Kidney & Renal Pelvis Cancer in Ohio

March 2025

Department of Health

Key Findings

- An average of 2,702 cases of kidney and renal pelvis cancer were diagnosed each year in Ohio from 2018 to 2022.
- The kidney and renal pelvis cancer incidence rate in Ohio was 18.2 per 100,000 population from 2018 to 2022, compared with the national rate of 17.3 per 100,000 from 2017 to 2021.
- Kidney and renal pelvis cancers occur about two times more often in males than in females.
- Black people have higher incidence rates of kidney and renal pelvis cancer than White people, Hispanic people, and Asian/Pacific Islanders in Ohio and the United States.
- Kidney and renal pelvis cancer was most frequently diagnosed among people in the 65 to 69 age group for both males and females.
- In Ohio, kidney and renal pelvis cancer incidence rates increased 70% overall from 1996 to 2022.
- Kidney and renal pelvis cancer incidence rates were higher in southern and southeastern Ohio.
- The five-year relative survival for kidney and renal pelvis cancer was 80% for all stages combined. Five-year relative survival was 95% at the local stage, 77% at the regional stage, and only 19% for distant-stage tumors.

New Cases

Cancers of the kidney and renal pelvis made up 3.8% of newly diagnosed (incidence) cancer cases in Ohio reported to the Ohio Cancer Incidence Surveillance System (OCISS) from 2018 through 2022.[1] An average of 2,702 cases of kidney and renal pelvis cancer were diagnosed annually in Ohio during this time period (Table 1). The 2018-2022 average annual age-adjusted kidney and renal pelvis cancer incidence rate in Ohio was 18.2 per 100,000 population, compared with the national incidence rate of 17.3 per 100,000 from 2017 to 2021. The kidney and renal pelvis cancer incidence rate among Ohio males (24.1 per 100,000) was nearly two times higher than the rate among females (13.0 per 100,000). The incidence rate was higher among Black Ohioans (18.7 per 100,000), compared with White Ohioans (18.2 per 100,000), Hispanic Ohioans (14.0 per 100,000), and Asian/Pacific islanders (6.5 per 100,000).

Deaths

An average of 590 deaths from kidney and renal pelvis cancer occurred each year in Ohio from 2018 to 2022 (Table 1). Ohio's average annual age-adjusted kidney and renal pelvis cancer mortality rate was 3.8 per 100,000 population, compared with the U.S. mortality rate of 3.4 per 100,000. The mortality rate was more than two times higher for males (5.5 per 100,000) than females (2.5 per 100,000) in Ohio during this time period.

Lifetime Risk: Approximately 2.2% of men and 1.3% of women will be diagnosed with kidney and renal pelvis cancer at some point during their lifetime.

[1]Due to the complexity of the cancer data collection and quality control process, there is typically a 24-month delay between the time a new cancer is diagnosed and the time the data is ready for analysis. Therefore, the most recent incidence data presented in this report is for cancer cases diagnosed through Dec. 31, 2022.

Table 1. Average Annual Number and Age-Adjusted Rates of Kidney and Renal Pelvis Cancer Cases and Deaths per 100,000 Population by Sex, Race, and Ethnicity, Ohio (2018-2022) and the United States (2017-2021, 2018-2022)

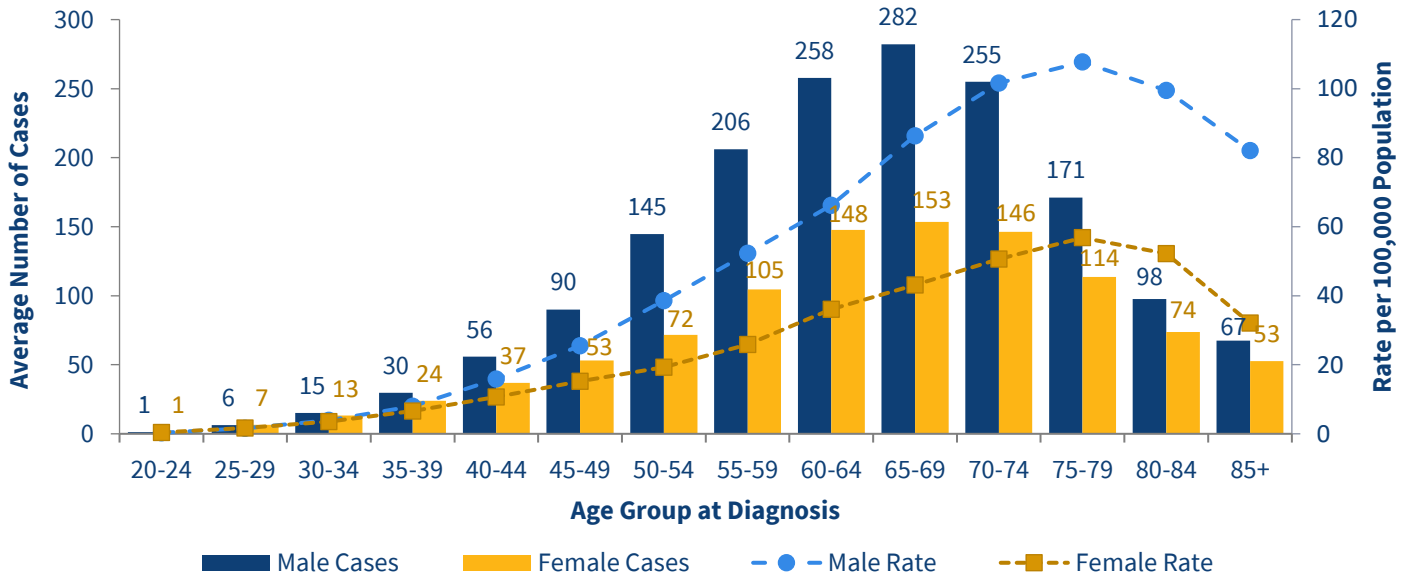
		Incidence			Mortality		
		Ohio Cases	Ohio Rate	U.S. Rate	Ohio Deaths	Ohio Rate	U.S. Rate
Total		**2,702**	**18.2**	**17.3**	**590**	**3.8**	**3.4**
Sex	Male	1,691	24.1	23.4	378	5.5	5.1
	Female	1,011	13.0	12.0	212	2.5	2.1
Race	White	2,354	18.2	17.5	535	3.9	3.6
	Black	299	18.7	18.2	52	3.5	3.2
	A/PI	18	6.5	8.1	2	0.8	1.6
Ethnicity	Hispanic	45	14.0	17.6	4	1.6	3.2

Sources: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2024; U.S. Cancer Statistics, Centers for Disease Control and Prevention and National Cancer Institute, June 2024 (Note: 2017-2021 U.S. cancer incidence data was the most recent available at the time of this publication); SEER*Stat Database - Mortality: All Cause of Death, Aggregated With State, Total U.S. (1990-2022), National Cancer Institute, April 2024. Underlying mortality data provided by the National Center for Health Statistics.
A/PI = Asian/Pacific Islander.

Incidence by Age Group and Sex

In Ohio from 2018 to 2022, kidney and renal pelvis cancer was most frequently diagnosed among people in the 65 to 69 age group for both males and females (Figure 1). Incidence rates for both males and females increased with advancing age group from 20-24 years to 75-79 years, followed by a decline.

Figure 1. Average Annual Number and Age-Specific Incidence Rates per 100,000 Population for Kidney and Renal Pelvis Cancer by Age Group and Sex, Ohio, 2018-2022

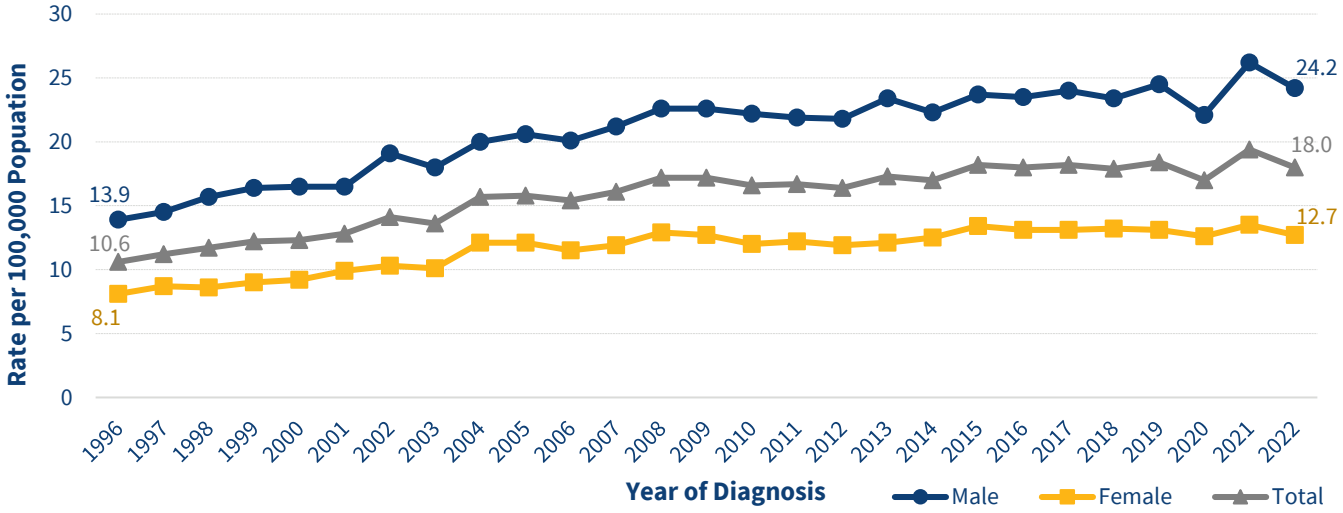


Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2024.

Trends in Incidence and Mortality

For each year from 1996 to 2022, the incidence rate was higher among males compared with females in Ohio (Figure 2). Overall, kidney and renal pelvis cancer incidence rates increased 70% in Ohio from 1996 (10.6 per 100,000 population) to 2022 (18.0 per 100,000). Part of this rise may be due to the use of newer imaging tests such as computed tomography (CT) scans, which has led to the detection of tumors that may not have been found otherwise.

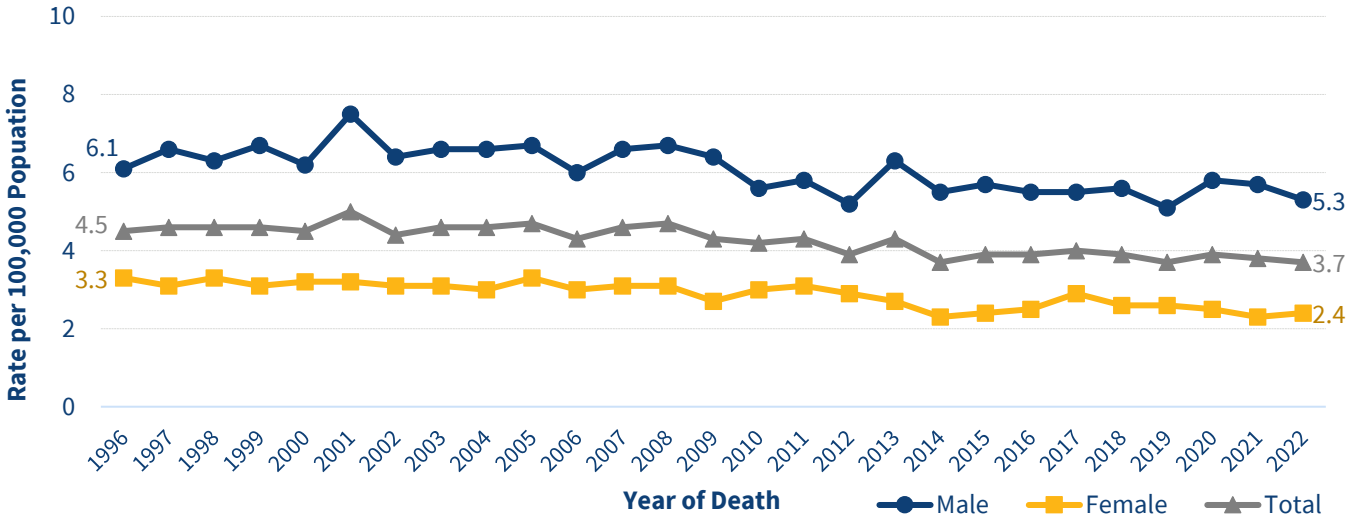
Figure 2. Trends in Age-Adjusted Incidence Rates per 100,000 Population for Kidney and Renal Pelvis Cancer by Sex, Ohio, 1996-2022



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2024.

For each year from 1996 to 2022, kidney and renal pelvis cancer mortality rates were higher among males compared with females in Ohio (Figure 3). Overall, kidney and renal pelvis cancer mortality rates decreased nearly 18% in Ohio from 1996 (4.5 per 100,000 population) to 2022 (3.7 per 100,000).

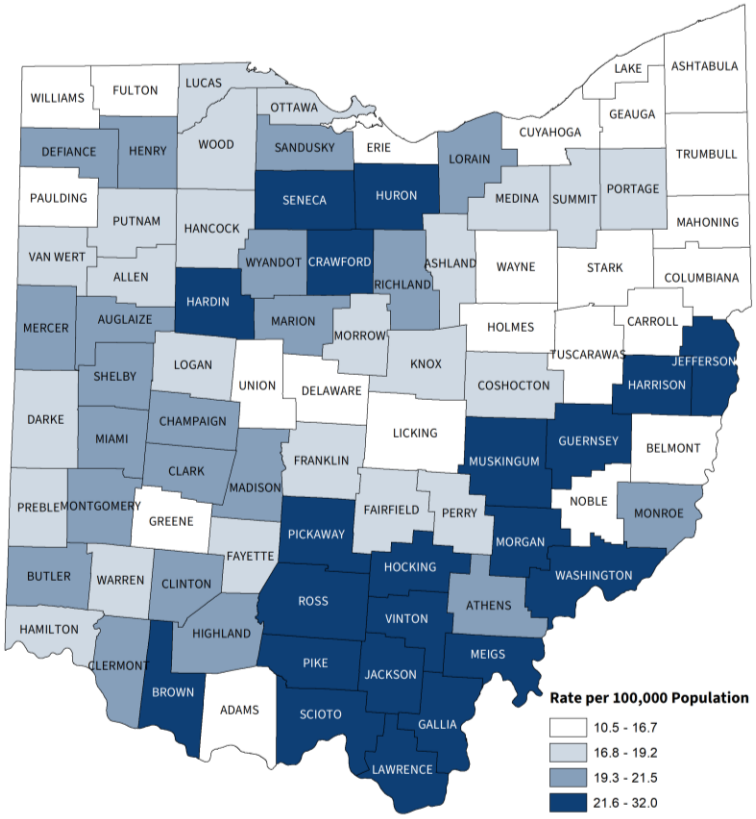
Figure 3. Trends in Age-Adjusted Mortality Rates per 100,000 Population for Kidney and Renal Pelvis Cancer by Sex, Ohio, 1996-2022



Source: SEER*Stat Database - Mortality: All Cause of Death, Aggregated With State, Total U.S. (1990-2022), National Cancer Institute, April 2024. Underlying mortality data provided by the National Center for Health Statistics.

Incidence by County

Figure 4. Average Annual Age-Adjusted Incidence Rates per 100,000 Population for Kidney and Renal Pelvis Cancer by County of Residence, Ohio, 2018-2022



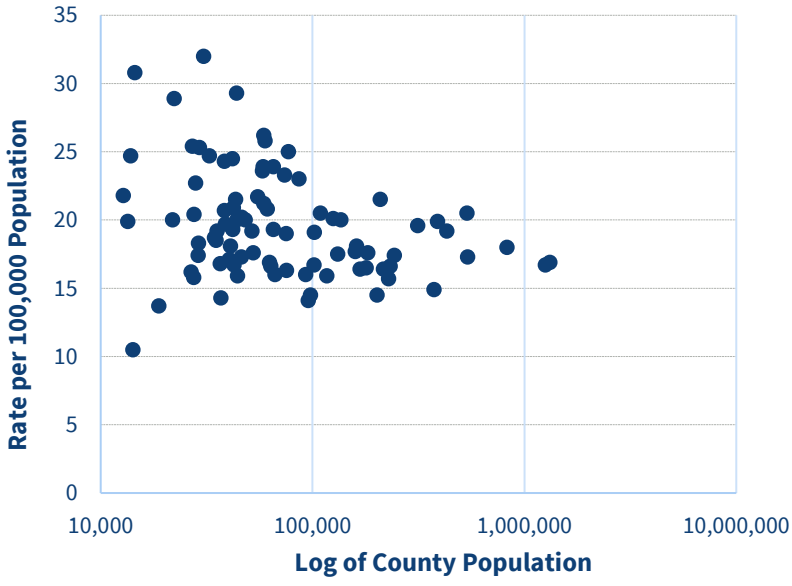
County-specific kidney and renal pelvis cancer incidence rates in Ohio ranged from 10.5 to 32.0 per 100,000 population, compared with Ohio's rate of 18.2 per 100,000 population (Figure 4).

Incidence rates for kidney and renal pelvis cancer were highest in counties located in the southern and southeastern regions of Ohio, and in a block of counties in northern Ohio from 2018 to 2022. The following counties had the highest incidence rates, in decreasing order, for this period: Hardin, Harrison, Brown, Meigs, and Pickaway.

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2024.

Each category represents approximately 25% of the 88 Ohio counties.

Figure 5. Average Annual Age-Adjusted Incidence Rates of Kidney and Renal Pelvis Cancer Plotted Against the Log of County Population, Ohio, 2018-2022



In Ohio, counties with small populations (less than 100,000 people) had more variable kidney and renal pelvis cancer incidence rates, ranging from 10.5 to 32.0 per 100,000, compared with counties with larger populations (more than 100,000 people), with rates ranging from 14.5 to 21.5 per 100,000 (Figure 5).

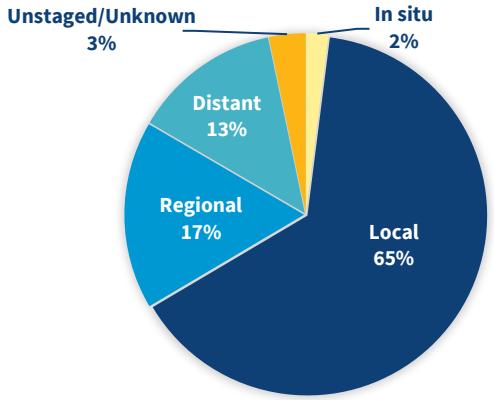
This is a typical effect of small numbers. Variation is higher when counts are smaller, so counties with smaller populations can have unusually high or low cancer rates. This should be considered before concluding that one county is more affected by cancer than another.

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2024.

Stage at Diagnosis

Cancer stage at diagnosis, which refers to the extent or spread of a cancer in the body, is used to select appropriate treatment and is an important determinant of survival. If cancer cells are present only in the layer of cells where they developed and have not spread, the stage is *in situ*. If cancer cells have penetrated beyond the original layer of tissue, the cancer has become invasive and is categorized as local, regional, or distant based on the extent of spread. In Ohio, most (65%) kidney and renal pelvis cancers were diagnosed at a local stage from 2018 to 2022 (Figure 6).

Figure 6. Proportion of Kidney and Renal Pelvis Cancer Cases (%) by Stage at Diagnosis, Ohio, 2018-2022



in situ: Noninvasive; has not penetrated surrounding tissue.

Local: Confined to site of origin.

Regional: Spread to surrounding organs or tissues or into regional lymph nodes.

Distant: Spread (metastasized) from one part of the body to another.

Unstaged/Unknown: Cancer was not staged, or stage information is missing.

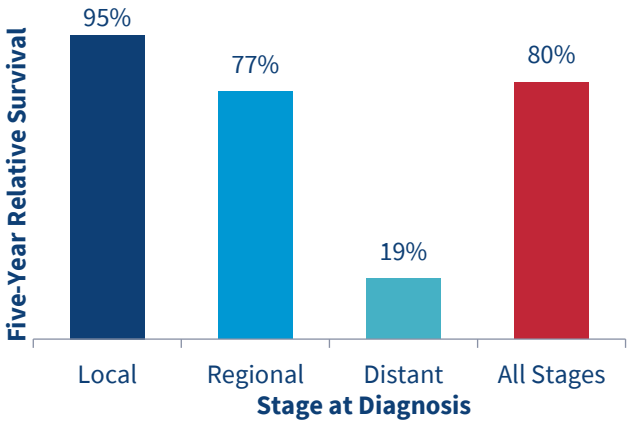
Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2024.

See definitions in Technical Notes on page 8.

Survival

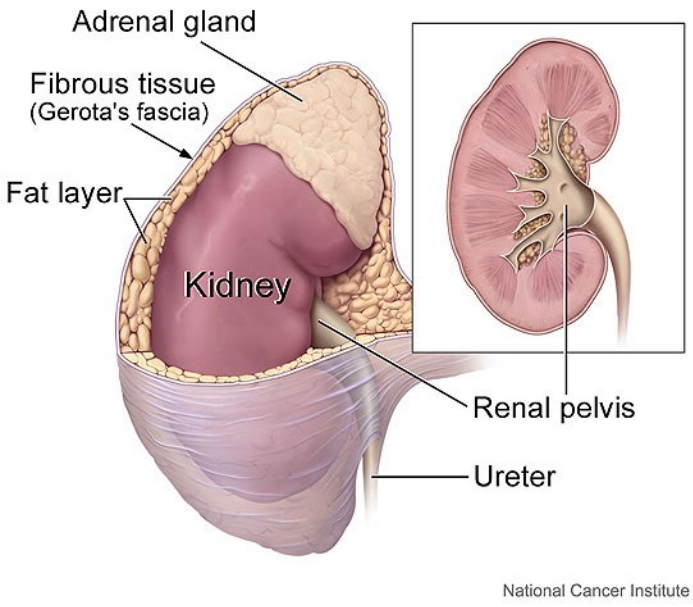
Relative survival probability is the percentage of people who are alive at a designated time period (usually five years) after a diagnosis divided by the percentage expected to be alive in the absence of a diagnosis based on normal life expectancy. Five-year relative survival was 95% at the local stage, 77% at the regional stage, and only 19% for distant-stage tumors. The five-year relative survival for kidney and renal pelvis cancer was 80% for all stages combined (Figure 7).

Figure 7. Five-Year Relative Survival Probability (%) by Stage at Diagnosis for Kidney and Renal Pelvis Cancer, Ohio, 2015-2021



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2024.
Based on Ohio cases diagnosed from 2015 to 2021 with follow up through December 2022.

Types of Kidney and Renal Pelvis Cancer



The kidneys are a pair of organs in the abdomen. Each kidney is about the size of a fist. The kidneys are part of the urinary tract. They make urine by removing wastes and extra water from the blood.

Urine collects in a hollow space (renal pelvis) in the middle of each kidney. Urine passes from the renal pelvis into the bladder through a long tube called a ureter.

The kidneys also make substances to help control blood pressure and to make red blood cells.

Attached to the top of each kidney is an adrenal gland. A layer of fatty tissue and an outer layer of fibrous tissue surround the kidney and adrenal gland.

There are three main types of kidney and renal pelvis cancer. **Renal cell carcinoma** (RCC) is the most common type in adults. It begins in the lining of the renal tubules in the kidney, which filter blood and produce urine. RCC is also called hypernephroma, renal cell adenocarcinoma, and renal cell cancer. The major subtypes include clear cell, papillary, and chromophobe, along with not otherwise specified (NOS). **Transitional cell cancer** forms in the renal pelvis and ureter in adults and behaves more like bladder cancer. **Wilms tumor** is a rare malignant kidney cancer that usually occurs in children younger than five years old.

Table 2 indicates the predominant types of kidney and renal pelvis cancer in Ohio from 2018 to 2022. RCC is the most common type, making up 88.7% of all cases of kidney and renal pelvis cancer.

Table 2. Average Annual Number and Proportion (%) of Kidney and Renal Pelvis Cancer Cases by Histology, Ohio, 2018-2022

Histology	Cases	Percent
Renal cell carcinoma (RCC)	**2,397**	**88.7%**
Clear cell	1,397	51.7%
Papillary	296	11.0%
Chromophobe	112	4.2%
Other RCC types	14	0.5%
Not otherwise specified (NOS)	578	21.4%
Transitional cell cancer	72	2.7%
Wilms tumor	19	0.7%
Other types	214	7.9%

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2024.
Percentages may not add up to 100% due to rounding.

Risk Factors and Populations at High Risk

Potentially Modifiable Risk Factors

- **Smoking:** Smoking approximately doubles the risk of developing kidney and renal pelvis cancer.
- **Obesity:** People who are overweight have a higher risk of developing kidney and renal pelvis cancer.
- **Workplace exposures:** Workplace exposure to certain substances (cadmium, some herbicides, and organic solvents, particularly trichloroethylene) increases the risk for kidney and renal pelvis cancer.
- **Overuse of certain medications:** Diuretics and analgesic pain pills such as aspirin, acetaminophen, and ibuprofen have been linked to kidney and renal pelvis cancer.
- **High blood pressure:** The risk of kidney and renal pelvis cancer is higher in people with high blood pressure.

Non-Modifiable Risk Factors

- **Age:** Kidney and renal pelvis cancer is most frequently diagnosed among people 65 to 69 years old.
- **Sex:** Kidney and renal pelvis cancer is two times more common in men than in women.
- **Race:** American Indians/Alaskan Natives and Black people have higher rates of kidney and renal pelvis cancer than do White people, Hispanics, and Asian/Pacific Islanders.
- **Family history:** People with a strong family history of kidney and renal pelvis cancer have a higher chance of developing this cancer. This risk is highest in brothers or sisters of those with kidney and renal pelvis cancer.
- **Advanced kidney disease:** People with advanced kidney disease, especially those needing dialysis, have a higher risk of kidney and renal pelvis cancer.
- **Rare inherited conditions:** People who have been diagnosed with von-Hippel-Lindau disease, hereditary papillary renal cancer, hereditary leiomyomatosis and renal cell cancer (HLRCC), and Birt-Hogg-Dube syndrome have increased risk of kidney and renal pelvis cancer.

Signs and Symptoms

Early stage kidney and renal pelvis cancer usually has no symptoms. As the tumor progresses, possible signs and symptoms include:

- Blood in the urine.
- A lump in the abdomen.
- A pain in the side that doesn't go away.
- Loss of appetite.
- Weight loss for no known reason.
- Anemia (low red blood cell counts).

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

Early Detection

There are no recommended screening tests for the early detection of kidney and renal pelvis cancer among people at average risk.

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. Using 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.

Average Annual Number: The number of cases or deaths diagnosed per year, on average, for the time period of interest (e.g., 2018-2022). Average annual numbers are calculated by summing the number of cases or deaths for a given time period, dividing by the number of years that comprise the time period, and rounding to the nearest whole number.

Incidence: The number of cases diagnosed during a specified time period (e.g., 2018-2022). Kidney and renal pelvis cancer cases were defined as follows: International Classification of Diseases for Oncology, Third Edition (ICD-O-3), codes C64.9, C65.9.

Invasive Cancer: Cancer that has spread beyond the layer of tissue in which it developed and is growing into surrounding, healthy tissues. Invasive cancers consist of those diagnosed at the local, regional, distant, and unstaged/unknown stages. Only invasive cancers were included in the calculation of incidence rates in this document.

Mortality: The number of deaths during a specified time period (e.g., 2018-2022). Kidney and renal pelvis cancer deaths were defined as follows: International Statistical Classification of Diseases and Related Health Problems, Ninth Edition (ICD-9), code 193 for 1996-1998 and International Statistical Classification of Diseases and Related Health Problems, Tenth Edition (ICD-10), codes C64-C65 for 1999-2022.

Population Data: Population estimates were provided by the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program. The 1990-2022 county-level population estimates include 19 age groups and four expanded races by origin, available at https://seer.cancer.gov/popdata/download.html#19.

Rate: The number of cases or deaths per unit of population (e.g., per 100,000 population) during a specified time period (e.g., 2018-2022). Rates may be unstable and are not presented when the count is less than five.

Relative Survival: The percentage of people who are alive at a designated time period (usually five years) after a cancer diagnosis divided by the percentage expected to be alive in the absence of cancer based on normal life expectancy.

Stage at Diagnosis: The degree to which a tumor has spread from its site of origin at the time of diagnosis. A system of summary staging is often used to group cases into the following stages:

In situ – Noninvasive cancer that has not penetrated surrounding tissue.

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

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

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

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

Table 3. Average Annual Number of Invasive Cancer Cases and Age-Adjusted Incidence Rates per 100,000 Population for Kidney and Renal Pelvis Cancer by County of Residence and Sex, Ohio (2018-2022) and the United States (2017-2021)

	Male		Female		Total			Male		Female		Total	
	Cases	Rate	Cases	Rate	Cases	Rate		Cases	Rate	Cases	Rate	Cases	Rate
Ohio	1,691	24.1	1,011	13.0	2,702	18.2	Lawrence	11	30.4	8	17.7	18	23.6
U.S.		23.4		12.0		17.3	Licking	23	22.7	13	11.0	37	16.5
Adams	3	19.2	3	12.8	6	15.8	Logan	6	18.8	5	16.2	11	17.3
Allen	16	26.6	9	12.0	25	19.1	Lorain	53	26.8	29	13.0	81	19.6
Ashland	7	22.1	4	13.9	11	17.6	Lucas	63	25.9	37	13.3	101	19.2
Ashtabula	14	20.0	7	9.0	20	14.5	Madison	7	23.6	4	19.3	11	20.0
Athens	7	23.6	6	18.7	13	20.8	Mahoning	31	20.5	18	11.4	49	15.7
Auglaize	10	31.8	3	9.2	13	20.2	Marion	10	23.1	6	15.8	16	19.3
Belmont	10	21.0	6	11.7	16	16.0	Medina	28	23.1	17	12.6	45	17.6
Brown	9	32.2	8	26.4	17	29.3	Meigs	6	42.2	3	18.1	9	28.9
Butler	58	26.4	34	14.3	91	19.9	Mercer	7	28.3	4	13.8	11	20.9
Carroll	4	19.3	2	13.2	6	16.2	Miami	18	26.9	11	15.0	29	20.5
Champaign	7	29.0	3	11.0	11	19.7	Monroe	3	22.1	1	17.7	4	19.9
Clark	21	25.3	14	15.6	35	20.0	Montgomery	88	28.1	50	14.1	137	20.5
Clermont	35	27.2	23	16.0	57	21.5	Morgan	3	33.6	2	15.0	5	24.7
Clinton	6	21.0	5	17.4	10	19.3	Morrow	5	19.9	4	17.2	9	18.5
Columbiana	16	21.4	9	12.2	25	16.7	Muskingum	15	30.9	10	17.0	25	23.0
Coshocton	6	24.2	3	9.8	8	16.8	Noble	2	16.5	<1	*	2	10.5
Crawford	10	34.1	5	15.3	14	24.5	Ottawa	8	23.1	3	11.4	11	17.1
Cuyahoga	169	22.6	105	11.9	274	16.7	Paulding	2	13.8	2	13.9	4	13.7
Darke	9	26.1	5	12.8	14	19.2	Perry	6	25.2	3	14.4	9	19.2
Defiance	5	21.4	5	19.9	10	20.7	Pickaway	12	33.2	8	19.7	20	26.2
Delaware	26	22.1	15	11.5	40	16.4	Pike	6	32.5	3	18.9	9	25.4
Erie	11	18.9	8	13.8	19	16.3	Portage	22	23.5	14	13.2	36	18.1
Fairfield	21	22.5	14	13.8	35	17.7	Preble	6	20.4	4	16.0	10	18.1
Fayette	4	23.2	2	14.0	7	18.3	Putnam	6	28.5	2	9.7	8	18.7
Franklin	138	22.4	89	12.5	227	16.9	Richland	21	26.1	12	14.7	33	20.1
Fulton	6	23.4	3	10.7	9	16.7	Ross	16	32.0	9	18.4	25	25.0
Gallia	5	28.5	4	22.7	9	25.3	Sandusky	9	24.1	7	18.5	16	21.2
Geauga	15	21.9	5	6.7	20	14.1	Scioto	12	27.5	10	19.0	22	23.3
Greene	21	21.3	14	11.9	35	16.4	Seneca	9	26.9	6	17.7	15	21.7
Guernsey	8	30.4	5	18.7	13	24.3	Shelby	7	25.3	5	16.0	12	20.0
Hamilton	107	24.4	67	12.8	175	18.0	Stark	47	20.2	28	10.4	75	14.9
Hancock	11	24.7	6	13.6	17	19.0	Summit	77	23.3	45	12.0	122	17.3
Hardin	7	42.3	4	23.1	11	32.0	Trumbull	27	18.6	16	10.6	42	14.5
Harrison	3	38.6	3	23.5	6	30.8	Tuscarawas	12	20.4	8	12.4	20	16.0
Henry	5	27.1	3	14.0	8	20.4	Union	8	22.1	4	11.3	11	16.6
Highland	9	34.4	3	10.2	12	21.5	Van Wert	4	20.7	3	15.2	6	17.4
Hocking	6	26.0	3	19.0	9	22.7	Vinton	2	27.3	1	16.5	4	21.8
Holmes	5	21.8	2	11.2	7	15.9	Warren	33	23.8	18	11.7	51	17.4
Huron	11	28.4	7	20.0	18	23.9	Washington	13	33.9	7	18.5	20	25.8
Jackson	6	29.6	4	20.9	9	24.7	Wayne	15	22.1	8	10.5	23	15.9
Jefferson	15	34.6	8	14.2	23	23.9	Williams	5	19.3	3	9.9	7	14.3
Knox	10	25.1	4	9.4	14	16.9	Wood	18	25.4	8	11.2	26	17.5
Lake	35	22.8	20	11.4	55	16.6	Wyandot	4	27.9	2	14.9	6	20.0

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2024; U.S. Cancer Statistics, Centers for Disease Control and Prevention and National Cancer Institute, June 2024. U.S. cancer incidence data for 2017-2021 was the most recent available at the time of this publication.
*Rate not presented when the total case count for 2018-2022 is less than five (i.e., the average annual count is less than one).

Sources of Data and Additional Information

Ohio Cancer Incidence Surveillance System:
Ohio Cancer Incidence Surveillance System (OCISS) | Ohio Department of Health

National Cancer Institute:
Kidney (Renal Cell) Cancer—Patient Version - NCI

American Cancer Society:
About Kidney Cancer | American Cancer Society

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