Older Told by Doctors that They Had COPD Emphysema or Chronic Bronchitis by Age Group, PA, 2011 - 2019



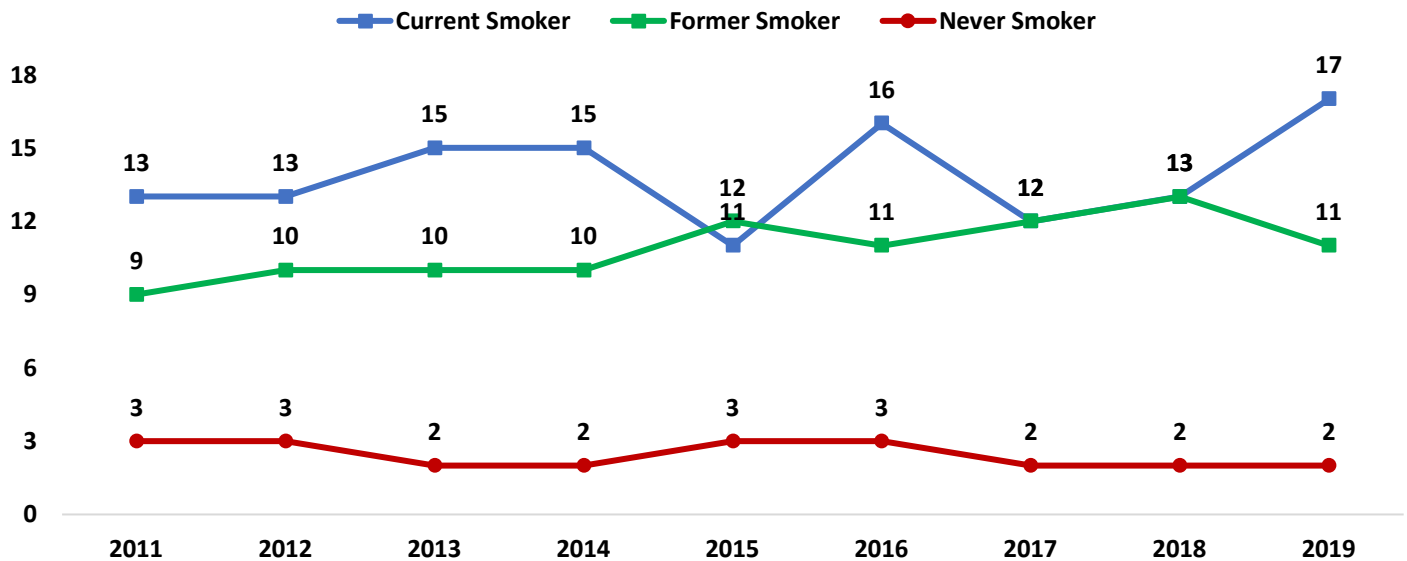
By educational level, there was an inverse relationship between education and the percentage of adults ever being told that they had COPD, emphysema or chronic bronchitis in PA from 2011 to 2019. The percentage was highest in adults with the lowest educational level (lower than high school), followed by adults with increased levels of educational attainment. Over the nine-year period, the percentage remained relatively unchanged among adults with education of a college degree or higher, some college, or high school. In adults with less education than a high school diploma, the percentage increased in recent years from 2017 to 2019 (Figure 133).

Figure 133. Percent of Adults 18 Years or Older Told by Doctors that They Had COPD, Emphysema or Chronic Bronchitis by Education, PA, 2011 - 2019



By smoking status, the percentage of adults being told that they had COPD, emphysema or chronic bronchitis was highest among current smokers, followed by former smokers. The percentage was lowest among never smokers. The percentage increased slightly among current smokers and former smokers but decreased slightly among never smokers from 2011 to 2019 (Figure 134).

Figure 134. Percent of Adults 18 Years or Older Told by Doctors that They Had COPD, Emphysema or Chronic Bronchitis by Smoking Status, PA, 2011 - 2019



In summary, the percentage of adults who were told by their doctors that they had COPD, emphysema or chronic bronchitis remained steady in PA from 2011 to 2019. The percentage was higher among females, people at older ages, people with less education, and smokers. To control and prevent chronic respiratory diseases, it is important to quit smoking as it is a known primary risk factor for these conditions.

11. Asthma

11.1 General Description of Asthma

Asthma in this section refers to conditions associated with ICD-10 codes of J45 – J46 or ICD-9 codes of 493.

Asthma is a chronic condition that affects the airways in the lungs. It causes repeated episodes of wheezing, chest tightness, shortness of breath, and coughing as a result of inflammation in the airways. These symptoms can range from mild to severe and can happen every day or only once in a while. The frequency and severity of symptoms vary greatly from patient to patient and tend to be less episodic and more persistent with increasing age. When symptoms get worse and become an asthma attack, the lining of the air passages swells and the muscles surrounding the airways become tight. This reduces the amount of air that can pass through the airway. Asthma affects people of all ages and often starts during childhood. Certain things can set off or worsen asthma symptoms, such as cold air, pollen, mold, dust mites, pet hair or dander, tobacco smoke, certain medicines, chemicals in the air or food, physical activity, and strong emotions. These are called asthma triggers. Asthma can be controlled by taking medicine and avoiding triggering factors. Without proper management, asthma can result in frequent emergency department (ED) visits, hospitalizations, and premature deaths. Patient education, environmental control, smoking cessation and avoidance of factors known to provoke asthma attacks are key to asthma prevention and control. The importance of quitting smoking cannot be overemphasized in reducing the risk of asthma. Occupation-related asthma can be prevented by reducing workplace exposure to chemicals or other triggering agents. An annual influenza vaccination is recommended for patients with persistent asthma. In clinical management of asthma, most patients respond well to appropriate medical treatment. Anti-inflammatory therapy for persistent asthma and immediate treatment for acute, severe asthma attacks are pivotal in reducing morbidity and mortality from the disease.

In the US, asthma affected approximately 25 million people (7.7%) in 2018, including six million children (7.5%) under 18 years of age. Among children, more boys (8.3%) had asthma than girls (6.7%). But among adults, more women (9.8%) had the disease than men (5.5%). By age group, adolescents 15 – 19 years old and young children 5 – 14 years old had the highest prevalence at 11.0% and 8.6%, respectively. By race and ethnicity, American Indians and Alaska Natives had the highest prevalence (10.5%), followed by Blacks (9.6%), Whites (8.2%), Hispanics (6.0%) and Asians (4.7%).³⁸

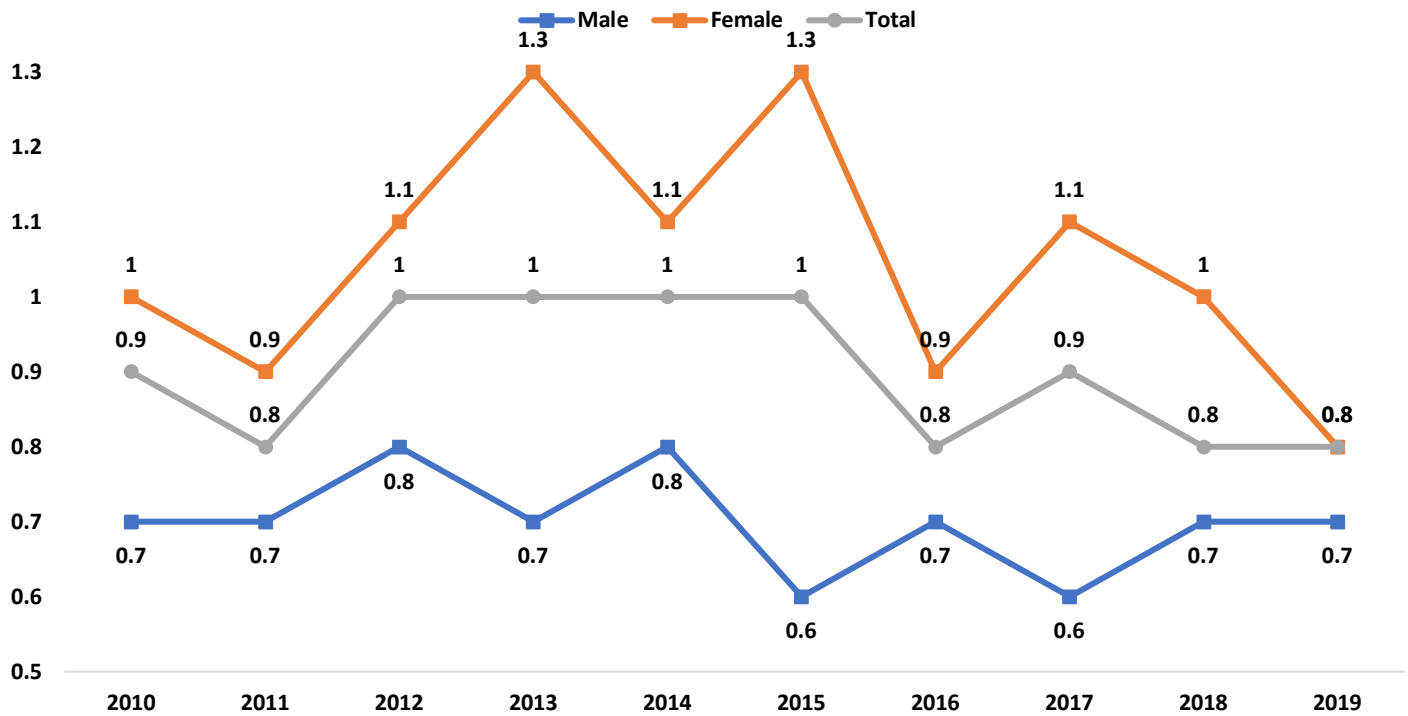
Among people with asthma, the prevalence of asthma attack was higher in children less than 18 years of age (53.8%) than in adults who were 18 years or over (43.0%) in 2018. However, the mortality rate from asthma was higher in adults (12.8 per million) than in children (2.6 per million), in particular among adults who were 65 years or over (29.0 per million). The mortality rate was higher in adult females (15.3 per million) than in adult males (10.2 per million). The mortality rates in boys and girls were similar (2.8 per million in boys vs. 2.4 per million in girls).³⁸

11.2 Mortality Trend for Asthma in Pennsylvania

The overall age-adjusted asthma mortality rate remained relatively stable in PA between 2010 and 2019, ranging from 0.8 to 1.0 per 100,000. The asthma mortality rates in males and females also remained steady between 2010 and 2019, although the mortality rate fluctuated more in females than in males. The mortality rate was generally higher in females than in males (Figure 135).

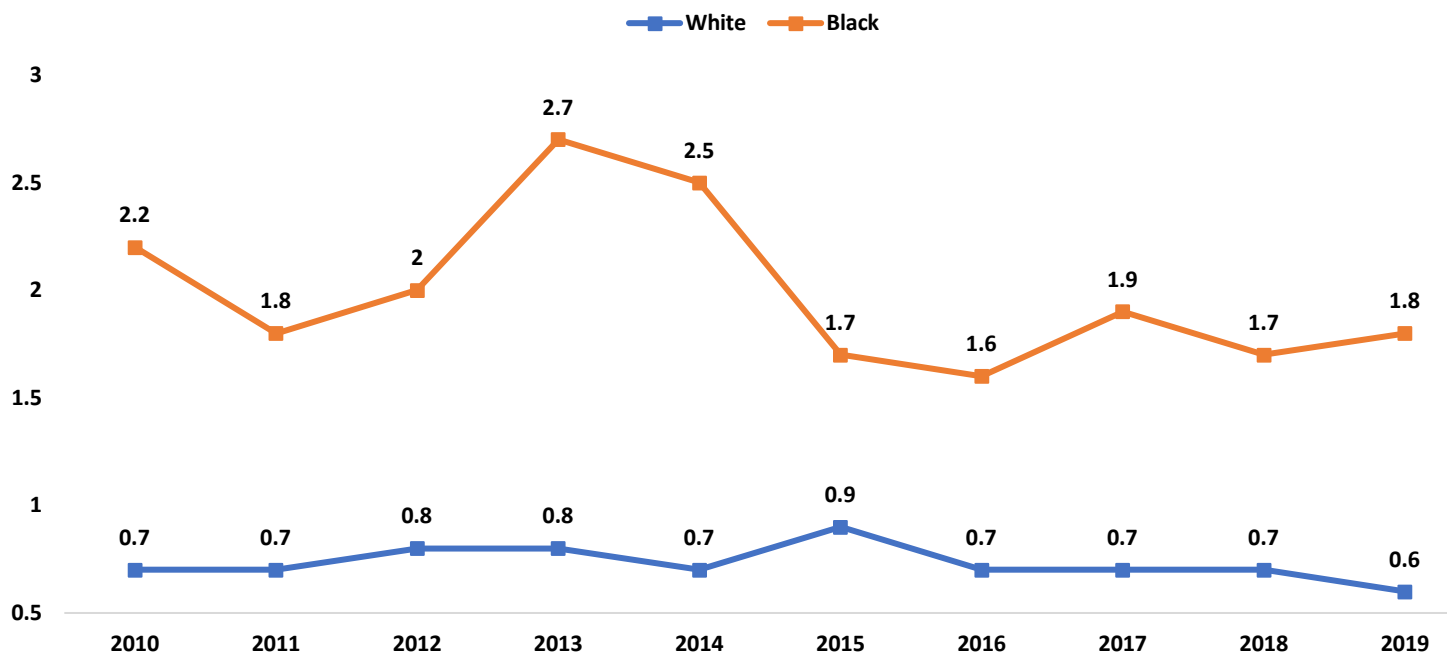
More women than men die from asthma each year in PA.

Figure 135. Age-adjusted Asthma Mortality Rate (per 100,000) by Sex, PA, 2010-2019



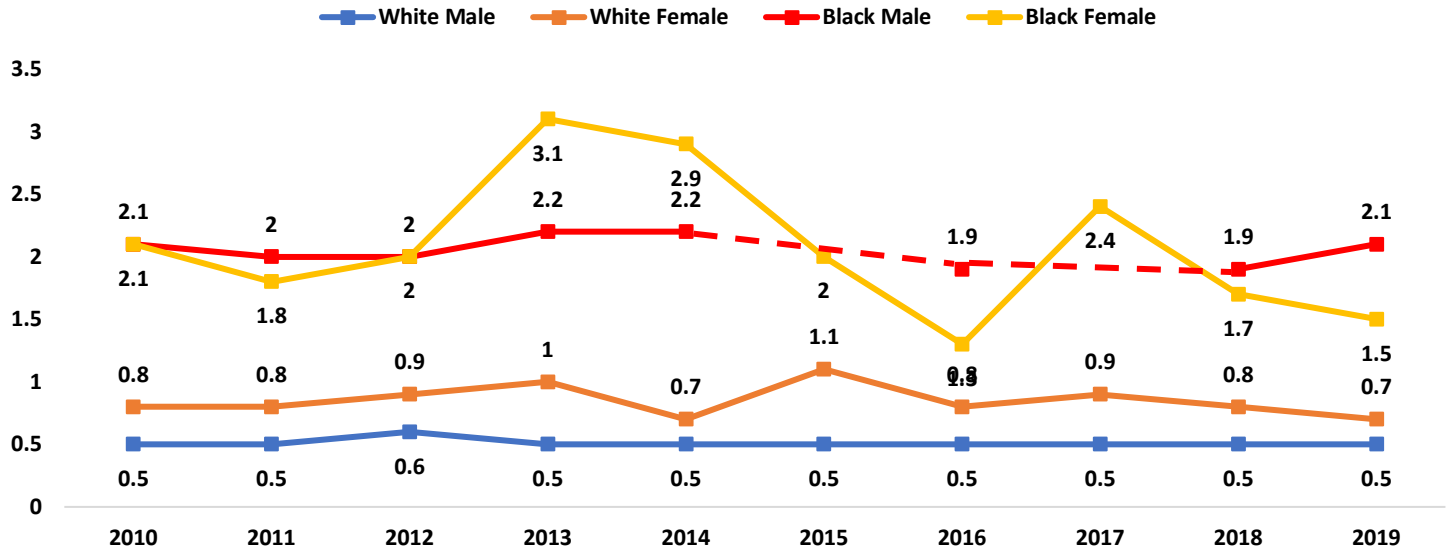
The age-adjusted asthma mortality rate differed across racial/ethnic populations from 2010 to 2019. The rate in Whites was lower than in Blacks and remained relatively unchanged over the 10-year period. The mortality rate in Blacks was substantially higher than in Whites. The rate in Blacks declined from 2.2 per 100,000 in 2010 to 1.8 per 100,000 in 2019. Mortality data were inadequate for analysis for the other racial/ethnic groups (Figure 136).

Figure 136. Age-adjusted Asthma Mortality Rates (per 100,000) by Race/Ethnicity, PA, 2010-2019



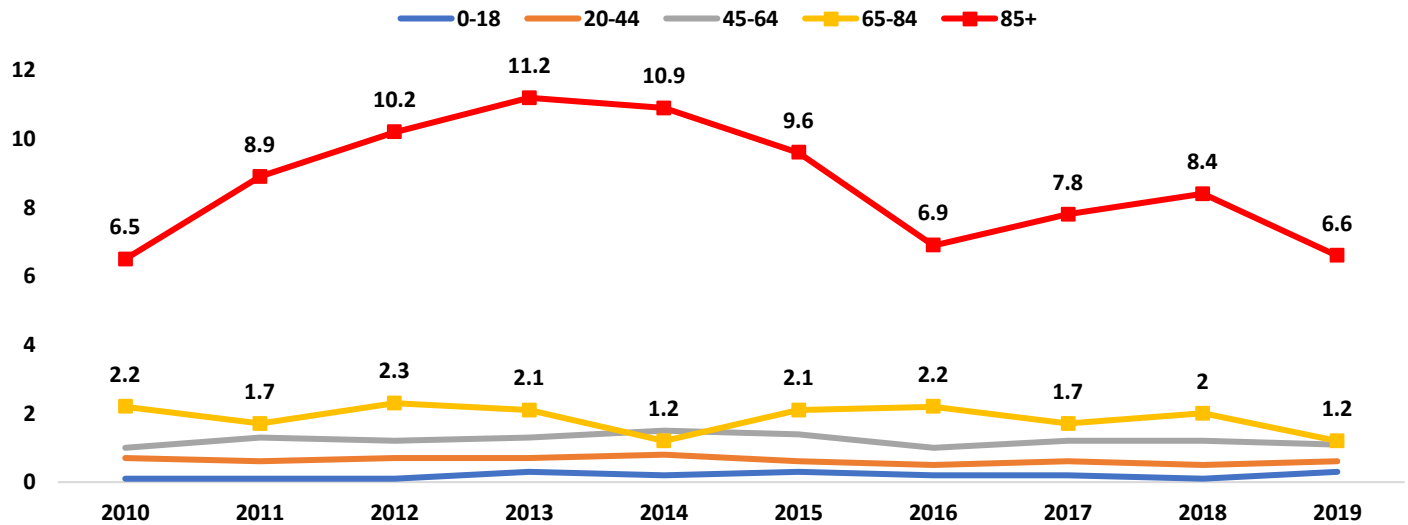
The age-adjusted asthma mortality rate by sex and race/ethnicity shows the same consistent pattern as seen by sex or race/ethnicity. The mortality rate appeared to be highest among Black females, despite the fluctuation over the 10-year period. Second to Black females, Black males had a higher asthma mortality rate than White females and White males. White males had the lowest asthma mortality rate in the four subgroup populations. Asthma mortality data were insufficient for analysis in other racial and ethnic groups (Figure 137).

Figure 137. Age-adjusted Asthma Mortality Rates (per 100,000) by Sex and Race/Ethnicity, PA, 2010-2019



Although asthma is common among children and young adults, the mortality rate for asthma increased proportionally with age from 2010 to 2019. Notably, the mortality rate was substantially higher among those who were 85 years or older. In this age group, the asthma mortality rate increased since 2010 and peaked to 11.2 per 100,000 population in 2013. The mortality rate declined from 2013 to 2016, rose again from 2016 to 2018, and then declined between 2018 and 2019. Asthma mortality rates remained relatively stable for all other age groups, with the lowest mortality rate (approximately 1 to 3 deaths from asthma per million each year) in children less than 19 years (Figure 138).

Figure 138. Asthma Mortality Rates (per 100,000) by Age Group, PA, 2010-2019



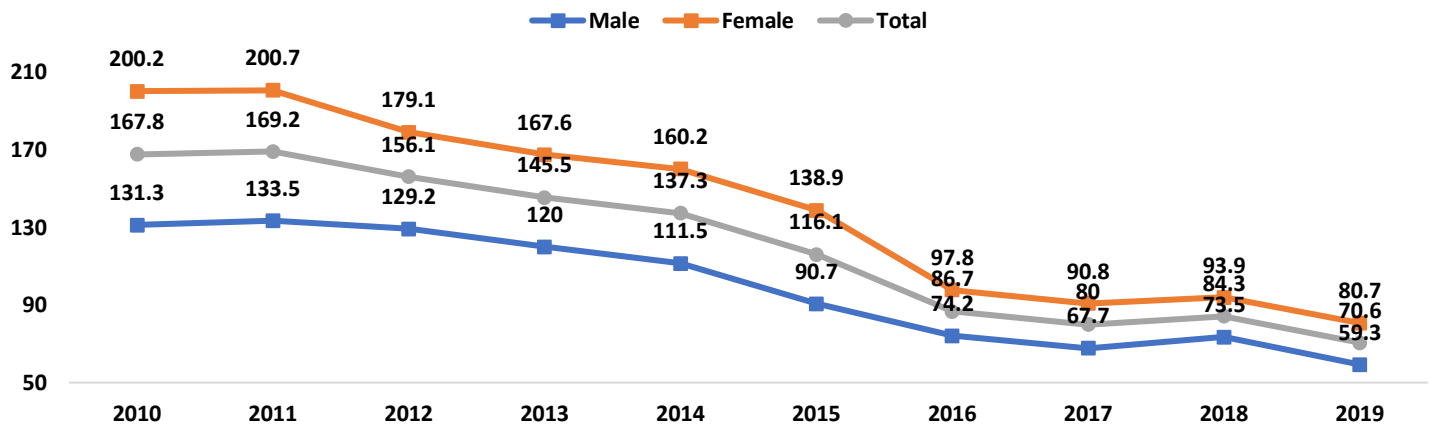
In summary, deaths due to asthma were low compared to other major chronic diseases in PA from 2010 to 2019. The mortality rate was higher in females, Blacks, and adults aged 85 years or older compared to their counterparts.

11.3 Hospitalization Trend for Asthma in Pennsylvania

More women than men are hospitalized for asthma each year in PA.

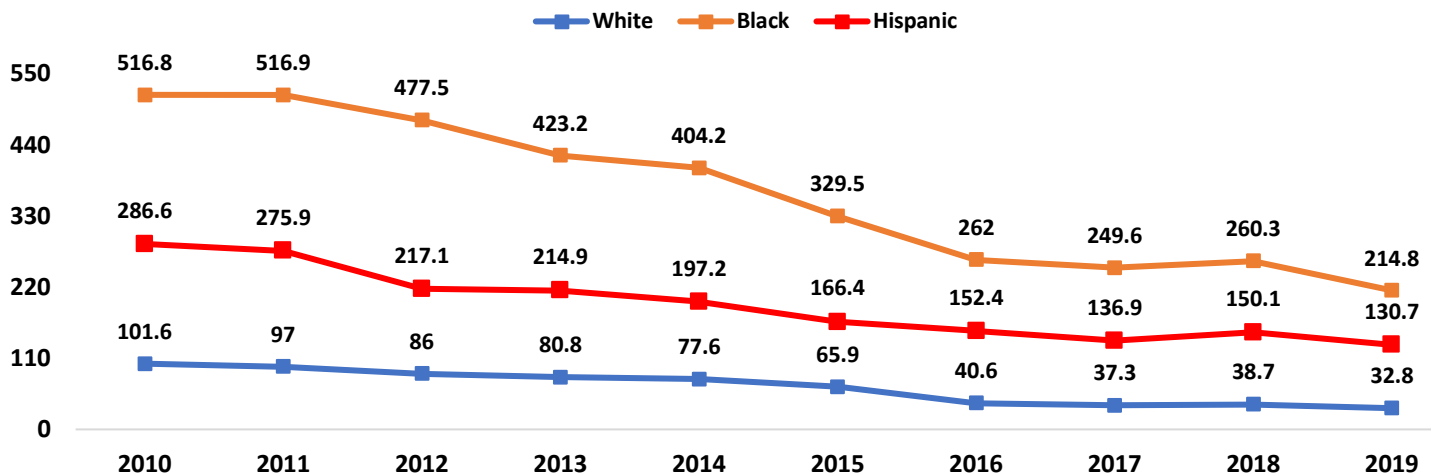
Over the 10-year period from 2010 to 2019, the age-adjusted asthma hospitalization rate declined 58%. The asthma hospitalization rate was higher in females than in males. Over the 10-year period, the hospitalization rate dropped 60% in females and 55% in males. In addition, the discrepancies in the asthma hospitalization rate between males and females narrowed. In 2010, the asthma hospitalization rate in females was 52% higher than in males, while in 2018, the rate in females was 36% higher than in males, with this gap dropping 16 percentage points (Figure 139).

Figure 139. Age-adjusted Asthma Hospitalization Rate (per 100,000) by Sex, PA, 2010-2019



From 2010 to 2019, the age-adjusted asthma hospitalization rate was highest in Blacks, followed by Hispanics and Whites. The hospitalization rate declined consistently among all racial/ethnic groups. The rate in Blacks declined 58% from 2010 to 2019. The rate in Whites and Hispanics declined 68% and 54%, respectively (Figure 140).

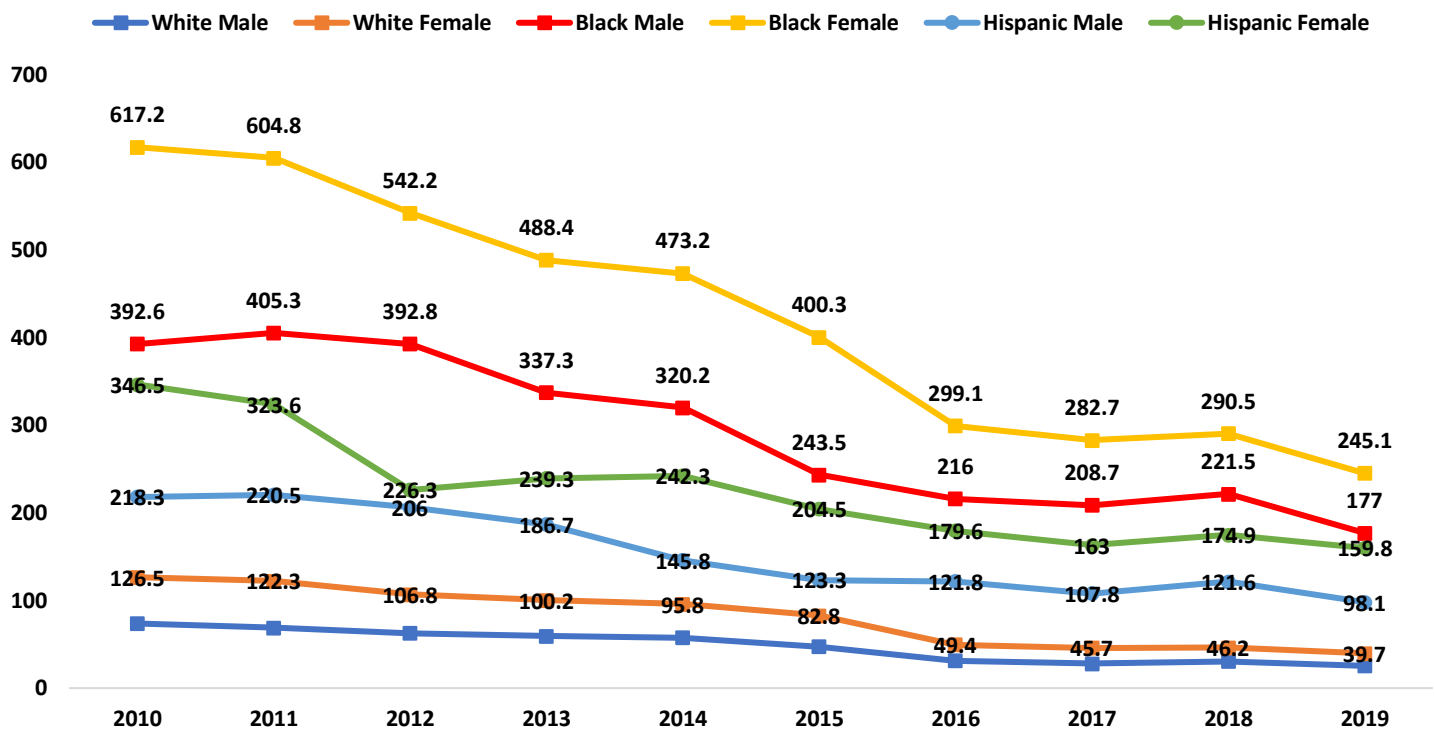
Figure 140. Age-adjusted Asthma Hospitalization Discharge Rate (per 100,000) by Race/Ethnicity, PA, 2010-2019



By sex and race/ethnicity, the age-adjusted asthma hospitalization rate was highest among Black females, followed by Black males, Hispanic females, Hispanic males, White females, and White males. The hospitalization rate declined across

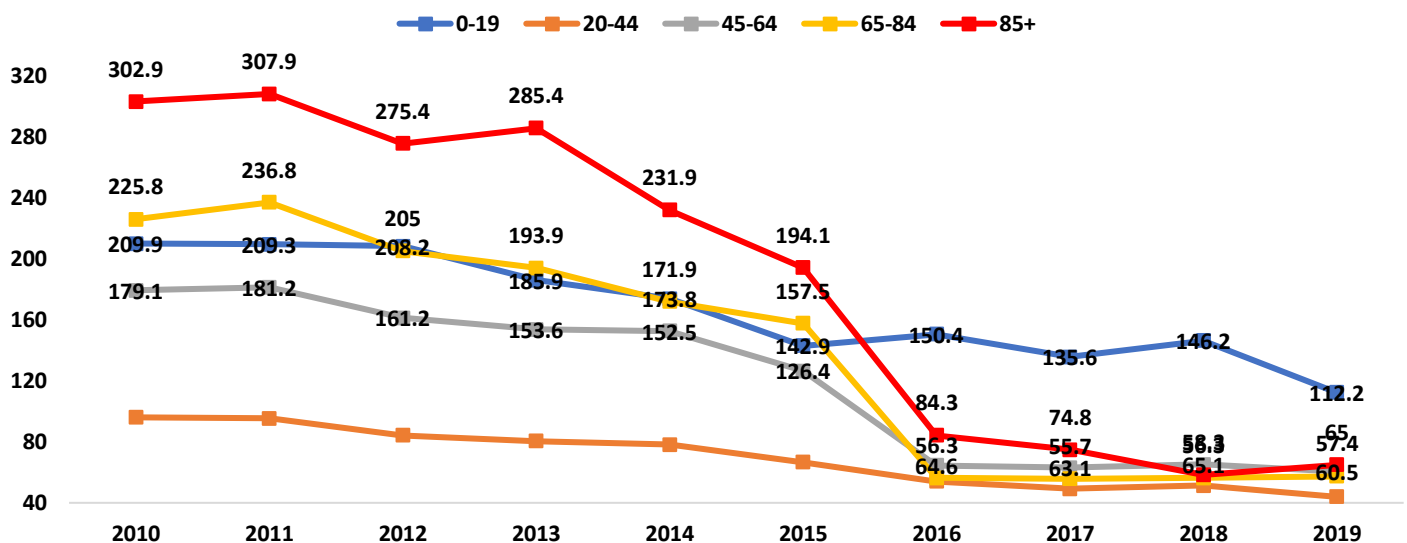
all subgroups from 2010 to 2019 (Figure 141).

Figure 141. Age-adjusted Asthma Hospitalization Rates (per 100,000) by Sex and Race/Ethnicity, PA, 2010-2019



From 2010 to 2019, the age-adjusted asthma hospitalization rate was highest among people aged 85 years or older, except between 2016 to 2019 when the hospitalization rate was highest among the youngest age group. The hospitalization rate declined across all age groups from 2010 to 2019 as follows: 78% in people 85 years or older, 75% in people 65 to 84 years, 66% in people 45 to 64 years, 54% in people 20 to 44 years, and 47% in those less than 20 years of age (Figure 142).

Figure 142. Asthma Hospitalization Rate (per 100,000) by Age Group, PA, 2010-2019



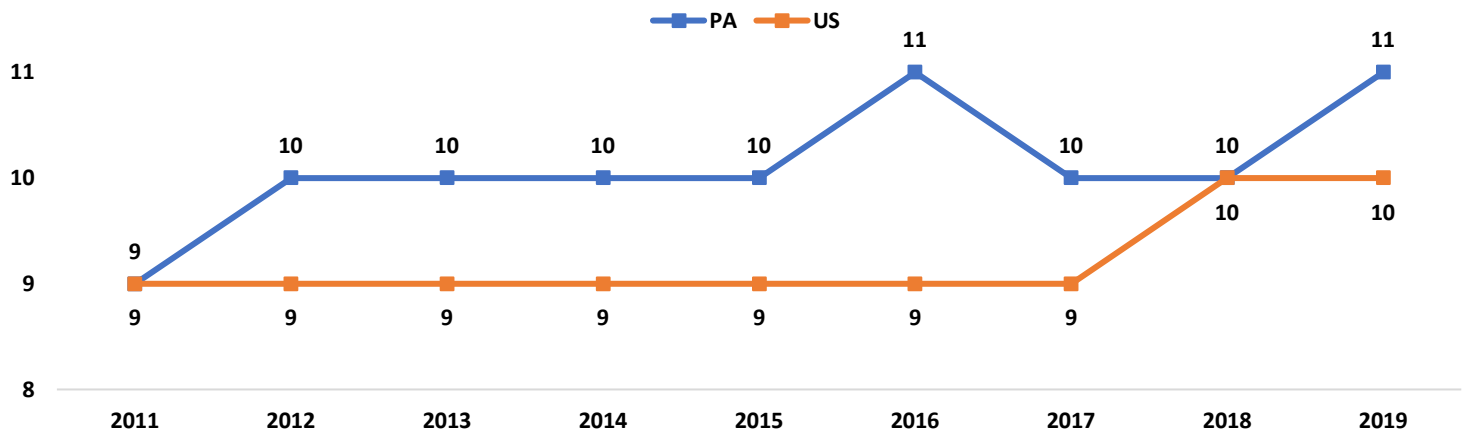
In summary, hospitalizations due to asthma declined in PA from 2010 to 2019. Over the 10-year period, the age-adjusted asthma hospitalization rate declined 58%. The asthma hospitalization rate was higher in females, Blacks (especially Black females), and people aged 85 years or older. In the most recent years, from 2016 to 2019, the asthma hospitalization rate became the highest in children and youths.

11.4 Asthma Prevalence Trend in Pennsylvania from BRFSS

More women than men have asthma in PA.

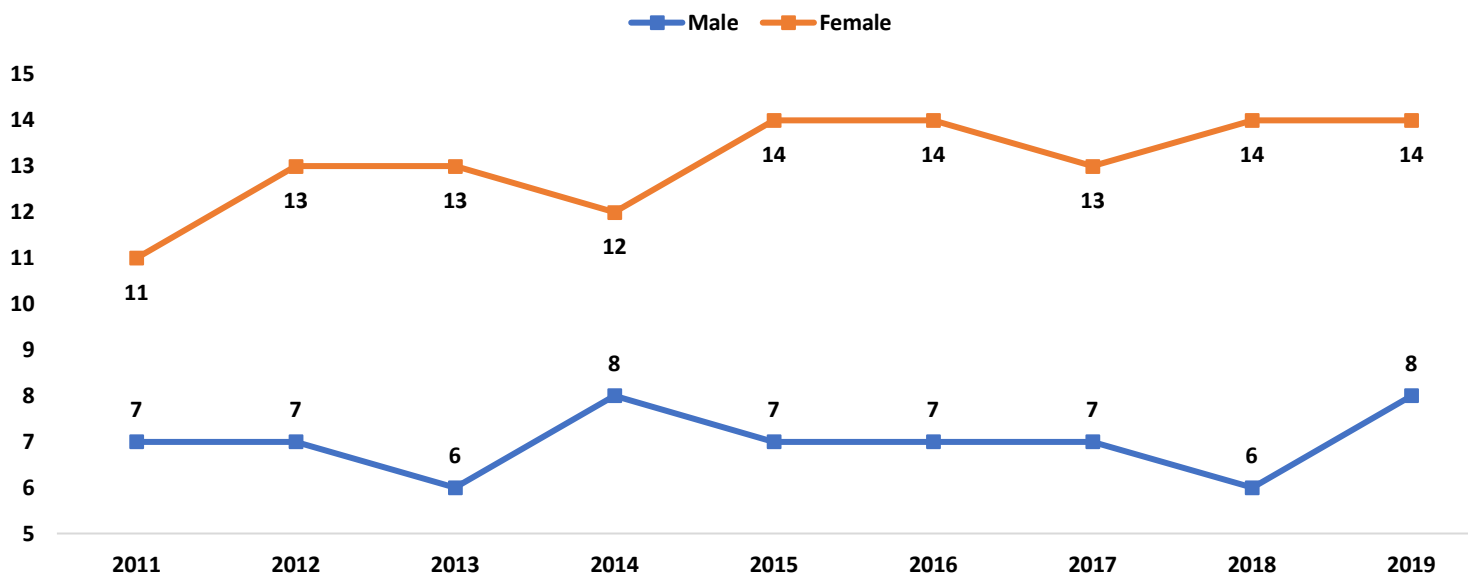
Figure 143 shows the percentage of adults who reported that they currently had asthma in PA and in the country from 2011 to 2019. In general, the percentage was consistently higher in PA than in the country throughout the nine-year period. The percentage increased in both PA and the country, with a 22% and a 11% increment in PA and in the country, respectively.

Figure 143. Percent of Adults 18 Years or Older Who Currently Have Asthma, PA vs. US, 2011–2019



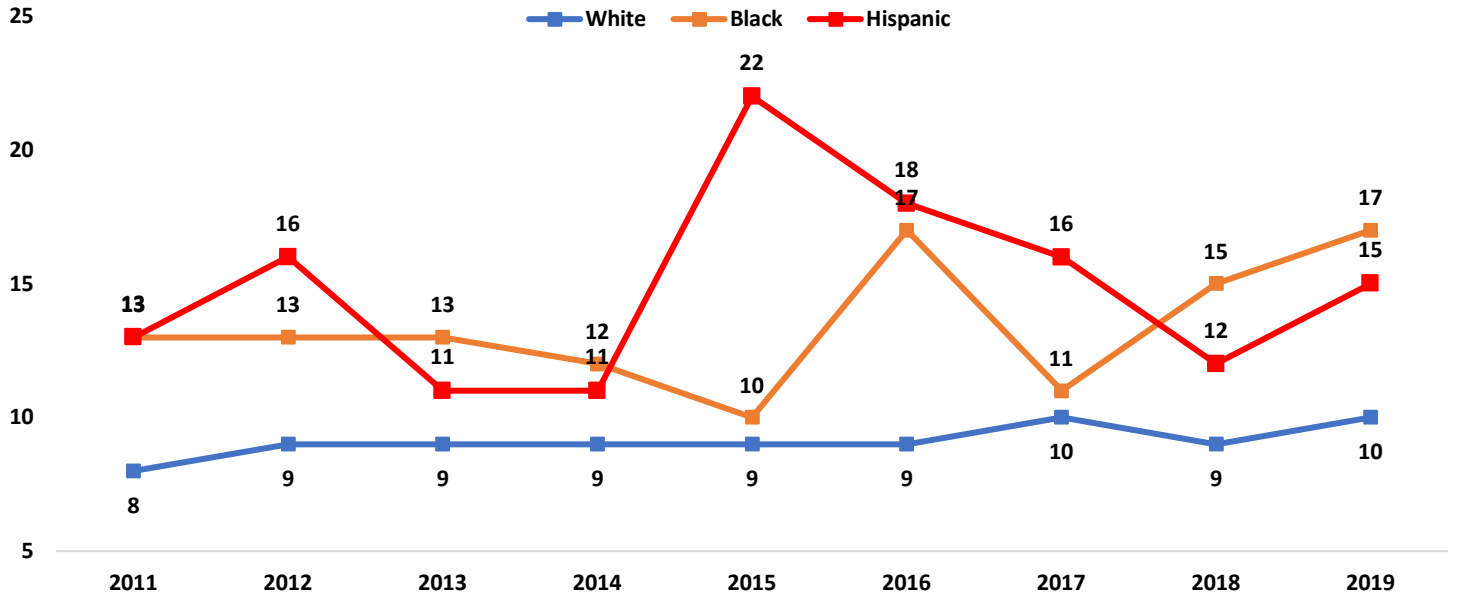
By sex, current asthma prevalence was higher in females than in males in PA. The prevalence increased 27% in females and 14% in males, respectively, from 2011 to 2019 (Figure 144).

Figure 144. Percent of Adults 18 Years or Older Who Currently Have Asthma by Sex, PA, 2011–2019



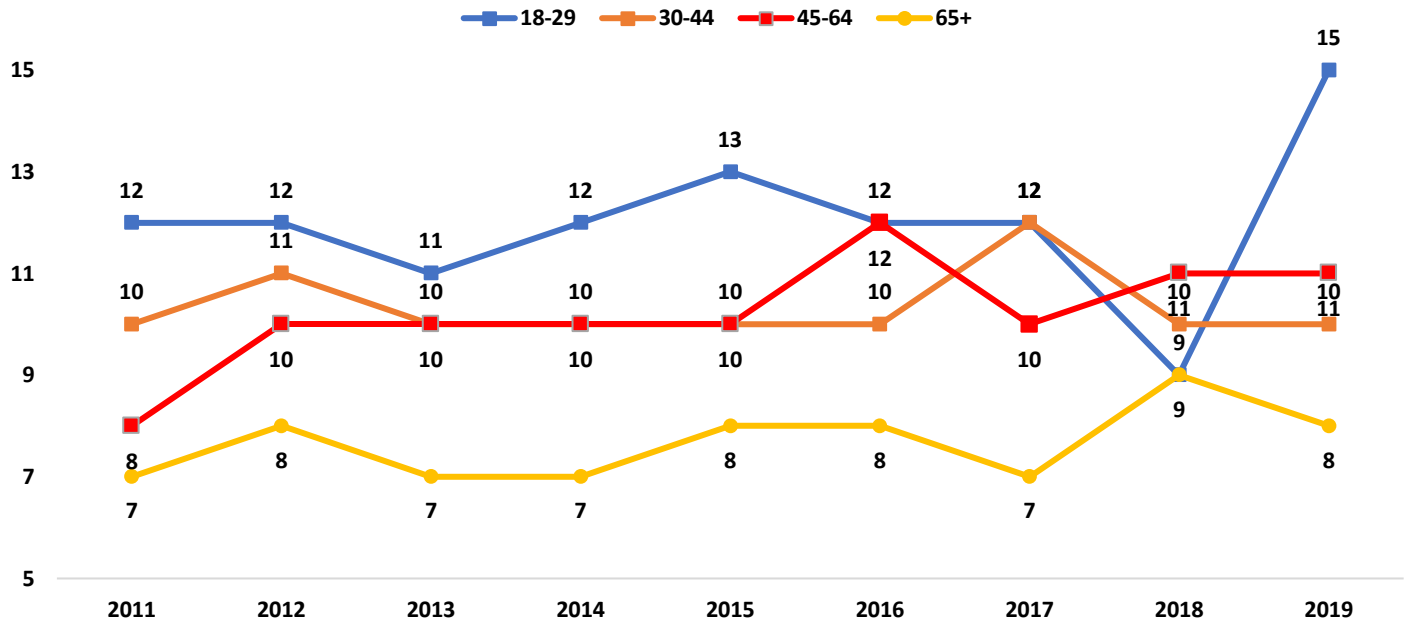
By race and ethnicity, current asthma prevalence was higher among Hispanics and Blacks from 2011 to 2019. The prevalence was lowest in Whites compared to Hispanics and Blacks. During the nine-year period, the current asthma prevalence increased 25% in Whites, 31% in Blacks, and 15% in Hispanics (Figure 145).

Figure 145. Percent of Adults 18 Years or Older Who Currently Have Asthma by Race/Ethnicity, PA, 2011–2019



By age group, current asthma prevalence was highest in young adults 18 to 29 years of age in most of the years from 2010 to 2019, followed by adults 30 to 44 years of age and adults 45 to 64 years of age. Current asthma prevalence was the lowest in adults 65 years or older. The prevalence remained relatively stable in adults aged 30 to 44 and 65 or older. In adults aged 18 to 29 and 45 to 64, the prevalence increased 25% and 38%, respectively (Figure 146).

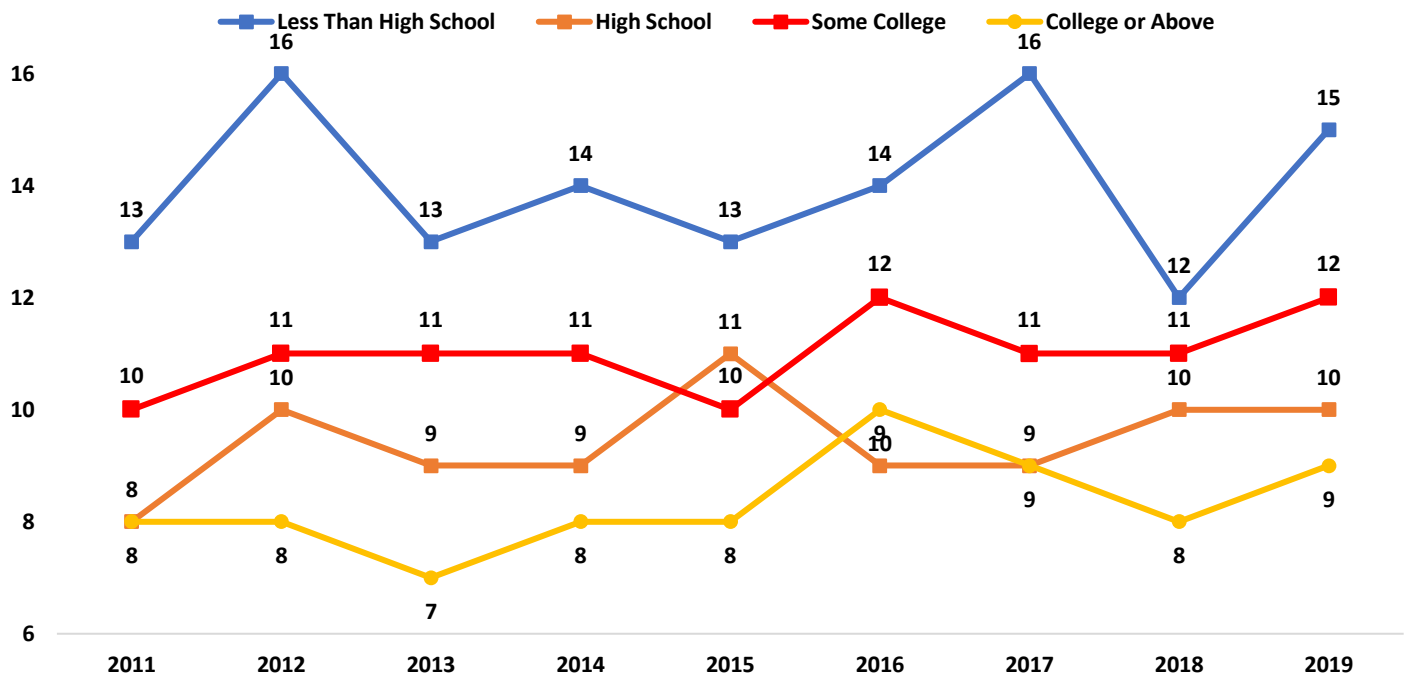
Figure 146. Percent of Adults 18 Years or Older Who Currently Have Asthma by Age Group, PA, 2011–2019



By education, current asthma prevalence was highest in adults with less education than a high school diploma, followed by adults with some college education, a high school diploma, and a college degree or above in PA from 2011 to 2019.

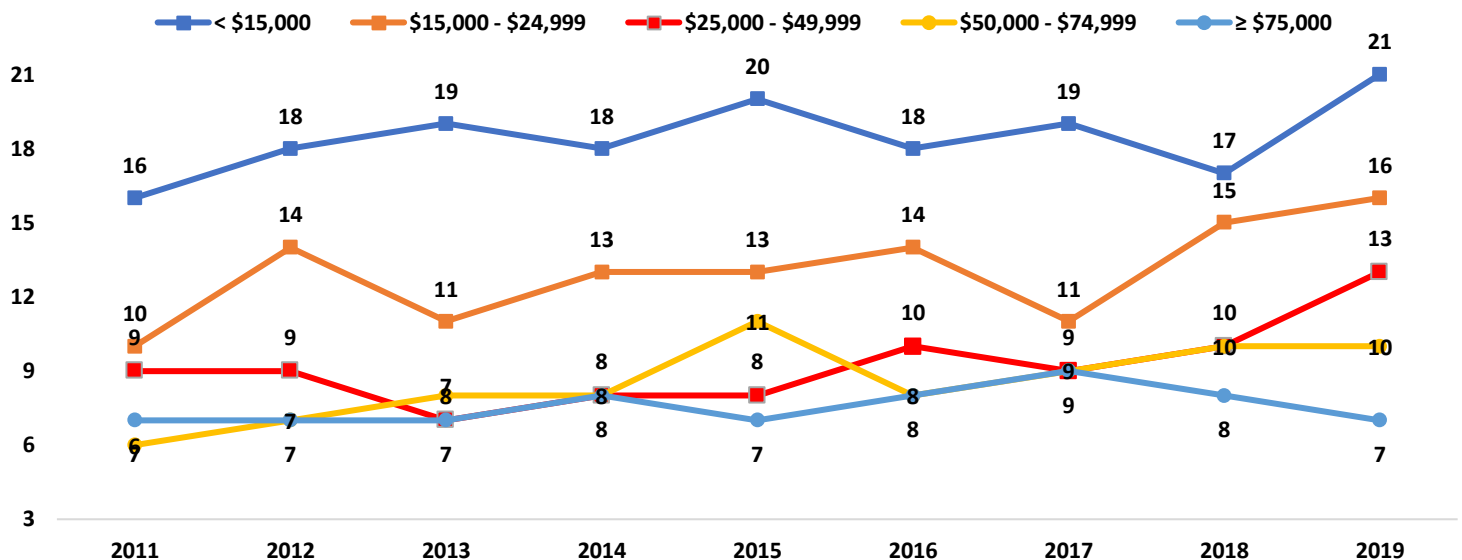
The prevalence fluctuated in all age groups over the nine-year period and it increased 15%, 25%, 20%, and 13% in adults with educational attainment from low to high (Figure 147).

Figure 147. Percent of Adults 18 Years or Older Who Currently Have Asthma by Education, PA, 2011–2019



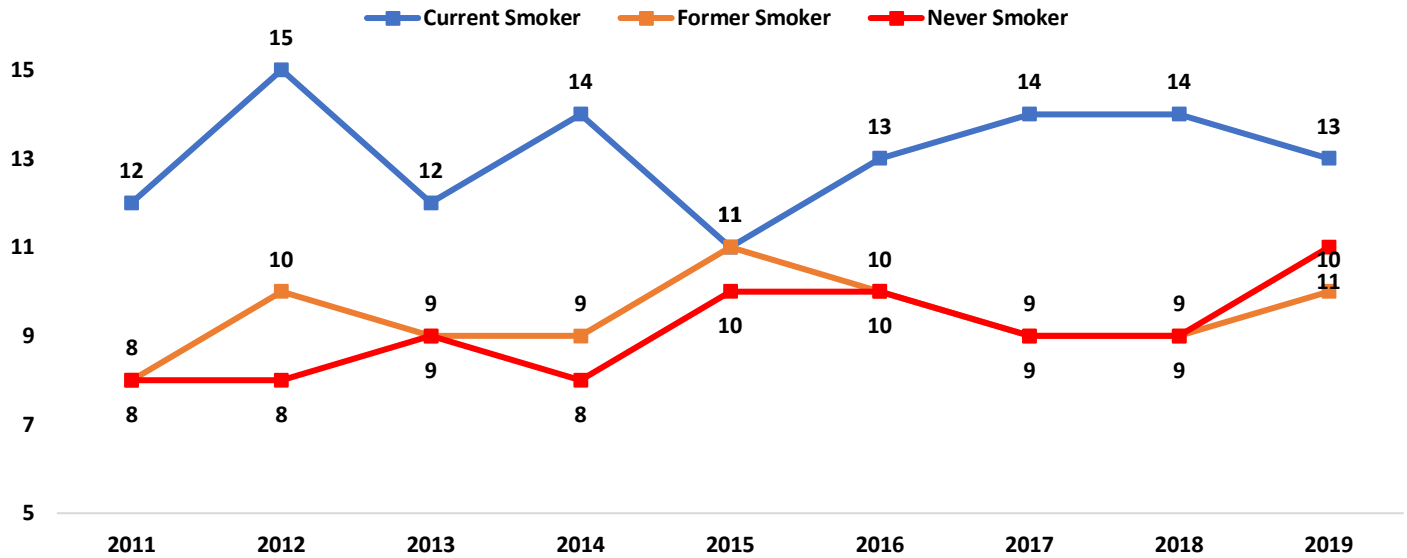
The relationship between asthma and income follows a similar pattern as between asthma and education. The prevalence of asthma was highest among adults with the lowest level of income, and the prevalence decreased as income level increased. Over the nine-year period from 2011 to 2019, the prevalence of asthma remained steady in adults with income of \$75,000 or more, yet it increased 31%, 60%, 44%, and 67% in adults with income of less than \$15,000, \$15,000 – \$24,999, \$25,000 - \$49,999, and \$50,000 - \$74,999, respectively (Figure 148).

Figure 148. Percent of Adults 18 Years or Older Who Currently Have Asthma by Annual Household Income, PA, 2011–2019



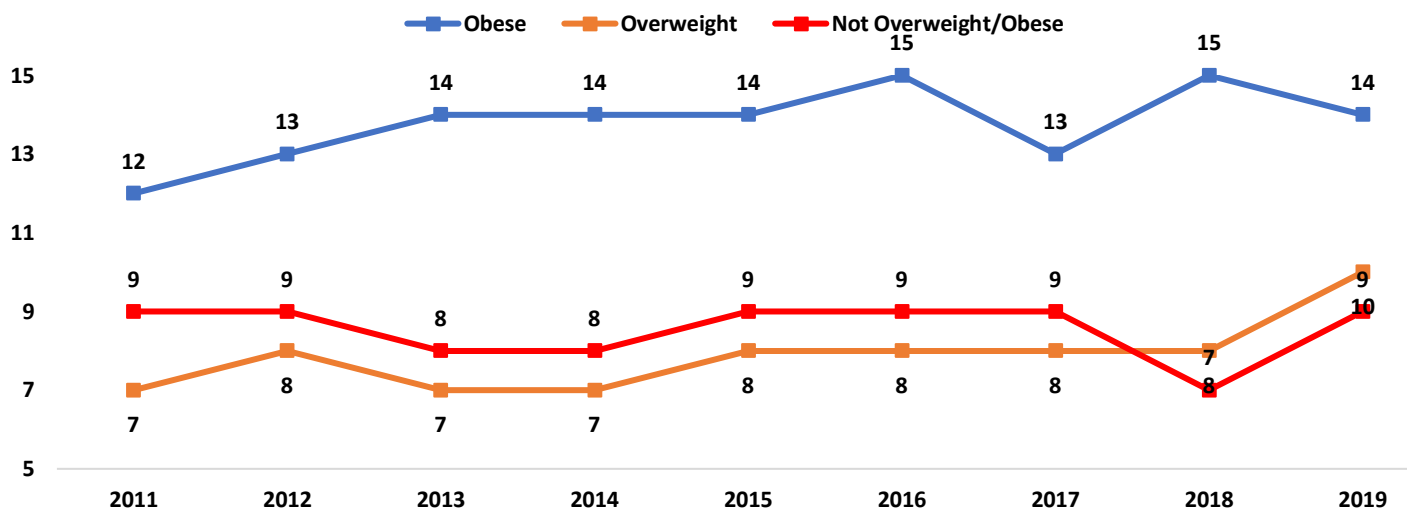
By smoking status, current asthma prevalence was highest among current smokers in PA from 2011 to 2019. The prevalence was lower and did not differ much between former and never smokers. Despite fluctuations, the prevalence increased 8% in current smokers, 25% in former smokers, and 38% in never smokers over the nine-year period (Figure 149).

Figure 149. Percent of Adults 18 Years or Older Who Currently Have Asthma by Smoking Status, PA, 2011–2019



By body weight status, current asthma prevalence was highest among adults who were obese in PA from 2011 to 2019. The prevalence was lower and did not differ much among adults who were not obese. Over the nine-year period, the prevalence of asthma increased 17% and 43% among adults who were obese and adults who were overweight, respectively. The prevalence remained steady among adults who were neither obese nor overweight (Figure 150).

Figure 150. Percent of Adults 18 Years or Older Who Currently Have Asthma by Body Weight, PA, 2011–2019



In summary, the prevalence of asthma increased 22% in PA from 2011 to 2019. The prevalence was higher among females, Blacks and Hispanics, young adults, people with lower education or income, current smokers, and people who were not obese.

12. Diabetes Mellitus

12.1 General Description of Diabetes Mellitus

Diabetes mellitus in this section is defined as a condition associated with ICD-10 codes of E10-E14 or ICD-9 codes of 250.

Diabetes is a disorder marked by high levels of blood glucose resulting from defects in insulin production or action. People with diabetes cannot properly move blood glucose (from consumption of carbohydrates) into cells for use as energy. Diabetes can lead to serious complications including heart disease, vision loss, and kidney disease, but people with diabetes can take steps to control the disease and lower the risk of complications.

There are three major types of diabetes: type 1, type 2, and gestational diabetes (diabetes while pregnant).

Type 1 diabetes is also known as insulin-dependent diabetes mellitus (IDDM) or juvenile-onset diabetes. Type 1 diabetes is thought to be caused by an autoimmune reaction that leads to the damage of the insulin-producing cells in the pancreas. In Type 1 diabetes, the pancreas makes little or no insulin, so sugar cannot get into the body's cells for use as energy. People with Type 1 diabetes must use insulin injections to control their blood glucose. Type 1 is the most common form of diabetes in people under age 30, but it can occur at any age. Among people with diabetes, approximately 10% have Type 1 diabetes. At present, there is no known way to prevent type 1 diabetes.

Type 2 diabetes is also called non-insulin-dependent diabetes or adult-onset diabetes. In type 2 diabetes, the pancreas produces reduced or normal levels of insulin, but the body develops resistance to the action of insulin, which leads to insufficient insulin to meet the body's needs. As type 2 diabetes progresses, the insulin-producing ability of the pancreas usually decreases. Approximately 90% of people with diabetes have type 2 diabetes. Previously type 2 diabetes was very rare among children and teens, but it has become more common in young people over the past two decades, likely due to the increase of being overweight or obese among young people. People with type 2 diabetes may not notice symptoms in the early stage, so it's important to get blood sugar tested regularly for people at high risk. Type 2 diabetes can be prevented or delayed with a healthy lifestyle, such as losing weight, eating healthy food, and being physically active.

Gestational diabetes occurs in the middle or late stage of pregnancy, which often induces some form of insulin resistance. Because a woman's blood sugars travel through her placenta to the baby, it's important to control gestational diabetes to protect the baby's growth and development. Gestational diabetes usually resolves after birth, but the risk for developing type 2 diabetes may increase in the mother later in life. The baby may be at higher risk for obesity and diabetes later in life. Gestational diabetes occurs in approximately 2% to 10% of pregnancies.

In addition to the above three types of diabetes, it is noteworthy to mention prediabetes, which is a serious health condition where blood sugar levels are higher than normal, but not high enough to be diagnosed as type 2 diabetes. Prediabetes increases the risk of developing type 2 diabetes, heart disease, and stroke. For people with prediabetes, the CDC-led National Diabetes Prevention Program (DPP) can help individuals make lifestyle changes to prevent or delay type 2 diabetes and other serious health problems. The National DPP builds partnerships between public and private organizations to offer evidence-based, cost-effective interventions that help prevent type 2 diabetes in communities

across the US. The National DPP focuses on lifestyle changes, including healthy eating and physical activity, which can cut the risk of developing type 2 diabetes by 58%.³⁹

Although the exact causes of diabetes have not been fully established, some factors may increase the risk of developing diabetes, including a family history of diabetes or a personal history of gestational diabetes, history of autoimmune diseases, injury to the pancreas, high blood pressure, older age, smoking, overweight or obesity, and lack of physical activity.

Thus far there is not a cure for diabetes. Using insulin is the primary way of controlling blood glucose for most patients. Weight control, eating healthy food, and being physically active can prevent and slow the development of diabetes and the related complications.

In the US, more than 34 million people have diabetes, and one in four of them do not know they have it. In addition, more than 88 million adults (i.e., one in three adults) have prediabetes, and 90% of them do not know they have it. The total estimated cost of diagnosed diabetes was \$327 billion in 2017. In PA, diabetes is the seventh leading cause of death. In 2018, 3,605 Pennsylvanians died of diabetes.⁴⁰

12.2 Mortality Trend for Diabetes in Pennsylvania

Figure 151 displays the trend for the age-adjusted diabetes mortality rate in PA and the US from 2010 to 2019. In PA, the age-adjusted diabetes mortality rate increased consecutively from 19.6 per 100,000 in 2010 to 22.6 per 100,000 in 2013. After 2013, the rate decreased with some fluctuation to 20.4 per 100,000 in 2019, which was slightly higher than the rate in 2010. Compared to PA, the age-adjusted diabetes mortality rate in the US remained relatively stable with a slight increase over the 10-year period (20.8 per 100,000 in 2010 vs. 21.6 per 100,000 in 2019). In 2010 and 2011, the rate in PA was lower than the rate in the US, but from 2012 to 2015, the rate in PA was higher than the rate in the US. After 2015, the rate in PA was again lower than the rate in the US (Figure 151).

Figure 151. Age-adjusted Diabetes Mortality Rate (per 100,000), PA vs. US, 2010-2019

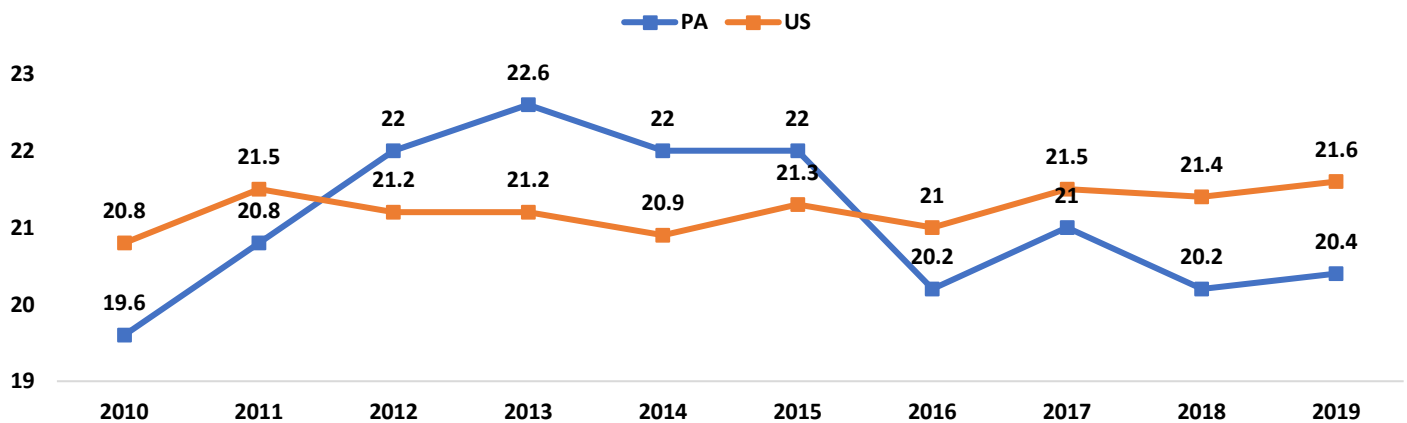
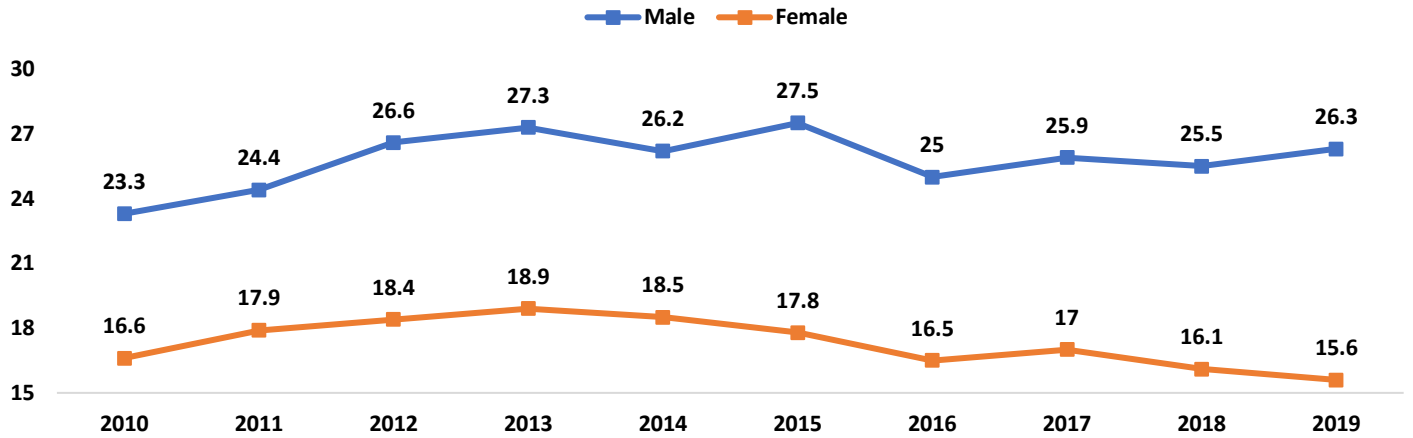


Figure 152 shows the trend for the age-adjusted diabetes mortality rate by sex in PA from 2010 to 2019. Overall, the mortality rate in males was consistently higher than the rate in females from 2010 to 2019. Despite some fluctuations, the rate in males increased from 23.3 per 100,000 in 2010 to 26.3 per 100,000 in 2019, equivalent to a 13% increase. The rate in females, however, displays different trends over the 10-year period than the rate in males. From 2010 to 2013, the rate increased from 16.6 per 100,000 in 2010 to 18.9 per 100,000 in females. After 2013, the rate in females decreased consecutively except between 2016 and 2017. Overall, the rate in females decreased 6% from 2010 to 2019 (Figure 152).

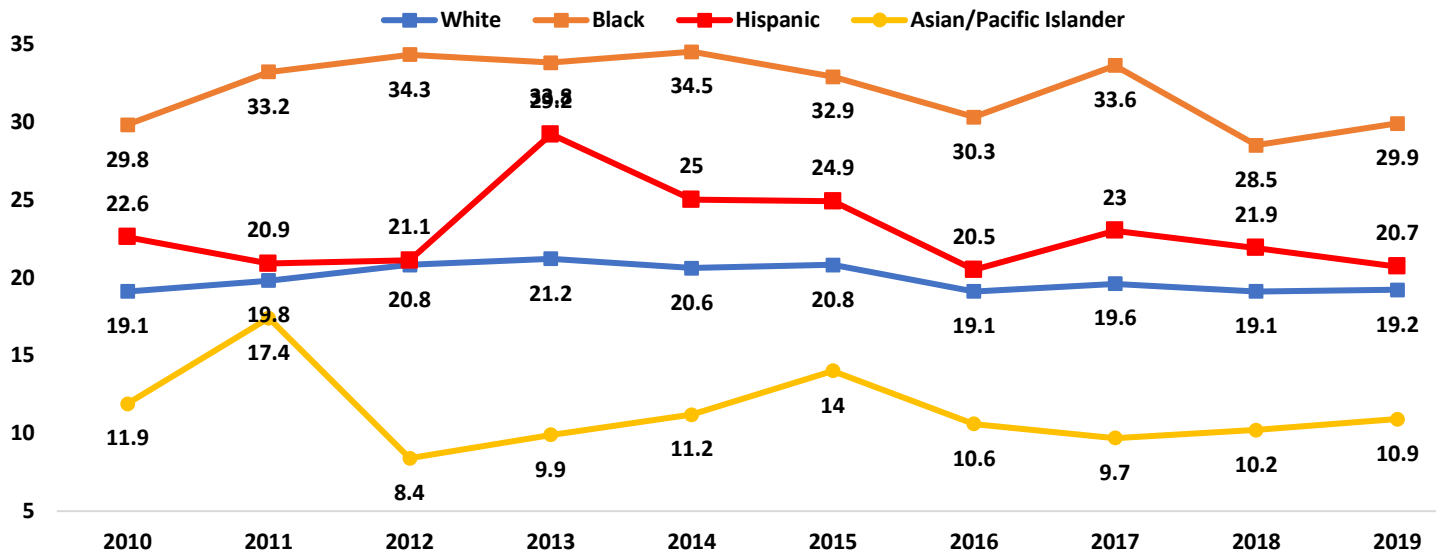
Each year, more men than women die from diabetes in PA.

Figure 152. Age-adjusted Diabetes Mortality Rates (per 100,000) by Sex, PA, 2010-2019



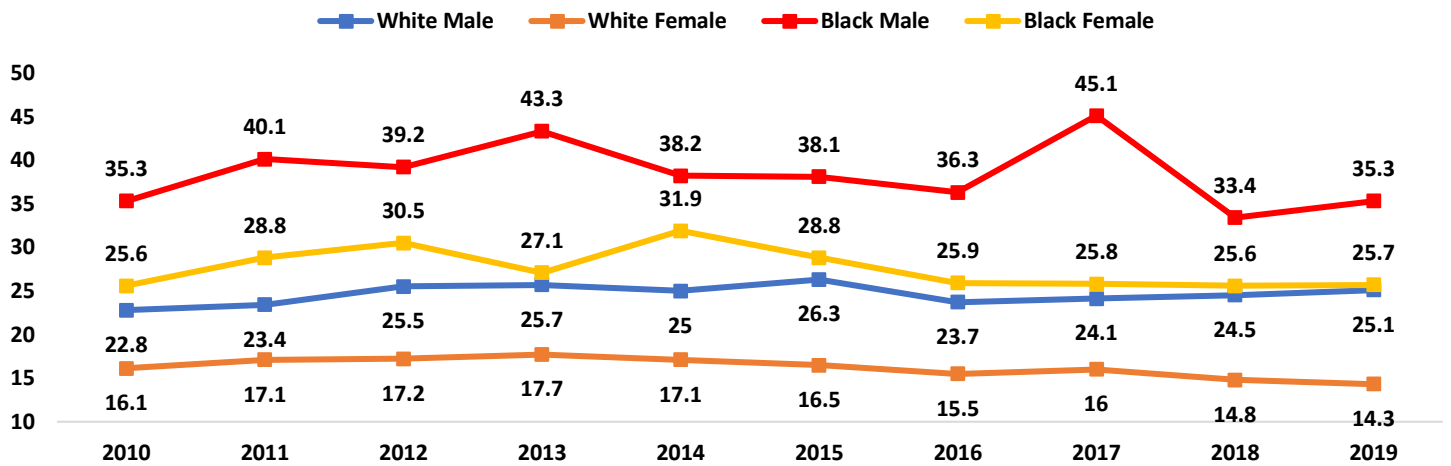
By race/ethnicity, Blacks consistently had the highest age-adjusted diabetes mortality rate from 2010 to 2019, followed by Hispanics, Whites, and Asians/Pacific Islanders. Over the 10-year period, changes in the mortality rate varied across racial/ethnic groups. In Blacks, the rate increased from 29.8 per 100,000 in 2010 to 34.5 per 100,000 in 2014 and then declined to 29.9 per 100,000 in 2019, similar to the level in 2010. The mortality rate in Hispanics first declined from 2010 to 2012 and then increased substantially in 2013, after which the rate generally decreased from 2013 to 2019. The overall rate change in Hispanics represented a 8% drop from 2010 to 2019. In Whites, the mortality rate increased slightly from 2010 to 2013 and then from 2013 to 2019 dropped slowly to the same level as in 2010. The mortality rate in Asians/Pacific Islanders fluctuated over the 10-year period and eventually dropped to 10.9 per 100,000 in 2019, representing an 8% decrease (Figure 153).

Figure 153. Age-adjusted Diabetes Mortality Rate (per 100,000) by Race/Ethnicity, PA, 2010-2019



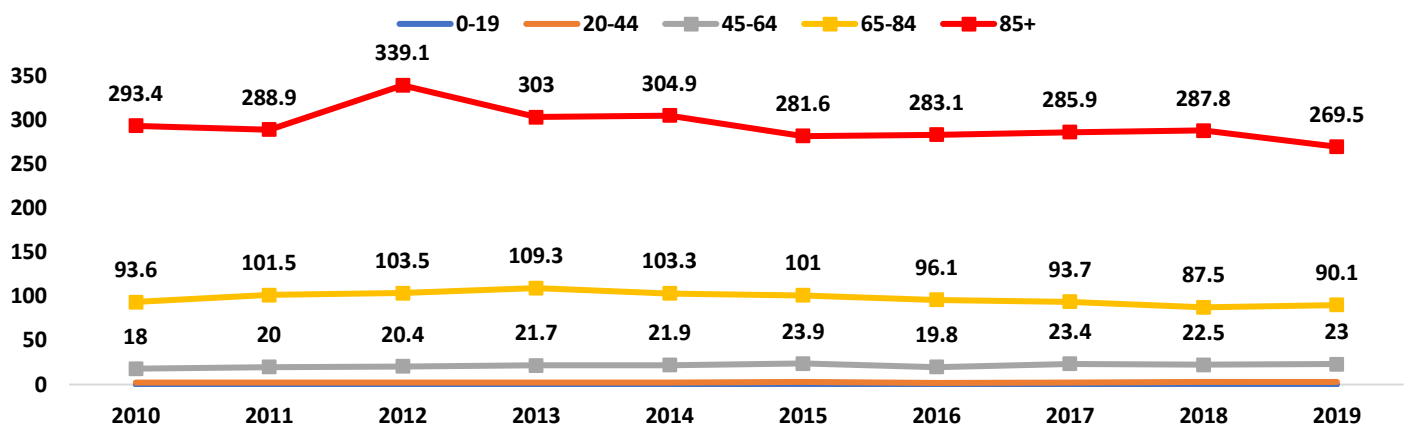
By sex and race/ethnicity, Black males had the highest age-adjusted diabetes mortality rate, followed by Black females, White males, and White females. Over the 10-year period from 2010 to 2019, the mortality rate remained largely unchanged in Black males and Black females. The rate increased 10% in White males but decreased 11% in White females (Figure 154).

Figure 154. Age-adjusted Diabetes Mortality Rate (per 100,000) by Sex and Race/Ethnicity, PA, 2010-2019



By age group, the diabetes mortality rate was highest among people 85 years of age or older, followed by those 65 to 84 years of age and 45 to 64 years of age from 2010 to 2019. Among people 85 years of age or older, the mortality rate dropped from 293.4 per 100,000 in 2010 to 269.5 per 100,000 in 2019, reflecting an 8% decrease. The mortality rate also dropped among people 65 to 84 years of age, decreasing from 93.6 per 100,000 in 2010 to 90.1 per 100,000 in 2019, equivalent to a 4% decline. Contrary to these two groups, the diabetes mortality rate increased 28% among people 45 to 64 years of age, up from 18 per 100,000 in 2010 to 23.0 per 100,000 in 2019. The diabetes mortality rate in people aged 20 to 44 years increased 21%, up from 2.4 per 100,000 in 2010 to 2.9 per 100,000 in 2019 (Figure 155).

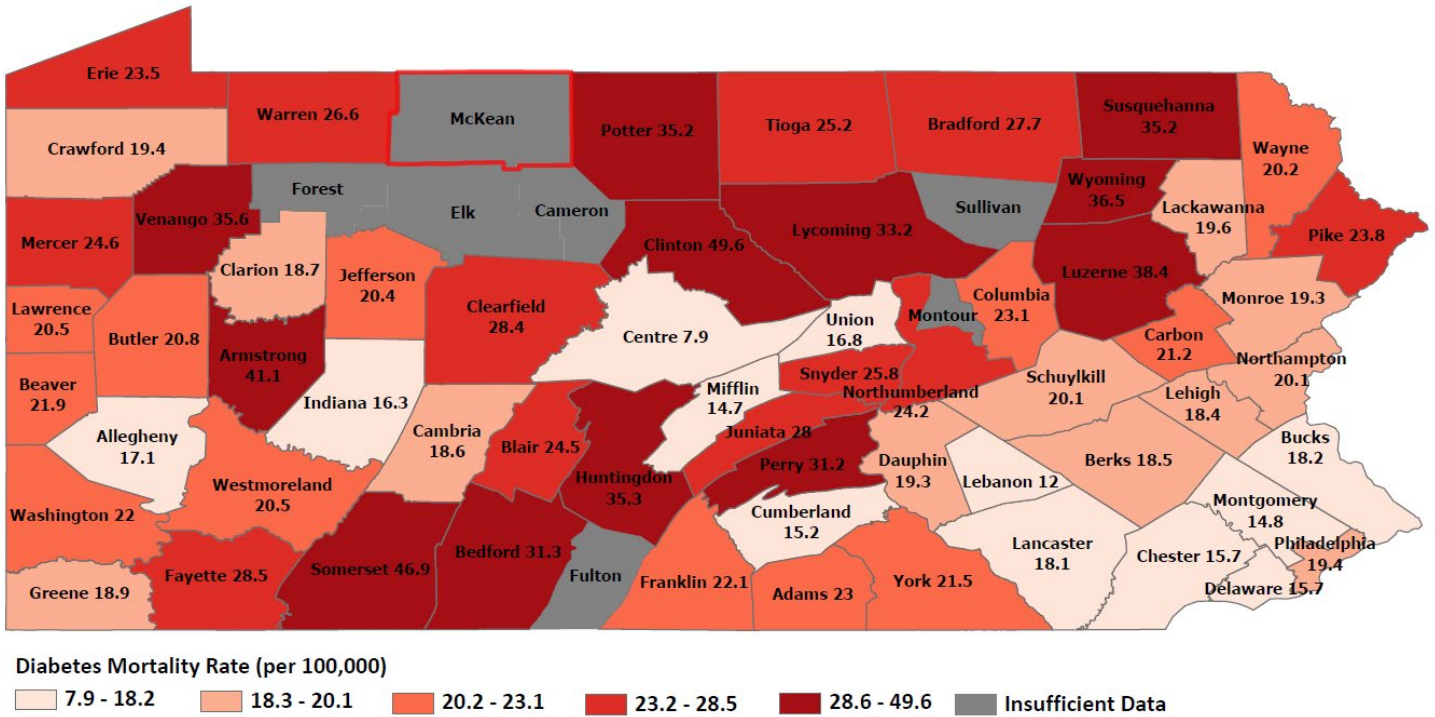
Figure 155. Diabetes Mortality Rate (per 100,000) by Age Group, PA, 2010-2019



Geographically, the age-adjusted diabetes mortality rate varied across PA. As displayed in Map 10, counties in the central and northern parts of the state had the highest level of diabetes mortality (28.6-49.6 per 100,000) in 2019. Specifically, the following 12 counties had the highest age-adjusted diabetes mortality rate in the respective region: Clinton, Lycoming, and Potter in the Northcentral Region; Luzerne, Susquehanna, and Wyoming in the Northeast region; Venango in the Northwest region; Bedford, Huntingdon, and Perry in the Southcentral region; and Armstrong and Somerset in the Southwest region.

In summary, diabetes mortality in PA increased from 2010 to 2013 and then dropped from 2013 to 2018. Overall, the mortality rate in 2018 was slightly higher than the rate in 2010. The diabetes mortality rate was higher in men, Blacks (especially Black males), and people at older ages. Geographically, some counties in the central, northern and northeastern areas had higher diabetes mortality rates.

Map 10. Age-adjusted Diabetes Mortality Rate (per 100,000) by County in PA, 2019

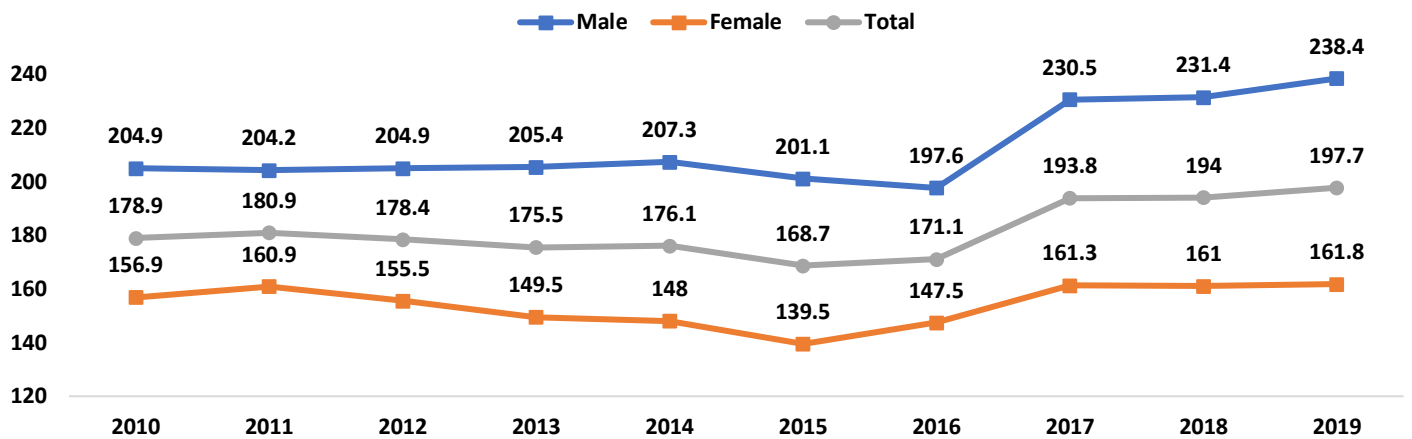


12.3 Hospitalization Trend for Diabetes in Pennsylvania

From 2010 to 2019, approximately 179 to 198 people per 100,000 were hospitalized for diabetes per year. Overall, the age-adjusted diabetes hospitalization rate increased 11%, up from 178.9 per 100,000 in 2010 to 197.7 per 100,000 in 2019. The hospitalization rate in males was consistently higher than the rate in females from 2010 to 2019. In addition, the rate in males increased 16%, up from 204.9 per 100,000 in 2010 to 238.4 per 100,000 in 2019, and the rate in females increased 3%, up from 156.9 per 100,000 in 2010 to 161.8 per 100,000 in 2019. In 2010, the hospitalization rate in males was 31% higher than the rate in females, and in 2019, this difference increased to 47% (Figure 156).

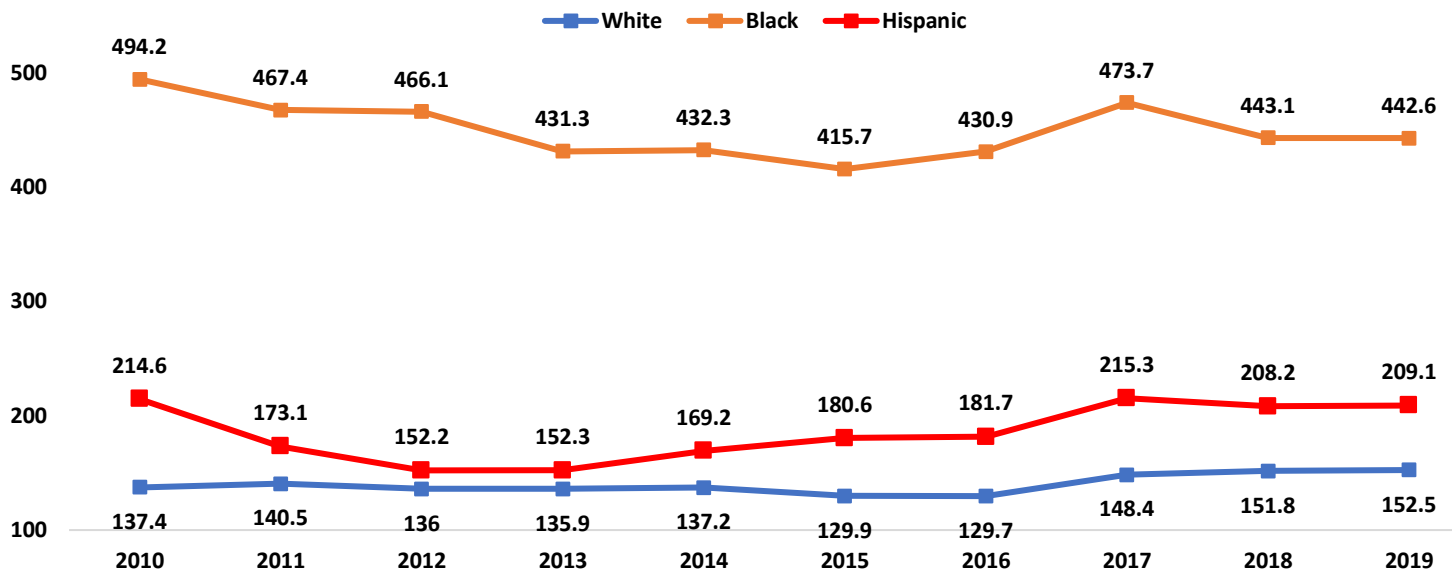
Each year, more men than women are hospitalized for diabetes in PA.

Figure 156. Age-adjusted Diabetes Hospitalization Rate (per 100,000) by Sex, PA, 2010-2019



Sufficient hospitalization data for diabetes were available for analysis for Whites, Blacks and Hispanics from 2010 to 2019. Differences in the age-adjusted diabetes hospitalization rates were clear among these three racial/ethnic populations. Over the nine-year period from 2010 to 2019, the rate was consistently highest in Blacks, followed by Whites and Hispanics. The hospitalization rate decreased 10% in Blacks and 3% in Hispanics but increased 11% in Whites from 2010 to 2019 (Figure 157).

Figure 157. Age-adjusted Diabetes Hospitalization Rate (per 100,000) by Race/Ethnicity, PA, 2010-2019



By sex and race/ethnicity, the age-adjusted diabetes hospitalization rate was highest in Black males, followed by Black females and Hispanic males. The rates in White males and Hispanic females were very similar. The rate in White females was the lowest among the six racial and ethnic groups. Although the age-adjusted diabetes hospitalization rate was highest in Black males and females, the rate showed a trend of decline in Black males and females from 2010 to 2019. The rate dropped from 558.2 per 100,000 in 2010 to 530.3 per 100,000 in 2019 in Black males, decreasing 5%. In Black females, the rate dropped from 445.3 per 100,000 in 2010 to 374.9 per 100,000 in 2019, decreasing 16%. The rate in Hispanic males and females also decreased 3% and 4%, respectively. The age-adjusted diabetes hospitalization rate, however, increased 17% in White males and 3% in White females (Figure 158).

Figure 158. Age-adjusted Diabetes Hospitalization Rate (per 100,000) by Sex and Race/Ethnicity, PA, 2010-2019

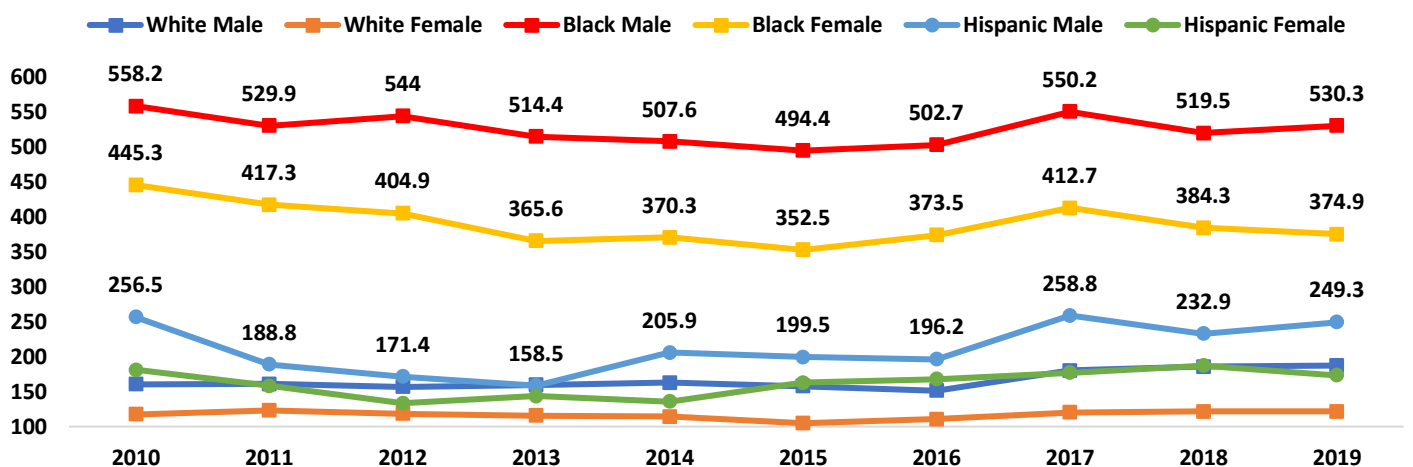
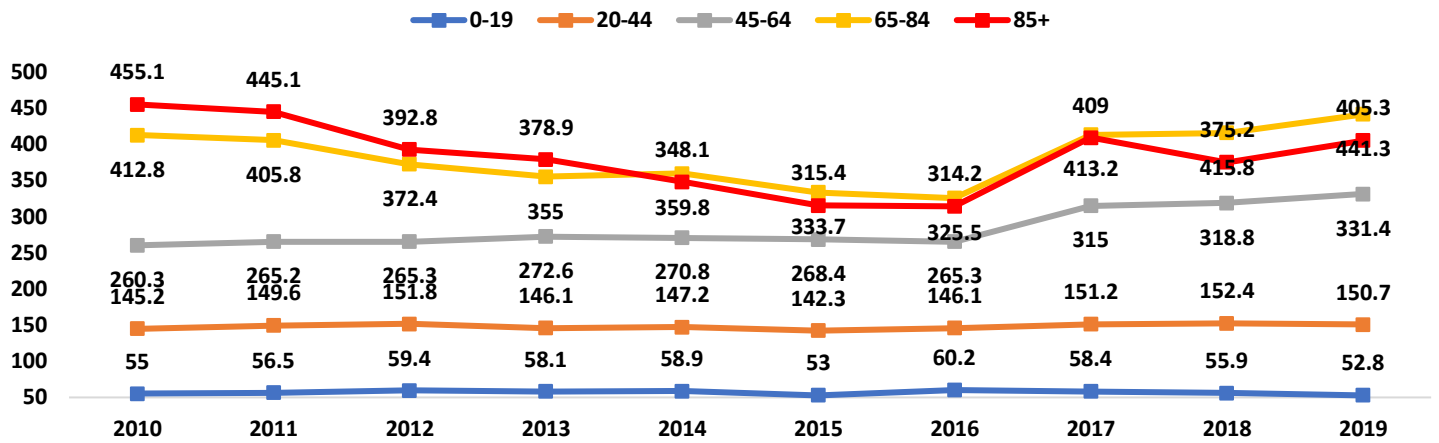


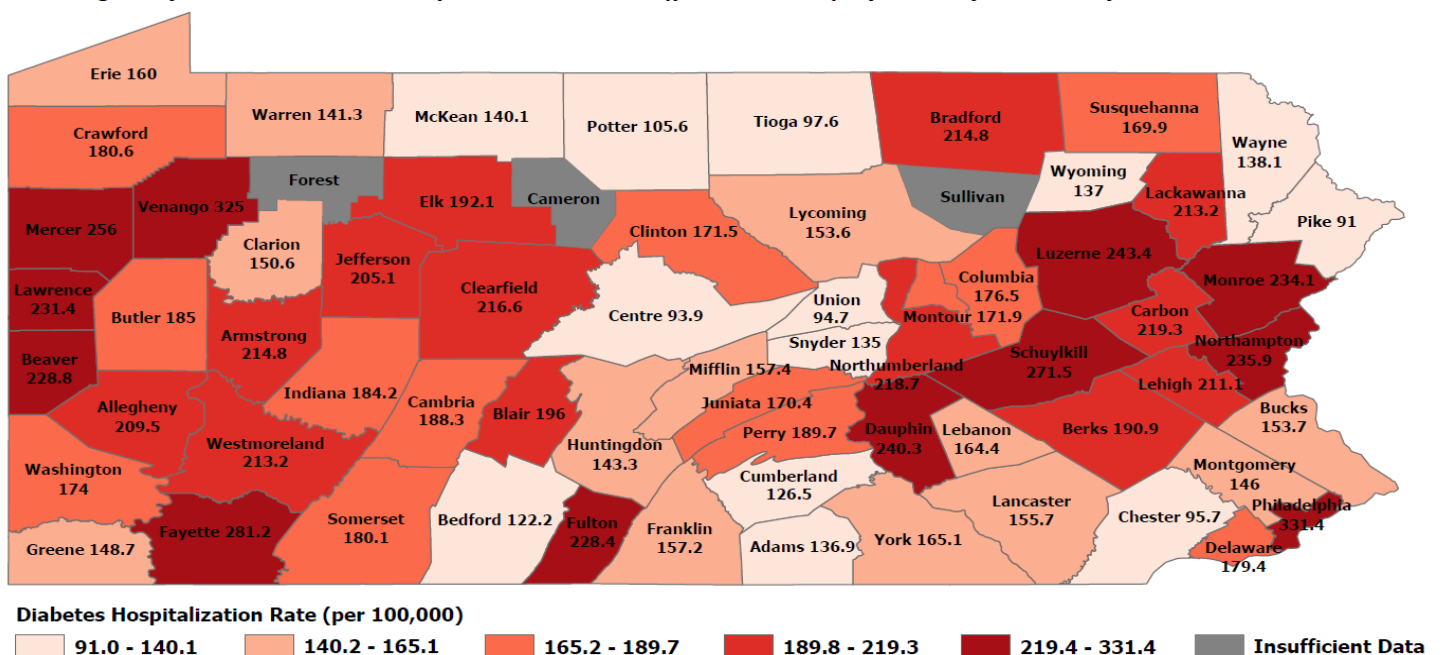
Figure 159 shows the age-adjusted diabetes hospitalization rate by age group in PA. The rate was highest in people aged 65 years or older, followed by each of the younger groups. In terms of trending over years, the diabetes hospitalization rate increased 27% among those 45 to 64 years of age over the 10-year period, while the rate declined or increased to a small extent in other age groups. In addition, for those aged 65 years or older, the rate initially decreased between 2010 and 2016 but then increased between 2016 and 2019. Overall, the diabetes hospitalization rate increased substantially in the three oldest age groups from 2016 to 2019. The increase was 25%, 36%, and 29% in those aged 45 to 64 years, 65 to 84 years, and 85 years or older, respectively (Figure 159).

Figure 159. Diabetes Hospitalization Rate (per 100,000) by Age Group, PA, 2010-2019



Map 11 displays the geographic distribution of age-adjusted diabetes hospitalization rate by county in PA in 2019. As shown in the map, more counties in the eastern and western parts of the state had the highest diabetes hospitalization rates (219.4-331.4 per 100,000). Specifically, the following 12 counties had the highest diabetes hospitalization rates in 2019: Luzerne, Monroe, and Northampton in the Northeast Region; Lawrence, Mercer, and Venango in the Northwest Region; Dauphin and Fulton in the Southcentral Region; Philadelphia and Schuylkill in the Southeast Region; and Beaver and Fayette in the Southwest Region.

Map 11. Age-adjusted Diabetes Hospitalization Rate (per 100,000) by County in PA, 2019



In summary, hospitalization due to diabetes increased in PA in the past decade. The age-adjusted hospitalization rate increased 11% from 2010 to 2019. The hospitalization rate was higher in males, Blacks (especially Black males) and the elderly. Geographically, there were disparities in the diabetes hospitalization rate across counties in PA.

12.4 Diabetes Prevalence Trend in Pennsylvania from BRFSS

In BRFSS, respondents were asked if they had ever been told by their doctors that they had diabetes. Figure 160 shows the prevalence of diabetes (i.e., ever been told by their doctors that they had diabetes) in PA and the US from 2011 to 2019. Over the 9-year period, the prevalence of diabetes in PA was generally at the same level as in the country. The prevalence in PA increased 22%, up from 9% in 2010 to 11% in 2019, while the prevalence in the country increased 10%, up from 10% in 2010 to 11% in 2019 (Figure 160).

Diabetes occurs equally in men and women in PA.

Figure 160. Percent of Adults 18 Years or Older Told by Doctors That They Had Diabetes, PA vs. US, 2011 - 2019

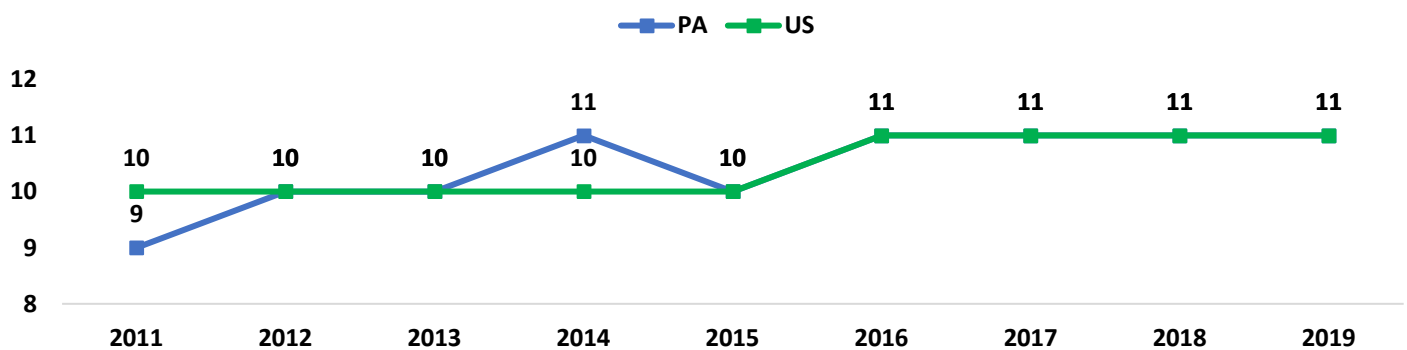


Figure 161 shows the prevalence of diabetes by sex in PA from 2011 to 2019. In general, the prevalence was higher in males than in females in most of the eight years from 2011 to 2019. Recently, in 2018 and 2019, the prevalence was indistinguishable between males and females. Overall, the prevalence increased 10% in males, up from 10% in 2010 to 11% in 2019, and the prevalence increased 22% in females, up from 9% in 2010 to 11% in 2019 (Figure 161).

Figure 161. Percent of Adults 18 Years or Older Told by Doctors That They Have Diabetes by Sex, PA, 2011 - 2019

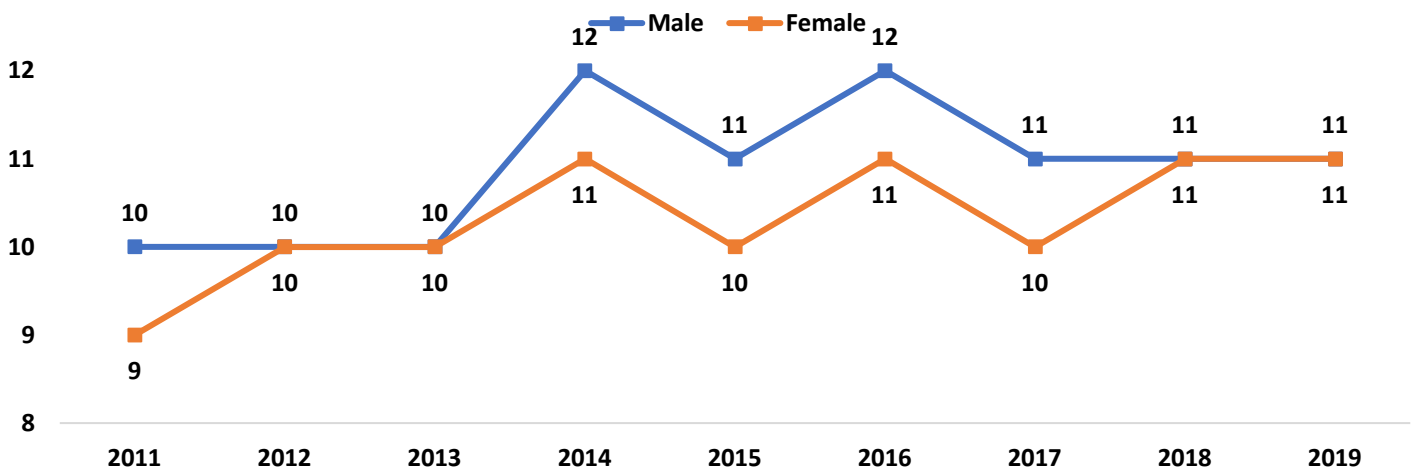
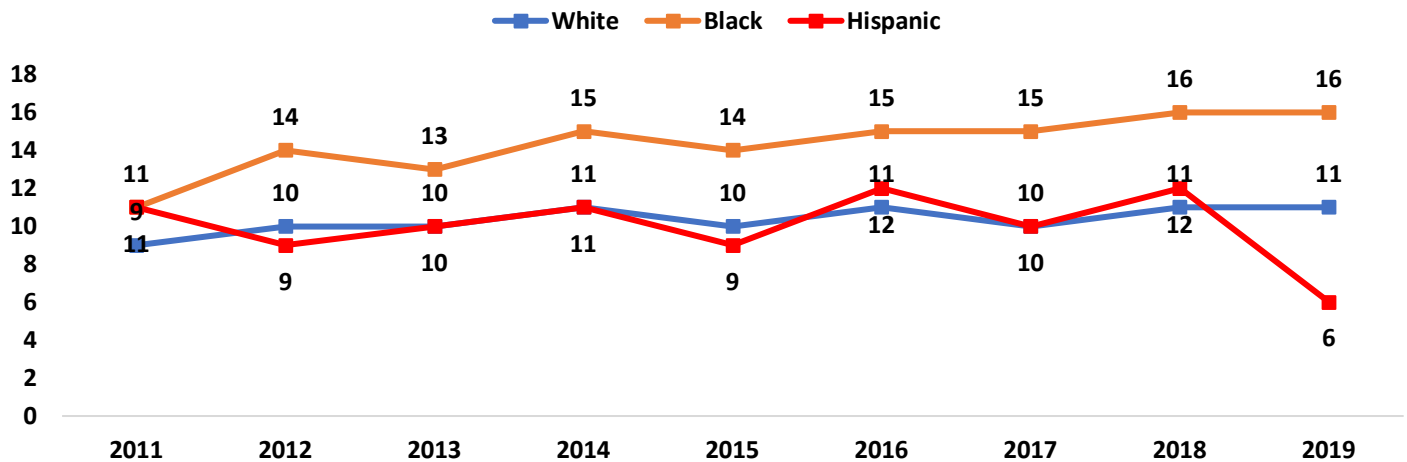


Figure 162 shows the prevalence of diabetes by race/ethnicity in PA from 2011 to 2019. Sufficient data were available for analysis for Whites, Blacks and Hispanics. Over the eight-year period, the prevalence of diabetes was consistently

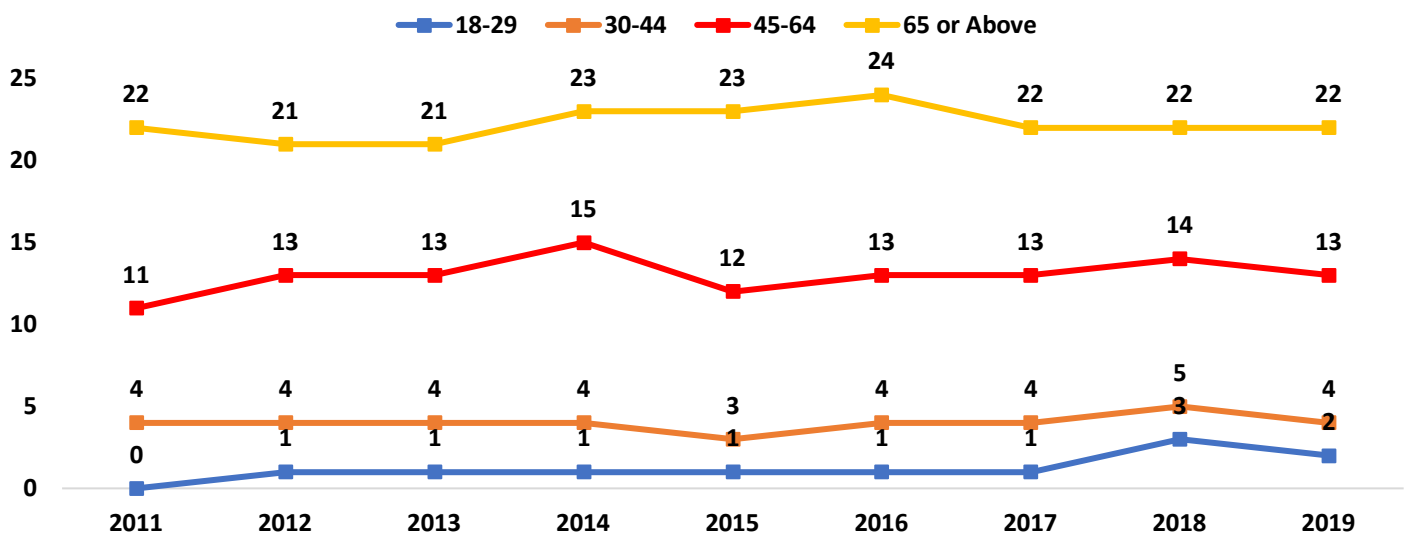
higher in Blacks than in Whites and Hispanics. The prevalence of diabetes was similar between Whites and Hispanics. Prevalence increased 45% in Blacks, up from 11% in 2011 to 16% in 2019. In Whites, the prevalence increased 22%, up from 9% in 2011 to 11% in 2019. The prevalence in Hispanics fluctuated over the years but generally showed a trend of increase as well. The sharp decrease from 12% to 6% between 2018 and 2019 was likely due to a small number of survey participants in the sampling process (Figure 162).

Figure 162. Percent of Adults 18 Years or Older Told by Doctors That They Have Diabetes by Race/Ethnicity, PA, 2011 - 2019



The prevalence of diabetes increased by age as shown in Figure 163. The highest prevalence was in people aged 65 years or older, followed by those aged 45 to 64 years, 30 to 44 years, and 18 to 29 years. The prevalence remained unchanged for people aged 65 years or older and those aged 30 to 44 years, despite some fluctuations over the 8-year period. It is noteworthy to point out that the prevalence of diabetes increased from 11% in 2011 to 13% in 2019 in people aged 45 to 64 years and from less than 1% to 2% in people aged 18 to 29 years (Figure 163).

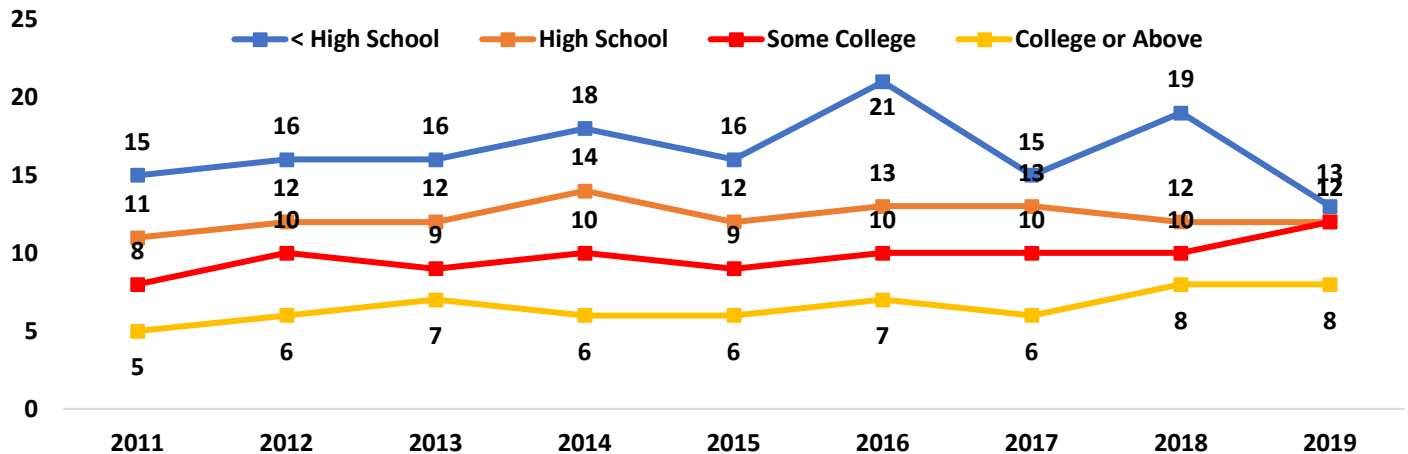
Figure 163. Percent of Adults 18 Years or Older Told by Doctors That They Have Diabetes by Age Group, PA, 2011 - 2019



The prevalence of diabetes was negatively associated with years of education as shown in Figure 164. The highest prevalence was among people with less education than a high school diploma, followed by people who completed high school, people with some college education, and people with a college degree or higher education. For most people, the

prevalence of diabetes appeared to be increasing from 2011 to 2019, regardless of educational attainment. For people with less education than a high school diploma, the prevalence increased from 2011 to 2016 and then fluctuated substantially until 2019, which might be due to sampling issues. Over the nine-year period, the prevalence of diabetes increased 60% in people with the highest education (college or above), 50% in those with some college education, and 9% in those with a high school degree, respectively (Figure 164).

Figure 164. Percent of Adults 18 Years or Older Told by Doctors That They Have Diabetes by Education, PA, 2011 - 2019



Diabetes prevalence was negatively associated with annual household incomes (Figure 165). From 2011 to 2019, the highest prevalence of diabetes was in people with an annual income of less than \$15,000 as well as among people with an annual income of \$15,000 to \$24,999, followed by people with an income of \$25,000 to \$49,999 annually, \$50,000 to \$74,999, and over \$74,999 a year. Despite fluctuations, the prevalence of diabetes increased universally in people with different levels of annual income from 2011 to 2019. Specifically, the prevalence of diabetes increased 21% in people with an annual income of less than \$25,000, 9% in people with an annual income of \$25,000 to \$49,999, 83% in people with an annual income of \$50,000 to \$74,999, and 40% in people with over \$74,999 a year.

Figure 165. Percent of Adults 18 Years or Older Told by Doctors That They Have Diabetes by Annual Household Income, PA, 2011 - 2019

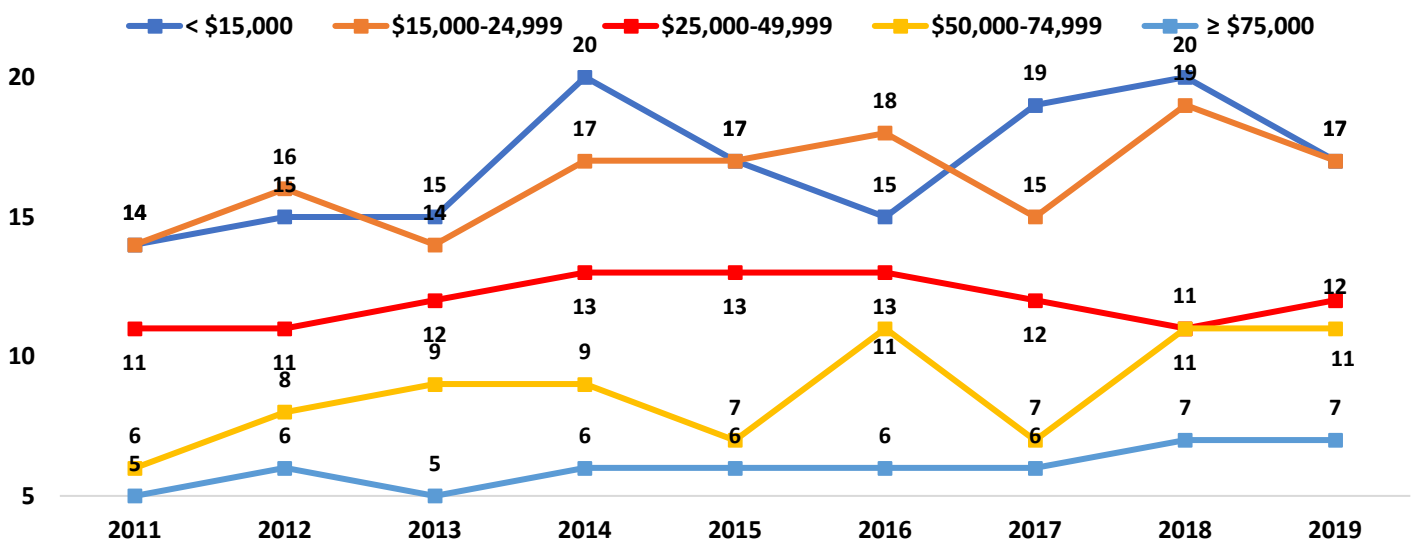
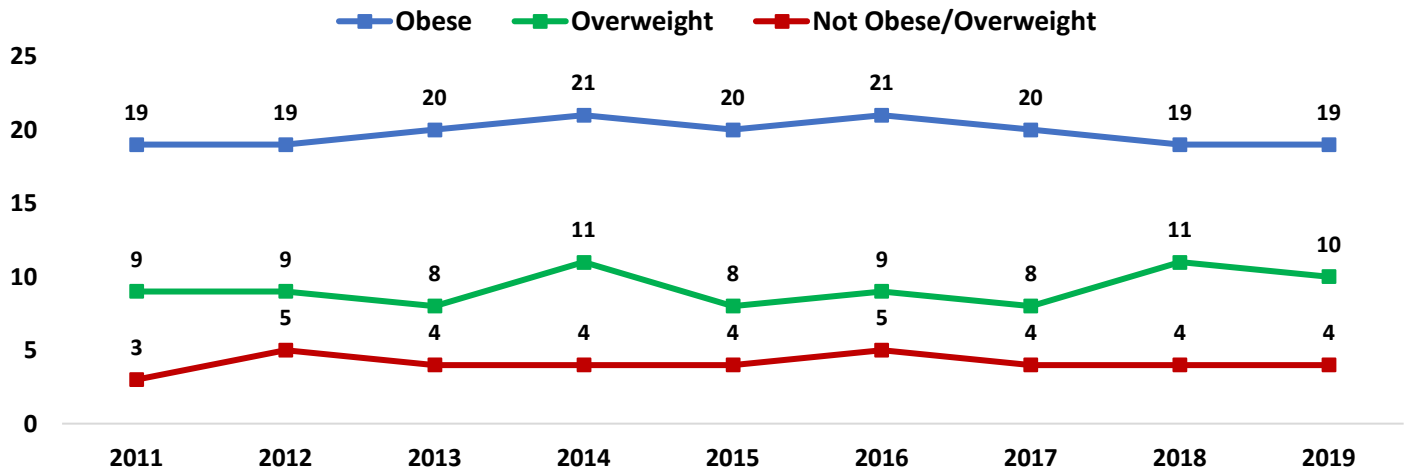


Figure 166 shows the prevalence of diabetes by body weight status in PA adults aged 18 years or older. The highest prevalence, ranging from 19% to 21%, was among people with obesity from 2011 to 2019. People without obesity but

who were overweight also had higher prevalence of diabetes over the nine-year period, ranging from 8% to 11%. People who were neither overweight nor obese had the lowest prevalence of diabetes, around 3% to 5% from 2011 to 2019. The prevalence of diabetes remained relatively steady in people with varying body weights (Figure 166).

Figure 166. Percent of Adults 18 Years or Older Told by Doctors That They Have Diabetes by Body Weight, PA, 2011 - 2019



In summary, the percentage of adults who were told by their doctor that they had diabetes in PA was at the same level as in the US from 2011 to 2019. In PA, the percentage was higher in men, Blacks, people at older ages, people with less education or less income, and people who had obesity.

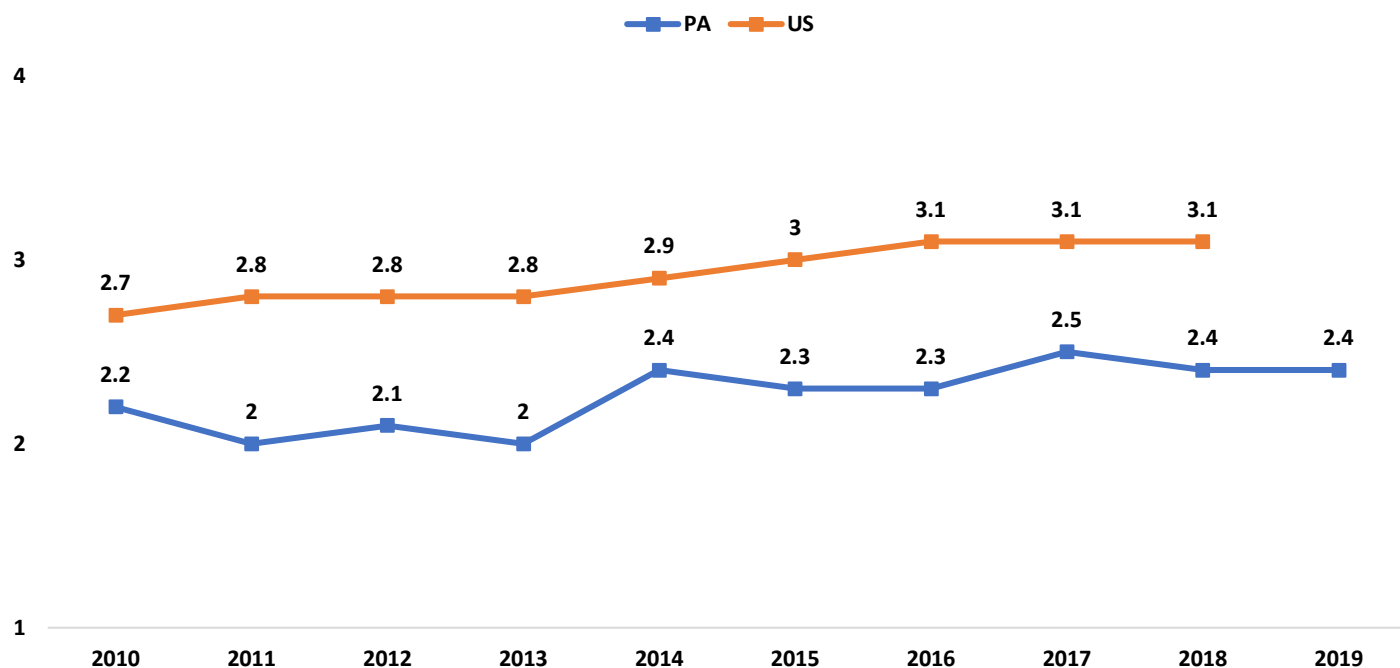
13. Oral Health Issues

Oral disease is a significant burden impacting individuals in the US. Approximately two in five adults in the country have had permanent tooth loss;³² one in four adults have untreated tooth decay;⁴¹ nearly half of adults aged 30 years or older have signs of gum disease; and severe gum disease affects about 9% of adults.⁴² In addition, oral cavity and pharynx cancer is common in older adults, particularly in people older than 55 years who smoke and are heavy drinkers. In 2020, approximately 53,000 people were diagnosed with oral cavity and pharynx cancer.⁴³ For children, cavities (also known as caries or tooth decay) are one of the most common childhood chronic diseases in the US. Untreated cavities can cause pain and infections that may lead to problems with eating, speaking, playing, and learning. Children who have poor oral health are more often to miss school and receive lower grades.⁴⁴ Approximately one in five children aged 5 to 11 years and one in seven adolescents aged 12 to 19 years have at least one untreated decayed tooth, and children aged 5 to 19 years from low-income families are twice as likely to have cavities, compared with children from higher-income families.⁴⁵

13.1 Mortality Trend for Cancer of Oral Cavity and Pharynx

Cancer of oral cavity and pharynx refers to conditions associated with ICD-10 codes of C000-C148 and ICD-9 codes of 140-149. Figure 167 displays the age-adjusted mortality rate of cancer of oral cavity and pharynx in PA and in the US from 2010 to 2019 (note: the US data in 2019 are not available). In general, the age-adjusted mortality rate of cancer of oral cavity and pharynx was lower in PA than in the country. During the 10-year period, the mortality rate increased slowly, up 20% in PA. The rate also increased in the country, up 15% from 2010 to 2018 (Figure 167).

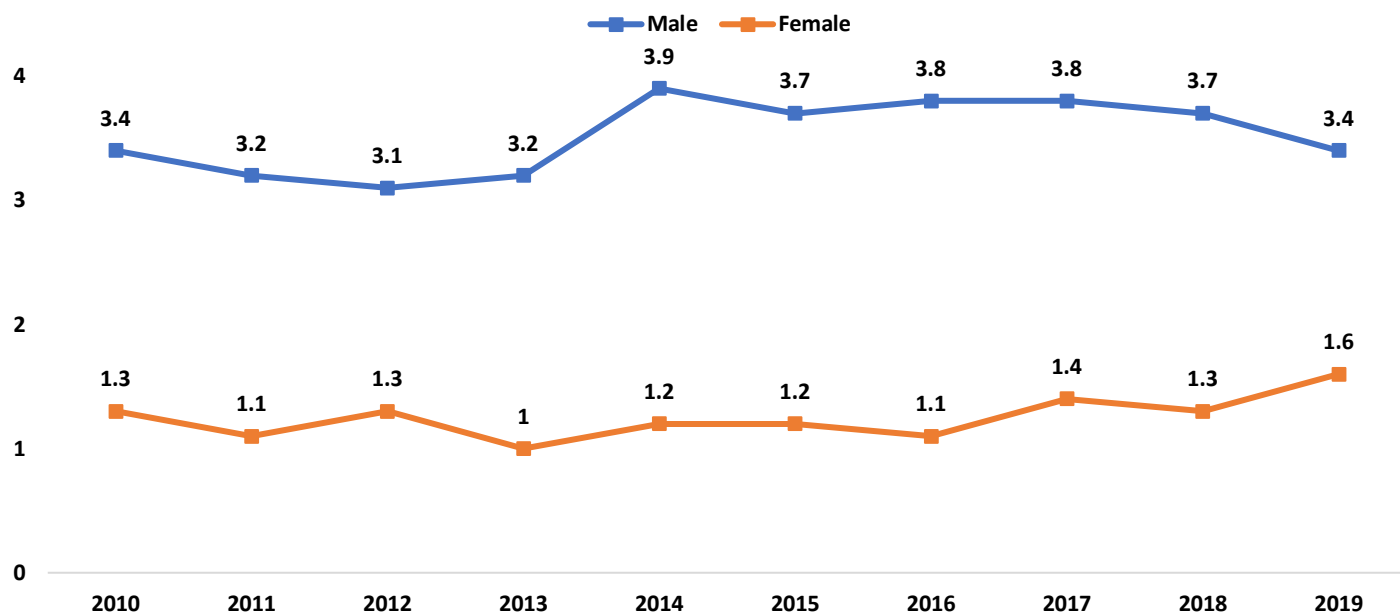
Figure 167. Age-adjusted Mortality Rate of Cancer of Oral Cavity and Pharynx (per 100,000), PA vs. US, 2010-2019



Note: US data for 2019 are not available.

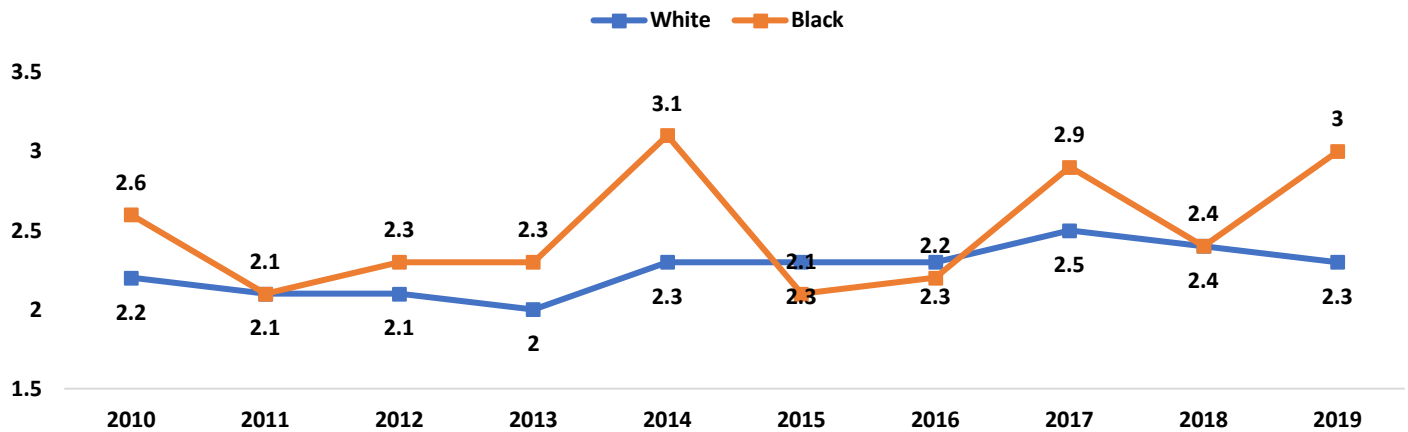
By sex, the age-adjusted mortality rate of cancer of oral cavity and pharynx was consistently higher in men than in women in PA. Over the 10-year period, the rate in men fluctuated and reached the same level in 2019 as in 2010. In women, the rate also fluctuated but increased 23% in 2019 as compared to 2010 (Figure 168).

Figure 168. Age-adjusted Mortality Rate of Cancer of Oral Cavity and Pharynx (per 100,000) by Sex, PA, 2010-2019



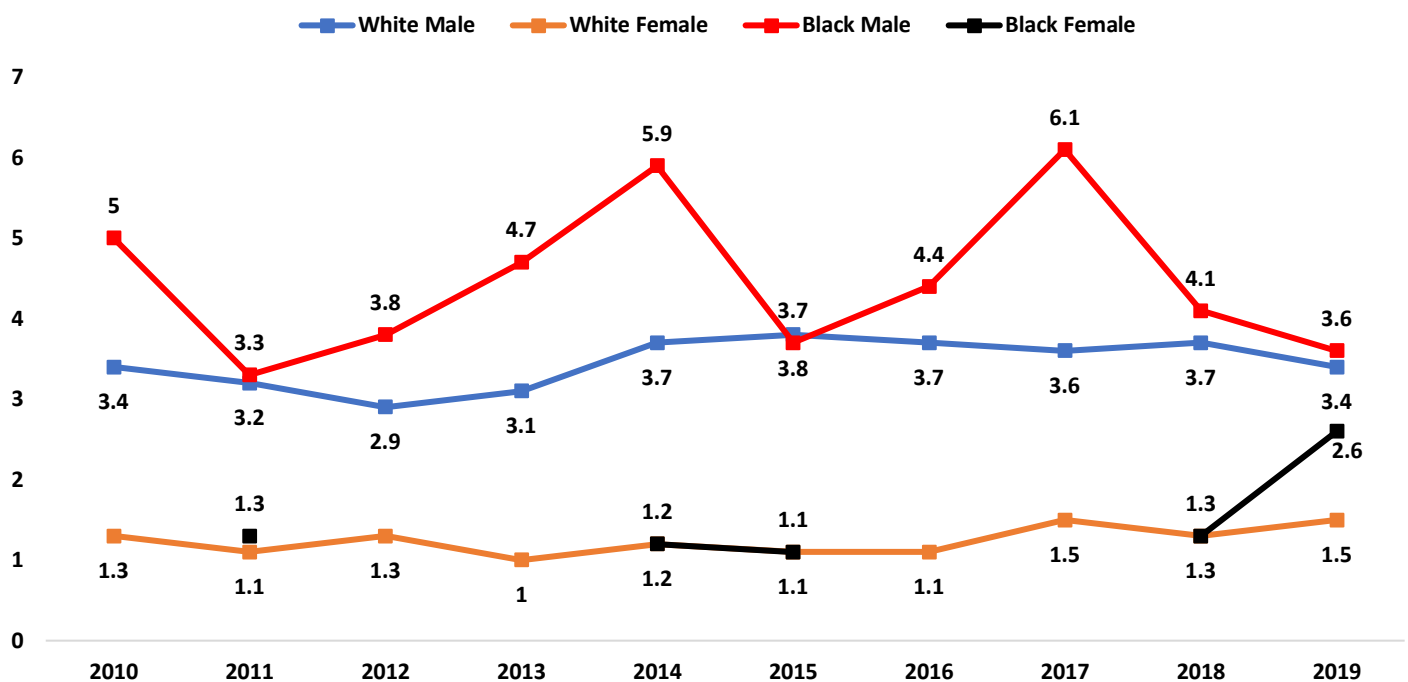
By race and ethnicity, the age-adjusted mortality rate of cancer of oral cavity and pharynx was generally higher in Blacks than in Whites in PA. Over the 10-year period, the rate increased in both White and Blacks. The increase was 10% in Whites and 40% in Blacks, respectively (Figure 169).

Figure 169. Age-adjusted Mortality Rate of Cancer of Oral Cavity and Pharynx (per 100,000) by Race/Ethnicity, PA, 2010-2019



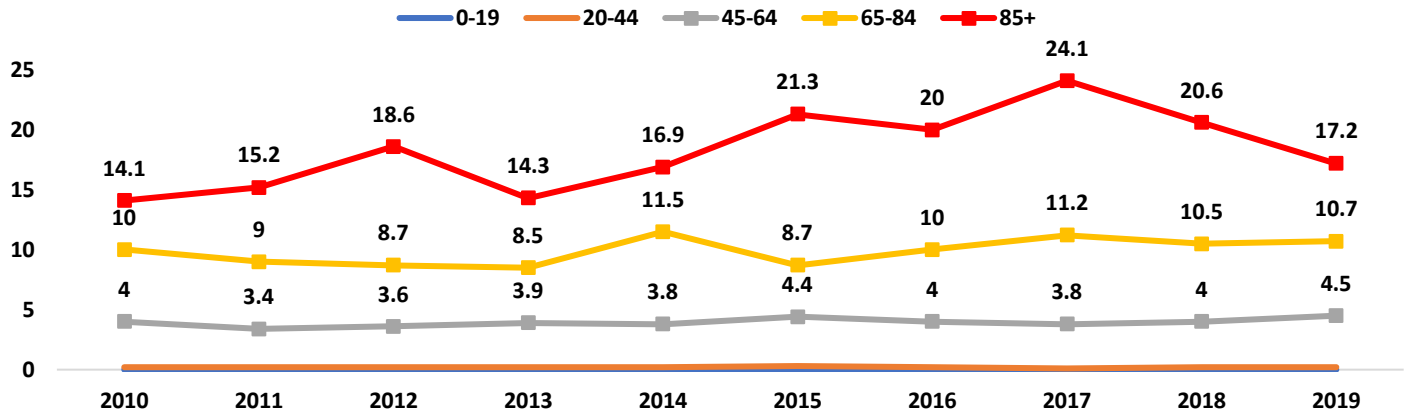
By sex and race/ethnicity, the age-adjusted mortality rate of cancer of oral cavity and pharynx was highest among Black men, followed by White men. The rates among White women and Black women were at the same level and were lower than the rates among Black men and White men. Over the 10-year period, the rate in Black men increased in some years but decreased in other years. In 2019, the rate in Black men was 3.6 per 100,000, down from 5 per 100,000 in 2010 (28% decrease). The rates in White men and White women were stable and remained largely unchanged. The rate in Black women was generally stable from 2010 to 2018 (despite data were insufficient in some years), but the rate increased substantially between 2018 and 2019 (Figure 170).

Figure 170. Age-adjusted Mortality Rate of Cancer of Oral Cavity and Pharynx (per 100,000) by Sex and Race/Ethnicity, PA, 2010-2019



By age group, the age-adjusted mortality rate of cancer of oral cavity and pharynx was highest among the oldest group, followed by each of the subsequent younger groups. The rate remained at the same level in the youngest two groups, but the rate increased in the other age groups. Specifically, the rate increased 22% among those 85 years of age or older, 7% among those 65 to 84 years of age, and 13% among those 45 to 64 years of age (Figure 171).

Figure 171. Mortality Rate of Cancer of Oral Cavity and Pharynx (per 100,000) by Age Group, PA, 2010-2019



In summary, the age-adjusted mortality rate of cancer of oral cavity and pharynx was lower in PA than in the US. In PA, the mortality rate was higher in men, Blacks (especially Black men), and people at older ages.

13.2 Percent of Adults Who Visited a Dentist in the Past Year, BRFSS

Every other year, in the BRFSS survey, respondents were asked if they visited a dentist in the past year. Figures 172 to 177 show the percentage of adults who visited a dentist in the past year, based on the BRFSS data from 2010 to 2018. Figure 172 displays the percentage of adults who visited a dentist in the past year in PA and in the US. In general, the percentage of adults who visited a dentist in the past year was higher in PA than in the country. Over the nine-year period, the percentage decreased in both PA and the country. The decrease was 4% in PA and 3% in the US (Figure 172).

Figure 172. Percent of Adults 18 Years or Older Who Visited a Dentist in the Past Year, PA vs. US, 2010 - 2018

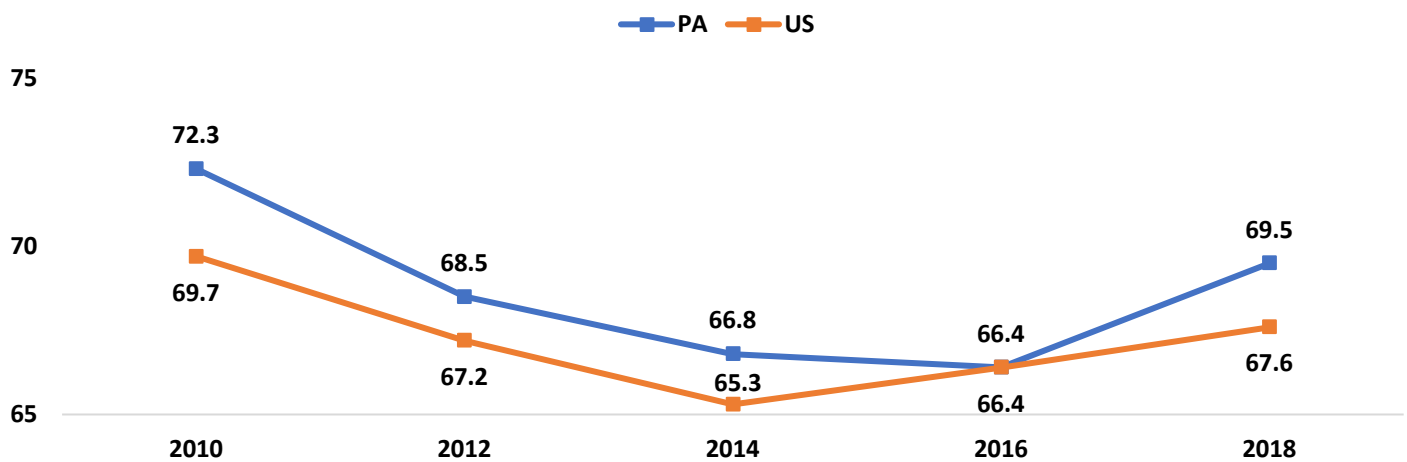


Figure 173 displays the percentage of adults who visited a dentist in the past year by sex in PA. The percentage was consistently higher in women than in men. Over the 9-year period, the percentage declined during 2010 and 2016 in

both men and women, and then increased since 2016. Overall, the percentage decreased 5% in men and 3% in women (Figure 173).

Figure 173. Percent of Adults 18 Years or Older Who Visited a Dentist in the Past Year by Sex, PA, 2010 - 2018

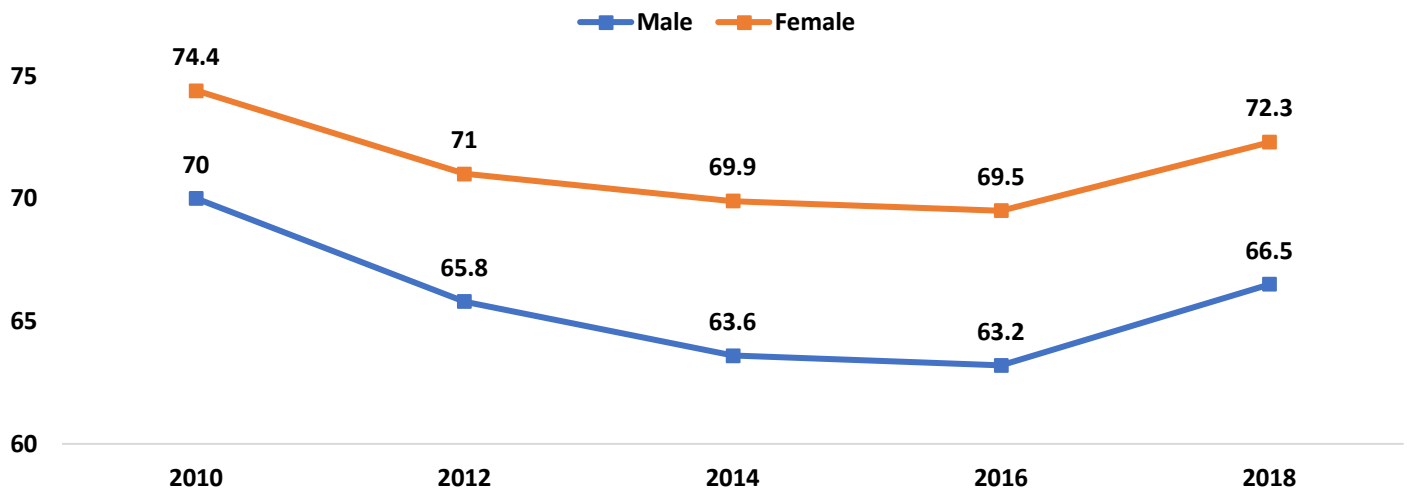


Figure 174 displays the percentage of adults who visited a dentist in the past year by race and ethnicity in PA. The percentage was consistently higher in Whites than in Blacks; however, the percentage declined 4% in Whites and increased 9% in Blacks over the nine-year period (Figure 174).

Figure 174. Percent of Adults 18 Years or Older Who Visited a Dentist in the Past Year by Race/Ethnicity, PA, 2010 - 2018

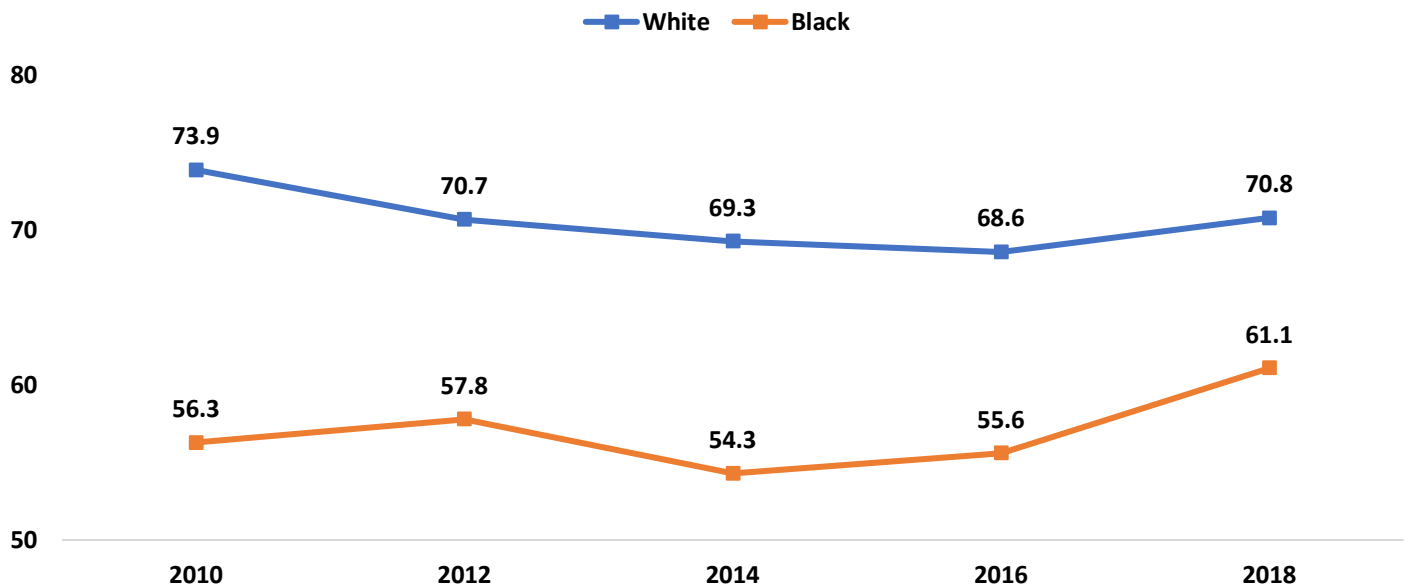


Figure 175 displays the percentage of adults who visited a dentist in the past year by sex and race/ethnicity in PA. The percentage was highest in White females, followed by White males, Black females, and Black males. Over the nine-year

period, the percentage declined slightly in White males (6%) and White females (3%). The percentage remained largely unchanged in Black females but increased 18% in Black males (Figure 175).

Figure 175. Percent of Adults 18 Years or Older Who Visited a Dentist in the Past Year by Sex and Race/Ethnicity, PA, 2010 - 2018

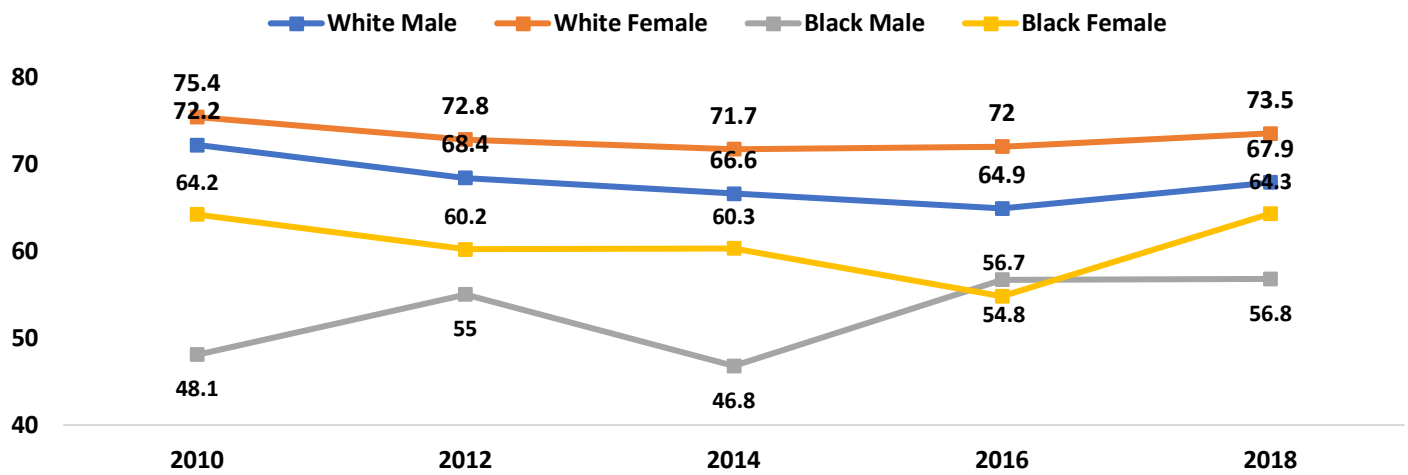


Figure 176 displays the percentage of adults who visited a dentist in the past year by age group in PA. The percentage fluctuated in all age groups over the nine-year period. In general, the percentage was highest among people 45 to 64 years of age. The percentage remained largely unchanged among the young age people (18-29 years), decreased 9% among people 30 to 44 years of age, and decreased slightly among people aged 45 to 64 years (2%) and among people 65 years of age or older (2%) (Figure 176).

Figure 176. Percent of Adults 18 Years or Older Who Visited a Dentist in the Past Year by Age Group, PA, 2010 - 2018

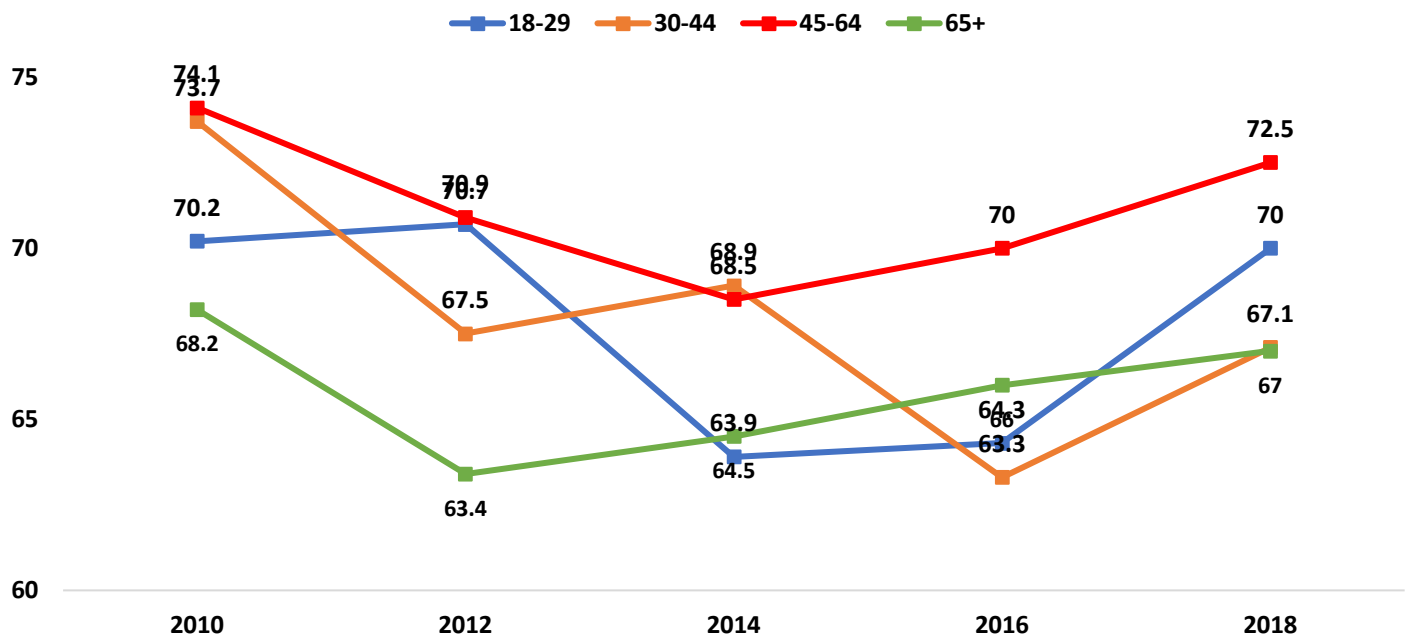
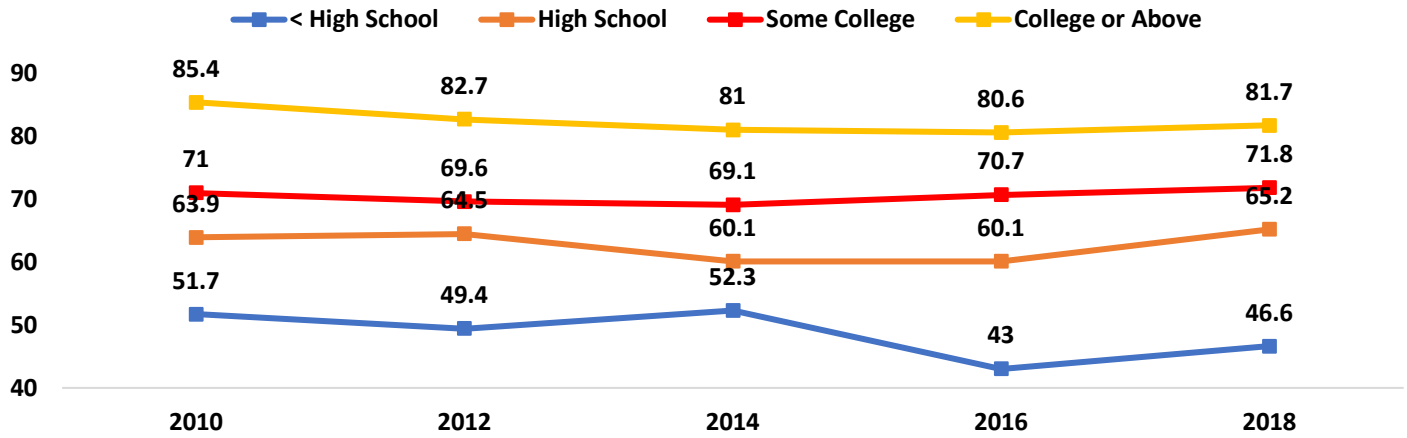


Figure 177 displays the percentage of adults who visited a dentist in the past year by educational level in PA. The percentage was highest among people with the highest educational level, followed by people with the subsequent

lower educational level. Over the nine-year period, the percentage increased slightly among people with some college education (1%) and people with a high school degree (2%). The percentage decreased 4% among people with a college degree or higher education. Of note, the percentage decreased 10% among people with less education than a high school diploma (Figure 177).

Figure 177. Percent of Adults 18 Years or Older Who Visited a Dentist in the Past Year by Educational Level, PA, 2010 - 2018



In summary, the percentage of adults who visited a dentist in the past year was higher in PA than in the US. In PA, the percentage was higher in women, Whites (especially White women), people 45 to 64 years of age, and people with higher education.

13.3 Percent of Adults Who Had Permanent Teeth Extracted, BRFSS

Every other year, in the BRFSS survey, respondents were asked if they had permanent teeth extracted. Figures 178 to 183 show the percentage of adults who had permanent teeth extracted, based on the BRFSS data from 2010 to 2018. Figure 178 displays the percentage of adults who had permanent teeth extracted in PA and in the US. In general, the percentage of adults who had permanent teeth extracted was higher in PA than in the country. Over the nine-year period, the percentage decreased in both PA and the country. The decrease was 12% in PA and 6% in the US (Figure 178).

Figure 178. Percent of Adults 18 Years or Older Who Had Permanent Teeth Extracted, PA vs. US, 2010 - 2018

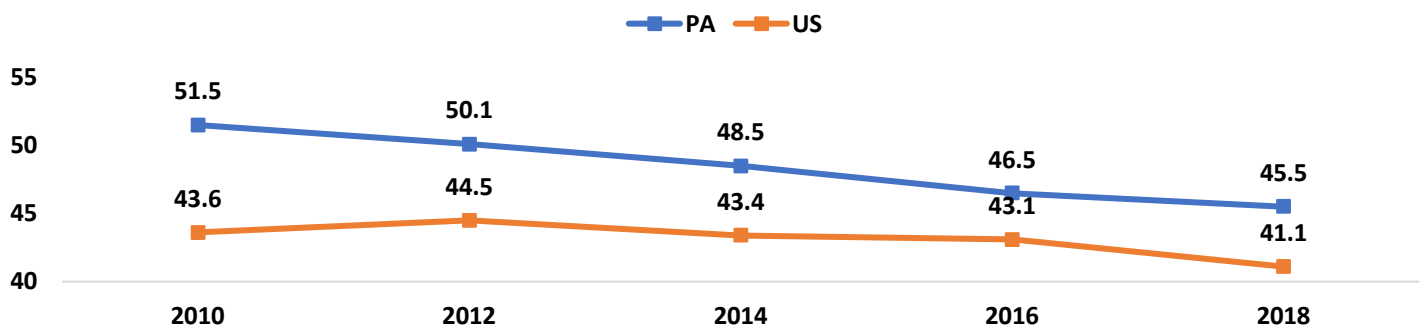


Figure 179 shows the percentage of adults who had permanent teeth extracted by sex in PA. In 2010, the percentage was higher in men than in women. Over the nine-year period, the percentage decreased more in men (17%) than in

women (7%) and shortly after 2014, the percentage of women who had permanent teeth extracted was higher than men (Figure 179).

Figure 179. Percent of Adults 18 Years or Older Who Have Had Permanent Teeth Extracted by Sex, PA, 2010 - 2018

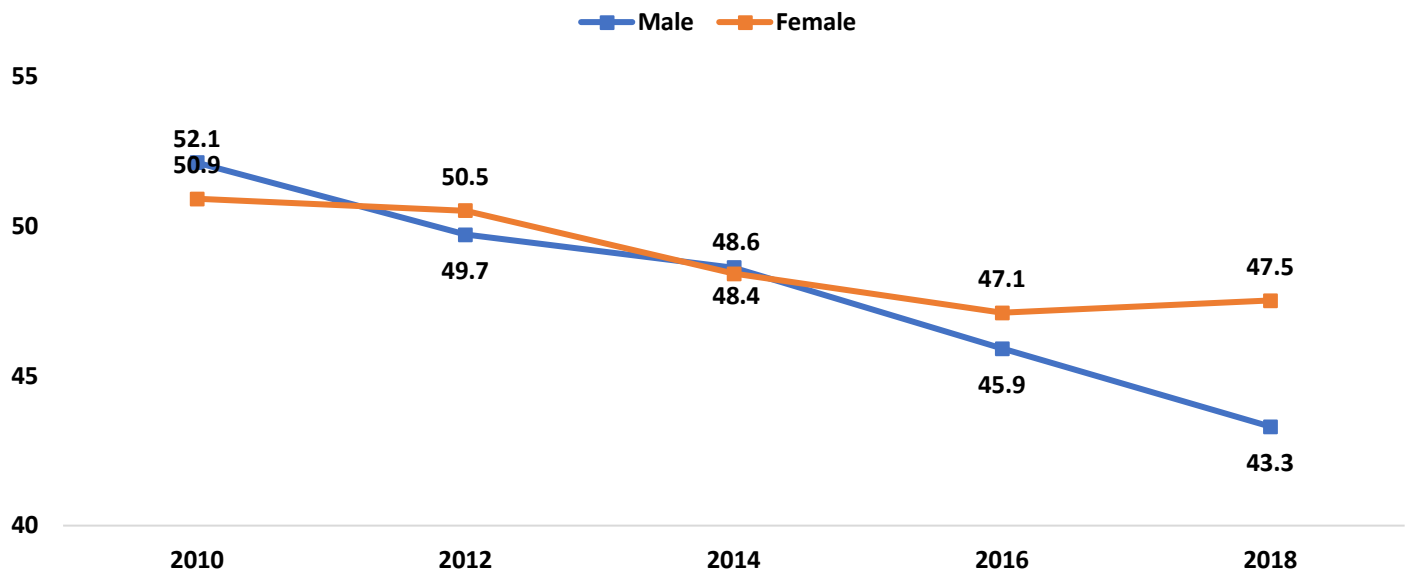


Figure 180 shows the percentage of adults who had permanent teeth extracted by race and ethnicity in PA. The percentage was consistently higher in Blacks than in Whites. Over the nine-year period, the percentage decreased 17% in Blacks, greater than the 10% decrease in Whites (Figure 180).

Figure 180. Percent of Adults 18 Years or Older Who Have Had Permanent Teeth Extracted by Race/Ethnicity, PA, 2010 - 2018

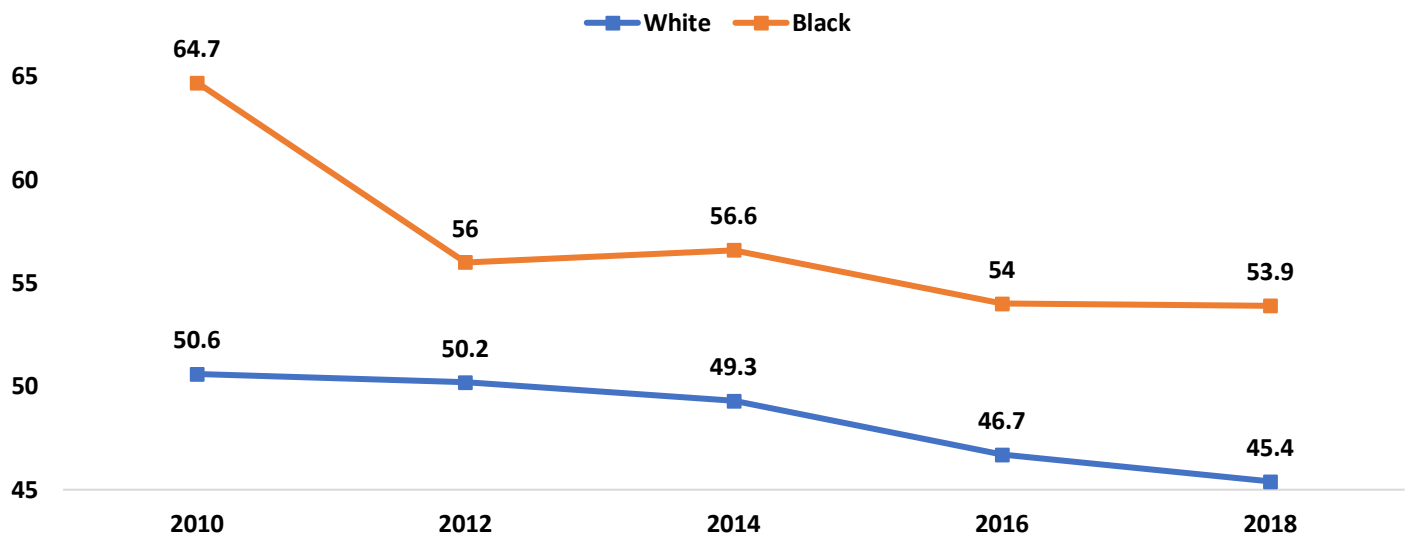


Figure 181 shows the percentage of adults who had permanent teeth extracted by sex and race/ethnicity in PA. In 2010, the percentage was highest in Black females, followed by Black males, White males, and White females. Over the nine-year period, the percentage decreased in all subgroups. Specifically, the percentage decreased 22% in Black females, 17% in White males, 9% in Black males, and 3% in White females. As a result of the changes, in 2019, the percentage was highest in Black males, followed by Black females, White females, and White males, different from the pattern in 2010 (Figure 181).

Figure 181. Percent of Adults 18 Years or Older Who Have Had Permanent Teeth Extracted by Sex and Race/Ethnicity, PA, 2010 - 2018

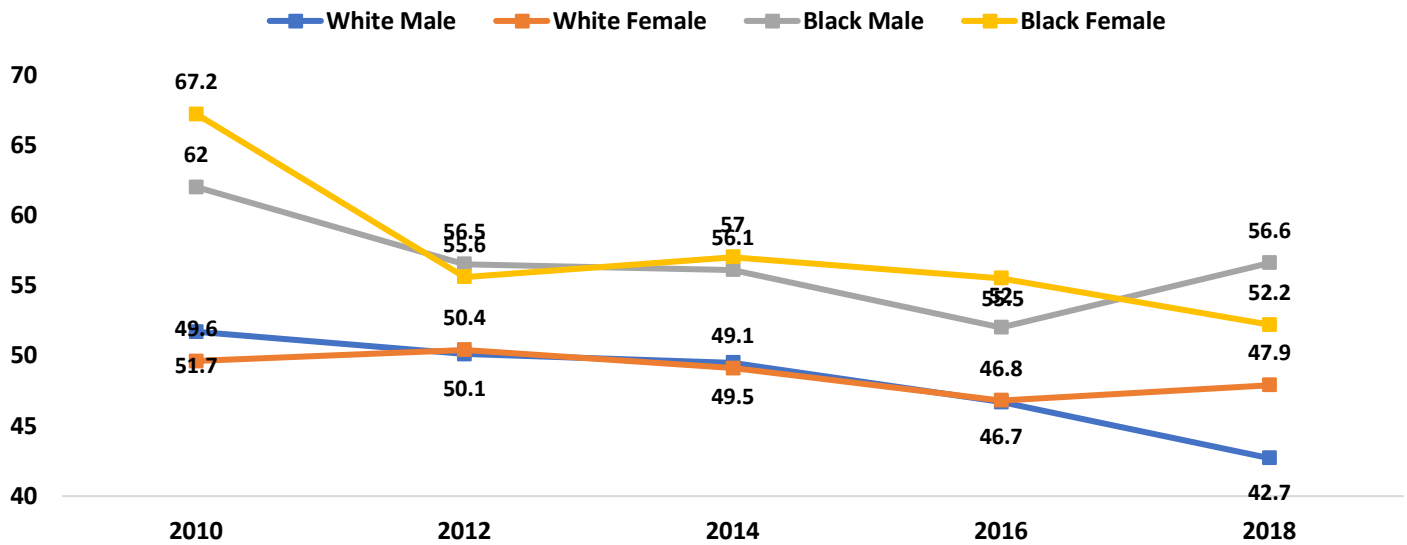


Figure 182 shows the percentage of adults who had permanent teeth extracted by age group in PA. The percentage was highest among people 65 years of age or older, followed by people at the subsequent younger ages. Over the nine-year period, the percentage decreased 11% in people 65 years of age or older, 14% in people aged 45 to 64 years, 3% among people 30 to 44 years of age, and 22% among the youngest group of people aged 18 to 29 years (Figure 182).

Figure 182. Percent of Adults 18 Years or Older Who Have Had Permanent Teeth Extracted by Age Group, PA, 2010 - 2018

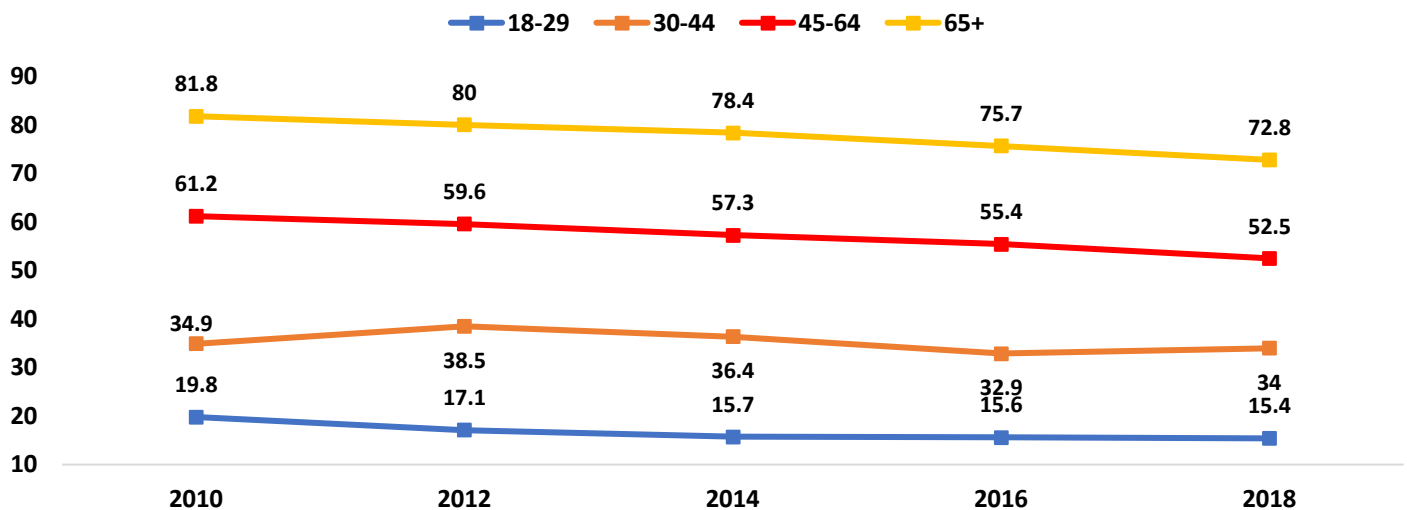
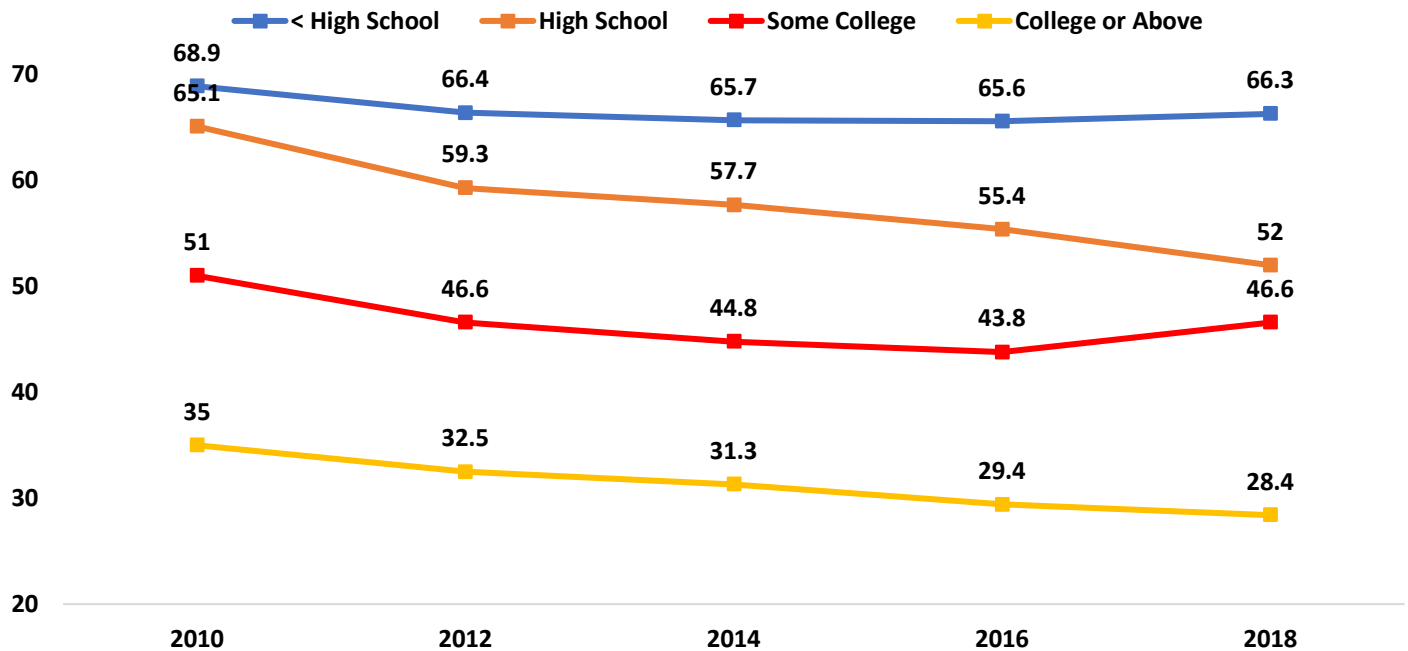


Figure 183 shows the percentage of adults who had permanent teeth extracted by educational level in PA. The percentage was highest among people with the lowest educational level, followed by people with the subsequent higher educational level. Over the nine-year period, the percentage decreased in all educational groups. The decrease was 4% among people with less education than a high school diploma, 20% among people with a high school diploma, 9% among people with some college education, and 19% among those with the highest educational level (college or higher education) (Figure 183).

Figure 183. Percent of Adults 18 Years or Older Who Have Had Permanent Teeth Extracted by Educational Level, PA, 2010 - 2018



In summary, the percentage of adults who had permanent teeth extracted was higher in PA than in the US. In PA, the percentage was higher in women than in men in recent years. The percentage was also higher among Blacks, people at older ages, and people with less education.

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15. Acronyms

AA: African American

ACS: American Community Survey

AIAN: American Indian and Alaska Native

BRFSS: Behavioral Risk Factor Surveillance System

CDC: Centers for Disease Control and Prevention

CHD: coronary heart disease

CLRD: chronic lower respiratory disease

COPD: Chronic obstructive pulmonary disease

DPP: Diabetes Prevention Program

ED: emergency department

EDDIE: Enterprise Data Dissemination Informatics Exchange

HPV: Human papillomavirus

ICD: International Classification of Diseases

IDDM: insulin-dependent diabetes mellitus

NHPI: Native Hawaiian and Other Pacific Islander

PA: Pennsylvania

PCR: Pennsylvania Cancer Registry

PHC4: Pennsylvania Health Care Cost and Containment Council

PI: Pacific Islander

TIA: transient ischemic attack

US: United States

USPSTF: The United States Preventive Services Task Force

YRBS: Youth Risk Behavior Surveillance