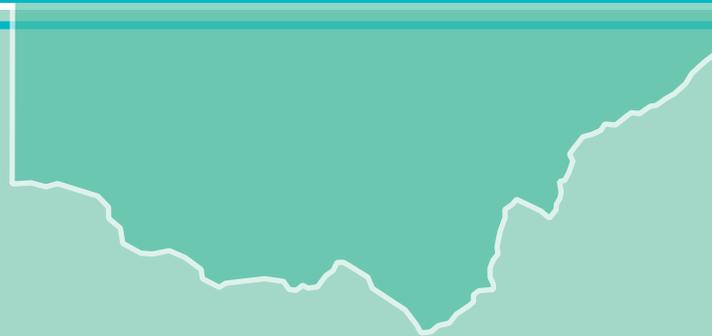




CANCER IN OHIO 2014





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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Columbus, Ohio 43215

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Ohio Cancer Incidence Surveillance System
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The James



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

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This report is public information. Reproduction and copying of this report for cancer prevention and control, education and program planning are greatly encouraged. Citation of source, however, is appreciated.

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Common Questions About Cancer

What Is Cancer?

Cancer is a group of diseases characterized by uncontrolled growth and spread of abnormal cells. If the spread is not controlled, it can result in death.¹

Are All Growths or Tumors Cancerous?

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?

Anyone can develop cancer, but risk increases with age. About 77% of all cancers are diagnosed at 55 and older.¹ In this report, lifetime risk refers to the probability that an individual born free of cancer and living to 85 will develop cancer over the course of a lifetime. **Table 1** shows an individual's lifetime risk of developing selected invasive cancers.

In the US, men and women have about a 1 in 3 lifetime risk of developing invasive cancer.²

What Percentage of People Survive Cancer?

The five-year relative survival probability (often referred to as five-year survival "rate") for all cancers diagnosed between 2002 and 2009 is 68%, up from 49% in 1975-1977, partly because of improvements in early detection and treatment.³ After adjusting for normal life expectancy (factors such as dying of heart disease, injuries, and diseases of old age), the five-year relative survival probability represents persons who are living five years after diagnosis, whether disease-free, in remission, or under treatment with evidence of cancer. While five-year relative survival probabilities are useful in monitoring progress in the early detection and treatment of cancer, they are not good predictors of an individual's prognosis. This is because five-year relative survival probabilities do not account for individual differences in stage at diagnosis, treatment, other illnesses, biology, or behaviors.

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

TABLE 1 Lifetime Risk of Being Diagnosed with Invasive Cancer for Selected Sites/Types in the US, 2008-2010^{1,2,3}

PRIMARY CANCER SITE/TYPE	GENDER	APPROXIMATE RISK FROM BIRTH TO DEATH
All Sites/Types*	Male	1 in 3 (40.4%)
	Female	1 in 3 (33.4%)
Breast	Female	1 in 9 (11.3%)
Cervix	Female	1 in 155 (0.6%)
Colon & Rectum	Male	1 in 23 (4.4%)
	Female	1 in 27 (3.8%)
Hodgkin's Lymphoma	Male	1 in 424 (0.2%)
	Female	1 in 514 (0.2%)
Leukemia	Male	1 in 75 (1.3%)
	Female	1 in 110 (0.9%)
Lung & Bronchus	Male	1 in 15 (6.8%)
	Female	1 in 18 (5.5%)
Melanoma of the Skin	Male	1 in 46 (2.2%)
	Female	1 in 71 (1.4%)
Non-Hodgkin's Lymphoma	Male	1 in 49 (2.0%)
	Female	1 in 62 (1.6%)
Prostate	Male	1 in 7 (15.0%)
Urinary Bladder	Male	1 in 32 (3.1%)
	Female	1 in 111 (0.9%)
Uterine Corpus & Uterine NOS**	Female	1 in 41 (2.4%)

¹ Source: DevCan: Probability of Developing or Dying of Cancer Software, Version 6.7.0; Statistical Research and Applications Branch, National Cancer Institute, 2013.

² Risk for those free of cancer at birth and living to age 85, based on cancer cases diagnosed during 2008-2010.

³ Numbers are rounded to the nearest whole person.

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

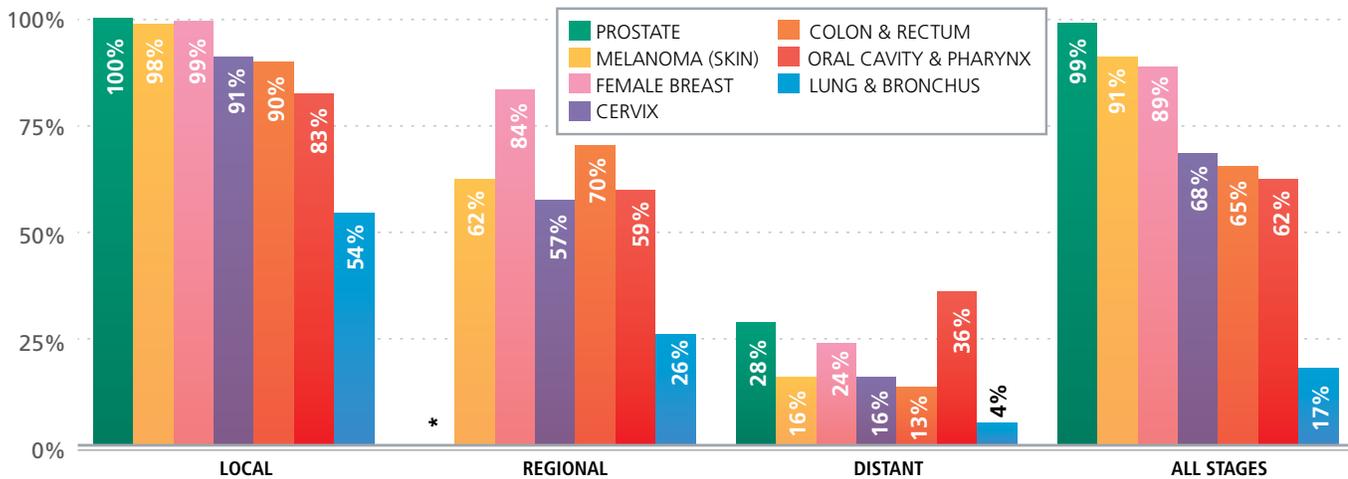
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How is Cancer Staged?

Staging is the process of describing the extent or spread of the disease from the site of origin. It is essential in determining the choice of therapy and assessing prognosis. A cancer's stage is based on the primary tumor's size and location in the body and whether it has spread to other areas of the body. A number of different staging systems are used to classify tumors. Summary staging (*in situ*, local, regional, and distant) is useful for descriptive and statistical analysis of tumor registry data (see description at left). If cancer cells are present only in the layer of tissue where they developed and have not spread, the tumor is *in situ*. If cancer cells have spread beyond the original layer of tissue (local, regional, or distant stage), the tumor is invasive.

FIGURE 1

US Five-year Relative Survival Probabilities by Cancer Site/Type and Stage at Diagnosis, 2003-2009^{1,2}



¹ Source: Surveillance, Epidemiology and End Results (SEER) Program, *SEER Cancer Statistics Review 1975-2010*, National Cancer Institute, 2013.

² Percentages are adjusted for normal life expectancy and are based on cases diagnosed in the SEER 18 areas from 2003-2009, followed into 2010.

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

Metastatic cancer is a cancer that has spread from its primary site to other parts of the body through the bloodstream or lymph system (the system that produces, stores, and carries the cells that fight infections). Metastasis can be regional if the cancer cells spread to lymph nodes near the primary tumor or distant if the cancer cells spread to other organs or lymph nodes far from the primary tumor.

Can Most Cancers Be Found Early?

Regular screening examinations by a health care professional can result in the detection of cancers of the 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. The five-year relative survival probability for all screenable cancers combined is about 86%, and is even higher for selected sites/types.³ For example, the overall five-year relative survival probability for female breast cancer is about 89%, and the probability for melanoma of the skin is about 91%.³ If all of these cancers were diagnosed localized stage through regular cancer screenings, the five-year survival probability would increase to about 99% for female breast cancer and 98% for melanoma of the skin (Figure 1).³ Cancers that can be prevented or detected earlier by screening account for about half of all new cancer cases in Ohio.⁴

How Many People Develop and Die From Cancer?

The National Cancer Institute (NCI) estimates that approximately 13.7 million Americans with a history of cancer were alive on January 1, 2012.¹ Some of these individuals were cancer-free, while others still had evidence of cancer and may have been undergoing treatment.¹ An estimated 1,660,290 new cancer cases and 580,350 cancer deaths are expected to occur in 2013 in the US.¹ In Ohio in 2013, the American Cancer Society (ACS) estimates that 66,610 new cases of invasive cancer will be diagnosed, including approximately 10,230 cases of lung and bronchus cancer; 9,060 cases of female breast cancer; 8,530 cases of prostate cancer; and 5,890 cases of colon and rectum cancer.¹ ACS also estimates that 25,130 cancer deaths will occur in Ohio in 2013 with the following sites/types accounting for the majority of deaths: lung and bronchus (7,350 deaths); colon and rectum (2,170 deaths); female breast (1,720 deaths); and pancreas (1,620 deaths).¹



Can Most Cancers Be Prevented?

The causes of cancer vary greatly by site/type of cancer. For example, the vast majority of lung and bronchus cancers are caused by tobacco smoking, yet only a small percentage of brain cancers can be explained by known risk factors. The primary causes of many cancers have yet to be identified. The causes of cancer interact with one another, as well as with unknown factors, to affect an individual's cancer risk.

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

The most effective way to prevent cancer is to control or change known, modifiable risk factors. All cancers caused by tobacco smoking and heavy alcohol use can be prevented completely. The ACS estimates that 174,000 cancer deaths in 2013 will be caused by tobacco use.¹ In addition, the World Cancer Research Fund estimates that one quarter to one third of new cancer cases in the US in 2013 will be associated with overweight and obesity, lack of physical activity, and poor nutrition.¹ Therefore, maintaining a healthy weight, eating a healthy diet including fruits and non-starchy vegetables, and being physically active are protective factors that may prevent new cancers from starting.

Certain cancers are related to infectious agents, e.g. hepatitis B virus (HBV), hepatitis C virus (HCV), human papillomavirus (HPV), human immunodeficiency virus (HIV), and *Helicobacter pylori* (*H. pylori*), and could be prevented through behavioral changes, vaccines, or antibiotics.¹ Many of the more than two million skin cancers expected to be diagnosed in 2013 could be prevented by protecting skin from excessive sun exposure and avoiding indoor tanning.¹ In addition, certain cancers (cervix and colon and rectum) may be prevented through regular screening to detect and remove precancerous growths.

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 US 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.



How Is Cancer Treated?

Treatment is cancer-specific and differs depending on the site/type and stage of diagnosis as well as other factors. The main treatment methods are as follows:

Chemotherapy – Chemotherapy uses anticancer drugs that are usually injected into a vein or taken by mouth. Chemotherapy is used as primary (main) therapy with the intention of curing or at least inducing a remission in some cancer cells.

Immunotherapy – Also known as biologic therapy, this treatment stimulates the cancer patient's immune system to recognize and attack cancer cells to destroy the cancer.

Radiation – Radiation therapy uses high-energy rays or particles to destroy cancer cells or slow their rate of growth. Radiation therapy can be used with the goal of curing some cancers that have not spread too far from their site of origin.

Surgery – Surgery removes the cancerous tumor by cutting it out.

Understanding Cancer Incidence & Mortality Rates

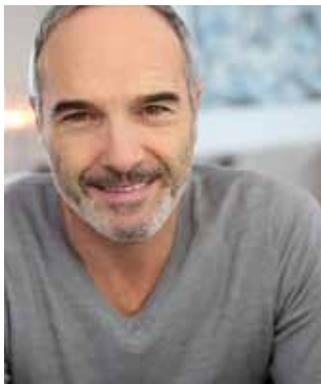
Incidence and Mortality Rates

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* urinary 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 40.0 per 100,000, this means an average of 40 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 10 new cases of lung and bronchus cancer were diagnosed in the county per year:

$$\frac{40 \text{ new cases diagnosed in one year}}{100,000 \text{ population}} = \frac{10 \text{ new cases diagnosed in one year}}{25,000 \text{ population}}$$

Rates provide a useful way to measure the cancer burden irrespective of the actual population size. Rates can be used to compare demographic groups (e.g., males have higher colon and rectum cancer rates than females), race/ethnic groups (e.g., African American 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 US 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 2006-2010 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 is referred to as "completeness." Completeness of case reporting is estimated to be 92% for 2006-2010, based on Ohio mortality rates and the Surveillance, Epidemiology, and End Results (SEER) Program incidence to mortality rate ratio for 2006-2010.^{3,4,7} Thus, incidence rates in Ohio may be lower than US rates for select cancer sites/types, geographic areas, or demographic subgroups due to incomplete reporting, rather than a true lower incidence of disease. By the same token, if an Ohio incidence rate is higher than the US rate, the magnitude of the difference may be even greater than it appears due to incomplete case reporting.

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: www.healthy.ohio.gov/cancer/ocisshs/reporting1.aspx.

Ohio Cancer Incidence and Mortality Data

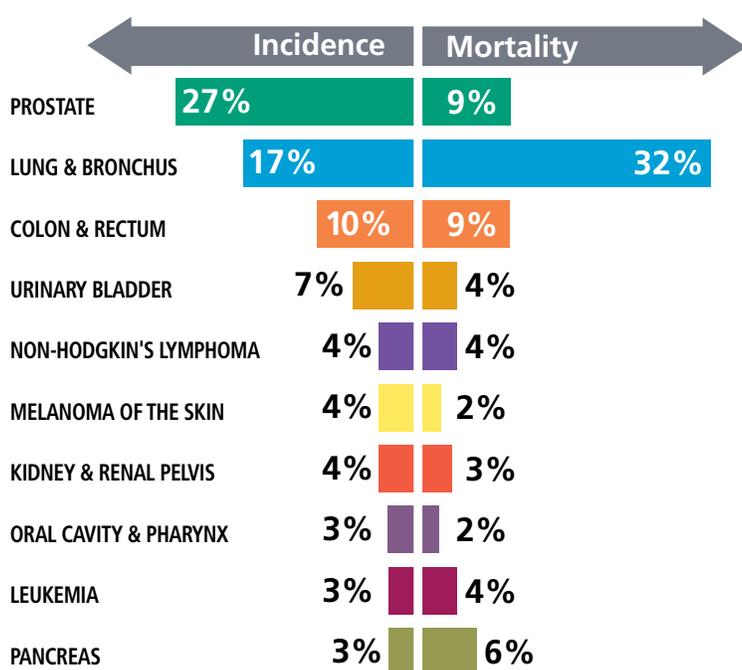
Incidence

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 for men, despite potential underreporting of the disease to the OCIS. Prostate cancer represented 27% of all cancers diagnosed in male Ohioans between 2006 and 2010 (Figure 2). Breast cancer remains the most frequently diagnosed cancer in Ohio women, representing 28% of cancer diagnoses (Figure 3).

Table 2 provides 2006-2010 average annual numbers of new invasive cancer cases and age-adjusted incidence rates for 23 common cancer sites/types by gender with national comparisons. For all cancer sites/types combined, the incidence rate in Ohio (465.1 per 100,000) was similar to the national rate (463.0 per 100,000). The lung and bronchus cancer incidence rate was 90.5 per 100,000 for Ohio men, which was 22% higher than the national lung and bronchus cancer incidence rate for men of 74.3 per 100,000. Similarly, the Ohio female lung and bronchus cancer incidence rate (59.8 per 100,000) was higher (15%) than the national rate of 51.9 per 100,000. Sites/types where the Ohio cancer incidence rate was higher than the national cancer incidence rate were brain and other central nervous system (CNS); colon and rectum; esophagus; Hodgkin's lymphoma; kidney and renal pelvis; larynx; lung and bronchus; urinary bladder; and uterine corpus and uterine not otherwise specified (NOS). Cancer sites/types that were less than 95% complete for 2006-2010 are noted with a cross (†).

Table 4 shows 2006-2010 average annual numbers of new invasive cancer cases and age-adjusted incidence rates by gender 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. Please note: Low county numbers and rates may reflect underreporting for that county. Counties that were less than 95% complete for 2006-2010 are noted with a cross (†).

FIGURE 2 Selected Cancer Sites/Types: Average Annual Number and Percentage of New Invasive Cancer Cases and Cancer Deaths in Males in Ohio, 2006-2010^{1,2}



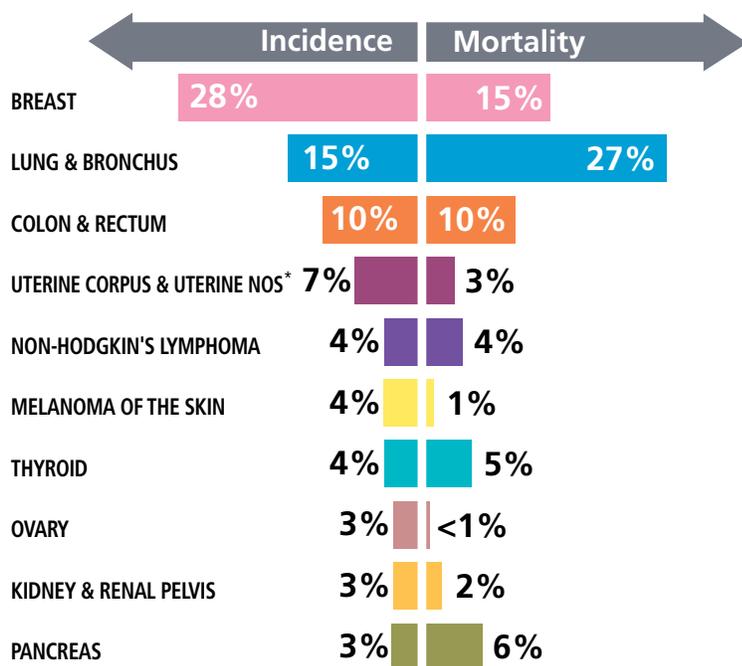
PRIMARY CANCER SITE/TYPE	NEW CASES	DEATHS
	AVERAGE ANNUAL	AVERAGE ANNUAL
Prostate	8,224	1,189
Lung & Bronchus	5,129	4,183
Colon & Rectum	3,009	1,185
Urinary Bladder	2,100	470
Melanoma of the Skin	1,303	243
Non-Hodgkin's Lymphoma	1,282	494
Kidney & Renal Pelvis	1,215	350
Oral Cavity & Pharynx	907	234
Leukemia	786	528
Pancreas	778	737
Esophagus	564	534
Liver & Intrahepatic Bile Duct	510	429
Stomach	478	244
Brain & Other CNS*	457	314
Larynx	438	147
Multiple Myeloma	378	243
Thyroid	318	33
Testis	281	12
Hodgkin's Lymphoma	180	29

¹ Source: Ohio Cancer Incidence Surveillance System, Chronic Disease and Behavioral Epidemiology Section and the Office of Vital Statistics, Ohio Department of Health, 2013.

² Figure 2 presents the top 10 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, 2006-2010^{1,2}



PRIMARY CANCER SITE/TYPE	NEW CASES	DEATHS
	AVERAGE ANNUAL	AVERAGE ANNUAL
Breast	8,268	1,812
Lung & Bronchus	4,307	3,223
Colon & Rectum	2,983	1,170
Uterine Corpus & Uterine, NOS*	1,944	359
Non-Hodgkin's Lymphoma	1,123	425
Melanoma of the Skin	1,091	130
Thyroid	1,041	35
Ovary	840	595
Kidney & Renal Pelvis	815	226
Pancreas	787	758
Urinary Bladder	705	198
Leukemia	617	426
Cervix	467	175
Oral Cavity & Pharynx	416	113
Brain & Other CNS**	401	257
Multiple Myeloma	319	224
Stomach	291	169
Liver & Intrahepatic Bile Duct	202	217
Hodgkin's Lymphoma	152	24
Esophagus	146	139
Larynx	124	37

¹ Source: Ohio Cancer Incidence Surveillance System, Chronic Disease and Behavioral Epidemiology Section and the Office of Vital Statistics, Ohio Department of Health, 2013.

² Figure 3 presents the top 10 cancer sites/types among females according to incidence.

* Not Otherwise Specified

** Central Nervous System



Mortality

In contrast to the data for incidence, the 2006-2010 cancer mortality rate in Ohio for all sites/types combined was 9% higher than the US rate (191.9 per 100,000 and 176.4 per 100,000, respectively).^{3,7} Lung and bronchus cancer remains the leading cause of cancer death in Ohio for males, females, and both genders combined, with a yearly (2006-2010) average of 4,183 men and 3,223 women dying from the disease (Table 3).⁷ Prostate cancer ranks as the second leading cause of cancer death for men in Ohio (1,189 deaths per year) followed closely by colon and rectum cancer (1,185 deaths per year), accounting for about 9% of male cancer deaths each (Figure 2).⁷ Breast cancer ranks as the second leading cause of cancer death for women with a yearly average of 1,812 deaths, accounting for 15% of female cancer deaths (Figure 3).⁷ Ohio cancer mortality rates were higher than the national cancer mortality rates during 2006-2010 for 16 specific sites/types of cancer: brain and other CNS; cervix; colon and rectum; esophagus; female breast; kidney and renal pelvis; larynx; leukemia; lung and bronchus; multiple myeloma; non-Hodgkin's lymphoma; oral cavity and pharynx; pancreas; prostate; urinary bladder; and uterine corpus and uterine NOS.^{3,7}

Table 5 displays 2006-2010 average annual numbers of cancer deaths and age-adjusted mortality rates by gender 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.

TABLE 2
Average Annual Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates by Cancer Site/Type and Gender in Ohio and the US, 2006-2010^{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 [†]	30,618	534.3	535.9	29,386	418.5	411.2	60,004	465.1	463.0
Brain & Other CNS**	457	8.0	7.7	401	6.0	5.4	858	7.0	6.5
Breast [†]	72	1.3	1.2	8,268	119.1	123.8	8,340	64.9	66.8
Cervix [†]	*	*	*	467	7.6	7.9	*	*	*
Colon & Rectum [†]	3,009	53.5	52.2	2,983	40.5	39.3	5,992	46.2	45.0
Esophagus	564	9.7	7.7	146	2.0	1.8	710	5.4	4.4
Hodgkin's Lymphoma	180	3.2	3.2	152	2.6	2.4	332	2.9	2.8
Kidney & Renal Pelvis [†]	1,215	20.8	21.0	815	11.6	10.6	2,029	15.7	15.3
Larynx	438	7.3	6.0	124	1.8	1.3	562	4.3	3.4
Leukemia [†]	786	14.2	16.3	617	8.8	10.0	1,403	11.1	12.8
Liver & Intrahepatic Bile Duct [†]	510	8.5	11.9	202	2.8	4.0	713	5.4	7.7
Lung & Bronchus	5,129	90.5	74.3	4,307	59.8	51.9	9,435	72.8	61.4
Melanoma of the Skin [†]	1,303	22.8	27.4	1,091	16.9	16.7	2,394	19.1	21.1
Multiple Myeloma [†]	378	6.6	7.5	319	4.4	4.8	697	5.4	5.9
Non-Hodgkin's Lymphoma [†]	1,282	22.6	23.9	1,123	15.8	16.4	2,405	18.8	19.7
Oral Cavity & Pharynx [†]	907	15.0	16.2	416	5.9	6.2	1,323	10.1	10.8
Ovary	*	*	*	840	12.0	12.5	*	*	*
Pancreas [†]	778	13.6	13.9	787	10.6	10.9	1,564	12.0	12.2
Prostate [†]	8,224	139.7	152.0	*	*	*	*	*	*
Stomach [†]	478	8.5	10.4	291	4.0	5.3	769	5.9	7.5
Testis [†]	281	5.2	5.5	*	*	*	*	*	*
Thyroid [†]	318	5.5	6.1	1,041	17.0	18.2	1,359	11.3	12.2
Urinary Bladder [†]	2,100	38.2	36.6	705	9.5	8.9	2,806	21.6	20.7
Uterine Corpus & Uterine NOS****	*	*	*	1,944	27.4	24.3	*	*	*

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2013; Surveillance, Epidemiology, and End Results (SEER) Program, SEER Cancer Statistics Review 1975-2010, National Cancer Institute, 2013.

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

* Not Applicable

** Central Nervous System

*** Not Otherwise Specified

[†] Data for this site/type did not meet the standard of 95% complete in 2006-2010.

TABLE 3
Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by Cancer Site/Type and Gender in Ohio and the US, 2006-2010^{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	12,995	235.9	215.3	12,026	162.1	149.7	25,021	191.9
Brain & Other CNS**	314	5.4	5.2	257	3.7	3.5	571	4.5	4.3
Breast	17	0.3	0.3	1,812	24.7	22.6	1,829	14.0	12.7
Cervix	*	*	*	175	2.7	2.4	*	*	*
Colon & Rectum	1,185	21.7	19.6	1,170	15.1	13.9	2,355	17.9	15.9
Esophagus	534	9.3	7.6	139	1.8	1.6	673	5.1	4.4
Hodgkin's Lymphoma	29	0.5	0.5	24	0.3	0.3	54	0.4	0.4
Kidney & Renal Pelvis	350	6.3	5.8	226	3.0	2.6	576	4.4	4.0
Larynx	147	2.5	2.0	37	0.5	0.4	184	1.4	1.1
Leukemia	528	9.8	9.5	426	5.7	5.3	954	7.4	7.1
Liver & Intrahepatic Bile Duct	429	7.3	8.3	217	2.9	3.4	647	4.9	5.6
Lung & Bronchus	4,183	74.8	63.5	3,223	44.2	39.2	7,406	57.1	49.5
Melanoma of the Skin	243	4.4	4.1	130	1.8	1.7	373	2.9	3.6
Multiple Myeloma	243	4.5	4.3	224	3.0	2.7	467	3.6	3.4
Non-Hodgkin's Lymphoma	494	9.1	8.2	425	5.6	5.1	919	7.1	6.4
Oral Cavity & Pharynx	234	4.0	3.8	113	1.5	1.4	347	2.6	2.5
Ovary	*	*	*	595	8.1	8.1	*	*	*
Pancreas	737	13.1	12.5	758	10.1	9.6	1,495	11.4	10.9
Prostate	1,189	23.6	23.0	*	*	*	*	*	*
Stomach	244	4.5	4.9	169	2.2	2.5	413	3.2	3.5
Testis	12	0.2	0.2	*	*	*	*	*	*
Thyroid	33	0.6	0.5	35	0.5	0.5	68	0.5	0.5
Urinary Bladder	470	9.0	7.7	198	2.5	2.2	668	5.1	4.4
Uterine Corpus & Uterine NOS***	*	*	*	359	4.8	4.3	*	*	*

¹ Source: Chronic Disease and Behavioral Epidemiology Section and the Office of Vital Statistics, Ohio Department of Health, 2013; National Center for Health Statistics Public Use Mortality Data published in SEER Cancer Statistics Review 1975-2010, National Cancer Institute, 2013

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

* Not applicable

** Central Nervous System

*** Not Otherwise Specified

TABLE
4

Average Annual Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates by County and Gender in Ohio, 2006-2010^{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	30,618	534.3	29,386	418.5	60,004	465.1	3,009	53.5	2,983	40.5	5,992	46.2
Adams [†]	84	544.7	71	431.7	155	482.5	11	67.0	10	57.0	21	62.0
Allen	293	544.9	272	423.9	565	472.9	27	51.4	27	39.7	54	44.4
Ashland [†]	125	427.1	136	408.6	262	412.7	14	49.9	16	45.1	30	47.7
Ashtabula [†]	332	598.2	298	456.3	630	516.6	32	57.5	32	46.8	64	52.0
Athens [†]	145	610.0	125	445.5	269	515.0	12	54.5	12	42.0	25	48.0
Auglaize [†]	133	534.0	126	425.0	259	472.6	16	62.2	17	48.2	33	56.3
Belmont	233	582.7	219	457.1	452	502.3	24	60.9	23	42.7	47	51.0
Brown [†]	132	581.2	102	405.6	234	483.8	12	54.6	11	44.0	23	48.2
Butler [†]	832	523.3	825	427.5	1,657	466.1	86	55.0	86	44.5	172	49.1
Carroll	99	577.9	76	408.2	175	484.1	10	56.6	8	44.0	18	49.7
Champaign [†]	108	528.5	106	450.8	214	480.0	12	58.9	12	46.2	24	51.7
Clark [†]	422	553.0	391	422.2	812	475.7	39	52.1	41	42.0	80	46.4
Clermont	497	560.1	456	433.4	953	487.3	45	50.6	42	39.7	87	44.8
Clinton [†]	117	556.9	125	506.9	242	523.9	12	57.5	12	46.2	24	52.2
Columbiana	337	540.3	293	410.2	630	463.1	31	50.2	34	44.9	65	47.1
Coshocton [†]	110	566.6	105	456.7	215	497.9	13	68.5	12	49.4	25	57.6
Crawford [†]	134	535.7	130	440.2	264	476.4	13	53.6	16	49.7	29	50.9
Cuyahoga	3,727	569.2	3,840	445.0	7,567	492.8	358	55.2	375	40.9	734	46.8
Darke [†]	138	470.4	124	365.1	262	409.1	18	62.7	20	56.4	38	58.9
Defiance [†]	103	494.2	79	331.8	182	402.1	9	46.6	10	38.6	19	42.2
Delaware	356	558.8	346	455.5	702	499.4	32	53.0	28	37.7	60	44.3
Erie	261	530.0	252	480.5	513	500.8	29	58.5	33	58.1	62	58.3
Fairfield [†]	358	539.8	335	428.2	694	475.4	33	49.9	36	45.6	69	48.3
Fayette [†]	79	510.3	71	405.3	149	451.3	7	47.5	7	41.2	15	44.7
Franklin	2,443	558.7	2,479	430.0	4,922	479.9	222	52.7	221	38.3	443	44.5
Fulton [†]	93	423.4	91	355.5	184	382.0	10	48.8	10	35.9	20	41.7
Gallia [†]	87	511.0	86	434.9	173	467.3	9	50.1	9	44.1	18	47.2
Geauga	255	447.2	244	384.6	499	411.6	26	46.4	20	29.9	46	37.7
Greene	382	512.6	396	438.7	778	467.6	34	47.2	41	42.4	75	45.0
Guernsey [†]	120	527.5	117	458.5	236	485.7	14	63.5	14	51.5	27	56.2
Hamilton [†]	2,069	516.5	2,099	398.5	4,168	444.5	201	50.9	212	37.7	412	43.2
Hancock	187	501.7	165	358.9	351	418.6	16	44.4	18	35.4	34	39.9
Hardin [†]	87	573.8	72	395.5	158	467.3	10	67.3	8	43.7	18	54.0
Harrison [†]	54	524.7	43	395.4	97	455.6	5	43.9	6	48.4	10	46.5
Henry [†]	68	455.2	65	372.2	133	400.7	5	35.5	5	29.1	11	31.6
Highland [†]	120	545.8	102	397.5	222	464.0	12	58.4	11	40.8	23	48.5
Hocking [†]	80	475.9	76	444.2	155	456.8	10	68.4	7	38.7	17	52.0
Holmes [†]	61	346.9	58	294.7	119	317.3	9	49.8	7	35.9	16	42.3
Huron	166	561.0	149	424.0	315	481.2	20	69.3	16	44.9	36	55.7
Jackson [†]	83	490.8	83	402.7	166	438.3	9	54.1	11	50.9	20	51.9
Jefferson [†]	239	558.8	210	420.2	449	478.3	21	50.0	26	45.5	47	47.9
Knox	173	566.9	164	458.9	337	498.7	21	68.8	18	47.4	39	56.9
Lake	695	540.9	664	424.9	1,359	472.1	69	54.4	59	35.7	128	43.8

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2013.

² Average annual rate per 100,000, age-adjusted to the 2000 US 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 2006-2010, National Cancer Institute, 2013.

[†] Data for this county did not meet the standard of 95% complete for all sites/types combined in 2006-2010. See page 9 for more information.

TABLE
4
cont.

Average Annual Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates by County and Gender in Ohio, 2006-2010^{1,2,3}

	Lung & Bronchus						Breast		Prostate	
	Male		Female		Total		Female		Male	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Ohio	5,129	90.5	4,307	59.8	9,435	72.8	8,268	119.1	8,224	139.7
Adams [†]	19	117.6	13	74.3	32	94.7	17	105.7	18	117.3
Allen	55	103.1	39	59.5	94	78.0	74	118.1	72	130.0
Ashland [†]	22	75.7	17	47.0	39	60.0	40	120.0	33	108.0
Ashtabula [†]	52	92.8	49	72.3	100	80.9	71	109.9	96	167.8
Athens [†]	27	112.9	18	64.0	45	86.4	33	116.4	39	157.7
Auglaize [†]	25	100.3	15	51.0	40	72.2	36	121.5	29	114.6
Belmont	35	86.1	34	66.1	68	73.7	62	127.7	67	163.8
Brown [†]	29	131.8	21	80.5	49	102.2	25	98.5	32	139.3
Butler [†]	141	92.1	122	63.4	263	75.6	236	121.8	221	133.2
Carroll	18	108.2	10	50.2	28	76.4	19	99.6	28	154.8
Champaign [†]	20	95.2	14	58.6	34	74.8	29	121.2	25	120.6
Clark [†]	81	106.4	62	63.1	143	81.4	113	123.7	109	137.6
Clermont	95	110.7	84	80.9	178	93.7	120	112.2	131	144.8
Clinton [†]	21	100.9	22	87.6	43	91.3	32	131.6	27	128.1
Columbiana	60	95.7	45	59.6	105	75.2	85	117.7	94	146.0
Coshocton [†]	19	102.7	15	61.6	34	79.3	26	109.6	22	107.5
Crawford [†]	22	86.1	14	45.1	36	62.9	37	125.4	34	131.0
Cuyahoga	590	90.3	546	60.6	1,136	72.7	1,080	128.8	1,042	156.9
Darke [†]	23	77.4	15	41.9	38	58.4	31	93.2	29	97.3
Defiance [†]	21	97.7	12	51.7	33	73.3	20	87.9	30	137.4
Delaware	47	82.3	43	62.8	90	71.4	114	146.5	113	170.1
Erie	41	82.5	34	61.1	76	70.7	71	138.9	67	128.8
Fairfield [†]	64	100.5	51	65.3	114	80.3	99	124.7	97	139.7
Fayette [†]	16	105.3	10	56.3	26	78.2	15	83.2	17	108.5
Franklin	386	93.5	353	63.5	740	75.8	726	125.6	718	162.9
Fulton [†]	16	74.0	12	47.7	28	59.9	24	93.8	22	96.7
Gallia [†]	21	126.6	14	66.7	35	92.4	22	113.3	18	98.6
Geauga	31	54.5	30	45.4	61	49.2	75	118.7	80	130.6
Greene	56	78.9	52	56.2	109	65.7	124	138.8	103	131.9
Guernsey [†]	23	101.8	15	56.8	39	76.8	34	131.4	28	116.8
Hamilton [†]	333	84.0	331	61.8	664	71.0	623	120.8	617	151.9
Hancock	30	82.5	17	36.6	47	55.9	52	115.4	58	151.3
Hardin [†]	16	108.9	10	50.4	26	76.3	20	113.0	23	142.8
Harrison [†]	9	87.1	5	43.4	14	64.0	11	102.8	14	131.8
Henry [†]	11	73.2	8	43.4	19	55.6	17	94.8	20	125.3
Highland [†]	27	118.7	17	63.2	44	88.9	26	102.0	21	96.1
Hocking [†]	13	78.5	13	72.4	26	74.1	21	123.8	16	86.0
Holmes [†]	9	51.4	5	24.2	14	36.4	17	87.4	12	69.7
Huron	28	95.6	20	56.4	49	73.3	41	118.3	39	129.2
Jackson [†]	18	99.2	12	57.9	30	76.9	21	99.0	18	102.5
Jefferson [†]	41	94.4	33	62.0	74	75.4	54	113.4	73	162.4
Knox	26	87.2	18	49.4	45	65.7	51	147.9	42	132.3
Lake	111	87.9	111	67.5	222	76.0	191	124.8	187	138.1

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2013.

² Average annual rate per 100,000, age-adjusted to the 2000 US 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 2006-2010, National Cancer Institute, 2013.

[†] Data for this county did not meet the standard of 95% complete for all sites/types combined in 2006-2010. See page 9 for more information.

TABLE
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cont.

Average Annual Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates by County and Gender in Ohio, 2006-2010^{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	30,618	534.3	29,386	418.5	60,004	465.1	3,009	53.5	2,983	40.5	5,992	46.2
Lawrence [†]	170	498.6	176	440.0	345	464.8	18	50.8	18	42.8	35	47.2
Licking	444	563.6	429	464.3	873	505.7	44	58.1	37	40.2	81	47.9
Logan [†]	131	523.0	118	410.5	248	456.3	13	54.4	13	44.0	26	48.4
Lorain [†]	798	524.7	751	412.2	1,549	457.0	78	51.9	72	38.6	150	44.2
Lucas [†]	1,071	496.1	1,005	363.8	2,076	416.1	98	46.9	104	35.9	202	40.3
Madison [†]	115	543.6	95	422.0	210	473.0	11	52.2	10	44.3	21	47.2
Mahoning [†]	791	572.9	721	411.2	1,512	476.9	80	57.9	84	42.8	164	49.2
Marion [†]	199	576.6	177	452.3	376	500.6	24	72.6	21	49.1	45	59.0
Medina	429	513.4	421	430.4	850	463.5	33	39.6	42	42.2	74	41.0
Meigs [†]	71	544.8	58	396.9	129	460.6	9	68.1	8	51.2	16	58.2
Mercer [†]	113	520.4	96	393.8	209	446.4	18	82.0	12	48.0	30	62.8
Miami [†]	278	504.3	253	397.9	531	442.3	31	57.4	25	38.1	56	46.8
Monroe [†]	58	616.9	41	412.9	99	507.0	5	48.1	6	52.1	11	50.6
Montgomery [†]	1,530	556.0	1,472	423.7	3,003	476.6	136	50.3	140	37.8	276	43.1
Morgan [†]	46	509.2	40	404.1	86	455.8	4	46.5	7	66.8	11	58.1
Morrow [†]	97	551.0	79	413.4	176	477.1	10	59.9	10	51.8	20	55.8
Muskingum [†]	228	503.4	230	420.4	458	454.1	21	47.5	23	39.5	44	43.2
Noble [†]	36	511.3	36	490.5	73	483.2	6	86.2	7	94.0	13	88.2
Ottawa	154	591.1	129	446.4	282	508.9	16	61.8	12	40.1	27	49.2
Paulding [†]	42	408.4	39	322.4	81	361.2	5	46.8	5	38.9	10	42.7
Perry [†]	90	505.5	80	390.9	170	438.6	10	54.5	7	32.3	16	42.6
Pickaway [†]	145	523.8	129	435.0	275	470.0	13	44.1	15	48.2	27	47.4
Pike [†]	77	538.4	76	465.2	152	494.1	9	60.8	7	40.7	15	49.8
Portage [†]	408	544.5	359	414.3	767	470.0	35	48.3	39	44.9	74	46.9
Preble [†]	116	499.3	101	386.2	216	433.9	14	62.8	9	34.4	23	47.0
Putnam	87	501.6	80	396.2	166	435.3	9	51.3	9	39.9	18	45.5
Richland [†]	356	503.6	334	412.9	690	448.2	38	54.8	38	44.2	76	48.8
Ross [†]	206	523.9	185	416.4	391	456.7	23	58.4	19	40.4	41	48.4
Sandusky [†]	161	500.8	163	423.4	324	451.8	21	65.3	16	38.8	37	50.7
Scioto [†]	242	613.2	219	448.7	461	514.8	24	62.0	20	39.4	44	49.3
Seneca	156	532.7	145	406.6	300	459.0	19	64.7	19	50.6	38	57.8
Shelby	118	512.4	107	381.0	225	437.1	16	68.9	12	41.7	28	54.6
Stark	1,113	533.0	1,012	400.3	2,125	454.2	100	48.7	99	36.9	200	42.0
Summit [†]	1,386	499.2	1,370	393.7	2,756	435.8	140	51.0	135	37.1	275	42.9
Trumbull	708	568.3	656	442.5	1,364	494.6	74	60.4	76	48.4	150	53.3
Tuscarawas	270	522.7	246	413.8	517	458.7	27	52.4	26	39.8	53	45.1
Union	108	547.7	103	435.5	211	484.8	11	59.1	10	43.2	21	49.8
Van Wert [†]	62	402.5	68	359.8	130	375.2	8	54.1	11	53.0	20	54.9
Vinton [†]	38	544.7	33	435.3	71	479.7	3	54.6	4	49.7	7	51.7
Warren	443	505.5	437	417.6	879	451.6	42	50.1	35	33.7	77	41.0
Washington [†]	208	563.7	184	449.7	391	497.8	19	54.0	16	37.9	36	44.8
Wayne [†]	266	456.6	272	402.2	538	422.1	26	45.2	24	33.2	50	38.6
Williams [†]	95	453.8	94	391.1	189	413.8	10	48.1	13	47.0	23	48.0
Wood [†]	276	488.9	248	367.4	525	417.7	35	63.3	25	36.5	60	48.4
Wyandot	68	531.9	55	383.3	122	446.8	9	71.3	6	38.2	15	53.5

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2013.

² Average annual rate per 100,000, age-adjusted to the 2000 US 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 2006-2010, National Cancer Institute, 2013.

[†] Data for this county did not meet the standard of 95% complete for all sites/types combined in 2006-2010. See page 9 for more information.

TABLE
4
cont.

Average Annual Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates by County and Gender in Ohio, 2006-2010^{1,2,3}

	Lung & Bronchus						Breast		Prostate	
	Male		Female		Total		Female		Male	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Ohio	5,129	90.5	4,307	59.8	9,435	72.8	8,268	119.1	8,224	139.7
Lawrence [†]	39	114.7	28	67.4	67	87.8	47	118.4	33	91.7
Licking	72	94.6	66	70.2	138	80.5	120	127.2	117	136.7
Logan [†]	24	97.5	16	53.9	40	73.1	37	126.4	28	104.4
Lorain [†]	137	91.6	115	61.2	251	73.8	200	109.8	213	136.8
Lucas [†]	169	79.4	162	58.4	331	66.6	269	99.3	297	135.4
Madison [†]	21	101.5	13	57.5	34	77.6	29	125.5	32	146.6
Mahoning [†]	122	87.7	102	55.5	224	68.7	205	122.5	222	157.1
Marion [†]	40	114.1	29	72.2	69	91.1	44	113.8	49	138.6
Medina	60	74.3	49	51.0	109	61.0	128	128.3	123	143.4
Meigs [†]	11	81.4	10	70.0	21	74.6	13	92.5	15	108.6
Mercer [†]	18	81.2	9	34.2	26	54.2	28	116.5	22	101.3
Miami [†]	46	83.9	36	55.0	82	67.7	69	109.1	73	126.3
Monroe [†]	11	118.5	6	54.4	17	83.3	10	98.5	17	169.6
Montgomery [†]	267	97.1	244	67.7	511	79.6	404	118.7	411	146.0
Morgan [†]	9	94.6	6	59.1	15	76.1	9	95.6	10	110.0
Morrow [†]	18	102.8	9	46.5	28	73.2	23	121.0	24	140.7
Muskingum [†]	47	103.5	34	59.5	81	78.7	54	98.8	51	107.4
Noble [†]	5	69.9	6	71.4	11	69.4	8	103.0	8	108.9
Ottawa	27	103.1	14	47.2	42	72.1	38	135.5	40	141.8
Paulding [†]	10	96.8	7	57.1	17	74.8	10	82.7	8	78.4
Perry [†]	17	92.9	13	63.4	30	76.8	21	100.7	19	106.5
Pickaway [†]	31	114.6	20	66.0	51	87.4	36	119.1	30	104.4
Pike [†]	15	106.6	15	88.3	30	96.7	17	106.5	14	97.7
Portage [†]	65	87.8	58	66.3	123	75.4	100	114.6	120	154.1
Preble [†]	18	77.7	15	55.0	33	64.9	30	114.9	28	113.5
Putnam	12	67.1	7	33.1	18	47.2	25	124.3	22	122.2
Richland [†]	60	84.9	47	54.9	107	67.7	94	116.6	92	125.5
Ross [†]	45	115.7	29	63.0	74	85.3	49	109.3	46	114.2
Sandusky [†]	27	84.8	19	49.3	46	63.8	48	125.4	37	112.1
Scioto [†]	53	131.3	43	84.7	96	105.1	49	101.8	57	142.0
Seneca	24	82.1	18	50.3	42	63.8	40	113.1	44	148.8
Shelby	17	75.7	13	46.3	31	59.7	31	110.5	30	124.6
Stark	180	85.6	137	51.4	317	66.3	286	114.4	314	145.8
Summit [†]	247	90.4	205	57.2	452	71.0	388	114.3	333	117.1
Trumbull	122	97.1	104	66.0	225	79.0	175	120.8	184	141.0
Tuscarawas	43	82.8	29	46.1	72	62.3	71	120.3	79	148.8
Union	16	86.4	12	53.0	28	68.5	29	119.2	25	122.7
Van Wert [†]	11	72.0	9	46.5	20	57.2	20	108.3	12	77.2
Vinton [†]	10	151.2	6	80.6	17	111.0	7	97.8	7	89.2
Warren	68	82.1	57	58.0	126	68.6	136	127.2	124	138.4
Washington [†]	39	101.8	26	58.9	64	78.0	50	125.8	48	124.0
Wayne [†]	40	68.0	32	46.4	72	55.7	78	114.2	55	91.7
Williams [†]	18	82.5	11	44.7	29	61.3	25	106.2	25	119.0
Wood [†]	40	71.9	32	46.2	72	57.1	70	103.6	84	145.4
Wyandot	12	91.7	9	57.1	21	72.4	14	103.3	18	134.2

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2013.

² Average annual rate per 100,000, age-adjusted to the 2000 US 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 2006-2010, National Cancer Institute, 2013.

[†] Data for this county did not meet the standard of 95% complete for all sites/types combined in 2006-2010. See page 9 for more information.

TABLE
5

Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by County and Gender in Ohio, 2006-2010^{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	12,995	235.9	12,026	162.1	25,021	191.9	1,185	21.7	1,170	15.2	2,355	18.0
Adams	41	277.4	32	183.8	73	227.6	4	25.2	3	17.2	7	21.5
Allen	120	228.1	115	165.5	235	189.9	9	16.6	9	12.5	17	14.0
Ashland	63	223.6	60	164.5	123	189.3	6	20.7	7	19.0	13	19.7
Ashtabula	137	254.4	129	184.1	266	214.0	10	18.6	12	16.2	22	17.3
Athens	62	277.3	53	183.8	116	222.8	6	28.1	6	22.0	13	25.1
Auglaize	60	245.0	53	164.4	114	198.4	7	27.1	6	16.2	12	20.7
Belmont	94	237.3	92	170.7	186	196.8	11	27.4	10	16.6	20	21.6
Brown	58	276.6	47	186.1	105	224.7	5	28.5	5	20.5	10	24.1
Butler	344	235.1	331	169.6	675	195.7	31	21.8	32	16.0	62	18.3
Carroll	42	253.3	26	135.3	68	187.5	4	21.7	2	10.1	6	15.8
Champaign	51	261.2	45	183.2	96	215.5	5	24.7	5	21.2	10	22.7
Clark	192	257.5	172	170.3	364	206.5	15	20.6	17	16.3	32	18.2
Clermont	186	229.7	175	169.1	362	194.0	15	18.2	14	12.7	28	15.0
Clinton	51	253.4	50	193.2	101	219.2	4	20.0	4	15.0	8	17.7
Columbiana	139	231.6	113	146.4	251	182.0	11	17.6	12	14.6	23	16.1
Coshocton	50	264.9	44	183.7	94	218.3	4	19.9	5	21.6	9	20.7
Crawford	63	262.5	50	148.8	113	195.7	5	21.5	9	26.2	14	23.6
Cuyahoga	1,584	243.9	1,574	168.2	3,158	197.4	135	21.0	140	14.5	275	17.1
Darke	66	228.5	57	150.8	124	184.2	5	14.6	8	18.9	12	17.4
Defiance	54	267.3	38	150.0	91	198.7	4	19.2	3	13.4	7	16.0
Delaware	112	200.9	106	151.3	218	172.3	9	17.0	10	13.5	19	15.3
Erie	106	220.0	97	167.4	203	189.7	8	18.0	11	17.1	19	17.5
Fairfield	146	236.5	135	171.6	280	198.3	14	22.3	14	17.6	28	19.7
Fayette	39	254.0	36	193.9	75	222.6	4	26.9	4	19.2	8	23.5
Franklin	935	233.4	944	164.7	1,879	191.4	82	20.4	82	13.9	164	16.7
Fulton	46	219.7	44	160.5	90	184.9	5	22.7	6	18.8	11	21.3
Gallia	40	248.4	30	150.3	70	192.2	4	24.5	3	15.1	7	18.8
Geauga	93	172.4	92	135.7	185	150.7	9	16.8	8	10.8	17	13.5
Greene	149	212.4	149	158.2	298	179.8	13	18.5	14	13.8	27	16.1
Guernsey	57	264.5	47	173.4	105	212.5	7	35.1	7	22.8	14	28.4
Hamilton	842	217.3	872	155.3	1,714	179.4	79	20.8	81	13.6	160	16.5
Hancock	74	206.9	68	137.5	142	165.4	6	17.0	7	14.2	13	15.2
Hardin	36	261.9	34	179.6	70	210.8	3	20.5	4	18.6	7	20.0
Harrison	24	227.2	18	153.8	42	187.4	3	25.8	2	13.3	4	18.9
Henry	34	229.6	26	133.4	60	172.3	5	29.9	3	13.0	7	21.2
Highland	62	296.3	41	154.1	103	216.8	6	30.9	5	17.8	11	23.5
Hocking	38	243.8	31	174.5	68	204.8	5	34.2	3	18.6	8	26.1
Holmes	35	204.9	24	119.5	59	157.9	5	25.7	4	17.9	8	21.4
Huron	69	241.4	57	154.7	125	191.5	7	24.9	6	16.9	13	20.7
Jackson	47	288.8	37	177.8	85	223.6	5	35.0	4	18.9	9	24.3
Jefferson	100	235.7	93	169.1	194	195.6	9	20.7	9	16.0	18	17.9
Knox	69	237.7	60	158.4	129	189.6	7	23.6	8	20.8	15	21.5
Lake	286	230.7	271	163.4	556	189.9	27	21.2	25	15.0	52	17.8

¹ Source: Chronic Disease and Behavioral Epidemiology Section and the Office of Vital Statistics Program, Ohio Department of Health, 2013.

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

Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by County and Gender in Ohio, 2006-2010^{1,2}

	Lung & Bronchus						Breast		Prostate	
	Male		Female		Total		Female		Male	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
Ohio	4,183	74.8	3,223	44.2	7,406	57.1	1,812	24.7	1,189	23.6
Adams	17	109.0	8	42.9	25	74.4	5	30.6	2	19.2
Allen	42	78.3	30	44.9	72	58.8	16	23.3	10	20.7
Ashland	19	64.6	14	40.0	33	51.2	9	25.7	7	26.9
Ashtabula	42	77.2	34	49.1	76	61.3	18	26.0	13	25.9
Athens	20	84.9	13	46.8	33	63.6	6	20.6	5	23.5
Auglaize	21	83.4	11	33.5	31	55.0	11	36.8	4	15.9
Belmont	28	68.3	24	47.2	52	55.7	11	20.1	6	17.2
Brown	23	107.1	15	57.3	38	78.5	6	26.3	3	15.5
Butler	117	78.3	90	46.9	207	60.3	49	24.9	30	23.4
Carroll	16	94.1	7	36.1	23	62.5	4	18.9	4	26.3
Champaign	18	87.2	13	55.9	31	69.2	6	24.4	4	22.0
Clark	67	88.7	47	46.7	115	64.6	26	26.2	18	25.4
Clermont	72	87.3	57	55.9	130	69.5	23	21.6	15	22.6
Clinton	19	95.7	14	55.8	33	72.1	7	27.8	4	24.2
Columbiana	46	75.3	32	41.3	78	55.8	16	21.0	11	21.6
Coshocton	18	95.2	14	55.5	31	72.3	6	25.6	5	25.2
Crawford	17	67.9	9	29.7	26	45.8	5	15.5	5	21.1
Cuyahoga	469	72.0	394	42.7	863	54.6	235	25.9	187	29.6
Darke	21	72.9	11	29.5	32	49.3	10	28.2	7	23.7
Defiance	18	86.4	9	35.6	27	59.0	6	25.8	6	32.5
Delaware	36	66.0	26	39.3	62	50.9	19	24.8	11	22.8
Erie	33	65.5	26	45.6	59	54.2	16	30.7	12	26.2
Fairfield	51	81.8	35	45.2	86	60.9	23	28.5	14	26.5
Fayette	13	83.7	9	47.3	22	63.8	5	28.5	4	25.7
Franklin	307	76.4	263	47.0	570	58.8	159	27.2	78	23.0
Fulton	13	59.7	9	33.3	22	44.9	7	26.9	4	21.4
Gallia	14	85.4	9	43.2	23	60.7	4	23.2	3	17.6
Geauga	23	43.4	22	34.1	46	38.0	15	22.3	9	18.6
Greene	44	61.4	41	43.5	85	51.0	21	22.4	14	21.6
Guernsey	17	74.2	12	44.5	29	57.9	7	24.8	4	18.9
Hamilton	268	68.6	245	44.9	513	54.7	133	23.9	85	23.6
Hancock	24	67.6	14	29.3	38	45.0	13	25.3	7	20.2
Hardin	12	81.2	9	46.3	20	60.9	4	21.8	2	19.1
Harrison	7	69.8	5	40.6	12	54.1	3	20.4	2	20.7
Henry	9	60.8	5	26.8	14	42.2	4	22.0	2	16.8
Highland	23	105.9	11	39.5	34	69.8	7	26.7	4	20.5
Hocking	12	72.7	10	58.1	22	63.7	4	23.6	3	22.4
Holmes	8	45.1	4	20.3	12	31.5	5	24.1	4	27.7
Huron	24	83.1	13	35.7	37	56.5	7	20.7	5	20.1
Jackson	15	86.0	8	39.6	23	60.8	5	22.5	4	30.1
Jefferson	31	71.1	23	41.8	53	53.5	14	25.8	9	22.7
Knox	18	60.5	14	36.5	32	46.3	8	23.6	7	26.3
Lake	93	74.1	81	49.5	174	59.4	44	27.4	26	21.9

¹ Source: Chronic Disease and Behavioral Epidemiology Section and the Office of Vital Statistics Program, Ohio Department of Health, 2013.

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

Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by County and Gender in Ohio, 2006-2010^{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	12,995	235.9	12,026	162.1	25,021	191.9	1,185	21.7	1,170	15.2	2,355	18.0
Lawrence	80	248.2	71	170.3	152	203.7	8	25.1	8	20.3	16	22.5
Licking	170	234.3	163	171.9	333	196.7	17	24.1	14	14.1	30	18.2
Logan	63	267.3	48	159.2	111	204.2	7	28.9	6	19.5	13	23.7
Lorain	336	231.5	320	169.4	657	194.1	31	21.1	26	13.6	57	16.6
Lucas	496	237.6	472	162.2	968	191.5	44	21.1	47	15.4	91	17.8
Madison	47	238.5	36	155.0	83	192.1	4	22.9	3	12.0	7	16.3
Mahoning	351	251.9	321	164.6	672	199.7	36	25.7	34	15.8	69	20.0
Marion	92	281.3	78	185.3	170	225.7	10	33.5	8	18.9	18	25.0
Medina	163	210.5	135	134.9	298	166.9	13	18.1	11	11.5	25	14.5
Meigs	37	306.5	25	163.8	63	225.3	5	40.5	3	18.7	8	28.8
Mercer	50	232.7	46	175.1	96	198.2	5	22.7	6	21.6	11	22.0
Miami	121	229.5	99	148.4	221	182.3	12	23.4	9	12.6	21	17.2
Monroe	25	266.6	18	166.8	43	210.3	1	16.6	2	18.5	4	17.6
Montgomery	656	243.0	604	163.0	1,260	195.4	56	20.6	55	14.0	111	16.9
Morgan	23	260.7	17	169.7	41	213.2	1	11.8	2	22.3	4	18.3
Morrow	45	279.7	31	164.5	76	217.6	5	33.9	4	22.4	9	27.5
Muskingum	113	258.9	107	182.0	220	213.4	9	21.7	10	16.9	19	19.1
Noble	16	236.2	14	173.8	30	199.7	3	39.7	3	33.2	5	36.5
Ottawa	64	259.1	51	164.3	115	204.0	7	29.7	5	16.9	12	22.4
Paulding	25	261.3	23	183.5	48	218.0	2	19.1	2	19.3	4	19.6
Perry	43	263.1	38	184.6	81	216.9	4	26.7	3	14.7	7	19.8
Pickaway	67	260.0	55	181.0	122	213.3	6	20.5	4	13.9	10	17.2
Pike	42	299.3	30	171.2	71	227.2	5	32.3	3	16.9	8	24.0
Portage	160	229.7	145	165.8	305	191.9	13	20.0	10	10.9	23	14.6
Preble	51	232.0	45	170.2	96	195.5	4	21.0	4	14.6	9	17.3
Putnam	36	218.5	27	119.8	64	157.9	3	19.1	4	15.3	7	17.3
Richland	166	242.3	140	161.1	306	195.0	17	26.4	17	18.4	34	21.5
Ross	101	271.0	74	162.8	175	208.1	10	26.1	8	16.3	18	21.1
Sandusky	76	244.4	71	169.6	147	199.8	9	31.1	10	20.5	19	25.2
Scioto	105	269.9	91	176.0	196	215.1	10	26.7	9	16.6	20	21.1
Seneca	63	223.6	56	150.7	120	180.5	6	20.6	7	17.3	13	18.9
Shelby	44	202.0	38	127.9	83	159.3	3	15.5	4	10.9	7	13.1
Stark	463	226.1	428	154.1	891	182.7	43	21.6	43	14.4	86	17.4
Summit	640	238.7	592	159.4	1,233	190.6	57	21.2	59	15.2	116	17.7
Trumbull	293	239.7	261	160.7	554	193.1	30	24.8	28	17.1	58	20.1
Tuscarawas	111	220.9	90	137.4	201	172.0	10	20.8	11	15.4	21	17.9
Union	37	208.8	35	158.0	72	180.4	3	18.1	4	16.1	7	16.9
Van Wert	34	225.6	34	167.9	68	190.3	3	22.7	4	18.1	7	20.4
Vinton	18	278.7	13	168.8	31	212.3	1	19.5	1	12.2	2	15.8
Warren	163	206.2	159	158.9	322	177.8	16	19.6	15	14.5	30	16.7
Washington	89	247.6	74	166.5	163	201.0	8	22.4	7	15.4	15	18.4
Wayne	127	227.7	106	149.6	233	181.2	12	23.0	10	14.0	23	17.7
Williams	50	238.9	41	155.8	91	191.5	5	21.9	5	16.3	9	19.5
Wood	116	216.7	109	153.2	225	178.8	12	23.2	12	16.2	24	18.8
Wyandot	29	227.5	23	142.6	52	179.0	3	23.5	3	19.0	6	20.9

¹ Source: Chronic Disease and Behavioral Epidemiology Section and the Office of Vital Statistics Program, Ohio Department of Health, 2013.

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

TABLE
5
cont.

Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by County and Gender in Ohio, 2006-2010^{1,2}

	Lung & Bronchus						Breast		Prostate	
	Male		Female		Total		Female		Male	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
Ohio	4,183	74.8	3,223	44.2	7,406	57.1	1,812	24.7	1,189	23.6
Lawrence	31	92.5	23	55.9	54	71.4	12	27.6	5	18.0
Licking	55	72.1	49	53.2	105	61.3	27	28.6	16	24.3
Logan	19	80.9	12	41.2	32	58.0	6	20.6	4	20.3
Lorain	110	74.8	87	46.0	197	58.2	53	28.0	27	20.8
Lucas	156	74.3	135	47.6	291	58.2	68	23.7	44	22.8
Madison	17	84.7	11	45.3	28	63.3	7	28.1	2	10.6
Mahoning	101	72.3	76	40.0	177	53.4	53	28.6	35	25.6
Marion	33	95.4	23	55.5	56	73.8	11	25.8	9	27.9
Medina	49	61.8	32	33.5	81	45.8	22	21.6	17	24.9
Meigs	10	72.3	9	59.9	19	65.4	2	12.8	3	28.0
Mercer	15	70.3	7	24.9	22	44.6	8	30.9	4	21.5
Miami	36	68.0	26	38.6	62	51.5	17	25.8	11	21.0
Monroe	10	106.2	6	53.6	16	77.5	3	23.8	2	20.2
Montgomery	209	76.2	181	49.3	389	60.4	84	23.2	61	23.8
Morgan	8	90.7	5	47.6	13	68.6	3	28.6	2	19.0
Morrow	14	82.7	6	30.3	20	54.6	7	35.2	3	23.2
Muskingum	41	92.0	30	51.2	71	68.8	15	26.6	8	18.6
Noble	4	50.6	5	61.8	8	54.8	2	19.4	2	27.4
Ottawa	23	89.3	11	34.2	34	57.9	10	31.8	3	14.1
Paulding	9	94.8	6	47.1	15	68.2	2	13.9	2	25.3
Perry	14	78.9	10	48.5	24	61.4	6	29.3	3	22.6
Pickaway	24	90.7	16	52.7	41	69.4	8	27.1	5	23.8
Pike	14	100.6	11	63.0	25	80.0	4	20.7	3	25.5
Portage	52	72.0	42	48.0	94	58.4	21	24.1	12	18.7
Preble	16	72.2	13	48.8	29	58.2	8	30.2	4	22.1
Putnam	11	65.1	4	21.1	15	38.9	4	19.6	4	25.3
Richland	53	76.1	36	40.7	89	56.4	23	28.1	13	20.5
Ross	39	103.7	22	48.5	61	71.6	8	17.2	7	21.9
Sandusky	24	75.6	15	37.6	39	54.0	11	28.3	6	22.5
Scioto	44	111.9	27	53.4	71	78.5	10	20.2	6	17.2
Seneca	21	73.8	13	34.8	34	51.5	9	22.8	5	21.0
Shelby	13	59.4	10	32.7	23	44.5	6	20.3	5	25.4
Stark	153	73.8	114	41.6	267	55.4	65	23.6	44	22.4
Summit	208	76.7	162	44.5	369	57.7	89	24.6	69	28.0
Trumbull	90	72.1	74	45.7	164	56.8	36	22.0	25	21.3
Tuscarawas	35	68.7	23	35.5	58	50.3	9	14.0	8	16.8
Union	15	83.5	11	51.7	26	66.4	5	20.2	2	17.7
Van Wert	10	62.9	10	50.8	19	55.3	4	23.3	3	18.8
Vinton	8	112.1	4	52.2	11	78.7	1	13.6	1	27.7
Warren	53	66.7	43	44.0	96	53.4	24	23.5	12	18.1
Washington	31	82.9	20	44.7	51	61.6	10	23.3	6	17.3
Wayne	38	65.8	25	35.9	63	48.8	16	22.1	13	26.1
Williams	16	77.0	10	39.3	26	55.8	5	17.6	5	24.5
Wood	37	67.6	27	39.1	64	50.9	14	18.9	9	18.7
Wyandot	9	72.9	7	41.2	16	55.9	3	19.4	2	15.1

¹ Source: Chronic Disease and Behavioral Epidemiology Section and the Office of Vital Statistics Program, Ohio Department of Health, 2013.

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

Trends in Ohio Cancer Mortality Rates⁷

1996-2010

Trend analyses of age-adjusted mortality rates in Ohio show that white and African American mortality rates for all cancers combined have been declining since 1996 (Figure 4). Between 1996 and 2010, the overall cancer mortality rate dropped 17%. The sharpest reduction (30%) in the 15-year time period was observed among African American males. Cancer mortality rates declined more in males (19%) than females (16%) for all races combined. African American males had the highest cancer mortality rate in 2010 (290.5 per 100,000). Note: Data for non-white, non-African American populations are not presented because numbers are too small for meaningful trend analyses.

Figure 5 displays racial differences in female breast cancer mortality rates from 1996 to 2010. White Ohio females experienced a 28% decrease in breast cancer mortality rates, from a rate of 32.4 per 100,000 in 1996 down to a rate of 23.4 per 100,000 in 2010. Over the same 15-year time period, the breast cancer mortality rate for African American Ohio females decreased 33%, from 43.2 per 100,000 in 1996 to 28.9 per 100,000 in 2010.

Figure 6 displays cervical cancer mortality trends in Ohio. From 1996 to 2010, the cervical cancer mortality rate in Ohio declined 29%; the rate declined 54% among African American females (from 5.2 per 100,000 to 2.4 per 100,000) and 25% in white females (from 3.2 per 100,000 to 2.4 per 100,000) during the time period.

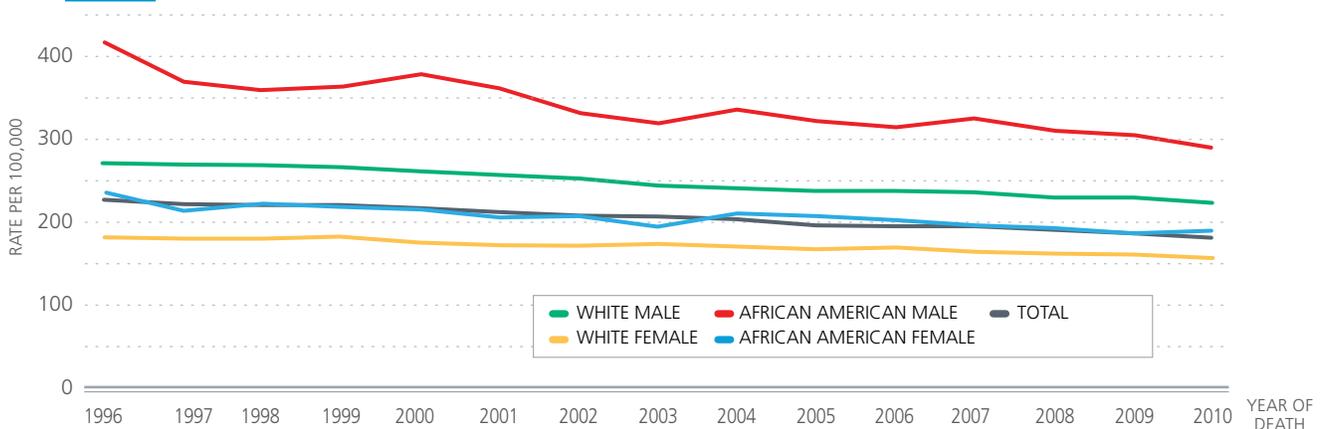
Colon and rectum cancer mortality rates in Ohio declined from 1996 to 2010 for all gender and race groups. In 2010, African Americans had a higher colon and rectum cancer mortality rate (23.5 per 100,000) compared to whites (17.7 per 100,000), and males of all races combined had a higher rate (21.9 per 100,000) compared to females (15.1 per 100,000). African American males in Ohio had the highest colon and rectum cancer mortality rate in 2010 (30.4 per 100,000) of all gender/race groups (Figure 7).

The lung and bronchus cancer mortality rate for all races and genders combined in Ohio declined 15% from 1996 to 2010. African American males had the highest rate of lung and bronchus cancer deaths, with a mortality rate 30% higher than that of white males in 2010 (90.7 per 100,000 and 69.8 per 100,000, respectively) (Figure 8).

Figure 9 displays a 43% overall decline in the prostate cancer mortality rate in Ohio from 1996 (38.0 per 100,000) to 2010 (21.5 per 100,000). The decline was similar among white males (44%) compared to African American males (40%) during the time period. African Americans are shown to have considerably higher rates of prostate cancer compared to whites; in 2010, the prostate cancer mortality rate for African American males (47.6 per 100,000) was more than two times that of white males (19.5 per 100,000).

Mortality from melanoma of the skin was relatively stable from 1996 to 2008 and increased slightly in 2009-2010 (Figure 10). The African American melanoma of the skin mortality rate in 2010 (0.4 per 100,000) was 89% lower than the melanoma of the skin mortality rate for whites (3.5 per 100,000). The melanoma of the skin mortality rate for white males (5.2 per 100,000) was more than two times the mortality rate for white females (2.3 per 100,000) in 2010.

FIGURE 4 Trends in Age-adjusted Mortality Rates for All Cancer Sites/Types Combined by Gender and Race in Ohio, 1996-2010^{1,2}



¹ Source: Chronic Disease and Behavioral Epidemiology Section and the Office of Vital Statistics, Ohio Department of Health, 2013.

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

FIGURE 5

Trends in Age-adjusted Mortality Rates for Cancer of the Female Breast by Race in Ohio, 1996-2010^{1,2}

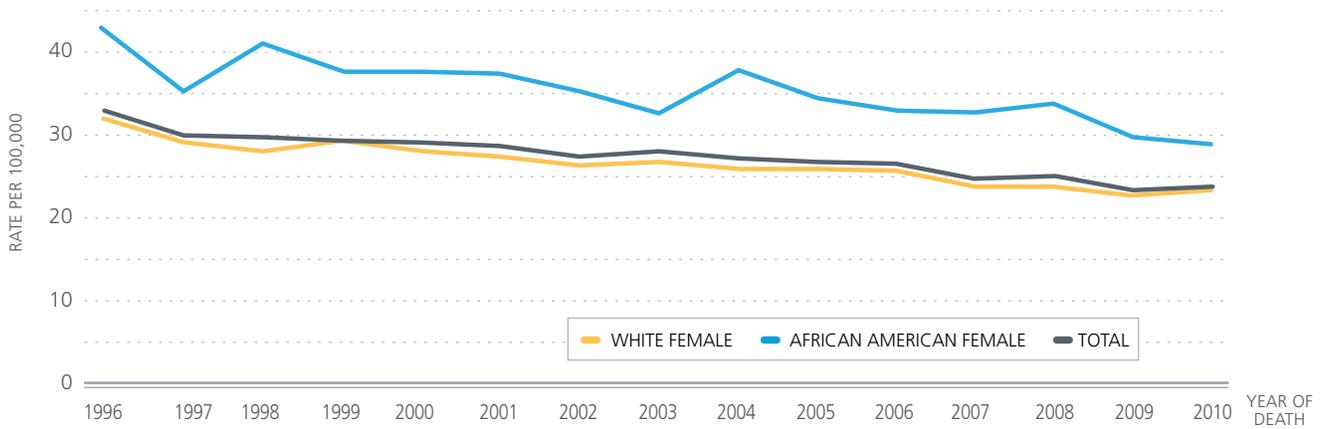


FIGURE 6

Trends in Age-adjusted Mortality Rates for Cancer of the Cervix by Race in Ohio, 1996-2010^{1,2}

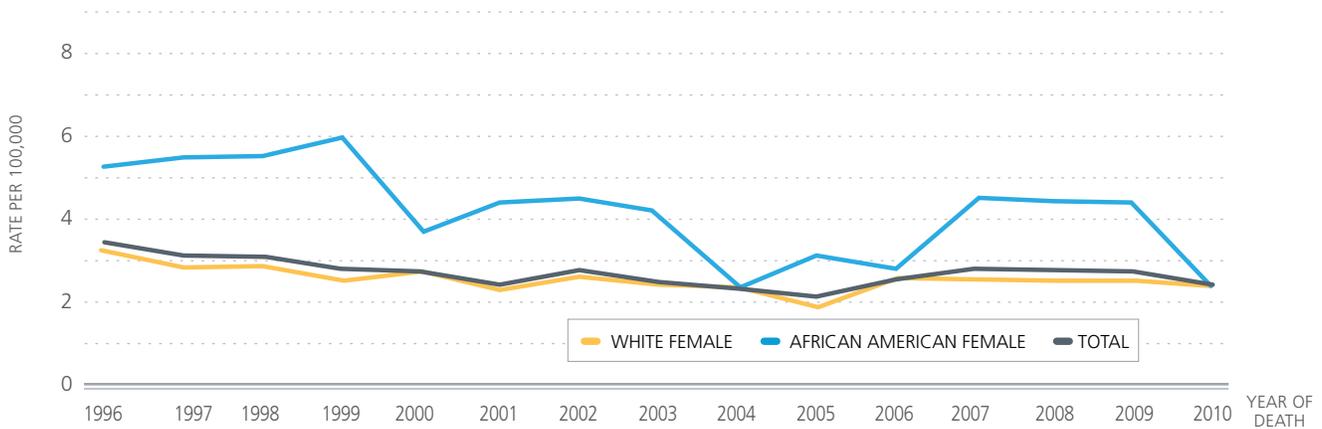
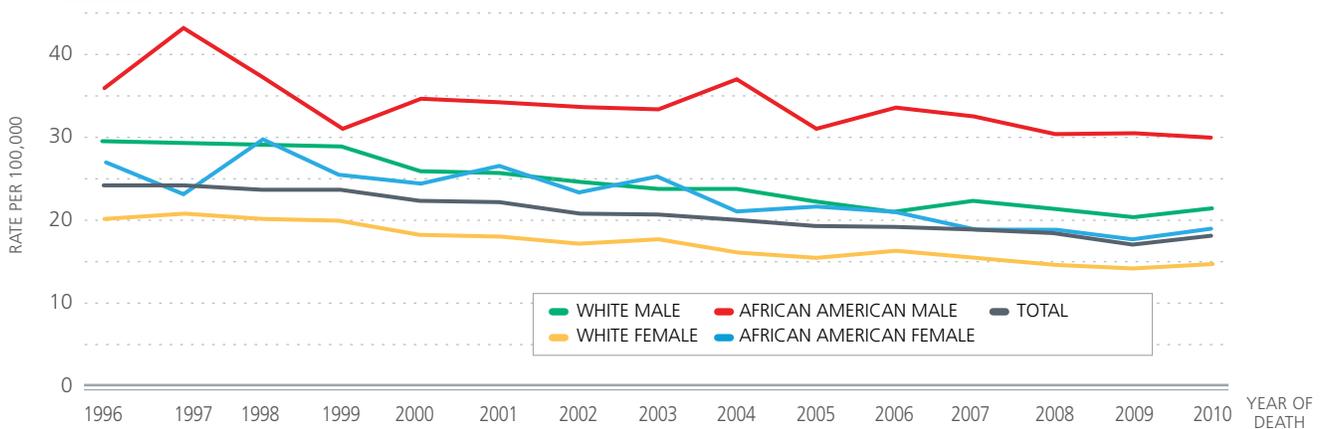


FIGURE 7

Trends in Age-adjusted Mortality Rates for Cancer of the Colon & Rectum by Gender and Race in Ohio, 1996-2010^{1,2}



FOOTNOTES FOR FIGURES 5-7

¹ Source: Chronic Disease and Behavioral Epidemiology Section and the Office of Vital Statistics, Ohio Department of Health, 2013.

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

FIGURE 8

Trends in Age-adjusted Mortality Rates for Cancer of the Lung & Bronchus by Gender and Race in Ohio, 1996-2010^{1,2}

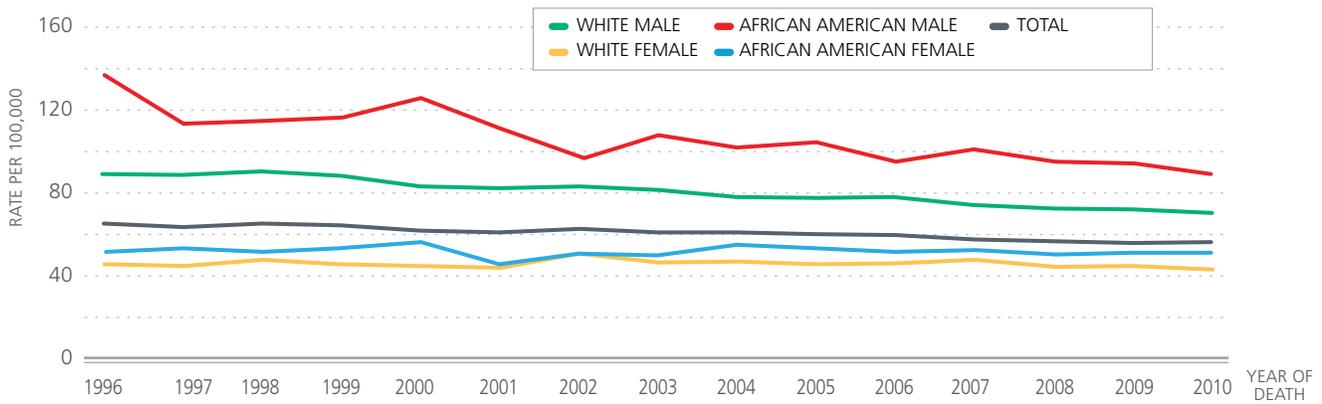


FIGURE 9

Trends in Age-adjusted Mortality Rates for Cancer of the Prostate by Race in Ohio, 1996-2010^{1,2}

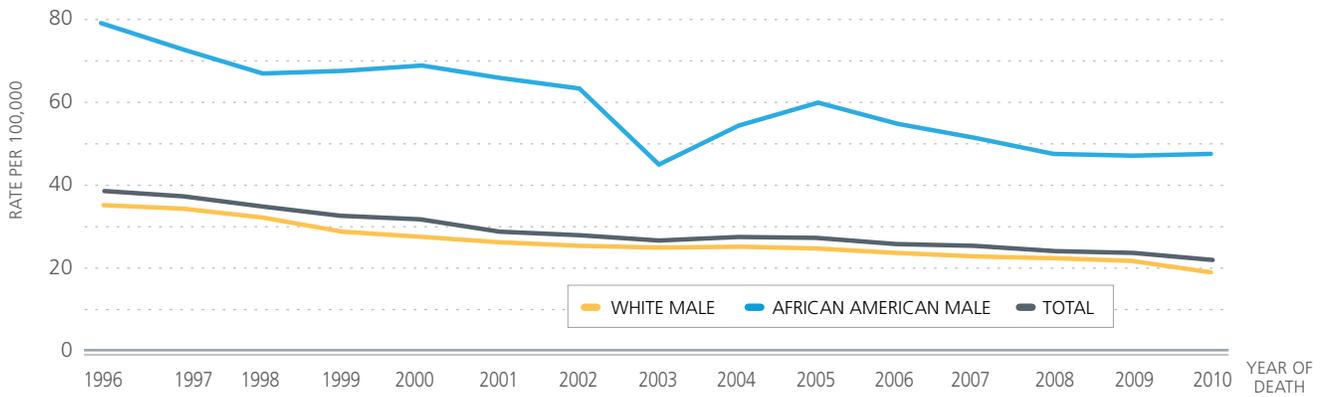
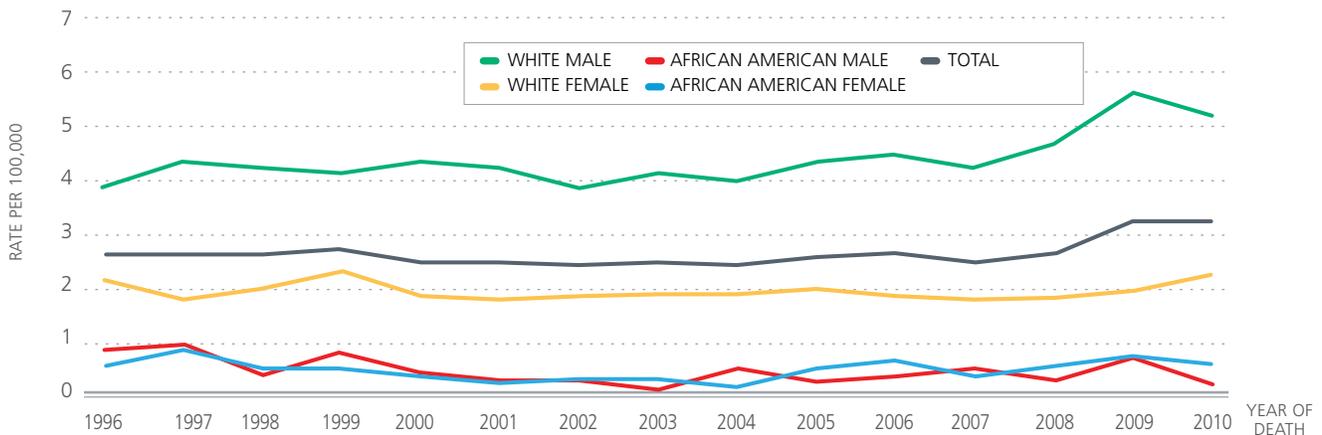


FIGURE 10

Trends in Age-adjusted Mortality Rates for Melanoma of the Skin by Gender and Race in Ohio, 1996-2010^{1,2}



FOOTNOTES FOR FIGURES 8-10

¹ Source: Chronic Disease and Behavioral Epidemiology Section and the Office of Vital Statistics, Ohio Department of Health, 2013.

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

Cancer Health Disparities in Specific Populations

Cancer Health Disparities

The NCI defines cancer health disparities as adverse differences in cancer incidence, cancer prevalence, cancer mortality, cancer survivorship and burden of cancer, and related adverse health conditions that exist among specific population groups in the US.⁸ These population groups are often defined by demographics such as race/ethnicity, gender, 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.



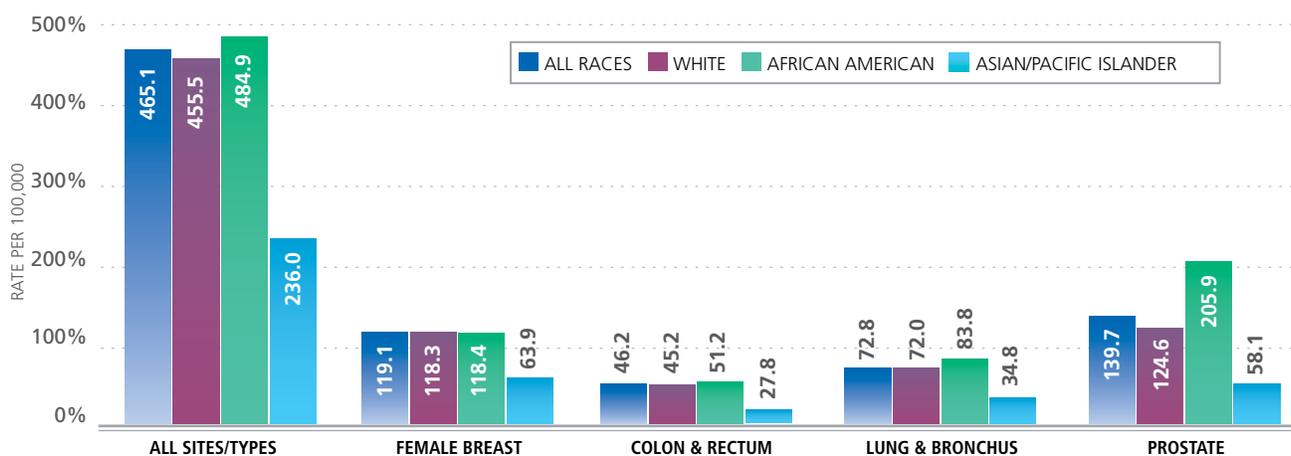
Disparities in Cancer Incidence Rates by Race

US Census 2011 population estimates indicate that Ohio's population is approximately 83.6% White, 12.4% Black, 1.7% Asian and 0.3% American Indian and Alaska Native.⁹

Figure 11 displays differences between 2006-2010 average annual age-adjusted cancer incidence rates by gender and race for the leading sites/types of cancer in Ohio. The African American average annual incidence rate (484.9 per 100,000) was 6.5% higher than whites (455.5 per 100,000) for all sites/types combined.⁴ African Americans also had higher incidence rates compared to whites for the following cancers: cervix; colon and rectum; kidney and renal pelvis; larynx; liver and intrahepatic bile duct; lung and bronchus; multiple myeloma; pancreas; prostate; and stomach.⁴ Among African Americans, the incidence rates for multiple myeloma and for cancers of the liver and intrahepatic bile duct were more than double the rates for whites (Table 6).⁴

Both male and female Asian/Pacific Islanders in Ohio had lower incidence rates than other races for most cancer sites/types.⁴ However, this population had a higher incidence of liver and intrahepatic bile duct cancer (11.4 per 100,000) and stomach cancer (11.4 per 100,000) compared to both whites and African Americans (Table 6).⁴

FIGURE 11 Average Annual Age-adjusted Incidence Rates for Selected Cancer Sites/Types by Race in Ohio, 2006-2010^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2013.

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

Disparities in Cancer Mortality Rates by Race

In 2006-2010, African Americans had the highest mortality rates of any racial group in the US for all sites/types of cancer (210.3 per 100,000), with African American males and females having 29.8% higher and 14.3% higher cancer mortality rates compared to white males and females, respectively.³

In Ohio, African American men are 65% more likely to be diagnosed with prostate cancer than white men and are often diagnosed at a more advanced stage.⁴

In 2006-2010, Asian/Pacific Islanders had the lowest mortality rates of any racial group in the US for all sites/types of cancer (108.8 per 100,000), with Asian/Pacific Islander males and females having 37.9% lower and 38.5% lower cancer mortality rates compared to white males and females, respectively.³

Table 7 presents the Ohio average annual number of deaths and age-adjusted mortality rates by cancer site/type, gender, and race. For the years 2006-2010, the mortality rate among African Americans in Ohio for all cancer sites/types combined (234.3 per 100,000) was 24% higher compared to whites (189.0 per 100,000).⁷ In 2006-2010, the greatest disparities in mortality between African Americans and whites in Ohio were observed for multiple myeloma, prostate, and stomach cancer with African Americans having two or more times the rate of mortality for these cancer sites/types.⁷ African Americans also had higher rates of cancer mortality compared to whites for the following cancers: cervix; colon and rectum; female breast; larynx; liver and intrahepatic bile duct; lung and bron-

TABLE
6

Average Annual Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates by Gender and Race in Ohio, 2006-2010^{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	30,618	534.3	29,386	418.5	60,004	465.1	26,546	515.5	25,855	415.8	52,400	455.5
Brain & Other CNS**	457	8.0	401	6.0	858	7.0	420	8.3	365	6.3	785	7.3
Breast	72	1.3	8,268	119.1	8,340	64.9	60	1.2	7,266	118.3	7,326	64.0
Cervix	*	*	467	7.6	*	*	*	*	387	7.3	*	*
Colon & Rectum	3,009	53.5	2,983	40.5	5,992	46.2	2,643	52.2	2,611	39.6	5,254	45.2
Esophagus	564	9.7	146	2.0	710	5.4	519	9.9	121	1.8	640	5.4
Hodgkin's Lymphoma	180	3.2	152	2.6	332	2.9	159	3.3	129	2.5	288	2.9
Kidney & Renal Pelvis	1,215	20.8	815	11.6	2,029	15.7	1,074	20.5	719	11.6	1,793	15.6
Larynx	438	7.3	124	1.8	562	4.3	387	7.2	106	1.7	493	4.2
Leukemia	786	14.2	617	8.8	1,403	11.1	707	14.3	544	8.8	1,252	11.2
Liver & Intrahepatic Bile Duct	510	8.5	202	2.8	713	5.4	396	7.4	163	2.5	560	4.8
Lung & Bronchus	5,129	90.5	4,307	59.8	9,435	72.8	4,553	89.0	3,808	59.4	8,361	72.0
Melanoma of the Skin	1,303	22.8	1,091	16.9	2,394	19.1	1,217	23.7	987	17.5	2,204	19.9
Multiple Myeloma	378	6.6	319	4.4	697	5.4	301	5.9	252	3.8	553	4.7
Non-Hodgkin's Lymphoma	1,282	22.6	1,123	15.8	2,405	18.8	1,156	22.8	1,012	16.0	2,168	19.0
Oral Cavity & Pharynx	907	15.0	416	5.9	1,323	10.1	815	15.0	367	5.9	1,181	10.2
Ovary	*	*	840	12.0	*	*	*	*	755	12.2	*	*
Pancreas	778	13.6	787	10.6	1,564	12.0	677	13.2	682	10.2	1,359	11.6
Prostate	8,224	139.7	*	*	*	*	6,630	124.6	*	*	*	*
Stomach	478	8.5	291	4.0	769	5.9	403	8.0	224	3.4	627	5.4
Testis	281	5.2	*	*	*	*	263	5.6	*	*	*	*
Thyroid	318	5.5	1,041	17.0	1,359	11.3	287	5.6	915	17.3	1,202	11.5
Urinary Bladder	2,100	38.2	705	9.5	2,806	21.6	1,920	38.5	633	9.5	2,554	21.8
Uterine Corpus & Uterine NOS***	*	*	1,944	27.4	*	*	*	*	1,755	28.0	*	*

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2013.

² Average annual rate per 100,000, age-adjusted to the 2000 US 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 2006-2010 is less than five (i.e., the average annual count is less than one).

chus; oral cavity and pharynx; pancreas; thyroid; and uterine corpus and uterine NOS.⁷ Both male and female Asian/Pacific Islanders in Ohio had mortality rates lower than or equal to other races for the cancer sites/types examined (Table 7).⁷

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 gene, 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 African American men and the incidence of more aggressive forms of breast cancer in African American women.¹ However, genetic differences are thought to make only a minor contribution to the disparate cancer burden between specific population groups.

POVERTY

Poverty is related to employment, disability status, educational attainment, type of household (e.g., female-headed household with children less than 18), age, gender, race, geography, and other factors. Poverty is also associated with the underlying 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 15.0% in 2011 with an estimated 46.2 million people in poverty.¹⁰ An estimated 1,846,000 people in Ohio, or 16.4% of the population, were poor in 2010-2011 according to the 2011 American Community Survey.¹¹ In 2010-2011 in Ohio, 34.9% of African Americans, 11.7% of Asian/Pacific Islanders, and 12.9% of whites were considered poor by federal standards.¹¹ Also, 30.0% of Ohio's Hispanic/Latino community was considered poor. The nine poorest counties in Ohio in 2011 were all located in the 32-county Appalachian region of the state. According to the 2007-2011 American Community

TABLE
6
cont.

Average Annual Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates by Gender and Race in Ohio, 2006-2010^{1,2,3}

Primary Cancer Site/Type	African American						Asian/Pacific Islander					
	MALE		FEMALE		TOTAL		MALE		FEMALE		TOTAL	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
All Sites/Types	3,028	603.0	2,879	408.9	5,907	484.9	141	229.5	177	219.3	318	236.0
Brain & Other CNS**	28	5.0	29	4.0	57	4.4	3	4.2	3	2.6	6	5.0
Breast	9	1.9	840	118.4	849	68.5	<1	****	56	63.9	57	40.0
Cervix	*	*	62	8.8	*	*	*	*	6	6.1	*	*
Colon & Rectum	302	62.7	307	43.9	610	51.2	15	24.2	15	22.1	31	27.8
Esophagus	37	7.5	22	3.1	59	4.9	2	3.3	1	1.5	3	3.6
Hodgkin's Lymphoma	15	2.4	18	2.5	33	2.4	1	1.0	2	1.7	3	2.5
Kidney & Renal Pelvis	123	23.0	88	12.4	212	16.9	5	7.9	2	2.4	7	7.2
Larynx	47	9.0	18	2.5	65	5.1	1	1.2	0	****	1	1.2
Leukemia	60	11.6	59	8.3	119	9.6	6	8.1	4	4.2	10	8.0
Liver & Intrahepatic Bile Duct	98	17.1	34	4.6	132	10.0	9	13.5	3	4.5	12	11.4
Lung & Bronchus	532	111.0	461	66.2	993	83.8	15	27.9	19	29.7	34	34.8
Melanoma of the Skin	6	1.3	7	1.0	13	1.1	1	1.5	1	1.0	2	2.2
Multiple Myeloma	69	14.3	64	9.2	132	11.1	3	5.1	1	1.4	4	4.7
Non-Hodgkin's Lymphoma	93	16.9	81	11.4	175	13.8	6	9.4	5	7.9	12	11.7
Oral Cavity & Pharynx	78	14.2	40	5.7	118	9.3	3	4.5	2	3.0	6	5.5
Ovary	*	*	67	9.4	*	*	*	*	6	7.2	*	*
Pancreas	89	18.0	93	13.6	182	15.5	4	5.8	5	7.0	8	9.0
Prostate	1,046	205.9	*	*	*	*	33	58.1	*	*	*	*
Stomach	62	13.5	56	8.2	118	10.2	7	10.1	5	6.8	11	11.4
Testis	9	1.3	*	*	*	*	3	2.4	*	*	*	*
Thyroid	20	3.6	85	11.9	105	8.1	3	3.0	15	14.5	18	11.5
Urinary Bladder	101	22.4	49	7.1	150	13.1	8	14.8	2	2.6	9	10.7
Uterine Corpus & Uterine NOS****	*	*	155	21.9	*	*	*	*	12	13.3	*	*

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2013.

² Average annual rate per 100,000, age-adjusted to the 2000 US 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 2006-2010 is less than five (i.e., the average annual count is less than one).

Survey, Appalachia Ohio had a 16.7% poverty rate compared to an area average of 14.3% for counties in the remainder of the state.¹¹

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 2010-2011 data, 14% of Ohioans were uninsured, a slight increase from previous years.¹² Among Ohio's non-elderly population in 2010-2011, Hispanics represented the largest racial/ethnic group without health insurance (29%), followed by African Americans (21%).¹²

President Obama signed the Patient Protection and Affordable Care Act (PPACA) and amendments to the PPACA that fall under the Health Care and Education Reconciliation Act of 2010 into law. This legislation has the potential to address cancer health disparities by (1) improving the affordability of coverage by increasing insurance subsidies and eliminating arbitrary annual and lifetime caps on coverage for all insurance plans so that families affected by cancer will face fewer financial barriers to care; (2) focusing on prevention and early detection by requiring all new insurance plans to provide coverage for essential, evidence-based preventive measures with no additional copays; (3) eliminating discrimination based on health status and preexisting conditions, which has been so detrimental to cancer patients over the years; and (4) requiring qualified health plans to provide materials in appropriate languages.¹

TABLE
7

Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by Gender and Race in Ohio, 2006-2010^{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	12,995	235.9	12,026	162.1	25,021	191.9	11,529	231.5	10,637	160.1	22,166	189.0
Brain & Other CNS**	314	5.4	257	3.7	571	4.5	295	5.7	241	3.9	535	4.7
Breast	17	0.3	1,812	24.7	1,829	14.0	15	0.3	1,576	24.0	1,591	13.5
Cervix	*	*	175	2.7	*	*	*	*	148	2.6	*	*
Colon & Rectum	1,185	21.7	1,170	15.1	2,355	17.9	1,038	21.0	1,038	14.9	2,076	17.5
Esophagus	534	9.3	139	1.8	673	5.1	495	9.6	119	1.8	614	5.2
Hodgkin's Lymphoma	29	0.5	24	0.3	54	0.4	26	0.5	22	0.4	49	0.4
Kidney & Renal Pelvis	350	6.3	226	3.0	576	4.4	318	6.3	204	3.0	522	4.4
Larynx	147	2.5	37	0.5	184	1.4	127	2.4	31	0.5	157	1.3
Leukemia	528	9.8	426	5.7	954	7.4	484	10.0	384	5.7	867	7.5
Liver & Intrahepatic Bile Duct	429	7.3	217	2.9	647	4.9	351	6.7	184	2.7	536	4.5
Lung & Bronchus	4,183	74.8	3,223	44.2	7,406	57.1	3,719	73.5	2,864	44.0	6,582	56.5
Melanoma of the Skin	243	4.4	130	1.8	373	2.9	241	4.8	125	2.0	366	3.2
Multiple Myeloma	243	4.5	224	3.0	467	3.6	204	4.2	186	2.7	390	3.3
Non-Hodgkin's Lymphoma	494	9.1	425	5.6	919	7.1	458	9.4	395	5.7	853	7.3
Oral Cavity & Pharynx	234	4.0	113	1.5	347	2.6	204	3.8	99	1.5	303	2.5
Ovary	*	*	595	8.1	*	*	*	*	548	8.4	*	*
Pancreas	737	13.1	758	10.1	1,495	11.4	649	12.8	664	9.8	1,313	11.1
Prostate	1,189	23.6	*	*	*	*	992	21.6	*	*	*	*
Stomach	244	4.5	169	2.2	413	3.2	200	4.1	133	2.0	333	2.9
Testis	12	0.2	*	*	*	*	12	0.2	*	*	*	*
Thyroid	33	0.6	35	0.5	68	0.5	29	0.6	31	0.5	60	0.5
Urinary Bladder	470	9.0	198	2.5	668	5.1	438	9.2	177	2.5	614	5.1
Uterine Corpus & Uterine NOS***	*	*	359	4.8	*	*	*	*	302	4.5	*	*

¹ Source: Chronic Disease and Behavioral Epidemiology Section and the Office of Vital Statistics, Ohio Department of Health, 2013.

² Average annual rate per 100,000, age-adjusted to the 2000 US 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 2006-2010 is less than five (i.e., the average annual count is less than one).

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 childbearing is encouraged often have lower risk of breast cancer due to early childbearing.¹ Similarly, individuals who don't 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

Summary of Cancer Health Disparities

Given the interconnectedness of genetics, race/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

In the US, Asian American women are the first race/gender population to experience cancer as the leading cause of death.¹

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
7
cont.

Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by Gender and Race in Ohio, 2006-2010^{1,2,3}

Primary Cancer Site/Type	African American						Asian/Pacific Islander					
	MALE		FEMALE		TOTAL		MALE		FEMALE		TOTAL	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
All Sites/Types	1,405	307.6	1,324	190.6	2,729	234.3	51	99.6	58	85.3	109	90.6
Brain & Other CNS**	18	3.6	13	1.9	31	2.6	2	3.3	2	1.9	4	2.6
Breast	2	0.4	225	31.9	227	18.8	0	****	10	12.6	10	6.9
Cervix	*	*	26	3.6	*	*	*	*	2	1.9	*	*
Colon & Rectum	142	31.3	128	18.5	269	23.5	5	8.2	4	6.2	9	7.0
Esophagus	37	7.9	19	2.7	56	4.7	2	3.7	<1	****	3	2.1
Hodgkin's Lymphoma	3	0.6	2	0.3	5	0.4	0	****	0	****	0	****
Kidney & Renal Pelvis	29	6.2	22	3.2	50	4.4	3	4.1	<1	****	3	2.3
Larynx	19	4.0	6	0.9	26	2.1	<1	****	0	****	<1	****
Leukemia	41	8.8	40	5.9	82	7.0	3	5.5	2	1.8	5	3.3
Liver & Intrahepatic Bile Duct	73	13.5	30	4.3	104	8.2	4	8.9	3	4.0	7	6.0
Lung & Bronchus	448	96.2	344	49.7	792	67.8	12	25.2	12	19.5	24	21.7
Melanoma of the Skin	2	0.4	4	0.6	6	0.5	<1	****	<1	****	<1	****
Multiple Myeloma	38	8.6	38	5.5	76	6.6	1	2.3	<1	****	2	1.3
Non-Hodgkin's Lymphoma	34	6.9	28	4.0	62	5.2	2	3.2	2	4.1	4	3.9
Oral Cavity & Pharynx	29	5.7	13	1.8	42	3.4	1	1.4	<1	****	1	1.2
Ovary	*	*	44	6.4	*	*	*	*	2	3.1	*	*
Pancreas	85	17.8	89	13.0	174	15.1	3	4.7	4	6.7	7	5.9
Prostate	194	50.2	*	*	*	*	2	5.2	*	*	*	*
Stomach	41	9.1	32	4.7	73	6.4	3	4.9	4	6.0	6	5.5
Testis	1	0.1	*	*	*	*	0	****	*	*	*	*
Thyroid	4	0.8	4	0.6	8	0.6	<1	****	<1	****	<1	****
Urinary Bladder	31	7.5	20	3.0	52	4.7	1	2.9	<1	****	2	2.0
Uterine Corpus & Uterine NOS***	*	*	54	7.9	*	*	*	*	2	3.1	*	*

¹ Source: Chronic Disease and Behavioral Epidemiology Section and the Office of Vital Statistics, Ohio Department of Health, 2013.

² Average annual rate per 100,000, age-adjusted to the 2000 US 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 2006-2010 is less than five (i.e., the average annual count is less than one).

What are Clinical Trials?¹³

Clinical trials are research studies that try to answer specific questions about new and better ways to help prevent, diagnose, or treat diseases. Some study new anticancer drugs that have been tested in the laboratory, while others look at new ways to use current drugs or other forms of treatment. Most of today's treatments for cancer are based on the results of earlier clinical trials.

Why Should People Participate?

People choose to enter clinical trials for different reasons. Clinical trials have both benefits and risks; they are not the right option for everyone.

POSSIBLE BENEFITS:

- Participants will receive, at a minimum, the best standard treatment.
- If the new treatment or intervention is proven to work, participants may be among the first to benefit.
- Participants have a chance to help others and improve cancer care.
- Some study sponsors may pay for part or all of participant medical care and expenses during the study.

POSSIBLE RISKS:

- New approaches may have side effects or risks that are unknown.
- Even if a new treatment under study has benefits, it may not work for every participant.
- Participants may have to pay for the costs of travel, childcare, lost work hours, and meals.

The ultimate purpose of a clinical trial is to answer a medical question. People who take part in clinical trials are research participants and may be required to do certain things or have certain tests done to stay in the study. Despite the possible risks, participants in clinical trials receive excellent, compassionate care. In fact, most people enrolled in clinical trials appreciate the extra attention they receive from their health care team.

Today, many safeguards are in place for people who join cancer trials to help ensure that they are run in an ethical manner. Participant rights and safety are protected through informed consent and required approvals by a scientific review panel and an institutional review board.



Where to Find Clinical Trials

At this time there is no single place to get information on all of the government and privately sponsored clinical trials now enrolling patients. However, there are several resources you should be aware of:

- The ACS's web site at www.cancer.org/clinicaltrials provides a matching service through the Coalition of Cancer Cooperative Groups (CCCG), which matches cancer patients to appropriate clinical trials by answering a few questions. The ACS's web site can also locate the closest NCI-designated center where many clinical trials are conducted.
- The NCI sponsors the majority of government-funded cancer clinical trials. The NCI maintains a database of active studies (those enrolling patients), as well as some privately funded studies. A list of current clinical trials can be obtained by calling the NCI's Cancer Information Service toll free at 1-800-4-CANCER (1-800-422-6237) or visiting the NCI Web site at www.cancer.gov/clinicaltrials.
- Cancer Trials Support Unit (CTSU) makes clinical trials available to doctors and patients in the US and Canada. CTSU members can enroll patients in clinical trials through the program's web site, which is located at www.ctsu.org. General information about the CTSU is also available on the program's Web site, or by calling 1-888-823-5923.
- The National Institutes of Health (NIH) maintains a large database of clinical trials at www.clinicaltrials.gov, but not all of these trials are cancer-specific.
- The CCCG provides a list of cancer studies being conducted at member institutions on their web site at www.cancertrialshelp.org.
- The Community Clinical Oncology Program (CCOP) is a large network that enables patients and physicians to participate in clinical trials sponsored by the NCI. Detailed information on the CCOP can be found at <http://ccop.cancer.gov/>.
- Major cancer centers (and some community hospitals and doctor's offices) usually offer lists on their web sites of the clinical trials being conducted there. Major cancer centers in Ohio offering clinical trials include the following:

The Ohio State University Comprehensive Cancer Center – Arthur G. James Cancer Hospital and Richard J. Solove Research Institute: cancer.osu.edu/patientsandvisitors/cancerinfo/clinical_trials

The Cleveland Clinic: my.clevelandclinic.org/cancer/clinical-trials-research

Case Western Reserve University Comprehensive Cancer Center: cancer.case.edu/sharedresources/clinicaltrials/

University of Cincinnati Cancer Institute: uccancer.com/research/ClinicalResearch/CurrentTrials.aspx

Toledo Community Oncology Program: tchop.com/clinical-trials

Dayton Clinical Oncology Program: med.wright.edu/dcop/ClinicalTrials.htm

Columbus Community Clinical Oncology Program: columbusccop.org

- Private companies, such as pharmaceutical or biotechnology firms, may list the studies they are sponsoring on their web sites. This can be helpful if you are interested in research on a particular experimental treatment and know the company developing it.

Breast Cancer



New Cases

An estimated 232,340 new cases of invasive breast cancer are expected to occur among women in the US during 2013.¹ It is the most frequently diagnosed cancer in women.¹ In addition to the number of female breast cancers, about 2,240 new cases of invasive breast cancer are expected to occur among males in 2013.¹ There was a decrease in the breast cancer incidence rate of about 7% from 2002-2003 which may be due to the reduction in the use of menopausal hormone therapy.¹ However, from 2005-2009 breast cancer incidence rates stabilized in the US.¹

In addition to invasive breast cancer, 64,640 new cases of *in situ* breast cancer are expected to occur nationally among women during 2013.¹ Of these, approximately 85% will be DCIS, that is ductal carcinoma *in situ* (noninvasive cancer cells in the milk ducts).¹ From 2005-2009, *in situ* breast cancer incidence rates have increased 2.8% per year.¹

Breast cancer is the most common reportable cancer among women in Ohio, regardless of race, accounting for 28% of all cancers diagnosed in women.⁴ An average of 8,268 new cases of female breast cancer were diagnosed annually between 2006 and 2010 in Ohio with a corresponding rate of 119.1 per 100,000 compared to the US rate of 123.8 per 100,000; although, the lower rate in Ohio may be due to incomplete reporting of female breast cancer in Ohio (Table 2).^{3,4}

The risk of developing breast cancer increases with age. In Ohio from 2006 to 2010, approximately 96% of women who developed breast cancer were 40 and older.⁴

RISK FACTORS AND POPULATIONS WITH HIGH RATES

Although a specific cause is unknown, several risk factors may contribute to the development of breast cancer.

NON-MODIFIABLE RISK FACTORS

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

Age: Nationally 95% of breast cancers occur in women 40 and older.

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

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

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

Mammographic breast density: Women with high breast tissue density (a mammographic measure of the amount of glandular tissue relative to fatty tissue in the breast) may have increased risk.

Certain breast changes found on biopsy: Some changes observed under a microscope are associated with an increased risk of breast cancer. These include atypical hyperplasia (a noncancerous condition in which cells have abnormal features and are increased in number), LCIS (lobular carcinoma *in situ*, abnormal cells are found in the lobules of the breast), and DCIS (abnormal cells found in the lining of breast ducts).

Family history: Risk is higher if a first-degree relative has had breast cancer, especially if the family member was diagnosed before 50. Having other relatives with breast cancer may also increase risk.

Personal history: Women with cancer in one breast, high breast tissue density, or biopsy-confirmed hyperplasia (abnormal cell proliferation) have increased risk.

Previous breast/chest radiation: Women who as children or young adults had radiation therapy to the chest area as treatment for another cancer (such as Hodgkin's lymphoma or non-Hodgkin's lymphoma) or other medical condition have increased risk.

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

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

POTENTIALLY MODIFIABLE RISK FACTORS

Reproductive history: Women who have had no children or who had their first child after 30 have higher 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 5 years have an increased risk of developing breast cancer.

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

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

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

Physical inactivity: Women who are physically inactive throughout life may have an increased risk of breast cancer.

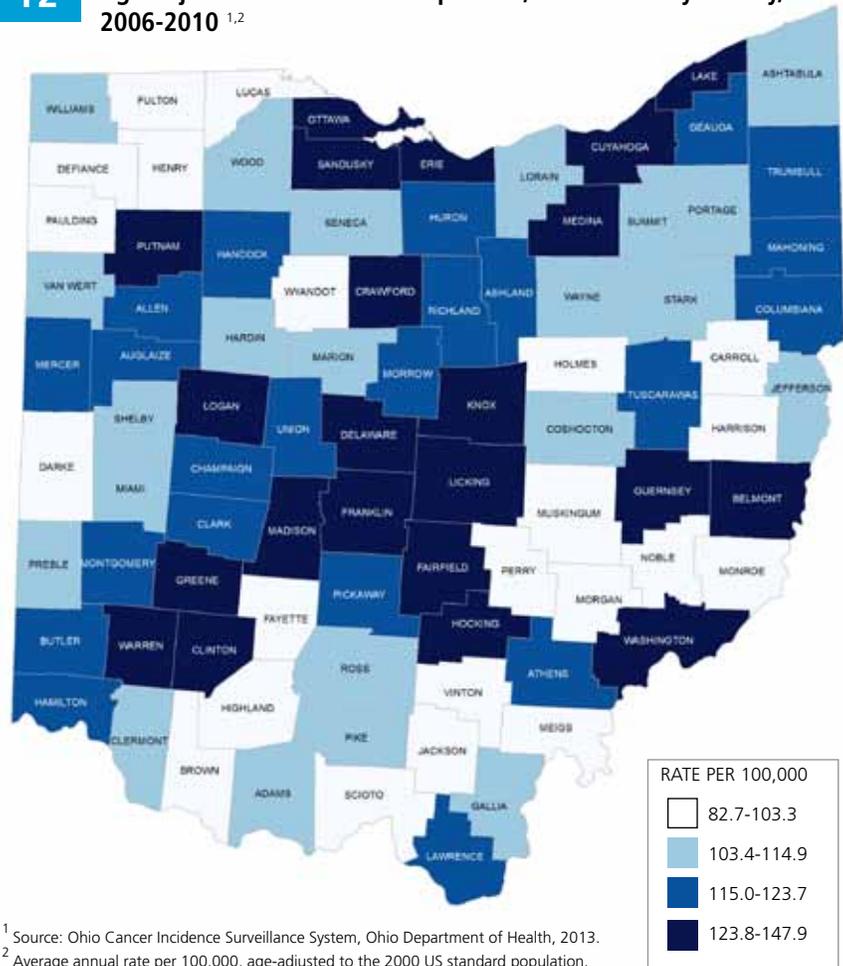
About 72 men were diagnosed with breast cancer each year in Ohio from 2006 to 2010 with a corresponding rate of 1.3 per 100,000, which is similar to the US rate of 1.2 per 100,000 (Table 2).^{3,4} Clinically, breast cancer in men is very similar to breast cancer in women, but the prognosis is often poorer for men because they tend to be diagnosed at a later stage than women.¹⁴ Average annual age-adjusted incidence rates of breast cancer by Ohio county of residence are shown in Figure 12.

Deaths

An estimated 40,030 deaths (39,620 women, 410 men) are anticipated from breast cancer in 2013 nationally.¹ Breast cancer ranks second in cancer deaths among women after lung and bronchus.¹ Mortality rates have steadily declined in women since 1989, with the largest decrease in younger women.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 2006-2010, 98% of breast cancer deaths occurred in women 40 and older.⁷ The 2006-2010 average annual mortality rate for breast cancer in Ohio females was 24.7 per 100,000.⁷ This represents 1,812 average annual deaths in Ohio from female breast cancer over the time period (Table 3).⁷

FIGURE 12

Cancer of the Female Breast: Quartiles of Average Annual Age-adjusted Incidence Rates per 100,000 in Ohio by County, 2006-2010^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2013.

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

EARLY DETECTION

Numerous studies have shown that early detection saves lives and increases treatment options. 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.¹ 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

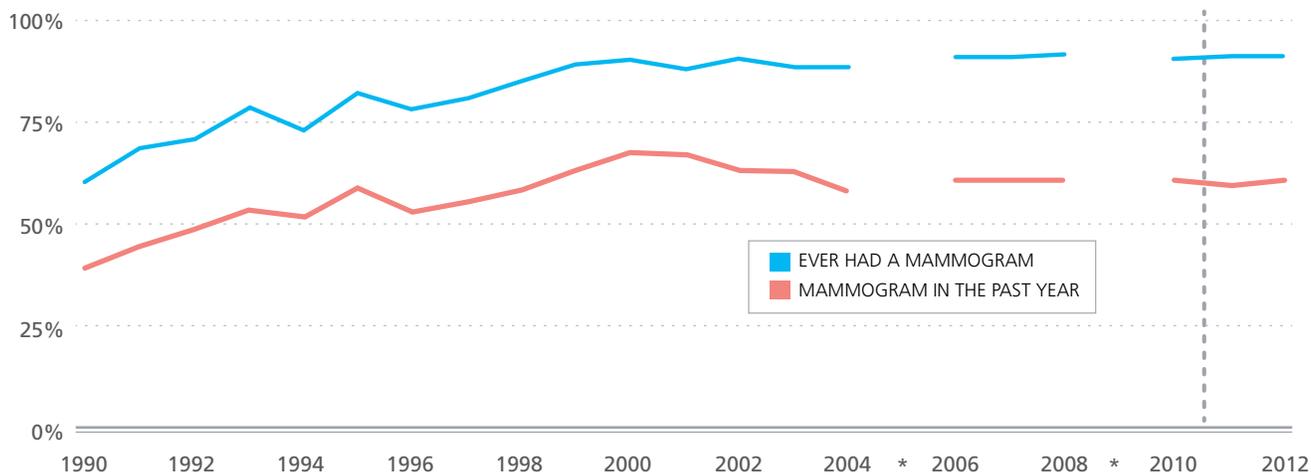
According to the 2012 Ohio Behavioral Risk Factor Surveillance Survey (BRFSS), 60% of Ohio women 40 and older reported having had a mammogram in the past year.¹⁵ Also according to the 2012 BRFSS, more African Americans (64%) than whites (60%) reported having had a mammogram in the past year.¹⁵ Figure 13 displays the upward trend in mammography rates among women 40 and over in both having a mammogram in the past year, which increased from 42% in 1990 to 60% in 2012, and ever having had a mammogram, which increased from 59% in 1990 to 92% in 2012.¹⁵

Among asymptomatic women at average risk for developing breast cancer, the ACS recommends a clinical breast exam about every three years starting at 20 and a yearly clinical breast exam and mammogram in women 40 and older.¹ In addition to an annual mammogram, the ACS recommends a yearly magnetic resonance imaging (MRI) scan starting at 30 among women at high risk of developing breast cancer. These women include those with a BRCA1 or BRCA2 gene mutation; a first-degree relative with a BRCA1 or BRCA2 gene mutation; a history of radiation therapy to the chest as a child or young adult (ages 10 to 30); or a 20%-25% lifetime risk of breast cancer (determined mainly by family history).¹ Those with Li-Fraumeni, Cowden, or Bannayan-Riley-Ruvalcaba syndrome or with a first-degree relative diagnosed with one of these syndromes are also high risk.¹⁶ MRI scans are more sensitive than mammograms but also produce many false positives. For this reason, MRI scans are not recommended for women at average risk.¹⁶ Breast self-exam is an option for women starting in their 20's.¹ Women should know how their breasts normally feel and report any breast change promptly to their health care provider.¹

The USPSTF recommends mammography every two years beginning at 50 among asymptomatic women at average risk of developing breast cancer. The USPSTF states the available evidence is insufficient to assess the benefits and harms of breast cancer screening in women 75 and older.¹⁷

Table A-5 on page 68 shows the ACS and USPSTF recommendations for early detection of cancer in average risk, asymptomatic people by site, age, and gender.

FIGURE 13 Trends in the Prevalence of Women 40 and Older Who Reported Having Had a Mammogram Ever or in the Past Year in Ohio, 1990-2012^{1,2,3}



¹ Source: Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2013.

² Data from 2011-present were weighted by age, gender, 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 gender using a post-stratification method. Thus, BRFSS data for 2011-present should not be compared to data prior to 2011.

³ "Don't Know" and "Refused" were excluded from the denominator. This can cause an artificially high percentage.

* The Ohio Behavioral Risk Factor Surveillance Survey did not include mammography screening questions in 2005 and 2009.

Currently, a woman living in the US has a 1 in 9 lifetime risk of developing invasive breast cancer.²

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 (e.g., tamoxifen and other selective estrogen response modifiers; aromatase inhibitors; ovarian ablation); 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

It is unknown as to how often DCIS will progress to invasive cancer and need to be treated. Because doctors can't yet distinguish DCIS cancers that will progress from those that won't, treatment of DCIS is recommended to prevent tumor progression. Treatment options include breast-conserving surgery with radiation therapy or mastectomy; either of these options may be followed with the drug, tamoxifen, if the tumor is hormone receptor positive.¹

SIGNS AND SYMPTOMS OF BREAST CANCER

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

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

Survival

The five-year relative survival probability for localized breast cancer was 99% in 2003-2009.³ If the cancer had spread regionally, however, the probability was 84%, and for women with distant metastases the probability was only 24% (Figure 1).³ 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 2006 to 2010, 67% of breast cancers among women were diagnosed early (*in situ* or local stage) (Table A-1).⁴

Cervical Cancer



New Cases

Nationally, an estimated 12,340 new cases of invasive cervical cancer are expected in 2013.¹ The incidence rate has decreased steadily over the past several decades but has begun to taper off. As Pap screening has become more prevalent, pre-invasive lesions of the cervix are detected far more frequently than invasive cancer.¹

In Ohio, more than half of the women diagnosed with cervical cancer from 2006 to 2010 were younger than 50 years.⁴ An average of 467 new cases of cervical cancer were diagnosed annually in Ohio during this time period with a corresponding rate of 7.6 per 100,000 compared to the US rate of 7.9 per 100,000; however, lower incidence rates in Ohio may be due to incomplete reporting of cervical cancer in Ohio (Table 2).⁴ African American women had higher incidence rates compared to white women in Ohio in 2006-2010 (8.8 per 100,000 vs. 7.3 per 100,000, respectively) (Table 6).⁴ Average annual age-adjusted incidence rates of cervical cancer by Ohio county of residence are shown in Figure 14.

Deaths

In the US, an estimated 4,030 cervical cancer deaths are expected in 2013.¹ Similar to incidence, the mortality rate has declined steadily over the past several decades due to prevention and early detection resulting from screening.¹ Although, this trend has slowed since 2005.¹

The average annual mortality rate for cervical cancer in Ohio from 2006-2010 was 2.7 per 100,000.⁷ This represents 175 average annual deaths in Ohio from cervical cancer over the time period (Table 3).⁷

Treatment

For pre-invasive lesions, preferred treatment includes electrocoagulation (the destruction of tissue through intense heat by electric current), cryotherapy (the destruction of cells by extreme cold), laser ablation (the destruction of cells by laser), or local surgery.¹ Invasive cervical cancers generally are treated by surgery or radiation, or both, as well as chemotherapy in some cases.¹

RISK FACTORS AND POPULATIONS WITH HIGH RATES

Effectively all cases of cervical cancer can be prevented with the prevention of HPV infection. All other risk factors act as co-factors with HPV.

NON-MODIFIABLE RISK FACTORS

Age: Half the women who develop cervical cancer are 35-55, and 20% are diagnosed at 65 and older.

Race/ethnicity: Hispanic women have more than twice the risk of developing cervical cancer compared to non-Hispanic white women, and African American women have 1.5 times the risk of non-Hispanic white women.

POTENTIALLY MODIFIABLE RISK FACTORS

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

Lack of condom use: Condom use during sexual intercourse decreases the risk of HPV infection.

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.

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

Weakened immunity: Drugs that weaken the immune system and infection with human immunodeficiency virus (HIV) increases risk for HPV infection due to immunosuppression, leading to an increased risk for cervical cancer.

Oral contraceptives (OC): Long-term use (five or more years) of OC increases risk; although, risk decreases if OC use is discontinued.

Multiple pregnancies: Women who have had a higher number of full-term pregnancies have increased risk.

No or irregular Pap screening: Women who do not receive recommended Pap tests will not get treated for pre-cancerous lesions.

Survival

Sixty-eight percent of patients with invasive cervical cancer survive five years after diagnosis.¹ Cervical cancer is one of the most successfully treated cancers if detected at an early stage, with a five-year relative survival probability of nearly 100% for patients with pre-invasive cervical lesions and 91% for patients with local stage tumors (Figure 1).³ Nationally, whites are more likely than African Americans to have their cancers diagnosed early stage (49% versus 40%, respectively).³

In Ohio, from 2006 to 2010, 52% of invasive cervical cancers were diagnosed late (regional or distant stage).⁴ (Please note: *in situ* cervical cancers are not required to be reported in Ohio, and so the percent diagnosed at this stage is unknown.)

EARLY DETECTION

New screening guidelines for the early detection of cervical cancer have recently been adopted by both the ACS and USPSTF.^{17,18} It is widely accepted that certain types of HPV contribute to the development of cervical cancer. Therefore, testing for the presence of HPV is now recommended together with the Pap test for women 30-65. The Pap test is a simple procedure in which a small sample of cells is collected from the cervix and examined under a microscope. Pap tests are good, but not perfect. Their results sometimes appear normal even when a woman has abnormal cells of the cervix. Conversely, sometimes results appear abnormal when there are no abnormal lesions on the cervix.

The ACS recommends, for women 21 to 29, a Pap test every three years.¹⁸ The HPV test should not be used in this age group unless it is needed after an abnormal Pap test result. For women 30 to 65, the ACS recommends a Pap test plus an HPV test (called "co-testing") every five years or a Pap test alone every three years. The ACS also recommends that 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.

The USPSTF recommends, 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.¹⁷ Screening after a hysterectomy with removal of the cervix among women and 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 is not recommended. Women older than 65 who have had adequate prior screenings and are not otherwise at high risk of cervical cancer should not be tested.

Table A-5 on page 68 shows the ACS and USPSTF recommendations for early detection of cancer in average risk, asymptomatic people by site, age, and gender.

According to the 2012 BRFSS, 78% of female Ohioans 18 and older reported having had a Pap test within the last three years (**Figure 15**).¹⁵ National survey data indicates that only 33% of Ohio female adolescents received three doses of the HPV vaccine in 2011.¹ In comparison, 35% of female adolescents in the US were estimated to have received three doses of the HPV vaccine.

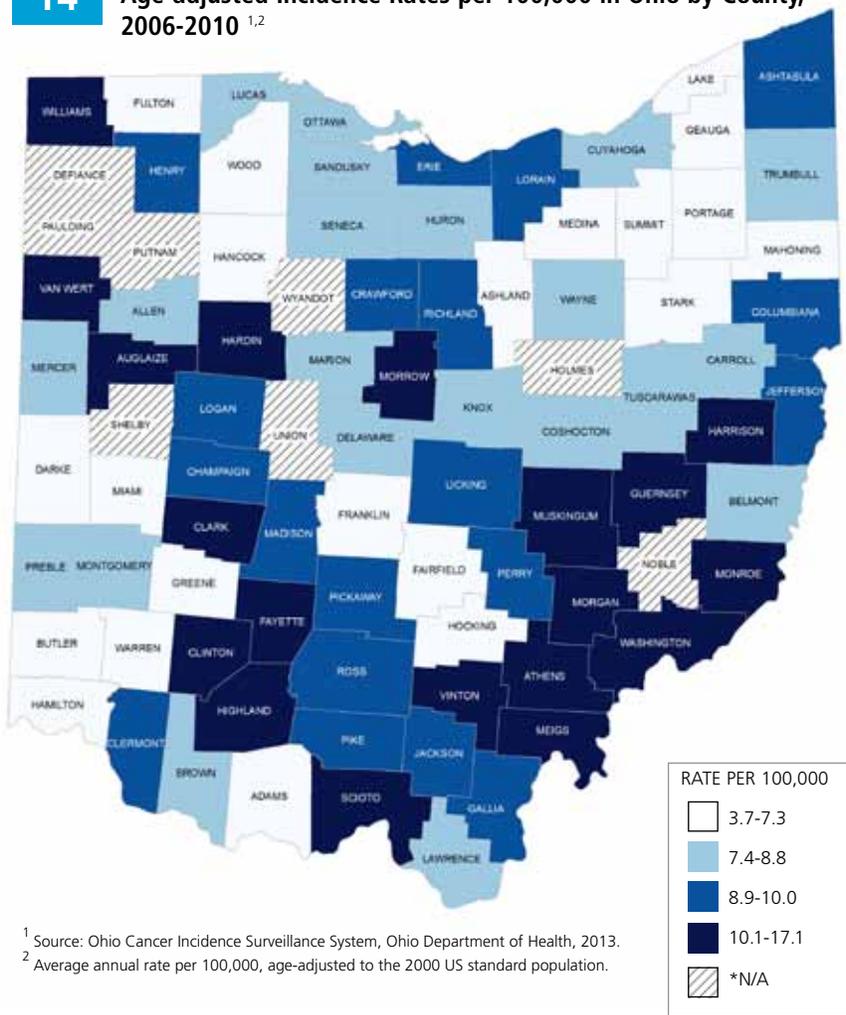


HPV types 16 and 18 account for 70%-80% of all cervical cancer cases. Two HPV vaccines that protect against cervical cancer have been approved for use. Gardasil[®] (Merck and Co, Bluebell, PA, USA) provides protection against HPV types 16, 18, 6, and 11. Cervarix[®] (GlaxoSmithKline, Rixensart, Belgium) is focused solely on cervical cancer prevention and only affords protection from HPV types 16 and 18. Gardasil[®] is currently approved for use in females and males 9 through 26 years of age, while Cervarix[®] is only approved for females. The federal agency responsible for establishing immunization best practices has recommended routine HPV vaccination for males and females beginning at 11 years of age (may start at 9 years of age).¹⁹ The 3-dose vaccination series is recommended for females up to 26 years of age and for males up to 21 years of age if not previously vaccinated.¹⁹

Currently, a woman living in the US has a 1 in 155 lifetime risk of developing invasive cervical cancer.²

FIGURE 14

Cancer of the Cervix: Quartiles of Average Annual Age-adjusted Incidence Rates per 100,000 in Ohio by County, 2006-2010^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2013.
² Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

SIGNS AND SYMPTOMS OF CERVICAL CANCER

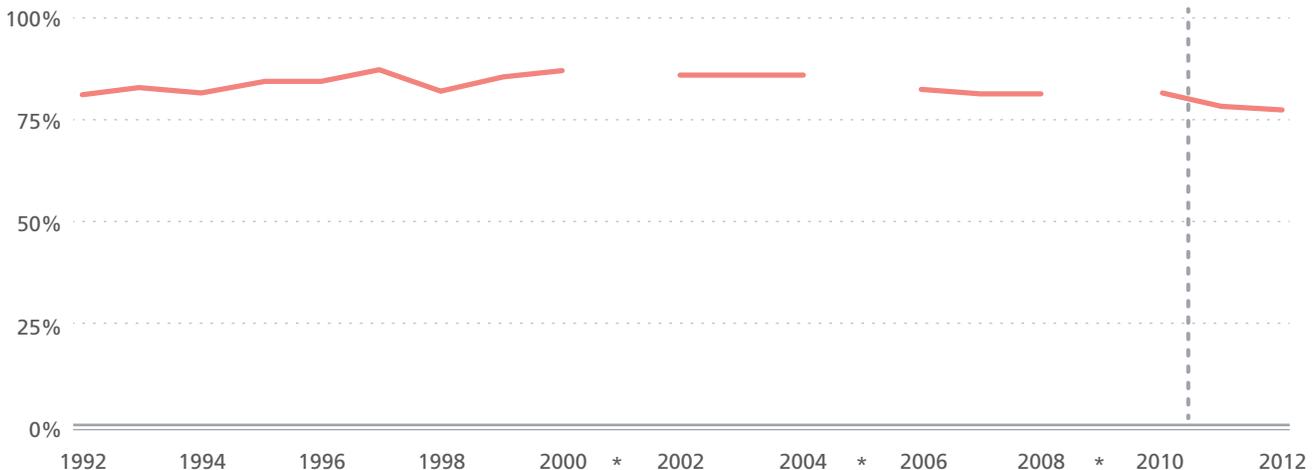
Symptoms usually do not appear until abnormal cervical cells become cancerous and invade nearby tissue.

- Abnormal vaginal bleeding that starts and stops between regular menstrual periods or occurs after sexual intercourse, douching, or a pelvic exam
- Menstrual bleeding that lasts longer or is heavier than usual
- Vaginal bleeding after menopause
- Increased vaginal discharge

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

FIGURE 15

Trend in the Prevalence of Women 18 and Older Had Who Reported Having Had a Pap Smear in the Past Three Years in Ohio, 1992-2012^{1,2,3,4}



¹ Source: Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2013.
² Data from 2011-present were weighted by age, gender, 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 gender using a post-stratification method. Thus, BRFSS data for 2011-present should not be compared to data prior to 2011.
³ "Don't Know" and "Refused" were excluded from the denominator. This can cause an artificially high percentage.
⁴ Denominator includes only women with an intact cervix (women who have never had a hysterectomy).
 * The Ohio Behavioral Risk Factor Surveillance Survey did not include cervical cancer screening questions in 2001, 2005, and 2009.

Colon and Rectum Cancer



New Cases

Nationally, an estimated 102,480 colon and 40,340 rectal cancer cases are expected to occur in 2013.¹ 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 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 5,992 (3,009 men and 2,983 women) new cases of colon and rectum cancer were diagnosed annually between 2006 and 2010 in Ohio with a corresponding rate of 46.2 per 100,000 (Table 2).⁴ Average annual age-adjusted incidence rates of colon and rectum cancer by Ohio county of residence are shown in Figure 16.

The risk of developing colon and rectum cancer increases with age. In Ohio, between 2006 and 2010, approximately 91% of individuals who developed colon and rectum cancer were 50 and over.⁴

RISK FACTORS AND POPULATIONS WITH HIGH RATES

Although the exact cause of most colon and rectum cancers is not known, several risk factors may contribute to the development of colon and rectum cancer.

NON-MODIFIABLE RISK FACTORS

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

Gender: Men have higher incidence rates of this cancer than women.

Race: African Americans have the highest incidence rates of this cancer.

Ethnicity: Ashkenazi Jews are at increased risk.

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

Colon and rectum polyps: Polyps, growths on the inner wall of the colon or rectum, are common in people over age 50. Most polyps are benign (not cancer), but some polyps (adenomas) can become cancer. Finding and removing polyps may reduce the risk.

Genetic alterations: Changes in certain genes increase risk. Hereditary non-polyposis colon cancer (HNPCC), caused by changes in the HNPCC gene, is the most common type of inherited (genetic) colon and rectum cancer, accounting for about 2% of all colon and rectum cancer cases. Most people with an altered HNPCC gene develop colon cancer at a young age (average age of 44 years). 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. Unless FAP is treated, it usually leads to colon and rectum cancer by age 40. FAP accounts for less than 1% of all colon and rectum cancer cases.

Personal history: 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.

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.

POTENTIALLY MODIFIABLE RISK FACTORS

Diet: Diets high in fat (especially animal fat) and low in calcium, folate, and fiber may increase the risk of colon and rectum cancer. Also, a diet very low in fruits and vegetables may increase risk.

Smoking: Long-term smokers may be more likely than nonsmokers to develop polyps and colon and rectum cancer.

Currently, a man living in the US has a 1 in 23 lifetime risk of developing invasive colon and rectum cancer, and a woman has a 1 in 27 lifetime risk of developing invasive colon and rectum cancer.²

Deaths

An estimated 50,830 colon and rectum cancer deaths are expected to occur in 2013 nationally, accounting for 9% of all cancer deaths.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 2006-2010 was 17.9 per 100,000.⁷ This represents 2,355 average annual deaths in Ohio from colon and rectum cancer over the time period (Table 3).⁷ Figure 7 on page 23 shows that, although colon and rectum cancer mortality rates are dropping, African American men in Ohio die from colon and rectum cancer at a higher rate compared to white men or women and African American women.⁷

Treatment

Surgery is the most common form of treatment for colon and rectum cancer.¹ For cancers that have not spread, it is frequently a cure. Chemotherapy alone or in combination with radiation is given before or after surgery to most patients whose cancer has deeply penetrated the bowel wall or has spread to the lymph nodes.¹ Adjuvant chemotherapy (anti-cancer drugs in addition to surgery or radiation) for colon cancer in otherwise healthy patients 70 and older is equally effective and can be no more toxic than in younger patients; toxicity in older patients can be limited if certain drugs (e.g. oxaliplatin) are avoided.¹ Several targeted therapies are approved by the Food and Drug Administration (FDA) to treat metastatic colon and rectum cancer: bevacizumab (Avastin®) and ziv-aflibercept (Zaltrap®) block the growth of blood vessels to the tumor, and cetuximab (Erbix®) and panitumumab (Vectibix®) block the effects of hormone-like factors that promote cancer cell growth.¹

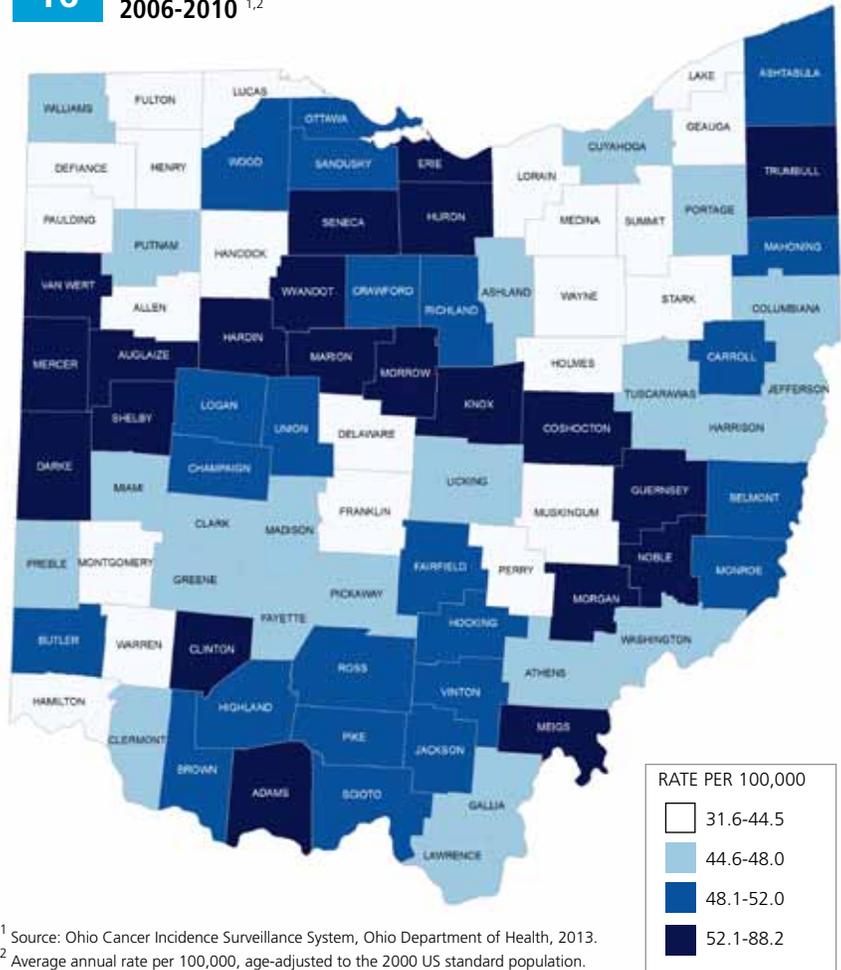
Survival

According to 2003-2009 data, the five-year relative survival probability for patients with colon and rectum cancer is 65%.³ When colon and rectum cancers are detected at local stage, the five-year relative survival probability is 90%; however, only 40% of colon and rectum cancers are discovered at local stage in the US.³ After the cancer has spread regionally to involve adjacent organs or lymph nodes, the five-year survival probability drops to 70%, and for persons with distant metastases to 13% (Figure 1).³

Nearly half (48%) of all colon and rectum cancers in Ohio are diagnosed at regional or distant stage, when survival is not as high (Table A-2).⁴

FIGURE
16

Cancer of the Colon & Rectum: Quartiles of Average Annual Age-adjusted Incidence Rates per 100,000 in Ohio by County, 2006-2010^{1,2}



SIGNS AND SYMPTOMS OF COLON AND RECTUM CANCER

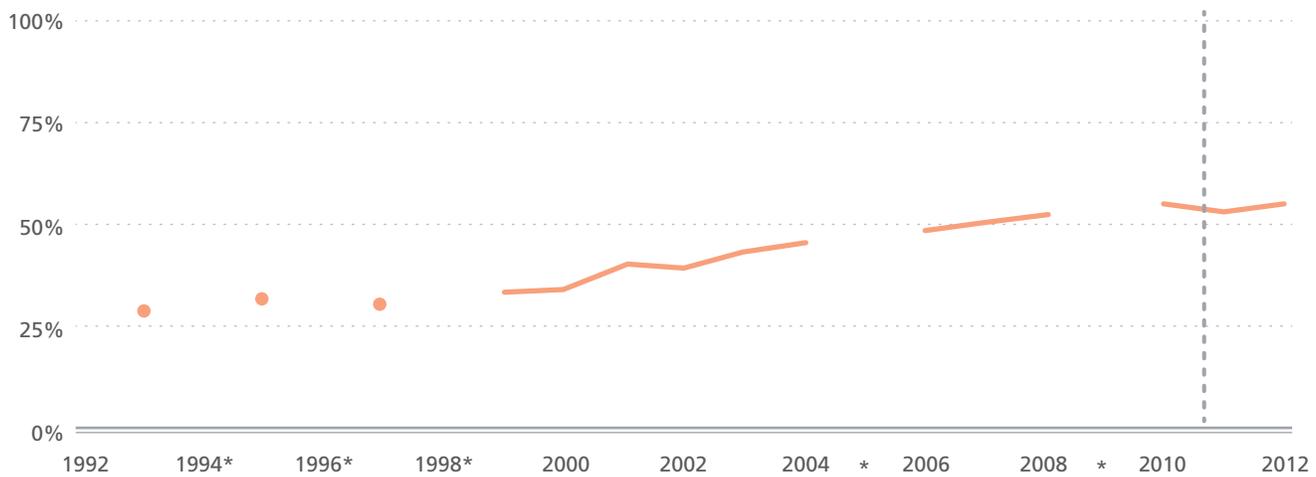
Early stage colon and rectum cancer usually does not have any signs and symptoms. Signs and symptoms of advanced disease may include the following¹:

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

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

FIGURE 17

Trend in the Prevalence of Persons 50 and Older Who Reported Having Had a Sigmoidoscopy/Colonoscopy in the Past Five Years in Ohio, 1993-2012^{1,2,3}



¹ Source: Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2013.

² Data from 2011-present were weighted by age, gender, 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 gender using a post-stratification method. Thus, BRFSS data for 2011-present should not be compared to data prior to 2011.

³ "Don't Know" and "Refused" were excluded from the denominator. This can cause an artificially high percentage.

* The Ohio Behavioral Risk Factor Surveillance Survey did not include colorectal screening questions in 1994, 1996, 1998, 2005, and 2009.

EARLY DETECTION

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. 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. According to the 2012 BRFSS, 53% of Ohioans 50 and older reported having had a sigmoidoscopy or colonoscopy within the past five years (Figure 17).¹⁵

According to ACS, men and women who are at average risk for developing colon and rectum cancer should begin screening at 50. The tests that are designed to find both early cancer and polyps are preferred if these tests are available to you and you are willing to have one of these more invasive tests. These include flexible sigmoidoscopy every 5 years, or colonoscopy every 10 years, or double-contrast barium enema every 5 years, or CT colonography (virtual colonoscopy) every 5 years. Tests that primarily find cancer include fecal occult blood test (FOBT) every year or fecal immunochemical test (FIT) every year. 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.

The USPSTF recommends a screening colonoscopy every 10 years; or sigmoidoscopy every 5 years, with high-sensitivity FOBT every 3 years; or screening with high-sensitivity FOBT every year. These recommendations are for men and women 50-75 who are at average risk for developing colon and rectum cancer. The USPSTF does not recommend colon and rectum cancer screening for adults 76 to 85, although there may be considerations that support screening in an individual patient. Screening is not recommended for adults >85. These recommendations do not apply to individuals with specific inherited syndromes (Lynch Syndrome or Familial Adenomatous Polyposis) or those with inflammatory bowel disease.

Beginning at 50, men and women who are at average risk for developing colon and rectum cancer should have one of the following screening tests:²⁰

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): A 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 (Virtual Colonoscopy): A computed tomography (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 A-5 on page 68 shows the ACS and USPSTF recommendations for early detection of cancer in average risk, asymptomatic people by site, age, and gender.

Leukemia



Leukemia is a type of cancer that originates in the bone marrow and causes the production of abnormal blood cells, particularly white blood cells. It is often thought of as a childhood cancer; although, it is 10 times more common in adults.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).²¹ 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% of the leukemia cases among young children and teens, while CLL is the most common type of leukemia among adults.¹

No valid tests are available to detect leukemia early; however, the risk for leukemia may be reduced through smoking cessation and limiting exposure to certain chemicals such as benzene and ionizing radiation.

TABLE 8 Average Annual Number of New Leukemia Cases and Age-adjusted Incidence Rates per 100,000 and Average Annual Number of Leukemia Deaths and Age-adjusted Mortality Rates per 100,000 by Histology Type in Ohio and the US, 2006-2010^{1,2}

Histology Type	INCIDENCE			MORTALITY		
	Ohio Cases	Ohio Rate	National Rate	Ohio Deaths	Ohio Rate	National Rate
All Leukemias*	1,403	11.1	12.8	954	7.4	7.1
Acute Lymphocytic Leukemia (ALL)	148	1.3	1.7	45	0.4	0.5
Acute Myeloid Leukemia (AML)	460	3.6	3.7	396	3.1	2.8
Chronic Lymphocytic Leukemia (CLL)	403	3.1	4.3	209	1.6	1.4
Chronic Myeloid Leukemia (CML)	168	1.3	1.6	45	0.4	0.3

¹ Source: Ohio Cancer Incidence Surveillance System, Chronic Disease and Behavioral Epidemiology Section, and the Office of Vital Statistics, Ohio Department of Health, 2013; Surveillance, Epidemiology, and End Results (SEER) Program, *SEER Cancer Statistics Review 1975-2010*, National Cancer Institute, 2013.

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

* In addition to the four primary histology types (ALL, AML, CLL, and CML), average annual incidence counts for "All Leukemias" include the following histology types: Other Lymphocytic (44 cases); Acute Monocytic (30 cases); Other Myeloid/Monocytic (24 cases); Other Acute (42 cases); and Aleukemic, Subleukemic, and Not Otherwise Specified (84 cases). These histology types account for 258 leukemia deaths per year.

RISK FACTORS AND POPULATIONS WITH HIGH RATES

A number of factors have been identified that may increase risk of developing leukemia.

NON-MODIFIABLE RISK FACTORS

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

Gender: Leukemia is more common among men compared to women.

Race: Whites have higher rates of leukemia compared to African Americans.

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.

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

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. Very high levels of radiation have been caused by atomic bomb explosions (such as those in Japan during World War II). 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 or ALL. Benzene is found in the chemical industry, and in cigarette smoke and gasoline.

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

Cigarette smoking: Smoking cigarettes increases the 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.

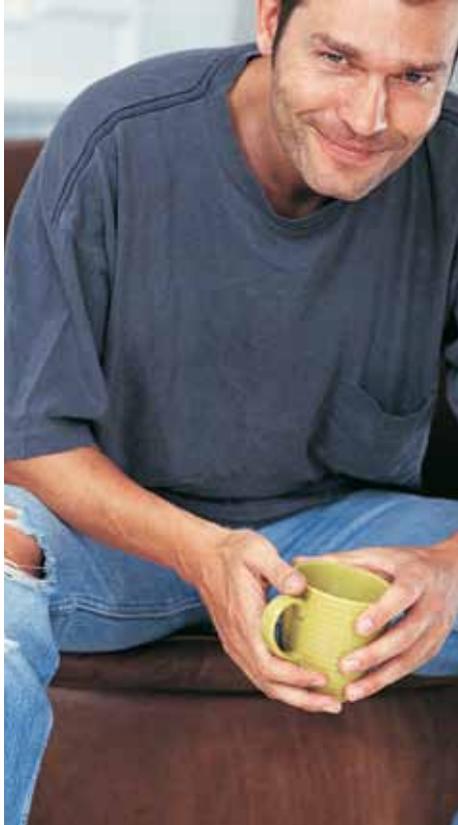
New Cases

An estimated 48,610 new cases of leukemia are expected to occur in 2013 in the US.¹ The most common type of leukemia in the US is CLL with an estimated 15,680 cases (32%) in 2013, followed by AML (14,590 cases; 30%), ALL (6,070 cases; 12%), and CML (5,920 cases; 12%).¹ Although ALL accounts for only 12% of total leukemia cases, it represents three-fourths (75%) of cases among children.¹ Overall leukemia increased slightly by 0.4% per year from 2005 to 2009.¹

An average of 1,403 cases of leukemia were diagnosed among Ohio residents each year from 2006-2010.⁴ The leukemia incidence rate in Ohio (11.1 per 100,000) was 13% lower than the US rate of 12.8 per 100,000 (Table 2).^{3,4} In contrast to the US, the most common type of leukemia in Ohio was AML, with an average of 460 cases per year in 2006-2010; although, incidence rates of AML were nearly the same in Ohio and the US (3.6 per 100,000 and 3.7 per 100,000, respectively).^{3,4} Rates of CLL (3.1 per 100,000), CML (1.3 per 100,000), and ALL (1.3 per 100,000) were 28%, 19%, and 24% lower in Ohio compared to the US, respectively (Table 8).^{3,4} Average annual age-adjusted incidence rates of leukemia by Ohio county of residence are shown in Figure 18.

Incidence rates of leukemia in Ohio were higher among males compared to females and whites compared to African Americans in 2006-2010.⁴ Incidence was highest among white males in Ohio (14.3 per 100,000) compared to all other gender/race categories (Table 6).⁴

Currently, a man living in the US has a 1 in 75 lifetime risk of developing leukemia, and a woman has a 1 in 110 lifetime risk of developing leukemia.²



SIGNS AND SYMPTOMS OF LEUKEMIA

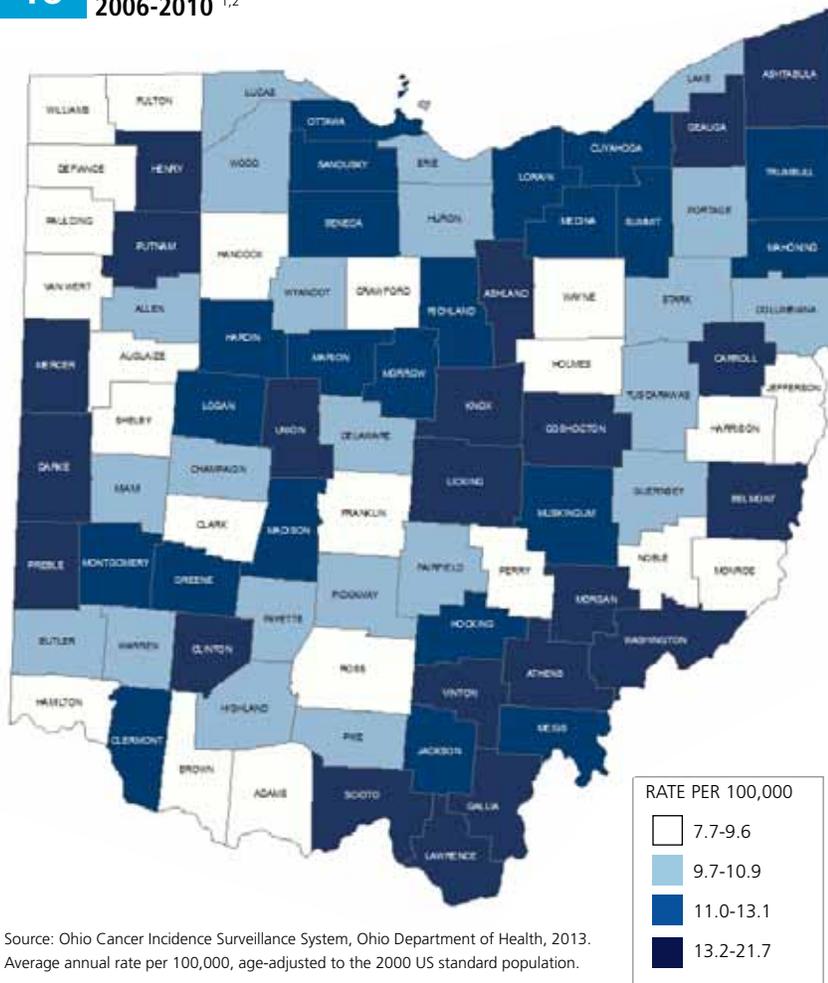
Symptoms of leukemia among children may appear suddenly; whereas, chronic leukemia more common among adults may progress slowly with few symptoms. Symptoms, when present, may include the following:

- Fatigue and weakness
- Pale skin
- Loss of appetite and weight loss
- Repeat infections
- Fever and night sweats
- Bruising or bleeding easily
- Nosebleeds, hemorrhages, and other excessive bleeding
- Swollen lymph nodes, especially in the neck or armpit
- Swelling or discomfort in the abdomen
- Bone or joint pain

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

FIGURE 18

Leukemia: Quartiles of Average Annual Age-adjusted Incidence Rates per 100,000 in Ohio by County, 2006-2010^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2013.
² Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

Treatment

Chemotherapy using various anticancer drugs alone or in combination is the most effective method of treating leukemia.¹ Imatinib (Gleevec®), nilotinib (Tasigna®), and dasatinib (Sprycel®) target the genetic defect and have been shown to be effective in the treatment of CML.¹ Imatinib and dasatinib are also approved to treat a certain type of ALL. People diagnosed with CLL that is not progressing or causing symptoms may not require treatment.¹ Antibiotics and transfusions of blood components are used as supportive treatments.¹ Under appropriate conditions, stem cell transplantation may be useful in treating certain types of leukemia.¹

Survival

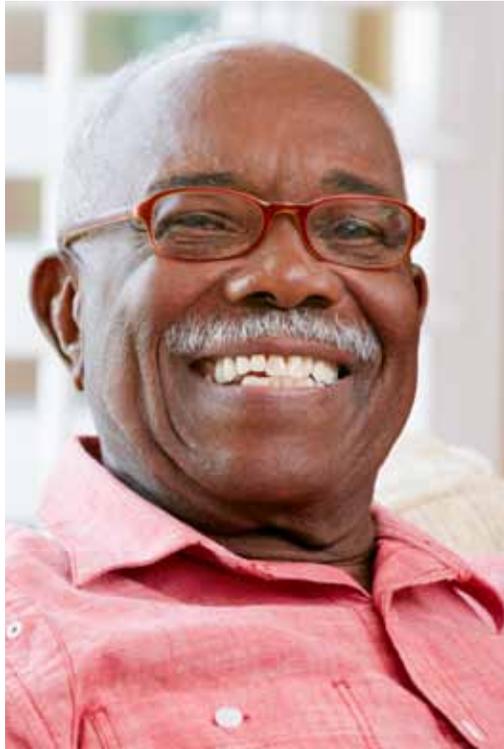
Five-year survival probabilities for leukemia vary by type and range from 25% for AML to 83% for CLL in 2003-2009.³ Survival for most types of leukemia has increased in the past 30 years largely due to advances in treatment.¹ For all leukemia types combined, the 2003-2009 five-year survival probability was similar for males (60%) and females (58%) but was higher among whites (60%) compared to African Americans (53%).³



EARLY DETECTION

At this time, there are no widely recommended screening tests to detect leukemia before it starts to cause symptoms. Detection of leukemia at an early stage is also difficult because symptoms often resemble those of other, less serious conditions. A suspected diagnosis can be confirmed by blood tests to check for high levels of white blood cells and/or low levels of platelets and hemoglobin or by a bone marrow biopsy.¹

Lung and Bronchus Cancer



RISK FACTORS AND POPULATIONS WITH HIGH RATES

Smoking is by far the most significant risk factor in the development of lung and bronchus cancer, accounting for about 87% of lung and bronchus cancer deaths.

NON-MODIFIABLE RISK FACTORS

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

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

Family history: Having a first-degree relative who has had lung and bronchus cancer may increase risk.

Personal history: Having had lung and bronchus cancer before increases risk.

POTENTIALLY MODIFIABLE RISK FACTORS

Smoking: Cigarette, pipe, cigar, and hookah (water pipe) smoking all cause lung and bronchus cancer. 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% increased risk of lung and bronchus cancer.

Occupational or environmental exposure: Exposure to substances such as radon; asbestos; arsenic; radioactive ores (e.g., uranium); silica; beryllium; cadmium; vinyl chloride; nickel and chromium compounds; coal products; mustard gas; chloromethyl ethers; and diesel exhaust increases risk.

Air pollution: Exposure to air pollution may slightly increase risk.

Most lung and bronchus cancers could be prevented if cigarette smoking and other tobacco use were eliminated. Although lung and bronchus cancer has been reduced among some groups in recent years, about 20% of adult Americans were current smokers in 2012.²² Until tobacco use ends, lung and bronchus cancer will likely remain the number one cause of cancer death in the US, killing nearly 159,480 Americans every year.¹ Lung cancer causes more deaths every year than do colon and rectum, breast, and prostate cancers combined.¹

New Cases

An estimated 228,190 new cases of lung and bronchus cancer are expected to occur in the US during 2013, accounting for about 14% of cancer diagnoses.¹ The incidence rate has been declining in men and has just recently begun to decrease among women after a long period of increase.¹

The risk of developing lung and bronchus cancer increases with age. In Ohio between 2006 and 2010, approximately 95% of individuals who developed lung and bronchus cancer were 50 and over.⁴ An average of 9,435 new cases of lung and bronchus cancer (5,129 men and 4,307 women) were diagnosed annually between 2006 and 2010 in Ohio with a corresponding rate of 72.8 per 100,000.⁴ In Ohio males, the average annual incidence rate per 100,000 was 90.5 compared to a rate of 59.8 among

Ohio females (Table 2).⁴ Average annual age-adjusted incidence rates of lung and bronchus cancer by Ohio county of residence are shown in Figure 18.

Deaths

Lung and bronchus cancer is the leading cause of cancer-related death in both men and women. Nationally, an estimated 159,480 deaths from lung and bronchus cancer are expected to occur in 2013, accounting for about 27% of all cancer deaths.¹

Since 1987, more women have died each year from lung and bronchus cancer than from breast cancer.²³ The female lung and bronchus cancer mortality rate did not begin declining until 2003 after continuously increasing for several decades.¹ The mortality rate declined considerably in men from 2005 to 2009 by about 2.8% per year.¹ These declines result from the reduction in cigarette smoking over the past 50 years.¹

The average annual mortality rate for lung and bronchus cancer in Ohio from 2006-2010 was 57.1 per 100,000 (74.8 per 100,000 for males and 44.2 per 100,000 for females).⁷ This represents 7,406 average annual deaths in Ohio from lung and bronchus cancer over the time period (Table 3).⁷ Figure 8 on page 24 displays a downward trend in lung and bronchus cancer mortality among males and females in Ohio from 1996-2010 by race.⁷

Currently, a man living in the US has a 1 in 15 lifetime risk of developing invasive lung and bronchus cancer, and a woman has a 1 in 18 lifetime risk of developing invasive lung and bronchus cancer.²

SIGNS AND SYMPTOMS OF LUNG CANCER

- Persistent cough
- Recurring pneumonia or bronchitis
- Chest pain, often aggravated by deep breathing, coughing, or laughing
- Bloody or rust-colored spit, phlegm, or sputum
- Shortness of breath, wheezing, or hoarseness
- Loss of appetite or weight loss

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

Treatment

Treatment options are determined by the type (small cell, non-small cell) and stage of the cancer and include surgery, radiation therapy, chemotherapy, and targeted biologic therapies such as bevacizumab (Avastin®), erlotinib (Tarceva®), and crizotinib (Xalkori®).¹ For localized cancers, surgery is usually the treatment of choice and is improved by chemotherapy following surgery for non-small cell tumors.¹ Because the disease has usually spread by the time it is discovered, radiation therapy and chemotherapy are often used, sometimes in combination with surgery.¹ Advanced-stage non-small cell lung cancers are usually treated with chemotherapy, targeted drugs, or some combination of the two.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 one-year relative survival probability for lung and bronchus cancer has increased from 35% in 1975-1979 to 46% in 2009 largely due to improvements in surgical techniques and combined therapies.³ However, the five-year survival probability for all stages combined is only 17% according to 2003-2009 data.³ The five-year survival probability is 54% for cases detected when the disease is still localized; although, only 15% of lung and bronchus cancers nationally are diagnosed at this early stage (Figure 1).³ In Ohio, approximately 17% of lung and bronchus cancer cases are diagnosed *in situ* or local stage; whereas, approximately 69% of Ohio lung and bronchus cancer cases are diagnosed late (regional or distant) stage.⁴ The percentage of late stage lung and bronchus cancer cases by Ohio county is presented in Table A-3 on page 66.

EARLY DETECTION

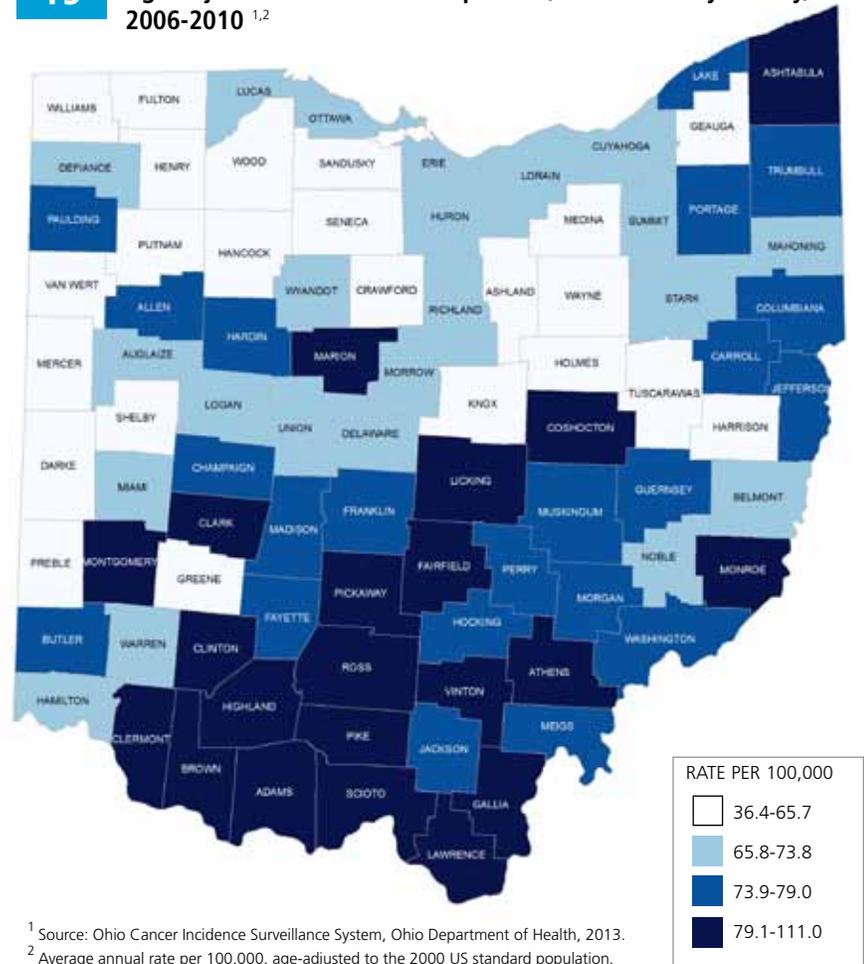
Early detection through annual screening with chest x-ray has not been shown to improve lung cancer survival.¹ However, tests such as low-dose spiral computed tomography (CT) scans and molecular markers in sputum have produced promising results in detecting lung cancers at earlier, more operable stages in high-risk patients.²³ Results from the National Lung Screening Trial (NLST), a cancer screening clinical trial funded by the NCI, showed 20% fewer lung cancer deaths among asymptomatic, high-risk individuals who were screened with spiral CT compared to standard chest x-ray.¹

The ACS recommends annual lung cancer screening with low-dose CT scans among patients who meet all of the following criteria: 55 to 74 years old, 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. These criteria were based on what was used in the NLST.¹

The USPSTF recommends annual screening for lung cancer with low-dose computed tomography in adults aged 55 to 80 years who have a 30 pack-year smoking history and currently smoke or have quit within the past 15 years. 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.¹⁷

FIGURE
19

Cancer of the Lung & Bronchus: Quartiles of Average Annual Age-adjusted Incidence Rates per 100,000 in Ohio by County, 2006-2010^{1,2}



¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2013.

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

Lymphoma



RISK FACTORS AND POPULATIONS WITH HIGH RATES

NON-MODIFIABLE RISK FACTORS

Age: Risk of NHL increases with advancing age; whereas, risk of HL is highest among persons 15-35 and 55 and older.

Gender: Lymphoma is more common in men compared to women.

Race: Whites are more likely to develop NHL than African Americans or Asians.

Family history: Family members, especially brothers and sisters, of a person with HL or other lymphomas may have an increased chance of developing this disease.

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

POTENTIALLY MODIFIABLE RISK FACTORS

Certain viruses: Having an infection with the Epstein-Barr virus (EBV), HIV, *H. pylori*, or human T-cell leukemia type I (HTLV-I) increases risk of developing lymphoma. Infection with the hepatitis C virus may increase risk.

Lymphoma is a type of cancer that results from the abnormal growth and accumulation of cells in the lymphoid tissue of the lymphatic system, which is responsible for filtering germs, cancer cells, and fluids from the extremities and internal organs. Lymphoid tissue is found in many places throughout the body, including the lymph nodes, thymus, spleen, tonsils and adenoids, and bone marrow.²⁴ Hodgkin's lymphoma (HL), also known as Hodgkin's disease, is a specialized type of lymphoma in which the cancer cells are mostly Reed-Sternberg cells.²⁴ All other lymphomas are called non-Hodgkin's lymphoma (NHL).

New Cases

An estimated 79,030 new cases of lymphoma will be diagnosed in the US in 2013, including 9,290 cases of HL and 69,740 cases of NHL.¹ Incidence rates of HL and NHL were stable among both men and women from 2005-2009.¹

In Ohio in 2006-2010, an average of 332 cases of HL and 2,405 cases of NHL were diagnosed per year.⁴ The incidence rate of HL was similar in Ohio (2.9 per 100,000) compared to the US (2.8 per 100,000); whereas, the incidence rate of NHL was slightly lower in Ohio compared to the US (18.8 and 19.7 per 100,000, respectively) (Table 2).^{3,4} The lower incidence rate of NHL in Ohio may be due to incomplete reporting of NHL in Ohio.

Incidence rates of both HL and NHL were higher among males compared to females and whites compared to African Americans in Ohio in 2006-2010.⁴ White males in Ohio had the highest incidence of both HL (3.3 per 100,000) and NHL (22.8 per 100,000) of all gender/race categories (Table 6).⁴

Deaths

In 2013, an estimated 20,200 deaths from lymphoma will occur in the US – 1,180 deaths from HL and 19,020 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 54 deaths from HL and 919 deaths from NHL occurred each year from 2006 to 2010.⁷ HL and NHL mortality rates by gender and race can be found in Table 7.⁷

Currently, a man living in the US has a 1 in 49 lifetime risk of developing NHL, and a woman has a 1 in 62 lifetime risk of NHL. The lifetime risk of developing HL is much lower – approximately 1 in 424 for males and 1 in 514 for females.²

Treatment

Chemotherapy, radiation therapy, or a combination of the two, are most often used to treat HL, depending on the disease stage and cell type.¹ For HL cases resistant to standard therapy, stem cell transplants may be an option.¹ Similar to HL, chemotherapy is the most common treatment for NHL; radiation, alone or in combination with chemotherapy, is used less often.¹ Several monoclonal antibodies have been designed to attack lymphoma cells, including rituximab (Rituxan®) and alemtuzumab (Campath®), and are used for initial treatment and recurrence of some types of NHL, as are antibodies linked to a radioactive atom.¹ If NHL persists after standard treatment, stem cell transplantation (with high-dose or nonmyeloablative chemotherapy) may be an option.¹

Survival

Five-year relative survival probabilities are higher for HL compared to NHL. The survival probability is 85% at five years for persons diagnosed with HL compared to 69% for NHL.³ For both types of lymphoma, five-year survival probabilities are higher for females compared to males and for whites compared to African Americans.³



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 won't go away

Additional symptoms of NHL may include the following:

- Decreased appetite
- Pain, swelling, or feeling of fullness in the abdomen
- Nausea
- Vomiting
- 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 symptoms may be caused by cancer or other, less serious, health problems. If you have any of these symptoms, see your doctor.

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.

Melanoma/Skin Cancer



New Cases

Basal cell and squamous cell skin cancer are the most common types of skin cancer. Most, but not all, of these forms of skin cancer are highly curable. Melanoma is the most common serious form of skin cancer and is expected to be diagnosed in about 76,690 persons in the US during 2013.¹ Because basal and squamous cell skin cancers are not required to be reported to the cancer registries in Ohio and many other states, the actual impact of skin cancer is likely underestimated.

Melanoma incidence rates have been increasing for at least 30 years.¹ Melanoma is rare among African Americans; the lifetime risk of developing melanoma is 233 times higher among whites than African Americans.¹ Average annual age-adjusted incidence rates of melanoma by Ohio county are shown in [Figure 20](#).

Risk Factors and Populations with High Rates

RISK FACTORS FOR ANY TYPE OF SKIN CANCER

NON-MODIFIABLE RISK FACTORS

Family history: Having two or more close relatives who have had melanoma is a risk factor for developing melanoma. Other types of skin cancer also sometimes run in families. Rarely, members of a family will have an inherited disorder, such as *seraderma pigmentosum* or *nevroid basal cell carcinoma syndrome*, that makes the skin more sensitive to the sun and increases the risk of skin cancer.

Skin that burns easily: 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.

Certain medical conditions or medicines: Medical conditions or medicines (such as some antibiotics, hormones, or antidepressants) that make your skin more sensitive to the sun increase risk of skin cancer. Also, medical conditions or medicines that suppress the immune system increase risk.

POTENTIALLY MODIFIABLE RISK FACTORS

Sunlight: Sunlight is a source of UV radiation and is the most important risk factor for any type of skin cancer.

Severe, blistering sunburns: People who have had at least one severe, blistering sunburn are at increased risk of skin cancer. Children in particular should be protected from the sun because severe sunburns in childhood may greatly increase risk of melanoma in later life.

Lifetime sun exposure: The total amount of sun exposure over a lifetime is a risk factor for skin cancer.

Tanning: Although a tan slightly lowers the risk of sunburn, even people who tan well without sunburning have a higher risk of skin cancer because of more lifetime sun exposure.

Sunlamps and tanning booths: Artificial sources of UV radiation, such as sunlamps and tanning booths, can cause skin damage and skin cancer. Risk is greatly increased by using sunlamps and tanning booths before age 30.

Personal history: People who have had melanoma have an increased risk of developing other melanomas. Also, people who have had basal cell or squamous cell skin cancer have an increased risk of developing another skin cancer of any type.

ADDITIONAL RISK FACTORS

MELANOMA

Dysplastic nevus: A dysplastic nevus is a type of mole that looks different from a common mole. A dysplastic nevus may be bigger than a common mole, and its color, surface, and border may be different. It's usually wider than a pea and may be longer than a peanut. A dysplastic nevus can have a mixture of several colors, from pink to dark brown. Usually, it's flat with a smooth, slightly scaly or pebbly surface, and it has an irregular edge that may fade into the surrounding skin. A dysplastic nevus is more likely than a common mole to turn into cancer.

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.

BASAL CELL AND SQUAMOUS CELL SKIN CANCERS

Skin injuries: Old scars, burns, ulcers, or areas of inflammation on the skin.

Exposure to some chemicals: Exposure to certain chemicals, such as arsenic, can increase risk. Arsenic exposure can occur from well water, pesticides and herbicides, some medicines (such as arsenic trioxide) and herbal remedies, and in certain occupations (such as mining and smelting).

Radiation therapy: People who have had radiation treatment have higher risk of developing skin cancer in the area where treatment was received. This is particularly a concern in children who have had radiation treatment for cancer.

SQUAMOUS CELL CANCER

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. It may also appear as cracking or peeling of the lower lip that does not heal. Without treatment, this scaly growth may turn into squamous cell skin cancer.

HPV infection: Certain types of HPV can infect the skin and may increase the risk of squamous cell skin cancer. These HPVs are different from the HPV types that cause cervical cancer and other cancers in the female and male genital areas.

The risk of developing melanoma of the skin increases with age. In Ohio between 2006 and 2010, approximately 72% of individuals who developed melanoma of the skin were 50 and over.⁴ An average of 2,394 new cases of melanoma of the skin were diagnosed annually between 2006 and 2010 in Ohio with a corresponding rate of 19.1 per 100,000 compared to the US rate of 21.1 per 100,000; although, the lower rate in Ohio may be due to incomplete reporting of melanoma of the skin in Ohio.⁴ The rate among males in Ohio (22.8 per 100,000) was 35% higher than the rate among females (16.9 per 100,000) during this time period (Table 2).⁴

Deaths

An estimated 12,650 deaths, 9,480 from melanomas and 3,170 from nonmelanoma skin cancers, will occur in 2013 nationally.¹ The death rate for melanoma has been declining rapidly in whites younger than 50 years of age; from 2005-2009 rates decreased by 2.8% per year in men and by 2.0% per year in women.¹

The average annual mortality rate for melanoma of the skin in Ohio from 2006-2010 was 2.9 per 100,000.⁷ This represents 373 average annual deaths in Ohio from melanoma over the time period (Table 3).⁷



EARLY DETECTION

Recognition of changes in skin growths or the appearance of new growths is the best way to find early skin cancer. Adults should periodically practice skin self-examination and have their skin assessed by a dermatologist on a routine basis. Suspicious lesions or a sudden or progressive change in a lesion's appearance should be evaluated promptly by a physician. Basal and squamous cell skin cancers often take the form of a pale, wax-like, pearly nodule, or a red, scaly, sharply outlined patch. Melanomas often start as small, mole-like growths that increase in size and change color.

A simple ABCDE rule outlines the warning signals of a mole that could be melanoma.

Check moles:

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

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

C is for color. The pigmentation is not uniform, with variable degrees of tan, brown, or black.

D is for diameter greater than 6 millimeters (about ¼ inch). 

Although, in recent years more melanomas are being diagnosed between 3 and 6 millimeters. Any sudden or progressive increase in size should be of concern.

E is for evolving. The mole has changed over the past few weeks or months.

In addition to the ABCDE rule, key warning signs of skin cancer are as follows:

Melanoma:

- Changes in the size, shape, or color of a mole or other skin lesion
- Appearance of a new growth

Basal cell carcinoma:

- Flat growths or small pink or red, translucent, shiny areas that may bleed following minor injury

Squamous cell carcinoma:

- Growing lump, often with a rough surface
- Flat, reddish patches that grow slowly

Skin Cancer:

- Sore that does not heal

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 doctor.

Oral Cavity and Pharynx Cancer



Oral cavity and pharynx cancers are usually grouped together and examined as one anatomic site 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 mouth. The pharynx includes the oropharynx, hypopharynx, nasopharynx, and the tonsil.

New Cases

An estimated 41,380 new cases of cancer of the oral cavity and pharynx are expected to be diagnosed in 2013 in the US.¹ Incidence rates are more than twice as high in men as in women.¹ From 2005 to 2009, incidence rates were stable in men and decreased by 0.9% annually in women.¹ However, recent studies have shown that incidence is increasing for cancers of the oropharynx that are associated with HPV infection among white men and women.¹

In Ohio, 46% of those diagnosed with oral cavity and pharynx cancer from 2006 to 2010 were younger than 60 years.⁴ An average of 1,323 new cases of oral cavity and pharyngeal cancers were diagnosed annually in Ohio during this time period with a corresponding rate of 10.1 per 100,000 compared to the US rate of 10.8 per 100,000; however, the lower rate in Ohio may be due to incomplete reporting of oral cavity and pharynx cancer in Ohio (Table 2).⁴ White and African American men had higher incidence rates of this cancer type compared to white and African American women in Ohio in 2006-2010 (Table 6).⁴ Average annual age-adjusted incidence rates of oral cavity and pharynx cancer by Ohio county are shown in Figure 21.

RISK FACTORS AND POPULATIONS WITH HIGH RATES

NON-MODIFIABLE RISK FACTORS

Age: Most patients with these cancers are older than 55. However, this may be changing as HPV-linked cancers become more common. People with cancers linked to HPV infection tend to be younger.

Gender: Oral cavity and pharynx cancers are about twice as common in men as in women. This might be because men have been more likely to use tobacco and alcohol in the past. In addition, the recent rise in HPV-linked cancers has been mainly among younger men.

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

POTENTIALLY MODIFIABLE RISK FACTORS

Tobacco: Tobacco use causes most of these cancers. Smoking cigarettes, cigars, or pipes, or 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 only alcohol.

Heavy alcohol use: People who are heavy drinkers are more likely to develop oral cavity cancer than people who don't drink alcohol. The risk increases with the amount of alcohol that a person drinks. The risk increases even more if the person both drinks alcohol and uses tobacco.

HPV infection: Some members of the HPV family of viruses can infect the mouth and throat. These viruses are passed from person to person through sexual contact. 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. Using a lotion or lip balm that has a sunscreen can reduce the risk. Wearing a hat with a brim can also block the sun's harmful rays. The risk of cancer of the lip increases if the person also smokes.

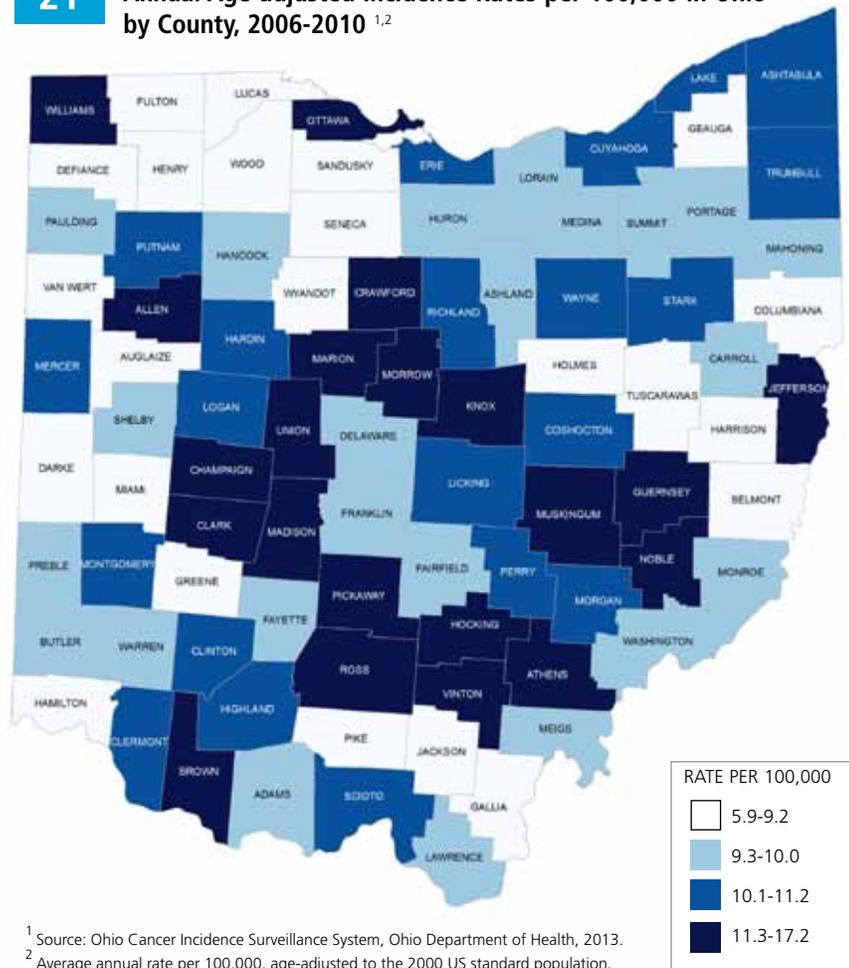
Betel nut use: Betel nut use is most common in Asia, where millions chew the product. It's a type of palm seed wrapped with a betel leaf and sometimes mixed with spices, sweeteners, and tobacco. Chewing betel nut causes oral cancer. The risk increases even more if the person also drinks alcohol and uses tobacco.

Diet: Some studies suggest that not eating enough fruits and vegetables may increase the risk of getting oral cavity cancer.

Currently, a man living in the US has a 1 in 72 lifetime risk of developing invasive oral cavity and pharynx cancer, and a woman has a 1 in 174 lifetime risk of developing invasive oral cavity and pharynx cancer.²

FIGURE 21

Cancer of the Oral Cavity & Pharynx: Quartiles of Average Annual Age-adjusted Incidence Rates per 100,000 in Ohio by County, 2006-2010 ^{1,2}



Deaths

An estimated 7,890 deaths from oral cavity and pharynx cancer are expected to occur in 2013 in the US.¹ Death rates have been decreasing over the past three decades; from 2005 to 2009, rates decreased by 1.3% per year in men and by 2.2% per year in women.¹

The average annual mortality rate for oral cavity and pharynx cancer in Ohio from 2006-2010 was 2.6 per 100,000.⁷ This represents 347 average annual deaths in Ohio from oral cavity and pharynx cancer over the time period (Table 3).⁷

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. Targeted therapy with cetuximab (Erbix[®]) 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

Sixty-two percent of patients with invasive oral cavity and pharynx cancer survive five years after diagnosis. Oral cavity and pharynx cancer is usually successfully treated if detected at an early stage, with a five-year relative survival probability of 83% for patients with local stage tumors (Figure 1).¹

In Ohio, from 2006 to 2010, 67% of oral cavity and pharynx cancers were diagnosed late (regional or distant stage).⁴

EARLY DETECTION

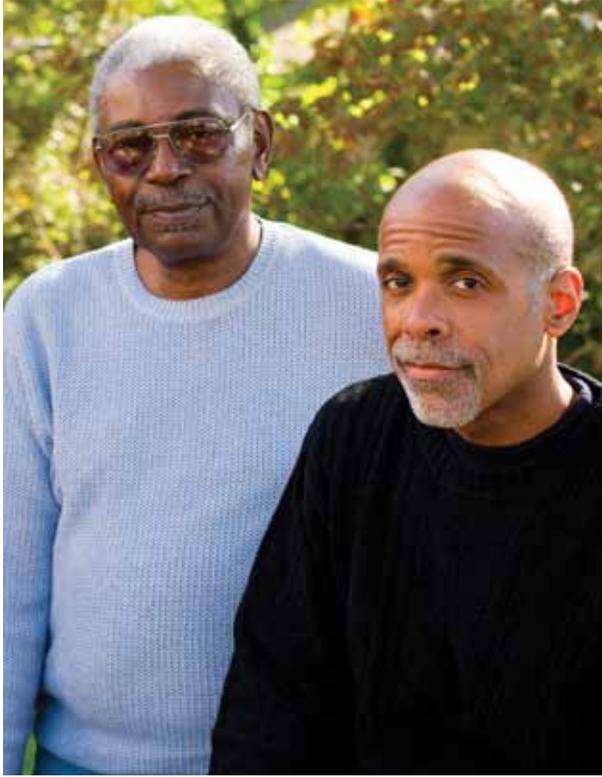
Cancer can affect any part of the oral cavity, including the lip, tongue, mouth, and throat. Through visual inspection, dentists and physicians can often detect premalignant abnormalities and cancer at an early stage, when treatment is both less extensive and more successful.¹

SIGNS AND SYMPTOMS OF ORAL CAVITY AND PHARYNX CANCER

- Patches inside your mouth or on your lips:
 - White patches are the most common.
 - Mixed red and white patches are more likely than white patches to become malignant.
 - Red patches are brightly colored, smooth areas that often become malignant.
- A sore on your lip or in your mouth that doesn't heal
- Bleeding in your mouth
- Loose teeth
- Difficulty or pain when swallowing
- Difficulty wearing dentures
- A lump in your neck
- An earache that doesn't 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 doctor or dentist.

Prostate Cancer



RISK FACTORS AND POPULATIONS WITH HIGH RATES

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

NON-MODIFIABLE RISK FACTORS

Age: Approximately 60% of all prostate cancers are diagnosed in men over 65 and 97% are diagnosed in men at least 50 years of age.¹

Race/ethnicity: African American men are more likely to be diagnosed with prostate cancer than white men and often at a more advanced stage. The death rate for African American 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 white men.

Family history: Having a father or brother with prostate cancer increases 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.

Prostate changes: Men with abnormal prostate cells, called high-grade prostatic intraepithelial neoplasia, may have increased risk.

New Cases

In 2013, an estimated 238,590 new cases of prostate cancer will occur among men in the US.¹ Incidence rates for prostate cancer changed substantially between the mid-1980s and mid-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

Prostate cancer accounted for 27% of new cancer cases among Ohio males in 2006-2010, or an annual average of 8,224 cases with a corresponding age-adjusted rate of 139.7 per 100,000 (Figure 2 and Table 2).⁴ The national age-adjusted prostate cancer incidence rate during this time period (152.0 per 100,000) was 9% higher than the Ohio rate; although, the lower rate in Ohio may be due to incomplete reporting of this cancer site/type.^{3,4}

Across the country and state, the incidence rates of prostate cancer are significantly higher among African American men than in white men, but the reasons for the difference are not well understood. Average annual age-adjusted incidence rates of prostate cancer by Ohio county are shown in Figure 22.

Deaths

In the US, an estimated 29,720 deaths in 2013 are expected from prostate cancer, the second leading cause of cancer death in men.¹ Although the death rate has been declining among white and African American men since the early 1990s, the rate in African American men remains more than twice as high as the rate in white men.¹

In Ohio, 1,189 average annual deaths from prostate cancer occurred between 2006 and 2010.⁷ The mortality rate for prostate cancer in Ohio was 23.6 per 100,000 over the time period compared to 23.0 per 100,000 nationally (Table 3).^{3,7}

Currently, a male living in the US has a 1 in 7 lifetime risk of developing invasive prostate cancer.²

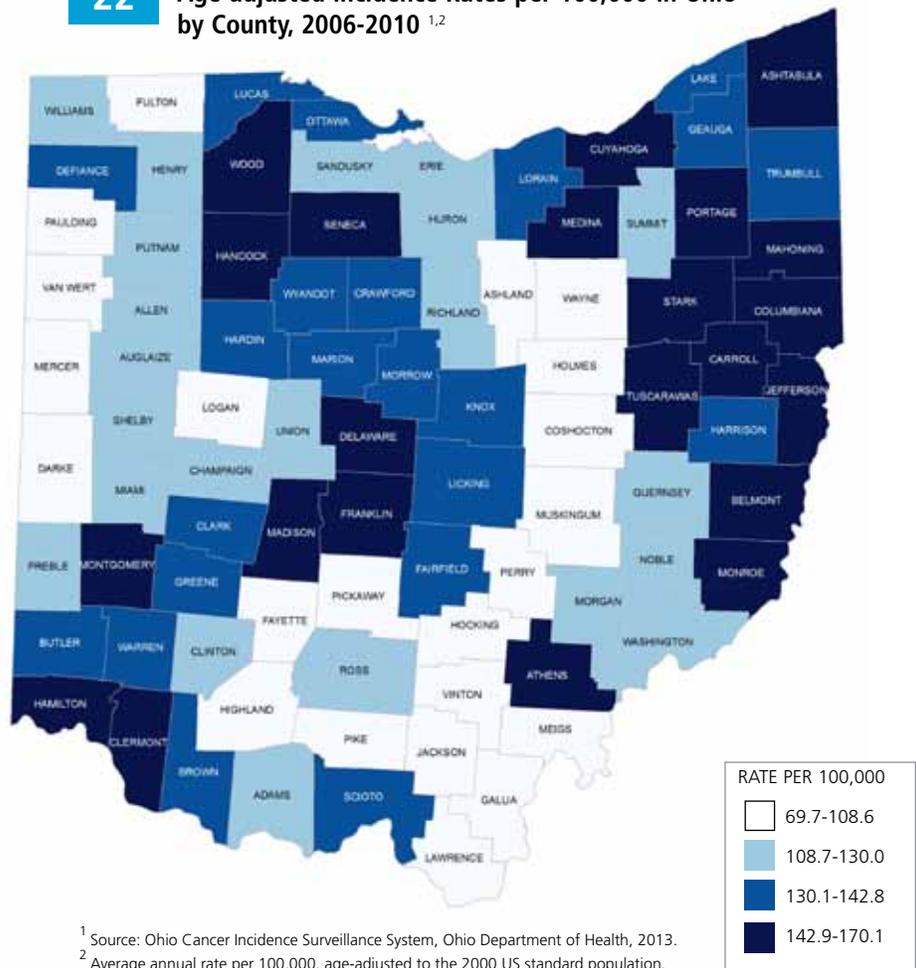
Treatment

Men who receive abnormal DRE or PSA test results may need to undergo a biopsy to determine whether cancer cells are present. Since there are differences in how prostate cancers grow and these differences cannot be detected by current testing methods, men who have cancer cells in their prostate should speak with their doctors to determine whether treatment is appropriate and, if so, what treatment options are available.¹

Since the type(s) of treatment an individual receives 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 physician. Surgery, external beam radiation, and radioactive seed implants (brachytherapy) may be used to treat early-stage disease.¹ Hormone therapy before or after surgery is sometimes used to treat early-stage disease.¹ More advanced stages of disease are commonly treated by using hormonal therapy, chemotherapy, radiation, or combinations of these treatments.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 Careful observation without immediate active treatment (“active surveillance”) may be recommended for men who are older or have less aggressive tumors.¹

FIGURE 22

Cancer of the Prostate: Quartiles of Average Annual Age-adjusted Incidence Rates per 100,000 in Ohio by County, 2006-2010^{1,2}



EARLY DETECTION

The ACS released updated guidelines in March 2010 to reflect the uncertainty surrounding routine prostate cancer screening.¹ It is recommended that asymptomatic men who have at least a 10-year life expectancy talk to their doctors to understand the risks and benefits of undergoing tests to detect prostate cancer early, such as a digital rectal exam (DRE) and prostate-specific antigen (PSA) test, so they can make informed health care decisions.¹ Men at average risk should have this conversation with their physician beginning at 50 whereas men at higher risk, such as African American men and men with a first-degree relative (father or brother) diagnosed with prostate cancer before 65, should begin this conversation at 45. Men at appreciably higher risk (multiple family members diagnosed with prostate cancer before 65) should have this conversation beginning at 40.

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. 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. Thus, it is important to consider overall health status – not age alone – when making decisions about screening.

The USPSTF views the available evidence as insufficient to assess the benefits and harms of prostate cancer screening.¹⁷ Consequently, there are currently no USPSTF prostate cancer screening recommendations for men of any age.¹⁷

Table A-5 on page 68 shows the ACS and USPSTF recommendations for early detection of cancer in average risk, asymptomatic people by site, age, and gender.

Table 9 displays the results of the 2012 Ohio BRFSS with respect to PSA testing. The 65 and older population had higher levels of PSA screening in the past year (56%) compared to 50- to 64-year-olds (40%).¹⁵ The percentage of respondents who received a PSA test was lowest for those with less than a high school education (35%) and those with the lowest income (less than \$25,000 per year) (32%), highest for college graduates (51%) and those with the highest income (at least \$50,000 per year) (51%), and slightly higher among whites (47%) compared to African Americans (41%).¹⁵



TABLE 9

Prevalence of Men 50 and Older Who Reported Having Had a Prostate-specific Antigen (PSA) Test in the Past Year by Demographics in Ohio, 2012^{1,2,3}

	PSA TEST IN THE PAST YEAR
AGE	
50-64	40%
65+	56%
RACE	
White	47%
African American	41%
EDUCATION	
Less Than High School	35%
High School or GED	44%
Some College	48%
College Graduate	51%
ANNUAL HOUSEHOLD INCOME	
< \$24,999	32%
\$25,000-\$49,999	48%
\$50,000+	51%
Total (Men 50+)	46%

¹ Source: Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2013.

² Data from 2011-present were weighted by age, gender, 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 gender using a post-stratification method. Thus, BRFSS data for 2011-present should not be compared to data prior to 2011.

³ "Don't Know" and "Refused" were excluded from the denominator. This can cause an artificially high percentage.

Survival

Nationally, 93% of all prostate cancers are diagnosed at a local or regional stage; the five-year relative survival probability for patients whose tumors are diagnosed at these stages is almost 100%.¹ Over the past two and a half decades, the five-year survival probability for all stages combined has increased from 68% to nearly 100%.¹ In Ohio, approximately 82% of all prostate cancers are diagnosed early.⁴ [Table A-4](#) highlights the percentage of new prostate cancer cases diagnosed at early and late-stages by county.⁴

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
- Blood in urine
- Difficulty having an erection (impotence)
- Pain in pelvic bone, spine, hips, or ribs
- Weakness or numbness in legs or feet
- Loss of bladder or bowel control

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

Tobacco Use



RISK FACTORS AND POPULATIONS WITH HIGH RATES

Lower income: Adults living below the poverty level are more likely to smoke than those with higher incomes.¹

Lower education: Smoking prevalence generally decreases with increasing years of education. College graduates achieved the greatest percent decline in smoking, from 21% in 1983 to 9% in 2011.¹

Age: Nearly 9 out of 10 adult smokers started by age 18; 99% started by age 26.²⁹

Race: The prevalence of smoking is highest among American Indian/Alaska Native men and women.³⁰

SMOKING-RELATED HEALTH EFFECTS³¹

Cigarette smoking causes the following:

- Cardiovascular disease
- Cancer (acute myeloid leukemia; cervix; esophagus; kidney and renal pelvis; larynx; lung and bronchus; oral cavity and pharynx; pancreas; stomach; urinary bladder)
- Respiratory disease
- Reduced fertility

Smoking during pregnancy is associated with the following:

- Premature births
- Low birth weight
- Stillbirth
- Sudden infant death syndrome (SIDS)

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 hip fracture than women who have never smoked

Smoking remains the most preventable cause of death in our society. Since the first published Surgeon General's report on smoking and health in 1964, there have been more than 15 million premature deaths attributable to smoking in the US.^{1,25} According to 2000-2004 data, tobacco is the cause of an estimated 443,000 premature deaths in the US each year; about 20% of all deaths can be attributed to tobacco use.^{1,26,27} The World Health Organization (WHO) states one billion will be killed in this century if the WHO tobacco recommendations are not implemented.²⁸

A study from the Centers for Disease Control and Prevention (CDC) estimates that 8.6 million people in the US have at least one chronic disease caused by smoking.¹ These smoking-related chronic diseases include chronic bronchitis, heart disease, cerebrovascular disease, emphysema, gastric ulcers, and the cancer sites/types outlined in Risk Factors and Populations with High Rates above.¹ Smoking accounts for an estimated 30% of all cancer deaths and 87% of lung and bronchus cancer deaths.¹

In Ohio, an estimated 7,506 cancer deaths annually can be attributed to smoking, including 6,443 deaths from lung and bronchus cancer.⁷

Every day in the US over 3,800 youth under 18 smoke their first cigarette and over 1,000 youth under age 18 become daily cigarette smokers.²⁹

Time Trends

The annual prevalence of current smoking among US adults in 2012 was 20%, down from 21% in 2011.¹⁵ 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%) to 2009 (20%).¹⁵ In 2012, 25% of adult males and 21% of adult females in Ohio reported current smoking.¹⁵ Figure 23 displays trends in adult smoking by gender, and Figure 24 displays trends in adult smoking by age group from 1984-2012. In general, smoking prevalence in Ohio was higher among males than females and was lower among older age groups during this time period.¹⁵

Nationally, 18% of high school students in grades 9-12 were current smokers in 2011, with American Indian/Alaska Native (31%) and Native Hawaiian or Other Pacific Islander (24%) having the highest smoking prevalence of all racial/ethnic groups followed by white students (20%).³² Self-reported data from the 2010 Ohio Youth Tobacco Survey (OYTS) indicated that Ohio high school students in the 11th (20%) and 12th (19%) grades were significantly more likely to smoke compared to 9th graders (14%).³³ A small percentage of middle school students also reported being current smokers; smoking prevalence was 3%, 5%, and 6% among 6th, 7th, and 8th graders, respectively.³³

FIGURE 23 Trends in the Prevalence of Current Cigarette Smoking Among Adults 18 and Older by Gender in Ohio, 1984-2012^{1,2,3,4}

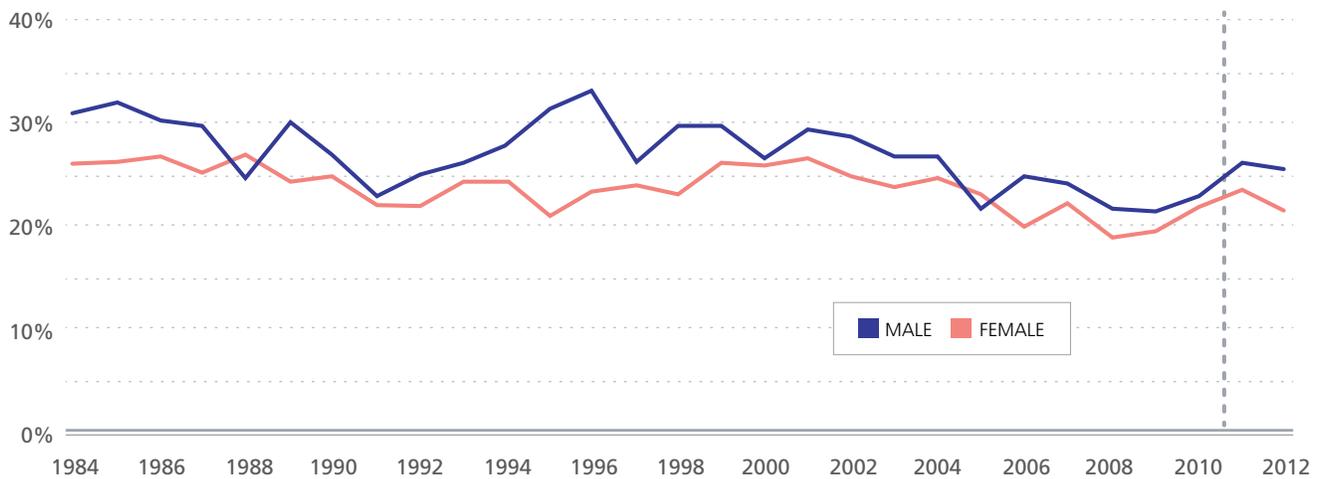
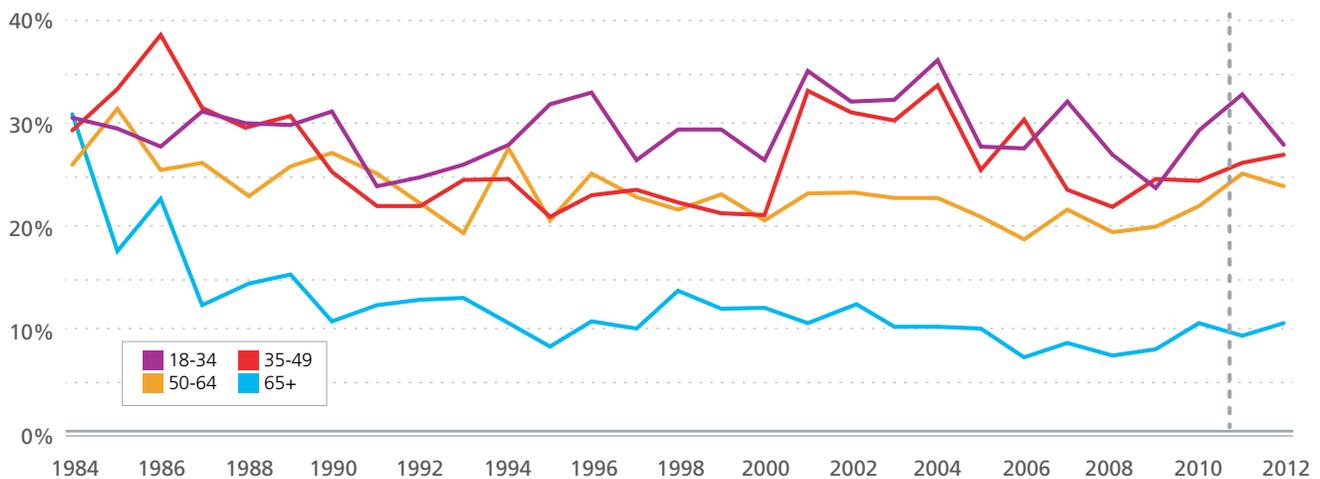


FIGURE 24 Trends in the Prevalence of Current Cigarette Smoking Among Adults 18 and Older by Age Group in Ohio, 1984-2012^{1,2,3,4}



FOOTNOTES FOR FIGURES 23-24

¹ Source: Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2013.

² Data from 2011-present were weighted by age, gender, 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 gender using a post-stratification method. Thus, BRFSS data for 2011-present should not be compared to data prior to 2011.

³ "Don't Know" and "Refused" were excluded from the denominator. This can cause an artificially high percentage.

⁴ "Current Cigarette Smoking" is defined as persons who reported smoking at least 100 cigarettes in their lifetime and currently smoke every day or some days.

Smokeless Tobacco

In 1986, the US 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.³⁴

- Among adults 18 and older, national data in 2010 showed 5% of men and less than 1% of women were current users of smokeless tobacco.¹
- According to the 2012 Ohio BRFSS, 5% of Ohio adults used smokeless tobacco every day or some days.¹⁵
- The prevalence of smokeless tobacco use in Ohio in 2012 was 8% among adult males, while the prevalence was less than 1% among adult females.¹⁵
- Nationally, an estimated 8% of high school students (13% male, 2% female) were current users of smokeless tobacco in 2011.³²
- In 2011, 12% of Ohio high school students (19% male, 4% female) reported being current users of smokeless tobacco.³²

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.³⁵ A comprehensive program coordinates efforts to establish smoke-free policies, reduce the social acceptability of tobacco use, promote cessation, help tobacco users quit, and prevent initiation of tobacco use.³⁵ This approach combines educational, clinical, regulatory, economic, and social strategies.³⁵ Laws and policies that include higher taxes on tobacco, implementation of smoke-free policies, limiting minors' access to tobacco products, and providing insurance coverage for tobacco-use treatment have all been effective in protecting the public from secondhand smoke exposure, promoting cessation, and preventing initiation by young people.³⁵

According to a 2012 report by the US Surgeon General, comprehensive, sustained, multi-component programs can cut youth tobacco use in half in six years.²⁹ Prevention is critical. Successful multi-component programs prevent young people from using tobacco in the first place and pay for themselves in lives and health care dollars saved.²⁹ Strategies that comprise successful comprehensive tobacco control programs for youth include mass media campaigns, higher tobacco prices, smoke-free laws and policies, evidence-based school programs, and sustained community-wide efforts.²⁹ These programs are most effective when funding for them is sustained at levels recommended by the CDC.²⁹

Smoking Cessation

In 2004, the US Surgeon General outlined the benefits of smoking cessation:²⁵

- People who quit, regardless of age, live longer than people who continue to smoke.¹
- Smokers who quit before 50 cut their risk of dying in the next 15 years in half compared with those who continue to smoke.¹
- Quitting smoking substantially decreases the risk of cancer of the cervix; esophagus; kidney and renal pelvis; larynx; lung and bronchus; oral cavity and pharynx; pancreas; stomach; and urinary bladder, as well as acute myeloid leukemia.¹
- Quitting lowers the risk for other major diseases including coronary heart disease and stroke.¹

Among adults 18 and older in Ohio, 2012 data showed about 56% of current smokers in Ohio had stopped smoking at least one day in the preceding 12 months because they were trying to quit.¹⁵



Nutrition, Physical Activity, Overweight and Obesity, and Cancer

Nutrition and Physical Activity

For the majority of Americans, dietary choices and physical activity are the most important modifiable strategies to reduce cancer risk, in addition to not using tobacco products.³⁶ Poor nutrition, physical inactivity, and excess weight are estimated to account for one-quarter to one-third of cancers in high income countries like the US, and can be prevented.¹ To provide the public with current cancer prevention information, the ACS periodically reviews, updates, and publishes guidelines on nutrition and physical activity. The most recent ACS guidelines, completed in 2012, emphasize weight control, dietary patterns, physical activity patterns, and limiting alcohol consumption in reducing cancer risk. The guidelines also recommend policy and environmental changes and urge public, private, and community organizations to create social and physical environments that support the adoption and maintenance of healthy nutrition and physical activity behaviors to help people stay well.¹

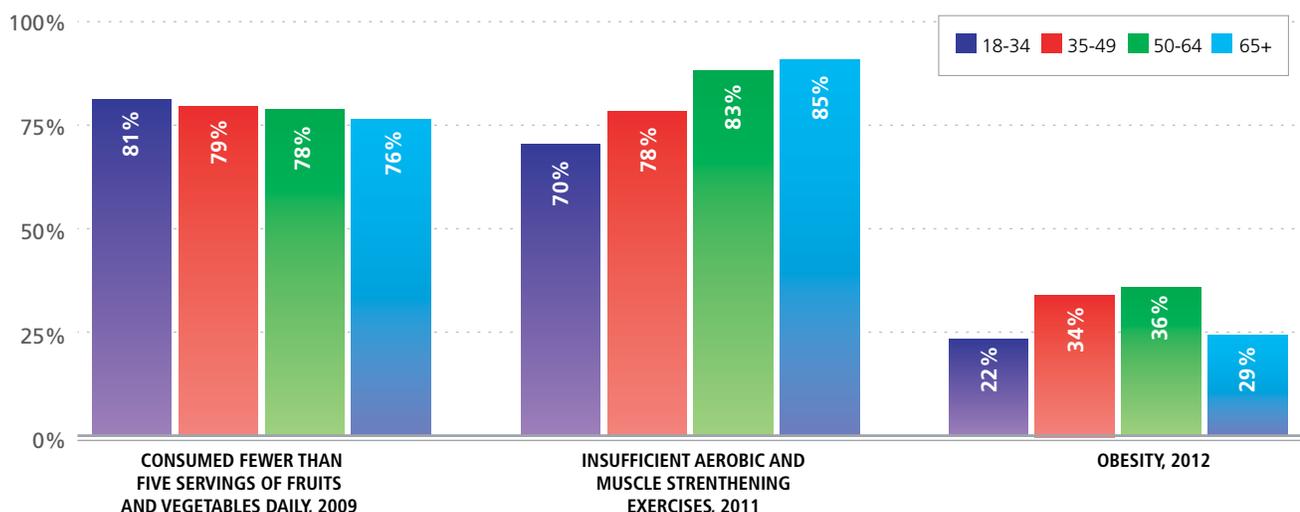


Nutrition, Physical Activity, and Overweight and Obesity among Adults

NUTRITION

Increased knowledge and awareness about the relationship between diet and disease has influenced food consumption patterns. The diet quality of Americans is far from optimal, and the Healthy Eating Index 2010 (HEI-2010) total score did not improve overall between 2001-2002 and 2007-2008.³⁷ *Dietary Guidelines for Americans, 2010* recommends that in addition to maintaining a calorie balance over time to achieve a healthy weight, Americans also need to focus on consuming nutrient-dense foods and beverages.³⁷ Americans currently consume too much sodium and too many calories from solid fats, added sugars, and refined grains. A healthy eating pattern limits intake of sodium, solid fats, added sugars, and refined grains and emphasizes nutrient-dense foods and beverages – vegetables, fruits, whole grains, fat-free or low-fat milk and milk products, seafood, lean meats and poultry, eggs, beans and peas, and nuts and seeds.³⁷

FIGURE 25 Prevalence of Inadequate Fruit & Vegetable Consumption, Insufficient Aerobic and Muscle Strengthening Exercises, and Obesity Among Adults 18 and Older by Age Group in Ohio, 2009, 2011, and 2012^{1,2,3,4,5}



¹ Source: Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2013.

² Data from 2011-present were weighted by age, gender, 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 gender using a post-stratification method. Thus, BRFSS data for 2011-present should not be compared to data prior to 2011.

³ "Don't Know" and "Refused" were excluded from the denominator. This can cause an artificially high percentage.

⁴ Guidelines for recommended physical activity state that adults should get at least 150 minutes a week of moderate-intensity aerobic activity such as walking, or 75 minutes a week of vigorous-intensity aerobic activity, such as jogging, or a combination of both. 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.

⁵ "Obesity" is defined as body mass index (BMI) ≥ 30 kg/m².

FIGURE 26

Prevalence of Inadequate Fruit & Vegetable Consumption, Insufficient Aerobic and Muscle Strengthening Exercises, and Obesity Among Adults 18 and Older by Level of Education in Ohio, 2009, 2011, and 2012^{1,2,3,4,5}

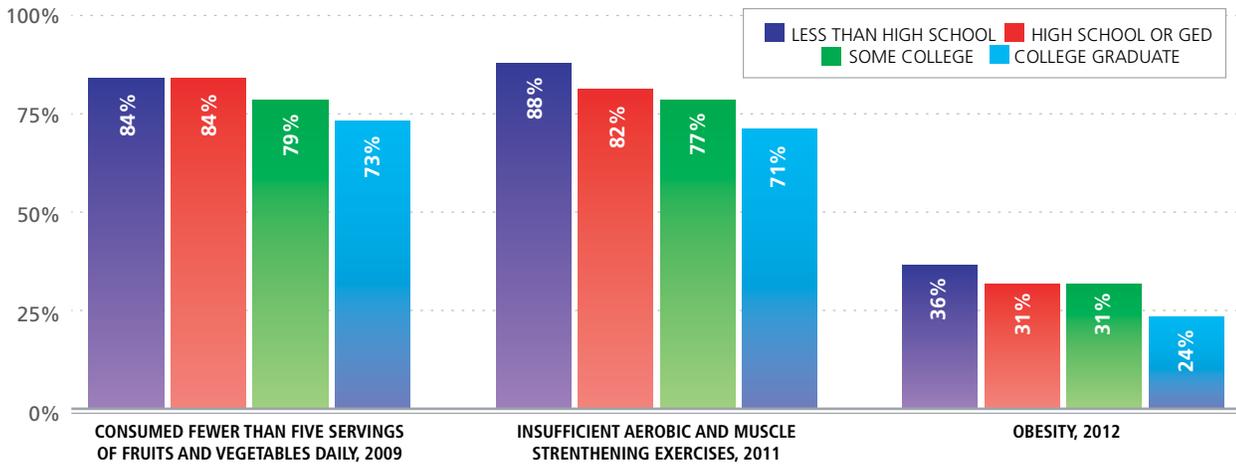


FIGURE 27

Prevalence of Inadequate Fruit & Vegetable Consumption, Insufficient Aerobic and Muscle Strengthening Exercises, and Obesity Among Adults 18 and Older by Household Income in Ohio, 2009, 2011, and 2012^{1,2,3,4,5}

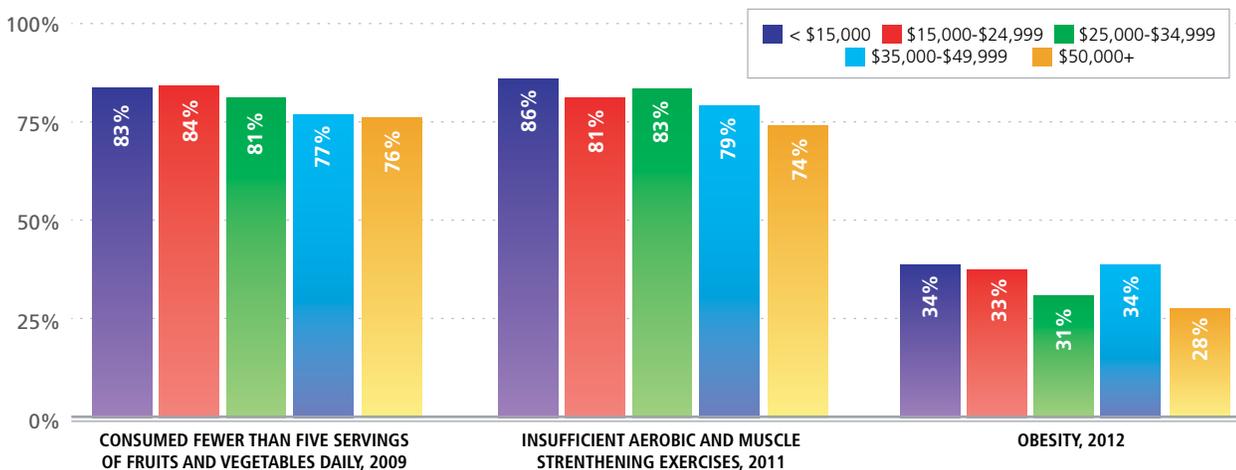
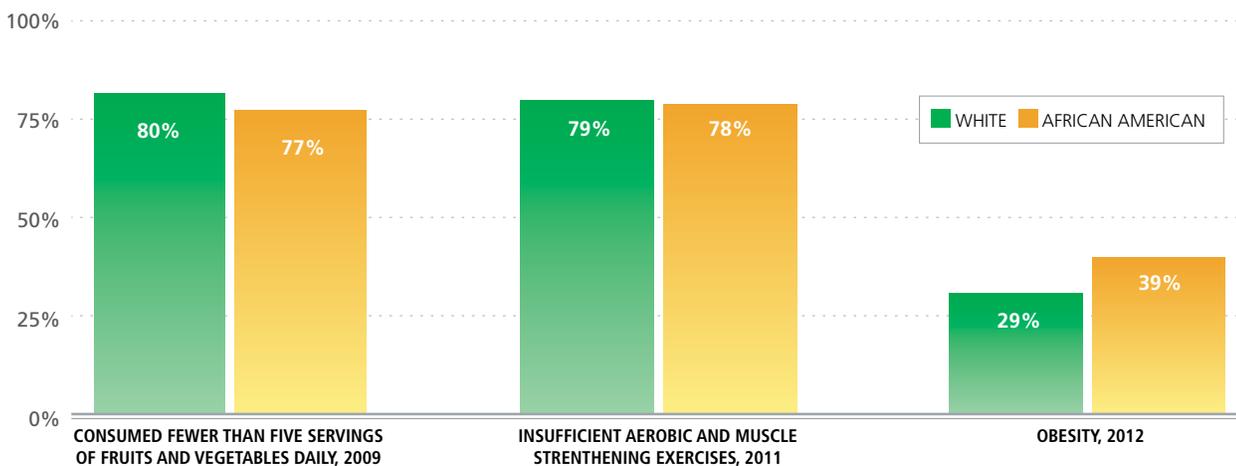


FIGURE 28

Prevalence of Inadequate Fruit & Vegetable Consumption, Insufficient Aerobic and Muscle Strengthening Exercises, and Obesity Among Adults 18 and Older by Race in Ohio, 2009, 2011, and 2012^{1,2,3,4,5}



FOOTNOTES FOR FIGURES 26-28

¹ Source: Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2013.

² Data from 2011-present were weighted by age, gender, 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 gender using a post-stratification method. Thus, BRFSS data for 2011-present should not be compared to data prior to 2011.

³ "Don't Know" and "Refused" were excluded from the denominator. This can cause an artificially high percentage.

⁴ Guidelines for recommended physical activity state that adults should get at least 150 minutes a week of moderate-intensity aerobic activity such as walking, or 75 minutes a week of vigorous-intensity aerobic activity, such as jogging, or a combination of both. 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.

⁵ "Obesity" is defined as body mass index (BMI) \geq 30 kg/m².

At the state level, healthful diets are monitored through fruit and vegetable consumption. In the 2009 Ohio BRFSS, 79% of Ohioans reported eating fewer than the recommended five servings of fruits and vegetables per day.¹⁵ In comparison to older adults, more young adults in Ohio reported eating fewer than five servings of fruits and vegetables (81% of people 18-34 versus 76% of people 65 and older) (Figure 25).¹⁵ Ohioans with a college degree were the least likely to report inadequate fruit and vegetable consumption (73%) compared to those with less education (Figure 26).¹⁵ Ohioans with the highest household incomes (\$50,000+) were less likely than Ohioans with lower household incomes (less than \$15,000 and \$15,000-\$24,999) to report inadequate fruit and vegetable consumption (Figure 27). Fruit and vegetable consumption was not shown to differ considerably by race (Figure 28).¹⁵

PHYSICAL ACTIVITY

CDC 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 walking, or 75 minutes a week of vigorous intensity aerobic activity, such as jogging or a combination of both.³⁹ The guidelines also recommend that adults do muscle-strengthening activities, such as push-ups, sit-ups, or activities using resistance bands or weights.³⁹ These activities should involve all major muscle groups and be done on two or more days per week. The health benefits of regular physical activity for the prevention of chronic diseases are well documented.¹ Recent evidence shows that physical activity may reduce the risk of several types of cancer including cancer of the breast, colon and rectum, and endometrium as well as advanced prostate cancer.¹ However, according to national data from the 2011 BRFSS, 79% of Americans did not meet the guidelines for both aerobic and muscle-strengthening activities.¹⁵ Similarly, 79% of adult Ohioans did not meet the aerobic and muscle-strengthening guidelines.¹⁵

According to the 2011 Ohio BRFSS, as age increased, the proportion of insufficient physical activity increased (Figure 25).¹⁵ However, higher levels of education (college graduate) and household income (\$50,000 or more) were associated with lower proportions of insufficient physical activity (Figures 26 and 27).¹⁵

OVERWEIGHT AND OBESITY

High caloric intake combined with inadequate physical activity leads to weight gain and subsequent development of overweight and obese children and adults. The NCI has identified the following cancer sites/types as being associated with overweight and obesity; adenocarcinoma of the esophagus; endometrial (corpus uterus); postmenopausal female breast; gallbladder; kidney and renal pelvis; pancreas, and thyroid.³⁸ In addition, overweight and obesity may increase the risk of other male genital cancers, ovarian cancer, non-Hodgkin's lymphoma, leukemia, liver and intrahepatic bile duct cancer, and hemangioma.³⁸

Data from the National Health and Nutrition Examination Survey (NHANES) indicated that the percentage of obese adults ages 20-74 rose dramatically from 13% in 1960-1962 to 34% in 2007-2008, with the largest increases occurring in the 1990s.⁴⁰ In 2012, the percentage of adults in Ohio classified as overweight was 35% and an additional 30% were obese.¹⁵

A greater proportion of African Americans (39%) in Ohio were obese compared to whites (29%) in 2012 (Figure 28).¹⁵ Obesity levels were highest among the 50- to 64-year age group (36%) (Figure 25).¹⁵ Ohioans with the highest level of education (college graduate) reported the lowest percentage of obesity (24%) (Figure 26) and Ohioans with the highest levels of income (\$50,000 or more) were the least likely to be obese (28%) (Figure 27).¹⁵

GUIDELINES ON NUTRITION AND PHYSICAL ACTIVITY FOR CANCER PREVENTION³⁸

1. MAINTAIN A HEALTHY WEIGHT THROUGHOUT LIFE.

- 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.

- 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.

Nutrition, Physical Activity, and Overweight and Obesity Among Youths

NUTRITION

A nutritious diet high in fruits and vegetables and low in saturated fat and sodium is important for growth and development. However, according to the US Department of Agriculture's Healthy Eating Index, most children ages 2-17 have a diet that falls considerably short of recommendations.⁴¹ This measure has remained consistent since 2003. In addition, diet quality has been shown to decline from childhood to adolescence due to low fruit and high salt and fat consumption, largely from an increased consumption of fast food and salty snacks.⁴² Ohio data from the Youth Risk Behavior Survey (YRBS) in 2011 showed that less than one-fifth (17%) of Ohio high school students ate five or more servings of fruits and vegetables per day.³²

To shift the trend toward more healthful diets among America's youths, both children and parents need to understand the impact of away-from-home meals on the overall diet. School-based nutrition programs play an important role in promoting life-long healthy eating and should be a part of a comprehensive school health program that includes health education; a healthy environment; health services; counseling; psychological and social services; integrated school and community efforts; physical education; nutrition; and health promotion among faculty and staff.⁴³

PHYSICAL ACTIVITY

Physical activity in childhood and adolescence can help maintain a healthy weight, improve muscular strength, enhance aerobic endurance, and promote lifelong physical activity.⁴⁴ In Ohio in 2011, only 25% of high school students reported engaging in at least 60 minutes or more of physical activity during the past seven days.³² Children and adolescents can reach recommended physical activity levels by walking or riding a bicycle to school. However, barriers such as motor-vehicle traffic and distance to school often prevent students from engaging these easy forms of moderate physical activity.⁴⁵ Parents should serve as physically active role models, incorporate physical activity in family events, and encourage opportunities for their children's physical activity, such as extracurricular school physical activity programs or community physical activity programs.

Body mass index (BMI) is used in children to screen for overweight 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. (www.cdc.gov/growthcharts).³⁸ Definitions of overweight among children are as follows:

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

OVERWEIGHT AND OBESITY

Research has shown that overweight children and adolescents are at greater risk of becoming overweight or obese in adulthood and are therefore more at risk for associated adult health problems such as several types of cancer, heart disease, Type 2 diabetes, stroke, and osteoarthritis.⁴⁶ Recent national data showed that the percentage of overweight children six to 11 years old increased from 4% in 1963-1965 to 20% in 2007-2008.⁴⁷ Similarly, the percentage of overweight adolescents 12 to 19 years old increased from 5% in 1966-1970 to 18% in 2007-2008.⁴⁷ Nationally in 2011, 15% of high school students were considered overweight.³² In 2011 in Ohio, 15% of high school students were overweight and an additional 15% were obese.³²

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 US 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 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.

Burden - Overall impact of cancer in a community.

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% 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 US. People who identify their origin as Spanish, Hispanic, or Latino may be of any race.

Five-year survival probability - The percentage of people with a given cancer who survive five years or longer with the disease. Although the term "five-year survival rate" is commonly used, the expression actually refers to a probability.

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 to involve adjacent tissues.

Lifetime risk - The probability that an individual, over the course of a lifetime, 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.

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/Unknown - 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).

**TABLE
A-1**

**Cancer of the Female Breast: Percentage of New Cancer Cases
by County of Residence and Stage at Diagnosis in Ohio, 2006-2010^{1,2}**

	Early Stage*	Late Stage*	Unstaged/ Unknown	Average Annual Cases
	%	%	%	
Ohio	67%	29%	4%	10,146
Adams	68%	27%	5%	21
Allen	63%	34%	3%	90
Ashland	64%	32%	4%	47
Ashtabula	65%	30%	5%	85
Athens	60%	26%	15%	37
Auglaize	61%	35%	4%	42
Belmont	68%	29%	3%	82
Brown	69%	26%	5%	31
Butler	67%	30%	4%	290
Carroll	74%	25%	1%	24
Champaign	65%	32%	3%	32
Clark	61%	35%	4%	130
Clermont	70%	28%	1%	151
Clinton	71%	27%	2%	40
Columbiana	63%	31%	6%	99
Coshocton	56%	38%	5%	29
Crawford	58%	39%	4%	43
Cuyahoga	67%	30%	3%	1,339
Darke	61%	34%	5%	38
Defiance	67%	28%	5%	26
Delaware	70%	27%	3%	139
Erie	64%	34%	2%	85
Fairfield	66%	29%	5%	116
Fayette	70%	26%	4%	18
Franklin	67%	30%	4%	893
Fulton	74%	23%	3%	31
Gallia	69%	29%	1%	29
Geauga	71%	25%	4%	93
Greene	69%	28%	4%	153
Guernsey	59%	40%	1%	40
Hamilton	70%	28%	3%	777
Hancock	67%	30%	4%	62
Hardin	58%	38%	4%	24
Harrison	62%	33%	5%	13
Henry	61%	35%	4%	20
Highland	67%	30%	3%	32
Hocking	64%	26%	10%	24
Holmes	57%	27%	16%	20
Huron	66%	28%	5%	51
Jackson	61%	38%	2%	24
Jefferson	70%	27%	3%	72
Knox	63%	30%	8%	57
Lake	70%	27%	3%	233
Lawrence	65%	30%	5%	53

	Early Stage*	Late Stage*	Unstaged/ Unknown	Average Annual Cases
	%	%	%	
Ohio	67%	29%	4%	10,146
Licking	70%	27%	3%	139
Logan	62%	34%	4%	48
Lorain	68%	29%	3%	256
Lucas	66%	31%	3%	341
Madison	59%	38%	2%	35
Mahoning	63%	30%	7%	242
Marion	60%	36%	4%	53
Medina	69%	28%	2%	162
Meigs	74%	23%	4%	16
Mercer	63%	29%	8%	35
Miami	68%	29%	3%	87
Monroe	62%	31%	8%	13
Montgomery	69%	29%	3%	503
Morgan	60%	36%	4%	11
Morrow	56%	35%	9%	27
Muskingum	58%	38%	4%	65
Noble	58%	40%	2%	9
Ottawa	70%	26%	4%	45
Paulding	46%	45%	9%	11
Perry	59%	39%	2%	24
Pickaway	68%	28%	4%	42
Pike	76%	21%	3%	19
Portage	66%	32%	2%	119
Preble	65%	30%	5%	37
Putnam	73%	25%	3%	31
Richland	70%	28%	2%	113
Ross	61%	35%	4%	57
Sandusky	72%	25%	3%	58
Scioto	65%	34%	2%	61
Seneca	69%	28%	3%	48
Shelby	66%	27%	7%	42
Stark	69%	27%	4%	363
Summit	68%	30%	3%	467
Trumbull	67%	29%	3%	215
Tuscarawas	70%	26%	4%	85
Union	60%	34%	6%	34
Van Wert	55%	36%	10%	25
Vinton	53%	38%	9%	9
Warren	67%	31%	2%	172
Washington	66%	31%	3%	58
Wayne	73%	22%	5%	98
Williams	59%	39%	2%	30
Wood	66%	30%	4%	90
Wyandot	64%	33%	2%	18

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2013.

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 cancers only (e.g., Table 4).

* Early stage includes tumors diagnosed *in situ* and localized stages, and late stage includes tumors diagnosed regional and distant stages.

**TABLE
A-2**

**Cancer of the Colon & Rectum: Percentage of New Cancer Cases
by County of Residence and Stage at Diagnosis in Ohio, 2006-2010^{1,2}**

	Early Stage*	Late Stage*	Unstaged/ Unknown	Average Annual Cases
	%	%	%	
Ohio	42%	48%	11%	6,358
Adams	45%	45%	10%	21
Allen	47%	43%	10%	57
Ashland	34%	56%	9%	32
Ashtabula	40%	48%	12%	68
Athens	47%	46%	7%	26
Auglaize	44%	44%	12%	35
Belmont	44%	50%	7%	52
Brown	36%	53%	12%	24
Butler	43%	45%	12%	181
Carroll	45%	47%	9%	20
Champaign	41%	46%	13%	25
Clark	44%	47%	10%	83
Clermont	45%	46%	9%	91
Clinton	43%	46%	11%	27
Columbiana	39%	46%	15%	69
Coshocton	41%	53%	6%	27
Crawford	48%	40%	12%	33
Cuyahoga	41%	49%	10%	777
Darke	43%	44%	13%	39
Defiance	40%	49%	10%	20
Delaware	40%	48%	12%	61
Erie	46%	46%	8%	65
Fairfield	42%	46%	13%	70
Fayette	37%	43%	20%	15
Franklin	36%	53%	11%	458
Fulton	45%	44%	11%	22
Gallia	46%	46%	8%	19
Geauga	42%	47%	12%	49
Greene	41%	43%	15%	82
Guernsey	28%	63%	9%	28
Hamilton	44%	44%	12%	432
Hancock	36%	54%	10%	34
Hardin	35%	53%	12%	19
Harrison	54%	41%	5%	11
Henry	30%	57%	13%	11
Highland	39%	49%	12%	24
Hocking	39%	38%	24%	17
Holmes	31%	49%	20%	18
Huron	46%	39%	15%	40
Jackson	43%	49%	9%	21
Jefferson	46%	42%	12%	53
Knox	39%	53%	8%	41
Lake	36%	50%	14%	132
Lawrence	53%	34%	13%	41

	Early Stage*	Late Stage*	Unstaged/ Unknown	Average Annual Cases
	%	%	%	
Ohio	42%	48%	11%	6,358
Licking	34%	56%	10%	86
Logan	42%	51%	7%	27
Lorain	45%	46%	10%	166
Lucas	39%	52%	8%	213
Madison	41%	50%	8%	21
Mahoning	37%	48%	15%	169
Marion	49%	41%	10%	48
Medina	45%	49%	6%	80
Meigs	48%	44%	8%	17
Mercer	46%	42%	12%	33
Miami	49%	41%	11%	59
Monroe	49%	47%	4%	11
Montgomery	42%	47%	11%	287
Morgan	42%	42%	16%	11
Morrow	38%	51%	10%	21
Muskingum	39%	49%	12%	45
Noble	30%	56%	14%	13
Ottawa	43%	47%	10%	28
Paulding	35%	46%	19%	10
Perry	46%	45%	9%	17
Pickaway	37%	57%	6%	28
Pike	46%	41%	13%	16
Portage	47%	47%	7%	78
Preble	48%	39%	13%	24
Putnam	46%	42%	12%	19
Richland	49%	44%	8%	96
Ross	39%	47%	13%	42
Sandusky	50%	42%	8%	41
Scioto	43%	48%	9%	49
Seneca	41%	50%	8%	40
Shelby	52%	39%	9%	33
Stark	41%	48%	11%	224
Summit	42%	48%	10%	291
Trumbull	37%	54%	9%	155
Tuscarawas	42%	46%	13%	60
Union	50%	41%	8%	22
Van Wert	43%	42%	14%	23
Vinton	31%	58%	11%	7
Warren	46%	45%	9%	81
Washington	44%	52%	4%	38
Wayne	47%	43%	10%	56
Williams	51%	43%	6%	25
Wood	43%	48%	10%	63
Wyandot	40%	43%	17%	15

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2013.

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 cancers only (e.g., Table 4).

* Early stage includes tumors diagnosed *in situ* and localized stages, and late stage includes tumors diagnosed regional and distant stages.

**TABLE
A-3**

Cancer of the Lung & Bronchus: Percentage of New Cancer Cases by County of Residence and Stage at Diagnosis in Ohio, 2006-2010^{1,2}

	Early Stage*	Late Stage*	Unstaged/ Unknown	Average Annual Cases
	%	%	%	
Ohio	17%	69%	14%	9,443
Adams	18%	64%	18%	32
Allen	14%	77%	9%	94
Ashland	14%	64%	22%	39
Ashtabula	16%	68%	16%	101
Athens	16%	65%	19%	45
Auglaize	16%	65%	19%	40
Belmont	20%	67%	13%	68
Brown	17%	62%	21%	49
Butler	17%	73%	10%	264
Carroll	14%	69%	17%	28
Champaign	14%	66%	21%	34
Clark	16%	71%	13%	143
Clermont	23%	70%	7%	178
Clinton	19%	66%	15%	43
Columbiana	14%	66%	19%	105
Coshocton	13%	66%	22%	34
Crawford	16%	66%	18%	36
Cuyahoga	18%	68%	14%	1,138
Darke	13%	70%	17%	38
Defiance	13%	65%	22%	33
Delaware	15%	74%	11%	90
Erie	12%	74%	14%	76
Fairfield	19%	68%	13%	114
Fayette	12%	69%	19%	27
Franklin	19%	70%	11%	740
Fulton	17%	63%	20%	28
Gallia	23%	72%	5%	35
Geauga	21%	64%	15%	61
Greene	19%	70%	12%	109
Guernsey	17%	69%	13%	39
Hamilton	19%	70%	11%	664
Hancock	18%	68%	14%	47
Hardin	20%	68%	13%	26
Harrison	19%	56%	25%	14
Henry	18%	66%	16%	19
Highland	14%	58%	28%	44
Hocking	17%	66%	17%	26
Holmes	6%	76%	18%	14
Huron	14%	75%	11%	49
Jackson	14%	71%	16%	30
Jefferson	19%	70%	11%	74
Knox	17%	72%	12%	45
Lake	18%	64%	18%	222
Lawrence	15%	65%	20%	67

	Early Stage*	Late Stage*	Unstaged/ Unknown	Average Annual Cases
	%	%	%	
Ohio	17%	69%	14%	9,443
Licking	16%	69%	15%	138
Logan	14%	65%	20%	40
Lorain	14%	72%	13%	252
Lucas	17%	67%	16%	331
Madison	15%	69%	16%	34
Mahoning	12%	67%	21%	224
Marion	13%	68%	19%	69
Medina	18%	71%	11%	110
Meigs	12%	77%	11%	21
Mercer	17%	55%	27%	26
Miami	13%	74%	13%	82
Monroe	22%	64%	14%	17
Montgomery	19%	70%	11%	511
Morgan	20%	68%	12%	15
Morrow	16%	73%	11%	28
Muskingum	16%	67%	16%	81
Noble	9%	65%	26%	11
Ottawa	11%	79%	10%	42
Paulding	18%	55%	27%	17
Perry	17%	68%	15%	30
Pickaway	20%	63%	17%	51
Pike	16%	66%	18%	30
Portage	17%	71%	12%	123
Preble	20%	61%	20%	33
Putnam	22%	74%	4%	18
Richland	17%	73%	10%	107
Ross	13%	64%	22%	74
Sandusky	16%	64%	20%	46
Scioto	17%	73%	10%	96
Seneca	15%	73%	12%	42
Shelby	13%	58%	29%	31
Stark	14%	72%	14%	317
Summit	16%	67%	17%	453
Trumbull	17%	71%	12%	225
Tuscarawas	9%	66%	25%	72
Union	12%	72%	16%	28
Van Wert	20%	60%	21%	20
Vinton	18%	67%	15%	17
Warren	19%	69%	12%	126
Washington	18%	72%	10%	64
Wayne	14%	65%	21%	72
Williams	8%	79%	13%	29
Wood	16%	65%	19%	72
Wyandot	16%	70%	14%	21

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2013.

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 cancers only (e.g., Table 4).

* Early stage includes tumors diagnosed *in situ* and localized stages, and late stage includes tumors diagnosed regional and distant stages.

**TABLE
A-4**

**Cancer of the Prostate: Percentage of New Cancer Cases
by County of Residence and Stage at Diagnosis in Ohio, 2006-2010^{1,2}**

	Early Stage*	Late Stage*	Unstaged/ Unknown	Average Annual Cases
	%	%	%	
Ohio	82%	11%	7%	8,228
Adams	81%	5%	13%	18
Allen	78%	13%	8%	72
Ashland	78%	12%	10%	33
Ashtabula	75%	13%	13%	96
Athens	81%	11%	8%	39
Auglaize	79%	16%	5%	29
Belmont	93%	3%	4%	67
Brown	81%	9%	10%	33
Butler	81%	13%	6%	221
Carroll	86%	8%	6%	28
Champaign	78%	10%	12%	25
Clark	81%	13%	6%	109
Clermont	84%	11%	5%	131
Clinton	76%	14%	10%	27
Columbiana	79%	9%	12%	94
Coshocton	75%	12%	13%	22
Crawford	84%	12%	4%	34
Cuyahoga	82%	11%	7%	1,042
Darke	80%	12%	8%	29
Defiance	83%	10%	7%	30
Delaware	82%	13%	6%	113
Erie	78%	11%	12%	67
Fairfield	78%	17%	5%	97
Fayette	75%	15%	10%	17
Franklin	81%	11%	8%	718
Fulton	84%	8%	8%	22
Gallia	81%	13%	7%	18
Geauga	81%	13%	6%	80
Greene	78%	12%	10%	103
Guernsey	79%	15%	6%	28
Hamilton	85%	10%	5%	618
Hancock	79%	18%	4%	58
Hardin	84%	7%	9%	23
Harrison	85%	3%	13%	14
Henry	81%	9%	10%	20
Highland	78%	10%	11%	21
Hocking	73%	17%	10%	16
Holmes	73%	8%	18%	12
Huron	78%	15%	7%	39
Jackson	78%	17%	5%	18
Jefferson	91%	5%	5%	73
Knox	78%	15%	8%	42
Lake	70%	14%	17%	187
Lawrence	80%	15%	5%	33

	Early Stage*	Late Stage*	Unstaged/ Unknown	Average Annual Cases
	%	%	%	
Ohio	82%	11%	7%	8,228
Licking	78%	14%	9%	117
Logan	75%	17%	9%	28
Lorain	84%	10%	6%	214
Lucas	83%	11%	6%	297
Madison	79%	14%	8%	32
Mahoning	81%	10%	10%	222
Marion	82%	12%	6%	49
Medina	84%	12%	4%	123
Meigs	77%	16%	7%	15
Mercer	77%	13%	10%	22
Miami	85%	11%	4%	73
Monroe	95%	2%	2%	17
Montgomery	81%	10%	9%	411
Morgan	81%	15%	4%	10
Morrow	85%	8%	7%	24
Muskingum	76%	16%	8%	51
Noble	88%	10%	2%	8
Ottawa	83%	10%	8%	40
Paulding	81%	12%	7%	8
Perry	80%	17%	3%	19
Pickaway	83%	9%	7%	30
Pike	70%	22%	9%	14
Portage	87%	8%	5%	120
Preble	84%	10%	6%	28
Putnam	76%	18%	6%	22
Richland	83%	11%	5%	92
Ross	73%	19%	8%	46
Sandusky	79%	11%	9%	37
Scioto	77%	17%	6%	57
Seneca	82%	9%	9%	44
Shelby	81%	9%	10%	30
Stark	86%	10%	5%	314
Summit	82%	10%	8%	333
Trumbull	83%	11%	5%	184
Tuscarawas	87%	9%	4%	79
Union	83%	9%	8%	26
Van Wert	76%	16%	8%	12
Vinton	88%	9%	3%	7
Warren	83%	11%	7%	124
Washington	85%	10%	5%	48
Wayne	81%	10%	8%	55
Williams	80%	13%	7%	25
Wood	81%	13%	6%	84
Wyandot	86%	11%	2%	18

¹ Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2013.

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 cancers only (e.g., Table 4).

* Early stage includes tumors diagnosed *in situ* and localized stages, and late stage includes tumors diagnosed regional and distant stages.

**American Cancer Society 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. PREVENTATIVE SERVICES TASK FORCE**

Gender	Primary Site/Type	Age	Test or Procedure***	Age	Test or Procedure***
Female	Cervix	21-29 ¹	Pap test every 3 years. Human papillomavirus (HPV) testing should <i>not</i> be used in this age group unless it is needed after an abnormal Pap test result.	21-65 ^{1,8}	Pap test every 3 years
		30-65 ²	Pap test and HPV test (called "co-testing") every 5 years, or Pap test alone every 3 years	30-65 ^{8,9}	Screening with a combination of Pap and HPV testing every 5 years (for women who want to lengthen the screening interval)
	Breast	20-39 ³	Clinical breast exam (CBE) about every 3 years	50-74 ¹⁰	Mammogram every two years
		40+ ³	Clinical breast exam (CBE) and mammogram every year	75+	Evidence is insufficient to assess the benefits and harms of screening.
Male	Prostate	50+ ⁴	Begin periodic discussion about prostate cancer screening	Any	Evidence is insufficient to assess the benefits and harms of screening.
Female and Male	Colon and Rectum	50+	<p>TESTS THAT FIND POLYPS AND CANCER⁵ Flexible sigmoidoscopy every 5 years⁶, or Colonoscopy every 10 years, or Double-contrast barium enema every 5 years⁶, or CT colonography (virtual colonoscopy) every 5 years⁶</p> <p>TESTS THAT PRIMARILY FIND CANCER Fecal occult blood test (FOBT) every year^{6,7}, or Fecal immunochemical test (FIT) every year^{6,7}</p>	50-75 ¹¹	Screening colonoscopy every 10 years, or Sigmoidoscopy every 5 years, with high-sensitivity FOBT every 3 years, or Screening with high-sensitivity FOBT every year

Source: Ohio Department of Health and The Ohio State University, 2014.

¹ Screening should begin at 21. Women under 21 should not be tested.

² 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.

³ Breast self-exam is an option for women starting in their 20s. Women should know how their breasts normally feel and report any breast change promptly to their health care provider. Some women, because of family history, a genetic tendency, or certain other factors, should be screened with magnetic resonance imaging (MRI) in addition to mammograms. Women should talk with their doctors about the benefits and limitations of adding MRI screening to their yearly mammograms.

⁴ The ACS recommends that men make an informed decision with their doctor 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 African American 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.

⁵ The tests that are designed to find both early cancer and polyps are preferred if these tests are available to you and you are willing to have one of these more invasive tests. Talk to your doctor about which test is best for you.

⁶ All positive tests should be followed up with a colonoscopy.

⁷ For FOBT or FIT to be a screening test, the take-home multiple-sample method should be used.

⁸ Screening after a hysterectomy with removal of the cervix among women and 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 is not recommended.

⁹ Women >65 who have had adequate prior screenings and are not otherwise at high risk of cervical cancer should not be tested.

¹⁰ 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.

¹¹ Colon and rectum cancer screening is not recommended for adults 76 to 85, although there may be considerations that support screening in an individual patient. Screening is not recommended for adults >85. These recommendations don't apply to individuals with specific inherited syndromes (Lynch Syndrome or Familial Adenomatous Polyposis) or those with inflammatory bowel disease.

* In addition to recommended cancer screenings named in the table, men and women 21 and older should seek periodic health counseling and exam of the thyroid, ovaries, testes, lymph nodes, oral cavity, and skin. According to ACS, patients who meet ALL of the following criteria may be candidates for lung cancer screening: 55 to 74 years old, 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. These criteria were based on what was used in the National Lung Screening Trial (NLST).

** The USPSTF states that evidence is insufficient to assess benefits and harms of screening for bladder, oral, and prostate cancer. The USPSTF recommends annual screening for lung cancer with low-dose computed tomography in adults aged 55 to 80 years who have a 30 pack-year smoking history and currently smoke or have quit within the past 15 years. 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. The USPSTF recommends against screening for ovarian, pancreatic, and testicular cancer.

*** 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 February 4, 2014.

Data Sources

Estimated New Cancer Cases and Deaths, 2013

The National Home Office of the American Cancer Society publishes estimates of new cancer cases at the national level, which are projected using a spatio-temporal model based on 1995-2009 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, medical settings, and cancer screening behaviors in the prediction model. Then, the number of new cases in the nation and each state are projected four years ahead. The estimated numbers of US cancer deaths are calculated by fitting the numbers of deaths for 1995-2009 from the National Center for Health Statistics to a statistical model that forecasts the number of deaths expected to occur in 2013.

Cancer Incidence and Mortality

Ohio cancer incidence data are from the Ohio Cancer Incidence Surveillance System, Ohio Department of Health. Ohio cancer mortality data are from the Chronic Disease and Behavioral Epidemiology Section and the Office of Vital Statistics at the Ohio Department of Health and are based on the underlying cause of death. Incidence and mortality rates for the US were published in the *SEER Cancer Statistics Review, 1975-2010*. Incidence rates in this publication are age-adjusted to the 2000 US 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 based on follow-up of patients into 2010.

Behavioral Risk Factor Data

The Ohio Department of Health, in conjunction with the Centers for Disease Control and Prevention (CDC), annually conducts the Behavioral Risk Factor Surveillance System (BRFSS) through landline and cell phone interviews of randomly selected adults 18 and older to provide insight into the health behaviors of Ohioans. To assure that prevalence estimates are representative of Ohio's population, data from 2011-present were weighted by age, gender, 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 gender 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)

This survey, which was developed by the CDC and is jointly sponsored by the Ohio Department of Health, Ohio Department of Alcohol and Drug Addiction Services, and the Ohio Department of Mental Health, 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.

Ohio Youth Tobacco Survey (OYTS)

The OYTS is a self-administered, school-based survey used to gather information about tobacco use prevalence, exposure to secondhand smoke, exposure to tobacco media messages, knowledge and beliefs about tobacco use, and future intent to use tobacco products.

Probability of Developing Cancer

Probabilities of developing cancer are calculated using DevCan (Probability of Developing Cancer Software) developed by the National Cancer Institute. These probabilities reflect the average experience of people in the US (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 15 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 the National Cancer Institute (www.cancer.gov) and the American Cancer Society (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 US. The survey is unique in that it combines interviews and physical examinations. NHANES is a major program of the National Center for Health Statistics (NCHS). NCHS is part of the Centers for Disease Control and Prevention (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 the American Cancer Society (www.cancer.org/healthy/findcancerearly/cancerscreeningguidelines/american-cancer-society-guidelines-for-the-early-detection-of-cancer) and the United States Preventive Services Task Force (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 US 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: 2005-2009. Volume Two: Registry-specific Cancer Incidence in the US and Canada*. Springfield, IL: North American Association of Central Cancer Registries, Inc. May 2012. Available at naaccr.org/DataandPublications/CINAPubs.aspx.
- C. Howlader N, Krapcho M, Neyman N, et al. (eds). *SEER Cancer Statistics Review, 1975-2009*. National Cancer Institute. Bethesda, MD, 2012. Available at www.seer.cancer.gov.
- D. Chen HS, Portier K, Ghosh K, et al. Predicting US 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 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2012 Sub (2000-2010) <Katrina/Rita Population Adjustment> - Linked To County Attributes - Total U.S., 1969-2011 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2013, based on the November 2012 submission. SEER*Stat software: Surveillance Research Program, National Cancer Institute SEER*Stat software (www.seer.cancer.gov/seerstat) version 8.0.4.
- F. DevCan: Probability of Developing and Dying of Cancer Software, Version 6.7.0; Statistical Research and Applications Branch, National Cancer Institute, 2013. <http://surveillance.cancer.gov/devcan/>

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