June 2017

Poverty and Cancer in Ohio, 2010-2014:

Cancer Disparities in Ohio's Poorest and Most Affluent Counties

Key Findings

Compared to Ohio's most affluent counties in 2010-2014, Ohio's poorest counties had:

- Higher cancer incidence and mortality rates for several cancers, particularly cervical cancer and laryngeal cancer;
- A cancer mortality rate 20 percent higher for all cancer sites/types combined;
- Higher proportions of late-stage diagnoses for cancers of the cervix, larynx, oral cavity and pharynx, and lung and bronchus;
- Significantly higher prevalence of current smoking, obesity and physical inactivity; and
- Fewer people with private insurance and more people uninsured and on Medicare or Medicaid at the time of their cancer diagnosis.

Introduction

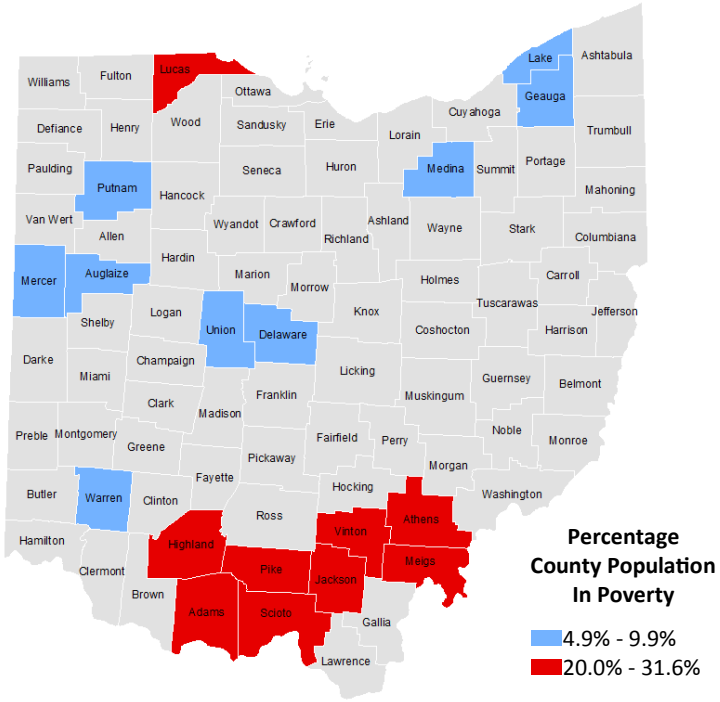
Poverty is defined as the state of being poor and is related to employment, disability status, educational attainment, type of household, age, sex, race, geography and other factors. People with lower socioeconomic status (SES) have higher cancer death rates than those with higher SES (ACS, 2017).

The U.S. Census Bureau uses a set of income thresholds that vary by family size and composition to determine who is in poverty. In 2014, for example, the minimum family income threshold for poverty was $12,316 for an individual under 65 and $24,008 for a family of four with two children under 18. According to the American Community Survey, poverty rates (the percentage of the population in poverty) varied across Ohio during the 2010-2014 period. As summarized in the Ohio Poverty Report, the rates ranged from 4.9 percent in Delaware County to 31.6 percent in Athens County. The statewide poverty rate for this period was 15.9 percent. Nine counties had poverty rates less than 10 percent, 38 had rates ranging from 10 percent to the state poverty rate, 32 counties had rates above the state poverty rate but less than 20 percent, and nine counties had poverty rates of 20 percent or more (ODSA, 2016).

Cancer affects all population groups in the United States; however, certain groups bear a disproportionate burden of cancer compared with other groups. The National Cancer Institute indicates that many different factors can cause cancer disparities, including poverty and a resultant lack of quality medical care (NCI, 2017). Studies have established relationships between SES and cancer incidence and/or mortality in the United States. The association between SES and cancer incidence and mortality vary depending on the cancer site/type. Cancer sites/types associated with poorer areas in the United States include lung and bronchus, colon and rectum, cervix, oral cavity and pharynx, and liver and intrahepatic bile duct. Cancer sites associated with wealthier areas in the United States include breast, melanoma of the skin, prostate and thyroid. A study using U.S. cancer data found an association between cancer incidence and poverty, with rates for some cancer sites/types as much as two times higher for those in the high poverty group compared to the low poverty group (Boscoe et al., 2014).

In this report, we compared Ohio's highest and lowest poverty counties to identify differences between these two groups in cancer incidence and mortality rates, stage at diagnosis, cancer risk factors, screening and health insurance status. Although this report is based on these specific county designations, the findings reported here may also be applicable to other geographical areas in Ohio with similar disparities.

Figure 1. Highest and Lowest Poverty Counties in Ohio, 2010-2014



Sources: Office of Research, Ohio Development Services Agency, 2016; 2010-2014 American Community Survey, U.S. Census Bureau.

Counties with the Highest Poverty Rates

- **Counties**: Nine counties had poverty rates of 20 percent or more (20.3 to 31.6 percent) in 2010-2014 (Adams, Athens, Highland, Jackson, Lucas, Meigs, Pike, Scioto and Vinton) and are defined in this report as the highest poverty counties or the poorest counties. All of these counties are in Appalachia except for Lucas County (Figure 1).
- **Population**: The population in this group of counties was 757,646 in 2010, 6.6 percent of the Ohio population. The population in these counties was approximately 85.2 percent white and 12.9 percent black in 2010.
- **New Cases**: There were 20,137 new invasive cancer cases diagnosed in 2010-2014, representing an average of 4,027 new cancer cases per year. The top three cancers diagnosed were lung and bronchus, breast and prostate.
- **Cancer Deaths**: There were 8,538 cancer deaths from 2010 to 2014, representing an average of 1,708 cancer deaths per year. Lung and bronchus cancer was the leading cause of cancer mortality, followed by colon and rectum, and breast cancers.

Counties with the Lowest Poverty Rates

- **Counties**: Nine counties had poverty rates less than 10 percent (4.9 to 9.2 percent) in 2010-2014 (Auglaize, Delaware, Geauga, Lake, Medina, Mercer, Putnam, Union and Warren) and are defined in this report as the lowest poverty counties or most affluent counties. Most of these counties are adjacent to metropolitan areas (Figure 1).
- **Population**: The population in this group of counties was 1,058,229 in 2010, 9.2 percent of the Ohio population. The population in these counties was approximately 94.6 percent white and 2.8 percent black in 2010.
- **New Cases**: There were 28,405 new invasive cancer cases in 2010-2014, representing an average of 5,681 new cancer cases per year. The top three cancers diagnosed were breast, lung and bronchus, and prostate.
- **Cancer Deaths**: There were 9,983 cancer deaths from 2010 to 2014, representing an average of 1,997 cancer deaths per year. Lung and bronchus cancer was the leading cause of cancer mortality, followed by colon and rectum, and breast cancers.

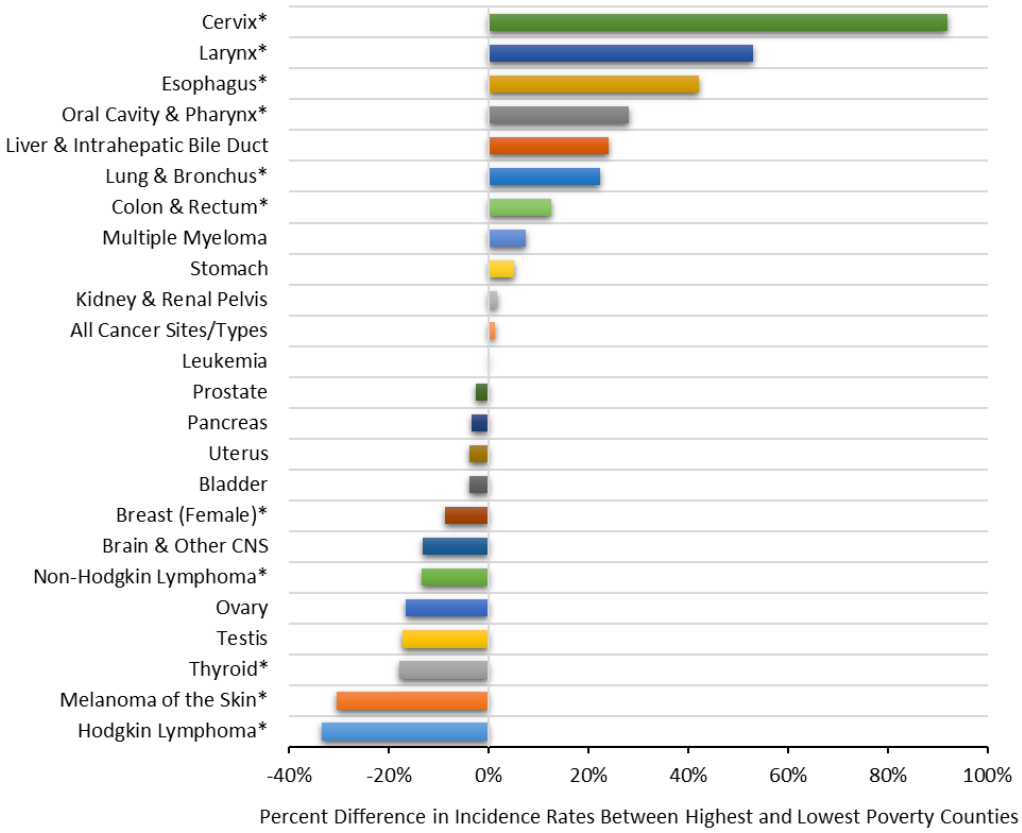
Incidence

Figure 2 shows the percent difference in age-adjusted cancer incidence rates by site/type between the highest and lowest poverty counties in Ohio in 2010-2014. For each cancer site/type, the confidence intervals for the highest and lowest poverty counties were compared to determine if the cancer incidence rates were significantly different (Appendix Table A-1). The difference was statistically significant if the confidence intervals did not overlap. The cancer sites/types that showed a significant difference in rates are indicated with an asterisk (*****).

Incidence rates for 10 out of 23 primary cancer sites/types were higher among residents in the highest poverty counties compared to the lowest poverty counties. Of these, six were significantly higher in the poorest counties than the most affluent counties: cervix, colon and rectum, esophagus, larynx, lung and bronchus, and oral cavity and pharynx. The most affluent counties had higher incidence rates for 12 out of 23 primary cancers; these differences were significant for female breast cancer, Hodgkin lymphoma, melanoma of the skin, non-Hodgkin lymphoma and thyroid cancer.

Incidence rates for cervical cancer showed the greatest percent difference between the two poverty groups. The age-adjusted cervical cancer incidence rate was 9.6 per 100,000 in the highest poverty counties compared to 5.0 per 100,000 in the lowest poverty counties, a percent difference of 92 percent. The incidence rate for all cancer sites/types combined was 467.9 per 100,000 (1 percent higher) in the highest poverty counties, compared to 461.7 per 100,000 in the lowest poverty counties in 2010-2014.

Figure 2. Percent Difference in Average Annual Age-adjusted Cancer Incidence Rates by Site/Type Between Counties with the Highest (≥20%) and Lowest (<10%) Poverty Rates in Ohio, 2010-2014



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2017.
CNS = Central Nervous System
***** Significant difference between the highest and lowest poverty counties at the 95% confidence level.

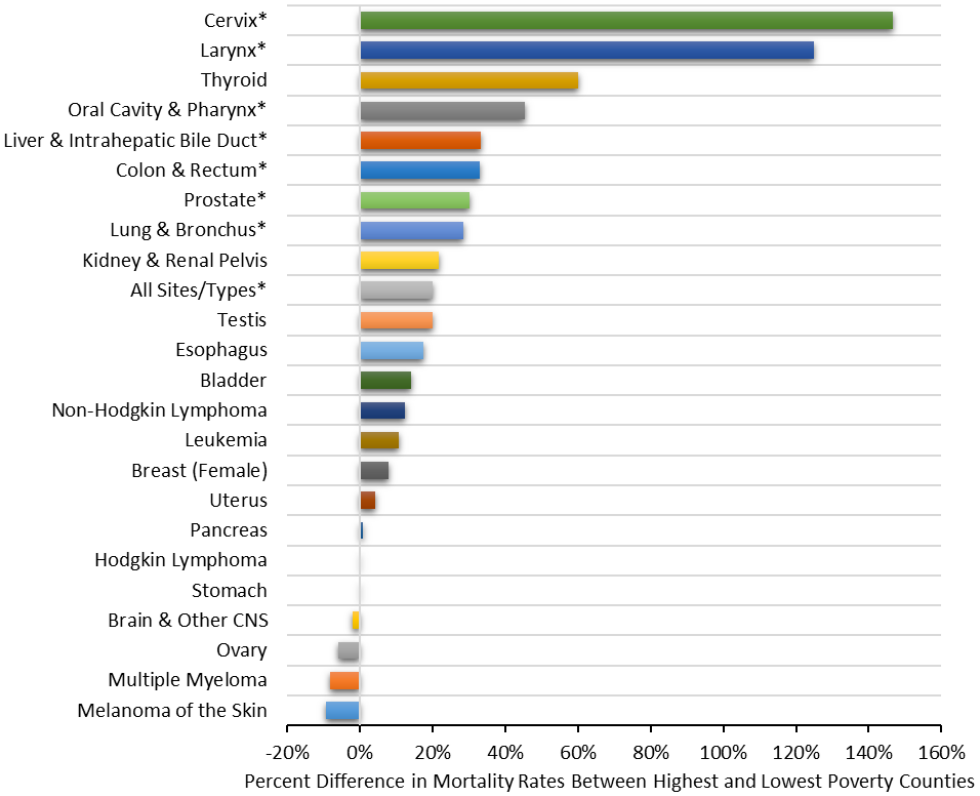
Mortality

Figure 3 shows the percent difference in age-adjusted cancer mortality rates by site/type between the highest and lowest poverty counties in Ohio in 2010-2014. For each cancer site/type, the confidence intervals for the highest and lowest poverty counties were compared to determine if the cancer mortality rates were significantly different (Appendix Table A-2). The difference was statistically significant if the confidence intervals did not overlap. The cancer sites/types that showed a significant difference in rates are indicated with an asterisk (*).

Mortality rates for 18 out of 23 cancer sites/types, along with all cancer sites/types combined, were higher among residents in the highest poverty counties compared to the lowest poverty counties. The specific sites/types that were significantly higher in the poorest counties compared to the most affluent counties were: cervix, colon and rectum, larynx, liver and intrahepatic bile duct, lung and bronchus, oral cavity and pharynx, prostate and all sites/types combined. The lowest poverty counties had higher mortality rates for a few cancers (melanoma of the skin, multiple myeloma, ovary, and brain and other central nervous system); however, these differences were not significant.

Cervical cancer and laryngeal cancer showed the greatest percent differences in mortality rates between the highest and lowest poverty counties. The cervical cancer mortality rate in the highest poverty counties (3.7 per 100,000) was about 150 percent higher than the lowest poverty counties (1.5 per 100,000). The laryngeal cancer mortality rate in the highest poverty counties (1.8 per 100,000) was 125 percent higher than the lowest poverty counties (0.8 per 100,000). Overall, the cancer mortality rate was 20 percent higher in the highest poverty counties (196.6 per 100,000) than the lowest poverty counties (163.8 per 100,000) for all sites/types combined.

Figure 3. Percent Difference in Average Annual Age-adjusted Cancer Mortality Rates by Site/Type Between Counties with the Highest (≥20%) and Lowest (<10%) Poverty Rates in Ohio, 2010-2014



Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2017.
CNS = Central Nervous System
***** Significant difference between the highest and lowest poverty counties at the 95% confidence level.

Cancer incidence rates are affected by delayed reporting or underreporting of cancer cases to the Ohio Cancer Incidence Surveillance System (OCISS), resulting in the incidence of some cancer sites/types being underestimated. The 2010-2014 estimated completeness of reporting for the highest poverty counties was 89 percent for all cancers combined, whereas the lowest poverty counties had an estimated completeness of 100 percent. Therefore, incidence rates may actually be higher than indicated for the highest poverty counties, resulting in even greater differences between the two groups. For this reason, cancer mortality rates may provide a more accurate depiction of the differences in the cancer burden between the highest and lowest poverty counties.

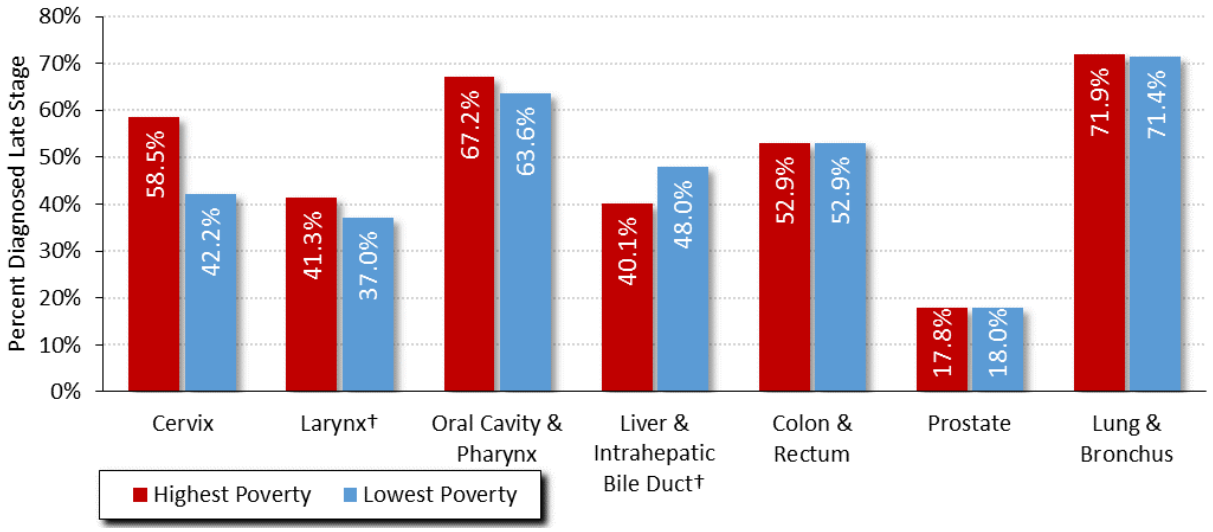
Stage at Diagnosis

Stage describes the extent or spread of the disease at the time of diagnosis and is an important determinant of survival. For *in situ* cancers, the tumor has not invaded or penetrated surrounding tissue. In the local stage, the tumor is confined to the organ in which it originated. In the regional stage, the tumor has spread to surrounding tissues. In the distant stage, the malignancy has spread, or metastasized, to other organs. Early stage includes tumors diagnosed at the *in situ* and localized stages. Patients with early stage disease often have better long-term survival, and detecting cancers at an early stage may lead to a reduction in mortality. Late stage includes tumors diagnosed at the regional and distant stages.

Figure 4 shows the proportion of cases diagnosed at a late stage in the highest and lowest poverty counties for selected cancers. The cancers selected were the leading sites/types that had significantly higher mortality rates in the highest poverty counties compared to the lowest poverty counties.

Cancers of the cervix, larynx, oral cavity and pharynx, and lung and bronchus were more frequently diagnosed at a later stage in counties with the highest poverty rates compared to counties with the lowest poverty rates. Cervical cancer showed the greatest difference in late stage diagnosis, with 58.5 percent of cases being diagnosed at a late stage in the highest poverty counties, compared to 42.2 percent in the lowest poverty counties.

Figure 4. Proportion of Cases Diagnosed at a Late Stage for Select Cancer Sites/Types in the Highest and Lowest Poverty Counties in Ohio, 2010-2014



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2017.
† No recommended screening tests are available for these cancer sites/types.

Factors Associated with Cancer Health Disparities and Poverty

A cancer risk factor is anything that increases a person's risk of developing cancer. Poverty is associated with some risk factors for cancer such as tobacco use, obesity, physical inactivity and heavy alcohol consumption. In addition, those in poverty may not have access to cancer screening and treatment. Using data from the Ohio Behavioral Risk Factor Surveillance System (BRFSS) for 2011-2014, selected cancer risk factors for residents living in the highest poverty counties were compared with those living in the lowest poverty counties. In addition, the OCISS database was used to evaluate health insurance status, which also plays a role in cancer health disparities.

Table 1. Prevalence of Current Smoking, Obesity, Physical Inactivity, Heavy Drinking and Pap Testing among Adults (ages 18+) by Highest (≥20%) and Lowest (<10%) Poverty Counties in Ohio, 2011-2014

	Highest Poverty Counties		Lowest Poverty Counties	
	Percent	95%CI	Percent	95%CI
Current Smoking[1*]	25.9	23.6 - 28.2	16.6	14.7 - 18.6
Obesity[2*]	34.2	31.9 - 36.6	28.8	26.5 - 31.1
Physical Inactivity[3*]	29.9	27.4 - 32.4	23.4	20.9 - 25.8
Heavy Drinking[4]	5.9	4.8 - 7.1	5.6	4.5 - 6.8
Pap Test in the Last 3 Years[5]	76.8	72.8 - 80.7	75.3	70.8 - 79.8

Source: 2011-2014 Ohio Behavioral Risk Factor Surveillance System (BRFSS), Ohio Department of Health, 2016.

[1] Current smoker is defined as persons who reported smoking at least 100 cigarettes in their lifetime and currently smoke cigarettes every day or some days.

[2] Obese classification is defined as a body mass index (BMI) of 30.0+.

[3] Physical inactivity is defined as no physical activity or exercise during the past 30 days other than their regular job.

[4] Heavy drinking is defined as adult men having more than two drinks per day and adult women having more than one drink per day.

[5] Not collected in the 2013 Ohio BRFSS.

95% CI = 95 percent confidence interval

[*] Significant difference between the highest and lowest poverty counties at the 95 percent confidence level.

Tobacco

Tobacco use is associated with many types of cancer, including cancers of the lung and bronchus; trachea; larynx; oral cavity and pharynx; esophagus; bladder; kidney and renal pelvis; liver and intrahepatic bile duct; stomach; pancreas; cervix; and colon and rectum, as well as acute myeloid leukemia. Smoking is estimated to cause more than 30 percent of all cancer deaths in the United States, including 80 percent of lung cancer deaths among men and women combined. Other cancer deaths attributed to smoking include 77 percent of larynx cancer deaths; 51 percent of esophagus cancer deaths; and 47 percent of oral cavity and pharynx cancer deaths (Siegel et al., 2015). The percentage of current smokers in Ohio was significantly higher in the highest poverty counties (25.9 percent) compared to the lowest poverty counties (16.6 percent) in 2011-2014 (Table 1).

Obesity

Obesity is the second leading cause of preventable cancer cases in the United States. Overweight and obesity are associated with increased risk for developing many cancers, including adenocarcinoma of the esophagus and cancers of the breast (in postmenopausal women), colon and rectum, endometrium, kidney, liver and pancreas. In 2011-2014, the prevalence of obesity in the highest poverty counties (34.2 percent) was significantly higher than in the lowest poverty counties in Ohio (28.8 percent) (Table 1).

Physical Inactivity

The health benefits of regular physical activity for the prevention of chronic diseases including heart disease, diabetes and some types of cancer are well documented. Physical inactivity was significantly higher among adults in Ohio's poorest counties (29.9 percent) than adults in the most affluent counties (23.4 percent) in 2011-2014 (Table 1).

Alcohol

Heavy alcohol consumption is a risk factor for cancers of the oral cavity and pharynx (excluding the lips), larynx, esophagus, liver and breast. Alcohol consumption is also associated with an increased risk of cancers of the colon and rectum. Research has shown that people who use both alcohol and tobacco have much greater risk of developing cancers of the oral cavity and pharynx, larynx and esophagus than people who use either alcohol or tobacco alone. In Ohio, the prevalence of heavy alcohol consumption in the highest poverty counties (5.9 percent) was similar to heavy drinking in the lowest poverty counties (5.6 percent) in 2011-2014 (Table 1).

Pap Testing

In general, counties with the highest poverty rates had higher incidence and mortality rates for cervical cancer. Virtually all cervical cancer cases are caused by infection with the human papillomavirus (HPV). Women who do not regularly have Pap tests to detect abnormal cells in the cervix or tests to detect HPV are at increased risk for cervical cancer. Among women infected with HPV, those who smoke have twice the risk of developing cervical cancer compared with non-smokers. During 2011-2014 (excluding 2013), the percentage of female Ohioans ages 21 to 65 who reported having had a Pap test within the last three years in the highest poverty counties (76.8 percent) was similar to the lowest poverty counties (75.3 percent) (Table 1). This finding is in contrast to national Pap test screening rates by household income; in 2014, 88.4 percent of women age 21-65 with a household income of $50,000 or more had a Pap test in the past three years, compared to only 74.5 percent of women with a household income less than $15,000.

Health Insurance Status

Health insurance status plays a role in cancer health disparities. Those who are uninsured/underinsured are less likely to have recommended cancer screening tests, adequate cancer treatment and care. Furthermore, unequal access to screening may lead to a later stage at diagnosis and a lower chance of survival.

During 2010-2014, Ohio's poorest counties had a higher percentage of people with cancer who were uninsured (3.0 percent versus 2.2 percent), on Medicaid (7.8 percent versus 3.1 percent) and on Medicare (38.5 percent versus 35.3 percent) compared to people with cancer in the most affluent counties. The most affluent counties had a higher percentage of people whose primary payer at diagnosis was private insurance (43.8 percent) than the poorest counties (33.3 percent).

Did You Know?

Access to preventive services like cervical cancer screening is more difficult for those in poverty. The U.S. Preventive Services Task Force (USPSTF) recommends that women ages 21 - 65 be screened with a Pap test every three years. In women 30 - 65 years, screening with a combination of Pap and HPV testing every five years is recommended for women who want to lengthen the screening interval.

References

American Cancer Society (ACS). *Cancer Facts & Figures 2017.* Atlanta, GA: American Cancer Society; 2017.

Ohio Development Services Agency (ODSA). The Ohio Poverty Report. February 2016. Available at: https://www.development.ohio.gov/files/research/p7005.pdf.

National Cancer Institute. Cancer Disparities. Available at: https://www.cancer.gov/about-cancer/understanding/disparities.

Boscoe et al., 2014. The relationship between area poverty rate and site-specific cancer incidence in the United States. *Cancer*. July 2014; 120:2191-8.

Siegel RL, Jacobs EJ, Newton CC, et al. Deaths Due to Cigarette Smoking for 12 Smoking-Related Cancers in the United States. *JAMA Intern Med*. 2015.

Appendices

Table A-1. Comparison of Average Annual Age-adjusted Incidence Rates of New Invasive Cancer Cases in Counties with the Highest (≥20%) and Lowest (<10%) Poverty Rates by Site/Type in Ohio, 2010-2014

Primary Cancer Site/Type	Highest Poverty Counties		Lowest Poverty Counties		Difference
	Rate	95% CI	Rate	95% CI	Percent
All Sites/Types	467.9	461.7 - 474.1	461.7	456.6 - 466.8	1.3%
Bladder	22.4	21.0 - 23.7	23.3	22.1 - 24.4	-3.9%
Brain & Other CNS	6.6	5.8 - 7.4	7.6	6.9 - 8.3	-13.2%
Breast (Female)*	121.2	116.6 - 125.8	132.7	128.7 - 136.6	-8.7%
Cervix*	9.6	8.2 - 11.0	5.0	4.1 - 5.8	92.0%
Colon & Rectum*	44.9	42.9 - 46.8	39.9	38.4 - 41.4	12.5%
Esophagus*	6.4	5.7 - 7.2	4.5	4.0 - 5.0	42.2%
Hodgkin Lymphoma*	2.2	1.7 - 2.7	3.3	2.8 - 3.8	-33.3%
Kidney & Renal Pelvis	16.8	15.5 - 18.0	16.5	15.5 - 17.5	1.8%
Larynx*	4.9	4.2 - 5.5	3.2	2.8 - 3.6	53.1%
Leukemia	12.6	11.5 - 13.6	12.6	11.7 - 13.5	0.0%
Liver & Intrahepatic Bile Duct	6.7	5.9 - 7.4	5.4	4.8 - 6.0	24.1%
Lung & Bronchus*	76.2	73.7 - 78.7	62.3	60.3 - 64.2	22.3%
Melanoma of the Skin*	18.1	16.8 - 19.4	26.0	24.7 - 27.3	-30.4%
Multiple Myeloma	5.8	5.1 - 6.5	5.4	4.9 - 6.0	7.4%
Non-Hodgkin Lymphoma*	17.6	16.4 - 18.8	20.3	19.2 - 21.4	-13.3%
Oral Cavity & Pharynx*	13.2	12.1 - 14.2	10.3	9.5 - 11.1	28.2%
Ovary	11.1	9.7 - 12.5	13.3	12.0 - 14.5	-16.5%
Pancreas	11.8	10.8 - 12.8	12.2	11.4 - 13.1	-3.3%
Prostate	110.9	106.4 - 115.3	113.8	110.0 - 117.5	-2.5%
Stomach	6.1	5.4 - 6.8	5.8	5.2 - 6.4	5.2%
Testis	5.3	4.2 - 6.4	6.4	5.3 - 7.4	-17.2%
Thyroid*	13.9	12.6 - 15.1	16.9	15.8 - 18.0	-17.8%
Uterus	28.4	26.2 - 30.5	29.5	27.7 - 31.3	-3.7%

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2017.
Rates are per 100,000, age-adjusted to the 2000 U.S. standard population and sex-specific for breast, cervix, ovary, prostate, testis and uterus.
CNS = Central Nervous System
95% CI = 95 percent confidence interval
* Significant difference between the highest and lowest poverty counties at the 95% confidence level.

Table A-2. Comparison of Average Annual Age-adjusted Mortality Rates in Counties with the Highest (≥20%) and Lowest (<10%) Poverty Rates by Site/Type in Ohio, 2010-2014

Primary Cancer Site/Type	Highest Poverty Counties		Lowest Poverty Counties		Difference
	Rate	95% CI	Rate	95% CI	Percent
All Sites/Types*	196.6	192.7 - 200.5	163.8	160.8 - 166.7	20.0%
Bladder	5.7	5.1 - 6.4	5.0	4.5 - 5.5	14.0%
Brain & Other CNS	4.6	4.0 - 5.2	4.7	4.2 - 5.2	-2.1%
Breast (Female)	23.2	21.3 - 25.1	21.5	20.0 - 23.0	7.9%
Cervix*	3.7	2.8 - 4.6	1.5	1.0 - 1.9	146.7%
Colon & Rectum*	18.5	17.3 - 19.7	13.9	13.1 - 14.8	33.1%
Esophagus	5.4	4.8 - 6.1	4.6	4.1 - 5.2	17.4%
Hodgkin Lymphoma	0.3	0.1 - 0.6	0.3	0.1 - 0.4	0.0%
Kidney & Renal Pelvis	4.5	3.9 - 5.1	3.7	3.3 - 4.1	21.6%
Larynx*	1.8	1.4 - 2.2	0.8	0.6 - 1.0	125.0%
Leukemia	7.3	6.5 - 8.0	6.6	6.1 - 7.2	10.6%
Liver & Intrahepatic Bile Duct*	6.4	5.6 - 7.1	4.8	4.3 - 5.3	33.3%
Lung & Bronchus*	59.1	56.9 - 61.3	46.0	44.4 - 47.6	28.5%
Melanoma of the Skin	2.9	2.4 - 3.4	3.2	2.7 - 3.6	-9.4%
Multiple Myeloma	3.4	2.9 - 4.0	3.7	3.3 - 4.2	-8.1%
Non-Hodgkin Lymphoma	7.2	6.5 - 8.0	6.4	5.8 - 7.0	12.5%
Oral Cavity & Pharynx*	3.2	2.7 - 3.7	2.2	1.9 - 2.5	45.5%
Ovary	7.8	6.7 - 8.9	8.3	7.4 - 9.3	-6.0%
Pancreas	11.2	10.3 - 12.2	11.1	10.3 - 11.9	0.9%
Prostate*	22.4	20.6 - 24.1	17.2	15.9 - 18.5	30.2%
Stomach	2.6	2.2 - 3.0	2.6	2.2 - 3.0	0.0%
Testis	0.6	0.2 - 1.0	0.5	0.2 - 0.8	20.0%
Thyroid	0.8	0.5 - 1.0	0.5	0.3 - 0.7	60.0%
Uterus	4.9	4.0 - 5.7	4.7	4.0 - 5.4	4.3%

Source: Chronic Disease Epidemiology and Evaluation Section and the Bureau of Vital Statistics, Ohio Department of Health, 2017.
Rates are per 100,000, age-adjusted to the 2000 U.S. standard population and sex-specific for breast, cervix, ovary, prostate, testis and uterus.
CNS = Central Nervous System
95% CI = 95 percent confidence interval
* Significant difference between the highest and lowest poverty counties at the 95% confidence level.

Technical Notes

Age-Adjusted Rate: A summary rate that is a weighted average of age-specific rates, where the weights represent the age distribution of a standard population (direct adjustment). The incidence and mortality rates presented in this report were standardized to the age distribution of the 2000 U.S. Standard Population. Under the direct method, the population was first divided into 19 five-year age groups, i.e., <1, 1-4, 5-9, 10-14, 15-19...85+, and the age-specific rate was calculated for each age group. Each age-specific rate was then multiplied by the standard population proportion for the respective age group.

Body Mass Index (BMI): A number calculated from a person's weight and height that provides a reliable indicator of body fatness for most people and is used to screen for weight categories that may lead to health problems. Excess body fat is linked to an increased risk of some diseases including heart disease and some cancers.

Census Data: The 2010-2014 rates were calculated using population estimates from the U.S. Census Bureau and National Center for Health Statistics. Population data were compiled from revised bridged-race intercensal population estimates for July 1, 2005-July 1, 2009 (released 6/26/2014) and vintage 2015 bridged-race postcensal population estimates for July 1, 2010-July 1, 2015 (released 6/28/2016).

Confidence Interval (CI): A range of values for a measure or estimate (e.g., rate) constructed so that the range has a specified probability of including the true value of the measure in the population. Incidence rates, mortality rates and prevalence estimates are presented in this report with 95 percent confidence intervals.

Incidence: The number of cases diagnosed during a specified time period (e.g., 2010-2014). Cancer cases were coded to the International Classification of Diseases for Oncology, Third Edition (ICD-O-3).

Invasive Cancer: Cancer that has spread beyond the layer of cells where it first developed. Invasive cancers consist of those diagnosed at the local, regional, distant and unstaged/missing stages. Only invasive cancers were included in the calculation of incidence rates in this document, with the exception of *in situ* bladder cancers.

Mortality: The number of deaths during a specified time period (e.g., 2010-2014). Cancer deaths were coded using the International Statistical Classification of Diseases and Related Health Problems, Tenth Edition (ICD-10).

Percent Difference: The difference between two numbers as a percentage, obtained by subtracting the second number from the first number, dividing by the first number and multiplying the result by 100, e.g., [(y-x)/x] x 100.

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

Rate: The number of cases or deaths per unit of population (e.g., per 100,000 persons) during a specified time period (e.g., 2010-2014).

Significant difference: In statistics, describes a mathematical measure of difference between groups. The difference is said to be significant if it is greater than what might be expected to happen by chance alone. In this report, statistical significance between populations was determined by comparing CIs; if the CIs do not overlap, the difference is determined to be statistically significant.

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

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

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

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

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

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

Sources of Data and Additional Information

Ohio Behavioral Risk Factor Surveillance System (BRFSS):
http://www.odh.ohio.gov/health/resources/datareports/behrisk1.aspx

Ohio Public Health Data Warehouse:
http://publicapps.odh.ohio.gov/EDW/DataCatalog

National Cancer Institute:
http://www.cancer.gov

American Cancer Society:
http://www.cancer.org

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