

CANCER IN OHIO 2016





To protect and improve the health of all Ohioans by preventing diseases, promoting good health, and assuring access to quality health care.



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The James



To improve people's lives through innovation in research, education, and patient care.

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Basic Cancer Facts

What Is Cancer?

Cancer is a group of diseases characterized by uncontrolled growth and spread of abnormal cells.¹ If the spread is not controlled, it can result in death.¹ Not all irregular growths of abnormal cells are cancerous. A tumor can be either benign (noncancerous) or malignant (cancerous). Benign tumors do not metastasize (spread) to other parts of the body and, with very rare exceptions, are not life threatening.



Who Is At Risk of Developing Cancer?

Cancer usually develops in older people; 86 percent of all cancers in the United States are diagnosed in people 50 years of age or older.¹ Lifetime cancer risk refers to the probability that an individual will develop or die from cancer over the course of a lifetime (living to the age of 85). In the United States, the lifetime risk of developing cancer is 36.6 percent (1 in 3) in men and 32.8 percent (1 in 3) in women (Table 1).² These probabilities are estimated based on the overall experience of the general population and may overestimate or underestimate individual risk because of differences in exposures (e.g., smoking), family history and/or genetic susceptibility.

Can Cancer Be Prevented?

A cancer risk factor is anything that increases a person's risk of developing cancer. Cancer risk factors include age, genetics (e.g., genetic mutations, family history, sex, race, ethnicity), health behaviors and lifestyle factors (e.g., tobacco and alcohol use, obesity), socioeconomic status (e.g., income, education) and environmental factors (e.g., radiation, infectious agents, workplace exposures). It is often not just one risk factor that increases a person's risk of developing cancer; rather, cancer most often results from a complex interaction of multiple factors, sometimes over long periods of time.

A substantial proportion of cancers could be prevented. Cancers caused by tobacco use and heavy alcohol consumption could be prevented completely.¹ In 2016, almost one-third of the cancer deaths in the United States will be caused by cigarette smoking, according to a recent study by the American Cancer Society (ACS).¹ Approximately 20 percent of cancers diagnosed in the United States are related to excess body fat, physical inactivity, excess alcohol consumption and/or poor nutrition, and thus could also be prevented.¹

TABLE
1

Lifetime Risk of Being Diagnosed with Invasive Cancer for Selected Sites/Types in the United States, 2011-2013^{1,2,3}

PRIMARY CANCER SITE/TYPE	SEX	APPROXIMATE RISK FROM BIRTH TO DEATH
All Sites/Types*	Male	1 in 3 (36.6%)
	Female	1 in 3 (32.8%)
Bladder	Male	1 in 33 (3.0%)
	Female	1 in 116 (0.9%)
Breast	Female	1 in 9 (11.3%)
Cervix	Female	1 in 170 (0.6%)
Colon & Rectum	Male	1 in 26 (3.9%)
	Female	1 in 30 (3.3%)
Hodgkin Lymphoma	Male	1 in 458 (0.2%)
	Female	1 in 552 (0.2%)
Kidney & Renal Pelvis	Male	1 in 53 (1.9%)
	Female	1 in 93 (1.1%)
Leukemia	Male	1 in 67 (1.5%)
	Female	1 in 99 (1.0%)
Lung & Bronchus	Male	1 in 17 (6.0%)
	Female	1 in 19 (5.1%)
Melanoma of the Skin	Male	1 in 44 (2.3%)
	Female	1 in 69 (1.4%)
Non-Hodgkin Lymphoma	Male	1 in 50 (2.0%)
	Female	1 in 64 (1.6%)
Oral Cavity & Pharynx	Male	1 in 69 (1.4%)
	Female	1 in 175 (0.6%)
Pancreas	Male	1 in 76 (1.3%)
	Female	1 in 86 (1.2%)
Prostate	Male	1 in 8 (11.9%)
Uterine Corpus & Uterine NOS**	Female	1 in 38 (2.6%)

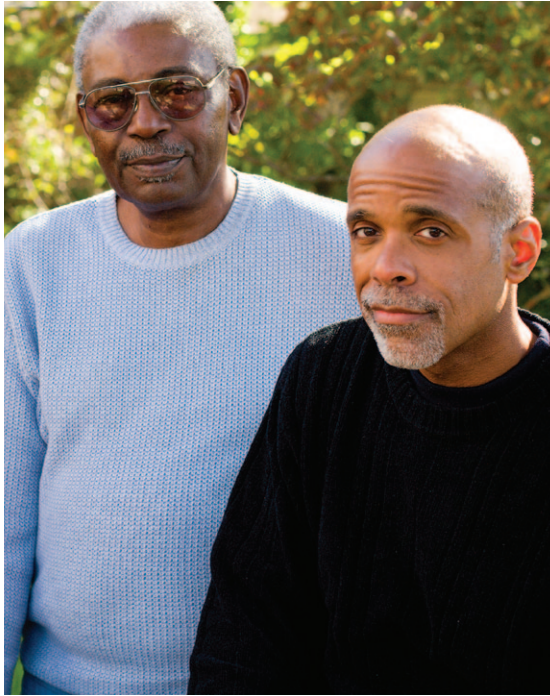
1 Source: DevCan: Probability of Developing or Dying of Cancer Software, Version 6.7.4; Statistical Methodology and Applications Branch, Division of Cancer Control and Population Sciences, National Cancer Institute, 2016.

2 Risk for those free of cancer at birth and living to age 85, based on cancer cases diagnosed during 2011-2013.

3 Numbers are rounded to the nearest whole person.

* Excludes basal and squamous cell skin cancer and *in situ* carcinomas except bladder.

** Not Otherwise Specified



Infectious agents such as human papillomavirus (HPV), hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV) and *Helicobacter pylori* (*H. pylori*) also cause cancer, and these cancers could be avoided by preventing infections through behavioral changes, vaccination and/or treating infections.¹ Many of the more than five million skin cancer cases that are diagnosed annually could be prevented by protecting skin from excessive sun exposure and not using indoor tanning devices.¹

How is Cancer Staged?

Staging describes the extent or spread of cancer at the time of diagnosis.¹ Proper staging is essential for determining therapy and assessing prognosis.¹ A cancer's stage is based on the size or extent of the primary tumor and whether it has spread to nearby lymph nodes or other areas of the body.¹ A number of different staging systems are used to classify cancer.¹ A system of summary staging is used for descriptive and statistical analysis of tumor registry data and is particularly useful for looking at trends over time.¹ According to this system, if cancer cells are present only in the layer of cells where they developed and have not spread, the stage is *in situ*.¹ If cancer cells have penetrated beyond the original layer of tissue, the cancer has become invasive and is categorized as local, regional or distant based on the extent of spread.¹

in situ – Noninvasive cancer that has not penetrated surrounding tissue.

Local – A malignant tumor confined entirely to the organ of origin.

Regional – A malignant tumor that has extended beyond the organ of origin directly into surrounding organs or tissues or into regional lymph nodes.

Distant – A malignant tumor that has spread to parts of the body (distant organs, tissues, and/or lymph nodes) remote from the primary tumor.

Unstaged/Missing Stage – Insufficient information is available to determine the stage or extent of the disease at diagnosis.

* Early stage includes tumors diagnosed at the *in situ* and local stages, and late stage includes tumors diagnosed at the regional and distant stages.

Clinicians use a different staging system, called TNM, for most cancers. The TNM system assesses cancer growth and spread in three ways: extent of the primary tumor (T), absence or presence of regional lymph node involvement (N) and absence or presence of distant metastases (M).

Can Most Cancers Be Found Early?

Regular screening examinations by a healthcare professional can result in the detection of some cancers including breast, colon and rectum, cervix, prostate, testis, oral cavity and pharynx, melanoma of the skin, and lung and bronchus, at earlier stages, when treatment is more likely to be successful. Cancers that can be prevented or detected earlier by screening account for more than half of all new cancer cases in Ohio.³

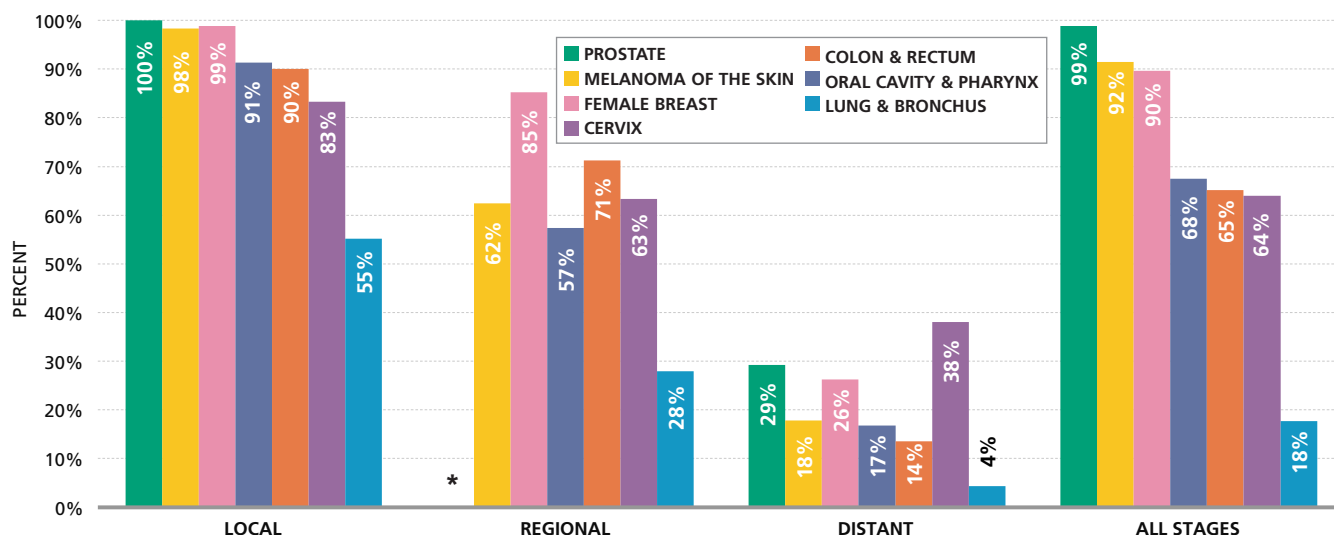
Screening can also prevent colon and rectum and cervical cancers by allowing for the detection and removal of precancerous lesions. Screening has been shown to help reduce mortality for cancers of the breast, colon and rectum, cervix, and lung and bronchus (among long-term and/or heavy smokers).¹

How Many People Develop and Die From Cancer?

Approximately 14.5 million Americans with a history of cancer were alive on January 1, 2014.¹ Some of these individuals were cancer-free, while others still had evidence of cancer and may have been undergoing treatment.¹ An estimated 1,685,210 new cancer cases and 595,690 cancer deaths are expected to occur in 2016 in the United States.¹ In Ohio in 2016, the ACS estimates that 66,020 new cases of invasive cancer will be diagnosed, including approximately 10,550 cases of lung and bronchus cancer, 9,390 cases of female breast cancer, 6,760 cases of prostate cancer and 5,340 cases of colon and rectum cancer.¹ ACS also estimates that 25,510 cancer deaths will occur in Ohio in 2016 with the following sites/types accounting for the majority of deaths: lung and bronchus (7,420 deaths), colon and rectum (2,060 deaths), female breast (1,700 deaths) and pancreas (1,800 deaths).¹

FIGURE 1

U.S. Five-year Relative Survival Probabilities by Cancer Site/Type and Stage at Diagnosis, 2006-2012^{1,2}



¹ Source: Surveillance, Epidemiology and End Results (SEER) Program, *SEER Cancer Statistics Review 1975-2013*, National Cancer Institute, 2016.

² Percentages are adjusted for normal life expectancy and are based on cases diagnosed in the SEER 18 areas from 2006-2012, followed into 2013.

* Percentage for regional stage prostate cancer is not presented because the rate for local stage represents local and regional stages combined.

What Percentage of People Survive Cancer?

Relative survival is the percentage of people who are alive at a designated time period (usually five years) after a cancer diagnosis divided by the percentage expected to be alive in the absence of cancer based on normal life expectancy. It does not distinguish between patients who have no evidence of cancer and those who have relapsed or are still in treatment. The five-year relative survival probability for all cancers diagnosed during 2006-2012 was 69 percent, up from 49 percent during 1975-1977.⁴ Improvement in survival reflects both the earlier diagnosis of certain cancers and improvements in treatment. Survival varies greatly by cancer type and stage at diagnosis (Figure 1). The five-year relative survival probability for all screenable cancers combined is about 73 percent, and is even higher for selected sites/types.⁴ For example, the overall five-year relative survival probability for colon and rectum cancer is 65 percent.⁴ If all colon and rectum cancers were diagnosed at a local stage through regular cancer screenings, the five-year survival probability would increase to 90 percent (Figure 1).⁴

What is a Cancer Cluster?

A cancer cluster is a greater than expected number of cancer cases among a group of people in a geographic area over a defined period of time.⁵ Cancer clusters may be suspected when people learn about multiple family members, friends, neighbors or coworkers who have been diagnosed with or died from cancer. Unfortunately, about one in three males and one in three females in the United States will develop cancer in their lifetime; thus, it is not unusual to see multiple cases of cancer in a community or workplace. True cancer clusters often involve multiple cases of one type of cancer or related cancers, unusual types of cancer in a particular population, an unusual geographic or time distribution and/or a known exposure pathway to a cancer causing agent.⁵ In addition, cancer clusters are often not the result of environmental pollution; rather, clusters may occur due to shared behaviors and lifestyle factors such as high rates of tobacco use, lack of access to preventive health care, increased rates of screening (which may identify previously undiagnosed cases), low socioeconomic status and chance, among other reasons.

Understanding Cancer Incidence and Mortality Rates

Incidence and Mortality Rates

The cancer rates in this document represent the number of new invasive cancer cases (incidence) or cancer deaths (mortality) per 100,000 population during a specific time period (typically per year). Incidence rates are calculated using invasive cancers only, with the addition of *in situ* bladder cancers.

The number of cancers diagnosed in a demographic subgroup or geographic area can be determined from a rate if the population is known. For example, if a county's average annual lung and bronchus cancer incidence rate is 80.0 per 100,000, this means an average of 80 new cases of lung and bronchus cancer were diagnosed in the county per year for every 100,000 people. If the county's population is 25,000, then an average of 20 new cases of lung and bronchus cancer were diagnosed in the county per year:

$$\frac{80 \text{ new cases per year}}{100,000 \text{ population}} = \frac{20 \text{ new cases per year}}{25,000 \text{ population}}$$

Rates provide a useful way to measure the cancer burden irrespective of the actual population size. Rates can be used to compare sexes (e.g., males have higher colon and rectum cancer rates than females), race/ethnic groups (e.g., black males have higher prostate cancer rates than white males) or geographic areas (e.g., Ohio has a higher lung and bronchus cancer incidence rate than California).

Age-adjusted Rates

A statistical method called "age adjustment" is used to compare rates among groups of people with different age compositions. Age adjustment removes the impact of different age distributions between populations. It also allows for comparisons within a single population over time. This is especially important when examining cancer rates because cancer is generally a disease of older people. Rates in this document are age-adjusted to the 2000 U.S. Standard Population.⁶

Reporting of Cancer Incidence Data

In order to assess the burden of cancer in Ohio, state law requires the reporting of all new cancer cases diagnosed among Ohio residents to Ohio's central cancer registry, the Ohio Cancer Incidence Surveillance System (OCISS). Any physician, dentist, hospital or person diagnosing and/or treating cancer cases is required to report them to the OCISS within six months of diagnosis. Additional information is collected over the two-year time period post diagnosis to obtain the most accurate and complete data on each case. Thus, incidence data for 2009-2013 were the most recent and complete available at the time of publication.

The percentage of cancer cases diagnosed among Ohio residents that are reported to the OCISS within 24 months of diagnosis is referred to as "completeness." Completeness of case reporting is estimated to be 94 percent for 2009-2013, based on Ohio mortality rates and the Surveillance, Epidemiology, and End Results (SEER) Program incidence to mortality rate ratio for 2009-2013.^{3,4,7} Thus, incidence rates in Ohio may be lower than U.S. rates for select cancer sites/types, geographic areas or demographic subgroups due to delayed or incomplete reporting, rather than a true lower incidence of disease. By the same token, if an Ohio incidence rate is higher than the U.S. rate, the magnitude of the difference may be even greater than it appears due to delayed or incomplete case reporting. Estimated completeness of reporting by cancer site/type is presented in [Table A-1](#) on page 69.

It is important for OCISS data to be complete to ensure that the true cancer burden in Ohio is correctly assessed. Unfortunately, not all cancer cases get reported to OCISS – in particular, cases that are diagnosed and treated outside the hospital setting. These settings include physician offices, laboratories, and outpatient treatment and diagnostic facilities. For more information on reporting cancer cases to OCISS, please see the following: <http://www.healthy.ohio.gov/cancer/ocisshs/reporting1.aspx>.

Cancer Incidence and Mortality Data



Incidence (New Cases)

Figures 2 and 3 display selected cancer sites/types in Ohio by percentage of new invasive cancer cases (and cancer deaths) for males and females, respectively. Prostate cancer is the most frequently diagnosed cancer in men.³ Prostate cancer represented 25 percent of all cancers diagnosed in male Ohioans between 2009 and 2013 (Figure 2).³ Breast cancer remains the most frequently diagnosed cancer in Ohio women, representing 28 percent of cancer diagnoses (Figure 3).³

Table 2 provides 2009-2013 average annual numbers of new invasive cancer cases and age-adjusted incidence rates for 23 common cancer sites/types by sex with national comparisons. For all cancer sites/types combined, the incidence rate in Ohio (459.9 per 100,000) was slightly higher than the national rate (448.7 per 100,000).^{3,4} The lung and bronchus cancer incidence rate was 85.6 per 100,000 for Ohio males, which was 26 percent higher than the national rate of 67.9 per 100,000.^{3,4} Similarly, the Ohio female lung and bronchus cancer incidence rate (59.7 per 100,000) was 21 percent higher than the national rate of 49.4 per 100,000.^{3,4}

Figure 4 presents a visual comparison of Ohio and U.S. 2009-2013 incidence rates for primary cancer sites/types. Sites/types where the Ohio cancer incidence rate was higher than the national cancer incidence rate were, in descending order: larynx, lung and bronchus, esophagus, uterine corpus and uterine not otherwise specified (NOS), bladder, brain and other central nervous system (CNS), kidney and renal pelvis, all sites/types combined, and colon and rectum.^{3,4} Ohio incidence rates were lower than the U.S. rates for some specific cancers; however, this may be due, in part, to delayed or incomplete reporting of some cancer sites/types during 2009-2013.

Table A-2 on page 70 shows 2009-2013 average annual numbers of new invasive cancer cases and age-adjusted incidence rates by sex for each county in Ohio for all cancer sites/types combined and cancers of the female breast, colon and rectum, lung and bronchus, and prostate. Please note that low county numbers and rates may reflect delayed or incomplete reporting for that county. Counties that were less than 95 percent complete for 2009-2013 are noted with a cross (†).

Mortality (Deaths)

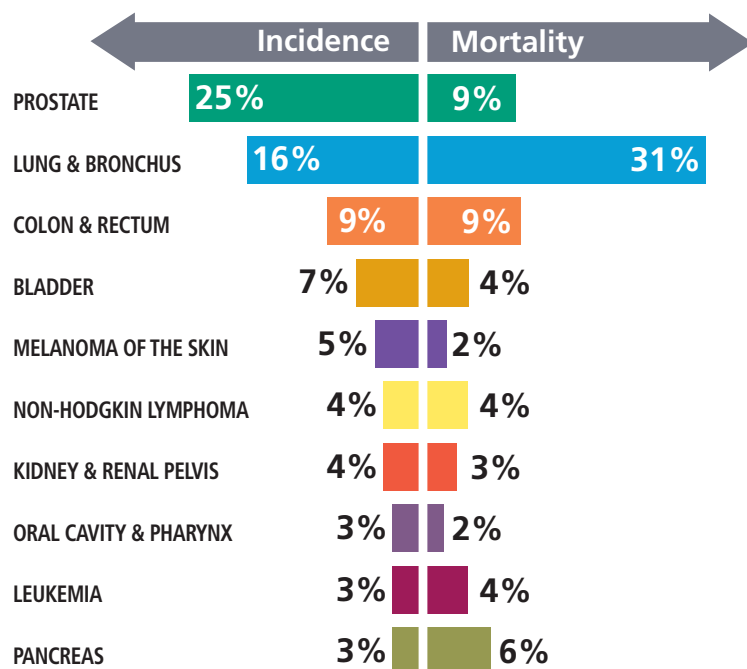
The 2009-2013 cancer mortality rate in Ohio for all sites/types combined was 9 percent higher than the U.S. rate (183.4 per 100,000 and 168.5 per 100,000, respectively).^{4,7} Lung and bronchus cancer remains the leading cause of cancer death in Ohio for males, females and both sexes combined, with a yearly (2009-2013) average of 4,081 males and 3,302 females dying from the disease (Table 3).⁷ Colon and rectum cancer is the second leading cause of cancer death for men in Ohio (1,179 deaths per year) followed closely by prostate cancer (1,123 deaths per year), each accounting for about 9 percent of male cancer deaths (Figure 2).⁷ Breast cancer is the second leading cause of cancer death for females with a yearly average of 1,761 deaths, accounting for 15 percent of female cancer deaths (Figure 3).⁷

Figure 5 presents a visual comparison of Ohio and U.S. 2009-2013 mortality rates for primary cancer sites/types. Ohio cancer mortality rates were higher than the national cancer mortality rates during 2009-2013 for 18 of the 23 sites/types of cancer presented.^{4,7} The top ten cancer sites/types where the Ohio cancer mortality rate was higher than the U.S. cancer mortality rate were, in descending order: esophagus, larynx, lung and bronchus, bladder, melanoma of the skin, non-Hodgkin lymphoma, colon and rectum, multiple myeloma, uterine corpus and uterine NOS, and all sites/types combined.^{4,7} Ohio cancer mortality rates were lower than the U.S. rates for cancers of the liver and intrahepatic bile duct, stomach and testis; however, the comparison for testicular cancer was based on small numbers and should be interpreted with caution.

Table A-3 on page 74 displays 2009-2013 average annual numbers of cancer deaths and age-adjusted mortality rates by sex for each county in Ohio. Data are provided for all cancer sites/types combined and cancers of the female breast, colon and rectum, lung and bronchus, and prostate.

FIGURE 2

Selected Cancer Sites/Types: Average Annual Number and Percentage of New Invasive Cancer Cases and Cancer Deaths in Males in Ohio, 2009-2013^{1,2}

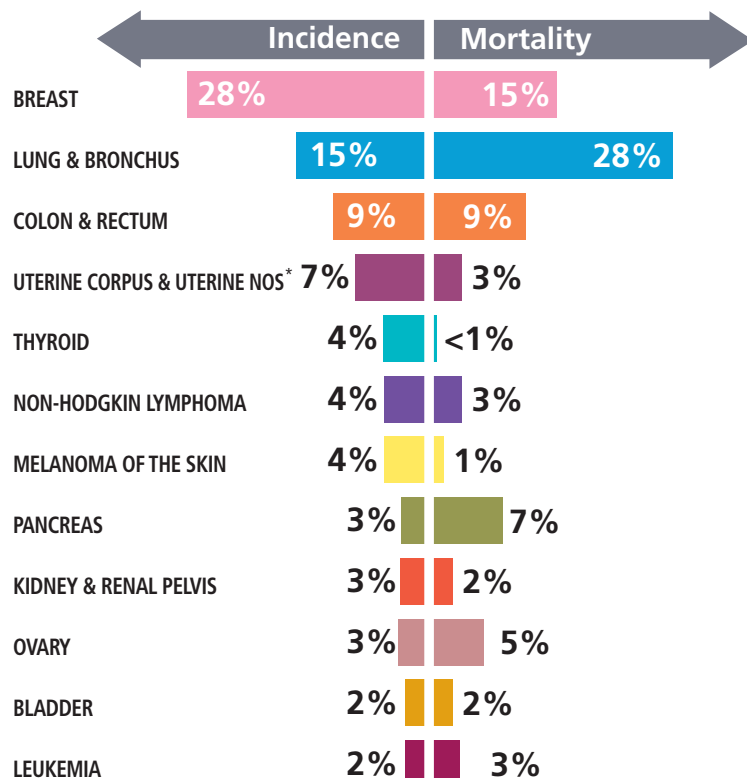


PRIMARY CANCER SITE/TYPE	NEW CASES	DEATHS
	AVERAGE ANNUAL	AVERAGE ANNUAL
Prostate	7,724	1,123
Lung & Bronchus	5,170	4,081
Colon & Rectum	2,925	1,179
Bladder	2,259	495
Melanoma of the Skin	1,421	257
Non-Hodgkin Lymphoma	1,364	484
Kidney & Renal Pelvis	1,347	353
Oral Cavity & Pharynx	1,067	241
Leukemia	882	550
Pancreas	844	777
Liver & Intrahepatic Bile Duct	639	513
Esophagus	576	551
Stomach	542	219
Brain & Other CNS*	490	329
Larynx	443	141
Multiple Myeloma	425	256
Thyroid	385	31
Testis	284	14
Hodgkin Lymphoma	170	26

¹ Source: Ohio Cancer Incidence Surveillance System, Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.
² Figure 2 presents the top cancer sites/types among males according to incidence.
 * Central Nervous System

FIGURE 3

Selected Cancer Sites/Types: Average Annual Number and Percentage of New Invasive Cancer Cases and Cancer Deaths in Females in Ohio, 2009-2013^{1,2}

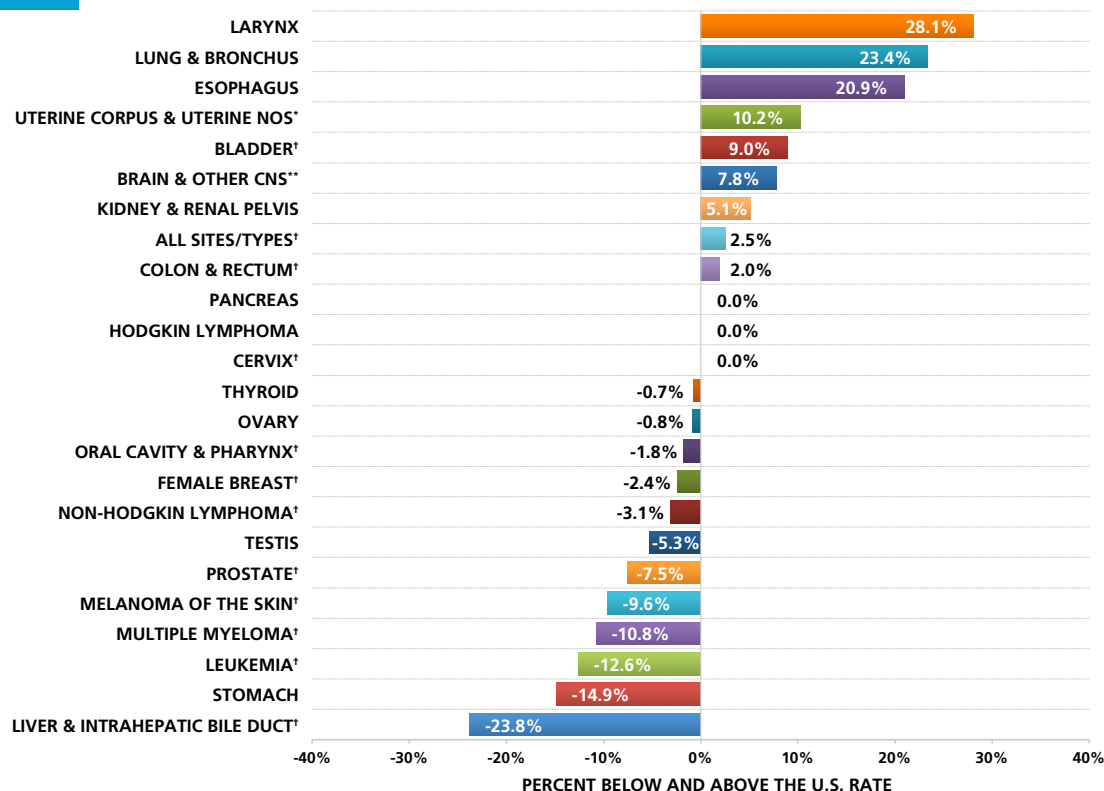


PRIMARY CANCER SITE/TYPE	NEW CASES	DEATHS
	AVERAGE ANNUAL	AVERAGE ANNUAL
Breast	8,722	1,761
Lung & Bronchus	4,478	3,302
Colon & Rectum	2,729	1,083
Uterine Corpus & Uterine NOS*	2,077	373
Thyroid	1,283	39
Non-Hodgkin Lymphoma	1,155	404
Melanoma of the Skin	1,120	141
Pancreas	857	781
Kidney & Renal Pelvis	855	223
Ovary	846	598
Bladder	721	206
Leukemia	657	413
Cervix	456	167
Oral Cavity & Pharynx	436	103
Brain & Other CNS**	389	260
Multiple Myeloma	361	233
Stomach	305	157
Liver & Intrahepatic Bile Duct	260	248
Esophagus	150	138
Larynx	137	40
Hodgkin Lymphoma	136	20

¹ Source: Ohio Cancer Incidence Surveillance System, Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.
² Figure 3 presents the top cancer sites/types among females according to incidence.
 * Not Otherwise Specified
 ** Central Nervous System

FIGURE
4

Comparison of Ohio and U.S. Average Annual Age-adjusted Incidence Rates by Cancer Site/Type, 2009-2013¹



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016; Surveillance, Epidemiology, and End Results (SEER) Program, SEER Cancer Statistics Review 1975-2013, National Cancer Institute, 2016.

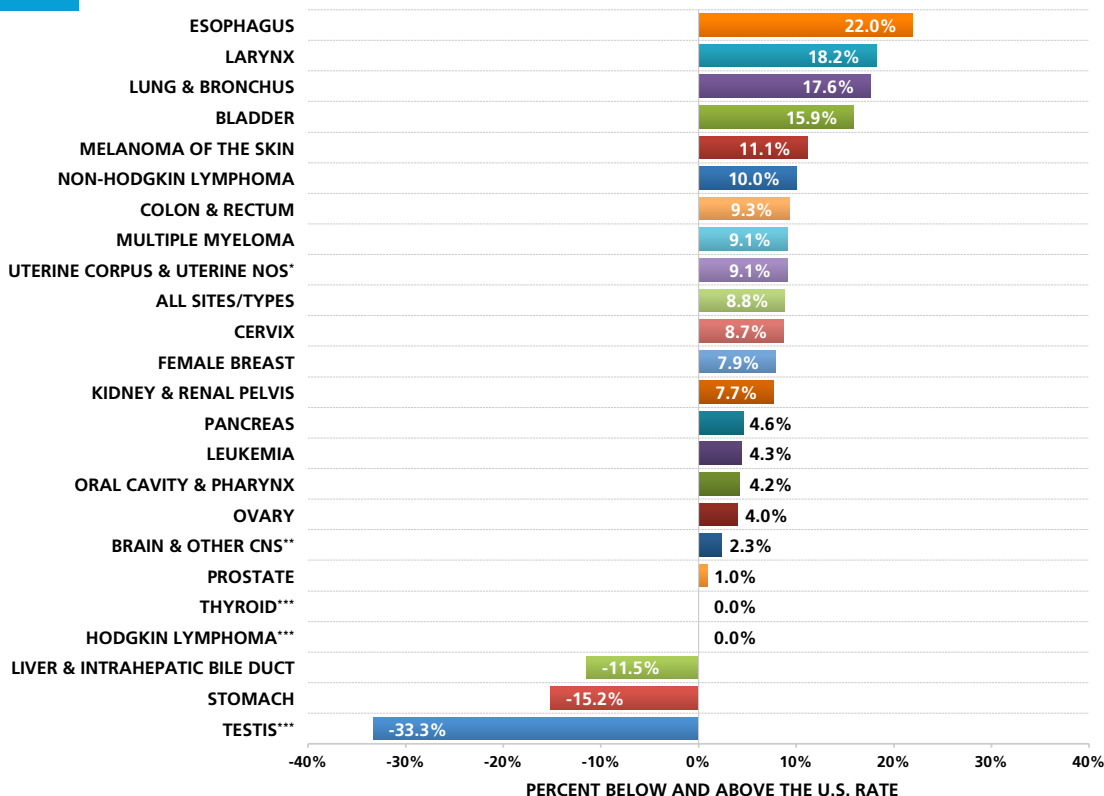
* Not Otherwise Specified

** Central Nervous System

† Data for this site/type did not meet the standard of 95 percent complete in 2009-2013.

FIGURE
5

Comparison of Ohio and U.S. Average Annual Age-adjusted Mortality Rates by Cancer Site/Type, 2009-2013¹



¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016; National Center for Health Statistics Public Use Mortality Data published in SEER Cancer Statistics Review 1975-2013, National Cancer Institute, 2016.

* Not Otherwise Specified

** Central Nervous System

*** The comparison should be interpreted with caution due to small numbers

Average Annual Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates by Cancer Site/Type and Sex in Ohio and the United States, 2009-2013^{1,2}

Primary Cancer Site/Type	MALE			FEMALE			TOTAL		
	Ohio Cases	Ohio Rate	National Rate	Ohio Cases	Ohio Rate	National Rate	Ohio Cases	Ohio Rate	National Rate
All Sites/Types [†]	31,400	513.8	504.5	30,620	423.8	409.9	62,020	459.9	448.7
Bladder [†]	2,259	38.8	35.3	721	9.3	8.6	2,981	21.9	20.1
Brain & Other CNS ^{**}	490	8.2	7.6	389	5.7	5.4	879	6.9	6.4
Breast [†]	70	1.2	1.2	8,722	122.0	125.0	8,792	66.0	67.2
Cervix [†]	*	*	*	456	7.5	7.5	*	*	*
Colon & Rectum [†]	2,925	48.9	47.1	2,729	36.2	36.0	5,654	41.8	41.0
Esophagus	576	9.3	7.4	150	1.9	1.7	726	5.2	4.3
Hodgkin Lymphoma	170	3.0	3.0	136	2.3	2.3	306	2.6	2.6
Kidney & Renal Pelvis	1,347	21.8	21.4	855	11.9	10.7	2,201	16.4	15.6
Larynx	443	6.9	5.6	137	1.8	1.1	580	4.1	3.2
Leukemia [†]	882	15.1	17.3	657	9.2	10.5	1,539	11.8	13.5
Liver & Intrahepatic Bile Duct [†]	639	9.8	13.0	260	3.5	4.4	898	6.4	8.4
Lung & Bronchus	5,170	85.6	67.9	4,478	59.7	49.4	9,648	70.7	57.3
Melanoma of the Skin [†]	1,421	23.9	28.5	1,120	17.0	16.9	2,541	19.7	21.8
Multiple Myeloma [†]	425	7.1	8.2	361	4.8	5.2	785	5.8	6.5
Non-Hodgkin Lymphoma [†]	1,364	22.9	23.7	1,155	15.7	16.1	2,519	18.9	19.5
Oral Cavity & Pharynx [†]	1,067	16.5	16.7	436	6.0	6.2	1,503	10.9	11.1
Ovary	*	*	*	846	11.8	11.9	*	*	*
Pancreas	844	13.9	14.1	857	11.1	11.0	1,701	12.4	12.4
Prostate [†]	7,724	119.7	129.4	*	*	*	*	*	*
Stomach	542	9.0	10.0	305	4.1	5.3	848	6.3	7.4
Testis	284	5.4	5.7	*	*	*	*	*	*
Thyroid	385	6.4	6.9	1,283	20.8	20.6	1,668	13.8	13.9
Uterine Corpus & Uterine NOS ^{***}	*	*	*	2,077	28.0	25.4	*	*	*

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016; Surveillance, Epidemiology, and End Results (SEER) Program, SEER Cancer Statistics Review 1975-2013; National Cancer Institute, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

* Not Applicable

** Central Nervous System

*** Not Otherwise Specified

[†] Data for this site/type did not meet the standard of 95 percent complete in 2009-2013.

TABLE 3 Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by Cancer Site/Type and Sex in Ohio and the United States, 2009-2013^{1,2}

Primary Cancer Site/Type	MALE			FEMALE			TOTAL		
	Ohio Deaths	Ohio Rate	National Rate	Ohio Deaths	Ohio Rate	National Rate	Ohio Deaths	Ohio Rate	National Rate
All Sites/Types	13,026	222.7	204.0	12,006	156.1	143.4	25,032	183.4	168.5
Bladder	495	8.9	7.7	206	2.5	2.2	702	5.1	4.4
Brain & Other CNS**	329	5.4	5.3	260	3.6	3.5	589	4.4	4.3
Breast	19	0.3	0.3	1,761	23.2	21.5	1,780	13.0	12.0
Cervix	*	*	*	167	2.5	2.3	*	*	*
Colon & Rectum	1,179	20.4	18.1	1,083	13.6	12.7	2,263	16.5	15.1
Esophagus	551	9.0	7.4	138	1.8	1.5	689	5.0	4.1
Hodgkin Lymphoma	26	0.4	0.5	20	0.3	0.3	45	0.4	0.4
Kidney & Renal Pelvis	353	5.9	5.7	223	2.9	2.5	576	4.2	3.9
Larynx	141	2.3	1.9	40	0.5	0.4	181	1.3	1.1
Leukemia	550	9.8	9.3	413	5.3	5.2	964	7.2	6.9
Liver & Intrahepatic Bile Duct	513	8.2	9.1	248	3.2	3.6	761	5.4	6.1
Lung & Bronchus	4,081	68.5	57.8	3,302	43.4	37.0	7,383	54.1	46.0
Melanoma of the Skin	257	4.4	4.1	141	1.9	1.7	398	3.0	2.7
Multiple Myeloma	256	4.5	4.2	233	3.0	2.7	489	3.6	3.3
Non-Hodgkin Lymphoma	484	8.5	7.7	404	5.1	4.7	888	6.6	6.0
Oral Cavity & Pharynx	241	3.8	3.8	103	1.3	1.3	344	2.5	2.4
Ovary	*	*	*	598	7.8	7.5	*	*	*
Pancreas	777	13.0	12.5	781	10.0	9.5	1,559	11.4	10.9
Prostate	1,123	20.9	20.7	*	*	*	*	*	*
Stomach	219	3.8	4.5	157	2.0	2.4	376	2.8	3.3
Testis	14	0.2	0.3	*	*	*	*	*	*
Thyroid	31	0.5	0.5	39	0.5	0.5	70	0.5	0.5
Uterine Corpus & Uterine NOS***	*	*	*	373	4.8	4.4	*	*	*

¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016; National Center for Health Statistics Public Use Mortality Data published in SEER Cancer Statistics Review 1975-2013, National Cancer Institute, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

* Not applicable
** Central Nervous System

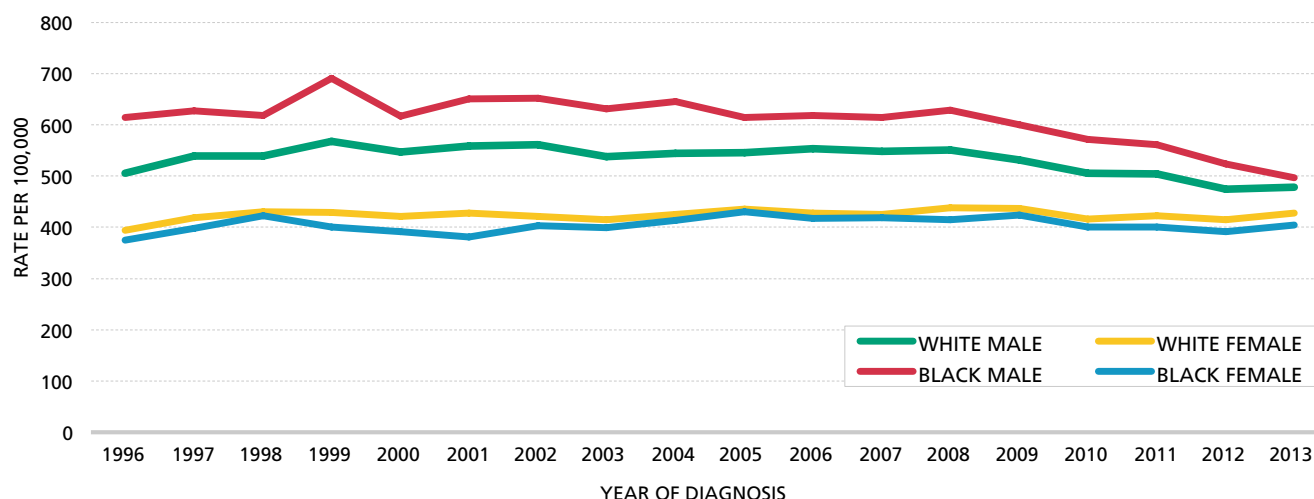
*** Not Otherwise Specified

Trends in Ohio Cancer Rates

Trends in Ohio Cancer Incidence Rates

Trend analyses of age-adjusted incidence rates in Ohio show that incidence rates for all cancer sites/types combined increased 3 percent from 1996 to 2013 (Figure 6).³ Cancer incidence rates increased among females (8 percent) and whites (3 percent) but declined among males (5 percent) and blacks (6 percent).³ The sharpest reduction (19 percent) in the 18-year time period was observed for black males; although, black males had the highest incidence rates each year during the time period.³

FIGURE 6 Trends in Age-adjusted Incidence Rates for All Cancer Sites/Types Combined by Sex and Race in Ohio, 1996-2013^{1,2}



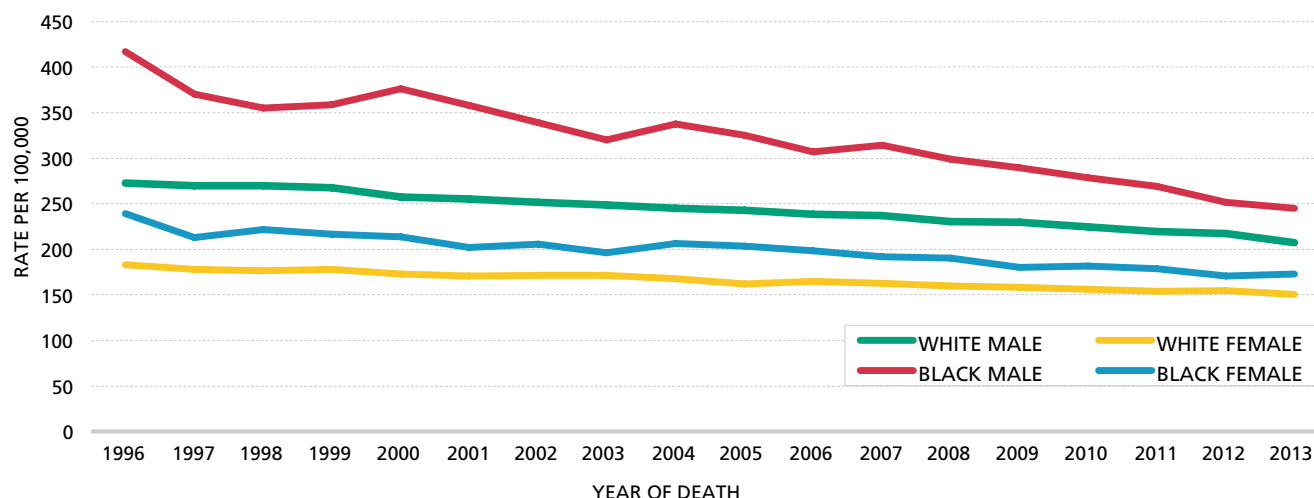
¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

Trends in Ohio Cancer Mortality Rates

In contrast to incidence trends, age-adjusted mortality rates in Ohio for all cancer sites/types combined declined 21 percent from 1996 to 2013 (Figure 7).⁷ The percent decline in cancer mortality rates in Ohio was higher among males (25 percent) compared to females (19 percent) and blacks (35 percent) compared to whites (20 percent) during this time period.⁷ Similar to Ohio, the U.S. cancer mortality rate dropped 23 percent from 1991 to 2012, most likely due to reductions in smoking, as well as improvements in early detection and treatment.¹

FIGURE 7 Trends in Age-adjusted Mortality Rates for All Cancer Sites/Types Combined by Sex and Race in Ohio, 1996-2013^{1,2}



¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

Cancer Health Disparities in Specific Populations

Cancer Health Disparities

The National Cancer Institute (NCI) defines cancer health disparities as adverse differences in cancer incidence, prevalence, mortality, survivorship and burden of cancer and related adverse health conditions that exist among specific population groups in the United States.⁸ These population groups are often defined by demographics such as race and ethnicity, sex, age and geographic area. However, there are a number of factors associated with specific population groups that play a role in the risk of developing cancer and receiving access to appropriate care to detect and treat cancer. These factors include, but are not limited to, education, income, employment, insurance status, genetics, cultural beliefs, religious beliefs, language and literacy level. It is crucial to ensure that these factors are addressed in cancer education, prevention, early detection and treatment programs so that no population is disproportionately affected by cancer.

Disparities in Cancer Incidence Rates by Race

U.S. Census 2014 population estimates indicate that Ohio's population is approximately 84 percent white, 12 percent black, 2 percent Asian and less than 1 percent American Indian or Alaskan Native.⁹

Figure 8 displays 2009-2013 average annual cancer incidence rates by race for the leading sites/types of cancer in Ohio. The average annual cancer incidence rate among blacks (462.7 per 100,000) was 6.5 percent higher than whites (452.8 per 100,000) for all sites/types combined.³ Blacks also had higher incidence rates compared to whites for the following cancers: colon and rectum, kidney and renal pelvis, larynx, liver and intrahepatic bile duct, lung and bronchus, multiple myeloma, pancreas, prostate and stomach. Among blacks, the incident rate for multiple myeloma was more than double the rate for whites (Table 4).³

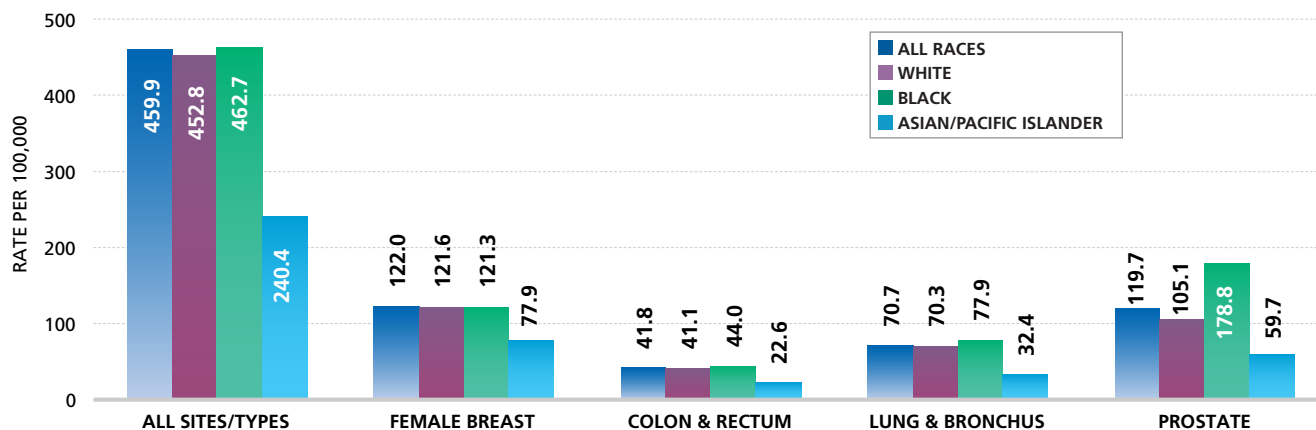
Asian/Pacific Islanders of both sexes in Ohio had lower incidence rates than other races for most cancer combined sites/types (Table 4).³ However, this population had a higher incidence of melanoma of the skin and cancers of the ovary, testis and thyroid compared to blacks, and a higher incidence of cancers of the liver and intrahepatic bile duct and stomach compared to whites.³

Disparities in Cancer Mortality Rates by Race

In 2009-2013, blacks had the highest mortality rates of any racial group in Ohio for all sites/types of cancer combined (210.9 per 100,000), with black males and females having 21 percent higher and 14 percent higher cancer mortality rates compared to white males and females, respectively (Table 5).⁷

In 2009-2013, Asian/Pacific Islanders had the lowest mortality rates of any racial group in the Ohio for all sites/types of cancer combined (93.7 per 100,000), with Asian/Pacific Islander males and females having 51 percent lower and 45 percent lower cancer mortality rates compared to white males and females, respectively (Table 5).⁷

FIGURE 8 Average Annual Age-adjusted Incidence Rates for Selected Cancer Sites/Types by Race in Ohio, 2009-2013^{1,2}



¹Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the U.S. 2000 standard population.



Additional Factors Associated with Cancer Health Disparities

GENETICS

Some cancer health disparities can be attributed to genetics. For instance, women of Ashkenazi Jewish descent have an increased frequency of mutations in the BRCA1 and BRCA2 genes, which increases their risk of breast and ovarian cancers.¹ Genetic factors may also play a role in the elevated risk of prostate cancer among black men and the incidence of more aggressive forms of breast cancer in black women.¹ However, genetic differences are thought to make only a minor contribution to the disparate cancer burden between specific population groups, which means the factors underlying disparate cancer health outcomes are not always clear.

TABLE
4

Average Annual Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates by Sex and Race in Ohio, 2009-2013^{1,2,3}

Primary Cancer Site/Type	All Races						White					
	MALE		FEMALE		TOTAL		MALE		FEMALE		TOTAL	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
All Sites/Types	31,400	513.8	30,620	423.8	62,020	459.9	27,143	498.2	26,911	423.5	54,055	452.8
Bladder	2,259	38.8	721	9.3	2,981	21.9	2,074	39.5	648	9.4	2,722	22.3
Brain & Other CNS**	490	8.2	389	5.7	879	6.9	447	8.6	353	6.0	800	7.2
Breast	70	1.2	8,722	122.0	8,792	66.0	60	1.1	7,637	121.6	7,698	65.3
Cervix	*	*	456	7.5	*	*	*	*	383	7.4	*	*
Colon & Rectum	2,925	48.9	2,729	36.2	5,654	41.8	2,569	48.1	2,386	35.5	4,955	41.1
Esophagus	576	9.3	150	1.9	726	5.2	534	9.6	128	1.8	662	5.3
Hodgkin Lymphoma	170	3.0	136	2.3	306	2.6	147	3.0	117	2.3	264	2.7
Kidney & Renal Pelvis	1,347	21.8	855	11.9	2,201	16.4	1,179	21.6	749	11.9	1,928	16.3
Larynx	443	6.9	137	1.8	580	4.1	387	6.8	118	1.8	505	4.1
Leukemia	882	15.1	657	9.2	1,539	11.8	796	15.4	579	9.3	1,374	12.0
Liver & Intrahepatic Bile Duct	639	9.8	260	3.5	898	6.4	498	8.7	207	3.1	705	5.7
Lung & Bronchus	5,170	85.6	4,478	59.7	9,648	70.7	4,593	84.7	3,962	59.7	8,556	70.3
Melanoma of the Skin	1,421	23.9	1,120	17.0	2,541	19.7	1,324	25.0	1,022	17.9	2,346	20.7
Multiple Myeloma	425	7.1	361	4.8	785	5.8	344	6.4	282	4.2	626	5.1
Non-Hodgkin Lymphoma	1,364	22.9	1,155	15.7	2,519	18.9	1,229	23.1	1,044	16.0	2,272	19.2
Oral Cavity & Pharynx	1,067	16.5	436	6.0	1,503	10.9	968	16.9	389	6.1	1,356	11.2
Ovary	*	*	846	11.8	*	*	*	*	760	12.0	*	*
Pancreas	844	13.9	857	11.1	1,701	12.4	740	13.6	740	10.7	1,479	12.0
Prostate	7,724	119.7	*	*	*	*	6,083	105.1	*	*	*	*
Stomach	542	9.0	305	4.1	848	6.3	458	8.5	238	3.5	696	5.8
Testis	284	5.4	*	*	*	*	268	6.0	*	*	*	*
Thyroid	385	6.4	1,283	20.8	1,668	13.8	350	6.7	1,119	21.4	1,469	14.1
Uterine Corpus & Uterine NOS***	*	*	2,077	28.0	*	*	*	*	1,864	28.6	*	*

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

³ Asian/Pacific Islander case counts are small. Interpret data with caution.

* Not Applicable

** Central Nervous System

*** Not Otherwise Specified

**** Rate not calculated when the case count for 2009-2013 is less than five (i.e., the average annual count is less than one).

POVERTY

Poverty is related to employment, disability status, educational attainment, type of household (e.g., female-headed household with children less than 18), age, sex, race, geography and other factors. Poverty is also associated with some risk factors for cancer, such as tobacco use and obesity, as well as lack of access to cancer screening and treatment.¹ The national poverty rate was 15 percent in 2014 with an estimated 46.7 million people in poverty.¹⁰ An estimated 1,796,942 people in Ohio, or 16 percent of the population, were poor in 2013 according to the 2014 American Community Survey.¹¹ In 2012-2013 in Ohio, 35 percent of blacks, 14 percent of Asian/Pacific Islanders and 16 percent of non-Hispanic whites were considered poor by federal standards.¹¹ Also, 28 percent of Ohio's Hispanic/Latino community was considered poor. The six poorest counties in Ohio in 2011 were all located in the 32-county Appalachian region of the state. In 2014, Appalachia Ohio had an 18 percent poverty rate compared to an average of 16 percent for counties in the remainder of the state.¹¹

TABLE
4
cont.

Average Annual Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates by Sex and Race in Ohio, 2009-2013^{1,2,3}

Primary Cancer Site/Type	Black						Asian/Pacific Islander					
	MALE		FEMALE		TOTAL		MALE		FEMALE		TOTAL	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
All Sites/Types	3,157	549.4	3,057	404.1	6,215	462.7	163	243.4	224	243.9	387	240.4
Bladder	110	21.3	51	6.9	161	12.7	6	10.4	2	2.2	7	5.7
Brain & Other CNS**	30	4.6	29	3.8	60	4.2	5	5.6	2	2.1	7	3.7
Breast	8	1.5	924	121.3	932	69.0	<1	****	77	77.9	78	42.7
Cervix	*	*	55	7.4	*	*	*	*	6	5.6	*	*
Colon & Rectum	293	52.8	285	37.9	578	44.0	17	26.5	16	20.0	33	22.6
Esophagus	35	6.2	19	2.5	54	4.0	2	3.6	1	1.1	3	2.2
Hodgkin Lymphoma	18	2.8	15	1.9	33	2.3	2	1.4	1	1.5	3	1.5
Kidney & Renal Pelvis	149	24.5	96	12.8	246	18.0	4	5.5	3	3.4	8	4.3
Larynx	49	8.0	18	2.3	67	4.7	2	3.7	<1	****	3	2.0
Leukemia	62	10.9	59	7.7	122	9.0	6	7.1	6	6.0	12	6.4
Liver & Intrahepatic Bile Duct	118	17.5	47	6.0	165	11.2	9	13.2	3	3.6	12	7.8
Lung & Bronchus	533	98.4	479	63.9	1,012	77.9	22	39.1	21	28.1	43	32.4
Melanoma of the Skin	4	0.8	7	1.0	11	0.9	1	1.5	1	1.3	2	1.4
Multiple Myeloma	74	13.8	73	9.9	147	11.4	2	3.8	2	2.8	4	3.1
Non-Hodgkin Lymphoma	106	18.0	84	11.0	190	14.1	8	10.6	7	8.8	15	9.7
Oral Cavity & Pharynx	83	13.3	38	4.9	121	8.6	4	5.3	4	4.6	8	4.8
Ovary	*	*	69	9.1	*	*	*	*	9	9.8	*	*
Pancreas	93	17.2	106	14.4	199	15.7	5	8.9	5	6.0	10	7.3
Prostate	1,065	178.8	*	*	*	*	41	59.7	*	*	*	*
Stomach	72	13.4	57	7.8	129	10.1	6	8.8	5	5.9	11	7.1
Testis	7	1.0	*	*	*	*	2	1.5	*	*	*	*
Thyroid	23	3.8	115	15.3	137	10.0	5	5.3	22	18.5	27	12.2
Uterine Corpus & Uterine NOS***	*	*	177	22.8	*	*	*	*	14	14.2	*	*

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

³ Asian/Pacific Islander case counts are small. Interpret data with caution.

* Not Applicable

** Central Nervous System

*** Not Otherwise Specified

**** Rate not calculated when the case count for 2009-2013 is less than five (i.e., the average annual count is less than one).

HEALTH INSURANCE STATUS

In addition to poverty, health insurance status plays a role in cancer health disparities. Those who are uninsured/underinsured are less likely to receive adequate cancer treatment and care. Furthermore, unequal access to screening may lead to a later stage of disease at diagnosis and a lower chance of survival. According to 2014 data, 7 percent of Ohioans were uninsured.¹² Among Ohio's non-elderly population in 2014, Hispanics represented the largest racial/ethnic group without health insurance (19 percent), followed by blacks (9 percent).¹²

CULTURAL BELIEFS AND PRACTICES

Culturally-appropriate behaviors may also contribute to cancer health disparities by increasing or decreasing cancer rates within a specific population. For example, women from cultures where early marriage and child-bearing is encouraged often have lower risk of breast cancer.¹ Similarly, individuals who do not use tobacco or who maintain a vegetarian diet, which is often associated with cultural or religious beliefs, experience a lower risk of many cancers.¹

TABLE
5

Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by Sex and Race in Ohio, 2009-2013^{1,2,3}

Primary Cancer Site/Type	All Races						White					
	MALE		FEMALE		TOTAL		MALE		FEMALE		TOTAL	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
All Sites/Types	13,026	222.7	12,006	156.1	25,032	183.4	11,556	219.6	10,588	154.6	22,144	181.3
Bladder	495	8.9	206	2.5	702	5.1	461	9.1	184	2.5	644	5.2
Brain & Other CNS**	329	5.4	260	3.6	589	4.4	310	5.7	241	3.8	551	4.7
Breast	19	0.3	1,761	23.2	1,780	13.0	17	0.3	1,520	22.5	1,537	12.6
Cervix	*	*	167	2.5	*	*	*	*	140	2.4	*	*
Colon & Rectum	1,179	20.4	1,083	13.6	2,263	16.5	1,033	19.8	958	13.4	1,991	16.2
Esophagus	551	9.0	138	1.8	689	5.0	509	9.3	120	1.7	629	5.1
Hodgkin Lymphoma	26	0.4	20	0.3	45	0.4	24	0.5	18	0.3	42	0.4
Kidney & Renal Pelvis	353	5.9	223	2.9	576	4.2	323	6.0	200	2.9	523	4.3
Larynx	141	2.3	40	0.5	181	1.3	122	2.2	33	0.5	154	1.2
Leukemia	550	9.8	413	5.3	964	7.2	508	10.1	371	5.3	880	7.3
Liver & Intrahepatic Bile Duct	513	8.2	248	3.2	761	5.4	419	7.6	211	3.1	630	5.1
Lung & Bronchus	4,081	68.5	3,302	43.4	7,383	54.1	3,622	67.6	2,927	43.3	6,550	53.7
Melanoma of the Skin	257	4.4	141	1.9	398	3.0	254	4.9	137	2.1	391	3.3
Multiple Myeloma	256	4.5	233	3.0	489	3.6	212	4.1	195	2.8	407	3.3
Non-Hodgkin Lymphoma	484	8.5	404	5.1	888	6.6	450	8.8	375	5.3	825	6.8
Oral Cavity & Pharynx	241	3.8	103	1.3	344	2.5	215	3.8	93	1.3	308	2.5
Ovary	*	*	598	7.8	*	*	*	*	548	8.1	*	*
Pancreas	777	13.0	781	10.0	1,559	11.4	686	12.8	678	9.7	1,364	11.1
Prostate	1,123	20.9	*	*	*	*	933	19.1	*	*	*	*
Stomach	219	3.8	157	2.0	376	2.8	179	3.4	125	1.8	304	2.5
Testis	14	0.2	*	*	*	*	13	0.3	*	*	*	*
Thyroid	31	0.5	39	0.5	70	0.5	27	0.5	35	0.5	62	0.5
Uterine Corpus & Uterine NOS***	*	*	373	4.8	*	*	*	*	315	4.5	*	*

¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

³ Asian/Pacific Islander case counts are small. Interpret data with caution.

* Not applicable

** Central Nervous System

*** Not Otherwise Specified

**** Rate not calculated when the case count for 2009-2013 is less than five (i.e., the average annual count is less than one).

Summary of Cancer Health Disparities

Given the interconnectedness of genetics, race and ethnicity, poverty, health insurance status and culture, it is extremely challenging to pinpoint exactly why a specific population group has a higher burden of cancer. Despite this difficulty, it is important to have an understanding of the ways in which these and other factors jointly and independently contribute to cancer health disparities. This knowledge is needed to inform cancer education, prevention, early detection and treatment programs so that no population is disproportionately affected by cancer.



TABLE
5
cont.

Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by Sex and Race in Ohio, 2009-2013^{1,2,3}

Primary Cancer Site/Type	Black						Asian/Pacific Islander					
	MALE		FEMALE		TOTAL		MALE		FEMALE		TOTAL	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
All Sites/Types	1,363	265.8	1,323	176.9	2,686	210.9	62	107.0	63	84.6	125	93.7
Bladder	32	6.9	22	2.9	54	4.4	1	3.3	<1	****	2	1.8
Brain & Other CNS**	16	2.8	16	2.2	32	2.4	3	4.4	2	1.8	5	2.9
Breast	2	0.3	227	30.0	229	17.5	0	****	9	11.0	9	6.4
Cervix	*	*	25	3.3	*	*	*	*	2	2.6	*	*
Colon & Rectum	137	27.0	116	15.6	253	20.2	5	8.5	7	8.9	12	8.6
Esophagus	38	7.2	17	2.3	55	4.3	2	2.5	<1	****	2	1.6
Hodgkin Lymphoma	1	0.3	2	0.2	3	0.2	0	****	0	****	0	****
Kidney & Renal Pelvis	28	5.0	22	2.9	50	3.8	1	1.5	<1	****	2	1.0
Larynx	17	3.0	7	1.0	25	1.9	<1	****	0	****	<1	****
Leukemia	38	7.7	40	5.4	77	6.2	4	5.9	2	1.4	5	3.3
Liver & Intrahepatic Bile Duct	82	12.7	34	4.4	116	8.1	7	11.6	2	3.6	10	6.9
Lung & Bronchus	427	81.5	354	47.3	780	61.0	18	33.3	14	19.3	32	25.1
Melanoma of the Skin	2	0.3	3	0.5	5	0.4	<1	****	<1	****	<1	****
Multiple Myeloma	41	8.6	37	5.0	79	6.3	1	2.1	<1	****	2	1.5
Non-Hodgkin Lymphoma	30	5.7	25	3.4	56	4.4	2	3.2	2	3.4	4	3.4
Oral Cavity & Pharynx	25	4.4	9	1.2	34	2.5	<1	****	<1	****	1	0.9
Ovary	*	*	45	6.0	*	*	*	*	3	3.5	*	*
Pancreas	86	16.2	96	13.1	182	14.5	3	4.8	5	6.9	8	6.0
Prostate	184	42.5	*	*	*	*	3	7.4	*	*	*	*
Stomach	37	7.4	28	3.9	66	5.4	2	3.2	3	3.7	5	3.5
Testis	<1	****	*	*	*	*	0	****	*	*	*	*
Thyroid	4	0.8	4	0.5	8	0.6	0	****	<1	****	<1	****
Uterine Corpus & Uterine NOS***	*	*	54	7.1	*	*	*	*	2	3.1	*	*

¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

³ Asian/Pacific Islander case counts are small. Interpret data with caution.

* Not applicable

** Central Nervous System

*** Not Otherwise Specified

**** Rate not calculated when the case count for 2009-2013 is less than five (i.e., the average annual count is less than one).

Bladder Cancer



New Cases

An estimated 76,960 new cases of bladder cancer are expected to be diagnosed in 2016 in the United States.¹ Incidence rates are about four times higher in men than in women and are almost two times higher in white men than in black men.¹

In Ohio, 16 percent of those diagnosed with bladder cancer from 2009 to 2013 were younger than 60 years.³ An average of 2,981 new cases (2,259 men and 721 women) of bladder cancer were diagnosed annually in Ohio during this time period, with a corresponding rate of 21.9 per 100,000 compared to the U.S. rate of 20.1 per 100,000 (Table 2).^{3,4} White and black men had higher incidence rates of bladder cancer compared to white and black women in Ohio in 2009-2013, with white men having the highest incidence rate (39.5 per 100,000) among all sex-race groups (Table 4).³ Average annual age-adjusted incidence rates of bladder cancer by Ohio county of residence are shown in Figure 9.

Currently, a man living in the United States has a 1 in 33 lifetime risk of developing bladder cancer and a women has a 1 in 116 lifetime risk of developing bladder cancer.²

Deaths

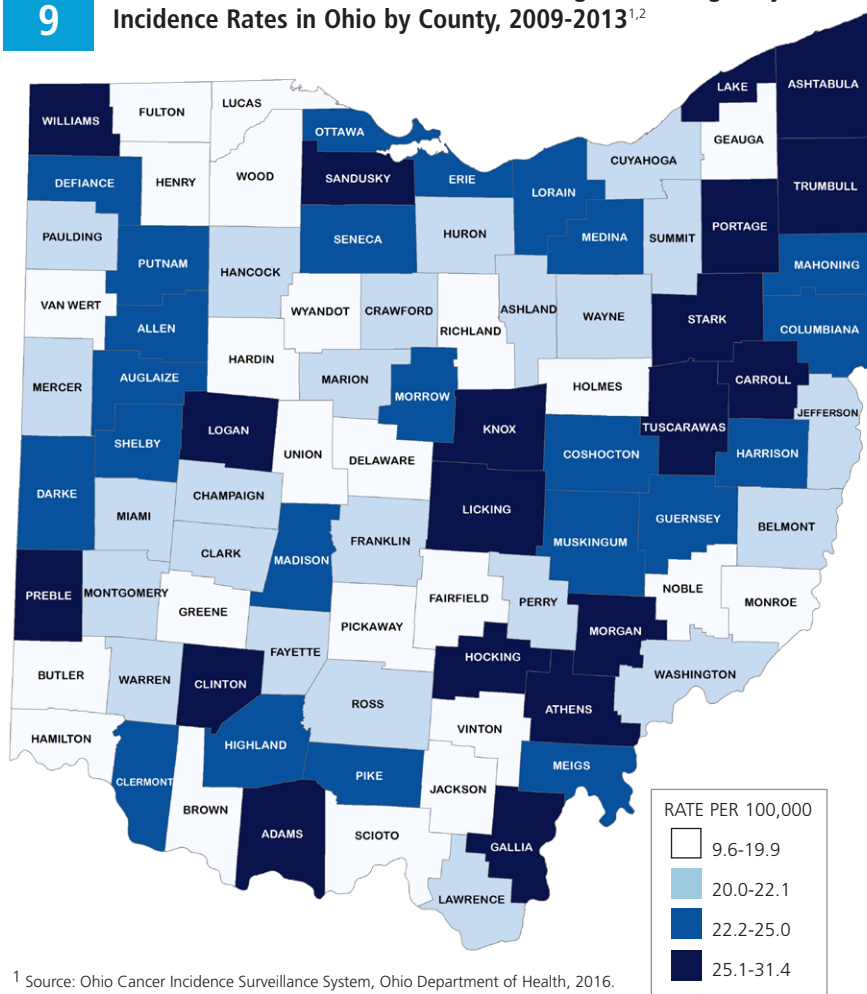
An estimated 16,390 deaths from bladder cancer are expected to occur in 2016 in the United States.¹ The average annual mortality rate for bladder cancer in Ohio from 2009-2013 was 5.1 per 100,000.⁷ This represents 702 average annual deaths in Ohio from bladder cancer during this time period (Table 3).⁷ Similar to incidence, the bladder cancer mortality rate in Ohio was highest among white males (9.1 per 100,000) (Table 5).⁷

Trends

After several decades of increasing incidence rates, bladder cancer has recently begun to decline in the United States.¹ From 2003 to 2012, rates have decreased by 0.5 percent per year.¹ Figure 10 displays bladder cancer incidence trends in Ohio. From 1996 to 2013, the bladder cancer incidence rate in Ohio increased 3 percent for all races and sexes combined.³ Incidence rates were relatively stable among white males and females in Ohio, whereas rates were more variable among black males and females during this time period.³

FIGURE 9

Cancer of the Bladder: Quartiles of Average Annual Age-adjusted Incidence Rates in Ohio by County, 2009-2013^{1,2}

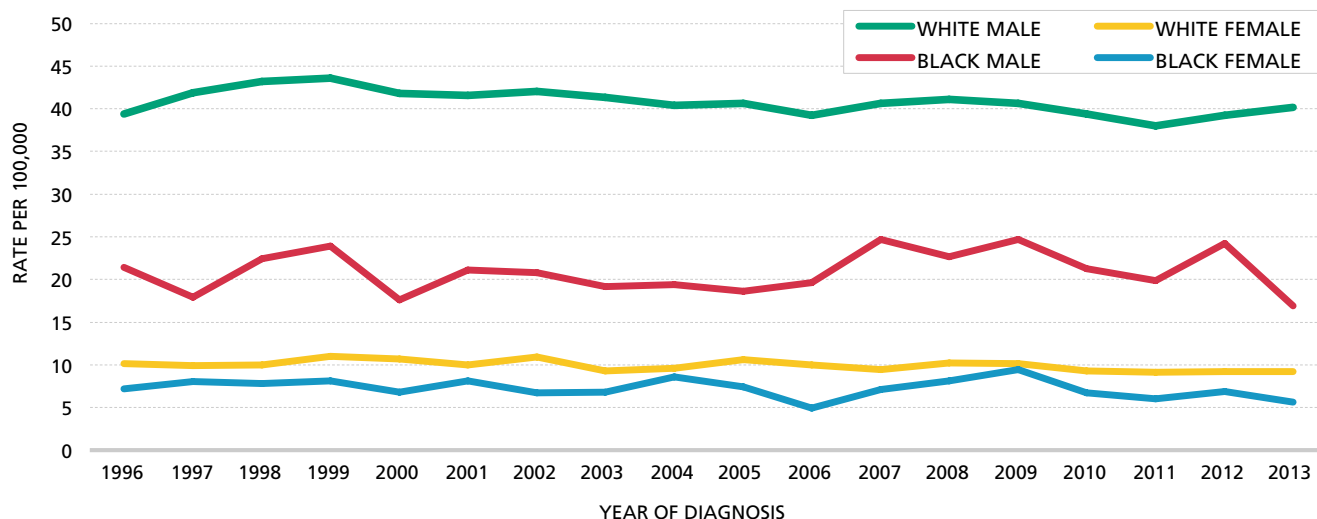


¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

Death rates for bladder cancer in the United States have been stable since 1987 in men and decreased by 0.4 percent per year since 1986 in women.¹ Figure 11 displays bladder cancer mortality trends in Ohio. Although the overall bladder cancer mortality rate in Ohio increased 10 percent from 1996 to 2013, there were no clear trends in bladder cancer mortality rates in Ohio for any sex-race group during this time period.⁷

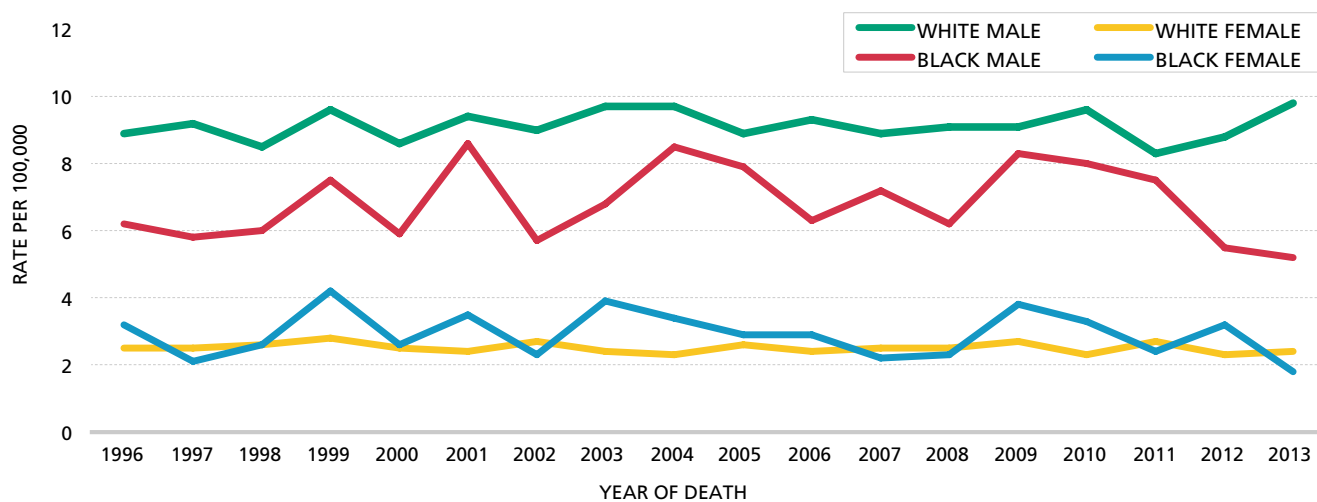
FIGURE 10 Trends in Age-adjusted Incidence Rates for Cancer of the Bladder by Sex and Race in Ohio, 1996-2013^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

FIGURE 11 Trends in Age-adjusted Mortality Rates for Cancer of the Bladder by Sex and Race in Ohio, 1996-2013^{1,2}



¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.



Early Detection

There is currently no screening method recommended for people at average risk of bladder cancer. Bladder cancer is diagnosed by microscopic examination of cells from urine or bladder tissue and examination of the bladder wall with a cystoscope, a slender tube fitted with a lens and light that is inserted through the urethra.¹ These and other tests may be used to screen people at increased risk, as well as during follow-up after bladder cancer treatment to detect recurrent or new tumors.

Treatment

Surgery, alone or in combination with other treatments, is used in more than 90 percent of cases.¹ Early stage cancers may be treated by removing the tumor and then administering immunotherapy or chemotherapy drugs directly into the bladder.¹ More advanced cancers may require removal of the entire bladder (cystectomy).¹ Patient outcomes are improved with the use of chemotherapy, alone or with radiation, before cystectomy.¹ Timely follow-up care is extremely important because of the high rate of bladder cancer recurrence.¹

Survival

For all stages combined, the 2006-2012 five-year relative survival probability for bladder cancer was 78 percent.⁴ Half of all bladder cancer patients were diagnosed while the tumor was *in situ*, for which the five-year survival probability was 96 percent.⁴ If the tumor was diagnosed at the distant stage, the five-year survival probability dropped to only 5 percent.⁴ In Ohio, from 2009 to 2013, 11 percent of bladder cancers were diagnosed late stage.³

RISK FACTORS AND POPULATIONS WITH HIGH RATES

POTENTIALLY MODIFIABLE RISK FACTORS

Smoking: Tobacco smoking is the most common modifiable risk factor for bladder cancer, accounting for approximately 50 percent of all cases.

Workplace exposures: Certain industrial chemicals have been linked with bladder cancer. Painters and workers in the dye, rubber, leather and aluminum industries have an increased risk.

Arsenic: Arsenic, including that in drinking water, has been linked with a higher risk of bladder cancer in some parts of the world.

Certain by-products in treated water: Exposure to chlorinated aliphatic hydrocarbons and chlorination by-products in treated water increase bladder cancer risk.

Aristolochic acid: Aristolochic acid, a Chinese herb, increases bladder cancer risk.

Chemotherapy: Taking the chemotherapy drug cyclophosphamide or ifosfamide increases the risk of bladder cancer.

Radiation therapy: People who are treated with radiation to the pelvis are more likely to develop bladder cancer.

NON-MODIFIABLE RISK FACTORS

Age: The risk of bladder cancer increases with age. About nine out of 10 people with bladder cancer are older than 55.

Race and ethnicity: Whites are about twice as likely to develop bladder cancer as blacks. Non-Hispanics are twice as likely to develop bladder cancer as Hispanics.

Sex: Bladder cancer is much more common in men than in women.

Chronic bladder irritation and infections: Urinary infections, kidney and bladder stones, bladder catheters left in place for a long time and other causes of chronic bladder irritation have been linked with bladder cancer.

Family history: People who have family members with bladder cancer have a higher risk of getting it themselves. The increased risk among family members may be due to exposure to the same cancer-causing chemicals (such as those in tobacco smoke).

Genetics: People with specific genetic characteristics have a higher bladder cancer risk. These include HRAS mutation (Costello Syndrome, Facio-Cutaneous-Skeletal Syndrome), Rb1 mutation, PTEN/MMAC1 mutation (Cowden Syndrome), NAT2 slow acetylator phenotype and GSTM1 null phenotype.

SIGNS AND SYMPTOMS OF BLADDER CANCER

- Blood in the urine
- Changes in bladder habits or symptoms of irritation:
 - Having to urinate more often than usual
 - Pain or burning during urination
 - Need to urinate right away, even when the bladder is not full
 - Having trouble urinating or having a weak urine stream

Bladder cancers that have grown large enough or have spread to other parts of the body can sometimes cause other symptoms, such as:

- Being unable to urinate
- Lower back pain on one side
- Loss of appetite and weight loss
- Feeling tired or weak
- Swelling in the feet
- Bone pain

Any of these signs/symptoms may be caused by cancer or by other, less serious health problems. If you have any of these signs/symptoms, see your healthcare provider.

An estimated 246,660 new cases of invasive breast cancer are expected to occur among women in the United States during 2016.¹ It is the most frequently diagnosed cancer in women.¹ In addition to the number of female breast cancers, about 2,600 new cases of invasive breast cancer are expected to occur among males in 2016.¹ From 2003 to 2012, U.S. breast cancer incidence rates were stable among white women and increased slightly (by 0.3 percent per year) among black women.¹

In addition to invasive breast cancer, 61,000 new cases of *in situ* breast cancer are expected to occur nationally among women during 2016.¹ Of these, approximately 83 percent will be ductal carcinoma *in situ* (DCIS), which is noninvasive cancer cells in the milk ducts.¹ *In situ* breast cancer incidence rates have stabilized since 2000 among women 50 and older and since 2007 among younger women.¹

FIGURE 12

12 Age-adjusted Incidence Rates in Ohio by County, 2009-2013^{1,2}

RATE PER 100,000

- 70.7-109.0
- 109.1-115.9
- 116.0-125.5
- 125.6-152.3

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.
² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population

The risk of developing breast cancer increases with age. In Ohio from 2009 to 2013, approximately 96 percent of women who developed breast cancer were 40 and older.³

About 70 men were diagnosed with breast cancer each year in Ohio from 2009 to 2013 with a corresponding rate of 1.2 per 100,000, which is the same as the U.S. rate (Table 2).^{3,4} Clinically, breast cancer in men is very similar to breast cancer in women, but the prognosis is often poorer for men because they tend to be diagnosed at a later stage than women.¹³

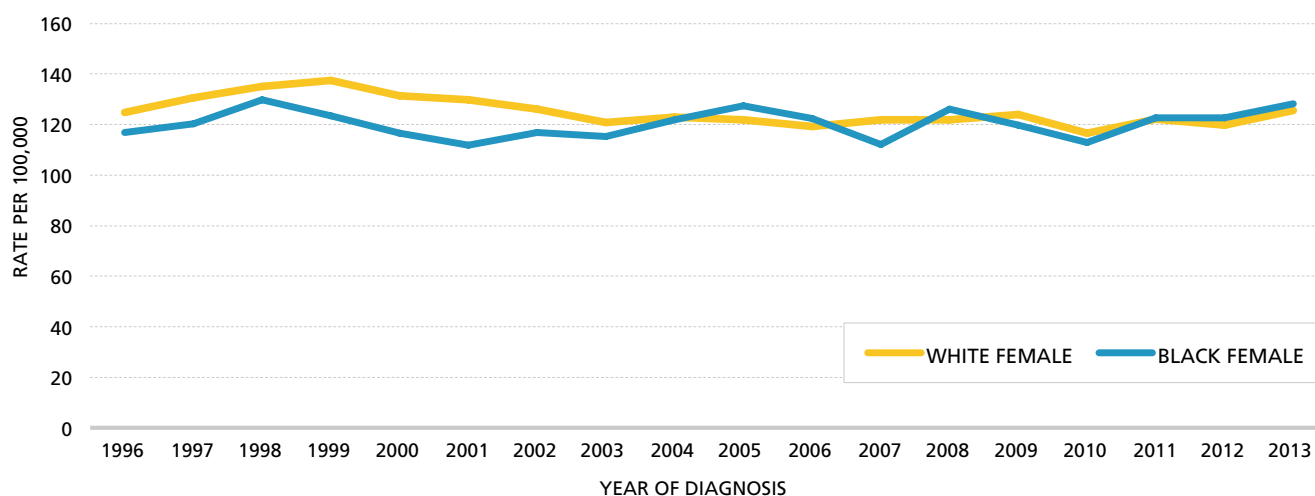
¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

Deaths

An estimated 40,890 deaths (40,450 women, 440 men) are anticipated from breast cancer in 2016 nationally.¹ Breast cancer ranks second in cancer deaths among women after lung and bronchus cancer.¹ Mortality rates declined 36 percent in women from 1989 to 2012.¹ Improved mammography screening to detect breast cancer early, along with better treatment options and increased awareness, have made breast cancer a more curable disease than it was 30 years ago.¹ In Ohio from 2009-2013, 98 percent of breast cancer deaths occurred in women 40 and older.⁷ The 2009-2013 average annual mortality rate for breast cancer in Ohio females was 23.2 per 100,000 compared to the U.S. rate of 21.5 per 100,000.⁷ This represents 1,761 average annual deaths in Ohio from female breast cancer over this time period (Table 3).⁷

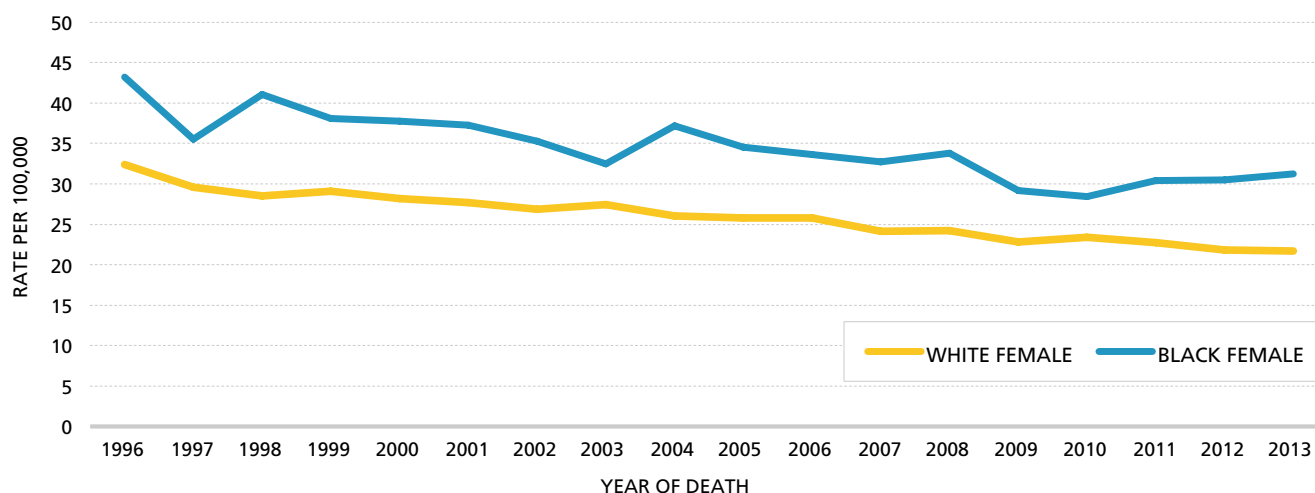
FIGURE 13 Trends in Age-adjusted Incidence Rates for Cancer of the Female Breast by Race in Ohio, 1996-2013^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

FIGURE 14 Trends in Age-adjusted Mortality Rates for Cancer of the Female Breast by Race in Ohio, 1996-2013^{1,2}



¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

Trends

Figure 13 displays female breast cancer incidence trends in Ohio. Between 1996 and 2013, breast cancer incidence rates among white Ohio females increased less than one percent, from a rate of 124.7 per 100,000 in 1996 to a rate of 125.6 per 100,000 in 2013.³ During the same 18-year time period, the breast cancer incidence rate for black Ohio females increased 10 percent, from 116.8 per 100,000 in 1996 to 128.2 per 100,000 in 2013.³

Figure 14 displays female breast cancer mortality trends in Ohio. Between 1996 and 2013, white Ohio females experienced a 33 percent decrease in breast cancer mortality rates, from a rate of 32.4 per 100,000 in 1996 to a rate of 21.7 per 100,000 in 2013.⁷ The breast cancer mortality rate for black Ohio females decreased 28 percent, from 43.2 per 100,000 in 1996 to 31.2 per 100,000 in 2013.⁷

SIGNS AND SYMPTOMS OF BREAST CANCER

- Lump or swelling in the breast or underarm area
- Persistent changes in the breast such as skin irritation, dimpling, thickening, swelling, distortion or tenderness
- Nipple ulceration or retraction (turning inward)
- Redness or scaliness of the nipple or breast skin
- Nipple discharge (other than breast milk)

Any of these signs/symptoms may be caused by cancer or by other, less serious health problems. If you have any of these signs/symptoms, see your healthcare provider.



RISK FACTORS AND POPULATIONS WITH HIGH RATES

POTENTIALLY MODIFIABLE RISK FACTORS

Having children after 30 or not having children: Women who have had no children or who had their first child after age 30 have a slightly higher breast cancer risk.

Oral contraceptive use: Women who currently or recently used oral contraceptives have a slightly increased risk compared with women who stopped using them more than 10 years ago or never used them.

Long-term use of menopausal hormone therapy: Women who used combined estrogen and progestin menopausal hormone therapy for more than five years have an increased risk of developing breast cancer.

Not breastfeeding: Women who have never nursed or who have nursed less than 1.5 years have a slightly increased risk compared to mothers who nursed 1.5 to 2 years.

Overweight and obesity: Overweight/obese women have an increased risk of post-menopausal breast cancer.

Alcohol: The more alcohol a woman drinks, the greater her risk of breast cancer.

Previous breast/chest radiation: Women who had radiation therapy to the chest area before age 30 as treatment for another cancer or other medical conditions have increased risk.

NON-MODIFIABLE RISK FACTORS

Sex: Breast cancer is about 100 times more common among women than men.

Age: Risk of developing breast cancer increases with age. About one out of eight invasive breast cancers are found in women younger than 45, while about two of three invasive breast cancers are found in women age 55 or older.

Race: White women are slightly more likely to develop breast cancer than black women, but black women are more likely to die of this cancer, due in part to more aggressive tumors among black women.

Ethnicity: Ashkenazi Jews are at increased risk due to increased prevalence of BRCA1 and BRCA2 mutations.

Genetic alterations: About 5-10 percent of cases are hereditary and result from gene mutations, most commonly mutations of the BRCA1 and BRCA2 genes.

High breast density: Women with high breast tissue density (the amount of glandular tissue relative to fatty tissue measured on a mammogram) have higher risk of breast cancer.

Family history: Risk is higher if a first-degree relative has had breast cancer, especially if the family member was diagnosed before age 50.

Personal history: Women with cancer in one breast, biopsy-confirmed hyperplasia (abnormal cell proliferation), lobular carcinoma *in situ* (LCIS) (abnormal cells are found in the lobules of the breast) or DCIS have increased risk.

Long menstrual history: Women who started menstruating before age 12 or who went through menopause after age 55 have a higher risk.

Diethylstilbestrol (DES): Women who were given DES during pregnancy have slightly increased risk.

Early Detection

Numerous studies have shown that early detection of breast cancer saves lives and increases treatment options.¹ Mammography is especially valuable as an early detection tool because it can often identify breast cancer at an early stage, usually before physical symptoms develop. Mammography will detect most, but not all, breast cancers in women without symptoms, and the sensitivity of the test is lower for women with dense breasts.¹

According to the 2014 Ohio Behavioral Risk Factor Surveillance System (BRFSS), 75 percent of Ohio women aged 50-64 and 79 percent of Ohio women aged 65-74 reported having had a mammogram in the past two years.¹⁴ Also according to the 2014 BRFSS, more blacks (84 percent) than whites (74 percent) reported having had a mammogram in the past two years.¹⁴ The percentage of respondents who received a mammogram was lowest for those with less than a high school education (72 percent) and those with the lowest income (less than \$25,000 per year) (69 percent), and highest for college graduates (84 percent) and those with the highest income (at least \$50,000 per year) (81 percent) (Table 6).¹⁴

Table A-8 on page 82 shows the ACS and U.S. Preventive Services Task Force (USPSTF) recommendations for the early detection of breast cancer in average risk, asymptomatic women by age.

In 2015, the ACS changed their guidelines for breast cancer screening.¹⁵ The ACS recommends that women with an average risk of breast cancer should undergo regular screening mammography starting at age 45 years.¹⁵ Women aged 45 to 54 years should be screened annually.¹⁵ Women 55 years and older should transition to biennial screening or have the opportunity to continue screening annually.¹⁵ Women should have the opportunity to begin annual screening between the ages of 40 and 44 years.¹⁵ Women should continue screening mammography as long as their overall health is good and they have a life expectancy of 10 years or longer.¹⁵ The ACS does not recommend clinical breast examination for breast cancer screening among average-risk women at any age.¹⁵

The USPSTF recommends mammography every two years beginning at age 50 among asymptomatic women at average risk of developing breast cancer.¹⁶ The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening mammography in women aged 75 years or older.¹⁶

Treatment

Patients should discuss possible options for the best management of their breast cancer with their physicians. Taking into account the tumor size, stage and other characteristics, as well as the patient's preferences, treatment may involve one or more of the following: breast-conserving surgery (surgical removal of the tumor and surrounding tissue), mastectomy (surgical removal of the breast), removal of the lymph nodes under the arm, radiation therapy, chemotherapy, hormone therapy or targeted therapy.¹ Numerous studies have shown that, for early stage disease, the long-term survival probability after breast-conserving surgery plus radiation therapy is similar to the survival probability after mastectomy.¹

Survival

The five-year relative survival probability for localized breast cancer was 99 percent in 2006-2012.⁴ If the cancer has spread regionally, however, the probability was 85 percent and for women with distant metastases, the probability was only 26 percent (Figure 1).⁴ Survival after a diagnosis of breast cancer continues to decline beyond five years and is also stage-dependent, with the best survival observed in women diagnosed with early stage disease. In Ohio from 2009-2013, 68 percent of breast cancers among women were diagnosed early stage (Table A-4 on page 78).³

TABLE
6

Prevalence of Women 50-74 Who Reported Having Had a Mammogram in the Past Two Years by Demographics in Ohio, 2014^{1,2}

	Had a Mammogram in the Past Two Years
AGE	
50-64	75%
65-74	79%
RACE	
White	74%
Black	84%
EDUCATION	
Less Than High School	72%
High School or GED*	74%
Some College	74%
College Graduate	84%
ANNUAL HOUSEHOLD INCOME	
<\$25,000	69%
\$25,000-\$49,999	72%
\$50,000+	81%
Total (Women 50-74)	76%

¹ Source: 2014 Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2016.

² "Don't Know" and "Refused" were excluded from the denominator. This can cause an artificially high percentage.

* General Educational Development

Cervical Cancer



New Cases

Nationally, an estimated 12,990 new cases of invasive cervical cancer are expected to occur in 2016.¹ The cervical cancer incidence rate declined by more than half between 1975 (14.8 per 100,000) and 2012 (6.7 per 100,000) due to the widespread uptake of screening with the Papanicolaou (Pap) test and removal of precancerous lesions.¹ However, from 2008 to 2012, incidence rates stabilized in women younger than 50 and decreased only 3 percent among women 50 and older.¹

An average of 456 new cases of invasive cervical cancer were diagnosed annually in Ohio in 2009-2013 with a corresponding rate of 7.5 per 100,000, which was the same as the rate in the United States during this time period (Table 2).^{3,4} Nearly half of the women diagnosed with cervical cancer in Ohio from 2009 to 2013 were younger than 50 years.³ Average annual age-adjusted incidence rates of cervical cancer by Ohio county of residence are shown in Figure 15.

Currently, a woman living in the United States has a 1 in 170 lifetime risk of developing invasive cervical cancer.²

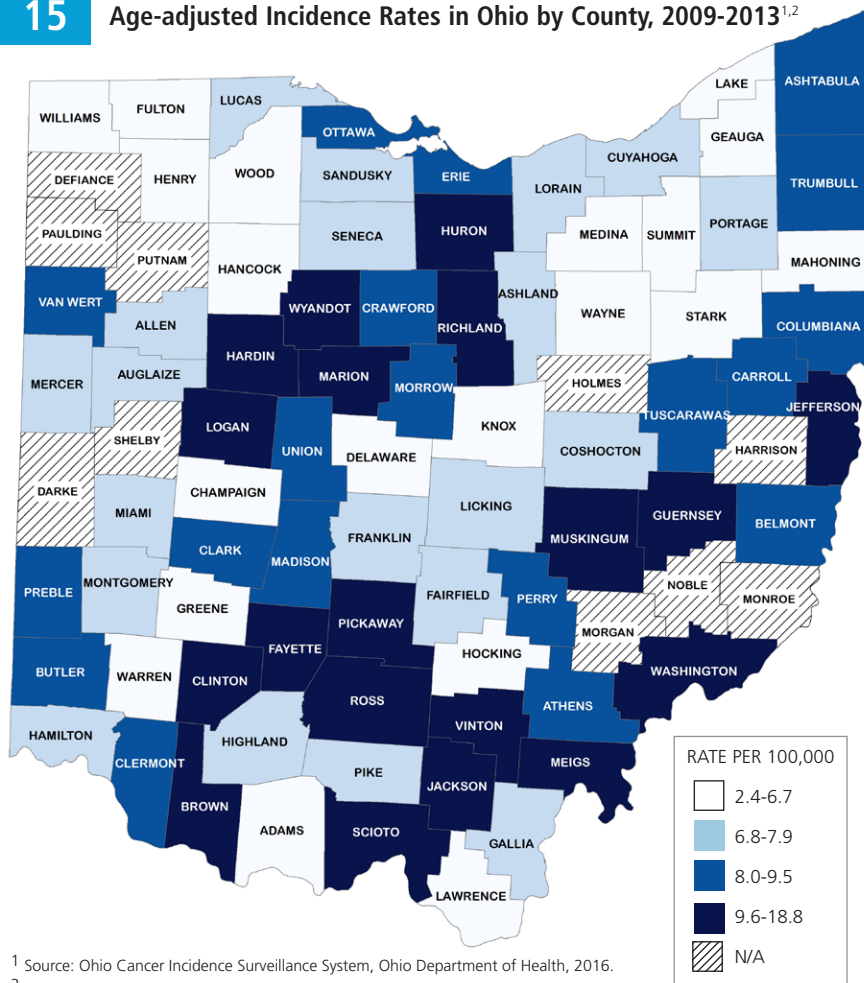
Deaths

In the United States, an estimated 4,120 cervical cancer deaths are expected to occur in 2016.¹ Similar to incidence, the cervical cancer death rate in 2012 (2.3 per 100,000) was less than half that in 1975 (5.6 per 100,000) due to declines in incidence and the early detection of cancer with the Pap test.¹ However, the magnitude of the decline has begun to slow in recent years in women of all ages, indicating that the rates may be approaching a lower limit.¹ From 2003 to 2012, the death rate decreased by 0.9 percent per year.¹

The average annual mortality rate for cervical cancer in Ohio from 2009 to 2013 was 2.5 per 100,000.⁷ This represents an annual average of 167 deaths in Ohio from cervical cancer over the time period (Table 3).⁷

FIGURE 15

Cancer of the Cervix: Quartiles of Average Annual Age-adjusted Incidence Rates in Ohio by County, 2009-2013^{1,2}

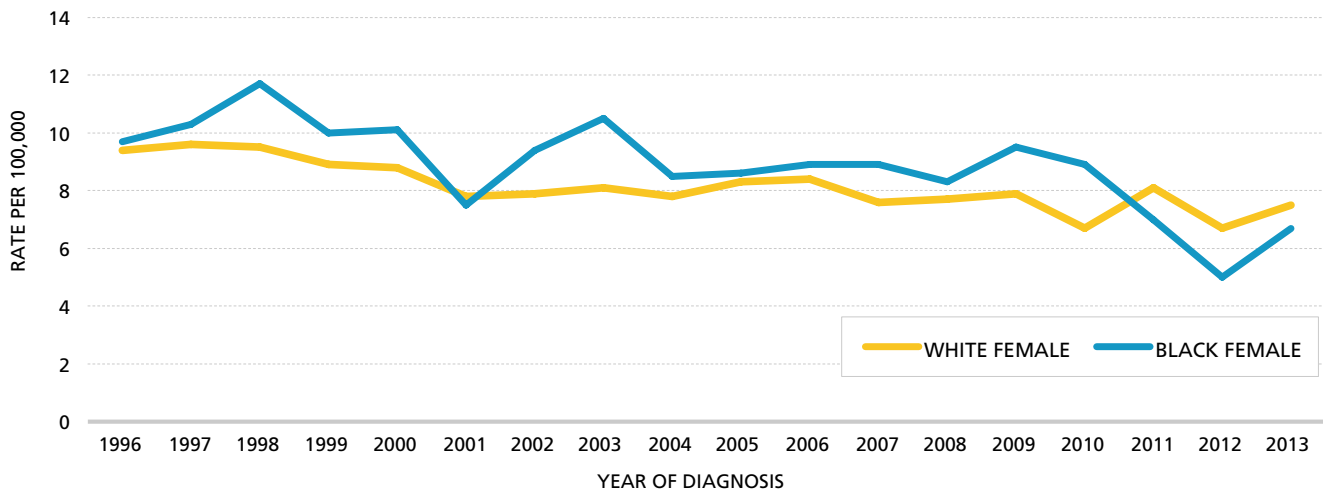


Trends

In Ohio, incidence rates of cervical cancer decreased 21 percent from 1996 to 2013 (9.4 per 100,000 and 7.4 per 100,000, respectively).³ The decline in cervical cancer incidence rates was higher for black females (31 percent) compared to white females (20 percent) in Ohio during this time period (Figure 16).³

Similar to incidence, cervical cancer mortality rates in Ohio declined 27 percent from 1996 (3.4 per 100,000) to 2013 (2.5 per 100,000).⁷ Mortality rates of cervical cancer among black females were variable from year to year but decreased 40 percent from 1996 to 2013, compared to a decrease of 22 percent among white females during this time period (Figure 17).⁷

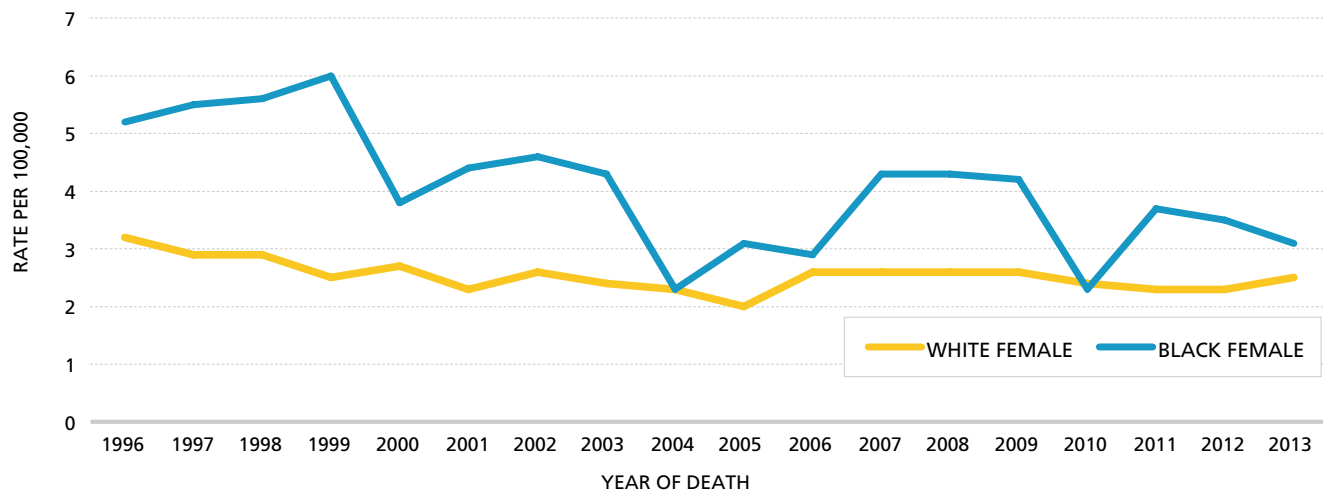
FIGURE 16 Trends in Age-adjusted Incidence Rates for Cancer of the Cervix by Race in Ohio, 1996-2013^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

FIGURE 17 Trends in Age-adjusted Mortality Rates for Cancer of the Cervix by Race in Ohio, 1996-2013^{1,2}



¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

RISK FACTORS AND POPULATIONS WITH HIGH RATES

Infection of the cervix with HPV is almost always the cause of cervical cancer. Not all women with HPV infection, however, will develop cervical cancer.¹⁷ Women who do not regularly have tests to detect HPV or abnormal cells in the cervix are at increased risk of cervical cancer. There are three vaccines (Cervarix, Gardasil and Gardasil 9) to prevent HPV in girls and young women who do not have HPV.¹⁷

POTENTIALLY MODIFIABLE RISK FACTORS

HPV infection and sexual activity: Factors that affect the risk of contracting HPV include the following:

Multiple sexual partners: Having multiple sexual partners or having a partner with multiple partners increases the risk of HPV infection.

Age at first sexual intercourse: Younger age at first sexual intercourse increases the risk of HPV infection.

Smoking: Women who smoke are about twice as likely as nonsmokers to develop cervical cancer.

Oral contraceptives: Long-term use of oral contraceptives increases risk of cervical cancer.

Giving birth to many children: Risk of cervical cancer increases with the number of childbirths.

NON-MODIFIABLE RISK FACTORS

DES: Being exposed to DES while in the mother's womb increases the risk of cervical dysplasia and clear cell adenocarcinoma of the cervix.

Immunosuppression: Having a weakened immune system caused by immunosuppression increases the risk of HPV infection and cervical cancer.

SIGNS AND SYMPTOMS OF CERVICAL CANCER

Signs and symptoms usually do not appear until abnormal cervical cells become cancerous and invade nearby tissue.

- Vaginal bleeding (including bleeding after sexual intercourse)
- Unusual vaginal discharge
- Pain during urination
- Pain during intercourse
- Pelvic pain

Any of these signs/symptoms may be caused by cancer or by other, less serious health problems. If you have any of these signs/symptoms, see your healthcare provider.

Early Detection

Table A-8 on page 82 shows the ACS and USPSTF recommendations for the early detection of cervical cancer in average risk, asymptomatic women by age.

The ACS recommends the following for the early detection of cervical cancer: for women 21 to 29, a Pap test every three years; and for women 30 to 65, Pap test plus an HPV test (called "co-testing") every five years (preferred) or a Pap test alone every three years (acceptable).¹⁹ The ACS also recommends that women over 65 who have had three or more consecutive negative Pap tests or two or more consecutive negative HPV and Pap tests within the past 10 years, with the most recent test occurring in the past five years, should stop cervical cancer screening.¹⁹ A woman who has had a total hysterectomy should stop cervical cancer screening.¹⁹ A woman who has been vaccinated against HPV should still follow the screening recommendations for her age group.¹⁹

The USPSTF recommends the following for the early detection of cervical cancer: for women 21 to 65, a Pap test every three years; and for women 30 to 65 who want to lengthen the screening interval, screening with a combination of Pap and HPV testing every five years.²⁰ Screening after a hysterectomy with removal of the cervix among women who do not have a history of high-grade precancerous lesions (*i.e.*, cervical intraepithelial neoplasia (CIN) grade 2 or 3) or cervical cancer is not recommended.²⁰ Women older than 65 who have had adequate prior screenings and are not otherwise at high risk of cervical cancer should not be tested.²⁰

According to the 2014 BRFSS, 82 percent of female Ohioans ages 21 to 65 reported having had a Pap test within the last three years (Table 7).¹⁴ The percentage of Pap testing was lowest for those with less than a high school education (68 percent) and those with the lowest household income (less than \$25,000 per year) (74 percent), and highest for college graduates (88 percent) and those with the highest household income (at least \$50,000 per year) (88 percent).¹⁴



**TABLE
7**

Prevalence of Women 21-65 Who Reported Having Had a Pap Test in the Past Three Years by Demographics in Ohio, 2014^{1,2}

	Had a Pap Test in the Past Three Years
AGE	
21-40	83%
41-65	81%
RACE	
White	81%
Black	82%
EDUCATION	
Less Than High School	68%
High School or GED*	77%
Some College	83%
College Graduate	88%
ANNUAL HOUSEHOLD INCOME	
<\$25,000	74%
\$25,000-\$49,999	77%
\$50,000+	88%
Total (Women 21-65)	82%

¹ Source: 2014 Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2016.

² "Don't Know" and "Refused" were excluded from the denominator. This can cause an artificially high percentage.

* General Educational Development

Treatment

For pre-invasive lesions, preferred treatment includes: loop electrosurgical excision procedure (LEEP) (removal of abnormal tissue with a wire loop heated by electric current), cryotherapy (destruction of cells by extreme cold), laser ablation (destruction of cells by laser) or conization (removal of a cone-shaped piece of tissue containing the abnormal tissue).¹ Invasive cervical cancers generally are treated with surgery or radiation combined with chemotherapy.¹

Survival

The five-year relative survival probability for cervical cancer was 69 percent in 2006-2012.⁴ Almost half of patients (46 percent) were diagnosed when the cancer was localized, for which the five-year survival probability was 91 percent.⁴ Nationally, whites were more likely than blacks to have their cancers diagnosed at the localized stage (48 percent versus 38 percent, respectively).⁴ In Ohio, from 2009-2013, 52 percent of invasive cervical cancers were diagnosed late stage.³

Vaccines are the best way to protect men and women against some of the most common types of HPV, including types 16 and 18 which have been linked to cancer in both men and women. HPV vaccines are safe and effective. HPV vaccines are most effective when given at 11 or 12 years old but can be given as early as 9 years old or as late as 26 years old. National survey data indicate that 35 percent of Ohio female adolescents and 23 percent of male adolescents received the recommended doses of the HPV vaccine in 2014 compared to 40 percent and 22 percent in the United States, respectively.¹⁸



A close-up portrait of a young woman with dark, curly hair, smiling warmly at the camera. She is wearing a bright yellow collared shirt. The background is a solid, vibrant orange color.

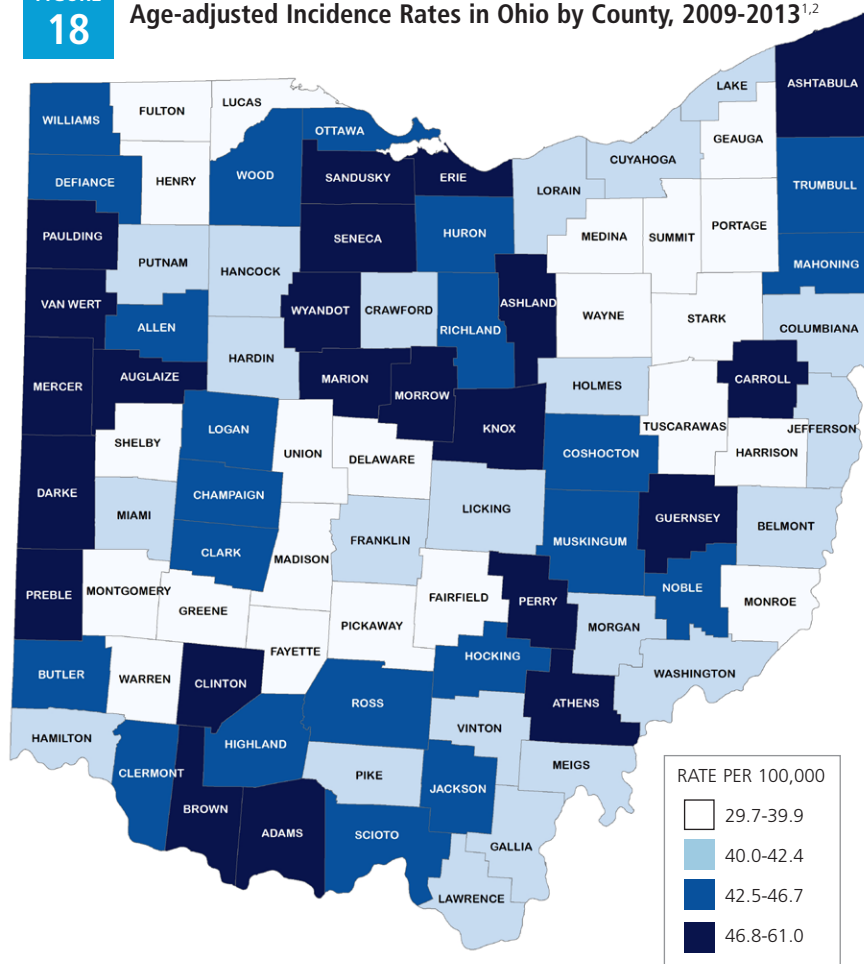
Nationally, an estimated 95,270 colon and 39,220 rectum cancer cases are expected to occur in 2016.¹ Colon and rectum cancer is the third most common invasive cancer in both men and women. Colon and rectum cancer incidence rates have been decreasing for most of the past two decades, which has largely been attributed to both changes in risk factors (e.g., decreased smoking, increased use of nonsteroidal anti-inflammatory drugs) and increases in use of colon and rectum screening tests that allow for detection and removal of colon and rectum polyps before they progress to cancer.¹ An average of 5,654 (2,925 men and 2,729 women) new cases of colon and rectum cancer were diagnosed annually between 2009 and 2013 in Ohio corresponding to an average annual rate of 41.8 per 100,000 (Table 2).³ Average annual incidence rates of colon and rectum cancer by Ohio county of residence are shown in Figure 18.

Deaths

An estimated 49,190 colon and rectum cancer deaths are expected to occur in 2016 nationally, accounting for 8 percent of cancer deaths for both men and women.¹ The mortality rate declined for both men and women over the past two decades.¹ This trend reflects declining incidence rates and improvements in early detection and treatment.¹

The average annual mortality rate for colon and rectum cancer in Ohio from 2009-2013 was 16.5 per 100,000.⁷ This represents 2,263 average annual deaths in Ohio from colon and rectum cancer over the time period (Table 3).⁷ Although colon and rectum cancer mortality rates are dropping, black men in Ohio die from colon and rectum cancer at a higher rate compared to white men, white women and black women (Table 5).⁷

Cancer of the Colon & Rectum: Quartiles of Average Annual Age-adjusted Incidence Rates in Ohio by County, 2009-2013^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

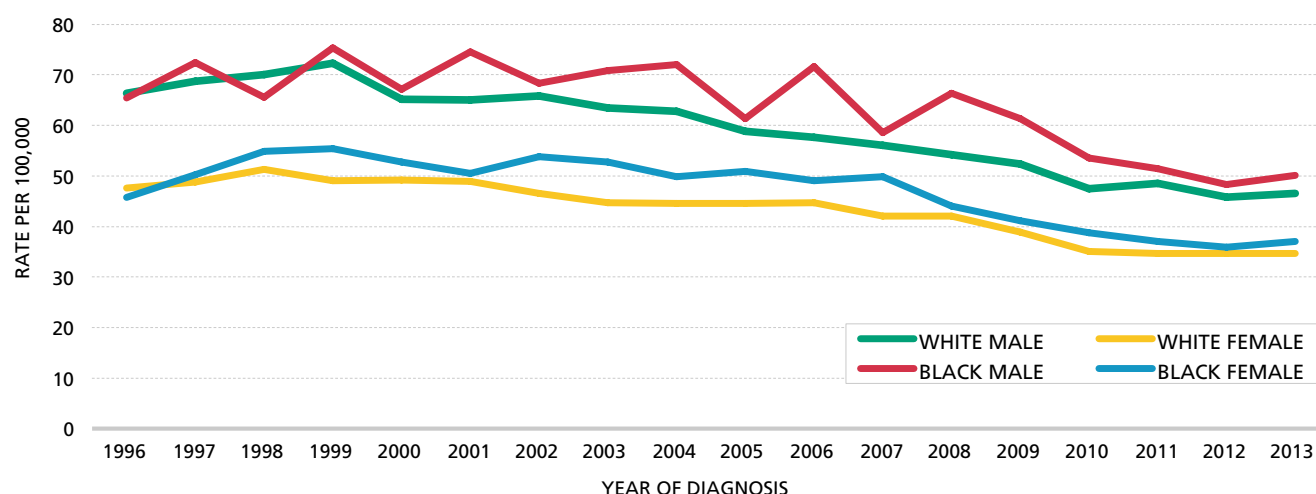
Currently, a man living in the United States has a 1 in 26 lifetime risk of developing invasive colon and rectum cancer, and a woman has a 1 in 30 lifetime risk of developing invasive colon and rectum cancer.³

Trends

Similar to the U.S. incidence rates, colon and rectum cancer incidence rates in Ohio declined from 1996 to 2013 for all sex and race groups.³ The largest decline (30 percent) was in white males (66.3 per 100,000 in 1996 to 46.5 per 100,000 in 2013) followed by white females (27 percent), black males in 1996 (23 percent) and black females in 2013 (19 percent) (Figure 19).³

Colon and rectum cancer mortality rates in Ohio declined at least 30 percent from 1996 to 2013 for all sex and race groups.⁷ The largest decline (45 percent) was in black females (27.8 per 100,000 in 1996 to 15.3 per 100,000 in 2013) (Figure 20).⁷

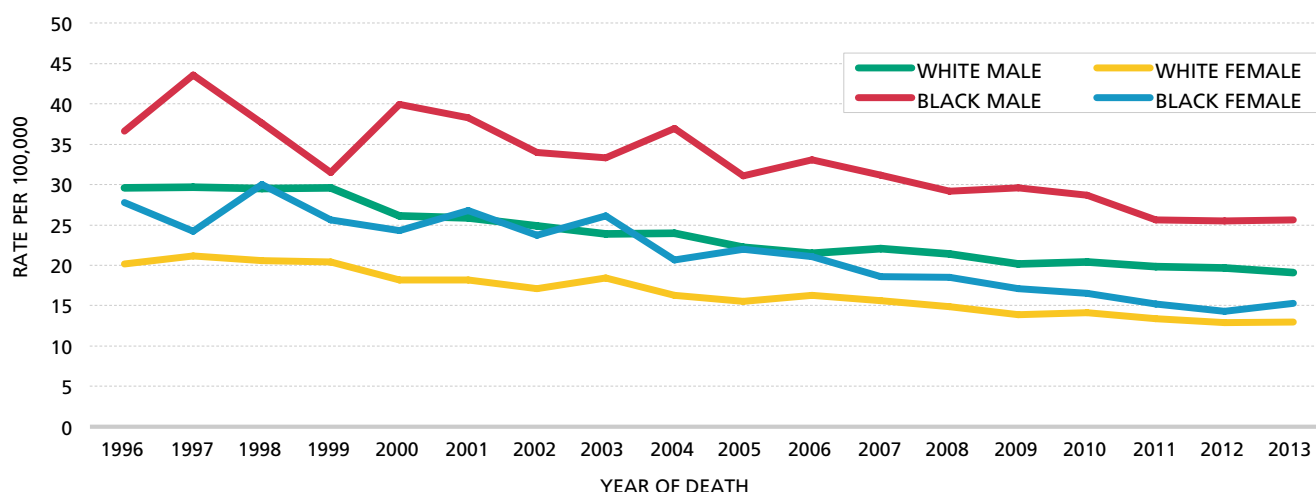
FIGURE 19 Trends in Age-adjusted Incidence Rates for Cancer of the Colon & Rectum by Sex and Race in Ohio, 1996-2013^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

FIGURE 20 Trends in Age-adjusted Mortality Rates for Cancer of the Colon & Rectum by Sex and Race in Ohio, 1996-2013^{1,2}



¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

RISK FACTORS AND POPULATIONS WITH HIGH RATES

POTENTIALLY MODIFIABLE RISK FACTORS

Excessive alcohol use: Heavy alcohol use increases risk.

Smoking: People who have smoked for a long time are more likely than nonsmokers to develop and die from colon and rectum cancer.

NON-MODIFIABLE RISK FACTORS

Age: More than 90 percent of colon and rectum cancers occur in individuals 50 and older.

Sex: Men have higher incidence rates of colon and rectum cancer than women.

Race: Blacks have the highest incidence rates of colon and rectum cancer.

Ethnicity: Ashkenazi Jews are at increased risk of colon and rectum cancer.

Colon and rectum polyps: Polyps, growths on the inner wall of the colon or rectum, are common in people older than 50. Most polyps are benign, but some polyps (adenomas) can become cancer.

Family history of colon and rectum cancer or adenomatous polyps: Having a parent, sibling or offspring who has had colon and rectum cancer or adenomatous polyps increases risk, especially if more than one has been diagnosed or the relative was diagnosed at a young age.

Genetic alterations: Changes in certain genes increase risk. Lynch syndrome, also known as hereditary nonpolyposis colon cancer (HNPCC), is an inherited condition that increases colon and rectum cancer risk. Familial adenomatous polyposis (FAP), caused by a change in a gene called adenomatous polyposis coli (APC), is a rare, inherited condition in which hundreds of polyps form in the colon and rectum, which increases colon and rectum cancer risk.

Personal history of certain cancers or adenomatous polyps:

A person who has already had colon and rectum cancer may develop colon and rectum cancer a second time. Also, women with a history of cancer of the ovary, uterus (endometrium) or breast are at higher risk. A person with a history of adenomatous polyps has an increased risk of colon and rectum cancer, especially if the polyps were numerous or large.

Ulcerative colitis or Crohn's disease: A person who has had a condition that causes inflammation of the colon (such as ulcerative colitis or Crohn's disease) for many years is at increased risk of developing colon and rectum cancer.

SIGNS AND SYMPTOMS OF COLON AND RECTUM CANCER

Early stage colon and rectum cancer usually does not have any signs and symptoms. Signs and symptoms of advanced disease may include the following:²¹

- Change in bowel habits such as diarrhea, constipation or narrowing of the stool that lasts for more than a few days
- Rectal bleeding, blood in the stool or blood in the toilet after having a bowel movement
- Dark or black stools
- Feeling that the bowel does not empty completely
- Cramping or steady lower abdominal (stomach area) pain
- Weakness and excessive fatigue
- Decreased appetite and unintentional weight loss
- Having nausea or vomiting

Any of these signs/symptoms may be caused by cancer or by other, less serious health problems. If you have any of these signs/symptoms, see your healthcare provider.

Early Detection

Early stage colon and rectum cancer often has no symptoms, which is why screening is so important.¹ Colonoscopy and flexible sigmoidoscopy offer the best opportunity to detect colon and rectum cancer at an early stage, when successful treatment is likely, and to prevent some cancers by detection and removal of polyps.¹ People should begin colon and rectum cancer screening earlier and/or undergo screening more often if they have a personal history of colon and rectum cancer or adenomatous polyps, a strong family history of colon and rectum cancer or polyps, a personal history of chronic inflammatory bowel disease or if they are a member of a family with hereditary colon and rectum cancer syndromes.¹

Table A-8 on page 82 shows the ACS and USPSTF recommendations for early detection of colon and rectum cancer in average risk, asymptomatic people by age and sex.

According to the ACS, men and women who are at average risk for developing colon and rectum cancer should begin screening at 50.¹ The tests that are designed to find both early cancer and polyps are preferred if these tests are available and the individual is willing to have one of the following more invasive tests: flexible sigmoidoscopy every five years; colonoscopy every 10 years; double-contrast barium enema every five years; or computed tomography (CT) colonography (virtual colonoscopy) every five years.¹ Tests that primarily find cancer include fecal occult blood test (FOBT) every year or fecal immunochemical test (FIT) every year.¹ The take-home multiple-sample method should be used for either FOBT or FIT. If either of these tests is positive, it should be followed up with a colonoscopy.¹

The USPSTF recommends screening for colon and rectum cancer starting at age 50 years and continuing through age 75 years.²² There are several different methods to accurately detect early stage colon and rectum cancer and adenomatous polyps, and the frequency of testing depends on the test performed.²² The decision to screen for colon and rectum cancer in adults 76 to 85 years should be an individual one, taking into account the patient's overall health and prior screening history.²² Adults in this age group who have never been screened for colon and rectum cancer are more likely to benefit. Screening would be most appropriate among adults who 1) are healthy enough to undergo treatment if colon and rectum cancer is detected and 2) do not have comorbid conditions that would significantly limit their life expectancy.²²

COLON AND RECTUM CANCER SCREENING TESTS:²³

Colonoscopy: A colonoscope, a slender, flexible, hollow, lighted tube about the thickness of a finger, is inserted through the rectum and into the colon to visually examine the inside of the entire colon. If a polyp is found, the physician may remove it by laser or by passing a wire loop through the colonoscope to cut the polyp from the wall of the colon using an electric current.

Flexible Sigmoidoscopy: A sigmoidoscope, an instrument similar to a colonoscope but shorter, is inserted through the rectum and into the colon to view the inside of the rectum and the lower portion of the colon. If a polyp is present, the patient is referred for a colonoscopy so that the colon can be examined further.

Fecal Occult Blood Test (FOBT): An FOBT is a stool sample analysis used to detect very small quantities of blood in feces that may be indicative of the presence of colon and rectum polyps or cancers. Positive tests should be followed up by a colonoscopy.

Double-contrast Barium Enema: This procedure allows complete radiological examination of the colon by x-ray. Barium sulfate is propelled into the colon through the rectum and is allowed to spread throughout the colon to partially fill and open it. The colon is then filled with air so that it can expand and increase the quality of x-rays that are taken. If a polyp or other abnormality is seen, the patient is referred for a colonoscopy so that the colon can be examined further.

CT Colonography (Also referred to as Virtual Colonoscopy): A CT scan of the colon and rectum is an x-ray test that produces detailed cross-sectional images to allow a doctor to look for polyps or cancer. If polyps or other suspicious areas are detected, this test should be followed up by a colonoscopy.

Fecal Immunochemical Test (FIT): This test, also called an immunochemical fecal occult blood test (iFOBT), is used to detect hidden blood in the stool. This test reacts to part of the hemoglobin molecule, which is found on red blood cells. If results are positive, a colonoscopy is required to investigate further.

Table 8 displays the prevalence of having a recommended colon and rectum cancer screening test by demographics.¹⁴ The percentage of adults 50-75 receiving a recommended test was lower for those with less than a high school education (57 percent) compared to college graduates (73 percent), those with an annual household income less than \$25,000 (59 percent) compared to those earning \$50,000 or more (68 percent) and whites (65 percent) compared to blacks (71 percent).¹⁴

Treatment

Surgery is the most common form of treatment for colon and rectum cancers which have not spread.¹ Chemotherapy alone or in combination with radiation is given before (neoadjuvant) or after (adjuvant) surgery to most patients whose cancer has deeply penetrated the bowel wall or has spread to the lymph nodes.¹ For colon and rectum cancer that has spread to other parts of the body, treatments typically include chemotherapy and/or targeted therapy.¹ Several targeted therapies are approved by the Food and Drug Administration (FDA) to treat metastatic colon and rectum cancer. Some of these inhibit new blood vessel growth to the tumor by targeting a protein called vascular endothelial growth factor (VEGF).²¹ Others interfere with cancer cell growth by targeting the epidermal growth factor receptor (EGFR) or other proteins.²¹

Survival

According to 2006-2012 data, the five-year relative survival probability for patients with colon and rectum cancer was 65 percent.⁴ When colon and rectum cancers were detected at local stage, the five-year relative survival probability was 90 percent; however, only 39 percent of colon and rectum cancers were diagnosed at local stage in the United States.⁴ For those diagnosed with regional stage, the five-year relative survival probability is 71 percent and 14 percent for persons with distant metastases (Figure 1).⁴ Just over half (51 percent) of all colon and rectum cancers in Ohio were diagnosed late, when survival was not as high (Table A-5 on page 79).³

TABLE
8

Prevalence of Adults 50-75 Who Reported Having Had a Recommended Colon & Rectum Cancer Screening Test by Demographics in Ohio, 2014^{1,2,3}

Had a Recommended Colon & Rectum Cancer Screening Test	
SEX	
Male	66%
Female	65%
AGE	
50-64	59%
65-75	79%
RACE	
White	65%
Black	71%
EDUCATION	
Less Than High School	57%
High School or GED*	61%
Some College	68%
College Graduate	73%
ANNUAL HOUSEHOLD INCOME	
<\$25,000	59%
\$25,000-\$49,999	67%
\$50,000+	68%
Total (Adults 50-75)	65%

¹ Source: 2014 Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2016.

² "Don't Know" and "Refused" were excluded from the denominator. This can cause an artificially high percentage.

³ Recommended screening tests include a screening colonoscopy every 10 years, or sigmoidoscopy every five years with high-sensitivity Fecal Occult Blood Test (FOBT) every three years, or screening with high sensitivity FOBT every year.

* General Educational Development

Kidney and Renal Pelvis Cancer



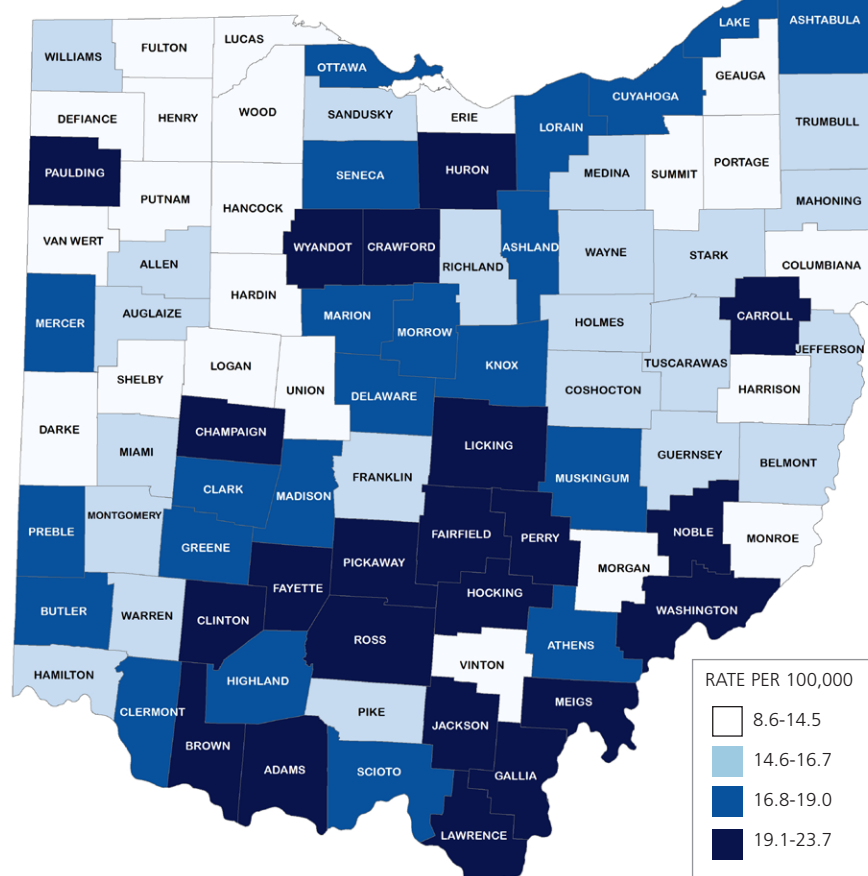
New Cases

Nationally, an estimated 62,700 kidney and renal pelvis cancer cases are expected to occur in 2016.¹ These are primarily renal cell carcinomas (RCC), which occur in the body of the kidney, but also include cancers of the renal pelvis (6 percent), which behave more like bladder cancer, and Wilms tumor (1 percent), a childhood cancer that usually develops before the age of five.¹ Men are twice as likely as women to be diagnosed with kidney and renal pelvis cancer.¹ Kidney and renal pelvis cancer incidence rates have been increasing in the United States for most of the past several decades, due in part to advances in abdominal imaging.¹

Currently, a man living in the United States has a 1 in 53 lifetime risk of developing invasive kidney and renal pelvis cancer and a woman has a 1 in 93 lifetime risk of developing invasive kidney and renal pelvis cancer.²

FIGURE 21

Cancer of the Kidney & Renal Pelvis: Quartiles of Average Annual Age-adjusted Incidence Rates in Ohio by County, 2009-2013^{1,2}



An average of 2,201 (1,347 men and 855 women) new cases of kidney and renal pelvis cancer were diagnosed annually between 2009 and 2013 in Ohio, corresponding to an average annual rate of 16.4 per 100,000 (Table 2).³ Black males had the highest kidney and renal pelvis cancer incidence rate (24.5 per 100,000) compared to white males and females and black females during this time period (Table 4).³ Average annual incidence rates of kidney and renal pelvis cancer by Ohio county of residence are shown in Figure 21.

The risk of developing kidney and renal pelvis cancer increases with age. In Ohio, between 2009 and 2013, approximately 85 percent of individuals who developed kidney and renal pelvis cancer were 50 and older.³

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

Deaths

An estimated 14,240 kidney and renal pelvis cancer deaths are expected to occur in 2016 nationally.⁴

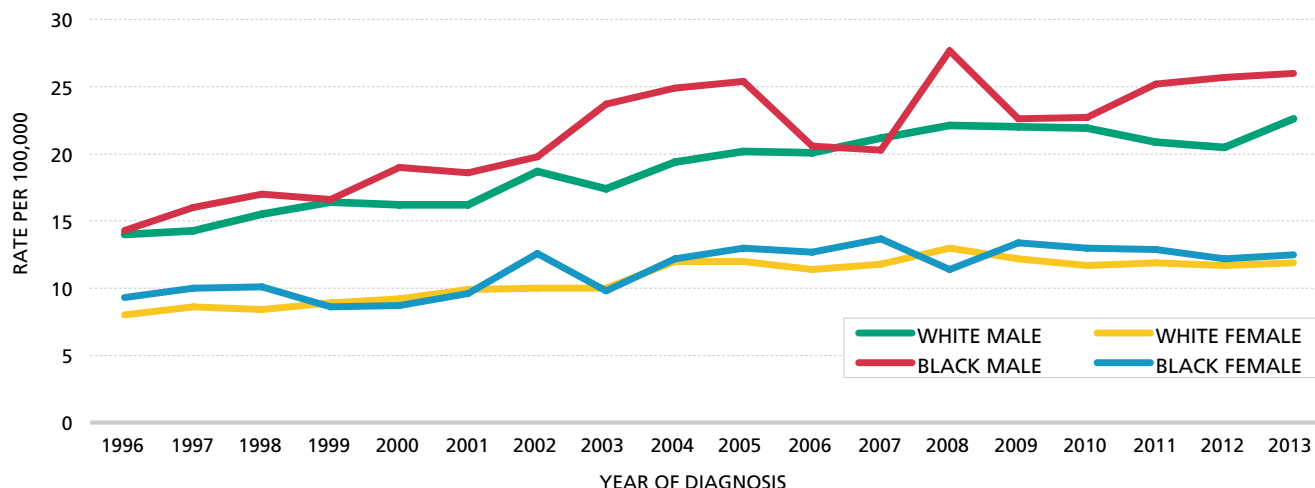
The average annual mortality rate for kidney and renal pelvis cancer in Ohio from 2009-2013 was 4.2 per 100,000 compared to 3.9 per 100,000 nationally.^{4,7} This represents 576 average annual deaths in Ohio from kidney and renal pelvis cancer over the time period (Table 3).⁷ In contrast to incidence, white men in Ohio die from kidney and renal pelvis cancer at a higher rate (6.0 per 100,000) compared to black men, black women and white women (Table 5).⁷

Trends

Kidney and renal pelvis cancer incidence rates in Ohio greatly increased (59 percent) from 1996 to 2013 for all sex-race groups combined, in contrast to U.S. incidence trends which increased over the past several decades but stabilized from 2008-2012.^{1,3} White males and black males had the greatest increases in rates of kidney and renal pelvis cancer in Ohio (61 percent and 82 percent, respectively) during this time period (Figure 22).³

The U.S. mortality rate for kidney and renal pelvis cancer has been decreasing by 0.7 percent per year since 1995.¹ Kidney and renal pelvis cancer mortality rates in Ohio were relatively stable from 1996 to 2013 for all sex-race groups combined.⁷ Mortality rates by sex-race group in Ohio were variable during the 18-year time period with no apparent trends (Figure 23).⁷

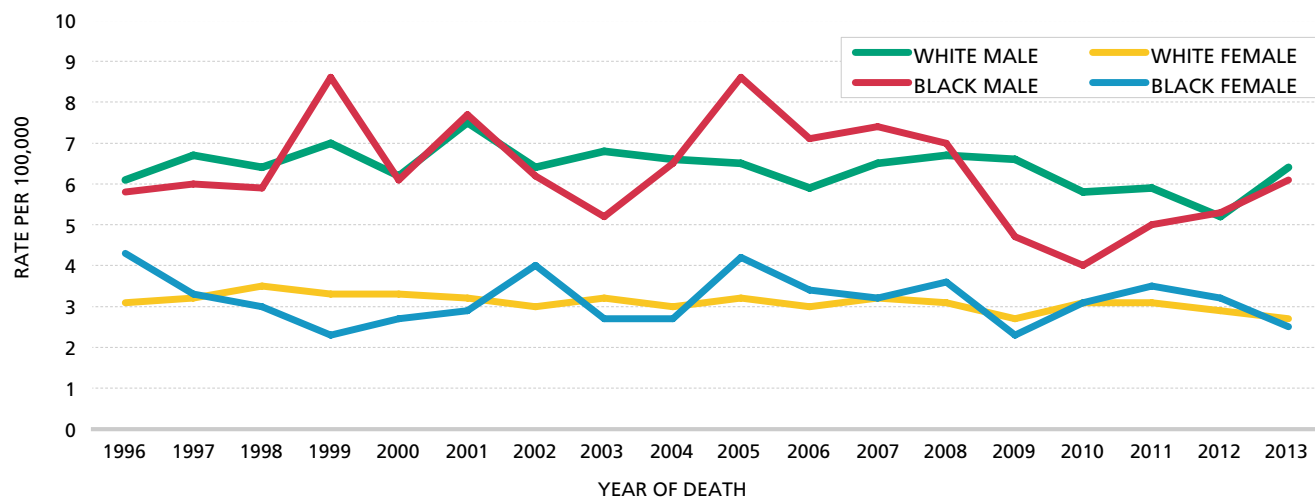
FIGURE 22 Trends in Age-adjusted Incidence Rates for Cancer of the Kidney & Renal Pelvis by Sex and Race in Ohio, 1996-2013^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

FIGURE 23 Trends in Age-adjusted Mortality Rates for Cancer of the Kidney & Renal Pelvis by Sex and Race in Ohio, 1996-2013^{1,2}



¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

RISK FACTORS AND POPULATIONS WITH HIGH RATES

POTENTIALLY MODIFIABLE RISK FACTORS

Smoking: Smoking approximately doubles the risk of developing kidney and renal pelvis cancer.

Obesity: People who are overweight have a higher risk of developing kidney and renal pelvis cancer.

Workplace exposures: Workplace exposure to certain substances (cadmium, some herbicides and organic solvents, particularly trichloroethylene) increases the risk for kidney and renal pelvis cancer.

Overuse of certain medications: Diuretics and analgesic pain pills, such as aspirin, acetaminophen and ibuprofen have been linked to kidney and renal pelvis cancer.

High blood pressure: The risk of kidney and renal pelvis cancer is higher in people with high blood pressure.

NON-MODIFIABLE RISK FACTORS

Age: Kidney and renal pelvis cancer is usually diagnosed in adults between the ages of 50 to 70 years.

Sex: Kidney and renal pelvis cancer is two to three times as common in men as in women.

Race: Blacks and American Indians/Alaskan Natives have higher rates of kidney and renal pelvis cancer than do whites.

Family history: People with a strong family history of kidney and renal pelvis cancer have a higher chance of developing this cancer. This risk is highest in brothers or sisters of those with kidney and renal pelvis cancer.

Advanced kidney disease: People with advanced kidney disease, especially those needing dialysis, have a higher risk of kidney and renal pelvis cancer.

Rare inherited conditions: People who have been diagnosed with von-Hippel-Lindau disease, hereditary papillary RCC, hereditary leiomyoma-RCC, Birt-Hogg-Dube syndrome and familial renal cancer have increased risk of kidney and renal pelvis cancer.

SIGNS AND SYMPTOMS OF KIDNEY AND RENAL PELVIS CANCER

Early stage kidney and renal pelvis cancer usually has no symptoms. As the tumor progresses, possible signs and symptoms include:

- Blood in the urine
- Low back pain on one side (not caused by injury)
- A lump on the side or lower back
- Fatigue
- Loss of appetite
- Weight loss not caused by dieting
- Fever that is not caused by an infection and that does not go away
- Anemia (low red blood cell counts)

Any of these signs/symptoms may be caused by cancer or by other, less serious health problems. If you have any of these signs/symptoms, see your healthcare provider.



Early Detection

There are no recommended screening tests for the early detection of kidney and renal pelvis cancer among people at average risk.¹

Treatment

Surgery is the primary treatment for most kidney cancers, although active surveillance may be an option for some patients with small tumors.¹ Patients who are not surgical candidates may be offered ablation therapy, a procedure that uses heat or cold to destroy the tumor.¹ Adjuvant treatment has not been shown to be helpful after surgery, although several targeted therapies are being studied.¹ For metastatic disease, targeted therapies are typically the main treatment, sometimes along with kidney removal.¹

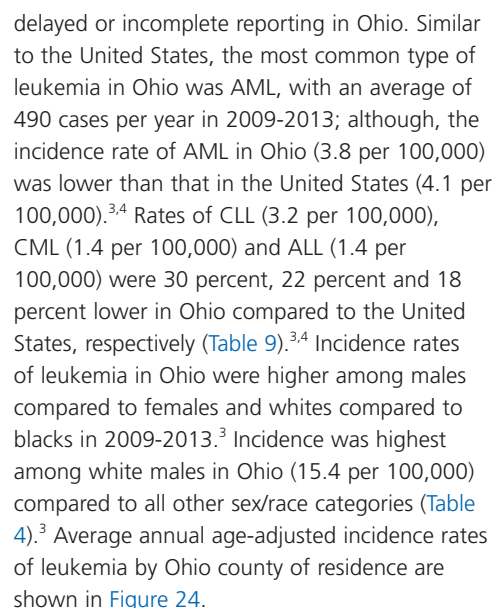
Survival

The five-year relative survival probability for kidney and renal pelvis cancer in 2006-2012 was 74 percent.⁴ Almost two-thirds of patients (65 percent) were diagnosed at the local stage, for which the five-year survival probability was 93 percent.⁴ The five-year survival probability, however, dropped to 12 percent for those diagnosed at the distant stage.⁴ In Ohio, from 2009-2013, 29 percent of invasive kidney and renal pelvis cancers were diagnosed late stage.³

Leukemia is a type of cancer that originates in the bone marrow and causes the production of abnormal blood cells, particularly white blood cells. Most people diagnosed with leukemia (91 percent) are adults 20 years of age and older.¹ Leukemia is categorized by whether it is acute (the number of leukemia cells increases rapidly and the disease worsens quickly) or chronic (the number of leukemia cells increases slowly and the disease worsens slowly), and by the type of blood cells that are affected (lymphoid cells or myeloid cells).²⁴ The four primary types of leukemia are acute lymphocytic leukemia (ALL), acute myeloid leukemia (AML), chronic lymphocytic leukemia (CLL) and chronic myeloid leukemia (CML). ALL accounts for approximately 75 percent of the leukemia cases among young children and teens, while CLL is the most common type of leukemia among adults.¹

An estimated 60,140 new cases of leukemia are expected to occur in 2016 in the United States.¹ The most common type of leukemia in the United States is AML with an estimated 19,950 cases (37 percent) expected to occur in 2016, followed by CLL (18,960 cases; 35 percent), CML (8,220 cases; 14 percent) and ALL (6,590 cases; 11 percent).¹ As shown in [Table 2](#), an average of 1,539 cases of leukemia were diagnosed among Ohio residents each year from 2009-2013.³ The leukemia incidence rate in Ohio (11.8 per 100,000) was 13 percent lower than the U.S. rate of 13.5 per 100,000 ([Table 2](#)).^{3,4} However, this is likely due to

FIGURE 24 Leukemia: Quartiles of Average Annual Age-adjusted Incidence Rates in Ohio by County, 2009-2013^{1,2}



An estimated 24,400 leukemia deaths are expected to occur in 2016 in the United States.¹ The average annual mortality rate for leukemia in Ohio in 2009-2013 was 7.2 per 100,000 (Table 3).⁷ This represents 964 average annual deaths in Ohio from leukemia over the time period.⁷ Similar to incidence, white males had the highest mortality rate for leukemia (10.1 per 100,000) compared to all other sex/race categories (Table 5).

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

**TABLE
9**

Average Annual Number of New Leukemia Cases and Age-adjusted Incidence Rates and Average Annual Number of Leukemia Deaths and Age-adjusted Mortality Rates by Histology Type in Ohio and the United States, 2009-2013^{1,2}

Histology Type	INCIDENCE			MORTALITY		
	Ohio Cases	Ohio Rate	National Rate	Ohio Deaths	Ohio Rate	National Rate
All Leukemias [*]	1,539	11.8	13.5	964	7.2	6.9
Acute Lymphocytic Leukemia (ALL)	161	1.4	1.7	47	0.4	0.4
Acute Myeloid Leukemia (AML)	490	3.8	4.1	413	3.1	2.8
Chronic Lymphocytic Leukemia (CLL)	442	3.2	4.6	200	1.5	1.3
Chronic Myeloid Leukemia (CML)	188	1.4	1.8	44	0.3	0.3

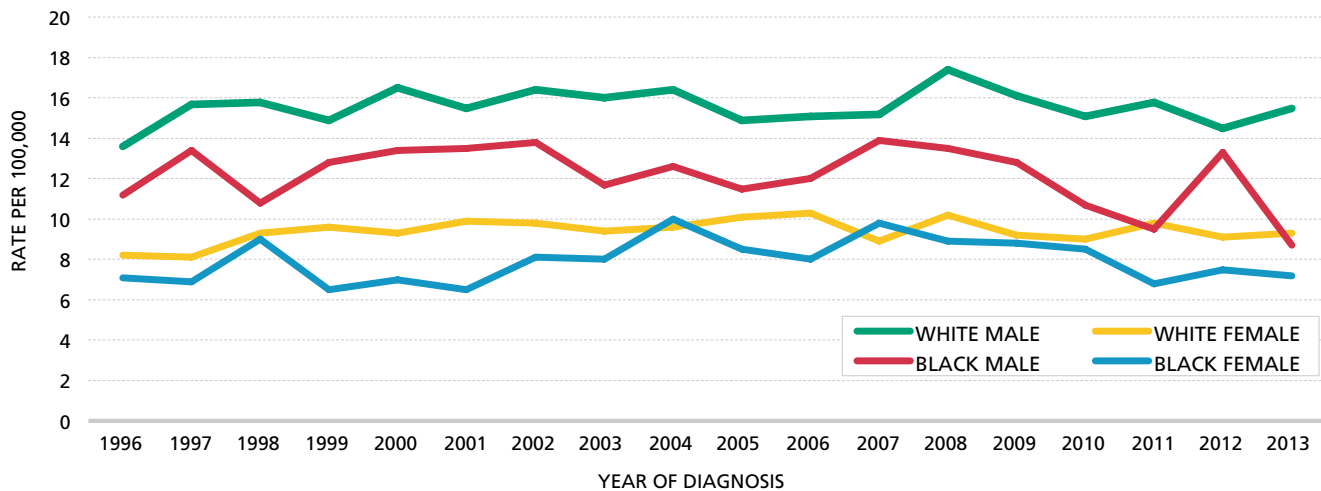
¹ Source: Ohio Cancer Incidence Surveillance System; Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016; Surveillance, Epidemiology, and End Results (SEER) Program, *SEER Cancer Statistics Review 1975-2013*, National Cancer Institute, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

^{*} Along with the four primary histology types (ALL, AML, CLL and CML), average annual incidence counts for "All Leukemias" include the following histology types: Other Lymphocytic (51 cases); Acute Monocytic (33 cases); Other Myeloid/Monocytic (30 cases); Other Acute (40 cases); and Aleukemic, Subleukemic and Not Otherwise Specified (103 cases). In addition, these histology types account for 258 leukemia deaths per year.

**FIGURE
25**

Trends in Age-adjusted Incidence Rates for Leukemia by Sex and Race in Ohio, 1996-2013^{1,2}

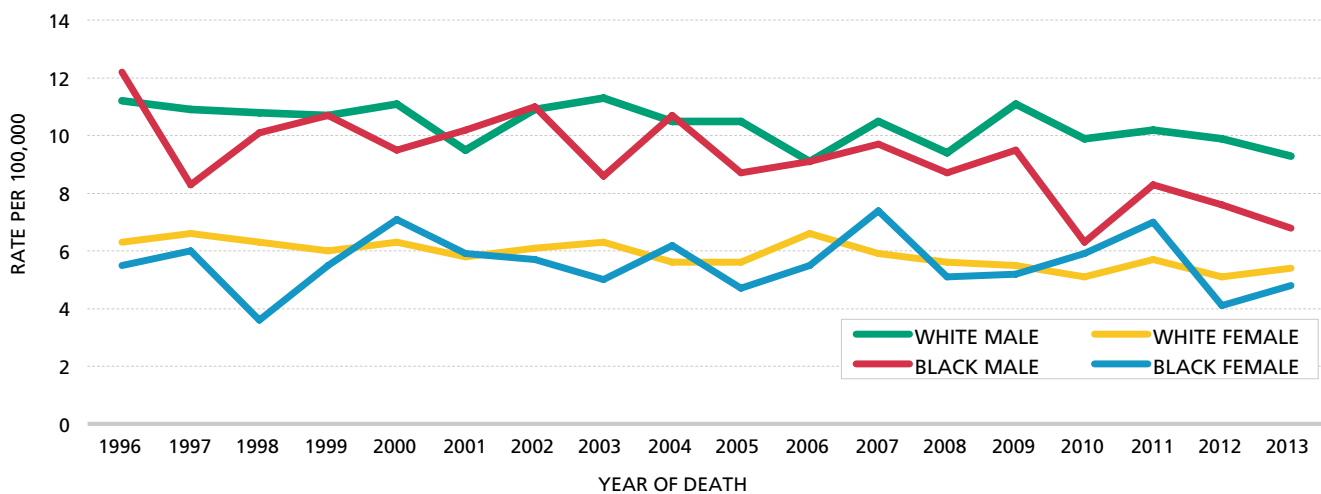


¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

**FIGURE
26**

Trends in Age-adjusted Mortality Rates for Leukemia by Sex and Race in Ohio, 1996-2013^{1,2}



¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

Trends

Nationally, leukemia incidence has increased slowly for many decades; from 2003 to 2012, rates increased by 1.3 percent per year.¹ [Figure 25](#) displays the trend in leukemia incidence rates among males and females by race in Ohio from 1996-2013.³ For each year, white males had the highest incidence rate.³ From 1996 to 2013, there was no clear trend in leukemia incidence rates in Ohio by sex/race category.

Nationally, leukemia death rates decreased 18 percent since 1980, with a steady decline of 1.0 percent per year from 2001 to 2012.¹ [Figure 26](#) shows the trend in leukemia mortality rates among Ohio males and females by race from 1996-2013.⁷ For most years, white males had the highest mortality rate.⁷ Mortality rates declined from 1996-2013 for white males, black males and white females; a trend was less evident for black females.⁷

Early Detection

There are no recommended screening tests for the detection of leukemia. However, it is sometimes diagnosed early because of abnormal results on blood tests performed for other indications.

Treatment

Chemotherapy, either single agents or agents in combination, is used to treat most types of leukemia.¹ Several targeted drugs are effective for treating CML because they attack cells with the Philadelphia chromosome, the genetic abnormality that is the hallmark of CML.¹ Some of these drugs are also used to treat a type of ALL involving a similar genetic defect.¹ People diagnosed with CLL that is not progressing or causing symptoms may not require treatment.¹ For those who do require treatment, CLL-targeted drugs are effective for some patients, even when other treatments are no longer working.¹ Certain types of leukemia may be treated with high-dose chemotherapy followed by stem cell transplantation under appropriate conditions.¹

Survival

Five-year relative survival probabilities for leukemia varied by type and range from 27 percent for AML to 85 percent for CLL in 2006-2012.⁴ Survival probabilities for most types of leukemia increased in the past 30 years largely due to advances in treatment.¹ For all leukemia types combined, the 2006-2012 five-year survival probability was slightly higher for males (64 percent) than for females (61 percent) and was higher among whites (64 percent) compared to blacks (58 percent).³

RISK FACTORS AND POPULATIONS WITH HIGH RATES

POTENTIALLY MODIFIABLE RISK FACTORS

Radiation: People exposed to very high levels of radiation are much more likely than others to get AML, CML or ALL. Radiation exposure resulting from medical treatment for cancer and other conditions can increase risk.

Benzene: Exposure to benzene in the workplace can cause AML. It may also cause CML and ALL. Benzene is found in the chemical industry, cigarette smoke and gasoline.

Chemotherapy: Cancer patients treated with certain types of cancer treatment drugs sometimes later get AML or ALL.

Smoking: Smoking cigarettes increases risk of AML.

Human T-cell leukemia virus type I (HTLV-I): People with HTLV-I infection are at increased risk of a rare type of leukemia known as adult T-cell leukemia.

NON-MODIFIABLE RISK FACTORS

Age: ALL is most commonly diagnosed among children, whereas AML, CLL and CML occur mainly in adults.

Sex: Leukemia is more common among men than women.

Race: Whites have higher rates of leukemia compared to blacks.

Family history: While it is rare for more than one person in a family to have leukemia, family history does increase risk of CLL.

Down syndrome and other inherited diseases: Down syndrome and certain other inherited diseases increase risk of developing acute leukemia (ALL and AML).

Myelodysplastic syndrome and certain other blood disorders: People with certain blood disorders are at increased risk of AML.

SIGNS AND SYMPTOMS OF LEUKEMIA

In acute leukemia, signs may appear suddenly, while chronic leukemia typically progresses slowly with few symptoms and is often diagnosed during routine blood tests.¹

Symptoms may include:

- Fatigue
- Paleness
- Weight loss
- Repeated infections
- Fever
- Bleeding or bruising easily
- Bone or joint pain
- Swelling in the lymph nodes or abdomen

Any of these signs/symptoms may be caused by cancer or by other, less serious health problems. If you have any of these signs/symptoms, see your healthcare provider.

Lung and Bronchus Cancer



New Cases

An estimated 224,390 new cases of lung and bronchus cancer are expected to occur in the United States during 2016, accounting for about 14 percent of all cancer diagnoses.¹

An average of 9,648 new cases of lung and bronchus cancer (5,170 men and 4,478 women) were diagnosed annually between 2009 and 2013 in Ohio with a corresponding rate of 70.7 per 100,000.³ The lung and bronchus cancer incidence rate was 23 percent higher in Ohio compared to the United States (57.3 per 100,000).^{3,4} In Ohio males, the average annual incidence rate was 85.6 per 100,000 compared to a rate of 59.7 per 100,000 among Ohio females (Table 2).³ Average annual incidence rates of lung and bronchus cancer by Ohio county of residence are shown in Figure 27.

Currently, a man living in the United States has a 1 in 17 lifetime risk of developing invasive lung and bronchus cancer, and a woman has a 1 in 19 lifetime risk of developing invasive lung and bronchus cancer.²

Deaths

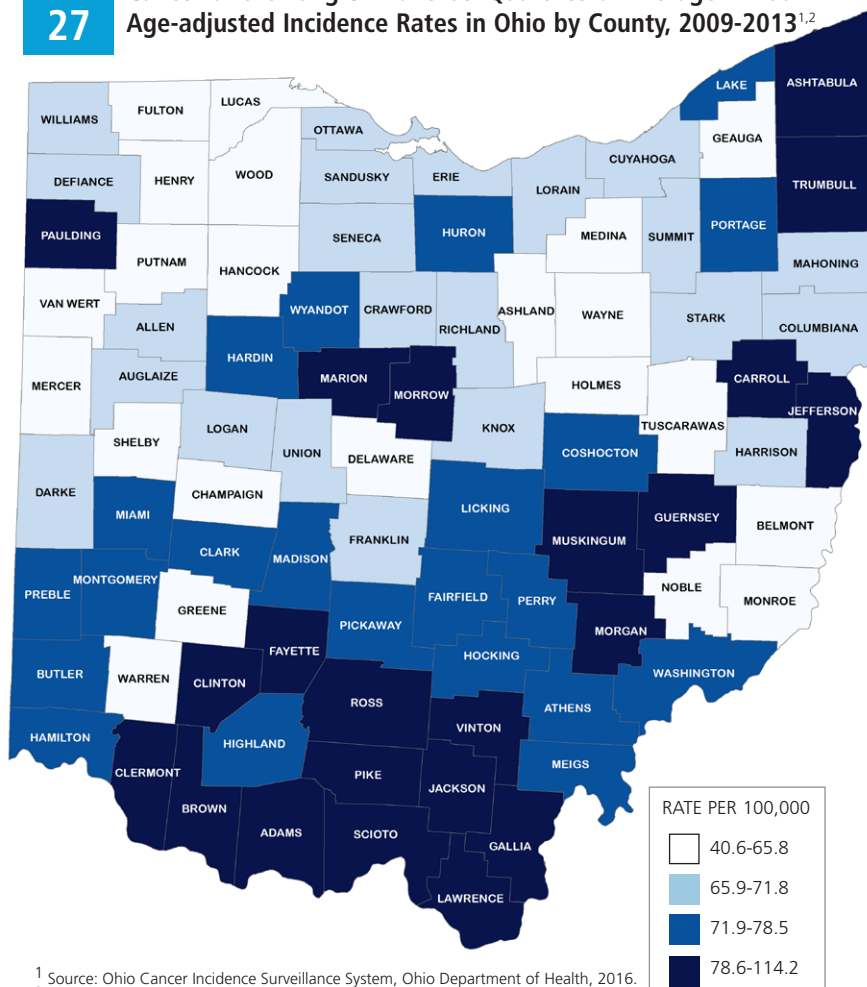
Lung and bronchus cancer is the leading cause of cancer-related death in both men and women. It causes more deaths every year than colon and rectum, breast, pancreatic and prostate cancers combined. An estimated 158,080 deaths are expected to occur in the United States in 2016, accounting for about one in four cancer deaths.¹

An average of 7,383 deaths occurred annually from lung and bronchus cancer among Ohio residents from 2009-2013.⁷ The average annual mortality rate was 54.1 per 100,000 (68.5 per 100,000 for males and 43.4 per 100,000 for females) (Table 3).⁷



FIGURE 27

Cancer of the Lung & Bronchus: Quartiles of Average Annual Age-adjusted Incidence Rates in Ohio by County, 2009-2013^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

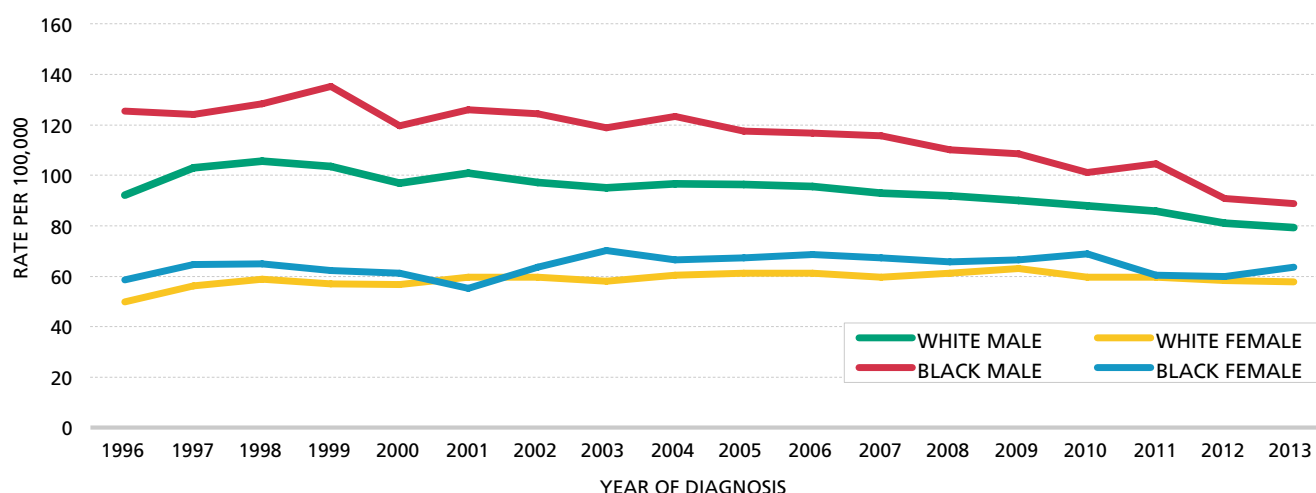
² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

Trends

Nationally, the lung and bronchus cancer incidence rate has been declining since the mid-1980s in men, but only since the mid-2000s in women.¹ Figure 28 displays the trend in lung and bronchus cancer incidence rates among males and females by race in Ohio from 1996-2013.³ For each year, black males had the highest incidence rate.³ Incidence rates decreased considerably from 1996 to 2013 for black males and white males, while incidence rates among black females and white females remained relatively unchanged.³

In the United States, lung and bronchus cancer death rates have declined by 38 percent since 1990 in men and by 12 percent since 2002 in women due to the drop in smoking prevalence.¹ Figure 29 displays the trend in lung and bronchus cancer mortality rates among Ohio males and females by race from 1996-2013.⁷ For each year, black males had the highest mortality rate.⁷ Mortality rates declined considerably from 1996-2013 for both black males and white males.⁷ However, mortality rates remained relatively unchanged for both black and white females in Ohio.⁷

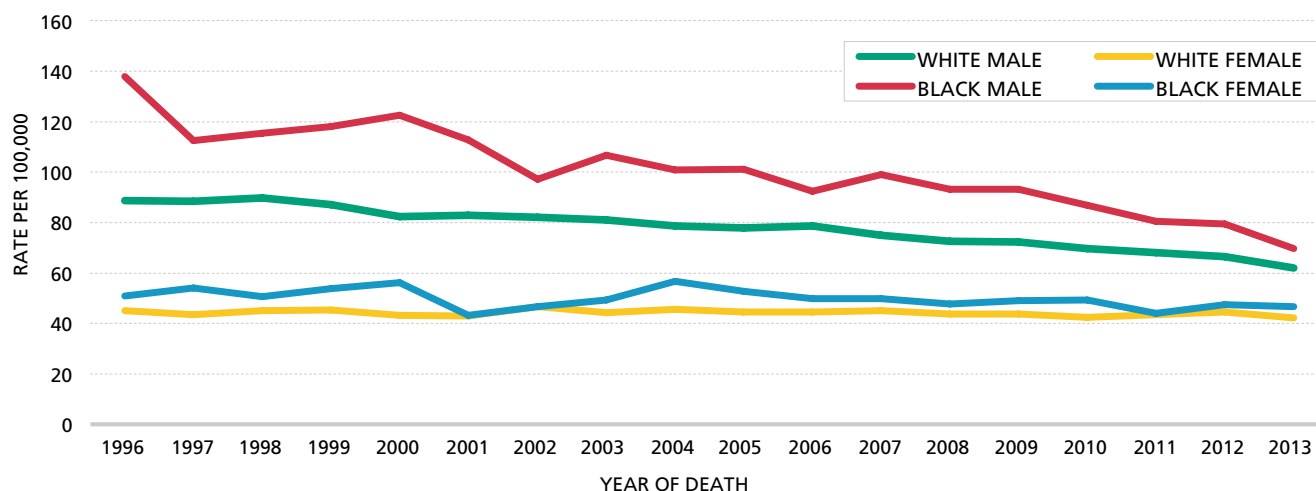
FIGURE 28 Trends in Age-adjusted Incidence Rates for Cancer of the Lung & Bronchus by Sex and Race in Ohio, 1996-2013^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

FIGURE 29 Trends in Age-adjusted Mortality Rates for Cancer of the Lung & Bronchus by Sex and Race in Ohio, 1996-2013^{1,2}



¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

Early Detection

Screening with low-dose spiral CT has been shown to reduce lung cancer mortality by 20 percent compared to standard chest x-rays among adults with at least a 30 pack-year smoking history who were current smokers or had quit within 15 years.¹

Table A-8 on page 82 shows the ACS and USPSTF recommendations for early detection of lung and bronchus cancer by age and sex.

The ACS recommends annual lung cancer screening with low-dose CT among patients who are aged 55-74 years, in fairly good health, have at least a 30 pack-year smoking history and are either still smoking or have quit smoking within the last 15 years.²⁵

The USPSTF recommends annual screening for lung cancer with low-dose CT in adults aged 55-80 years who have a 30 pack-year smoking history and currently smoke or have quit within the past 15 years.²⁶ Screening should be discontinued once a person has not smoked for 15 years or develops a health problem that substantially limits life expectancy or the ability or willingness to have curative lung surgery.²⁶

Treatment

Treatment options are determined by the type of lung cancer (small cell or non-small cell) and stage of the cancer. Treatments can include surgery, radiation therapy, chemotherapy and/or targeted therapies.¹ For early stage non-small cell tumors, surgery is usually the treatment of choice.¹ Because the disease has usually spread by the time it is discovered, chemotherapy and radiation therapy are often used, sometimes in combination with surgery.¹ Advanced-stage non-small cell lung cancers are usually treated with chemotherapy, targeted drugs (or a combination of the two) or immunotherapy.¹ Chemotherapy alone or combined with radiation is the usual treatment of choice for small cell lung cancer; on this regimen, a large percentage of patients experience remission; although, the cancer often returns.¹

Survival

Nationally, the five-year relative survival probability for lung and bronchus cancer for all stages combined was 18 percent according to 2006-2012 data.⁴ The five-year relative survival probability was 55 percent for cases detected when the disease was local stage, however, only 16 percent of lung and bronchus cancers were diagnosed at this stage (Figure 1).⁴ In Ohio, approximately 17 percent of lung and bronchus cancer cases were diagnosed early stage; whereas, approximately 70 percent were diagnosed late in 2009-2013.³ The percentage of early and late stage lung and bronchus cancer cases in Ohio by county is presented in Table A-6 on page 80.

RISK FACTORS AND POPULATIONS WITH HIGH RATES

POTENTIALLY MODIFIABLE RISK FACTORS

Smoking: Tobacco smoking is the most important risk factor for lung cancer. Cigarette, cigar and pipe smoking all increase the risk of lung cancer. Tobacco smoking causes about nine out of 10 cases of lung cancer in men and about eight out of 10 cases of lung cancer in women. Risk increases with the amount and duration of use.

Secondhand smoke: Exposure to secondhand (environmental) tobacco smoke increases risk. Nonsmokers exposed to secondhand smoke have approximately 20 percent increased risk of lung and bronchus cancer.

Radon: Radon is a cancer-causing gas and is the second leading cause of lung cancer.

Radiation: Being exposed to radiation is a risk factor for lung cancer. Sources include radiation therapy and imaging tests.

Occupational exposure: Workplace exposure to asbestos, arsenic, crystalline silica dust, beryllium, cadmium, nickel compounds, chromium (VI) compounds, tar and soot, mustard gas, chloromethyl ethers and diesel exhaust increases risk.

Air pollution: Exposure to outdoor air pollution, specifically small particles, increases risk.

NON-MODIFIABLE RISK FACTORS

Age: About two out of three people diagnosed with lung and bronchus cancer are older than 65.

Sex: Lung and bronchus cancer is more common among men compared to women.

SIGNS AND SYMPTOMS OF LUNG AND BRONCHUS CANCER

Signs and symptoms usually do not occur until the cancer is advanced and may include:

- Persistent cough
- Chest discomfort or pain
- Trouble breathing, wheezing or hoarseness
- Bloody sputum (mucus coughed up from the lungs)
- Loss of appetite or weight loss
- Trouble swallowing
- Recurring pneumonia or bronchitis

Any of these signs/symptoms may be caused by cancer or by other, less serious health problems. If you have any of these signs/symptoms, see your healthcare provider.

A photograph of a male doctor with grey hair and a beard, wearing a white lab coat over a blue shirt. He has a stethoscope around his neck and is holding a blue clipboard with a pen, looking down at it. He is standing and talking to an elderly woman with short brown hair and glasses. She is sitting at a table, resting her chin on her right hand, and looking at the doctor with a thoughtful expression. The background is a blurred indoor setting, likely a clinic or hospital.

Currently, a man living in the United States has a 1 in 50 lifetime risk of developing NHL and a woman has a 1 in 64 lifetime risk of NHL. The lifetime risk of developing HL is much lower – approximately 1 in 458 for males and 1 in 552 for females.²

Incidence rates of both HL and NHL were higher among males compared to females and whites compared to blacks in Ohio in 2009-2013.³ White males in Ohio had the highest incidence of both HL (3.0 per 100,000) and NHL (23.1 per 100,000) of all sex/race categories (Table 4).³ Average annual incidence rates of NHL by Ohio county of residence are shown in Figure 30.

30 Age-adjusted Incidence Rates in Ohio by County, 2009-2013^{1,2}

1 Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

Deaths

In 2016, an estimated 21,270 deaths from lymphoma will occur in the United States – 1,120 deaths from HL and 20,150 deaths from NHL.¹ Mortality rates of HL have been decreasing for the last four decades, and mortality rates of NHL have been decreasing since the late 1990s.¹ These declines are likely due to improvements in treatment over time.¹

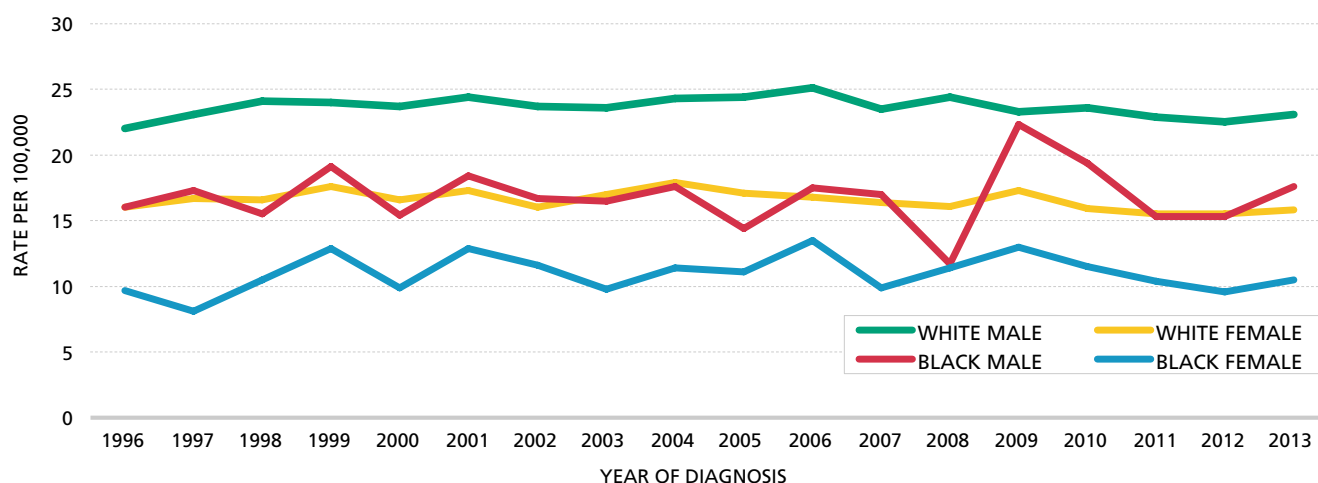
In Ohio, an average of 45 deaths from HL and 888 deaths from NHL occurred each year from 2009-2013.⁷ Mortality rates of HL and NHL were highest among white males compared to the other sex/race categories (Table 5).⁷

Trends

In Ohio, the NHL incidence rate increased 6 percent (21.5 per 100,000 to 22.8 per 100,000) from 1996 to 2013 for all sex and race groups combined.³ For each year, white males had the highest incidence rate. Incidence rates in Ohio increased from 1996 to 2013 for white males, black males and black females, and decreased for white females (Figure 31).³

NHL mortality rates decreased 39 percent in Ohio from 1996 (9.4 per 100,000) to 2013 (5.7 per 100,000) among all sex and races groups.⁷ For each year, white males had the highest incidence rate (Figure 32).⁷

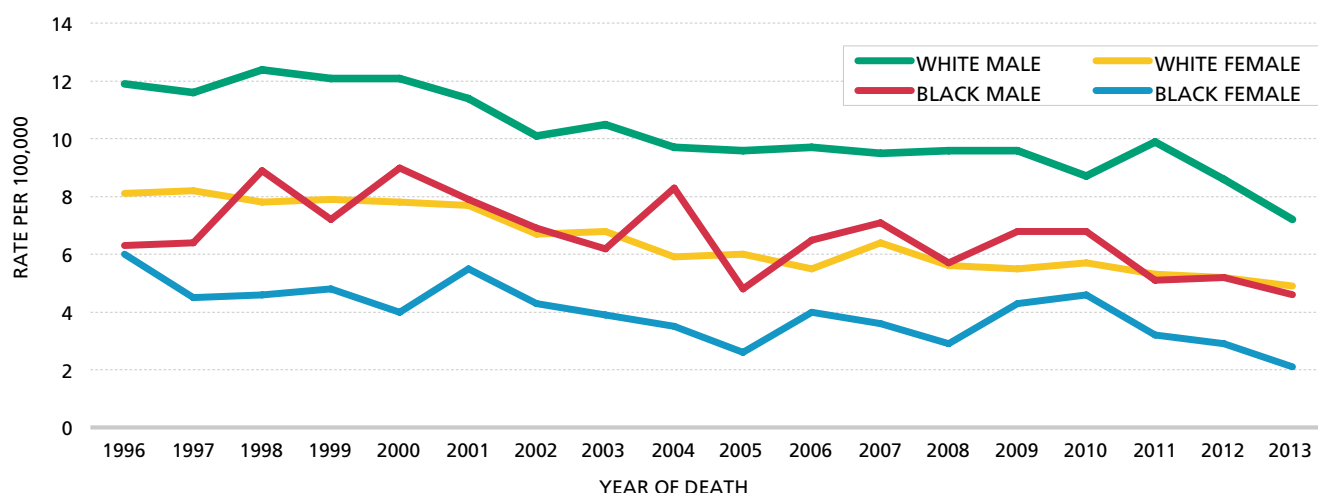
FIGURE 31 Trends in Age-adjusted Incidence Rates for Non-Hodgkin Lymphoma by Sex and Race in Ohio, 1996-2013^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

FIGURE 32 Trends in Age-adjusted Mortality Rates for Non-Hodgkin Lymphoma by Sex and Race in Ohio, 1996-2013^{1,2}



¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

SIGNS AND SYMPTOMS OF LYMPHOMA

In general, symptoms of HL and NHL are non-specific and may include the following:

- Painless swelling of the lymph nodes in the neck, underarm or groin
- Unexplained fever
- Night sweats
- Itchy skin
- Unexplained weight loss
- Coughing, trouble breathing and chest pain
- Weakness or tiredness that will not go away

Additional symptoms of NHL may include the following:

- Decreased appetite
- Pain, swelling or feeling of fullness in the abdomen
- Nausea
- Vomiting
- Low red blood cell counts
- Swelling in head, arms and upper chest
- Headache
- Seizures
- Personality changes
- Trouble thinking or moving body
- Itchy red or purple nodules/lumps under the skin

Any of these signs/symptoms may be caused by cancer or other, less serious health problems. If you have any of these signs/symptoms, see your healthcare provider.

Early Detection

At present, there are no screening tests available for lymphoma to detect the disease early. The best strategy for early diagnosis is prompt attention to signs and symptoms.

Treatment

Chemotherapy, radiation therapy or a combination of the two are most often used to treat HL, depending on the stage and type of the disease.¹ For HL cases resistant to standard therapy, monoclonal antibody treatment and stem cell transplantation may be options.¹ Similar to HL, chemotherapy is the most common treatment for NHL and may be used alone or in combination with radiation.¹ If NHL continues or recurs after standard treatment, stem cell transplantation may be an option.¹

Survival

Five-year relative survival probabilities were higher for HL compared to NHL in 2006-2012.⁴ The survival probability was 86 percent at five years for persons diagnosed with HL compared to 71 percent for NHL.⁴ For both types of lymphoma, five-year survival probabilities were higher for females compared to males and for whites compared to blacks.⁴

RISK FACTORS AND POPULATIONS WITH HIGH RATES

POTENTIALLY MODIFIABLE RISK FACTORS

Certain viruses: Having an infection with the Epstein-Barr virus (EBV), HIV, *Helicobacter pylori*, human herpes virus 8 (HHV8) or human T-cell leukemia/lymphoma type I (HTLV-1) increases risk of developing NHL.

Certain chemicals: Chemicals such as benzene and certain herbicides and insecticides (weed- and insect-killing substances) are linked with an increased risk of NHL.

Radiation: Studies of survivors of atomic bombs and nuclear reactor accidents have shown they have an increased risk of developing NHL. Patients treated with radiation therapy for some other cancers, such as Hodgkin disease, have a slightly higher risk of developing NHL later in life.

Breast implants: Although it is rare, some women develop anaplastic large cell lymphoma in the scar tissue around their breast implants.

NON-MODIFIABLE RISK FACTORS

Age: Risk of NHL increases with advancing age; whereas, risk of HL is highest among persons 15-30 and 55 and older.

Sex: Overall, the risk of NHL is higher in men compared to women, but there are certain types of NHL that are more common in women.

Race: Whites are more likely to develop NHL than blacks or Asians/Pacific Islanders.

Family history: Brothers and sisters of young people with HL have a higher risk for HL. The risk is very high for an identical twin of a person with HL.

Weakened immune system: The risk of developing NHL is increased by having a weakened immune system (such as from an inherited condition or certain drugs used after an organ transplant).





New Cases

Basal cell and squamous cell (nonmelanoma) skin cancers are the most common types of skin cancer. An estimated 5.4 million cases of basal and squamous cell skin cancer were diagnosed in the United States in 2012.¹ However, because basal and squamous cell skin cancers are not required to be reported to cancer registries, the actual impact of skin cancer is likely underestimated. Most, but not all, of these forms of skin cancer are highly curable.

Melanoma of the skin (hereafter, referred to as melanoma) is the most common serious form of skin cancer and is expected to be diagnosed in about 76,380 persons in the United States in 2016.¹ Melanoma incidence rates have increased rapidly over the past 30 years; however, in the past five years, rates have been plateauing or declining among those younger than 50.¹ Melanoma is rare among blacks; the lifetime risk of developing melanoma is 25 times higher among whites than blacks.¹

Currently, a man living in the United States has a 1 in 44 lifetime risk of developing invasive melanoma of the skin, and a woman has a 1 in 69 lifetime risk of invasive melanoma of the skin.²

In Ohio between 2009 and 2013, approximately 76 percent of individuals who developed melanoma were 50 and older.³ An average of 2,541 new cases of melanoma were diagnosed annually between 2009 and 2013 in Ohio with a corresponding rate of 19.7 per 100,000 compared to the U.S. rate of 21.8 per 100,000; although, the lower rate in Ohio may be due to incomplete reporting of melanoma in Ohio.^{3,4} The rate among Ohio males (23.9 per 100,000) was 41 percent higher than the rate among females (17.0 per 100,000) during this time period (Table 2).³ Average annual age-adjusted incidence rates of melanoma by Ohio county of residence are presented in Figure 33.

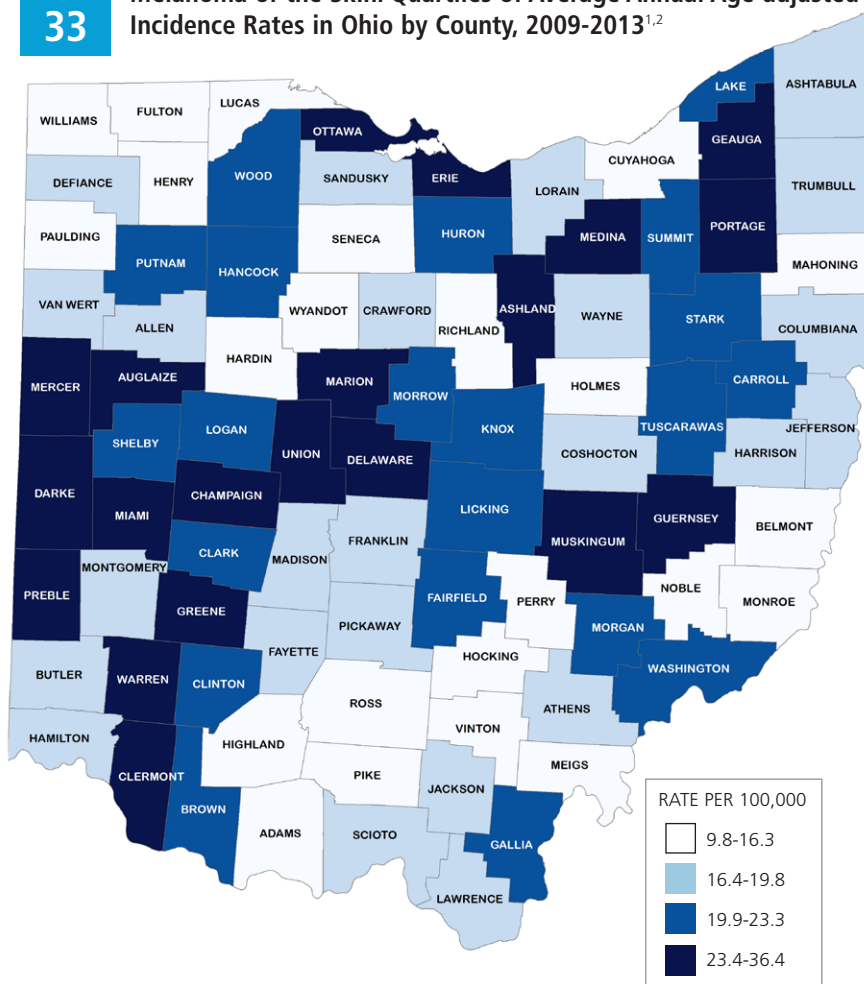
Deaths

An estimated 10,130 deaths from melanoma will occur in 2016 nationally.¹ The overall death rate for melanoma has been stable since the late 1980s; however, the trends vary by age.¹ Rates have been declining 2.6 percent per year among those younger than 50 but have increased slightly (0.6 percent per year) among those 50 and older.¹

An average of 398 deaths from melanoma occurred each year in Ohio from 2009-2013.⁷ The average annual melanoma mortality rate in Ohio was 3.0 per 100,000 and was 2.3 times higher among males (4.4 per 100,000) compared to females (1.9 per 100,000) during this time period (Table 3).⁷

FIGURE 33

Melanoma of the Skin: Quartiles of Average Annual Age-adjusted Incidence Rates in Ohio by County, 2009-2013^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

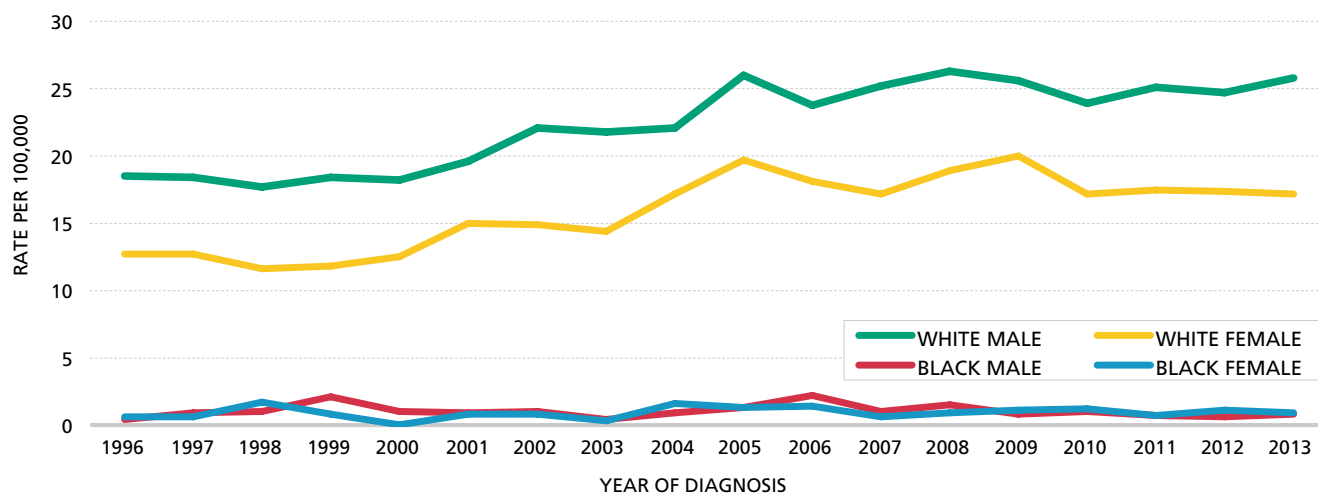
² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

Trends

Melanoma incidence rates increased 40 percent in Ohio from 1996 (13.9 per 100,000) to 2013 (19.5 per 100,000).³ Among whites, melanoma incidence rates increased 37 percent, but the increase was higher among white males (40 percent) compared to white females (35 percent).³ Incidence rates among black males and females in Ohio were variable over the time period (Figure 34).³

From 1996 to 2013, melanoma mortality rates in Ohio increased 26 percent among white males, from 3.9 per 100,000 in 1996 to 4.9 per 100,000 in 2013.⁷ In contrast, melanoma mortality rates were relatively stable among white females and decreased among black males and black females (56 percent and 50 percent, respectively) during the same time period (Figure 35).⁷

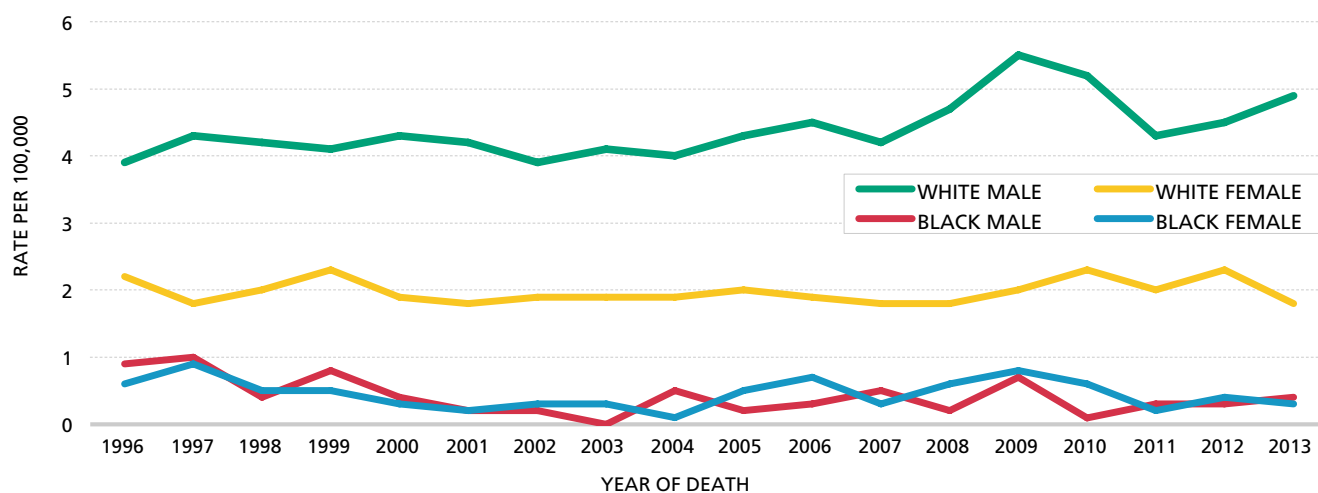
FIGURE 34 Trends in Age-adjusted Incidence Rates for Melanoma of the Skin by Sex and Race in Ohio, 1996-2013^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

FIGURE 35 Trends in Age-adjusted Mortality Rates for Melanoma of the Skin by Sex and Race Ohio, 1996-2013^{1,2}



¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

RISK FACTORS AND POPULATIONS WITH HIGH RATES

RISK FACTORS FOR BOTH MELANOMA AND NONMELANOMA SKIN CANCERS	ADDITIONAL MELANOMA RISK FACTORS	ADDITIONAL NONMELANOMA SKIN CANCER RISK FACTORS
POTENTIALLY MODIFIABLE RISK FACTORS	POTENTIALLY MODIFIABLE RISK FACTORS	POTENTIALLY MODIFIABLE RISK FACTORS
<p>Ultraviolet (UV) radiation: High lifetime exposure to UV radiation is a major risk factor for most skin cancers. UV exposure primarily comes from the following sources:</p> <p>Sunlight: Sunlight is the main source of UV radiation.</p> <p>Sunlamps and tanning booths/beds: These artificial sources of UV radiation can cause skin damage and skin cancer.</p>	<p>Blistering sunburns: People who have a history of many blistering sunburns, especially as a child or teenager, are at increased risk of melanoma.</p>	<p>Radiation treatment: People who have had radiation treatment have a higher risk of developing nonmelanoma skin cancer in the area where treatment was received. This is particularly a concern in children who have had radiation treatment for cancer.</p>
NON-MODIFIABLE RISK FACTORS	NON-MODIFIABLE RISK FACTORS	
<p>Certain physical characteristics: Having fair (pale) skin that burns in the sun easily, blue or gray eyes, red or blond hair, or many freckles increases the risk of skin cancer.</p>	<p>Dysplastic nevi: A dysplastic nevus is a type of mole that looks similar to a common mole, but is often bigger and has an abnormal shape or color. Dysplastic nevi often run in families and may develop into melanomas.</p> <p>More than 50 common moles: Usually, a common mole is smaller than a pea, has an even color (pink, tan or brown), and is round or oval with a smooth surface. Having many common moles increases melanoma risk.</p> <p>Family history: People with a family history of melanoma (particularly in one or more first-degree relatives) have an increased risk of developing melanoma.</p> <p>Personal history: People who have had melanoma have an increased risk of developing other melanomas.</p>	<p>Actinic keratosis: Actinic keratosis is a type of flat, scaly growth on the skin. It is most often found on areas exposed to the sun, especially the face and the backs of the hands. The growth may appear as a rough red or brown patch on the skin. Without treatment, this scaly growth may turn into nonmelanoma skin cancer.</p> <p>Weakened immune system: People with weakened immune systems, such as from previous organ transplants, corticosteroid drugs or HPV infection, have increased risk of nonmelanoma skin cancer.</p> <p>Arsenic: Arsenic exposure such as from well water, pesticides and herbicides can increase risk of nonmelanoma skin cancer.</p>

Early Detection

Recognition of changes in skin growths or the appearance of new growths is the best way to find early skin cancer. All major areas of the skin should be examined regularly. Any new or suspicious lesions or a sudden or progressive change in a lesion's appearance should be evaluated promptly by a physician.¹

Treatment

Early stage basal and squamous cell skin cancers can be treated in most cases by surgical excision, electrodesiccation and curettage (tissue destruction by electric current and removal by scraping with a curette) or cryosurgery (tissue destruction by freezing).¹ Radiation therapy and certain topical medications may be used in some cases.¹ For melanoma, the primary growth and surrounding normal tissue must be adequately removed, and in some cases, it may be necessary to remove one or more nearby lymph nodes.¹ Melanomas with deep invasion or that have spread to lymph nodes may be treated with surgery, immunotherapy, chemotherapy and/or radiation therapy.¹ In recent years, the Food and Drug Administration has approved several new immunotherapy drugs for the treatment of advanced melanoma.¹

ACS RECOMMENDS THE FOLLOWING FOR THE PREVENTION OF SKIN CANCER:¹

- Minimize skin exposure to intense UV radiation by seeking shade
- When outdoors, wear protective clothing (e.g., long sleeves, long pants or skirts, tightly woven fabrics and a wide-brimmed hat)
- Wear sunglasses that block UV rays
- Apply a broad-spectrum sunscreen with a sun protection factor (SPF) of 30 or higher
- Avoid indoor tanning booths and sun lamps, which are additional sources of UV radiation

Survival

Most basal cell and squamous cell skin cancers are highly curable if detected and treated early.¹ Melanoma is more likely than nonmelanoma to spread to other parts of the body, but is highly curable when detected and treated at its earliest stages.¹ Nationally, the five-year relative survival probability for patients with melanoma was 92 percent in 2006-2012.⁴ For localized melanoma, the five-year survival probability was 98 percent; whereas, survival at the distant stage was only 18 percent (Figure 1).⁴ In Ohio, 86 percent of melanomas in 2009-2013 were diagnosed at the *in situ* or local stages.³




SIGNS AND SYMPTOMS OF MELANOMA/SKIN CANCER

A simple ABCDE rule outlines the warning signs of the most common type of melanoma:

A is for asymmetry. One half of the mole does not match the other half.

B is for border irregularity. The edges are irregular, ragged, notched or blurred.

C is for color. The pigmentation is not uniform, with variable degrees of tan, brown or black, or sometimes with patches of red, pink, white or blue.

D is for diameter greater than 6 millimeters (about ¼ inch).  Although, some melanomas may be smaller than this.

E is for evolving. The mole has changed in size, shape or color.

ADDITIONAL KEY WARNING SIGNS OF MELANOMA/SKIN CANCER ARE AS FOLLOWS:

Melanoma:

- Sore that does not heal
- Spread of pigment from the border into surrounding skin
- Redness or a new swelling beyond the border
- Change in sensation (itchiness, tenderness, pain)
- Change in surface of mole (scaliness, oozing, bleeding, appearance of bump or nodule)

Basal Cell Carcinoma:

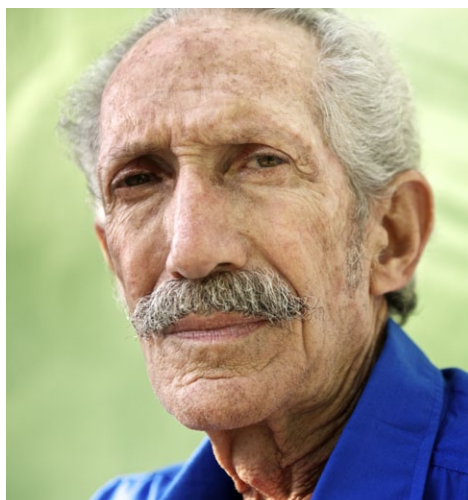
- Flat, firm, pale or yellow areas, similar to a scar
- Raised reddish patches that might be itchy
- Small, pink or red, translucent, shiny, pearly bumps which might have blue, brown or black areas
- Pink growths with raised edges and a lower area in their center
- Open sores (which may have oozing or crusted areas) that do not heal, or that heal and then come back

Squamous Cell Carcinoma:

- Rough or scaly red patches, which might crust or bleed
- Raised growths or lumps, sometimes with a lower area in the center
- Open sores (which may have oozing or crusted areas) that do not heal, or that heal and then come back
- Wart-like growths

Any of these signs/symptoms may be caused by cancer or by other, less serious health problems. If you have any of these signs/symptoms, see your healthcare provider.

Oral Cavity and Pharynx Cancer



Oral cavity and pharynx cancers are usually grouped together and examined as one site/type of cancer by the NCI. The oral cavity includes the following anatomic sites: lip, tongue, salivary gland, floor of mouth, gum and other areas of the mouth. The pharynx includes the oropharynx, hypopharynx, nasopharynx and the tonsil.

New Cases

An estimated 48,330 new cases of cancer of the oral cavity and pharynx are expected to be diagnosed in 2016 in the United States.¹ Incidence rates are more than twice as high in men (34,780) as in women (13,550).¹ From 2003 to 2012 in the United States, incidence rates among whites increased by 1.3 percent per year in men and were stable in women, while among blacks rates declined by 2.8 percent per year in men and by 1.6 percent per year in women.¹ The increase among white men is due to the increase in cancers of the oropharynx that are associated with HPV infection.¹ HPV-associated cancers recently began increasing in white women.¹

Currently, a man living in the United States has a 1 in 69 lifetime risk of developing invasive oral cavity and pharynx cancer, and a woman has a 1 in 175 lifetime risk of invasive oral cavity and pharynx cancer.²

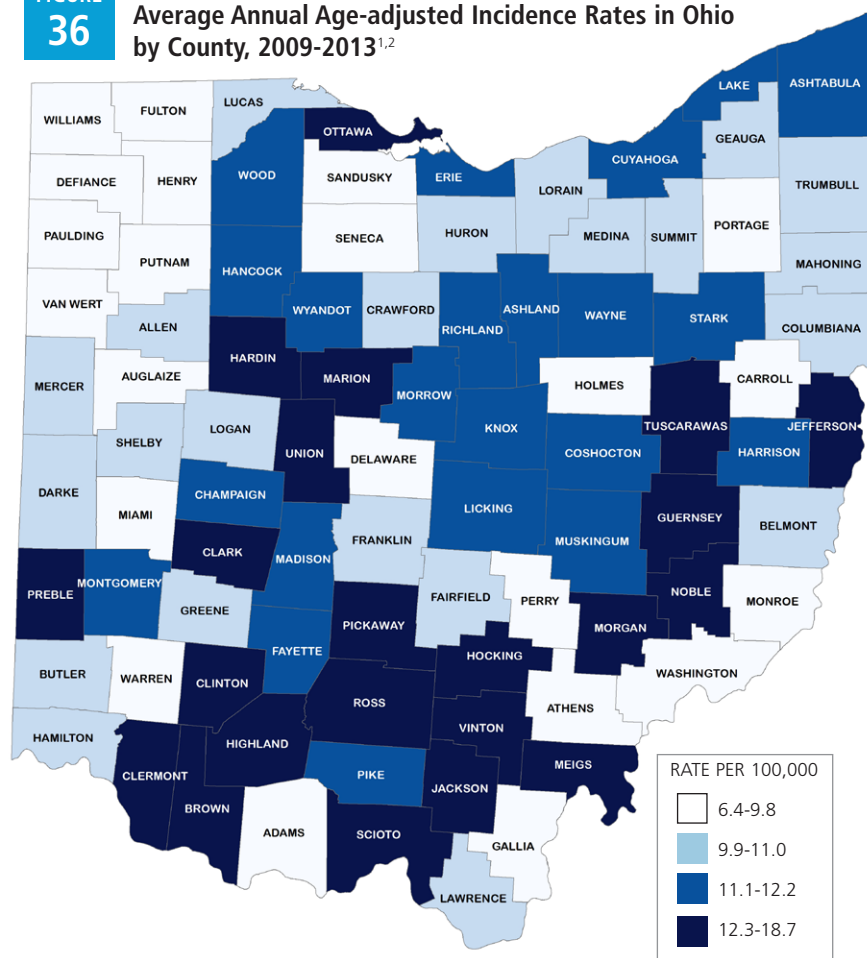
In Ohio, 45 percent of those diagnosed with oral cavity and pharynx cancer from 2009 to 2013 were younger than 60 years.³ An average of 1,503 new cases of oral cavity and pharynx cancer were diagnosed annually in Ohio during this time period with a corresponding rate of 10.9 per 100,000 compared to the U.S. rate of 11.1 per 100,000 (Table 2).^{3,4} White and black men had higher incidence rates of this cancer site/type compared to white and black women in Ohio in 1996-2013 (Table 4).³ Average annual age-adjusted incidence rates of oral cavity and pharynx cancer by Ohio county of residence are shown in Figure 36.

Deaths

An estimated 9,570 deaths from oral cavity and pharynx cancer are expected to occur in 2016 in the United States.¹ Death rates have been decreasing over the past three decades partly due to the decrease in smoking prevalence.¹ From 2003 to 2012, rates continued to decrease in women (by 1.1 percent per year in whites and 3.5 percent per year in blacks); however, they stabilized in men.¹

The average annual mortality rate for oral cavity and pharynx cancer in Ohio from 2009-2013 was 2.5 per 100,000.⁷ This represents 344 average annual deaths in Ohio from oral cavity and pharynx cancer over the time period (Table 3).⁷

FIGURE 36 Cancer of the Oral Cavity & Pharynx: Quartiles of Average Annual Age-adjusted Incidence Rates in Ohio by County, 2009-2013^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

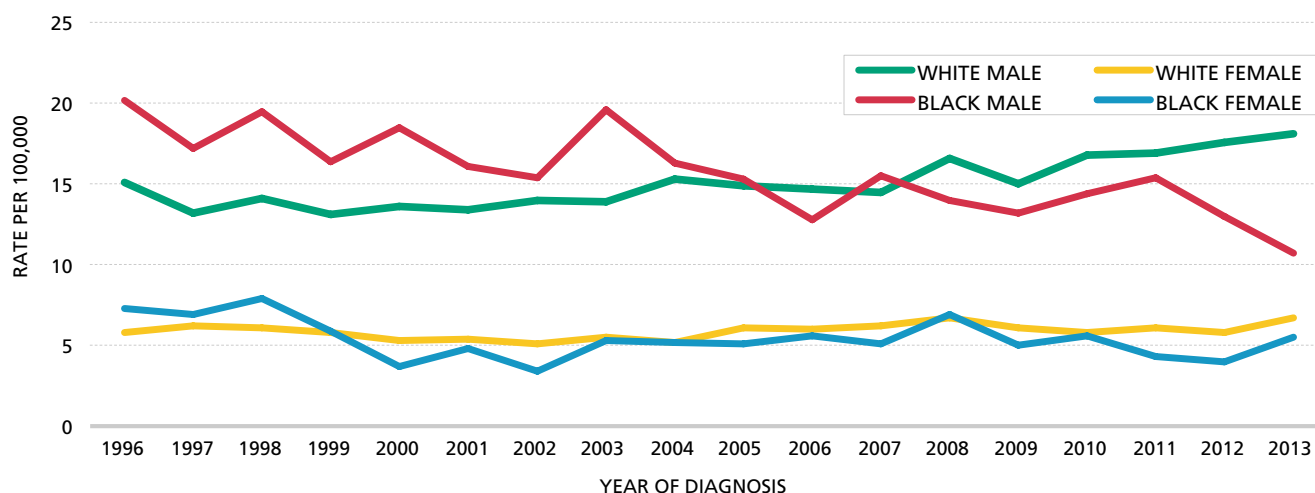
² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

Trends

The oral cavity and pharynx cancer incidence rate in Ohio increased 14 percent for all races and sexes combined from 1996 to 2013.³ Oral cavity and pharynx cancer incidence rates increased for both white males (20 percent) and white females (16 percent) but decreased for black males (47 percent) and black females (25 percent) during this time period.³ From 1996 to 2005, the incidence rate was higher in black males compared to white males, but in recent years, incidence rates were higher in white males compared to black males.³ Incidence rates were similar among white and black females (Figure 37).³

Figure 38 displays oral cavity and pharynx cancer mortality trends in Ohio. From 1996 to 2013, the oral cavity and pharynx cancer mortality rate in Ohio decreased 15 percent for all races and sexes combined and decreased for each of the sex/race groups.⁷ The largest decrease in oral cavity and pharynx cancer mortality rates was seen in black males (63 percent), followed by black females (40 percent).⁷ There was a modest decrease in mortality rates among white males (5 percent) and a 14 percent decrease among white females during this time period.⁷

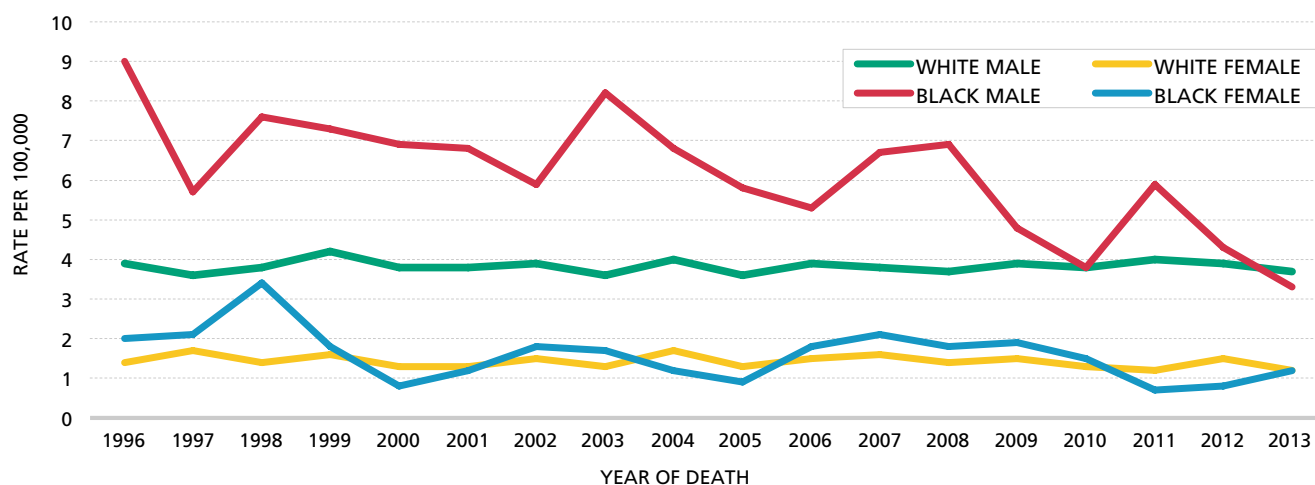
FIGURE 37 Trends in Age-adjusted Incidence Rates for Cancer of the Oral Cavity & Pharynx by Sex and Race in Ohio, 1996-2013^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

FIGURE 38 Trends in Age-adjusted Mortality Rates for Cancer of the Oral Cavity & Pharynx by Sex and Race in Ohio, 1996-2013^{1,2}



¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

Early Detection

Cancer can affect any part of the oral cavity, including the lip, tongue, mouth and throat. Through visual inspection, dentists and physicians can often detect premalignant abnormalities and cancer at an early stage, when treatment is both less extensive and more successful.¹

Treatment

People with early oral cavity and pharynx cancer may be treated with surgery or radiation therapy or a combination of the two.¹ People with advanced oral cavity and pharynx cancer may have a combination of treatments including chemotherapy.¹ Targeted therapy may be combined with radiation in initial treatment or used to treat recurrent cancer.¹ The choice of treatment depends mainly on general health, where in the mouth or throat the cancer began, the size of the tumor and whether the cancer has spread.

Survival

The five-year relative survival probability for oral cavity and pharynx cancer was 64 percent for patients diagnosed in 2006-2012.⁴ Oral cavity and pharynx cancer is usually successfully treated if detected at an early stage, with a five-year relative survival probability of 83 percent for patients with local stage tumors (Figure 1).⁴ In Ohio, from 2009 to 2013, 64 percent of oral cavity and pharynx cancers were diagnosed late stage.³

SIGNS AND SYMPTOMS OF ORAL CAVITY AND PHARYNX CANCER

- Patches inside the mouth or on the lips:
 - White patches are the most common.
 - Mixed red and white patches are more likely white patches to become malignant.
 - Red patches are brightly colored, smooth areas that often become malignant.
- A sore on the lip or in the mouth that does not heal
- Bleeding in the mouth
- Loose teeth
- Difficulty or pain when swallowing
- Difficulty wearing dentures
- A lump in the neck
- An earache that does not go away
- Numbness of lower lip and chin

Any of these signs/symptoms may be caused by cancer or by other, less serious health problems. If you have any of these signs/symptoms, see your healthcare provider or dentist.

RISK FACTORS AND POPULATIONS WITH HIGH RATES

POTENTIALLY MODIFIABLE RISK FACTORS

Tobacco: Smoking cigarettes, cigars or pipes causes oral cavity and pharynx cancer and using smokeless tobacco (such as snuff and chewing tobacco) causes oral cavity cancer. For cigarette smokers, risk increases with the number of cigarettes smoked per day. The risk is greater for people who use both tobacco and alcohol than for those who use only tobacco or alcohol.

Heavy alcohol use: People who are heavy drinkers are more likely to develop oral cavity cancer than people who do not drink alcohol. The risk increases with the amount of alcohol that a person drinks.

HPV infection: Some members of the HPV family of viruses can infect the mouth and throat. Cancer at the base of the tongue, at the back of the throat, in the tonsils or in the soft palate is linked with HPV infection.

Sun: Cancer of the lip can be caused by exposure to the sun. The risk of cancer of the lip increases if the person also smokes.

Betel nut use: Most common in Asia, chewing betel nut (a type of palm seed wrapped with a betel leaf and sometimes mixed with spices, sweeteners and tobacco) causes oral cancer. The risk increases even more if the person also drinks alcohol and uses tobacco.

Weakened immune system: Oral cavity and pharynx cancers are more common in people who have a weak immune system.

Graft-versus-host disease: Graft-versus-host disease (GVHD) is a condition that sometimes occurs after a stem cell transplant. GVHD can affect many tissues of the body, including those in the mouth, which increases the risk of oral cancer.

NON-MODIFIABLE RISK FACTORS

Age: Most patients with oral cavity and pharynx cancers are older than 55.

Sex: Oral cavity and pharynx cancers are about twice as common in men as in women.

Personal history: People who have had oral cavity and pharynx cancers are at increased risk of developing another oral cavity and pharynx cancer.

Genetics: People with certain genetic conditions (e.g., Fanconi anemia, dyskeratosis congenita) have a very high risk of oral cavity and pharynx cancers.



Pancreatic Cancer



New Cases

Nationally, an estimated 53,070 pancreatic cancer cases are expected to occur in 2016.¹ Most (95 percent) will be cancers of the exocrine pancreas, which produces enzymes to digest food.¹ Much rarer are neuroendocrine tumors (5 percent), which are usually diagnosed at a younger age but have a better prognosis.¹ U.S. incidence rates of pancreatic cancer increased 1.2 percent per year from 2000 to 2012.¹

An average of 1,701 (844 men and 857 women) new cases of pancreatic cancer were diagnosed annually between 2009 and 2013 in Ohio corresponding to an average annual rate of 12.4 per 100,000, which was the same as the U.S. incidence rate during this time period (Table 2).^{3,4} Black males and females had higher incidence rates of pancreatic cancer than white males and females in Ohio during this time period (Table 4).³ Average annual incidence rates of pancreatic cancer by Ohio county of residence are shown in Figure 39.

The risk of developing pancreatic cancer increases with age. In Ohio, between 2009 and 2013, approximately 95 percent of individuals who developed pancreatic cancer were 50 and older.³

*Currently, a man living in the United States has a 1 in 76 lifetime risk of developing invasive pancreatic cancer and a woman has a 1 in 86 lifetime risk of developing invasive pancreatic cancer.*²

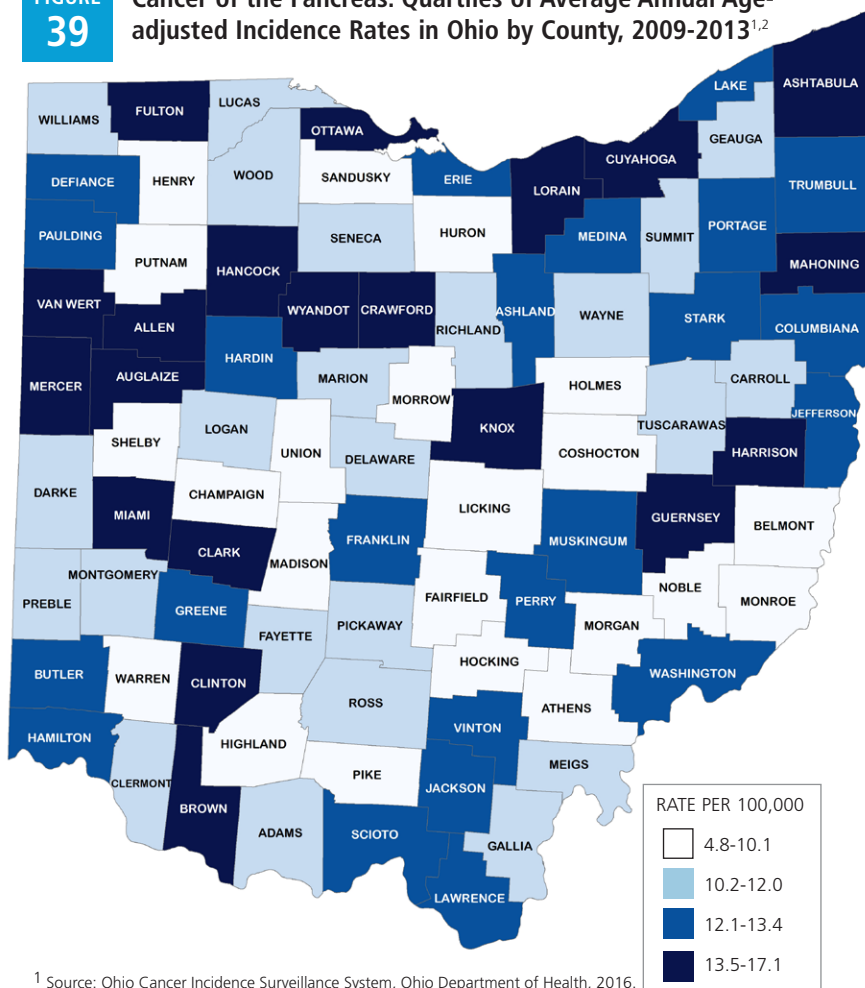
Deaths

An estimated 41,780 pancreatic cancer deaths are expected to occur in 2016 nationally, with similar numbers in men (21,450) and women (20,330).¹ The mortality rate has been increasing slightly (0.4 percent per year) since 2000.¹

The average annual mortality rate for pancreatic cancer in Ohio from 2009-2013 was 11.4 per 100,000 compared to 10.9 per 100,000 nationally.^{4,7} This represents 1,559 average annual deaths in Ohio from pancreatic cancer over the time period (Table 3).⁷ Table 5 shows that black men and women in Ohio die from pancreatic cancer at a higher rate compared to white men and women.⁷

FIGURE 39

Cancer of the Pancreas: Quartiles of Average Annual Age-adjusted Incidence Rates in Ohio by County, 2009-2013^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

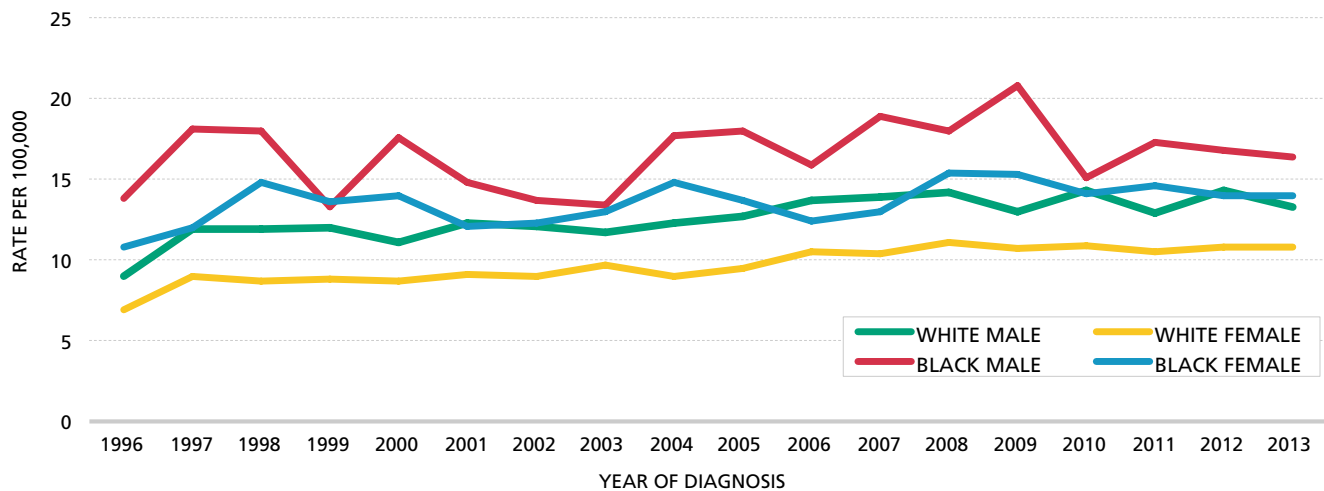
² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

Trends

The pancreatic cancer incidence rate for all races and sexes combined in Ohio increased 50 percent from 1996 to 2013.³ White females in Ohio had the greatest increase in pancreatic cancer incidence rates from 1996 to 2013 (57 percent), followed by white males (48 percent) (Figure 40).³

The pancreatic cancer mortality rate for all races and sexes combined in Ohio was relatively stable from 1996 to 2013.⁷ No significant increases or decreases in pancreatic cancer mortality rates were observed by sex-race group in Ohio during this time period (Figure 41).⁷

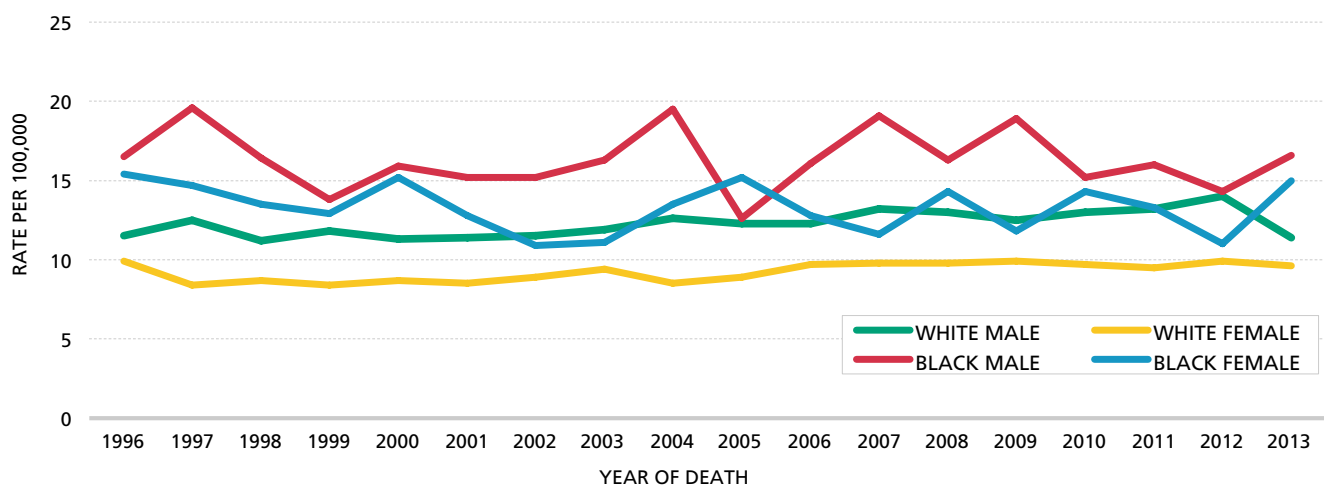
FIGURE 40 Trends in Age-adjusted Incidence Rates for Cancer of the Pancreas by Sex and Race in Ohio, 1996-2013^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

FIGURE 41 Trends in Age-adjusted Mortality Rates for Cancer of the Pancreas by Sex and Race in Ohio, 1996-2013^{1,2}



¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.



Early Detection

There is currently no reliable method for the early detection of pancreatic cancer.¹

Treatment

Surgery, radiation therapy and chemotherapy are treatment options that may extend survival and/or relieve symptoms, but seldom are curative.¹

Less than 20 percent of patients are candidates for surgery because pancreatic cancer is usually detected after it has spread beyond the pancreas.¹

Even among patients who are thought to be surgical candidates, the cancer is often found to have spread too extensively to be removed.¹

Adjuvant treatment with chemotherapy (and sometimes radiation) may lower the risk of recurrence among those who undergo surgery.¹

For advanced disease, chemotherapy (sometimes with a targeted therapy drug) may lengthen survival.¹

Survival

For all stages combined, the five-year relative survival probability for pancreatic cancer in 2006–2012 was only 8 percent.⁴ The five-year relative survival probability was 27 percent among those diagnosed at a local stage, however, only 9 percent of people were diagnosed at this early stage.⁴ More than half (52 percent) of patients were diagnosed at the distant stage, for which the five-year relative survival probability was only 3 percent.⁴ In Ohio, from 2009 to 2013, 71 percent of pancreatic cancers were diagnosed late stage.³

RISK FACTORS AND POPULATIONS WITH HIGH RATES

POTENTIALLY MODIFIABLE RISK FACTORS

Tobacco: The risk of getting pancreatic cancer is about twice as high among smokers compared to those who have never smoked. Use of smokeless tobacco products also increases risk.

Overweight and obesity: Being overweight is a risk factor for pancreatic cancer. People who are obese are about 20 percent more likely to develop pancreatic cancer.

Diabetes: Pancreatic cancer is more common in people with type 2 diabetes.

NON-MODIFIABLE RISK FACTORS

Age: The risk of developing pancreatic cancer increases as people age. About two-thirds of people with pancreatic cancer are 65 or older.

Sex: Men are slightly more likely to develop pancreatic cancer than women.

Race: Blacks are slightly more likely to develop pancreatic cancer than whites.

Family history: Pancreatic cancer seems to run in some families, possibly due to an inherited genetic syndrome (explained below).

Inherited genetic syndromes: Inherited gene changes can be passed from parent to child. Examples of genetic syndromes that can cause exocrine pancreatic cancer include: hereditary breast and ovarian cancer syndrome, familial atypical multiple mole melanoma (FAMM) syndrome, Lynch syndrome, Peutz-Jeghers syndrome, Von Hippel-Lindau syndrome, neurofibromatosis type 1, multiple endocrine neoplasia type 1 (MEN1) and BRCA1 and BRCA2.

Chronic pancreatitis: Chronic pancreatitis, a long-term inflammation of the pancreas, increases the risk of pancreatic cancer.

SIGNS AND SYMPTOMS OF PANCREATIC CANCER

Symptoms of pancreatic cancer usually do not appear until the disease has progressed. Some symptoms include:

- Jaundice (yellowing of skin or eyes) due to tumor development near the bile duct
- Belly or back pain
- Weight loss and poor appetite
- Nausea and vomiting
- Development of diabetes

Any of these signs/symptoms may be caused by cancer or by other, less serious health problems. If you have any of these signs/symptoms, see your healthcare provider.

Prostate Cancer



New Cases

In 2016, an estimated 180,890 new cases of prostate cancer will occur among men in the United States.¹ Incidence rates for prostate cancer increased substantially in the United States between the late-1980s and early-1990s and have since fluctuated widely from year to year, in large part reflecting changes in prostate cancer screening with the prostate-specific antigen (PSA) blood test.¹ From 2003 to 2012, rates decreased by 4 percent per year.¹

Prostate cancer accounted for 25 percent of new cancer cases among Ohio males in 2009-2013, or an average of 7,724 cases per year with a corresponding average annual rate of 119.7 per 100,000 (Figure 2 and Table 2).³ The U.S. average annual prostate cancer incidence rate during this time period (129.4 per 100,000) was 8 percent higher than the Ohio rate; although, the lower rate in Ohio may be due to incomplete or delayed reporting of this cancer site/type.^{3,4}

Across the United States and Ohio, incidence rates of prostate cancer were significantly higher among black men than in white men, but the reasons for the difference are not well understood.^{1,3} Average annual incidence rates of prostate cancer by Ohio county of residence are shown in Figure 42.

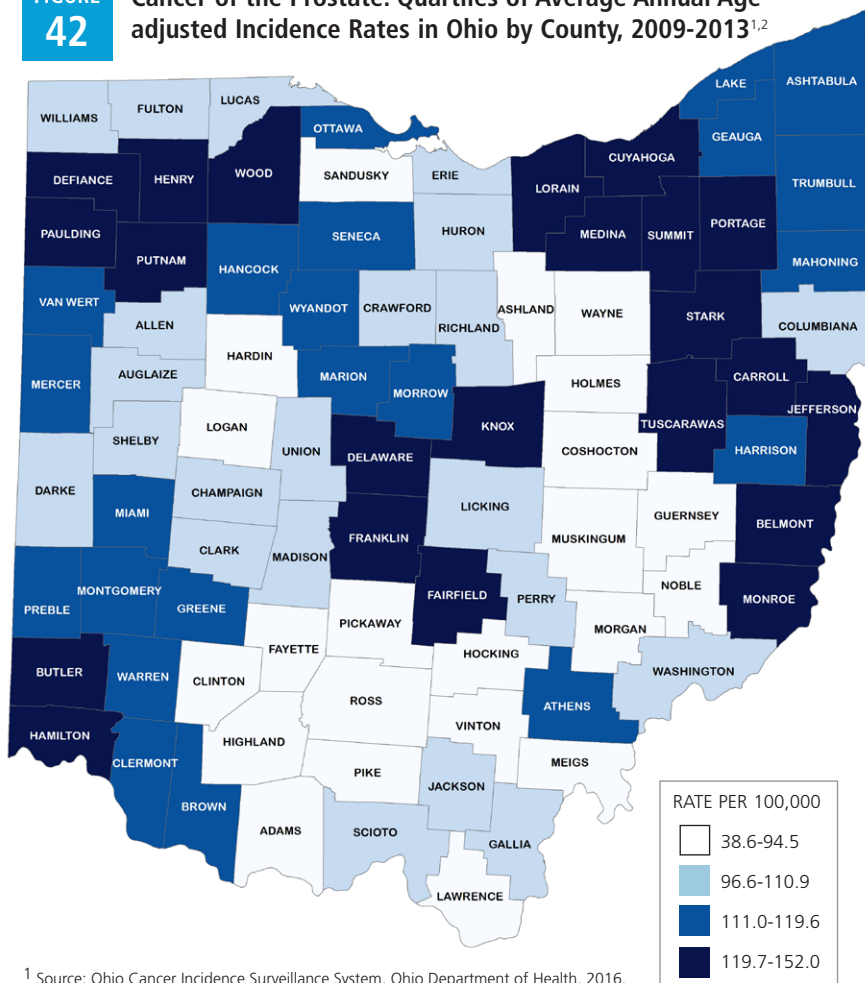
Currently, a male living in the United States has a 1 in 8 lifetime risk of developing invasive prostate cancer.²

Deaths

In the United States, an estimated 26,120 deaths in 2016 are expected from prostate cancer, the second leading cause of cancer death in men.¹ Although the death rate has been declining in the United States among white and black men since the early 1990s, the rate in black men remains more than twice as high as the rate in white men (44.2 and 19.1 per 100,000, respectively).¹ Overall, prostate cancer death rates decreased by 3.5 percent per year from 2003 to 2012.¹ In Ohio, 1,123 average annual deaths from prostate cancer occurred between 2009 and 2013.⁷ The mortality rate for prostate cancer in Ohio was 20.9 per 100,000 over the time period compared to 20.7 per 100,000 nationally (Table 3).^{4,7}

FIGURE 42

Cancer of the Prostate: Quartiles of Average Annual Age-adjusted Incidence Rates in Ohio by County, 2009-2013^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

Trends

Figure 43 displays a 24 percent overall decline in the prostate cancer incidence rate in Ohio from 1996 (134.6 per 100,000) to 2013 (101.7 per 100,000).³ The decline was similar among white males (31 percent) compared to black males (30 percent) during the time period.³

Figure 44 displays a 51 percent overall decline in the prostate cancer mortality rate in Ohio from 1996 (38.0 per 100,000) to 2013 (18.5 per 100,000).⁷ The decline was similar among white males (52 percent) compared to black males (51 percent) during the time period.⁷

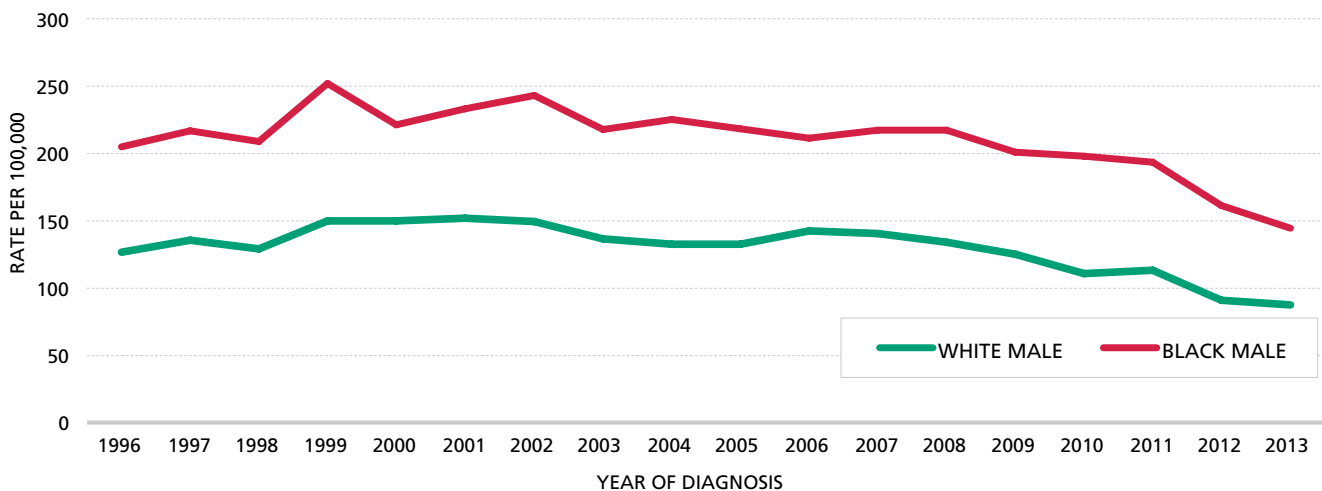
Early Detection

The ACS released updated guidelines in 2015 to reflect the uncertainty surrounding routine prostate cancer screening.²⁸ It is recommended that asymptomatic men who have at least a 10-year life expectancy talk to their healthcare providers to understand the risks and benefits of undergoing tests to detect prostate cancer

early, such as a digital rectal exam (DRE) and PSA test, so they can make informed healthcare decisions.²⁸ Men at average risk should have this conversation about screening with their healthcare provider beginning at 50 whereas men at higher risk, such as black men and men with a first-degree relative (father, brother or son) diagnosed with prostate cancer before 65, should begin this conversation at 45.²⁸ Men at appreciably higher risk (multiple family members diagnosed with prostate cancer before 65) should have this conversation beginning at 40.²⁸

However, the ACS recommends that symptomatic men who have less than a 10-year life expectancy based on age and health status should not be offered prostate cancer screening.²⁸ Men in this age group with significant comorbidities (additional unrelated health issues), as well as younger men with life-limiting conditions, are not likely to benefit from screening.²⁸ Thus, it is important to consider overall health status, not age alone, when making decisions about screening.

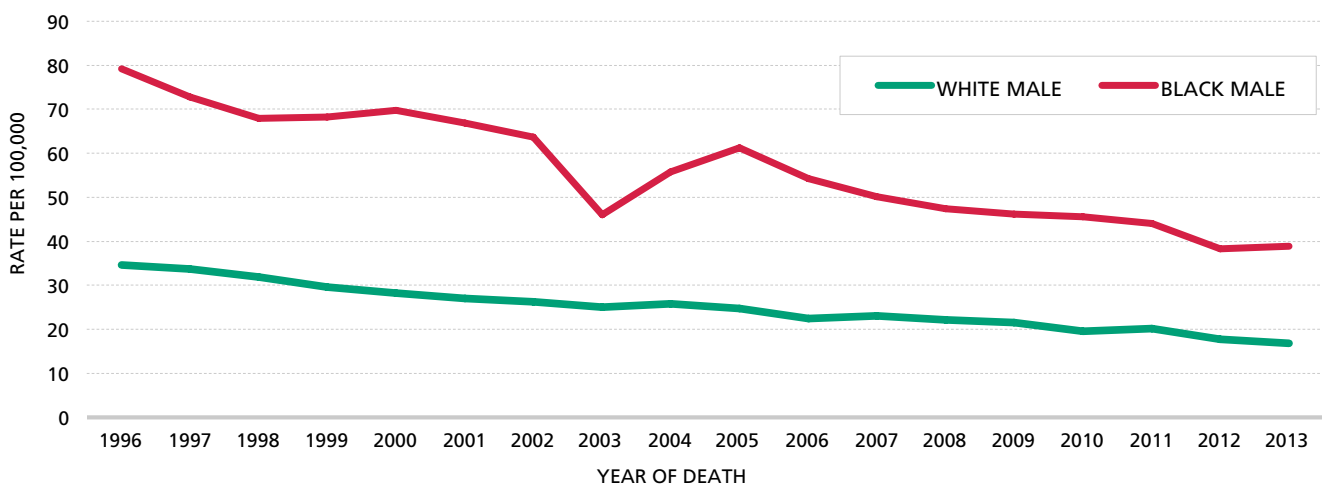
FIGURE 43 Trends in Age-adjusted Incidence Rates for Cancer of the Prostate by Race in Ohio, 1996-2013^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

FIGURE 44 Trends in Age-adjusted Mortality Rates for Cancer of the Prostate by Race in Ohio, 1996-2013^{1,2}



¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

TABLE
10

Prevalence of Men 50 and Older Who Reported Having Had a Prostate-specific Antigen (PSA) Test in the Past Year by Demographics in Ohio, 2014^{1,2}

Had a PSA Test in the Past Year	
AGE	
50-64	38%
65+	49%
RACE	
White	43%
Black	44%
EDUCATION	
Less Than High School	36%
High School or GED*	39%
Some College	40%
College Graduate	51%
ANNUAL HOUSEHOLD INCOME	
<\$25,000	32%
\$25,000-\$49,999	43%
\$50,000+	48%
Total (Men 50+)	42%

¹ Source: 2014 Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2016.

² "Don't Know" and "Refused" were excluded from the denominator.

This can cause an artificially high percentage.

* General Educational Development

The USPSTF views the available evidence as insufficient to assess the benefits and harms of prostate cancer screening.²⁹ Consequently, there are currently no USPSTF prostate cancer screening recommendations for men of any age.²⁹

Table 10 displays the results of the 2014 Ohio BRFSS with respect to PSA testing for men 50 and older. The 65 and older population had higher levels of PSA screening in the past year (49 percent) compared to 50- to 64-year-olds (38 percent).¹⁴ The percentage of respondents who received a PSA test was lowest for those with less than a high school education (36 percent) and those with the lowest income (less than \$25,000 per year) (32 percent), highest for college graduates (51 percent) and those with the highest income (at least \$50,000 per year) (48 percent) and similar among blacks (44 percent) compared to whites (43 percent).¹⁴

Treatment

Since the type(s) of treatment an individual receives for prostate cancer depends on his age, the stage and grade of the cancer and other medical conditions he may have, treatment options should be discussed with a healthcare provider.¹ Careful observation (called active surveillance) in place of immediate treatment is appropriate for many patients, particularly men diagnosed at an early stage or with less aggressive tumors and for older men.¹ Surgery, external beam radiation and/or radioactive seed implants (brachytherapy) may be used to treat early stage disease.¹

More advanced stages of disease are commonly treated by using hormonal therapy along with surgery or radiation.¹ Hormone treatment has the potential to control prostate cancer for an extended period of time by shrinking the size or limiting the growth of the tumor, which in turn may relieve pain and other symptoms.¹ Chemotherapy is often used if hormone treatments are no longer effective.¹ An option for some men with advanced prostate cancer that is no longer responding to hormones is a cancer vaccine designed to stimulate the patient's immune system to specifically attack prostate cancer cells.¹

RISK FACTORS AND POPULATIONS WITH HIGH RATES

A specific cause of prostate cancer is unknown, and according to NCI there are no potentially modifiable risk factors for prostate cancer at this time.²⁷ However, several non-modifiable risk factors may contribute to the development of prostate cancer.

NON-MODIFIABLE RISK FACTORS

Age: Approximately 57 percent of all prostate cancers are diagnosed in men over 65 and 99 percent are diagnosed in men at least 45 years of age.

Race/ethnicity: Black men are more likely to be diagnosed with prostate cancer than white men and often at a more advanced stage. The death rate for black men is more than two times higher than for white men. Prostate cancer is less common among Asian-American and Hispanic/Latino men compared to non-Hispanic white men.

Family history: Having a father or brother with prostate cancer more than doubles a man's risk of developing this disease. Risk is even higher for men with several affected relatives, particularly if their relatives were young at the time of diagnosis.

Genetic changes: Men with genetic changes in one or more specific regions of certain chromosomes have increased risk. Risk increases with the number of genetic changes. In addition, changes in the BRCA1 and BRCA2 genes increase risk. Men with Lynch syndrome also have an increased risk.

SIGNS AND SYMPTOMS OF PROSTATE CANCER

Although men with early stages of prostate cancer do not usually experience symptoms, those with a more advanced stage of the disease may experience:

- Weak or interrupted urine flow
- Inability to urinate or start or stop urine flow
- Need to urinate more frequently especially at night
- Blood in urine
- Pain or burning with urination
- Difficulty having an erection (erectile dysfunction)
- Pain in hips, spine, ribs or other areas from cancer that has spread to bones
- Weakness or numbness in legs or feet
- Loss of bladder or bowel control

Any of these signs/symptoms may be caused by cancer or by other, less serious health problems. If you have any of these signs/symptoms, see your healthcare provider.

Survival

Nationally, 92 percent of all prostate cancers were diagnosed at a local or regional stage; the five-year relative survival probability for patients whose tumors were diagnosed at these stages was 100 percent in 2006-2012.⁴ The five-year survival probability for all stages combined had increased from 68 percent in 1975-1977 to 99 percent in 2006-2012.⁴ In 2009-2013, approximately 78 percent of all prostate cancers were diagnosed at an early stage.³ Table A-7 on page 81 highlights the percentage of new prostate cancer cases in Ohio diagnosed at early and late stages by county.³

Tobacco Use



Smoking continues to be the most preventable cause of death in the world.¹ Since the first published Surgeon General's report on smoking and health in 1964, there have been more than 20 million premature deaths attributable to smoking in the United States.¹ Cigarette smoking is the cause of an estimated 480,000 premature deaths in the United States each year, 42,000 of which are due to secondhand smoke exposure.¹ In 2012, smoking accounted for \$176 billion in healthcare-related expenditures in the United States.¹

According to a 2014 U.S. Surgeon General's report, smoking leads to disease and disability and harms nearly every organ of the body.³⁰ More than 16 million Americans are living with a disease caused by smoking. For every person who dies because of smoking, at least 30 people live with a serious smoking-related illness. Smoking causes cancer, heart disease, stroke, lung diseases, diabetes and chronic obstructive pulmonary disease (COPD).³¹ Excluding secondhand smoke, smoking is estimated to cause 32 percent of all cancer deaths, including 83 percent of lung cancer deaths among men and 76 percent of lung cancer deaths among women.¹

In Ohio, an estimated 8,010 cancer deaths each year are attributed to smoking, including 5,906 deaths from lung and bronchus cancer.⁷

RISK FACTORS AND POPULATIONS WITH HIGH RATES^{32,33}

Lower income: Adults living below the poverty level are more likely to smoke than those with higher incomes.

Lower education: Smoking prevalence generally decreases with increasing years of education. In the United States in 2014, smoking prevalence was 23 percent among adults 25 years and older with less than a high school education and 5 percent among those with post-graduate degrees.

Race: The prevalence of smoking is highest among American Indian/Alaskan Native men and women.

Age: Nearly nine out of 10 adult smokers tried their first cigarette by age 18; 99 percent started by age 26.

Certain Populations: The prevalence of smoking is higher among lesbian, gay, bisexual and transgender groups, military service members and veterans, people living with HIV, people with mental health conditions and adults with disabilities.

SMOKING-RELATED HEALTH EFFECTS³⁴

Cigarette smoking causes the following:

- Cardiovascular disease
- Cancer (acute myeloid leukemia, bladder, cervix, colon and rectum, esophagus, kidney and ureter, larynx, liver, oropharynx, pancreas, stomach, lung, bronchus and trachea)
- Respiratory disease
- Rheumatoid arthritis
- Reduced fertility

Smoking during pregnancy is associated with the following:

- Premature births
- Low birth weight
- Stillbirth
- Sudden infant death syndrome (SIDS)
- Ectopic pregnancy
- Orofacial clefts in infants

Smoking is associated with the following adverse health effects:

- Postmenopausal women who smoke have lower bone density than women who never smoked
- Women who smoke have an increased risk for bone fracture than women who never smoked
- Smoking affects the health of teeth and gums and can cause tooth loss
- Smoking can increase the risk of cataracts and age-related macular degeneration
- Smoking increases the risk of developing type 2 diabetes and can make it harder to control
- Smoking causes general adverse effects on the body including inflammation and decreased immune function

If smoking continues at the current rate among youth, 5.6 million of today's Americans younger than 18 (1 in 13) will die early from a smoking-related illness.³²

**TABLE
11**

Prevalence of Current Cigarette Smoking among Adults 18 and Older by Demographics in Ohio, 2014^{1,2}

	Current Cigarette Smokers
SEX	
Men	22%
Women	20%
AGE	
18-34	26%
35-49	24%
50-64	22%
65+	10%
RACE	
White	21%
Black	22%
EDUCATION	
Less Than High School	39%
High School or GED*	25%
Some College	20%
College Graduate	7%
ANNUAL HOUSEHOLD INCOME	
<\$25,000	35%
\$25,000-\$49,999	23%
\$50,000+	12%
Total (Adults 18 and Over)	21%

1 Source: 2014 Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2016.

2 "Don't Know" and "Refused" were excluded from the denominator. This can cause an artificially high percentage.

* General Educational Development

Smoking Prevalence

The prevalence of current smoking among adults in the United States was 17 percent in 2014, down from 21 percent in 2005.³⁵ Data from the BRFSS indicate that the use of cigarettes by Ohio adults remained almost constant from the late 1980s to 2007 with a significant decline observed from 2007 (23 percent) to 2009 (20 percent).¹⁴ Table 11 displays 2014 smoking prevalence in Ohio adults by sex, age group, race, education and annual household income. In general, smoking prevalence in Ohio was highest among the 18-34 year age group, those with less than a high school education and those with an annual household income less than \$25,000.¹⁴

Nationally, 16 percent of high school students in grades 9-12 were current smokers in 2013, with American Indian/Alaskan Natives having the highest smoking prevalence (25 percent) of all racial/ethnic groups, followed by white students (19 percent).³⁶ In Ohio, high school students in the 11th (20 percent) and 12th (18 percent) grades were more likely to smoke compared to students in the 9th (10 percent) and 10th grades (13 percent).³⁶ Male high school students in Ohio (17 percent) were more likely than female students (13 percent) to be current smokers.³⁶



Secondhand Smoke

Involuntary smoking or passive smoking refers to the involuntary inhalation of tobacco smoke by nonsmokers. The smoke inhaled is called secondhand smoke or environmental tobacco smoke.³⁷

Secondhand smoke is a mixture of two forms of smoke that come from burning tobacco:³⁸

- Mainstream smoke: The smoke exhaled by a smoker.
- Sidestream smoke: Smoke from the lighted end of a cigarette, pipe, cigar or tobacco burning in a hookah. This type of smoke has higher concentrations of cancer-causing chemicals and is more toxic than mainstream smoke.

Secondhand smoke contains more than 7,000 chemicals, including at least 70 chemicals that can cause cancer.³⁸ In 2006, the U.S. Surgeon General's report on the health consequences of involuntary exposure to tobacco smoke concluded that the evidence is sufficient to infer a causal relationship between secondhand smoke exposure and lung cancer among lifetime nonsmokers.³⁷ Secondhand smoke caused more than 7,300 lung cancer deaths each year during 2005-2009 among adult nonsmokers in the United States.³¹ There is also some evidence suggesting that secondhand smoke may increase the risk of breast cancer, nasal sinus cavity cancer and nasopharyngeal cancer in adults and the risk of leukemia, lymphoma and brain tumors in children.³⁷

People are exposed to secondhand smoke primarily at home and in the workplace, but exposures also occur in vehicles and in public places such as bars, restaurants and recreation venues.³⁷ Many states and communities have passed laws making workplaces, public places, restaurants and bars smoke-free. Making homes and cars smoke-free and visiting smoke-free venues offer the best protection against secondhand smoke.



INTERVENTION STRATEGIES

For the general population, evidence-based, statewide tobacco control programs that are comprehensive, sustained and accountable have been shown to reduce smoking rates, tobacco-related deaths and diseases caused by smoking.

Funding at CDC-recommended levels could improve progress toward reducing the health and economic burden of tobacco-related diseases in the United States. However, during 2015, it was estimated that states spent less than 15 percent of the CDC-recommended level of funding for all states combined.³⁵ Implementation of comprehensive tobacco control interventions can result in substantial reductions in tobacco-related morbidity and mortality and billions of dollars in savings from averted medical costs.³⁵ Additionally, states can work with healthcare systems, insurers and purchasers of health insurance to improve coverage and utilization of tobacco cessation treatments and to implement health system changes that make tobacco cessation treatment a standard of clinical care.

National, state and local program activities have been shown to reduce and prevent youth tobacco use when implemented together. They include the following:³³

- Higher costs for tobacco products
- Prohibiting smoking in indoor areas of worksites and public places
- Raising the minimum age for sale of tobacco products to 21 years
- TV and radio commercials, posters and other media messages targeted toward youth to counter tobacco product advertisements
- Community programs, school and college policies, and interventions that encourage tobacco-free environments and lifestyles
- Community programs that reduce tobacco advertising, promotions and availability of tobacco products

E-cigarettes

Electronic cigarettes, also known as e-cigarettes or e-cigs, are battery-operated devices that heat a solution of liquid, flavorings and nicotine to create a vapor that is inhaled.³⁹ The following are some important facts about e-cigarettes:

- E-cigarettes contain nicotine and other chemicals.
- E-cigarettes are the most commonly used tobacco products among middle and high school students in the United States; 16 percent of high school students and 5 percent of middle school students used e-cigarettes in 2015.³²
- There is no scientific evidence to show that e-cigarettes are effective in helping people to quit smoking.³⁹

Smokeless Tobacco

In 1986, the U.S. Surgeon General concluded that the use of smokeless tobacco is not a safe substitute for smoking cigarettes or cigars, as these products cause various cancers and noncancerous oral conditions, and can lead to nicotine addiction.⁴⁰

- Among adults 18 and older, national data in 2014 showed that 4 percent of men and less than 1 percent of women were current users of smokeless tobacco.¹
- In 2014, 5 percent of Ohio adults used smokeless tobacco every day or some days.¹⁴
- The prevalence of smokeless tobacco use in Ohio in 2014 was 9 percent among adult males and less than 1 percent among adult females.¹⁴
- Nationally, an estimated 9 percent of high school students (15 percent male, 3 percent female) were current users of smokeless tobacco in 2013.³⁶
- In 2013, similar to the United States, 9 percent of Ohio high school students (15 percent male, 2 percent female) reported being current users of smokeless tobacco.³⁶

Smoking Cessation

- Smokers who quit, regardless of age, increase their longevity, with those who quit before middle age generally experiencing a lifespan similar to never smokers.¹
- Quitting smoking cuts cardiovascular risks. Just one year after quitting smoking, the risk for a heart attack drops sharply.³⁴
- Within two to five years after quitting smoking, the risk for stroke could fall to about the same as a nonsmoker.³⁴
- Quitting smoking decreases the risk for cancers of the mouth, throat, esophagus and bladder by half within five years.³⁴
- After quitting smoking for 10 years, the risk for lung cancer drops by half.³⁴
- Among adults 18 and older in Ohio, 2014 data showed that about 61 percent of current smokers in Ohio had stopped smoking at least one day in the preceding 12 months because they were trying to quit.⁴¹

Nutrition, Physical Activity, and Overweight and Obesity



Poor nutrition, physical inactivity and obesity are major risk factors for cancer, second only to tobacco use.¹ The World Cancer Research Fund estimates that about one-quarter to one-third of all cancers in the United States can be attributed to diet and insufficient physical activity, as well as being overweight or obese.¹ The ACS's nutrition and physical activity guidelines (most recently updated in 2012) emphasize the importance of weight control, physical activity, healthy dietary patterns and limited, if any, alcohol consumption in reducing cancer risk and helping people stay healthy.¹ ACS's guidelines also include recommendations for community action because of the large influence that physical and social environments have on food and activity behaviors.¹

Nutrition, Physical Activity, and Overweight and Obesity among Adults

NUTRITION

The 2015-2020 Dietary Guidelines for Americans focus on healthy eating patterns as whole and the variety of what people eat and drink, not just on individual nutrients or foods in isolation.⁴² Healthy eating patterns include a variety of nutritious foods like vegetables, fruits, grains, low-fat and fat-free dairy, lean meats and other protein sources, and oils while limiting saturated fats, trans fats, added sugars and sodium.⁴² A healthy eating pattern can be adapted to a person's taste preferences, traditions, culture and budget.⁴² In addition to the home, schools, workplaces, communities and food retail outlets can all contribute to supporting healthy and nutritious food options.⁴²

GUIDELINES ON NUTRITION AND PHYSICAL ACTIVITY FOR CANCER PREVENTION¹

1. Achieve and maintain a healthy weight throughout life.

- Be as lean as possible throughout life without being underweight.
- Avoid excess weight gain at all ages. For those who are currently overweight or obese, losing even a small amount of weight has health benefits and is a good place to start.
- Engage in regular physical activity and limit consumption of high-calorie foods and beverages as key strategies for maintaining a healthy weight.

2. Adopt a physically active lifestyle.

- Adults should engage in at least 150 minutes of moderate intensity or 75 minutes of vigorous intensity activity each week, or an equivalent combination, preferably spread throughout the week.
- Children and adolescents should engage in at least 1 hour of moderate or vigorous intensity activity each day, with vigorous activity occurring at least 3 days each week.
- Limit sedentary behavior such as sitting, lying down, watching television or other forms of screen-based environments.

3. Consume a healthy diet, with an emphasis on plant sources.

- Choose foods and beverages in amounts that help achieve and maintain a healthy weight.
- Limit consumption of processed meat and red meat.
- Eat at least 2.5 cups of vegetables and fruits each day.
- Choose whole grains instead of refined grain products.

4. If you drink alcoholic beverages, limit consumption.

- Drink no more than 1 drink per day for women or 2 per day for men.



RECOMMENDATIONS FOR COMMUNITY ACTION

Public, private and community organizations should work to create social and physical environments that support the adoption and maintenance of healthy nutrition and physical activity behaviors to help people stay well.

PHYSICAL ACTIVITY

Guidelines for recommended levels of physical activity state that adults should get at least 150 minutes a week of moderate intensity aerobic activity such as brisk walking, or 75 minutes a week of vigorous intensity aerobic activity such as jogging, or a combination of both.⁴³ The guidelines also recommend that adults do muscle-strengthening activities, such as push-ups, sit-ups, or activities using resistance bands or weights. These activities should involve all major muscle groups and be done on two or more days per week.⁴³ The health benefits of regular physical activity for the prevention of chronic diseases including heart disease, diabetes and some types of cancer are well documented. However, in 2013, 80 percent of Americans did not meet the guidelines for both aerobic and muscle-strengthening activities.⁴⁴ Similarly, 81 percent of adult Ohioans did not meet the aerobic and muscle-strengthening guidelines in 2013.⁴⁵

In 2013 in Ohio, the proportion of insufficient physical activity was higher among females (84 percent) compared to males (78 percent), the same among whites and blacks (81 percent) and increased as age increased (Figures 45-47).⁴⁵ Higher levels of education (college graduate) and household income (\$50,000 or more) were associated with lower proportions of insufficient physical activity (Figures 48 and 49).⁴⁵

OVERWEIGHT AND OBESITY

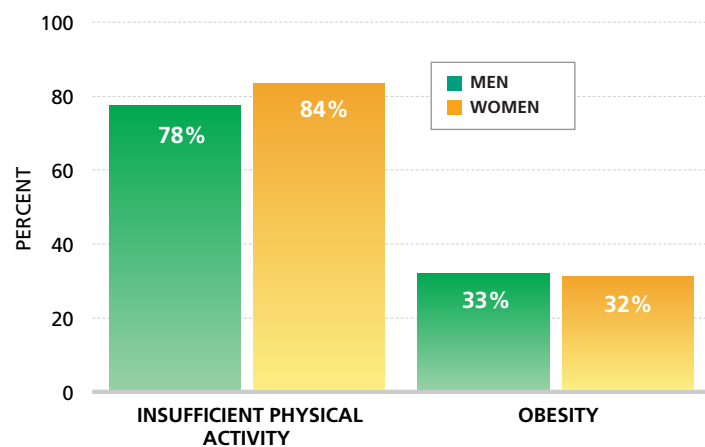
High caloric intake combined with inadequate physical activity leads to weight gain and subsequent development of being overweight and obese among children and adults. The NCI has identified the following cancer sites/types as being associated with overweight and obesity: adenocarcinoma of the colon and rectum, esophagus, endometrium (corpus uterus), postmenopausal female breast, gallbladder, kidney and renal pelvis, pancreas and thyroid.⁴⁶

Data from the National Health and Nutrition Examination Survey (NHANES) indicated that the percentage of obese adults ages 20-74 rose dramatically, from 13 percent in 1960-1962 to 35 percent in 2011-2012, with the largest increases occurring in the 1990s.⁴⁷ In 2014, the percentage of adults in Ohio classified as overweight was 34 percent and an additional 33 percent were obese.¹⁴

A similar number of Ohio men (33 percent) and women (32 percent) were obese in 2014 (Figure 45).¹⁴ A greater proportion of blacks (42 percent) in Ohio were obese compared to whites (32 percent) (Figure 46).¹⁴ Obesity levels were highest among the 50-64 age group (40 percent) compared to all other age groups (Figure 47).¹⁴ Ohioans with the highest level of education (college graduate) and income (\$50,000 or more) reported the lowest percentage of obesity (26 percent and 31 percent, respectively) (Figures 48 and 49).¹⁴

FIGURE
45

Prevalence of Insufficient Physical Activity and Obesity among Adults 18 and Older by Sex in Ohio, 2013 and 2014^{1,2,3,4}



¹ Source: 2013 and 2014 Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2016. Insufficient Physical Activity data are from 2013, and Obesity data are from 2014.

² "Don't Know" and "Refused" were excluded from the denominator.

This can cause an artificially high percentage.

³ "Insufficient Physical Activity" is defined as failure to meet recommended guidelines for physical activity, which are defined as at least 150 minutes of moderate-intensity physical activity per week and muscle-strengthening activities two or more days per week.

⁴ "Obesity" is defined as body mass index (BMI) $\geq 30.0 \text{ kg/m}^2$.

FIGURE 46 Prevalence of Insufficient Physical Activity and Obesity among Adults 18 and Older by Race in Ohio, 2013 and 2014^{1,2,3,4}

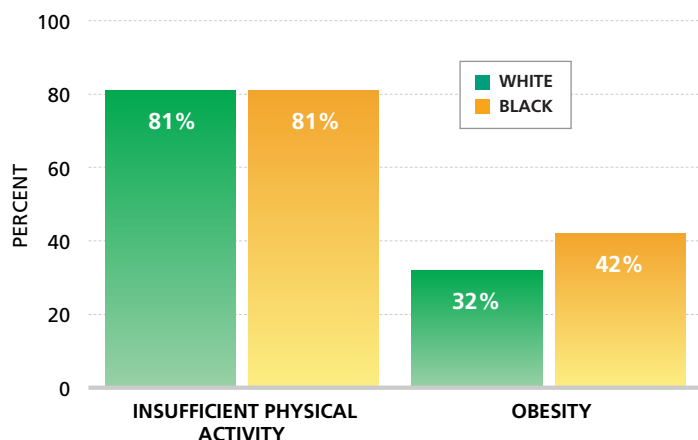


FIGURE 47 Prevalence of Insufficient Physical Activity and Obesity among Adults 18 and Older by Age Group in Ohio, 2013 and 2014^{1,2,3,4}

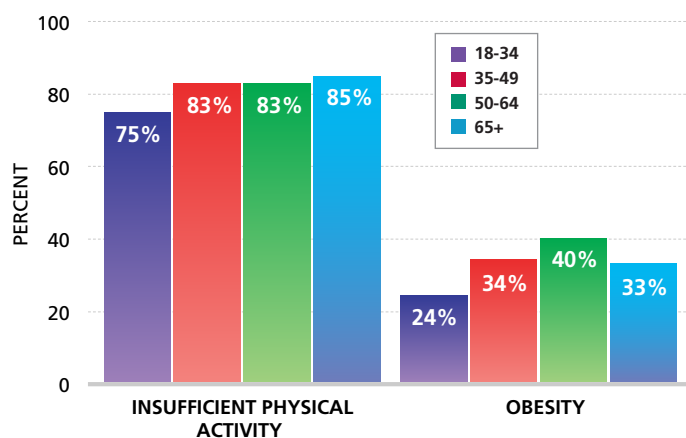


FIGURE 48 Prevalence of Insufficient Physical Activity and Obesity among Adults 18 and Older by Level of Education in Ohio, 2013 and 2014^{1,2,3,4}

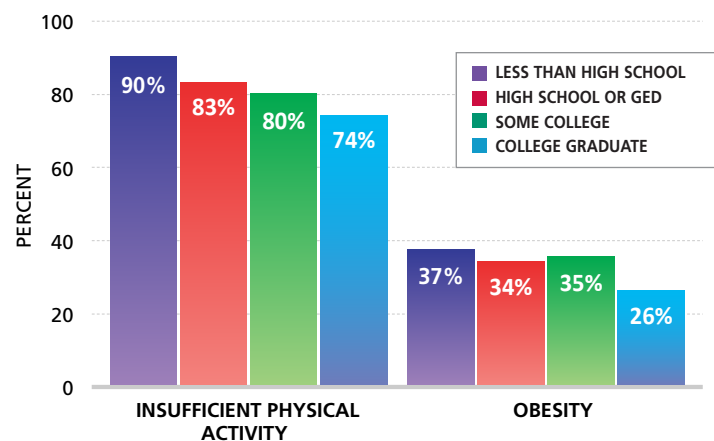
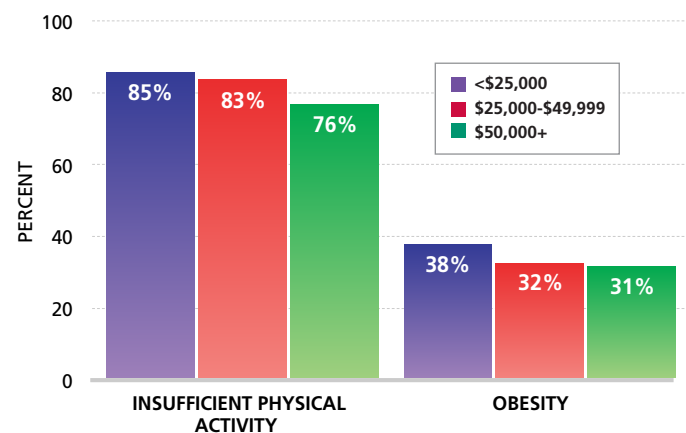


FIGURE 49 Prevalence of Insufficient Physical Activity and Obesity among Adults 18 and Older by Household Income in Ohio, 2013 and 2014^{1,2,3,4}



FOOTNOTES FOR FIGURES 46-49

¹ Source: 2013 and 2014 Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2016. Insufficient Physical Activity data are from 2013, and Obesity data are from 2014.

² "Don't Know" and "Refused" were excluded from the denominator. This can cause an artificially high percentage.

³ "Insufficient Physical Activity" is defined as failure to meet recommended guidelines for physical activity, which are defined as at least 150 minutes of moderate-intensity physical activity per week and muscle-strengthening activities two or more days per week.

⁴ "Obesity" is defined as body mass index (BMI) ≥ 30.0 kg/m².

Nutrition, Physical Activity, and Overweight and Obesity among Youths

NUTRITION

Healthy eating in adolescence promotes optimal growth, development, cognitive functioning, attendance and mood, and reduces the risk for many harmful illnesses and diseases.⁴¹ The Dietary Guidelines for Americans recommend a diet rich in fruits and vegetables, whole grains, and fat-free and low-fat dairy products for persons aged two years and older. The guidelines also recommend that children, adolescents and adults limit intake of solid fats, cholesterol, sodium added sugars and refined grains.⁴⁸ Unfortunately, most young people are not following the recommendations set forth in the Dietary Guidelines for Americans.⁴⁸ Ohio data from the Youth Risk Behavior Survey (YRBS) in 2013 showed that less than one-fifth (19 percent) of Ohio high school students ate five or more servings of fruits and vegetables per day.⁴⁸ In addition, 20 percent of Ohio high school students consumed one or more cans, bottles or glasses of soda or pop every day during the last seven days.⁴⁸



Schools are in a unique position to promote healthy eating and help ensure appropriate food and nutrient intake among students. Schools provide students with opportunities to consume a wide variety of foods and beverages during the school day and enable students to learn about and practice healthy eating behaviors.⁴⁹ Schools should ensure that only nutritious and appealing foods and beverages are provided in school cafeterias, vending machines, snack bars, school stores and other venues that offer food and beverages to students.⁴⁹ In addition, nutrition education should be part of a comprehensive school health education curriculum.⁴⁹

PHYSICAL ACTIVITY

Regular physical activity in childhood and adolescence improves strength and endurance, helps build healthy bones and muscles, helps control weight, reduces anxiety and stress, increases self-esteem and may improve blood pressure and cholesterol levels.⁴⁸ In Ohio in 2013, only 26 percent of high school students reported engaging in at least 60 minutes of physical activity each day during the past seven days.⁴¹

Schools can help promote physical activity through comprehensive school physical activity programs including recess, classroom-based physical activity, intramural physical activity clubs, interscholastic sports and physical education.⁴⁸ Schools should ensure that physical education is provided to all students in all grades and is taught by qualified teachers.⁴⁸ Schools can also work with community organizations to provide out-of-school-time physical activity programs and share physical activity facilities.⁴⁸

Body mass index (BMI) is used in children to screen for excess weight and for those at risk of becoming overweight. Because the amount of body fat changes with age and differs between boys and girls, the CDC developed BMI-for-age growth charts to show the entire distribution of height and weight by gender and age.⁵¹ Definitions of overweight and obese among children are as follows:

- Overweight: 85th to 94th percentile for BMI
- Obese: 95th or higher percentile for BMI

OVERWEIGHT AND OBESITY

Obese youth have a greater risk of being obese in adulthood and have a higher risk for prediabetes, cardiovascular disease, bone and joint problems, sleep problems, and social and emotional problems.⁴⁹ Recent national data showed that the percentage of obese children 6 to 11 years old increased from 4 percent in 1971-1974 to 18 percent in 2011-2012.⁵⁰ Similarly, the percentage of obese 12 to 19 year olds increased from 6 percent in 1971-1974 to 21 percent in 2011-2012.⁵⁰ Nationally in 2013, 17 percent of high school students were considered overweight and 14 percent were obese.³⁶ In 2013 in Ohio, 16 percent of high school students were overweight and an additional 14 percent were obese.³⁶



**TABLE
A-1**

Estimated Completeness of Reporting by Cancer Site/Type in Ohio, 2009-2013^{1,2}

SITE/TYPE	% COMPLETE
All Sites/Types	94%
Bladder	94%
Brain & Other CNS*	>100%
Breast	90%
Cervix	92%
Colon & Rectum	93%
Esophagus	99%
Hodgkin Lymphoma	100%
Kidney & Renal Pelvis	98%
Larynx	>100%
Leukemia	84%
Liver & Intrahepatic Bile Duct	86%
Lung & Bronchus	>100%
Melanoma of the Skin	81%
Multiple Myeloma	82%
Non-Hodgkin Lymphoma	88%
Oral Cavity & Pharynx	94%
Ovary	95%
Pancreas	96%
Prostate	92%
Stomach	100%
Testis	>100%
Thyroid	99%
Uterine Corpus & Uterine NOS**	>100%

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Expected incidence rates generated to calculate completeness were estimated based on the Surveillance, Epidemiology, and End Results (SEER) Program national background cancer incidence to mortality ratio for 2009-2013, National Cancer Institute, 2016.

* Central Nervous System

** Not Otherwise Specified

Note: Completeness may exceed 100 percent if the observed number of cases exceeds the number expected based on the Surveillance, Epidemiology and End Results (SEER) Program incidence to mortality rate ratio and Ohio mortality rates. See page 10 for more information.

Average Annual Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates by County and Sex in Ohio, 2009-2013^{1,2,3}

	All Sites/Types						Colon & Rectum					
	Male		Female		Total		Male		Female		Total	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Ohio	31,400	513.8	30,620	423.8	62,020	459.9	2,925	48.9	2,729	36.2	5,654	41.8
Adams [†]	84	505.1	77	438.4	162	467.9	10	61.8	9	52.5	19	56.8
Allen [†]	298	512.7	273	418.6	570	456.1	27	48.9	27	39.9	54	43.7
Ashland [†]	140	460.4	150	444.5	291	447.7	15	51.1	17	45.7	33	47.9
Ashtabula [†]	326	549.7	296	450.6	622	492.2	36	62.2	27	39.1	63	49.7
Athens [†]	136	538.3	128	434.8	264	473.9	15	58.2	14	44.5	29	50.8
Auglaize	137	521.5	138	468.6	275	489.8	14	54.5	16	49.3	31	52.9
Belmont [†]	210	485.1	190	387.1	400	420.8	22	51.0	17	33.3	39	40.9
Brown [†]	147	562.3	124	454.4	271	503.1	14	57.6	12	43.2	26	49.7
Butler [†]	879	504.8	891	434.1	1,770	462.4	81	46.8	86	41.7	167	44.1
Carroll	106	571.3	80	404.7	186	477.6	10	54.0	9	45.3	19	49.0
Champaign [†]	109	491.8	109	443.8	218	459.4	12	56.5	9	34.6	21	44.0
Clark [†]	406	509.8	419	451.8	825	474.8	39	49.2	38	38.1	76	43.2
Clermont	532	539.7	500	436.4	1,032	478.8	47	50.1	43	37.2	90	42.8
Clinton [†]	116	532.8	116	449.3	233	483.7	13	62.8	10	39.7	24	49.6
Columbiana	329	497.5	294	400.2	623	439.7	28	43.3	31	39.1	59	40.8
Coshocton [†]	109	503.9	106	428.2	215	458.2	10	51.7	11	38.9	21	44.7
Crawford	135	490.8	141	454.7	275	468.1	12	46.0	12	36.9	24	41.2
Cuyahoga	3,820	554.4	3,929	449.5	7,750	490.5	347	50.9	337	36.2	684	42.4
Darke	162	511.1	148	428.3	310	460.9	19	58.5	20	56.1	39	57.0
Defiance [†]	113	505.0	100	405.8	213	445.8	10	47.0	11	43.4	22	45.0
Delaware	384	495.8	385	426.9	769	454.3	31	42.3	29	32.9	59	37.2
Erie	263	529.6	247	462.0	510	490.9	30	60.8	25	43.4	55	51.4
Fairfield	375	507.7	347	404.9	722	448.1	33	45.1	28	33.0	61	38.6
Fayette [†]	81	501.0	76	405.1	157	445.7	7	43.3	6	28.1	12	34.5
Franklin	2,528	528.2	2,621	432.4	5,149	469.2	229	49.0	210	34.8	439	41.0
Fulton [†]	103	430.6	86	318.6	189	365.9	11	47.4	7	27.4	18	36.1
Gallia [†]	100	557.5	79	398.1	180	468.7	9	45.3	8	37.4	17	41.4
Geauga	254	460.0	267	424.1	521	438.3	25	47.8	21	30.4	45	39.2
Greene	411	479.1	429	436.1	839	453.9	32	38.3	33	32.6	65	35.6
Guernsey [†]	131	542.4	117	442.6	248	486.9	14	61.2	16	60.0	31	61.0
Hamilton	2,045	520.6	2,166	438.6	4,212	470.2	182	47.0	195	37.9	377	41.8
Hancock [†]	201	489.6	181	389.5	383	431.7	19	49.0	17	34.1	36	41.1
Hardin [†]	78	487.7	74	404.8	152	434.6	9	53.1	6	28.8	14	40.7
Harrison [†]	54	507.7	42	362.5	96	428.8	5	44.3	2	17.1	7	29.7
Henry [†]	75	462.2	66	357.0	141	401.7	8	50.7	6	28.3	14	38.8
Highland [†]	113	460.8	110	397.2	223	423.2	10	43.4	13	45.3	23	44.1
Hocking [†]	88	499.0	78	419.5	166	455.8	8	47.0	8	42.8	16	46.2
Holmes [†]	66	343.6	65	313.1	132	326.6	8	41.2	9	41.1	16	40.9
Huron [†]	167	533.1	158	442.7	325	478.8	17	55.4	14	39.1	31	46.4
Jackson [†]	92	528.9	81	389.7	173	445.3	10	57.3	8	36.3	18	44.5
Jefferson [†]	231	521.6	215	436.7	446	472.0	20	50.4	19	33.3	39	41.1
Knox	187	558.9	182	479.8	369	510.9	18	55.4	16	40.1	34	47.2
Lake	722	541.5	744	467.5	1,466	494.9	70	52.5	56	32.6	125	41.4

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

³ Expected incidence rates generated to calculate completeness were estimated based on the Surveillance, Epidemiology, and End Results (SEER) Program national background cancer incidence to mortality ratio for 2009-2013, National Cancer Institute, 2016.

[†] Data for this county did not meet the standard of 95 percent complete for all sites/types combined in 2009-2013. See page 10 for more information.

Average Annual Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates by County and Sex in Ohio, 2009-2013^{1,2,3}

	Lung & Bronchus						Breast		Prostate	
	Male		Female		Total		Female		Male	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Ohio	5,170	85.6	4,478	59.7	9,648	70.7	8,722	122.0	7,724	119.7
Adams [†]	16	93.9	16	82.6	32	87.1	18	102.1	16	90.1
Allen [†]	53	90.8	37	54.0	90	70.4	75	116.5	66	108.7
Ashland [†]	22	73.7	18	51.2	41	61.2	43	126.4	28	83.0
Ashtabula [†]	54	91.3	49	70.6	103	79.2	76	115.9	74	115.7
Athens [†]	22	87.1	21	68.6	42	76.4	37	125.8	32	115.4
Auglaize	22	82.2	18	57.1	40	68.1	41	143.4	29	106.2
Belmont [†]	31	69.4	29	54.5	60	60.9	50	99.4	58	129.8
Brown [†]	32	119.8	27	95.0	58	106.5	28	101.1	31	111.1
Butler [†]	149	87.5	136	65.8	285	75.0	256	124.4	226	122.6
Carroll	20	113.0	11	52.2	31	79.7	18	88.7	26	130.8
Champaign [†]	16	74.5	15	57.1	31	64.0	29	116.7	26	110.7
Clark [†]	75	94.0	64	63.8	139	76.7	122	135.0	88	103.5
Clermont	94	98.6	88	76.1	181	85.2	148	127.7	123	115.8
Clinton [†]	22	99.9	21	77.0	42	86.6	29	115.3	19	83.1
Columbiana	57	85.4	44	55.9	101	68.5	84	117.2	78	110.9
Coshocton [†]	20	91.9	16	60.0	36	74.0	25	100.5	18	74.3
Crawford	24	86.2	17	51.5	41	66.6	38	125.9	29	100.1
Cuyahoga	563	81.7	545	59.5	1,108	68.7	1,108	130.5	1,021	142.6
Darke	26	82.3	20	53.5	46	66.0	39	113.1	35	105.3
Defiance [†]	17	77.5	15	57.5	32	67.3	27	115.7	34	144.8
Delaware	48	69.9	47	55.7	94	61.0	124	132.3	109	125.8
Erie	42	84.4	29	50.4	72	66.0	76	145.0	59	110.5
Fairfield	66	94.1	51	58.1	117	73.3	104	120.9	97	120.3
Fayette [†]	19	118.7	12	62.1	32	87.4	19	102.6	15	84.6
Franklin	382	84.5	354	59.9	736	70.3	778	128.4	663	134.3
Fulton [†]	16	66.8	9	34.5	25	48.4	24	86.1	28	108.9
Gallia [†]	22	120.2	13	62.1	35	88.2	17	87.0	19	101.0
Geauga	31	55.4	33	48.7	64	51.5	82	129.8	68	111.2
Greene	59	71.1	54	53.4	113	60.9	136	137.6	109	119.0
Guernsey [†]	26	107.2	17	61.1	43	82.2	26	96.8	24	94.5
Hamilton	332	85.7	341	67.7	673	75.1	649	133.6	560	137.5
Hancock [†]	30	73.1	23	47.3	52	58.3	52	111.6	50	114.5
Hardin [†]	15	96.5	11	55.7	26	72.9	22	121.4	16	91.4
Harrison [†]	10	89.6	7	58.8	17	71.8	12	102.1	13	112.9
Henry [†]	11	69.1	9	45.9	20	55.3	19	102.7	21	122.0
Highland [†]	25	101.0	16	55.1	41	75.8	28	104.8	21	81.2
Hocking [†]	17	94.5	12	62.9	29	77.0	23	126.0	17	88.3
Holmes [†]	10	53.5	6	29.4	16	40.6	15	70.7	14	71.3
Huron [†]	30	96.0	24	63.7	54	78.2	41	116.8	36	107.8
Jackson [†]	20	106.4	13	63.5	33	82.3	20	95.2	18	98.3
Jefferson [†]	42	93.3	36	68.3	78	78.9	58	120.4	59	125.9
Knox	28	85.0	23	57.9	51	69.8	58	152.3	54	152.0
Lake	104	78.4	118	70.5	222	73.0	215	137.6	166	115.5

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

³ Expected incidence rates generated to calculate completeness were estimated based on the Surveillance, Epidemiology, and End Results (SEER) Program national background cancer incidence to mortality ratio for 2009-2013, National Cancer Institute, 2016.

[†] Data for this county did not meet the standard of 95 percent complete for all sites/types combined in 2009-2013. See page 10 for more information.

Average Annual Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates by County and Sex in Ohio, 2009-2013^{1,2,3}

	All Sites/Types						Colon & Rectum					
	Male		Female		Total		Male		Female		Total	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Ohio	31,400	513.8	30,620	423.8	62,020	459.9	2,925	48.9	2,729	36.2	5,654	41.8
Lawrence [†]	178	503.8	179	439.8	357	466.9	15	42.9	16	38.2	31	40.9
Licking [†]	454	516.4	445	442.4	898	472.4	38	44.1	41	40.5	79	42.2
Logan [†]	126	486.3	132	459.5	258	466.6	15	57.4	11	37.3	26	46.4
Lorain	868	528.5	820	424.5	1,689	465.7	83	50.8	68	33.7	150	41.2
Lucas [†]	1,008	456.5	922	344.7	1,930	390.9	93	43.7	78	28.5	172	34.9
Madison [†]	110	476.8	101	424.0	210	440.0	10	44.4	9	35.5	18	38.8
Mahoning [†]	740	511.4	719	402.9	1,459	446.3	80	56.7	75	39.2	155	46.7
Marion [†]	211	561.7	184	460.2	395	496.5	26	71.6	20	45.3	46	56.7
Medina	472	510.4	458	438.5	930	467.4	37	41.7	41	37.8	78	39.3
Meigs [†]	70	492.1	63	395.3	133	434.9	7	52.8	6	35.5	13	42.4
Mercer [†]	121	510.0	103	398.2	224	444.5	14	59.9	13	48.4	27	53.2
Miami	301	513.3	272	405.5	572	449.4	27	47.6	25	35.6	52	40.6
Monroe [†]	53	502.7	35	342.9	88	419.4	4	39.4	3	33.4	7	36.2
Montgomery [†]	1,461	504.0	1,537	431.2	2,998	459.3	129	45.1	128	34.0	257	38.7
Morgan [†]	48	481.5	42	403.0	90	437.5	3	35.3	5	44.2	8	41.4
Morrow	105	529.6	89	417.0	194	469.4	13	62.8	11	51.3	24	58.5
Muskingum [†]	239	505.2	251	450.2	491	470.6	22	48.1	24	42.3	47	44.7
Noble	37	279.6	37	449.4	73	351.1	5	33.7	5	51.6	10	43.1
Ottawa	158	540.6	131	413.5	289	471.1	13	45.4	15	44.7	28	45.4
Paulding [†]	60	547.9	50	402.2	110	463.9	8	68.4	4	31.5	12	49.2
Perry [†]	95	505.8	92	426.5	187	456.4	13	70.0	6	28.0	19	47.1
Pickaway [†]	147	495.8	138	432.3	285	453.8	13	43.8	12	35.7	25	39.9
Pike [†]	78	487.2	82	465.1	160	473.2	8	53.7	6	32.6	14	41.2
Portage [†]	436	523.0	386	420.3	822	464.1	34	42.5	32	35.0	67	38.4
Preble [†]	127	523.8	117	422.8	245	466.2	14	59.4	11	39.3	25	49.0
Putnam	85	462.3	84	404.9	170	424.7	8	44.9	8	34.9	16	40.1
Richland [†]	374	509.2	340	407.3	713	448.5	37	52.1	31	34.5	68	42.6
Ross [†]	213	496.0	198	431.2	411	453.1	24	59.9	16	33.7	40	45.3
Sandusky [†]	162	471.8	164	412.4	325	433.5	19	56.2	19	43.0	38	49.1
Scioto [†]	243	559.7	232	458.7	475	497.6	24	54.7	19	33.8	42	43.0
Seneca	153	484.9	150	419.8	303	445.7	17	54.9	18	47.1	35	51.7
Shelby [†]	112	440.2	101	349.7	213	387.6	12	44.1	7	24.1	19	33.4
Stark	1,138	519.8	1,028	402.0	2,166	451.0	90	41.9	84	30.8	174	35.7
Summit [†]	1,501	509.1	1,417	398.8	2,918	444.2	130	44.6	123	32.7	253	37.9
Trumbull	700	540.4	638	423.0	1,339	472.6	65	52.6	67	41.3	132	46.2
Tuscarawas	289	525.1	241	380.5	530	443.1	24	43.0	24	35.5	49	38.8
Union	115	503.6	117	435.7	232	465.5	10	45.7	9	35.0	19	39.7
Van Wert [†]	80	480.2	81	405.2	161	432.7	9	52.5	9	43.9	18	47.3
Vinton [†]	35	467.6	39	471.5	73	460.3	3	46.3	3	39.8	6	41.0
Warren	489	489.5	472	405.4	962	438.4	44	45.0	33	28.2	77	36.0
Washington	202	519.5	195	455.6	397	479.4	18	45.8	17	38.8	35	41.8
Wayne [†]	284	447.4	291	411.1	576	424.4	25	40.1	26	35.6	51	37.7
Williams [†]	102	460.6	95	382.6	197	413.5	10	43.8	11	41.0	21	42.6
Wood [†]	303	491.3	266	370.5	569	422.2	37	60.8	25	34.5	62	46.7
Wyandot	74	563.8	62	421.2	136	480.6	9	64.0	8	46.2	16	54.9

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

³ Expected incidence rates generated to calculate completeness were estimated based on the Surveillance, Epidemiology, and End Results (SEER) Program national background cancer incidence to mortality ratio for 2009-2013, National Cancer Institute, 2016.

[†] Data for this county did not meet the standard of 95 percent complete for all sites/types combined in 2009-2013. See page 10 for more information.

Average Annual Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates by County and Sex in Ohio, 2009-2013^{1,2,3}

	Lung & Bronchus						Breast		Prostate	
	Male		Female		Total		Female		Male	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Ohio	5,170	85.6	4,478	59.7	9,648	70.7	8,722	122.0	7,724	119.7
Lawrence [†]	36	102.7	29	67.8	66	83.4	47	115.9	36	94.1
Licking [†]	83	98.2	67	64.3	149	78.5	121	119.1	100	101.7
Logan [†]	22	84.2	19	60.7	40	70.7	37	129.0	22	77.1
Lorain	139	86.8	119	59.5	258	70.7	234	121.7	226	129.7
Lucas [†]	163	75.2	143	52.4	306	61.9	262	98.5	242	104.1
Madison [†]	20	91.1	15	61.5	36	74.8	28	115.1	26	106.5
Mahoning [†]	132	91.2	100	53.9	232	69.4	207	119.8	172	113.4
Marion [†]	40	106.0	27	63.4	67	82.9	46	115.4	45	113.9
Medina	67	74.7	55	52.6	122	62.0	134	125.5	131	130.9
Meigs [†]	13	90.2	10	62.0	23	73.0	15	96.8	13	88.8
Mercer [†]	17	73.2	10	37.5	28	52.9	29	111.5	29	117.6
Miami	53	93.3	42	60.0	95	73.7	78	117.1	74	116.3
Monroe [†]	9	85.3	4	36.0	13	60.3	9	89.4	14	124.4
Montgomery [†]	253	87.4	254	68.4	507	76.4	448	127.5	353	116.3
Morgan [†]	9	87.0	8	69.6	17	78.6	11	104.5	9	83.5
Morrow	22	109.6	12	52.0	34	80.1	23	107.6	24	116.8
Muskingum [†]	48	101.2	38	64.2	87	80.6	62	110.4	42	82.5
Noble	7	43.6	5	57.4	12	48.6	9	113.1	6	38.6
Ottawa	25	83.9	17	50.2	43	66.0	41	132.9	37	113.2
Paulding [†]	11	93.8	11	83.7	21	87.6	12	102.0	15	129.7
Perry [†]	18	90.6	15	68.0	33	78.5	25	113.6	20	99.6
Pickaway [†]	28	93.7	22	64.8	49	77.5	43	129.5	27	86.4
Pike [†]	17	100.3	15	81.8	33	91.3	21	116.4	13	81.8
Portage [†]	68	83.7	60	63.4	128	72.0	107	115.3	118	133.6
Preble [†]	19	75.2	20	71.3	39	72.8	30	109.0	29	112.4
Putnam	11	59.0	8	36.4	19	45.5	25	116.8	24	120.8
Richland [†]	68	93.0	50	55.7	118	71.4	93	111.3	82	107.0
Ross [†]	47	110.9	32	65.6	79	85.2	53	115.2	37	82.2
Sandusky [†]	33	95.5	20	48.8	53	69.2	46	115.5	28	74.9
Scioto [†]	54	123.6	42	78.1	96	97.8	61	120.9	50	108.9
Seneca	27	89.1	22	59.3	49	71.8	42	119.5	37	111.9
Shelby [†]	16	60.1	15	51.3	32	55.7	25	85.4	25	95.8
Stark	187	84.3	151	55.4	338	68.1	294	116.7	306	132.7
Summit [†]	243	83.1	207	55.6	450	67.2	401	115.4	381	122.1
Trumbull	136	103.7	101	63.4	237	80.8	170	114.9	155	112.1
Tuscarawas	46	83.4	30	43.6	76	60.9	69	110.2	82	141.8
Union	17	75.4	16	63.7	33	68.9	32	120.1	27	109.3
Van Wert [†]	13	74.9	9	41.6	21	56.2	28	141.5	19	115.5
Vinton [†]	11	140.5	8	94.7	19	114.2	9	114.7	7	83.3
Warren	76	80.9	63	54.5	139	65.8	155	130.1	123	116.7
Washington	38	92.7	30	63.9	68	76.3	51	120.2	42	101.4
Wayne [†]	41	65.1	38	50.9	79	57.0	78	110.1	63	91.2
Williams [†]	18	82.7	14	53.7	32	66.0	29	122.1	22	96.3
Wood [†]	41	66.7	32	42.9	73	53.3	80	112.9	81	123.7
Wyandot	14	104.8	8	50.8	22	74.4	16	117.5	17	119.6

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

³ Expected incidence rates generated to calculate completeness were estimated based on the Surveillance, Epidemiology, and End Results (SEER) Program national background cancer incidence to mortality ratio for 2009-2013, National Cancer Institute, 2016.

[†] Data for this county did not meet the standard of 95 percent complete for all sites/types combined in 2009-2013. See page 10 for more information.

Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by County and Sex in Ohio, 2009-2013^{1,2}

	All Sites/Types						Colon & Rectum					
	Male		Female		Total		Male		Female		Total	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
Ohio	13,026	222.7	12,006	156.1	25,032	183.4	1,179	20.4	1,083	13.6	2,263	16.5
Adams	42	268.1	32	174.4	75	216.3	5	31.4	3	17.1	8	23.6
Allen	127	224.8	112	154.7	240	184.2	10	18.0	11	14.1	21	15.7
Ashland	67	226.0	61	162.7	128	190.2	7	23.4	7	18.2	14	20.3
Ashtabula	136	238.9	124	173.0	259	200.7	13	23.2	10	13.0	23	17.5
Athens	56	237.1	49	159.7	104	189.5	5	20.0	5	15.5	9	17.4
Auglaize	58	224.6	50	155.2	109	186.3	7	25.4	5	14.3	12	19.9
Belmont	90	211.9	92	166.2	182	182.2	9	22.5	10	16.8	19	19.0
Brown	62	251.0	52	188.3	114	215.6	6	25.4	5	18.9	11	21.7
Butler	363	223.7	341	163.2	704	188.7	31	19.0	29	14.0	60	16.3
Carroll	40	228.6	27	134.1	67	173.7	4	20.9	3	12.2	6	16.1
Champaign	49	232.1	41	159.9	90	190.1	5	23.9	3	9.7	7	15.7
Clark	183	235.3	175	172.1	357	199.1	13	17.9	17	15.7	30	17.1
Clermont	195	216.3	175	153.1	370	178.9	17	19.6	14	12.1	31	15.2
Clinton	56	267.5	52	192.5	108	224.6	6	26.8	4	16.6	10	21.3
Columbiana	135	211.4	117	147.3	252	173.2	10	15.6	12	14.4	22	14.6
Coshocton	51	244.5	44	173.6	96	202.9	5	24.4	4	16.7	9	20.1
Crawford	62	236.4	52	145.8	114	185.5	4	15.1	7	19.3	11	17.5
Cuyahoga	1,544	227.0	1,538	160.2	3,082	186.6	128	19.0	123	12.4	252	15.2
Darke	66	211.0	62	160.0	128	180.3	5	15.9	9	23.1	14	19.9
Defiance	48	225.1	42	158.9	90	186.4	4	18.7	4	16.3	8	17.7
Delaware	122	185.9	116	135.0	239	155.5	12	16.6	10	11.4	22	13.8
Erie	118	239.3	91	156.6	209	194.0	11	21.8	9	13.8	19	17.5
Fairfield	145	212.9	129	147.5	273	174.4	14	20.5	12	13.8	26	16.9
Fayette	36	230.9	32	164.1	68	194.4	3	20.8	3	15.8	6	18.1
Franklin	934	214.6	942	156.1	1,876	179.4	87	20.0	80	13.0	167	15.9
Fulton	48	210.5	46	161.6	94	180.2	5	24.9	5	17.8	11	20.6
Gallia	46	263.5	32	152.3	78	200.8	2	14.5	2	10.0	5	11.7
Geauga	91	175.1	86	124.5	177	145.4	7	13.2	6	7.8	12	10.2
Greene	151	185.8	146	140.8	297	160.2	14	17.1	12	11.2	27	14.2
Guernsey	62	270.9	47	167.5	109	212.4	5	21.7	6	20.2	11	20.8
Hamilton	833	221.7	831	158.7	1,664	183.7	82	22.2	72	13.3	154	17.0
Hancock	86	221.2	73	145.2	160	177.0	8	21.3	7	13.5	15	16.9
Hardin	33	220.8	32	162.2	64	183.2	3	16.8	3	14.1	6	15.9
Harrison	26	256.8	20	154.8	46	199.2	2	19.7	1	11.3	3	14.5
Henry	32	203.6	27	136.1	60	162.8	4	21.8	2	11.5	6	16.0
Highland	63	264.7	44	149.2	107	199.8	6	27.4	4	13.0	10	19.2
Hocking	44	259.0	33	170.4	77	210.3	5	32.1	4	19.8	9	25.9
Holmes	32	175.1	27	127.3	59	146.8	5	27.5	4	17.1	9	21.4
Huron	78	262.9	60	159.5	138	203.3	7	23.5	6	15.1	13	19.4
Jackson	48	289.4	34	156.8	82	210.1	4	24.3	2	11.1	6	15.7
Jefferson	95	216.3	97	173.0	192	190.2	9	22.8	9	14.5	18	18.3
Knox	69	213.3	62	157.0	132	179.8	7	21.1	8	20.0	15	20.7
Lake	288	223.4	269	155.8	557	182.3	28	21.8	23	12.6	51	16.5

¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by County and Sex in Ohio, 2009-2013^{1,2}

	Lung & Bronchus						Breast		Prostate	
	Male		Female		Total		Female		Male	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
Ohio	4,081	68.5	3,302	43.4	7,383	54.1	1,761	23.2	1,123	20.9
Adams	16	97.2	11	56.0	27	74.4	4	23.7	2	12.5
Allen	41	70.4	27	39.1	69	53.1	18	25.5	9	17.9
Ashland	21	68.9	15	42.1	36	54.3	8	22.2	5	16.4
Ashtabula	41	71.3	36	50.2	77	59.1	15	21.1	11	20.3
Athens	18	72.7	16	54.2	34	62.5	7	20.9	5	24.2
Auglaize	19	74.7	11	34.7	30	52.4	9	30.9	3	12.5
Belmont	25	58.0	25	44.8	50	49.9	12	22.4	7	16.6
Brown	25	96.5	16	57.4	41	75.4	7	24.4	3	12.2
Butler	119	71.5	101	48.1	220	58.1	52	25.0	29	19.8
Carroll	14	79.9	6	31.3	20	53.3	4	18.8	3	21.3
Champaign	15	70.6	12	45.3	27	55.8	8	30.1	3	15.2
Clark	63	79.2	48	45.8	111	60.2	25	24.9	15	20.8
Clermont	70	76.7	57	50.5	127	61.3	26	22.2	12	16.0
Clinton	17	82.0	16	57.7	33	67.4	6	23.2	6	30.0
Columbiana	42	63.4	31	40.8	74	50.6	17	21.1	9	16.1
Coshocton	17	80.2	14	53.0	31	65.0	5	20.9	5	26.4
Crawford	20	74.5	13	39.2	33	54.4	5	16.0	3	11.7
Cuyahoga	443	64.7	393	41.5	836	51.0	237	25.3	172	25.9
Darke	21	66.4	16	41.3	37	52.6	10	25.3	7	22.6
Defiance	15	68.3	11	42.4	26	54.8	7	28.9	4	23.8
Delaware	37	58.2	30	36.8	68	45.5	18	19.4	9	16.3
Erie	35	69.2	25	42.1	59	54.7	17	30.8	11	22.5
Fairfield	49	71.5	37	42.2	86	54.3	21	24.3	13	20.9
Fayette	14	91.4	9	48.6	24	66.7	4	17.7	3	21.0
Franklin	285	64.6	261	44.1	546	52.8	153	25.0	76	20.4
Fulton	14	61.9	9	33.1	24	45.3	5	17.3	4	20.5
Gallia	17	98.4	9	42.4	26	66.9	4	19.2	2	16.5
Geauga	22	42.3	21	30.9	44	35.6	14	20.7	10	21.7
Greene	43	52.4	39	37.6	82	44.1	21	20.7	12	15.7
Guernsey	22	90.6	14	50.1	36	69.0	5	15.7	4	21.8
Hamilton	261	68.3	238	46.5	499	55.6	125	23.9	82	23.6
Hancock	26	65.2	18	37.1	44	48.5	14	27.6	8	20.3
Hardin	11	73.3	9	45.9	20	56.4	4	19.9	2	14.7
Harrison	9	87.0	4	31.8	13	55.9	3	24.6	2	24.8
Henry	9	58.1	8	41.9	18	48.4	4	19.0	3	20.1
Highland	22	91.8	14	46.5	36	66.9	7	24.3	4	18.7
Hocking	16	92.0	9	46.2	25	66.6	4	21.3	4	24.8
Holmes	7	35.7	4	17.2	11	25.7	4	17.5	4	24.6
Huron	24	79.3	17	45.7	42	61.1	8	21.5	9	33.6
Jackson	18	98.6	9	41.8	27	66.6	5	23.4	5	32.1
Jefferson	31	70.0	28	49.9	59	58.4	14	25.6	8	20.1
Knox	19	57.7	16	39.8	35	47.8	9	24.6	7	22.9
Lake	85	65.6	84	49.5	169	55.4	41	24.5	25	20.5

¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by County and Sex in Ohio, 2009-2013^{1,2}

	All Sites/Types						Colon & Rectum					
	Male		Female		Total		Male		Female		Total	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
Ohio	13,026	222.7	12,006	156.1	25,032	183.4	1,179	20.4	1,083	13.6	2,263	16.5
Lawrence	83	245.1	69	159.2	152	197.0	8	22.2	7	15.3	14	18.6
Licking	184	231.0	168	163.5	352	190.1	17	21.6	14	13.0	30	16.4
Logan	64	260.0	49	160.7	112	203.1	8	35.4	4	13.8	13	23.3
Lorain	333	212.0	329	161.8	662	181.7	31	20.0	30	14.3	61	16.6
Lucas	504	240.1	470	166.4	974	195.9	50	24.1	44	14.8	94	18.8
Madison	48	220.7	43	173.2	91	195.8	5	23.4	4	16.4	9	19.1
Mahoning	345	238.1	310	156.3	656	189.2	30	21.3	32	15.7	62	17.8
Marion	85	244.6	74	172.1	160	201.1	9	27.6	6	12.3	15	18.8
Medina	170	199.3	155	145.3	325	167.5	14	16.6	11	9.9	25	13.1
Meigs	35	267.9	27	163.6	62	205.5	4	32.3	4	26.5	8	28.3
Mercer	51	219.7	44	155.2	95	182.4	6	26.1	3	11.6	9	17.5
Miami	122	217.5	107	149.7	229	177.2	10	17.3	9	12.2	19	14.2
Monroe	27	263.9	16	139.5	42	195.3	1	15.8	2	14.3	3	14.1
Montgomery	641	226.7	606	158.6	1,248	186.3	53	18.5	53	13.2	106	15.5
Morgan	22	223.0	20	178.2	41	197.6	2	16.5	3	27.7	5	22.4
Morrow	44	234.6	31	144.0	75	185.6	5	25.8	4	19.4	9	23.0
Muskingum	118	259.3	106	175.7	224	210.3	10	22.9	7	10.7	17	16.0
Noble	16	132.4	12	134.5	28	126.1	2	20.5	2	20.2	4	19.6
Ottawa	63	224.5	52	155.8	115	186.6	5	18.0	6	19.2	11	18.3
Paulding	26	252.2	26	194.7	52	216.6	3	21.6	2	18.6	5	20.5
Perry	42	238.4	37	170.2	79	198.5	6	29.7	2	10.1	8	19.4
Pickaway	66	241.2	57	173.2	123	200.6	5	18.4	5	16.0	10	17.1
Pike	43	273.7	31	169.2	74	215.1	4	23.7	2	12.9	6	18.0
Portage	170	218.7	152	160.5	322	185.4	14	19.3	11	11.8	25	14.9
Preble	54	230.5	47	163.6	101	191.9	5	18.8	4	11.9	8	15.5
Putnam	35	200.1	28	118.0	63	152.1	4	22.8	3	12.5	7	17.6
Richland	165	229.2	139	153.4	304	185.3	13	17.9	16	15.9	28	16.8
Ross	100	250.9	79	168.8	180	203.0	9	21.0	7	14.0	15	17.4
Sandusky	79	237.8	71	165.3	150	194.7	9	28.9	10	21.3	19	24.8
Scioto	108	256.7	89	163.7	197	202.3	10	23.6	9	15.6	20	19.5
Seneca	64	209.3	58	147.0	122	172.6	6	19.4	8	18.5	14	19.0
Shelby	51	212.2	42	134.8	93	168.4	5	19.0	4	10.6	8	14.6
Stark	468	219.6	412	145.7	880	176.4	41	19.4	36	12.3	76	15.2
Summit	619	216.5	578	150.3	1,197	177.3	58	20.5	50	12.7	108	16.1
Trumbull	290	226.7	254	155.2	544	185.0	27	21.6	26	15.3	52	18.0
Tuscarawas	117	217.0	92	132.2	209	168.2	10	19.2	12	15.8	22	17.5
Union	41	197.0	38	150.6	79	170.6	3	18.0	3	13.7	7	15.5
Van Wert	32	197.4	35	159.8	68	173.9	4	24.1	4	15.2	7	18.9
Vinton	15	216.4	14	159.8	29	183.3	1	11.8	1	12.3	2	12.3
Warren	171	187.6	164	142.1	335	160.8	14	14.9	14	12.6	28	13.6
Washington	83	216.4	74	161.1	157	183.3	6	14.9	7	16.2	13	15.3
Wayne	116	194.9	115	152.9	232	169.3	10	16.0	9	12.2	19	13.8
Williams	51	239.9	39	143.0	91	183.2	4	20.3	3	10.9	8	15.1
Wood	118	203.8	112	148.0	230	171.3	15	25.8	11	14.1	26	19.2
Wyandot	35	274.6	21	125.0	56	188.0	4	30.0	2	14.0	6	20.8

¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by County and Sex in Ohio, 2009-2013^{1,2}

	Lung & Bronchus						Breast		Prostate	
	Male		Female		Total		Female		Male	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
Ohio	4,081	68.5	3,302	43.4	7,383	54.1	1,761	23.2	1,123	20.9
Lawrence	29	84.4	23	53.3	52	66.3	9	20.1	3	10.0
Licking	64	76.1	51	49.5	114	61.0	24	23.3	15	21.4
Logan	19	77.1	15	46.9	34	59.7	6	22.2	4	16.4
Lorain	106	66.6	95	46.7	200	55.0	46	22.6	26	17.7
Lucas	146	68.9	128	45.8	274	55.1	66	23.9	45	23.7
Madison	15	64.6	11	41.8	25	52.9	7	28.9	2	10.8
Mahoning	108	74.0	75	38.6	183	53.3	49	26.2	28	19.5
Marion	30	80.4	20	46.7	50	62.0	10	23.7	8	27.1
Medina	50	57.2	40	38.0	90	46.0	22	20.7	19	25.4
Meigs	9	68.8	7	42.0	16	52.4	3	19.9	3	28.0
Mercer	13	55.4	8	28.4	21	40.3	6	22.1	4	17.1
Miami	40	70.2	32	44.7	72	54.9	15	21.7	9	17.7
Monroe	9	87.8	3	24.9	12	55.2	3	27.3	2	20.4
Montgomery	195	68.2	180	47.7	375	56.3	89	23.8	61	23.0
Morgan	8	73.2	7	61.7	15	67.5	2	15.9	1	16.8
Morrow	16	83.1	7	30.4	23	55.5	4	19.2	3	20.6
Muskingum	40	86.8	34	55.7	75	69.4	15	26.0	7	17.2
Noble	6	38.4	4	44.3	9	39.8	1	13.2	1	14.4
Ottawa	23	78.0	12	34.7	35	55.4	9	28.0	5	16.9
Paulding	9	79.4	8	62.3	17	69.4	2	18.2	3	32.5
Perry	14	79.9	11	51.0	25	62.4	4	20.4	3	26.4
Pickaway	24	83.4	18	53.7	42	67.3	5	15.6	4	19.4
Pike	14	84.1	11	57.6	24	70.1	3	16.7	2	16.3
Portage	54	67.0	45	48.0	99	56.4	21	21.7	10	13.2
Preble	18	72.4	13	48.1	31	58.5	6	21.1	5	21.5
Putnam	11	59.2	4	18.8	15	36.2	4	19.8	4	23.0
Richland	57	77.2	36	40.0	93	56.1	22	25.7	13	19.3
Ross	35	84.9	21	44.8	56	62.3	10	21.0	9	28.1
Sandusky	26	74.9	17	41.5	43	56.2	12	28.3	6	18.3
Scioto	42	98.0	29	53.1	71	72.8	9	17.0	8	22.7
Seneca	23	76.7	14	36.4	37	53.7	8	20.4	5	16.3
Shelby	12	48.4	12	41.1	25	44.6	7	24.3	5	25.5
Stark	141	64.9	116	41.8	258	51.9	58	20.6	42	20.3
Summit	192	66.4	159	42.1	351	52.2	85	22.5	55	20.2
Trumbull	96	72.9	70	42.7	166	55.8	32	19.4	22	18.5
Tuscarawas	36	65.5	20	29.4	56	45.3	14	20.7	7	14.3
Union	15	68.5	12	46.9	27	56.8	7	23.6	2	8.1
Van Wert	10	57.6	9	41.9	19	48.6	5	26.1	3	16.8
Vinton	6	76.6	4	51.5	11	65.1	2	24.8	1	27.3
Warren	58	63.0	44	39.2	102	49.5	24	20.0	12	15.0
Washington	28	70.0	20	43.3	48	54.7	12	24.6	6	16.6
Wayne	33	53.1	28	37.4	62	44.1	13	18.0	11	20.0
Williams	14	63.4	9	36.5	23	48.2	5	18.1	7	35.5
Wood	35	59.2	25	33.3	60	44.5	15	19.4	9	17.0
Wyandot	11	88.4	6	36.3	17	57.8	3	21.5	3	23.1

¹ Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2016.

² Average annual rate per 100,000, age-adjusted to the 2000 U.S. standard population.

Cancer of the Female Breast: Percentage of New Cancer Cases by
County of Residence and Stage at Diagnosis in Ohio, 2009-2013^{1,2}

	Early Stage*	Late Stage*	Unstaged/ Missing	Average Annual Cases
	%	%	%	
Ohio	68%	29%	3%	10,619
Adams	66%	28%	6%	22
Allen	64%	32%	4%	91
Ashland	61%	35%	4%	49
Ashtabula	72%	27%	1%	90
Athens	62%	31%	8%	44
Auglaize	65%	33%	3%	47
Belmont	74%	25%	2%	69
Brown	67%	29%	4%	34
Butler	69%	29%	2%	319
Carroll	70%	30%	0%	22
Champaign	68%	28%	4%	35
Clark	65%	33%	2%	143
Clermont	72%	27%	1%	180
Clinton	66%	33%	1%	38
Columbiana	65%	29%	6%	99
Coshocton	64%	32%	4%	29
Crawford	62%	34%	3%	42
Cuyahoga	68%	30%	2%	1,355
Darke	65%	32%	3%	47
Defiance	73%	25%	2%	35
Delaware	71%	28%	2%	158
Erie	64%	33%	3%	92
Fairfield	70%	28%	2%	126
Fayette	59%	39%	3%	22
Franklin	68%	30%	3%	959
Fulton	74%	21%	5%	30
Gallia	65%	31%	4%	21
Geauga	72%	26%	2%	101
Greene	72%	26%	3%	167
Guernsey	62%	37%	1%	33
Hamilton	69%	29%	2%	792
Hancock	65%	32%	3%	60
Hardin	61%	34%	5%	28
Harrison	62%	28%	10%	14
Henry	64%	33%	3%	24
Highland	57%	37%	7%	33
Hocking	63%	28%	9%	28
Holmes	58%	34%	8%	18
Huron	68%	29%	3%	53
Jackson	66%	32%	3%	23
Jefferson	69%	28%	4%	72
Knox	59%	34%	7%	65
Lake	71%	27%	2%	268
Lawrence	72%	26%	2%	54

	Early Stage*	Late Stage*	Unstaged/ Missing	Average Annual Cases
	%	%	%	
Ohio	68%	29%	3%	10,619
Licking	70%	28%	2%	141
Logan	72%	27%	2%	46
Lorain	70%	28%	3%	289
Lucas	66%	31%	3%	319
Madison	65%	35%	0%	34
Mahoning	64%	29%	7%	248
Marion	68%	29%	3%	53
Medina	68%	30%	2%	167
Meigs	67%	28%	5%	17
Mercer	62%	29%	9%	34
Miami	63%	35%	2%	93
Monroe	68%	27%	5%	12
Montgomery	70%	28%	2%	549
Morgan	61%	34%	5%	12
Morrow	72%	25%	2%	26
Muskingum	68%	29%	3%	77
Noble	65%	31%	4%	10
Ottawa	68%	28%	4%	47
Paulding	63%	32%	5%	15
Perry	72%	26%	2%	29
Pickaway	71%	27%	2%	50
Pike	75%	22%	3%	23
Portage	68%	31%	1%	126
Preble	70%	27%	4%	38
Putnam	67%	31%	2%	31
Richland	66%	32%	2%	109
Ross	62%	35%	3%	62
Sandusky	67%	29%	4%	54
Scioto	73%	26%	2%	75
Seneca	67%	29%	4%	47
Shelby	71%	27%	2%	32
Stark	72%	25%	3%	369
Summit	69%	28%	3%	478
Trumbull	70%	28%	2%	218
Tuscarawas	71%	28%	2%	83
Union	63%	32%	5%	37
Van Wert	57%	32%	11%	32
Vinton	58%	35%	7%	11
Warren	70%	29%	1%	192
Washington	63%	35%	2%	59
Wayne	71%	25%	4%	93
Williams	62%	35%	3%	35
Wood	67%	29%	4%	98
Wyandot	64%	30%	6%	21

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.² The total case counts in tables by stage at diagnosis include *in situ* cancers and thus differ from tables with counts and rates of invasive cancer cases only (e.g., Table 4).* Early stage includes tumors diagnosed at the *in situ* and local stages, and late stage includes tumors diagnosed at the regional and distant stages.

Cancer of the Colon & Rectum: Percentage of New Cancer Cases by County of Residence and Stage at Diagnosis in Ohio, 2009-2013^{1,2}

	Early Stage*	Late Stage*	Unstaged/ Missing	Average Annual Cases
	%	%	%	
Ohio	39%	51%	10%	5,919
Adams	42%	50%	8%	20
Allen	42%	51%	8%	58
Ashland	40%	54%	6%	34
Ashtabula	38%	53%	9%	65
Athens	42%	52%	6%	30
Auglaize	40%	49%	12%	33
Belmont	40%	51%	9%	41
Brown	41%	48%	12%	28
Butler	39%	50%	11%	173
Carroll	39%	56%	5%	20
Champaign	40%	47%	13%	21
Clark	37%	51%	11%	79
Clermont	44%	49%	7%	93
Clinton	38%	53%	9%	25
Columbiana	47%	44%	9%	63
Coshocton	39%	53%	8%	21
Crawford	44%	45%	11%	27
Cuyahoga	40%	53%	8%	707
Darke	44%	50%	7%	41
Defiance	41%	51%	9%	23
Delaware	38%	52%	10%	61
Erie	42%	50%	8%	57
Fairfield	41%	51%	8%	62
Fayette	31%	64%	5%	13
Franklin	34%	55%	11%	452
Fulton	38%	46%	17%	20
Gallia	36%	54%	10%	18
Geauga	37%	56%	7%	46
Greene	36%	49%	15%	67
Guernsey	28%	65%	7%	31
Hamilton	40%	48%	12%	391
Hancock	36%	57%	7%	37
Hardin	41%	49%	11%	15
Harrison	32%	54%	14%	7
Henry	43%	45%	12%	15
Highland	37%	47%	16%	24
Hocking	28%	51%	22%	16
Holmes	37%	53%	10%	18
Huron	40%	46%	14%	33
Jackson	38%	54%	8%	18
Jefferson	43%	45%	12%	43
Knox	42%	52%	7%	36
Lake	35%	56%	9%	127
Lawrence	51%	40%	9%	37

	Early Stage*	Late Stage*	Unstaged/ Missing	Average Annual Cases
	%	%	%	
Ohio	39%	51%	10%	5,919
Licking	34%	56%	10%	82
Logan	39%	53%	8%	27
Lorain	38%	52%	10%	160
Lucas	37%	49%	14%	184
Madison	36%	52%	12%	18
Mahoning	35%	51%	15%	160
Marion	46%	46%	8%	48
Medina	39%	55%	6%	81
Meigs	40%	49%	10%	13
Mercer	43%	45%	12%	29
Miami	46%	47%	8%	54
Monroe	47%	45%	8%	8
Montgomery	39%	49%	12%	264
Morgan	39%	48%	14%	9
Morrow	42%	52%	7%	25
Muskingum	40%	52%	8%	49
Noble	30%	58%	12%	10
Ottawa	42%	50%	7%	30
Paulding	42%	47%	11%	12
Perry	39%	54%	7%	19
Pickaway	35%	54%	12%	25
Pike	24%	69%	7%	14
Portage	40%	56%	4%	70
Preble	44%	46%	11%	26
Putnam	42%	50%	8%	17
Richland	49%	44%	7%	90
Ross	35%	55%	10%	40
Sandusky	38%	54%	8%	40
Scioto	40%	54%	7%	45
Seneca	38%	56%	6%	37
Shelby	50%	37%	14%	22
Stark	38%	53%	9%	188
Summit	39%	51%	10%	265
Trumbull	36%	57%	7%	135
Tuscarawas	38%	51%	11%	52
Union	41%	48%	11%	20
Van Wert	44%	46%	10%	19
Vinton	36%	45%	19%	6
Warren	44%	50%	7%	80
Washington	42%	55%	3%	36
Wayne	36%	55%	9%	55
Williams	50%	43%	8%	23
Wood	40%	52%	9%	65
Wyandot	44%	45%	11%	17

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² The total case counts in tables by stage at diagnosis include *in situ* cancers and thus differ from tables with counts and rates of invasive cancer cases only (e.g., Table 4).

* Early stage includes tumors diagnosed at the *in situ* and local stages, and late stage includes tumors diagnosed at the regional and distant stages.

Cancer of the Lung & Bronchus: Percentage of New Cancer Cases by County of Residence and Stage at Diagnosis in Ohio, 2009-2013^{1,2}

	Early Stage*	Late Stage*	Unstaged/ Missing	Average Annual Cases
	%	%	%	
Ohio	17%	70%	12%	9,660
Adams	21%	61%	19%	32
Allen	17%	73%	10%	90
Ashland	18%	64%	19%	41
Ashtabula	17%	70%	14%	103
Athens	17%	68%	16%	42
Auglaize	15%	64%	21%	40
Belmont	18%	65%	17%	60
Brown	20%	66%	14%	58
Butler	16%	74%	10%	285
Carroll	11%	77%	12%	31
Champaign	17%	66%	17%	31
Clark	15%	73%	11%	139
Clermont	21%	70%	9%	182
Clinton	18%	71%	11%	42
Columbiana	15%	70%	15%	101
Coshocton	13%	73%	15%	36
Crawford	19%	55%	25%	41
Cuyahoga	17%	71%	12%	1,109
Darke	15%	75%	10%	46
Defiance	16%	66%	19%	32
Delaware	16%	74%	10%	95
Erie	12%	73%	15%	72
Fairfield	22%	68%	11%	117
Fayette	17%	66%	17%	32
Franklin	20%	70%	9%	737
Fulton	14%	57%	29%	25
Gallia	24%	63%	13%	35
Geauga	22%	71%	8%	64
Greene	18%	75%	7%	113
Guernsey	15%	68%	17%	43
Hamilton	18%	71%	11%	674
Hancock	19%	70%	11%	52
Hardin	22%	69%	9%	26
Harrison	14%	64%	21%	17
Henry	15%	61%	24%	20
Highland	13%	66%	21%	41
Hocking	15%	66%	19%	29
Holmes	15%	69%	16%	16
Huron	17%	69%	14%	54
Jackson	13%	75%	13%	33
Jefferson	20%	66%	14%	78
Knox	19%	70%	12%	51
Lake	20%	71%	10%	222
Lawrence	19%	73%	9%	66

	Early Stage*	Late Stage*	Unstaged/ Missing	Average Annual Cases
	%	%	%	
Ohio	17%	70%	12%	9,660
Licking	16%	73%	12%	150
Logan	16%	66%	18%	40
Lorain	14%	76%	10%	258
Lucas	13%	61%	25%	306
Madison	16%	73%	11%	36
Mahoning	12%	72%	16%	232
Marion	23%	61%	15%	67
Medina	18%	73%	9%	123
Meigs	16%	79%	5%	23
Mercer	16%	59%	25%	28
Miami	17%	73%	11%	96
Monroe	18%	75%	8%	13
Montgomery	19%	72%	9%	507
Morgan	16%	64%	20%	17
Morrow	21%	63%	16%	34
Muskingum	15%	70%	15%	87
Noble	14%	74%	12%	12
Ottawa	13%	75%	13%	43
Paulding	18%	65%	18%	21
Perry	21%	70%	9%	33
Pickaway	20%	66%	13%	49
Pike	17%	67%	16%	33
Portage	16%	74%	9%	128
Preble	16%	68%	16%	39
Putnam	19%	74%	7%	19
Richland	17%	71%	12%	118
Ross	18%	67%	15%	79
Sandusky	17%	63%	20%	53
Scioto	20%	70%	10%	96
Seneca	16%	72%	12%	49
Shelby	14%	63%	23%	32
Stark	15%	74%	11%	338
Summit	19%	67%	14%	451
Trumbull	17%	73%	10%	237
Tuscarawas	12%	74%	15%	76
Union	16%	73%	11%	34
Van Wert	18%	63%	19%	21
Vinton	21%	73%	5%	19
Warren	16%	73%	11%	139
Washington	23%	70%	7%	68
Wayne	13%	69%	18%	79
Williams	15%	73%	12%	32
Wood	14%	69%	17%	73
Wyandot	17%	77%	6%	22

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² The total case counts in tables by stage at diagnosis include *in situ* cancers and thus differ from tables with counts and rates of invasive cancer cases only (e.g., Table 4).

* Early stage includes tumors diagnosed at the *in situ* and local stages, and late stage includes tumors diagnosed at the regional and distant stages.

Cancer of the Prostate: Percentage of New Cancer Cases by County of Residence and Stage at Diagnosis in Ohio, 2009-2013^{1,2}

	Early Stage*	Late Stage*	Unstaged/ Missing	Average Annual Cases
	%	%	%	
Ohio	78%	14%	8%	7,731
Adams	73%	9%	18%	16
Allen	70%	18%	12%	66
Ashland	80%	14%	6%	28
Ashtabula	73%	16%	11%	74
Athens	60%	19%	21%	32
Auglaize	75%	19%	6%	29
Belmont	88%	8%	5%	58
Brown	69%	17%	13%	31
Butler	76%	15%	10%	226
Carroll	79%	12%	9%	26
Champaign	74%	11%	15%	26
Clark	75%	19%	6%	88
Clermont	77%	12%	10%	124
Clinton	66%	21%	14%	19
Columbiana	75%	9%	17%	79
Coshocton	71%	18%	11%	18
Crawford	80%	12%	8%	29
Cuyahoga	81%	14%	5%	1,021
Darke	74%	19%	6%	35
Defiance	84%	14%	3%	34
Delaware	73%	17%	10%	109
Erie	76%	18%	7%	59
Fairfield	73%	20%	8%	97
Fayette	74%	19%	7%	15
Franklin	72%	16%	12%	663
Fulton	76%	14%	10%	28
Gallia	75%	21%	4%	19
Geauga	71%	18%	11%	68
Greene	73%	19%	8%	109
Guernsey	74%	17%	9%	24
Hamilton	78%	12%	10%	563
Hancock	69%	23%	8%	50
Hardin	80%	10%	10%	16
Harrison	82%	3%	15%	13
Henry	81%	11%	9%	21
Highland	72%	10%	18%	21
Hocking	72%	22%	6%	17
Holmes	76%	16%	9%	14
Huron	72%	20%	8%	36
Jackson	67%	24%	9%	18
Jefferson	89%	6%	5%	60
Knox	80%	15%	6%	54
Lake	68%	18%	14%	166
Lawrence	81%	17%	2%	36

	Early Stage*	Late Stage*	Unstaged/ Missing	Average Annual Cases
	%	%	%	
Ohio	78%	14%	8%	7,731
Licking	69%	19%	12%	100
Logan	63%	21%	16%	22
Lorain	86%	11%	4%	226
Lucas	77%	15%	8%	242
Madison	64%	23%	13%	26
Mahoning	83%	9%	8%	172
Marion	72%	18%	10%	46
Medina	83%	13%	4%	131
Meigs	59%	31%	11%	13
Mercer	70%	23%	6%	29
Miami	75%	14%	12%	74
Monroe	90%	6%	4%	14
Montgomery	77%	16%	7%	353
Morgan	75%	18%	7%	9
Morrow	77%	14%	9%	24
Muskingum	73%	19%	9%	42
Noble	84%	16%	0%	6
Ottawa	78%	17%	5%	37
Paulding	81%	15%	4%	15
Perry	72%	21%	7%	20
Pickaway	79%	10%	11%	27
Pike	78%	16%	6%	13
Portage	86%	11%	3%	118
Preble	73%	12%	16%	29
Putnam	74%	17%	9%	24
Richland	71%	14%	15%	82
Ross	67%	24%	9%	37
Sandusky	76%	19%	5%	28
Scioto	75%	19%	6%	50
Seneca	76%	16%	8%	37
Shelby	63%	14%	22%	25
Stark	85%	10%	5%	306
Summit	85%	11%	3%	381
Trumbull	81%	14%	5%	155
Tuscarawas	75%	9%	16%	82
Union	82%	12%	6%	27
Van Wert	83%	18%	0%	19
Vinton	79%	12%	9%	7
Warren	74%	15%	11%	123
Washington	82%	16%	3%	42
Wayne	83%	14%	3%	63
Williams	67%	17%	16%	22
Wood	79%	14%	7%	81
Wyandot	77%	16%	7%	17

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2016.

² The total case counts in tables by stage at diagnosis include *in situ* cancers and thus differ from tables with counts and rates of invasive cancer cases only (e.g., Table 4).

* Early stage includes tumors diagnosed at the *in situ* and local stages, and late stage includes tumors diagnosed at the regional and distant stages.

American Cancer Society (ACS) and U.S. Preventive Services Task Force (USPSTF) Recommendations for the Early Detection of Cancer in Average Risk, Asymptomatic People*

AMERICAN CANCER SOCIETY				U.S. PREVENTIVE SERVICES TASK FORCE	
Sex	Primary Site/Type	Age	Test or Procedure	Age	Test or Procedure
Female	Breast	40-44 ¹	Women at average risk for breast cancer have a choice to start annual mammograms if they wish to do so.	40-49 ²	Women who place a higher value on the potential benefits than the potential harms may choose to begin screening mammography every 2 years.
		45-54 ¹	Mammogram every year	50-74	Mammogram every 2 years
		55+ ¹	Mammogram every 2 years or continue yearly screening	75+	Evidence is insufficient to assess the benefits and harms of screening.
	Cervix	21-29 ³	Pap test every 3 years. Human papillomavirus (HPV) testing should not be used in this age group unless it is needed after an abnormal Pap test result.	21-65 ^{3,4}	Pap test every 3 years
		30-65 ⁵	Pap test and HPV test (called "co-testing") every 5 years, or Pap test alone every 3 years	30-65 ^{4,6}	Screening with a combination of Pap and HPV testing every 5 years (for women who want to lengthen the screening interval)
Male	Prostate	50+ ⁷	Begin periodic discussions about prostate cancer screening with a healthcare provider.	Any	Evidence is insufficient to assess the benefits and harms of screening.
Female and Male	Colon & Rectum	50+	TESTS THAT FIND POLYPS AND CANCER⁸ Flexible sigmoidoscopy every 5 years, or Colonoscopy every 10 years, or Double-contrast barium enema every 5 years, or Computed tomography (CT) colonography (virtual colonoscopy) every 5 years TESTS THAT PRIMARILY FIND CANCER Fecal occult blood test (FOBT) every year ⁹ , or Fecal immunochemical test (FIT) every year ⁹ , or Stool DNA test (sDNA) every 3 years	50-75 ¹⁰	Several different tests may be used to detect early stage colon and rectum cancer. Screening frequency depends on the test performed.
Female and Male	Lung & Bronchus (Note that recommendations are for those at high risk).	55-74	Annual lung cancer screening with low-dose computed tomography (LDCT) in patients who are in good health, have at least a 30 pack-year smoking history and currently smoke or have quit within the past 15 years	55-80	Annual screening with LDCT in patients who have a 30 pack-year smoking history and currently smoke or have quit within the past 15 years ¹¹

Source: Ohio Department of Health and The Ohio State University, 2016.

- ¹ Based on the ACS guidelines published October 20, 2015. Women who are at high risk for breast cancer based on certain factors should be screened with magnetic resonance imaging (MRI) and a mammogram every year. Women at high risk include those with a personal history of breast cancer, a family history of breast cancer, a genetic mutation known to increase risk of breast cancer (such as BRCA) and those who had radiation therapy to the chest before 30.
- ² The decision to start regular, biennial screening mammograms before 50 should be an individual one and should take into account the patient's values regarding the benefits and harms. Women with a parent, sibling or child with breast cancer are at higher risk for breast cancer and thus may benefit more from biennial screenings than average-risk women.
- ³ Screening should begin at 21.
- ⁴ Screening after a hysterectomy with removal of the cervix is not recommended among women who do not have a history of a high-grade precancerous lesion (i.e., cervical intraepithelial neoplasia (CIN) grade 2 or 3) or cervical cancer.
- ⁵ Women over 65 who have had regular cervical cancer testing with normal results should not be tested for cervical cancer. Once testing is stopped, it should not be started again. Women with a history of a serious cervical pre-cancer should continue to be tested for at least 20 years after that diagnosis, even if testing continues past 65. A woman who has had her uterus removed (and also her cervix) for reasons not related to cervical cancer and who has no history of cervical cancer or serious cervical pre-cancer should not be tested. A woman who has been vaccinated against HPV should still follow the screening recommendations for her age group.
- ⁶ Women over 65 who have had adequate prior screenings and are not otherwise at high risk of cervical cancer should not be tested.
- ⁷ The ACS recommends that men make an informed decision with their healthcare provider about whether to be tested for prostate cancer. Research has not yet proven that the potential benefits of testing outweigh the harms of testing and treatment. The ACS believes that men should not be tested without learning what is known about the risks and possible benefits of testing and treatment. Men at high risk, such as black men or those with one or more first-degree relatives diagnosed with prostate cancer before 65, should discuss potential benefits and limitations of testing beginning at 45. Men at average risk should begin this discussion at 50. If men decide to be tested, they should have the prostate-specific antigen (PSA) blood test with or without rectal exam. How often they are tested will be dependent on their PSA level.
- ⁸ The tests that are designed to find both early cancer and polyps are preferred.
- ⁹ For FOBT or FIT to be a screening test, the take-home multiple-sample method should be used.
- ¹⁰ The decision to screen for colon and rectum cancer in adults aged 76 to 85 years should be an individual one, taking into account the patient's overall health and prior screening history. Adults in this age group who have never been screened for colon and rectum cancer are more likely to benefit. Screening would be most appropriate among adults who 1) are healthy enough to undergo treatment if colon and rectum cancer is detected and 2) do not have comorbid conditions that would significantly limit their life expectancy. These recommendations don't apply to individuals with specific inherited syndromes (Lynch syndrome or familial adenomatous polyposis) or those with inflammatory bowel disease.
- ¹¹ Screening should be discontinued once a person has not smoked for 15 years or develops a health problem that substantially limits life expectancy or the ability or willingness to have curative lung surgery.

* This summary of recommendations is based on information available at: ACS website <http://www.cancer.org/healthy/findcancerearly/cancerscreeningguidelines/american-cancer-society-guidelines-for-the-early-detection-of-cancer> and USPSTF website <http://www.uspreventiveservicestaskforce.org> as of June 2016.

GLOSSARY

Age adjustment - A statistical method used to compare rates among groups of people with different age compositions. This method applies a standard age composition to the groups being compared to remove the effect of age. Rates in this publication are age-adjusted to the 2000 U.S. standard population.

Benign - Noncancerous. A condition categorized by abnormal cell division that has not invaded or metastasized and, in most cases, has not recurred.

Body Mass Index (BMI) - A number calculated from a person's weight and height (kg/m^2) that provides a reliable indicator of body fatness for most people and is used to screen for weight categories that may lead to health problems. BMI is calculated the same way for children and adults, however, the criteria used to interpret the meaning of BMI are different. For children and teens, the CDC BMI-for-age growth charts account for changes in body fat with age and differences between girls and boys, and allow translation of BMI into a percentile for a child's sex and age. For adults, BMI categories are not dependent on sex or age.

Cancer - Uncontrolled abnormal cell growth, which may lead to invasion of surrounding tissues and spread to other parts of the body.

Carcinogen - Anything – chemical, physical, or viral – that causes cancer.

Carcinoma - A malignant tumor that begins in the lining layer of organs. At least 80 percent of all cancers are carcinomas.

Ethnicity - The heritage, nationality group, lineage or country of birth of a person or his parents or ancestors before their arrival in the United States. People who identify their origin as Spanish, Hispanic or Latino may be of any race.

Incidence rate - The number of new cases of a disease that occur in a defined population per 100,000 during a specified period of time.

Invasive cancer - Cancer that has spread beyond the layer of cells where it first developed.

Lifetime risk - The probability that an individual, over the course of a lifetime (living to age 85), will develop or die from cancer.

Malignant - Cancerous. A condition characterized by abnormal cell division with the ability to invade, metastasize and recur.

Metastasis - The spread of cancer cells to other parts of the body through the lymph system or blood.

Morbidity - The number of people who have a disease.

Mortality rate - The number of deaths that occur in a defined population per 100,000 during a specified period of time.

Oncology - The branch of medicine concerned with the diagnosis and treatment of cancer.

Prevalence - The proportion of people with a certain disease or characteristic at a given time.

Primary cancer site - The tissue or organ where the cancer originated.

Rate - The frequency of an event in a defined population during a given period of time, often expressed per 100,000 people.

Relative survival - The percentage of people who are alive at a designated time period (usually five years) after a cancer diagnosis divided by the percentage expected to be alive in the absence of cancer based on normal life expectancy. It does not distinguish between patients who have no evidence of cancer and those who have relapsed or are still in treatment.

Risk factor - Anything that increases a person's probability of getting a disease such as cancer. Risk factors can be lifestyle-related, environmental, genetic (inherited) or a combination of these factors.

Stage at diagnosis - The extent or spread of the disease from the site of origin, often classified into the following stages:

in situ - Noninvasive cancer that has not penetrated surrounding tissue.

Local - A malignant tumor confined entirely to the organ of origin.

Regional - A malignant tumor that has extended beyond the organ of origin directly into surrounding organs or tissues or into regional lymph nodes.

Distant - A malignant tumor that has spread to parts of the body (distant organs, tissues and/or lymph nodes) remote from the primary tumor.

Unstaged/Missing - Insufficient information is available to determine the stage or extent of the disease at diagnosis.

Tumor - An abnormal lump or mass of tissue. Tumors can be benign (noncancerous) or malignant (cancerous).

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DATA SOURCES

Estimated New Cancer Cases and Deaths, 2016

The national home office of the ACS publishes estimates of new cancer cases at the national level, which are projected using a spatio-temporal model based on 1998-2012 incidence rates from 49 states and the District of Columbia that meet the quality standards of the North American Association of Central Cancer Registries (NAACCR). The method considers geography, sociodemographics, lifestyle factors, medical settings, cancer screening behaviors and expected delays in case reporting in the prediction model. The estimated numbers of U.S. and state-level cancer deaths are calculated by fitting 1998-2012 deaths from the National Center for Health Statistics (NCHS) to a statistical model that forecasts the number of deaths expected to occur in 2016.

Cancer Incidence and Mortality

Ohio cancer incidence data are from OCISS at ODH. Ohio cancer mortality data are from the Bureau of Vital Statistics at ODH and are based on the underlying cause of death. Incidence and mortality rates for the United States were published in the *SEER Cancer Statistics Review, 1975-2013*. Incidence rates in this publication are age-adjusted to the 2000 U.S. standard population to allow for comparisons across populations that have different age distributions.

Survival Probabilities

Five-year relative survival probabilities presented in this report are from the SEER 18 areas for 2006-2012 based on follow-up of patients into 2013.

Behavioral Risk Factor Surveillance System (BRFSS)

ODH, in conjunction with CDC, annually conducts the BRFSS through landline and cell phone interviews of randomly selected adults 18 and older to collect data regarding diseases/conditions, risk factors and health practices among Ohioans. To ensure that prevalence estimates are representative of Ohio's population, data from 2011-present were weighted by age, sex, race/ethnicity, geography, marital status, education, home ownership and telephone source using an iterative proportional fitting (raking) method. Data prior to 2011 were weighted by age and sex using a post-stratification method. Thus, BRFSS data for 2011-present should not be compared to data prior to 2011. Respondents who answered "don't know/not sure" or refused the question were excluded from the analyses for that question.

Ohio Youth Risk Behavior Survey (YRBS)

The YRBS, which was conducted by ODH under the direction of CDC, is a population-based survey of students in grades 9 through 12. The YRBS provides information on risk behaviors among young people to more effectively target and improve health programs.

Probability of Developing Cancer

Probabilities of developing cancer are calculated using DevCan (Probability of Developing Cancer Software) developed by NCI. These probabilities reflect the average experience of people in the United States (born free of cancer and living to 85) and do not take into account individual behaviors and risk factors. For example, the estimate of 1 man in 17 developing invasive lung and bronchus cancer in his lifetime underestimates the risk for smokers and overestimates the risk for nonsmokers. These probabilities are based on invasive cancers only and do not take into account *in situ* or non-reportable cancers.

Risk Factors and Populations with High Rates

The primary sources of risk factor information presented in this document were NCI (<http://www.cancer.gov>) and ACS (<http://www.cancer.org>). In any instance where there was a discrepancy between the two websites, the NCI was used as the source because it presented the most recent and comprehensive information available at the time of publication.

The National Health and Nutrition Examination Survey (NHANES)

The NHANES is a program of studies designed to assess the health and nutritional status of adults and children in the United States. The survey is unique in that it combines interviews and physical examinations. NHANES is a major program of the NCHS at CDC and has the responsibility for producing vital and health statistics for the nation.

Screening and Early Detection

The primary sources of screening and early detection information presented in this document were ACS (<http://www.cancer.org/healthy/findcancerearly/cancerscreeningguidelines/american-cancer-society-guidelines-for-the-early-detection-of-cancer>) and the United States Preventive Services Task Force (<http://www.uspreventiveservicestaskforce.org/>).

Additional Information

More information on the methods used to generate the statistics for this report can be found at the following:

- A. Zhu L, Pickle LW, Naishadham D, et al. Predicting U.S. and state-level cancer counts for the current calendar year: part II – evaluation of spatio-temporal projection methods for incidence. *Cancer* 2012; 118(4): 1100-9.
- B. Copeland G, Lake A, Firth R, et al. (eds). *Cancer in North America: 2008-2012. Volume Two: Registry-specific Cancer Incidence in the United States and Canada*. Springfield, IL: North American Association of Central Cancer Registries, Inc. June 2015. Available at: <http://naaccr.org/DataandPublications/CINAPubs.aspx>.
- C. Howlader N, Noone AM, Krapcho M, et al. (eds). *SEER Cancer Statistics Review, 1975-2013*, National Cancer Institute. Bethesda, MD: http://seer.cancer.gov/csr/1975_2013/, based on November 2015 SEER data submission, posted to the SEER Web site; April 2016.
- D. Chen HS, Portier K, Ghosh K, et al. Predicting U.S. and state-level counts for the current calendar year: part I – evaluation of temporal projection methods for mortality. *Cancer* 2012;118(4):1091-9.
- E. Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 9 Regs Research Data, Nov 2015 Sub (1973-2013) <Katrina/Rita Population Adjustment> - Linked To County Attributes - Total U.S., 1969-2014 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2016, based on the November 2015 submission.
- F. DevCan: Probability of Developing and Dying of Cancer Software, Version 6.7.4; Surveillance Research Program, Statistical Methodology and Applications, National Cancer Institute, 2016. <https://surveillance.cancer.gov/devcan/>.

ACRONYMS

ACRONYM	FULL TERM
ACS	American Cancer Society
ALL	Acute lymphocytic leukemia
AML	Acute myeloid leukemia
APC	Adenomatous polyposis coli
BMI	Body mass index
BRCA	Breast cancer susceptibility gene
BRFSS	Behavioral Risk Factor Surveillance System
CDC	Centers for Disease Control and Prevention
CIN	Cervical intraepithelial neoplasia
CLL	Chronic lymphocytic leukemia
CML	Chronic myeloid leukemia
CNS	Central nervous system
COPD	Chronic obstructive pulmonary disease
CT	Computed tomography
DCIS	Ductal carcinoma <i>in situ</i>
DES	Diethylstilbestrol
DRE	Digital rectal exam
EBV	Epstein-Barr virus
EGFR	Epidermal growth factor receptor
FAMMM	Familial atypical multiple mole melanoma
FAP	Familial adenomatous polyposis
FDA	Food and Drug Administration
FIT	Fecal immunochemical test
FOBT	Fecal occult blood test
H. pylori	Helicobacter pylori
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HHV8	Human herpesvirus-8
HIV	Human immunodeficiency virus
HL	Hodgkin lymphoma
HNPCC	Hereditary nonpolyposis colon cancer
HPV	Human papillomavirus
HTLV-I	Human T-cell leukemia virus type I
iFOBT	Immunochemical fecal occult blood test
LCIS	Lobular carcinoma <i>in situ</i>
MEN1	Multiple endocrine neoplasia type 1
MRI	Magnetic resonance imaging
NAACCR	North American Association of Central Cancer Registries
NCI	National Cancer Institute
NHANES	National Health and Nutrition Examination Survey
NHL	Non-Hodgkin lymphoma
OCISS	Ohio Cancer Incidence Surveillance System
PSA	Prostate-specific antigen
RCC	Renal cell carcinoma
SEER	Surveillance, Epidemiology, and End Results
SIDS	Sudden infant death syndrome
SPF	Sun Protection Factor
USPSTF	U.S. Preventive Services Task Force
UV	Ultraviolet
VEGF	Vascular endothelial growth factor
YRBS	Youth Risk Behavior Survey

NOTES

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