The Burden of Cancer in Pennsylvania

A Report of the Cancer Control, Prevention and Research Advisory Board

August 2019

pennsylvania
DEPARTMENT OF HEALTH

Contents

Executive Summary

Cancer continues to be the second leading cause of death in the Commonwealth of Pennsylvania. The Department of Health (Department) estimates over 79,000 Pennsylvanians will be newly diagnosed with an invasive cancer, and over 28,000 people will die from this disease in 2019. Advanced age is a risk factor for cancer, and Pennsylvania had the seventh oldest population in the United States in 2016, with one sixth (17.4 percent) of its citizens being 65 or older. Four modifiable health risk behaviors can also increase the risk of cancer: tobacco use, being overweight, lack of physical activity and poor nutrition.

Preventive activities such as mammography, colonoscopy/sigmoidoscopy and having adequate health care coverage can increase the chance of detecting cancer at an early stage. This improves the effectiveness of treatment and gives a higher chance of survival.

Purpose of the Report

Cancer burden is defined as cancer diagnoses and the deaths, disabilities and suffering caused by cancer. This includes impacts from risk factors, comorbidities with other diseases and health determinants.

This report provides a comprehensive analysis of the burden of cancer in Pennsylvania. It lists disparities and the harms of cancer for policy makers, program administrators, business and industry leaders, and the citizens of the commonwealth.

Cancer Program Goals and Objectives

Even though the rate of death from cancer is at its lowest since before 1990, Pennsylvania is committed to taking a comprehensive approach to cancer control. The Pennsylvania Department of Health, Bureau of Health Promotion and Risk Reduction, Division of Cancer Prevention and Control, is responsible for cancer control programs in Pennsylvania. The Department is funded in part by the Centers for Disease Control and Prevention (CDC) to conduct evidence-based and efficient activities that help Pennsylvanians prevent and manage cancer. The overarching goal of the Department and its many stakeholders is to eliminate the burden of cancer for Pennsylvanians. To achieve this, the Department has established the following secondary goals for cancer control:

1. Increase access to regular healthcare for Pennsylvanians;
2. Assist Pennsylvanians in comprehending health information and making appropriate decisions;
3. Decrease lung cancer by reducing tobacco use and abating radon exposure;
4. Increase the number of homes tested and mitigated for radon;
5. Increase breast cancer screening;
6. Increase cervical cancer screening;
7. Prevent skin cancer;
8. Reduce obesity;
9. Expand liver cancer prevention efforts;
10. Increase lung cancer screening rates;
11. Increase HPV vaccination rates;
12. Increase colorectal cancer screening rates;
13. Increase genetic testing and counseling for hereditary cancers;
14. Increase participation in clinical trials; and

15. Increase the survival rate of cancer survivors.

In Pennsylvania, certain CDC programs were established to develop, implement and promote effective cancer prevention and control practices:

National Comprehensive Cancer Control Program
The program maintains, implements and revises a cancer control plan as well as supports and coordinates with the cancer coalition.

National Breast and Cervical Cancer Early Detection Program
The Pennsylvania Healthy Woman Program provides low-income, uninsured and underinsured women access to timely breast and cervical cancer screening, diagnostic services and patient navigation services.

National Program of Cancer Registries
The Pennsylvania Cancer Registry maintains and enhances the operations of an existing population-based central cancer registry.

Backed by a strong programmatic framework, the Division of Cancer Control and Prevention, along with the Pennsylvania Cancer Control, Prevention and Research Advisory Board (CAB) and the Pennsylvania Cancer Coalition (PCC), developed the 2019-2023 Pennsylvania Cancer Control Plan. The plan sets the stage for the major issues Pennsylvania should address and potential actions to take. The plan is based on CDCs four domains:

1. Epidemiology and surveillance;
2. Policy systems and environmental approaches;
3. Health system interventions; and
4. Community clinical linkages.

The Pennsylvania Cancer Burden Report supports the epidemiology and surveillance requirement as a comprehensive analysis of cancer in Pennsylvania. The report helps decision makers and stakeholders in cancer control allocate resources and reach those most in need.

Organization of the Report

Eight cancers were selected for study: cervix uteri, colon and rectum, female breast, leukemia, lung and bronchus, melanoma of the skin, ovary, and prostate.

These selections were based on a survey from cancer control partners in Pennsylvania, each cancer's impact on the overall burden of cancer, and the fact that screenings and preventive measures exist for most of them. This report shows different aspects of each cancer's burden including:

- Numbers and rates of new cases (incidence) and deaths
- Trends over time
- Comparisons by sex and race and ethnicity;
- Comparisons to the United States
- The age when Pennsylvanians are diagnosed with or die from cancer
- The stage of the cancer when detected;
- Survival relative to the general population rates; and

- Behavioral and other risk factors.

Methodology

Incidence data

Cancer abstracts collected by the Pennsylvania Cancer Registry (PCR) are the source for Pennsylvania cancer incidence data and net cancer survival rate. The PCR began collecting statewide cancer incidence data in 1985. Only cases diagnosed among Pennsylvanian residents are included in this report (Pennsylvania Cancer Registry Dataset, 2016).

The PCR collects cancer records from hospitals, pathology laboratories, radiation treatment centers, medical oncology centers, physician offices, nursing homes, hospice agencies, autopsy reports, death certificates and other hospital outpatient units/ambulatory surgical facilities across the commonwealth. Reporting sources are required to submit all cancer cases newly diagnosed and/or treated at their facility. If an individual had more than one primary tumor, each tumor is reported and counted. Thus, counts reported in this publication are based on the number of cancer diagnoses, rather than the number of people with the disease.

Primary cancer sites follow the definitions used by the National Cancer Institute's Surveillance, Epidemiology and End Results (SEER) program (Surveillance, Epidemiology and End Results Program, 2018). Unless noted, in situ cases for sites other than urinary bladder cancer are not included in any calculation 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. Because classifications of tumor malignancy have changed over time, statistics for invasive cancers only include those which have always been considered invasive. The same is done for statistics for in situ cancers. These consistent classifications avoid artificial changes in trends. The SEER Behavior Recode for Analysis was used for classification.(Surveillance, Epidemiology, and End Results Program, 2018).

As of the writing of this report, 2016 is the latest year of available incidence data for the commonwealth.

Mortality data

Pennsylvania's Certificate of Death is the source document for Pennsylvanian cancer mortality data. The actual numbers of Pennsylvanian cancer deaths reported were used to forecast the expected number of cancer deaths listed in this report. As of the writing of this report, 2016 is the latest year of available mortality data for the commonwealth (Pennsylvania Certificates of Death, 2016).

Age-adjusted rates (direct method)

Age-specific rates for a selected population are applied to a standard population to calculate what the rate would be if the analyzed population had the same age distribution as the standard. This report uses the 2000 U.S. standard populations for 19 age groups, provided by the U.S. Census Bureau (U.S. Census, 2019). 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 to compute each age-adjusted rate to allow comparability. Age-adjusted rates should never be compared with any other type of rate or used as absolute measurements. All state population figures

used for calculating rates are estimates produced by SEER. See their U.S. Population Data page for more information (Surveillance, Epidemiology and End Results Program , 2018).

Trends

This report uses joinpoint models, as described by SEER, to identify and compare trends in rates. A joinpoint model fits connected segments, each spanning a portion of the period, to the data. These segments do not represent the actual rates. Each segment has a constant percent change between subsequent years, which is called an annual percent change (APC). The APC is estimated using a least squares linear regression model to the natural logarithm of the rates (Surveillance, Epidemiology, and End Results Program, 2018).

A statistical algorithm determines when the segments should be separated. These are called joinpoints. The algorithm adds joinpoints only if they represent a statistically significant change in the trend. Statistical significance is determined at the 95% CI (confidence level) using a permutation test.

Because two rates can have different joinpoints, this report uses the average annual percent change (AAPC) to compare trends for a period. The AAPC is a geometric weighted average of the APC from each segment crossing the period, where the weights are the number of years from the segment in the period.

The Joinpoint software, provided by SEER, was used to create these models. The models were created according to certain criteria:

- Joinpoints occur at exact years.
- The number of joinpoints is between zero and three.
- Each segment must be at least three years long.

Projections

Cancer incidence and mortality data only become available a few years after the events occur. Projected numbers of diagnoses and deaths are used when other data is not available.

Multiple models are fit to the monthly numbers of events (diagnoses or deaths) by cancer type and sex. The models were then used to predict the number of events for each combination of cancer type and sex for the current year. The projections for each combination were combined by taking their mean. The same process was then done by county of residence at diagnosis. The combined projections for each county were rescaled so that the total of all county-level projections equaled the sum of all cancer type and sex projections.

For more details on which diagnoses, and deaths were used and how the models were chosen, see the Technical Notes for the Pennsylvania Department of Health's Cancer Statistics Dashboard (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Net survival

The survival statistics presented in this dashboard are all net survival rates. A net survival rate is the expected survival rate in a hypothetical world without deaths unrelated to cancer. Because the listed cause on a death certificate is not totally reliable, the Pohar-Perme method is used (Perme, 2014). The risk of death unrelated to cancer was taken from life tables created using the entire population of Pennsylvania residents. These tables include cancer deaths in calculating risk, but this should have little

effect on the net survival estimates. Cancer records were matched to life tables by age, race, sex and calendar year. All net survival statistics were created using the SEER*Stat software provided by the SEER program (Surveillance, Epidemiology, and End Results Program, 2018).

Risk factors and screening

Most data for risk factors and screening are taken from the Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS), a survey conducted by the Pennsylvania Department of Health and the U.S. BRFSS, conducted by the Centers for Disease Control and Prevention. For more details on the BRFSS, see the Behavioral Health Risks of Pennsylvania Adults report from the Department of Health. (Division of Health Informatics, Pennsylvania Department of Health, 2017) and the CDC BRFSS Prevalence Data and Data Analysis Tools (Centers for Disease Control and Prevention BRFSS, 2017). Cancer screening and prevention information was taken from the Centers for Disease Control recommendations (Centers for Disease Control and Prevention-Screening, 2019).

Modifiable Risk Factors

Smoking

According to the Behavioral Risk Factor Surveillance System (BRFSS) report, the prevalence of Pennsylvanian adults who currently smoke decreased slightly from 22 percent in 2011 to 19 percent in 2017. Despite this decline, Pennsylvania's rate is still higher than the 2017 national rate of 17 percent (Centers for Disease Control and Prevention BRFSS, 2017).

Non-Hispanic black Pennsylvanians had the highest rates of smoking (20 percent), followed by Hispanics (20 percent) and whites (19 percent). Males (21 percent) are more likely to smoke than women (17 percent). Rates of smoking were inversely proportional to income and education. Those having less than a high school education had a higher rate (30 percent) than those with more education. Those with an annual income less than $15,000 had a higher rate (31 percent) than those with higher incomes. (Division of Health Informatics, Pennsylvania Department of Health-BRFSS, 2018).

Obesity

Obesity rates in Pennsylvania follow national trends and have increased slightly from 29 percent in 2011 to 32 percent in 2017. Overall, obesity rates for Pennsylvania are higher than national rates (31 percent in 2017) (Centers for Disease Control and Prevention BRFSS, 2017).

Males (33 percent) were more likely to be obese than women (31 percent). Non-Hispanic blacks had a higher rate of obesity (38 percent) than Hispanics (25 percent) and non-Hispanic whites (32 percent). Those having less than a high school education had a higher rate (36 percent) than those with more education. Those with an annual income less than $15,000 had a higher rate (38 percent) than those with higher incomes (Division of Health Informatics, Pennsylvania Department of Health-BRFSS, 2018).

Physical activity

Among Pennsylvanian adults surveyed in 2017, 25 percent had not participated in any leisure time activity in the previous month. This was not a statistically significant difference from the 2011 rate of 26 percent. It was also close to the national rate of 26 percent in 2017.(Centers for Disease Control and Prevention BRFSS, 2017).

Females and Pennsylvanian men had similar rates of inactivity during leisure time (26 and 24 percent, respectively). Hispanics had a higher rate (32 percent) than non-Hispanic blacks (25 percent) or whites (25 percent). Leisure time physical inactivity inversely correlated with annual income, ranging from 37 percent among those earning less than $15,000 per year to 15 percent among those earning $75,000 or more (Division of Health Informatics, Pennsylvania Department of Health-BRFSS, 2018).

Human Papillomavirus Vaccine (HPV) coverage

The Advisory Committee on Immunization Practices (ACIP) recommends the two-dose series of HPV vaccine for routine vaccination of boys and girls at age 11 or 12 years. ACIP also recommends vaccination for females through 26 years and for males through age 21 years who were not adequately vaccinated previously. Vaccination is also recommended through age 26 years for men who have sex with men and for immunocompromised persons (including those with HIV infection) if not adequately vaccinated previously (Advisory Committee on Immunzation Practices , 2019).

As of 2017, the National Immunization Survey-Teen (NIS-Teen) reports that 51.1 percent of Pennsylvanian girls aged 13 to 15 are up to date with the HPV vaccination, which is close to the national rate of 49.9. The percentage of Pennsylvanian boys aged 13 to 15 who were up to date was 50.0 percent, which was much higher than the national rate of 42.3 percent (Centers for Disease Control and Prevention, NIS, 2017).

Preventive Risk Factors

Health care coverage

In 2017, 9 percent of Pennsylvanians aged 18 to 64 did not have health care coverage, as compared to the national rate of 10 percent. Hispanics have the greatest percentage of uninsured at 16 percent, followed by non-Hispanic blacks at 10 and non-Hispanic whites at 7 percent (Division of Health Informatics, Pennsylvania Department of Health-BRFSS, 2018).

Younger adults, ages 18 to 29, are more likely to be uninsured (11 percent) than the 30 to 44 (10 percent) or 45 to 64 (6 percent) age groups.

Grouping Pennsylvanians by their highest education levels attained shows large disparities in rates of those uninsured: 23 percent for less than high school, 11 percent for high school or a G.E.D., 6 percent for some college, and 3 percent for a college degree.

The southwest and southeast corners of the state had the highest rates of uninsured Pennsylvanians.

Cancer screenings

The Centers for Disease Control and Prevention (CDC) supports screening for breast, cervical, colorectal and lung cancers as recommended by the United States Preventive Services Task Force (USPSTF) (Centers for Disease Control and Prevention-Screening, 2019).

In 2016, 68 percent of Pennsylvanians aged 50 to 74 met the USPSTF colorectal screening recommendation. This matched the national rate of 68 percent. The percent of women 50-74 who had a mammogram in the past two years was 76 percent, while 77 percent of Pennsylvanian women 21-65 years of age received a Pap test in the past three years. Pennsylvania's rates were slightly lower than national rates for mammography (78 percent) and cervical cancer screening (80 percent) (Division of Health Informatics, Pennsylvania Department of Health-BRFSS, 2018).

Grouping by race and ethnicity, white and black Pennsylvanians had similar rates for meeting colorectal screening guidelines at 69 percent. Black women had higher rates of mammography (81 percent) compared to white women (75 percent). The rates for cervical cancer screening by race and ethnicity were more equitable, with white women and Hispanic women being screened at a rate of 78 percent, while Black women were screened are a rate of 70 percent. There were not enough respondents to calculate a Hispanic mammography rate.

In all screening modalities, disparities were most apparent by income and education. Pennsylvanians in households with incomes less than $25,000 and having less than a high school education reported cancer screening rates much below the state averages.

Cancer Incidence and Mortality

Pennsylvanians had an overall higher cancer incidence rate (482.5 per 100,000) than the nation (436.0 per 100,000) in 2016. Pennsylvanians also had a higher rate of death from cancer (164.3 per 100,000) than the U.S. (156.0 per 100,000). Pennsylvania has not met the Healthy People 2020 goal for the rate of death from cancer (161.4 per 100,000). Out of all 50 states, Pennsylvania had the third highest cancer diagnosis rate and the sixteenth highest cancer death rate in 2016 (U.S.Cancer Statistics Workging Group, 2018).

In 2016, there were 78,621 invasive cancer diagnoses among Pennsylvanians. For the cancers examined in the report, four cancer types accounted for half (48.1 percent) of all diagnoses: female breast (11,287); lung and bronchus (10,942); prostate (8,853); and colon and rectum (6,770) (Pennsylvania Cancer Registry Dataset, 2016).

Some differences in cancer incidence stood out. Pennsylvanian men had a higher incidence rate of lung and bronchus cancer (72.6 per 100,000) than women (55.9 per 100,000). The same was true for colorectal cancer: 46.3 per 100,000 for men and 36.0 per 100,000 for women.

Black Pennsylvanians had a higher incidence rate of lung and bronchus cancer (74.2 per 100,000) than white Pennsylvanians (62.5 per 100,000). Black men also had a higher incidence rate of prostate cancer (159.4 per 100,000) than white men (96.4per 100,000).

The risk of developing cancer escalates suddenly with the beginning of middle age and reaches a high around 80 years of age. The risk of dying from cancer also increases with age, lagging slightly behind the risk of development (Pennsylvania Cancer Registry Dataset, 2016).

There were 28,363 cancer deaths reported in 2016 among Pennsylvanians. Four of the eight cancer sites listed in this report accounted for over half of these deaths: lung and bronchus (7,137); colon and rectum (2,532); pancreas (2,133); and female breast (1,978). The rate of death from cancer for Pennsylvanians (164.3 per 100,000) was higher than for the U.S. (155.9 per 100,000) in 2016 (the most recent published year of data) (U.S.Cancer Statistics Workging Group, 2018).
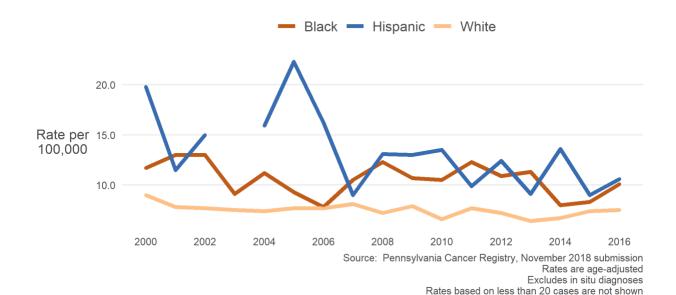
Several disparities in cancer deaths also stood out. Compared to Pennsylvanian women, men had higher rates of death from colorectal cancer, lung and bronchus cancer, leukemia, and melanoma. The rate of death from lung and bronchus cancer for men (50.2 per 100,000) was 1.5 times higher than the rate for women (34.0 per 100,000). Men also had a higher rate of dying from colorectal cancer (17.8 per 100,000) than women (12.1 per 100,000) (Pennsylvania Certificates of Death, 2016).

Black Pennsylvanians had a higher rate of death from lung and bronchus cancer (49.0 per 100,000) than white Pennsylvanians (40.2 per 100,000). Black women had a higher rate of death from breast cancer (27.3 per 100,000) than white women (20.8 per 100,000). Black men had a higher rate of death from prostate cancer (42.8 per 100,000) than white men (17.5 per 100,000) (Pennsylvania Certificates of Death, 2016).

While overall cancer incidence and death rates for Pennsylvania are greater than the national rates, the state has seen significant progress over the past two decades. The incidence rate of cancer decreased between 2000 and 2016, with an average annual percentage change (AAPC) of 0.4 percent. Over the same period, the rate of death from cancer also decreased (AAPC of 1.4 percent). However, incidence rates increased for female breast cancer and melanoma. The rates of death from liver and pancreatic cancer both fell, but both types also caused more deaths in 2016 than in 2000. The state and its partners continue to increase screening rates, reduce tobacco use, promote vaccination and encourage a healthy lifestyle. This work will help Pennsylvania reduce its cancer burden. Its citizens will enjoy increases to both the quality and quantity of years lived (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Pennsylvania Cervical Cancer

Figure 1: Cervix Uteri Cancer Incidence Rates by Race, Pennsylvanian Women, 2000-2016

Source: Pennsylvania Cancer Registry, November 2018 submission
Rates are age-adjusted
Excludes in situ diagnoses
Rates based on less than 20 cases are not shown

Frequency and Rate

Incidence: There were 535 cases of cervical cancer diagnosed, a rate of 7.8 cases per 100,000 Pennsylvanian women in 2016. Of all the invasive cancer types diagnosed among Pennsylvania females, cervical cancer accounted for 1.4 percent. Approximately 1 out of 164 Pennsylvanian women will develop cervical cancer in her lifetime (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: In 2016, 164 deaths were attributed to cervical cancer, resulting in a rate of 2.0 deaths per 100,000 Pennsylvanian women. Cervical cancer accounted for 1.2 percent of all cancer deaths among women that year. Approximately 1 out of 489 Pennsylvanian women will die of cervical cancer (Division of Health Informatics, Pennsylvania Department of Health, 2018).
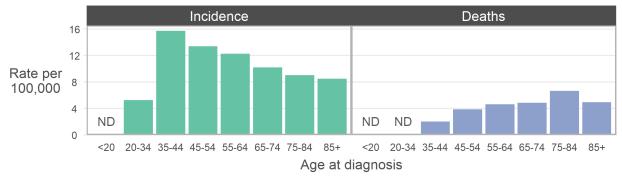
Race and Ethnicity Comparisons

Incidence: Hispanic women had the highest incidence rate of cervical cancer (10.6 per 100,000), followed by black (10.1 per 100,000) and white women (7.5 per 100,000) in 2016 (Figure 1) (Pennsylvania Cancer Registry Dataset, 2016).

Deaths: Hispanic women had a higher rate of cervical cancer death (5.5 per 100,000) than white women (1.8 per 100,000) in 2016. There were no clear differences between the death rates for black women (2.5 per 100,000) and Hispanic or white women) (Pennsylvania Certificates of Death, 2016).

Age

Figure 2: Cervix Uteri Cancer Incidence Rates by Age at Diagnosis, Pennsylvanian Women, 2016

Source: Pennsylvania Cancer Registry, November 2018 submission
Excludes in situ diagnoses
ND: Not Displayed, statistically unreliable

Incidence: Women aged 35 to 44 years had the highest incidence rate of cervical cancer in 2016 (Figure 2). The incidence decreased as age progressed, however, according to the 2016 Pennsylvania BRFSS, 24 percent of women aged 45 to 64 and 42 percent of women 65 or older had undergone a hysterectomy. To measure the risk of developing cervical cancer, those women who had their cervix removed as part of these procedures should not be included in the population at risk. Half of Pennsylvanian women diagnosed with cervical cancer in 2016 were over 58 years old. (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: Women 45 years of age and older died of cervical cancer at higher rates than younger women in Pennsylvania in 2016. The death rate was highest for women aged 75 to 84. Half of Pennsylvanian women who died of cervical cancer that year were over 58 (Figure 2) (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Stage at Diagnosis

Close to half (45.6 percent) of cervical cancers in Pennsylvania were diagnosed at an early stage in 2016. No racial disparities could be identified. (Pennsylvania Cancer Registry Dataset, 2016).

Trends

Incidence: The incidence of cervical cancer for Pennsylvanian women decreased between 2000 and 2016, with an annual decrease of 1.0 percent (AAPC of -1.0 percent). Most of the decrease came from a decline in the rate of cases caught at the localized stage, which decreased approximately 1.8 percent from 2000 to 2016 (AAPC of -1.8 percent). The rate of late-staged cervical cancers showed no clear trend. By race, cervical cancer incidence declined slightly with no apparent fluctuation in white women between 2000 and 2016; the incidence in black women also declined slightly but the incidence fluctuated between 2000 and 2016; the incidence in Hispanic women had a similar pattern to Black women, but with more fluctuation, which might be a result of insufficient data. (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: The rate of death from cervical cancer for Pennsylvanian women decreased between 2000 and 2016, with an annual decrease of 1.2 percent (AAPC of -1.2 percent). No racial disparities in trends could be identified (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Geographical Differences

Incidence: The five counties with highest incidence rates of cervical cancer were Adams: (10.8 per 100,000), Armstrong (13.1 per 100,000), Lackawanna (10.8 per 100,000), Luzerne (11.5 per 100,000) and Philadelphia (10.6 per 100,000) for the period 2012-2016 (Pennsylvania Cancer Registry Dataset, 2016).

Deaths: The five counties with highest rates of deaths from cervical cancer were Adams (3.9 per 100,000), Dauphin (3.0 per 100,000), Fayette (3.0 per 100,000), Philadelphia (3.6 per 100,000) and Schuylkill (3.7 per 100,000) for the period 2012-2016 (Pennsylvania Certificates of Death, 2016).

Survival

The five-year net survival rate for cervical cancer was estimated to be 61.8 percent in Pennsylvania, based on cases from 2009-2015. Black and white women showed similar five-year rates: 59.6 and 61.9 percent, respectively (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Pennsylvania Compared to United States

Incidence: The incidence rates of cervical cancer have decreased since 2000 in Pennsylvania at an annual decrease rate of 1.0 percent(AAPC of -1.0 percent) and the U.S. (AAPC of -1.6 percent). The PA rate and U.S. rate remained close for the whole period. In 2016, the Pennsylvania rate (7.8 per 100,000) was close to the U.S. rate (7.3 per 100,000) (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: The rates of cervical cancer death have decreased since 2000 in Pennsylvania at an annual decrease rate of 1.2 percent (AAPC of -1.2 percent) and the U.S. (AAPC of -1.4 percent). In 2016, the Pennsylvanian rate (2.0 per 100,000) was close to the U.S. rate (2.2 per 100,000). The Pennsylvania rate was often lower than the U.S. rate. Between 2000 and 2016, the annual rates for Pennsylvania were 7.4 percent lower than the U.S. rates on average (Division of Health Informatics, Pennsylvania Department of Health, 2018).
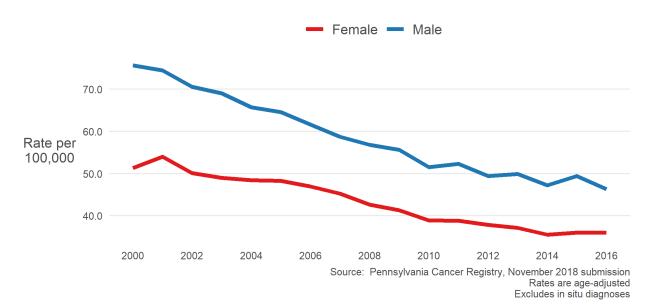
Risk Factors and Screening

Per the CDC, cervical cancer is almost always caused by human papillomavirus, also known as HPV. Other potential risk factors include smoking, HIV, using birth control for more than five years, giving birth to three or more children, and having several sexual partners. The CDC recommends cervical cancer screening every three years, with cytology alone for women aged 21 to 29 years. For women 30 to 65 years, the CDC recommends screening every three years with cervical cytology alone, every five years with high risk HPV testing alone, or every five years with HPV testing in combination with cytology. Screening is not recommended for women over 65 years who have had adequate screening and are not at high risk for cervical cancer (Centers for Disease Control and Prevention-Screening, 2019).

In 2016, 77 percent of Pennsylvania women age 21-65 had a pap test in the past three years. (Division of Health Informatics, Pennsylvania Department of Health-BRFSS, 2018)

Pennsylvania Colon and Rectum Cancer

Figure 3: Colon and Rectum Cancer Incidence Rates by Sex, Pennsylvanians, 2000-2016

Source: Pennsylvania Cancer Registry, November 2018 submission
Rates are age-adjusted
Excludes in situ diagnoses

Frequency and Rate

Incidence: In 2016, 6,770 invasive cases of colorectal cancer were diagnosed for an age-adjusted rate of 40.7 per 100,000. Of all the invasive cancer types diagnosed among Pennsylvanians, colorectal ranked fourth for number of new cases, making up 8.6 percent of all new invasive cases. Approximately 1 out of 22 Pennsylvanians will develop colorectal cancer in their lifetime. (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: In 2016, 2,532 Pennsylvanians died from colorectal cancer for an age-adjusted rate of 14.6 per 100,000. Colorectal cancer was the second leading cause of cancer death in Pennsylvanians, accounting for 8.9 percent of all cancer deaths in the state. Approximately 1 out of 54 Pennsylvanians will die of colorectal cancer (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Men Compared to Women

Incidence: The colorectal cancer incidence rate for Pennsylvanian men (46.3 per 100,000) was higher than the rate for women (36.0 per 100,000) in 2016 (Figure 3) (Pennsylvania Cancer Registry Dataset, 2016).

Deaths: The colorectal cancer death rate for Pennsylvanian men (17.8 per 100,000) was higher than the rate for women (12.1 per 100,000) in 2016 (Pennsylvania Certificates of Death, 2016).
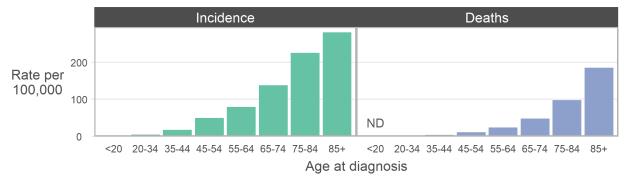
Race and Ethnicity Comparisons

Incidence: White and black Pennsylvanians had similar incidence rates of colorectal cancer (41.1 per 100,000 for blacks, and 40.4 per 100,000 for whites) in 2016, followed by Hispanics (35.5 per 100,000) and Asian and Pacific Islanders (31.2 per 100,000).. For all races except Asian and Pacific Islanders, men had higher rates than women. (Pennsylvania Cancer Registry Dataset, 2016)

Deaths: Blacks had the highest colorectal cancer death rate (19.3 per 100,000) in 2016, followed by whites (14.0 per 100,000), Hispanics (12.9 per 100,000), and Asian and Pacific Islanders (8.0 per 100,000). (Pennsylvania Certificates of Death, 2016)

For race and sex, both black and white Pennsylvanian men had higher rates than black and white women (black men and women: 24.0 and 15.8 per 100,000, respectively; whites men and women: 17.2 and 11.5 per 100,000, respectively). There was no statistically significant difference between Hispanic men and Hispanic women. There were too few colorectal cancer deaths among Asian and Pacific Islanders to compare by sex.

Age

Figure 4: Colon and Rectum Cancer Incidence Rates by Age at Diagnosis, Pennsylvanians, 2016

Source: Pennsylvania Cancer Registry, November 2018 submission
Excludes in situ diagnoses
ND: Not Displayed, statistically unreliable

Incidence: Pennsylvanians aged 85 and older had a higher incidence of colorectal cancer (281.0 per 100,000) than other age groups in 2016 (Figure 4). Since 2000, the rate for Pennsylvanians aged 45 and older decreased from 93.1 per 100,000 to 58.6 per 100,000. But the rate among those between the ages of 20 and 44 increased from 6.6 per 10,000 to 10.1 per 100,000. Half of Pennsylvanians diagnosed with colorectal cancer in 2016 were over 69 years old (Figure 4) (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: The rate of death from colorectal cancer increased with age, reaching a high for those aged 85 and older (184.8 per 100,000) in 2016. Half of Pennsylvanians who died from colorectal cancer that year were over 75 years old. (Figure 4) (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Stage at Diagnosis

In 2016, only three-eighths (37.0 percent) of colorectal cancers in Pennsylvania were diagnosed at a late stage. No disparities could be identified by race or sex (Pennsylvania Cancer Registry Dataset, 2016).

Trends

Incidence: The incidence rate of colorectal cancer for Pennsylvanians steadily decreased between 2000 and 2016 (AAPC of -2.7 percent). The rate for men was much higher than the rate for women during the entire period, but it declined faster between 2000 and 2010 (AAPC of -3.7 percent) than the rate for

women (AAPC of -2.7 percent). This closed the gap slightly, and the two rates have followed similar trends since 2007(Division of Health Informatics, Pennsylvania Department of Health, 2018).

The incidence of late-staged colorectal cancer has been on a slightly downward trend since 2007 (AAPC of -1.0 percent), while early-staged diagnoses followed a sharper decline (AAPC of -5.2 percent). No racial disparities in trends could be identified.

Deaths: The rate of death from colorectal cancer for Pennsylvanians decreased between 2000 and 2016 (AAPC of -2.9 percent). No sex or racial disparities in trends could be identified (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Geographical Differences

Incidence: Elk (56.1 per 100,000), Fulton (55.1 per 100,000), Greene (55.9 per 100,000), Potter (51.0 per 100,000) and Schuylkill (52.2 per 100,000) counties had the highest incidence rates of colorectal cancer for the period 2012-2016. All these counties are rural (Pennsylvania Cancer Registry Dataset, 2016).

Deaths: Cameron (26.5 per 100,000), Clinton (20.2 per 100,000), Greene (24.3 per 100,000), Jefferson (19.5 per 100,000) and Potter (20.6 per 100,000) had the highest rates of death from colorectal cancer for the period 2012-2016. Again, all these counties are rural (Pennsylvania Certificates of Death, 2016).

Survival

The five-year net survival rate for colorectal cancer was estimated to be 63.2 percent in Pennsylvania, based on diagnoses from 2009-2015. Five-year net survival rates for colorectal cancer showed women having a slightly higher survival rate (64.5 percent) compared to men (62.0 percent). White and black Pennsylvanians had large differences in net survival, even when diagnosed at the same stage. For early-staged colorectal cancer, whites had an 89.2 percent five-year net survival rate, and blacks had an 85.5 five-year net percent rate. For late-staged, whites had a 50.0 percent rate, and blacks had a 40.9 percent rate (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Pennsylvania Compared to United States

Incidence: The incidence rate of colorectal cancer has decreased since 2000 in Pennsylvania (AAPC of -2.7 percent) and the U.S. (AAPC of -2.5 percent). In 2016, the Pennsylvania rate (40.7 per 100,000) was slightly higher than the U.S. rate (37.1 per 100,000). The Pennsylvania rate has consistently been higher than the U.S. rate. Between 2000 and 2016, the annual rates for Pennsylvania were 9.1 percent higher than the U.S. rates on average (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: The rates of colorectal cancer death have decreased since 2000 in Pennsylvania (AAPC of -2.9 percent) and the U.S. (AAPC of -2.6 percent). In 2016, the Pennsylvanian rate (14.6 per 100,000) was close to the U.S. rate (13.7 per 100,000). The Pennsylvania rate has consistently been higher than the U.S. rate. Between 2000 and 2016, the annual rates for Pennsylvania were 7.6 percent higher than the U.S. rates on average (Division of Health Informatics, Pennsylvania Department of Health, 2018).
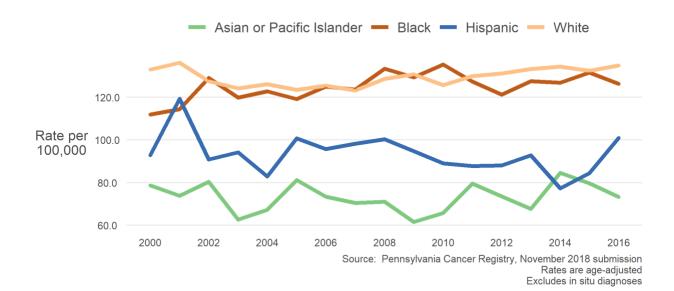
Risk Factors and Screening

The CDC recommends that adults aged 50 to 75 be screened for colorectal cancer. CDC recommends that adults aged 76 to 85 ask their doctors if they should be screened (Centers for Disease Control and Prevention-Screening, 2019). In 2016, 68 percent of Pennsylvania adults aged 50-75 reported that they

received one or more of the recommended colorectal cancer screening tests within the recommended time interval (Division of Health Informatics, Pennsylvania Department of Health-BRFSS, 2018).

Pennsylvania Female Breast Cancer

Figure 5: Breast Cancer Incidence Rates by Race, Pennsylvanians, 2000-2016

Source: Pennsylvania Cancer Registry, November 2018 submission
Rates are age-adjusted
Excludes in situ diagnoses

Frequency and Rate

Incidence: Breast cancer was the most commonly diagnosed cancer for Pennsylvanian women in 2016. There were 11,287 cases of female breast cancer, giving an age-adjusted rate of 132.9 per 100,000. Breast cancer made up 28.7 percent of all new cancers among women that year. Approximately 1 in 7 Pennsylvanian women will develop breast cancer in their lifetime (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: In 2016, 1,978 women died of breast cancer, giving an age-adjusted death rate of 21.4 per 100,000. This made up 14.5 percent of all cancer deaths among women that year. Breast cancer was the fourth leading cause of cancer death in women. Approximately 1 out of 37 Pennsylvanian women will die of breast cancer (Division of Health Informatics, Pennsylvania Department of Health, 2018).
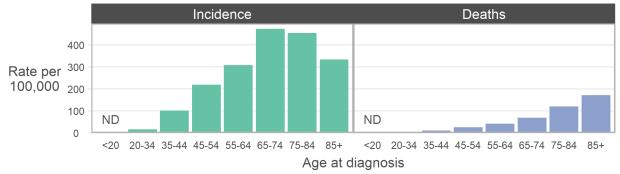
Race and Ethnicity Comparisons

Incidence: Black and white Pennsylvanian women had similar breast cancer incidence rates in 2016 (126.3 per 100,000 for blacks and 134.9 per 100,000 for whites [Figure 5]). Hispanic women had a much lower rate (101.0 per 100,000) compared to black and white women. The rate for Asian and Pacific Islander women was the lowest (73.3 per 100,000) (Pennsylvania Cancer Registry Dataset, 2016).

Deaths: Black Pennsylvanian women had the highest death rate from breast cancer (27.3 per 100,000) in 2016, followed by white women (20.8 per 100,000), Hispanic women (10.1 per 100,000) and Asian and Pacific Islander women (6.0 per 100,000) (Pennsylvania Certificates of Death, 2016).

Age

Figure 6: Breast Cancer Incidence Rates by Age at Diagnosis, Pennsylvanians, 2016

Source: Pennsylvania Cancer Registry, November 2018 submission
Excludes in situ diagnoses
ND: Not Displayed, statistically unreliable

Incidence: Pennsylvanian women aged 65 to 74 had a higher incidence rate of breast cancer (473.0 per 100,000) than other age groups in 2016 (Figure 6). Half of Pennsylvanian women diagnosed with breast cancer that year were over 71 years old (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: Pennsylvanian women aged 85 and older had a higher rate of deaths from breast cancer (171.3 per 100,000) than other age groups in 2016 (Figure 6). Half of Pennsylvanian women who died of breast cancer that year were over 71 years old (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Stage at Diagnosis

Three-fourths (72.7 percent) of breast cancers in Pennsylvanian women were diagnosed at an early stage in 2016. By race, the proportion of early stage breast cancer was lowest for Hispanic women (66.3 percent) and black women (66.5 percent). White women (73.3 percent) and Asian and Pacific Islander women (76.9 percent) had higher proportion of early stage breast cancer diagnosed (Pennsylvania Cancer Registry Dataset, 2016).

Trends

Incidence: The incidence rate of breast cancer for Pennsylvanian women showed no clear trend during the period from 2000 to 2016 (AAPC of -0.1 percent). The rate sharply declined between 2000 and 2003 (AAPC of -2.8 percent) but has slowly risen since then (AAPC of 0.6 percent) (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Early staged diagnoses of breast cancers contributed most to this recent increase, with a strong upward trend between 2004 and 2014 (AAPC of 1.6 percent). The rate of late-staged diagnoses showed no clear trend.

The rate for black women steadily increased between 2000 and 2016 (AAPC of 0.6 percent). The rate for white women declined between 2000 and 2004 (AAPC of -2.2 percent), coming close to the rate for black women. Since 2004, the rate for white women has followed the same trend as for black women.

Deaths: The rate of breast cancer death for Pennsylvanian women steadily fell between 2000 and 2016 (AAPC of -0.3 percent). No racial disparities in trends could be identified (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Geographical Differences

Incidence: Armstrong (142.2 per 100,000), Lycoming (146.1 per 100,000), Montgomery (142.5 per 100,000), Sullivan (151.0 per 100,000) and Warren (144.8 per 100,000) counties had the highest incidence rates of breast cancer for women during the period 2012-2016(Pennsylvania Cancer Registry Dataset, 2016).

Deaths: Bradford (27.0 per 100,000), Elk (29.1 per 100,000), Fulton (27.3 per 100,000), Lawrence (26.9 per 100,000) and Warren (27.5 per 100,000) counties had the highest rates of death from breast cancer for women during the period 2012-2016 (Pennsylvania Certificates of Death, 2016).

Survival

The five-year net survival rate for female breast cancer was estimated to be 88.4 percent in Pennsylvania, based on 2009-2015 incidence cases. White women's net survival rate for early-staged breast cancer was similar to black women's (99.4 and 98.1 percent, respectively). However, there was a larger gap for late-staged diagnoses: 71.3 percent among white women and 64.9 percent among black women. (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Pennsylvania Compared to United States

Incidence: The incidence rate of breast cancer for women have shown no clear trend in Pennsylvania or the U.S since 2000. In 2016, the Pennsylvania rate (132.9 per 100,000) was slightly higher than the U.S. rate (126.3 per 100,000) (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: The rates of death from breast cancer for women have decreased since 2000 in Pennsylvania (AAPC of -1.9 percent) and the U.S. (AAPC of -1.8 percent). In 2016, the Pennsylvanian death rate (21.4 per 100,000) was close to the U.S. death rate (20.0 per 100,000). The Pennsylvania rate was consistently higher than the U.S. rate. Between 2000 and 2016, the annual rates for Pennsylvania were 5.1 percent higher than the U.S. rates on average (Division of Health Informatics, Pennsylvania Department of Health, 2018).
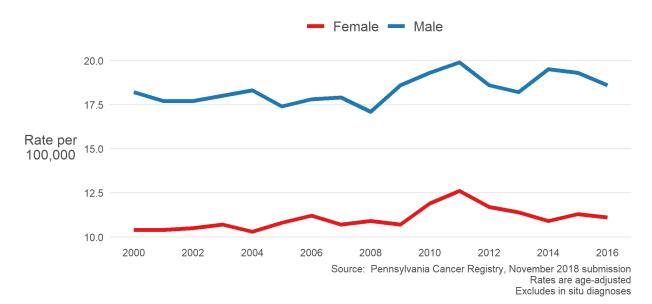
Risk Factors and Screening

Mammograms are considered the primary screening tool for female breast cancer; 76.0 percent of all women in Pennsylvania 50-74 years of age had a mammogram in the past two years. The CDC recommends women who are 50 to 74 years of age and are at average risk for breast cancer get a mammogram every year. Women who are 40 to 49 years old should talk to their doctor or other health care professional (Centers for Disease Control and Prevention-Screening, 2019).

Regions with the lowest screening rates are the southwest (excluding Allegheny County) at 74 percent and the southeast (excluding Philadelphia County) at 73 percent (Division of Health Informatics, Pennsylvania Department of Health-BRFSS, 2018).

Pennsylvania Leukemia

Figure 7: Leukemia Incidence Rates by Sex, Pennsylvanians, 2000-2016

Source: Pennsylvania Cancer Registry, November 2018 submission
Rates are age-adjusted
Excludes in situ diagnoses

Frequency and Rate

Incidence:

Leukemia was the twelfth leading cancer type in Pennsylvania by number of diagnoses in 2016, with 2,317 new cases. Leukemia made up 2.9 percent all cancers that year. The age-adjusted incidence rate of leukemia was 14.4 per 100,000. Approximately 1 out of 63 Pennsylvanians will develop leukemia in their lifetime (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: Leukemia was the seventh leading cancer type in Pennsylvania by number of deaths in 2016, with 1,101 deaths. Leukemia made up 3.9 percent all cancer deaths that year. The age-adjusted death rate was 6.4 per 100,000. Approximately 1 out of 120 Pennsylvanians will die of leukemia (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Men Compared to Women

Incidence: The incidence rate of leukemia for Pennsylvanian men (18.6 per 100,000) was substantially higher than the rate for women (11.1 per 100,000) in 2016 (Figure 7) (Pennsylvania Cancer Registry Dataset, 2016).

Deaths: Pennsylvanian men had a higher rate of death from leukemia (8.9 per 100,000) than women (4.6 per 100,000) in 2016 (Pennsylvania Certificates of Death, 2016).
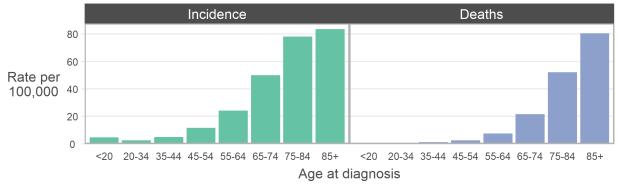
Race and Ethnicity Comparisons

Incidence: White Pennsylvanians had the highest incidence rate of leukemia (14.6 per 100,000), followed by Hispanics Pennsylvanians (12.6 per 100,000) and blacks (10.7 per 100,000) in 2016. Asian and Pacific Islander Pennsylvanians had the lowest rate (6.5 per 100,000) (Pennsylvania Cancer Registry Dataset, 2016).

Deaths: The rate of death from leukemia for white Pennsylvanians (6.4 per 100,000) resembled the rate for black Pennsylvanians (6.2 per100,000) in 2016. The rates for Hispanic Pennsylvanians (4.8 per100,000) and Asian and Pacific Islander Pennsylvanians (3.3 per 100,000) were lower. (Pennsylvania Certificates of Death, 2016)

Age

Figure 8: Leukemia Incidence Rates by Age at Diagnosis, Pennsylvanians, 2016

Source: Pennsylvania Cancer Registry, November 2018 submission
Excludes in situ diagnoses

Incidence: Nationally, leukemia is the most common kind of cancer for children and teens. Acute lymphocytic leukemia develops more often in children and teens than in adults. Other types of leukemia develop more often in people over the age of 20 (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Pennsylvanians aged 85 and older had the highest incidence rate of leukemia in 2016 (83.4 per 100,000) (Figure 8). Pennsylvanians aged 65 to 74 made up 26.6 percent of diagnoses, more than any other age group.

Deaths: Deaths from leukemia in Pennsylvanians aged 75 to 84 made up 30.9 percent of leukemia deaths, more than any other age group. (Figure 8) (Division of Health Informatics, Pennsylvania Department of Health, 2018)

Stage at Diagnosis

Of all leukemias diagnosed in Pennsylvania in 2016, 96.2 percent had already reached a late stage. There were no racial or sex disparities in stage at diagnosis (Pennsylvania Cancer Registry Dataset, 2016).

Trends

Incidence: The incidence rate of leukemia for Pennsylvanians increased between 2000 and 2016 (AAPC of 0.3 percent). The rate stayed steady between 2000 and 2008, rose between 2008 and 2011 (AAPC of 3.7 percent), and then slowly decreased until 2016 (AAPC of -1.5 percent). No racial or sex disparities in trends could be identified (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: The rate of death from leukemia for Pennsylvanians decreased between 2000 and 2016 (AAPC of -1.1 percent). No racial or sex disparities in trends could be identified (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Geographical Differences

Incidence: Columbia (19.0 per 100,000), Crawford (18.8 per 100,000), Indiana (18.3 per 100,000), Jefferson (19.5 per 100,000) and Montour (19.0 per 100,000) counties had the highest incidence rates of leukemia for the period 2012-2016. These counties are all rural (Pennsylvania Cancer Registry Dataset, 2016).

Deaths: Adams (9.1 per 100,000), Butler (8.3 per 100,000), Clarion (10.8 per 100,000), Fulton (13.0 per 100,000) and Juniata (10.2 per 100,000) counties had the highest rates of death from leukemia for the period 2012-2016. Again, these are all rural counties (Pennsylvania Certificates of Death, 2016).

Survival

In Pennsylvania, the five-year net survival for leukemia was 58.2 percent, based on diagnoses from 2009-2015. There was only a small difference in net survival between men and women. Black Pennsylvanians had a lower net survival rate (49.2 percent) than whites (58.7 percent) (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Pennsylvania Compared to United States

Incidence: The incidence rates of leukemia for both Pennsylvania and the U.S. increased sharply from 2008-2011, then decreased in 2013 and have increased slightly from 2013 to 2016. In 2016, the Pennsylvania rate (14.4 per 100,000) was slightly higher than the U.S. rate (13.3 per 100,000) (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: The rates of death from leukemia have decreased since 2000 in Pennsylvania (AAPC of -1.1 percent) and the U.S. (AAPC of -1.3 percent). In 2016, the Pennsylvanian rate (6.4 per 100,000) was close to the U.S. rate (6.3 per 100,000) (Division of Health Informatics, Pennsylvania Department of Health, 2018).
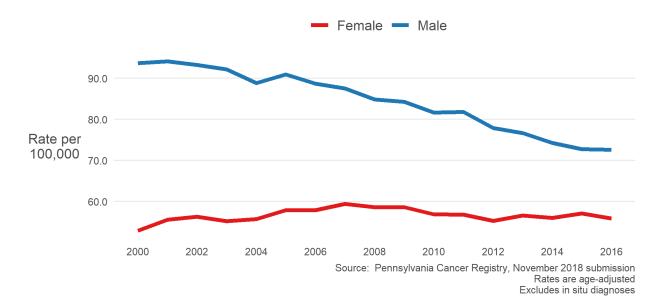
Risk Factors and Screening

Leukemia is cancer of the blood cells and when leukemia develops, the body makes many abnormal blood cells. Leukemia can affect both adults and children. It is a disease that includes four major types of leukemia: acute myeloid, chronic myeloid, chronic lymphocytic leukemia adult and acute lymphocytic leukemia (childhood).

Per the CDC, the cause of most leukemias is unknown. General risk factors include: long term benzene exposure, high doses of ionizing radiation genetic abnormalities and smoking (Centers for Disease Control and Prevention, 2016).

Not smoking can reduce the risk for acute myeloid leukemia. Avoiding unnecessary radiation exposure can prevent many types of cancers (Centers for Disease Control and Prevention, 2016).

Pennsylvania Cancer of the Lung and Bronchus

Figure 9: Lung and Bronchus Cancer Incidence Rates by Sex, Pennsylvanians, 2000-2016

Source: Pennsylvania Cancer Registry, November 2018 submission
Rates are age-adjusted
Excludes in situ diagnoses

Frequency and Rate

Incidence: Cancer of the lung and bronchus was the second most common cancer type for Pennsylvanians in 2016. There were 10,942 invasive cases diagnosed for an age-adjusted rate of 63.0 per 100,000. These made up 13.9 percent of all new cases that year. Pennsylvanians have a 1 out of 14 chance of developing cancer of the lung and bronchus in their lifetimes (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: Cancer of the lung and bronchus was the most common cause of cancer deaths for Pennsylvanians in 2016. There were 7,137 deaths for an age-adjusted rate of 40.9 per 100,000. These made up 25.2 percent of all cancer deaths that year. Pennsylvanians have a 1 out of 19 chance of dying from cancer of the lung and bronchus. (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Men Compared to Women

Incidence: The incidence rate of lung and bronchus cancer was higher for Pennsylvanian men (72.6 per 100,000) than Pennsylvanian women (55.9 per 100,000) in 2016 (Figure 9) (Pennsylvania Cancer Registry Dataset, 2016).

Deaths: Pennsylvanian men had a higher rate of death from lung and bronchus cancer (50.2 per 100,000) than Pennsylvanian women (34.0 per 100,000) in 2016 (Pennsylvania Certificates of Death, 2016).

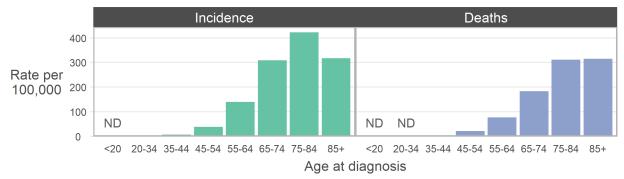## Race and Ethnicity Comparisons

Incidence: Black Pennsylvanians had the highest incidence rate of lung and bronchus cancer (74.2 per 100,000) in 2016, . followed by white Pennsylvanians (62.5 per 100,000). In contrast, Hispanic and Asian

or Pacific Islander Pennsylvanians had much lower rates of 35.3 per 100,000 and 34.2 per 100,000, respectively. The rates for men were much higher than the rates for the women in whites, blacks and Hispanics (Pennsylvania Cancer Registry Dataset, 2016).

Deaths: Black Pennsylvanians had the highest rate of death from lung and bronchus cancer in 2016 (49.0 per 100,000), followed by white Pennsylvanians (40.2 per 100,000). Hispanic and Asian or Pacific Islander Pennsylvanians had much lower death rates of 19.4 per 100,000 and 19.8 per 100,000, respectively. , The death rates for men were much higher than the rates for women in whites, blacks and Hispanics (Pennsylvania Certificates of Death, 2016).

Age

Figure 10: Lung and Bronchus Cancer Incidence Rates by Age at Diagnosis, Pennsylvanians, 2016

Source: Pennsylvania Cancer Registry, November 2018 submission
Excludes in situ diagnoses
ND: Not Displayed, statistically unreliable

Incidence: The incidence rate of lung and bronchus cancer was higher for Pennsylvanians aged 75 to 84 (423.2 per 100,000) than for other age groups in 2016 (Figure 10). Half of Pennsylvanians diagnosed with lung and bronchus cancer that year were over 70 years old (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: The rate of death from lung and bronchus cancer was higher for Pennsylvanians aged 85 and older (315.4 per 100,000) than for other age groups in 2016. Half of Pennsylvanians diagnosed with lung and bronchus cancer that year were over 72 years old (Figure 10) (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Stage at Diagnosis

Statewide, only one-fourth (25.2 percent) of lung and bronchus cancers diagnosed in 2016 were caught at an early stage. Pennsylvanian men had a lower rate of early diagnosis (22.2 percent) compared to women (28.4 percent). No racial disparities in early-stage diagnosis rates were identified (Pennsylvania Cancer Registry Dataset, 2016).

Trends

Incidence: The incidence rate of lung and bronchus cancer for all Pennsylvanians decreased between 2000 and 2016 (AAPC -0.8 percent). Most of this decrease came between 2007 and 2016. The rates for men decreased over this period (AAPC of -1.7 percent), while the rates for women started with an increasing trend from 2000 to 2007 (AAPC of 1.2 percent) then leveled off until 2016. It is worth noting

that the gap between men and women lung and bronchus cancer incidence rates narrowed considerably between 2000 and 2016. Between 2000 and 2016, the rate of late-staged lung and bronchus cancer for Pennsylvanians fell (AAPC of -0.7 percent), while the rate of early-staged cancers rose (AAPC of 1.1 percent) (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: The rate of death from lung and bronchus cancer for Pennsylvanians decreased between 2000 and 2016 (AAPC of -1.7 percent). The death rate for men decreased over the entire period (AAPC of -2.4 percent). The rate for women stayed steady between 2000 and 2008 but then started a decreasing trend (AAPC of -1.0 percent). For all years, the death rate was lower for women than for men. However, the gap between men and women death rates for lung and bronchus cancer has also narrowed considerably from 2000 to 2016 (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Geographical Differences

Incidence: Beaver (74.2 per 100,000), Fayette (72.2 per 100,000), Forest (73.6 per 100,000), Lawrence (72.1 per 100,000) and Philadelphia (78.1 per 100,000) counties had the lung and bronchus cancer incidence rates for the period 2012-2016 (Pennsylvania Cancer Registry Dataset, 2016).

Deaths: Clinton (54.2 per 100,000), Fayette (54.8 per 100,000), Forest (62.1 per 100,000), Philadelphia (53.6 per 100,000) and Wyoming (54.2 per 100,000) counties had the highest rates of death from lung and bronchus cancer for the period 2012-2016 (Pennsylvania Certificates of Death, 2016).

Survival

The five-year net survival rate for lung and bronchus cancer was estimated to be 21.4 percent in Pennsylvania, based on diagnoses from 2009-2015. Men had a lower rate (17.4 percent) than women (25.8 percent) (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Survival rates for lung and bronchus are typically very poor since most cases are diagnosed at the late stage when treatment is difficult and not as effective. Even for those cancers caught at an early stage, the net survival rate for Pennsylvanians was only 62.8 percent.

Pennsylvania Compared to United States

Incidence: The rates of lung and bronchus cancer diagnosis have decreased since 2000 in Pennsylvania (AAPC of -0.8 percent) and the U.S. (AAPC of -1.6 percent). In 2016, the Pennsylvania rate (63.0 per 100,000) was higher than the U.S. rate (51.7 per 100,000). The Pennsylvania rate has consistently been higher than the U.S. rate. Between 2000 and 2016, the annual rates for Pennsylvania were 11.2 percent higher than the U.S. rates on average (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: The rates of death from lung and bronchus cancer have decreased since 2000 in Pennsylvania (AAPC of -1.7 percent) and the U.S. (AAPC of -2.3 percent). In 2016, the Pennsylvanian rate (40.9 per 100,000) was slightly higher than the U.S. rate (38.5 per 100,000) (Division of Health Informatics, Pennsylvania Department of Health, 2018).
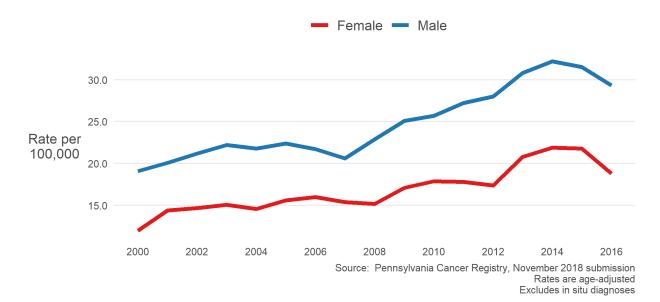
Risk Factors and Screening

Tobacco use is considered the primary risk factor for cancer of the lung and bronchus in the U.S. In 2017, 19.0 percent of Pennsylvania adults reported that they were current smokers compared to the U.S. rate of 17.0 percent (Division of Health Informatics, Pennsylvania Department of Health-BRFSS, 2018).

The CDC recommends yearly lung cancer screening with low-done computed tomography (LDCT) for people who have a history of heavy smoking and smoke now or have quit within the past 15 years, and are between 55 and 80 years old (Centers for Disease Control and Prevention-Screening, 2019).

Radon is the second leading cause of lung cancer in Pennsylvania. Over 40 percent of Pennsylvania's homes have radon levels greater than 4 picocuries/liter, which is considered the action level by the United States Environmental Protection Agency (EPA). When combined with radon exposure, the risk of developing lung cancer is significantly higher for smokers than non-smokers (Pennsylvania Department of Environmental Protection, 2018).

Pennsylvania Melanoma of the Skin

Figure 11: Melanoma of the Skin Incidence Rates by Sex, Pennsylvanians, 2000-2016

Source: Pennsylvania Cancer Registry, November 2018 submission
Rates are age-adjusted
Excludes in situ diagnoses

Frequency and Rate

Incidence: Melanoma was the sixth leading cancer type in Pennsylvania by number of diagnoses, with 3,685 new cases in 2016. Melanoma made up 4.7 percent of all new cases that year. The age-adjusted incidence rate of melanoma was 23.1 per 100,000. Approximately 1 out of 41 Pennsylvanians will develop melanoma in their lifetimes (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: Melanoma was the eighteenth leading cancer type in Pennsylvania by number of deaths, with 388 deaths in 2016. Melanoma made up 1.4 percent all cancer deaths that year. The age-adjusted rate of death from melanoma was 2.3 per 100,000. Approximately 1 out of 340 Pennsylvanians will die of melanoma (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Men Compared to Women

Incidence: The incidence rate of melanoma for Pennsylvanian men (29.3 per 100,000) was higher than the rate for women (18.8 per 100,000) in 2016 (Figure 11) (Pennsylvania Cancer Registry Dataset, 2016).

Deaths: The rate of death from melanoma for Pennsylvanian men was higher (3.3 per 100,000) than for women (1.5 per 100,000) in 2016 (Pennsylvania Certificates of Death, 2016).
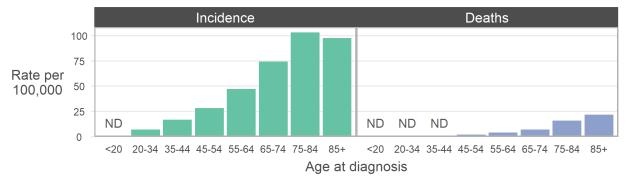
Race and Ethnicity Comparisons

Incidence: Because people who are nonwhite rarely develop melanoma, many melanoma statistics for those races are unreliable. There were 400 diagnoses of melanoma for non-white Pennsylvanians in 2016 (Pennsylvania Cancer Registry Dataset, 2016). The incidence rate of melanoma for Hispanic Pennsylvanians (5.4 per 100,000) was lower than that for white Pennsylvanians (23.6 per 100,000).

Deaths: Because people who are non-white rarely die of melanoma, many melanoma statistics for those races are unreliable. There were four deaths from melanoma for non-white Pennsylvanians in 2016. There were too few deaths from melanoma among non-white Pennsylvanians to identify any difference in rates. The rate of death from melanoma among whites was 2.6 per 100,000.(Pennsylvania Certificates of Death, 2016).

Age

Figure 12: Melanoma of the Skin Incidence Rates by Age at Diagnosis, Pennsylvanians, 2016

Source: Pennsylvania Cancer Registry, November 2018 submission
Excludes in situ diagnoses
ND: Not Displayed, statistically unreliable

Incidence: Pennsylvanians aged 75 to 84 had a higher incidence rate of melanoma (103.3 per 100,000) than other age groups in 2016 (Figure 12). Half of Pennsylvanians diagnosed with melanoma that year were over 72 years old (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Below age 55, men and women had similar rates of melanoma. After that, a wide gap appears for ages 55 to 64 (58.9 per 100,000 for men versus 35.2 per 100,000 for women) and grows larger as age increases. For Pennsylvanians aged 85 and older, the rate for men was 185.9 per 100,000 and the rate for women was 54.1 per 100,000 in 2016.

Deaths: Pennsylvanians aged 85 and older had a higher rate death from melanoma (21.8 per 100,000) than other age groups in 2016. Half of Pennsylvanians diagnosed with melanoma that year were over 72 years old (Figure 12) (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Like incidence, a gap appears between the rates of death from melanoma for men and women around age 65. It widens for older ages, with death rates among those aged 85 and older of 38.8 for men and 13.4 for women.

Stage at Diagnosis

Most melanoma in Pennsylvania was diagnosed in the early stage (84.7 percent) in 2016. There were no disparities in stage between Pennsylvanian men and women (Pennsylvania Cancer Registry Dataset, 2016).

Trends

Incidence: The incidence rate of melanoma for Pennsylvanians increased between 2000 and 2016 (AAPC of 2.8 percent). The rate for men was always higher than the rate for women. Because of the low

number of cases for non-whites, no racial disparities in trends could be identified (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: The rate of death from melanoma for Pennsylvanians increased between 2000 and 2011 and then declined steadily from 2012-2016 (AAPC of -4.5 percent). The death rate for men was always higher than the death rate for women. Because of the low number of deaths among non-whites, no racial disparities in trends could be identified (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Geographical Differences

Incidence: Butler (33.2 per 100,000), Fulton (39.4 per 100,00), Montour (38.7 per 100,000), Snyder (33.9 per 100,000) and York (32.9 per 100,000) counties had the highest rates of melanoma diagnosis for the period 2012-2016 (Pennsylvania Cancer Registry Dataset, 2016).

Deaths: Carbon (5.0 per 100,000), Clarion (4.4 per 100,000), Perry (4.5 per 100,000), Snyder (6.6 per 100,000) and Warren (4.8 per 100,000) counties had the highest rates of death from melanoma for the period 2012-2016 (Pennsylvania Certificates of Death, 2016).

Survival

The five-year net survival rate for melanoma was estimated to be 89.9 percent in Pennsylvania, based on diagnoses from 2009-2015. With melanomas caught at an early stage, men had a similar net survival rate (97.6 percent) to that of women (99.0 percent). However, men had a much lower net survival rate for late-staged melanoma (51.7 percent) than women (61.1 percent) (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Pennsylvania Compared to United States

Incidence: The incidence rates of melanoma have increased since 2000 in Pennsylvania (AAPC of 2.8 percent) and the U.S. (AAPC of 1.9 percent). In 2016, the Pennsylvania rate (23.1 per 100,000) was higher than the U.S. rate (22.4 per 100,000) (Division of Health Informatics, Pennsylvania Department of Health, 2018).
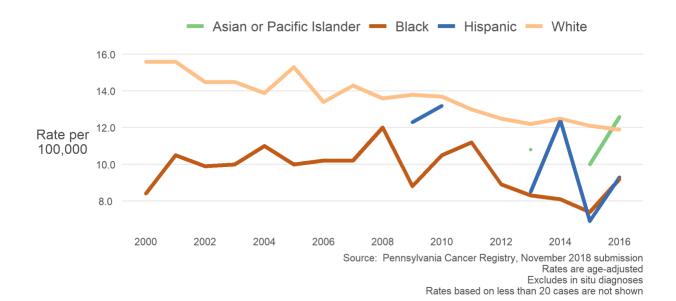
Deaths: The rate of death from melanoma has decreased slightly since 2000 in Pennsylvania as did the U. S. rate (AAPC of -1.2 percent). The Pennsylvania rate was often higher than the U.S. rate. Between 2000 and 2016, the annual rates for Pennsylvania were 5.4 percent higher than the U.S. rates on average (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Risk Factors and Screening

Per the CDC, an individual is at a higher risk of melanoma of the skin if they are exposed to high amounts of sunlight, have a family history of skin cancer or use indoor tanning beds. The full list of risk factors is listed on the CDC's website. It is recommended that you inform your doctor if you are in any of the higher risk categories or observe any unusual moles or changes to your skin (Centers of Disease Control and Prevention, 2019).

Pennsylvania Ovarian Cancer

Figure 13: Ovarian Cancer Incidence Rates by Race, Pennsylvanian Women, 2000-2016

Source: Pennsylvania Cancer Registry, November 2018 submission
Rates are age-adjusted
Excludes in situ diagnoses
Rates based on less than 20 cases are not shown

Frequency and Rate

Incidence: Ovarian cancer was the eighteenth leading cancer type in Pennsylvania by number of diagnoses in 2016, with 1,024 new cases. Ovarian cancer made up 2.6 percent all new cases among women that year. The age-adjusted incidence rate of ovarian cancer was 11.7 per 100,000. Approximately 1 out of 78 Pennsylvanian women will develop ovarian cancer in her lifetime (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: Ovarian cancer was the twelfth leading cancer type in Pennsylvania by number of deaths in 2016, with 644 deaths. Ovarian cancer made up 4.7 percent all cancer deaths among women that year. The age-adjusted death rate was 6.8 per 100,000. Approximately 1 out of 108 Pennsylvanian women will die of ovarian cancer (Division of Health Informatics, Pennsylvania Department of Health, 2018).
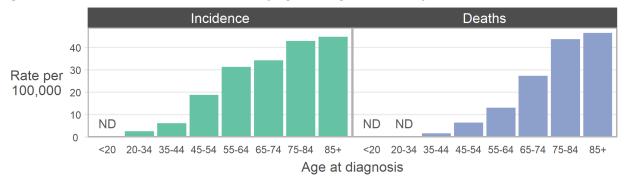
Race and Ethnicity Comparisons

Incidence: Ovarian incidence rates in Pennsylvania are approximately 26 percent higher for white females (12.0 per 100,000) compared to black females (9.5 per 100,000) in 2016 (Figure 13) (Pennsylvania Cancer Registry Dataset, 2016). Hispanic females had the lowest incidence rate (6.9 per 100,000) while Asian and Pacific Islander women had the highest rates (12.9 per 100,000). Data was limited for Hispanic and Asian and Pacific Islander women throughout the reporting period making it difficult to obtain consistent rates.

Deaths: Death rates for ovarian cancer for 2016 were slightly higher for white females (6.8 per 100,000) than black females (5.7 per 100,000) in 2016. The Hispanic death rate for females was 6.6 per 100,000

and there was not enough data for Asian and Pacific Islander women to calculate a stable death rate. (Pennsylvania Certificates of Death, 2016).

Age

Figure 14: Ovarian Cancer Incidence Rates by Age at Diagnosis, Pennsylvanian Women, 2016

Source: Pennsylvania Cancer Registry, November 2018 submission
Excludes in situ diagnoses
ND: Not Displayed, statistically unreliable

Incidence: Pennsylvanian women aged 85 and older had a higher incidence rate of ovarian cancer (44.7 per 100,000) than other age groups in 2016 (Figure 14). Half of Pennsylvanian women diagnosed with ovarian cancer that year were over 72 years old (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: Pennsylvanian women aged 85 and older had a higher death rate of ovarian cancer (46.5 per 100,000) than other age groups in 2016 (Figure 14). Half of Pennsylvanian women who died of ovarian cancer that year were over 72 years old (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Stage at Diagnosis

In Pennsylvania, only 21.0 percent of ovarian cancers diagnosed in 2016 were caught at an early stage. No racial disparities could be confidently identified (Pennsylvania Cancer Registry Dataset, 2016).

Trends

Incidence: The incidence rate of ovarian cancer for Pennsylvanian women decreased between 2000 and 2016 (AAPC of -1.6 percent). The incidence in white women showed a relatively steady decrease between 2000 and 2016, with some fluctuation between 2004 and 2007. Despite the decrease, the incidence in white women was still higher than the incidence in black women. For black women, in general, the incidence did not decrease between 2000 and 2016. There were more fluctuations in the incidence in black women than in white women. Data in other races were insufficient to compare the trend. (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: The rate of death from ovarian cancer for Pennsylvanian women decreased between 2000 and 2016 (AAPC of -2.0 percent). No racial disparities in trends could be identified. (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Geographical Differences

Incidence: Clarion (21.3 per 100,000), Somerset (15.8 per 100,000), Susquehanna (16.1 per 100,000), Tioga (15.7 per 100,000) and Warren (18.8 per 100,000) counties had the highest incidence rates of ovarian cancer for the period 2012-2016 (Pennsylvania Cancer Registry Dataset, 2016).

Deaths: Cambria (9.7 per 100,000), Clarion (11.4 per 100,000), Fayette (10.9 per 100,000), Jefferson (10.0 per 100,000) and Juniata (10.6 per 100,000) counties had the highest rates of ovarian cancer death for the period 2012-2016 (Pennsylvania Certificates of Death, 2016).

Survival

The five-year net survival rate for ovarian cancer was estimated to be 43.3 percent in Pennsylvania, based on diagnoses from 2009-2015. Despite catching the cancer at an early stage, black women had a much lower net survival rate (70.5 percent) than white women (90.6 percent) (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Pennsylvania Compared to United States

Incidence: The incidence rates of ovarian cancer decreased since 2000 in Pennsylvania (AAPC of -1.6 percent) and the U.S. (AAPC of -1.7 percent). In 2016, the Pennsylvania rate (11.7 per 100,000) was slightly higher than the U.S. rate (10.5 per 100,000). The Pennsylvania rate was often higher than the U.S. rate. Between 2000 and 2016, the annual rates for Pennsylvania were 4.6 percent higher than the U.S. rates on average (Division of Health Informatics, Pennsylvania Department of Health, 2018).
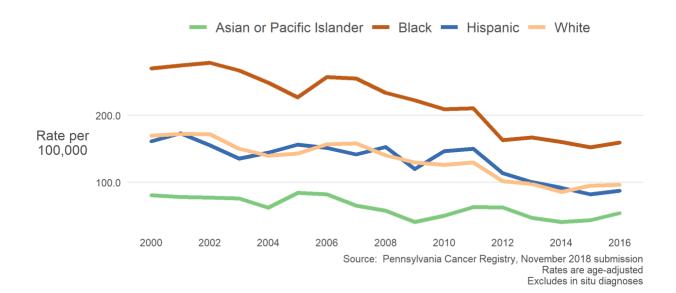
Deaths: The rates of death from ovarian cancer have decreased since 2000 in Pennsylvania (AAPC of -2.0 percent) and the U.S. (AAPC of -1.8 percent). In 2016, the Pennsylvania rate matched the U.S. rate (6.8 per 100,000) (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Risk Factors and Screening

An individual is at a higher risk of ovarian cancer if they are middle-aged or older, have a family history of ovarian cancer, or have several other risk factors listed on the CDC's website. There is no recommended screening test for ovarian cancer. Symptoms may include vaginal bleeding, pain or pressure in the pelvic area, abdominal or back pain, bloating, feeling full too quickly, or a change in bathroom habits (Centers for Disease Control and Prevention-Screening, 2019).

Pennsylvania Prostate Cancer

Figure 15: Prostate Cancer Incidence Rates by Race, Pennsylvanian men, 2000-2016

Source: Pennsylvania Cancer Registry, November 2018 submission
Rates are age-adjusted
Excludes in situ diagnoses

Frequency and Rate

Incidence: Prostate cancer was the third leading cancer type in Pennsylvania by number of diagnoses in 2016, with 8,853 new cases. Prostate cancer made up 22.6 percent all new cancers among men that year. The age-adjusted incidence rate of prostate cancer was 106.7 per 100,000. Approximately 1 out of 9 Pennsylvanian men will develop prostate cancer in his lifetime (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: Prostate cancer was the fifth leading cancer type in Pennsylvanian men by number of deaths in 2016, with 1,383 deaths. Prostate cancer made up 9.4 percent all cancer deaths among Pennsylvanian men that year. The age-adjusted death rate was 19.2 per 100,000. Approximately 1 out of 45 Pennsylvanian men will die of prostate cancer (Division of Health Informatics, Pennsylvania Department of Health, 2018).
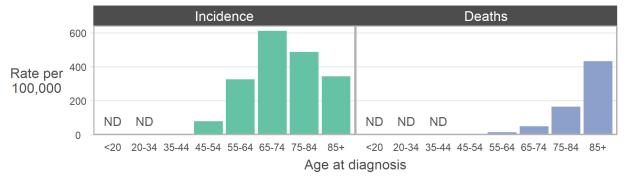
Race and Ethnicity Comparisons

Incidence: Black men had the highest incidence rate of prostate cancer (159.4 per 100,000) in 2016 (Figure 15), followed by white men (96.4 per 100,000) and Hispanic men (87.4 per 100,000). Asian and Pacific Islander men in Pennsylvania had the lowest rate (54.1 per 100,000) (Pennsylvania Cancer Registry Dataset, 2016).

Deaths: Black men had the highest rate of death from prostate cancer (42.8 per 100,000)in 2016, followed by white men (17.5 per 100,000) and Hispanic men (17.3 per 100,000). (Pennsylvania Certificates of Death, 2016).

Age

Figure 16: Prostate Cancer Incidence Rates by Age at Diagnosis, Pennsylvanian Men, 2016

Source: Pennsylvania Cancer Registry, November 2018 submission
Excludes in situ diagnoses
ND: Not Displayed, statistically unreliable

Incidence: Pennsylvanian men aged 65 to 74 had a higher incidence rate of prostate cancer (613.2 per 100,000) than other age groups in 2016 (Figure 16). Half of Pennsylvanian men diagnosed with prostate cancer that year were over 81 years old (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: Pennsylvanian men aged 85 and older had a higher death rate of prostate cancer (434.0 per 100,000) than other age groups in 2016 (Figure 16). Half of Pennsylvanian men who died of prostate cancer that year were over 81 years old (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Stage at Diagnosis

Statewide, most prostate cancers diagnosed in 2016 were caught at an early stage (70.8 percent). No racial disparities could be confidently identified (Pennsylvania Cancer Registry Dataset, 2016).

Trends

Incidence: The incidence rate of prostate cancer for Pennsylvanian men decreased between 2000 and 2016 (AAPC of -3.6 percent). The rate of early-staged prostate cancer had no clear trend between 2000 and 2007, but then began a rapid decrease (AAPC of -6.5 percent). In 2012, the USPSTF advised against routine prostate specific antigen (PSA) testing for men without symptoms of prostate cancer. This caused a sharp drop in the number of early-staged prostate cancers diagnosed that year. The rate of late-staged diagnosis showed no clear trend between 2000 and 2016. No racial disparities in incidence trends could be identified (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: The rate of death from prostate cancer for Pennsylvanians decreased between 2000 and 2016 (AAPC of -2.9 percent). This trend leveled off between 2014 and 2016. No racial disparities in trends could be identified (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Geographical Differences

Incidence: Cameron (150.0 per 100,000), Elk (142.1 per 100,000), Jefferson (133.9 per 100,000), Mercer (126.4 per 100,000) and Philadelphia (139.8 per 100,000) counties had the highest rates of prostate

cancer diagnosis for the period 2012-2016. Except for Philadelphia County, all other counites are considered rural (Pennsylvania Cancer Registry Dataset, 2016).

Deaths: Beaver (23.5 per 100,000), Elk (24.2 per 100,000), Philadelphia (29.2 per 100,000), Potter (26.2 per 100,000) and Wyoming (24.1 per 100,000) counties had the highest rates of death from prostate cancer for the period 2012-2016 (Pennsylvania Certificates of Death, 2016).

Survival

The five-year net survival rate for prostate cancer was estimated to be 95.1 percent in Pennsylvania, based on diagnoses from 2009-2015. Survival rates for prostate are typically very good, because most cases are caught at an early and more effectively treatable stage. For cases caught at later stages, black men have a lower net survival rate (60.9 percent) than white men (73.6 percent) (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Pennsylvania Compared to United States

Incidence: The rates of prostate cancer diagnosis have decreased since 2000 in Pennsylvania (AAPC of -3.6 percent) and the U.S. (AAPC of -3.5 percent). Both rates dropped sharply in 2012 because of the USPSTF recommendation (see the Trends section above). In 2016, the Pennsylvania rate (106.7 per 100,0000) was close to the U.S. rate (107.3 per 100,000) (Division of Health Informatics, Pennsylvania Department of Health, 2018).

Deaths: The rates of death from prostate cancer have decreased since 2000 in Pennsylvania (AAPC of -2.9 percent) and the U.S. (AAPC of -2.9 percent). The downward trends for both rates lasted until 2013, after which the rates showed signs of levelling off. In 2016, the Pennsylvania rate (19.2 per 100,000) was close to the U.S. rate (19.4 per 100,000) (Division of Health Informatics, Pennsylvania Department of Health, 2018).

All men are at risk for prostate cancer, but black men are more likely to get prostate cancer than men of other races. Men with three or more first-degree relatives (father, son or brother), or two close relatives on the same side of the family who have had prostate cancer, may have a type of prostate cancer caused by genetic changes that are inherited.

In 2018 the CDC made the following recommendations about prostate cancer screening:

- Men who are 55 to 69 years old should make individual decisions about being screened for prostate cancer with a PSA test.

- Before making a decision, men should talk to their doctor about the benefits and harms of screening for prostate cancer, including the benefits and harms of other tests and treatment

- Men who are 70 years old and older should not be screened for prostate cancer routinely(Centers for Disease Control and Prevention-Screening, 2019).

Works Cited

Advisory Committee on Immunzation Practices (ACIP). (2019). *Vaccine Specific Recommendations-HPV*. Retrieved from Vaccine Recommendtions and Guidelines (ACIP): https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/hpv.html

Centers for Disease Control and Prevention. (2016). *Leukemia and the Environment*. Retrieved from https://ephtracking.cdc.gov/showCancerLeukEnv.action

Centers for Disease Control and Prevention BRFSS. (2017). *Behavioral Risk Factor Surveillance System (BRFSS)*. Retrieved from BRFSS Prevalence and Trends Data: BRFSS Prevalence and Trends Data

Centers for Disease Control and Prevention, NIS. (2017). *National Immunization Survey-Teen Data*. Retrieved from TeenVaxView: ttps://www.cdc.gov/vaccines/imz-managers/coverage/teenvaxview/data-reports/hpv/index.html

Centers for Disease Control and Prevention-Ovarian. (2017). *Ovarian Cancer*. Retrieved from Basic Information: https://www.cdc.gov/cancer/ovarian/basic_info/risk_factors.htm

Centers for Disease Control and Prevention-Prostate. (2018). *Prostate Cancer*. Retrieved from Basic Information: https://www.cdc.gov/cancer/prostate/basic_info/benefits-harms.htm

Centers for Disease Control and Prevention-Screening. (2019). *Cancer Prevention and Control*. Retrieved from https://www.cdc.gov/cancer/dcpc/prevention/screening.htm

Centers of Disease Control and Prevention. (2019). *Skin Cancer*. Retrieved from Basic Information: https://www.cdc.gov/cancer/skin/basic_info/risk_factors.htm

Division of Health Informatics, Pennsylvania Department of Health. (2017). *Behavoral Health Risks of Pennsylvania Adults*. Retrieved from Health Statistics: https://www.health.pa.gov/topics/HealthStatistics/BehavioralStatistics/Pages/BehavioralRisk.aspx

Division of Health Informatics, Pennsylvania Department of Health. (2018). *Cancer Statistics Dashboard*. Retrieved from Health Statistics: https://www.health.pa.gov/topics/HealthStatistics/CancerStatistics/Pages/Cancer-Statistics.aspx

Division of Health Informatics, Pennsylvania Department of Health. (2018). *Health Statistics*. Retrieved from Cancer Statistics Dashboard: https://www.health.pa.gov/topics/HealthStatistics/CancerStatistics/dashboard/Pages/Cancer-Dashboard.aspx

Division of Health Informatics, Pennsylvania Department of Health-BRFSS. (2018). *Health Statistics*. Retrieved from Enterprise Data Dissemination Informatics Exchange-BRFSS: https://www.health.pa.gov/topics/HealthStatistics/EDDIE/Pages/EDDIE.aspx

Pennsylvania Cancer Registry Dataset. (2016). *Enterprise Data Dissemination Informatics Exchange*. Retrieved from Health Statistics: https://www.health.pa.gov/topics/HealthStatistics/EDDIE/Pages/EDDIE.aspx

Pennsylvania Certificates of Death. (2016). *Pennsylvania Enterprise Data Dissemination Informatics Exchange*. Retrieved from https://www.phaim1.health.pa.gov/EDD/

Pennsylvania Department of Environmental Protection. (2018). *Radiation Protection Programs*. Retrieved from Radon in the Home: https://www.dep.pa.gov/Business/RadiationProtection/RadonDivision/Pages/default.aspx

Perme, M. P. (2014). On Estimation in Relative Survival. *Biometrics; The International Biometric Society*, 113-20.

Surveillance, Epidemiology and End Results Program . (2018, January). *U.S. Population Data 1969-2017*. Retrieved from SEER Data and Software, U.S. Data Sets: https://seer.cancer.gov/popdata/

Surveillance, Epidemiology and End Results Program. (2018). *SEER Coding Manual*. Retrieved from Registry Operations: https://seer.cancer.gov/registrars/

Surveillance, Epidemiology, and End Results Program. (2018). *SEER Behavior Recode Analysis*. Retrieved from SEER Data and Software: https://seer.cancer.gov/behavrecode/

Surveillance, Epidemiology, and End Results Program. (2018). *SEER Statistical Software*. Retrieved from Analytical Software: https://seer.cancer.gov/data-software/related.html

U.S. Census. (2019). *Population*. Retrieved from U.S. Census Bureau: https://www.census.gov/topics/population.html

U.S. Preventive Service Task Force . (2019). *Published Recommendaions*. Retrieved from Cancer Screening: https://www.uspreventiveservicestaskforce.org/BrowseRec/Search?s=screening

U.S.Cancer Statistics Workging Group. (2018). *United States Cancer Statistics: Data Visualizations*. Retrieved from U.S. Cancer Visualizations Tool : https://gis.cdc.gov/Cancer/USCS/DataViz.html