THE BURDEN OF
Cancer
IN PENNSYLVANIA

Calculating Costs

Understanding Impacts

Exploring Interventions

Dear Reader:

The Burden of Cancer in Pennsylvania provides information about the incidence, mortality, behavioral risks and the cost of cancer; the disease that continues to be the second leading cause of death among Pennsylvanians. While the death rates for cancer are declining, Pennsylvania is still above the national rates for mortality in most cancers. There are many areas for improvement in screening, lifestyle modification and tobacco cessation that can prevent Pennsylvanians from getting cancer.

This report shows how cancer affects different genders, ethnic and racial groups across Pennsylvania. The collection and reporting of cancer statistics allows resources to be targeted to populations or communities of Pennsylvania most in need for public health interventions and to evaluate the impact of cancer interventions.

This report addresses the cancers of bladder, breast, cervical, colorectal, lung, melanoma, prostate, and thyroid. These cancers were selected due to their impact on the overall burden of cancer and the fact that screenings/preventative measures exist for them. Researchers seeking information on other cancers or additional analyses are directed to www.health.state.pa.us/stats for a comprehensive list of Pennsylvania-related health statistics.

Our appreciation to the members of the Data Advisory Committee of the Pennsylvania Cancer Control, Prevention and Research Advisory Board whose hard work made this report possible.

Sincerely,

Joel Noumoff, MD.

Chairman, Pennsylvania Cancer Control, Prevention and Research Advisory Board

DATA ADVISORY COMMITTEE (DAC)

As a committee of the Pennsylvania Cancer Control, Prevention and Research Advisory Board, the mission of the DAC is to facilitate the use of cancer surveillance data to evaluate the impact of cancer interventions and identify target populations and communities where interventions should be focused.

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EXECUTIVE SUMMARY

Cancer is the second leading cause of death in Pennsylvania, exceeded only by heart disease. In 2011, over 77,000 people had a diagnosis of an invasive cancer and approximately 28,500 died of cancer. Beyond the number of lives lost and new diagnoses each year, cancer also imposes a great financial and emotional burden on cancer patients and their families. According to the Centers for Disease Control and Prevention (CDC), cancer cost Pennsylvania an estimated $7.3 billion in medical costs and lost productivity in 2010.

More than 30% of cancer could be prevented, mainly by not using tobacco, having a healthy diet, being physically active and moderating the use of alcohol. Screening increases the chances of detecting certain cancers early, when they are most likely to be curable. Screening procedures such as mammography, colonoscopy/sigmoidoscopy and Pap testing can detect precancerous conditions or increase the likelihood of discovering cancer in an early stage where the chance of effective treatment and survival is higher.

Purpose of the Report

The purpose of the Pennsylvania Cancer Burden Report is to provide a general description of cancer incidence, mortality, hospitalization and selected risk factors to help policy makers, program administrators, business and industry leaders and the citizens of the Commonwealth understand the true cost of cancer in Pennsylvania and to target interventions to certain geographic regions or populations experiencing cancer-related health disparities.

The Pennsylvania Cancer Burden report supports the epidemiology and surveillance requirement and provides information to stakeholders involved in cancer control. The report informs decision makers, helps managers allocate resources and helps reach those most in need. It is a comprehensive analysis of cancer in Pennsylvania and it illustrates the true cost of this disease to the Commonwealth and its over 12 million citizens.

Statewide Cancer Control Efforts

Even though cancer death rates are at their lowest since 1990, Pennsylvania continues its commitment to provide a comprehensive approach to cancer control. The Cancer Control, Prevention and Research Advisory Board (CAB) is a legislatively mandated board that advises the Secretary of Health on cancer control and prevention-related issues in Pennsylvania; approves the statewide cancer plan; and reports annually to the Governor and General Assembly on cancer control activities. The CAB has four committees to carry out its mission: the Stakeholder Leadership Team (SLT), functioning as the statewide cancer coalition; the Breast and Cervical Cancer Medical Advisory Committee and the Colorectal Cancer Advisory Committee, both to provide clinical expertise for screening programs; and the Data Advisory Committee to coordinate the enhancement of data sharing with internal and external organizations and act as an advisory group to the Pennsylvania Cancer Registry.

The 2013-2018 Pennsylvania Cancer Control Plan was created by the SLT coalition, approved by the CAB, and now serves as a blueprint for all sectors of Pennsylvania, setting the stage for the major issues to be addressed, along with potential actions for implementation. The Plan is based on improving health through a range of policy, system and environmental approaches commonly referred to as the Chronic Disease Prevention and Health Promotion Domains established by CDC:

Epidemiology and Surveillance—using data to target services to those at higher risk for developing cancer and the factors contributing to cancer

Policy Systems and Environmental Approaches—promoting access to affordable and quality health care in schools, worksites, and communities

Health System Interventions—improving how prevention services and cancer treatment are delivered

Community Clinical Linkages—linking community resources with health care delivery systems to improve the prevention, management, and survival of cancer

The Pennsylvania Department of Health (Department) is responsible for the planning, implementation, and evaluation of efforts to prevent and manage cancer, funded in part by state appropriations and the Centers for Disease Control and Prevention (CDC). The overarching goal of the Department is to eliminate the burden of cancer for Pennsylvanians. To achieve this, the Department established the s goals of reducing the rate of cancer mortality and increasing screening rates to detect breast, cervical, and colorectal cancer.

Within the Department, the Division of Cancer Prevention and Control is responsible for statewide cancer control planning, including staff support to the CAB, the SLT coalition and its workgroups. The Division manages program oversight for the Pennsylvania HealthyWoman Program which provides low-income, uninsured and underinsured women access to timely breast and cervical cancer screening, diagnostic and patient navigation services. The Division oversees the PA Colorectal Cancer Control Program which provides screening, diagnostic and follow-up services in Philadelphia County.

The Pennsylvania Cancer Registry (PCR) is the statewide data system established by the Pennsylvania Cancer Prevention, Control and Research Act to collect information on all new cases of cancer diagnosed or treated in Pennsylvania. The PCR has collected a complete statewide data summary of patient history, diagnosis, treatment and status since 1985. The PCR has earned Gold Certification from North American Association of Central Cancer Registries (NAACCR) for 14 years.

The Pennsylvania Department of Health's Bureau of Health Statistics and Research collects and disseminates data to assist in planning, administering and evaluating the health status of Pennsylvania residents and the quality and quantity of health services within Pennsylvania. The Bureau provides technical assistance, statistical analysis, and training to other program areas. The Department's Data Driven Management Program is also the responsibility of the Bureau.

The Pennsylvania Cancer Control, and Prevention and Research Act established as one of its priorities cancer epidemiology and statistics. The Pennsylvania Department of Health has a dedicated Epidemiologist that focuses on the causes, distribution and control of cancer. The Epidemiologist's work is instrumental in developing the cancer incidence and mortality reports as well as providing comprehensive analysis of the risk factors and disparities associated with cancer.

Report Design

First, selected modifiable risk factor behaviors and preventive activities associated with cancer diagnosis are described. Data presented in this section includes prevalence rates from 2000-2010, prevalence by gender and race/ethnicity, prevalence by age group and prevalence by income and education. Geographic information from the 2010-2012 Behavioral Risk Factor Surveillance System (BRFSS) Survey is also presented.

Eight cancers were selected for study: Cervix uteri, colon and rectum, female breast, lung and bronchus, prostate,

malignant melanoma, thyroid and urinary bladder. These cancers were selected due to their impact on the overall burden of cancer and the fact that screenings/preventative measures exist for them.

Summary of Findings

Modifiable Risk Factors Behaviors

The rate of adult smoking is currently down to 18% in 2010 from 24% in 1995. Smoking rates peaked in 2003 at 25% but have been slowly declining. It is worth noting that in 2002 Pennsylvania imposed a significant excise tax on cigarettes and in 2008, Pennsylvania instituted the Clean Indoor Air Act. Although smoking rates have declined over the years, Pennsylvania's rates in all categories are slightly higher than the national rates.

Pennsylvanians who identified themselves as multiracial had the highest rates of smoking followed by blacks and Hispanics; males are more likely to smoke than females. Rates of smoking were inversely proportional to income and education, with those having less than a high school education and making less than $15,000 having the highest rates of smoking.

Obesity rates in Pennsylvania follow national trends and have increased from 16% in 1995 to 29% in 2010. Overall, obesity rates for Pennsylvania are marginally higher than the national rates. Females tend to be slightly more obese than males and Hispanics show the highest rate of obesity at 36% followed by blacks at 34%. Citizens belonging to the age group 55-64 have the highest rates of obesity at 33%, and those who are poorest and least educated have the highest rates of obesity. Geographically, several south central counties exhibit rates of obesity that are 6-7 % higher than the state average.

"Physically inactive" can be defined as not having engaged in a physical activity other than regular job activities within the past month. The level of physical activity for Pennsylvania peaked in 1998 but has remained somewhat steady for the time period studied. Pennsylvania rates are, as with other factors, slightly above the national average. The state 2012 rate for all age groups is 23%; those 55-64 years old are the most inactive at 35.8% far surpassing the national rate of 25.9% for this indicator. This trend does correspond with the above mentioned increased obesity rate for this age category. Not surprisingly, the rates of physical inactivity are highest with those citizens at the lowest income and education levels. The southwest corner of the state and Philadelphia County show the highest rates of physical inactivity statewide.

Preventive Activities

From 1995 to 2010, the number of people without health care coverage in Pennsylvania increased slightly from 12% to 14%, and the state continues to be below the national average in almost all categories. Males, Hispanics, followed by blacks, make up the greatest number of uninsured. Younger adults, ages 25-34, have less health care coverage than other age groups. Those making $15,000-$25,000, along with those having less than a high school education are most likely to be uninsured. The northeast corner of the state, four south central counties and Philadelphia County have the highest rates of no health coverage. However, with the addition of the Affordable Care Act and Healthy PA an increase in health care coverage rates can be expected.

Colonoscopy/sigmoidoscopy rates in Pennsylvania for adults ages 50 years and older have increased steadily and currently stand at a rate of 68%. Overall rates for colonoscopy/sigmoidoscopy are nearly the same or slightly better than national rates in all categories. Males and females are screened at approximately the same rates. Hispanics have the lowest rates of screening at 57%. Adults 50-59 years of age show the lowest rate of screening at 59%. Once again, those with the least amount of education and annual income exhibit the lowest rates of screening. The southwest area of the state has the lowest rate of colonoscopy/sigmoidoscopy at 60%. A less invasive, but less utilized type of colorectal cancer screening is a blood stool kit known as known as the FOBT (fecal occult blood test) or the FIT (fecal immunochemical fecal occult blood test). The current rate for this method of screening is 9% statewide. The lowest rate of screening occurs in the northeast at 7%.

Mammogram screening rates for women 40 years of age and older have increased from 63% in 1995 to 74% in 2010. Pennsylvania's rate at 73.9% is slightly lower than the national average.at 75.2%. Women ages 40-49 have the lowest screening rate at 65.3% and women who have less than a high school education and make less than $15,000 are also the least likely to receive a mammogram. Geographic areas of the state that show lower rates of screening than the state average are the: northeast, southwest and Allegheny County.

The Papanicolaou test (Pap test) is a method to detect cervical cancer. The rate of women who received a Pap test in the past three years is 73%. The southwest and north central regions of the state are 3 to 5% below the state average, of 73%. Philadelphia County has the highest rate for adult females who received a Pap test at 78%.

Cancer Incidence

In 2011 approximately 78,000 cases of invasive cancer were diagnosed in Pennsylvania. Nearly all non-female specific cancers, except breast cancer and thyroid cancer, males have higher incidence and mortality rates than females. For many types of cancers, racial disparities regarding incidence and mortality are also highly evident, and with few exceptions, black male incidence and mortality rates are the highest in all race/sex/ethnicity categories.

Disparities between gender and races can be noted. Black males had an overall age-adjusted cancer incidence rate of 625.7 per 100,000 in 2011, compared to 542.0 for white males, and approximately 460 for females of both races.

Lung and bronchus, female breast, and prostate cancer are the three most commonly diagnosed invasive cancers with over 10,000 cases each.

Lung and bronchus cancer is the most common invasive cancer in Pennsylvania as of 2011 with a total of 10,568 cases diagnosed, female breast cancer at 10,561 cases and prostate cancer at 10,235 cases. The rate of lung cancer in males is significantly higher than in females. However, male lung cancer incidence rates have declined slightly over the past decade, while female incidence rates increased until 2007 and currently appear to be holding steady.

Cancer Mortality

In 2011, more than 28,500 Pennsylvanians died from cancer. The highest number of deaths, by a substantial margin, was lung and bronchus cancer, with 7,600 deaths. Colorectal cancer, with 2,600 deaths, and female breast cancer, with 2,000 deaths are the second and third leading causes of cancer death in both males and females.

Stage Distribution at time of Diagnosis

Approximately half of all cancers are diagnosed at early stages (e.g., local or in situ) and less than 25 percent are diagnosed at the distant stage. The exception to this trend is lung and bronchus cancer. Over 50% of lung and bronchus tumors are diagnosed as distant and therefore much less treatable. Some variation exists among the race/ethnic groups represented in the figure, but overall rates are relatively close.

Geographic Information

The overall cancer incidence rates for males and females in Pennsylvania are higher than the national rate. Counties which have a statistically significant higher rate occurred in both very urban and very rural areas. The distribution of counties with statistically significant higher or lower incidence rates for females is slightly different than for males, but the largely urban and rural pattern remains.

The national and Pennsylvania mortality rates for males and females, in contrast to incidence rates, are fairly close. For both sexes, the distribution of counties with significantly higher and lower rates also differs from incidence. Two of the counties in the Philadelphia Metropolitan Statistical Area (MSA), specifically Philadelphia and Delaware counties, have significantly higher mortality rates compared to the state for both males and in females.

Hospitalization Data

The data source for this section of the report is from the 2001-2011 Pennsylvania Health Care Cost Containment Council (PHC4) inpatient discharge data. PHC4 is an independent state agency charged with collecting, analyzing and reporting information that can improve the quality and restrain the costs of health care in the state.

The following table shows select hospitalization data for high burden cancers in Pennsylvania.

Consistent with the incidence and mortality data, lung cancer had the highest number of hospitalization admissions at 6,921 in 2011. Except for thyroid cancer, admissions decreased from 2001 to 2011. However, hospitalization charges have increased substantially in the same time period. Colorectal cancer had the highest charges by primary payer at a cost of $311 million to Medicare, followed closely by lung cancer at $306.6 million. It is worth noting that charges for prostate cancer almost tripled from 2001 to 2011, with commercial insurance assuming a majority of the costs. An analysis of the data also shows that non-Hispanic blacks and Hispanics are hospitalized at a disproportionate rate as compared to other racial and ethnic groups.

Select Data from Cancer Hospitalization Report 2001-2011				
Cancer Type	Year	Total Number of Hospital Admissions	Total Hospitalization Charges by Primary Payer type (millions)	Age Adjusted Hospital rate by race/ethnicity
Lung and Bronchus	2001	7821	$167.8 Medicare	82.2% non-Hispanic black
	2011	6921	$306.6 Medicare	66.6% non-Hispanic black
Colorectal	2001	8726	$222.3 Medicare	73.9% Hispanic
	2011	6379	$311.0 Medicare	35.8% non-Hispanic black
Female Breast	2001	5370	$39.6 Commercial	42.4% Hispanic
	2011	3373	$82.6 Commercial	33.7% non-Hispanic black
Prostate	2001	4801	$46.6 Commercial	44.9% non-Hispanic black
	2011	4291	$125.7 Commercial	34.2% non-Hispanic black

DEMOGRAPHIC PROFILE OF PENNSYLVANIA

Pennsylvania ranks as the sixth largest state in United States, with an estimated population of 12.8 million in 2013. Two major cities—Philadelphia and Pittsburgh—anchor each side of the state with a total population of 1.55 and 0.31 million respectively. However, Pennsylvania ranks third in the nation with 16.4% of its citizens at 65 years of age or older.[1]

Pennsylvanians reside in 67 counties with 2,575 municipalities; 31 of the 67 counties have total populations over 100,000, while the other 36 counties have populations less than 100,000.[2]

The Center for Rural Pennsylvania defines a county "rural" if the population density is lower than the population density of the state. For Pennsylvania, counties with population density of less than 284 persons per square mile are "rural." Forty-eight of Pennsylvania's 67 counties meet this definition; nineteen counties do not and are considered urban. In 2013, over 3.5 million or 27 percent of the population of Pennsylvania lived in a rural county.[3]

The Pennsylvania Department of Health is organized into six community health districts, 60 state health centers, as well as 10 county or municipal health departments. The state is also served by more than 200 Federally Qualified Health Centers serving over 700,000 patients in Pennsylvania. They are located in 45 out of 67 counties and serve both urban (60%) and rural (40%) populations.[4]

Race and Ethnicity

Pennsylvania is becoming more racially and ethnically diverse, as is the United States. In 2000, the U.S. Census Bureau calculated that 16 percent of Pennsylvania residents belonged to a minority group. Ten years later, the agency found 20 percent of the state's population belonged to a minority group. During the same time period, the percentage of people belonging to at least one minority group increased from 31 percent to 36 percent nationwide.

Minority residents comprise a greater percentage of the population in urban areas (25 percent) than in rural areas (8 percent) of Pennsylvania. Urban counties include Allegheny, Beaver, Berks, Bucks, Chester, Cumberland, Dauphin, Delaware, Erie, Lackawanna, Lancaster, Lebanon, Lehigh, Luzerne, Montgomery, Northampton, Philadelphia, Westmoreland and York.[5]

Table 1 (Appendix) shows the 2000 and 2010 population

totals for Pennsylvania counties by race/ethnicity. Counties with the greatest population of black residents, in descending order, are Philadelphia, Allegheny, Delaware, Montgomery and Dauphin. The majority of Hispanic residents live in Philadelphia, Berks, Lehigh, Lancaster and Luzerne counties. The Hispanic population has shown the most growth in Luzerne County, which increased almost 500 percent from 2000 to 2010. Population change in Forest County is due in large part to the opening of a prison in that county in 2004. In addition, the populations of people who identify as Asian/Pacific Islander or Hispanic have increased, especially in eastern counties.

Socioeconomic Status

According to the Centers for Disease Control (CDC), a person's socioeconomic status impacts his or her ability to obtain health care.[6] Areas that have a higher unemployment rate, higher eligibility for medical assistance, less education, less per capita income or less education typically exhibit poorer health coutcomes among its inhabitants.

Income

According to US Census, the Pennsylvania median household income for 2008-2012 was $52,267 compared to $53, 046 for the United States. The largest employment sector in the state is educational services, health and social assistance, followed by manufacturing and retail trades.

Poverty

According to US Census, about 13.1 percent of Pennsylvanians lived below the poverty level during 2008-2012, which was lower than the national rate of 14.9 percent. The Pennsylvania poverty rate among black residents was 28 percent, compared to 34 percent for Hispanics and only 11 percent for whites during the above time period.

Education

According to the US Census Bureau's American Community Survey 2012, 11.1 percent of Pennsylvania's population 25 or over has less than a high school educations, 36.8 percent has a high school diploma or equivalent, 16.6 percent have some college education, 7.9 percent have attained An Associate's degree and 27.9 percent have a Bachelor's degree or higher.[7]

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1 (United States Census, 2014)
2 (United States Census, 2014)
3 (Center for Rural Pennsylvania, 2014)
4 (Pennsylvania Association for Community Health Centers, 2014)
5 (Center for Rural Pennsylvania, 2014)

6 (Centers for Disease Control, 2014)
7 (U. S. Census Bureau American Community Survey, 2012)

DATA NOTES

Demographic Data:

Socioeconomic and demographic data and tables were taken in part from the Pennsylvania State Health Assessment 2013.

Incidence Data:

Cancer abstracts collected by the Pennsylvania Cancer Registry (PCR) are the source for Pennsylvania cancer incidence data shown here. Data from the PCR were used to project the expected number of cancer cases listed in this report. Primary cancer sites or types follow the definitions used by the National Cancer Institute's SEER Program and are therefore comparable. Currently, 2011 is the latest year of available incidence data for the commonwealth.

Unless noted, in situ cases for sites other than urinary bladder cancer are not included in any calculation or projection contained in this report. Cancer cases were coded using the International Classification of Diseases for Oncology—Third Edition (ICD-O-3) and staged according to the "SEER Summary Staging Manual" categories.

Mortality Data:

Pennsylvania's Certificate of Death is the source document for Pennsylvania cancer mortality data. The actual numbers of Pennsylvania cancer deaths reported were used to forecast the expected number of cancer deaths listed in this report. Currently, 2011 is the latest year of available mortality data for the commonwealth.

Incidence and Mortality Projections:

The projections of new cancer cases in this report were obtained by producing a regression line using the method of least squares. This approach utilized the actual number of cases reported to the PCR with a diagnosis year of 2006 through 2010. This method constructed the regression line that minimizes the sum of the squared residuals. A residual is the difference between each data point (actual or observed event) and the regression line (predicted event). Once a regression line has been computed, the population standard error of the estimate is computed. This estimate measures the variability of the line.

The population standard deviation of the dependent variable (year of diagnosis) is also computed. This is a measure of the variability of projected cancer cases based on the arithmetic mean of cancer cases for the five years of 2006 through 2010. The population standard error of the estimate was then compared to the population standard deviation of the mean to identify which method had less variability. If the population standard deviation was lower, then the arithmetic mean for the five-year period was used as the projected number of cancer cases. This same method was applied to projecting the number of cancer deaths. However, since the cancer mortality file is more current, the five-year period of 2007 through 2011 was used to project the number of cancer deaths.

Precision of Projections:

Estimates of new cancer cases and new cancer deaths have been rounded to the nearest whole five. The projected figures should be used cautiously. Considerable variation may occur, particularly with estimates of small numbers.

Age-Adjusted Rates (Direct Method):

Age-specific rates for a selected population are applied to a standard population (in this report, the 2000 U .S. standard million population for 18 age groups) in order to calculate what rate would be expected if the selected population had the same age distribution as the standard. The total of these expected events divided by the total of the standard population and multiplied by 100,000 yields the age-adjusted rate per 100, 000. It is important to use the same standard population in the computation of each age-adjusted rate to allow comparability. Age-adjusted rates should never be compared with any other type of rate or be used as absolute measurements of vital events. All state population figures used for calculating rates are estimates produced jointly by the U.S. Census Bureau and the Pennsylvania State Data Center of Penn State at Harrisburg.

Cancer Hospitalization:

The data source for this section of the report is the 2001 to 2011 Pennsylvania Health Care Cost Containment Council (PHC4) inpatient discharge data. PHC4 is an independent state agency charged with collecting, analyzing and reporting information that can be used to improve the quality and restrain the cost of health care in the state. PHC4 collects comprehensive inpatient and outpatient

records—nearly 5 million patient records per year—from Pennsylvania's 246 hospitals and 271 ambulatory surgery centers. The data is collected on a quarterly basis and verified by PHC4 staff. Only inpatient records with primary diagnosis of cancer were used in this report. Patient with cancer as secondary diagnoses without primary diagnosis of cancer were excluded.

Total length of hospitalization stay represents the sum of all number of days a patient stayed in the hospital for that particular cancer as a primary diagnosis. Average length of stay by sex is calculated using total length of stay/total hospital admissions by sex. How long a patient stays in the hospital may reflect upon the success of the treatment.

Age-adjusted hospitalization rate is the rate per 100,000 general population using 2000 U.S. standard population, not the population with the specific condition. Hospitalization rate is based on the number of hospitalizations, not the distinct patients. A patient who is hospitalized more than once in the time period will be counted multiple times in the rate calculation.

Payer type is determined by primary payer type at discharge. Charges are round to the millions and are not the actual payment reimbursed. Hospitalization charge in this report is the submitted charge amount and not the actual reimbursement amount, which is usually less than the submitted charges.

MODIFIABLE RISK FACTOR BEHAVIORS

A small set of common modifiable risk factors are responsible for most of the main chronic diseases, including most cancers. These risk factors are the same in men and women: smoking, obesity and lack of physical activity. The major modifiable risk factors, in conjunction with the non-modifiable risk factors of age and heredity, are associated with the majority of new events of chronic respiratory diseases and some types of cancer. Promoting healthy behaviors and limiting exposures to potential cancer risks such as tobacco can reduce a person's risk of being diagnosed with cancer.

SMOKING

FIGURE A-1

The current rate of smoking among adults in Pennsylvania decreased from a high of 25.4 percent in 2003 to 18.4 percent in 2010. Nationwide, the highest rate of adult smoking was 24.2 percent in 1996 and decreased to 17.3 percent in 2010. Pennsylvania was slightly above the nationwide median for the time period shown. Both rates began to decline in 2003-2004 and are at their lowest rates ever in 2010.
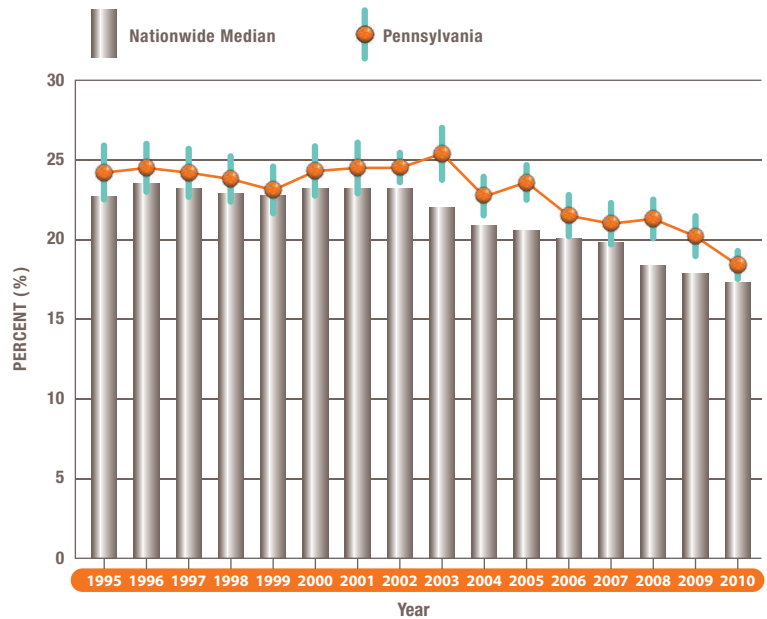
FIGURE A-2

This graph shows that, in 2012, 23.2 percent of smokers in Pennsylvania were male, while 19.7 percent were female. Multiracial smokers represented the highest ethnic group at 30.9 percent, followed by blacks at 27.5 percent and Hispanics at 25.5 percent. Smoking rates in all categories were above the nationwide median for Pennsylvania.
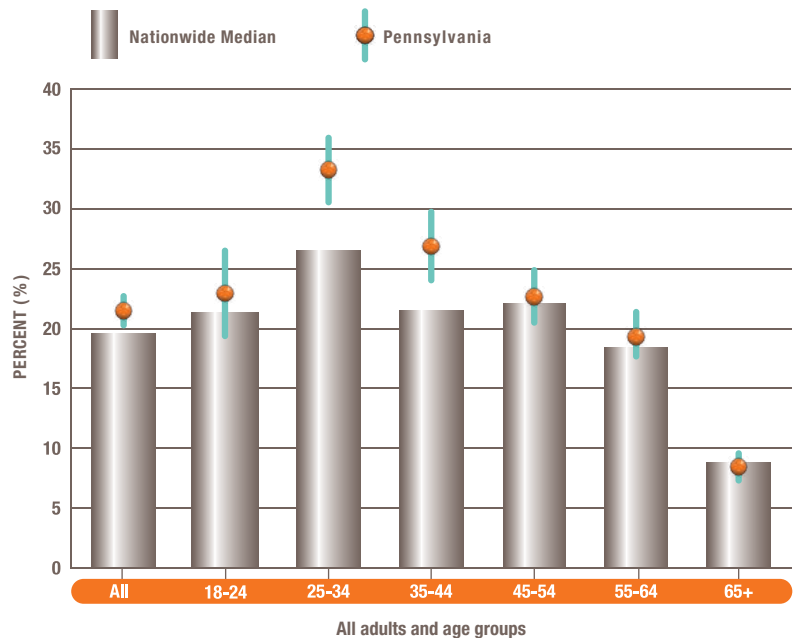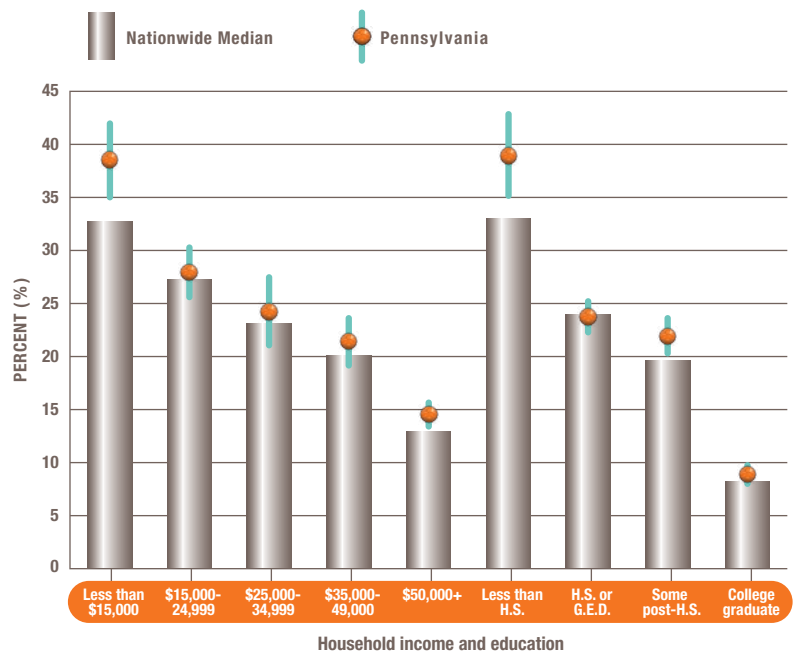
Current smokers among adults, 1995-2010

Source: Centers for Disease Control and Prevention (CDC).
Behavioral Risk Factor Surveillance System Survey Data. Pennsylvania percentages are shown with their 95% confidence intervals.

## Current smokers among adults, by sex and race/ethnicity, 2012
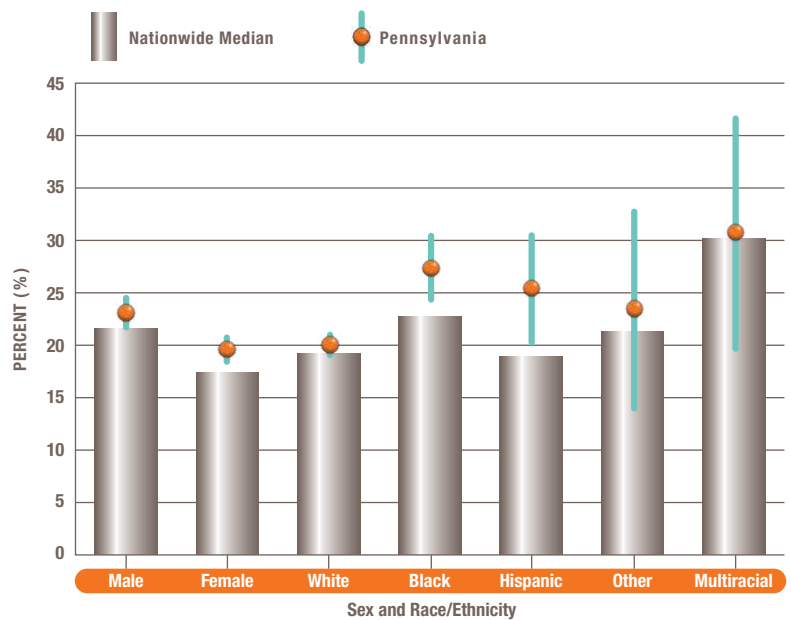
Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Pennsylvania percentages are shown with their 95% confidence intervals. "Other" includes Asian, American Indian, Alaskan Native, some other mentioned race, or "Other race."

Figure A-3 depicts the current rate of adults who smoke in 2012. The Pennsylvania rate for all smokers is listed at 21.4 percent, higher than the national rate of 19.6 percent. Smoking in Pennsylvania is highest in the 25-34 age group at 32.8 percent followed by the 35-44 age group at 26.9 percent. Pennsylvania is above the national median for each group of current smokers except 65+, the greatest disparities being evident in the 25-34 and 35-44 age groups.

Current smokers among adults, by age group, 2012

Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Pennsylvania percentages are shown with their 95% confidence intervals.

Figure A-4 shows the effect of household income and education on smoking adults. Smoking rates at both the state and national levels are highest with those who have the least education and the least household income. In Pennsylvania, smoking rates for citizens making less than $15,000 per year and having less than a high school education are 38.5 percent and 38.9 percent respectively. Conversely, smoking rates are lowest among those with the highest education levels and household income.

Current smokers among adults by household income and education, 2012

Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Pennsylvania percentages are shown with their 95% confidence intervals.

The Behavioral Risk Factor Surveillance System (BRFSS) data from 2010-2012 in shows twelve counties in the Northwest corner of the state that have a significantly higher percentage of smokers at 24 percent as compared to the Pennsylvania average of 18 percent. The counties include: Crawford, Lawrence, Mercer, Venango, Forest, Elk, Cameron, Clearfield, Jefferson, Clarion and McKean and Warren. Conversely, Cumberland, Perry, Chester and Montgomery exhibit percentages that are significantly lower than the Pennsylvania average.

Significant differences between BRFSS region and Pennsylvania current smokers* Pennsylvania adults, 2010-2012
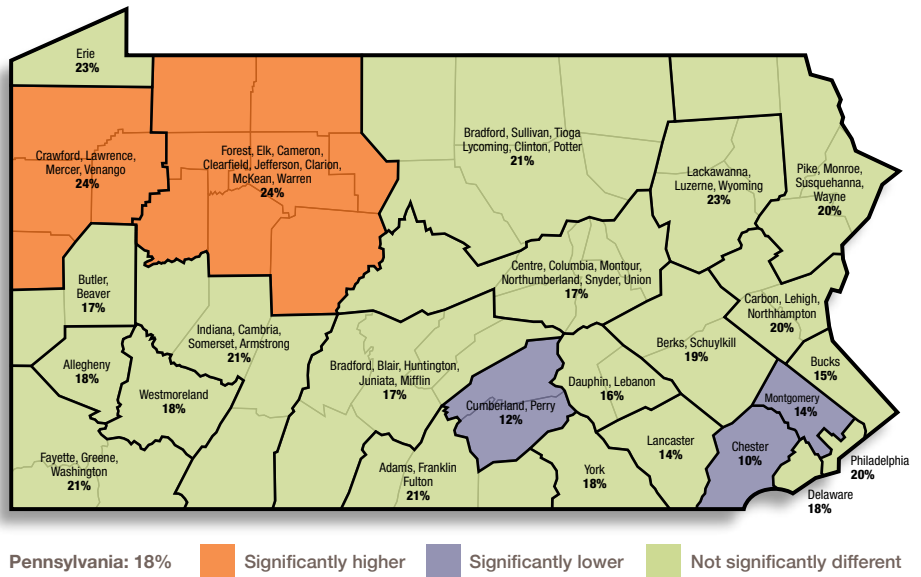
Pennsylvania: 18% | Significantly higher | Significantly lower | Not significantly different

Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS). Starting in 2010, Pennsylvania began collecting data by eight different strata consisting of the six Pennsylvania health districts and both Allegheny and Philadelphia Counties. In 2011, the BRFSS added cell phone numbers and introduced a new weighing methodology to the survey. Therefore, single-year measures should be re-benchmarked at the 2011 estimate values, and not compared to BRFSS estimates from previous years. Three-year summaries can still be compared to previous years since they will continue to be weighed using the post-stratification methlology until 2011-2013 data is available.
*Excludes missing, don't know, and refused
†Includes adults who smoke cigarettes every day or some days

OBESITY

Following the national trend, the obesity prevalence among adults in Pennsylvania has increased steadily from 1995 to 2010. Figure A-6 shows that 16.4 percent of Pennsylvanians were considered obese in 1995. In 2010, the statewide rate jumped almost 13 points to 29.2 percent, as compared to the national rate which was 27.5 percent. Over time, Pennsylvania's obesity rates have shown to be close to, but slightly higher than, US obesity rates, except for 2006 when the rate dropped one point below the national median.
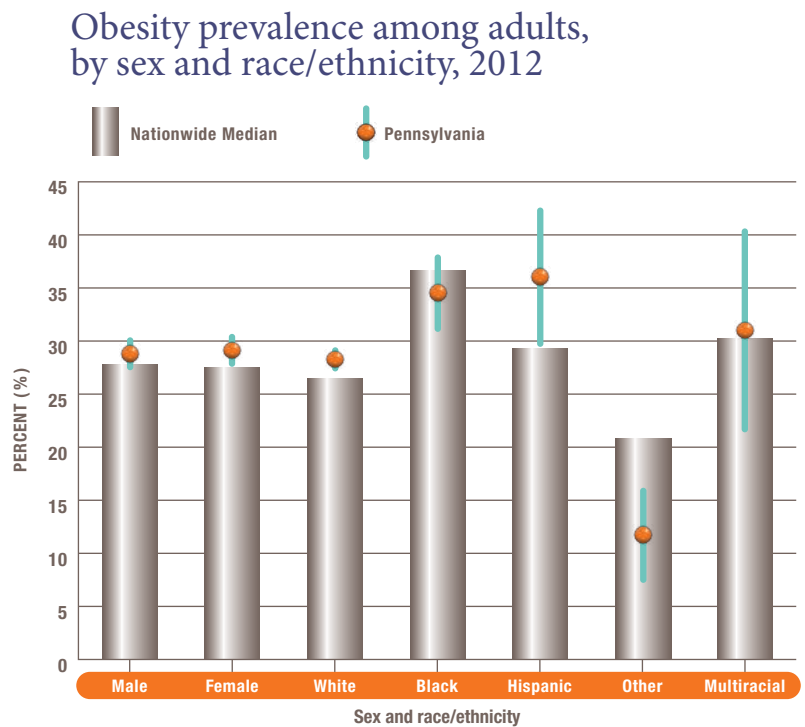
Obesity prevalence among adults, 1995-2010
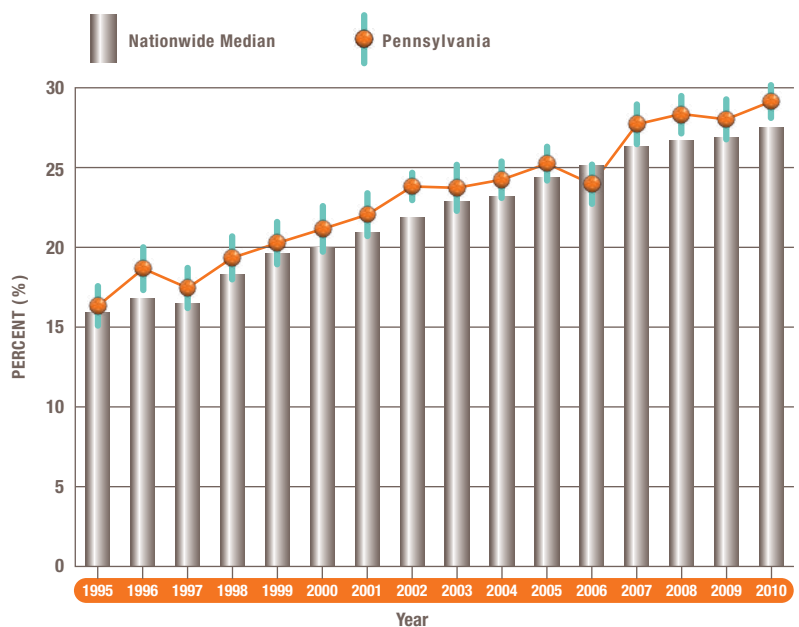
Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data.
Obesity is defined as having a Body Mass Index (BMI) of 30 or more. Pennsylvania percentages are shown with their 95% confidence intervals.

FIGURE A-7

Figure A-7 shows the prevalence of obesity among adults by gender and race/ethnicity in 2012. In Pennsylvania, females were slightly more obese at 29.2 percent than males at 28.9 percent. Hispanics showed the highest rate of obesity at 36.1 percent followed by 34.6 percent of blacks. Pennsylvania rates were higher than national rates in almost all categories, the exceptions being blacks and Other (Asian, Pacific Islander, Native American) categories.

Obesity prevalence among adults, by sex and race/ethnicity, 2012

Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data.
Obesity is defined as having a Body Mass Index (BMI) of 30 or more. Pennsylvania percentages are shown with their 95% confidence intervals. "Other" includes Asian, American Indian, Alaskan Native, some other

FIGURE A-8

In Figure A-8, the prevalence of obesity by age group for all Pennsylvania adults is depicted at 29.1 percent. Most Pennsylvania rates are at or above the corresponding national rates by age group. Residents in middle age show the highest rates of obesity; the rate for the 55-64 age group stands at 33.3 percent while the 45-54 age group rate peaks at 32.9 percent. The 18-24 age group rate is significantly lower at a rate of at 18.5 percent, but is almost four percentage points higher than the national rate of 14.7.
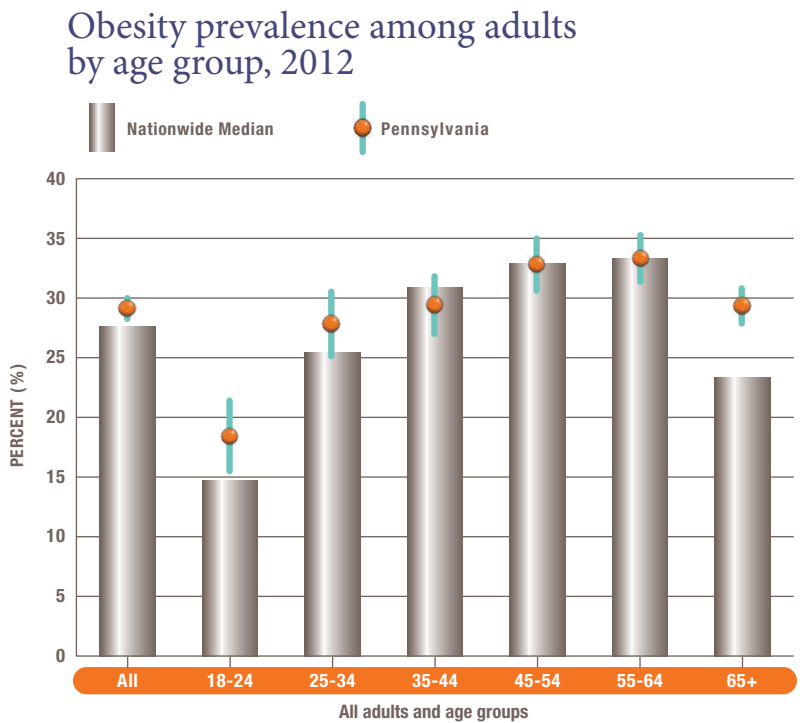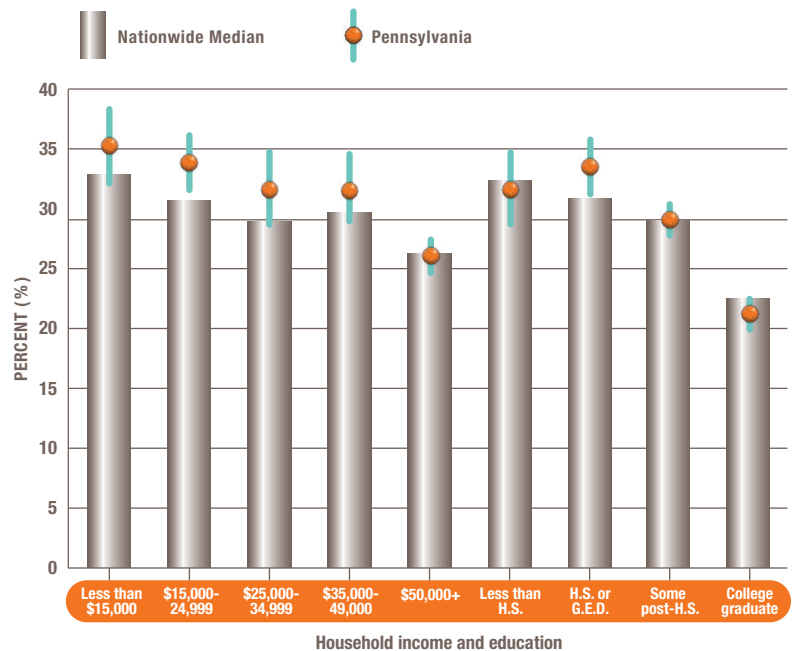
Obesity prevalence among adults by age group, 2012

Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data.
"Physical inactive" is defined as not having engaged in a physical activity other than their regular job within the past month. Pennsylvania percentages are shown with their 95% confidence intervals.

Figure A-9 shows that Pennsylvania adults with a household income of less than $15,000 and those with High School diploma or G.E.D are most likely to be obese at a rate of 35.4 percent and 31.1 percent respectively. College graduates and those with income over $50,000 show the least tendency towards obesity. Again, the Pennsylvania rates for obesity by household income and education are, as a rule, higher than the national rates.

Obesity prevalence among adults by household income and education, 2012

Nationwide Median   Pennsylvania

Household income and education

Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data.
"Physical inactive" is defined as not having engaged in a physical activity other than their regular job within the past month. Pennsylvania percentages are shown with their 95% confidence intervals.

The BRFSS data in figure A-10 shows that citizens in Indiana, Cambria, Somerset Armstrong counties possess a 34 percent regional rate of obesity. Residents of Bedford, Blair, Huntingdon, Juniata, Mifflin counties post a regional rate of 33 percent. Both areas show rates that are significantly higher than the Pennsylvania average obesity rate of 27 percent. Chester and Montgomery counties are below the state average at 20 and 21 percent respectively.

Significant differences between BRFSS region and Pennsylvania
Percent who are obese (body mass index of 30 or more)
Pennsylvania adults, 2010-2012
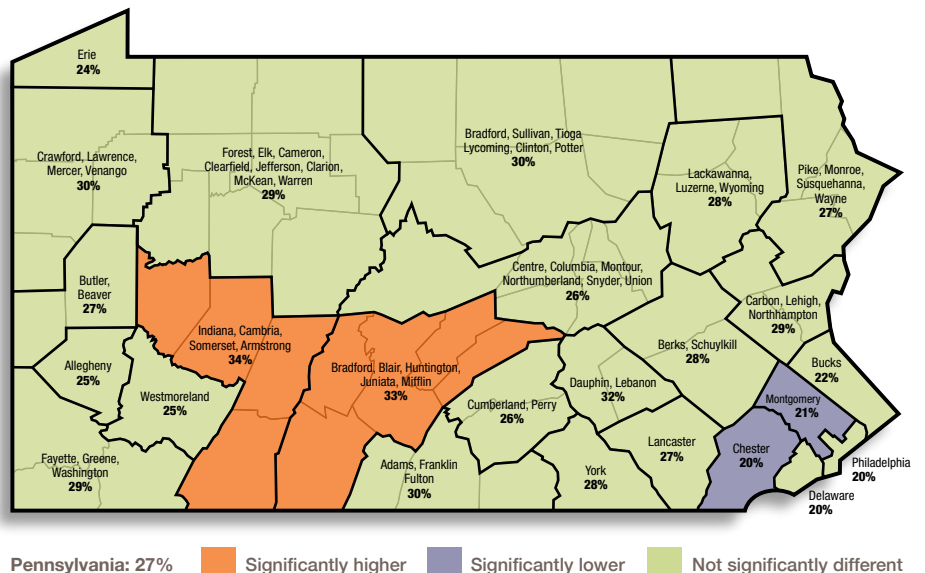
Pennsylvania: 27%   Significantly higher   Significantly lower   Not significantly different

Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS). Starting in 2010, Pennsylvania began collecting data by eight different strata consisting of the six Pennsylvania health districts and both Allegheny and Philadelphia Counties. In 2011, the BRFSS added cell phone numbers and introduced a new weighing methodology to the survey. Therefore, single-year measures should be re-benchmarked at the 2011 estimate values, and not compared to BRFSS estimates from previous years. Three-year summaries can still be compared to previous years since they will continue to be weighed using the post-stratification methology until 2011-2013 data is available.
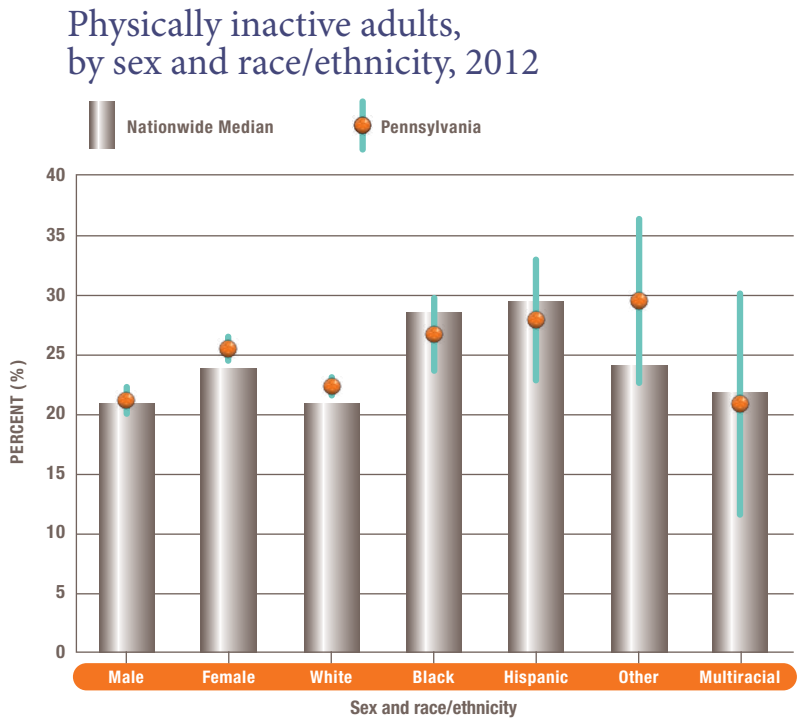
PHYSICAL INACTIVITY

Physical inactivity is defined by the CDC as not having engaged in a physical activity other than your regular job within the past month. Overall, Pennsylvania's level of physical inactivity has remained relatively the same from 1996-2010 (Figure A-11). It was at its highest in 1998 at 32.7 percent but has remained somewhat stable for the last 14 years. Pennsylvania trends are similar to the national rates for the above time period.
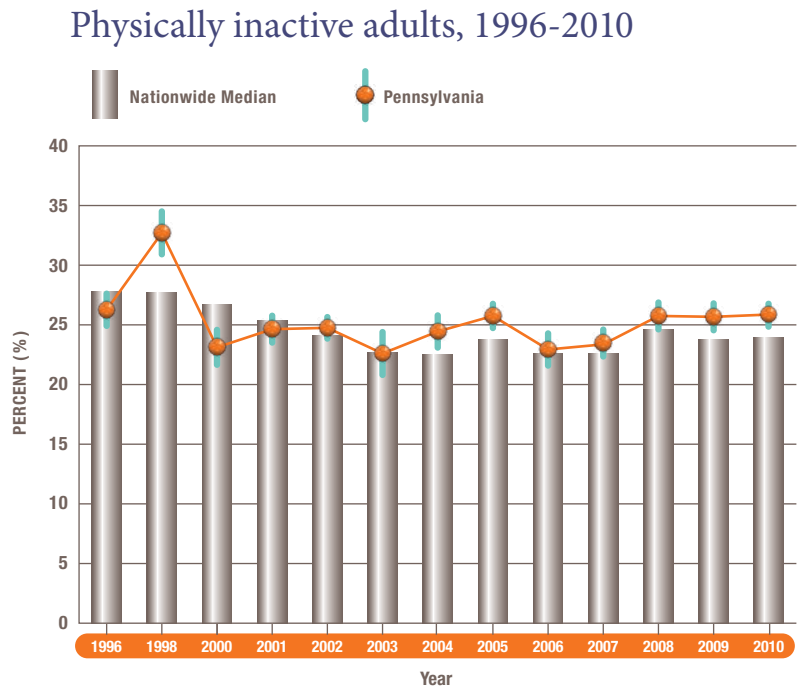
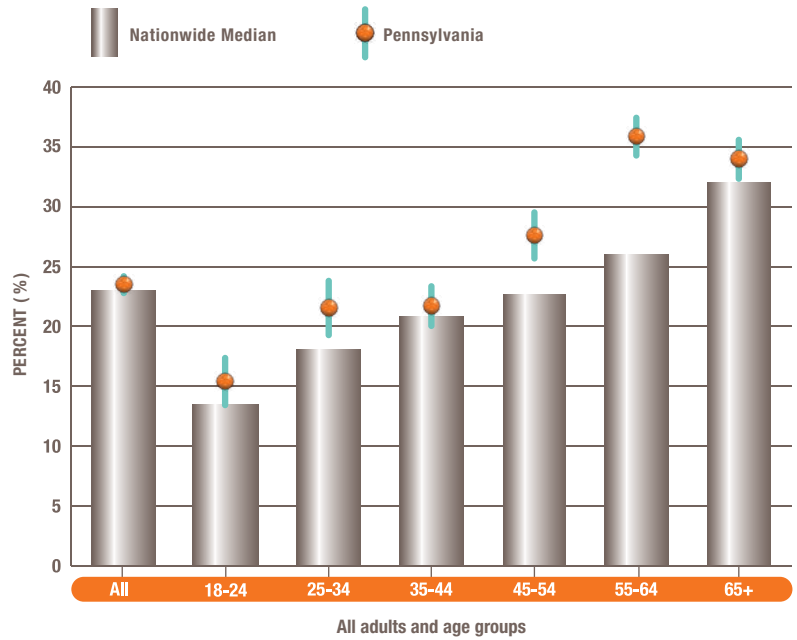## Physically inactive adults, 1996-2010

Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data.
"Physically inactive" is defined as not having engaged in a physical activity other than their regular job within the past month. Pennsylvania percentages are shown with their 95% confidence intervals.

In Figure A-12, Pennsylvania's physically inactive adults who are categorized as Other (Asian, Pacific Islander, and Native American) show the highest rate of physical inactivity at 29.5 percent, followed by Hispanics at 28.1 and blacks at 26.8 percent. Those who identify as white are the least inactive at a rate of 22.5 percent. In Pennsylvania, males are more active than females, with inactivity rates of 21.2 and 25.6 respectively. Overall, Pennsylvania rates for physical inactivity are similar to national rates, with the exception of the Other category rate which is markedly higher than the national rate.

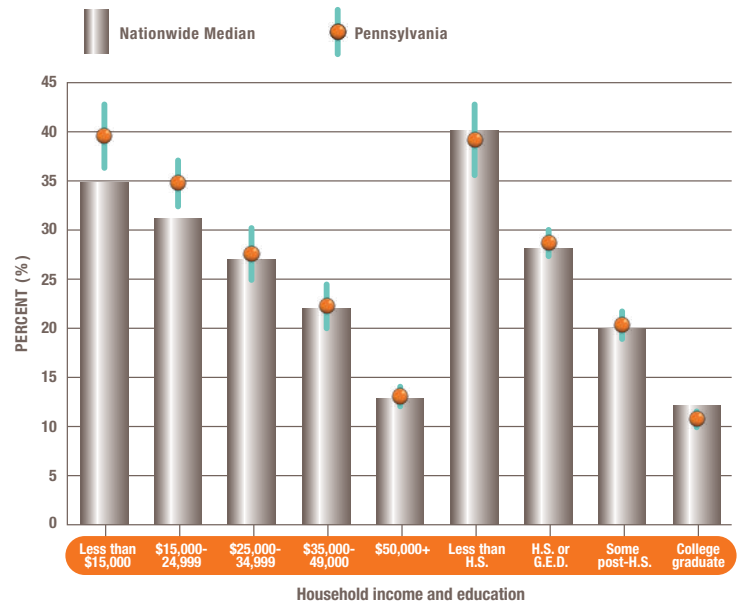## Physically inactive adults, by sex and race/ethnicity, 2012

Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data.
"Physically inactive" is defined as not having engaged in a physical activity other than their regular job within the past month. Pennsylvania percentages are shown with their 95% confidence intervals. "Other" includes Asian, American Indian, Alaskan Native, some other mentioned race, or "Other race."

Overall, 23.5 percent of Pennsylvanians consider themselves inactive. (Figure A.13) Pennsylvanians between 55 and 64 years of age are the most physically inactive of all age groups. This rate is ten percentage points higher than the national rate of 25.9 percent for the same age group. Adults 18 to 25 years old in Pennsylvania show the least amount of physical inactivity at 15.5 percent. Pennsylvania's rates in all age groups are above the national median.

## Physically inactive adults, by age group, 2012

Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data.
"Physical inactive" is defined as not having engaged in a physical activity other than their regular job within the past month. Pennsylvania percentages are shown with their 95% confidence intervals.

Pennsylvanians making $15,000 or less, and having less than a high school education, possess the Commonwealth's highest levels of physical inactivity. In direct contrast, the inactivity level of Pennsylvanians with incomes of $50,000 or more and those who are college educated, are the lowest in Pennsylvania. The lowest two income categories in Pennsylvania have inactivity rates that are substantially higher than corresponding national rates.

Physically inactive adults by household income and education, 2012

Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data.
"Physical inactive" is defined as not having engaged in a physical activity other than their regular job within the past month. Pennsylvania percentages are shown with their 95% confidence intervals.

Figure A-15 depicts Bedford, Blair, Huntingdon, Juniata, Mifflin and Philadelphia Counties as the counties showing the highest rates of physical inactivity at a rate of 31 percent. Montgomery County is the most active with a rate of 19 percent. The remainder of Pennsylvania is within the range of the state average for physical inactivity of 25 percent.

Significant differences between BRFSS region and Pennsylvania
Percent who had no leisure time physical activity in past month
Pennsylvania adults, 2008-2010
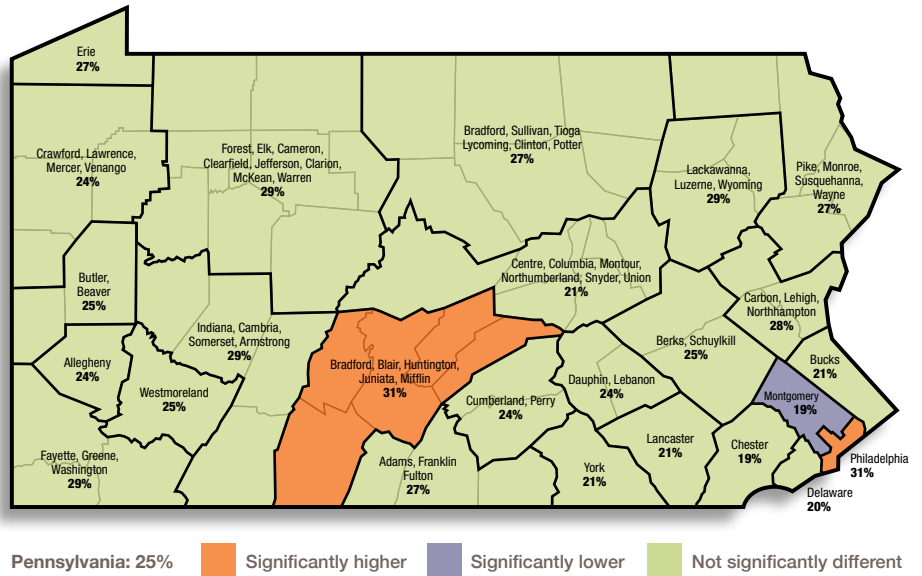
Pennsylvania: 25% | Significantly higher | Significantly lower | Not significantly different

Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS). Starting in 2010, Pennsylvania began collecting data by eight different strata consisting of the six Pennsylvania health districts and both Allegheny and Philadelphia Counties. In 2011, the BRFSS added cell phone numbers and introduced a new weighing methodology to the survey. Therefore, single-year measures should be re-benchmarked at the 2011 estimate values, and not compared to BRFSS estimates from previous years. Three-year summaries can still be compared to previous years since they will continue to be weighed using the post-stratification methology until 2011-2013 data is available.
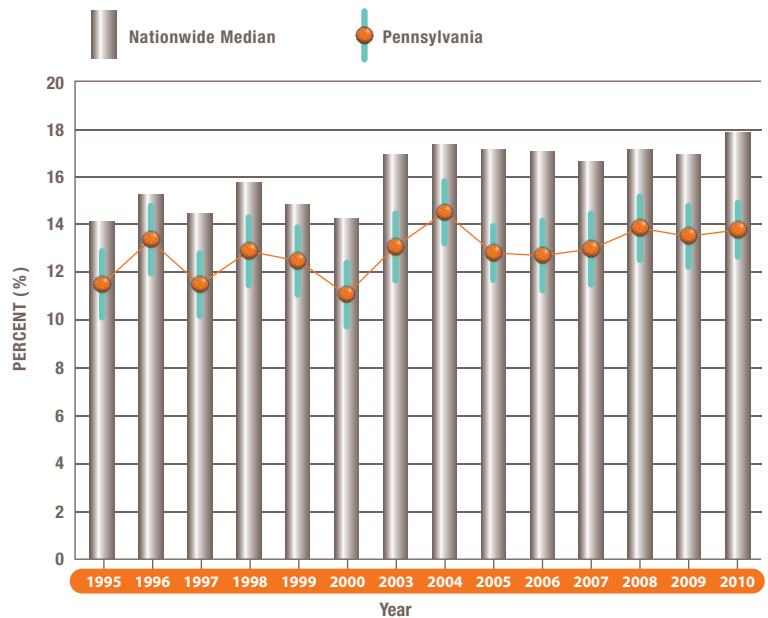
PREVENTIVE ACTIVITIES

The number of new cancer cases can be reduced, and many cancer deaths can be prevented by engaging in preventive activities. Research shows that screening for cervical and colorectal cancers as recommended helps prevent these diseases by finding precancerous lesions so they can be treated before they become cancerous. Screening for cervical, colorectal, and breast cancers also helps find these diseases at an early, often highly treatable stage. The access to health care coverage can also play a part in a person's ability to engage in preventive activities and therefore plays an important role in the discussion of cancer care and prevention.

HEALTH CARE COVERAGE

FIGURE B-1

Figure B-1 highlights the percentage of adults between the ages of 18 and 64 who do not have health care coverage. For 1995 as well as each subsequent year until 2010, Pennsylvania has a lower percentage of individual adults who are without health care coverage as compared to the national average. The percentage of uninsured Pennsylvanians was highest in 2004, when 14.5 percent of adults were without health care coverage. This can be compared to the national rate which reached its highest point in 2010 with a rate of 17.8 percent.

FIGURE B-2

Figure B-2 illustrates the percentage of adults between the ages of 18 and 64 who do not have health care coverage, based on gender, and race and ethnicity. Both nationally and statewide, Hispanics had the highest percentage of adults without health care coverage at 26.9 percent, and males were less likely to be insured than females.

Adults, aged 18-64, without health care coverage, 1995-2010
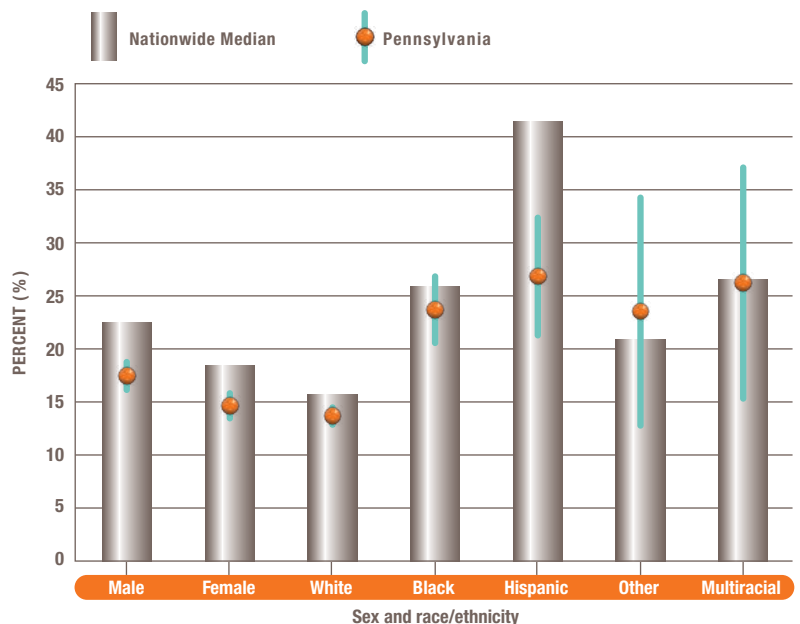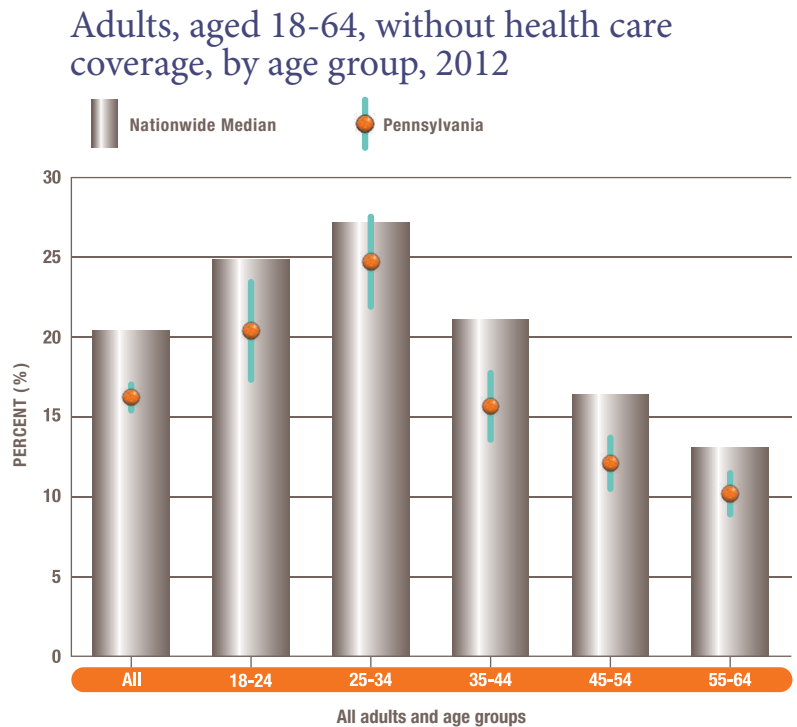

Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Pennsylvania percentages are shown with their 95% confidence intervals.

Adults, aged 18-64, without health care coverage by sex and race/ethnicity, 2012

Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Pennsylvania percentages are shown with their 95% confidence intervals. "Other" includes Asian, American Indian, Alaskan Native, some other mentioned race, or "Other race."

Figure B-3 shows the number of uninsured adults aged 18-64 for 2012. Overall, the Pennsylvania rate is 16.2 percent compared to the national rate of 20.4 percent. In Pennsylvania, adults 25-34 are most likely to be uninsured at a rate of 24.7 percent. Nationally, the rate for this age group is also the highest at 27.2 percent. In all age groups, Pennsylvania rates are lower than the national averages.

Adults, aged 18-64, without health care coverage, by age group, 2012

Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Pennsylvania percentages are shown with their 95% confidence intervals.

The number of adults aged 18-64 without health care coverage, by income and education, is displayed in Figure B-4. Pennsylvanians who make between $15,000-24,999 are most likely to be without health care coverage at a rate of 35.1 percent. Nationally, the highest rate of not having health care coverage occurs within the same income group, at a rate of 41.8 percent. Adults having less than a high school education exhibit the highest rates of no health care coverage at 33.8 percent statewide and 42.7 percent nationally. Comparatively, those with the highest levels of income and education are much more likely to be insured. In Pennsylvania, only 5.1 percent of those earning 50,000 or more and 6.4 percent of those with a college education are without health care coverage.
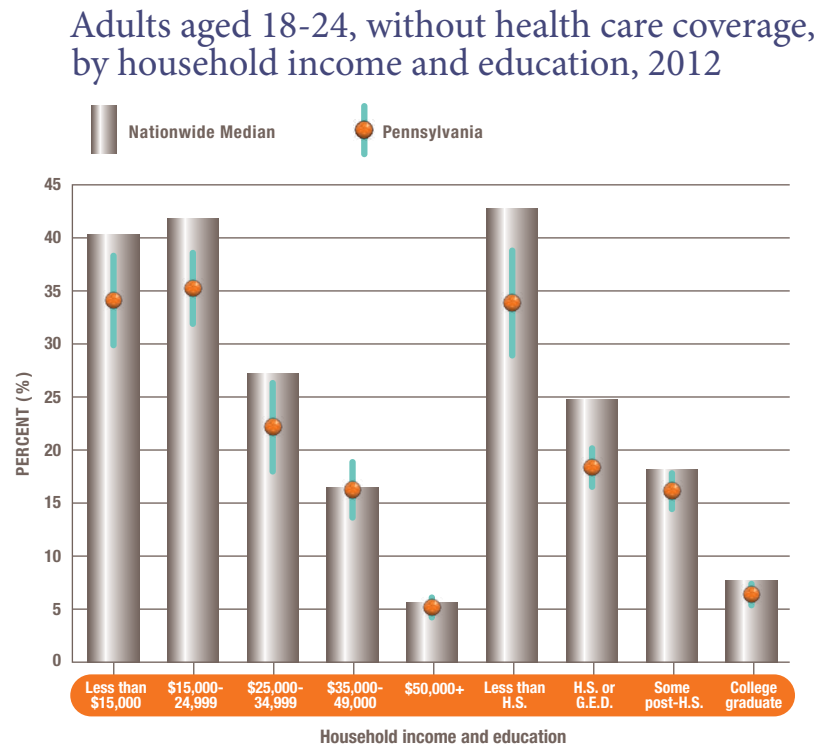
Adults aged 18-24, without health care coverage, by household income and education, 2012

The map in Figure B-5 displays the percent of adults who do not have health insurance by region for 2010-2012. In Pennsylvania, the Southcentral area comprised of Adams, Franklin, and Fulton counties had the highest rate in the state at 22 percent, followed by Lancaster County at 21 percent, Pike Monroe, Susquehanna and Wayne counties at 20 percent and Philadelphia County at 18 percent. Chester County had the lowest rate of adults who did not have insurance at six percent.

Significant differences between BRFSS region and Pennsylvania
Percent who do not have health insurance (age 18-64)
Pennsylvania adults, 2010-2012
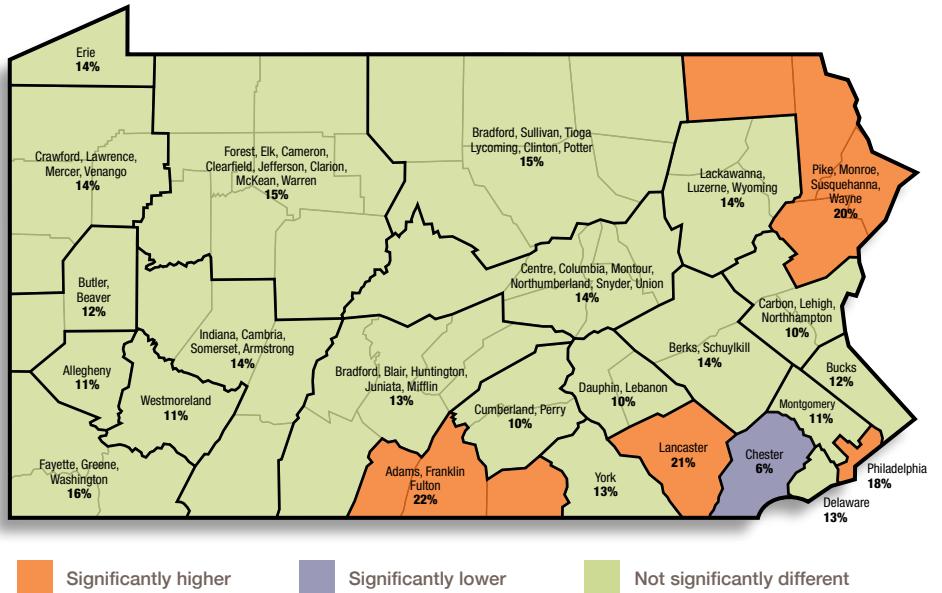
Legend: Significantly higher | Significantly lower | Not significantly different

Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS). Starting in 2010, Pennsylvania began collecting data by eight different strata consisting of the six Pennsylvania health districts and both Allegheny and Philadelphia Counties. In 2011, the BRFSS added cell phone numbers and introduced a new weighing methodology to the survey. Therefore, single-year measures should be re-benchmarked at the 2011 estimate values, and not compared to BRFSS estimates from previous years. Three-year summaries can still be compared to previous years since they will continue to be weighed using the post-stratification methology until 2011-2013 data is available.

COLORECTAL CANCER SCREENING

The number of adults, age 50 and older, who have ever had a colonoscopy or sigmoidoscopy, is illustrated in Figure B-6. In 1999, 39.7 percent of Pennsylvanians 50 years and older had colonoscopy/sigmoidoscopy compared to the lowest national rate in 1997 at 40.2 percent. Rates steadily increased from 1997 to 2010 and were at their highest in 2010 with 68 percent of Pennsylvanians participating in screening as compared to the national rate which was slightly lower at 65.2 percent.

Adults, aged 50+, who have ever had a colonoscopy or sigmoidoscopy, 1997-2010
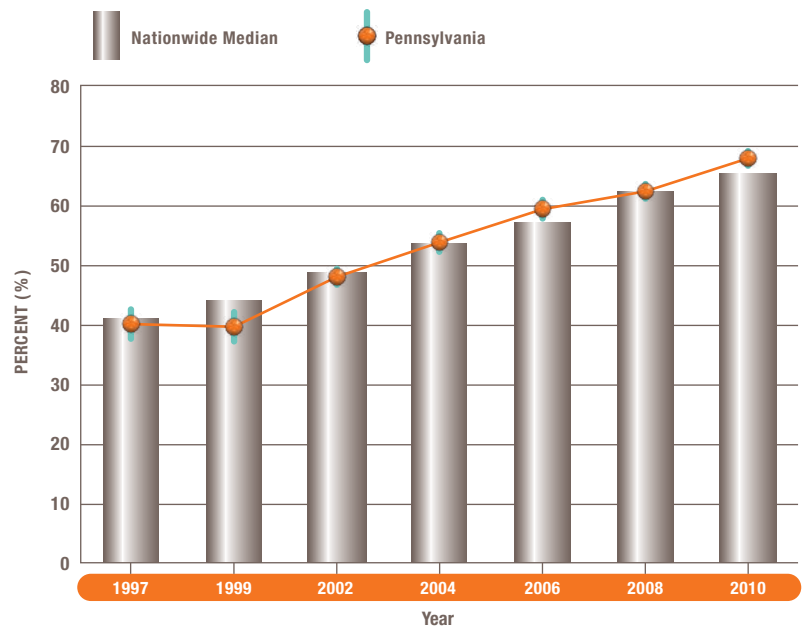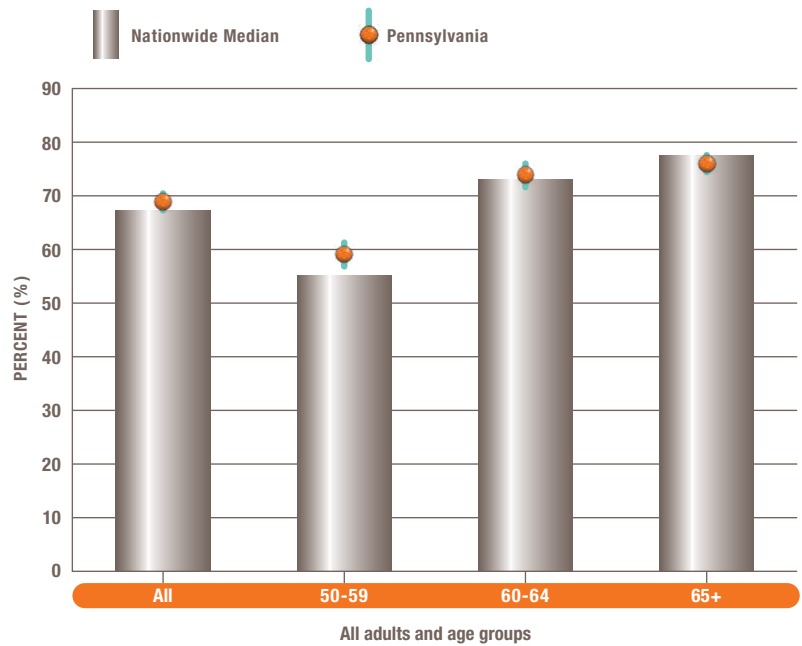

Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Pennsylvania percentages are shown with their 95% confidence intervals.

Figure B-7 shows national and statewide rates of adults age 50 and over who had a colonoscopy/sigmoidoscopy, by gender and race/ethnicity. In Pennsylvania, females had a slightly higher rate of screening than males. In 2012, females had a screening rate of 69.6 percent, while males had a screening rate of 67.8 percent. Whites had a screening rate of 69.7 percent followed closely by blacks at a rate of 68.6 percent. Those that consider themselves multiracial were lowest at 54.4 percent. Statewide, rates were similar if not higher than national rates in most categories of sex/race/ethnicity.

Adults, aged 50+, who have ever had a colonoscopy or sigmoidoscopy, by sex and race/ethnicity, 2012
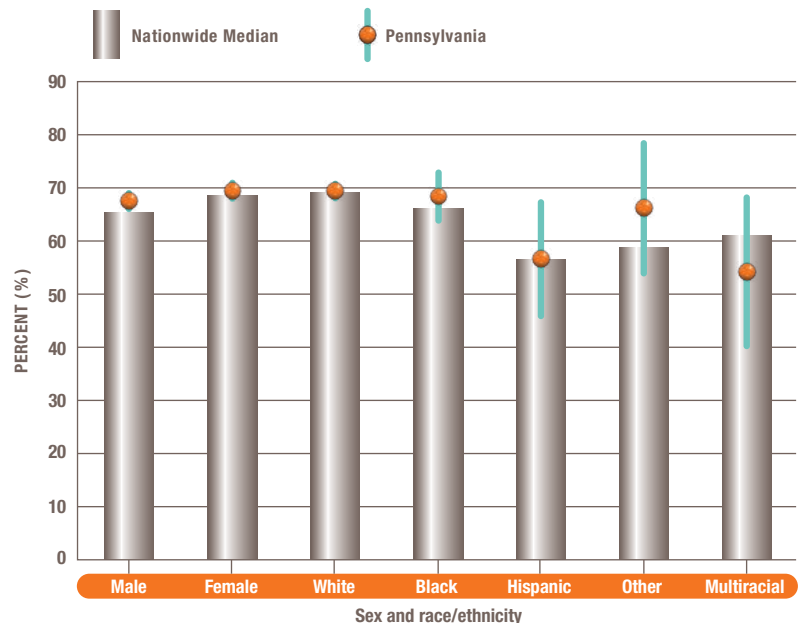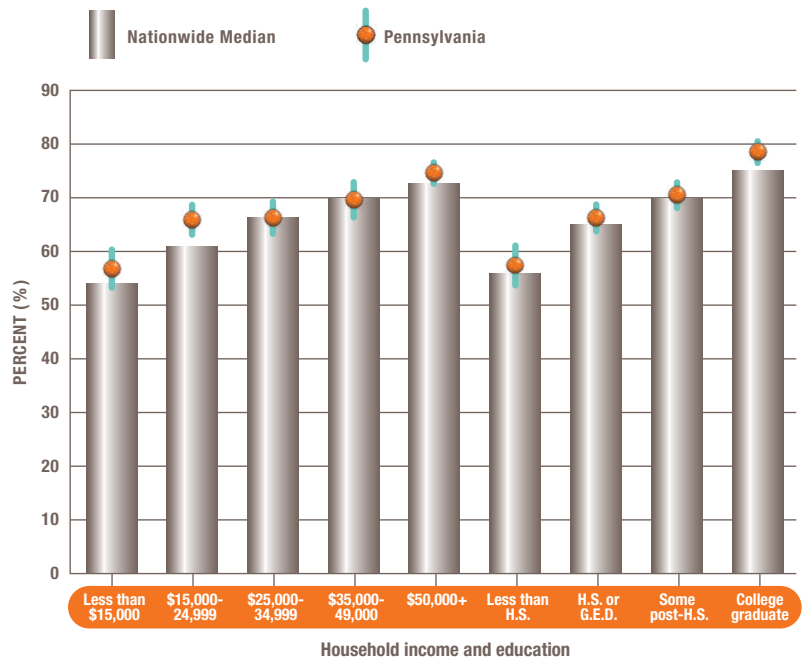

Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Pennsylvania percentages are shown with their 95% confidence intervals. "Other" includes Asian, American Indian, Alaskan Native, some other mentioned race, or "Other race."

The rate of adults aged 50 and over who ever had a colonoscopy or sigmoidoscopy is shown in Figure B-8. Overall, the rate for Pennsylvania is 68.8 percent while the rate for the US is slightly lower at 67.3 percent. Both rates fall short of the Healthy People 2020 goal of 70.5 percent. Adults 65 years of age and older had the highest screening rates statewide and nationally, 75.8 percent for Pennsylvania and 77.4 percent nationally.

Adults, aged 50+, who have ever had a colonoscopy or sigmoidoscopy, by age group, 2012

Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Pennsylvania percentages are shown with their 95% confidence intervals.

As with other activities, those citizens with the highest levels of income and education exhibit the highest rates of colonoscopy/sigmoidoscopy. Conversely, Pennsylvania adults aged 50 and older having less than $15,000 in annual income and less than a high school education had the lowest colonoscopy or sigmoidoscopy rates at 56.8 percent and 57.0 percent respectively. Pennsylvania rates in all categories are equal to or slightly higher than the national rates.

Adults, aged 50+, who have ever had a colonoscopy or sigmoidoscopy, by household income and education, 2012
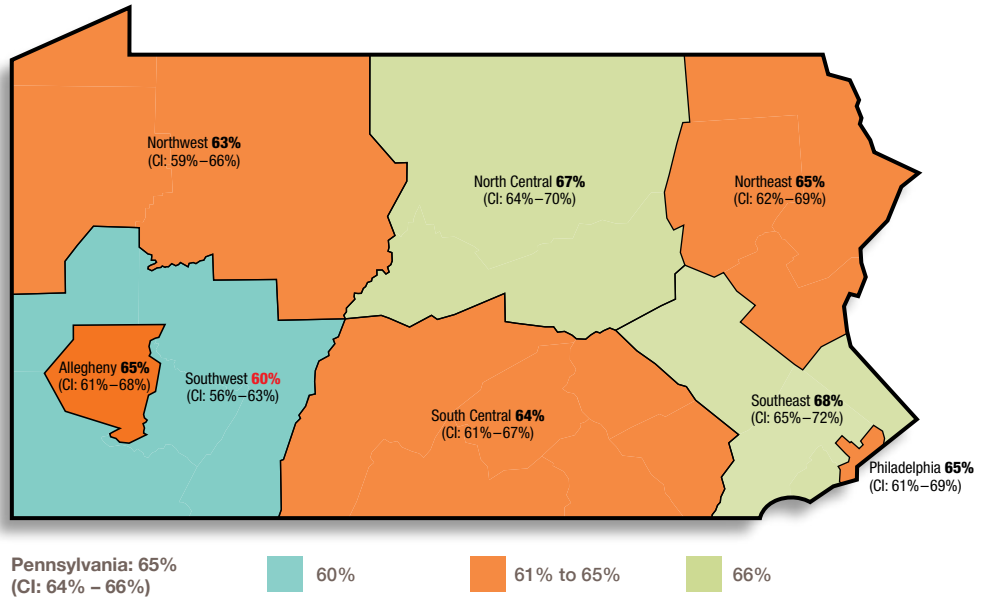
Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Pennsylvania percentages are shown with their 95% confidence intervals.

The map in Figure B-10 shows the percentage of adults who had a colonoscopy or sigmoidoscopy in the past 10 years. The Southwest corner of the state, except for Allegheny County, had a screening rate of 60 percent which was significantly lower than the overall Pennsylvania rate of 65 percent. The Southeast corner of the state exhibits the highest rate of colonoscopy/ sigmoidoscopy at a rate of 68 percent.

Percentage of adults (age 50+) in 2012 who had a colonoscopy or sigmoidoscopy in the past 10 years

Northwest **63%**
(CI: 59%–66%)

North Central **67%**
(CI: 64%–70%)

Northeast **65%**
(CI: 62%–69%)

Allegheny **65%**
(CI: 61%–68%)

Southwest **60%**
(CI: 56%–63%)

South Central **64%**
(CI: 61%–67%)

Southeast **68%**
(CI: 65%–72%)

Philadelphia **65%**
(CI: 61%–69%)

Pennsylvania: 65%
(CI: 64% – 66%)

60% | 61% to 65% | 66%
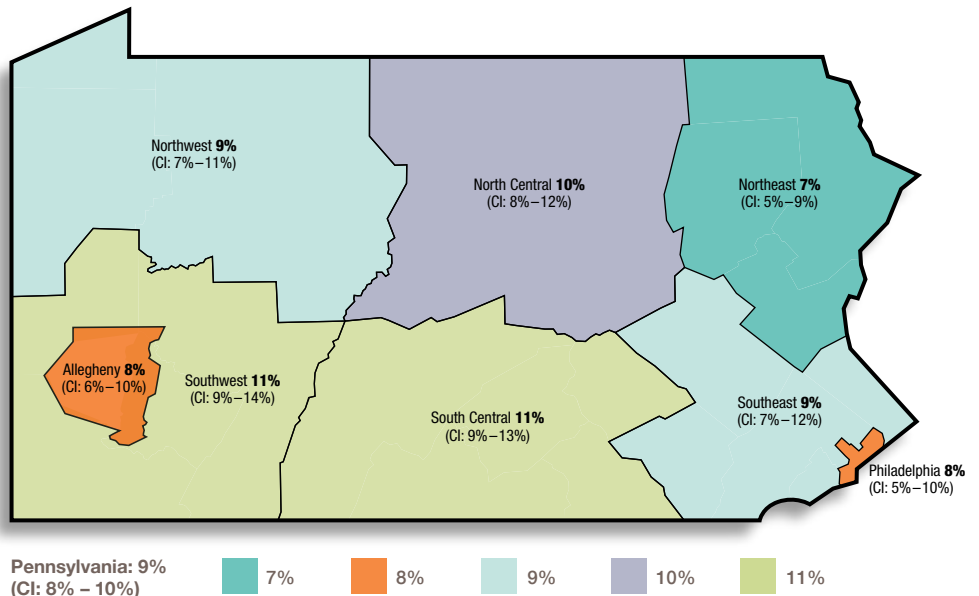
Source: Behavioral Health Risks of Pennsylvania Regions – 2012. Included with each percentage is its 95% confidence interval (CI).
Percentages in RED are statistically significantly lower than the percentage for Pennsylvania.

Figure B-11 shows rates of colorectal screening using the at home blood stool kit, known as a FOBT (fecal occult blood test) or the FIT (fecal immunochemical fecal occult blood test). These are fecal-based colorectal cancer screening tests that allow patients to procure samples in the comfort of their own homes. This screening test is not widely used in Pennsylvania. The state rate for such testing is nine percent with the Northeast area having the lowest rate of testing at seven percent.

Percentage of adults (age 50+) in 2012 who had a blood stool test using a home kit in the past year

Northwest **9%**
(CI: 7%–11%)

North Central **10%**
(CI: 8%–12%)

Northeast **7%**
(CI: 5%–9%)

Allegheny **8%**
(CI: 6%–10%)

Southwest **11%**
(CI: 9%–14%)

South Central **11%**
(CI: 9%–13%)

Southeast **9%**
(CI: 7%–12%)

Philadelphia **8%**
(CI: 5%–10%)

Pennsylvania: 9%
(CI: 8% – 10%)

7% | 8% | 9% | 10% | 11%

Source: Behavioral Health Risks of Pennsylvania Regions – 2012. Included with each percentage is its 95% confidence interval (CI).

BREAST AND CERVICAL CANCER SCREENING

Figure B-12 illustrates the percent of women, aged 40 and over, who had a mammogram in the past two years. This rate was at it is lowest, both nationally and statewide in 1995, and in Pennsylvania reached its peak in 2000 at 77.8 percent. Nationally, the highest rate was recorded in 2006 at 76.5 percent. Overall, the rate of mammography for 2010 is 73.9 percent for Pennsylvania and 75.2 percent for the United States.

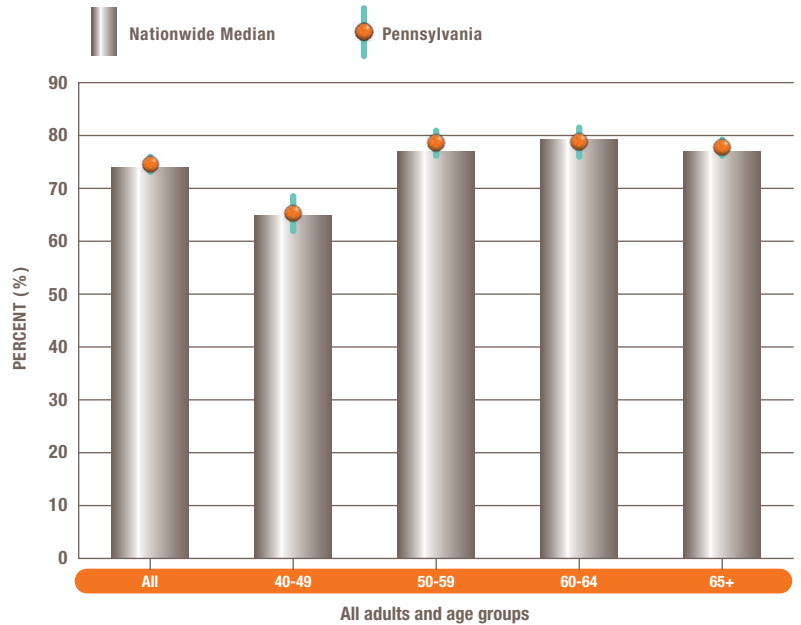## Females, aged 40+, who have had a mammogram in the past two years, 1995-2010
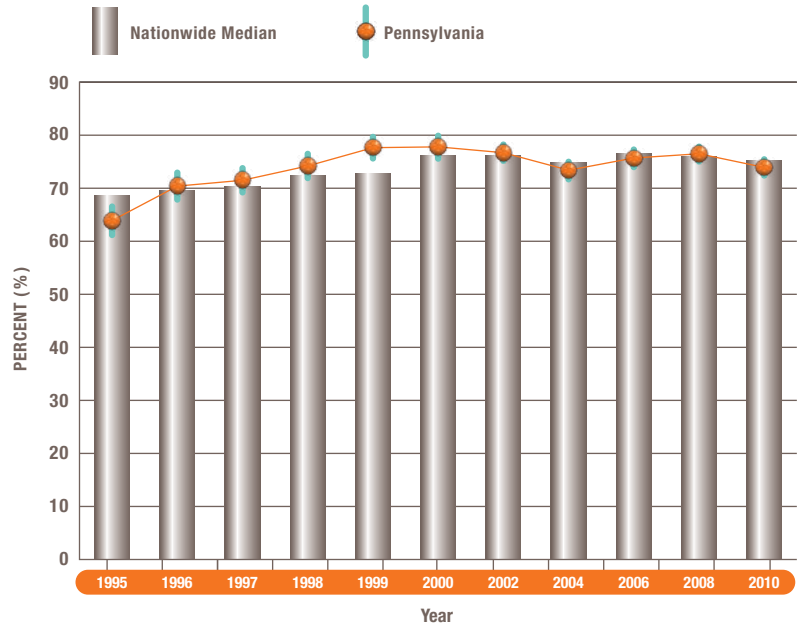
Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Pennsylvania percentages are shown with their 95% confidence interval.

Figure B-13 shows the percent of females 40 years and over who had a mammogram in the past two years, by race/ethnicity. Black women 40 years and over had the highest rate of mammography in 2012 at a rate of 80.5 percent for Pennsylvania and 78.3 percent nationally. Multiracial women showed the lowest screening rates at 49.6 percent for Pennsylvania and 60.1 percent nationally.

Females, aged 40+, who have had a mammogram in the past two years, by race/ethnicity, 2012
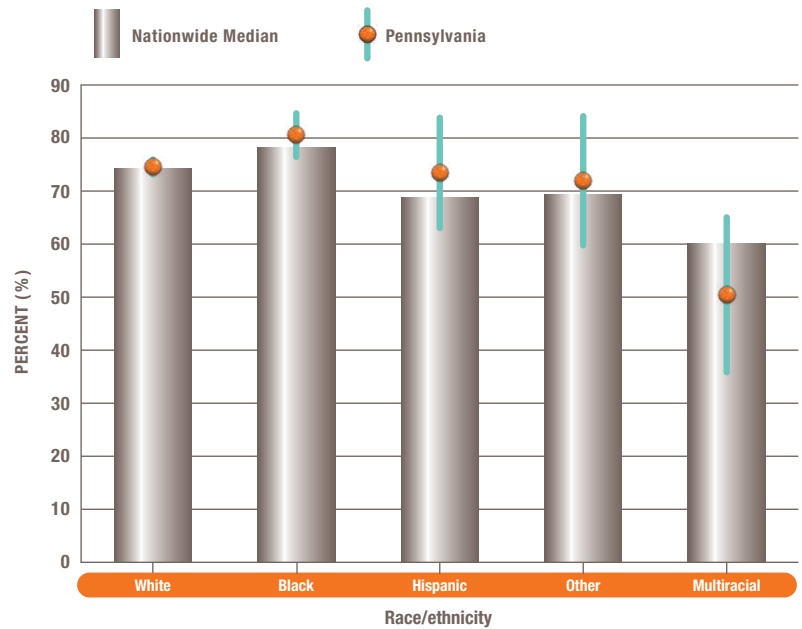
Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Pennsylvania percentages are shown with their 95% confidence interval. "Other" includes Asian, American Indian, Alaskan Native, some other mentioned race, or "Other race."

Figure B-14 shows the percent of females, aged forty and over, who had a mammogram in the past two years by age group. The overall rate of mammograms for women aged 40 years and older was 74.7 percent for Pennsylvania and 74 percent nationwide. Women in the 50-59 year old category exhibited the highest screening for Pennsylvania at 78.7 percent. Almost identical to that rate, was the rate for the 60-64 year old age group in Pennsylvania which had a screening rate of 78.6 percent. Nationally, the highest screening rates were exhibited by women in the 60-64 year old age group with a rate of 79.2 percent.

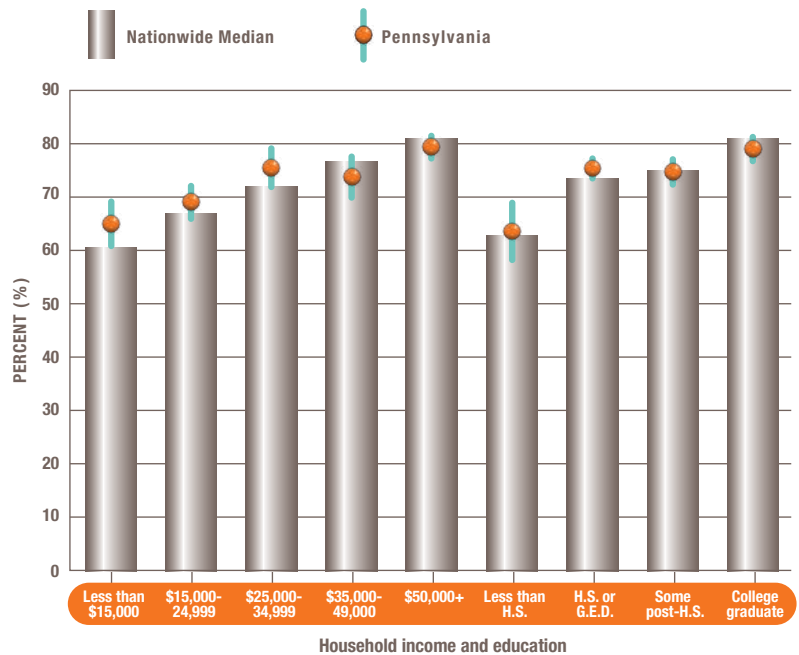## Females, aged 40+, who have had a mammogram in the past two years, by age group, 2012

Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Pennsylvania percentages are shown with their 95% confidence interval.

Figure B-15 shows that women having $15,000 or less in household income and having less than a high school education had lower mammogram rates than other income and educational groups. In Pennsylvania, the lowest rate of mammogram screening was found in women with less than a high school education at 63.8 percent, and those making less than $15,000, at 65.0 percent. Nationally, the rate for women with the lowest level of education was 62.7 percent and 60.4 percent for those with the least amount of annual income.

Females, aged 40+, who have had a mammogram in the past two years, by household income and education, 2012
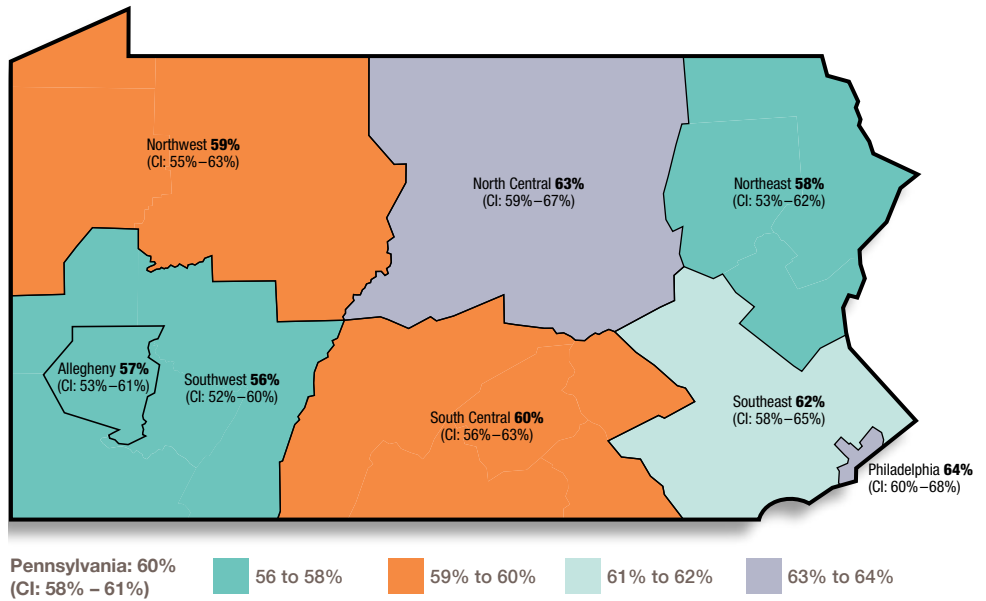

Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Pennsylvania percentages are shown with their 95% confidence interval.

FIGURE B-16

The map in Figure B-16 shows the percentage of Pennsylvania women, 40 years and older, who in the past year, received a mammogram in 2012. The statewide average is 60 percent; however, three areas of Pennsylvania (Northeast at 58 percent, Southwest at 56 percent and Allegheny County at 57 percent) are lower than the statewide average. Philadelphia County has the highest percentage of mammography at 64 percent.

Percentage of adults females (age 40+) in 2012 who had a mammogram in the past year

Northwest **59%**
(CI: 55%−63%)

North Central **63%**
(CI: 59%−67%)

Northeast **58%**
(CI: 53%−62%)

Allegheny **57%**
(CI: 53%−61%)

Southwest **56%**
(CI: 52%−60%)

South Central **60%**
(CI: 56%−63%)

Southeast **62%**
(CI: 58%−65%)

Philadelphia **64%**
(CI: 60%−68%)

Pennsylvania: 60%
(CI: 58% – 61%)
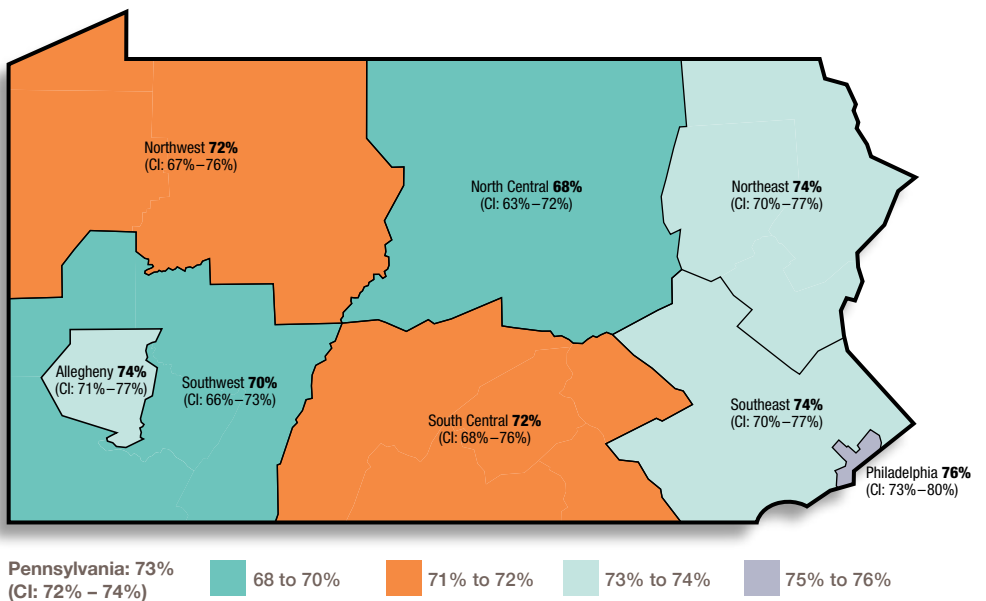
56 to 58% 59% to 60% 61% to 62% 63% to 64%

Source: Behavioral Health Risks of Pennsylvania Regions – 2012. Included with each percentage is its 95% confidence interval (CI).

FIGURE B-17

The Papanicolaou test (Pap test) is a method of screening to detect cervical cancer. In Pennsylvania, the rate of women who received a Pap test in the past three years is 73 percent. The Southwest at 70 percent and the Northcentral at 68 percent, are 3 to 5 percent below the state average. Philadelphia County has the highest rate of cervical cancer screening at 78 percent.

Percentage of adults females in 2012 who had a Pap test in the past 3 years

Northwest **72%**
(CI: 67%−76%)

North Central **68%**
(CI: 63%−72%)

Northeast **74%**
(CI: 70%−77%)

Allegheny **74%**
(CI: 71%−77%)

Southwest **70%**
(CI: 66%−73%)

South Central **72%**
(CI: 68%−76%)

Southeast **74%**
(CI: 70%−77%)

Philadelphia **76%**
(CI: 73%−80%)

Pennsylvania: 73%
(CI: 72% – 74%)

68 to 70% 71% to 72% 73% to 74% 75% to 76%

Source: Behavioral Health Risks of Pennsylvania Regions – 2012. Included with each percentage is its 95% confidence interval (CI).

CANCER BURDEN

Cancer is the most visible chronic disease afflicting Pennsylvanians. One of the directives that the Cancer Advisory Board is charged with, accomplished through the Stakeholder Leadership Team, is being data-driven. Thus, cancer plan implementation decisions must proceed from an understanding of the cancer data. This report on the burden of cancer in Pennsylvania will provide an overview of cancer incidence and mortality, cancer hospitalizations, cancer risk factors, and cancer prevention/health outcomes for cancer within the Commonwealth. The burden report uses the most recent available data at time of report creation, and the data can be used to inform where cancer disparities are, thus providing leadership with the tools necessary for a data-driven approach, and identifying potential areas for further inquiry.

For all non-female specific cancers, except breast cancer and thyroid cancer, males have higher incidence and mortality rates than females. For most types of cancers, racial disparities in incidence and mortality are also highly evident, and with few exceptions, black male incidence and mortality rates are the highest of all race/sex/ethnicity categories.

ALL CANCERS

Incidence

In 2011, there were approximately 78,000[8] new cases of invasive cancer[9] diagnosed among Pennsylvania residents. Lung and bronchus, female breast, and prostate cancer are the three most commonly diagnosed invasive cancers with over 10,000 cases each, and seven of the eight cancers covered in this report are among the most common cancers affecting the lives of Pennsylvanians. The cancers covered in this report[10] were chosen because of a combination of their overall impact on the overall burden of cancer and the fact that screenings/preventative measures exist for them. Figure 1-1 depicts the incidence rates for all cancers since 2000.

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8 Incidence and Mortality counts in this report are rounded to the nearest thousand or hundred as appropriate
9 Also including new in situ Urinary Bladder Cancer cases
10 Lung and Bronchus, Female Breast, Cervical, Colorectal, Prostate, Melanoma, Urinary Bladder, and Thyroid

FIGURE 1-1

Clear differences between males and females, and black males and white males can be noted. Black males had an overall age-adjusted cancer incidence rate of 625.7 per 100,000 in 2011, compared to 542.0 for white males, and approximately 460 for females of both races.

All cancers, age-adjusted incidence rates by sex and race, Pennsylvania residents, 2000-2011
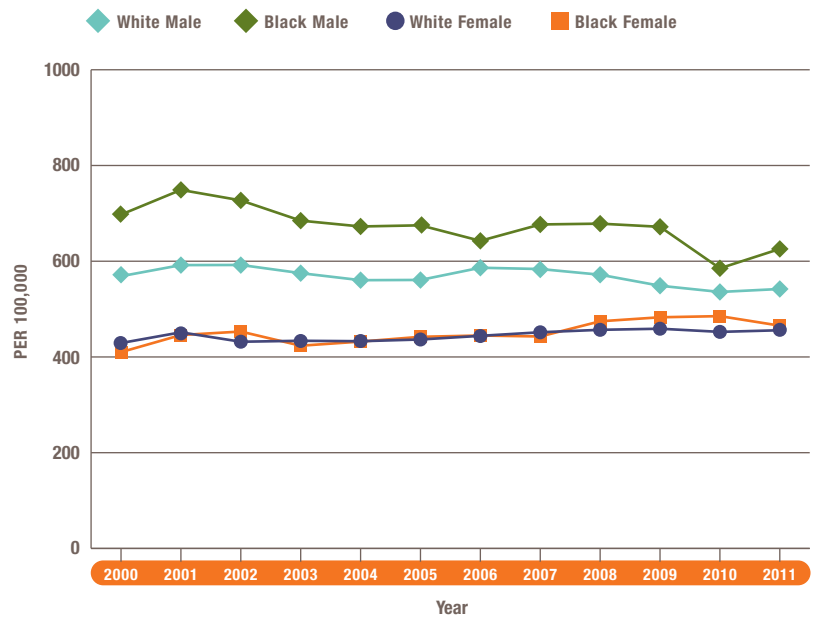
NOTES: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Incidence rates are based on invasive (and in situ urinary bladder) cancers. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

Mortality

In 2011, more than 28,500 Pennsylvanians died from cancer. The highest number of deaths, by a substantial margin, was lung and bronchus cancer, with 7,600 deaths. Colorectal cancer, with 2,600 deaths, and female breast cancer, with 2,000 deaths are the second and third leading causes of cancer death. Figure 1-2 shows mortality by sex and race, since 2000.

FIGURE 1-2

Racial and sex disparities in cancer mortality are again evident. Black males had a mortality rate of 274.6 per 100,000 in 2011, compared to white females with a mortality rate of 149.2 in the same year, almost twice as high. The black male mortality rate has declined since 2,000 by 32.4 percent, moving closer to the other the other race/sex combinations, but still remains the highest.

Age and Summary data

Cancer is primarily a disease of the aged, and as age increases, so do rates of both incidence and mortality. This is the case for all cancers taken together, as seen in Figure 1-3.
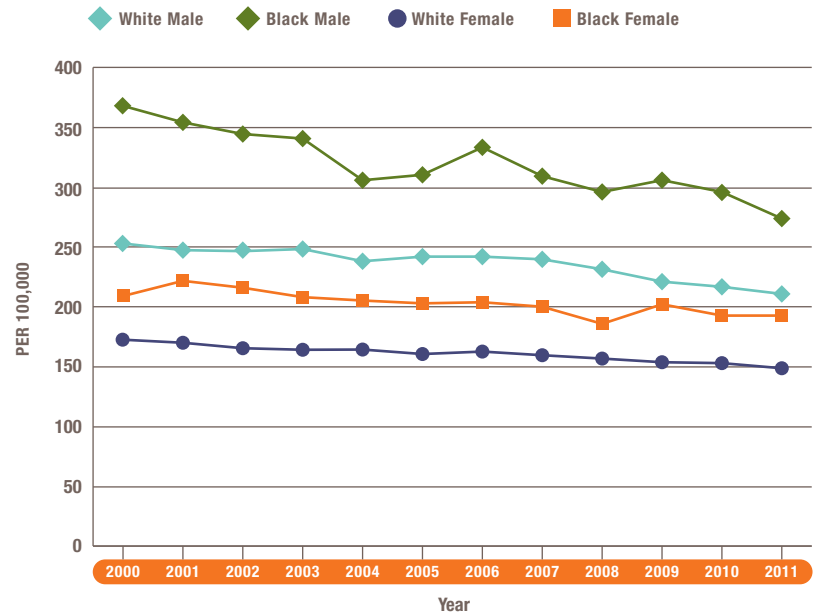
FIGURE 1-3

Cancer incidence begins rising sharply with the onset of middle age, with mortality lagging behind slightly but also increasing steadily with age. Incidence rates peak in the early 80's, while mortality rates continue to rise across all age brackets.

All cancer deaths, age-adjusted rates by sex and race, Pennsylvania residents, 2000-2011


NOTES: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

All cancers, age-specific incidence and death rates, Pennsylvania residents, 2009-2011
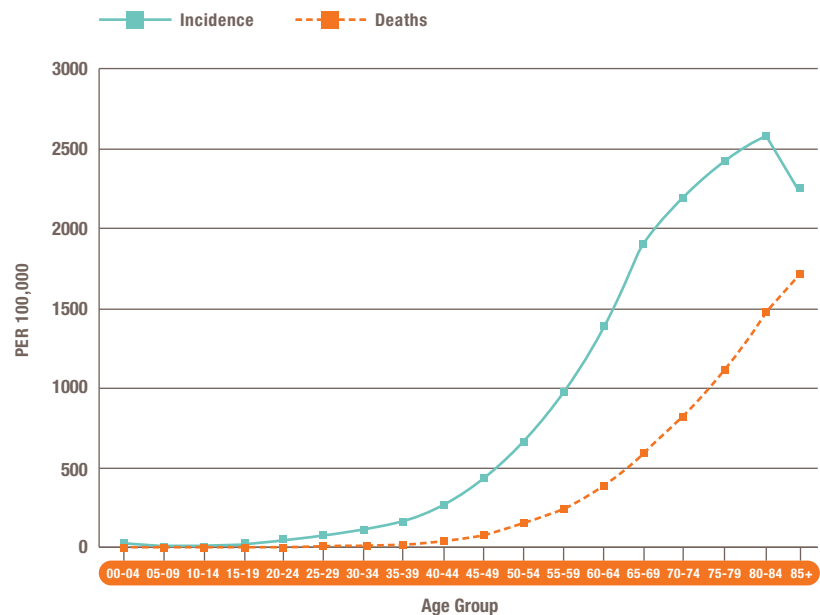

NOTES: Incidence rates are based on invasive cancers. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

FIGURE 1-4

Three year summary data for all cancers, both incidence and mortality rates, including additional racial and ethnic groups appears in Figure 1-4. Black males have the highest incidence and mortality of all sex and race/ethnicity groups followed by white males, then black females.

All cancers, age-adjusted incidence and death rates* by sex and race/ethnicity, Pennsylvania, 2009-2011

Incidence   Deaths
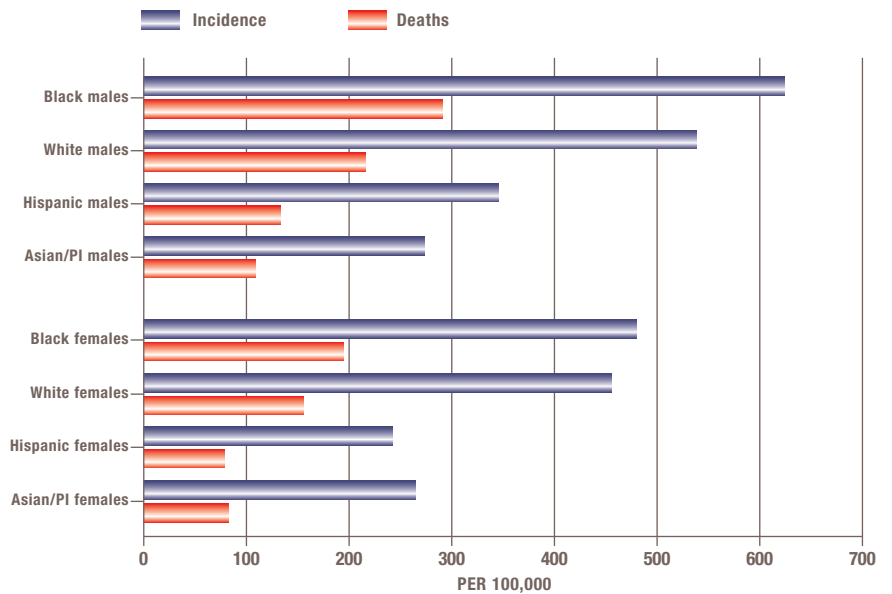
PER 100,000

*Three-year average annual rates are per 100,000 and age-adjusted to the 2000 U.S.standard population.

FIGURE 1-5

Note that approximately half of all cancers are diagnosed in early stage.[11] Some variation exists among the race/ethnic groups represented in the figure, but the rates are all relatively close.

Geographical Data

Great interest exists in analyzing county and local level sub state health data whenever it is available. Mapping cancer rates by county provides a powerful way of visualizing cancer incidence and mortality in Pennsylvania. Figures 1-6 through 1-9 below illustrate cancer incidence and mortality, by sex, for all counties in Pennsylvania for which data exists. Counties that have significantly higher or lower rates are indicated on the map, as well as a comparison of the overall United States rate to the applicable Pennsylvania rate.

Stage distribution of all cancers at time of diagnosis by race/ethnicity, Pennsylvania, 2009-2011*
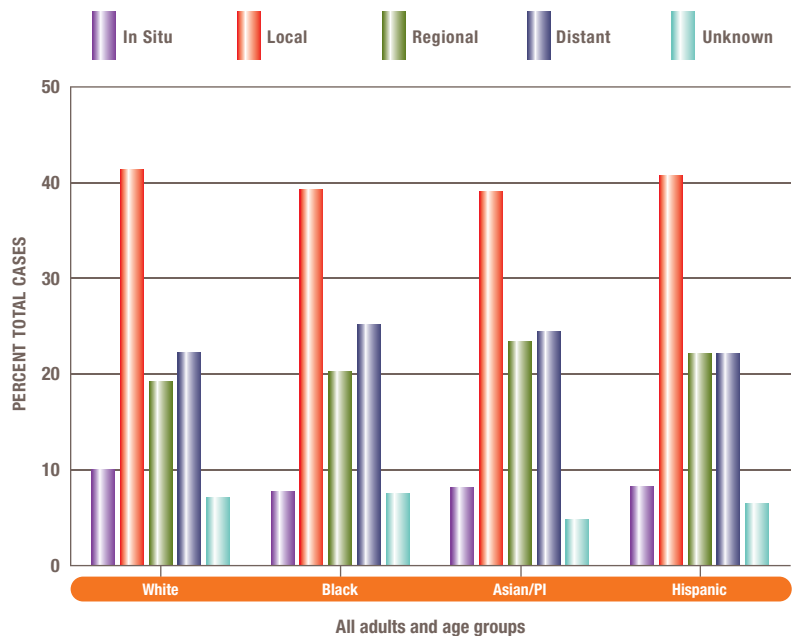
In Situ   Local   Regional   Distant   Unknown

All adults and age groups

*Rates are three-year average annual percentages and based of SEER Summary Stage definitions.
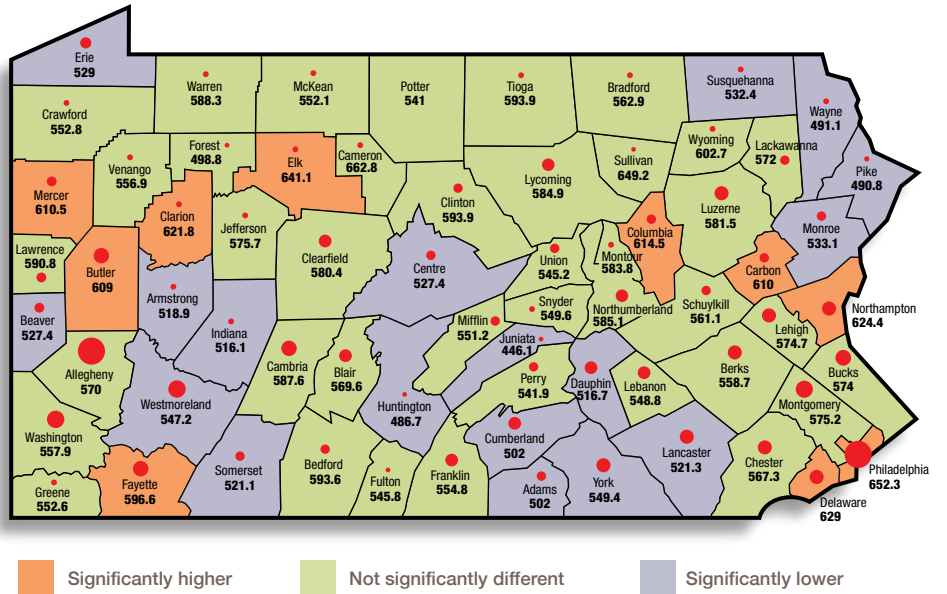
11 (In situ and Local)

FIGURE 1-6

Note that Pennsylvania's overall cancer rate for males is higher than the United State (US) rate, and the counties which have a statistically significant higher rate tend to be very urban or very rural.

Male all cancer incidence, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

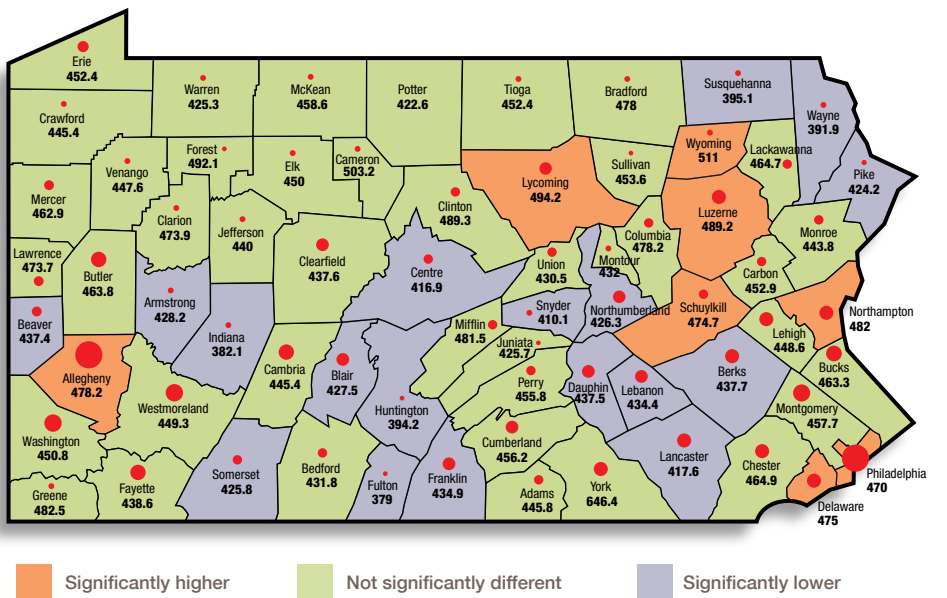U.S. Rate—(2007–2011) **536.1**   Pa. Rate—(2007–2011) **571.7**

Erie 529
Warren 588.3
McKean 552.1
Potter 541
Tioga 593.9
Bradford 562.9
Susquehanna 532.4
Wayne 491.1
Crawford 552.8
Forest 498.8
Cameron 662.8
Elk 641.1
Wyoming 602.7
Lackawanna 572
Pike 490.8
Venango 556.9
Clinton 593.9
Lycoming 584.9
Sullivan 649.2
Luzerne 581.5
Monroe 533.1
Mercer 610.5
Clarion 621.8
Jefferson 575.7
Clearfield 580.4
Columbia 614.5
Montour 583.8
Carbon 610
Lawrence 590.8
Butler 609
Centre 527.4
Union 545.2
Northampton 624.4
Armstrong 518.9
Snyder 549.6
Northumberland 585.1
Schuylkill 561.1
Lehigh 574.7
Beaver 527.4
Indiana 516.1
Mifflin 551.2
Juniata 446.1
Allegheny 570
Cambria 587.6
Blair 569.6
Perry 541.9
Dauphin 516.7
Lebanon 548.8
Berks 558.7
Bucks 574
Westmoreland 547.2
Huntington 486.7
Cumberland 502
Lancaster 521.3
Chester 567.3
Montgomery 575.2
Washington 557.9
Philadelphia 652.3
Fayette 596.6
Somerset 521.1
Bedford 593.6
Fulton 545.8
Franklin 554.8
Adams 502
York 549.4
Delaware 629
Greene 552.6

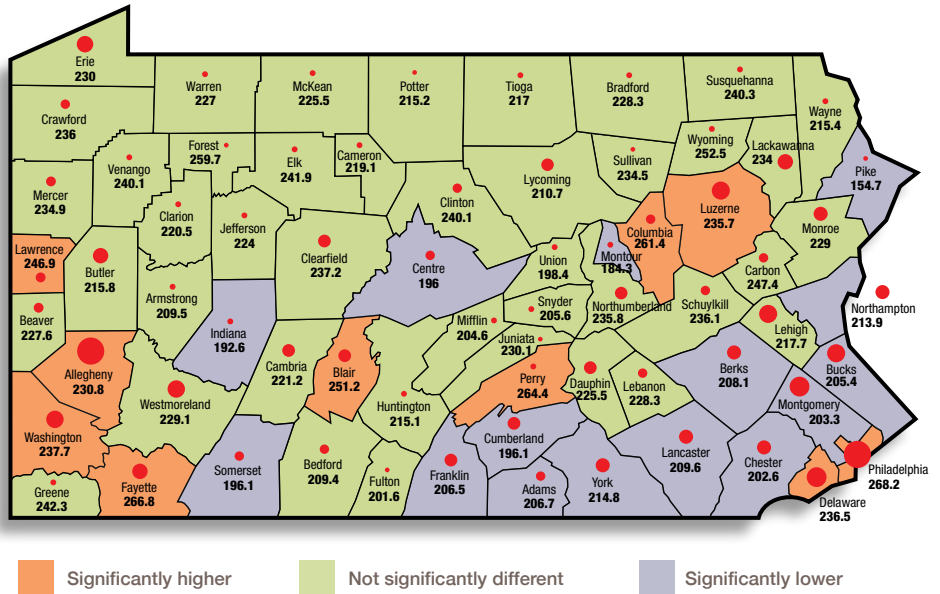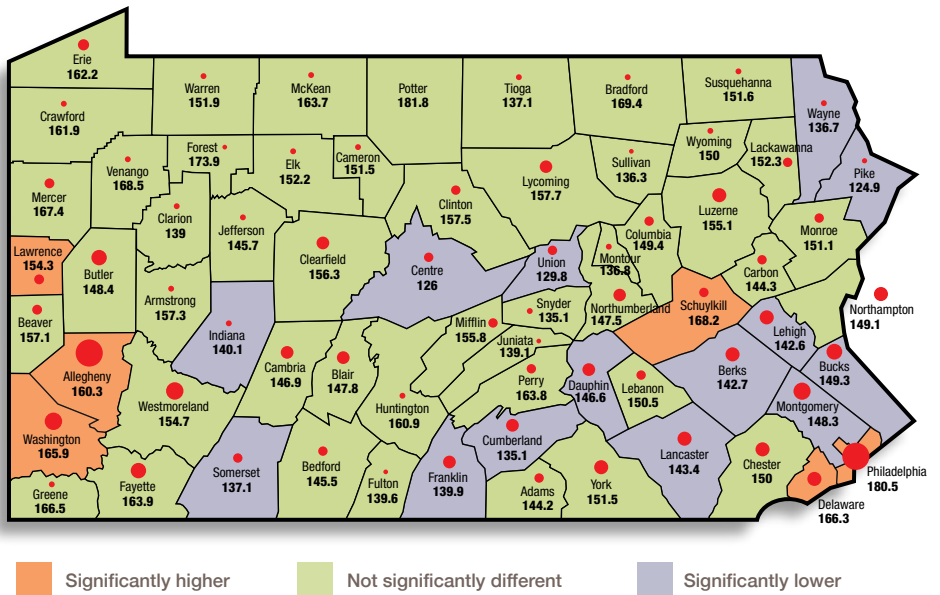**Significantly higher**   **Not significantly different**   **Significantly lower**

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of cases.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

FIGURE 1-7

The distribution of counties with statistically significant higher or lower incidence rates for females is slightly different than for males, but the largely urban and rural pattern remains. The overall female cancer rate for Pennsylvania is also higher than the US rate.

Female all cancer incidence, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2007–2011) **420.1**   Pa. Rate—(2007–2011) **455.9**

Erie 452.4
Warren 425.3
McKean 458.6
Potter 422.6
Tioga 452.4
Bradford 478
Susquehanna 395.1
Wayne 391.9
Crawford 445.4
Forest 492.1
Cameron 503.2
Elk 450
Wyoming 511
Lackawanna 464.7
Pike 424.2
Venango 447.6
Clinton 489.3
Lycoming 494.2
Sullivan 453.6
Luzerne 489.2
Monroe 443.8
Mercer 462.9
Clarion 473.9
Jefferson 440
Clearfield 437.6
Columbia 478.2
Montour 432
Carbon 452.9
Lawrence 473.7
Butler 463.8
Centre 416.9
Union 430.5
Northampton 482
Armstrong 428.2
Snyder 410.1
Northumberland 426.3
Schuylkill 474.7
Lehigh 448.6
Beaver 437.4
Indiana 382.1
Mifflin 481.5
Juniata 425.7
Bucks 463.3
Allegheny 478.2
Cambria 445.4
Blair 427.5
Perry 455.8
Dauphin 437.5
Lebanon 434.4
Berks 437.7
Montgomery 457.7
Westmoreland 449.3
Huntington 394.2
Cumberland 456.2
Lancaster 417.6
Chester 464.9
Philadelphia 470
Washington 450.8
Somerset 425.8
Bedford 431.8
Fulton 379
Franklin 434.9
Adams 445.8
York 646.4
Delaware 475
Fayette 438.6
Greene 482.5

Significantly higher   **Not significantly different**   **Significantly lower**

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of deaths.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

FIGURE 1-8

The US and Pennsylvania mortality rates for males, in contrast to incidence rates, are fairly close. The distribution of counties with significantly higher and lower rates also differs from incidence. For example, three of the counties in the Philadelphia Metropolitan Statistical Area (MSA) have significantly lower mortality rates compared to the state as a whole, where Philadelphia itself and Delaware county are significantly higher.

Male all cancer deaths, 2007–2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S.Rate—(2007–2011) **215.3**   PA. Rate—(2007–2011) **225.1**

| Significantly higher | Not significantly different | Significantly lower |

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of deaths.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

FIGURE 1-9

The overall female cancer mortality rate in Pennsylvania, like the male rate, is relatively close to the US mortality rate, though both are slightly higher. In this case, the distribution of significantly higher and significantly lower mortality rates appears to be roughly similar to the male rates. A similar pattern emerges in the MSA, for example.

Female all cancer deaths, 2007–2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S.Rate—(2007–2011) **149.7**   PA. Rate—(2007–2011) **154.8**

| Significantly higher | Not significantly different | Significantly lower |

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of deaths.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

LUNG AND BRONCHUS CANCER

Incidence

Lung cancer[12] is the most common invasive cancer in Pennsylvania as of 2011, with female breast cancer and prostate cancer close behind. In 2011, 10,600 cases of lung cancer were diagnosed. The rate of lung cancer in males is significantly higher than in females, and while male lung cancer incidence rates have declined slightly over the past decade, the incidence rate in females is holding steady. Substantial racial disparities in incidence rates exist as well—the age adjusted incidence rate for black males was 106.6 per 100,000, in 2011, in comparison to a rate of 78.6 per 100,000 for white males in the same year.

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12 (Lung cancer incidence is defined using ICD-O-3 codes C340-C349, excluding ICD-O-3 histologies 9590-9989. Lung cancer mortality is defined as ICD-10 code C34)

FIGURE 2-1

Figure 2-1 demonstrates some of the disparities among sex and white and black racial groups for lung cancer incidence. Since 2000, black male and white male incidence rates have declined 15.8 percent and 14.8 percent, respectively. In contrast, the white female incidence rate has held steady, while black female incidence has actually edged upwards.

Lung and bronchus cancers, age-adjusted incidence rates by sex and race, Pennsylvania residents, 2000-2011
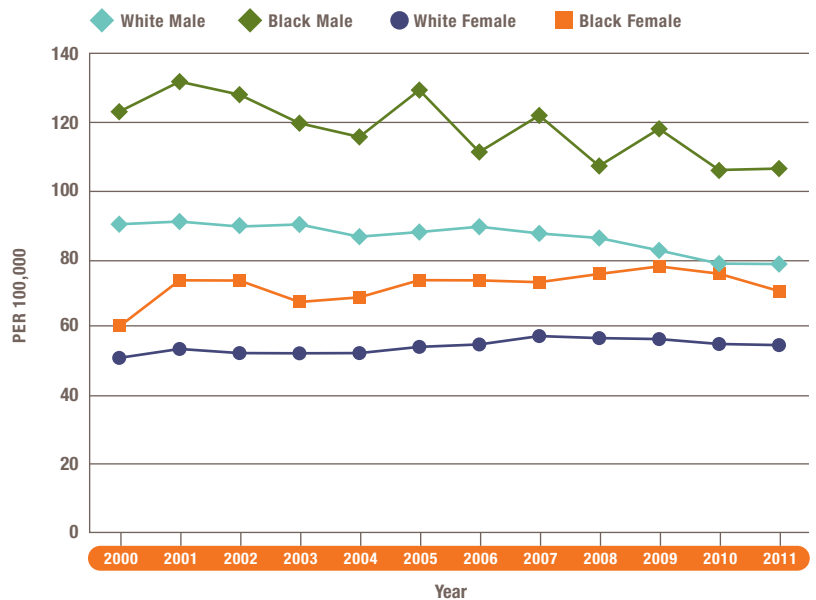
NOTES: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Incidence rates based on invasive cancers. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

Mortality

Lung cancer has the highest mortality rate of any cancer in Pennsylvania, by a large margin. In 2011, 7,600 lung cancer deaths were reported. The overall trend across the past decade for mortality mirrors the trend in incidence rates. Male mortality rates have declined, rather steeply in the case of black males, but have remained stagnant for females, as show in Figure 2-2 below.

Age-adjusted black male mortality rates have fallen 42.8 percent since 2000, though black males retain the highest mortality of any group for lung cancer. There has been little net movement across the decade in female mortality rates.

Lung and bronchus cancer deaths, age-adjusted rates by sex and race, Pennsylvania residents 2000-2011
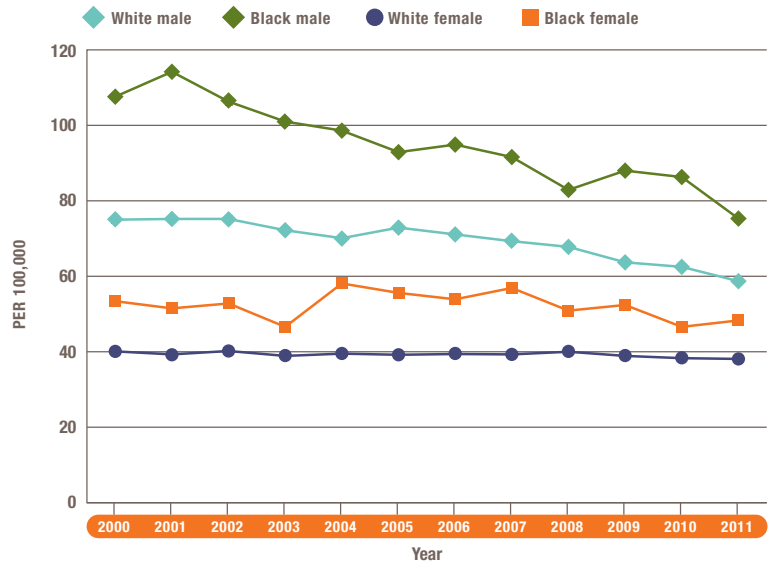
NOTES: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

Age and Summary data

The effects of aging on lung cancer incidence and mortality are similar to those of overall cancer incidence and mortality, as seen in Figure 2-3. Invasive lung cancer diagnoses start increasing steeply by the early 50s, and peak around 80. Lung cancer deaths begin increasing rapidly starting around age 60. Three year summary data for eight sex and race combinations, for both lung cancer incidence and mortality, are show in Figure 2-4. Figure 2-5 depicts stage distribution for lung cancer also using three year aggregate data.

FIGURE 2-3

As with most cancers, incidence and mortality for lung cancer both rise with age, peaking around 80 years of age.

Lung and bronchus cancers, age-specific incidence and death rates, Pennsylvania residents, 2009-2011
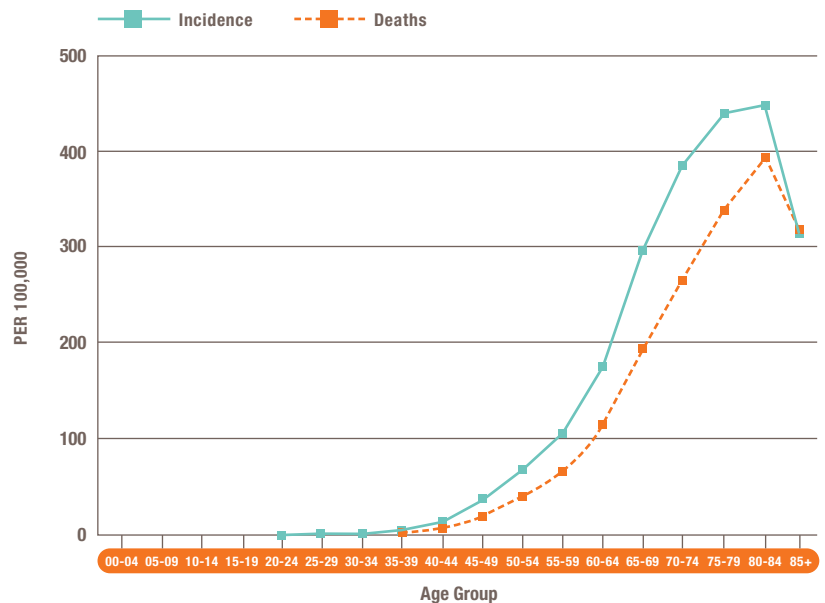
NOTES: Incidence rates are based on invasive cancers. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

FIGURE 2-4

Figure 2-4 demonstrates that the incidence and mortality rates for lung and bronchus cancers are highest for black males, followed by white males.

Lung and bronchus, age-adjusted incidence and death rates,* by sex and race/ethnicity, Pennsylvania, 2009-2011
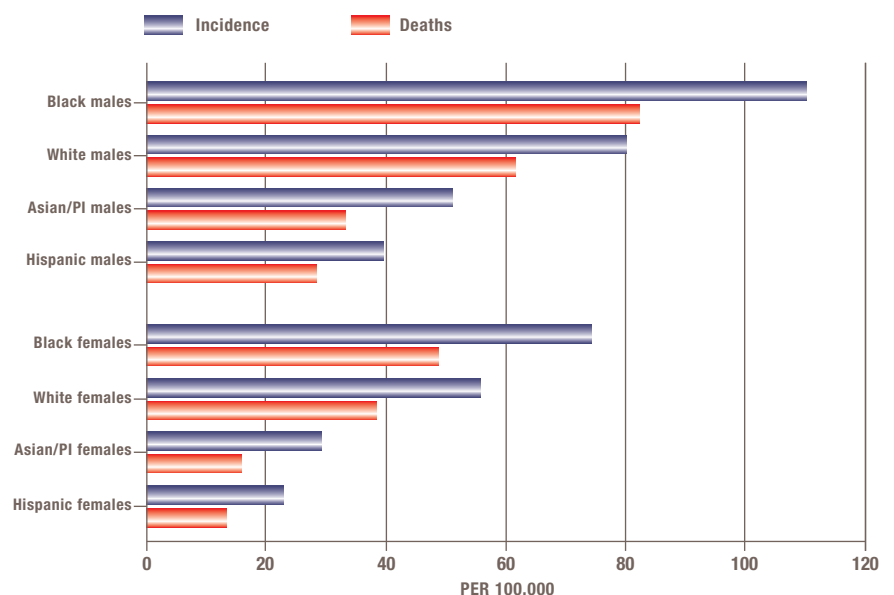
*Three-year average annual rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.

FIGURE 2-5

Unfortunately, in marked contrast to the other more screen-able cancers in this report, a distinct majority of lung cancers are diagnosed in late stage.[13] Similar to overall cancer incidence, the lung cancer incidence stage distribution breakdown is relatively close across the four race/ethnic groups for which data exists.

Stage distribution of lung and bronchus cancers at time of diagnosis by race/ethnicity, Pennsylvania, 2009-2011*
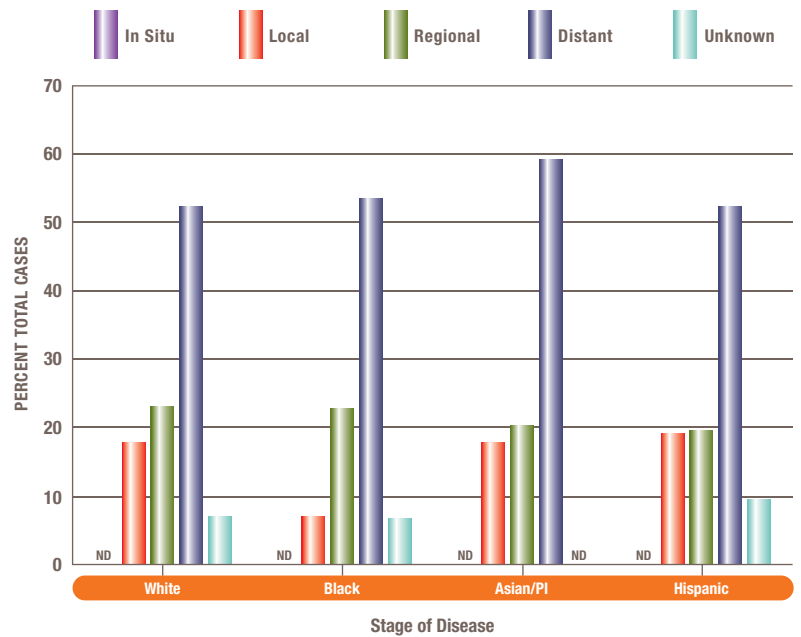
*Rates are three-year average annual percentages and based of SEER Summary Stage definitions.
NOTE: ND indicates the data were not displayed due to low frequency counts <10.

13 (Regional and Distant)

Geographical Data

Figures 2-6 through 2-9 below depict lung cancer incidence and mortality rates by sex, in Pennsylvania, using four year summary data.

Male lung cancer incidence rate in Pennsylvania is substantially higher than the US rate. Clustering of significantly higher than average incidence rates occurs in the Northeastern, Southeastern, and Southwestern areas of the state.

Male lung cancer incidence, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2007–2011) **69.6**   Pa. Rate—(2007–2011) **83.8**
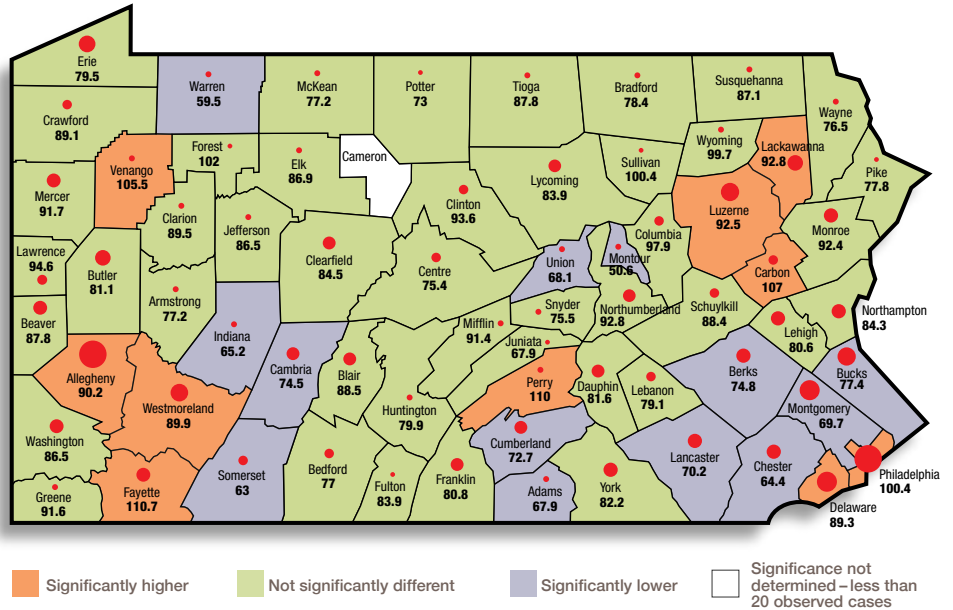
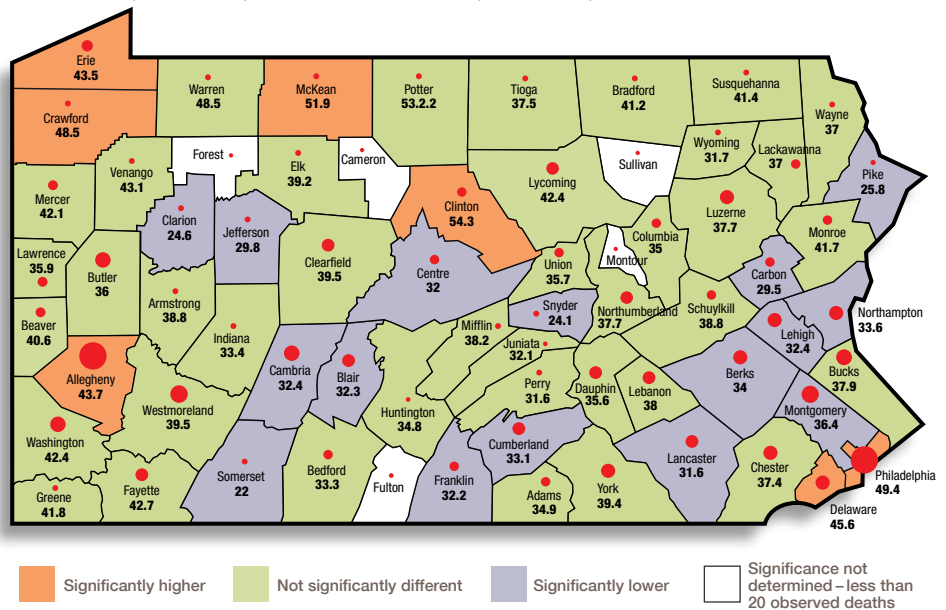| Significantly higher | Not significantly different | Significantly lower | Significance not determined – less than 20 observed cases |

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of cases.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

Female lung cancer incidence rate for Pennsylvania is slightly higher than the US rate. The distribution of significantly higher or lower than average counties is roughly similar to that of males.
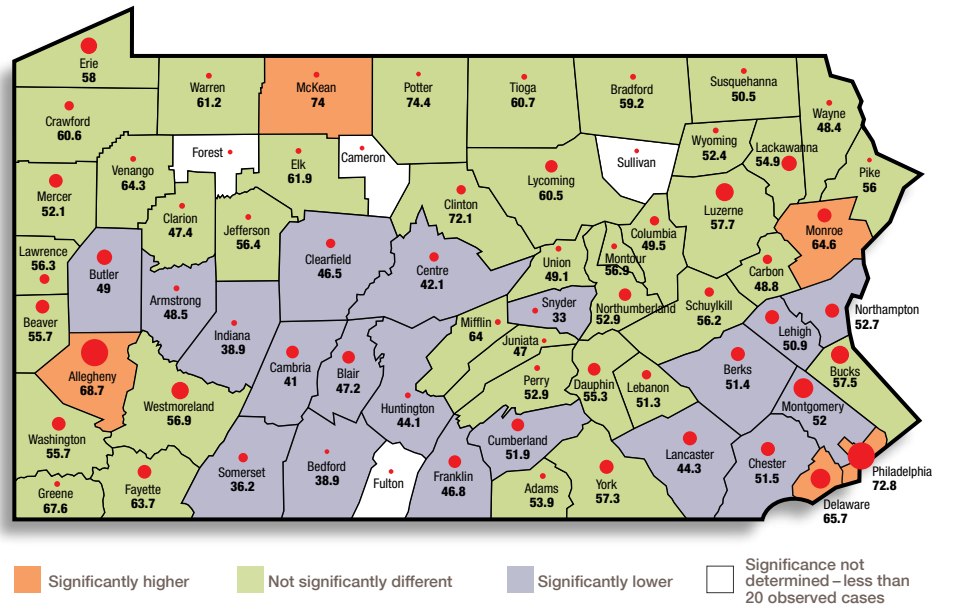
Female lung cancer incidence, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2007–2011) **51.0**   Pa. Rate—(2007–2011) **57.3**

| Significantly higher | Not significantly different | Significantly lower | Significance not determined – less than 20 observed cases |

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of cases.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

FIGURE 2-8

Mirroring the trend for overall cancer deaths, the Pennsylvania mortality rate for males is similar to the US rate. The distribution of counties differing significantly from average in mortality is roughly similar to the distribution for incidence.

Male lung cancer deaths, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2006–2010) **63.5**   Pa. Rate—(2006–2010) **64.7**
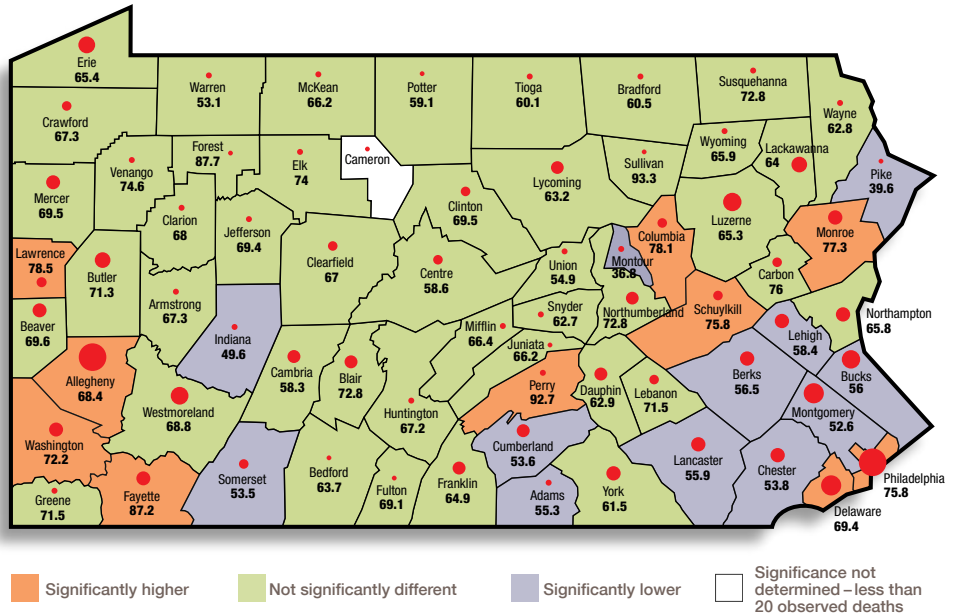
Significantly higher   Not significantly different   Significantly lower   Significance not determined – less than 20 observed deaths

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of deaths.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

FIGURE 2-9

Female lung cancer mortality rates in Pennsylvania are also similar to the US rate. However, the distribution of significantly higher than average mortality rates differs from female incidence and male incidence and mortality, with a cluster of significantly higher than average mortality in Northwestern Pennsylvania.

Female lung cancer deaths, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2006–2010) **39.2**   Pa. Rate—(2007–2011) **39.1**

Significantly higher   Not significantly different   Significantly lower   Significance not determined – less than 20 observed deaths

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of deaths.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

Hospitalization Data[14]

FIGURE 2-10

There were 3,532 male and 3,389 female lung cancer hospitalizations in 2011. The total number of lung cancer hospitalizations decreased from 4,308 in 2001 to 3,532 in 2011 for male, an 18.0% decrease. The number of lung cancer hospitalizations for female decreased a mere 3.5%, from 3,513 in 2001 to 3,389 in 2011. The gaps in the number of lung cancer hospitalizations between male and female decreased over the years from 2001 to 2011.

Hospital admissions for lung cancer by sex in Pennsylvania, 2001-2011
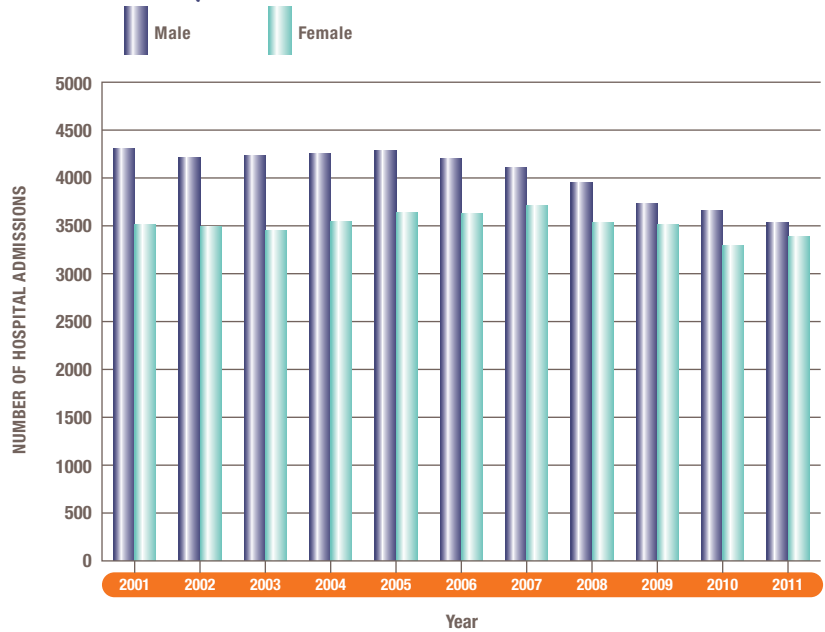
FIGURE 2-11

Total hospitalization charges for lung cancer to Medicare were the highest from 2001 to 2011, followed by commercial insurance and Medicaid. The total charges to Medicare for lung cancer in 2011 were $306.6 million, about 3 times of that to commercial insurance ($122.1 million) and about 5 times of that to Medicaid ($56.5 million). The total hospitalization charges for lung cancer in 2011 were almost two times of that in 2001 ($167.8 million) for Medicare. Hospitalization charges for lung cancer to Medicaid increased 197.9% from $19.0 million in 2001 to $56.6 million in 2011, while commercial insurance charges increased 58.6% from $77.0 million in 2001 to $122.1 million in 2011.

Hospitalization charges for lung cancer by primary payer type in Pennsylvania, 2001-2011
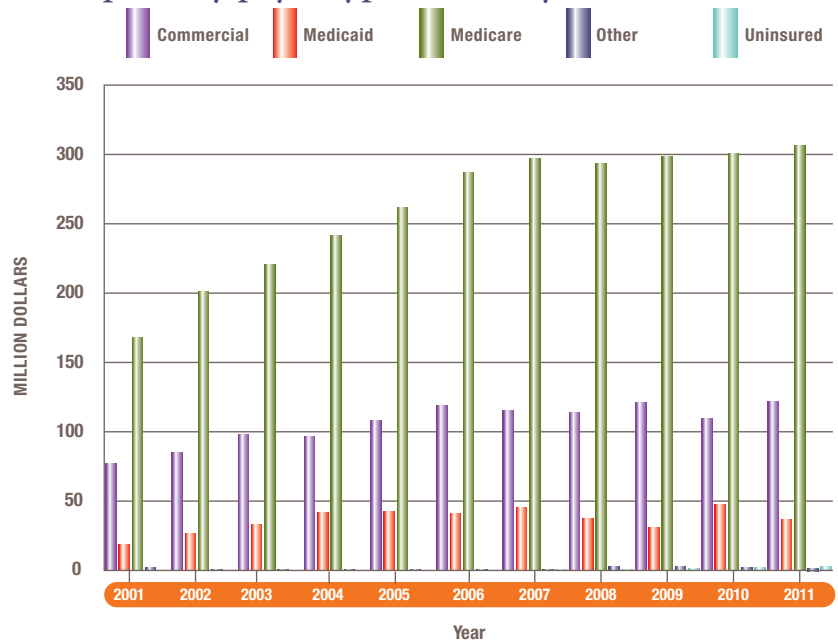
14 (The data source for all hospitalization data in this report is the 2001 to 2011 Pennsylvania Health Care Cost Containment Council (PHC4) inpatient discharge data.)

FIGURE 2-12

The male age-adjusted lung cancer
hospitalization rate was consistently
higher than the rate for females from 2001
to 2011. The male age-adjusted lung
cancer hospitalization rate consistently
decreased yearly from 69.4 per 100,000
in 2001 to 50.0 per 100,000 in 2011,
a 28.0% decrease. The female lung
cancer age-adjusted hospitalization rate
decreased 11.4% from 43.8 per 100,000
in 2001 to 38.8 per 100,000 in 2011.

Age-adjusted lung cancer hospitalization rate by sex in, Pennsylvania, 2001-2011
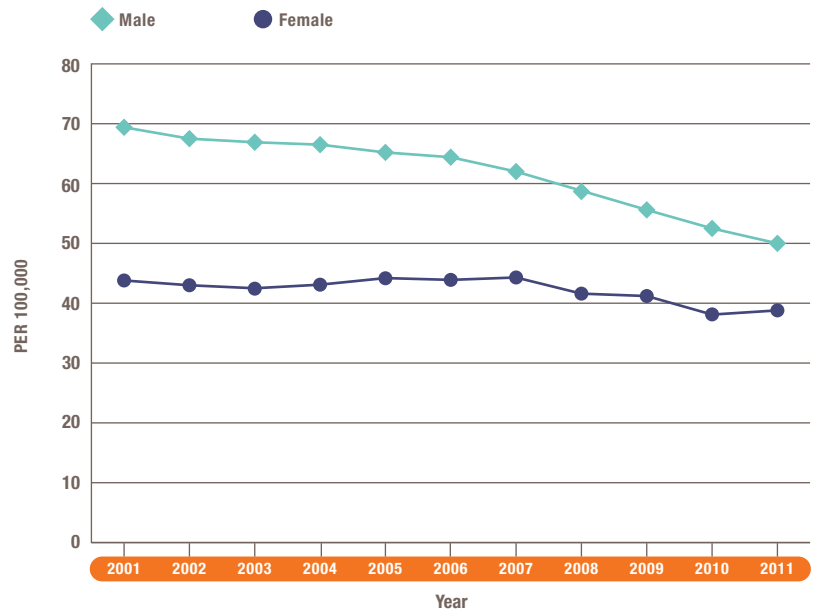
FIGURE 2-13

Non-Hispanic black had the highest
age-adjusted lung cancer hospitalization
rates over the years of 2001 to 2011.
Non-Hispanic black had the highest
age-adjusted lung cancer hospitalization
rate in 2011 (66.64 per 100,000) followed
by non-Hispanic white (41.59 per 100,000)
and Hispanic (15.56 per 100,000). The
age-adjusted lung cancer hospitalization
rate decreased from 2001 to 2011 among
non-Hispanic white, non-Hispanic black
and Hispanic. Hispanic age-adjusted
hospitalization rate had the largest
decrease from 2001 to 2011 followed by
non-Hispanic black and non-Hispanic
white.

Age-adjusted lung cancer hospitalization rate by race/ethnicity in Pennsylvania, 2001-2011
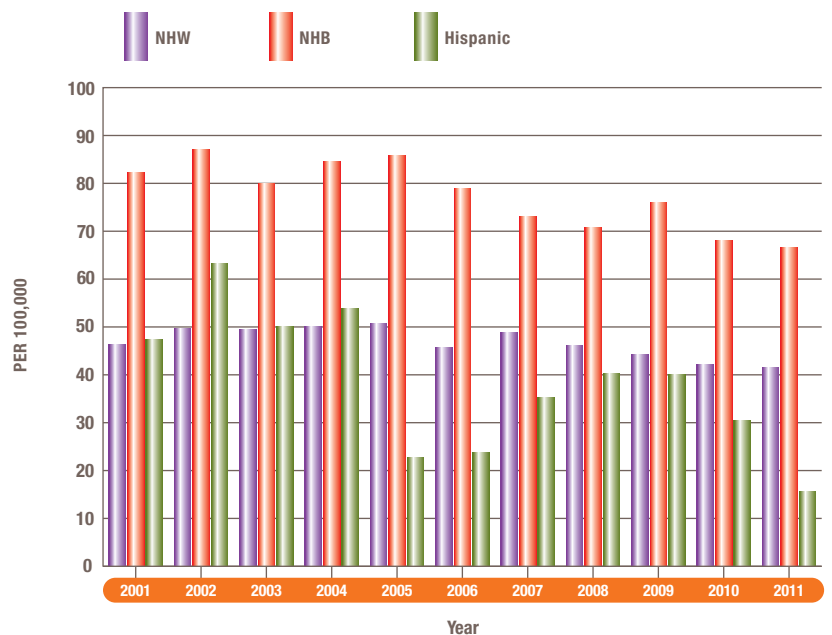
COLORECTAL CANCER

Incidence

Colorectal cancer[15] is the fourth most commonly diagnosed invasive cancer in Pennsylvania, with over 7,000 diagnoses in 2011. Racial disparities in incidence are not as pronounced for colorectal cancer as they are for most other types. The black male incidence rates are higher than white male rates, but not dramatically so. Similarly, the black female incidence rates across the past decade are on average slightly higher than the white female rates, but the two rates are fairly close.

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15 (Colorectal cancer incidence is defined using ICD-O-3 codes C180-C289 and C260, excluding ICD-O-3 histologies 9590-9989. Colorectal cancer mortality is defined as ICD-10 codes C18-20, C260)

All four race and sex combinations trended down since 2000 as seen in Figure 3-1, and the largest decline was the white male incidence rate, which decreased 49.0 percent.

Colon and rectum cancers, age-adjusted incidence rates by sex and race, Pennsylvania residents, 2000-2011

NOTES: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Incidence rates are based on invasive cancers. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

Mortality

Though trailing lung cancer deaths by several thousand, the second leading killer among all cancer types was colorectal cancer, with 2,600 deaths in 2011 among Pennsylvanians. Since 2000, colorectal mortality has declined among each of the race/sex groups. While the incidence rate gap between black and white males is fairly small, the mortality rate gap is quite marked, as seen in Figure 3-2 below.

There is a large spike in the black male mortality rate for 2006. The reason or reasons for this, if it is not just noise in the data, are unknown. The overall trend is more important than one individual outlying year. Substantial racial disparity in mortality exists for colorectal cancer. In 2011, the black male incidence rate was 54.9 percent higher than the white male rate. The black female incidence rate in the same year was 46.5 percent higher than the white female rate.

Colon and rectum cancer deaths, age-adjusted death rates by sex and race, Pennsylvania residents, 2000-2011
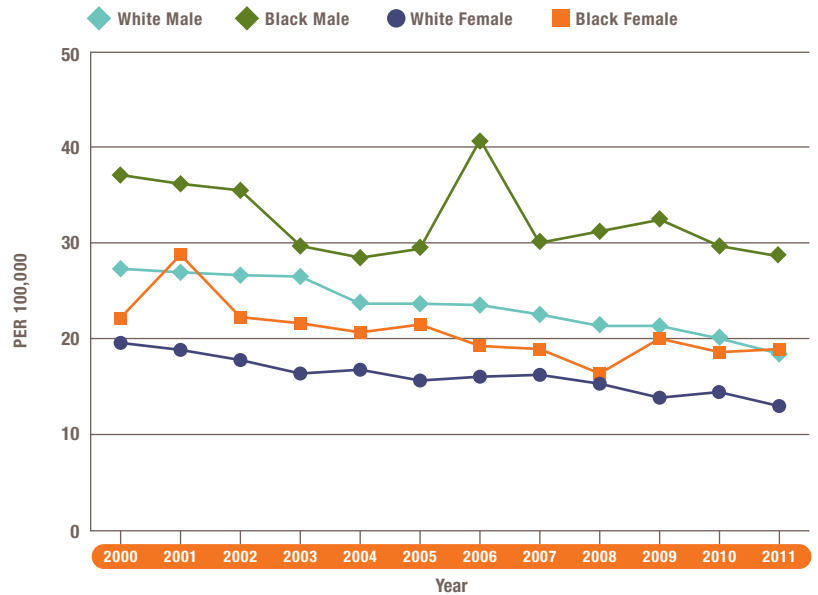
NOTES: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

Age and Summary Data

For colorectal cancer, incidence rates do not start climbing steeply until around age sixty, as seen in Figure 3-3. Though increasing with age, death rates lag behind incidence rates, possibly because colorectal cancer often develops slowly in comparison to other cancers.

FIGURE 3-3

Note that colorectal incidence rates level off around age eighty, while mortality rates continue to increase steadily.

Colon and rectum cancers, age-specific incidence and death rates Pennsylvania residents, 2009-2011
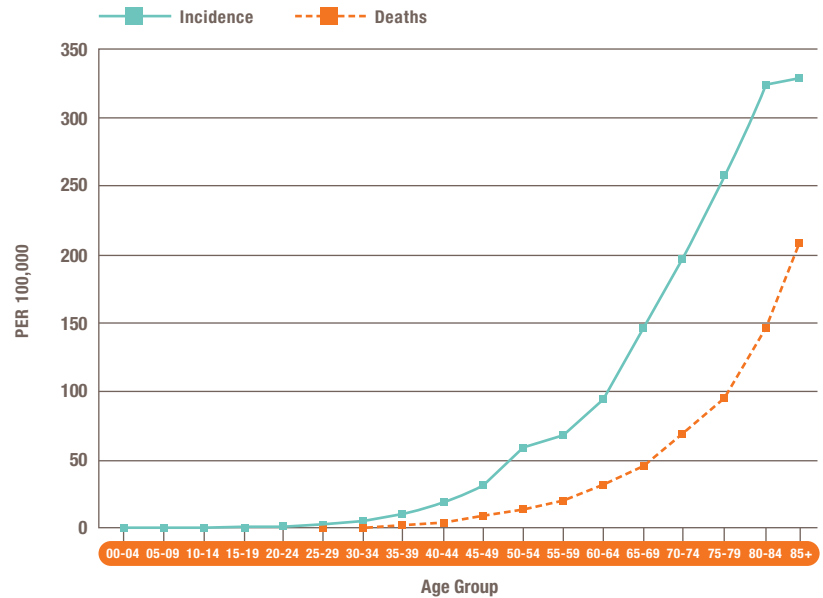
NOTES: Incidence rates are based on invasive cancers. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

FIGURE 3-4

Figure 3-4 demonstrates that both incidence and death rates for black males and black females are the highest among all race/ethnicity and sex combinations.

Colon and rectum cancers, age-adjusted incidence and death rates* by sex and race/ethnicity, Pennsylvania, 2009-2011
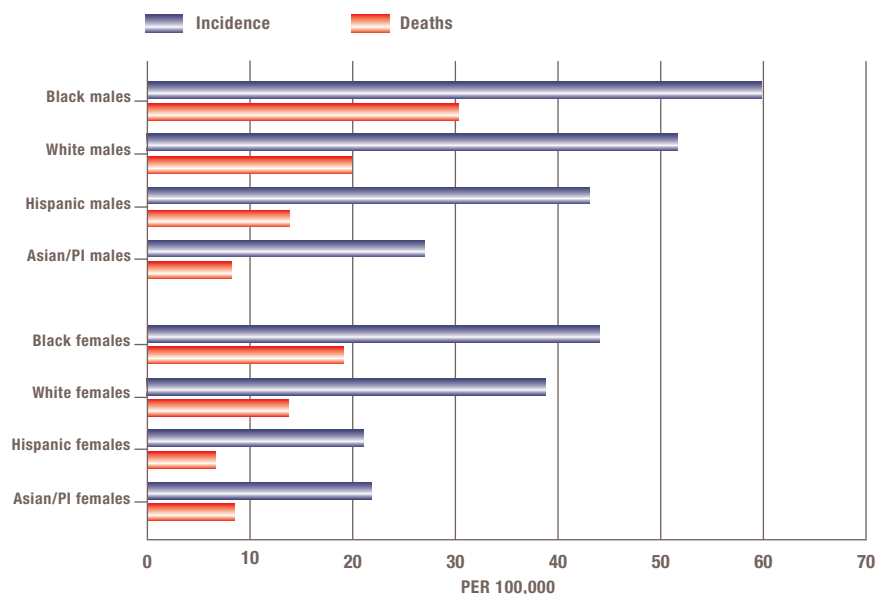
*Three-year average annual rates are per 100,000 and age-adjusted to the 2000 U.S.standard population.
Note: ND indicates the data were not displayed due to low frequency counts < 10.
Hispanics can be of any race.

FIGURE 3-5

Some racial disparities emerge in stage distribution for colorectal cancer. Interestingly, for both black males and black females, in situ cases are higher than for whites of the same sex. While white and black males have approximately equal early and late stage diagnoses, a larger portion of the late stage diagnoses for black males is distant.

Stage distribution of colon and rectum cancer at time of diagnosis by sex and race, Pennsylvania, 2009-2011*
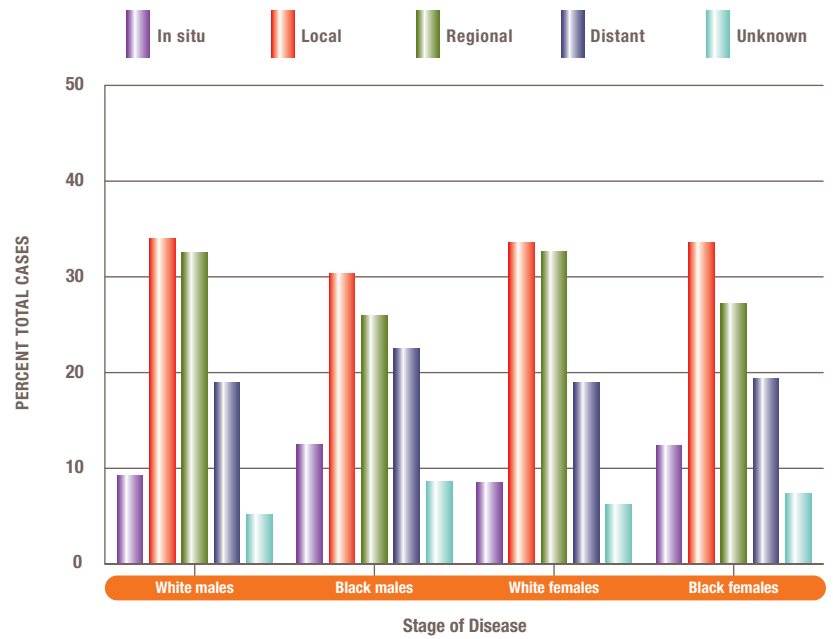
*Rates are three-year average annual percentages and based on SEER Summary Stage definitions.

Geographical Data

As with overall cancer and lung cancer, Pennslyvania's colorectal incidence rates for males and females are higher than the respective US rates, while mortality rates are fairly close. Note that for cancers other than lung, female breast, and prostate, larger numbers of white colored significance not determined counties will appear in the maps, due to lower absolute numbers of incidences and deaths.

Relatively few counties show a signifcant difference from the overall Pennsylvania rate for colorectal cancer. No immediately clear pattern of significantly higher or lower counties presents itself.

Similarly, only ten counties out of sixty-seven show either a significantly higher or lower female incidence rate compared to Pennsylvania's overall rate. Again, these counties are distributed fairly widely across the state.

Male colorectal cancer incidence, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2007–2011) **48.9**   Pa. Rate—(2007–2011) **55.0**

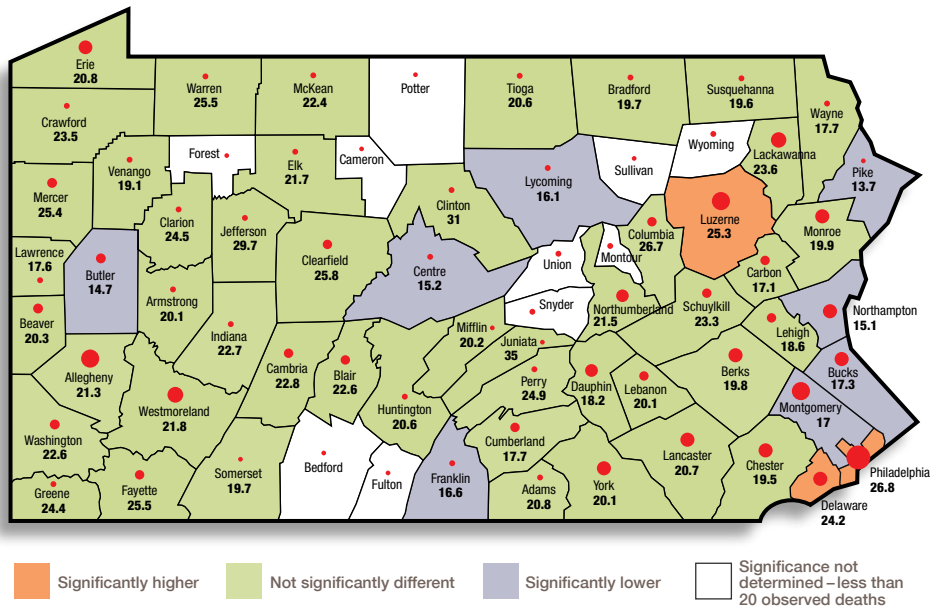| Significantly higher | Not significantly different | Significantly lower | Significance not determined – less than 20 observed cases |

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of cases.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

Female colorectal cancer incidence, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2007–2011) **37.9**   Pa. Rate—(2007–2011) **41.2**
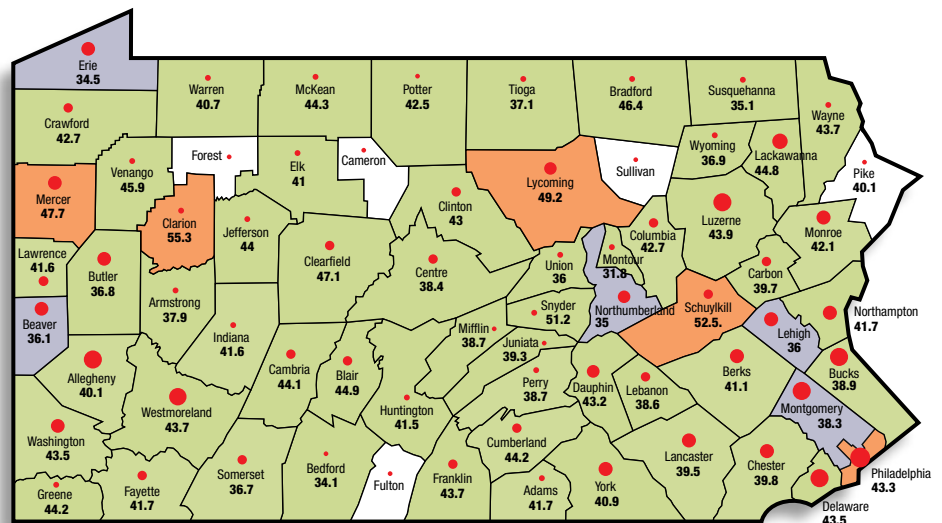
| Significantly higher | Not significantly different | Significantly lower | Significance not determined – less than 20 observed cases |

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of cases.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

FIGURE 3-8

However, comparing incidence to mortality for males shows that Luzerne, Delaware, and Philadelphia county have evelvated rates of both incidence and mortality.

Male colorectal cancer deaths, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

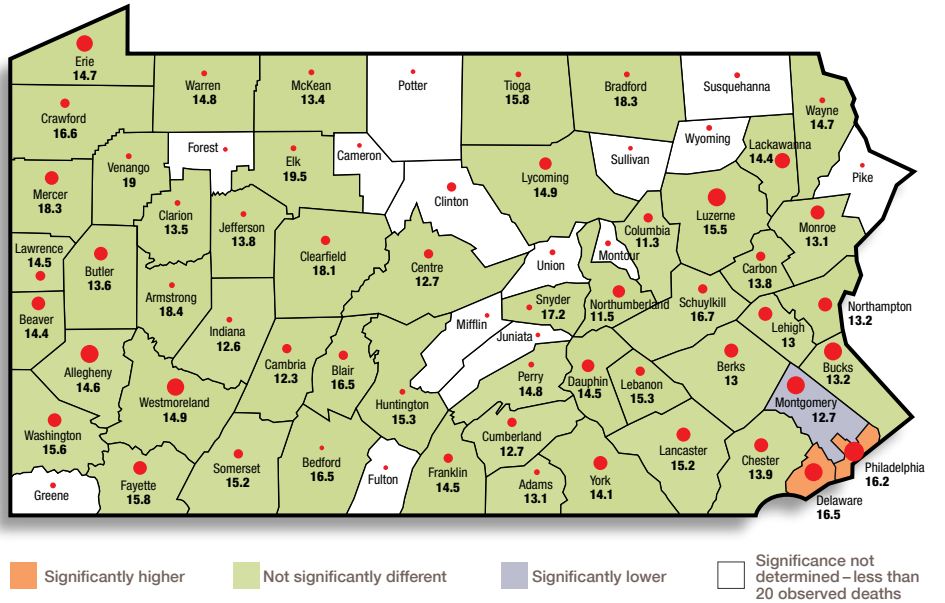U.S. Rate—(2006–2010) **19.6**   Pa. Rate—(2007–2011) **21.0**

| Significantly higher | Not significantly different | Significantly lower | Significance not determined – less than 20 observed deaths |

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of deaths.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

FIGURE 3-9

For females, the only counties that have significantly higher or lower mortality rates are part of the Philadelphia MSA, and Philadelphia has both a significantly higher incidence and mortality rate among females.

Female colorectal cancer deaths, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2006–2010) **13.9**   Pa. Rate—(2007–2011) **14.6**

| Significantly higher | Not significantly different | Significantly lower | Significance not determined – less than 20 observed deaths |

The symbol, ●, represents the number of cancer deaths. A larger circle indicates a larger amount of deaths.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

Hospitalization Data

There were 3,191 male and 3,188 female colorectal cancer hospitalizations in 2011. The total number of colorectal cancer hospitalizations decreased consistently from 2001 to 2011 for both male and female. The total number of colorectal cancer hospitalizations decreased 24.9% for male, from 4,247 in 2001 to 3,191 in 2011, and 28.8% for female, from 4,479 in 2001 to 3,188 in 2011.
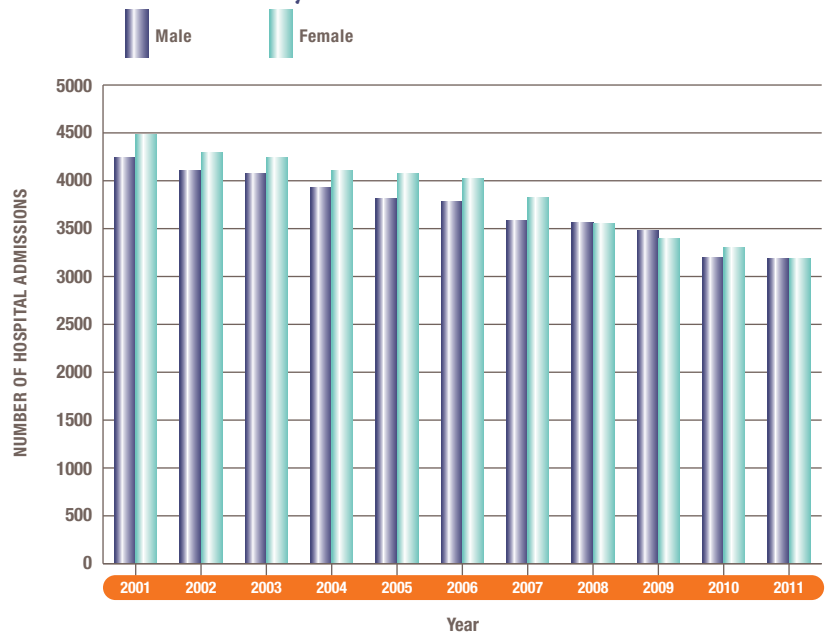
Hospital admissions for colorectal cancer by sex in Pennsylvania, 2001-2011

Medicare had the largest colorectal cancer hospitalization charges from 2001 to 2011, followed by commercial insurances and Medicaid. The total hospitalization charges for colorectal cancer reached $311.0 million for Medicare, a 39.9% increase comparing to 2001 ($222.3 million). The total hospitalization charges for colorectal cancer in 2011 reached $40.7 million for Medicaid, almost a 190.7% increase from $14.0 million in 2001. Hospitalization charges for colorectal cancer to Medicare were the highest over the years from 2001 to 2011, followed by commercial insurance and Medicaid.

Hospitalization charges for colorectal cancer by primary payer type in Pennsylvania, 2001-2011
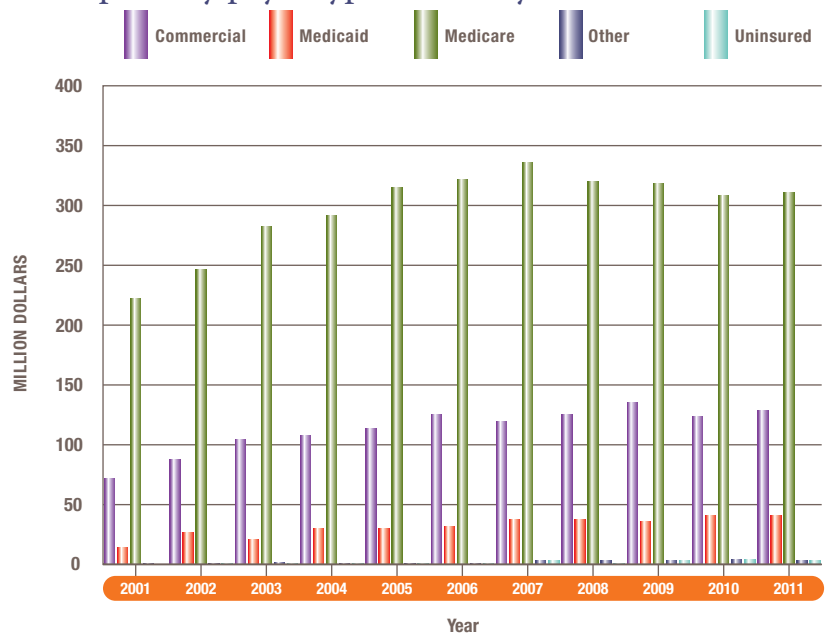
FIGURE 3-12

Age-adjusted colorectal cancer hospitalization rates for male were consistently higher than the rates for female from 2001 to 2011. The age-adjusted colorectal cancer hospitalization rate decreased from 70.0 per 100,000 in 2001 to 45.8 per 100,000 for male, and from 51.9 per 100,000 in 2001 to 35.8 per 100,000 in 2011 for female.
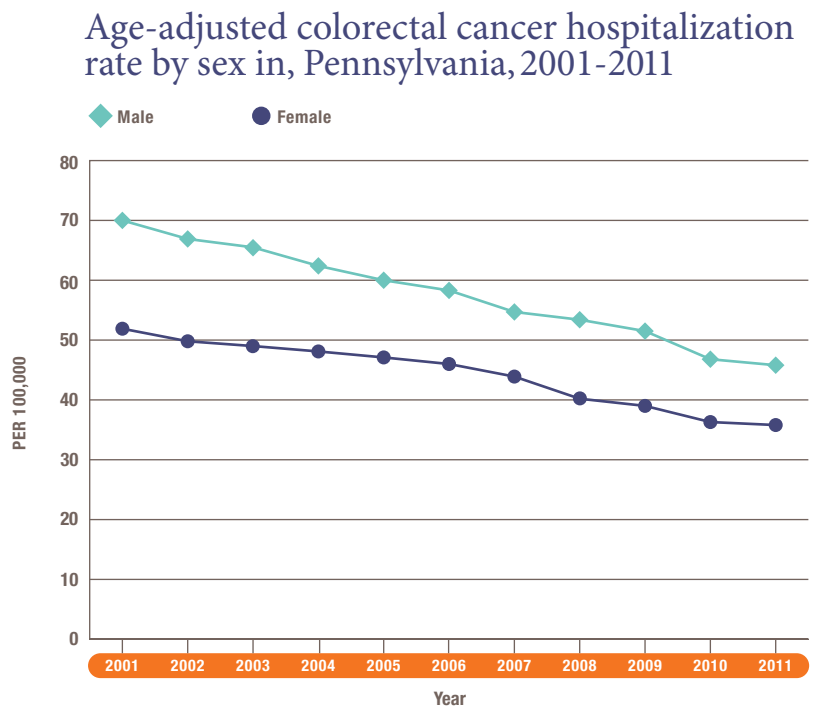
Age-adjusted colorectal cancer hospitalization rate by sex in, Pennsylvania, 2001-2011

FIGURE 3-13

Non-Hispanic black had the highest age-adjusted colorectal cancer hospitalization rate in 2011 (47.5 per 100,000) followed by non-Hispanic white (39.5 per 100,000) and Hispanic (21.4 per 100,000). The age-adjusted hospitalization rate decreased from 2001 to 2011 among non-Hispanic white, non-Hispanic black and Hispanic. Hispanic age-adjusted hospitalization rates had the largest decrease from 2001 to 2011 followed by non-Hispanic white and non-Hispanic black.

Age-adjusted colorectal cancer hospitalization rate by race/ethnicity in Pennsylvania, 2001-2011
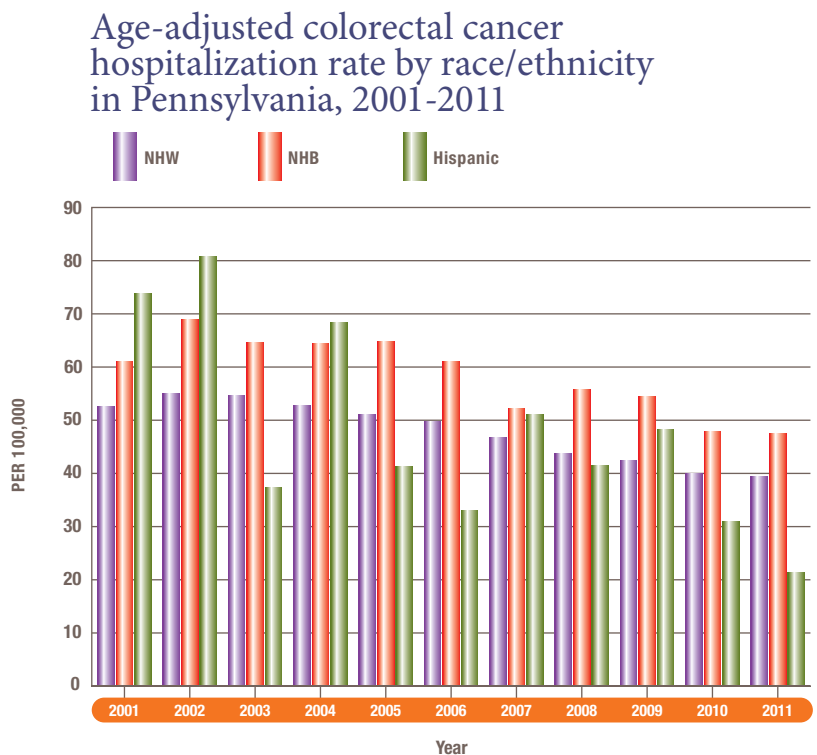
FEMALE BREAST CANCER

Incidence

Female[16] breast cancer,[17] along with lung and bronchus and prostate cancer, is one of the three most commonly diagnosed invasive cancers in Pennsylvania. In 2011, nearly 10,600 women were diagnosed with invasive breast cancer. Because there are no male and race combinations to depict, figures 4-1 and 4-2 below include Asian/Pacific islander and Hispanic[18] females. Note that due to the racial and ethnic makeup of Pennsylvania, the data for those two categories are sparse and sometimes unavailable.

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16 (While males can develop breast cancer; it is extremely rare. Male breast cancer data is therefore typically not available or reported.)

17 (Breast cancer incidence is defined using ICD-O-3 codes C50.0-C50.9, excluding ICD-O-3 histologies 9590-9989. Breast cancer mortality is defined as ICD-10 code C50)

18 (Prior to 2002, no Hispanic incidence data for any cancer was collected in Pennsylvania. All incidence graphs depicting Hispanic incidence will therefore show no data prior to 2002.)

FIGURE 4-1

Across the past decade, female breast cancer incidence rates have shown little difference between black and white females. Since 2000, incidences rates for all women have held steady overall.

Female breast cancers, age-adjusted incidence rates by race/ethnicity, Pennsylvania residents, 2000-2011
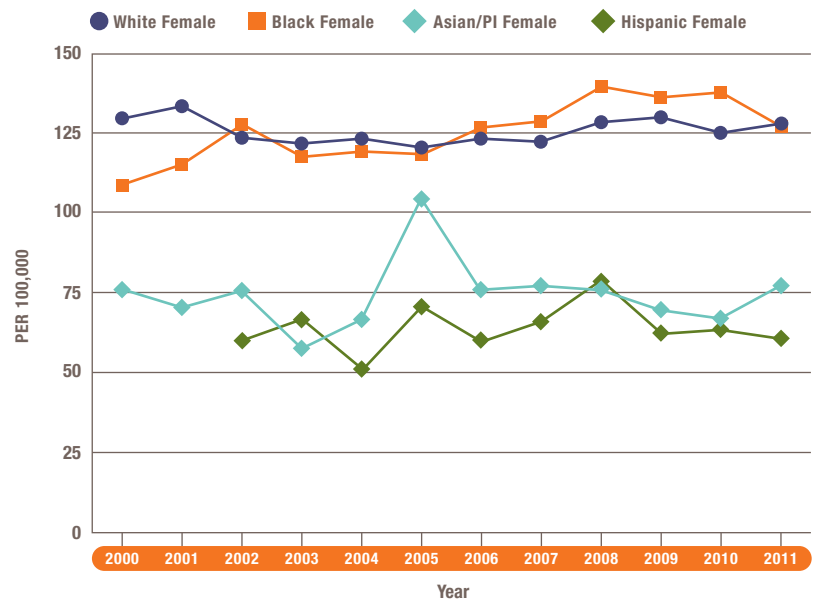
NOTES: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Incidence rates are based on invasive cancers. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program. Hispanics can be of any race and are only available for 2000+. Prior to 2002, Hispanics were classified as white

Mortality

In 2011, more than 2,000 women died of breast cancer in Pennsylvania, more than any other cancer group except lung and bronchus.

FIGURE 4-2

In contrast to incidence rates, black and white female death rates differ substantially. In 2011, for black and white females respectively, mortality rates were 31.9 and 22.3 per 100,000: a 43.0 percent difference. Very slight net declines in mortality rates can be noted since 2000, but the trend is fairly level.

Female breast cancer deaths, age-adjusted rates by race/ethnicity, Pennsylvania residents, 2000-2011
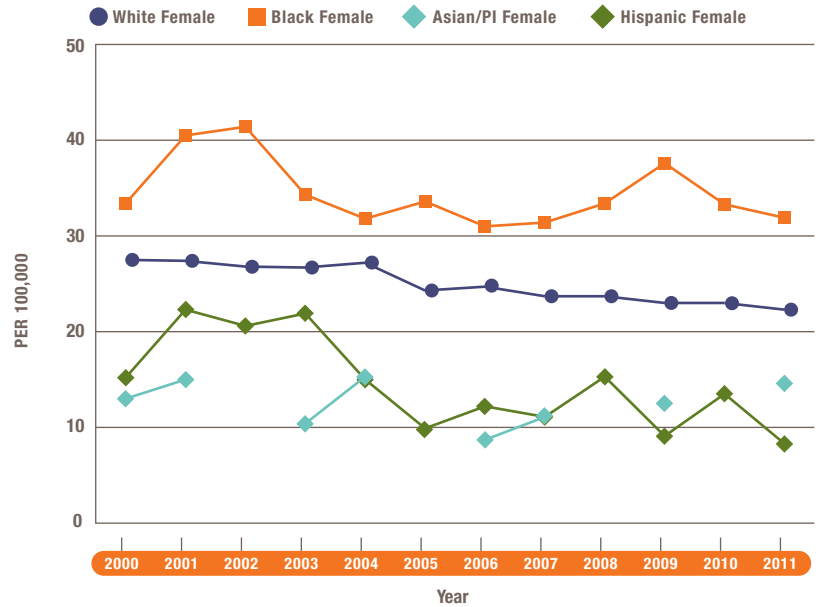
NOTES: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program. *Insufficient date to include Asian/Pacific Islanders and Hispanics.

Age and Summary Data

For female breast cancers, the gap between incidence and mortality rates is quite pronounced, as seen in Figure 4-3. Incidence begins to rise rapidly around age thirty-five. In contrast, mortality does not begin to rise sharply until approximately age seventy. Three-year aggregate data for female breast cancer show minimal difference in incidence rates between black and white females but does demonstrate a substantial disparity in mortality rates.

FIGURE 4-3

The increase in female breast cancer incidence slows around age sixty-five, peaking around age eighty, while mortality continues to rise with age.
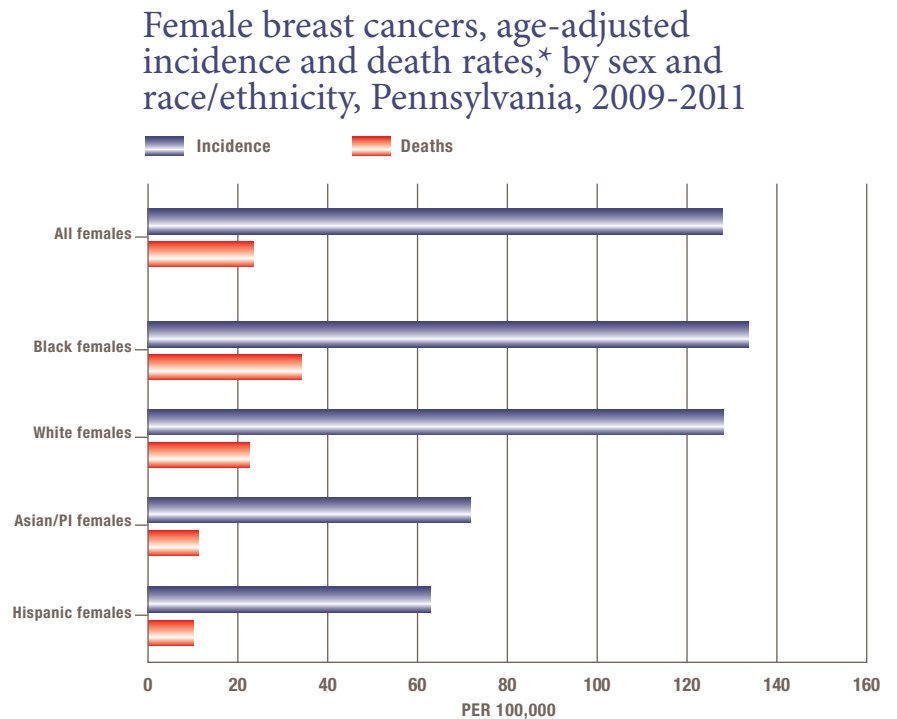
Female breast cancers, age-specific incidence and death rates, Pennsylvania females, 2009-2011
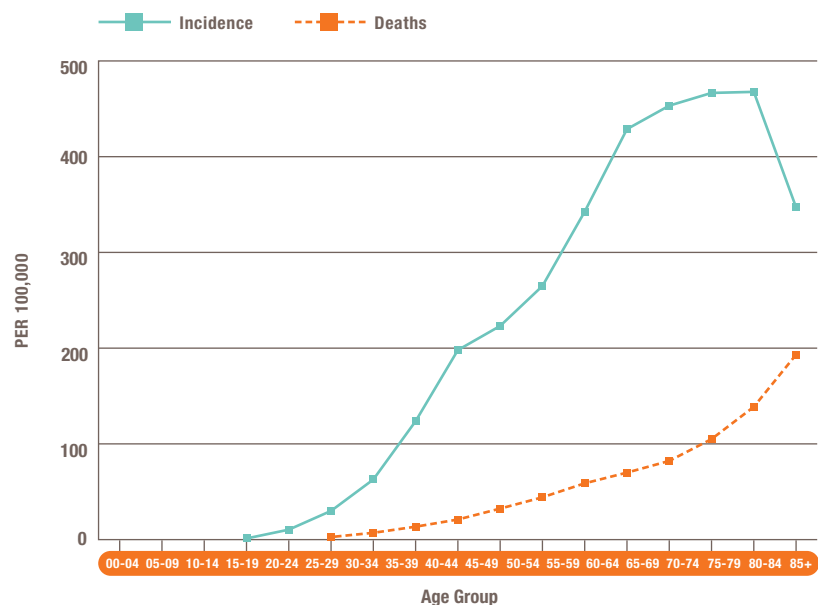
NOTES: Incidence rates are based on invasive cancers. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

FIGURE 4-4

Three-year data for Asian/Pacific islander and Hispanic females are more reliable than single-year data and may possibly indicate significantly lower rates of incidence and mortality of breast cancer in those groups. However, the vast majority of absolute incidence and mortality totals of breast cancer in Pennsylvania are among black and white females, and making inferences regarding the rates for the other two groups should be approached with caution.

Female breast cancers, age-adjusted incidence and death rates,* by sex and race/ethnicity, Pennsylvania, 2009-2011

*Three-year average annual rates are per 100,000 and age-adjusted to the 2000 U.S. standard population. Hispanics can be of any race.

FIGURE 4-5

Stage distribution across the four race/ethnicity categories is roughly similar. Early stage diagnoses comprise the majority for all groups. However, some disparity exists; 71.6 percent of the diagnoses for white females are early stage, while 66.2 percent are early stage for black females.
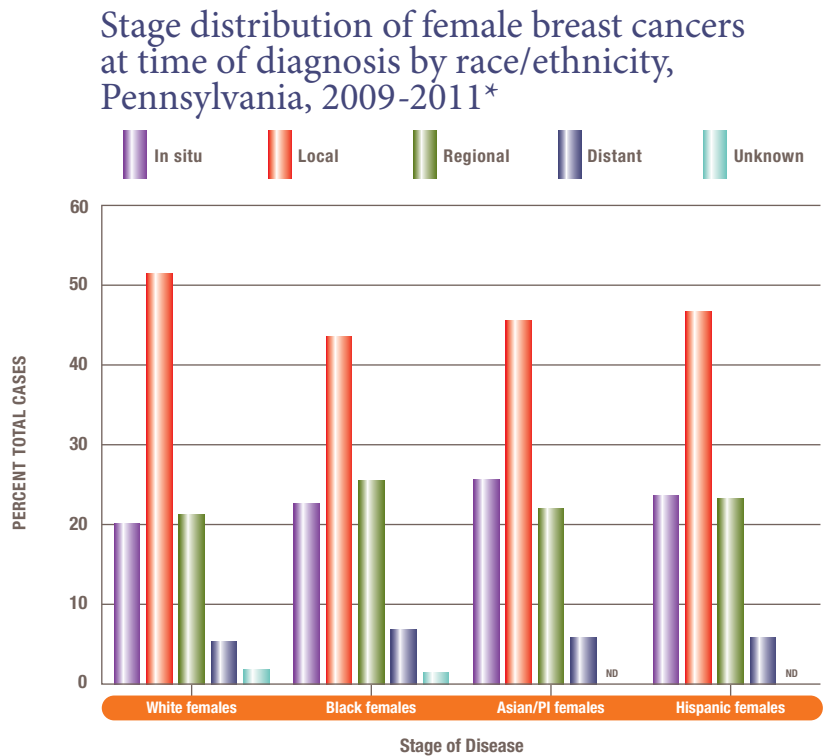
Stage distribution of female breast cancers at time of diagnosis by race/ethnicity, Pennsylvania, 2009-2011*

*Rates are three-year average annual percentages and based on SEER Summary Stage definitions.
Note: ND indicates the percentages were not displayed due to low frequency counts <10.
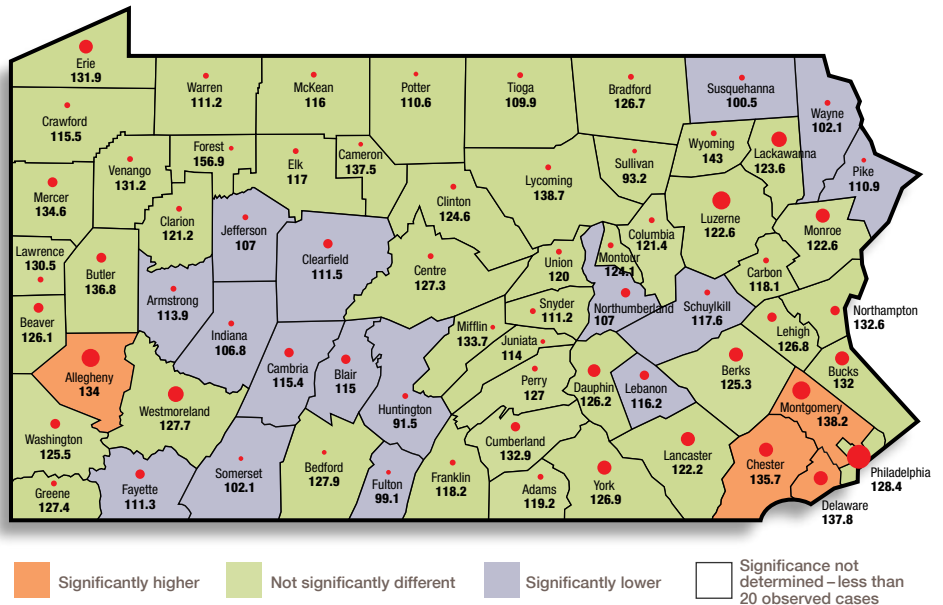
Geographical Data

In contrast to the cancers previously discussed, female breast cancer rates for both incidence and mortality are very similar to the U.S. rates.

For female breast cancer incidence, incidence rates significantly higher than the state rate appear to center around the Pittsburgh and Philadelphia areas, though interestingly, Philadelphia itself has an incidence rate not significantly different from the state.

Female breast cancer incidence, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2007–2011) **128.5**   Pa. Rate—(2007–2011) **127.4**

Significantly higher | Not significantly different | Significantly lower | Significance not determined—less than 20 observed cases

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of cases.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

Note that, for female breast cancer mortality, the Philadelphia rate is significantly higher than the state rate, in contrast to its incidence rate.

Female breast cancer deaths, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2006–2010) **22.6**   Pa. Rate—(2007–2011) **23.5**
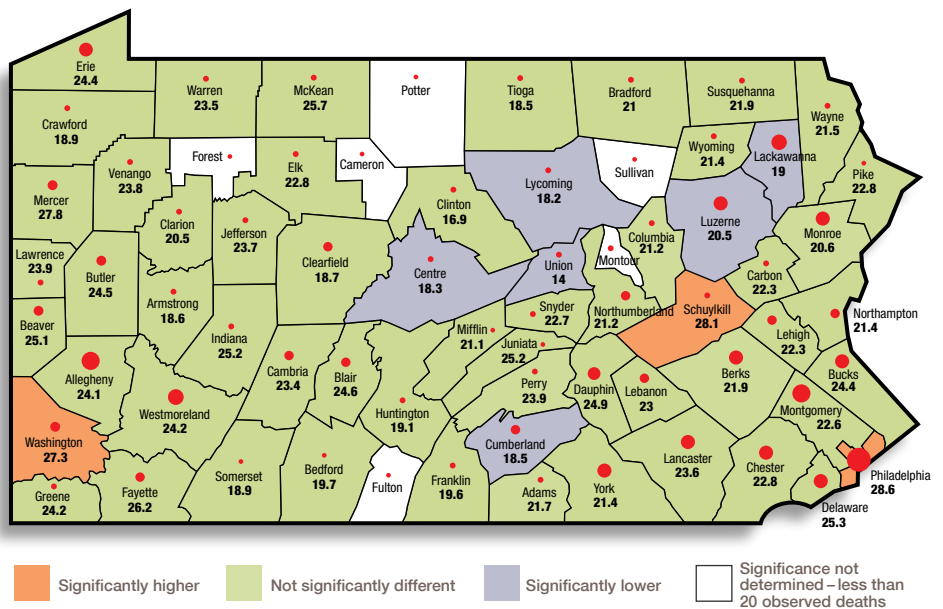
Significantly higher | Not significantly different | Significantly lower | Significance not determined—less than 20 observed deaths

The symbol, ●, represents the number of cancer deaths. A larger circle indicates a larger amount of deaths.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

Hospitalization Data

There were 3,373 female breast cancer hospitalizations in 2011. This was a 37.2% decrease from 5,370 in 2001.

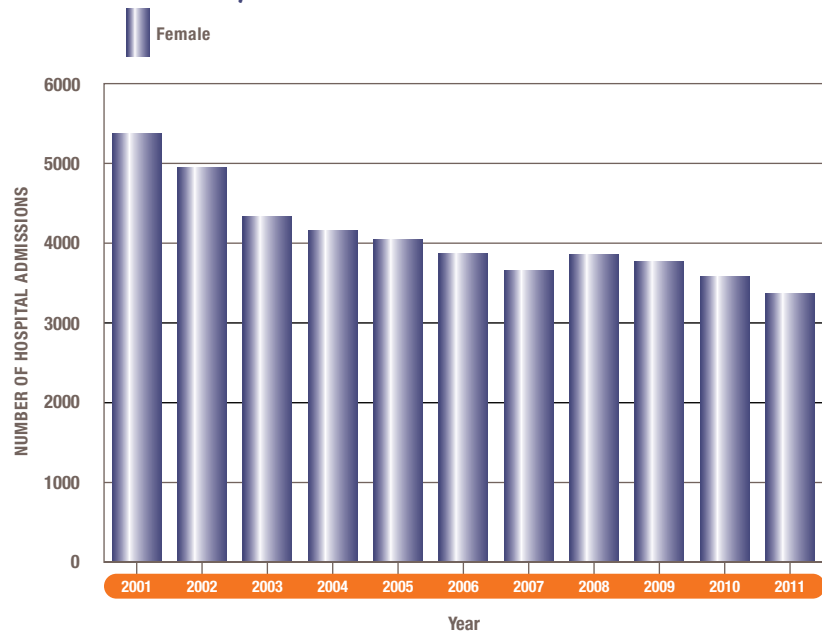## Hospital admissions for female breast cancer in Pennsylvania, 2001-2011

Female

NUMBER OF HOSPITAL ADMISSIONS

Year

Commercial insurances had the largest female breast cancer charges from 2001 to 2011, followed by Medicare and Medicaid. Total female breast cancer hospitalization charges to Medicare were $51.4 million in 2011. The total Medicaid charges in 2011 were $18.8 million, a 261.5% increase from $5.2 million in 2001.

Hospitalization charges for female breast cancer by primary payer type in Pennsylvania, 2001-2011

Commercial   **Medicaid**   **Medicare**   **Other**   **Uninsured**

MILLION DOLLARS

Year
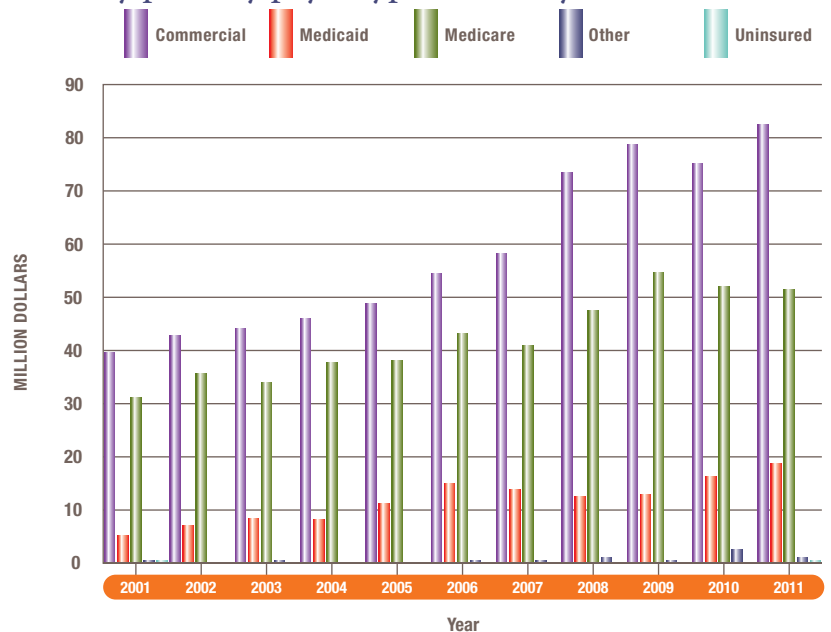
FIGURE 4-10

The age-adjusted female breast cancer hospitalization rate decreased from 71.0 per 100,000 in 2001 to 42.5 per 100,000 in 2011. Greater decreases were observed from 2001 to 2007 with a slight increase from 2007 to 2008 and then a slight decrease from 2008 to 2011.

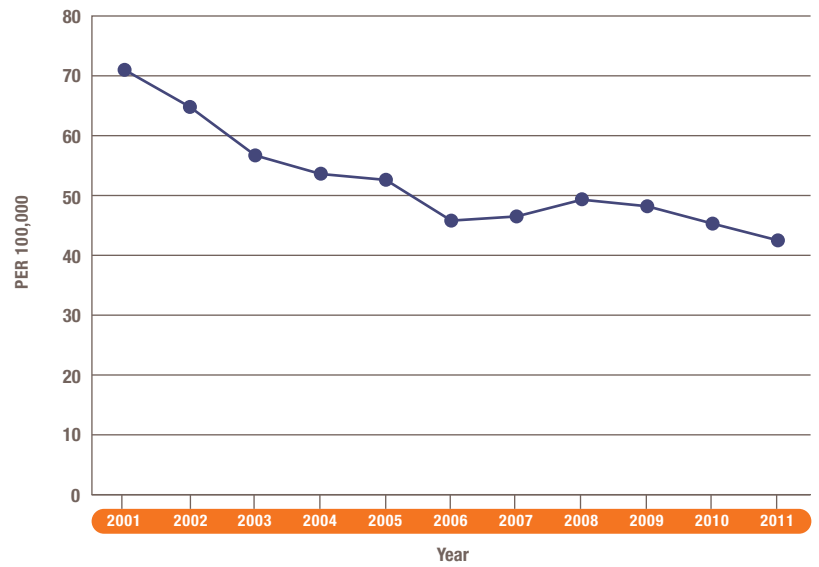## Age-adjusted female breast cancer hospitalization rates in Pennsylvania, 2001-2011

FIGURE 4-11

Non-Hispanic blacks had the highest age-adjusted female breast cancer hospitalization rate in 2011, followed by non-Hispanic whites and Hispanics. The Hispanic female breast cancer hospitalization rate had the greatest decreases from 2001 to 2011, followed by the non-Hispanic white and non-Hispanic black rates. Non-Hispanic blacks consistently had the highest rate over the years from 2002 to 2011.

Age-adjusted female breast cancer hospitalization rate by race/ethnicity in Pennsylvania, 2001-2011

NHW   NHB   Hispanic
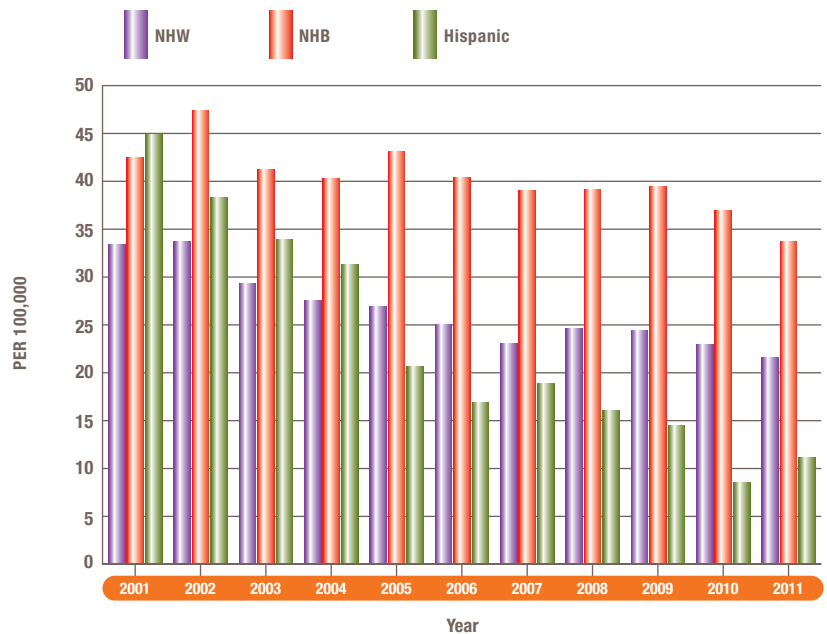
CERVICAL CANCER

Incidence

Cervical Cancer[19] is a relatively rare female-specific cancer with 552 invasive cases diagnosed in 2011. It is included in this report because it is the only cancer that is almost wholly preventable through use of the Human Papilloma Virus (HPV) vaccine. As shown in Figure 5-1, the cervical cancer incidence rate has been higher for black females than white females.

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19 (Cervical cancer incidence is defined using ICD-O-3 codes C53.0-C53.9, excluding ICD-O-3 histologies 9590-9989. Cervical cancer mortality is defined as ICD-10 code C53. In situ stage data for cervical cancer is unavailable because that data is not collected by the PA Cancer Registry.)

FIGURE 5-1

The 2011 year-over-year comparison shows that the black female incidence rate is 58.4 percent higher than the white female incidence rate. Note that the absolute incidence, the number of cases, for black females is quite low even state-wide, and therefore the true difference between the two rates may not be that large. The net trend since 2000 has held steady for both races.

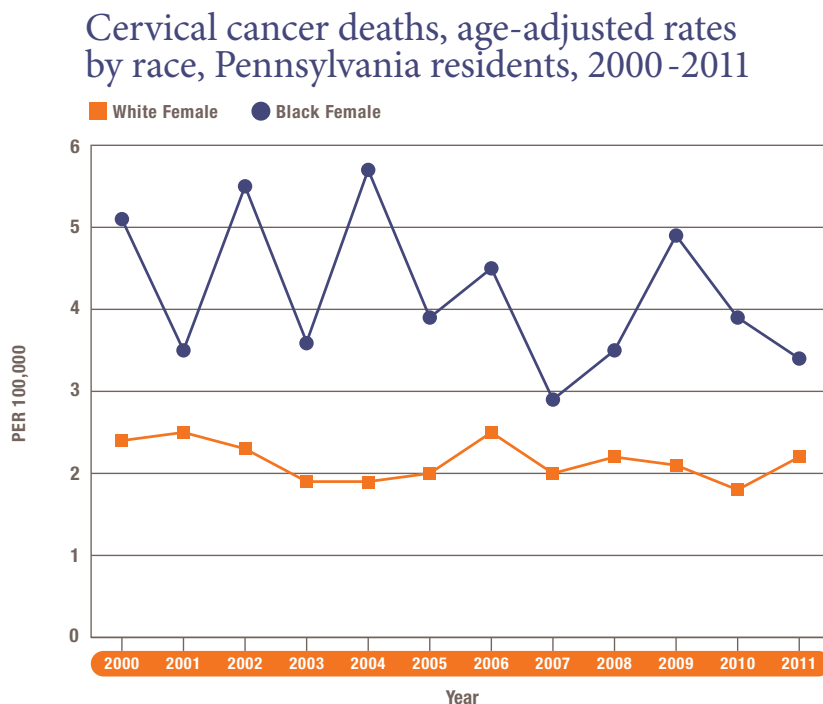## Cervical cancers, age-adjusted incidence rates by race, Pennsylvania females, 2000-2011
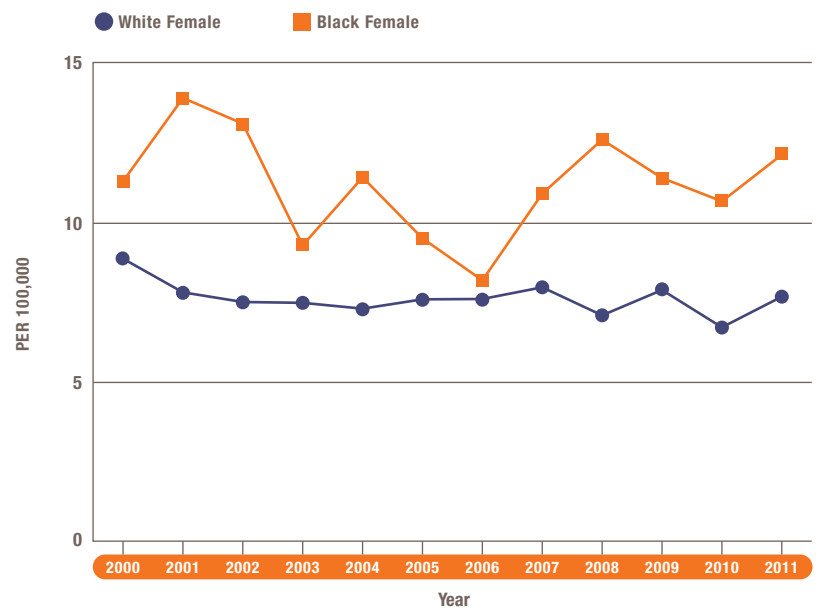
NOTES: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Incidence rates are based on invasive cancers. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

Mortality

In 2011, 180 cervical cancer deaths were recorded in Pennsylvania, approximately 25 of which were black females. Because the absolute mortality totals are so low, it can be difficult to infer much information in terms of trends over time.

Again, due to the low absolute numbers, the black female cervical cancer death rate has a high degree of variability over time. However, the net trend over the past decade for the black female mortality rate, like the trend for the white female rate, shows little movement.

Cervical cancer deaths, age-adjusted rates by race, Pennsylvania residents, 2000-2011

NOTES: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program. *Insufficient data to include Asian/Pacific Islanders and Hispanics.

Age and Summary Data

In contrast to most cancers, cervical cancer incidence peaks in early middle age, and declines as women age and pass through menopause. Mortality rises, albeit slowly, as age increases, as seen in Figure 5-3. In Figure 5-4, three year aggregate data for incidence and mortality more reliably indicate a disparity between white and black female incidence and mortality rates for cervical cancer.

FIGURE 5-3

Cervical cancer incidence rises sharply from around age twenty up through approximately age forty, declining steadily as age increases thereafter. Mortality lags substantially behind incidence, and peaks around age sixty-five, leveling off around that point.

### Cervix uteri cancers, age-specific incidence and death rates, Pennsylvania females, 2009-2011
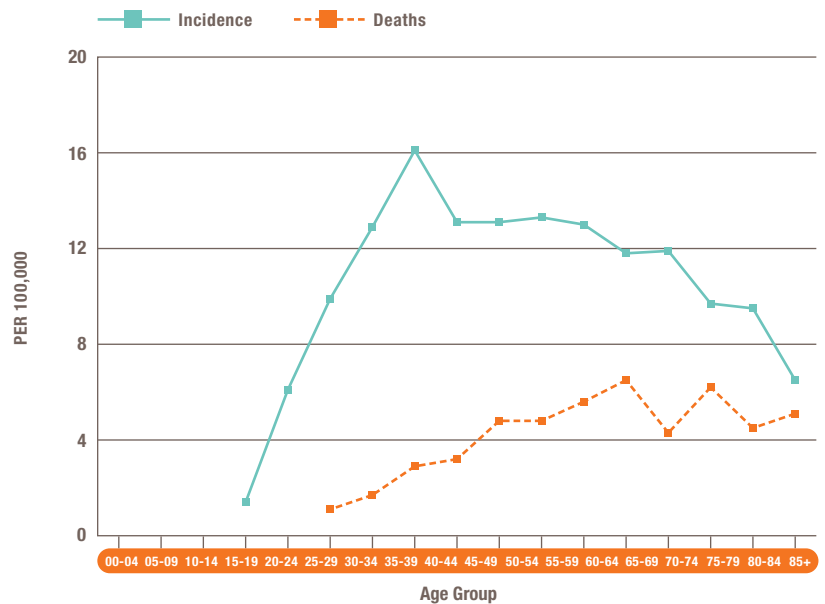
NOTES: Incidence rates are based on invasive cancers. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

FIGURE 5-4

White females make up the overwhelming majority of cervical cancer incidence and mortalities, and the total incidence and mortality rates reflect that. However, black female incidence and mortality rates appear to be substantially higher than rates for white women. For example, the mortality rate for black females appears to be double that of white females. With such low absolute incidence and mortality counts, even across three years, it is difficult to infer that the true difference is necessarily that high, but there does appear to be a significant difference of some kind.

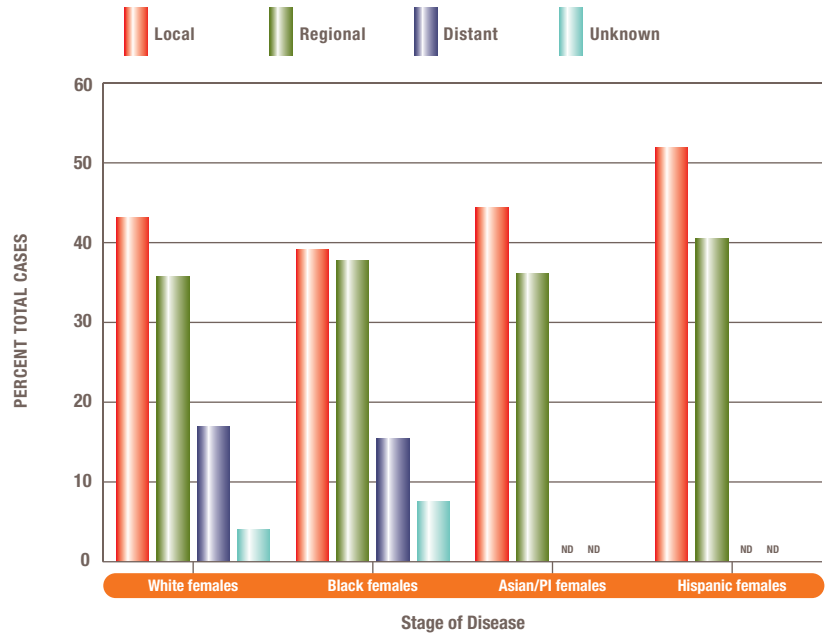### Cervix uteri cancers, age-adjusted incidence and death rates* by race/ethnicity, Pennsylvania, 2009-2011
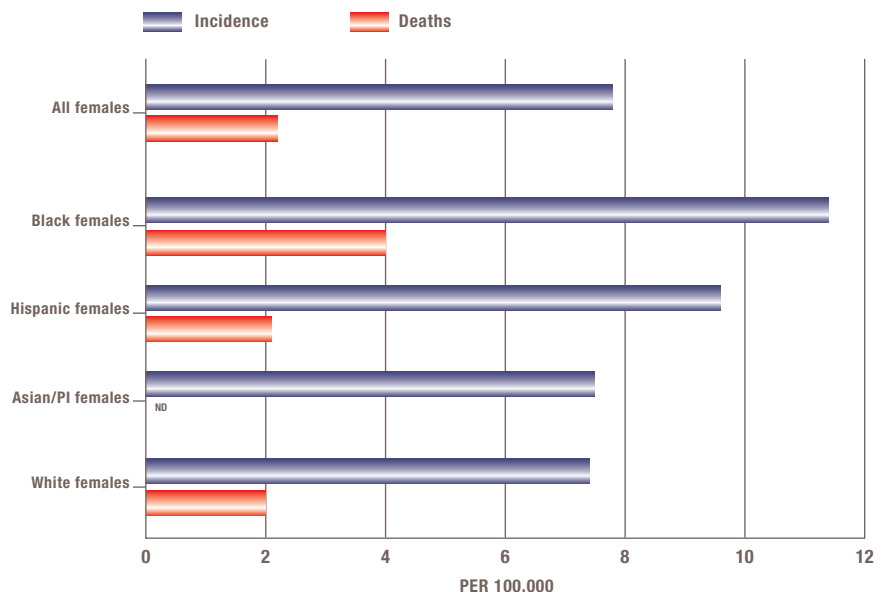
*Three-year average annual rates are per 100,000 and age-adjusted to the 2000 U.S.standard population.
Note: ND indicates the data were not displayed due to low frequency counts <10.
Hispanics can be of any race.

FIGURE 5-5

Stage distribution is similar across each racial or ethnic group. While the number of in situ cervical cancers is not known, the cases collected show that late-staged cancers made up the majority among both white and black females.

Stage distribution of cervix uteri cancers at time of diagnosis by race/ethnicity, Pennsylvania, 2009-2011*

Local   Regional   Distant   Unknown

PERCENT TOTAL CASES

Stage of Disease

*Rates are three-year average annual percentages and based on SEER Summary Stage definitions.
Note: ND indicates the percentages were not displayed due to low frequency counts <10.

Geographical Data

The sub state geographical data for cervical cancer are very limited due to the low incidence and mortality of the cancer. Overall, the US and Pennsylvania incidence and mortality rates do not appear to differ widely.

The Philadelphia MSA once again shows interesting rate disparities, possibly reflecting racial makeup and access issues, with Philadelphia county showing a significantly higher cervical incidence rate, while the three outer MSA counties show a significantly lower rate.

Female cervical cancer incidence, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2007–2011) **6.8**   Pa. Rate—(2007–2011) **7.9**

Significantly higher | Not significantly different | Significantly lower | Significance not determined – less than 20 observed cases

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of cases.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

Philadelphia has a significantly higher cervical cancer mortality rate compared to the state rate, as well as a significantly higher incidence rate.

Female cervical cancer deaths, 2007–2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2006–2010) **2.4**   Pa. Rate—(2007–2011) **2.2**

Significantly higher | Not significantly different | Significantly lower | Significance not determined – less than 20 observed deaths

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of deaths.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

Hospitalization Data

There were 391 cervix uteri cancer hospitalizations in 2011. This was a 30.4% decrease from 562 hospitalizations in 2001.

Hospital admissions for female cervix uteri cancer in Pennsylvania, 2001-2011

Medicaid led the cervix uteri cancer hospitalization charges in 2011 with $9.3 million, followed by commercial insurance ($7.9 million) and Medicare ($5.7 million). Before then, cervix uteri cancer hospitalization charges were the highest to commercial insurance from 2001 to 2010. Total hospitalization charges to Medicaid increased 97.9 percent, from $4.7 million in 2001 to $9.3 million in 2011, while the total hospitalization charges to Medicare increased 111.1 percent, from $2.7 million in 2001 to $5.7 million in 2011.

Hospitalization charges for cervix uteri cancer by primary payer type in Pennsylvania, 2001-2011
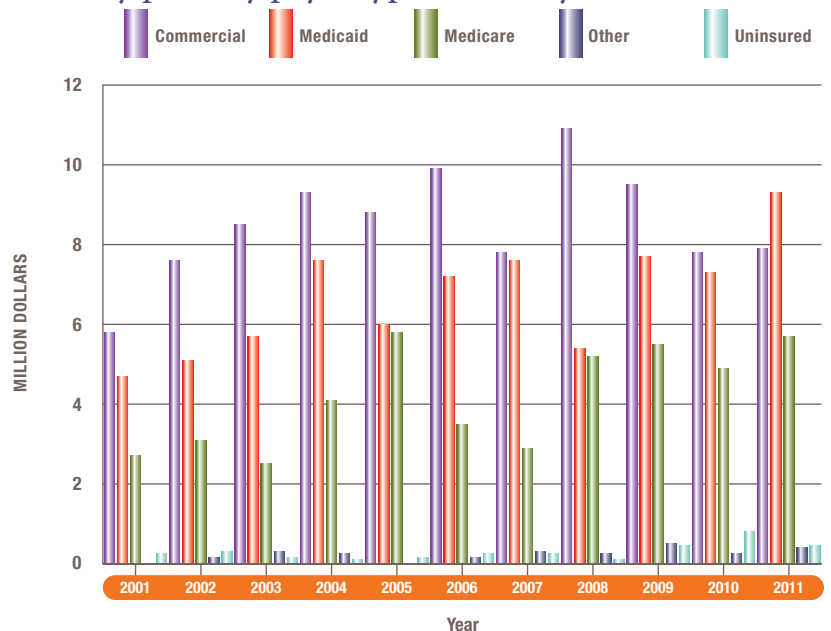
FIGURE 5-10

The age-adjusted cervix uteri cancer hospitalization rate decreased from 8.4 per 100,000 in 2001 to 5.6 in 2011.

Age-adjusted female cervix uteri cancer hospitalization rates in Pennsylvania, 2001-2011
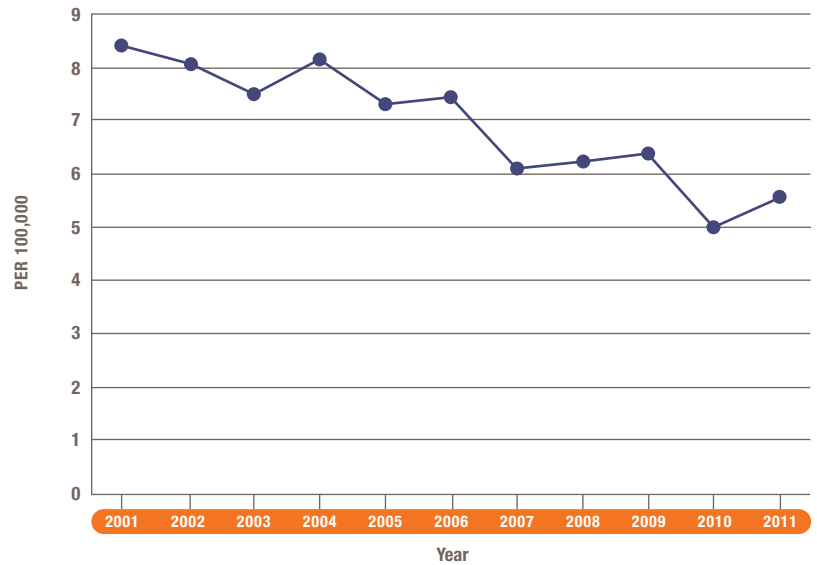
FIGURE 5-11

Non-Hispanic blacks consistently had the highest age-adjusted cervix uteri cancer hospitalization rate from 2001 to 2011 except in 2006, when surpassed by Hispanic. Non-Hispanic white rates were consistently lower than among non-Hispanic blacks and Hispanics except in 2003 and 2011, when the Hispanic rate was the lowest. Non-Hispanic blacks and Hispanics had greater decreases in their age-adjusted cervix uteri hospitalization rates than non-Hispanic whites from 2001 to 2011.

Age-adjusted cervix uteri cancer hospitalization rate by race/ethnicity in Pennsylvania, 2001-2011

cancer burden | cervical cancer
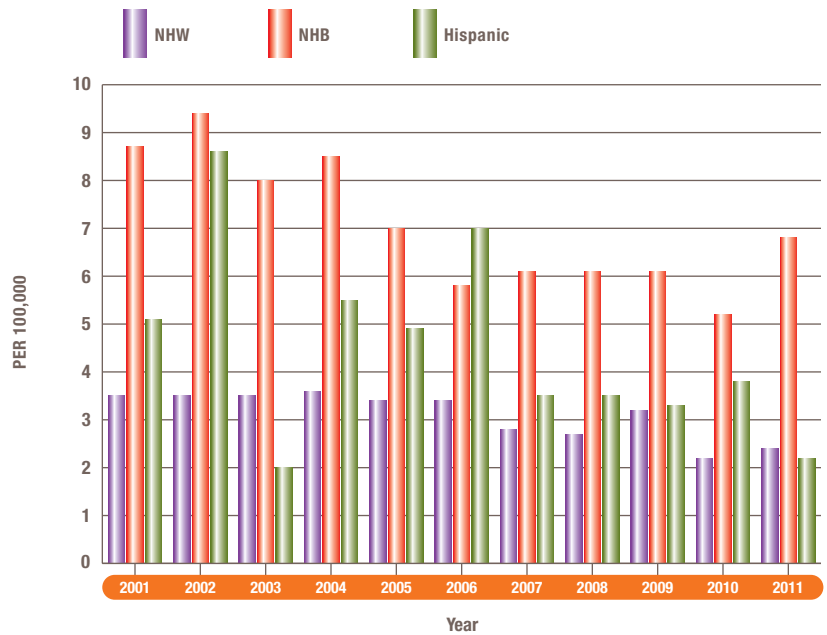
PROSTATE CANCER

Incidence

Prostate cancer[20] is one of the three most commonly diagnosed cancers in Pennsylvania, trailing only slightly behind lung and bronchus and female breast cancer. In 2011, 10,235 men were diagnosed with invasive prostate cancer. Because this is a male-specific cancer, Asian/Pacific islander and Hispanic males are depicted in Figure 6-1. Additionally, because prostate cancer is very common in comparison to female-specific cervical cancer, the Asian/Pacific islander and Hispanic data may be considered more reliable.

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20 Prostate cancer incidence is defined as ICD-O-3 code C61.9, excluding ICD-O-3 histologies 9590-9989. Prostate cancer mortality is defined as ICD-10 code C61.)

FIGURE 6-1

Prostate cancer incidence rates have been holding steady or declining for all races and ethnicities since 2000, with black male incidence declining markedly. The black male incidence rate in 2000 was 252.2 per 100,000, 30.0 percent higher than the 2011 rate of 194.0. However, though the gap has narrowed slightly, the 2011 black male incidence rate for prostate cancer was still 58.4 percent higher than the 2011 white male incidence rate.

### Prostate cancers, age-adjusted rates by race/ethnicity, Pennsylvania residents, 2000-2011
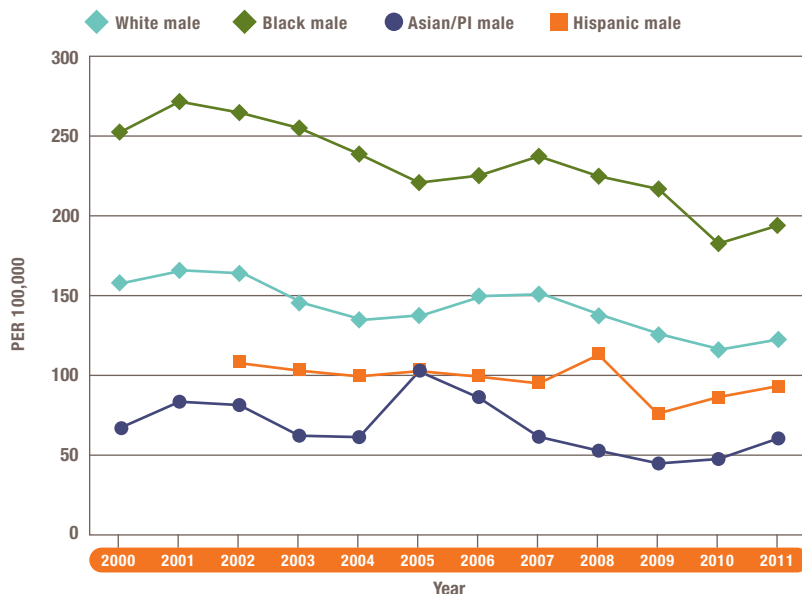
NOTES: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program. Hispanics can be of any race and are only availabe for 2002+. Prior to 2002, Hispanics were classified as white.

Mortality

Though prostate cancer has a very high incidence count, it has a relatively low mortality count in comparison to other cancers, such as female breast cancer. In 2011, 1,364 men died of prostate cancer. Figure 6-2 below illustrates the large disparity in mortality rates between black males and white or Hispanic males.

FIGURE 6-2

Over the past decade, prostate cancer death rates have shown a net decline in black and white males, while the Hispanic male rate has held steady or possibly declined slightly. However, the mortality rate gap is even more dramatic than the incidence rate gap. In 2011, the black male rate (52.1 per 100,000) was 175.7 percent higher than the white male rate (18.9)
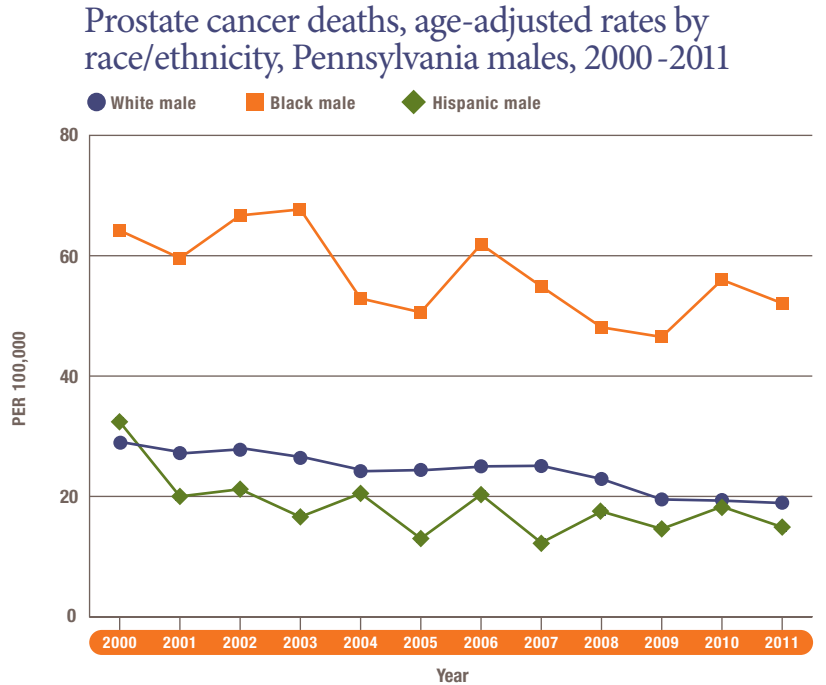
Prostate cancer deaths, age-adjusted rates by race/ethnicity, Pennsylvania males, 2000-2011

● White male   ■ Black male   ◆ Hispanic male

NOTES: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program. *Insufficient data to include Asian/Pacific islanders.

Age and Summary Data

Incidence rates for prostate cancer rise rapidly starting around age forty-five, and peak around age sixty-five. In contrast, mortality rates do not become substantial until approximately seventy-five years of age, and rise rapidly after that. The three-year aggregate data also demonstrate the markedly higher incidence and mortality rates among black males in comparison to all other races and ethnicities.

Prostate cancers, age-specific incidence and death rates, Pennsylvania males, 2009-2011
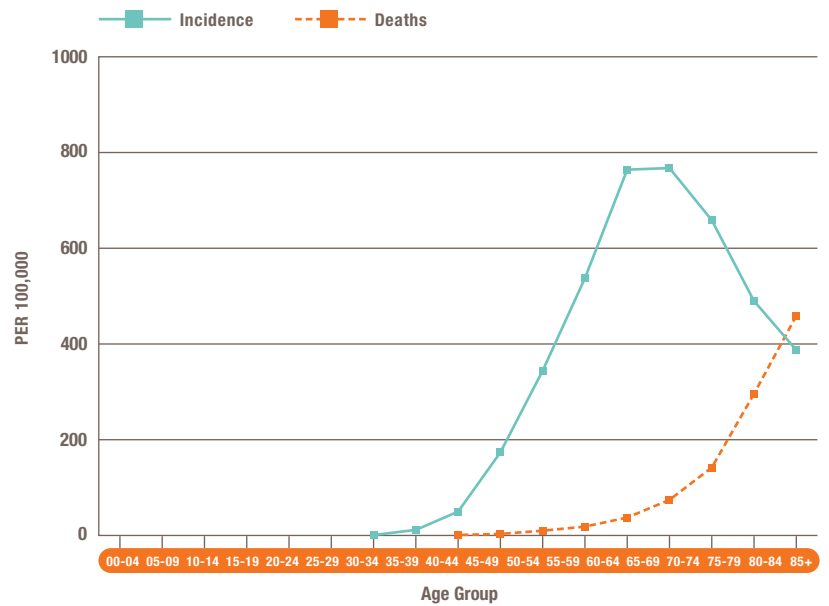
NOTES: Incidence rates are based on invasive cancers. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

Black males are by far most affected by prostate cancer. Black males exhibit the highest incidence and mortality rates among all racial groups. Although the incidence of prostate cancer is substantial, its mortality rate is lower in comparison to other high incidence cancers.

Prostate cancers, age-adjusted incidence and death rates* by race/ethnicity, Pennsylvania, 2009-2011
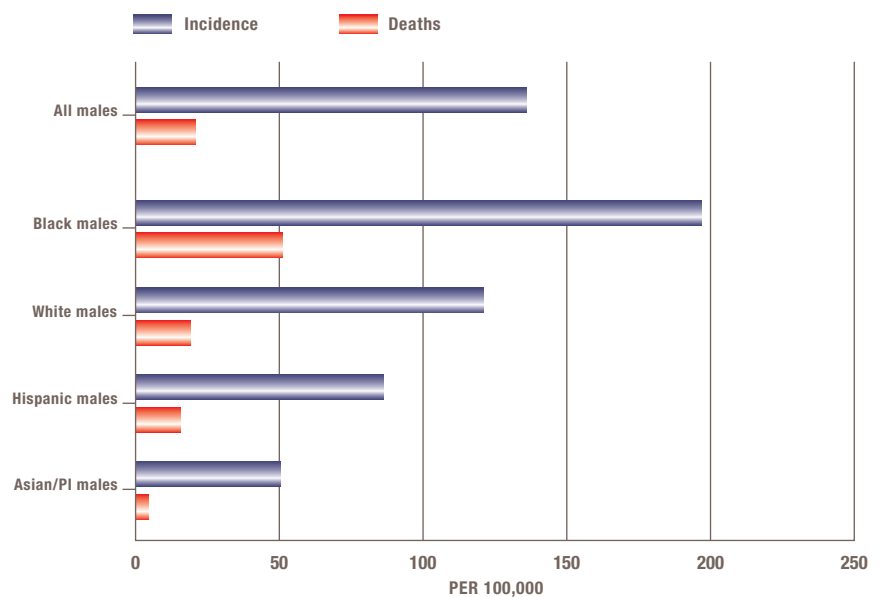
*Three-year average annual rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.
Note: ND indicates the data were not displayed due to low frequency counts <10.
Hispanics can be of any race.

FIGURE 6-5

A large majority of prostate cancers, over 75 percent for all races, are diagnosed in early stage. This may contribute to the lower mortality rate of prostate cancers as compared to other high incidence cancers.

Stage distribution of prostate cancers at time of diagnosis by race/ethnicity, Pennsylvania, 2009-2011*


Legend: In situ | Local | Regional | Distant | Unknown

PERCENT TOTAL CASES

White males | Black males | Asian/PI females | Hispanic males

Stage of Disease
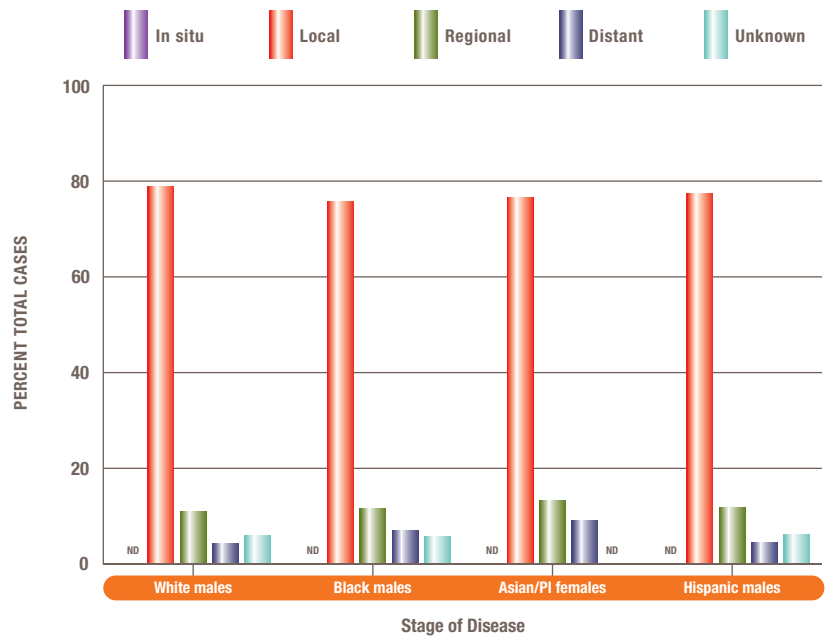
Geographical Data

Prostate cancer shows somewhat distinctive clustering of high or low incidence rates in comparison to other cancers. In contrast to most other Pennsylvania cancers which are typically at a similar or higher incidence rate than the U.S., the Pennsylvania prostate cancer rate is lower than the U.S. rate.

Interestingly, the Southwest, Southcentral, and Northeast regions of the state show significantly lower rates of prostate cancer incidence in comparison to the Pennsylvania rate. The Southeast and Northwest regions of the state have a preponderence of significantly higher rates.

Male prostate cancer incidence, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2007–2011) **154.2**   Pa. Rate—(2007–2011) **144.6**
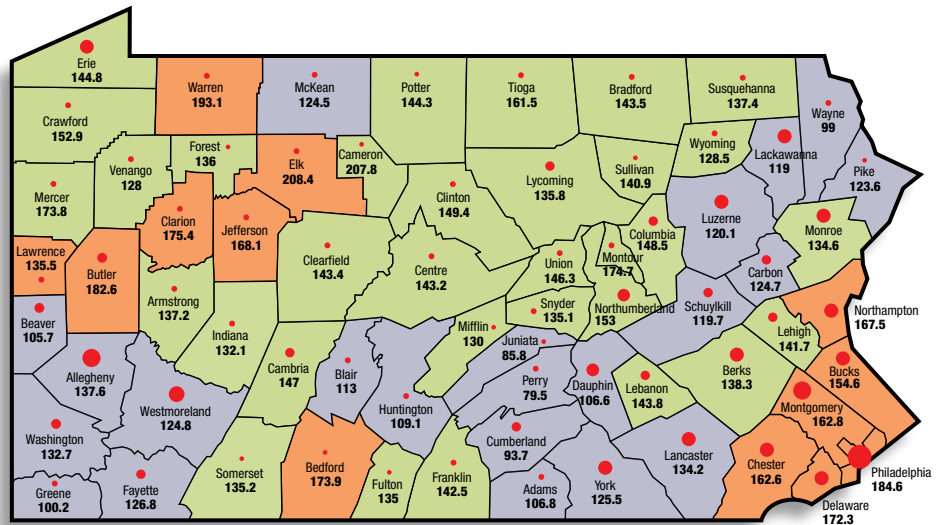
Significantly higher   Not significantly different   Significantly lower   Significance not determined – less than 20 observed cases

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of cases.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

The county level prostate cancer mortality data do not show nearly the same range of differences in death rates. Some of the counties with a significantly lower incidence rate retained a significantly lower mortality rate, and Philadelphia retained a significantly higher mortality rate.

Male prostate cancer deaths, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2006–2010) **23.0**   Pa. Rate—(2007–2011) **22.4**
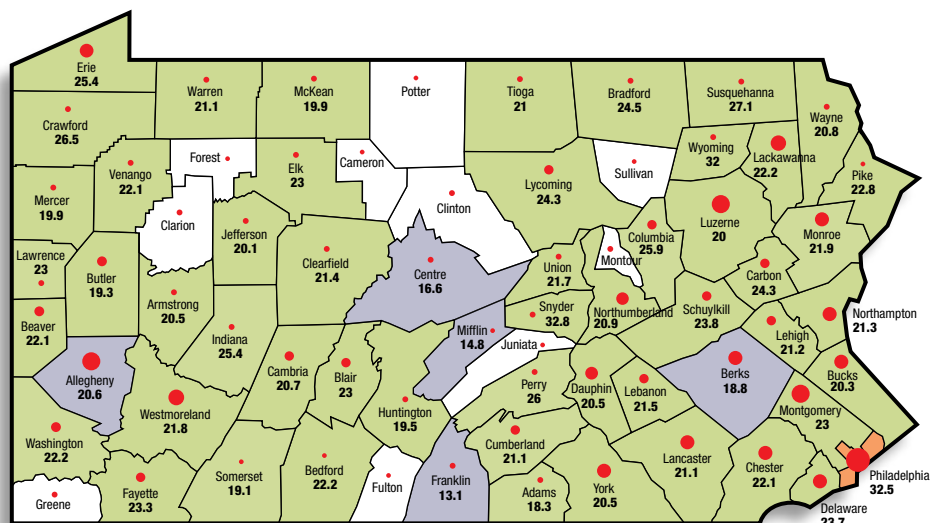
Significantly higher   Not significantly different   Significantly lower   Significance not determined – less than 20 observed deaths

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of deaths.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

Hospitalization Data

There were 4,291 prostate cancer hospitalizations in 2011. This was a 10.6 percent decrease from 4,801 in 2001. The number of hospitalizations decreased from 2001 to 2004, then increased from 2004 to 2007, and stayed level from 2007 to 2009. The total prostate cancer hospitalizations decreased from 2009 to 2010 then increased again from 2010 to 2011.

Hospital admissions for prostate cancer in Pennsylvania, 2001-2011

Total hospitalization charges for prostate cancer to commercial insurance were the highest of all insurance types from 2001 to 2011, followed by Medicare and Medicaid. The total charges to Medicare for prostate cancer in 2011 were $66.4 million, an 82.4 percent increase from $36.4 million in 2001. The total hospitalization charges to Medicaid increased 236.4 percent from $3.3 million in 2001 to $11.1 million in 2011.

Hospitalization charges for prostate cancer by primary payer type in Pennsylvania, 2001-2011

cancer burden | prostate cancer
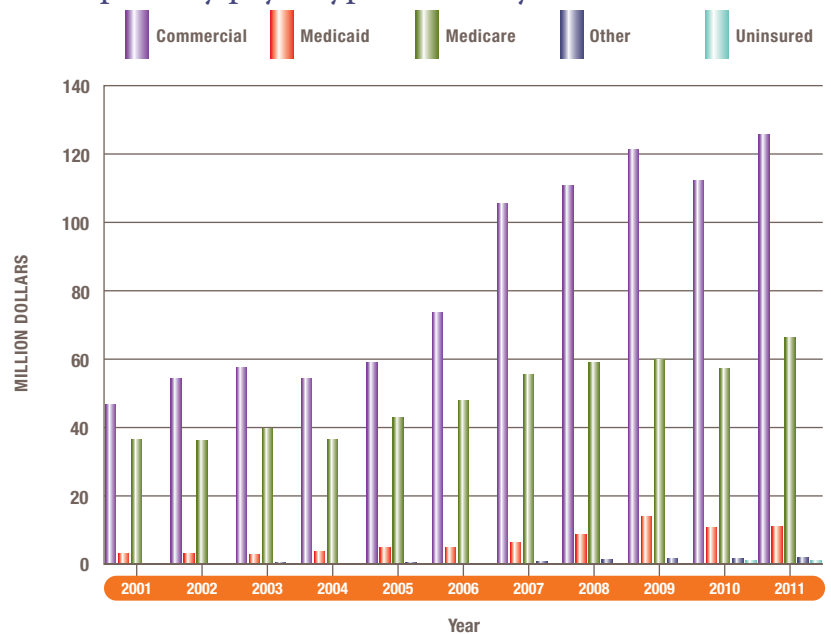
FIGURE 6-10

The age-adjusted prostate cancer hospitalization rate decreased greatly from 77.3 per 100,000 in 2001 to 53.5 in 2004 and then remained steady.

Age-adjusted prostate cancer hospitalization rates in Pennsylvania, 2001-2011
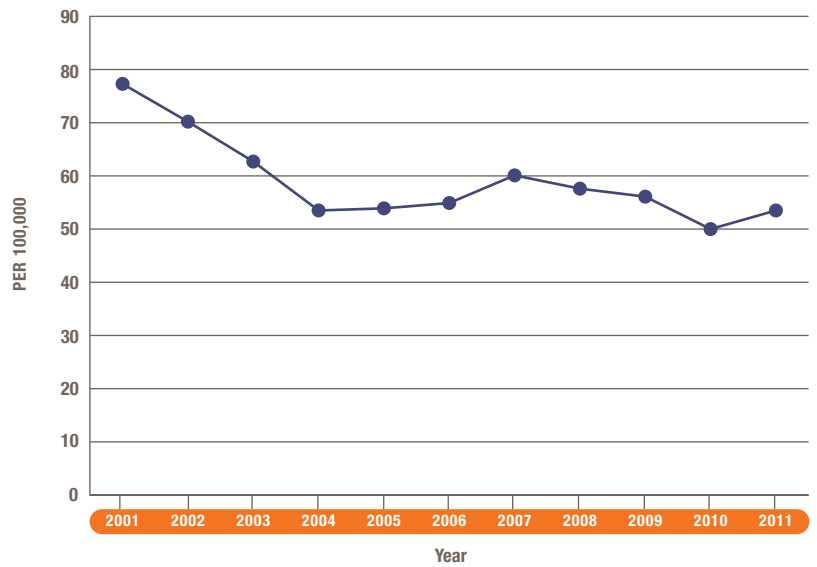
FIGURE 6-11

Non-Hispanic blacks had the highest age-adjusted prostate cancer hospitalization rates from 2001 to 2011, except in 2002, when Hispanics exhibited the highest rate. The rate in 2011 for non-Hispanic blacks was 43.0 percent higher than that of non-Hispanic whites and 171.0 percent higher than that of Hispanics. The rate saw a net decrease from 2001 to 2011 among non-Hispanic whites, non-Hispanic blacks and Hispanics. The Hispanic age-adjusted hospitalization rate had the largest decrease over this period, followed by the non-Hispanic black and non-Hispanic white rates.

Age-adjusted prostate cancer hospitalization rate by race/ethnicity in Pennsylvania, 2001-2011
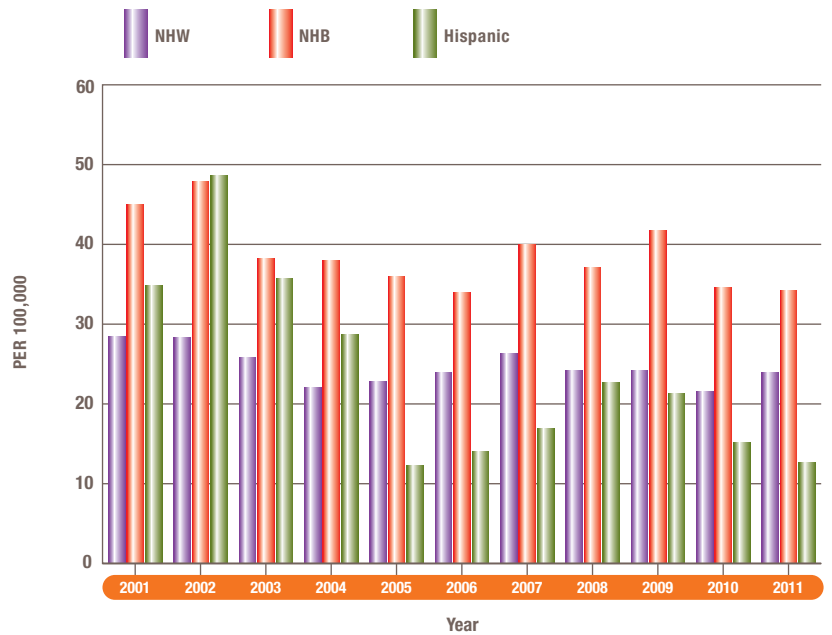
MELANOMA OF THE SKIN

Incidence

In 2011, 3,200 invasive cases of melanoma[21] were diagnosed in Pennsylvania, which places it among the ten most commonly diagnosed invasive cancers in Pennsylvania. Additionally, melanoma of the skin is one of the few common cancers for which incidence rates have been steadily rising, as shown in Figure 7-1 below. The only other cancer in this report showing growth in incidence is thyroid cancer. The presence of substantial quantities of melanin in the skin greatly mitigates the risk of developing melanoma; therefore, almost all cases develop in white males and females. The figures in this section depict categories for white males and white females only, unless otherwise indicated.

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21 (Melanoma of the skin incidence is defined using ICD-O-3 codes C440-C449, with the ICD-O-3 histologies 8720-8790. Melanoma of the skin mortality is defined as ICD-10 code C43.)

FIGURE 7-1

As is typical for cancers affecting both sexes, incidence rates are substantially higher for males than for females. In 2011, for example, the male melanoma incidence rate was 48.9 percent higher than the female melanoma rate. Most notable, however, is the fact that for both males and females, incidence has increased steadily since 2000. Incidence of melanoma has risen 48.0 percent for males and 57.1 percent for females across this time period.

Melanoma skin cancers, age-adjusted incidence rates by sex, Pennsylvania residents, 2000-2011
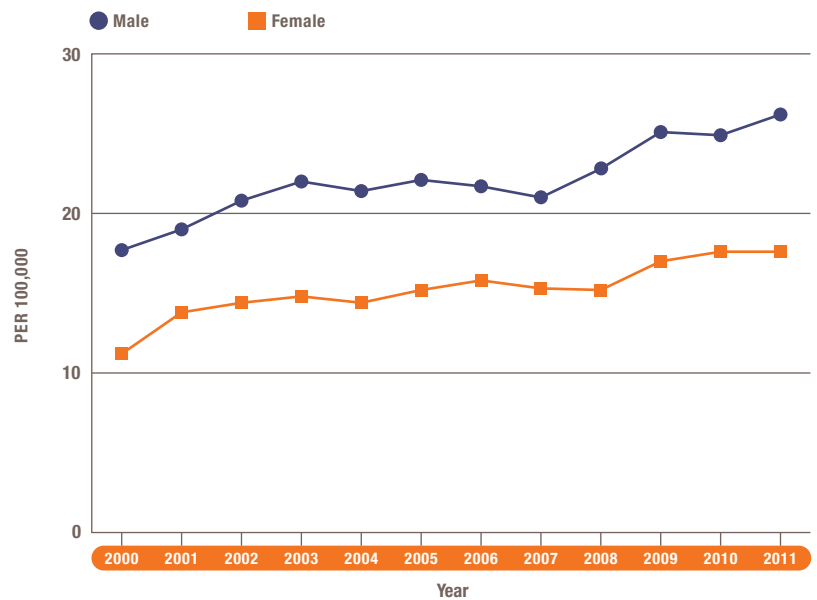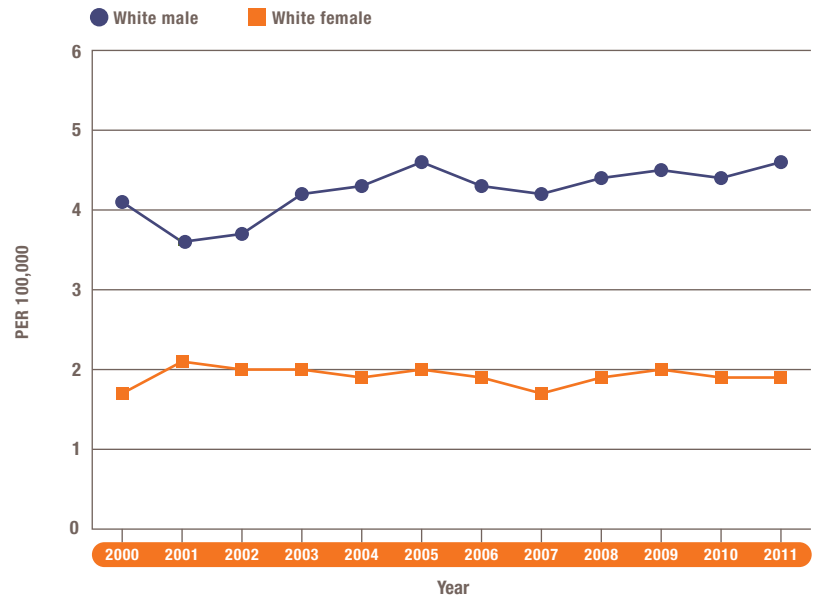

NOTES: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

Mortality

Melanoma of the skin is typically highly treatable when diagnosed at an early stage, and mortality rates relative to incidence rates are fairly low. Additionally, despite the increase in incidence since 2000, mortality rates have held relatively steady, as seen in Figure 7-2 below.

Melanoma skin cancer deaths, age-adjusted rates by sex and race, Pennsylvania residents, 2000-2011

NOTES: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

Age and Summary Data

Incidence and mortality rates for melanoma of the skin rise overall with age, as with many cancers. However, melanoma is unusual in that the incidence rate is high enough to be measurable below approximately thirty-five years of age. The three-year aggregate data for white males and females demonstrates the same disparities of incidence and mortality apparent in Figures 7-1 and 7-2.

Aside from the earlier onset, melanoma of the skin shows a typical cancer incidence and mortality growth pattern. Incidence peaks around age eighty and mortality levels off at that point as well. The mortality rate in general is much lower than the incidence rate, and increases rather slowly with age.

Melanoma skin cancers, age-specific incidence and death rates, Pennsylvania residents, 2009-2011
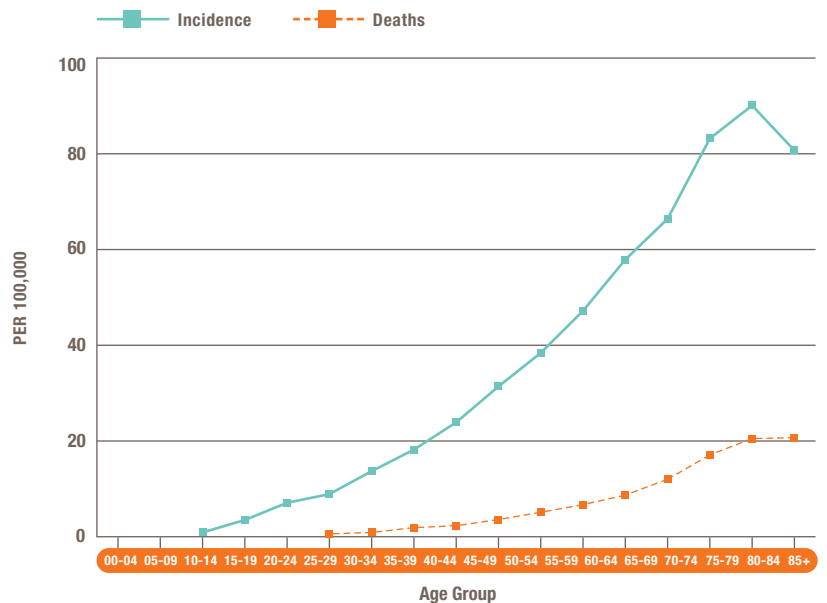
NOTES: Incidence rates are based on invasive cancers. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

The death rate among males appears to be more than double that of females. However, because the absolute mortality counts are so low, the true difference may be less.

### Melanoma skin cancers, age-adjusted incidence and death rates* by sex, Pennsylvania, 2009-2011
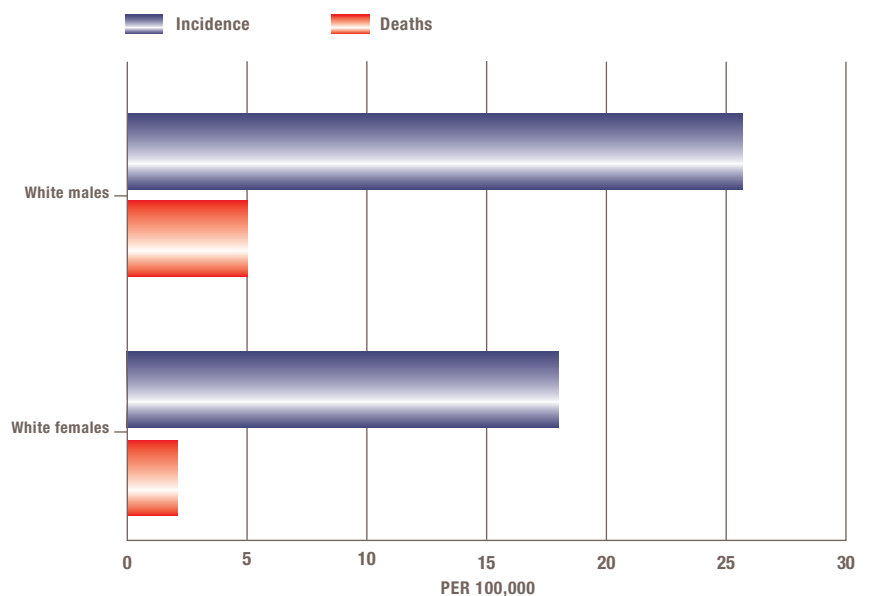
*Three-year average annual rates are per 100,000 and age-adjusted to the 2000 U.S.standard population.

FIGURE 7-5

For both white males and females, more than 80 percent of melanoma skin cancer is diagnosed in early stage.

Stage distribution of melanoma skin cancers at time of diagnosis by sex, Pennsylvania, 2009-2011*
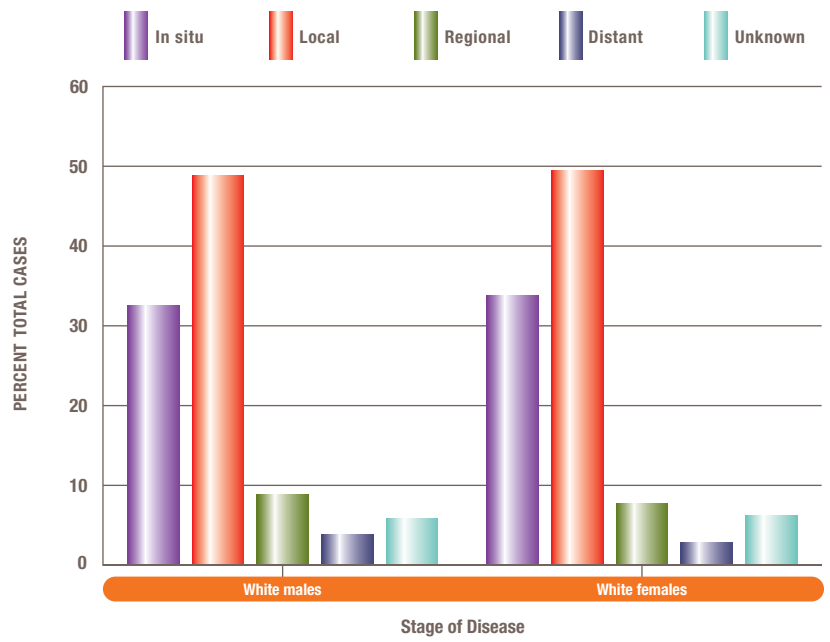
*Rates are three-year average annual percentages and based on SEER Summary Stage definitions.

Geographical Data

County level data for melanoma of the skin demonstrates some overall clustering of incidence rates significantly higher and lower than the Pennsylvania rate. Due to the very low absolute mortality counts, significance was unable to be determined for most counties in the mortality rate maps.

For male incidence, some clustering of significantly higher incidence rates occur in the Southcentral and Southeastern portions of the state, with significantly lower rates in the Northwest, Southwest, and Northeastern portions. Additionally, Pennsylvania's melanoma of the skin incidence rate for white males is lower than the US rate. Interestingly, and in contrast to almost all other cancers, Philadelphia has a significantly lower rate of melanoma incidence for both males and females. This likely reflects the racial makeup of the county.

Male melanoma of the skin cancer incidence, 2007-2011 Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2007–2011) **29.0**   Pa. Rate—(2007–2011) **24.0**
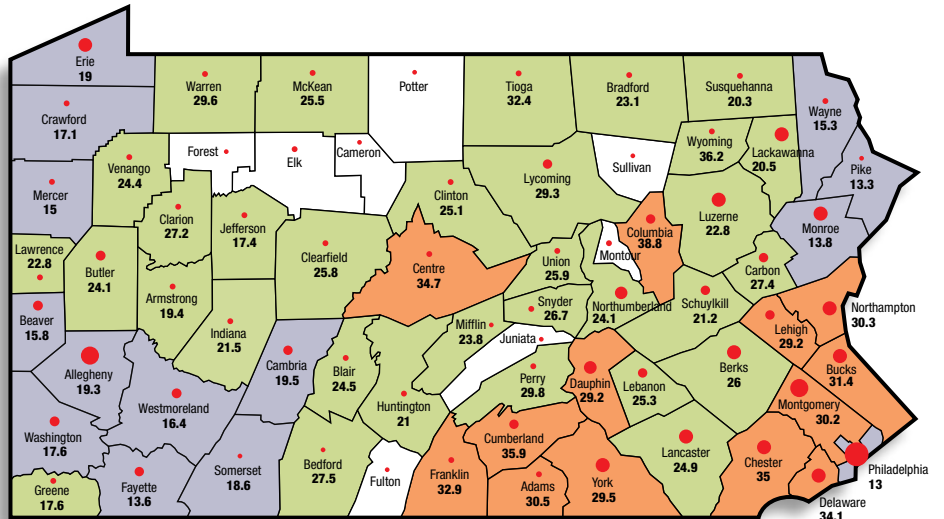
Significantly higher   Not significantly different   Significantly lower   Significance not determined – less than 20 observed cases

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of cases.
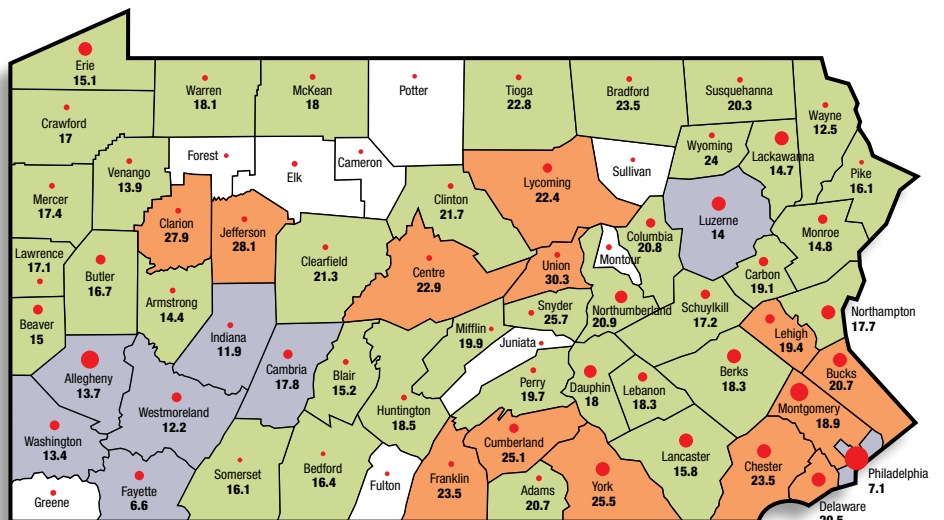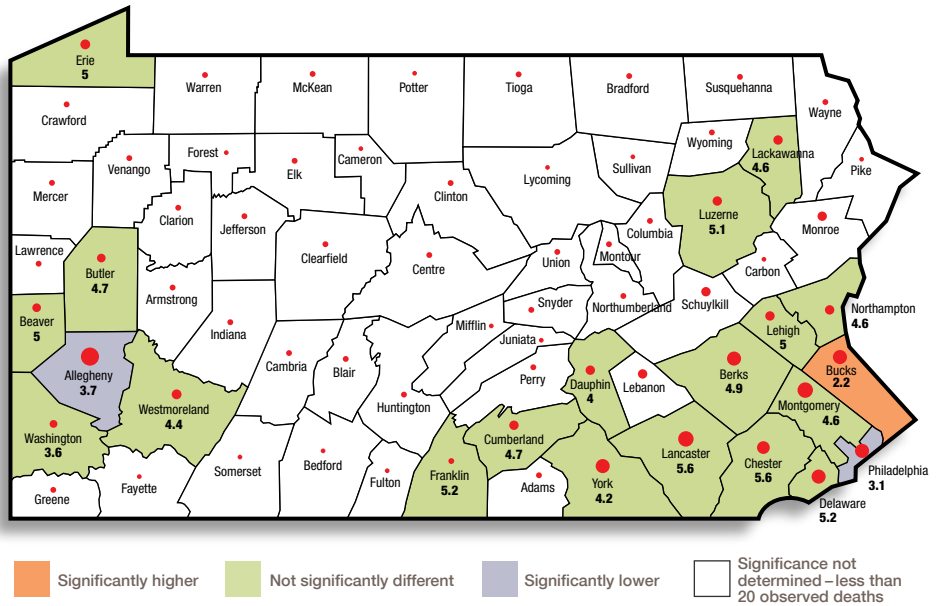Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

Similar to male melanoma cancer incidence, female melanoma incidence shows similar significantly higher rate clustering in Southcentral and Southeastern Pennsylvania. In addition, there appears to be a cluster of significantly higher incidence rates in Northcentral PA. In contrast to male incidence rates, only the Southwestern portion of the state shows a cluster of significantly lower rates.

Female melanoma of the skin cancer incidence, 2007-2011 Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2007–2011) **18.6**   Pa. Rate—(2007–2011) **16.5**

Significantly higher   Not significantly different   Significantly lower   Significantly not determined – less than 20 observed cases

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of cases.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

FIGURE 7-8

Because of the low mortality counts, it is difficult to infer much geographically about either male or female mortality for melanoma of the skin.

Male melanoma of the skin cancer deaths, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

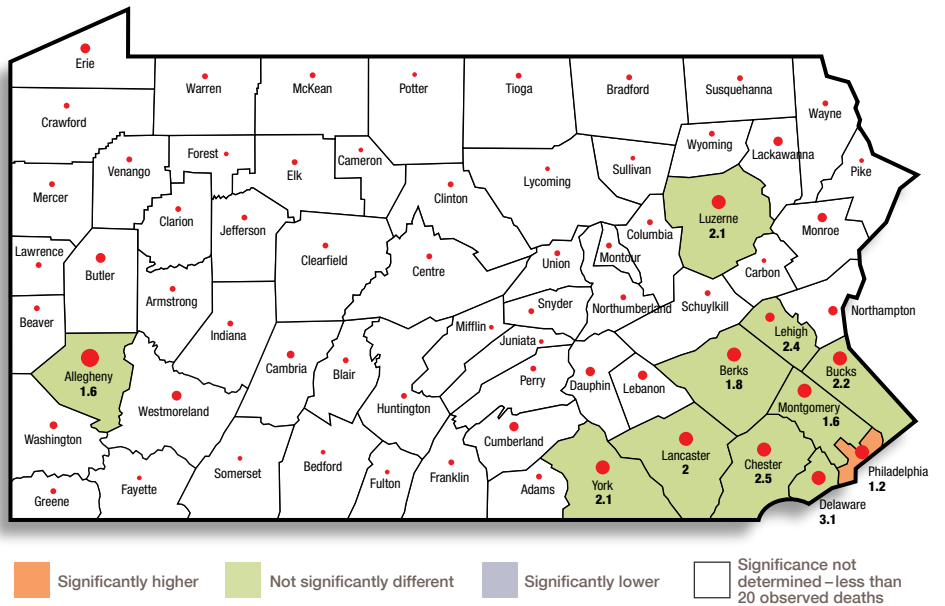U.S. Rate—(2006–2010) **4.1**   Pa. Rate—(2007–2011) **4.4**

| Significantly higher | Not significantly different | Significantly lower | Significance not determined – less than 20 observed deaths |

The symbol, ●, represents the number of cancer deaths. A larger circle indicates a larger amount of deaths.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

FIGURE 7-9

Pennsylvania and U.S. rates for melanoma mortality appear to be similar. Interestingly, Philadelphia County is lower than the state average, while neighboring Delaware County is higher than the state average. A majority of the state had less than 20 observed deaths from melanoma and its significance was not determined.

Female melanoma of the skin cancer deaths, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2006–2010) **1.7**   Pa. Rate—(2007–2011) **1.9**

| Significantly higher | Not significantly different | Significantly lower | Significance not determined – less than 20 observed deaths |

The symbol, ●, represents the number of cancer deaths. A larger circle indicates a larger amount of deaths.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

Hospitalization Data

There were 86 male and 56 female melanoma hospitalizations in 2011. The total number of melanoma hospitalizations decreased from 129 in 2001 to 86 in 2011 for males, a 33.3% decrease. The total number of melanoma hospitalizations for females decreased 41.7% from 96 in 2001 to 56 in 2011.

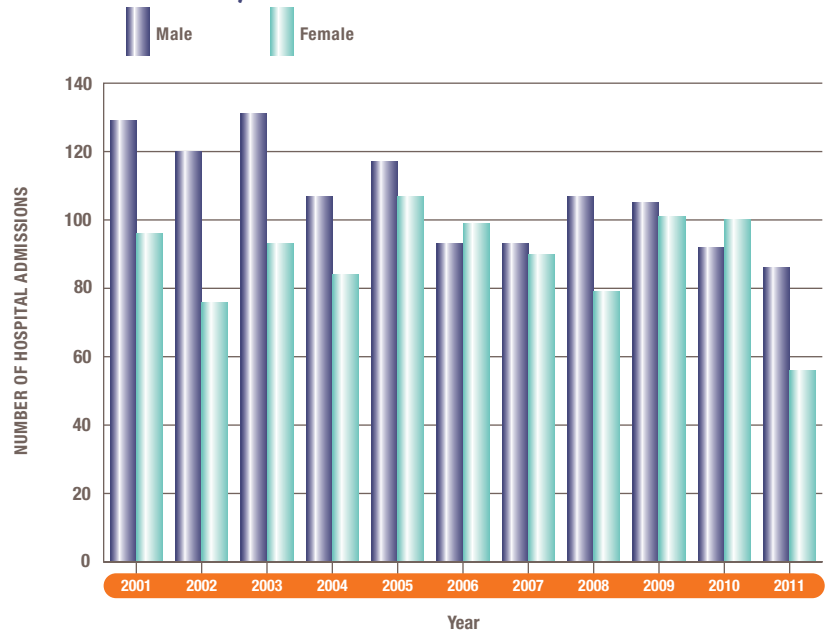### Hospital admissions for melanoma by sex in Pennsylvania, 2001-2011

Total hospitalization charges for melanoma from 2001 to 2011 were highest for Medicare followed by commercial insurance and Medicaid. The total charges to Medicare for melanoma in 2011 were $3.0 million, about 1.5 times of that to commercial insurance ($2.1 million) and about 4 times that to Medicaid ($0.7 million). The total hospitalization charges for melanoma in 2011 were about 50% higher than in 2001 ($2.1 million) for Medicare. Hospitalization charges to Medicaid increased 133.3% from 0.3 million in 2001 to 0.7 million in 2011 while charges to commercial insurance increased 16.7% from 1.8 million in 2001 to 2.1 million in 2011.

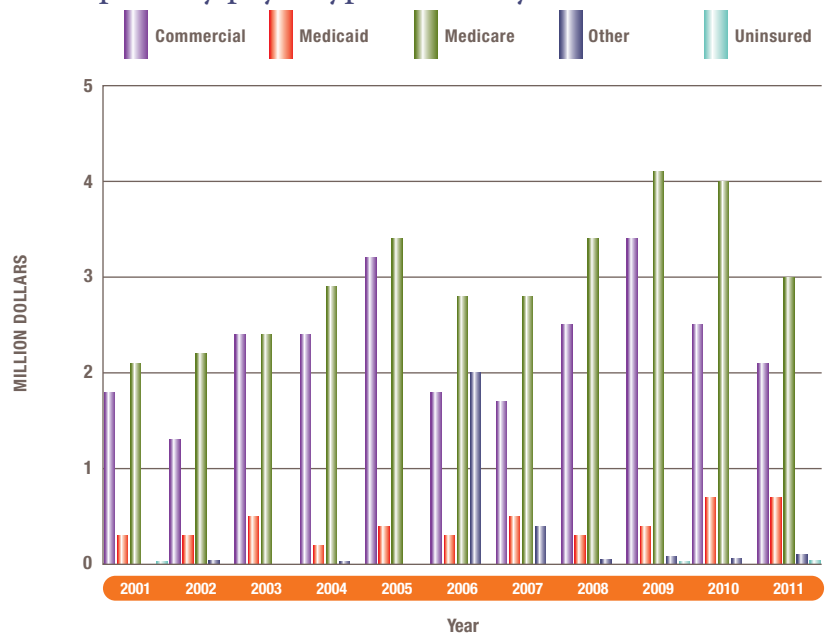### Hospitalization charges for melanoma by primary payer type in Pennsylvania, 2001-2011

FIGURE 7-12

Males had consistently higher melanoma hospitalization rates than females from 2001 to 2011. Both age-adjusted melanoma hospitalization rates for males and females decreased from 2001 to 2011. Age-adjusted melanoma hospitalization rates decreased from 2.1 per 100,000 in 2001 to 1.3 per 100,000 for males and from 1.2 per 100,000 in 2001 to 0.7 per 100,000 in 2011 for females.

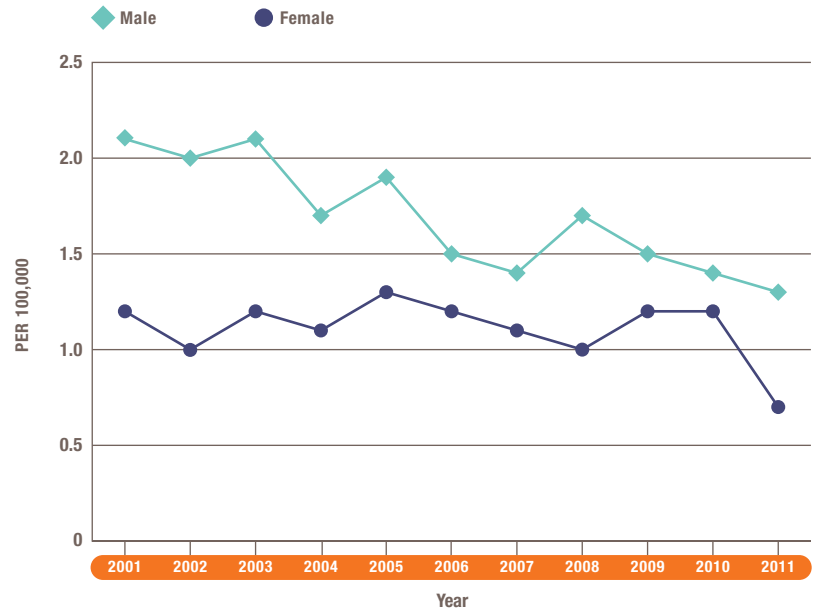## Age-adjusted melanoma hospitalization rate by sex in, Pennsylvania, 2001-2011


FIGURE 7-13

Non-Hispanic whites had higher age-adjusted melanoma hospitalization rates than non-Hispanic blacks from 2001 to 2011. The age-adjusted hospitalization rate decreased from 1.37 per 100,000 in 2001 to 1.01 per 100,000 in 2011 for non-Hispanic whites and from 0.32 per 100,000 in 2001 to 0.29 per 100,000 in 2011 for non-Hispanic blacks. Hispanic age-adjusted hospitalization rates were unstable due to small counts from 2001 to 2011.

Age-adjusted melanoma hospitalization rate by race/ethnicity in Pennsylvania, 2001-2011
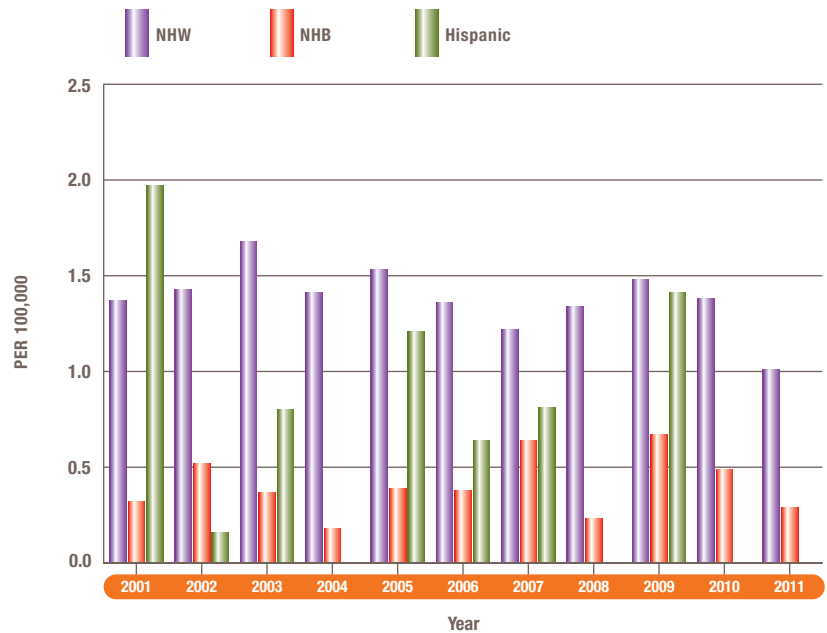
URINARY BLADDER CANCER

Incidence

Urinary bladder cancer[22] is the fifth most commonly diagnosed cancer in Pennsylvania. Because of some of the unique features of this cancer, incidence for bladder cancer includes newly diagnosed invasive and in situ cases. For all other cancers, incidence includes only invasive diagnoses. In 2011, 4,100 new cases were diagnosed. In addition to being a common cancer, urinary bladder cancer is also notable for its unusual racial incidence pattern. For almost all cancers, black males suffer from the highest incidence and mortality rates, often higher, by a large margin, than the other race and sex combinations. In marked contrast, the highest incidence rates for urinary bladder cancer are found among white males. In general, males have a larger than usual share of the urinary bladder cancer incidence.

22 (Urinary bladder cancer incidence is defined using ICD-O-3 codes C670-C679, excluding ICD-O-3 histologies 9590-9989. Urinary bladder cancer mortality is defined as ICD-10 code C67.)

FIGURE 8-1

As noted above, white males have the highest incidence rates for urinary bladder cancer. In 2011, the white male incidence rate was 78.7 percent higher than the black male rate. For all race/sex combinations, the net trend across the previous decade has been flat.

Urinary bladder cancers, age-adjusted incidence rates by sex and race, Pennsylvania residents, 2000-2011
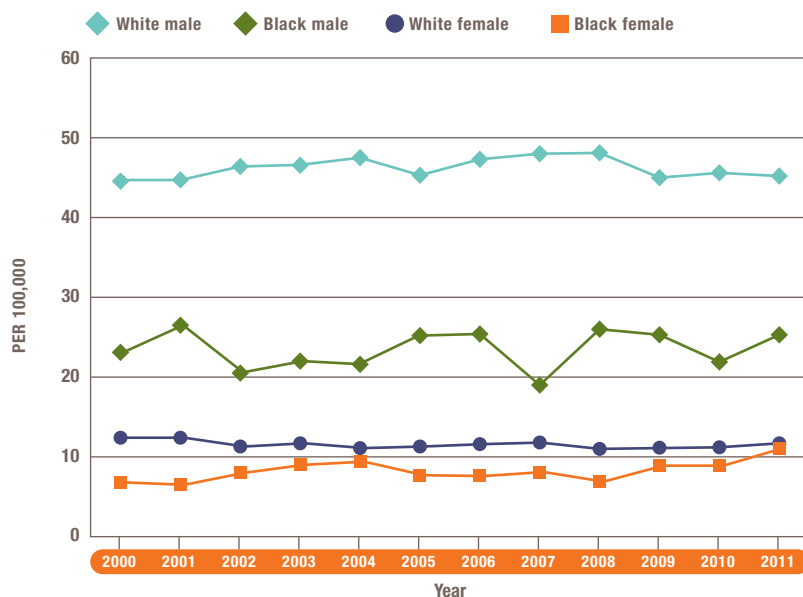
NOTES: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

Mortality

Though the absolute incidence counts for urinary bladder cancer are high, the absolute mortality counts for the cancer are fairly low. As expected, white males do have the highest mortality rate, as seen in Figure 8-2 below.

The black male mortality rate shows substantial variability, likely due to low mortality counts. It is interesting to note that in 2011, white male mortality was 39.0 percent higher than black male mortality, a substantially narrower gap than for incidence. This may suggest a disproportionately high mortality rate among black males. Due to the variability of the black male mortality rate, caution should be observed before making such an inference. Since 2000, the net trend for all race and sex combinations has held steady.

Urinary bladder cancer deaths, age-adjusted rates by sex and race, Pennsylvania residents, 2000-2011
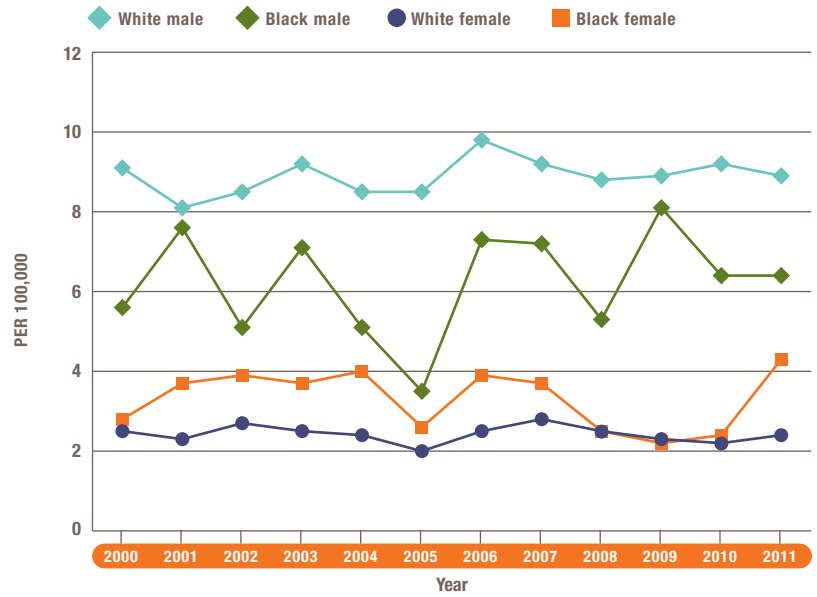
NOTES: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

Age and Summary Data

As is typical for cancer in general, urinary bladder cancer incidence rates and mortality rates increase with age. For urinary bladder cancer, mortality rates are fairly low and, even in advanced age, the mortality rate rise lags behind the incidence rate rise.

Urinary bladder cancer incidence rates begin to increase steeply around age fifty-five, rising rapidly and peaking around age eighty. Urinary bladder cancer mortality rates rise slowly, only beginning to increase rapidly around age seventy-five.

Urinary bladder cancers, age-specific incidence and death rates Pennsylvania residents, 2009-2011
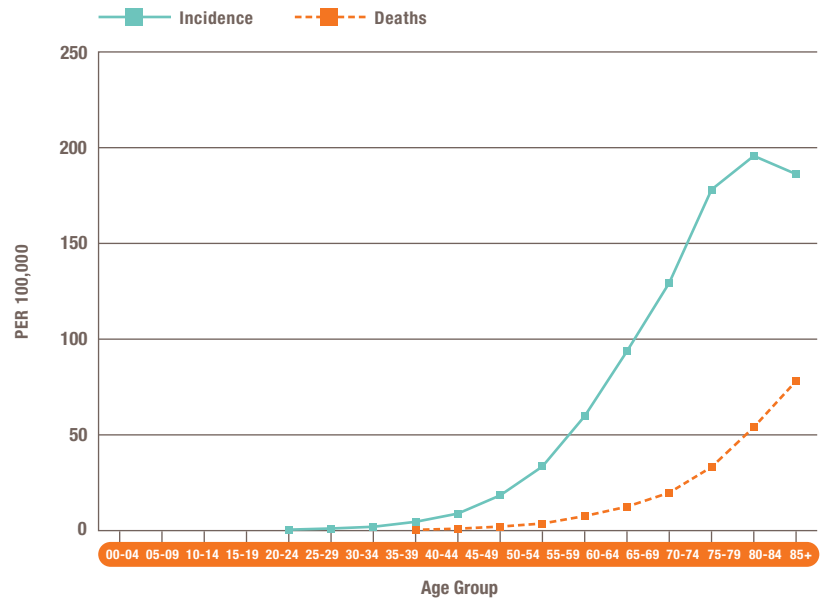

NOTES: Incidence rates are based on invasive cancers. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

The three year aggregate data necessarily includes higher mortality counts than single year data and as such can typically be considered more reliable. However, for urinary bladder cancer, even three year mortality data for groups other than white males is sparse. The data suggests much greater incidence and mortality rates in white males compared to those of black males.

Urinary bladder cancers, age-adjusted incidence and death rates* by sex and race/ethnicity, Pennsylvania, 2009-2011
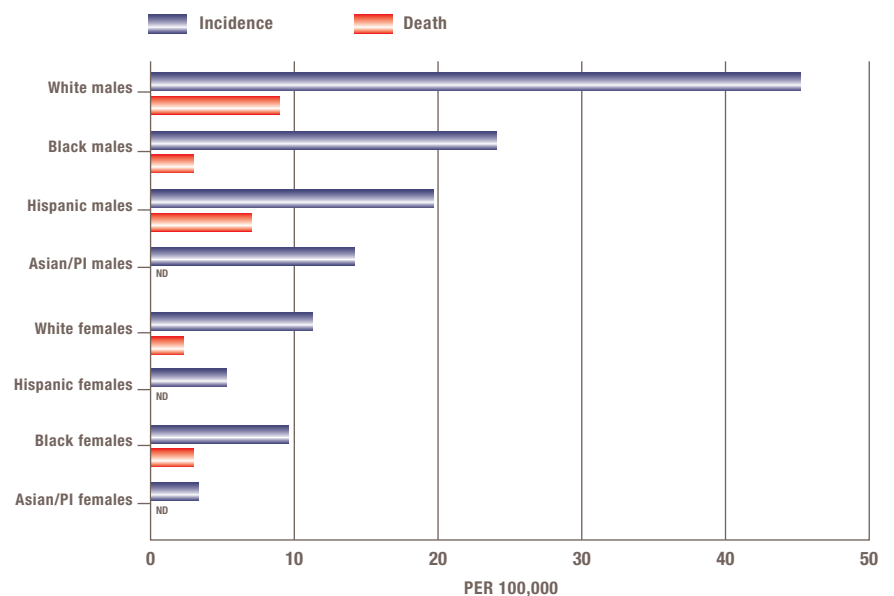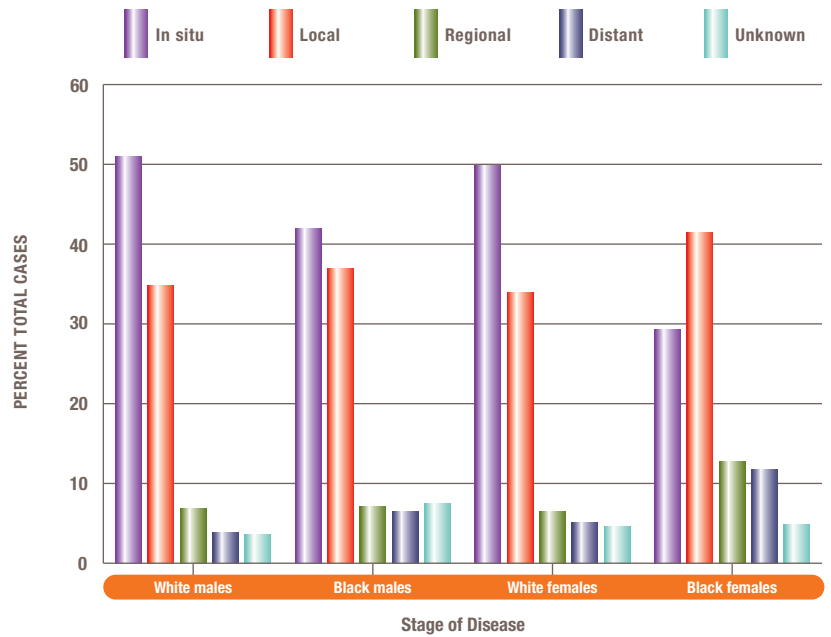

*Three-year average annual rates are per 100,000 and age-adjusted to the 2000 U.S.standard population.
Note: ND indicates the data percentages were not displayed due to low frequency counts <10.
Hispanics can be of any race.

FIGURE 8-5

For all race and sex groups, a large majority of all urinary bladder cancers are diagnosed in early stage. With the possible exception of black females, the stage distribution is consistent across the sex and race combinations.

Stage distribution of urinary bladder cancers at time of diagnosis by sex and race, Pennsylvania, 2009-2011*

*Rates are three-year average annual percentages and based on SEER Summary Stage definitions.

Geographical Data

Urinary bladder cancer is rare enough in females that the female incidence map contains numerous counties for which incidence rate significance could not be determined. Absolute mortality counts, even among males, are low enough that significance could not be determined for many counties on the mortality maps.

As with most other cancers covered in this report, the male and female Pennsylvania incidence rate is higher than the US rate. Urinary bladder cancer incidence rates for males are significantly higher than the Pennsylvania rate in Eastern and Southwestern Pennsylvania, while Southcentral Pennsylvania has the most counties with significantly lower incidence rates. Again, unusually, Philadelphia has a significantly lower incidence rate of urinary bladder cancer, possibly reflecting the local racial demographics.

Male urinary bladder cancer incidence, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2007–2011) **37.2**   Pa. Rate—(2007–2011) **44.7**
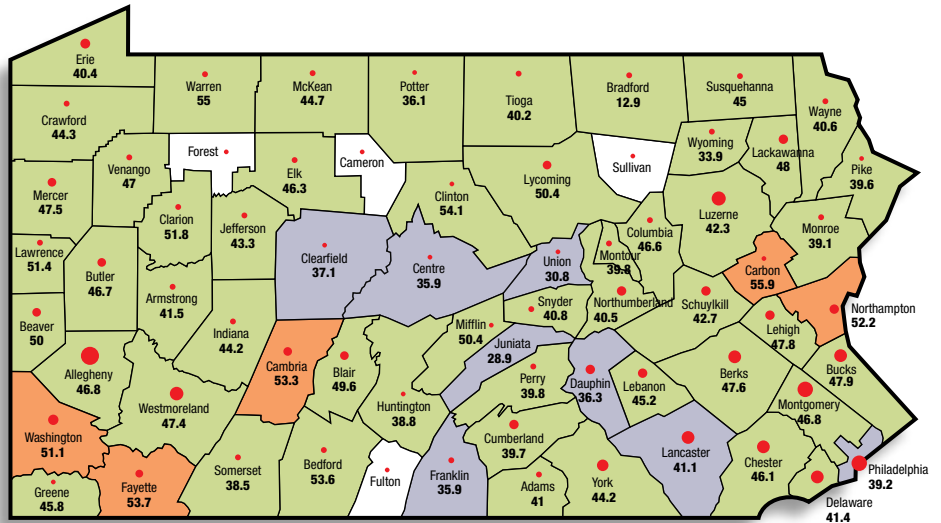
Significantly higher | Not significantly different | Significantly lower | Significance not determined—less than 20 observed deaths

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of cases.
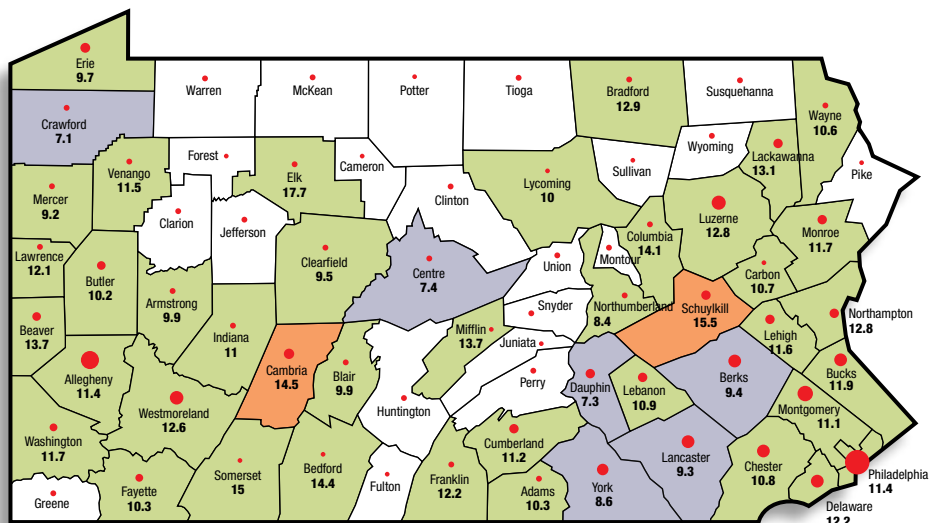Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

Little can be gleaned from the female urinary bladder cancer incidence map. As with males, the Southcentral portion of the state contains most of the counties showing significantly lower incidence rates, compared to the Pennsylvania rate.

Female urinary bladder cancer incidence, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2007–2011) **9.0**   Pa. Rate—(2007–2011) **11.1**

Significantly higher | Not significantly different | Significantly lower | Significance not determined—less than 20 observed cases

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of cases.
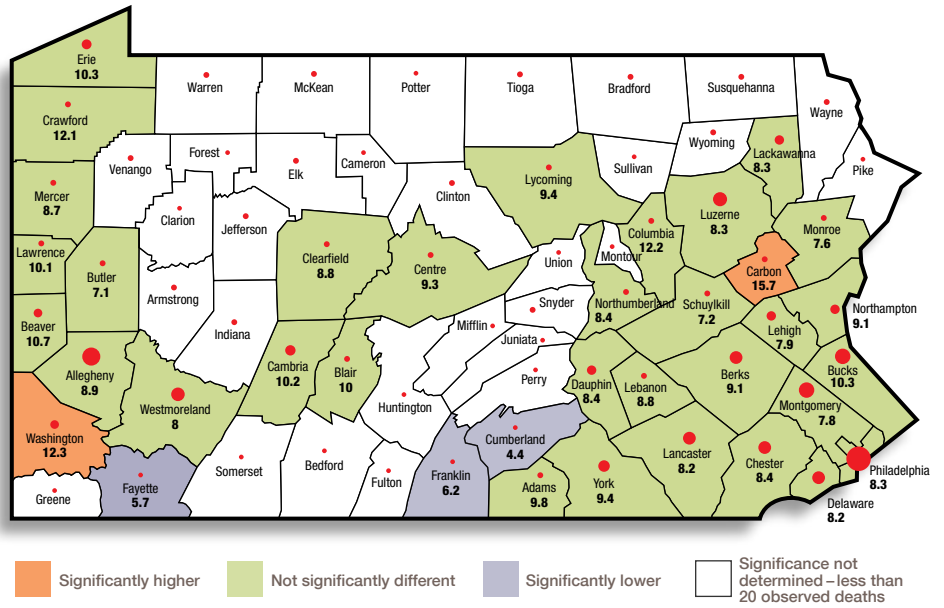Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

FIGURE 8-8

The Pennsylvania death rate is numerically larger than the US death rate, for male urinary bladder cancer. However, the absolute mortality counts are low, and the two rates are close. Therefore, it cannot be said with reasonable certainty that the true Pennsylvania death rate is higher than the US rate. No clear pattern emerges, though again, some significantly lower mortality rates appear in Southcentral Pennsylvania.

Male urinary bladder cancer deaths, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2006–2010) **7.7**   Pa. Rate—(2007–2011) **8.7**

The symbol, ●, represents the number of cancer deaths. A larger circle indicates a larger amount of deaths.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

FIGURE 8-9

Very little data can be depicted for female urinary bladder cancer deaths. It is interesting to note, that Philadelphia has a significantly higher female mortality rate than the state as a whole.

Female urinary bladder cancer deaths, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

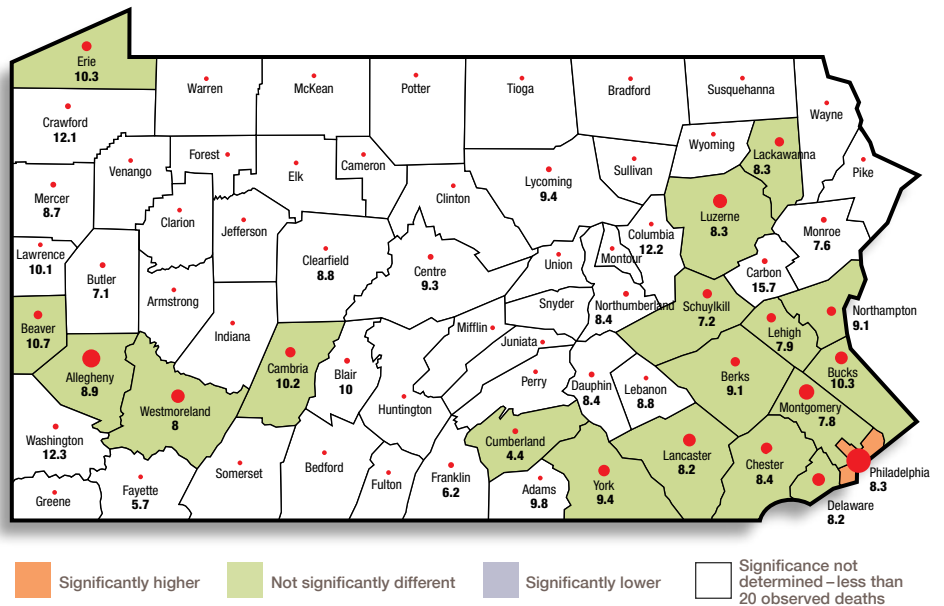U.S. Rate—(2006–2010) **2.2**   Pa. Rate—(2007–2011) **2.4**

The symbol, ●, represents the number of cancer deaths. A larger circle indicates a larger amount of cases.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

Hospitalization Data

FIGURE 8-10

There were 1,413 male and 455 female urinary bladder cancer hospitalizations in 2011. The number of urinary bladder cancer hospitalizations in Pennsylvania decreased 22.2% for males from 1,818 in 2001 to 1,413 in 2013 and 29.7% for females from 647 in 2001 to 455 in 2011.

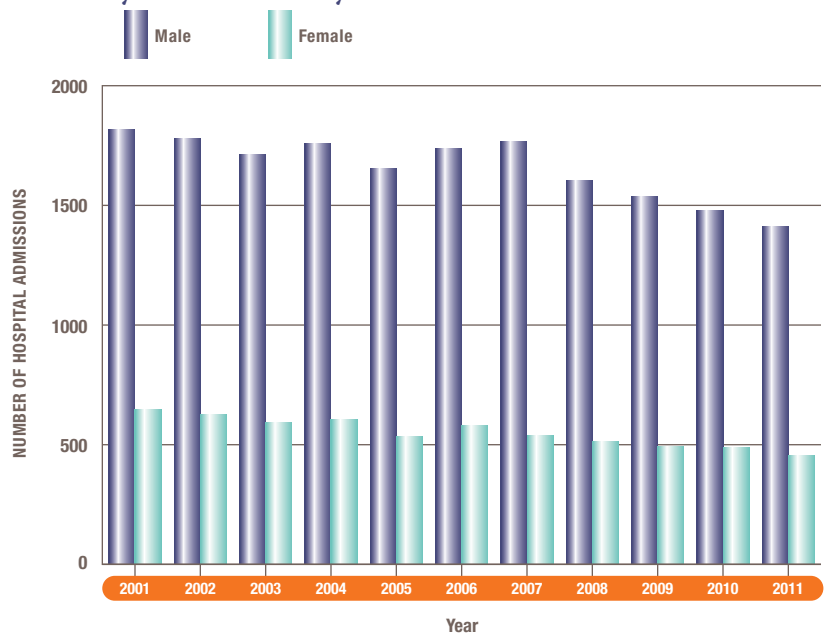## Hospital admissions for urinary bladder cancer by sex in Pennsylvania, 2001-2011

FIGURE 8-11

The total hospitalization charges for urinary bladder cancer reached $84.2 million for Medicare in 2011, almost a 100% increase compared to 2001 ($42.2 million). The total hospitalization charges for urinary bladder cancer reached 8.2 million for Medicaid in 2011, about a 187% increase compared to 2001 ($2.9 million). The total charges to commercial insurance payers increased 78% from $14.0 million in 2001 to $24.6 million in 2011. Charges to Medicare were the highest over the years from 2001 to 2011, more than twice the charges to commercial payers.

Hospitalization charges for urinary bladder cancer by primary payer type in Pennsylvania, 2001-2011
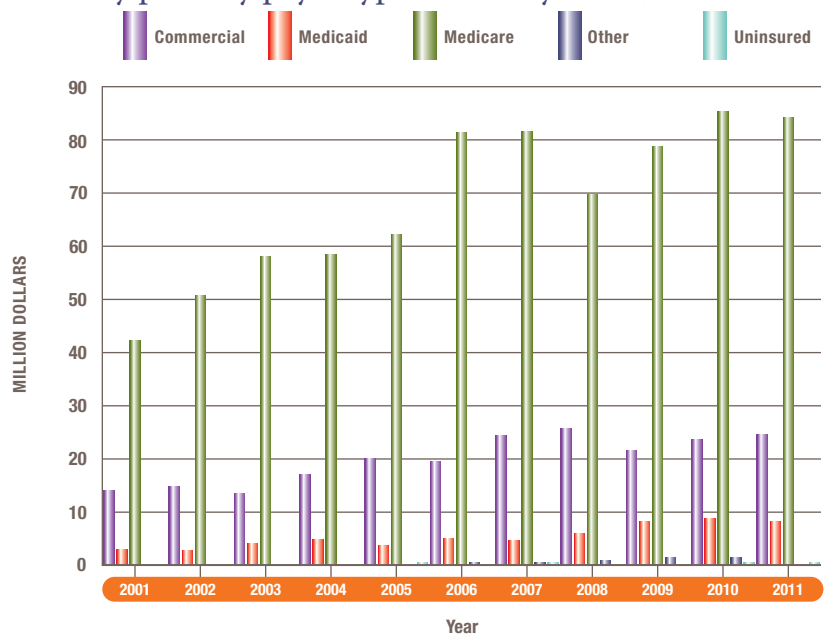
FIGURE 8-12

Age-adjusted urinary bladder cancer hospitalization rate for males were 4 times higher than the rates for females from 2001 to 2011. Age-adjusted urinary bladder cancer hospitalization rates decreased from 2001 to 2011 for both males and females.

Age-adjusted urinary bladder cancer hospitalization rate by sex in Pennsylvania, 2001-2011
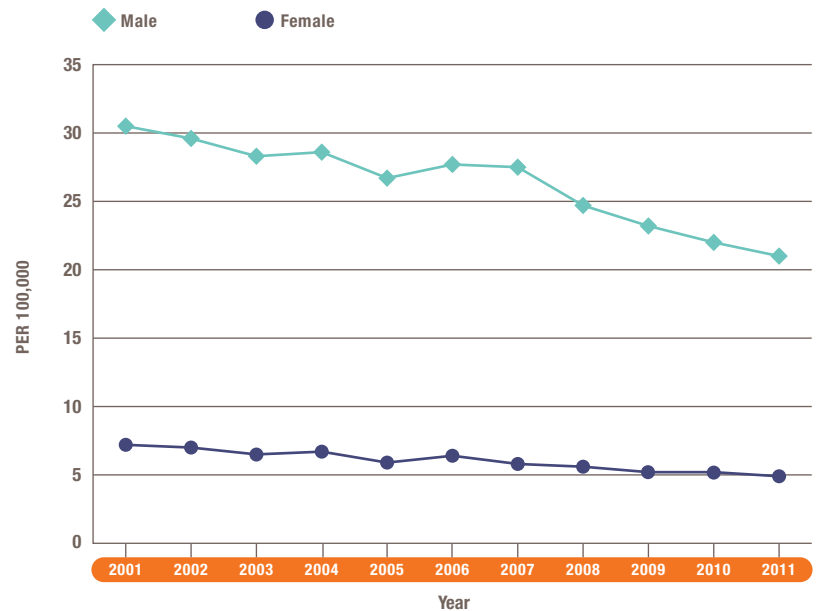
FIGURE 8-13

Non-Hispanic white and non-Hispanic blacks had much higher age-adjusted urinary bladder cancer hospitalization rates than the rate for Hispanics from 2001 to 2011. The age-adjusted rate for non-Hispanic whites and non-Hispanic blacks increased from 2001 to 2011 while the age-adjusted hospitalization rate for Hispanics decreased from 2001 to 2011.

Age-adjusted urinary bladder cancer hospitalization rate by race/ethnicity in Pennsylvania, 2001-2011
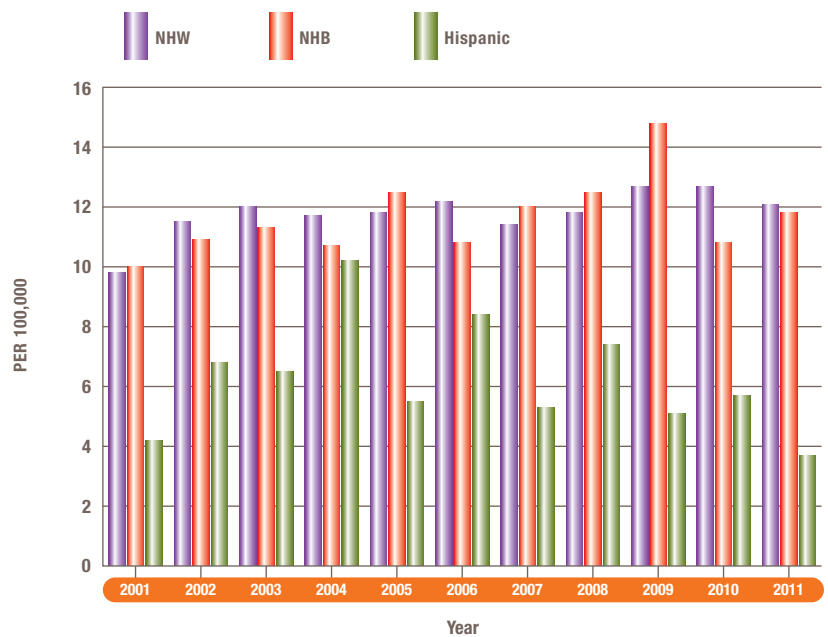
THYROID CANCER

Incidence

Thyroid cancer[23] is a relatively common cancer, with 2,800 new invasive cases diagnosed in 2011. It also presents a very unusual and atypical burden for many reasons. Almost none of the typical cancer patterns of incidence and mortality hold for thyroid cancer. In contrast to all other non-female specific cancers,[24] incidence rates for females are substantially higher than male incidence rates. Furthermore, white females have a higher incidence rate than black females, another oddity. Finally, in marked contrast to all other cancers covered in this report, other than melanoma of the skin, incidence rate has risen rather sharply over the past decade for females.

23 (Thyroid cancer incidence is defined using ICD-O-3 codes C739, excluding ICD-O-3 histologies 9590-9989. Thyroid cancer mortality is defined as ICD-10 code C73.)

24 (Excepting breast cancer – breast cancer is technically not female specific. Males can develop breast cancer, though this is rare.)

FIGURE 9-1

The 2011 incidence rates for black and white females, respectively, are 110.6 percent and 99.2 percent higher than the 2000 rates. Male incidence rates are low and have held steady or increased slightly since 2000. Unusually, white male incidence rates are slightly higher than black male incidence rates.

Thyroid cancers, age-adjusted incidence rates by sex and race, Pennsylvania residents, 2000-2011
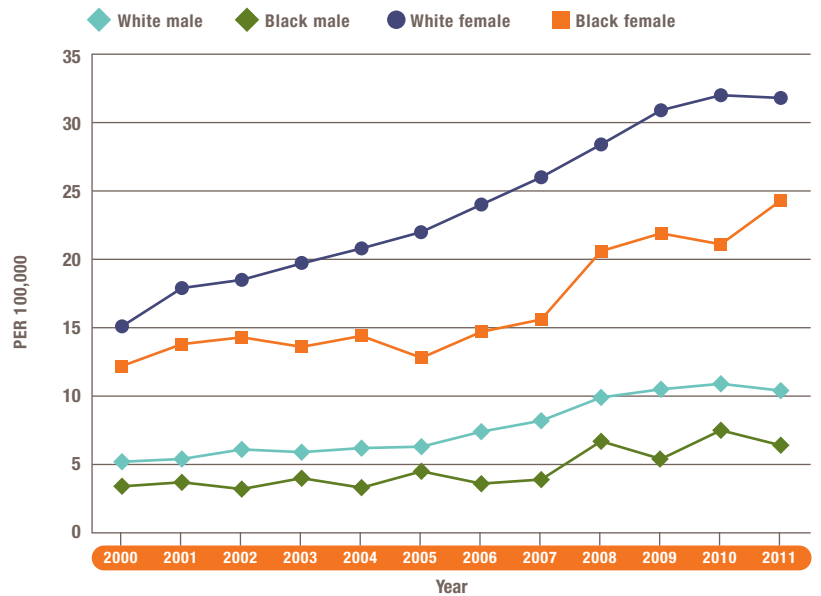
NOTES: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

Mortality

Despite thyroid cancer being a relatively common cancer, mortality rates are extremely low. In 2011, only 77 people in Pennsylvania died of thyroid cancer. The mortality rates for thyroid cancer are so low, that it is difficult to make any inferences from the mortality data. Insufficient data exists to depict mortality rates over time for any race/ethnicity and sex combinations other than white males and females.

FIGURE 9-2

It appears the mortality rate of thyroid cancer for white males and females is fairly similar, and that not much change has occurred in mortality rates for whites of either sex across the past decade.

Thyroid cancer deaths, age-adjusted rates by sex and race, Pennsylvania residents, 2000-2011
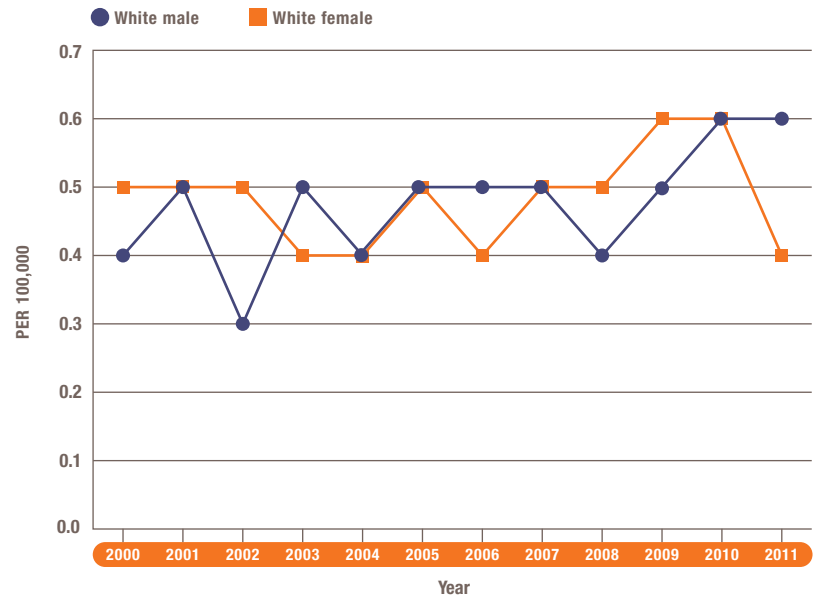
NOTES: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program. *Insufficient data for black males and females.

Age and Summary Data

Due to the low mortality counts, even three year aggregate data does not reveal much in regard to mortality disparities, though it does support the trend line data showing a large incidence disparity between females and males of all races. Though the racial breakout by sex has limited data to report, it appears white males and white females have the highest incidence rates of all racial and ethnic groups as seen in Figure 9-4. The incidence rate distribution across age groups is also highly unusual.

Thyroid incidence age group distribution shows measurable incidence rates for individuals as young as ten, which is atypical for cancer. The incidence rate rises steadily until approximately age forty-five, at which point it stays relatively steady until approximately age seventy, when incidence declines steeply. Mortality rates are not measurably high for individuals under age fifty, after which rates rise slowly, peaking in the highest age groups.

Thyroid cancers, age-specific incidence and death rates, Pennsylvania residents, 2009-2011
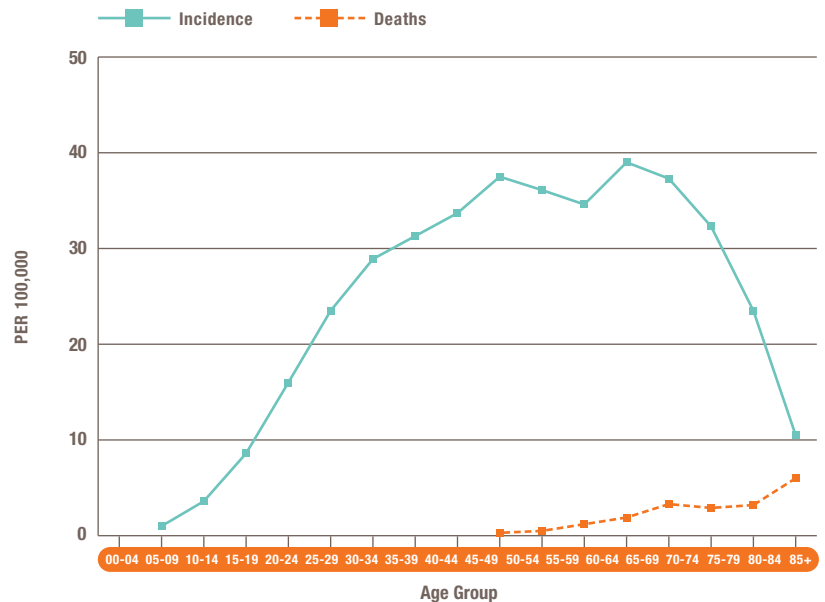
NOTES: Incidence rates are based on invasive cancers. Rates based on less than 10 events are considered statistically unreliable and are not displayed. Cancer primary site/type groupings follow the definitions used by the National Cancer Institute's SEER program.

Thyroid cancers, age-adjusted incidence and death rates* by sex and race/ethnicity, Pennsylvania, 2009-2011

*Three-year average annual rates are per 100,000 and age-adjusted to the 2000 U.S.standard population.
Note: ND indicates the data were not displayed due to low frequency counts <10.
Hispanics can be of any race.

FIGURE 9-5

Most thyroid cancers are diagnosed in early stage, as high as 84.8 percent for black females. White males may have a disproportionately high late stage diagnosis rate, though the paucity of data makes that difficult to infer.

Stage distribution of thyroid cancers at time of diagnosis by sex and race, Pennsylvania, 2009-2011*
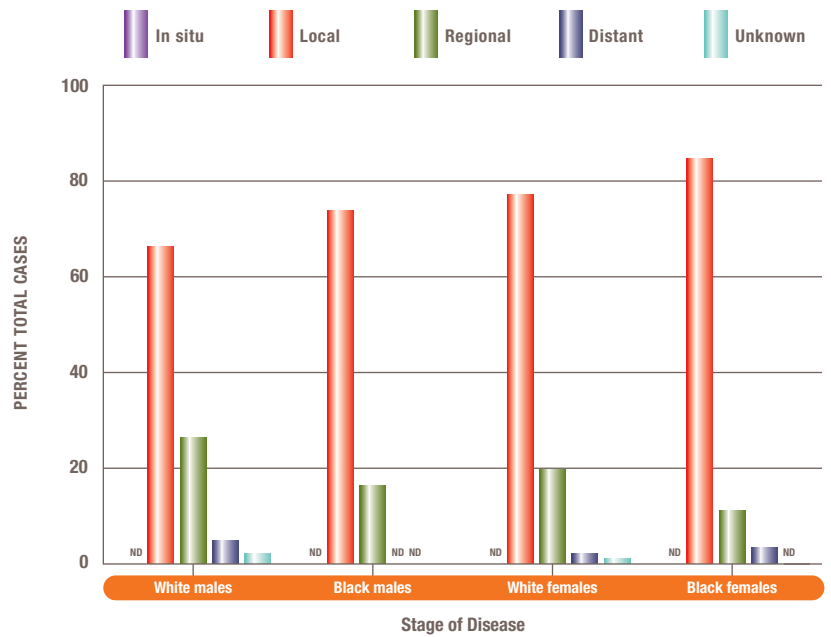
*Rates are three-year average annual percentages and based on SEER Summary Stage definitions.
Note: ND indicates the data were not displayed due to low frequency counts <10.

Geographical Data

The one area in which thyroid cancer appears to comply with the typical trend of the cancers explored in this report is that the incidence rates for males and females in Pennsylvania is higher than the US rates. Some geographical patterns emerge for male and female incidence at the county level, but mortality is so low the mortality maps are almost devoid of usable data.

For males, the west central portion of the state contains three of the four counties with a significantly higher incidence rate than the PA rate. Philadelphia shows a significantly lower incidence rate, which again possibly reflects local demographics.

Male thyroid cancer incidence, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2007–2011) **6.7**   Pa. Rate—(2007–2011) **9.6**
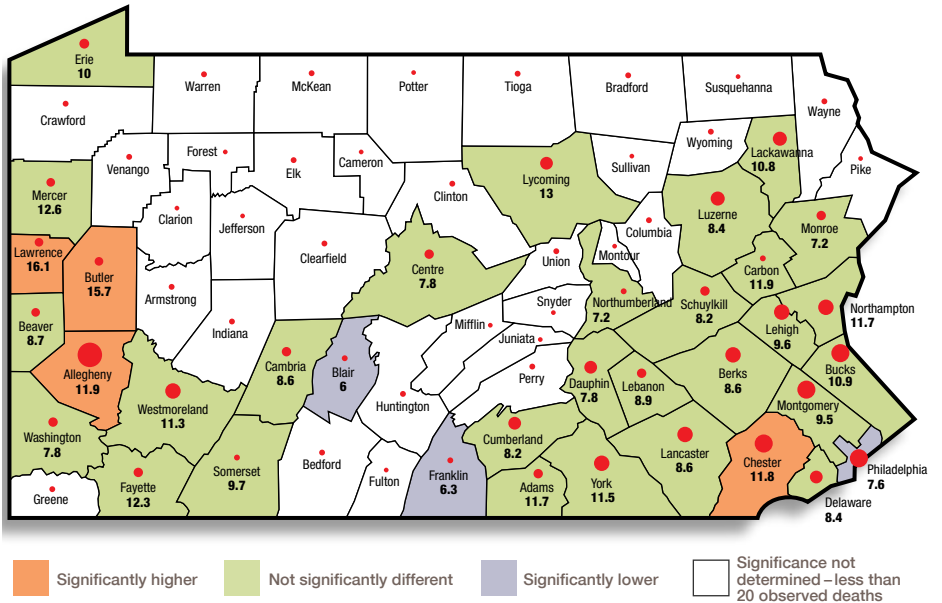
The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of cases.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

FIGURE 9-7

More data is available for the female thyroid cancer incidence map. Clusters of counties with significantly higher incidence rates for females occur in West Central and Northeastern portions of the state. A cluster of counties with significantly lower incidence rates occurs in Southcentral Pennsylvania.

Female thyroid cancer incidence, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

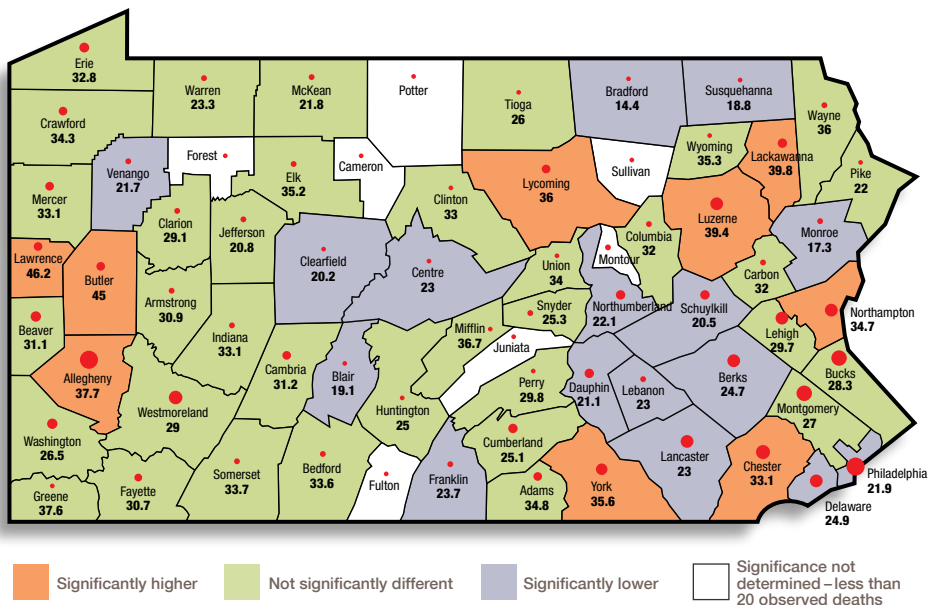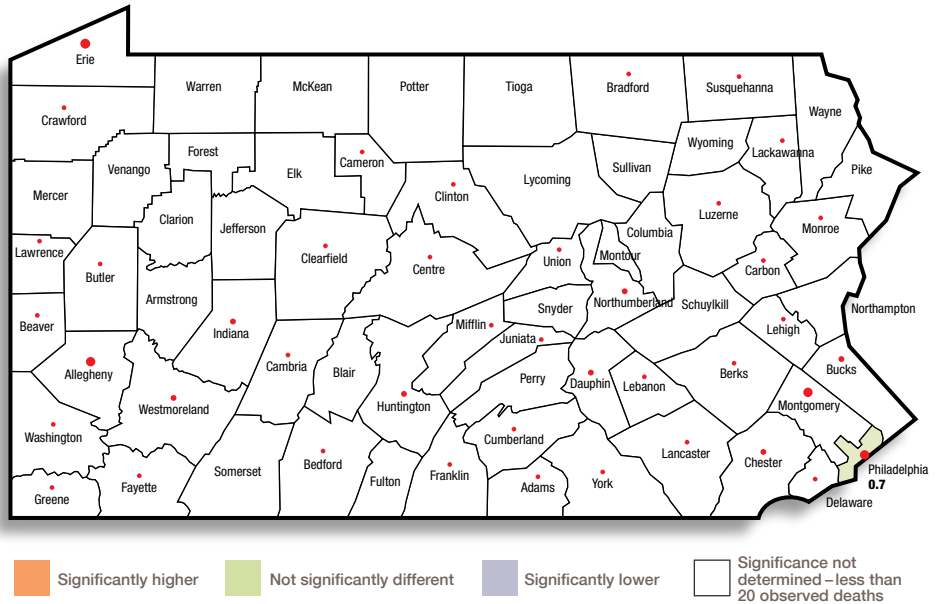U.S. Rate—(2007–2011) **20.5**   Pa. Rate—(2007–2011) **28.8**

The symbol, ●, represents the number of invasive cancers. A larger circle indicates a larger amount of cases.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

FIGURE 9-8

The only county in Pennsylvania with enough male deaths to calculate significance was Philadelphia, which appears to not have a significantly different death rate than the state as a whole. Mortality rate for males in Pennsylvania appears to be similar to the US rate.

Male thyroid cancer deaths, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2006–2010) **0.5**   Pa. Rate—(2007–2011) **0.5**

| | Significantly higher | | Not significantly different | | Significantly lower | | Significance not determined – less than 20 observed deaths |

The symbol, ●, represents the number of cancer deaths. A larger circle indicates a larger amount of deaths.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

FIGURE 9-9

Even for female thyroid death cancer rates, the only county with enough deaths to calculate significance was again Philadelphia, which does not appear to differ significantly from the state as a whole in mortality rate. Female thyroid mortality in Pennsylvania also appears to be similar to the US mortality rate.

Female thyroid cancer deaths, 2007-2011
Significant differences between Pennsylvania county and state age-adjusted rates

U.S. Rate—(2006–2010) **0.5**   Pa. Rate—(2007–2011) **0.5**

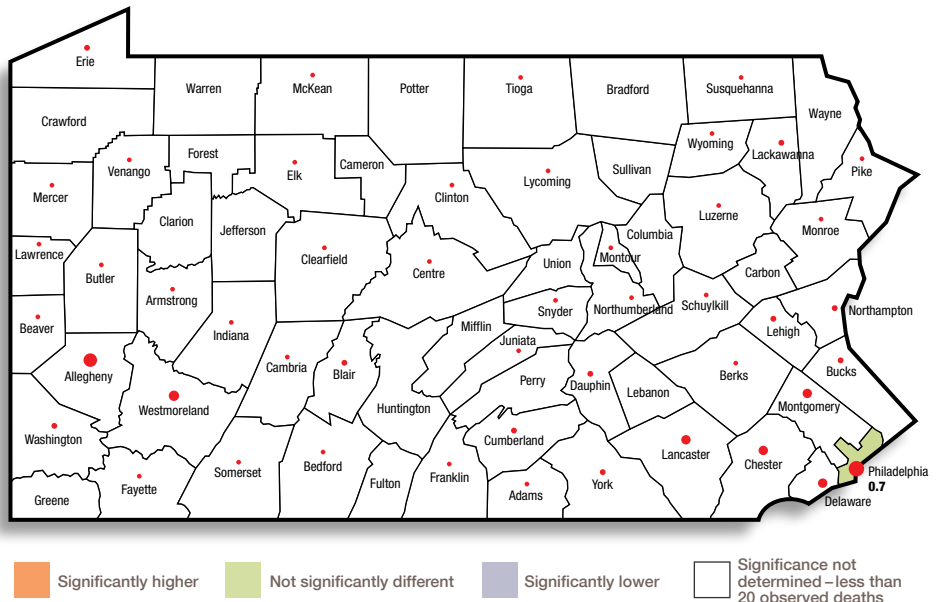| | Significantly higher | | Not significantly different | | Significantly lower | | Significance not determined – less than 20 observed deaths |

The symbol, ●, represents the number of cancer deaths. A larger circle indicates a larger amount of deaths.
Note: Age-adjusted rates are per 100,000 and computed by the direct method using the 2000 U.S. standard million population. Rates based on less than 20 events are considered statistically unreliable.

Hospitalization Data

FIGURE 9-10

There were 454 male and 1,164 female thyroid cancer hospitalizations in 2011. Females had approximately three times the thyroid cancer hospitalizations than males from 2001 to 20011. The total number of female thyroid cancer hospitalizations increased from 1,138 in 2001 to 1,229 in 2009 then decreased from 2009 to 2011. The total number of thyroid cancer hospitalizations for males increased 34.3 percent from 338 in 2001 to 454 in 2011.

Hospital Admissions for Thyroid Cancer by Sex in Pennsylvania, 2001-2011
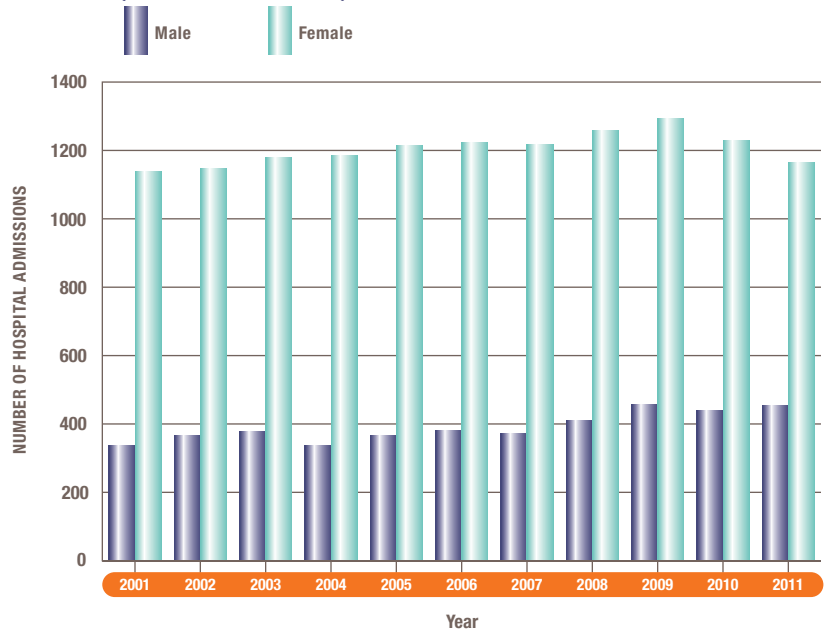
FIGURE 9-11

Total hospitalization charges for thyroid cancer to commercial insurance were the highest from 2001 to 2011 followed Medicare and Medicaid. The total charges to Medicare for thyroid cancer in 2011 were $18.3 million, about 3 times of the total charges in 2001 ($66 million). The total hospitalization charges for thyroid cancer to Medicaid also increased 3 times from $1.8 million in 2001 to $6.5 million in 2011.

Hospitalization charges for thyroid cancer by primary payer type in Pennsylvania, 2001-2011
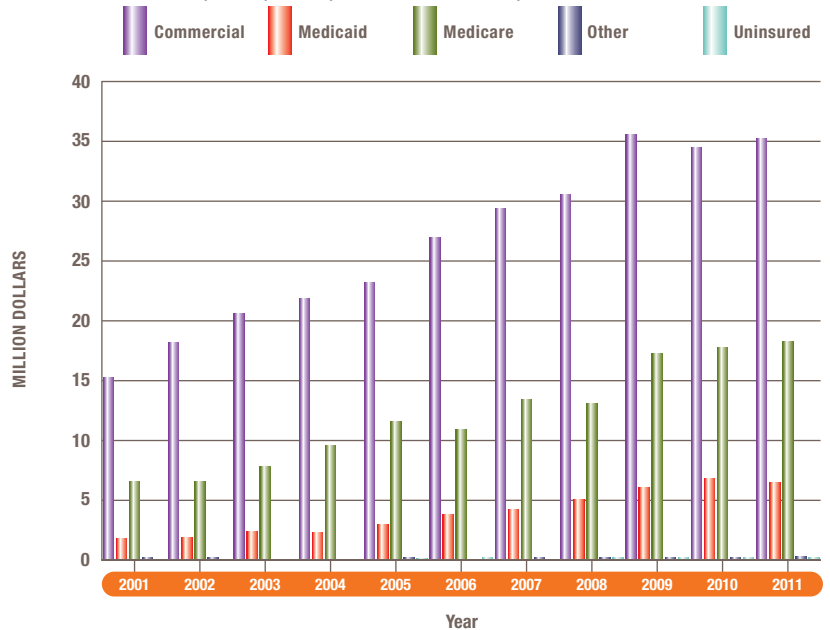
FIGURE 9-12

Age-adjusted thyroid cancer hospitalization rates for females were consistently about 3 times higher than the rates for males from 2001 to 2011. Age-adjusted thyroid cancer hospitalization rates increased from 5.5 per 100,000 in 2001 to 6.5 per 100,000 in 2011 for females while male thyroid cancer age-adjusted hospitalization rates stayed the same in 2001 and in 2011.

Age-adjusted thyroid cancer hospitalization rate by sex in, Pennsylvania, 2001-2011
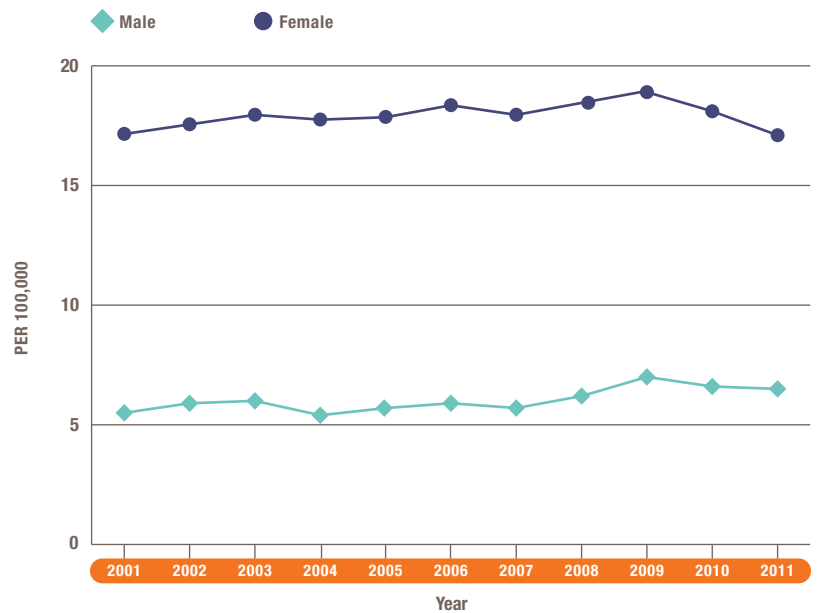
FIGURE 9-13

Non-Hispanic whites had the highest age-adjusted thyroid cancer hospitalization rate in 2011 (12.14 per 100,000) followed by non-Hispanic blacks (11.84 per 100,000) and Hispanics (3.67 per 100,000). The age-adjusted hospitalization rate increased from 2001 to 2011 for non-Hispanic whites and non-Hispanic blacks but not for Hispanics. The Hispanic age-adjusted hospitalization rate decreased 12.2 percent from 4.18 per 100,000 in 2001 to 3.67 per 100,000 in 2011 while age-adjusted rates for non-Hispanic whites and non-Hispanic blacks increased 24.5 percent and 18.2 percent, respectively.

Age-adjusted thyroid cancer hospitalization rate by race/ethnicity in Pennsylvania, 2001-2011
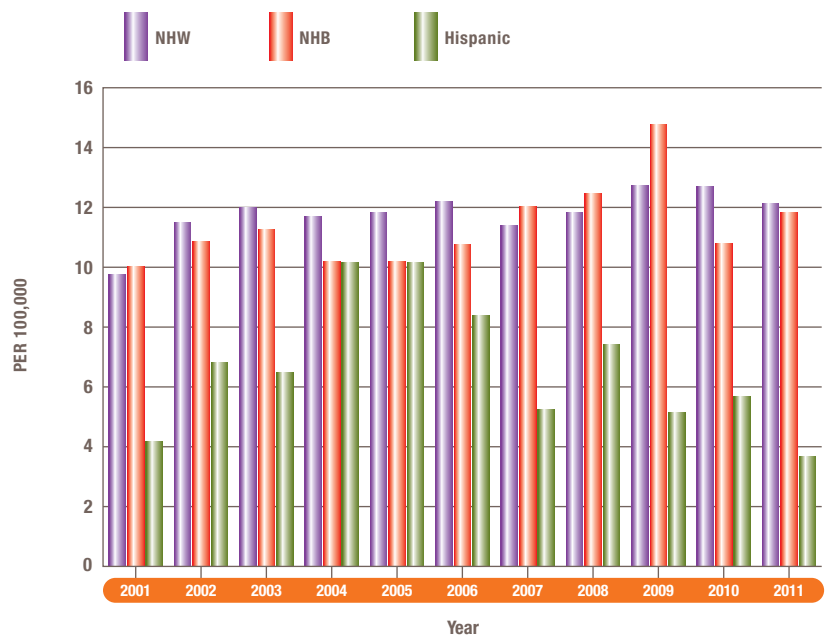
APPENDIX

Table 1. Population by Race and Ethnicity, Pennsylvania, 2000 and 2010[25]

	2000				2010			
	White	Black	Asian/ Pacific Islander	Hispanic	White	Black	Asian/ Pacific Islander	Hispanic
Pennsylvania	10,484,203	1,224,612	223,230	394,088	10,406,288	1,377,689	352,741	719,660
Adams*	87,088	1,105	469	3,323	94,979	1,561	766	6,115
Allegheny	1,080,800	159,058	22,051	11,166	997,295	161,861	34,368	19,070
Armstrong*	71,173	592	102	308	67,565	553	159	366
Beaver	167,890	10,811	482	1,315	155,561	10,676	764	1,998
Bedford*	49,253	178	150	263	48,782	238	115	450
Berks	329,460	13,778	3,862	36,357	342,148	20,143	5,513	67,355
Blair*	126,059	1,535	482	662	122,238	2,129	735	1,230
Bradford*	61,471	251	289	398	61,035	311	346	702
Bucks	552,588	19,495	13,791	14,005	557,647	22,376	24,182	26,782
Butler*	170,302	1,367	1,032	1,016	177,605	2,021	1,888	1,941
Cambria*	146,183	4,322	610	1,352	135,206	5,222	758	2,006
Cameron*	5,904	21	10	34	5,000	13	14	19
Carbon*	57,520	353	203	858	62,519	976	338	2,145
Centre*	124,134	3,544	5,467	2,243	137,625	4,638	8,034	3,690
Chester	386,745	27,040	8,608	16,126	426,707	30,623	19,457	32,503
Clarion*	40,998	329	144	172	38,873	484	199	245
Clearfield*	81,218	1,239	230	471	77,912	1,862	405	1,907
Clinton*	37,264	197	160	205	37,860	625	215	437
Columbia*	62,602	516	355	609	64,227	1,246	578	1,349
Crawford*	87,653	1,437	277	537	85,448	1,547	422	823
Cumberland	201,716	5,048	3,655	2,883	213,934	7,527	7,137	6,448
Dauphin	194,158	42,580	5,013	10,404	194,910	48,386	8,658	18,795
Delaware	442,449	79,981	18,203	8,368	405,233	110,260	26,422	16,537
Elk*	34,746	52	137	142	31,469	89	102	183
Erie	255,282	17,202	1,990	6,126	247,569	20,155	3,167	9,518
Fayette*	141,657	5,223	341	564	127,418	6,325	429	1,049
Forest*	4,745	110	7	60	5,937	1,389	13	418
Franklin*	123,279	3,016	757	2,268	137,674	4,700	1,339	6,438
Fulton*	14,012	94	17	52	14,450	151	20	123
Greene*	38,665	1,585	96	357	36,584	1,282	120	465

25 (Pennsylvania Department of Health, 2014)

	2000				2010			
	White	Black	Asian/ Pacific Islander	Hispanic	White	Black	Asian/ Pacific Islander	Hispanic
Huntingdon*	42,544	2,342	98	524	42,470	2,392	186	727
Indiana*	86,796	1,407	673	457	84,360	2,434	784	947
Jefferson*	45,457	59	102	188	44,446	157	95	275
Juniata*	22,376	85	96	369	23,845	151	88	623
Lackawanna	206,160	2,793	1,624	2,958	197,296	5,423	3,699	10,682
Lancaster	430,456	12,993	6,960	26,742	460,171	19,035	10,024	44,930
Lawrence*	89,894	3,416	267	529	85,484	3,501	380	931
Lebanon	113,662	1,548	1,110	5,969	121,566	2,885	1,569	12,410
Lehigh	271,590	11,097	6,668	31,881	276,286	21,440	10,373	65,615
Luzerne	308,476	5,408	1,907	3,713	290,943	10,767	3,192	21,491
Lycoming*	112,737	5,189	521	799	107,573	5,203	696	1,559
McKean*	44,312	860	150	485	41,661	1,046	196	757
Mercer*	112,031	6,318	513	803	106,890	6,726	744	1,248
Mifflin*	45,803	226	137	263	45,531	300	175	534
Monroe*	122,342	8,343	1,585	9,195	131,162	22,348	3,563	22,288
Montgomery	648,510	55,969	30,446	15,300	649,021	69,351	51,861	34,233
Montour*	17,628	185	234	167	17,408	256	328	324
Northampton	243,639	7,400	3,737	17,868	256,895	14,986	7,301	31,179
Northumberland*	91,803	1,439	227	1,041	90,156	1,921	345	2,253
Perry*	42,964	189	70	301	44,779	296	183	588
Philadelphia	683,267	655,824	68,383	128,928	626,221	661,839	97,149	187,611
Pike*	43,109	1,513	288	2,315	50,856	3,322	613	5,173
Potter*	17,729	52	95	103	17,128	67	46	181
Schuylkill*	145,249	3,147	644	1,671	140,013	3,967	736	4,080
Snyder*	36,768	307	158	368	38,476	428	220	657
Somerset*	77,938	1,275	178	532	74,603	1,863	256	840
Sullivan*	6,266	144	10	72	6,163	168	20	92
Susquehanna*	41,621	128	98	285	42,510	156	135	564
Tioga*	40,589	250	128	214	40,852	333	187	437
Union*	37,496	2,878	460	1,622	39,414	3,324	546	2,346
Venango*	56,208	626	143	298	53,390	571	208	478
Warren*	43,286	90	126	151	41,031	149	169	305
Washington*	193,297	6,606	769	1,170	195,657	6,757	1,358	2,366
Wayne*	46,160	757	183	811	49,759	1,644	259	1,816

	2000				2010			
	White	Black	Asian/ Pacific Islander	Hispanic	White	Black	Asian/ Pacific Islander	Hispanic
Westmoreland	357,325	7,446	1,984	1,869	348,182	8,562	2,766	3,179
Wyoming*	27,598	149	79	187	27,545	208	98	437
York	354,103	14,095	3,389	11,296	385,135	24,344	5,530	24,397

Note: Hispanic origin can be of any race. White, black, and Asian in this chart include those of Hispanic origin. Asterisk (*) indicates rural counties, per Center for Rural Pennsylvania definition.