

Social Vulnerability and Cancer in Ohio

June 2023

Key Findings

Compared with counties with low social vulnerability, Ohio counties with high social vulnerability had:*

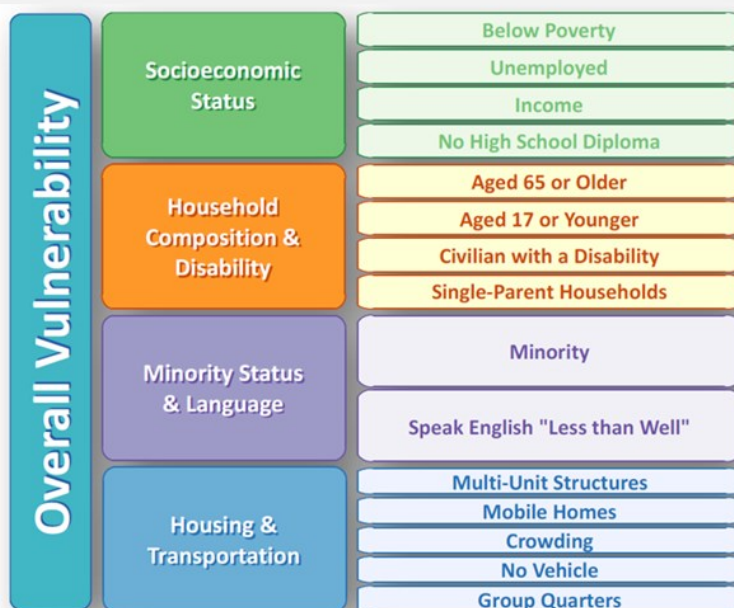
- Higher incidence rates for all cancers combined and for cancers of the liver and intrahepatic bile duct, larynx, stomach, lung and bronchus, uterus, colon and rectum, oral cavity and pharynx, prostate, along with multiple myeloma.
- Higher mortality rates for all cancers combined and for cancers of the cervix, stomach, liver and intrahepatic bile duct, larynx, lung and bronchus, oral cavity and pharynx, prostate, and colon and rectum.
- Higher percentage of late-stage cancer diagnoses for all sites/types combined, melanoma of the skin, stomach cancer, and uterine cancer.
- Higher percentage of cancer patients who were uninsured or covered by Medicaid as the primary payer at the time of diagnosis.
- Higher percentage of patients who did not receive treatment.
- Higher prevalence of current smoking, obesity, and physical inactivity.
- Lower five-year relative survival for all cancers combined, lung and bronchus cancer, and female breast cancer.

*Based on a [statistically significant](#) difference between the two sets of counties.

Introduction

Social vulnerability refers to the resilience of communities (the ability to survive and thrive) when confronted by external stresses on human health, such as natural or human-caused disasters, or disease outbreaks.

Figure 1. Social Vulnerability Attributes

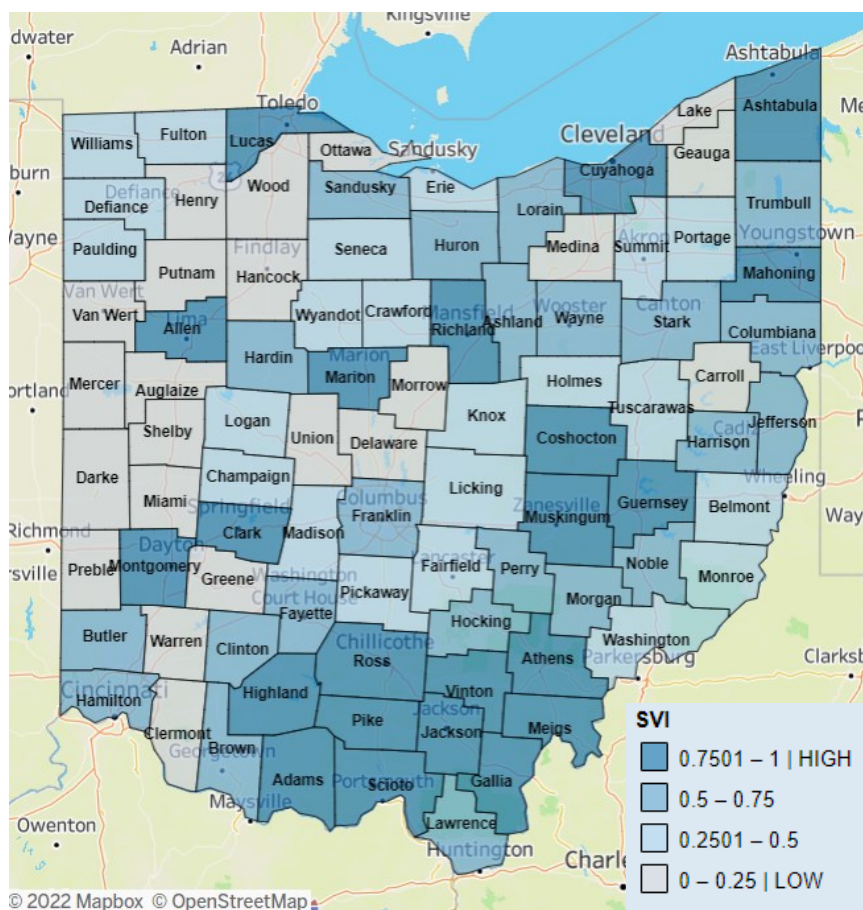


The Social Vulnerability Index (SVI), created by the U.S. Centers for Disease Control and Prevention (CDC), quantifies social vulnerability at the county and census tract levels. The SVI uses data from the U.S. Census Bureau and is composed of 15 indicators grouped into four themes: socioeconomic status, household composition and disability, minority status and language, and housing and transportation (Figure 1).

SVI scores range from 0 (lowest vulnerability) to 1 (highest vulnerability).

This report compares Ohio's counties in the highest SVI quartile (high vulnerability) with those in the lowest SVI quartile (low vulnerability) to identify differences between these two groups of counties in cancer incidence and mortality rates, late-stage diagnoses, cancer treatment, health insurance status, cancer risk factors, cancer screening, and survival. In this report, differences between the two groups for each cancer outcome were noted as being higher or lower when a statistically significant difference was evident. "[Statistically significant](#)" means that the difference is greater than what might be expected to happen by chance alone, hereafter denoted by an asterisk (*). See Technical Notes on page 12.

Figure 2. Overall Social Vulnerability Index (SVI) by County, Ohio, 2018



Source: Health Improvement Opportunity Zones, Office of Health Opportunity, Ohio Department of Health, <https://odh.ohio.gov/know-our-programs/health-equity/health-improvement-zones>; CDC/ATSDR Social Vulnerability Index 2018.

Low SVI Counties

- **Counties:** 22 counties had an SVI score of **0 to 0.25** (Auglaize, Carroll, Clermont, Darke, Delaware, Geauga, Greene, Hancock, Henry, Lake, Medina, Mercer, Miami, Morrow, Ottawa, Preble, Putnam, Shelby, Union, Van Wert, Warren, and Wood) and are defined in this report as the low SVI counties. Most of these counties are adjacent to metropolitan areas.
- **Population:** The population in this group of counties was 2.1 million in 2018, and 18% of the Ohio population. The population's races in these counties were 94% white, 3% Black, and 3% Asian/Pacific Islander, in 2018.
- **New Cases:** There were 60,750 new invasive cancer cases in low SVI counties in 2015-2019. The top three cancers diagnosed were breast, lung and bronchus, and prostate.
- **Cancer Deaths:** There were 21,255 cancer deaths in low SVI counties from 2015-2019. Lung and bronchus cancer was the leading cause of cancer mortality, followed by colon and rectum, and pancreas.

High SVI Counties

Counties: 22 counties had an SVI score of **0.75 to 1** (Adams, Allen, Ashtabula, Athens, Clark, Coshocton, Cuyahoga, Gallia, Guernsey, Highland, Jackson, Lucas, Mahoning, Marion, Meigs, Montgomery, Muskingum, Pike, Richland, Ross, Scioto, and Vinton) and are defined in this report as the high SVI counties. Many of these counties are in southern Ohio and Appalachia.

Population: The population in this group of counties was 3.5 million in 2018, and 30% of Ohio's population. The population's races in these counties were 77% white, 20% Black, and 2% Asian/Pacific Islander, in 2018.

New Cases: There were 111,629 new invasive cancer cases diagnosed in 2015-2019 in high SVI counties, according to data from the Ohio Cancer Incidence Surveillance System. The top three cancers diagnosed were lung and bronchus, breast, and prostate.

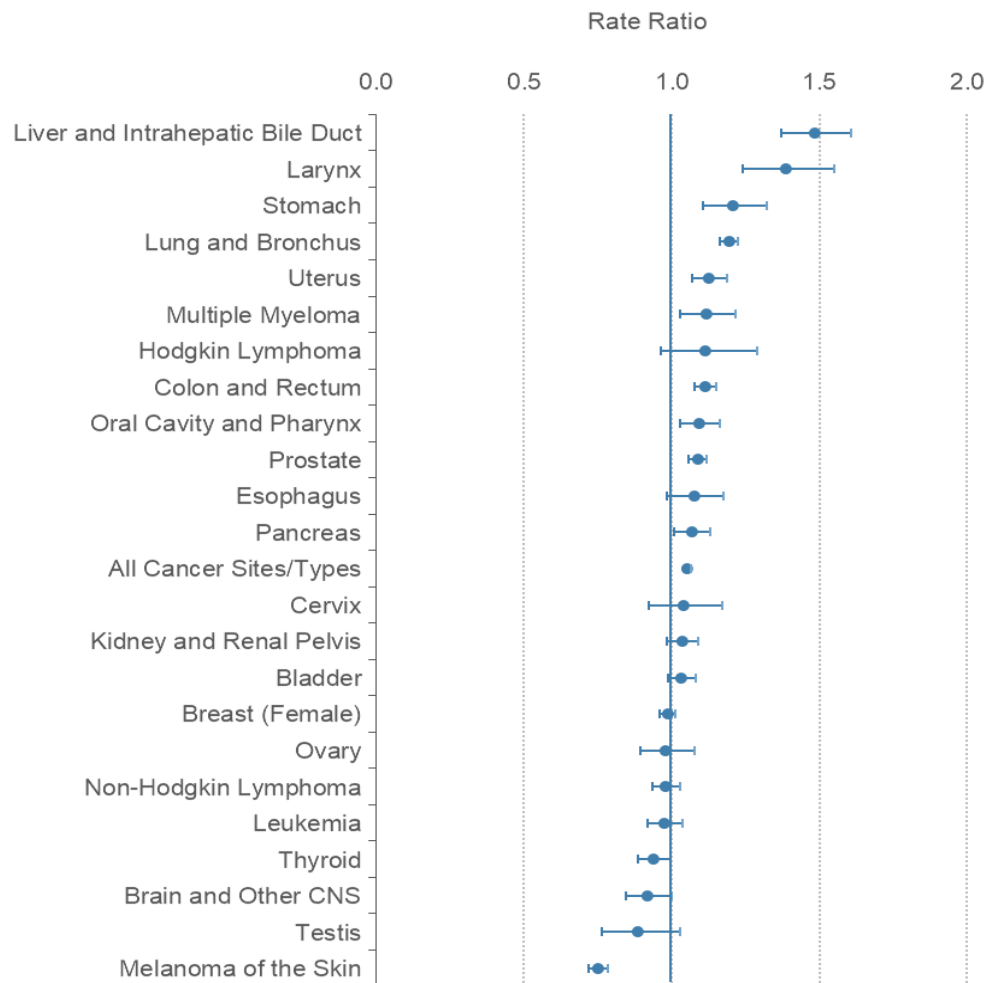
Cancer Deaths: There were 42,255 cancer deaths in high SVI counties from 2015-2019. Lung and bronchus cancer was the leading cause of cancer mortality, followed by colon and rectum, and pancreas.

Cancer Incidence

To compare high SVI counties with low SVI counties, rate ratios of cancer incidence were calculated by dividing the incidence rate among the high SVI counties by the incidence rate among the low SVI counties for each cancer site/type. The 95% confidence intervals of the rate ratios were used to determine significant* differences. If the 95% confidence interval excluded one (1.0), the difference between the two groups of counties was determined to be statistically significant*.

Figure 3 and Table A-1 show the rate ratios of cancer-specific incidence rates between the high and low SVI counties in Ohio in 2015-2019. The incidence rate of all cancers combined was 483.3 per 100,000 population in the high SVI counties and 458.9 per 100,000 population in the low SVI counties. In addition to all cancers combined, the incidence rate was significantly* higher in the high SVI counties than in the low SVI counties for the following sites/types of cancer: liver and intrahepatic bile duct (8.9 vs. 6.0 per 100,000), larynx (4.3 vs. 3.1 per 100,000), stomach (6.4 vs. 5.3 per 100,000), lung and bronchus (70.2 vs. 58.8 per 100,000), uterus (32.9 vs. 29.2 per 100,000 females), multiple myeloma (6.7 vs. 6.0 per 100,000), colon and rectum (42.4 vs. 38.1 per 100,000), oral cavity and pharynx (12.8 vs. 11.7 per 100,000), and prostate (116.8 vs. 107.4 per 100,000 males). The high SVI counties had a significantly* lower incidence rate for melanoma of the skin (23.2 vs. 30.9 per 100,000 population).

Figure 3. Rate Ratios and 95% Confidence Intervals of Cancer Incidence Between High and Low SVI Counties, Ohio, 2015-2019

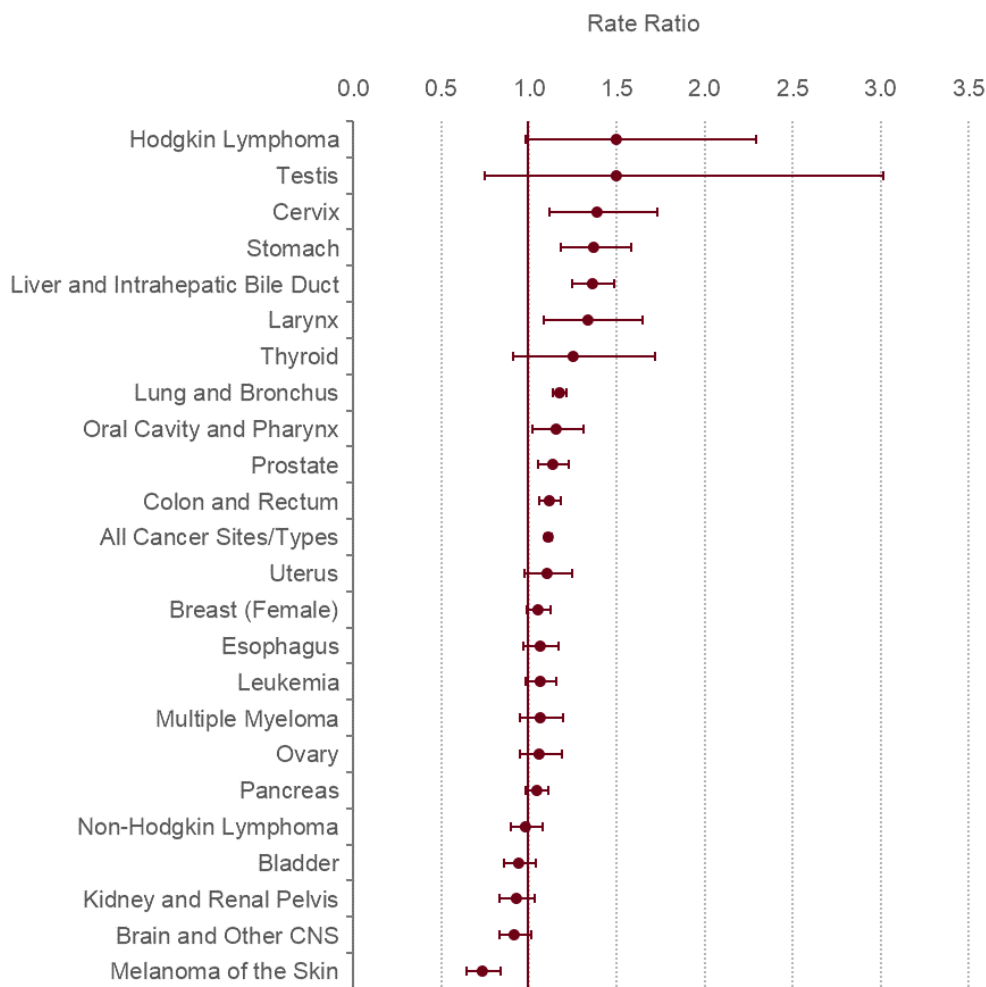


Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.
CNS = Central Nervous System.

Cancer Mortality

Figure 4 and Table A-2 show the rate ratios of cancer-specific mortality rates between the high and low SVI counties in Ohio in 2015-2019. The mortality rate for all cancers combined was 11% higher in the high SVI counties (176.0 per 100,000 population) than in the low SVI counties (158.5 per 100,000 population). In addition, the mortality rate was significantly* higher in the high SVI counties than in low SVI counties for the following sites/types of cancer: cervix (2.5 vs. 1.8 per 100,000 females), stomach (2.6 vs. 1.9 per 100,000), liver and intrahepatic bile duct (7.2 vs. 5.3 per 100,000), larynx (1.2 vs. 0.9 per 100,000), lung and bronchus (47.4 vs. 40.4 per 100,000), oral cavity and pharynx (3.0 vs. 2.6 per 100,000), prostate (20.9 vs. 18.4 per 100,000 males), and colon and rectum (15.4 vs. 13.8 per 100,000). The high SVI counties had a significantly* lower mortality rate for melanoma of the skin (2.2 vs. 3.0 per 100,000 population).

Figure 4. Rate Ratios and 95% Confidence Intervals of Cancer Mortality Between High and Low SVI Counties, Ohio, 2015-2019



Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.
CNS = Central Nervous System.

Stage at Diagnosis

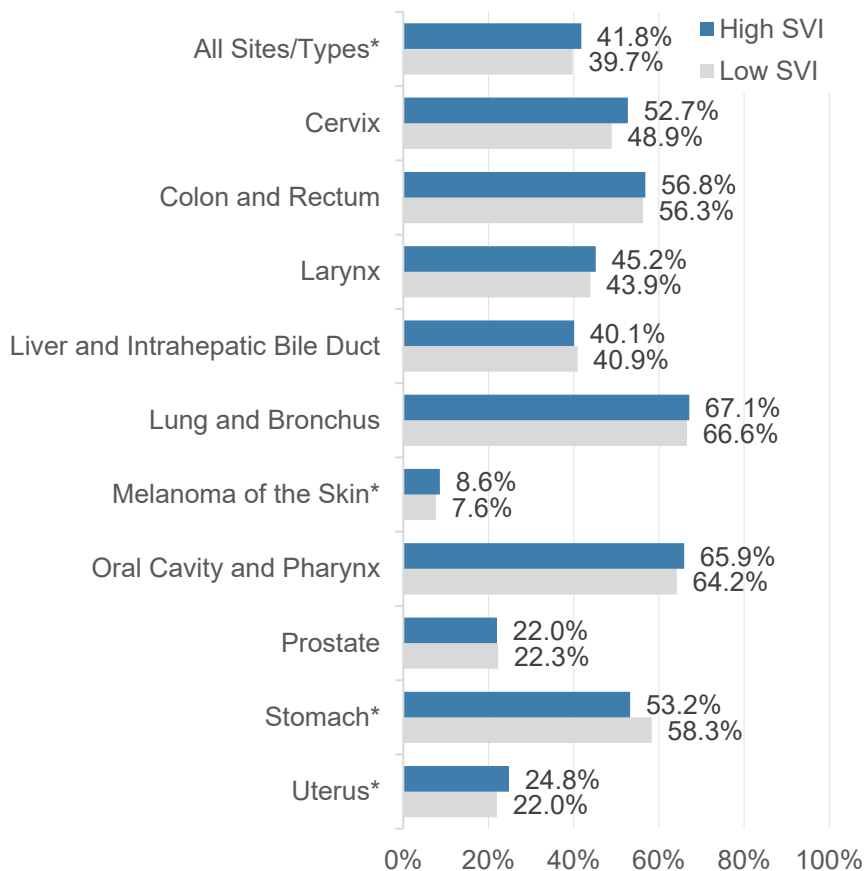
Stage describes the extent or spread of the disease at the time of diagnosis and is an important determinant of survival. For *in situ* cancers, the tumor has not invaded or penetrated surrounding tissue. In the local stage, the tumor is confined to the organ in which it originated. In the regional stage, 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 5 shows the proportion of cases diagnosed at a late stage in the high and low SVI counties for selected cancers. The cancers selected are the sites/types that had significantly* higher or lower mortality rates in the high SVI counties, compared with the low SVI counties.

Late-stage diagnoses were significantly* higher among residents of high SVI counties compared with the low SVI counties for all cancer sites/types combined, melanoma of the skin, and uterine cancer. There was a significantly* higher percentage of stomach cancers diagnosed at a late stage in the low SVI counties compared with the high SVI counties.

The two-proportion z-test at the .05 significance level was used to test for differences in stage at diagnosis, health insurance status, and treatment status.

Figure 5. Proportion of Cases (%) Diagnosed at a Late Stage for Select Cancer Sites/Types in High and Low SVI Counties, Ohio, 2015-2019

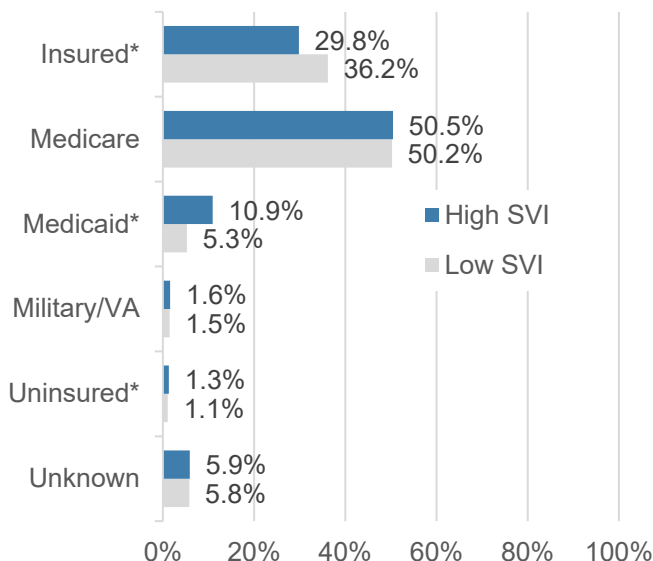


Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.

* Significant difference between the high and low SVI counties determined by the two-proportion z-test; significance set at <.05.

Health Insurance Status

Figure 6. Proportion of Cases (%) by Primary Payer for All Cancers Combined in High and Low SVI Counties, Ohio, 2015-2019



Compared with cancer patients in low SVI counties, a significantly* higher percentage of cancer patients in the high SVI counties were uninsured (1.3% vs. 1.1%) or covered by Medicaid (10.9% vs. 5.3%) as the primary payer at the time of their diagnosis.

The low SVI counties had a significantly* higher percentage of people whose primary payer at diagnosis was some type of private insurance or insurance not otherwise specified (36.2% vs. 29.8%).

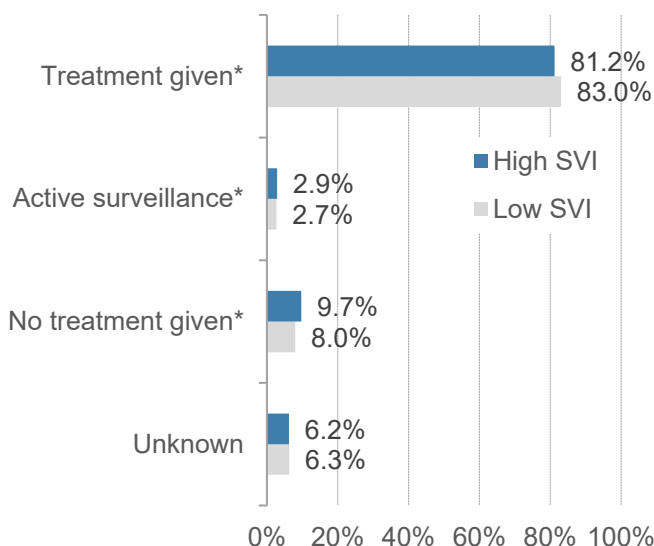
Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.

* Significant difference between the high and low SVI counties determined by the two-proportion z-test; significance set at <.05.

Insured includes private insurance (managed care, health maintenance organization [HMO], or preferred provider organization [PPO]); fee-for-service private insurance; and insurance not otherwise specified (NOS).

Treatment Status

Figure 7. Proportion of Cases (%) by Treatment Status for All Cancers Combined in High and Low SVI Counties, Ohio, 2015-2019



A higher percentage of people were given some form of first-course cancer treatment in low SVI counties (83.0%) than in high SVI counties (81.2%).

Active surveillance (watchful waiting) was higher among cancer patients in the high SVI counties (2.9%) compared with those in low SVI counties (2.7%).

A higher percentage of cases in the high SVI counties did not receive treatment (9.7%), compared with the low SVI counties (8.0%).

About 6% of all cancer treatment was reported as unknown in both groups of counties.

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.

* Significant difference between the high and low SVI counties determined by the two-proportion z-test; significance set at <.05.

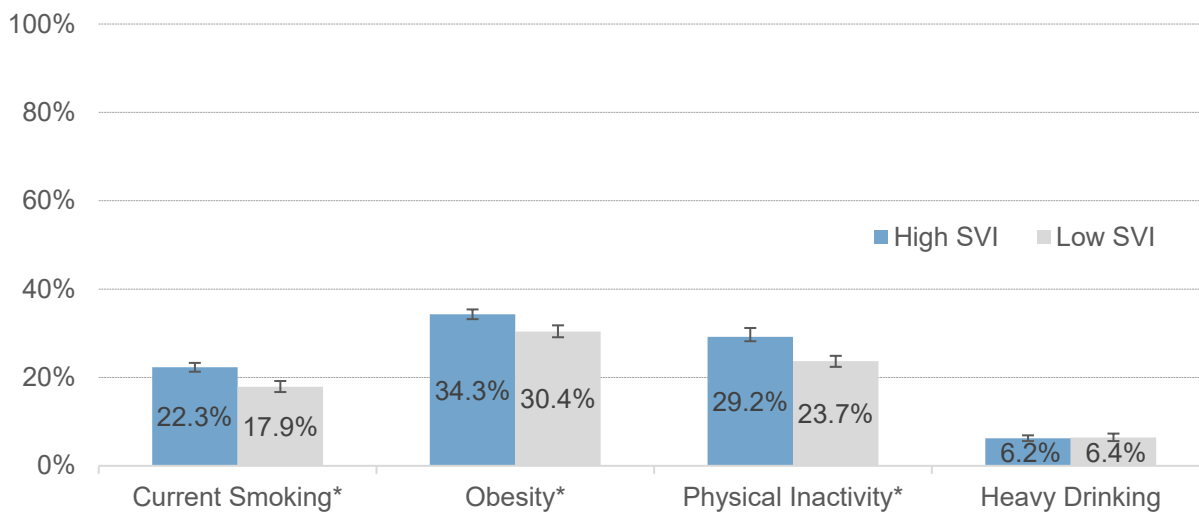
Based on initiated first course of treatment only; treatments planned but not yet started at the time of reporting to OCISS are not included.

Cancer Risk Factors

A cancer risk factor is anything that increases a person's risk of developing cancer. Cancer risk factors include age, sex, race, ethnicity, genetics (e.g., genetic mutations, family history), health behaviors and lifestyle factors (e.g., tobacco and alcohol use, obesity), socioeconomic status (i.e., poverty), and environmental factors (e.g., radiation, infectious agents, workplace exposures). Tobacco use is associated with 12 types of cancer and 30% of all cancer deaths. Obesity is associated with 13 types of cancer and is estimated to account for 7% of new cancer cases among Ohio adults 30 years of age and older. Excessive alcohol use causes 6% of new cancers and 4% of cancer-related deaths in the United States. Higher levels of physical activity have been linked to lower risk of several types of cancer.

Using data from the Ohio Behavioral Risk Factor Surveillance System (BRFSS) for 2015-2019, selected cancer risk factors for residents living in the high SVI counties were compared with those living in the low SVI counties.

Figure 8. Prevalence (%) of Current Smoking, Obesity, Physical Inactivity, and Heavy Drinking Among Adults (Ages 18+) in High and Low SVI Counties, Ohio, 2015-2019



Source: 2015-2019 Ohio Behavioral Risk Factor Surveillance System (BRFSS), Ohio Department of Health, 2022.

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.

Obesity classification is defined as a body mass index (BMI) of 30.0+.

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

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

* Significant difference between the high and low SVI counties at the 95% confidence level, determined by comparing CIs (error bars); if the CIs do not overlap, the difference is determined to be statistically significant.

The prevalence of current smoking, obesity, and physical inactivity was significantly* higher in high SVI counties than in the low SVI counties: 22.3% versus 17.9% for current smoking, 34.3% versus 30.4% for obesity, and 29.2% versus 23.7% for physical inactivity. The prevalence of heavy drinking in the high SVI counties (6.2%) was not significantly* different than the prevalence in the low SVI counties (6.4%).

Early Detection

Cancer screening can detect some cancers early when treatment is often less intensive and more successful. Cancer screening is known to reduce mortality for cancers of the breast, colon and rectum, cervix, prostate, and lung (among current or former heavy smokers). Screening can help prevent colon and rectum and cervical cancers by detecting precancerous lesions that can be removed. The U.S. Preventive Services Task Force provides recommendations for screening for cervical, colon and rectum, breast, and lung cancers.

Prevalence refers to the proportion of people with a certain disease or characteristic at a given time. In Ohio, there was no significant* difference in the prevalence of cancer screening for breast, cervical, and colorectal cancer between the high and low SVI counties, as summarized in Table 1.

Table 1. Prevalence (%) of Adults Who Reported Having a Recommended Cancer Screening Test in High and Low SVI Counties, Ohio, 2016, 2018-2019

| | High SVI Counties | | Low SVI Counties | |
|--|-------------------|-------------|------------------|-------------|
| | Percent | 95% CI | Percent | 95% CI |
| Mammogram (past 2 years, women 50-74) | 78.2 | 76.3 - 80.1 | 77.9 | 75.3 - 80.5 |
| Pap Test (past 3 years, women 21-65) | 74.5 | 72.6 - 76.5 | 77.6 | 75.0 - 80.3 |
| Colorectal Cancer Screening (age 50-75)* | 67.7 | 66.2 - 69.2 | 67.5 | 65.4 - 69.5 |

Source: 2016, 2018, and 2019 Ohio Behavioral Risk Factor Surveillance System, Ohio Department of Health, 2022.

95% CI = 95 percent confidence interval.

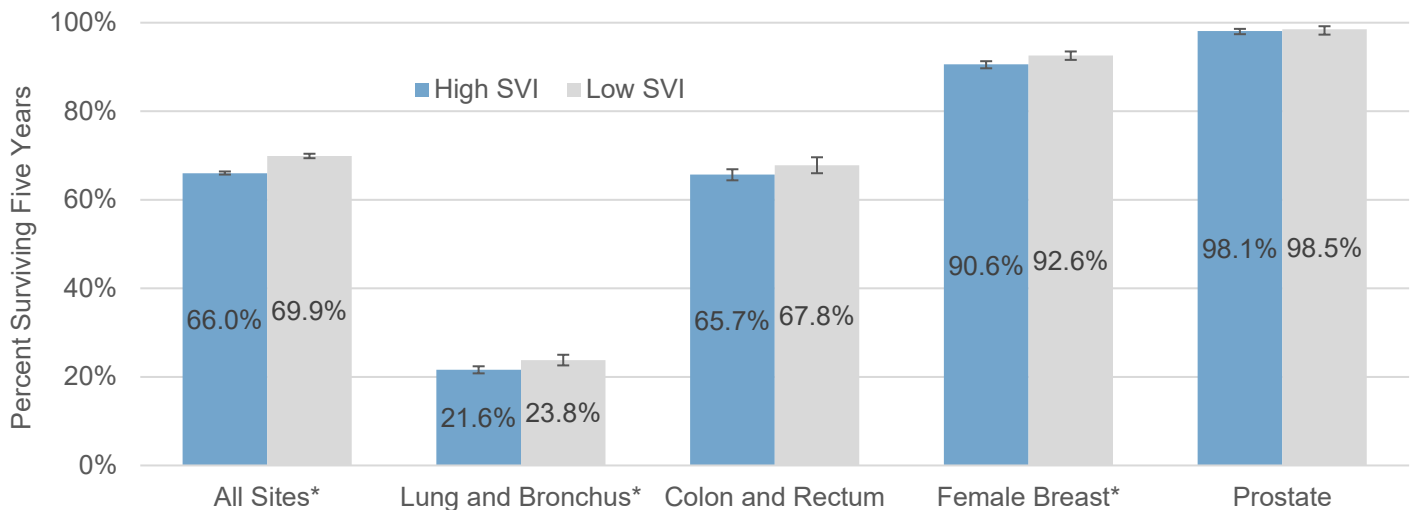
*A screening colonoscopy every 10 years, or sigmoidoscopy every five years with high-sensitivity fecal occult blood test (FOBT) every three years, or screening with high-sensitivity FOBT every year.

- The prevalence of women 50-74 years old who had a mammogram in the past two years was not significantly* different between high SVI counties (78.2%) and low SVI counties (77.9%).
- The prevalence of women 21-65 years old who reported they had a Pap test in the past three years was not significantly* different between high SVI counties (74.5%) and low SVI counties (77.6%).
- The prevalence of adults 50-75 years old who met colon and rectum cancer screening guidelines was not significantly* different between high SVI counties (67.7%) and low SVI counties (67.5%).

Survival

In general, cancer survival is the estimated proportion of people alive at some point after cancer diagnosis, usually five years. Five-year relative survival, the estimate used here, compares the survival of people diagnosed with cancer with the survival of people in the general population who are the same age, race, and sex, and who have not been diagnosed with cancer.

Figure 9. Five-Year Relative Survival (%) for Four Common Cancers in High and Low SVI Counties, Ohio, 2012-2018



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.

* Significant difference between the high and low SVI counties at the 95% confidence level, determined by comparing CIs (error bars); if the CIs do not overlap, the difference is determined to be statistically significant.

Based on Ohio cases diagnosed during the period 2012-2018 and followed through 2019.

Among the four most common cancers, five-year relative survival was significantly* lower among the high SVI counties, compared with the low SVI counties, for all cancers combined (66.0% vs. 69.9%), lung and bronchus cancer (21.6% vs. 23.8%), and female breast cancer (90.6% vs. 92.6%).

Appendices

Table A-1. Five-Year Case Counts and Comparisons of Average Annual Age-Adjusted Rates of Cancer Incidence in High and Low SVI Counties by Site/Type, Ohio, 2015-2019

| Cancer Site/Type | High SVI Counties | | Low SVI Counties | | Rate Ratio |
|----------------------------------|-------------------|-------|------------------|-------|---------------------------|
| | Cases | Rate | Cases | Rate | Rate Ratio (95% CI) |
| All Cancer Sites/Types | 111,629 | 483.3 | 60,750 | 458.9 | 1.05 (1.04 - 1.06) |
| Bladder | 5,445 | 22.5 | 2,934 | 21.8 | 1.03 (0.99 - 1.08) |
| Brain and Other CNS | 1,391 | 6.8 | 895 | 7.4 | 0.92 (0.84 - 1.00) |
| Breast (Female) | 15,547 | 130.2 | 8,996 | 132.1 | 0.99 (0.96 - 1.01) |
| Cervix | 742 | 8.0 | 423 | 7.7 | 1.04 (0.92 - 1.17) |
| Colon and Rectum | 9,747 | 42.4 | 4,993 | 38.1 | 1.11 (1.08 - 1.15) |
| Esophagus | 1,393 | 5.7 | 725 | 5.3 | 1.08 (0.98 - 1.18) |
| Hodgkin Lymphoma | 523 | 2.9 | 279 | 2.6 | 1.12 (0.96 - 1.29) |
| Kidney and Renal Pelvis | 4,043 | 18.0 | 2,305 | 17.4 | 1.03 (0.98 - 1.09) |
| Larynx | 1,023 | 4.3 | 434 | 3.1 | 1.39 (1.24 - 1.55) |
| Leukemia | 2,798 | 12.7 | 1,634 | 13.0 | 0.98 (0.92 - 1.04) |
| Liver and Intrahepatic Bile Duct | 2,203 | 8.9 | 833 | 6.0 | 1.48 (1.37 - 1.61) |
| Lung and Bronchus | 17,042 | 70.2 | 8,077 | 58.8 | 1.19 (1.16 - 1.23) |
| Melanoma of the Skin | 5,092 | 23.2 | 3,874 | 30.9 | 0.75 (0.72 - 0.78) |
| Multiple Myeloma | 1,581 | 6.7 | 824 | 6.0 | 1.12 (1.03 - 1.21) |
| Non-Hodgkin Lymphoma | 4,382 | 19.3 | 2,575 | 19.7 | 0.98 (0.93 - 1.03) |
| Oral Cavity and Pharynx | 2,980 | 12.8 | 1,590 | 11.7 | 1.09 (1.03 - 1.16) |
| Ovary | 1,211 | 10.1 | 703 | 10.3 | 0.98 (0.89 - 1.08) |
| Pancreas | 3,367 | 14.0 | 1,771 | 13.1 | 1.07 (1.01 - 1.13) |
| Prostate | 13,394 | 116.8 | 7,318 | 107.4 | 1.09 (1.06 - 1.12) |
| Stomach | 1,496 | 6.4 | 698 | 5.3 | 1.21 (1.10 - 1.32) |
| Testis | 437 | 5.5 | 287 | 6.2 | 0.89 (0.76 - 1.03) |
| Thyroid | 2,853 | 15.1 | 1,811 | 16.1 | 0.94 (0.88 - 0.99) |
| Uterus | 4,120 | 32.9 | 2,137 | 29.2 | 1.13 (1.07 - 1.19) |

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2022.

Rates are per 100,000 population, age-adjusted to the 2000 U.S. standard population, and sex-specific for cancers of the breast, cervix, ovary, prostate, testis, and uterus.

CNS = Central Nervous System.

95% CI = 95 percent confidence interval.

Bold = Significant* difference between the high and low SVI counties at the 95% confidence level.

Table A-2. Five-Year Death Counts and Comparisons of Average Annual Age-Adjusted Rates of Cancer Mortality in High SVI and Low SVI Counties by Site/Type, Ohio, 2015-2019

| Cancer Site/Type | High SVI Counties | | Low SVI Counties | | Rate Ratio |
|----------------------------------|-------------------|-------|------------------|-------|---------------------------|
| | Deaths | Rate | Deaths | Rate | Rate Ratio (95% CI) |
| All Cancer Sites/Types | 42,255 | 176.0 | 21,255 | 158.5 | 1.11 (1.09 - 1.13) |
| Bladder | 1,195 | 4.9 | 686 | 5.2 | 0.94 (0.86 - 1.04) |
| Brain and Other CNS | 1,025 | 4.5 | 635 | 4.9 | 0.92 (0.83 - 1.01) |
| Breast (Female) | 2,831 | 21.8 | 1,486 | 20.7 | 1.05 (0.99 - 1.12) |
| Cervix | 267 | 2.5 | 114 | 1.8 | 1.39 (1.12 - 1.73) |
| Colon and Rectum | 3,662 | 15.4 | 1,834 | 13.8 | 1.12 (1.06 - 1.18) |
| Esophagus | 1,238 | 5.1 | 656 | 4.8 | 1.06 (0.97 - 1.17) |
| Hodgkin Lymphoma | 69 | 0.3 | 31 | 0.2 | 1.50 (0.98 - 2.29) |
| Kidney and Renal Pelvis | 918 | 3.8 | 539 | 4.1 | 0.93 (0.83 - 1.03) |
| Larynx | 301 | 1.2 | 125 | 0.9 | 1.33 (1.08 - 1.64) |
| Leukemia | 1,596 | 6.8 | 832 | 6.4 | 1.06 (0.98 - 1.16) |
| Liver and Intrahepatic Bile Duct | 1,774 | 7.2 | 724 | 5.3 | 1.36 (1.25 - 1.48) |
| Lung and Bronchus | 11,503 | 47.4 | 5,534 | 40.4 | 1.17 (1.14 - 1.21) |
| Melanoma of Skin | 507 | 2.2 | 390 | 3.0 | 0.73 (0.64 - 0.84) |
| Multiple Myeloma | 839 | 3.4 | 427 | 3.2 | 1.06 (0.95 - 1.19) |
| Non-Hodgkin Lymphoma | 1,367 | 5.7 | 754 | 5.8 | 0.98 (0.90 - 1.07) |
| Oral Cavity and Pharynx | 723 | 3.0 | 353 | 2.6 | 1.15 (1.02 - 1.31) |
| Ovary | 935 | 7.0 | 475 | 6.6 | 1.06 (0.95 - 1.18) |
| Pancreas | 3,001 | 12.3 | 1,601 | 11.8 | 1.04 (0.98 - 1.11) |
| Prostate | 2,067 | 20.9 | 1,017 | 18.4 | 1.14 (1.05 - 1.22) |
| Stomach | 634 | 2.6 | 254 | 1.9 | 1.37 (1.18 - 1.58) |
| Testis | 28 | 0.3 | 11 | 0.2 | 1.50 (0.75 - 3.01) |
| Thyroid | 120 | 0.5 | 56 | 0.4 | 1.25 (0.91 - 1.72) |
| Uterus | 747 | 5.5 | 371 | 5.0 | 1.10 (0.97 - 1.25) |

Source: Bureau of Vital Statistics, Ohio Department of Health, 2022.

Rates are per 100,000 population, age-adjusted to the 2000 U.S. standard population, and sex-specific for cancers of the breast, cervix, ovary, prostate, testis, and uterus.

CNS = Central Nervous System.

95% CI = 95 percent confidence interval.

Bold = Significant* difference between the high and low SVI 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 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 – a person's weight in kilograms divided by the square of height in meters (kg/m^2). BMI provides a reliable indicator of body fatness for most people and is used to screen for weight categories that may lead to health problems. Obesity is defined as a BMI of 30.0 or higher.

Census Data: The 2015-2019 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 2020 bridged-race postcensal population estimates for July 1, 2010-July 1, 2020 (released 9/22/2021).

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 and mortality rate ratios and prevalence estimates are presented in this report with 95% confidence intervals.

Incidence: The number of cases diagnosed during a specified time period (e.g., 2015-2019). Cancer cases were coded using 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., 2015-2019). Cancer deaths were coded using the International Statistical Classification of Diseases and Related Health Problems, Tenth Edition (ICD-10).

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., 2015-2019).

Statistically Significant*: In statistics, this phrase describes a mathematical measure of difference between groups. The difference is said to be statistically significant if it is greater than what might be expected to happen by chance alone. In this report, statistical significance between populations was determined using one of the following three methods:

- 1) Checking if 95% [confidence intervals](#) of incidence and mortality rate ratios include 1.0.
- 2) Checking for overlap between 95% confidence intervals of prevalence estimates.
- 3) Using a statistical test. A two-proportion z-test is used to test for a difference between two population proportions.

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 Department of Health Comprehensive Cancer Control Program:

<https://odh.ohio.gov/know-our-programs/comprehensive-cancer-control-program/welcome>

Ohio Department of Health Office of Health Opportunity/Health Improvement Zones:

<https://odh.ohio.gov/know-our-programs/health-equity/health-improvement-zones>

Ohio Behavioral Risk Factor Surveillance System (BRFSS):

<https://odh.ohio.gov/know-our-programs/behavioral-risk-factor-surveillance-system/welcome-to>

Ohio Public Health Data Warehouse:

<https://publicapps.odh.ohio.gov/EDW/DataCatalog>

National Cancer Institute:

<https://www.cancer.gov/>

American Cancer Society:

<https://www.cancer.org/>

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