Cancer Incidence and Mortality in the City of Cleveland 2009-2013

Cleveland Department of Public Health
Office of Communicable Disease Surveillance and Epidemiology
75 Erieview Plaza Cleveland, OH 44114|Phone: 216-664-3747|Fax: 216-644-6159

2009-2013 City of Cleveland Cancer Report

Published June 2017

Cleveland Department of Public Health

Office of Communicable Disease Surveillance and Epidemiology

The Cleveland Department of Public Health would like to thank the following for their contributions to this report:

Sydney M. Ogden, MPH
Cleveland Department of Public Health; Epidemiology Intern

Chenai Milton, MPH
Cleveland Department of Public Health; Epidemiologist

Jana Rush, MPH, MA
Cleveland Department of Public Health; Chief Epidemiologist

Cover Photo: Courtesy of The Goodyear Tire & Rubber Company

Table of Contents

Tables

Figures

Cancer Introduction

The National Burden of Cancer

Cancer is the second leading cause of death in the United States. In 2014, the total number of deaths from all causes was 2,626,418: heart disease ranks first with 614,348 deaths; cancer is a close second with 591,699 deaths; and chronic lower respiratory diseases are a distant third with 147,101 deaths.[2]

In the United States, about 1 in every 4 deaths is caused by cancer.[1]

What is cancer?

Cancer (also called malignancy) is a group of diseases resulting from uncontrolled, abnormal cell division. These cancerous cells may invade surrounding tissues or spread to other areas of the body. If this abnormal cell proliferation (growth) is not controlled, it can result in death.

Are all tumors cancerous?

No. Tumors can be cancerous (malignant) or noncancerous (benign). Noncancerous tumors will not spread, but may still be dangerous depending on their location in the body.

Are all cancers tumors?

No. Not all cancers form solid masses. Leukemia (cancer of blood forming tissues such as bone marrow and white blood cells), for example, does not typically form tumors.

Cancer Staging

Staging is the assessment of the extent to which a cancer has grown or spread from its primary site in the body. Cancer is staged at the time of diagnosis and is important for determining prognosis and possible treatment options.

There are different systems by which cancer can be staged. Summary staging is typically used for statistical reporting:

***in situ* –** cancer that has not spread beyond the layer of tissue in which it started

local – cancer that is only present within the organ in which it started

regional – cancer that has spread beyond the organ in which it started into surrounding areas (tissues, organs, regional lymph nodes)

distant – cancer that has spread beyond the area in which it started to remote areas of the body

unstaged/unknown – not enough information is known to determine the stage, or data for stage was not reported

Causes and Risk Factors

There are many factors (and combinations of factors) that can cause cancer—many of which are still unknown—and these factors may be modifiable (e.g., cigarette smoking, sun exposure, alcohol consumption, obesity) or non-modifiable (e.g., age, race, ethnicity, genetic mutations). Specific risk factors vary depending on the type of cancer, and the risk of cancer will vary greatly from person to person. Anyone can develop cancer; however, risk of cancer tends to increase with age. In the US, 86% of cancers are diagnosed in people who are age 50 and older.[1] Similarly, in the City of Cleveland, for the years 2009-

2013, about 87% of new cancer cases were diagnosed in persons aged 50 years and older. In the US, the lifetime risk of developing cancer is 42% among men, and 38% among women.[1] Risk factors for selected sites/types of cancer are described later in this report.

Cancer Treatment

Cancer is treated based on the site/type of cancer, the stage of cancer, and individual factors such as a patient's age or the presence of other existing health conditions. It is important for all cancer patients to communicate concerns and ask questions regarding cancer treatments. The most common types of cancer treatment are:

chemotherapy – "chemo"; medicines and drugs designed to kill cancer cells.
Chemotherapy drugs work by killing fast-growing cells. Side effects of chemotherapy happen because certain types of non-cancer cells also grow fast; for example, hair follicles (potentially resulting in hair loss), blood forming cells in bone marrow (potentially causing anemia), and certain cell types in the digestive tract (potentially resulting in weight loss) and reproductive system (potentially leading to fertility problems). Not everyone experiences the same side effects, and some people may not experience any. Some other side effects of chemotherapy may include (but are not limited to): diarrhea, constipation, mood changes, easy bruising and bleeding, fatigue, or nerve and muscle problems. Chemotherapy drugs often interact with other drugs or supplements a person is taking, including over-the-counter medicines or herbal supplements (such as vitamins A and C, for example), so it is important to share this information with your oncologist.

immunotherapy – "biologic therapy"; stimulates a patient's immune system to destroy cancer cells. Immunotherapy may be used alone or with other types of treatment, depending on the type of cancer. Some types of immunotherapy work by boosting the body's overall immune response, and some types work by training the immune system to target cancer cells specifically.

radiation – uses high-energy rays or particles to destroy cancer cells or slow down their growth.
The most common, general side effects of radiation therapy are fatigue, skin changes (e.g. discoloration, dryness), and loss of appetite; however, other side effects may occur depending on the area the radiation is targeting.

surgery – physically cut out the cancerous tumor.

Many effects of cancer can be mental or emotional, and certain medications may be able to help, however, many patients benefit from support groups or having someone with whom they can talk.

Healthy People 2020

Healthy People is a set of goals and objectives created by the Office of Disease Prevention and Health Promotion (ODPHP), aimed at improving the health of all people in the United States. New *Healthy People* goals and objectives are released by the U.S. Department of Health and Human Services every ten years—the current set of goals and objectives is *Healthy People 2020*.

Cancer Goal and Objectives

The *Healthy People 2020* cancer goal is to reduce the number of new cancer cases, cancer deaths, and overall burden of cancer in the United States. "The cancer objectives for *Healthy People 2020* support monitoring trends in cancer incidence, mortality, and survival to better assess the progress made toward decreasing the burden of cancer in the United States."[3] The Cleveland Department of Public Health is committed to providing information regarding cancer incidence and mortality in the City of Cleveland to help reach this goal and support its relevant objectives. *Healthy People 2020* objectives regarding specific cancer types are specified in the relevant sections of this report.

The City of Cleveland

The City of Cleveland is located in Northeast Ohio, within Cuyahoga County, and is bordered on the North by Lake Erie. Cleveland is comprised of 17 political wards and 34 neighborhoods. The tables below describe population demographics for the City of Cleveland as per 2010 United States Census data.

Cleveland Population by Gender

	2010 Census Population	% of Total Population
Male	190,285	48.0
Female	206,530	52.0
Total	396,815	

Cleveland Population by Hispanic Origin

	2010 Census Population	% of Total Population
Hispanic or Latino	39,534	10.0
Not Hispanic or Latino	357,281	90.0
Total	396,815	

Cleveland Population by Race

	2010 Census Population	% of Total Population
White	147,929	37.3
Black	211,672	53.3
Other	37,214	9.4
Total	396,815	

Cancer Incidence

Cancer incidence refers to newly diagnosed cases of cancer. In order to assess the burden of cancer in Ohio and its subdivisions, state law requires all Ohio medical care providers to report all cancers diagnosed in Ohio to the state cancer registry: the Ohio Cancer Incidence Surveillance System (OCISS). Incidence data in this report are for invasive (malignant) cancer cases only, with the addition of *in situ* bladder cancer. *In situ* cancers differ from malignant cancers in that they are confined to the layer of tissue in which they started. *In situ* bladder cancer is included in incidence rates because of the high likelihood that it will spread.

All incidence and mortality rates in this report for the City of Cleveland are for the years 2009-2013, are age-adjusted to the 2000 US Standard Population, and are presented as 5-year rates per 100,000 population. For smaller demographic groups (such as gender or race) or geographic areas (such as cities, towns, or neighborhoods), 5-year rates are calculated instead of 1-year rates because the 5-year rates are more stable/accurate; case counts for a one year period in a small population are often too low to provide an accurate statistic. The purpose of calculating rates instead of simply presenting the number of cases is so that the burden of cancer in smaller areas/groups can be compared to other areas/groups, regardless of the actual population size. Rates are expressed per 100,000 population even when the population might actually be smaller so that the rates for a smaller area can be compared to that of a larger area. For example, the 2010 population of Ward 1 was 22,372 and the number of new cancer cases in Ward 1 (from 2009-2013) was 807, but the incidence rate of cancer (for the years 2009-2013) in Ward 1 is presented as 475.8 per 100,000 persons. If we did not wish to compare the incidence rate for Ward 1 to the incidence rate for the city or any other larger area, then the rate for Ward 1 could be presented per any arbitrary number (e.g. per 1,000, per 2,500, per 15,000).

Age Group	Number of Cases
less than 1 year	8
1-4 years	16
5-9 years	9
10-14 years	13
15-19 years	24
20-24 years	49
25-29 years	59
30-34 years	108
35-39 years	150
40-44 years	290
45-49 years	612
50-54 years	1076
55-59 years	1450
60-64 years	1466
65-69 years	1320
70-74 years	1193
75-79 years	1053
80-84 years	857
85 years and older	684

Similarly, rates are calculated using a statistical method called "age-adjustment", which allows the rates of two populations to be compared regardless of the age distribution within each population. Age-adjustment is particularly important when calculating cancer rates because cancers tend to disproportionately affect older age groups.

The table to the left shows the number of new invasive cancer cases by age group in Cleveland for the years 2009-2013. In the City of Cleveland, those in the 60-64 years old age group had the highest number of new cases, and those in the 55-59 years old age group had the second highest number of new cases.

The purpose of comparing cancer rates is to inform public health officials about the relative health of the community and help determine where scarce resources should be allocated. While rates can help predict what the future burden of cancer might be based on trends, it is important to note that rates do not directly measure the likelihood that a person in a certain area will develop cancer in the future. The likelihood that a person will develop cancer in the future can be determined by assessing that particular person's known risk factors. Risk factors for specific cancer types are described in later sections of this report.

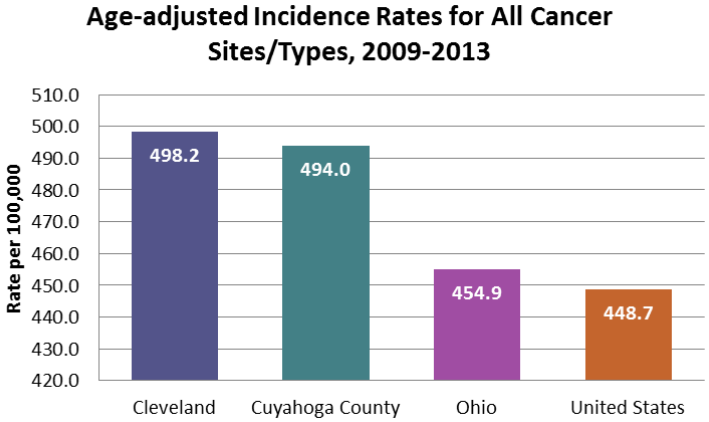
Incidence Rate Comparisons

Incidence rates in this report are presented for 25 individual cancer site groupings and for all cancer sites/types combined.

Cleveland's incidence rate was higher than the Ohio rate for multiple myeloma, leukemia, and for cancers of the cervix, uterus, colon and rectum, esophagus, kidney and renal pelvis, larynx, liver and intrahepatic bile duct, lung and bronchus, oral cavity and pharynx, pancreas, prostate, and stomach.

Cleveland's incidence rate was higher than the national rate for multiple myeloma, Hodgkin's lymphoma, and for cancers of the cervix, colon and rectum, uterus, esophagus, kidney and renal pelvis, larynx, liver and intrahepatic bile duct, lung and bronchus, oral cavity and pharynx, pancreas, prostate, and stomach.

The figure below shows comparisons of incidence rates for all cancer sites/types combined for the City of Cleveland, Cuyahoga County, Ohio, and the United States. For all cancer sites/types combined, Cleveland's incidence rate (498.2 per 100,000) was 9.5% higher than the Ohio rate (454.9 per 100,000), and 11% higher than the national rate (448.7 per 100,000).



Number of cases are specified in **Table 1** of Appendix (data sources are specified in corresponding footnotes).

Incidence within the City of Cleveland

Age-adjusted Incidence Rates by Cancer Site/Type and Gender in Cleveland, 2009-2013

	Males	Females
Cancer Site/Type*	**Rate**	**Rate**
All Sites/Types	582.9	440.2
Bladder	29.8	10.3
Brain & Other CNS**	6.8	4.8
Breast	1.0	111.2
Colon & Rectum	59.0	37.7
Esophagus	10.6	3.5
Hodgkin's Lymphoma	3.5	2.4
Kidney & Renal Pelvis	26.5	12.0
Larynx	11.6	3.1
Leukemia	16.1	9.1
Liver & Intrahepatic Bile Duct	23.5	5.9
Lung & Bronchus	108.5	73.6
Melanoma of the Skin	7.4	5.8
Multiple Myeloma	9.8	6.7
Non-Hodgkin's Lymphoma	21.0	13.6
Oral Cavity & Pharynx	18.6	7.3
Other Sites/Types	46.3	41.6
Pancreas	15.4	13.7
Stomach	15.8	7.2
Thyroid	4.6	16.0

** Central Nervous System * non sex-specific cancer types only

[1] Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population

In Cleveland, for the years 2009-2013, breast cancer was the most commonly diagnosed cancer among women with an incidence rate of 111.2 per 100,000 women, and prostate cancer was the most commonly diagnosed cancer among men with an incidence rate of 143.5 per 100,000 men.

Cleveland males had a higher incidence rate than Cleveland females for every cancer site/type, except for thyroid and breast cancer. For all cancer sites/types combined, Cleveland's incidence rate was 32.4% higher among males (582.9 per 100,000 males) than among females (440.2 per 100,000 females).

The table to the left shows male and female cancer incidence rates for each non sex-specific cancer site/type in the City of Cleveland for the years 2009-2013. (Number of cases and data sources are specified in **Table 2** of Appendix).

Incidence by Political Ward

Population demographics for the City of Cleveland by gender and ward are specified in **Table 3** of Appendix.

Overall

Of Cleveland's 17 political wards, ward 5 had the highest incidence rate for all cancer types at 564.9 per 100,000 persons, which is higher than the city (498.2 per 100,000), county (494.0 per 100,000), state (454.9 per 100,000) and national (448.7 per 100,000) rates. Wards 2, 8, 11, 12, and 16 also had incidence rates that were higher than the city overall. Ward 1 had the lowest overall incidence rate at 475.8 per 100,000 persons, which is lower than the city and county rates, but higher than the state and national rates.

Males

Among Cleveland males, Ward 5 had the highest incidence rate for all cancer sites/types at 686.0 per 100,000 males, and Ward 14 had the lowest rate at 522.8 per 100,000 males. Wards 1, 2, 5, 6, 8, 9, 11, 12, and 16 all had incidence rates that were higher than the city rate (582.9 per 100,000 males).

Females

Among Cleveland females, Ward 11 had the highest incidence rate for all cancer sites/types at 500.2 per 100,000 females, and Ward 9 had the lowest rate at 400.7 per 100,000 females. Wards 2, 5, and 10 to 17 all had incidence rates that were higher than the city rate (440.2 per 100,000 females).

Comparisons of incidence rates for all cancer sites/types combined by gender and ward are illustrated in **Figures 1, 2** and **3** below.

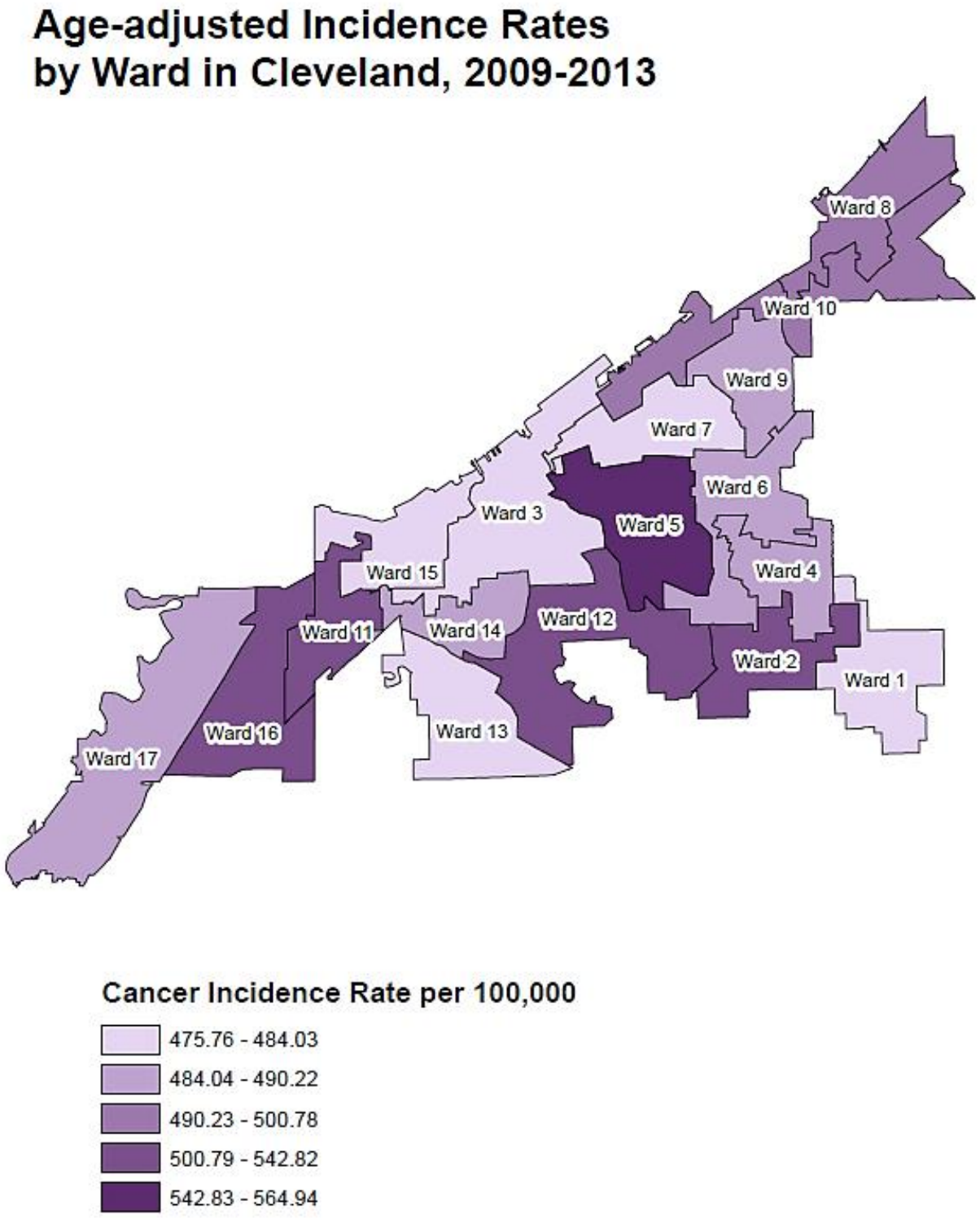


Figure 1 shows the Wards with the highest cancer incidence rates in the City of Cleveland for the years 2009-2013. Number of new cases and exact rate values are specified in **Table 4** of Appendix.

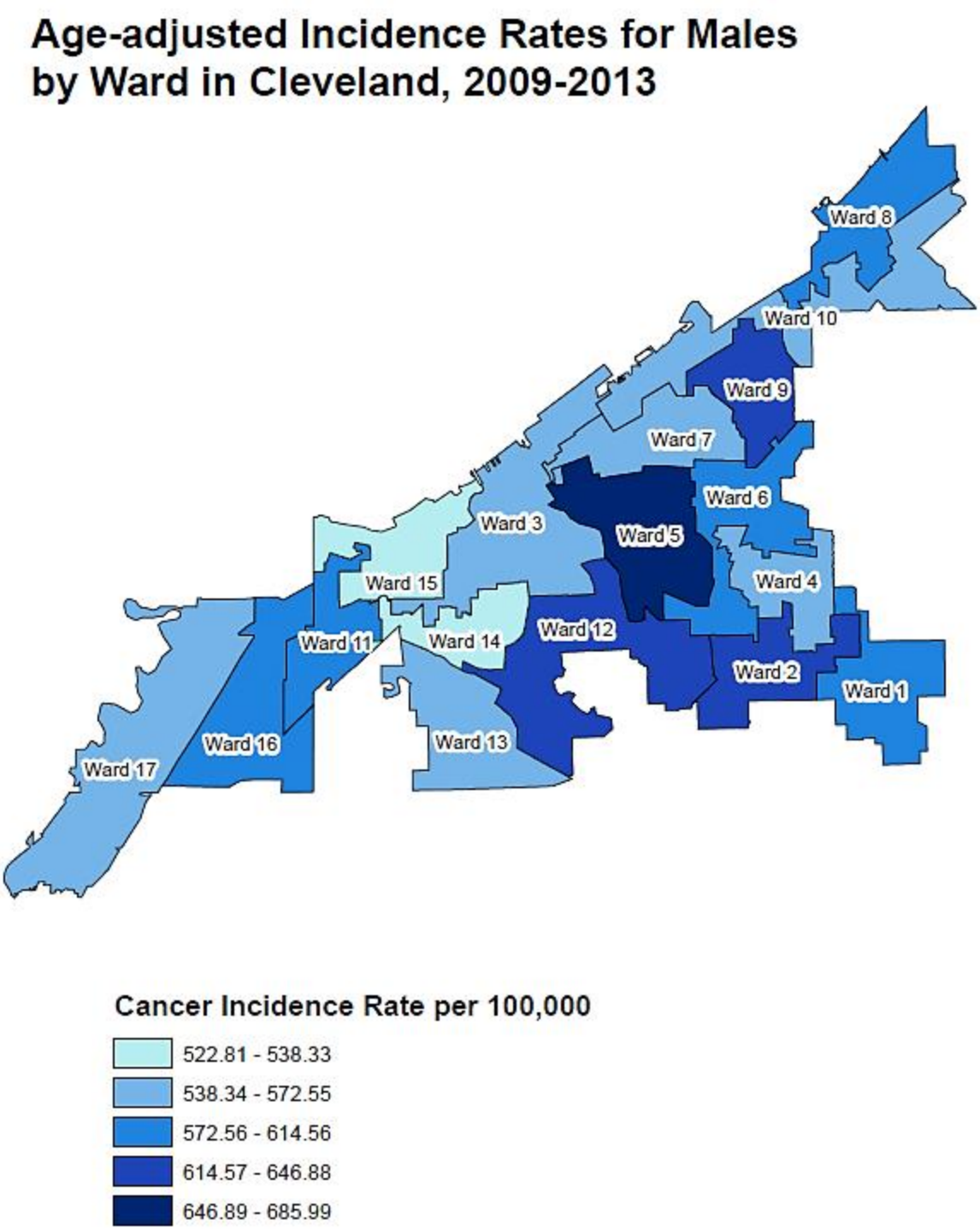


Figure 2 shows the Wards with the highest cancer incidence rates among males in the City of Cleveland for the years 2009-2013. Number of new cases and exact rate values are specified in **Table 5** of Appendix.

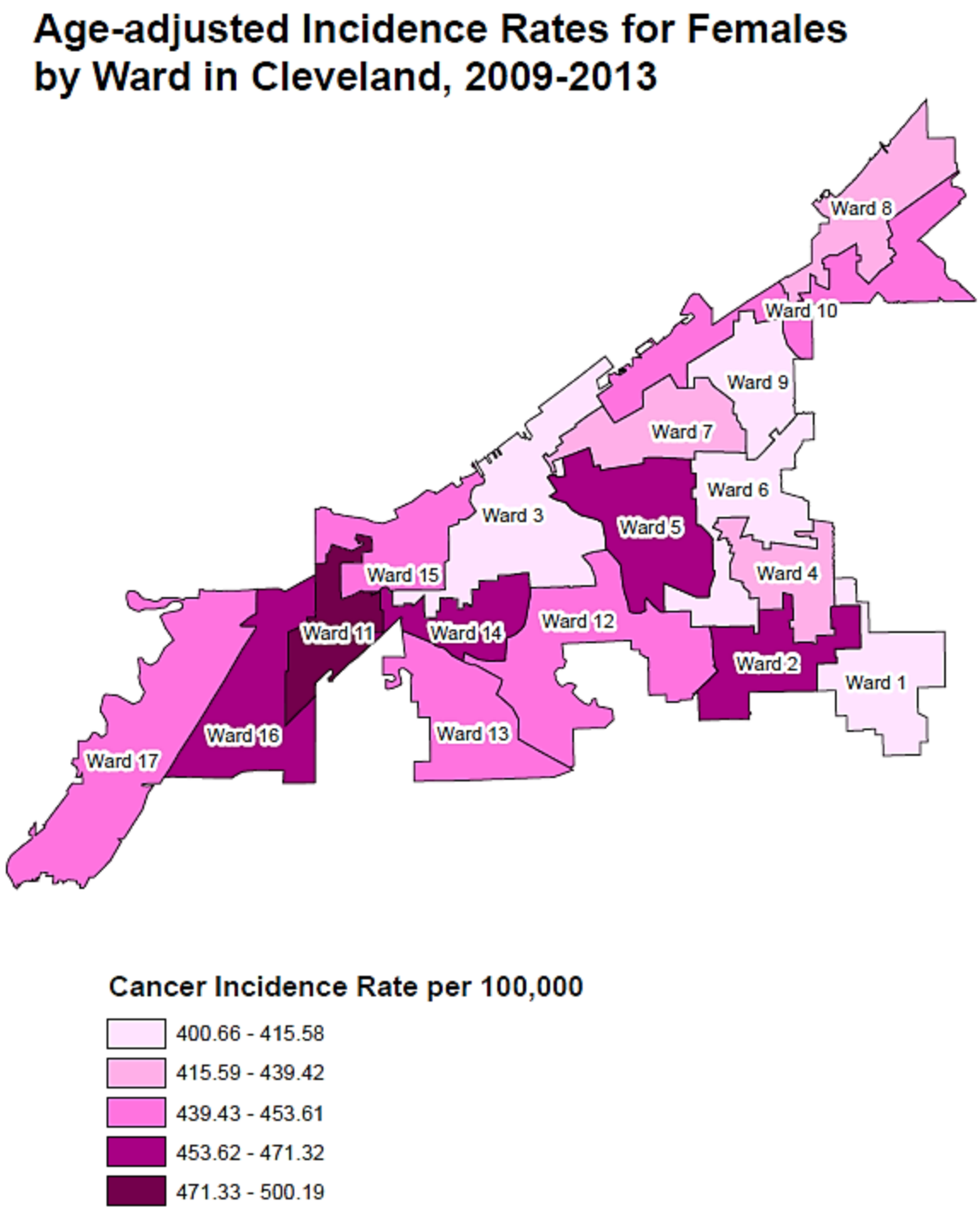


Figure 3 shows the Wards with the highest cancer incidence rates among females in the City of Cleveland for the years 2009-2013. Number of new cases and exact rate values are specified in **Table 5** of Appendix.

Cancer Mortality

Cancer mortality refers to the number of deaths resulting from cancer as the primary cause. The numbers of cancer deaths for the City of Cleveland were obtained from the Ohio Department of Health Office of Vital Statistics. Mortality rates were calculated using the same methods to calculate incidence rates in this report: Cleveland mortality rates are for the years 2009-2013, are age-adjusted to the 2000 US Standard Population, and are presented as 5-year rates per 100,000 population.

Age Group	Number of Deaths
less than 1 year	2
1-4 years	2
5-9 years	3
10-14 years	2
15-19 years	4
20-24 years	9
25-29 years	8
30-34 years	18
35-39 years	27
40-44 years	75
45-49 years	183
50-54 years	312
55-59 years	557
60-64 years	583
65-69 years	593
70-74 years	581
75-79 years	572
80-84 years	609
85 years and older	621

Similar to cancer incidence, cancer mortality also disproportionately affects older age groups. The table to the left shows the number of cancer deaths by age group in Cleveland for 2009-2013. In the City of Cleveland, those in the 85 years and older age group had the highest number of deaths, and those in the 80-84 years old age group had the second highest number of deaths.

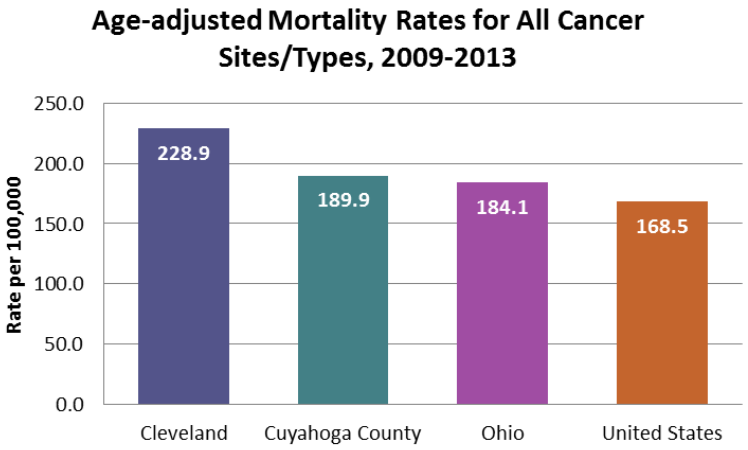
Mortality Rate Comparisons

Mortality rates are presented for 25 individual cancer site groupings and for all cancer sites/types combined (the same site groupings that are presented for incidence rates in this report).

Cleveland's mortality rate was higher than the Ohio rate for multiple myeloma, and for cancers of the bladder, female breast, cervix, colon and rectum, uterus, esophagus, kidney and renal pelvis, larynx, liver and intrahepatic bile duct, lung and bronchus, oral cavity and pharynx, pancreas, prostate, and stomach.

Cleveland's mortality rate was higher than the national rate for multiple myeloma, non-Hodgkin's lymphoma, and cancers of the bladder, female breast, male breast, cervix, colon and rectum, uterus, esophagus, kidney and renal pelvis, larynx, liver and intrahepatic bile duct, lung and bronchus, oral cavity and pharynx, pancreas, prostate, and stomach.

The figure below shows comparisons of mortality rates for all cancer sites/types combined for the City of Cleveland, Cuyahoga County, Ohio, and the United States. For all cancer sites/types combined, Cleveland's mortality rate (228.9 per 100,000) was 24.3% higher than the Ohio rate (184.1 per 100,000), and 35.8% higher than the national rate (168.5 per 100,000).



Number of deaths are specified in **Table 6** of Appendix (data sources are specified in corresponding footnotes).

Mortality within the City of Cleveland

Age-adjusted Mortality Rates by Cancer Site/Type and Gender in Cleveland, 2009-2013

	Males	Females
Cancer Site/Type*	**Rate**	**Rate**
All Sites/Types	285.9	190.3
Bladder	7.8	4.2
Brain & Other CNS**	3.2	2.3
Breast	0.5	24.1
Colon & Rectum	25.8	17.1
Esophagus	11.9	2.7
Hodgkin's Lymphoma	***	***
Kidney & Renal Pelvis	7.1	3.3
Larynx	4.5	0.9
Leukemia	7.2	5.4
Liver & Intrahepatic Bile Duct	15.2	4.8
Lung & Bronchus	91.9	54.0
Melanoma of the Skin	2.0	1.5
Multiple Myeloma	5.0	3.9
Non-Hodgkin's Lymphoma	8.8	4.1
Oral Cavity & Pharynx	8.2	2.1
Other Sites/Types	29.0	22.5
Pancreas	16.0	13.1
Stomach	8.0	4.4
Thyroid	***	***

** Central Nervous System * non sex-specific cancer types only

*** rates are suppressed when number of deaths is less than 5 (i.e. less than 1 death per year) for either gender

[1] Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population

In Cleveland, for the years 2009-2013, lung and bronchus cancer was the most common cause of cancer deaths for both males and females, with mortality rates of 91.9 per 100,000 and 54.0 per 100,000, respectively. Cleveland males had a higher mortality rate than Cleveland females for every cancer site/type, except for breast cancer. For all cancer sites/types combined, Cleveland's mortality rate was 50.2% higher among males (285.9 per 100,000 males) than among females (190.3 per 100,000 females).

The table to the left shows male and female cancer mortality rates for each non sex-specific cancer site/type in the City of Cleveland for the years 2009-2013. (Number of deaths and data sources are specified in **Table 7** of Appendix).

Mortality by Political Ward

Overall

Of Cleveland's 17 political wards, ward 5 had the highest mortality rate for all cancer types at 370.0 per 100,000 persons, which is higher than the city (228.9 per 100,000), county (189.9 per 100,000), state (184.1 per 100,000) and national (168.5 per 100,000) rates. Wards 2, 3, 5, 7-12, and 14 also had mortality rates that were higher than the city overall. Ward 6 had the lowest overall mortality rate at 172.3 per 100,000 persons, which is lower than the city, county and state rates, but higher than the national rate.

Males

Among Cleveland males, Ward 5 had the highest mortality rate for all cancer sites/types at 492.8 per 100,000 males, and Ward 6 had the lowest rate at 209.7 per 100,000 males. Wards 3, 5, 8-12, and 17 all had mortality rates that were higher than the city rate (285.9 per 100,000 males).

Females

Among Cleveland females, Ward 5 had the highest mortality rate for all cancer sites/types at 287.5 per 100,000 females, and Ward 6 had the lowest rate at 148.7 per 100,000 females. Wards 2, 5, 7-10, 12, 14 and 16 all had mortality rates that were higher than the city rate (190.3 per 100,000 females).

Comparisons of mortality rates for all cancer sites/types combined by gender and ward are illustrated in **Figures 4, 5** and **6** below.

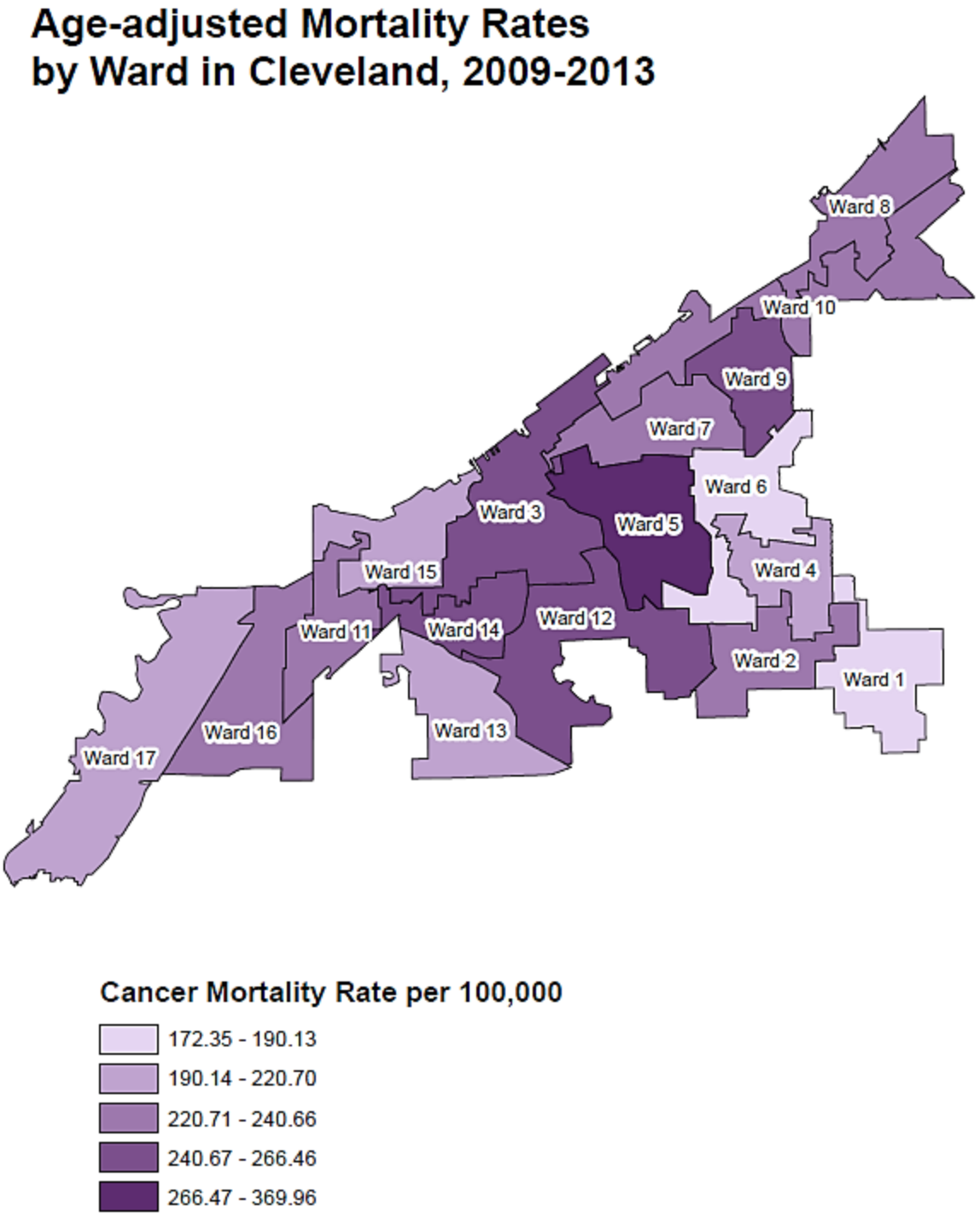


Figure 4 shows the Wards with the highest cancer mortality rates in the City of Cleveland for the years 2009-2013. Number of deaths and exact rate values are specified in **Table 8** of Appendix.

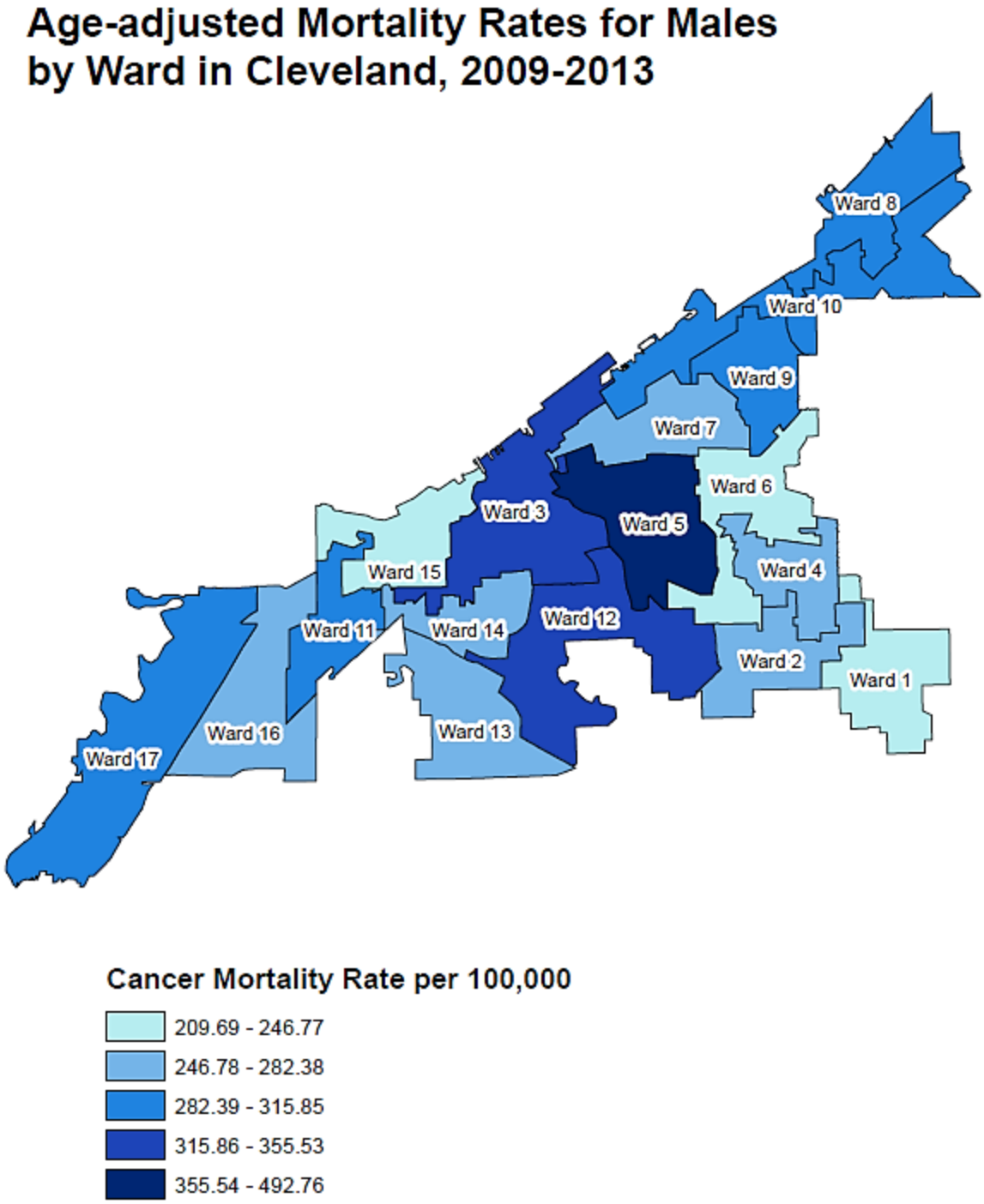


Figure 5 shows the Wards with the highest cancer mortality rates among males in the City of Cleveland for the years 2009-2013. Number of deaths and exact rate values are specified in **Table 9** of Appendix.

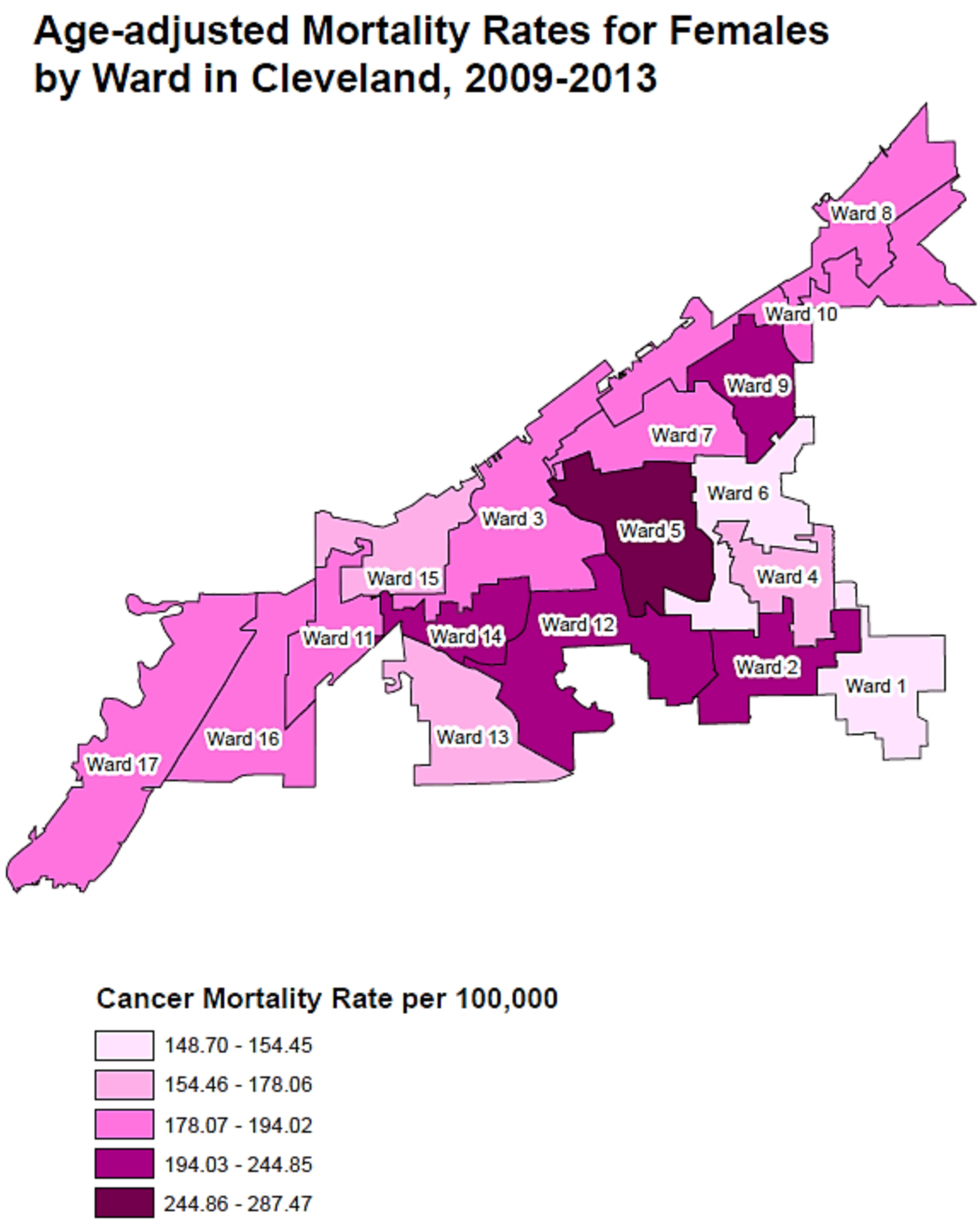


Figure 6 shows the Wards with the highest cancer mortality rates among females in the City of Cleveland for the years 2009-2013. Number of deaths and exact rate values are specified in **Table 9** of Appendix.

Prostate Cancer

Healthy People 2020

Healthy People 2020 objective C-7 is to reduce the national prostate cancer mortality rate from 24.2 prostate cancer deaths per 100,000 males in 2007, to 21.8 deaths per 100,000 males by 2020.[3]

About Prostate Cancer

The prostate is a male reproductive glad (roughly the size of a walnut, although the size of the prostate varies with age) located below the bladder and in front of the rectum, and surrounds the upper part of the urethra (the tube that carries urine from the bladder and semen from the testes through the length of the penis to be expelled during urination or ejaculation). Made up of muscle and glad cells, the main function of the prostate is to produce prostate fluid (the component of semen that carries sperm). While prostate cancer diagnoses generally occur in men over the age of 60, males of any age can develop prostate cancer. Almost all prostate cancers are adenocarcinomas. The exact causes of prostate cancer are not known, and more research is needed to determine factors that contribute to prostate cancer risk.

Risk Factors:

Non-Modifiable Risk Factors

Gender: Only males are at risk for developing prostate cancer.

Age: In the US, about 6 out of every 10 prostate cancer cases are diagnosed in men over the age of 65.[4]

Race/Ethnicity: In the US, prostate cancer is more common among African Americans than in men of other races, and less common in Hispanic men than in non-Hispanic men.[4]

Family history: Having a first degree relative who had prostate cancer increases the risk of developing prostate cancer; however, most prostate cancers are diagnosed in men without a family history of the disease.

Genetics: Certain gene changes (such as those associated with Lynch syndrome) can increase the risk of developing prostate cancer.[4]

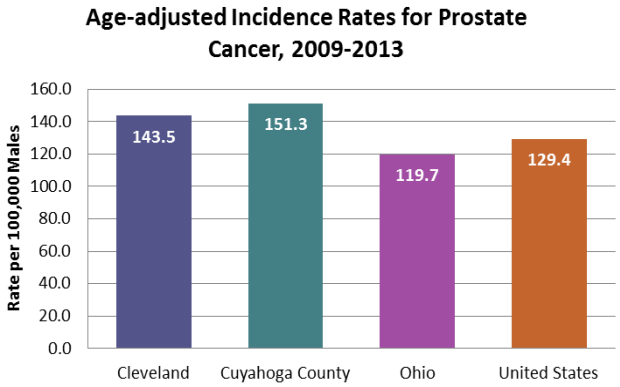
Signs and Symptoms:

- Difficulty urinating
- Blood in the urine
- Erectile dysfunction
- Pain in the hips or spine
- Loss of bladder control

Note: These symptoms are not exclusive to prostate cancer, and symptoms of prostate cancer may be different for different people. Talk to your doctor if you are experiencing any of these symptoms.

Incidence:

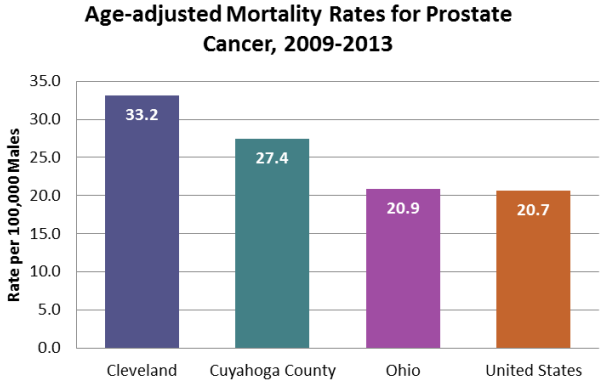
In the City of Cleveland, 1,331 new cases of prostate cancer were diagnosed between 2009 and 2013, with a 5-year incidence rate of 143.5 per 100,000 males (see **Table 1** in Appendix). This means that for every 100,000 Cleveland males, about 144 developed prostate cancer.
In Cleveland, between the years 2009 and 2013, 96% of all prostate cancer cases were diagnosed in men aged 50 years and older.
The figure below shows comparisons of city, county, state and national incidence rates for prostate cancer. For prostate cancer, Cleveland's incidence rate (143.5 per 100,000 males) was 19.9% higher than the Ohio rate (119.7 per 100,000 males), and 10.9% higher than the US rate (129.4 per 100,000 males).



Numbers of cases and data sources are specified in **Table 1** of Appendix.

Mortality:

In the City of Cleveland, 256 prostate cancer deaths occurred between 2009 and 2013, with a 5-year mortality rate of 33.2 per 100,000 males.
The figure below shows comparisons of city, county, state and national mortality rates for prostate cancer. Cleveland's mortality rate (33.2 per 100,000 males) was 58.9% higher than the Ohio rate (20.9 per 100,000 males), and 60.4% higher than the US rate (20.7 per 100,000 males).



Numbers of deaths and data sources are specified in **Table 6** of Appendix.

Breast Cancer

Healthy People 2020

Healthy People 2020 objective C-3 is to reduce the national female breast cancer mortality rate from 23.0 breast cancer deaths per 100,000 females in 2007, to 20.7 deaths per 100,000 females by 2020.[3]

About Breast Cancer

Female breasts are made up of fat, fibrous tissue, and glandular tissue. Nearly all breast cancers occur in women and begin in the ducts that carry milk from the mammary glands to the nipple. Breast cancer is the most commonly diagnosed cancer in women; however, men can also develop breast cancer. Male breast tissue differs from female breast tissue in that it has significantly less glandular tissue (fewer ducts). Since male breast tissue consists of significantly fewer ducts, and since these duct cells are less developed than duct cells in female breast tissue (due to hormone differences), breast cancer is significantly less common—but may still occur—in men.

Risk Factors:

Modifiable Risk Factors

Alcohol: Women who consume 2 or more alcoholic beverages per day have about 1.5 times the risk of developing breast cancer compared to nondrinkers.[5]

Overweight/obesity: Being overweight or obese after the onset of menopause increases the risk of developing breast cancer.

Reproductive history: For most types of breast cancer, not having children, or having the first child after age 30 increases the risk of developing breast cancer; having children before age 30 and continuing breastfeeding for more than 1 year can reduce the risk of breast cancer.

Birth control: Certain types of contraceptives (i.e. oral, injectable) can slightly increase the risk of developing breast cancer while use is continued.

Hormone replacement therapy: The use of hormone replacement therapy after menopause (used to treat osteoporosis or symptoms of menopause) increases the risk of developing breast cancer.

Non-Modifiable Risk Factors

Gender: In the US, breast cancer is about 100 times more common in women than in men.[5]

Age: In the US, most invasive breast cancers are diagnosed in women aged 55 years and older.

Race: White women have a slightly greater risk of developing breast cancer compared to black women.

Personal history: Women who have had cancer in one breast have a higher risk of developing cancer in the other breast.

Family history: Having a first degree relative who had breast cancer increases the risk of developing the disease; however, most women who develop breast cancer do not have a family history of the disease.

Genetics: About 5-10% of all breast cancers are thought to be genetic.[5]

Breast tissue density: Women with dense breasts (breasts contain more glandular and fibrous tissue than fatty tissue) have up to two times greater risk of developing breast cancer compared to women with normal breast density.[5]

Previous radiation therapy: Radiation therapy to the chest during adolescence for other cancer types increases the risk of developing breast cancer.

Signs and Symptoms:

- Presence of a new lump or mass in the breast (often painless)
- Swelling of the breast (with or without the presence of a lump) or underarm
- Breast or nipple pain
- Discharge other than breast milk
- Unexplained changes in skin of the breast or nipple

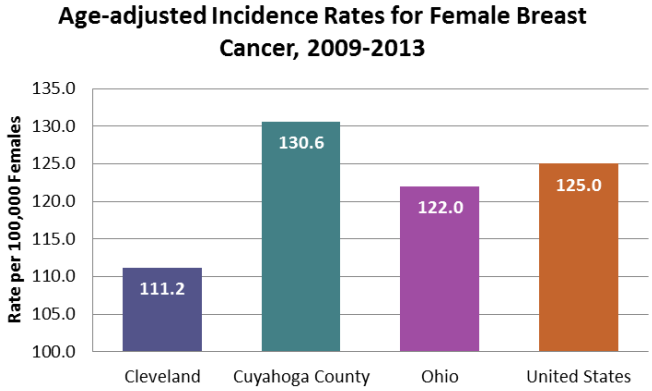
Note: These symptoms are not exclusive to breast cancer, and symptoms of breast cancer may be different for different people. Talk to your doctor if you are experiencing any of these symptoms.
Breast cancer may be present without symptoms, and not all breast lumps are cancerous. Regular breast exams are important for early identification of breast cancer, regardless of whether or not you are experiencing symptoms.

Incidence:

Female Breast Cancer
In the City of Cleveland, 1,278 new cases of female breast cancer were diagnosed between 2009 and 2013, with a 5-year incidence rate of 111.2 per 100,000 females (see **Table 1** in Appendix). This means that for every 100,000 Cleveland females, about 111 developed breast cancer.

In Cleveland, between the years 2009 and 2013, 96% of newly diagnosed cases of invasive female breast cancer occurred in women aged 40 years and older.

The figure below shows comparisons of city, county, state and national incidence rates for female breast cancer. For female breast cancer, Cleveland's incidence rate (111.2 per 100,000 females) was 9.7% lower than the Ohio rate (122.0 per 100,000 females), and 12.4% lower than the national rate (125.0 per 100,000 females).



Numbers of cases and data sources are specified in **Table 1** of Appendix.

Male Breast Cancer

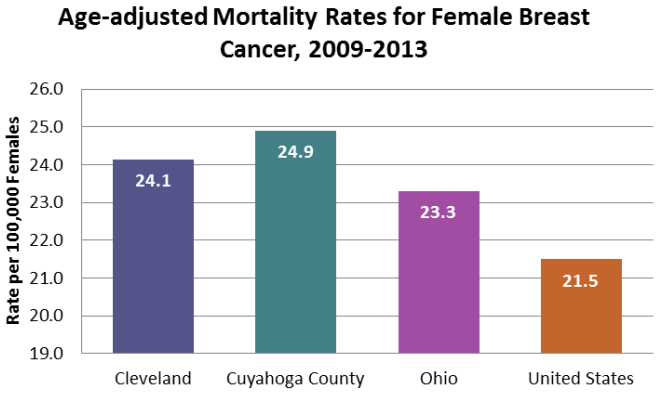
In the City of Cleveland, 9 new cases of male breast cancer were diagnosed between 2009 and 2013, with a 5-year incidence rate of 1.0 per 100,000 males (see **Table 1** in Appendix). Cleveland's male breast cancer incidence rate (1.0 per 100,000 males) was lower than the national incidence rate for male breast cancer (1.2 per 100,000 males).

Mortality:

Female Breast Cancer

In the City of Cleveland, 291 female breast cancer deaths occurred between 2009 and 2013, with a 5-year mortality rate of 24.1 per 100,000 females.

The figure below shows comparisons of city, county, state and national mortality rates for female breast cancer. Cleveland's mortality rate (24.1 per 100,000 females) was 3.4% higher than the Ohio rate (23.3 per 100,000 females), and 12.1% higher than the national rate (21.5 per 100,000 females).



Numbers of deaths and data sources are specified in **Table 6** of Appendix.

Male Breast Cancer

In the City of Cleveland, 5 breast cancer deaths occurred in men between 2009 and 2013, with a 5-year mortality rate of 0.5 per 100,000 males (see **Table 1** in Appendix). Cleveland's male breast cancer mortality rate (0.5 per 100,000 males) was higher than the national mortality rate for male breast cancer (0.3 per 100,000 males).

Lung and Bronchus Cancer

Healthy People 2020

Healthy People 2020 objective C-2 is to reduce the national lung cancer mortality rate from 50.6 lung cancer deaths per 100,000 population in 2007, to 45.5 deaths per 100,000 population by 2020.[3]

About Lung and Bronchus Cancer

Types of Lung Cancer[6]

1. Non-small cell lung cancer (accounts for about 85% of all lung cancers)
Subtypes of non-small cell lung cancer include adenocarcinoma, large cell carcinoma and squamous cell carcinoma.

2. Small cell lung cancer (accounts for about 10-15% of all lung cancers)
Small cell lung cancer usually spreads quickly.

3. Lung carcinoid tumor (accounts for less than 5% of all lung cancers)
Lung carcinoid tumors typically grow slowly and rarely spread.

Risk Factors:

Modifiable Risk Factors

Smoking: Cigarette smoking is responsible for about 85-90% of all lung and bronchus cancer cases.[7] Cigar, pipe, and hookah smoking can also cause lung and bronchus cancer. The risk of lung and bronchus cancer (as well as risk for other types of cancer) increases with the amount and duration of smoking or tobacco use. Individuals who smoke are about 25 times more likely to develop lung and bronchus cancer than nonsmokers.[8]

Secondhand smoke: Exposure to secondhand smoke from cigarettes or other tobacco products can cause lung and bronchus cancer.[9,10,11] Prolonged exposure to secondhand smoke is estimated to increase a nonsmoking individual's likelihood of developing lung and bronchus cancer by up to 30%.[12] For the years 2005-2009, exposure to secondhand smoke resulted in more than 7,300 lung cancer deaths each year in nonsmoking adults.[13]

Thirdhand smoke: Thirdhand smoke refers to chemicals (including nicotine) in tobacco smoke that are absorbed by fabrics and other surfaces. Significant amounts of these chemicals have been shown to be retained by fabrics for more than a year after exposure to tobacco smoke, and nicotine exposure from these residues can be up to 56 times higher than from secondhand smoke.[14]

Radon: Radon is an odorless, tasteless gas that occurs naturally in the earth and can be present in homes or buildings (typically in basements or lower levels). Exposure to radon increases a person's risk of developing lung and bronchus cancer. According to the Environmental Protection Agency (EPA), radon is the second leading cause of lung cancer overall, and the number one cause of lung cancer among nonsmokers.[15]

Non-Modifiable Risk Factors

Age: Lung cancer typically affects older people. In the US, two out of three people who are diagnosed with lung and bronchus cancer are over the age of 65. [16]

Gender: Lung and bronchus cancer is more commonly diagnosed in men than in women. In the US, from 1999-2013, among men, black men had the highest rate of lung cancer, and among women, white women had the highest rate of lung cancer.[16]

Family history: Having a first degree relative who had lung cancer may increase the risk of developing lung cancer.

Signs and Symptoms:

- Persistent cough
- Coughing up blood
- Reoccurring pneumonia or respiratory illnesses
- Chest pain that worsens with coughing or deep breathing
- Wheezing or shortness of breath
- Unexplained weight loss

Note: These symptoms are not exclusive to lung cancer, and symptoms of lung cancer may be different for different people. Talk to your doctor if you are experiencing any of these symptoms.

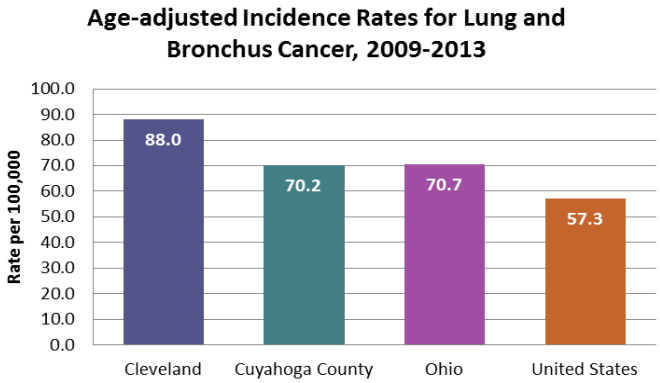
Incidence:

Overall

In the City of Cleveland, 1,840 new cases of lung and bronchus cancer were diagnosed between 2009 and 2013, with a 5-year incidence rate of 88.0 per 100,000 (see **Table 1** in Appendix). This means that for every 100,000 Clevelanders, 88 developed lung and bronchus cancer.

In Cleveland, about 94% of people diagnosed with lung and bronchus cancer were age 50 years and older, and about 57% were age 65 and older.

The figure below shows comparisons of city, county, state and national incidence rates for lung and bronchus cancer overall. For lung and bronchus cancer, Cleveland's incidence rate (88.0 per 100,000) was 24.5% higher than the Ohio rate (70.7 per 100,000), and 53.6% higher than the national rate (57.3 per 100,000).



Numbers of cases and data sources are specified in **Table 1** of Appendix.

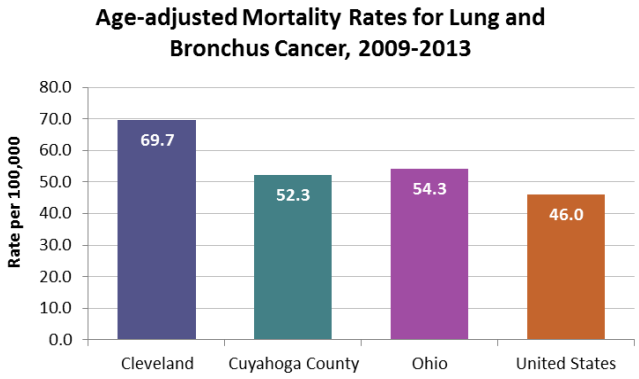
By Gender

Among Cleveland males, the 5-year incidence rate for lung and bronchus cancer (108.5 per 100,000 males) was 47.4% higher than the incidence rate for lung and bronchus cancer among Cleveland females (73.6 per 100,000 females).

Mortality:

Overall

In the City of Cleveland, lung cancer has the highest mortality rate of any cancer type; 1,448 lung cancer deaths occurred between 2009 and 2013, with a 5-year mortality rate of 69.7 per 100,000 population. The figure below shows comparisons of city, county, state and national mortality rates for lung and bronchus cancer. Cleveland's mortality rate (69.7 per 100,000) was 28.4% higher than the Ohio rate (54.3 per 100,000), and 51.5% higher than the national rate (46.0 per 100,000).



Numbers of deaths and data sources are specified in **Table 6** of Appendix.

By Gender

Among Cleveland males, the 5-year mortality rate for lung and bronchus cancer (91.9 per 100,000 males) was 70.2% higher than the mortality rate for lung and bronchus cancer among Cleveland females (54.0 per 100,000 females).

Colon and Rectum (colorectal) Cancer

Healthy People 2020

Healthy People 2020 objective C-9 is to reduce the national invasive colorectal cancer incidence rate from 46.9 new cases per 100,000 population in 2007, to 39.9 new cases per 100,000 population by 2020.[3]
Healthy People 2020 objective C-5 is to reduce the national colorectal cancer mortality rate from 17.1 colorectal cancer deaths per 100,000 population in 2007, to 14.5 deaths per 100,000 population by 2020.[3]

About Colon and Rectum Cancer

Most colorectal cancers are adenocarcinomas (beginning in the gland cells that produce mucus to lubricate the digestive tract), and most of these cancers begin as a polyp (a growth on the inner lining of the colon or rectum). Not all polyps lead to cancer, and most colorectal cancers do not cause symptoms in early stages, so it is important to discuss colorectal cancer screening with your doctor.

Risk Factors:

Modifiable Risk Factors

Smoking: Cigarette smoking increases the risk of developing colorectal cancer, and also increases the risk of dying from colorectal cancer.
Alcohol: Consuming more than one alcoholic beverage per day increases the risk of developing colorectal cancer.
Overweight/obesity: Being overweight or obese increases the risk of developing colorectal cancer.
Diet: Diets high in fat and red meats, and diets low in fiber, fruits, vegetables and whole grains increase the risk of developing colorectal cancer. Diets high in natural fibers from consuming foods like fruits, vegetables and whole grains may reduce the risk of developing colorectal cancer.
Physical inactivity: Lack of regular physical activity increases the risk of developing colorectal cancer.
Type 2 diabetes: People with non-insulin dependent diabetes have increased risk of developing colorectal cancer.

Non-Modifiable Risk Factors

Age: The risk of developing colorectal cancer increases as age increases. In the US, most colorectal cancers are diagnosed in individuals aged 50 years and older.[8]
Gender: Colorectal cancer is more commonly diagnosed in men than in women.
Race: In the US, African Americans have higher incidence and mortality rates for colorectal cancer compared to other races/ethnicities.[8]
Family history: Having a first degree relative who had colorectal cancer may increase the risk of developing colorectal cancer.
Inflammatory bowel disease: Diseases such as ulcerative colitis or Crohn's disease increase the risk of developing colorectal cancer. People with these conditions should begin regular colorectal cancer screenings at a younger age.
Genetics: Certain hereditary syndromes (such as Lynch syndrome) can increase the risk for developing colorectal cancer.

Signs and Symptoms:

- Persistent change in bowel habits (e.g. diarrhea, constipation, narrowing of the stool)
- Blood in the stool or bleeding from the rectum
- Not feeling relieved after a bowel movement
- Abdominal pain or cramping
- Weakness and fatigue
- Unexplained weight loss or loss of appetite

Note: These symptoms are not exclusive to colorectal cancer, and symptoms of colorectal cancer may be different for different people. Talk to your doctor if you are experiencing any of these symptoms.

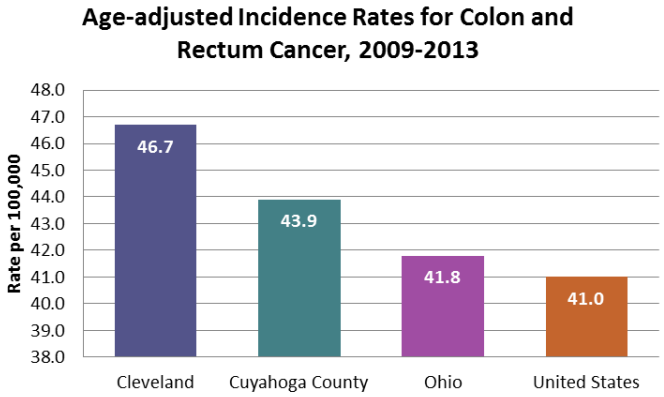
Incidence:

Overall

In the City of Cleveland, 985 new cases of colon and rectum cancer were diagnosed between 2009 and 2013, with a 5-year incidence rate of 46.7 per 100,000 (see **Table 1** in Appendix). This means that for every 100,000 Clevelanders, about 47 developed colon and rectum cancer.

In Cleveland, about 91% of people diagnosed with colon and rectum cancer were age 50 years and older.

The figure below shows comparisons of city, county, state and national incidence rates for colon and rectum cancer overall. For colon and rectum cancer, Cleveland's incidence rate (46.7 per 100,000) was 11.7% higher than the Ohio rate (41.8 per 100,000), and 13.9% higher than the national rate (41.0 per 100,000).



Numbers of cases and data sources are specified in **Table 1** of Appendix.

By Gender

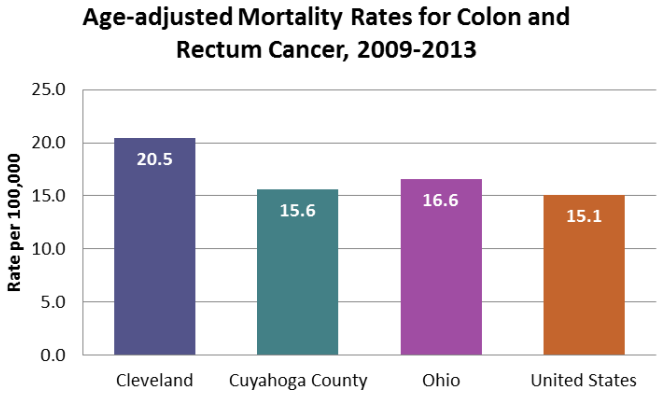
Among Cleveland males, the 5-year incidence rate for colon and rectum cancer (59.0 per 100,000 males) was 56.5% higher than the incidence rate for colon and rectum cancer among Cleveland females (37.7 per 100,000 females).

Mortality:

Overall

In the City of Cleveland, 419 colon and rectum cancer deaths occurred between 2009 and 2013, with a 5-year mortality rate of 20.5 per 100,000 population.

The figure below shows comparisons of city, county, state and national mortality rates for colon and rectum cancer. Cleveland's mortality rate (20.5 per 100,000) was 23.5% higher than the Ohio rate (16.6 per 100,000), and 35.8% higher than the national rate (15.1 per 100,000).



Numbers of deaths and data sources are specified in **Table 6** of Appendix.

By Gender

Among Cleveland males, the 5-year mortality rate for colon and rectum cancer (25.8 per 100,000 males) was 50.9% higher than the mortality rate for colon and rectum cancer among Cleveland females (17.1 per 100,000 females).

Uterine (uterus) Cancer

About Uterine Cancer

The uterus is a female reproductive organ located in the pelvic region (behind the bladder, in front of the rectum, and opening downward into the vagina), and is where a fetus develops during pregnancy. Almost all uterine cancers are endometrial carcinomas (beginning in the endometrium (the inner lining of the uterus)), and most endometrial carcinomas are adenocarcinomas. Women who have had a hysterectomy to remove the uterus have almost no risk of developing uterine/endometrial cancer; however, if some endometrial cells are left, uterine/endometrial cancer may still develop.

Risk Factors:

Modifiable Risk Factors

Overweight/obesity: In the US, uterine cancer is diagnosed twice as often in overweight women compared to women who are normal weight, and diagnosed more than 3 times as often in obese women compared to women who are normal weight.[17]

Reproductive history: Women who have never had children have a higher risk of developing endometrial cancer.

Diabetes: In the US, endometrial cancer is up to 4 times more common among women who are diabetic compared to women who are not diabetic.[17]

Non-Modifiable Risk Factors

Gender: Only women are at risk of developing uterine cancer. Women who have had a hysterectomy to remove the uterus have almost no risk of developing uterine cancer; however, if some endometrial cells are left, uterine/endometrial cancer may still develop.

Age: The risk of developing uterine cancer increases after age 50.

Family history: Having a first degree relative who has had uterine, colon or ovarian cancer increases the risk of developing uterine cancer.

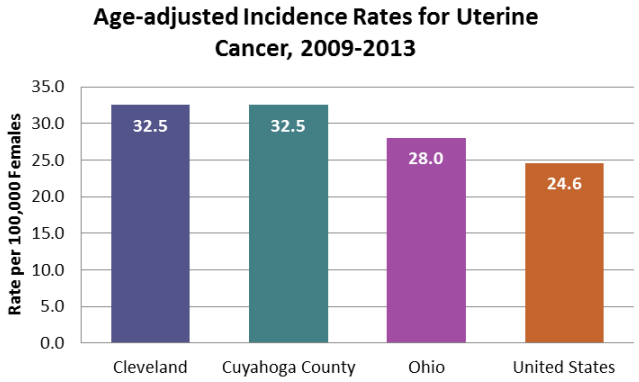
Signs and Symptoms:

- Abnormal vaginal bleeding
- Abnormal vaginal discharge
- Pelvic pain, pressure, or cramping
- A mass in the area of the uterus
- Unexplained weight loss

Note: These symptoms are not exclusive to uterine cancer, and symptoms of uterine cancer may be different for different people. Talk to your doctor if you are experiencing any of these symptoms.

Incidence:

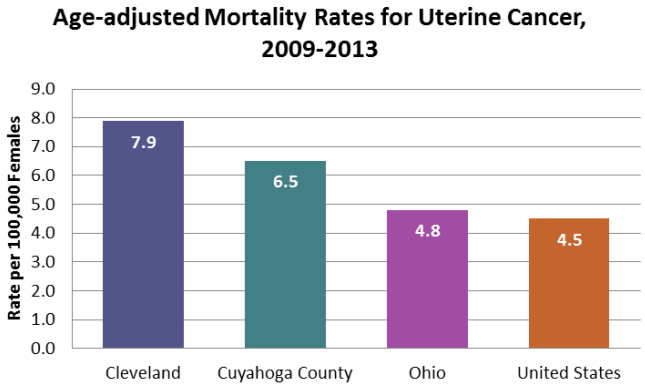
In the City of Cleveland, 378 new cases of uterine cancer were diagnosed between 2009 and 2013, with a 5-year incidence rate of 32.5 per 100,000 females (see **Table 1** in Appendix). This means that for every 100,000 Cleveland females, about 33 developed uterine cancer.
In Cleveland, between the years 2009 and 2013, 93% of all newly diagnosed cases of invasive uterine cancer occurred in individuals aged 45 years and older.
The figure below shows comparisons of city, county, state and national incidence rates for uterine cancer overall. For uterine cancer, Cleveland's incidence rate (32.5 per 100,000 females) was 16.1% higher than the Ohio rate (28.0 per 100,000 females), and 32.1% higher than the national rate (3.2 per 100,000 females).



Numbers of cases and data sources are specified in **Table 1** of Appendix.

Mortality:

In the City of Cleveland, 92 uterine cancer deaths occurred between 2009 and 2013, with a 5-year mortality rate of 7.9 per 100,000 females.
The figure below shows comparisons of city, county, state and national mortality rates for uterine cancer. Cleveland's mortality rate (7.9 per 100,000 females) was 64.6% higher than the Ohio rate (4.8 per 100,000 females), and 75.6% higher than the national rate (4.5 per 100,000 females).



Numbers of deaths and data sources are specified in **Table 6** of Appendix.

Cervical (cervix) Cancer

Healthy People 2020

Healthy People 2020 objective C-10 is to reduce the national invasive cervical cancer incidence rate from 8.0 new cases per 100,000 females in 2007, to 7.2 new cases per 100,000 females by 2020.[3]
Healthy People 2020 objective C-4 is to reduce the national cervical cancer mortality rate from 2.4 cervical cancer deaths per 100,000 females in 2007, to 2.2 deaths per 100,000 females by 2020.[3]

About Cervical Cancer

The cervix (also called the uterine cervix) is the lower part of the uterus that connects the body of the uterus to the vagina; part of the female reproductive system. The cervix is made up of glandular cells (the part closest to the body of the uterus) and squamous cells (the part closest to the vagina). The area in which these two cell types meet is called the transformation zone. Most cervical cancers are squamous cell carcinomas that develop in the transformation zone. Since only females have a cervix, only females are at risk of developing cervical cancer. Most cervical cancers do not show symptoms in early stages.

Risk Factors:

Immunosuppression: Weakened immunity due to factors such as infection with human immunodeficiency virus (HIV) or taking drugs to suppress the immune system (e.g. those taken by individuals who have had an organ transplant) have a higher risk of developing cervical cancer.

Modifiable Risk Factors

HPV infection: Almost all cervical cancers are caused by infection with human papillomavirus (HPV).
Overweight: Women who are overweight are more likely to develop adenocarcinoma of the cervix compared to women who are normal weight.
Smoking: Women who smoke are twice as likely to develop cervical cancer compared to nonsmokers.[18]
Oral contraceptive use: Long-term use of oral contraceptives increases the risk of developing cervical cancer; however, this risk decreases once oral contraceptive use has stopped.

Non-Modifiable Risk Factors

Gender: Only women are at risk of developing cervical cancer. Women who have had their cervix removed have almost no risk of developing cervical cancer; however, if some cells of the cervix remain, cervical cancer may still develop.
Family history: Women who have a mother or sister who had cervical cancer have 2 to 3 times greater chances of developing cervical cancer compared to women who do not have a family history.[18]

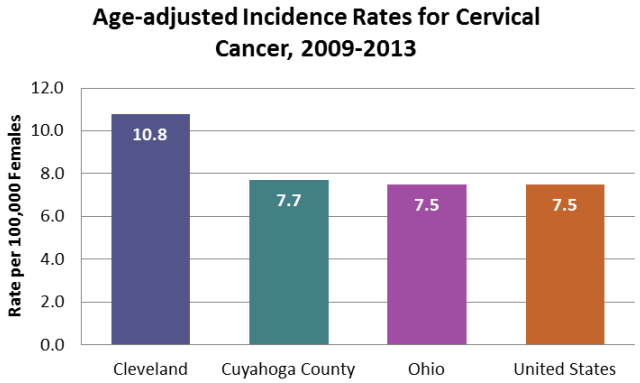
Signs and Symptoms:

- Abnormal vaginal bleeding
- Abnormal vaginal discharge
- Pain during intercourse

Note: These symptoms are not exclusive to cervical cancer, and symptoms of cervical cancer may be different for different people. Talk to your doctor if you are experiencing any of these symptoms.

Incidence:

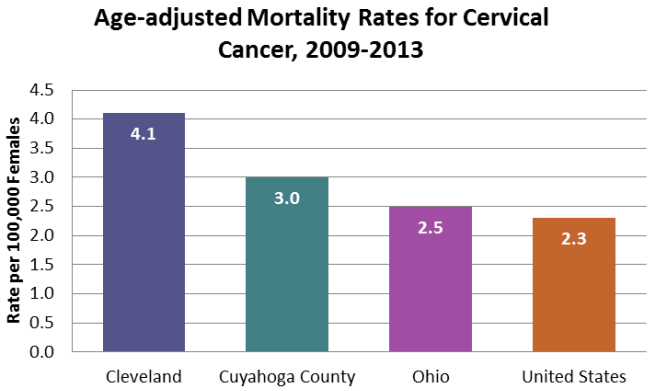
In the City of Cleveland, 111 new cases of cervical cancer were diagnosed between 2009 and 2013, with a 5-year incidence rate of 10.8 per 100,000 females (see **Table 1** in Appendix). This means that for every 100,000 Cleveland females, about 11 developed uterine cancer.
In Cleveland, between the years 2009 and 2013, about 63% of all newly diagnosed cases of invasive cervical cancer occurred in individuals between the ages of 35 and 59.
The figure below shows comparisons of city, county, state and national incidence rates for cervical cancer overall. For cervical cancer, Cleveland's incidence rate (10.8 per 100,000 females) was 44% higher than the Ohio rate (7.5 per 100,000 females), and 44% higher than the national rate (7.5 per 100,000 females).



Numbers of cases and data sources are specified in **Table 1** of Appendix.

Mortality:

In the City of Cleveland, 45 cervical cancer deaths occurred between 2009 and 2013, with a 5-year mortality rate of 4.1 per 100,000 females.
The figure below shows comparisons of city, county, state and national mortality rates for cervical cancer. Cleveland's mortality rate (4.1 per 100,000 females) was 64% higher than the Ohio rate (2.5 per 100,000 females), and 78.3% higher than the national rate (2.3 per 100,000 females).



Numbers of deaths and data sources are specified in **Table 6** of Appendix.

TECHNICAL NOTES AND METHODS

Objectives

The purpose of this report is to describe the burden of cancer in the City of Cleveland and provide relevant information to its residents on selected types of cancer.

Methods

City of Cleveland Incidence and Mortality Rates

All data for the City of Cleveland are for the years 2009-2013 and were the most recent, complete data available at the time of this report. Incidence data are for new, invasive (malignant) cancer cases, with the addition of *in situ* bladder cancer, and were obtained via Ohio's state cancer registry (i.e. the Ohio Cancer Incidence Surveillance System (OCISS))[19]. Mortality data were obtained from death certificate information reported to the Office of Vital Statistics at the Ohio Department of Health.[20] Site and histology codes (as per the International Classification of Diseases for Oncology, third edition (ICD-O-3)), and cause of death (as per the International Classification of Disease, tenth revision (ICD-10)) were categorized according to the Surveillance, Epidemiology, and End Results (SEER) program site groupings.[21,22,23] All rates calculated in this report are per 100,000 population and age-adjusted to the 2000 US Standard Population. Rates are not calculated if the number of observed cases/deaths is less than 5 (i.e. less than 1 case per year); counts of less than 5 are suppressed because they result in rates that are unreliable, and also for the purpose of protecting patient confidentiality. Population counts and age distributions for the City of Cleveland and its geographic and demographic subdivisions (e.g. ward, gender, etc.) were obtained from the 2010 United States Census.

Maps

Cancer cases and deaths were geocoded and mapped using ArcGIS software version 10.4 to conduct a spatial join of shapefiles representing the current geographic neighborhood and ward boundaries with corresponding 2010 census population data.

References

1. American Cancer Society. *Cancer Facts & Figures 2016*. Atlanta, GA: American Cancer Society; 2016.

2. National Center for Health Statistics. Health, United States, 2015: With Special Feature on Racial and Ethnic Health Disparities. Hyattsville, MD; 2016. Available at http://www.cdc.gov/nchs/data/hus/hus15.pdf#019

3. Office of Disease Prevention and Health Promotion. Cancer. In *Healthy People 2020*; 2016. Available at https://www.healthypeople.gov/2020/topics-objectives/topic/cancer/objectives

4. American Cancer Society. Prostate Cancer; 2016. Available at http://www.cancer.org/cancer/prostatecancer/detailedguide/prostate-cancer-risk-factors

5. American Cancer Society. Breast Cancer; 2016. Available at http://www.cancer.org/cancer/breastcancer/detailedguide/breast-cancer-risk-factors

6. American Cancer Society. Lung Cancer; 2016. Available at http://www.cancer.org/cancer/lungcancer/

7. Centers for Disease Control and Prevention. Lung Cancer: Basic Information; 2016. Available at https://www.cdc.gov/cancer/lung/basic_info/risk_factors.htm

8. American Cancer Society. *Cancer Facts & Figures 2016*. Atlanta: American Cancer Society; 2016.

9. National Toxicology Program. *Report on Carcinogens, Thirteenth Edition*. Research Triangle Park (NC): U.S. Department of Health and Human Services, Public Health Service; 2014.

10. U.S. Department of Health and Human Services. *How Tobacco Smoke Causes Disease: The Biology and Behavioral Basis for Smoking-Attributable Disease: A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2010.

11. U.S. Environmental Protection Agency. *Respiratory Health Effects of Passive Smoking (Also Known as Exposure to Secondhand Smoke or Environmental Tobacco Smoke—ETS)*. U.S. Environmental Protection Agency; 1992.

12. U.S. Department of Health and Human Services. *The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General*. Rockville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2006.

13. U.S. Department of Health and Human Services. *The Health Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General*. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2014.

14. Bahl V, Jacob P III, Havel C, Schick SF, Talbot P (2014) Thirdhand Cigarette Smoke: Factors Affecting Exposure and Remediation. PLoS ONE 9(10): e108258. doi:10.1371/journal.pone.0108258

15. US Environmental Protection Agency. Health Risk of Radon; 2016. Available at https://www.epa.gov/radon/health-risk-radon#head

16. Centers for Disease Control and Prevention. Lung Cancer Statistics; 2016. Available at https://www.cdc.gov/cancer/lung/statistics/race.htm

17. American Cancer Society. Endometrial Cancer; 2016. Available at http://www.cancer.org/cancer/endometrialcancer/detailedguide/endometrial-uterine-cancer-risk-factors

18. American Cancer Society. Cervical Cancer; 2016. Available at http://www.cancer.org/cancer/cervicalcancer/detailedguide/cervical-cancer-risk-factors

19. Ohio Department of Health, Ohio Cancer Incidence Surveillance System. Columbus, Ohio: Ohio Department of Health; 2013.

20. Ohio Department of Health: Office of Vital Statistics. Columbus, OH: Ohio Department of Health; 2013.

21. World Health Organization. International Classification of Diseases for Oncology. 3rd ed. Geneva, Switzerland*; World Health Organization Press;* 2000.

22. US Department of Health and Human Services. Instruction Manual. Part 9: ICD-10 Cause-of-Death Lists for Tabulating Mortality Statistics. Hyattsville, MD: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics; March 2009.

23. Howlader N, Noone AM, Krapcho M, Miller D, Bishop K, Altekruse SF, Kosary CL, Yu M, Ruhl J, Tatalovich Z, Mariotto A, Lewis DR, Chen HS, Feuer EJ, Cronin KA (eds). SEER Cancer Statistics Review, 1975-2013, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2013/, based on November 2015 SEER data submission, posted to the SEER web site, April 2016.

Appendix

Table 1

Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates by Cancer Site/Type in Cleveland, 2009-2013[1-6]

Cancer Site/Type	Cleveland Population†	Number of New Cases	Cleveland Rate	Cuyahoga County Rate	Ohio Rate	U.S. Rate
All Sites/Types	1984075	10437	498.2	494.0	454.9	448.7
Bladder	1984075	374	18.3	21.6	21.9	20.1
Brain & Other CNS**	1984075	115	5.7	6.8	6.9	6.4
Breast (Female)	1032650	1278	111.2	130.6	122.0	125.0
Breast (Male)	951425	9	1.0	*	*	1.2
Cervix (Female)	1032650	111	10.8	7.7	7.5	7.5
Colon & Rectum	1984075	985	46.7	43.9	41.8	41.0
Corpus Uterus (Female)	1032650	378	32.5	32.5	28.0	24.6
Esophagus	1984075	141	6.6	5.1	5.2	4.3
Hodgkin's Lymphoma	1984075	55	2.9	3.5	2.9	2.6
Kidney & Renal Pelvis	1984075	388	18.5	16.1	16.4	15.6
Larynx	1984075	154	6.9	4.4	4.3	3.2
Leukemia	1984075	243	11.9	12.9	11.7	13.5
Liver & Intrahepatic Bile Duct	1984075	316	14.0	8.5	6.4	8.4
Lung & Bronchus	1984075	1840	88.0	70.2	70.7	57.3
Melanoma of the Skin	1984075	134	6.4	15.9	19.7	21.8
Multiple Myeloma	1984075	163	8.0	7.1	5.4	6.5
Non-Hodgkin's Lymphoma	1984075	348	16.9	19.9	18.9	19.5
Oral Cavity & Pharynx	1984075	267	12.4	10.9	10.9	11.1
Other Sites/Types	1984075	899	43.6	*	*	*
Ovary (Female)	1032650	131	11.4	13.1	11.8	11.9
Pancreas	1984075	306	14.6	14.2	12.4	12.4
Prostate (Males)	951425	1331	143.5	151.3	119.7	129.4
Stomach	1984075	219	10.8	7.9	6.3	7.4
Testis (Male)	951425	32	3.5	5.0	5.2	5.7
Thyroid	1984075	220	10.6	13.8	13.8	13.9

* Not applicable ** Central Nervous System † 5-year population

[1] Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population

[2] Number of Observed Cases data source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2015.

[3] Cuyahoga County data source: Cuyahoga County Cancer Profile, Ohio Department of Health, 2015. (Note: rates are from 2008-2012 and were the most recent data available).

[4] Ohio data source: State Cancer Profiles (2009-2013).

[5] Additional Ohio data source for rates of Hodgkin's lymphoma, laryngeal cancer, multiple myeloma and testicular cancer: Cancer in Ohio 2014. Ohio Cancer Incidence Surveillance System, Ohio Department of Health and The Ohio State University, Columbus, Ohio, March 2014. (Note: specified rates are from 2006-2010 and were the most recent data available).

[6] U.S. data cource: Howlader N, Noone AM, Krapcho M, Miller D, Bishop K, Altekruse SF, Kosary CL, Yu M, Ruhl J, Tatalovich Z, Mariotto A, Lewis DR, Chen HS, Feuer EJ, Cronin KA (eds). SEER Cancer Statistics Review, 1975-2013, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2013/, based on November 2015 SEER data submission, posted to the SEER web site, April 2016.

Table 2

Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates by Cancer Site/Type and Gender in Cleveland, 2009-2013[1,2]

	Males		Females	
Cancer Site/Type	Cleveland Cases	Cleveland Rate	Cleveland Cases	Cleveland Rate
All Sites/Types	5318	582.9	5116	440.2
Bladder	250	29.8	124	10.3
Brain & Other CNS**	60	6.8	55	4.8
Breast	9	1.0	1278	111.2
Cervix	*	*	111	10.8
Colon & Rectum	531	59.0	453	37.7
Corpus Uterus	*	*	378	32.5
Esophagus	98	10.6	42	3.5
Hodgkin's Lymphoma	32	3.5	23	2.4
Kidney & Renal Pelvis	250	26.5	138	12.0
Larynx	116	11.6	38	3.1
Leukemia	138	16.1	105	9.1
Liver & Intrahepatic Bile Duct	242	23.5	74	5.9
Lung & Bronchus	970	108.5	869	73.6
Melanoma of the Skin	68	7.4	66	5.8
Multiple Myeloma	85	9.8	78	6.7
Non-Hodgkin's Lymphoma	190	21.0	158	13.6
Oral Cavity & Pharynx	182	18.6	85	7.3
Other Sites/Types	411	46.3	488	41.6
Ovary	*	*	131	11.4
Pancreas	142	15.4	164	13.7
Prostate	1331	143.5	*	*
Stomach	136	15.8	83	7.2
Testis	32	3.5	*	*
Thyroid	45	4.6	175	16.0

* Not applicable ** Central Nervous System

[1] Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population

[2] Number of Cleveland Cases data source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2015.

Table 3 **Cleveland Population Demographics by Gender and Ward**

	All Races				
Ward	5-year Male Population	% of Total Population	5-year Female Population	% of Total Population	Total 5-year Population
1	49370	44.14	62490	55.86	111860
2	52045	45.88	61385	54.12	113430
3	68545	56.04	53775	43.96	122320
4	51700	46.51	59465	53.49	111165
5	48245	43.13	63610	56.87	111855
6	52965	46.96	59815	53.04	112780
7	56230	50.43	55280	49.57	111510
8	51500	45.88	60755	54.12	112255
9	52935	46.20	61640	53.80	114575
10	51175	45.95	60190	54.05	111365
11	60115	49.09	62335	50.91	122450
12	59150	48.88	61870	51.12	121020
13	60400	49.29	62145	50.71	122545
14	59660	48.89	62365	51.11	122025
15	61140	49.97	61205	50.03	122345
16	58440	49.13	60520	50.87	118960
17	57810	47.54	63805	52.46	121615

*Population demographics are per 2010 U.S. Census data

Population counts are multiplied by 5 for 5 years of data. Percent of total population are the same regardless of whether the count is for a 5-year or 1-year population.

Table 4 **Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates for All Cancer Sites/Types by Ward in Cleveland, 2009-2013[1-3]**

Ward	Population*	Number of Observed Cases	Rate
Cleveland	1984075	10437	498.2
1	111860	807	475.8
2	113430	707	539.2
3	122320	448	481.3
4	111165	677	487.8
5	111855	421	564.9
6	112780	623	489.7
7	111510	636	484.0
8	112255	651	500.8
9	114575	603	490.2
10	111365	631	497.9
11	122450	596	542.8
12	121020	635	525.5
13	122545	626	481.4
14	122025	477	486.7
15	122345	544	483.3
16	118960	653	527.8
17	121615	702	488.5

[1] Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population

[2] Number of Observed Cases data source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2015.

[3] Population data source: 2010 United States Census

* 5 year population

Table 5 **Number of New Invasive Cancer Cases and Age-adjusted Incidence Rates for All Cancer Sites/Types by Gender and Ward, 2009-2013[1-3]**

	Male			Female		
Ward	Male Population*	Number of Observed Cases	Rate	Female Population*	Number of Observed Cases	Rate
Cleveland	951425	5318	582.9	1032650	5116	440.2
1	49370	389	589.2	62490	418	404.8
2	52045	352	646.9	61385	355	468.8
3	68545	264	572.6	53775	184	415.6
4	51700	331	564.4	59465	346	439.4
5	48245	221	686.0	63610	200	471.3
6	52965	331	603.4	59815	292	412.2
7	56230	349	556.2	55280	285	428.8
8	51500	331	596.6	60755	320	436.8
9	52935	313	625.2	61640	290	400.7
10	51175	309	570.2	60190	322	445.9
11	60115	303	610.9	62335	293	500.2
12	59150	330	636.2	61870	304	453.6
13	60400	309	551.0	62145	317	445.2
14	59660	235	522.8	62365	242	462.2
15	61140	280	538.3	61205	264	444.2
16	58440	336	614.6	60520	317	464.8
17	57810	335	570.6	63805	367	448.9

[1] Rates are per 100,000 and age-adjusted to the U.S. 2000 Standard Population

[2] Number of Observed Cases data source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2015.

[3] Population data source: 2010 United States Census

* 5 year population

Table 6

Number of Cancer Deaths and Age-adjusted Mortality Rates by Cancer Site/Type in Cleveland, 2009-2013[1-6]

Cancer Site/Type	Cleveland Population†	Number of Deaths	Cleveland Rate	Cuyahoga County Rate	Ohio Rate	U.S Rate
All Sites/Types	1984075	4761	228.9	189.9	184.1	168.5
Bladder	1984075	112	5.6	5.0	5.1	4.4
Brain & Other CNS**	1984075	55	2.8	4.0	4.5	4.3
Breast (Female)	1032650	291	24.1	24.9	23.3	21.5
Breast (Male)	951425	5	0.5	*	*	0.3
Cervix (Female)	1032650	45	4.1	3.0	2.5	2.3
Colon & Rectum	1984075	419	20.5	15.6	16.6	15.1
Corpus Uterus (Female)	1032650	92	7.9	6.5	4.8	4.5
Esophagus	1984075	139	6.6	4.9	5.0	4.1
Hodgkin's Lymphoma	1984075	5	0.2	0.4	0.4	0.4
Kidney & Renal Pelvis	1984075	106	5.0	4.1	4.2	3.9
Larynx	1984075	52	2.5	1.5	1.4	1.1
Leukemia	1984075	123	6.0	7.0	7.2	6.9
Liver & Intrahepatic Bile Duct	1984075	213	9.5	6.4	5.5	6.1
Lung & Bronchus	1984075	1448	69.7	52.3	54.3	46.0
Melanoma of the Skin	1984075	38	1.8	2.1	3.0	2.7
Multiple Myeloma	1984075	93	4.4	3.7	3.6	3.4
Non-Hodgkin's Lymphoma	1984075	124	6.1	6.4	6.6	6.0
Oral Cavity & Pharynx	1984075	105	4.9	3.1	2.5	2.4
Other Sites/Types	1984075	529	25.4	*	*	*
Ovary (Female)	1032650	89	7.5	7.4	7.9	7.5
Pancreas	1984075	299	14.5	12.8	11.4	10.9
Prostate (Males)	951425	256	33.2	27.4	20.9	20.7
Stomach	1984075	119	5.9	4.4	2.8	3.3
Testis (Male)	951425	*	*	0.4	0.2	0.2
Thyroid	1984075	*	*	0.5	0.5	0.5

* Not applicable ** Central Nervous System † 5-year population

Note: Rates are suppressed when the number of deaths is less than 5 (i.e. less than one death per year)

[1] Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population

[2] Numbers of Deaths data source: Chronic Disease and Behavioral Epidemiology Section and the Office of Vital Statistics, Ohio Department of Health, 2013.

[3] Cuyahoga County data source: Cuyahoga County Cancer Profile, Ohio Department of Health, 2015. (Note: rates are from 2008-2012 and were the most recent data available).

[4] Ohio data source: State Cancer Profiles (2009-2013).

[5] Additional Ohio data source (for rates of Hodgkin's lymphoma, laryngeal cancer, multiple myeloma and testicular cancer): Cancer in Ohio 2014. Ohio Cancer Incidence Surveillance System, Ohio Department of Health and The Ohio State University, Columbus, Ohio, March 2014. (Note: specified rates are from 2006-2010 and were the most recent data available).

[6] Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Mortality - All COD, Aggregated With State, Total U.S. (1969-2013) , National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2016. Underlying mortality data provided by NCHS (www.cdc.gov/nchs).

Table 7

Number of Cancer Deaths and Age-adjusted Mortality Rates by Cancer Site/Type and Gender in Cleveland, 2009-2013[1,2]

	Males		Females	
Cancer Site/Type	Cleveland Deaths	Cleveland Rate	Cleveland Deaths	Cleveland Rate
All Sites/Types	2471	285.9	2290	190.3
Bladder	59	7.8	53	4.2
Brain & Other CNS**	28	3.2	27	2.3
Breast	5	0.5	291	24.1
Cervix	*	*	45	4.1
Colon & Rectum	212	25.8	207	17.1
Corpus Uterus	*	*	92	7.9
Esophagus	108	11.9	31	2.7
Hodgkin's Lymphoma	*	*	*	*
Kidney & Renal Pelvis	66	7.1	40	3.3
Larynx	41	4.5	11	0.9
Leukemia	57	7.2	66	5.4
Liver & Intrahepatic Bile Duct	153	15.2	60	4.8
Lung & Bronchus	802	91.9	646	54.0
Melanoma of the Skin	20	2.0	18	1.5
Multiple Myeloma	44	5.0	49	3.9
Non-Hodgkin's Lymphoma	74	8.8	50	4.1
Oral Cavity & Pharynx	79	8.2	26	2.1
Other Sites/Types	254	29.0	275	22.5
Ovary	*	*	89	7.5
Pancreas	141	16.0	158	13.1
Prostate	256	33.2	*	*
Stomach	67	8.0	52	4.4
Testis	*	*	*	*
Thyroid	*	*	*	*

Note: Rates are suppressed when the number of deaths is less than 5 (i.e. less than 1 death per year)

* Not applicable ** Central Nervous System

[1] Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population

[2] Number of Cleveland Deaths data source: Chronic Disease and Behavioral Epidemiology Section and the Office of Vital Statistics, Ohio Department of Health, 2013.

Table 8 **Number of Cancer Deaths and Age-adjusted Mortality Rates for all Cancer Sites/Types by Ward in Cleveland, 2009-2013[1-3]**

Ward	Population*	Number of Deaths	Mortality Rate
Cleveland	1984075	4761	228.9
1	111860	350	190.1
2	113430	313	240.7
3	122320	215	261.9
4	111165	299	210.1
5	111855	246	370.0
6	112780	222	172.3
7	111510	307	230.8
8	112255	298	233.5
9	114575	319	255.0
10	111365	301	238.3
11	122450	239	233.4
12	121020	312	266.5
13	122545	278	217.2
14	122025	234	254.1
15	122345	221	202.3
16	118960	275	226.5
17	121615	320	220.7

* 5-year population **12 individuals missing ward data

[1] Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population

[2] Numbers of Deaths data source: Chronic Disease and Behavioral Epidemiology Section and the Office of Vital Statistics, Ohio Department of Health, 2013.

[3] Population data source: 2010 United States Census

Table 9 **Number of Cancer Deaths and Age-adjusted Mortality Rates for All Cancer Sites/Types by Gender and Ward, 2009-2013[1-3]**

	Male			Female		
Ward	Male Population*	Number of Deaths	Rate	Female Population*	Number of Deaths	Rate
1	49370	172	246.77	62490	178	154.45
2	52045	147	282.38	61385	166	213.66
3	68545	138	355.53	53775	77	189.12
4	51700	151	274.11	59465	148	170.04
5	48245	138	492.76	63610	108	287.47
6	52965	116	209.69	59815	106	148.70
7	56230	169	282.13	55280	138	191.88
8	51500	152	297.99	60755	146	193.54
9	52935	159	315.85	61640	160	214.86
10	51175	157	301.55	60190	144	194.02
11	60115	130	302.57	62335	109	188.14
12	59150	162	327.65	61870	150	222.13
13	60400	147	274.50	62145	131	174.58
14	59660	110	260.87	62365	124	244.85
15	61140	114	232.92	61205	107	178.06
16	58440	145	279.69	60520	130	191.05
17	57810	160	297.23	63805	160	183.45

* 5-year population **12 individuals missing values for ward: 8 female, 4 male

[1] Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population

[2] Numbers of Deaths data source: Chronic Disease and Behavioral Epidemiology Section and the Office of Vital Statistics, Ohio Department of Health, 2013.

[3] Population data source: 2010 United States Census

Glossary

Adenocarcinoma – cancer that forms in glandular cells
Glandular (gland) cells produce substances like mucus and other fluids and are present in various tissues/organs throughout the body.

Age-adjusted rate – a rate that has been calculated in a way that enables it to be compared to rates for other populations
Age-adjustment is a statistical method used to calculate rates for conditions that disproportionately affect certain age groups; for example, cancer mostly affects the elderly. Age-adjustment allows the rates of groups (demographic or geographic) with different age distributions to be compared by applying the age composition of a standard population to each group.

Benign – nonmalignant; not cancerous
Benign tumors cannot spread to other areas of the body; however, they can grow in size. A benign tumor that increases in size may become dangerous depending on its location in the body.

Burden – the overall impact of cancer in a specified population

Cancer – also called malignancy; diseases that result from uncontrolled, abnormal cell division and may invade nearby tissues or spread to other areas of the body

Cancer registry – all cancer cases are reported to state cancer registries, which are then reported to the national cancer registry
Cancer registries are used to determine the burden of cancer within a population (e.g. generate statistics and reports like this), and are important in concentrating public health efforts to reduce this burden.

Carcinogen – any substance that can cause cancer

Carcinoma – cancer that begins in the skin, or in the lining or covering of internal organs

Chemotherapy – "chemo"; medicines and drugs designed to kill cancer cells

Distant – cancer that has spread beyond the area in which it started to remote areas of the body

Histology – the study of the microanatomy of cells and tissues

Immunotherapy – "biologic therapy"; cancer treatment that stimulates a patient's immune system to destroy cancer cells

***in situ* –** Latin for "in its original place"; abnormal cells that are a form of neoplasm but have not penetrated beyond the layer of tissue in which they started

Invasive cancer – cancer that has spread beyond the layer of tissue in which it started into surrounding tissues

Local – cancer that is only present within the organ in which it started

Malignant – cancerous (harmful); abnormal cells that divide uncontrolled and may invade, spread and recur

Metastasize – the spread of cancer cells from the site where they first formed

Modifiable – things you can change

Morbidity – the number of people who have a particular disease or condition

Neoplasm – commonly referred to as a tumor; a new, abnormal growth or mass of tissue that may be benign or malignant
This occurs when cells divide more than they should or do not die when they should.

Oncology – the branch of medicine that deals with cancer
A doctor who specializes in cancer diagnosis and treatment is called an "oncologist".

Primary site – the first place in the body where a cancer starts

Prognosis – the likely course a disease will take
Many factors can influence an individual's prognosis; cancer prognoses can vary greatly from person to person, even for the same type of cancer.

Radiation – cancer treatment that uses high-energy rays or particles to destroy cancer cells or slow down their growth

Rate – the frequency at which an event occurs in a population during a specified period of time
Rates in this report are expressed per 100,000 population; the term "population" here could refer to all people, or could refer to a specific subpopulation (race, gender, ethnicity, etc.).

Recurrent cancer – cancer that has returned after a period of time during which no cancer could be detected

Regional – cancer that has spread beyond the organ in which it started into surrounding areas (tissues, organs, regional lymph nodes)

Remission – the decrease (partial remission) or disappearance (complete remission) of cancer symptoms

Sarcoma – cancer that occurs in connective tissue (e.g. bone, muscle, fat, etc.)

Secondary site – the site to which a primary cancer has spread.
Secondary cancer cells will be the same type as those in the primary site, regardless of their location in the body

Stage/staging – the assessment of the extent to which a cancer has grown or spread from its primary site in the body

Tumor – see **neoplasm**

Unstaged/unknown – not enough information is known to determine the cancer's stage, or data for stage was not reported