Ohio Cancer Facts & Figures

2010

American Cancer Society®

Ohio Cancer Incidence Surveillance System

The American Cancer Society is the nationwide community-based voluntary health organization dedicated to eliminating cancer as a major health problem by preventing cancer, saving lives, and diminishing suffering from cancer through research, education, advocacy, and service.

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

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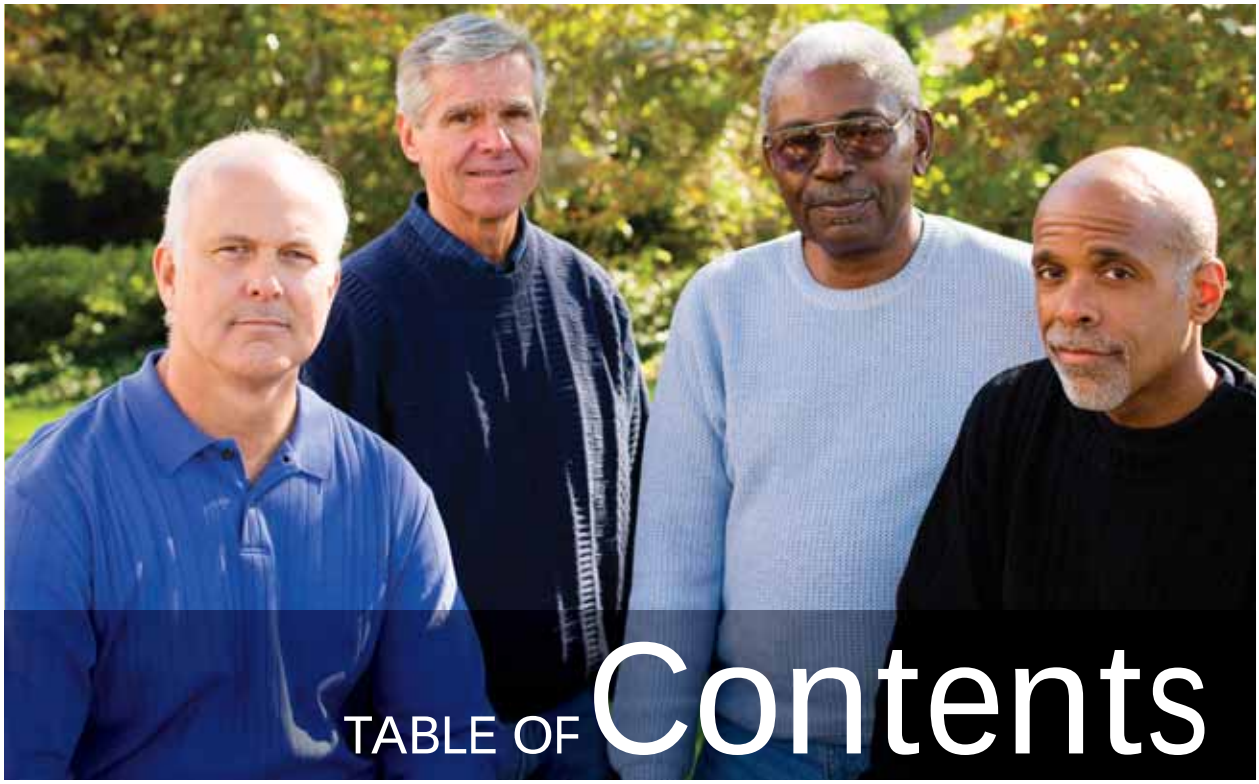

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Common Questions About Cancer

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?

No. 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?

Everyone. Anyone can develop cancer, but risk increases with age. About 78% 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.

In the US, men and women have about a 1 in 3 lifetime risk of developing invasive cancer.[2] Table 1 shows an individual's lifetime risk of developing selected cancers.

TABLE 1 Lifetime Risk of Being Diagnosed with Invasive Cancer for Selected Sites/Types in the US, 2005-2007[1,2,3]

Primary Cancer Site/Type	Gender	Approximate Risk from Birth to Death
All Sites/Types*	Male	1 in 3 (35.1%)
	Female	1 in 3 (29.0%)
Breast	Female	1 in 10 (10.0%)
Cervix	Female	1 in 161 (0.6%)
Colon & Rectum	Male	1 in 26 (3.9%)
	Female	1 in 32 (3.2%)
Hodgkin's Lymphoma	Male	1 in 405 (0.2%)
	Female	1 in 482 (0.2%)
Leukemia	Male	1 in 92 (1.1%)
	Female	1 in 135 (0.7%)
Lung & Bronchus	Male	1 in 18 (5.7%)
	Female	1 in 21 (4.7%)
Melanoma of the Skin	Male	1 in 55 (1.8%)
	Female	1 in 78 (1.3%)
Non-Hodgkin's Lymphoma	Male	1 in 58 (1.7%)
	Female	1 in 74 (1.4%)
Prostate	Male	1 in 7 (13.5%)
Urinary Bladder	Male	1 in 40 (2.5%)
	Female	1 in 138 (0.7%)
Uterine Corpus & Uterine NOS**	Female	1 in 46 (2.2%)

1 Source: DevCan: Probability of Developing or Dying of Cancer Software, Version 6.5.0; Statistical Research and Applications Branch, National Cancer Institute, 2009 (release date June 2010). http://srab.cancer.gov/devcan

2 Risk for those free of cancer at birth and living to 85, based on cancer cases diagnosed during 2005-2007.

3 Numbers are rounded to the nearest whole person.

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

** Not Otherwise Specified

What Percentage of People Survive Cancer?

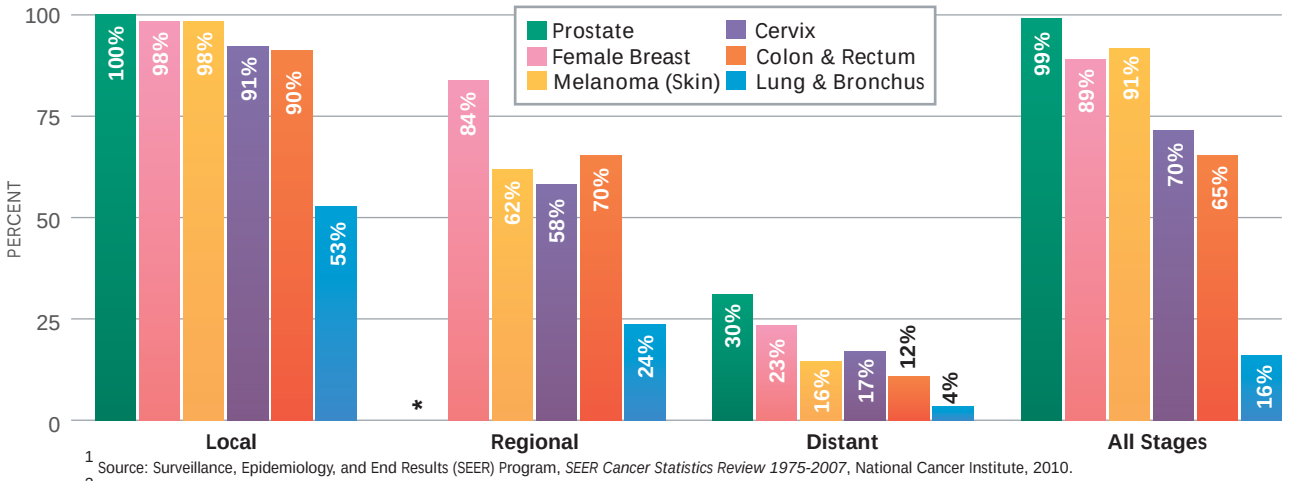
The five-year relative survival probability (often referred to as five-year survival "rate") for all cancers diagnosed between 1999 and 2006 is 68%, up from 50% in 1975-1977, partly because of improvements in early detection and treatment.[3] After adjusting for normal life expectancy (factors such as 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.

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 on next page). 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,1999-2006[1,2]



[1] Source: Surveillance, Epidemiology, and End Results (SEER) Program, *SEER Cancer Statistics Review 1975-2007*, National Cancer Institute, 2010.

[2] Percentages are adjusted for normal life expectancy and are based on cases diagnosed in the SEER 13 area from 1999-2006 and the SEER 17 area from 1999-2006, followed into 2007.

* 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.

In the US, men and women have about a

1 in 3 lifetime risk

of developing invasive cancer.[2]

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.

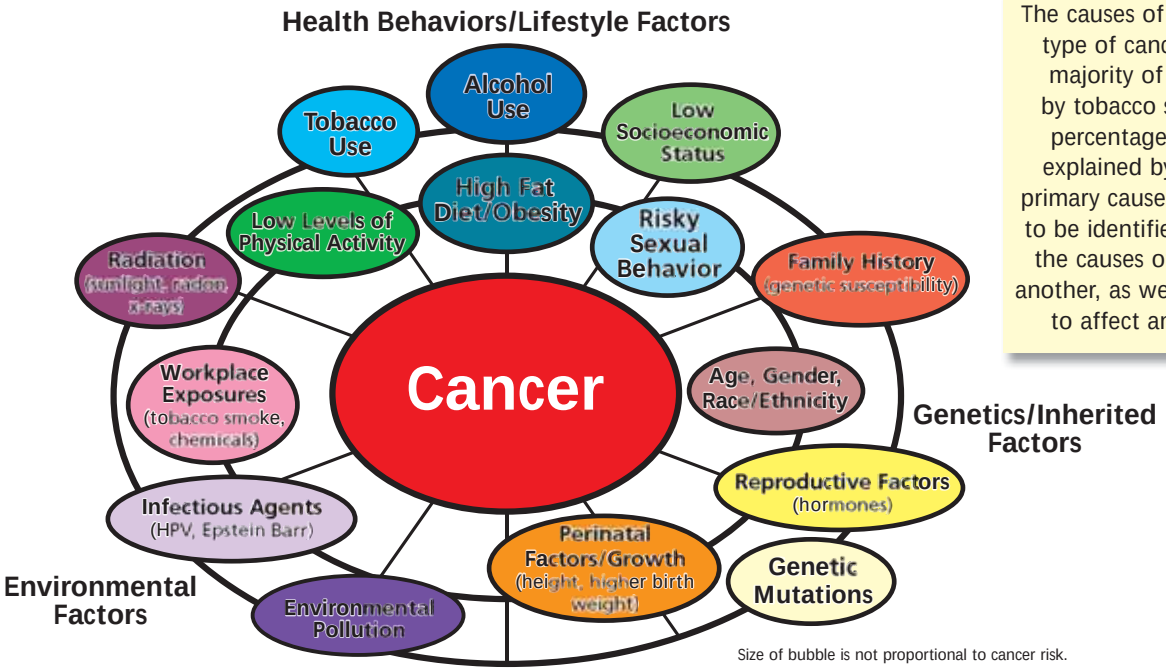
Can Most Cancers Be Found Early?

Yes. 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; and skin 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 98% 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.

How Many People Develop and Die From Cancer?

The National Cancer Institute estimates that approximately 11.4 million Americans with a history of cancer were alive in January 2006.[1] Some of these individuals were cancer-free, while others still had evidence of cancer and may have been undergoing treatment.[1] An estimated 1,529,560 new cancer cases and 569,490 cancer deaths are expected to occur in 2010 in the US.[1] In Ohio in 2010, the American Cancer Society estimates that 64,450 new cases of invasive cancer will be diagnosed, including approximately 10,710 cases of lung cancer; 8,280 cases of female breast cancer; 8,010 cases of prostate cancer; and 5,960 cases of colorectal cancer.[1] The Society also estimates that 24,980 cancer deaths will occur in Ohio in 2010 with the following sites/types accounting for the majority of deaths: lung and bronchus (7,260 deaths); colon and rectum (2,280 deaths); female breast (1,730 deaths); and pancreas (1,530 deaths).[1]

Factors that Increase Cancer Risk



The causes of cancer vary greatly by site/type of cancer. For example, the vast majority of lung 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. As shown in the figure, the causes of cancer interact with one another, as well as with unknown factors, to affect an individual's cancer risk.

Can Most Cancers Be Prevented?

Yes. All cancers caused by cigarette smoking and heavy use of alcohol could be prevented completely. The American Cancer Society estimates that in 2010 about 171,000 cancer deaths in the US and about 7,500 cancer deaths in Ohio will be caused by tobacco use.[1,4] Scientific evidence suggests that about one-third of the 569,490 US cancer deaths expected to occur in 2010 will be related to poor nutrition, physical inactivity, obesity, and other lifestyle factors and could be prevented.[1]

Certain cancers are related to infectious agents, *e.g.*, hepatitis B virus (HBV), human papillomavirus (HPV), human immunodeficiency virus (HIV), *helicobacter pylori (H. pylori)*, and others, and could be prevented through behavioral changes, vaccines, or antibiotics.[1] In addition, many of the more than 1 million skin cancers expected to be diagnosed in 2010 could be prevented by protection from the sun's rays and avoiding indoor tanning.[1]

What Are The Costs Of Cancer?

The National Institutes of Health estimated overall costs of cancer in the US for the year 2010 at $263.8 billion: $102.8 billion for direct medical costs (total of all health expenditures); $20.9 billion for indirect morbidity costs (cost of lost productivity due to illness); and $140.1 billion for indirect mortality costs (cost of lost productivity due to premature death).[1]

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 cancer incidence rate is 40.0 per 100,000, this means an average of 40 new cases of lung 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 cancer were diagnosed in the county per year:

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

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 colorectal 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 cancer incidence rate than California).

The primary reason for data not being 100% complete is that there are still physicians, hospitals, laboratories, and outpatient treatment and diagnostic facilities that are not reporting their cancer data to the OCISS. Completeness standards help ensure that the true cancer burden in Ohio is correctly assessed.

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.[5]

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 2003-2007 were the most recent 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 94% for 2003-2007, based on Ohio mortality rates and the Surveillance, Epidemiology, and End Results (SEER) Program incidence to mortality rate ratio for 2003-2007.[3,4,6] 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.

Ohio Cancer Incidence & Mortality Data

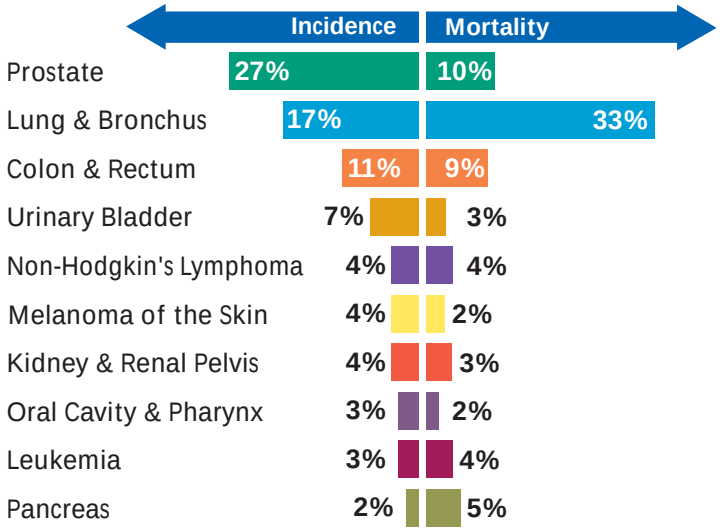
Incidence

Figures 2 & 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 OCISS.[4] Prostate cancer represented 27% of all cancers diagnosed in male Ohioans between 2003 and 2007 (Figure 2).[4] Breast cancer remains the most frequently diagnosed cancer in Ohio women, representing 28% of cancer diagnoses (Figure 3).[4]

Table 2 provides 2003-2007 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 (470.0 per 100,000) was 2% higher than the national rate (461.6 per 100,000).[3,4] The lung cancer incidence rate was 96.3 per 100,000 for Ohio men, which was 26% higher than the national lung cancer incidence rate for men of 76.2 per 100,000.[3,4] Similarly, the Ohio female lung cancer incidence rate (59.8 per 100,000) was higher (14%) than the national rate of 52.4 per 100,000.[3,4] 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; testis; urinary bladder; and uterine corpus and uterine not otherwise specified (NOS).[3,4]

FIGURE 2

Selected Cancer Sites/Types:
Average Annual Number and Percentage of New Invasive Cancer Cases and Cancer Deaths in Males in Ohio, 2003-2007[1,2]



[1] Source: Ohio Cancer Incidence Surveillance System, Chronic Disease & Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2010.

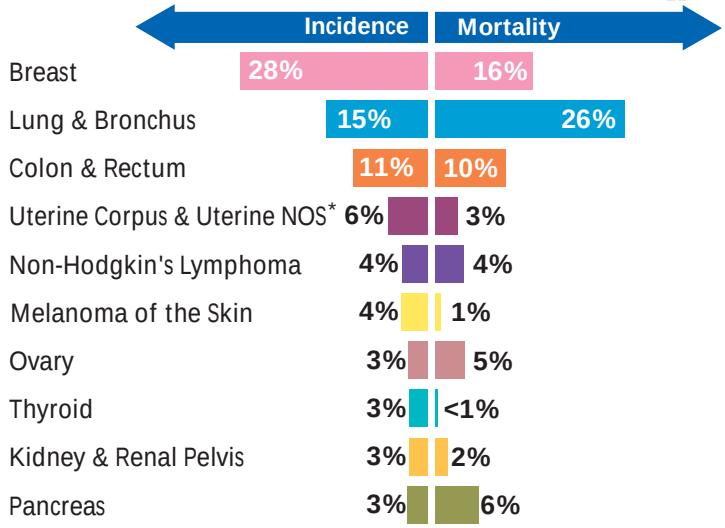
[2] Figure 2 presents the top 10 cancer sites/types among males according to incidence.

* Central Nervous System

Primary Cancer Site/Type	New Cases	Deaths
	Average Annual	Average Annual
Prostate	7,961	1,232
Lung & Bronchus	5,142	4,224
Colon & Rectum	3,184	1,203
Urinary Bladder	2,012	443
Non-Hodgkin's Lymphoma	1,249	487
Melanoma of the Skin	1,193	205
Kidney & Renal Pelvis	1,085	341
Oral Cavity & Pharynx	835	223
Leukemia	746	522
Pancreas	697	681
Esophagus	547	511
Stomach	463	250
Brain & Other CNS*	439	295
Larynx	430	141
Liver & Intrahepatic Bile Duct	385	355
Multiple Myeloma	338	240
Testis	308	13
Thyroid	252	28
Hodgkin's Lymphoma	186	33

FIGURE 3

Selected Cancer Sites/Types:
Average Annual Number and Percentage of New Invasive Cancer Cases and Cancer Deaths in Females in Ohio, 2003-2007[1,2]



[1] Source: Ohio Cancer Incidence Surveillance System, Chronic Disease & Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2010.
[2] Figure 3 presents the top 10 cancer sites/types among females according to incidence.
* Not Otherwise Specified
** Central Nervous System

Primary Cancer Site/Type	New Cases	Deaths
	Average Annual	Average Annual
Breast	8,073	1,875
Lung & Bronchus	4,152	3,187
Colon & Rectum	3,186	1,252
Uterine Corpus & Uterine NOS*	1,830	323
Non-Hodgkin's Lymphoma	1,131	434
Melanoma of the Skin	1,029	119
Ovary	836	605
Thyroid	834	34
Kidney & Renal Pelvis	764	224
Pancreas	710	700
Urinary Bladder	679	188
Leukemia	604	430
Cervix	487	159
Oral Cavity & Pharynx	385	110
Brain & Other CNS**	380	245
Multiple Myeloma	298	239
Stomach	297	175
Liver & Intrahepatic Bile Duct	177	204
Hodgkin's Lymphoma	163	27
Esophagus	149	137
Larynx	127	38

Table 4 shows 2003-2007 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 2003-2007 are noted with an asterisk(*).

Mortality

In contrast to the data for incidence, the 2003-2007 cancer mortality rate in Ohio for all sites/types combined was 9% higher than the US rate (199.6 per 100,000 and 183.8 per 100,000, respectively).[3,6] Lung cancer remains the leading cause of cancer death in Ohio for males, females, and both genders combined, with a yearly (2003-2007) average of 4,224 men and 3,187 women dying from the disease (Table 3).[6] Prostate cancer ranks as the second leading cause of cancer death for men in Ohio (1,232 deaths per year) followed closely by colorectal cancer (1,203 deaths per year), accounting for about 10% and 9% of male cancer deaths, respectively (Figure 2).[6] Breast cancer ranks as the second leading cause of cancer death for women with a yearly average of 1,875 deaths, accounting for 16% of female cancer deaths (Figure 3).[6] Ohio cancer mortality rates were higher than the national cancer mortality rates during 2003-2007 for 16 specific sites/types of cancer: brain and other CNS; colon and rectum; esophagus; female breast; Hodgkin's lymphoma; 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.[3,6]

Table 5 displays 2003-2007 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, 2003-2007[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	29,591	548.4	538.9	28,545	418.6	408.0	58,136	470.0	461.6
Brain & Other CNS**	439	7.9	7.6	380	5.9	5.5	819	6.8	6.5
Breast	65	1.2	1.2	8,073	119.9	122.9	8,139	65.7	66.5
Cervix	*	*	*	487	8.0	8.1	*	*	*
Colon & Rectum	3,184	60.0	55.8	3,186	44.5	41.7	6,370	51.1	47.9
Esophagus	547	10.1	7.8	149	2.1	1.9	696	5.6	4.5
Hodgkin's Lymphoma	186	3.4	3.2	163	2.7	2.5	348	3.0	2.8
Kidney & Renal Pelvis	1,085	19.5	19.2	764	11.3	9.9	1,849	15.0	14.1
Larynx	430	7.6	6.1	127	1.9	1.3	557	4.4	3.4
Leukemia	746	14.0	15.8	604	8.9	9.6	1,351	11.1	12.3
Liver & Intrahepatic Bile Duct	385	6.9	10.7	177	2.5	3.7	561	4.5	6.9
Lung & Bronchus	5,142	96.3	76.2	4,152	59.8	52.4	9,295	75.0	62.5
Melanoma of the Skin	1,193	21.9	25.6	1,029	16.3	16.2	2,222	18.3	20.1
Multiple Myeloma	338	6.3	7.1	298	4.2	4.5	636	5.1	5.6
Non-Hodgkin's Lymphoma	1,249	23.1	23.6	1,131	16.4	16.5	2,380	19.3	19.6
Oral Cavity & Pharynx	835	14.6	15.4	385	5.7	6.1	1,220	9.8	10.4
Ovary	*	*	*	836	12.4	12.9	*	*	*
Pancreas	697	13.0	13.3	710	9.9	10.5	1,407	11.3	11.7
Prostate	7,961	145.5	156.9	*	*	*	*	*	*
Stomach	463	8.8	10.9	297	4.1	5.5	760	6.1	7.8
Testis	308	5.6	5.4	*	*	*	*	*	*
Thyroid	252	4.5	5.2	834	13.7	15.2	1,087	9.2	10.2
Urinary Bladder	2,012	38.8	37.2	679	9.5	9.2	2,691	21.6	21.1
Uterine Corpus & Uterine NOS***	*	*	*	1,830	26.9	23.5	*	*	*

[1] Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2010; Surveillance, Epidemiology, and End Results (SEER) Program, *SEER Cancer Statistics Review 1975-2007*, National Cancer Institute, 2010.
[2] Average annual rate per 100,000, age-adjusted to the 2000 US standard population.
* Not Applicable
** Central Nervous System
*** Not Otherwise Specified

TABLE 3 Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by Cancer Site/Type and Gender in Ohio and the US, 2003-2007[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	12,859	248.4	225.4	12,058	167.9	155.4	24,917	199.6	183.8
Brain & Other CNS**	295	5.3	5.2	245	3.6	3.5	540	4.4	4.3
Breast	14	0.3	0.3	1,875	26.5	24.0	1,889	15.1	13.5
Cervix	*	*	*	159	2.4	2.4	*	*	*
Colon & Rectum	1,203	23.5	21.2	1,252	16.7	14.9	2,456	19.6	17.6
Esophagus	511	9.5	7.8	137	1.9	1.7	648	5.2	4.4
Hodgkin's Lymphoma	33	0.6	0.5	27	0.4	0.3	60	0.5	0.4
Kidney & Renal Pelvis	341	6.5	5.9	224	3.1	2.7	566	4.5	4.1
Larynx	141	2.6	2.2	38	0.5	0.5	179	1.4	1.2
Leukemia	522	10.2	9.7	430	5.9	5.4	952	7.7	7.2
Liver & Intrahepatic Bile Duct	355	6.6	7.7	204	2.8	3.2	559	4.5	5.2
Lung & Bronchus	4,224	80.2	68.8	3,187	45.2	40.6	7,411	59.7	52.5
Melanoma of the Skin	205	3.9	4.0	119	1.7	1.7	324	2.6	2.7
Multiple Myeloma	240	4.7	4.4	239	3.3	2.9	478	3.8	3.6
Non-Hodgkin's Lymphoma	487	9.5	8.7	434	5.9	5.5	921	7.4	6.9
Oral Cavity & Pharynx	223	4.0	3.9	110	1.5	1.4	333	2.6	2.5
Ovary	*	*	*	605	8.6	8.6	*	*	*
Pancreas	681	12.8	12.3	700	9.5	9.4	1,381	11.0	10.7
Prostate	1,232	26.2	24.7	*	*	*	*	*	*
Stomach	250	4.9	5.3	175	2.4	2.7	426	3.4	3.8
Testis	13	0.2	0.2	*	*	*	*	*	*
Thyroid	28	0.5	0.5	34	0.5	0.5	62	0.5	0.5
Urinary Bladder	443	9.1	7.5	188	2.4	2.2	631	5.0	4.3
Uterine Corpus & Uterine NOS***	*	*	*	323	4.5	4.1	*	*	*

[1] Source: Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2010; National Center for Health Statistics Public Use Mortality Data published in *SEER Cancer Statistics Review 1975-2007*, National Cancer Institute, 2010.
[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, 2003-2007[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	29,591	548.4	28,545	418.6	58,136	470.0	3,184	60.0	3,186	44.5	6,370	51.1
Adams*	74	527.5	61	387.4	136	444.2	11	76.3	8	51.1	19	61.2
Allen	274	528.4	274	427.2	548	466.9	28	54.9	32	46.9	60	50.1
Ashland*	127	473.0	115	358.3	242	404.0	17	65.8	13	37.7	31	50.2
Ashtabula	320	605.5	284	445.4	604	513.6	33	62.4	36	54.2	68	57.5
Athens	130	580.4	112	409.1	242	479.7	13	61.8	12	44.0	26	51.7
Auglaize	119	510.4	121	414.6	240	452.0	16	66.7	15	46.2	31	55.8
Belmont*	233	605.9	217	441.5	450	504.4	32	82.7	28	50.3	60	64.9
Brown*	121	578.3	99	414.1	220	486.6	10	52.3	13	53.9	23	53.4
Butler*	756	525.1	762	421.2	1,518	461.4	83	59.8	86	47.6	169	52.8
Carroll	88	546.3	71	404.3	159	467.2	10	60.1	7	39.1	17	49.8
Champaign*	103	534.9	95	411.3	198	460.5	10	51.7	13	54.6	23	53.2
Clark*	401	544.1	374	409.7	774	463.4	44	60.7	42	43.2	86	51.0
Clermont	442	564.0	440	453.3	882	497.8	44	57.1	46	48.0	90	52.1
Clinton	110	583.0	106	451.4	215	503.5	10	55.6	11	44.5	21	49.7
Columbiana	340	579.7	291	411.7	631	480.6	41	71.4	38	50.6	80	59.3
Coshocton*	101	545.2	96	420.5	198	470.6	12	65.5	13	51.8	25	58.8
Crawford*	126	520.1	116	388.9	242	440.9	13	53.8	16	47.6	29	50.3
Cuyahoga*	3,731	567.6	3,768	425.3	7,499	480.7	389	59.2	406	42.9	795	49.6
Darke*	140	497.6	115	340.6	255	406.3	14	49.4	15	40.3	29	44.6
Defiance*	95	479.8	85	362.8	180	410.0	9	45.9	9	37.0	18	41.2
Delaware	308	592.8	289	447.7	597	507.8	30	62.1	24	38.8	54	48.7
Erie	263	569.1	238	463.1	502	507.6	32	70.5	28	51.0	61	60.1
Fairfield*	312	521.8	306	422.9	618	462.9	33	57.3	37	50.1	70	53.5
Fayette*	77	530.0	67	388.6	144	447.6	9	65.0	9	52.3	19	57.6
Franklin*	2,277	562.1	2,392	438.4	4,669	485.0	221	56.8	225	41.7	446	47.9
Fulton	94	467.3	99	401.9	193	426.8	9	45.9	13	48.2	21	47.0
Gallia*	86	543.1	76	401.2	162	459.9	10	63.2	7	34.7	17	47.0
Geauga	246	492.5	228	403.2	474	441.5	24	50.5	22	38.9	47	44.1
Greene	369	516.9	368	424.4	737	460.9	39	56.9	43	48.3	82	51.9
Guernsey*	116	545.2	115	455.9	231	490.7	17	76.8	12	45.5	29	60.1
Hamilton*	2,017	527.3	2,093	404.5	4,110	451.0	215	57.2	234	42.6	449	48.5
Hancock	178	518.5	169	388.7	347	441.7	15	43.8	19	41.4	33	42.1
Hardin*	83	581.7	69	392.5	153	469.7	10	70.4	8	44.2	18	55.5
Harrison*	55	571.1	43	392.6	98	468.8	8	85.4	6	50.9	14	66.2
Henry*	69	480.1	64	364.5	133	409.3	8	59.6	6	29.6	14	42.4
Highland*	111	540.7	95	388.0	207	454.2	14	66.3	13	49.1	27	57.4
Hocking*	75	485.1	72	450.5	147	465.0	10	62.0	7	44.9	17	54.4
Holmes*	60	370.9	58	309.2	118	336.2	10	64.3	10	53.6	21	59.1
Huron*	144	525.4	133	394.1	277	448.1	20	74.5	16	43.7	36	57.8
Jackson*	83	527.9	86	431.3	169	467.7	11	66.8	10	47.6	20	55.4
Jefferson*	257	608.5	229	441.3	486	508.1	29	67.3	32	56.6	61	61.6
Knox	150	536.4	148	436.4	298	474.0	19	68.3	20	57.7	39	61.8
Lake*	661	548.2	625	417.2	1,286	470.3	71	60.4	66	41.5	137	49.8

[1] Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2010.
[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 2003-2007, National Cancer Institute, 2010.
* Data for this county did not meet the standard of 95% complete for all sites/types combined in 2003-2007. 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, 2003-2007[1,2,3]

	Lung & Bronchus						Breast		Prostate	
	Male		Female		Total		Female		Male	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Ohio	5,142	96.3	4,152	59.8	9,295	75.0	8,073	119.9	7,961	145.5
Adams*	16	109.8	8	46.0	23	74.6	16	102.8	17	124.1
Allen	52	100.9	37	56.8	89	75.3	79	127.1	70	133.3
Ashland*	23	86.1	13	39.7	36	60.3	34	109.5	34	124.9
Ashtabula	53	100.4	41	63.3	94	79.7	69	109.3	100	187.5
Athens	23	104.5	17	58.8	40	78.8	28	102.8	39	172.0
Auglaize	21	89.1	14	48.8	35	65.5	34	117.4	25	106.1
Belmont*	40	104.5	28	54.6	68	74.9	66	137.8	63	160.3
Brown*	25	118.7	16	66.3	41	89.9	27	110.9	31	145.2
Butler*	142	102.2	116	64.5	258	79.9	218	120.0	197	131.4
Carroll	17	107.1	11	58.4	28	80.6	19	111.3	24	147.4
Champaign*	19	97.3	14	61.2	33	76.6	26	110.9	24	126.5
Clark*	79	109.4	60	62.2	139	81.8	105	118.7	100	129.5
Clermont	94	123.8	85	89.4	179	104.1	126	126.5	111	140.6
Clinton	19	101.1	17	70.8	36	83.6	28	119.6	27	143.6
Columbiana	63	108.1	39	54.3	103	77.1	75	107.8	87	146.0
Coshocton*	20	108.1	14	58.1	34	79.1	23	97.6	21	112.2
Crawford*	20	81.1	16	51.1	36	64.1	32	111.2	36	143.6
Cuyahoga*	607	92.4	540	59.2	1,147	72.6	1,045	121.2	1,040	157.3
Darke*	22	77.2	12	32.4	33	52.5	35	109.0	37	131.8
Defiance*	20	100.6	13	56.4	33	75.9	22	94.0	25	123.1
Delaware	45	95.5	31	53.8	76	71.6	99	148.1	92	171.4
Erie	48	103.1	34	63.8	83	81.2	70	140.7	73	150.6
Fairfield*	54	93.9	45	62.9	99	75.7	94	128.1	82	132.7
Fayette*	16	105.6	8	42.4	23	70.3	17	98.2	18	118.2
Franklin*	386	101.6	354	67.3	740	80.9	710	128.8	652	161.0
Fulton	14	71.5	11	43.7	25	55.7	28	114.7	23	112.6
Gallia*	20	123.7	13	64.3	33	89.7	18	95.3	19	112.9
Geauga	32	63.4	27	47.0	59	54.3	73	129.9	81	154.8
Greene	59	83.1	47	53.0	106	66.7	120	139.5	100	133.1
Guernsey*	22	104.9	15	55.8	37	76.9	36	143.4	24	109.0
Hamilton*	344	90.9	337	64.0	680	74.8	605	119.1	593	154.1
Hancock	32	93.8	19	42.5	51	64.1	55	129.3	47	136.6
Hardin*	17	121.1	10	53.9	27	83.6	16	90.3	22	147.5
Harrison*	12	121.6	6	56.5	18	86.3	9	85.6	14	141.5
Henry*	11	72.1	7	37.6	17	52.7	14	80.9	15	103.3
Highland*	23	109.9	13	54.6	36	78.8	25	100.0	22	106.0
Hocking*	18	114.1	12	71.8	29	90.7	18	113.7	17	108.2
Holmes*	8	52.2	6	33.4	14	41.3	16	88.3	12	73.8
Huron*	26	92.9	17	48.9	42	68.0	35	103.9	35	126.8
Jackson*	18	114.8	13	65.0	31	86.3	21	105.8	18	118.3
Jefferson*	46	108.2	36	64.1	82	82.3	56	114.2	66	152.1
Knox	25	90.5	18	51.7	43	67.6	41	125.4	37	127.0
Lake*	113	94.7	94	60.9	207	74.8	176	118.6	179	144.0

[1] Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2010.
[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 2003-2007, National Cancer Institute, 2010.
* Data for this county did not meet the standard of 95% complete for all sites/types combined in 2003-2007. 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, 2003-2007[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	29,591	548.4	28,545	418.6	58,136	470.0	3,184	60.0	3,186	44.5	6,370	51.1
Lawrence*	163	508.2	185	475.0	348	486.5	22	70.2	21	51.6	43	60.1
Licking	396	558.2	405	467.3	801	502.8	45	65.9	40	46.7	85	54.5
Logan*	129	550.6	116	418.8	245	475.9	14	63.1	12	41.7	27	50.7
Lorain*	781	555.1	718	416.4	1,499	472.7	85	61.5	80	44.6	165	52.0
Lucas*	1,124	569.7	1,089	418.7	2,213	476.3	113	58.8	118	43.1	232	49.4
Madison*	99	523.6	88	414.4	187	453.6	9	46.4	9	41.1	18	43.1
Mahoning	836	614.5	739	419.1	1,575	497.6	91	66.1	95	47.7	185	55.4
Marion*	181	559.0	173	444.5	354	488.1	19	61.4	23	56.8	42	58.0
Medina	412	552.0	369	416.5	781	473.9	37	50.1	34	39.3	71	44.3
Meigs*	69	574.7	55	367.3	124	452.8	9	74.6	8	54.4	17	63.0
Mercer*	105	506.8	105	445.8	211	463.3	18	88.8	12	47.4	31	65.1
Miami	251	493.5	243	398.2	494	435.7	31	61.1	28	44.2	59	52.0
Monroe*	46	503.3	36	360.7	82	423.5	5	55.3	5	47.4	10	52.3
Montgomery	1,455	548.2	1,454	425.0	2,909	473.2	144	54.7	156	42.9	299	48.1
Morgan	47	553.4	35	355.9	82	447.0	5	57.8	6	56.3	11	57.1
Morrow*	85	532.5	74	405.9	159	464.4	8	55.6	8	46.2	17	50.7
Muskingum*	226	539.7	228	431.9	454	472.7	27	64.4	26	46.2	53	53.8
Noble*	39	553.2	33	441.5	72	485.5	5	70.7	6	75.2	11	73.3
Ottawa	147	598.9	129	459.0	277	518.2	18	75.4	12	41.7	30	56.5
Paulding*	48	493.1	46	394.8	94	435.1	5	49.7	7	55.6	12	54.0
Perry*	93	572.3	79	410.1	171	479.1	12	73.8	10	48.9	22	61.3
Pickaway*	135	533.8	120	431.6	255	471.6	13	53.2	15	52.0	28	52.1
Pike*	70	518.9	67	419.5	137	458.8	7	55.7	7	43.0	14	48.2
Portage*	374	548.0	327	400.7	702	463.0	36	55.8	35	42.2	71	48.5
Preble*	112	515.2	105	411.8	217	455.3	12	55.3	10	38.4	22	46.3
Putnam*	89	537.0	73	370.2	161	434.0	11	69.4	8	38.1	19	50.6
Richland*	350	522.7	327	408.2	677	454.0	42	63.3	41	48.2	82	54.9
Ross*	193	536.9	182	435.1	375	472.3	21	59.6	20	46.6	41	52.3
Sandusky	172	562.1	169	446.5	342	487.3	21	70.0	18	43.7	39	54.9
Scioto	238	633.7	211	435.6	449	514.5	24	65.1	24	45.6	48	54.2
Seneca	160	571.9	145	418.0	305	479.4	18	64.5	19	49.9	37	56.4
Shelby	117	537.6	103	383.2	220	446.5	15	71.9	16	55.6	31	63.6
Stark	1,080	548.7	968	389.5	2,048	453.6	117	60.0	117	43.7	234	50.6
Summit*	1,423	538.3	1,392	410.2	2,815	460.9	159	60.5	159	44.7	318	51.4
Trumbull	709	589.9	622	417.1	1,331	488.5	73	61.6	73	46.0	146	52.0
Tuscarawas*	236	492.1	225	384.0	461	426.7	28	59.4	27	41.7	55	49.2
Union	93	523.3	98	443.5	191	476.0	10	64.2	12	56.4	22	58.3
Van Wert*	72	479.1	70	374.8	142	417.0	11	73.4	10	47.9	21	59.9
Vinton	38	613.9	35	480.8	73	534.0	5	89.4	3	42.6	8	61.5
Warren	396	530.3	404	441.2	800	474.8	42	58.5	34	38.0	76	46.6
Washington	210	608.6	180	441.4	389	511.7	21	63.5	18	40.8	39	50.7
Wayne*	256	479.2	255	397.4	511	428.8	24	46.0	31	46.5	55	46.1
Williams*	96	483.5	98	417.2	194	441.3	10	51.3	10	41.7	21	45.9
Wood*	255	494.3	246	379.4	501	422.9	30	61.2	26	39.8	57	48.2
Wyandot	59	495.7	62	431.8	121	453.9	8	69.4	4	29.0	12	45.0

[1] Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2010.
[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 2003-2007, National Cancer Institute, 2010.
* Data for this county did not meet the standard of 95% complete for all sites/types combined in 2003-2007. 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, 2003-2007[1,2,3]

	Lung & Bronchus						Breast		Prostate	
	Male		Female		Total		Female		Male	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Ohio	5,142	96.3	4,152	59.8	9,295	75.0	8,073	119.9	7,961	145.5
Lawrence*	39	119.3	30	73.4	68	93.2	51	131.5	29	90.9
Licking	59	84.3	60	68.1	119	74.8	119	135.3	106	141.5
Logan*	24	100.8	16	56.9	40	76.9	32	118.3	36	149.4
Lorain*	141	101.1	104	59.4	245	77.2	199	114.6	214	151.3
Lucas*	187	96.6	176	66.4	363	78.3	300	117.9	292	147.7
Madison*	20	112.9	14	65.6	34	85.0	24	111.0	25	126.8
Mahoning	129	93.8	102	55.8	230	71.1	214	126.3	254	184.5
Marion*	40	120.4	31	76.4	70	95.9	45	116.8	39	119.6
Medina	58	79.7	45	52.0	102	64.4	110	121.5	118	155.6
Meigs*	15	121.7	10	67.7	25	90.6	12	78.5	13	101.9
Mercer*	18	84.7	12	46.9	29	62.9	29	126.6	22	107.2
Miami	35	70.5	31	49.9	66	58.1	74	121.9	70	131.7
Monroe*	8	84.4	5	44.2	13	62.2	9	94.2	15	152.5
Montgomery	253	96.4	244	68.9	497	79.8	414	123.1	410	151.4
Morgan	12	133.2	4	37.9	16	81.7	10	103.2	9	100.5
Morrow*	18	107.8	10	54.7	28	80.2	21	115.4	23	147.8
Muskingum*	47	113.0	36	66.4	84	86.3	56	108.6	46	107.8
Noble*	6	93.9	5	61.7	11	75.7	6	86.5	10	133.9
Ottawa	25	100.8	16	56.3	41	75.2	38	138.5	38	149.9
Paulding*	10	98.4	5	42.7	15	67.1	12	104.1	12	118.1
Perry*	20	121.6	11	59.0	31	86.7	21	111.8	17	110.7
Pickaway*	30	122.0	18	62.4	48	88.6	35	123.8	28	111.9
Pike*	15	115.1	13	75.6	28	93.1	16	102.6	12	89.1
Portage*	62	92.0	52	63.9	114	75.6	91	111.4	110	158.2
Preble*	21	96.9	14	55.1	35	72.8	34	133.8	26	112.0
Putnam*	12	75.3	8	37.1	20	53.5	22	115.6	21	125.7
Richland*	63	95.1	43	51.2	106	70.3	96	123.4	92	133.7
Ross*	47	133.0	25	59.2	72	91.0	48	114.8	34	95.1
Sandusky	31	102.0	22	57.0	53	74.6	47	127.4	44	142.2
Scioto	52	136.6	40	79.7	92	103.1	47	99.8	52	135.1
Seneca	29	100.7	19	53.5	48	73.6	40	114.8	45	159.8
Shelby	20	91.8	11	40.5	31	63.7	30	114.3	32	145.9
Stark	172	88.0	131	50.7	303	66.3	268	110.0	311	154.5
Summit*	252	96.1	199	57.1	451	73.3	404	121.0	360	135.2
Trumbull	117	97.6	95	60.8	212	76.0	174	119.5	197	157.8
Tuscarawas*	38	78.3	25	41.9	64	58.0	62	107.3	70	143.5
Union	16	98.6	14	69.6	30	82.2	27	120.9	26	142.7
Van Wert*	12	77.7	11	56.5	23	65.7	21	113.4	19	123.5
Vinton	9	148.1	6	85.5	16	112.1	8	114.7	9	154.1
Warren	59	85.0	52	59.5	111	70.2	124	132.3	109	145.0
Washington	40	112.3	26	61.6	66	83.6	45	112.3	56	155.0
Wayne*	48	87.6	29	45.4	77	64.3	66	102.3	59	107.7
Williams*	20	100.0	13	54.6	33	73.9	24	102.9	25	125.5
Wood*	41	79.3	32	49.5	72	62.0	73	112.5	64	123.1
Wyandot	10	81.3	10	61.1	20	71.4	19	135.7	17	141.7

[1] Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2010.
[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 2003-2007, National Cancer Institute, 2010.
* Data for this county did not meet the standard of 95% complete for all sites/types combined in 2003-2007. 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, 2003-2007[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	12,859	248.4	12,058	167.9	24,917	199.6	1,203	23.5	1,252	16.7	2,456	19.6
Adams	38	284.2	26	156.8	65	211.9	3	24.1	2	11.3	5	16.7
Allen	115	229.1	113	162.6	229	188.9	10	19.3	10	15.1	20	16.7
Ashland	62	237.8	50	143.2	112	182.0	7	28.2	6	15.5	13	21.5
Ashtabula	137	267.1	121	179.5	258	215.9	13	24.3	12	18.3	25	20.9
Athens	54	254.0	48	166.2	101	201.9	6	27.2	6	22.2	12	24.7
Auglaize	55	238.0	51	160.6	105	189.8	6	27.3	6	16.5	12	20.0
Belmont	108	283.4	96	171.0	204	215.6	15	40.5	12	19.7	27	28.3
Brown	52	267.6	45	183.9	96	218.1	4	21.1	5	19.2	9	20.5
Butler	336	254.9	320	176.9	656	206.7	23	18.4	32	17.5	55	17.8
Carroll	33	214.7	26	135.7	59	171.0	3	18.2	2	11.7	5	14.5
Champaign	49	269.9	37	152.9	86	200.5	6	31.4	4	17.6	10	23.5
Clark	194	272.1	174	176.7	368	214.5	19	25.8	16	15.7	35	20.0
Clermont	176	244.3	174	182.4	350	207.5	14	19.7	14	14.7	28	16.8
Clinton	45	252.4	43	177.3	89	208.1	3	15.6	4	14.6	7	16.0
Columbiana	142	249.4	120	158.4	262	196.3	12	21.4	13	16.4	25	18.4
Coshocton	49	266.6	44	182.9	93	218.1	3	15.4	5	19.0	8	17.6
Crawford	63	268.2	55	163.8	117	206.5	6	24.7	8	23.2	14	24.2
Cuyahoga	1,664	255.1	1,653	172.5	3,317	204.1	155	23.8	164	16.1	319	19.2
Darke	64	230.5	58	149.0	122	183.6	6	22.0	10	22.3	16	22.9
Defiance	44	230.4	39	158.5	82	185.5	4	19.9	4	14.9	8	17.3
Delaware	97	219.5	94	160.0	191	182.9	8	17.8	8	13.3	16	15.6
Erie	102	227.2	95	171.0	197	192.9	11	24.7	10	17.0	21	20.1
Fairfield	130	238.9	125	173.2	255	199.7	13	24.1	15	20.1	28	22.0
Fayette	38	269.7	34	186.4	72	221.3	5	32.7	5	27.2	10	29.4
Franklin	945	257.3	951	176.8	1,897	207.1	90	24.5	91	16.7	181	20.0
Fulton	43	225.7	39	149.9	83	179.6	3	14.7	6	20.4	8	18.2
Gallia	40	261.9	30	155.4	70	198.4	5	31.8	3	15.9	8	22.7
Geauga	88	190.1	89	151.1	177	167.2	8	17.3	10	16.3	18	16.9
Greene	145	220.8	134	150.6	279	178.5	12	18.8	12	13.6	24	15.8
Guernsey	56	275.7	46	170.1	103	213.4	7	33.2	6	19.7	13	25.8
Hamilton	872	236.2	923	168.4	1,796	193.3	78	21.4	98	16.9	176	18.6
Hancock	76	227.2	71	150.5	148	182.6	5	13.7	8	16.1	13	15.5
Hardin	39	280.4	34	179.7	73	219.2	4	28.1	4	20.1	8	24.0
Harrison	23	242.7	20	163.8	43	199.6	3	26.9	2	18.3	5	22.5
Henry	31	219.0	30	153.7	61	178.9	4	28.2	3	14.7	7	21.2
Highland	58	292.5	39	153.0	97	212.4	5	27.1	5	19.2	10	22.7
Hocking	38	261.3	30	183.2	68	217.8	3	20.7	4	21.6	7	22.0
Holmes	30	193.0	29	146.7	59	168.0	3	19.6	5	21.8	8	22.0
Huron	64	240.5	55	157.3	118	191.3	8	30.1	5	15.1	13	21.3
Jackson	45	294.5	41	194.7	86	235.3	5	34.2	4	20.4	10	26.1
Jefferson	117	278.3	99	170.2	216	214.5	10	25.4	10	15.9	20	19.7
Knox	65	244.2	61	172.1	126	198.8	6	23.8	8	21.7	15	22.5
Lake	287	247.9	267	169.3	554	200.9	25	22.0	24	14.3	49	17.6

[1] Source: Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2010.
[2] Average annual rate per 100,000, age-adjusted to the 2000 US standard population.
* Rate not calculated when the case count for 2003-2007 is less than five (*i.e.*, the average annual count is less than one).

TABLE 5 cont.

Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by County and Gender in Ohio, 2003-2007[1,2]

	Lung & Bronchus						Breast		Prostate	
	Male		Female		Total		Female		Male	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
Ohio	4,224	80.2	3,187	45.2	7,411	59.7	1,875	26.5	1,232	26.2
Adams	15	109.0	6	36.7	22	69.4	5	28.8	4	34.3
Allen	40	78.6	28	41.8	68	56.5	17	24.6	9	18.6
Ashland	20	78.3	12	34.6	32	53.5	8	23.1	8	31.2
Ashtabula	45	85.8	29	43.5	74	62.3	20	29.8	14	29.2
Athens	19	87.6	13	45.2	32	63.0	4	12.7	4	21.4
Auglaize	17	74.7	10	30.6	27	48.1	9	30.1	4	16.2
Belmont	32	83.0	24	44.7	56	60.7	13	22.6	9	24.6
Brown	21	103.4	14	58.6	35	78.0	6	26.8	3	19.5
Butler	122	89.2	91	50.7	213	66.6	47	25.9	28	25.6
Carroll	14	88.1	7	37.7	21	60.7	5	25.9	3	22.9
Champaign	13	70.0	12	49.1	25	57.4	4	18.5	4	28.8
Clark	64	89.5	56	57.3	120	70.6	24	25.3	20	29.8
Clermont	73	98.9	58	61.3	131	77.3	23	23.9	13	21.8
Clinton	16	89.3	13	53.8	29	68.8	5	21.3	5	28.3
Columbiana	52	89.9	32	42.7	84	62.7	17	21.7	12	22.8
Coshocton	16	84.9	12	51.4	28	65.4	7	27.6	5	26.9
Crawford	20	81.1	12	36.4	31	55.4	8	23.1	6	28.1
Cuyahoga	497	75.8	404	43.3	901	56.3	247	26.8	200	31.5
Darke	18	64.3	7	20.2	25	39.8	12	32.3	6	22.7
Defiance	14	73.4	11	46.3	25	57.8	6	24.7	6	38.0
Delaware	32	72.4	23	40.0	55	53.4	18	28.6	11	32.0
Erie	33	71.4	26	46.3	59	57.0	11	21.3	10	23.8
Fairfield	42	76.2	32	45.1	75	58.0	21	29.3	13	27.6
Fayette	15	105.0	6	31.8	21	63.2	6	34.4	2	17.8
Franklin	321	86.8	276	52.6	597	65.9	150	27.4	85	27.5
Fulton	11	57.5	8	30.8	19	42.3	8	31.2	6	33.4
Gallia	15	91.9	9	46.1	24	66.5	3	18.2	3	21.2
Geauga	26	53.5	20	35.2	46	43.1	12	21.1	10	26.1
Greene	49	71.0	34	38.5	83	52.5	22	24.7	12	21.2
Guernsey	17	81.4	13	47.5	30	61.8	7	26.2	4	23.8
Hamilton	276	74.2	264	49.4	540	59.0	153	28.2	94	27.7
Hancock	26	76.5	14	29.8	40	49.7	10	23.0	6	19.5
Hardin	13	91.8	9	45.3	21	65.6	5	25.2	3	26.5
Harrison	10	97.7	6	51.2	15	72.1	3	19.2	2	24.7
Henry	8	57.5	7	39.5	16	47.5	4	20.5	3	27.3
Highland	21	106.2	9	34.7	30	65.1	6	25.5	3	16.8
Hocking	15	97.1	8	47.6	22	70.1	3	19.2	3	25.0
Holmes	6	37.0	5	28.7	11	32.3	5	26.5	3	21.3
Huron	20	75.5	14	40.9	34	55.4	7	20.3	6	24.8
Jackson	17	110.8	10	50.4	28	76.6	5	23.6	3	24.7
Jefferson	43	101.1	25	42.6	68	67.3	14	25.5	8	21.3
Knox	19	72.4	14	39.7	34	53.3	9	26.3	7	27.1
Lake	95	80.1	72	46.0	167	60.3	42	27.6	29	27.8

[1] Source: Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2010.
[2] Average annual rate per 100,000, age-adjusted to the 2000 US standard population.
* Rate not calculated when the case count for 2003-2007 is less than five (*i.e.*, the average annual count is less than one).

TABLE 5 cont.

Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by County and Gender in Ohio, 2003-2007[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	12,859	248.4	12,058	167.9	24,917	199.6	1,203	23.5	1,252	16.7	2,456	19.6
Lawrence	88	290.7	81	197.1	170	235.3	10	34.8	9	21.2	19	26.8
Licking	156	236.7	156	177.5	312	201.0	14	21.6	16	18.4	30	19.7
Logan	64	290.0	51	172.4	115	222.2	5	23.7	6	18.8	11	21.0
Lorain	332	246.7	318	178.8	650	205.9	32	24.2	32	17.3	64	20.2
Lucas	502	263.5	480	174.9	982	208.8	49	26.6	49	17.3	99	20.9
Madison	43	253.6	37	170.9	80	202.2	4	24.9	3	12.4	7	17.6
Mahoning	349	254.5	335	172.5	684	204.3	36	26.8	42	19.5	78	22.5
Marion	89	290.0	75	181.9	163	225.6	8	29.1	8	18.7	16	22.6
Medina	151	221.1	130	147.0	280	178.1	13	19.9	12	13.6	25	16.5
Meigs	39	332.2	26	162.3	64	233.0	3	26.5	4	21.6	7	24.5
Mercer	51	249.0	42	159.8	93	196.6	6	28.2	5	18.8	11	22.6
Miami	112	231.5	97	151.7	209	183.5	10	22.0	10	15.0	20	17.9
Monroe	21	221.8	16	151.8	37	183.1	2	22.1	3	21.4	5	22.5
Montgomery	610	237.4	600	165.4	1,210	193.7	55	21.4	56	14.7	111	17.6
Morgan	22	262.5	13	119.3	35	187.3	2	23.9	<1	*	3	14.7
Morrow	41	274.4	28	156.7	69	210.3	4	27.0	4	23.5	8	25.1
Muskingum	111	270.8	107	185.7	217	219.2	11	29.1	13	22.4	25	24.7
Noble	18	269.6	13	160.9	31	207.6	2	27.4	2	17.7	3	22.9
Ottawa	63	261.4	54	183.3	117	215.5	9	35.8	5	17.0	14	25.7
Paulding	24	253.2	20	169.7	44	205.3	2	23.6	3	23.4	5	22.9
Perry	48	303.1	36	182.2	83	235.1	5	30.3	5	23.7	9	26.6
Pickaway	62	272.7	49	174.0	110	213.5	6	22.9	4	15.5	10	18.8
Pike	34	257.2	29	171.0	63	207.5	3	25.0	4	21.7	7	22.5
Portage	157	245.9	140	171.1	297	202.0	15	25.4	11	13.2	26	18.3
Preble	48	230.2	46	174.5	93	197.7	5	22.1	4	16.4	9	18.9
Putnam	38	235.3	34	154.1	72	185.8	4	22.6	4	17.4	8	19.1
Richland	160	248.1	141	165.4	301	199.2	17	27.3	17	19.7	35	23.0
Ross	92	280.5	79	181.1	171	219.4	9	28.1	8	17.5	17	21.7
Sandusky	72	241.2	71	170.7	142	196.7	8	26.3	7	16.1	15	20.0
Scioto	103	278.1	88	169.7	191	212.4	9	26.3	10	16.6	19	20.6
Seneca	67	242.8	53	145.3	120	185.8	7	26.6	6	14.3	13	19.1
Shelby	47	224.8	37	131.7	84	169.9	4	18.5	6	20.7	10	19.9
Stark	442	230.2	420	155.1	862	184.5	37	19.4	45	15.4	81	17.2
Summit	649	254.7	591	164.2	1,240	199.2	61	24.3	60	15.8	121	19.2
Trumbull	302	258.1	266	164.0	568	201.6	29	24.8	29	17.4	58	20.1
Tuscarawas	114	242.5	93	146.1	207	185.7	11	23.5	8	10.9	18	16.2
Union	38	243.3	34	165.3	72	195.5	5	31.6	4	17.7	8	22.8
Van Wert	35	236.0	30	146.4	65	185.4	3	22.0	3	14.8	7	18.5
Vinton	17	287.7	13	174.6	30	221.2	2	32.0	1	15.0	3	21.5
Warren	147	220.5	137	155.5	283	181.6	12	18.4	13	15.0	25	16.2
Washington	88	260.2	79	181.3	167	212.9	9	27.0	7	15.3	16	20.3
Wayne	121	237.0	108	161.7	229	191.7	11	23.4	13	18.9	24	20.5
Williams	46	238.5	41	160.7	87	191.4	3	14.7	5	17.5	8	16.7
Wood	118	239.9	111	163.2	228	193.0	11	22.8	13	19.4	24	20.3
Wyandot	26	218.4	26	161.3	52	184.7	3	29.1	3	17.4	7	22.7

[1] Source: Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2010.
[2] Average annual rate per 100,000, age-adjusted to the 2000 US standard population.
* Rate not calculated when the case count for 2003-2007 is less than five (*i.e.*, the average annual count is less than one).

TABLE 5 cont.

Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by County and Gender in Ohio, 2003-2007[1,2]

	Lung & Bronchus						Breast		Prostate	
	Male		Female		Total		Female		Male	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
Ohio	4,224	80.2	3,187	45.2	7,411	59.7	1,875	26.5	1,232	26.2
Lawrence	32	99.7	24	58.1	56	76.0	14	35.1	7	25.9
Licking	50	71.8	39	44.6	89	56.2	29	32.9	14	25.5
Logan	21	92.7	15	49.8	36	68.6	6	19.8	6	31.6
Lorain	114	83.2	83	47.0	197	62.4	50	28.4	27	21.9
Lucas	161	83.5	136	50.3	297	63.7	76	27.7	43	24.5
Madison	15	87.7	11	48.2	26	64.2	6	26.5	3	16.6
Mahoning	103	75.5	74	38.7	177	53.6	56	30.6	41	29.5
Marion	32	99.2	23	56.2	55	75.2	9	21.0	8	27.5
Medina	44	61.8	31	36.5	75	47.8	23	25.7	14	26.4
Meigs	14	115.8	9	55.4	23	81.4	3	16.8	4	35.0
Mercer	16	76.9	7	27.4	23	49.1	8	32.0	5	26.1
Miami	33	66.7	24	37.9	57	49.6	16	25.8	11	24.7
Monroe	7	74.9	4	44.0	12	58.2	2	16.6	1	15.6
Montgomery	200	76.9	172	48.0	372	59.5	92	25.8	55	23.1
Morgan	8	90.2	4	35.5	12	61.5	3	24.2	1	17.0
Morrow	13	84.5	7	37.2	20	59.2	4	24.3	4	33.6
Muskingum	40	95.2	30	52.9	70	71.2	15	27.5	8	19.9
Noble	4	63.1	5	58.8	9	59.8	1	16.3	3	47.9
Ottawa	21	85.3	14	47.6	34	62.9	10	33.7	4	19.0
Paulding	9	91.1	4	35.5	13	59.2	3	21.0	2	20.8
Perry	18	110.1	10	53.8	28	78.8	5	26.7	4	30.0
Pickaway	23	97.1	15	51.5	38	71.4	8	28.1	4	22.1
Pike	13	97.7	9	52.7	22	72.4	4	25.6	2	18.4
Portage	51	77.7	40	48.4	91	61.0	22	26.6	13	23.8
Preble	17	81.1	11	43.6	28	59.5	7	24.9	3	16.7
Putnam	10	59.6	7	33.2	17	44.8	6	30.6	3	21.4
Richland	54	81.2	33	38.3	86	56.9	24	28.7	16	27.3
Ross	35	105.5	21	50.0	57	72.9	12	28.2	5	18.0
Sandusky	24	80.0	16	41.1	41	57.1	12	29.1	7	24.3
Scioto	39	102.9	28	53.4	66	73.7	12	24.3	5	15.3
Seneca	24	83.3	12	33.4	36	55.3	9	27.0	4	17.7
Shelby	17	79.2	10	38.6	27	56.2	4	16.3	3	16.7
Stark	151	77.9	109	41.3	260	56.1	69	26.0	42	23.5
Summit	210	81.2	155	43.7	365	59.0	94	26.8	73	31.1
Trumbull	97	81.4	68	42.7	165	58.7	45	28.3	31	27.9
Tuscarawas	38	79.5	22	36.0	61	54.9	14	21.9	10	23.7
Union	11	70.4	10	51.5	22	60.2	6	27.7	2	20.2
Van Wert	11	71.2	8	42.4	19	54.5	3	17.0	3	17.7
Vinton	7	107.8	4	49.6	10	75.6	1	17.9	1	25.6
Warren	46	68.5	39	44.7	84	54.5	24	26.5	14	24.3
Washington	31	87.7	22	51.5	53	67.0	13	32.3	8	25.8
Wayne	38	71.3	26	40.1	64	53.9	18	26.4	13	28.3
Williams	16	85.4	9	36.2	25	57.0	5	21.4	5	26.7
Wood	38	75.2	28	43.0	67	56.5	16	23.9	9	19.8
Wyandot	7	61.0	7	44.7	15	53.7	3	21.0	2	20.1

[1] Source: Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2010.
[2] Average annual rate per 100,000, age-adjusted to the 2000 US standard population.
* Rate not calculated when the case count for 2003-2007 is less than five (*i.e.*, the average annual count is less than one).

Trends in Ohio Cancer Mortality Rates[6]

1991-2007

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 1991 (Figure 4). Between 1991 and 2007, the overall cancer mortality rate dropped 14%. The sharpest reduction (26%) in the 17-year time period was observed among African American males. Cancer mortality rates declined more in males (18%) than females (11%) for all races combined. African American males had the highest cancer mortality rate in 2007 (321.1 per 100,000), followed by white males (239.9 per 100,000). Note: Data for racial/ethnic categories other than white and African American are not presented because numbers are too small for meaningful trend analyses.

Figure 5 displays racial differences in female breast cancer mortality rates from 1991 to 2007. White Ohio females experienced a 30% decrease in breast cancer mortality rates, from a rate of 34.2 per 100,000 in 1991 down to a rate of 24.1 per 100,000 in 2007. Over the 17-year time period, however, the breast cancer mortality rate for African American Ohio females decreased only 8%, from 36.0 per 100,000 in 1991 to 33.3 per 100,000 in 2007.

Figure 6 displays cervical cancer mortality trends in Ohio. From 1991 to 2007, the cervical cancer mortality rate in Ohio declined 18%; the rate declined 8% among African American females (from 4.8 per 100,000 to 4.4 per 100,000) and 21% in white females (from 3.3 per 100,000 to 2.6 per 100,000) during the time period.

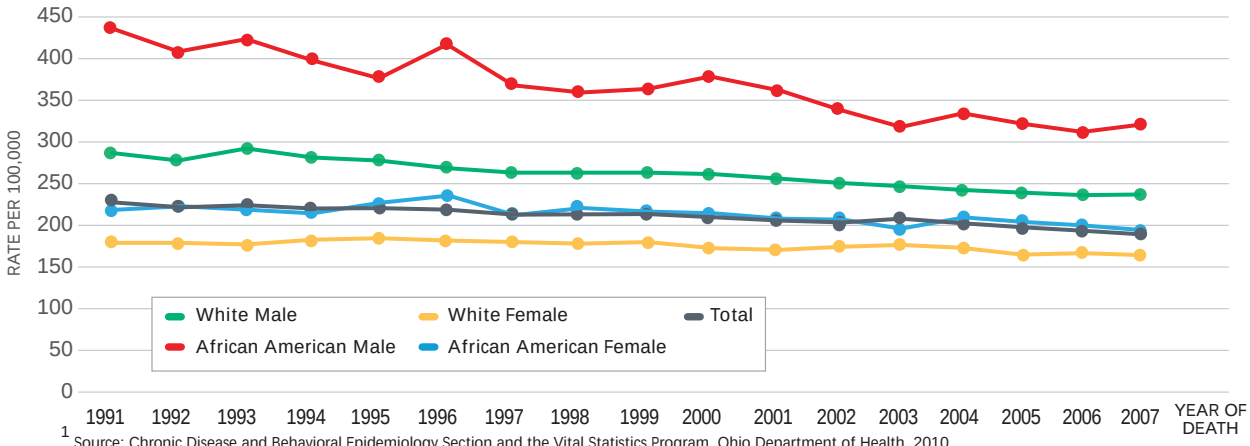
Colorectal cancer mortality rates in Ohio declined from 1991 to 2007 for all gender and race groups. In 2007, African Americans had a higher colorectal cancer mortality rate (23.8 per 100,000) compared to whites (18.4 per 100,000), and males of all races combined had a higher rate (23.0 per 100,000) compared to females (15.7 per 100,000). African American males in Ohio had the highest colorectal cancer mortality rate in 2007 (31.7 per 100,000) of all gender/race groups (Figure 7).

The lung cancer mortality rate for all races and genders combined in Ohio declined 9% from 1991 to 2007; although, rates among both white females and African American females increased during the 17-year time period. African American males had the highest rate of lung cancer deaths, with a mortality rate 34% higher than that of white males in 2007 (102.0 per 100,000 and 76.2 per 100,000, respectively) (Figure 8).

Figure 9 displays a 40% overall decline in the prostate cancer mortality rate in Ohio from 1991 (42.1 per 100,000) to 2007 (25.2 per 100,000). The decline was similar among white males (40%) compared to African American males (41%) during the time period. African Americans are shown to have considerably higher rates of prostate cancer compared to whites; in 2007, the prostate cancer mortality rate for African American males (49.8 per 100,000) was more than two times that of white males (23.3 per 100,000).

Mortality from melanoma of the skin was relatively stable from 1991 to 2007 (Figure 10). The African American melanoma mortality rate in 2007 (0.4 per 100,000) was 86% lower than the melanoma mortality rate for whites (2.8 per 100,000). The melanoma mortality rate for white males (4.2 per 100,000) was more than two times the mortality rate for white females (1.8 per 100,000) in 2007.

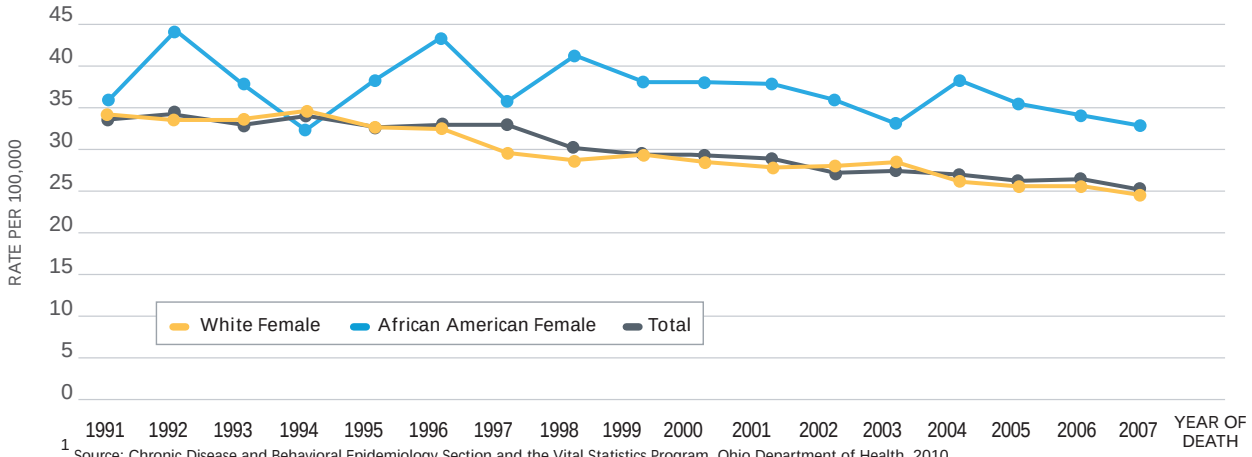
FIGURE 4 **Trends in Age-adjusted Mortality Rates for All Cancer Sites/Types Combined by Gender and Race in Ohio, 1991-2007[1,2]**



1 Source: Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2010.
2 Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

FIGURE 5

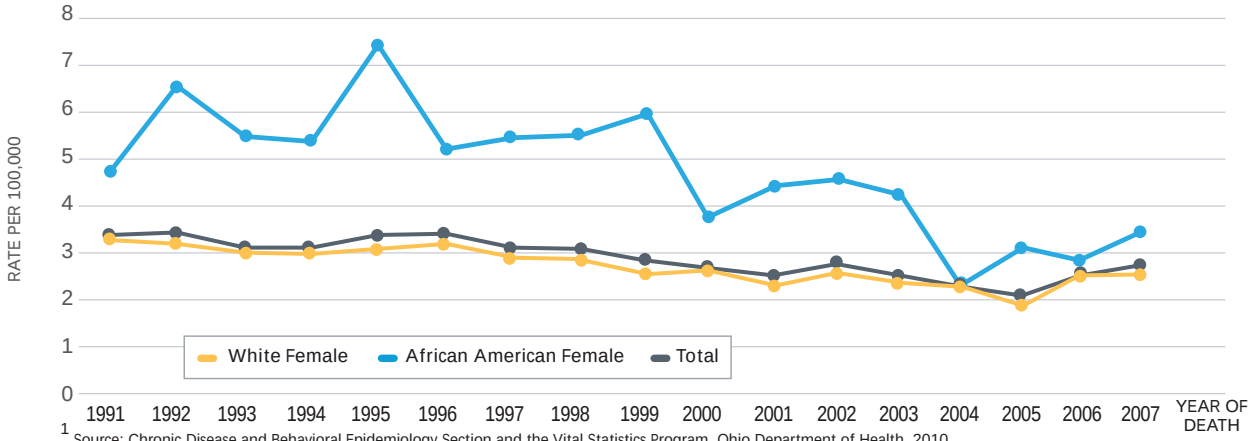
Trends in Age-adjusted Mortality Rates for Cancer of the Female Breast by Race in Ohio, 1991-2007[1,2]



1 Source: Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2010.
2 Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

FIGURE 6

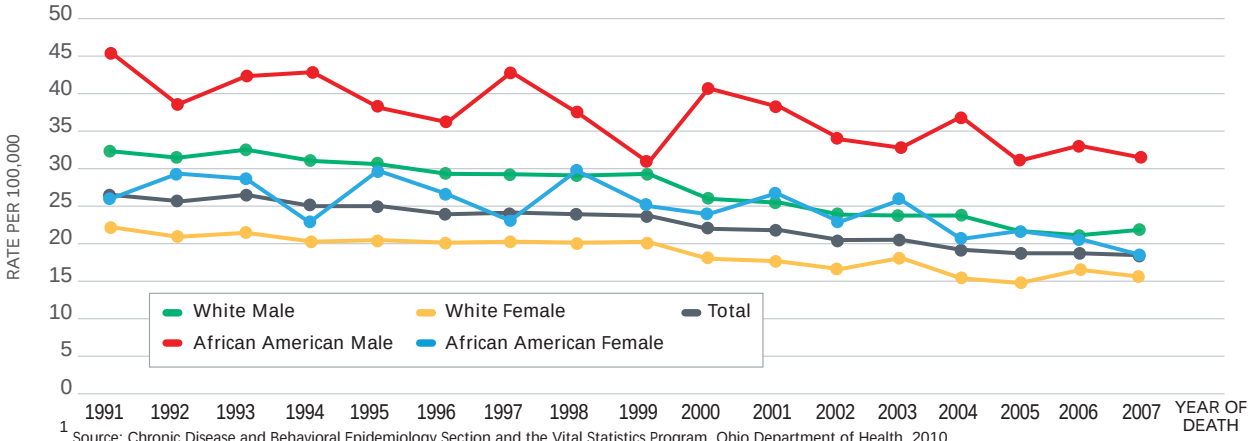
Trends in Age-adjusted Mortality Rates for Cancer of the Cervix by Race in Ohio, 1991-2007[1,2]



1 Source: Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2010.
2 Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

FIGURE 7

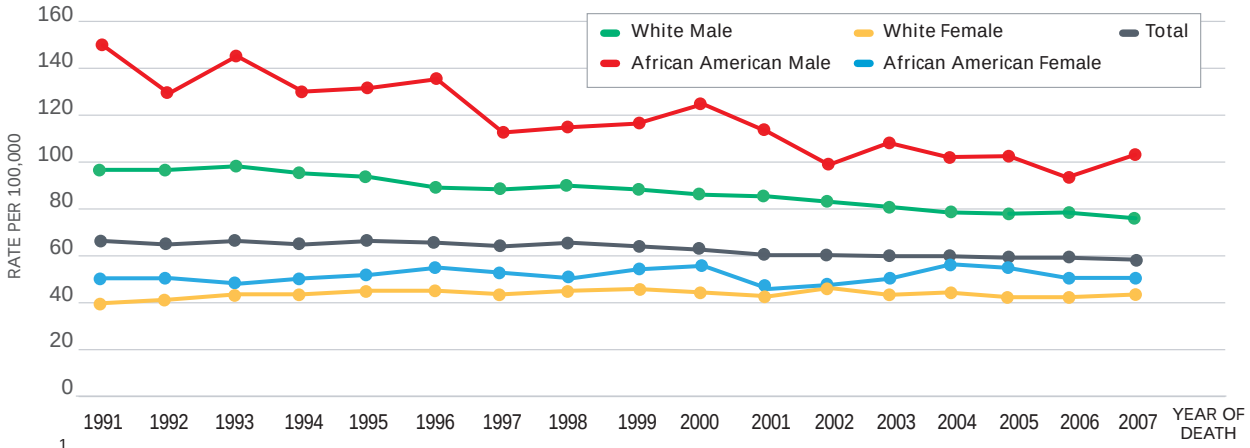
Trends in Age-adjusted Mortality Rates for Cancer of the Colon & Rectum by Gender and Race in Ohio, 1991-2007[1,2]



1 Source: Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2010.
2 Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

FIGURE 8

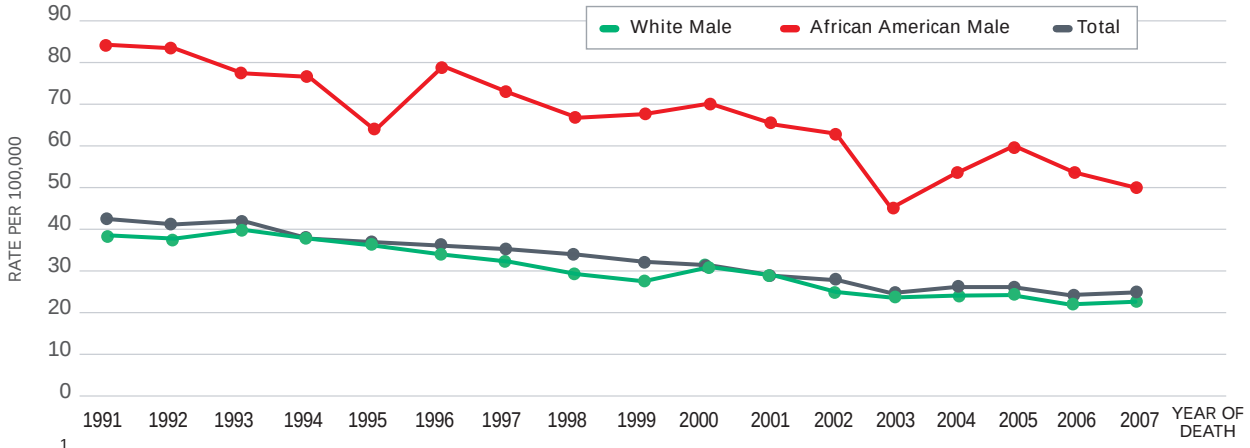
Trends in Age-adjusted Mortality Rates for Cancer of the Lung & Bronchus by Gender and Race in Ohio, 1991-2007[1,2]



1 Source: Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2010.
2 Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

FIGURE 9

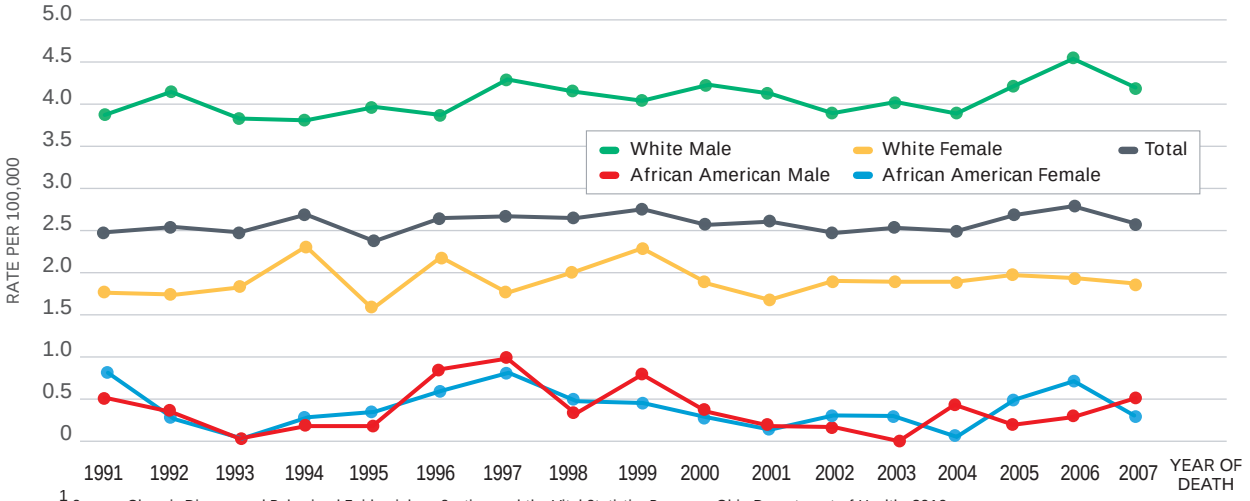
Trends in Age-adjusted Mortality Rates for Cancer of the Prostate by Race in Ohio, 1991-2007[1,2]



1 Source: Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2010.
2 Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

FIGURE 10

Trends in Age-adjusted Mortality Rates for Melanoma of the Skin by Gender and Race in Ohio, 1991-2007[1,2]



1 Source: Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2010.
2 Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

Cancer Disparities in Special Populations

Health disparities are differences in the incidence, prevalence, mortality, and burden of disease among specific population groups. 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.

Diversity in the United States and Ohio

According to US Census estimates for 2008, the nation's diverse racial populations included 13% African American; 5% Asian and Pacific Islander; and 1% American Indian and Alaska Native.[7] Also, it was estimated that 15% of the US population was Hispanic/Latino.[7]

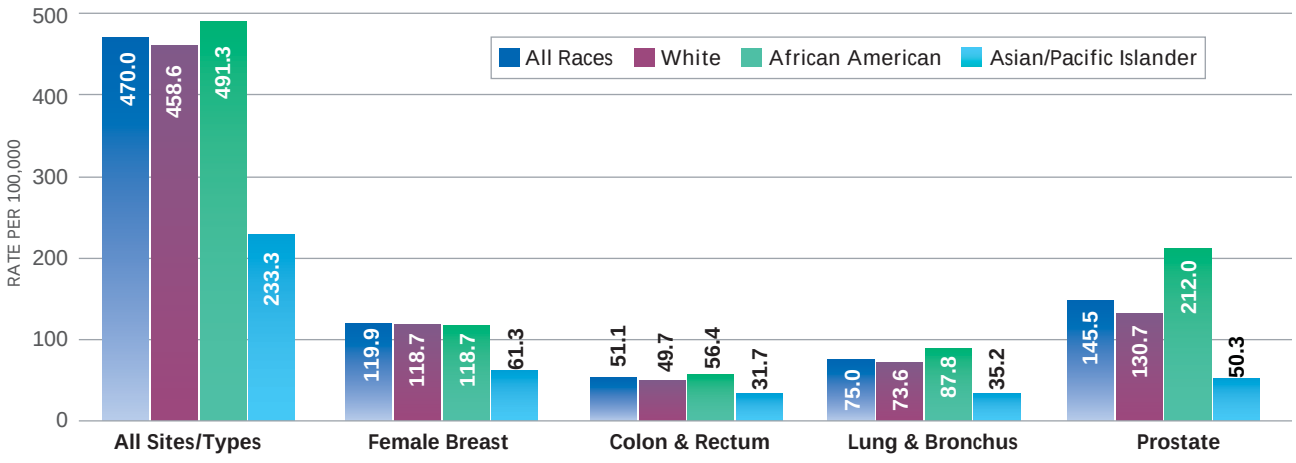
In 2008, an estimated 11,485,910 people were residents of Ohio.[7] Of these, 85% were white, 12% were African American, and about 3% were another race or combination of races.[7] Approximately 3% of Ohio's population was Hispanic/Latino in 2008.[7]

Disparities in Cancer Incidence Rates

Figure 11 displays differences between 2003-2007 average annual incidence rates by race for the leading sites/types of cancer in Ohio. The African American average annual incidence rate (491.3 per 100,000) was 7% higher than whites (458.6 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; esophagus; kidney and renal pelvis; larynx; liver and intrahepatic bile duct; lung and bronchus; multiple myeloma; oral cavity and pharynx; pancreas; prostate; and stomach (Table 6).[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 (Table 6).[4] However, this population had a higher incidence of liver and intrahepatic bile duct cancer (9.7 per 100,000) compared to both whites (3.9 per 100,000) and African Americans (8.6 per 100,000).[4]

FIGURE 11 Average Annual Age-adjusted Incidence Rates for Selected Cancer Sites/Types by Race in Ohio, 2003-2007[1,2]



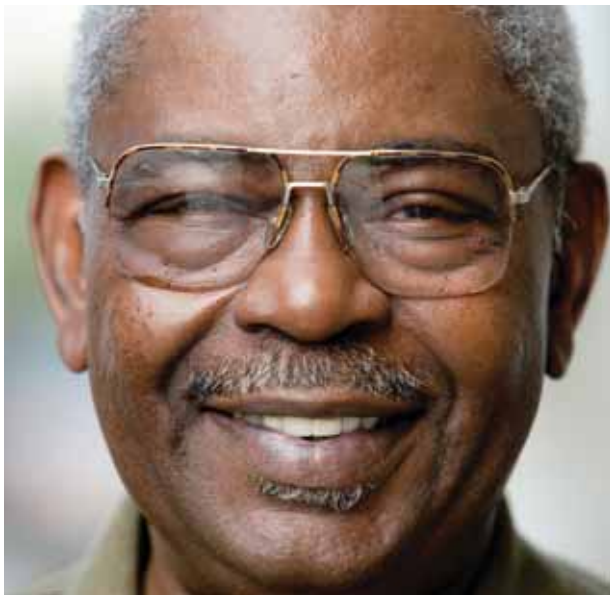
[1] Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2010.
[2] Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

TABLE 6 Average Annual Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates by Gender and Race in Ohio, 2003-2007[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	29,591	548.4	28,545	418.6	58,136	470.0	25,690	528.3	25,081	413.6	50,771	458.6
Brain & Other CNS**	439	7.9	380	5.9	819	6.8	404	8.2	353	6.3	757	7.2
Breast	65	1.2	8,073	119.9	8,139	65.7	56	1.1	7,088	118.7	7,144	64.6
Cervix	*	*	487	8.0	*	*	*	*	413	7.9	*	*
Colon & Rectum	3,184	60.0	3,186	44.5	6,370	51.1	2,801	58.5	2,773	43.0	5,574	49.7
Esophagus	547	10.1	149	2.1	696	5.6	499	10.2	122	1.9	621	5.5
Hodgkin's Lymphoma	186	3.4	163	2.7	348	3.0	163	3.4	139	2.7	302	3.0
Kidney & Renal Pelvis	1,085	19.5	764	11.3	1,849	15.0	953	19.1	672	11.1	1,626	14.7
Larynx	430	7.6	127	1.9	557	4.4	378	7.5	109	1.8	487	4.3
Leukemia	746	14.0	604	8.9	1,351	11.1	673	14.1	534	8.9	1,207	11.1
Liver & Intrahepatic Bile Duct	385	6.9	177	2.5	561	4.5	298	6.0	143	2.2	441	3.9
Lung & Bronchus	5,142	96.3	4,152	59.8	9,295	75.0	4,548	94.2	3,664	58.9	8,212	73.6
Melanoma of the Skin	1,193	21.9	1,029	16.3	2,222	18.3	1,113	22.7	922	16.7	2,035	19.0
Multiple Myeloma	338	6.3	298	4.2	636	5.1	275	5.7	237	3.7	512	4.6
Non-Hodgkin's Lymphoma	1,249	23.1	1,131	16.4	2,380	19.3	1,131	23.4	1,019	16.5	2,150	19.5
Oral Cavity & Pharynx	835	14.6	385	5.7	1,220	9.8	735	14.3	339	5.6	1,074	9.7
Ovary	*	*	836	12.4	*	*	*	*	758	12.6	*	*
Pancreas	697	13.0	710	9.9	1,407	11.3	608	12.5	615	9.5	1,223	10.9
Prostate	7,961	145.5	*	*	*	*	6,478	130.7	*	*	*	*
Stomach	463	8.8	297	4.1	760	6.1	387	8.1	229	3.5	617	5.5
Testis	308	5.6	*	*	*	*	287	6.1	*	*	*	*
Thyroid	252	4.5	834	13.7	1,087	9.2	227	4.5	732	13.9	958	9.3
Urinary Bladder	2,012	38.8	679	9.5	2,691	21.6	1,844	39.2	608	9.4	2,452	21.8
Uterine Corpus & Uterine NOS***	*	*	1,830	26.9	*	*	*	*	1,656	27.5	*	*

[1] Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2010.
[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 2003-2007 is less than five (*i.e.*, the average annual count is less than one).



In Ohio, African American men are 62% more likely to be diagnosed with prostate cancer than white men and often at a more advanced stage.

TABLE 6 cont.

Average Annual Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates by Gender and Race in Ohio, 2003-2007[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	2,898	613.5	2,739	410.6	5,637	491.3	127	248.6	155	224.6	283	233.3
Brain & Other CNS**	26	4.7	21	2.9	47	3.7	2	3.2	3	3.1	5	3.2
Breast	7	1.6	799	118.7	806	68.6	<1	****	47	61.3	47	33.5
Cervix	*	*	61	9.0	*	*	*	*	4	4.7	*	*
Colon & Rectum	305	66.3	328	49.8	633	56.4	17	30.8	19	31.2	36	31.7
Esophagus	40	8.6	23	3.5	63	5.6	1	2.9	1	1.8	3	2.2
Hodgkin's Lymphoma	16	2.8	18	2.5	35	2.6	1	1.0	<1	****	1	0.6
Kidney & Renal Pelvis	114	22.9	82	12.2	196	16.7	4	6.6	3	3.4	6	4.9
Larynx	46	9.4	16	2.4	62	5.3	<1	****	<1	****	<1	****
Leukemia	56	11.4	56	8.2	112	9.5	6	9.9	3	3.5	9	6.3
Liver & Intrahepatic Bile Duct	75	14.5	28	4.2	103	8.6	7	15.4	4	5.7	11	9.7
Lung & Bronchus	538	117.9	445	67.8	982	87.8	17	38.8	18	32.4	35	35.2
Melanoma of the Skin	5	1.1	7	1.0	12	1.0	2	3.7	<1	****	3	1.9
Multiple Myeloma	58	12.4	56	8.6	114	10.1	2	3.7	2	2.2	3	2.8
Non-Hodgkin's Lymphoma	83	16.1	74	10.9	157	13.1	7	12.5	6	7.8	13	9.9
Oral Cavity & Pharynx	83	16.0	35	5.2	118	9.8	5	9.0	3	3.9	8	6.2
Ovary	*	*	61	9.1	*	*	*	*	6	8.6	*	*
Pancreas	79	16.8	87	13.2	165	14.8	4	8.1	3	6.3	7	7.2
Prostate	997	212.0	*	*	*	*	25	50.3	*	*	*	*
Stomach	62	13.9	55	8.5	118	10.7	5	9.2	5	7.6	10	8.4
Testis	11	1.7	*	*	*	*	1	1.3	*	*	*	*
Thyroid	16	3.0	65	9.4	81	6.5	2	1.6	9	9.8	11	6.0
Urinary Bladder	86	19.8	45	6.8	130	12.0	8	16.2	2	2.4	9	8.3
Uterine Corpus & Uterine NOS***	*	*	130	19.6	*	*	*	*	9	11.0	*	*

[1] Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2010.
[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 2003-2007 is less than five (*i.e.*, the average annual count is less than one).

TABLE 7 Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by Gender and Race in Ohio, 2003-2007[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	12,859	248.4	12,058	167.9	24,917	199.6	11,409	243.5	10,691	165.4	22,100	196.3
Brain & Other CNS**	295	5.3	245	3.6	540	4.4	278	5.6	232	3.9	510	4.7
Breast	14	0.3	1,875	26.5	1,889	15.1	11	0.2	1,637	25.8	1,648	14.6
Cervix	*	*	159	2.4	*	*	*	*	135	2.4	*	*
Colon & Rectum	1,203	23.5	1,252	16.7	2,456	19.6	1,057	22.8	1,107	16.3	2,165	19.0
Esophagus	511	9.5	137	1.9	648	5.2	470	9.7	118	1.8	588	5.2
Hodgkin's Lymphoma	33	0.6	27	0.4	60	0.5	30	0.6	25	0.4	55	0.5
Kidney & Renal Pelvis	341	6.5	224	3.1	566	4.5	308	6.5	203	3.1	510	4.5
Larynx	141	2.6	38	0.5	179	1.4	121	2.4	32	0.5	153	1.4
Leukemia	522	10.2	430	5.9	952	7.7	479	10.4	390	5.9	869	7.8
Liver & Intrahepatic Bile Duct	355	6.6	204	2.8	559	4.5	291	6.0	175	2.7	466	4.1
Lung & Bronchus	4,224	80.2	3,187	45.2	7,411	59.7	3,759	78.8	2,837	44.8	6,596	58.9
Melanoma of the Skin	205	3.9	119	1.7	324	2.6	203	4.2	116	1.9	319	2.9
Multiple Myeloma	240	4.7	239	3.3	478	3.8	199	4.3	197	3.0	396	3.5
Non-Hodgkin's Lymphoma	487	9.5	434	5.9	921	7.4	455	9.8	408	6.1	863	7.7
Oral Cavity & Pharynx	223	4.0	110	1.5	333	2.6	189	3.8	99	1.5	288	2.5
Ovary	*	*	605	8.6	*	*	*	*	557	8.8	*	*
Pancreas	681	12.8	700	9.5	1,381	11.0	600	12.5	613	9.2	1,213	10.7
Prostate	1,232	26.2	*	*	*	*	1,032	24.1	*	*	*	*
Stomach	250	4.9	175	2.4	426	3.4	204	4.4	135	2.0	339	3.0
Testis	13	0.2	*	*	*	*	12	0.2	*	*	*	*
Thyroid	28	0.5	34	0.5	62	0.5	26	0.5	29	0.4	56	0.5
Urinary Bladder	443	9.1	188	2.4	631	5.0	414	9.3	168	2.4	582	5.1
Uterine Corpus & Uterine NOS***	*	*	323	4.5	*	*	*	*	277	4.3	*	*

1 Source: Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2010.
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 2003-2007 is less than five (*i.e.*, the average annual count is less than one).

TABLE 7 cont.

Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates by Gender and Race in Ohio, 2003-2007[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	1,407	322.9	1,317	200.5	2,724	247.2	37	85.2	45	76.9	82	80.0
Brain & Other CNS**	16	3.2	12	1.7	28	2.3	1	1.5	1	1.5	2	1.5
Breast	2	0.5	230	34.4	232	20.2	<1	****	7	11.5	8	6.7
Cervix	*	*	23	3.4	*	*	*	*	<1	****	*	*
Colon & Rectum	142	33.3	141	21.6	284	26.2	3	6.4	3	5.3	6	5.7
Esophagus	39	8.6	18	2.8	58	5.1	1	3.0	<1	****	2	1.8
Hodgkin's Lymphoma	4	0.7	1	0.2	5	0.4	0	****	0	****	0	****
Kidney & Renal Pelvis	32	7.1	21	3.3	54	4.9	1	1.8	<1	****	1	1.1
Larynx	20	4.4	6	0.8	25	2.3	<1	****	0	****	<1	****
Leukemia	41	9.4	38	5.8	79	7.2	1	2.9	2	2.5	3	2.7
Liver & Intrahepatic Bile Duct	60	12.0	26	3.9	85	7.4	4	10.1	4	6.4	8	7.9
Lung & Bronchus	454	101.9	340	52.2	794	71.9	8	20.0	9	15.3	17	17.2
Melanoma of the Skin	1	0.3	3	0.4	4	0.3	<1	****	0	****	<1	****
Multiple Myeloma	40	9.7	40	6.3	81	7.5	<1	****	<1	****	1	1.2
Non-Hodgkin's Lymphoma	31	6.7	23	3.5	54	4.8	1	2.6	2	4.4	3	3.8
Oral Cavity & Pharynx	32	6.8	10	1.6	43	3.7	1	2.2	<1	****	2	1.4
Ovary	*	*	46	7.0	*	*	*	*	2	3.3	*	*
Pancreas	77	17.0	84	12.9	161	14.7	3	7.0	3	5.3	6	6.1
Prostate	198	52.2	*	*	*	*	2	5.9	*	*	*	*
Stomach	44	10.3	36	5.6	80	7.5	2	5.0	4	6.2	6	5.7
Testis	1	0.2	*	*	*	*	0	****	*	*	*	*
Thyroid	2	0.4	5	0.7	6	0.6	<1	****	0	****	<1	****
Urinary Bladder	28	7.1	20	3.0	48	4.6	<1	****	<1	****	1	1.3
Uterine Corpus & Uterine NOS***	*	*	46	7.0	*	*	*	*	<1	****	*	*

1 Source: Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2010.
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 2003-2007 is less than five (*i.e.*, the average annual count is less than one).

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

Disparities in Cancer Mortality Rates

In the US, African Americans have the highest mortality rates of any racial group for all sites/types of cancer, with African American males and females having 33% higher and 21% higher 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 and race. For the years 2003-2007, the mortality rate among African Americans in Ohio for all cancer sites/types combined (247.2 per 100,000) was 26% higher compared to whites (196.3 per 100,000).[6]

In Ohio, in 2003-2007, the greatest disparities in mortality between African Americans and whites were observed for multiple myeloma, prostate cancer, and stomach cancer, with African Americans having two or more times the rate of mortality for these cancer sites/types.[6] African Americans also had higher rates of cancer mortality compared to whites for the following cancers: cervix; colon and rectum; female breast; kidney and renal pelvis; larynx; liver and intrahepatic bile duct; lung and bronchus; oral cavity and pharynx; pancreas; thyroid; and uterine corpus and uterine NOS.[6]

Both male and female Asian/Pacific Islanders in Ohio had lower mortality rates than other races for most cancer sites/types (Table 7).[6] However, similar to incidence, this population had higher mortality rates for liver and intrahepatic bile duct cancer than other racial groups.[6]

Factors Contributing to the Unequal Cancer Burden

Socioeconomic Status

Disparities in socioeconomic status may contribute to differences in the cancer burden by race/ethnicity. Socioeconomic disparities often involve unequal access to medical care, low income, poverty, inadequate health insurance, and disparities in treatment.

Poverty is an important factor influencing disparities in diagnosis and treatment of some cancers.[1] Poverty is related to employment, disability status, educational attainment, type of household, age, gender, race, geography, and other factors. An estimated 1,464,000 people in Ohio, or 13.1% of the population, were poor in 2009 according to the 2009 Current Population Survey.[8] The 14 poorest counties in Ohio in 2009 were located in the 32-county Appalachian region, which had a 13.0% poverty rate compared to 10.1% in the remainder of the state.[8] In 2006-2007 in Ohio, 30.9% of African Americans, 9.7% of Asian/Pacific Islanders, and 10.4% of whites were considered poor by federal standards.[8] Also, 25.5% of Ohio's Hispanic/Latino community was considered poor.[8]

Poverty is 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. Unequal access to screening may lead to a later stage of disease at diagnosis and a lower chance of survival. For example, a greater proportion of African Americans are impoverished, and this group is more likely than any other racial group to be diagnosed with advanced stage disease and less likely to survive five years after diagnosis.[3,8]

Insurance

In addition to poverty, health insurance status plays a role in whether one is more likely to receive adequate treatment and care. Nationally, the number of persons without health insurance decreased from 47.0 million in 2006 to 45.7 million in 2007.[9] Hispanics represent the largest racial/ethnic group without health insurance (32.1%), followed by African Americans (19.5%), and whites (14.3%).[9] In Ohio, 1,249,000 people, or 11% of the population, were uninsured according to 2005-2007 data, a slight increase from previous years.[9] Medicare provides health insurance coverage, including cancer screening benefits, for most Americans 65 and over; thus, the largest proportion of uninsured individuals are under age 65. Privately insured Americans may or may not have

cancer screening benefits. Members of working families may also be uninsured or under-insured. In Ohio, 79% of nonelderly uninsured individuals are from families where at least one person in the family works either a full- or part-time job.[10]

Recent federal health reform legislation provided several provisions to increase the number of Americans who have some form of health insurance, including eliminating insurance companies' ability to place restrictions on preexisting medical conditions and drop coverage for existing patients, allowing dependent young adults to remain on their parents' insurance plan, shrinking the coverage gap for prescription drugs and catastrophic care, and promoting the use and reducing the cost of preventive services.[11] The bipartisan Congressional Budget Office predicts that an estimated 32 million additional Americans will be covered in the next 10 years through the provisions in the legislation; however, the long-term effects of the Patient Protection and Affordable Care Act remain largely unknown.[11]

Genetics, Behavior, and Culture

There are some cancers that disproportionately affect certain racial/ethnic groups due to genetic factors or behavioral factors such as diet and screening use. The rate of newly diagnosed breast cancer cases in African American women in Ohio is the same as white women; however, the mortality rate is 33% higher.[4,6] This may be because African American women are being diagnosed at a later stage or with more aggressive tumors, which are more difficult to treat. The Hispanic population experiences lower incidence and mortality rates for all cancers combined and most cancer sites/types but carries a higher burden of cancers associated with infections, such as stomach, liver, and cervical cancers, than non-Hispanic whites.[1] The national liver cancer incidence rate in Hispanic males and females is about twice that of whites.[1,12] Similar to Hispanics, Asian/Pacific Islanders have lower incidence rates compared to whites for most cancer sites/types but higher incidence of infection-related cancers, especially liver and stomach.[1]

Many studies have shown that, compared to other racial groups, Asian/Pacific Islander women have low breast and cervical cancer screening rates. This may be one reason cancer is the leading cause of death for Asian American women. In the US, Asian American women are the first race/gender population to experience cancer as the leading cause of death.[13]

Other cultural factors that influence cancer risk can increase or decrease cancer rates. For example, women from cultures where early marriage and childbearing is encouraged often have lower risk of breast cancer.[1] 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] In the Appalachian region of Ohio, incidence and mortality rates of some cancers (*e.g.*, cervical; colon and rectum; and lung and bronchus) are greater than the non-Appalachian region of the state. Many factors may contribute to these cancer disparities, including unique cultural values, beliefs, and attitudes about cancer; the social environment (*e.g.*, limited health care access and public transportation, low socioeconomic status); provider–patient communication issues (including lack of recommendations for screening); psychosocial factors (*e.g.*, fear of cancer, stress); behavioral factors (*e.g.*, tobacco use, risky sexual activity, and obesity); higher prevalence of human papillomavirus (HPV); and lower rates of cancer screening (*e.g.*, Pap testing and colonoscopy).[14,15,16,17,18] Understanding how these cultural factors influence such behaviors may help intervention efforts aimed at preventing cancer in this subpopulation that is at increased risk of developing and dying from cancer.

Genetic factors may also explain differences in observed rates of cancer in some populations. For example, women from population groups with an increased frequency of mutations in the BRCA1 and BRCA2 genes, which includes women of Ashkenazi Jewish descent, have an increased 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 associated with race are thought to make a minor contribution to the disparate cancer burden between racial/ethnic populations.[1]

Breast Cancer

Bottom Line

Nearly all breast cancers can be treated successfully if detected early. An annual mammogram beginning at age 40 is the most effective way to detect breast cancer at an early, curable stage. Annual clinical breast exams by a doctor or nurse, monthly self-breast examinations, and magnetic resonance imaging (MRI) for women at high lifetime risk are additional ways to detect breast cancer early.

New Cases

An estimated 207,090 new cases of invasive breast cancer are expected to occur among women in the United States during 2010.[1] It is the most frequently diagnosed cancer in women. In addition to the number of female breast cancers, about 1,970 new cases of invasive breast cancer are expected to occur among males in 2010.[1] Breast cancer incidence rates increased among women for more than two decades but decreased 2.0% per year from 1996-2006.[1]

In addition to invasive breast cancer, 54,010 new cases of *in situ* breast cancer are expected to occur nationally among women during 2010.[1] Of these, approximately 85% will be DCIS, that is ductal carcinoma *in situ* (noninvasive cancer cells in the milk ducts).[1] Since 1998, *in situ* breast cancer incidence rates have been stable in white women and increasing in African American women.[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 8,073 new cases of female breast cancer were diagnosed annually between 2003 and 2007 in Ohio with a corresponding rate of 119.9 per 100,000 (Table 2).[4]

Risk Factors & 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: 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.

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 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.

Modifiable risk factors

Not having children: 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.

Post-menopausal hormone therapy (PHT): Long-term use (several years) of PHT (especially combined estrogen and progestin therapy) is associated with increased risk.

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.

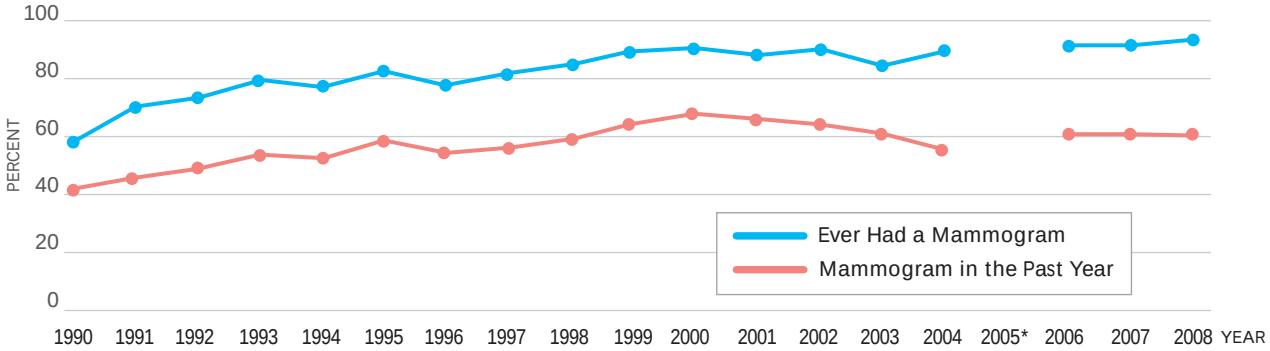
Overweight/obesity: Overweight/obese women have an increased risk of post-menopausal breast cancer.

Alcohol: Women who drink one alcoholic beverage per day have a slight increased risk. Women who drink 2-5 alcoholic beverages daily have 1.5 times the risk of a nondrinker.

Physical inactivity: Those who do not engage in vigorous physical activity in addition to usual activity on five or more days a week have higher risk than those who do.

FIGURE 12

Trends in the Prevalence of Women 40 and Older Who Reported Having Had a Mammogram Ever or in the Past Year in Ohio, 1990-2008[1,2,3]



1 Source: Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2009.
2 The weighted percentages were adjusted to: 1) probability of selection, *i.e.*, the number of different phone numbers that reach the household, the number of adults in each household, and the number of completed interviews in each cluster; and 2) demographic distribution, *i.e.*, age and gender.
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.

The risk of developing breast cancer increases with age. In Ohio from 2003 to 2007, approximately 95% of women who developed breast cancer were 40 and over.[4]

About 65 men were diagnosed with breast cancer each year in Ohio from 2003 to 2007 with a corresponding rate of 1.2 per 100,000, which is equal to the rate in the US (Table 2).[3,6] Clinically, breast cancer in men is very similar to breast cancer in women, but the prognosis was once thought to be worse than for women. However, recent studies have not found this to be true.[1,24]

Deaths

An estimated 40,230 deaths (39,840 women, 390 men) are anticipated from breast cancer in 2010 nationally.[1] Breast cancer ranks second in cancer deaths among women. Only lung cancer accounts for more cancer deaths in women. Mortality rates have steadily declined in women since 1990, with the largest decrease (3.2% per year) in women younger than 50 years of age.[1] Improved mammography screening to detect breast cancer early, along with better treatment options, have made breast cancer a more curable disease than it was 30 years ago. In Ohio from 2003-2007, 97% of breast cancer deaths occurred in women 40 and older.[6] The 2003-2007 average annual mortality rate for breast cancer in Ohio females was 26.5 per 100,000.[6] This represents 1,875 average annual deaths in Ohio from female breast cancer over the time period (Table 3).[6]

Early Detection

Mammography is especially valuable as an early detection tool because it can identify breast cancer at an early stage, usually before physical symptoms develop.[1] Numerous studies have shown that early detection saves lives and increases treatment options. It is important for all women to follow the screening guidelines in Table 8 on page 35.

According to the 2008 Ohio Behavioral Risk Factor Surveillance Survey (BRFSS), 61% of Ohio women 40 and older reported having had a mammogram in the past year.[25] Also according to the 2008 BRFSS, more African Americans (69%) than whites (61%) reported having had a mammogram in the past year.[25] Figure 12 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 61% in 2008, and ever having had a mammogram, which increased from 59% in 1990 to 92% in 2008.[25]

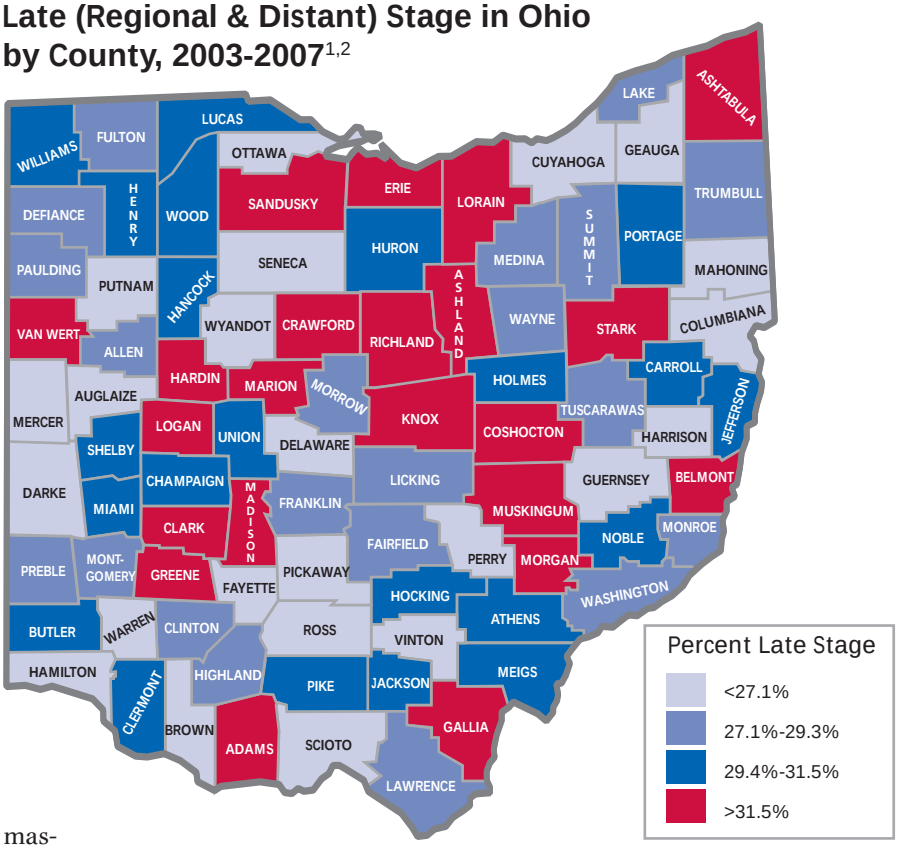
In addition to mammography, the American Cancer Society now recommends a yearly MRI scan starting at age 30 among women at an exceptionally high risk of developing breast cancer.[1] These women include those with BRCA1 or BRCA2 gene mutation; a first-degree relative with a BRCA1 or BRCA2 gene mutation; 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). 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.[26] 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.[26]

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 lumpectomy (surgical removal of the tumor) or mastectomy (surgical removal of the breast) and removal of the lymph nodes under the arm if cancer has spread to the nodes; radiation therapy; chemotherapy; hormone therapy (tamoxifen; aromatase inhibitors); or targeted biologic therapy.[1] Often, two or more methods are used in combination. Numerous studies have shown that, for early stage disease, the long-term survival probability after lumpectomy plus radiation therapy is similar to the survival probability after mastectomy for women whose tumors have not spread to the skin, chest wall, or distant organs.[1]

FIGURE 13

Cancer of the Female Breast Diagnosed Late (Regional & Distant) Stage in Ohio by County, 2003-2007[1,2]



[1] Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2010.
[2] In Ohio, 29% of female breast cancers are diagnosed late (regional and distant) stage.

Signs & Symptoms of Breast Cancer

- Lump or swelling in the breast or underarm area
- Persistent changes in the breast such as skin irritation, thickening, dimpling, 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.

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 lumpectomy and radiation therapy, with or without the drug tamoxifen, and mastectomy with or without tamoxifen.[1]

Survival

The five-year relative survival probability for localized breast cancer was 98% in 1999-2006.[3] If the cancer had spread regionally, however, the probability was 84%, and for women with distant metastases the probability was only 23% (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 2003 to 2007, 68% of breast cancers among women were diagnosed early (*in situ* or local stage) (Table A-1).[4] In order to improve the odds of survival, early detection through mammography screening provides the best chance of discovering breast cancer at an early stage.[1] Regions and populations with a high percentage of late stage breast cancer need increased screening to reduce mortality from this disease. The percentages of late stage breast cancer by county in Ohio are shown in Figure 13.

Currently, a woman living in the United States has a 1 in 10 lifetime risk of developing invasive breast cancer.[2]

TABLE 8 American Cancer Society Recommendations for the Early Detection of Cancer in Average Risk, Asymptomatic People

Gender	Age	Primary Site/Type	Test or Procedure*	Frequency
Female	Under Age 21[1]	Cervix	Conventional Pap Test	Every year *OR*
			Liquid-based Pap Test	Every 2 years
	21-39	Cervix	Conventional Pap Test	Every year[2] *OR*
			Liquid-based Pap Test	Every 2 years
		Breast	Clinical Breast Exam	Every 3 years
			Breast Self-exam[3]	Every month
	40-49	Cervix	Conventional Pap Test	Every year[2] *OR*
			Liquid-based Pap Test	Every 2 years
		Breast	Mammogram[4]	Every year
			Clinical Breast Exam	Every year
			Breast Self-exam[3]	Every month
	50+	Cervix	Conventional Pap Test	Every year[2] *OR*
			Liquid-based Pap Test	Every 2 years
		Breast	Mammogram[4]	Every year
			Clinical Breast Exam	Every year
			Breast Self-exam[3]	Every month
		Colon & Rectum	Colonoscopy	Every 10 years *OR*
			Flexible Sigmoidoscopy[5]	Every 5 years *OR*
			Double-contrast Barium Enema[5]	Every 5 years *OR*
			CT Colonography (virtual colonoscopy)[5]	Every 5 years *OR*
			Fecal Occult Blood Test (FOBT)[5,6]	Every year *OR*
			Fecal Immunochemical Test (FIT)[5,6]	Every year *OR*
			Stool DNA (sDNA) Test[5]	Interval Uncertain
Male	50+	Colon & Rectum	Colonoscopy	Every 10 years *OR*
			Flexible Sigmoidoscopy[5]	Every 5 years *OR*
			Double-contrast Barium Enema[5]	Every 5 years *OR*
			CT Colonography (virtual colonoscopy)[5]	Every 5 years *OR*
			Fecal Occult Blood Test (FOBT)[5,6]	Every year *OR*
			Fecal Immunochemical Test (FIT)[5,6]	Every year *OR*
			Stool DNA (sDNA) Test[5]	Interval Uncertain
		Prostate	Begin discussion about prostate cancer testing[7]	Periodic

[1] Screening should begin approximately three years after a woman begins having vaginal intercourse, but no later than 21.

[2] Women 30+ who have had three consecutive normal annual exams may get screened every two to three years. Alternatively, HPV DNA testing and conventional or liquid-based cytology could be performed every three years. Women who have risk factors such as HIV infection or a weak immune system may need to get screened more often. Women 70+ who have had three or more consecutive normal Pap tests in the last 10 years may choose to stop cervical cancer screening. Screening after a total hysterectomy is not necessary unless the surgery was done as a treatment for cervical cancer.

[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.

[4] Women with a 20% or greater lifetime risk, such as those with known BRCA1 or BRCA2 mutations, strong family history of breast or ovarian cancer, or radiation to the chest between ages 10 to 30, should begin annual mammography and magnetic resonance imaging (MRI) at 30. Women with moderate (15%-20%) lifetime risk should talk with their doctors about the benefits and limitations of adding MRI screening to their yearly mammograms.

[5] All positive tests should be followed up with a colonoscopy.

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

[7] The American Cancer Society does not support routine prostate testing, such as digital rectal exam and prostate-specific antigen blood test, at this time. 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.

* In addition to recommended cancer screenings named in the table, men and women 21 and older should seek periodic health counseling and exam of thyroid, ovaries/testes, lymph nodes, oral cavity, and skin.

TABLE 9 Summary Information for Selected Cancer Sites

Cancer Sites	Non-modifiable Risk Factors & Populations with High Rates		Modifiable Risk Factors & Populations with High Rates		Early Detection	Signs & Symptoms				Treatment
Brain & Other Central Nervous System	• Gene mutations: Rare genetic mutations such as those causing neurofibromatosis, tuberous sclerosis, Li-Fraumeni syndrome, and Von Hippel-Lindau disease increase risk.	• Family history: A family history of brain and other central nervous system (CNS) cancer increases risk.	• Ionizing radiation: Radiation to the head, e.g., for treatment of ringworm or another cancer, increases risk.		No screening examinations are currently available.	• Headache (in 50% of patients) • Nausea • Vomiting	• Blurred vision • Lethargy or weakness • Coma • Hearing loss	• Numbness • Impaired coordination • Difficulty talking or walking	• Difficulty thinking • Personality changes • Facial paralysis or pain • Seizures	Depending upon tumor location: • Surgery • Radiation therapy • Other drugs • Chemotherapy • Targeted therapy
Female Breast	• Age: 95% of breast cancers occur in women 40+. • Gender: Breast cancer is 100 times more common among women than men. • 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, probably because their tumors tend to be of a more aggressive type. • Ethnicity: Ashkenazi Jews are at increased risk. • Genetics: About 5%-10% of cases are hereditary and result from gene mutations, most commonly mutations of the BRCA1 and BRCA2 genes. • Family history: Risk increases if a first-degree relative has had breast cancer, especially if the family member was diagnosed before 50. Having other relatives with this cancer may also increase risk.	• Personal history: Women with cancer in one breast, lobular carcinoma *in situ*, ductal carcinoma *in situ*, high breast tissue density, or biopsy-confirmed hyperplasia are at greater risk. • Previous breast radiation: Women who have had radiation therapy to the chest area earlier in life such as for treatment of another cancer have increased risk. • Long menstrual history: Women who started menstruating before 12 or who went through menopause after 55 have higher risk. • Diethylstilbestrol (DES): Women who were given DES during pregnancy have slightly increased risk, and their daughters may also have increased risk.	• Not having children: 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. • Post-menopausal hormone therapy (PHT): Long-term use of PHT, especially estrogen and progesterone combined, is associated with increased risk.	• 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. • Weight: Overweight/obese women have an increased risk of post-menopausal breast cancer. • Alcohol: Women who drink 2-5 alcoholic beverages daily have 1.5 times the risk of a nondrinker. • Physical inactivity: Those who do not engage in vigorous physical activity in addition to usual activity on five or more days a week have higher risk than those who do.	Age 20-39: • Clinical breast exam every three years • Monthly breast self-exam (optional) Age 40+: • Annual mammogram • Annual clinical breast exam • Monthly breast self-exam (optional)	• Lump or swelling in the breast or underarm area • Persistent changes in the breast such as skin irritation, thickening, dimpling, swelling, distortion, or tenderness	• Nipple ulceration or the nipple turning inward • Redness or scaliness of the nipple or breast skin	• Spontaneous discharge other than breast milk • Breast or nipple pain		• Surgery - Lumpectomy (local removal of the tumor) or mastectomy (surgical removal of the breast and lymph nodes under the arm) alone or combined with: • Radiation therapy • Chemotherapy • Hormone therapy • Targeted therapy
Cervix	• Age: Half of women who develop this cancer are 35-55, and 20% are diagnosed at 65+. • Race/ethnicity: Hispanic women have more than twice the risk as non-Hispanic white women, and African American women have 1.5 times the risk of non-Hispanic white women. • DES: Women whose mothers were given DES during pregnancy have slightly increased risk.		• Human papillomavirus (HPV) and sexual activity: Infection with certain types of HPV is the greatest risk factor. Behaviors that increase risk of developing HPV include the following: • sex at an early age • sex with many partners • sex with a partner who has had many sexual partners • sex with an uncircumcised male	• Weakened immunity: Drugs that weaken the immune system and infection with human immunodeficiency virus (HIV) increase risk. • Smoking: Women who smoke have twice the risk of those who don't. • Multiple pregnancies: Having many full-term pregnancies increases risk. • No or irregular Pap screening: Women who do not receive recommended Pap tests will not get treated for precancerous cervical lesions. • Oral contraceptive use: Five or more years taking birth control pills increases risk; but risk is decreased if use is discontinued.	Under age 21 (only if sexually active): • Conventional Pap test every year or liquid-based Pap test every two years Age 21+: • Conventional Pap test every year or liquid-based Pap test every two years Age 30+: • Conventional Pap test every year or liquid-based Pap test every two years • For women who have had three normal Pap tests in a row, conventional Pap test or liquid-based Pap test every two to three years OR Combination of HPV DNA test and conventional Pap test or liquid-based Pap test every three years	• Any unusual vaginal discharge (not menstruation) • Blood spots or light bleeding between periods	• Unusually long or heavy periods • Vaginal bleeding after menopause	• Bleeding or pain after sex, douching, or pelvic exam		For pre-invasive lesions: • Cryosurgery • Laser surgery For invasive cervical cancers: • Surgery • Radiation • Chemotherapy
Colon & Rectum	• Age: More than 90% of colorectal cancers occur in individuals 50+. • Gender: Men have higher incidence rates of this cancer than women. • Race: African Americans have the highest incidence of this cancer. • Ethnicity: Ashkenazi Jews are at increased risk. • Family history: Having a first-degree relative who has had colorectal cancer or adenomatous polyps increases risk, especially if the relative was diagnosed before 60.	• Genetics: About 5%-10% of patients with this cancer have an inherited genetic syndrome, such as familial adenomatous polyposis (FAP) or hereditary nonpolyposis colorectal cancer (HNPCC). • Personal history: Having had colorectal cancer, intestinal polyps, ulcerative colitis, Crohn's disease, or chronic inflammatory bowel disease increases risk.	• Diet: Diets high in red meats and processed meats, fat (especially animal fat), and low in calcium, folate, and fiber *may* increase risk. There is also some evidence that diets very low in fruits/vegetables may increase risk. • Smoking: Long-term smokers *may* be more likely than nonsmokers to develop and die from this cancer.		Age 50+: Discuss with your doctor which one of the following screening tests is right for you: • Colonoscopy every 10 years • Flexible sigmoidoscopy every five years • Double-contrast barium enema every five years • CT colonography (virtual colonoscopy) every five years • Stool DNA (sDNA) test, interval uncertain • Fecal Occult Blood Test (FOBT) every year • Fecal immunochemical test (FIT) every year	• Change in bowel habits such as diarrhea, constipation, or narrowing of the stool that lasts for more than a few days	• Feeling the need to have a bowel movement that is not relieved by doing so • Rectal bleeding or blood in the stool	• Cramping or steady abdominal (stomach area) pain • Weakness and fatigue		• Surgery • Radiation therapy • Chemotherapy • Targeted therapies (monoclonal antibodies)
Leukemia	• Age: Acute lymphocytic leukemia (ALL) is most commonly diagnosed among children; whereas, acute myeloid leukemia (AML), chronic lymphocytic leukemia (CLL), and chronic myeloid leukemia (CML) occur mainly in adults. • Gender: Leukemia is more common among men than women. • Race: Whites have higher rates of leukemia than African Americans.	• Family history: First-degree relatives of CLL patients have increased risk of CLL. • Inherited syndromes: Certain inherited conditions such as Down syndrome, Klinefelter syndrome, Fanconi's anemia, Wiskott-Aldrich syndrome, Bloom's syndrome, Li-Fraumeni syndrome, and ataxia telangiectasia increase risk. • Myelodysplastic syndrome: This blood disease increases risk of AML.	• Ionizing radiation: Exposure to large amounts of ionizing radiation (e.g., from an atomic bomb explosion, nuclear reactor accident, or medical treatments that use radiation) increases risk of AML, ALL, and CML. • Benzene: Long-term exposure to high levels of benzene increases risk of AML and possibly ALL and CML.	• Chemotherapy: Certain chemotherapy drugs used to treat other cancers increase risk of AML and ALL. • Cigarette smoking: Carcinogens in cigarette smoke, particularly benzene, increase risk of AML. • Human T-cell lymphotropic virus (HTLV-1) infection: Infection with HTLV-1 increases risk of a rare type of leukemia known as adult T-cell leukemia.	No screening examinations are currently available.	• Weakness • Fatigue • Weight loss	• Repeat infections • Fever and night sweats • Swelling or discomfort in the abdomen	• Bruising, nosebleeds, hemorrhages	• Swollen lymph nodes, especially in the neck or armpit	• Chemotherapy • Gleevec® for treatment of CML • Radiation therapy • Antibiotics • Transfusions of blood components • Bone marrow transplants
Lung & Bronchus	• Age: About 2 out of 3 people diagnosed with lung cancer are 65+. • Personal history: A previous lung cancer diagnosis increases risk of a second lung cancer.	• Family history: Having parents or siblings who have had lung cancer *may* increase risk.	• Smoking: Cigarette, pipe, cigar, and hookah (water pipe) smoking all cause lung cancer. Risk increases with amount and duration of use. • Exposure to secondhand smoke • Air pollution: Exposure to air pollution *may* slightly increase risk.	• Occupational or environmental exposures: Exposure to substances such as radon; asbestos; arsenic; radioactive ores (e.g., uranium); silica; beryllium; cadmium; vinyl chloride; chromium compounds; nickel chromates; coal products; mustard gas; chloromethyl ethers; and diesel exhaust increases risk.	No screening examinations are currently available. However, the National Lung Screening Trial is testing spiral computed tomography (CT) scanning as a potential screening tool for lung cancer.	• Persistent cough • Recurring pneumonia or bronchitis	• Chest pain, often aggravated by deep breathing, coughing or laughing • Bloody or rust-colored spit or phlegm	• Shortness of breath, wheezing, or hoarseness • Loss of appetite or weight loss		Non-small cell: • Surgery plus radiation therapy • Chemotherapy • Targeted therapy • Antiangiogenesis drugs Small-cell: • Chemotherapy plus radiation therapy • Surgery (rare)
Melanoma of the Skin	• Age: Melanomas are more common in older people; however, it is one of the most common cancers in people younger than 30. • Gender: Men are more likely to develop this cancer than women. • Race: Risk of melanoma is more than 10 times higher for whites than for African Americans. • Dysplastic moles: Having these abnormal moles increases risk. • Fair skin: Melanoma occurs more frequently in people who have fair skin that burns or freckles easily (these people also usually have red or blond hair and blue eyes) than in people with dark skin.	• Many (more than 50) ordinary moles: Having many moles increases risk. • Personal history of melanoma or skin cancer: People who have been treated for melanoma or non-melanoma skin cancers (basal cell carcinoma or squamous cell carcinoma) are at increased risk of melanoma. • Family history of melanoma: Having two or more close relatives who have had melanoma increases risk. • Weakened immune system: People whose immune system is weakened by certain cancers, by drugs given following organ transplantation, or by HIV are at increased risk of developing melanoma.	• Severe, blistering sunburns: People who have had at least one severe, blistering sunburn as a child or teenager are at increased risk of melanoma. Sunburns in adulthood are also a risk factor. • Ultraviolet (UV) radiation: UV radiation from both the sun and artificial sources, such as sunlamps and tanning booths, increases risk.		• Monthly self-examination of the skin • Periodic clinical skin examination	• Asymmetry of a mole • Border irregularity of a mole • Color over the mole is not the same	• Diameter of mole is larger than 6 millimeters (about ¼ inch or about the size of a pencil eraser)	• Change in size, shape, color, or feel of a mole		• Surgery • Immunotherapy • Chemotherapy for advanced disease • Radiation in some cases
Non-Hodgkin's Lymphoma	• Age: Risk increases with advancing age. • Gender: Lymphoma is more common in men than women. • Race: Whites are more likely to get this cancer than African Americans or Asians.	• Weakened immunity: HIV infection, inherited immunodeficiency syndromes (e.g., rheumatoid arthritis, lupus), and drugs given following organ transplants to suppress immunity increase risk of lymphoma.	• Infections: Infection with HTLV-1; HIV, *Helicobacter pylori*; hepatitis C virus; or Epstein-Barr virus increase risk.		No screening examinations are currently available.	• Enlarged lymph nodes • Fever • Drenching night sweats • Weight loss • Itching	• Decreased appetite • Swollen abdomen • Nausea • Vomiting	• Coughing and shortness of breath • Swollen head and arms • Headache • Seizures	• Trouble thinking or moving body • Itchy red or purple nodules/ lumps under the skin • Personality changes	• Chemotherapy • Radiation therapy plus stem cell transplant for advanced disease • Immunotherapy • Monoclonal antibodies • Interferon
Oral Cavity & Pharynx	• Gender: Men are more than two times as likely to develop this cancer type compared to females, likely due to higher tobacco use and alcohol consumption.	• Personal history: People who have had oral and pharynx cancer are at increased risk of developing another.	• Tobacco use: Most patients with this cancer type use tobacco (cigarette, cigar, pipe, or smokeless tobacco), and risk increases with the amount and duration of use. • Alcohol: Drinking alcohol increases risk, especially if combined with tobacco use. • Betel nut use: Chewing this mild stimulant increases risk.	• UV radiation: Lip cancer is more common among those who have prolonged exposure to sunlight. • Diet: Inadequate consumption of fruits and vegetables *may* increase risk. • HPV infection	• Examination of the entire mouth by a doctor or dentist during routine checkups • Complete head and neck exam	• Sore in mouth that bleeds easily and does not heal • Pain in mouth that doesn't go away • Persistent lump or thickening in the cheek	• Persistent white or red patch on gums, tongue, tonsil, or lining of mouth • Sore throat or feeling of something caught in throat	• Difficulty chewing, swallowing, or moving the jaw or tongue • Numbness of tongue or other area of mouth • Voice changes	• Loosening of teeth or pain and swelling around teeth or jaw • Lump or mass in neck • Weight loss • Persistent bad breath	• Surgery • Radiation therapy • Chemotherapy • Targeted therapies
Prostate	• Age: About 2 out of 3 prostate cancers are diagnosed in men over 65. • Race/ethnicity: African American men are more likely than white men to be diagnosed with this cancer. • Family history: Having a father or brother with prostate cancer increases risk.	• 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. Changes in BRCA1 and BRCA2 increase risk. • Prostate changes: Men with abnormal prostate cells, called high-grade prostatic intraepithelial neoplasia, may have increased risk.	There are no known modifiable risk factors.		Age 50+: Patients should discuss the benefits and limitations of testing with their doctors. • Annual prostate-specific antigen (PSA) blood test • Annual digital rectal exam (DRE)	• Weakened 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 • Pain in pelvic bone, spine, hips, or ribs	• Weakness or numbness in legs or feet • Loss of bladder or bowel control	• Surgery • Radiation therapy (external beam, seed implants) • Hormone therapy • Chemotherapy • Watchful waiting depending upon stage of disease
Testis	• Age: Most testicular cancers occur between 20-39. • Race: Risk is higher among whites than among African Americans and Asian/Pacific Islanders. • Family history: A man whose father or brother has had testicular cancer has increased risk. • Cryptorchidism: This condition in which the testicles do not descend into the scrotum before birth increases risk.	• Personal history: A man who has developed cancer in one testicle has increased risk of developing cancer in the other. • Congenital abnormalities: Men born with inguinal hernia or abnormal penis, testicles, or kidneys are at increased risk.	There are no known modifiable risk factors.		• Physical examination of the testicles	• Painless or slightly uncomfortable lump on a testicle	• Testicular enlargement or swelling	• Sensation of heaviness or aching in the lower abdomen or scrotum	• Breast tenderness or growth	• Surgery • Chemotherapy • Radiation therapy
Uterine Corpus (Endometrium)	• Age: Most cases are diagnosed in women older than 50. • Race: White women are more likely than African American women to develop this cancer. • Long menstrual history: Beginning menstruation before 12 and/or starting menopause after 55 increases risk.	• Personal history: Endometrial hyperplasia and a type of inherited colorectal cancer increase risk. • Family history: Having family members who have had endometrial cancer or HNPCC increases risk.	• Never having given birth • Tamoxifen use	• Hormone replacement therapy • Obesity: Fat tissue can increase estrogen levels, which raises risk.	• At menopause, all women should be informed of risks and symptoms and encouraged to report any unexpected bleeding or spotting to their physician. • Annual endometrial biopsy beginning at 35 for women with or at risk for HNPCC	• Unusual bleeding, spotting, or abnormal discharge, especially after menopause	• Pelvic pain or mass • Unexplained weight loss			• Surgery • Radiation therapy • Hormone therapy • Chemotherapy for advanced disease

Pain Control:
MYTHS & MISCONCEPTIONS[19]

Approximately 30% of patients newly diagnosed with cancer, 30%-50% of patients undergoing treatment, and 70%-90% of patients with advanced disease experience pain.[20,21,22] Unfortunately, research has shown that cancer-related pain is still being under-treated. Here are 10 common reasons that patients often do not seek pain relief:

1. I will become addicted.
Fear of addiction is very common for people who take narcotics or opioid analgesics for pain relief. Drug addiction is defined as dependence on the regular use of opioid analgesics to satisfy physical, emotional, and psychological needs rather than for medical reasons. Pain relief is a medical reason for taking narcotics. Therefore, if you take opioid analgesics as prescribed to relieve pain, you are not an "addict," no matter how much or how often medicines are taken. Drug addiction in cancer patients is rare, and almost never occurs in people who do not have a history of drug abuse prior to illness.

2. I won't be able to handle the side effects of analgesics.
Some people think pain relief medication will make them feel drowsy, dizzy, or not "themselves." Not everyone has side effects from analgesics. However, some of the more common side effects are drowsiness, constipation, nausea, and vomiting. There are many different pain medications. If you experience side effects from one, a different one may not cause side effects. Also, side effects from opioid pain relievers can usually be treated successfully.

3. Pain is an inevitable consequence of cancer.
There are many cancer patients who never experience pain. Most cancer pain can be relieved safely and effectively.

4. I should be able to tolerate the pain.
People's religious, moral, cultural, or family backgrounds can lead them to think that needing pain medication makes them weak. Appropriate pain control actually makes patients stronger by helping them fight their cancer.

5. My doctor won't understand my pain.
Some people are afraid health care professionals will think they are exaggerating the level of pain or are being too cowardly. Doctors and nurses understand that tumors can cause pain depending on their size and location. It is a patient's right to receive assistance in pain management. In fact, if your doctor or nurse does not understand and control your pain, you may need to seek further assistance.

6. If I complain, I am not being a good patient.
Some people are afraid of being a burden or nuisance if they talk about their pain. Understanding how bad pain is helps the health care professional decide how to treat it. Also, changes in your pain may help your doctor determine how your treatment is working. You are the best judge of your pain, and the better you can describe it, the more helpful it will be.

7. Pain means my cancer is getting worse.
Some people think pain is a sign of deteriorating health. However, pain may occur at any time during the course of an illness, for any number of reasons. New pain does not always mean that your cancer is getting worse; an increase in pain with the start of a new treatment is sometimes a sign that the treatment is working. Pain may even occur for people whose condition is stable and whose life expectancy is long.

8. If my doctor focuses on pain control, it will distract him/her from treating my cancer.
Doctors and nurses are trained to manage many problems at the same time and not be distracted. Working on managing the pain will actually help improve your quality of life. Chronic unrelieved pain may cause patients to reject their treatment programs.

9. I will not be able to afford pain medication.
Most health plans cover partial costs for prescription medications that are medically necessary. Use of a generic medication is an option in some situations for lowering costs. Many pharmaceutical companies have patient drug assistance programs to help with the costs associated with pain medication. Your health care team and social workers can help you access these programs.

10. I have too many pills to take as it is.
Some people find it hard to remember to take all of their medications. Return of the pain is not the best reminder to take pain medication. It is important to try to prevent the pain before it starts or gets worse by using a pain-relief method on a regular schedule. If pain begins, do not wait for it to get worse before doing something about it.

What Are Clinical Trials?[23]

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.

Lists of 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 American Cancer Society's Web site at www.cancer.org/clinicaltrials provides a matching service through the Coalition of Cancer Cooperative Groups, which matches cancer patients to appropriate clinical trials by answering a few questions. The Society's Web site can also locate the closest National Cancer Institute-designated center where many clinical trials are conducted.
- The National Cancer Institute (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 United States 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 Coalition of National Cancer Cooperative Groups (CNCCG) 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. A fact sheet on the CCOP can be found at www.cancer.gov/cancertopics/factsheet/NCI/clinical-center.
- 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

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

  University of Cincinnati: www.universityhospitalcincinnati.com/cancer/clinicaltrials.html

  Toledo Community Hospital Oncology Program: www.tchop.com/clinical

  Dayton Clinical Oncology Program: www.med.wright.edu/dcop/groups.html

  Columbus Community Clinical Oncology Program: www.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.

Cervical Cancer

Bottom Line

Screening tests offer a powerful opportunity for the prevention, early detection, and successful treatment of cervical cancer. For women whose precancerous lesions are detected through Pap tests, the survival probability is near 100%.[27]

New Cases

Nationally, an estimated 12,200 new cases of invasive cervical cancer are expected in 2010.[1] The incidence rate has decreased steadily over the past several decades. As Pap screening has become more prevalent, pre-invasive lesions of the cervix are detected far more frequently than invasive cancer.[1]

In Ohio, approximately two-thirds of women who developed cervical cancer from 2003 to 2007 were 30 to 59 years old.[4] An average of 487 new cases of cervical cancer were diagnosed annually in Ohio during this time period with a corresponding rate of 8.0 per 100,000 (Table 2).[4] African American women had higher incidence rates compared to white women in Ohio in 2003-2007 (9.0 per 100,000 vs. 7.9 per 100,000, respectively) (Table 6).[4]

Risk Factors & Populations with High Rates

The primary cause of cervical cancer is infection with certain types of human papillomavirus (HPV), especially types 16 and 18.

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.

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

Modifiable risk factors

HPV infection and sexual activity: Infection with HPV is the greatest risk factor for cervical cancer. Behaviors that increase risk of contracting HPV include the following:

- **Having multiple sexual partners**
- **Sex at an early age**
- **Having a sexual partner who has had multiple sexual partners**
- **Having a male sexual partner who is not circumcised**

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 many full-term pregnancies have increased risk.

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

Deaths

In the US, an estimated 4,210 cervical cancer deaths are expected in 2010.[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 2003.[1]

The average annual mortality rate for cervical cancer in Ohio from 2003-2007 was 2.4 per 100,000.[6] This represents 159 average annual deaths in Ohio from cervical cancer over the time period (Table 3).[6] Approximately 56% of Ohioans who died from cervical cancer were 55 and over.[6]

FIGURE 14

Trend in the Prevalence of Women 18 and Older Who Reported Having Had a Pap Smear in the Past Three Years in Ohio, 1992-2008[1,2,3,4]

1 Source: Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2009.
2 The weighted percentages were adjusted to: 1) probability of selection, *i.e.*, the number of different phone numbers that reach the household, the number of adults in each household, and the number of completed interviews in each cluster; and 2) demographic distribution, *i.e.*, age and gender.
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 and 2005.

Early Detection

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.

Screening should begin about three years after a woman begins having vaginal intercourse, but no later than age 21.[1] Screening should be done annually with conventional Pap tests or every two years using liquid-based Pap tests.[1] For women 30 and over who have had three tests in a row with normal findings, the Pap test may be performed every two to three years.[1] However, doctors may suggest a woman get screened more often if she has certain risk factors, such as HIV infection or a weak immune system. Most women 70 and older who have had three or more consecutive normal Pap tests and no abnormal Pap tests in the past 10 years, and women who have had a total hysterectomy, do not need to continue screening.[1] DNA tests to detect human papillomavirus (HPV) strains associated with cervical cancer may be used in conjunction with the Pap test.[1]

According to the 2008 BRFSS, 82% of female Ohioans 18 and older reported having had a Pap test within the last three years (Figure 14). This percentage has remained relatively stable since 1992.[25]

Most cases of cervical cancer can be prevented if a woman avoids sexual behavior that leads to infection with HPV, the leading cause of cervical cancer.[28] In addition, the US Food and Drug Administration has approved two vaccines for the prevention of the most common HPV infections that cause cervical cancer; Gardasil® was approved for use in ages 9 to 26 in 2006, and Cervarix® was approved for ages 10 to 25 in October 2009.[1] The vaccines cannot protect against established infections, nor do they protect against all HPV types.[1]

Signs & 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.

Treatment

For pre-invasive lesions, preferred treatment includes electro-coagulation (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]

Survival

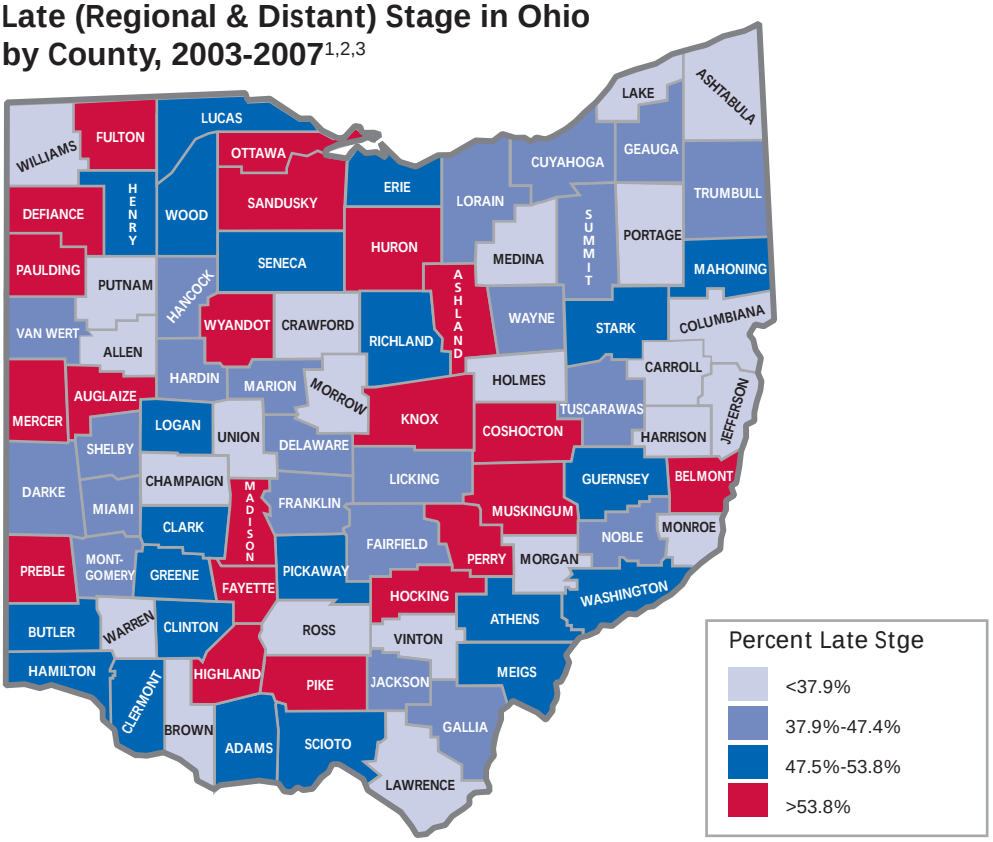
Seventy percent of patients with invasive cervical cancer survive five years after diagnosis.[3] Cervical cancer is one of the most successfully treated cancers if detected at an early stage, with a five-year relative survival probability of nearly 100% for patients with pre-invasive cervical lesions and 91% for patients with local stage tumors (Figure 1).[3] Nationally, whites are more likely than African Americans to have their cancers diagnosed local stage (50% versus 43%, respectively).[3]

In Ohio, from 2003 to 2007, 46% of invasive cervical cancers were diagnosed late (regional or distant stage) (Figure 15).[4] (Please note: *in situ* cervical cancers are not required to be reported in Ohio, thus the percent diagnosed at this stage is unknown.)

Currently, a woman living in the United States has a 1 in 161 lifetime risk of developing invasive cervical cancer.[2]

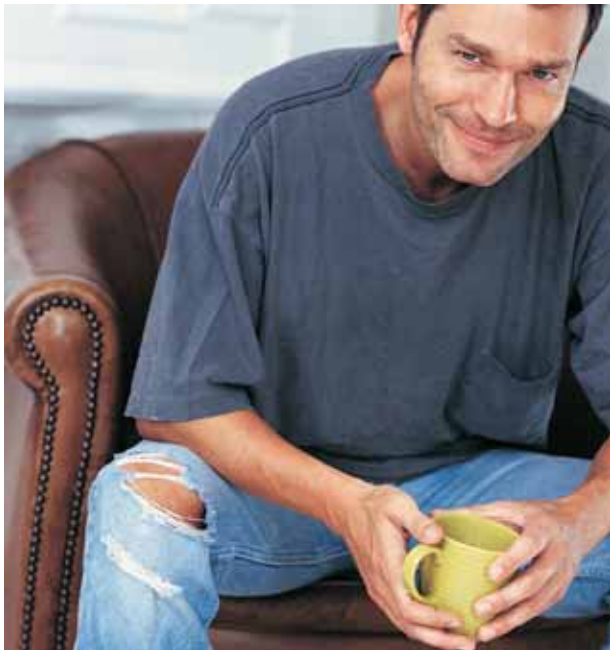
FIGURE 15

Cancer of the Cervix Diagnosed Late (Regional & Distant) Stage in Ohio by County, 2003-2007[1,2,3]



[1] Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2010.
[2] In Ohio, 46% of cervical cancers are diagnosed late (regional and distant) stage.
[3] In Ohio, *in situ* cervical cancers are not required to be reported to the cancer registry. Thus percentages are based on invasive cancers only.

Colon & Rectum Cancer



Risk Factors & Populations with High Rates

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

Non-modifiable risk factors

Age: More than 90% of colorectal 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 colorectal cancer or adenomatous polyps increases risk, especially if the relative was diagnosed before 60.

Genetics: About 5%-10% of patients with colorectal cancer have an inherited genetic syndrome such as familial adenomatous polyposis (FAP) or hereditary nonpolyposis colorectal cancer (HNPCC).

Personal history: Having had colorectal cancer, intestinal polyps, or chronic inflammatory bowel disease (which includes ulcerative colitis and Crohn's disease) increases risk.

Modifiable risk factors

Diet: Diets high in red meats and processed meats, fat (especially animal fat) and low in calcium, folate, and fiber *may* increase risk. There is also some evidence that diets very low in fruits and vegetables *may* increase risk.

Smoking: Long-term smokers *may* be more likely than nonsmokers to develop and die from colorectal cancer.

Bottom Line

Screening tests offer a powerful opportunity for the prevention, early detection, and successful treatment of colorectal cancers. Yet, according to 2008 data, only 53% of Americans 50 and older had either a fecal occult blood test (FOBT) in the past year, a sigmoid-oscopy in the past five years, or a colonoscopy in the past 10 years.[27] While people cannot change their genetic makeup or family health history, most people can reduce their risk of colorectal cancer by following screening guidelines and eating a healthy, low-fat diet.

New Cases

Nationally, an estimated 102,900 colon and 39,670 rectal cancer cases are expected to occur in 2010.[1] Colorectal cancer is the third most common invasive cancer in both men and women. The incidence rate peaked in 1985 at 66.3 per 100,000 and has been decreasing for the last two decades.[1] Research suggests that these declines may be due in part to increased screening and polyp removal, preventing progression of polyps to invasive cancers.[1] An average of 6,370 (3,184 men and 3,186 women) new cases of colorectal cancer were diagnosed annually between 2003 and 2007 in Ohio with a corresponding rate of 51.1 per 100,000 (Table 2).[4]

The risk of developing colorectal cancer increases with age. In Ohio, between 2003 and 2007, approximately 92% of individuals who developed colorectal cancer were 50 and over.[4]

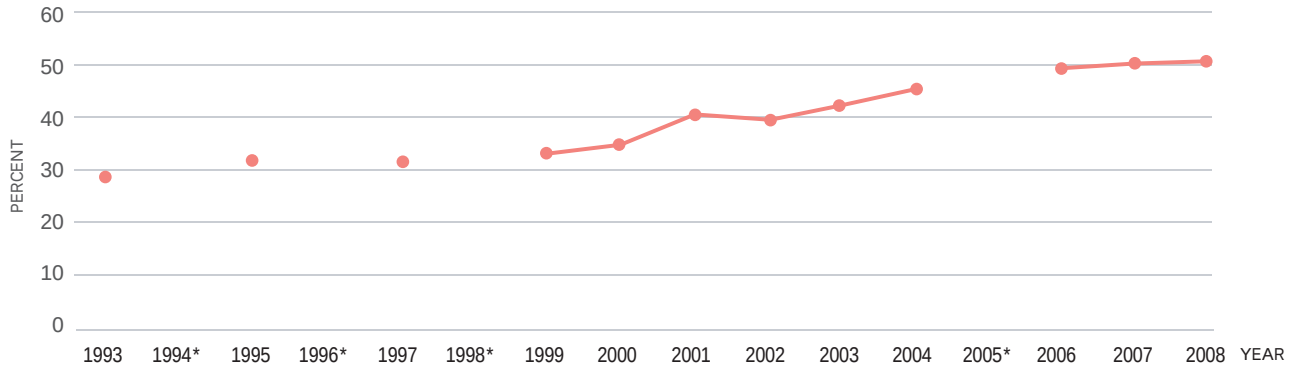
Deaths

An estimated 51,370 colorectal cancer deaths are expected to occur in 2010 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 increased survival from improvements in early detection and treatment.[1]

Currently, a man living in the United States has a 1 in 26 lifetime risk of developing invasive colorectal cancer, and a woman has a 1 in 32 lifetime risk of developing invasive colorectal cancer.[2]

FIGURE 16

Trend in the Prevalence of Persons 50 and Older Who Reported Having Had a Sigmoidoscopy/Colonoscopy in the Past Five Years in Ohio, 1993-2008[1,2,3]



1 Source: Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2009.
2 The weighted percentages were adjusted to: 1) probability of selection, *i.e.*, the number of different phone numbers that reach the household, the number of adults in each household, and the number of completed interviews in each cluster; and 2) demographic distribution, *i.e.*, age and gender.
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, and 2005.

The average annual mortality rate for colorectal cancer in Ohio from 2003-2007 was 19.6 per 100,000.[6] This represents 2,456 average annual deaths in Ohio from colorectal cancer over the time period (Table 3).[6] Figure 7 on page 23 shows that, although colorectal cancer mortality rates are dropping, African American men in Ohio die from colorectal cancer at a higher rate compared to white men or women and African American women.[6]

Early Detection

Colonoscopy and flexible sigmoidoscopy offer the best opportunity to detect colorectal cancer at an early stage, when successful treatment is likely, and to prevent some cancers by detection and removal of polyps. People should begin colorectal cancer screening earlier and/or undergo screening more often if they have a personal history of colorectal cancer or adenomatous polyps, a strong family history of colorectal cancer or polyps, a personal history of chronic inflammatory bowel disease, or if they are a member of a family with hereditary colorectal cancer syndromes. According to the 2008 BRFSS, 51% of Ohioans 50 and older reported having had a sigmoidoscopy or colonoscopy within the past five years (Figure 16).[25]

Beginning at 50, men and women who are at average risk for developing colorectal cancer should have one of the following screening tests:[29]

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

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

Fecal Occult Blood Test (FOBT): An FOBT is a stool sample analysis used to detect very small quantities of blood in feces that may be indicative of the presence of colorectal 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.

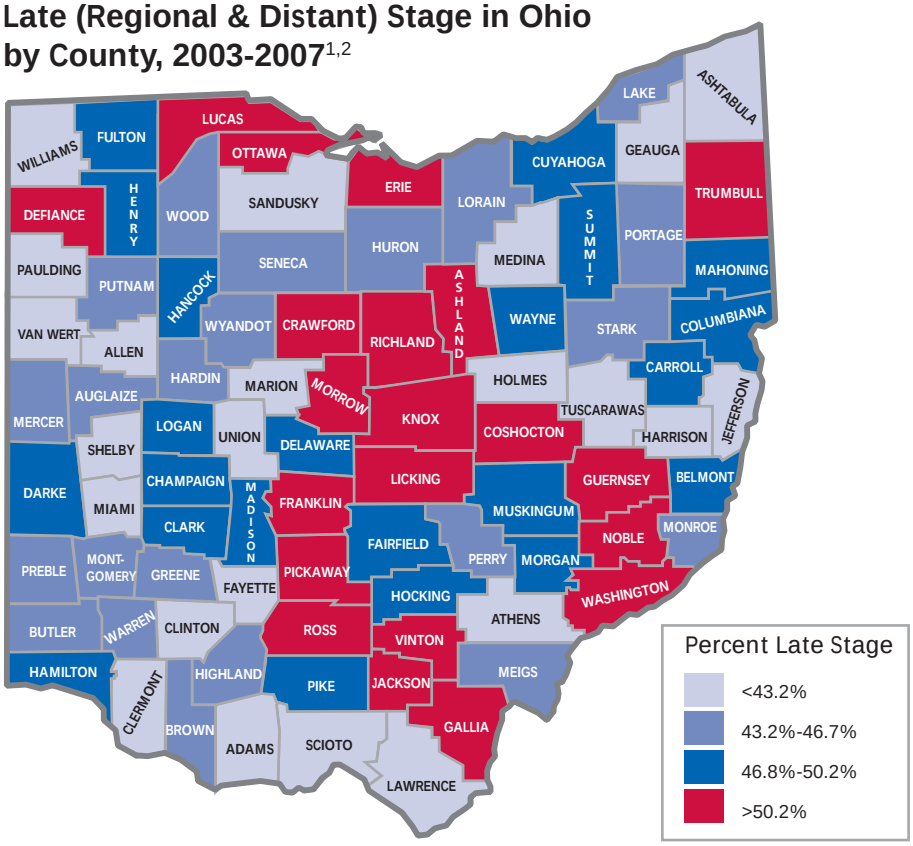
CT Colonography (Virtual Colonoscopy): A computed tomography (CT) scan of the colon and rectum is an x-ray test that produces detailed cross-sectional images to allow a doctor to look for polyps or cancer. If polyps or other suspicious areas are detected, this test should be followed up by a colonoscopy.

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. The FIT is done essentially the same way as the FOBT, but there are no drug or dietary restrictions, and sample collection may take less effort. If results are positive, a colonoscopy is required to investigate further.

Stool DNA Test: Instead of looking for blood in the stool, these tests look for certain abnormal sections of DNA (genetic material) from cancer or polyp cells. Colorectal cancer cells often contain DNA mutations (changes) in certain genes. Cells from colorectal cancers or polyps with these mutations are often shed into the stool, where tests may be able to detect them. If the results are positive, a colonoscopy will need to be done.

FIGURE 17

Cancer of the Colon & Rectum Diagnosed Late (Regional & Distant) Stage in Ohio by County, 2003-2007[1,2]



[1] Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2010.
[2] In Ohio, 47% of colon and rectum cancers are diagnosed late (regional and distant) stage.

Treatment

Surgery is the most common form of treatment for colorectal cancer.[1] For cancers that have not spread, it is frequently a cure. Chemotherapy or chemotherapy plus radiation (for rectal cancer) 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 (anticancer 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.[1] A chemotherapy combination referred to as FOLFOX (oxaliplatin, fluorouracil, and leucovorin) is often used to treat persons with metastatic carcinoma of the colon or rectum.[1] The US Food and Drug Administration has approved three targeted monoclonal antibody therapies to treat metastatic colorectal cancer: bevacizumab (Avastin®), which blocks the growth of blood vessels to the tumor, and cetuximab (Erbitux®) and panitumumab (Vectibix®) that block the effects of hormone-like factors that promote cancer cell growth.[1]

Survival

According to 1999-2006 data, the five-year relative survival probability for patients with colorectal cancer is 65%.[3] When colorectal cancers are detected at local stage, the five-year relative survival probability is 90%; however, only 39% of colorectal 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 12% (Figure 1).[3]

Nearly half (47%) of all colorectal cancers in Ohio are diagnosed at regional or distant stage, when survival is not as high (Table A-2).[4] Figure 17 presents the percentage of regional and distant stage colorectal cancer by Ohio county.[4]

Signs & Symptoms of Colorectal Cancer

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

- Change in bowel habits such as diarrhea, constipation, or narrowing of the stool that lasts for more than a few days
- Feeling the need to have a bowel movement that is not relieved by doing so
- Rectal bleeding or blood in the stool
- Cramping or steady abdominal (stomach area) pain
- Weakness and fatigue

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.

Leukemia

Bottom Line

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. Leukemia is categorized by whether it is acute (cells are unable to mature properly) or chronic (cells can mature but do not function properly or fight infection well), and by the type of blood cells that are affected (lymphoid cells or myeloid cells). The four primary types of leukemia are as follows:

- **Acute Lymphocytic Leukemia (ALL)** results from an acquired genetic injury to DNA of a single cell in the bone marrow. It accounts for approximately 74% of the leukemia cases among young children, but also affects adults, especially those 65 and older.[1]
- **Acute Myeloid Leukemia (AML)** results from genetic damage to the DNA of developing cells in the bone marrow. It occurs in both adults and children.
- **Chronic Lymphocytic Leukemia (CLL)** results from a malignant disorder involving a progressive accumulation of small, mature-appearing lymphocytes in blood lymph nodes, the spleen, and bone marrow. This type of leukemia is most common among adults 55 and older and is rare in children.
- **Chronic Myeloid Leukemia (CML)** results from injury to the DNA of a stem cell in the bone marrow, leading to uncontrolled growth of white blood cells. This type of leukemia occurs mainly in adults.

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

New Cases

An estimated 43,050 new cases of leukemia are expected to occur in 2010 in the US.[1] The most common type of leukemia in the US is CLL with an estimated 14,990 cases (35%) in 2010, followed by AML (12,330 cases; 29%), ALL (5,330 cases; 12%), and CML (4,870 cases; 11%).[1] Although ALL accounts for only 12% of total leukemia cases, it represents nearly three-fourths (74%) of cases among children.[1] The incidence of AML increased by an average of 2.1% per year from 1988-2000, and then decreased by about 2.7%.[1] CLL has remained relatively stable since 1975.[1]

Risk Factors & 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: First-degree relatives of CLL patients have increased risk of CLL.

Inherited syndromes: Certain inherited conditions such as Down syndrome, Klinefelter syndrome, Fanconi's anemia, Wiskott-Aldrich syndrome, Bloom's syndrome, Li-Fraumeni syndrome, and ataxia telangiectasia increase risk of leukemia.

Myelodysplastic syndrome: This blood disease increases risk of AML.

Modifiable risk factors

Ionizing radiation: Exposure to large amounts of ionizing radiation such as from an atomic bomb explosion or nuclear reactor accident increases risk of AML, ALL, and CML. Medical treatments that use radiation can be another source of high-level exposure.

Human T-cell lymphotropic virus (HTLV-1) infection: Infection with HTLV-1 increases risk of a rare type of leukemia known as adult T-cell leukemia.

Benzene: Long-term exposure to high levels of benzene increases risk of AML and possibly ALL and CML.

Chemotherapy: Certain chemotherapy drugs used to treat other cancers increase risk of AML and ALL.

Cigarette smoking: Carcinogens in cigarette smoke, particularly benzene, account for as many as 1 in 5 cases of AML.

Currently, a man living in the United States has a 1 in 92 lifetime risk of developing leukemia, and a woman has a 1 in 135 lifetime risk of developing leukemia.[2]

An average of 1,351 cases of leukemia were diagnosed among Ohio residents each year from 2003-2007.[4] The leukemia incidence rate in Ohio (11.1 per 100,000) was 10% lower than the US rate of 12.3 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 439 cases per year in 2003-2007; although, incidence rates of AML were nearly the same in Ohio and the US (3.6 per 100,000 and 3.5

per 100,000, respectively).[3,4] Rates of CLL, CML, and ALL were 21%, 13%, and 19% lower in Ohio compared to the US, respectively; however, lower incidence rates in Ohio may be due to incomplete reporting of leukemia in Ohio (Table 10).[3,4]

Incidence rates of leukemia in Ohio were higher among males compared to females and whites compared to African Americans in 2003-2007.[4] Incidence was highest among white males in Ohio (14.1 per 100,000 compared to all other gender/race categories (Table 6).[4]

Deaths

In the US, an estimated 21,840 leukemia deaths are expected to occur in 2010.[1] Death rates declined for both males and females combined between 2001-2006 at about 1.3% per year.[1] In both Ohio and the US, 2003-2007 mortality rates by leukemia type were highest for AML followed by CLL.[3,6] Mortality rates of AML and CLL were slightly higher in Ohio compared to the US in 2003-2007 (Table 10).[3,6]

Signs & 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
- Weight loss
- Repeat infections
- Fever and night sweats
- Bruising easily
- Nosebleeds and hemorrhages
- Swollen lymph nodes, especially in the neck or armpit
- Swelling or discomfort in the abdomen

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

Detection of leukemia at an early stage is 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]

Treatment

Chemotherapy using various anticancer drugs alone or in combination is the most effective method of treating leukemia.[1] Gleevec®, a type of targeted therapy that blocks the production of leukemia cells but does not harm normal cells, has been shown to be effective in the treatment of CML.[1] Mylotarg® is a targeted drug approved for treatment in older AML patients whose cancer has relapsed or who are not able to receive other chemotherapy.[1] Arzerra® was recently approved for the treatment of CLL patients if other chemotherapeutic agents can no longer control the cancer.[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 24% for AML to 80% for CLL.[3] Survival has increased in the past 30 years due to advances in treatment, especially for ALL, which increased from 42% in 1975-1977 to 66% in 1999-2006.[3] For all leukemia types combined, the 1999-2006 five-year survival probability was similar for males (56%) and females (55%) but was higher among whites (56%) compared to African Americans (47%).[3]

TABLE 10 **Average Annual Number of New Invasive Leukemia Cases and Age-adjusted Incidence Rates and Average Annual Number of Leukemia Deaths and Age-adjusted Mortality Rates by Histology Type in Ohio and the US, 2003-2007** [1,2]

Histology Type	INCIDENCE			MORTALITY		
	Ohio Cases	Ohio Rate	National Rate	Ohio Deaths	Ohio Rate	National Rate
All Leukemias*	1,351	11.1	12.3	952	7.7	7.2
Acute Lymphocytic Leukemia (ALL)	147	1.3	1.6	51	0.4	0.5
Acute Myeloid Leukemia (AML)	439	3.6	3.5	377	3.1	2.8
Chronic Lymphocytic Leukemia (CLL)	408	3.3	4.2	206	1.6	1.5
Chronic Myeloid Leukemia (CML)	162	1.3	1.5	50	0.4	0.4

[1] Source: Ohio Cancer Incidence Surveillance System, Chronic Disease and Behavioral Epidemiology Section, and the Vital Statistics Program, Ohio Department of Health, 2010; Surveillance, Epidemiology, and End Results (SEER) Program, *SEER Cancer Statistics Review 1975-2007,* National Cancer Institute, 2010.
[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 (49 cases); Acute Monocytic (30 cases); Other Myeloid/Monocytic (21 cases); Other Acute (48 cases); and Aleukemic, Subleukemic, and Not Otherwise Specified (46 cases). These histology types account for 268 leukemia deaths per year.

Lung & Bronchus Cancer

Bottom Line

Most lung cancers could be prevented if cigarette smoking and other tobacco use were eliminated. Although lung cancer has been reduced among some groups in recent years, about 18% of adult Americans were current smokers in 2009.[30] Until tobacco use ends, lung cancer will likely remain the number one cause of cancer death in the United States, killing nearly 157,300 Americans every year.[1] Lung cancer causes more deaths every year than do colorectal, breast, prostate, and pancreatic cancers combined.[1]

New Cases

An estimated 222,520 new cases of lung cancer are expected to occur in the United States during 2010, accounting for about 15% of cancer diagnoses.[1] The incidence rate is declining significantly in men, from a high of 102.1 per 100,000 in 1984 to 71.3 per 100,000 in 2006.[1] In contrast, the rate among women is leveling off after a long period of increase.[1]

The risk of developing lung cancer increases with age. In Ohio between 2003 and 2007, approximately 94% of individuals who developed lung cancer were 50 and over.[4] An average of 9,295 new cases of lung cancer (5,142 men and 4,152 women) were diagnosed annually between 2003 and 2007 in Ohio with a corresponding rate of 75.0 per 100,000.[4] In Ohio males, the average annual incidence rate per 100,000 was 96.3 compared to a rate of 59.8 among Ohio females (Table 2).[4]

Risk Factors & Populations with High Rates

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

Non-modifiable risk factors

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

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

Personal history: Having had lung cancer before increases risk of a new lung cancer.

Modifiable risk factors

Smoking: Cigarette, pipe, cigar, and hookah (water pipe) smoking all cause lung cancer. Risk increases with the amount and duration of use.

Secondhand smoke: Exposure to secondhand (environmental) tobacco smoke increases risk. A nonsmoker living with a smoker has about a 20%-30% greater risk.

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.

Deaths

Lung cancer is the leading cause of cancer-related death in both men and women. Nationally, an estimated 157,300 deaths from lung cancer are expected to occur in 2010, accounting for about 28% of all cancer deaths.[1]

Since 1987, more women have died each year from lung cancer than from breast cancer.[1] The female lung cancer mortality rate has been stable since 2003 after continuously increasing for several decades.[1] The mortality rate declined significantly in men from 1994 to 2006 by about 2.0% per year.[1] These declines result from the reduction in cigarette smoking over the past 40 years.[1]

The average annual mortality rate for lung cancer in Ohio from 2003-2007 was 59.7 per 100,000 (80.2 per 100,000 for males and 45.2 per 100,000 for females).[6] This represents 7,411 average annual deaths in Ohio from lung cancer over the time period (Table 3).[6] Figure 8 on page 24 displays a downward trend in lung cancer mortality among males and an increasing trend among females in Ohio from 1991-2007 by race.

Early Detection

Early detection has not yet been demonstrated to improve survival. Chest x-ray, analysis of cells in sputum, and fiber-optic examination of the bronchial passages have shown limited effectiveness in reducing lung cancer deaths.[1] However, newer 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.[1] The National Lung Screening Trial, a cancer screening clinical trial funded by the National Cancer Institute, will determine if screening asymptomatic individuals at high risk for lung cancer with either spiral CT or standard chest x-ray can reduce lung cancer deaths.[1]

Signs & 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 or phlegm
- 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®) and erlotinib (Tarceva®).[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] 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]

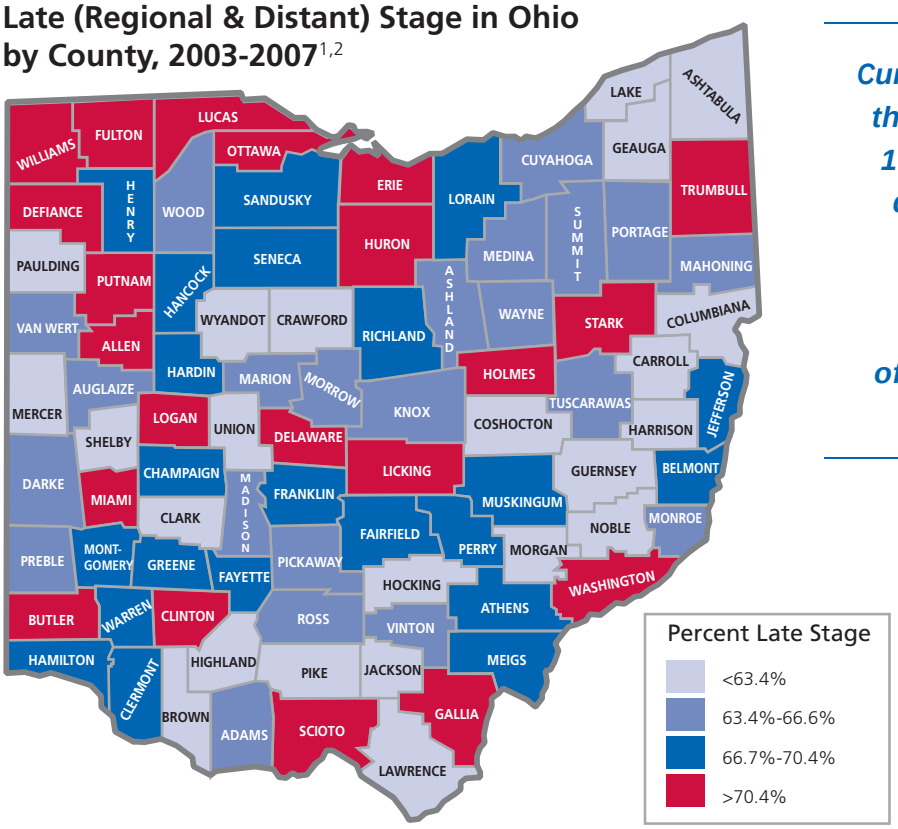
Survival

Nationally, the one-year relative survival probability for lung cancer has increased from 37% in 1975-1979 to 45% in 2002-2006, largely due to improvements in surgical techniques and combined therapies.[3] However, the five-year survival probability for all stages combined is only 16% according to 1999-2006 data.[3] The survival probability is 53% for cases detected when the disease is still localized; although, only 15% of lung cancers nationally are diagnosed at this early stage (Figure 1).[3]

In Ohio, approximately 17% of lung cancer cases are diagnosed *in situ* or local stage; whereas, approximately 68% of Ohio lung cancer cases are diagnosed late (regional or distant) stage (Table A-3).[4] The percentage of late stage lung cancer cases by Ohio county is presented in Figure 18.

FIGURE 18

Cancer of the Lung & Bronchus Diagnosed Late (Regional & Distant) Stage in Ohio by County, 2003-2007[1,2]



Currently, a man living in the United States has a 1 in 18 lifetime risk of developing invasive lung cancer, and a woman has a 1 in 21 lifetime risk of developing invasive lung cancer.[2]

[1] Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2010.
[2] In Ohio, 68% of lung and bronchus cancers are diagnosed late (regional and distant) stage.

Lymphoma

Risk Factors & 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: Siblings of people with HL, especially identical twins, are more likely to develop HL.

Weakened immunity: HIV infection, inherited immunodeficiency syndromes (such as rheumatoid arthritis and lupus), and drugs given following organ transplants to suppress immunity increase risk.

Modifiable risk factors

Infections: Infection with the human T-cell lymphotropic virus (HTLV-1), HIV (which reduces immunity), *Helicobacter pylori,* or hepatitis C virus increases risk of NHL. Infection with the Epstein-Barr virus, which causes infectious mononucleosis, increases risk of both NHL and HL.

Bottom Line

Lymphoma is 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. Hodgkin's lymphoma (HL), also known as Hodgkin's disease, is a specialized type of lymphoma in which the cancer cells are called Reed-Steenberg cells. All other lymphomas are called non-Hodgkin's lymphoma (NHL). Early detection of lymphoma is difficult due to lack of valid screening tests and non-specific signs and symptoms (fatigue, weight loss, etc.).

New Cases

An estimated 74,030 new cases of lymphoma will be diagnosed in the US in 2010, including 8,490 cases of HL and 65,540 cases of NHL.[1] Incidence rates of NHL have been stable since 1991 in men but have increased 1.1% per year in women since 1990.[1] HL has declined in males by 0.6% per year in the past 30 years and has increased slightly in females (0.4% per year).[1]

In Ohio in 2003-2007, an average of 348 cases of HL and 2,380 cases of NHL were diagnosed per year.[4] The incidence rate of HL was slightly higher in Ohio (3.0 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 (19.3 and 19.6 per 100,000, respectively) (Table 2).[3,4]

Incidence rates of both HL and NHL were higher among males compared to females and whites compared to African Americans in Ohio in 2003-2007.[4] White males in Ohio had the highest incidence of both HL (3.4 per 100,000) and NHL (23.4 per 100,000) of all gender/race categories (Table 6).[4]

Signs & 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

Additional symptoms of NHL may include the following:

- Decreased appetite
- Swollen abdomen
- Nausea
- Vomiting
- Coughing and shortness of breath
- Swollen head and arms
- 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.

Currently, a man living in the United States has a 1 in 58 lifetime risk of developing NHL, and a woman has a 1 in 74 lifetime risk of NHL. The lifetime risk of developing HL is much lower – approximately 1 in 405 for males and 1 in 482 for females.[2]

Deaths

In 2010, an estimated 21,530 deaths from lymphoma will occur in the US – 1,320 deaths from HL and 20,210 deaths from NHL.[1] HL mortality has been decreasing in both men and women for more than three decades.[1] Death rates for NHL have been decreasing since 1997 in both men and women.[1]

In Ohio, an average of 60 deaths from HL and 921 deaths from NHL occurred each year from 2003 through 2007.[6] Mortality rates of both HL and NHL were highest among white males compared to white females and black males and females (Table 7).[6]

Early Detection

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

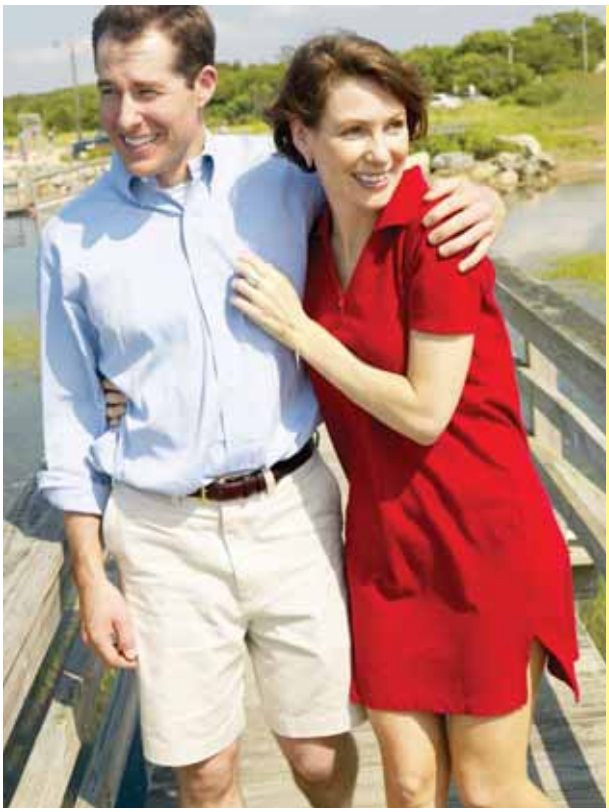
Treatment

Chemotherapy, radiation therapy, bone marrow and stem cell transplantation, or any combination thereof, are used to treat HL, depending on the stage and cell type of the disease.[1] For HL cases resistant to standard therapy, blood-forming stem cell transplants may be used following high-dose chemotherapy.[31] Chemotherapy is the most common treatment for NHL and may be used alone or in combination with radiation.[1] External beam radiation (radiation from a source outside the body) is the most common treatment for early stage NHL.[32] 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.[1]

Survival

Five-year relative survival probabilities are higher for HL compared to NHL. The survival probability is 87% 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]

Melanoma/Skin Cancer



Risk Factors & Populations with High Rates

Non-modifiable risk factors

Age: Risk of melanoma increases with age; however, it is one of the most common cancers among adolescents and young adults.

Gender: Men are more likely than women to develop basal and squamous cell skin cancers and melanomas of the skin, likely due to higher levels of sun exposure.

Race: Risk of melanoma is more than 10 times higher for whites than for African Americans.

Dysplastic moles: Having these abnormal moles increases risk.

Many (more than 50) ordinary moles: Having many moles increases risk.

Fair skin: All types of skin cancer occur more frequently in people who have fair skin that burns or freckles easily (these people also usually have red or blond hair and blue eyes) than in people with dark skin.

Personal history: People who have been treated for melanoma or nonmelanoma skin cancers (basal cell carcinoma or squamous cell carcinoma) are at increased risk of additional skin cancers.

Family history: Having two or more close relatives who have had melanoma increases risk.

Weakened immune system: People whose immune system is weakened by certain cancers, by drugs given following organ transplantation, or by HIV are at increased risk of developing melanoma.

Modifiable risk factors

Severe, blistering sunburns: People who have had at least one severe blistering sunburn as a child or teenager are at increased risk of melanoma. Sunburns in adulthood are also a risk factor for melanoma.

Ultraviolet (UV) radiation: UV radiation from both the sun and artificial sources, such as sunlamps and tanning booths, increases risk.

Bottom Line

Nearly all skin cancers are preventable by limiting unprotected exposure to the sun. Most skin cancers can be treated successfully if detected early – even melanoma, the most serious type of skin cancer. Children in particular should be protected from the sun because severe sunburns in childhood may greatly increase risk of melanoma in adulthood.[1]

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 68,130 persons in the United States during 2010.[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 more than 30 years.[1] Recently, rapid increases have occurred among young white women 15-39 and older white men 65 and older.[1] Melanoma is primarily a disease of whites; the incidence rate of melanoma skin cancer is more than 10 times higher in whites than in African Americans.[1]

The risk of developing melanoma of the skin increases with age. In Ohio between 2003 and 2007, approximately 70% of individuals who developed melanoma of the skin were 50 and over.[4] An average of 2,222 new cases of melanoma of the skin were diagnosed annually between 2003 and 2007 in Ohio with a corresponding rate of 18.3 per 100,000.[4] The rate among males in Ohio (21.9 per 100,000) was 34% higher than the rate among females (16.3 per 100,000) during this time period (Table 2).[4]

Deaths

An estimated 11,790 deaths, 8,700 from melanomas and 3,090 from nonmelanoma skin cancers, will occur in 2010 nationally.[1] Among whites younger than 50, melanoma mortality rates have been decreasing rapidly since 1990 in men and since 1985 in women.[1]

The average annual mortality rate for melanoma of the skin in Ohio from 2003-2007 was 2.6 per 100,000.[5] This represents 324 average annual deaths in Ohio from melanoma over the time period (Table 3).[5]

Prevention

The American Cancer Society recommends the following for the prevention of skin cancer:

- Limit or avoid exposure to the sun during the midday hours (10 a.m.-4 p.m.).
- When outdoors, wear a hat that shades the face, neck, and ears, a long-sleeved shirt, and long pants.
- Wear sunglasses with at least 99% UV absorption to protect the skin around the eyes.
- Use a sunscreen with a sun protection factor (SPF) of 15 or higher. A one-ounce application is recommended to cover the entire body and should be reapplied at least every two hours.
- Avoid tanning beds and sun lamps, which are additional sources of UV radiation.
- Identify and remove abnormal moles.

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 practice skin self-examination monthly 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 ABCD rule outlines the warning signals of 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. 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.

Treatment

Removal and microscopic examination of all suspicious moles is essential.[1] Early stage basal and squamous cell cancers can be removed in most cases by surgical excision, electrodessication (tissue destruction by electric current), curretage (tissue destruction by heat), or cryosurgery (tissue destruction by freezing).[1] Radiation therapy and certain topical medications are also options in some cases.[1] For melanoma, the primary growth and surrounding tissues must be adequately removed, and in some cases, it may be necessary to remove one or more nearby lymph nodes. Advanced cases of melanoma are treated with palliative surgery, immunotherapy, and/or chemotherapy and sometimes radiation therapy.[1]

Currently, a man living in the United States has a 1 in 55 lifetime risk of developing melanoma of the skin, and a woman has a 1 in 78 lifetime risk of developing melanoma of the skin.[2]

Key warning signs of nonmelanoma skin cancers are as follows:

- A new skin growth
- A sore that does not heal within three months
- Any change on the skin, especially in the size, color, shape, or feel of a mole or other skin lesion
- Scaliness, oozing, bleeding, or change in the appearance of a bump, nodule, or mole
- The spread of pigmentation beyond the border of a mole
- A change in sensation, itchiness, tenderness, or pain of the skin

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.

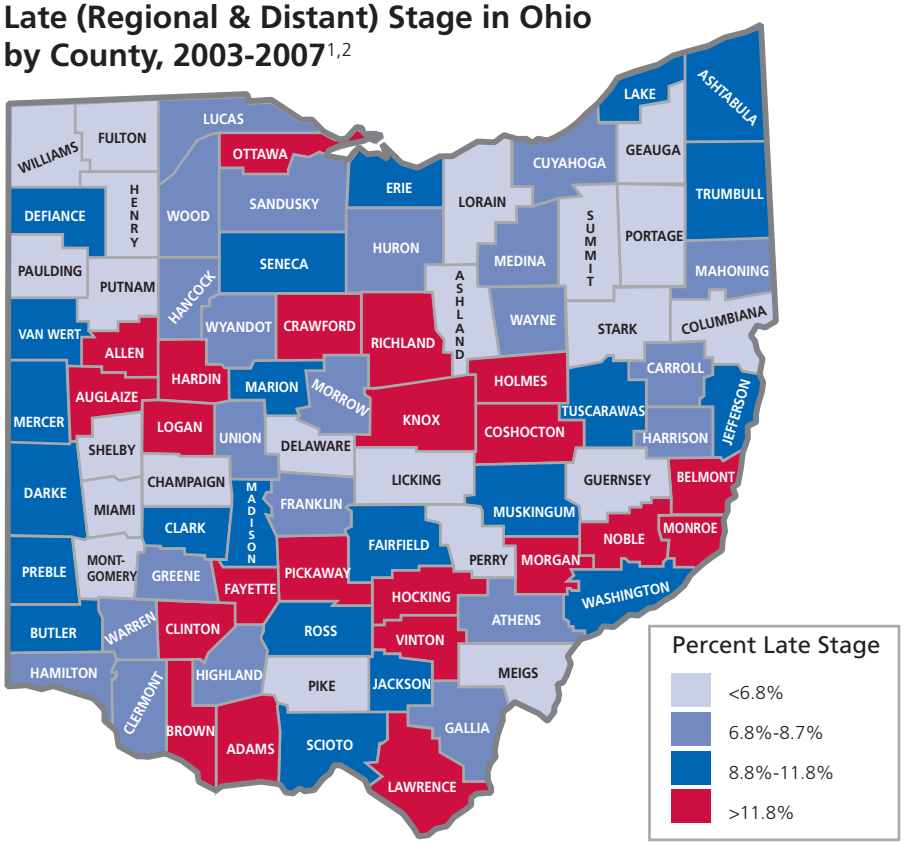
Survival

Most basal cell and squamous cell skin cancers are highly curable if detected and treated early.[1] Melanomas can spread to other body parts quickly but also can be cured if detected early and treated properly. Nationally, the five-year survival probability for patients with melanoma is 91%.[3] For localized melanoma, the five-year survival probability is 98%; whereas, survival at the distant stage is only 16% (Figure 1).[3]

In Ohio, 86% of melanomas in 2003-2007 were diagnosed *in situ* or local stage.[4] Figure 19 identifies counties in Ohio with a high percentage of late stage cases where increased screening is needed.

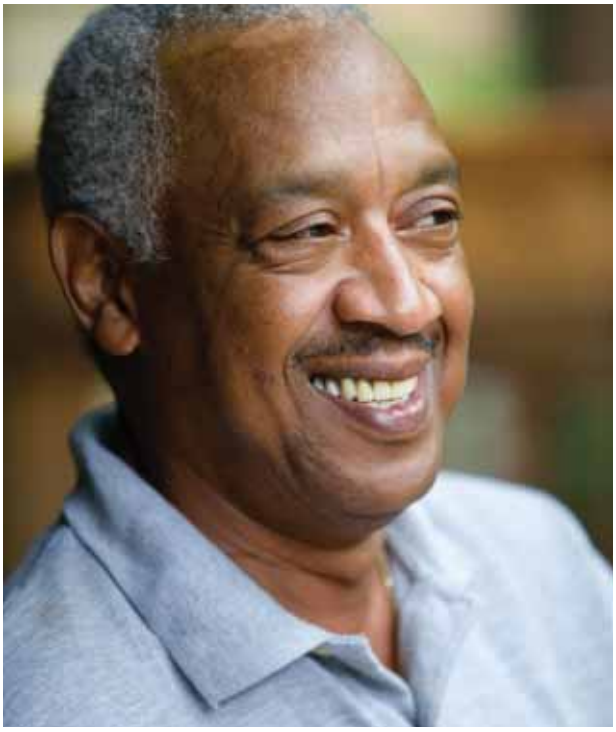
FIGURE 19

Melanoma of the Skin Diagnosed Late (Regional & Distant) Stage in Ohio by County, 2003-2007[1,2]



[1] Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2010.
[2] In Ohio, 8% of melanomas of the skin are diagnosed late (regional and distant) stage.

Prostate Cancer



Risk Factors & Populations with High Rates

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

Non-modifiable risk factors

Age: About two-thirds of all prostate cancers are diagnosed in men over 65.

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 BRCA1 and BRCA2 increase risk.

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

Bottom Line

Prostate cancer is the most frequently diagnosed invasive cancer in men. A specific cause is unknown.[1] All men should talk to their doctors about having tests to detect prostate cancer early, such as an annual digital rectal exam (DRE) and prostate-specific antigen (PSA) test. Men should discuss an abnormal DRE or PSA with their doctor because a variety of treatment options are available.[1]

New Cases

An estimated 217,730 new cases of prostate cancer will occur in the US during 2010.[1] Incidence rates of prostate cancer for all races combined in the US show five distinct phases since 1975, when population-based surveillance of cancer began: Between 1975 and 1988, the incidence rate increased by 2.6% per year; between 1988 and 1992, the incidence rate increased by 16.5% per year; between 1992 and 1995, the incidence rate decreased by 11.7% per year; between 1995 and 2000, the incidence rate was stable; between 2000 and 2006, the incidence rate decreased by 2.4% per year.[1] For reasons that remain unclear, prostate cancer incidence rates in African American men are significantly higher than in white men.

Prostate cancer accounted for 27% of new cancer cases among Ohio males in 2003-2007, or an annual average of 7,961 cases with a corresponding rate of 145.5 per 100,000 (Figure 2 & Table 2).[4] The national prostate cancer incidence rate during this time period (156.9 per 100,000) was 8% higher than the Ohio rate; although, the lower rate in Ohio may be due to incomplete reporting of this cancer site/type.[3,4]

Deaths

Nationally, an estimated 32,050 deaths in 2010 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, 1,232 average annual deaths from prostate cancer occurred between 2003 and 2007.[6] The mortality rate for prostate cancer in Ohio was 26.2 per 100,000 over the time period compared to 24.7 per 100,000 nationally (Table 3).[3,6]

Early Detection

The American Cancer Society released updated prostate cancer screening guidelines in March 2010.[1] These guidelines recommend that asymptomatic men who have at least a 10-year life expectancy have an opportunity to make an informed decision with their health care provider about whether to be screened for prostate cancer after receiving information about the uncertainties, risks, and potential benefits associated with prostate cancer screening. Screening should not occur without an informed decision-making process. Men at average risk should receive this information beginning at age 50. Men at higher risk, including African American men and men with a first-degree relative (father or brother) diagnosed with prostate cancer before age 65, should receive this information beginning at age 45. Men at appreciably higher risk (multiple family members diagnosed with prostate cancer before age 65) should receive this information beginning at age 40.

Asymptomatic men who have less than a 10-year life expectancy based on age and health status should not be offered prostate cancer screening. At age 75, only about half of men have a life expectancy of 10 years or more. 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. Life-limiting conditions become more common as men age; thus, it is important to consider overall health status – not age alone – when making decisions about screening.

TABLE 11 **Prevalence of Men 50 and Older Who Reported Having Had a Prostate-specific Antigen (PSA) Test and/or Digital Rectal Exam (DRE) in the Past Year by Demographics in Ohio, 2008**[1,2,3]

	PSA TEST IN THE PAST YEAR	DRE IN THE PAST YEAR
AGE		
50-64	50%	45%
65+	69%	56%
RACE		
White	57%	49%
African American	55%	49%
EDUCATION		
Less Than High School	54%	35%
High School or GED*	53%	45%
Some College	53%	46%
College Graduate	62%	57%
ANNUAL HOUSEHOLD INCOME		
< $25,000	49%	38%
$25,000-$49,999	55%	45%
$50,000+	60%	55%
Total (Men 50+)	57%	49%

1 Source: Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2009.

2 The weighted percentages were adjusted to: 1) probability of selection, *i.e.*, the number of different phone numbers that reach the household, the number of adults in each household, and the number of completed interviews in each cluster; and 2) demographic distribution, *i.e.*, age and gender.

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

* General Equivalency Diploma

Table 11 displays the results of the 2008 Ohio BRFSS with respect to PSA and DRE testing. More Ohio men 50 and older reported having had a PSA (57%) than a DRE (49%) in the past year.[25] The 65 and older population had much higher levels of PSA screening in the past year (69%) compared to 50- to 64-year-olds (50%).[25] The percentage of respondents who received a PSA test was lowest for those in the lowest income (less than $25,000 per year) category, highest for college graduates, and slightly higher among whites compared to African Americans.[25] The percentage of males who reported having had a DRE test in the past year was the same among whites and African Americans but differed by age, education, and income, with the highest percentages among men who were 65 and older, those who were college graduates, and those who earned $50,000 or more per year.[25]

Treatment

Most men with prostate cancer have several treatment options available to them and participate in treatment decisions along with their health care providers.[1] Treatment recommendations vary by disease severity and life expectancy since the side effects of treatment may outweigh the potential benefits for men whose cancers are unlikely to progress in their lifetime.[1] The major treatments for clinically localized prostate cancer are active surveillance, radical prostatectomy, and radiation therapy, with active surveillance more likely to be recommended for men of any age with low risk cancer and for those with less than 10 years of life expectancy.[1] The main benefit of active surveillance is that it may allow definitive treatment to be postponed indefinitely or for many years, during which time the man will not be affected by complications or side effects of treatment.[1] On the other hand, there is a risk that if the cancer does progress, delayed treatment may make it more difficult to cure.[1]

Patients with locally advanced prostate cancer are generally recommended to receive external beam radiation along with androgen deprivation therapy (ADT), or hormone therapy; some may be eligible for radical prostatectomy as an alternative to external beam radiation.[1] Patients with lymph node metastasis may receive ADT alone or a combination of external beam radiation and ADT, while those with metastatic disease will generally receive ADT alone.[1]

Survival

Nationally, 92% of all prostate cancers are diagnosed local or regional stage; the five-year relative survival probability for patients whose tumors are diagnosed at these stages is almost 100%.[3] Over the past two decades, the five-year survival probability for all stages combined has increased from 69% in 1975-1977 to nearly 100% in 1999-2006.[3] In Ohio, approximately 83% of all prostate cancers are diagnosed early (Table A-4).[4] Figure 20 highlights counties in Ohio with a high percentage of late stage disease.[4]

Signs & Symptoms of Prostate Cancer

Early prostate cancer usually does not have signs or symptoms. With more advanced disease, individuals may experience the following:

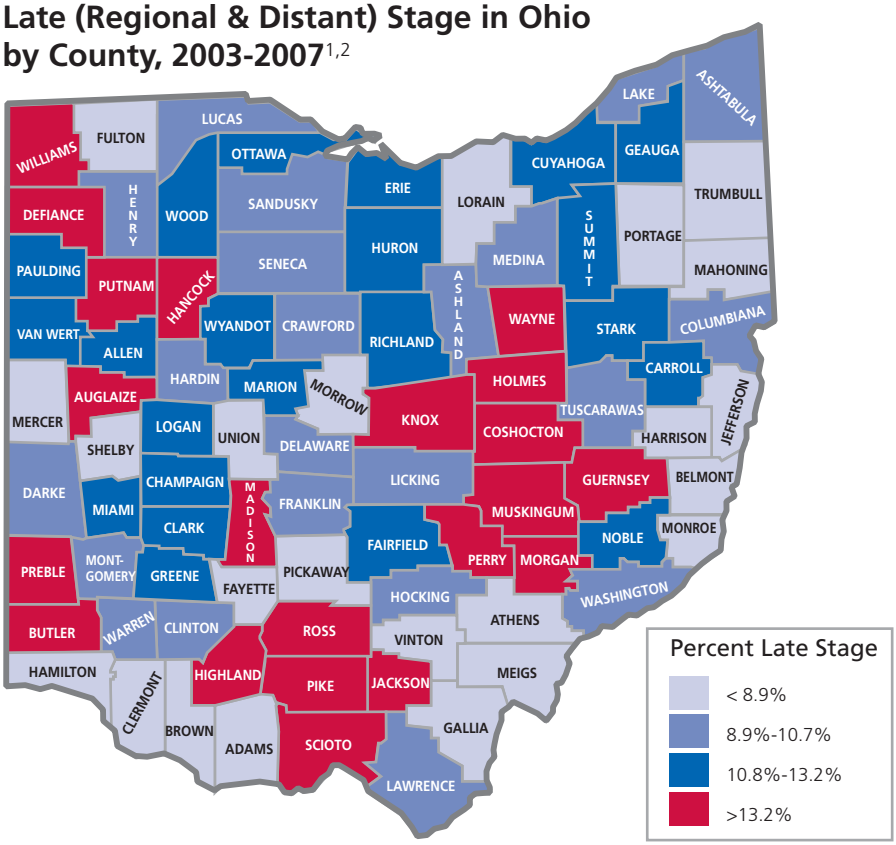
- Weak or interrupted urine flow
- Inability to urinate or start or stop urine flow
- Need to urinate more frequently
- Blood in urine
- Difficulty having an erection (impotence)
- Pain in pelvic bone, spine, hips, or ribs
- Weakness or numbness in legs or feet
- Loss of bladder or bowel control

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.

Currently, a male living in the United States has a 1 in 7 lifetime risk of developing invasive prostate cancer.[2]

FIGURE 20

Cancer of the Prostate Diagnosed Late (Regional & Distant) Stage in Ohio by County, 2003-2007[1,2]



[1] Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2010.
[2] In Ohio, 10% of prostate cancers are diagnosed late (regional and distant) stage.

Tobacco Use

Risk Factors & Populations with High Rates

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

Lower education: Smoking prevalence generally decreases with increasing years of education. College graduates achieved the greatest percent decline in smoking, from 21% in 1983 to 9% in 2009.

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

Age: Young people are a high-risk group for tobacco use. About 50% of adolescents who start smoking will continue to smoke for 15 to 20 years.[39]

Health Effects

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
- Gastric ulcers
- Reduced fertility

Smoking during pregnancy is associated with the following:

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

Environmental tobacco smoke contributes to the following:

- An estimated 3,000 lung cancer deaths among nonsmoking adults each year in the US[40]
- A 25%-30% increased risk of heart disease and 20%-30% increased risk of lung cancer among nonsmokers exposed at home or work[41]

Bottom Line

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 12 million premature deaths attributable to smoking in the US.[1,33] According to 2000-2004 data, tobacco is the cause of an estimated 443,000 premature deaths in the United States each year; about 20% of all deaths can be attributed to tobacco use.[1,34,35] The World Health Organization projects that by the year 2020, the use of tobacco will kill 10 million people annually worldwide.[36]

Smoking accounts for an estimated 30% of all cancer deaths and 87% of lung cancer deaths.[1,37] 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.[38] These smoking-related chronic diseases include chronic bronchitis, chronic obstructive pulmonary disease (COPD), emphysema, and several cardiovascular diseases.[38] Smoking is associated with increased risk for the following sites/types of cancer: 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.[33]

In Ohio, an estimated 7,475 cancer deaths annually can be attributed to smoking, including 6,448 deaths from lung cancer.[6]

Worldwide, between 80,000 and 100,000 children start smoking every day.[39]

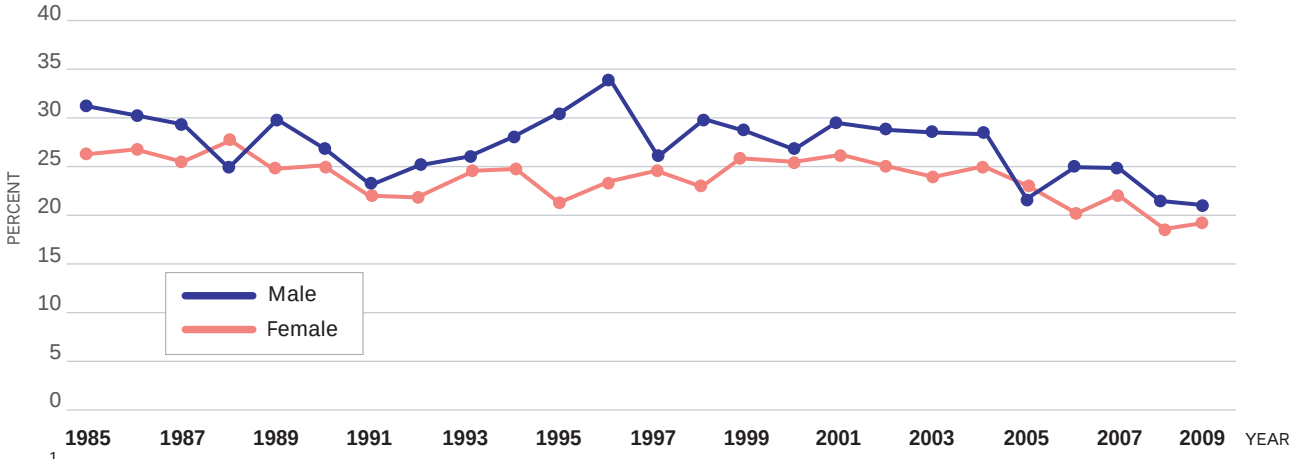
Time Trends

The annual prevalence of current smoking among US adults in 2009 was 18%, down from 21% in 2005.[42] 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%).[43] In 2009, 21% of adult males and 20% of adult females in Ohio reported current smoking.[43] Figure 21 displays trends in adult smoking by gender, and Figure 22 displays trends in adult smoking by age group from 1985-2009. In general, smoking prevalence in Ohio was higher among males than females and was lower among older age groups during this time period.[43]

Nationally, 20% of high school students in grades 9-12 were current smokers in 2007, with white students having the highest smoking prevalence (23%) of all racial/ethnic groups.[44] Self-reported data from the 2008 Ohio Youth Tobacco Survey indicated that Ohio high school students in the 11th (22%) and 12th (25%) grades were significantly more likely to smoke compared to 9th graders (12%).[45] A small percentage of middle school students also reported being current smokers; smoking prevalence was 2%, 4%, and 8% among 6th, 7th, and 8th graders, respectively.[45]

FIGURE 21

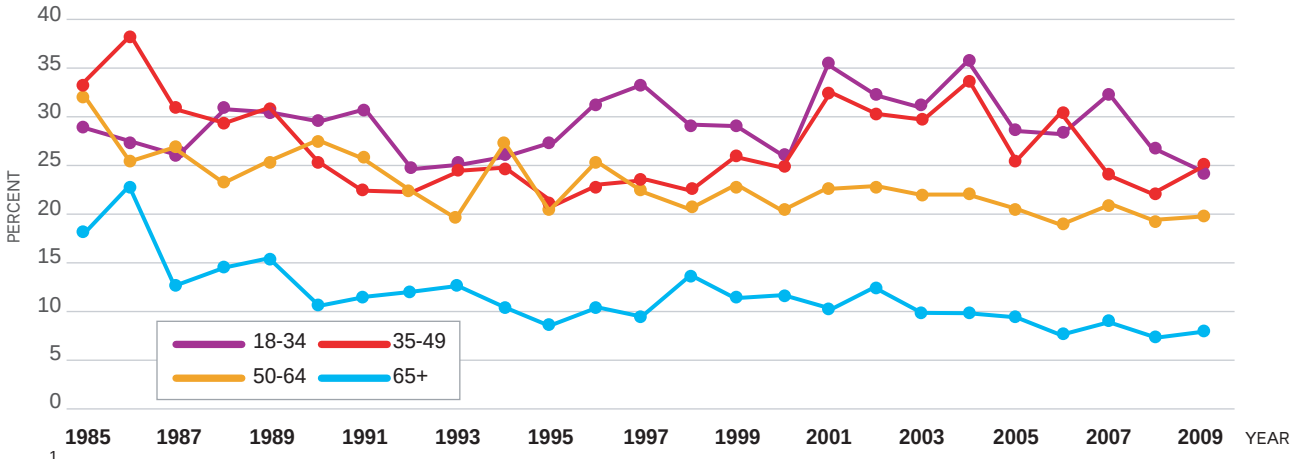
Trends in the Prevalence of Current Cigarette Smoking Among Adults 18 and Older by Gender in Ohio, 1985-2009[1,2,3,4]



1 Source: Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2010.
2 The weighted percentages were adjusted to: 1) probability of selection, *i.e.*, the number of different phone numbers that reach the household, the number of adults in each household, and the number of completed interviews in each cluster; and 2) demographic distribution, *i.e.*, age and gender.
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.

FIGURE 22

Trends in the Prevalence of Current Cigarette Smoking Among Adults 18 and Older by Age Group in Ohio, 1985-2009[1,2,3,4]



1 Source: Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2010.
2 The weighted percentages were adjusted to: 1) probability of selection, *i.e.*, the number of different phone numbers that reach the household, the number of adults in each household, and the number of completed interviews in each cluster; and 2) demographic distribution, *i.e.*, age and gender.
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.[46]

- Among adults 18 and older, national data in 2008 showed 7.1% of men and less than 1% of women were current users of smokeless tobacco.[47]
- According to the 2009 Adult Tobacco Survey, 2% of Ohio adults used smokeless tobacco every day or some days.[48]
- The prevalence of smokeless tobacco use in Ohio in 2009 was 4% among adults males, while the prevalence was less than 1% among adult females.[48]
- Nationally, an estimated 8% of high school students (13% male, 2% female) were current users of smokeless tobacco in 2007.[44]
- In 2008, 10% of Ohio high school students (17% male, 3% female) reported being current users of smokeless tobacco.[45]

Smoking Cessation

In 2004, the US Surgeon General outlined the benefits of smoking cessation:[49]

- People who quit, regardless of age, live longer than people who continue to smoke.
- Smokers who quit before 50 cut their risk of dying in the next 15 years in half compared with those who continue to smoke.
- 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.
- Quitting lowers the risk for other major diseases including coronary heart disease and stroke.

Among adults 18 and older in Ohio, 2009 data showed about 59% of current smokers in Ohio had stopped smoking at least one day in the preceding 12 months because they were trying to quit.[43]

Intervention Strategies

The 2004 US Surgeon General's report on the health benefits of smoking cessation outlines the components of comprehensive tobacco control.[49] The goal of comprehensive tobacco control programs is to reduce disease, disability, and death related to tobacco use by preventing initiation of tobacco use among youth, promoting quitting among young people and adults, eliminating nonsmokers' exposure to secondhand smoke, and identifying and eliminating the disparities related to tobacco use and its effects among different population groups.[49]

The best approach for comprehensive tobacco control should combine educational, clinical, regulatory, economic, and social strategies. Research has shown that laws and policies such as increasing the unit price of tobacco products, public smoking bans, and limiting minors' access to tobacco products are extremely effective in tobacco control. The most effective population-based approaches should include the following components: state and community interventions; health communication interventions; cessation interventions (*e.g.*, quit lines); surveillance and evaluation; and administration and management.[50]

According to a 1994 report by the US Surgeon General, school-based smoking prevention programs that identify social influences have demonstrated consistent and significant reductions in adolescent smoking.[51] These programs appear to be enhanced by comprehensive school health education and by community programs involving parents, mass media, and community organizations.[51]

Nutrition, Physical Activity, Obesity & 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.[52] Nutritional factors account for about one-third of US cancer deaths.[37] To provide the public with current cancer prevention information, the American Cancer Society periodically reviews, updates, and publishes guidelines on nutrition and physical activity. The most recent Society guidelines, completed in 2006, emphasize weight control, dietary patterns, and physical activity patterns in reducing cancer risk. The guidelines also recommend community action to promote healthy food choices and physical activity in schools, worksites, and communities.[52]

Nutrition, Physical Activity, and Obesity among Adults

Nutrition

Increased knowledge and awareness about the relationship between diet and disease has influenced food consumption patterns. According to the US Department of Agriculture's Healthy Eating Index, scores for milk, oil, and sodium consumption improved from 1994-1996 to 2001-2002; whereas, scores declined for whole fruit, total vegetables, and whole grains.[53] Most Americans are consuming more calories than they need without meeting recommended dietary guidelines.[54] Both adults and children are shown to be deficient in the intake of calcium, potassium, fiber, magnesium, and vitamin E, and adults have additional deficiencies in vitamins D, A, and C.[54] Furthermore, consumption of saturated and trans fats, cholesterol, added sugars, and salt is in excess.[54]

The recommended guidelines may be difficult to maintain because of increased consumption of pre-packaged meals and meals outside the home. These meals are often lower in

American Cancer Society guidelines on nutrition and physical activity for cancer prevention

1. Maintain a healthy weight throughout life.

- Balance caloric intake with physical activity.
- Avoid excess weight gain throughout the life cycle.
- Achieve and maintain a healthy weight if currently overweight or obese.

2. Adopt a physically active lifestyle.

- Adults: Engage in at least 30 minutes of moderate to vigorous physical activity, above usual activities, on five or more days of the week; 45 to 60 minutes of intentional physical activity on five or more days per week may further reduce the risk of breast and colon cancer.
- Children and adolescents: Engage in at least 60 minutes per day of moderate to vigorous physical activity at least five days per week.

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

- Choose foods and beverages in amounts that help to achieve and maintain a healthy weight.
- Eat five or more servings of a variety of vegetables and fruits each day.
- Choose whole grains in preference to processed (refined) grains and sugars.
- Limit consumption of processed and red meats.

4. If you drink alcoholic beverages, limit consumption.

- Limit consumption of alcoholic beverages to no more than one per day for women and two per day for men.

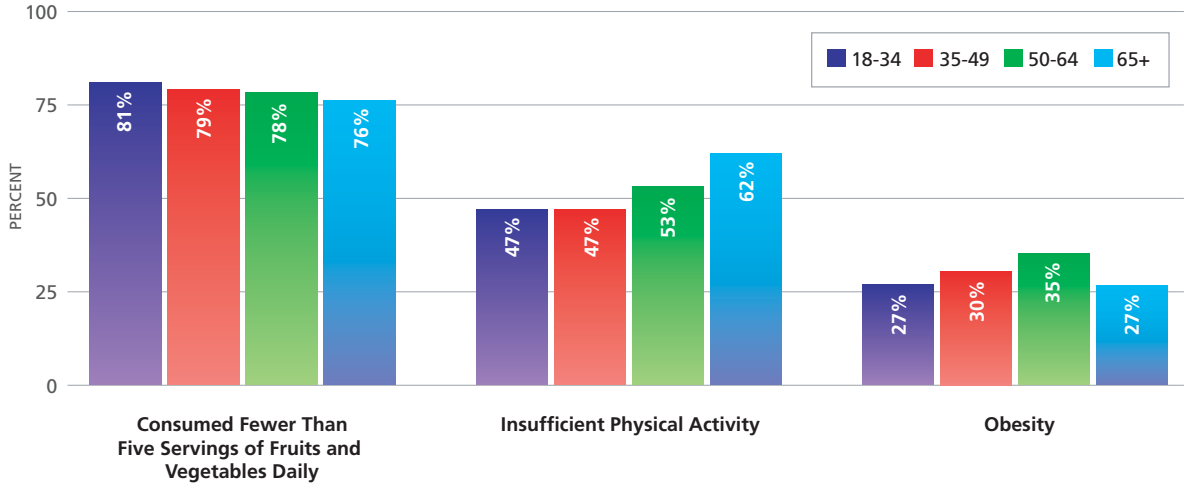
Recommendations for Community Action

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.

- Increase access to healthy foods in schools, worksites, and communities.
- Provide safe, enjoyable, and accessible environments for physical activity in schools and for transportation (*e.g.,* biking and walking) and recreation in communities.

FIGURE 23

Prevalence of Inadequate Fruit & Vegetable Consumption, Insufficient Physical Activity, and Obesity Among Adults 18 and Older by Age Group in Ohio, 2009[1,2,3,4,5]



1 Source: Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2010.

2 The weighted percentages were adjusted to: 1) probability of selection, *i.e.*, the number of different phone numbers that reach the household, the number of adults in each household, and the number of completed interviews in each cluster; and 2) demographic distribution, *i.e.*, age and gender.

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

4 "Insufficient Physical Activity" is defined as failure to meet recommended guidelines for physical activity, which are defined as moderate activity for 30 or more minutes per day on five or more days per week or vigorous physical activity for 20 or more minutes per day on three or more days per week.

5 "Obesity" is defined as body mass index (BMI) $\geq$ 30 kg/m^2.

nutritional quality, higher in fat and saturated fat, and lower in fiber and calcium than foods prepared at home. In addition, food portions have increased dramatically and have led to an excess of calories consumed.[55,56]

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.[43] 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 23).[43] Ohioans with a college degree were the least likely to report inadequate fruit and vegetable consumption (73%) compared to those with less education (Figure 24).[43] 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 25). Fruit and vegetable consumption was not shown to differ considerably by race (Figure 26).[43]

Physical Activity

Guidelines for recommended levels of physical activity state that adults should achieve 30 minutes or more of moderate physical activity on five or more days per week, or 20 minutes or more of vigorous physical activity on three or more days per week.[57] The health benefits of regular physical activity for the prevention of chronic diseases are well documented.[58] Recent evidence shows that physical activity is strongly associated with reduced risk of developing colon and breast cancers.[52] More limited evidence suggests that physical activity may also decrease the risk for cancers of the prostate, lung, and endometrium.[59] However, according to national data from the 2009 BRFSS, 49% of Americans reported having insufficient physical activity.[30] Similarly, 51% of adult Ohioans reported insufficient physical activity.[43]

According to the 2009 Ohio BRFSS, as age increased, the proportion of insufficient physical activity increased (Figure 23).[43] Conversely, higher levels of education (college graduate) and household income ($50,000 or more) were associated with lower proportions of insufficient physical activity (Figures 24 and 25).[43] African Americans were more likely to be physically inactive (58%) compared to whites (51%) (Figure 26).[43]

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. A survey of beliefs about cancer causation revealed cancer survivors underestimated the importance of behavioral factors, such as obesity and physical inactivity, and overestimated genetics and environmental factors.[60] There is evidence that being overweight or obese increases risk of breast cancer (among postmenopausal women) and kidney cancer. In addition, being overweight or obese may increase risk of liver cancer and uterine or endometrial cancer.[61]

FIGURE 24

Prevalence of Inadequate Fruit & Vegetable Consumption, Insufficient Physical Activity, and Obesity Among Adults 18 and Older by Level of Education in Ohio, 2009[1,2,3,4,5]

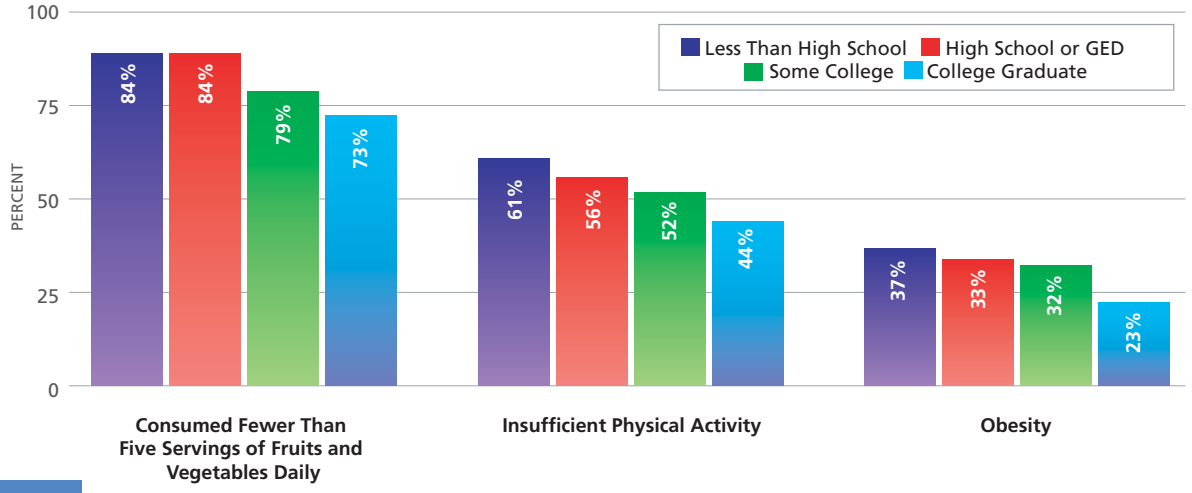


FIGURE 25

Prevalence of Inadequate Fruit & Vegetable Consumption, Insufficient Physical Activity, and Obesity Among Adults 18 and Older by Household Income in Ohio, 2009[1,2,3,4,5]

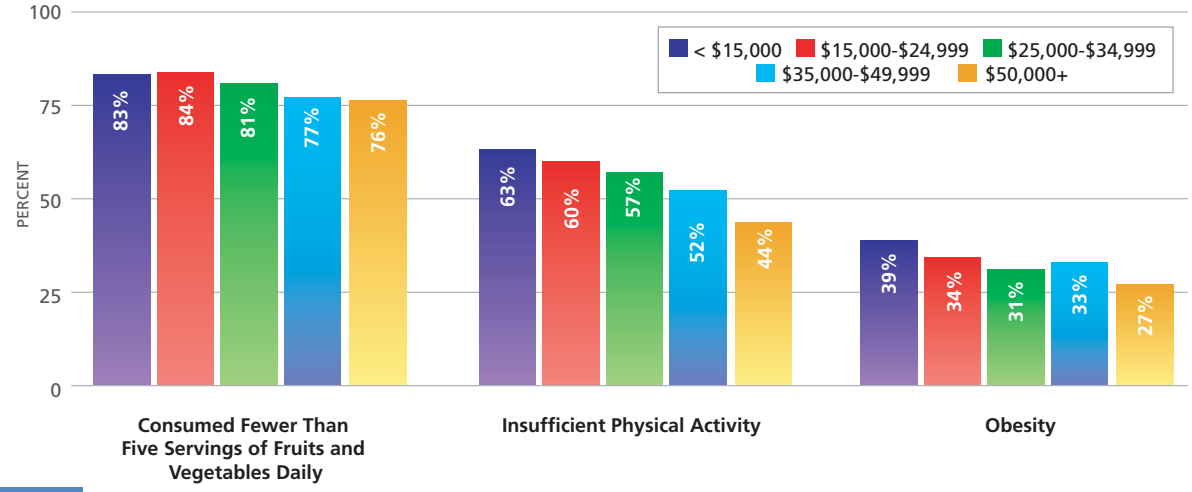
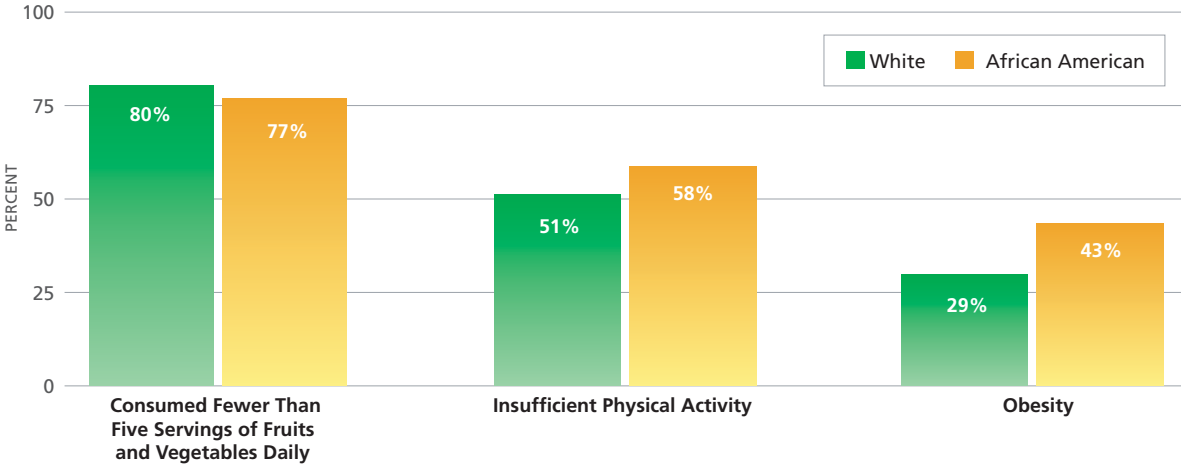


FIGURE 26

Prevalence of Inadequate Fruit & Vegetable Consumption, Insufficient Physical Activity, and Obesity Among Adults 18 and Older by Race in Ohio, 2009[1,2,3,4,5]



Footnotes for Figures 24-26

[1] Source: Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2010.

[2] The weighted percentages were adjusted to: 1) probability of selection, *i.e.*, the number of different phone numbers that reach the household, the number of adults in each household, and the number of completed interviews in each cluster; and 2) demographic distribution, *i.e.*, age and gender.

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

[4] "Insufficient Physical Activity" is defined as failure to meet recommended guidelines for physical activity, which are defined as moderate activity for 30 or more minutes per day on five or more days per week or vigorous physical activity for 20 or more minutes per day on three or more days per week.

[5] "Obesity" is defined as body mass index (BMI) $\geq$ 30 kg/m^2.

Data from the National Health and Nutrition Examination Survey indicated that the percentage of obese adults ages 20-74 rose dramatically from 13% in 1960-1962 to 34% in 2003-2006, with the largest increases occurring in the 1990s.[62] In 2009, the percentage of adults in Ohio classified as clinically overweight was 37% and an additional 30% were clinically obese.[43]

A greater proportion of African Americans (43%) in Ohio were obese compared to whites (29%) in 2009 (Figure 26).[43] Obesity levels were highest among the 50- to 64-year age group (35%) (Figure 23).[43] Ohioans with the highest level of education (college graduate) reported the lowest percentage of obesity (23%) (Figure 24), and Ohioans with the highest levels of income ($50,000 or more) were the least likely to be obese (27%) (Figure 25).[25]

Nutrition, Physical Activity, 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 2-9 have a diet rated as poor or in need of improvement.[63] 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.[63,64] National data from the Youth Risk Behavior Surveillance Survey in 2007 showed that only about one-fifth (21%) of US high school students ate five or more servings of fruits and vegetables per day.[44]

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 lifelong 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.[65]

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.[66] In Ohio in 2007, only 48% of high school students reported engaging in the recommended 60 minutes or more of physical activity on five or more days of the week.[67] Children and adolescents can reach recommended physical activity levels by walking, riding a bicycle to school, or participating in other activities. However, barriers such as motor-vehicle traffic and distance to school often prevent students from engaging in this easy form of moderate physical activity.[68] 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 or community physical activity programs.[66]

Overweight

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.[69] Recent national data showed that the percentage of overweight children 6 to 11 years old increased from 4% in 1963-1965 to 15% in 2005-2006.[62] Similarly, the percentage of overweight adolescents 12 to 19 years old increased from 5% in 1966-1970 to 18% in 2005-2006.[62] Nationally in 2007, 16% of high school students were considered overweight.[44] In 2007 in Ohio, 12% of high school students were overweight and an additional 15% were at risk of becoming overweight.[67]

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).[70] Definitions of overweight among children are as follows:

- **Overweight: 95th or higher percentile for BMI**
- **At risk of becoming overweight: 85th to 94th percentile for BMI**

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.

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 United States. 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 process of describing 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, 2003-2007[1,2]

	Early Stage*	Late Stage*	Unstaged/ Unknown	Average Annual Cases
	%	%	%	
Ohio	68%	29%	3%	9,903
Adams	68%	30%	2%	18
Allen	67%	30%	3%	98
Ashland	75%	23%	3%	43
Ashtabula	67%	27%	6%	85
Athens	66%	29%	5%	33
Auglaize	65%	33%	2%	42
Belmont	65%	32%	2%	83
Brown	65%	34%	1%	31
Butler	67%	30%	3%	270
Carroll	73%	23%	3%	24
Champaign	66%	31%	3%	29
Clark	66%	31%	3%	126
Clermont	68%	29%	2%	156
Clinton	74%	24%	2%	36
Columbiana	64%	27%	8%	89
Coshocton	57%	37%	5%	26
Crawford	58%	38%	4%	37
Cuyahoga	68%	29%	3%	1,290
Darke	56%	37%	7%	42
Defiance	71%	25%	4%	27
Delaware	71%	27%	2%	121
Erie	68%	29%	3%	83
Fairfield	67%	29%	3%	111
Fayette	74%	20%	7%	21
Franklin	67%	30%	3%	867
Fulton	65%	32%	2%	34
Gallia	69%	29%	2%	24
Geauga	74%	24%	2%	91
Greene	66%	30%	3%	144
Guernsey	63%	36%	0%	43
Hamilton	71%	27%	2%	758
Hancock	66%	32%	3%	63
Hardin	73%	24%	4%	20
Harrison	64%	31%	5%	11
Henry	66%	32%	2%	16
Highland	77%	20%	3%	31
Hocking	73%	23%	5%	21
Holmes	57%	31%	13%	19
Huron	73%	25%	2%	43
Jackson	67%	30%	3%	25
Jefferson	69%	28%	3%	68
Knox	66%	29%	5%	47
Lake	72%	25%	3%	221
Lawrence	62%	33%	5%	56

	Early Stage*	Late Stage*	Unstaged/ Unknown	Average Annual Cases
	%	%	%	
Ohio	68%	29%	3%	9,903
Licking	69%	27%	4%	138
Logan	70%	27%	4%	41
Lorain	68%	28%	4%	253
Lucas	67%	31%	3%	375
Madison	61%	36%	4%	28
Mahoning	65%	30%	5%	255
Marion	64%	33%	3%	56
Medina	69%	28%	3%	139
Meigs	78%	22%	0%	15
Mercer	62%	31%	7%	35
Miami	69%	28%	3%	90
Monroe	68%	28%	3%	12
Montgomery	68%	29%	3%	508
Morgan	65%	33%	2%	11
Morrow	57%	33%	10%	26
Muskingum	66%	32%	2%	69
Noble	70%	30%	0%	8
Ottawa	62%	35%	3%	43
Paulding	53%	36%	11%	14
Perry	58%	39%	3%	24
Pickaway	66%	29%	5%	41
Pike	60%	38%	2%	19
Portage	68%	29%	3%	112
Preble	65%	30%	5%	41
Putnam	72%	26%	3%	28
Richland	67%	31%	3%	117
Ross	69%	28%	3%	59
Sandusky	66%	32%	2%	54
Scioto	63%	34%	3%	57
Seneca	68%	29%	3%	46
Shelby	72%	21%	7%	38
Stark	70%	27%	3%	346
Summit	67%	30%	2%	486
Trumbull	72%	25%	3%	213
Tuscarawas	68%	29%	3%	73
Union	63%	32%	6%	32
Van Wert	71%	26%	4%	27
Vinton	70%	25%	6%	11
Warren	67%	31%	2%	157
Washington	72%	26%	2%	53
Wayne	70%	24%	6%	85
Williams	69%	29%	2%	31
Wood	67%	29%	4%	92
Wyandot	66%	31%	3%	23

[1] Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2010.

[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, 2003-2007[1,2]

	Early Stage*	Late Stage*	Unstaged/ Unknown	Average Annual Cases
	%	%	%	
Ohio	43%	47%	9%	6,841
Adams	44%	39%	18%	19
Allen	48%	40%	12%	66
Ashland	35%	56%	9%	32
Ashtabula	44%	41%	15%	74
Athens	51%	40%	9%	27
Auglaize	49%	46%	5%	35
Belmont	41%	48%	11%	66
Brown	42%	46%	12%	26
Butler	45%	46%	9%	184
Carroll	47%	48%	6%	21
Champaign	39%	48%	13%	25
Clark	41%	47%	12%	90
Clermont	49%	43%	8%	95
Clinton	54%	34%	12%	25
Columbiana	35%	50%	15%	84
Coshocton	40%	56%	4%	26
Crawford	38%	50%	12%	31
Cuyahoga	42%	48%	10%	851
Darke	35%	49%	15%	31
Defiance	41%	53%	5%	18
Delaware	44%	48%	8%	57
Erie	40%	51%	9%	67
Fairfield	41%	48%	10%	71
Fayette	40%	40%	21%	19
Franklin	39%	53%	8%	466
Fulton	47%	49%	4%	23
Gallia	37%	55%	8%	18
Geauga	46%	40%	14%	52
Greene	48%	44%	8%	91
Guernsey	35%	59%	7%	30
Hamilton	44%	48%	9%	487
Hancock	45%	50%	5%	36
Hardin	42%	46%	13%	19
Harrison	50%	42%	8%	16
Henry	43%	49%	8%	15
Highland	46%	44%	10%	28
Hocking	39%	49%	13%	18
Holmes	46%	42%	12%	24
Huron	49%	44%	7%	40
Jackson	36%	51%	13%	21
Jefferson	48%	40%	12%	68
Knox	41%	50%	8%	44
Lake	42%	45%	13%	146
Lawrence	53%	37%	10%	47

	Early Stage*	Late Stage*	Unstaged/ Unknown	Average Annual Cases
	%	%	%	
Ohio	43%	47%	9%	6,841
Licking	37%	55%	8%	91
Logan	47%	48%	5%	29
Lorain	43%	47%	10%	179
Lucas	41%	53%	6%	241
Madison	43%	47%	9%	20
Mahoning	39%	48%	13%	194
Marion	49%	40%	10%	47
Medina	49%	42%	9%	81
Meigs	41%	45%	14%	17
Mercer	42%	46%	11%	33
Miami	51%	43%	6%	64
Monroe	53%	44%	4%	11
Montgomery	45%	46%	9%	315
Morgan	46%	47%	7%	11
Morrow	37%	55%	8%	17
Muskingum	46%	48%	7%	54
Noble	39%	53%	9%	11
Ottawa	33%	62%	6%	31
Paulding	49%	40%	11%	13
Perry	47%	45%	8%	23
Pickaway	35%	54%	11%	28
Pike	42%	49%	9%	15
Portage	48%	46%	6%	76
Preble	45%	46%	9%	23
Putnam	46%	47%	8%	21
Richland	39%	53%	8%	90
Ross	33%	55%	12%	43
Sandusky	53%	42%	5%	43
Scioto	49%	42%	9%	55
Seneca	47%	45%	9%	39
Shelby	46%	39%	14%	34
Stark	45%	46%	9%	266
Summit	43%	48%	9%	343
Trumbull	36%	54%	10%	151
Tuscarawas	49%	40%	11%	65
Union	49%	41%	9%	23
Van Wert	48%	38%	14%	25
Vinton	43%	52%	5%	8
Warren	45%	46%	9%	82
Washington	44%	53%	3%	43
Wayne	43%	48%	9%	61
Williams	56%	37%	8%	23
Wood	46%	45%	9%	60
Wyandot	44%	44%	12%	14

[1] Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2010.

[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, 2003-2007[1,2]

	Early Stage*	Late Stage*	Unstaged/ Unknown	Average Annual Cases
	%	%	%	
Ohio	17%	68%	15%	9,304
Adams	18%	64%	18%	24
Allen	15%	76%	9%	89
Ashland	12%	66%	22%	36
Ashtabula	14%	63%	23%	94
Athens	16%	67%	17%	40
Auglaize	23%	66%	11%	35
Belmont	20%	67%	13%	68
Brown	18%	60%	22%	41
Butler	16%	71%	13%	258
Carroll	22%	55%	22%	28
Champaign	10%	68%	23%	33
Clark	16%	62%	22%	140
Clermont	21%	70%	9%	179
Clinton	16%	71%	12%	36
Columbiana	14%	62%	24%	103
Coshocton	19%	59%	22%	34
Crawford	18%	60%	23%	36
Cuyahoga	16%	67%	17%	1,148
Darke	15%	65%	20%	33
Defiance	11%	76%	13%	33
Delaware	16%	72%	11%	76
Erie	16%	72%	13%	83
Fairfield	16%	69%	15%	99
Fayette	12%	68%	20%	23
Franklin	19%	70%	11%	740
Fulton	14%	76%	10%	25
Gallia	18%	71%	12%	33
Geauga	20%	59%	21%	59
Greene	18%	69%	13%	106
Guernsey	20%	62%	18%	37
Hamilton	20%	70%	11%	680
Hancock	20%	68%	12%	51
Hardin	18%	67%	15%	27
Harrison	24%	63%	13%	18
Henry	15%	67%	17%	17
Highland	18%	61%	20%	36
Hocking	22%	61%	17%	30
Holmes	4%	73%	23%	14
Huron	16%	74%	10%	43
Jackson	18%	63%	19%	31
Jefferson	22%	70%	9%	82
Knox	23%	64%	13%	43
Lake	18%	61%	21%	207
Lawrence	15%	60%	25%	68

	Early Stage*	Late Stage*	Unstaged/ Unknown	Average Annual Cases
	%	%	%	
Ohio	17%	68%	15%	9,304
Licking	15%	71%	13%	119
Logan	12%	74%	15%	40
Lorain	14%	68%	17%	245
Lucas	17%	74%	9%	363
Madison	17%	65%	18%	34
Mahoning	16%	66%	19%	230
Marion	16%	64%	20%	70
Medina	18%	65%	17%	103
Meigs	19%	69%	12%	25
Mercer	18%	62%	20%	29
Miami	18%	73%	10%	66
Monroe	17%	63%	19%	13
Montgomery	19%	70%	11%	497
Morgan	22%	60%	18%	16
Morrow	14%	65%	20%	28
Muskingum	20%	68%	12%	84
Noble	14%	61%	25%	11
Ottawa	14%	73%	13%	41
Paulding	22%	60%	18%	15
Perry	13%	68%	19%	31
Pickaway	18%	66%	17%	48
Pike	17%	62%	21%	28
Portage	20%	65%	15%	114
Preble	21%	64%	15%	35
Putnam	11%	81%	8%	20
Richland	16%	69%	15%	106
Ross	16%	66%	18%	72
Sandusky	14%	68%	17%	53
Scioto	18%	71%	11%	92
Seneca	17%	70%	13%	48
Shelby	18%	54%	28%	31
Stark	14%	71%	15%	304
Summit	19%	65%	16%	452
Trumbull	15%	72%	13%	212
Tuscarawas	11%	64%	25%	64
Union	21%	61%	18%	31
Van Wert	17%	66%	18%	23
Vinton	19%	66%	15%	16
Warren	23%	68%	10%	111
Washington	17%	73%	9%	66
Wayne	14%	65%	21%	77
Williams	13%	75%	11%	33
Wood	20%	67%	14%	72
Wyandot	26%	59%	15%	20

[1] Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2010.

[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, 2003-2007[1,2]

	Early Stage*	Late Stage*	Unstaged/ Unknown	Average Annual Cases
	%	%	%	
Ohio	83%	10%	6%	7,964
Adams	82%	2%	15%	17
Allen	77%	11%	12%	70
Ashland	79%	11%	10%	34
Ashtabula	82%	10%	8%	100
Athens	87%	8%	5%	39
Auglaize	81%	16%	3%	25
Belmont	92%	4%	4%	63
Brown	85%	8%	7%	31
Butler	82%	14%	4%	197
Carroll	81%	12%	7%	24
Champaign	80%	11%	8%	24
Clark	81%	11%	8%	100
Clermont	91%	6%	3%	111
Clinton	77%	9%	14%	27
Columbiana	81%	9%	10%	87
Coshocton	76%	13%	10%	21
Crawford	81%	10%	9%	36
Cuyahoga	81%	12%	7%	1,040
Darke	86%	10%	4%	37
Defiance	76%	15%	10%	25
Delaware	87%	9%	4%	92
Erie	81%	13%	6%	73
Fairfield	86%	11%	3%	82
Fayette	84%	7%	9%	18
Franklin	86%	9%	5%	653
Fulton	87%	9%	4%	23
Gallia	89%	9%	2%	19
Geauga	81%	12%	7%	82
Greene	77%	11%	12%	100
Guernsey	77%	19%	3%	24
Hamilton	88%	9%	4%	593
Hancock	80%	18%	2%	47
Hardin	81%	9%	9%	22
Harrison	90%	7%	3%	14
Henry	80%	11%	9%	15
Highland	83%	14%	4%	22
Hocking	84%	9%	7%	17
Holmes	74%	14%	12%	12
Huron	85%	11%	4%	35
Jackson	78%	17%	4%	18
Jefferson	89%	5%	5%	66
Knox	79%	15%	6%	37
Lake	76%	10%	14%	179
Lawrence	78%	10%	12%	29

	Early Stage*	Late Stage*	Unstaged/ Unknown	Average Annual Cases
	%	%	%	
Ohio	83%	10%	6%	7,964
Licking	82%	10%	8%	106
Logan	79%	12%	9%	36
Lorain	86%	9%	5%	214
Lucas	87%	10%	3%	292
Madison	82%	14%	5%	25
Mahoning	79%	8%	13%	254
Marion	84%	12%	5%	39
Medina	83%	11%	7%	118
Meigs	84%	6%	9%	13
Mercer	85%	8%	7%	22
Miami	86%	11%	3%	70
Monroe	89%	7%	4%	15
Montgomery	82%	9%	8%	410
Morgan	80%	18%	2%	9
Morrow	86%	8%	6%	23
Muskingum	81%	14%	5%	46
Noble	83%	13%	4%	10
Ottawa	82%	11%	7%	38
Paulding	81%	12%	7%	12
Perry	82%	15%	3%	17
Pickaway	89%	6%	5%	28
Pike	75%	20%	5%	12
Portage	87%	7%	6%	110
Preble	80%	14%	5%	26
Putnam	75%	15%	10%	21
Richland	78%	11%	10%	92
Ross	79%	15%	6%	34
Sandusky	82%	9%	9%	44
Scioto	76%	19%	5%	52
Seneca	87%	9%	4%	45
Shelby	87%	7%	6%	32
Stark	84%	11%	5%	311
Summit	84%	11%	5%	361
Trumbull	84%	8%	8%	197
Tuscarawas	86%	9%	5%	70
Union	88%	7%	5%	26
Van Wert	84%	11%	4%	19
Vinton	83%	9%	9%	9
Warren	86%	10%	5%	109
Washington	89%	9%	1%	56
Wayne	72%	14%	14%	59
Williams	78%	14%	9%	25
Wood	84%	12%	5%	64
Wyandot	87%	12%	1%	17

[1] Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2010.

[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.

DATA SOURCES

Expected Cases and Deaths, 2010 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 1995-2006 incidence rates from 44 states and the District of Columbia that meet the quality standards of the North American Association of Central Cancer Registries (NAACCR). The estimated numbers of US cancer deaths are calculated by fitting the numbers of deaths for 1969-2007 from the National Center for Health Statistics to a statistical model that forecasts the number of deaths expected to occur in 2010.

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 Vital Statistics Program at the Ohio Department of Health and are based on the underlying cause of death. Incidence and mortality rates for the United States were published in the *SEER Cancer Statistics Review, 1975-2007*. 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 areas San Francisco, Connecticut, Detroit, Hawaii, Iowa, New Mexico, Seattle, Utah, Atlanta, San Jose-Monterey, Los Angeles, Alaska Native Registry, Rural Georgia, California (excluding SF/SJM/LA), Kentucky, Louisiana, and New Jersey. California excluding SF/SJM/LA, Kentucky, Louisiana, and New Jersey contributed cases for diagnosis years 2000-2006. The remaining SEER areas contributed cases for the entire period 1999-2006. Rates are based on follow-up of patients into 2007. Relative survival probabilities are adjusted for normal life expectancy (and events such as death from heart disease, injuries, and diseases of old age). These probabilities are calculated by dividing observed five-year survival probabilities for cancer patients by five-year survival probabilities expected for people in the general population who are similar to the patient group with respect to age, sex, race, and calendar year of observation.

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 household telephone 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 were weighted/adjusted for age, gender, and probability of selection (*i.e.,* the number of adults and number of telephone numbers in the household). Respondents who answered "don't know/not sure" or refused the question were excluded from the analyses for that question.

The 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 United States (born free of cancer and living to 85) and do not take into account individual behaviors and risk factors. For example, the estimate of 1 man in 18 developing invasive lung 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 & Populations with High Rates The primary sources of risk factor information presented in this document were the National Cancer Institute (http://www.cancer.gov) and the American Cancer Society (http://www.cancer.org). In any instance where there was a discrepancy between the two Web sites, the NCI was used as the source because it presented the most recent and comprehensive information available at the time of publication.

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

A. For information on the methods used to estimate the numbers of new US cancer cases: Pickle L, Hao Y, Jemal A, et al. *CA Cancer J Clin.* 2007;57:30-42.

B. For information on the methods used to estimate the number of US cancer deaths: Tiwari, et al. *CA Cancer J Clin.* 2004;54:30-40.

C. For information on data collection methods used by the North American Association of Central Cancer Registries: Copeland G, Lake A, Firth R, et al. (eds). Cancer in North America, 2003-2007. *Volume One: Combined Cancer Incidence for the United States and Canada.* Springfield, Il: North American Association of Central Cancer Registries, Inc.; May 2010. Available at: www.naaccr.org/filesystem/pdf//CINA2010.vl.combined_incidence.pdf.

D. For information on data collection methods used by the National Cancer Institute's Surveillance, Epidemiology, and End Results Program: Altekruse SF, Kosary CL, Krapcho M, et al. (eds). *SEER Cancer Statistics Review, 1975-2007*. Bethesda, Md: National Cancer Institute; 2010. Available at: www.seer.cancer.gov/csr/1975_2007.

E. For information on data collection methods used by the National Center for Health Statistics: www.cdc.gov/nchs/deaths.htm.

F. For information on the methods used to calculate the probability of developing cancer: DevCan 6.5.0. Probability of developing or dying of cancer software. Statistical Research and Applications Branch, National Cancer Institute; June 2010. Available at: http://srab.cancer.gov/devcan.

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