

Kidney & Renal Pelvis Cancer in Ohio, 2011-2015



Incidence and Mortality

Cancers of the kidney and renal pelvis made up 3.6 percent of newly diagnosed (incidence) cancer cases in Ohio reported to the Ohio Cancer Incidence Surveillance System (OCISS) from 2011 to 2015. An average of 2,316 cases of kidney and renal pelvis cancer were diagnosed annually in Ohio during this time period (Table 1). The average annual age-adjusted kidney and renal pelvis cancer incidence rate in Ohio was 16.8 per 100,000, compared to the national (SEER) incidence rate of 15.9 per 100,000. The kidney and renal pelvis cancer incidence rate among males (22.3 per 100,000) was 1.8 times higher than the rate among females (12.2 per 100,000), and the incidence rate was 13 percent higher among blacks (18.8 per 100,000) compared to whites (16.7 per 100,000) in Ohio in 2011-2015.

An average of 569 deaths from kidney and renal pelvis cancer occurred each year in Ohio in 2011-2015 (Table 1). Ohio's average annual age-adjusted kidney and renal pelvis cancer mortality rate was 4.0 per 100,000, compared to the U.S. mortality rate of 3.8 per 100,000. The mortality rate was more than two times higher for males (5.7 per 100,000) than females (2.6 per 100,000) in Ohio during this time period.

Key Findings and Populations at High Risk

- An average of 2,316 cases of kidney and renal pelvis cancer were diagnosed each year in Ohio in 2011-2015.
- The kidney and renal pelvis cancer incidence rate in Ohio was 16.8 per 100,000, compared to the national rate of 15.9 per 100,000 in 2011-2015.
- Kidney and renal pelvis cancers occur about two times more often in males than in females.
- Blacks have higher incidence rates of kidney and renal pelvis cancer than whites in Ohio and the United States.
- Kidney and renal pelvis cancer was most frequently diagnosed among people in the 60 to 64 and 65 to 69 age groups for males and females, respectively.
- In Ohio, kidney and renal pelvis cancer incidence rates increased approximately 60 percent for males and females from 1996 to 2015.
- Kidney and renal pelvis cancer incidence rates were higher in the southern part of Ohio in 2011-2015.
- The percentage of kidney and renal pelvis cancers diagnosed at an early stage increased from 1996 to 2015; whereas, those diagnosed at a late stage or unstaged/missing stage decreased.

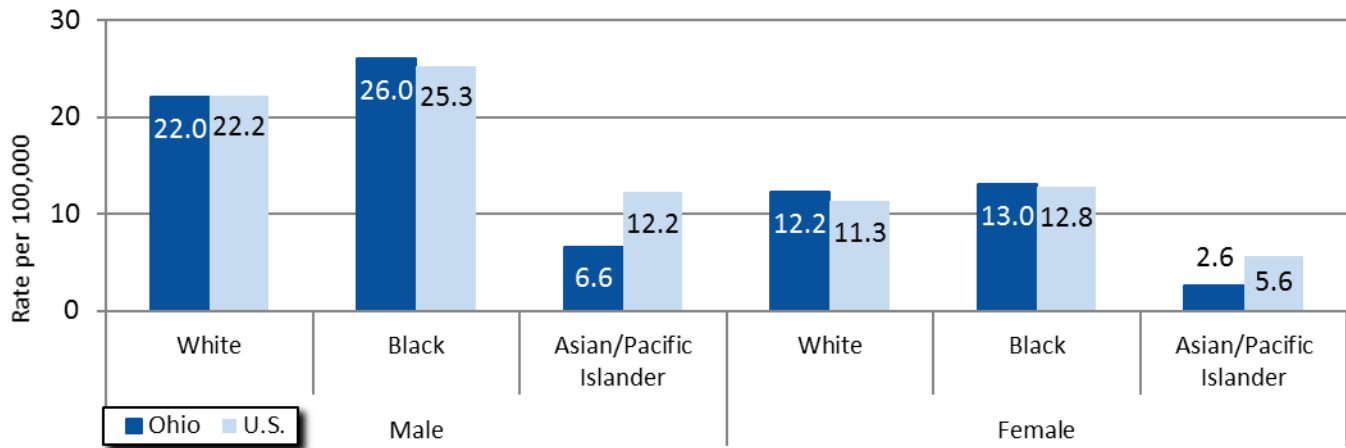
Table 1. Kidney & Renal Pelvis Cancer: Average Annual Number and Age-adjusted Rates of Cases and Deaths per 100,000 Persons by Sex, Race and Age Group, Ohio and the United States, 2011-2015

		Incidence			Mortality		
		Ohio Cases	Ohio Rate	U.S. Rate	Ohio Deaths	Ohio Rate	U.S. Rate
Total		2,316	16.8	15.9	569	4.0	3.8
Sex	Male	1,424	22.3	21.7	359	5.7	5.6
	Female	892	12.2	10.9	210	2.6	2.4
Race	White	2,023	16.7	16.3	511	4.0	4.0
	Black	267	18.8	18.3	56	4.1	3.7
	Asian/Pacific Islander	8	4.3	8.5	1	0.7	1.8
Age Group	<65	1,190	9.8	8.8	192	1.4	1.3
	65+	1,126	65.2	65.0	377	21.7	21.5

Sources: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018; Bureau of Vital Statistics, Ohio Department of Health, 2018; Surveillance, Epidemiology and End Results (SEER) Program, National Cancer Institute, 2018.

Incidence by Race and Sex

Figure 1. Kidney and Renal Pelvis Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons by Race and Sex, Ohio and the United States, 2011-2015

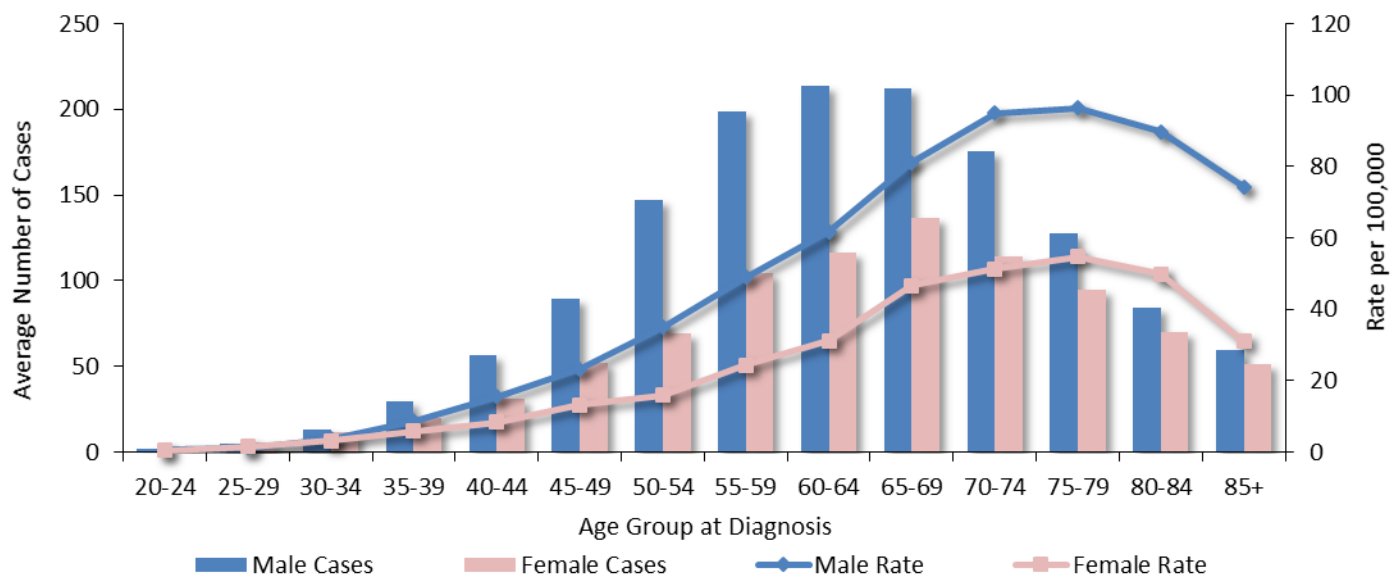


Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018; Surveillance, Epidemiology and End Results (SEER) Program, National Cancer Institute, 2018.

Figure 1 shows the kidney and renal pelvis cancer age-adjusted incidence rates in Ohio among males in 2011-2015 were higher than those of females for each race group. In both Ohio and the United States, Asians/Pacific Islanders had lower kidney and renal pelvis cancer incidence rates compared to both blacks and whites, with blacks having the highest incidence rates for both males and females.

Incidence by Age Group and Sex

Figure 2. Kidney and Renal Pelvis Cancer: Average Annual Number and Age-specific Incidence Rates per 100,000 Persons by Age Group and Sex, Ohio, 2011-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.

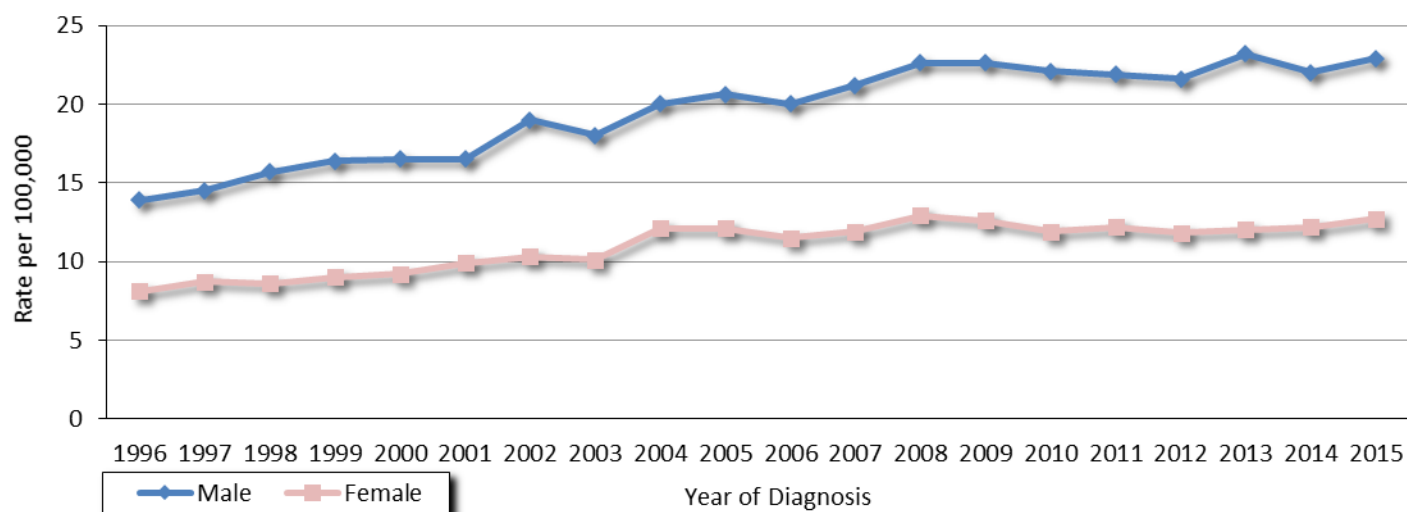
In Ohio between 2011 and 2015, kidney and renal pelvis cancer was most frequently diagnosed among people in the 60 to 64 age group for males and 65 to 69 age group for females (Figure 2). Incidence rates for both males and females increased with advancing age group from ages 20-24 years to 75-79 years, followed by a decline.

Trends in Incidence and Mortality

Figure 3 shows incidence rates of kidney and renal pelvis cancer according to year of diagnosis (1996 through 2015) for males and females in Ohio. For each year, the incidence rate was higher among Ohio males compared to females. Kidney and renal pelvis cancer incidence rates increased 60 percent for both males and females in Ohio from 1996 to 2015.

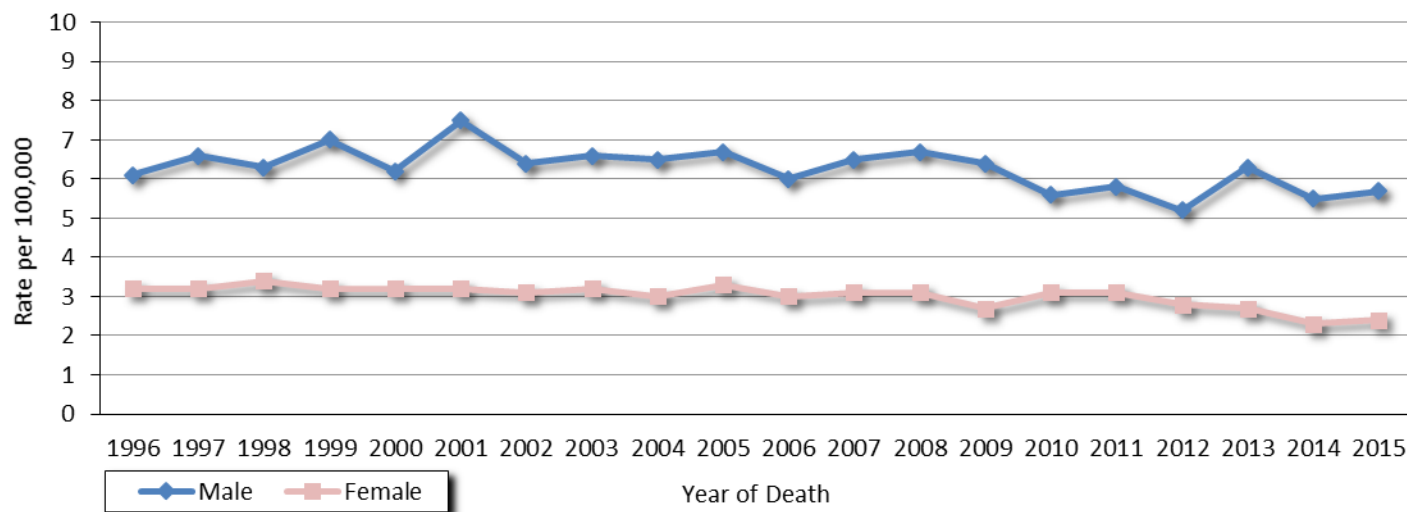
Figure 4 shows kidney and renal pelvis cancer mortality rates in Ohio according to year of death (1996 through 2015) for males and females. For each year, kidney and renal pelvis cancer mortality rates were higher among males compared to females in Ohio. The kidney and renal pelvis cancer mortality trend among males was variable from 1996 to 2015; whereas, there was a 25 percent decrease in mortality rates among females during this time period.

Figure 3. Kidney and Renal Pelvis Cancer: Trends in Age-adjusted Incidence Rates per 100,000 Persons by Sex in Ohio, 1996-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.

Figure 4. Kidney and Renal Pelvis Cancer: Trends in Age-adjusted Mortality Rates per 100,000 Persons by Sex in Ohio, 1996-2015

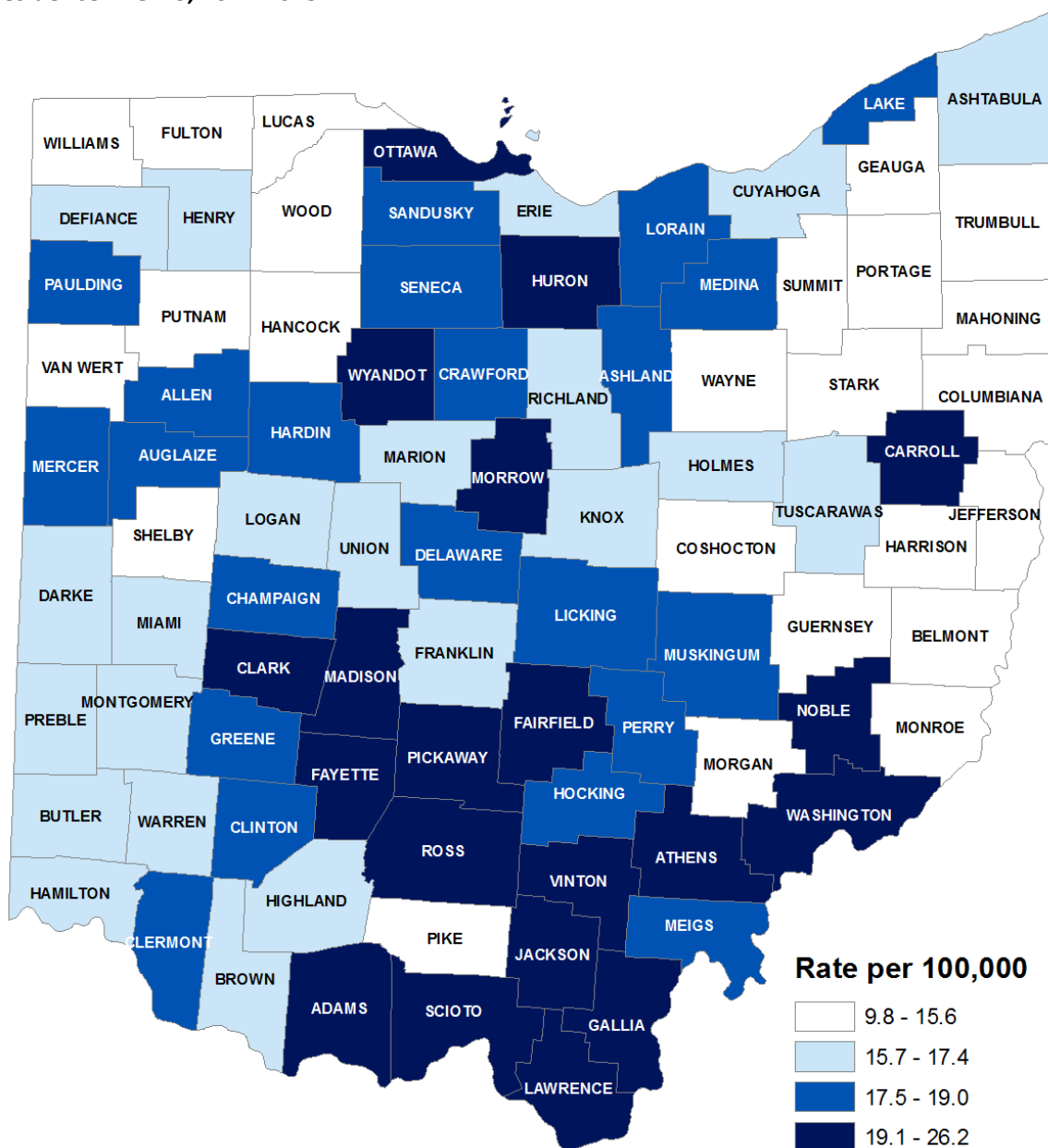


Source: Bureau of Vital Statistics, Ohio Department of Health, 2018.

Incidence by County

Figure 5 shows 2011-2015 average annual age-adjusted kidney and renal pelvis cancer incidence rates by county of residence. County-specific kidney and renal pelvis cancer incidence rates in Ohio ranged from 9.8 to 26.2 per 100,000 persons, compared with Ohio’s rate of 16.8 per 100,000. Incidence rates for kidney and renal pelvis cancer were highest in counties located in the southern part of Ohio in 2011-2015. The following counties had the highest incidence rates, in decreasing order, for this time period: Noble, Washington, Fayette, Morrow, Pickaway, Vinton, Jackson, Adams and Scioto.

Figure 5. Kidney and Renal Pelvis Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons by County of Residence in Ohio, 2011-2015



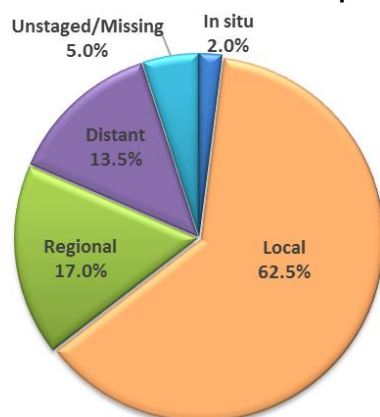
Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.

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

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 (62.5 percent) kidney and renal pelvis cancers were diagnosed at a local stage in 2011-2015 (Figure 6).

Figure 6. Kidney and Renal Pelvis Cancer: Proportion of Cases (%) by Stage at Diagnosis, Ohio, 2011-2015



in situ: Noninvasive; has not penetrated surrounding tissue

Local: Confined to primary site

Regional: Spread to regional lymph nodes

Distant: Cancer has metastasized

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

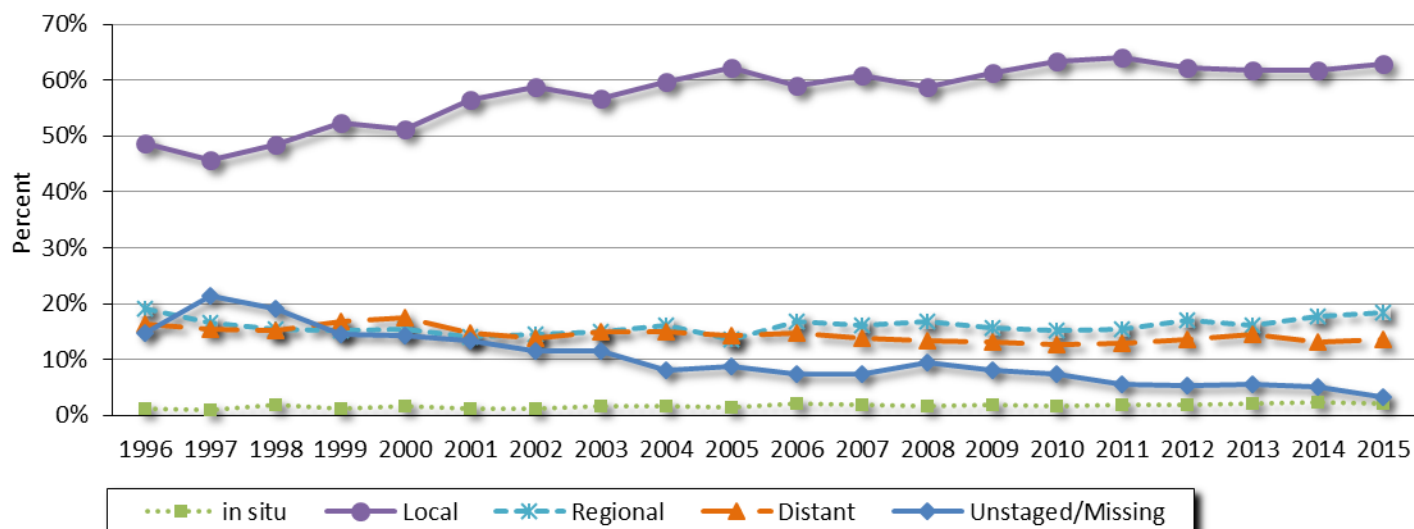
See definitions in Technical Notes on page 9.

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.

Trends in Stage at Diagnosis

Figure 7 shows the distribution of stage at diagnosis of kidney and renal pelvis cancer according to year of diagnosis from 1996 to 2015. There was an increase in the proportions of kidney and renal pelvis cancer cases diagnosed at an early (*in situ* or local) stage: *in situ* cases increased from 1 percent in 1996 to 2 percent in 2015 and local stage cases increased from 49 percent in 1996 to 63 percent in 2015. In contrast, the proportions of cases diagnosed at a late (regional or distant) stage decreased: regional stage cases decreased from 19 to 18 percent and distant stage cases decreased from 16 to 14 percent in Ohio from 1996 to 2015. The proportion of kidney and renal pelvis cancer cases with an unstaged/missing stage at diagnosis decreased 80 percent during this time period, from 15 percent in 1996 to 3 percent in 2015.

Figure 7. Kidney and Renal Pelvis Cancer: Trends in the Proportion of Cases (%) by Stage at Diagnosis, Ohio, 1996-2015



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.

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. Table 2 shows the U.S. (SEER) five-year relative survival probability for kidney and renal pelvis cancer in 2008-2014 was 74.5 percent for all stages combined. Five-year relative survival probabilities were 92.6 percent at the local stage, 68.7 percent at the regional stage and only 11.6 percent for distant-stage tumors. Five-year relative survival probability was greater for females (75.8 percent) compared to males (73.7 percent) for all stages combined.

Table 2: Kidney and Renal Pelvis Cancer: Five-year Relative Survival Probability (%) by Stage at Diagnosis and Sex in the United States, 2008-2014

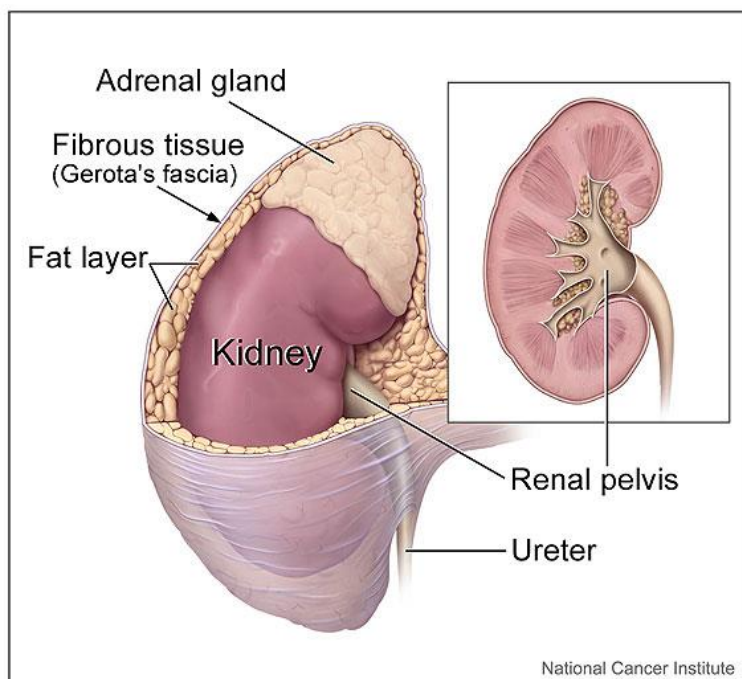
	Male	Female	Total
All Stages	73.7%	75.8%	74.5%
Local	92.5%	92.8%	92.6%
Regional	69.8%	66.6%	68.7%
Distant	11.3%	12.1%	11.6%
Unstaged/Missing	39.8%	35.5%	38.0%

Source: Surveillance, Epidemiology and End Results (SEER) Program, National Cancer Institute, 2018.

Did You Know?

- *About 2.1 percent of men and 1.2 percent of women will be diagnosed with kidney and renal pelvis cancer at some point during their lifetime.*
- *The rate of new kidney cancers has been increasing since the 1990s but has leveled off in recent years. Part of this increase is likely due to the use of newer imaging tests such as CT scans, which are able to detect some cancers that may not have been found otherwise.*

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 childhood cancer that usually develops before the age of five.

Table 3 indicates the predominant types of kidney and renal pelvis cancer in Ohio in 2011-2015. RCC is the most common type, making up about 87 percent of all cases of kidney and renal pelvis cancers.

Table 3: Kidney and Renal Pelvis Cancer: Average Annual Number and Proportion (%) of Cases by Histology, Ohio, 2011-2015

Histology	Cases	Percent
Renal cell carcinoma	2,019	87.2%
Clear cell	1,009	43.6%
Papillary	263	11.4%
Chromophobe	88	3.8%
Other RCC types	34	1.5%
NOS	625	27.0%
Transitional cell cancer	54	2.3%
Wilms tumor	21	0.9%
Other types	222	9.6%

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018.

RCC = Renal cell carcinoma

NOS = Not otherwise specified

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 usually diagnosed in adults ages 50 to 70 years.

Sex: Kidney and renal pelvis cancer is two to three times more common in men than in women.

Race: Blacks and American Indians/Alaskan Natives have higher rates of kidney and renal pelvis cancer than do whites.

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 RCC, hereditary leiomyomatosis and renal cell cancer (HLRCC), Birt-Hogg-Dube syndrome and familial renal cancer 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
- Low back pain on one side (not caused by injury)
- A lump on the side or lower back
- Fatigue
- Loss of appetite
- Weight loss not caused by dieting
- Fever that is not caused by an infection and that does not go away
- 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. 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.

Average Annual Number: The number of cases or deaths diagnosed per year, on average, for the time period of interest (e.g., 2011-2015). 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.

Census Data: The 1996-2015 rates were calculated using population estimates from the U.S. Census Bureau and National Center for Health Statistics. Population data were compiled from bridged-race intercensal population estimates for July 1, 1990-July 1, 1999; revised bridged-race intercensal population estimates for July 1, 2000-July 1, 2004 (released 10/26/2012); revised bridged-race intercensal population estimates for July 1, 2005-July 1, 2009 (released 6/26/2014) and vintage 2016 bridged-race postcensal population estimates for July 1, 2010-July 1, 2016 (released 6/26/2017).

Incidence: The number of cases diagnosed during a specified time period (e.g., 2011-2015). 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: A malignant tumor that has infiltrated the organ in which the tumor originated. 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.

Mortality: The number of deaths during a specified time period (e.g., 2011-2015). 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 1999-2015.

Rate: The number of cases or deaths per unit of population (e.g., per 100,000 persons) during a specified time period (e.g., 2011-2015). 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. It does not distinguish between patients who have no evidence of cancer and those who have relapsed or are still in treatment.

Stage at Diagnosis: The degree to which a tumor has spread from its site of origin at the time of diagnosis. Cancer stage is often related to survival and is used to select appropriate treatment. 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. The stages of cancer, in the order of increasing spread, are *in situ*, local, regional and distant. *In situ* and localized tumors are referred to as early stage tumors, and regional and distant tumors are termed late stage. Cancers diagnosed at the local, regional, distant and unstaged/missing stages are categorized as invasive.

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.

Table 4. Kidney and Renal Pelvis Cancer: Average Annual Number of Invasive Cancer Cases and Age-adjusted Incidence Rates per 100,000 Persons by County of Residence and Sex, Ohio and the United States, 2011-2015

	Male		Female		Total			Male		Female		Total	
	Cases	Rate	Cases	Rate	Cases	Rate		Cases	Rate	Cases	Rate	Cases	Rate
Ohio	1,424	22.3	892	12.2	2,316	16.8							
U.S.		21.7		10.9		15.9							
Adams	5	30.9	2	14.5	8	22.2	Lawrence	8	21.9	8	21.0	16	21.3
Allen	14	23.6	8	12.5	22	17.9	Licking	26	26.5	13	12.2	39	19.0
Ashland	7	22.7	4	13.1	11	17.5	Logan	5	18.7	4	13.5	9	15.7
Ashtabula	11	20.1	8	12.6	20	16.4	Lorain	41	24.2	27	13.8	68	18.7
Athens	9	32.1	4	12.3	13	21.5	Lucas	47	20.2	25	9.4	72	14.4
Auglaize	5	19.7	5	18.1	11	18.9	Madison	6	21.9	4	17.4	10	19.3
Belmont	8	17.0	6	13.3	14	14.9	Mahoning	30	20.0	18	11.0	48	15.2
Brown	6	20.8	4	14.4	10	17.4	Marion	9	22.9	4	9.6	13	15.7
Butler	41	21.8	27	12.8	68	17.0	Medina	23	23.9	15	13.4	38	18.3
Carroll	5	23.2	4	18.5	8	20.6	Meigs	3	20.7	2	15.0	5	17.5
Champaign	5	21.6	4	15.9	9	18.6	Mercer	7	25.2	3	11.0	10	18.0
Clark	22	28.1	14	14.4	35	20.7	Miami	13	20.9	10	13.5	23	16.9
Clermont	26	23.1	15	12.8	41	17.5	Monroe	<1	*	2	13.5	2	9.8
Clinton	5	23.1	3	12.4	8	17.9	Montgomery	68	23.0	47	12.9	115	17.4
Columbiana	14	18.9	9	12.1	22	15.6	Morgan	2	22.3	1	8.3	3	15.3
Coshocton	4	17.2	3	15.2	7	15.6	Morrow	6	29.6	4	17.2	10	23.3
Crawford	7	24.6	5	14.4	11	19.0	Muskingum	13	25.3	7	13.8	20	19.0
Cuyahoga	162	23.1	102	11.9	264	16.9	Noble	4	41.1	<1	*	4	26.2
Darke	6	19.1	5	13.3	11	15.7	Ottawa	9	31.5	3	9.5	12	20.1
Defiance	5	22.0	3	11.0	7	16.0	Paulding	3	27.2	2	11.1	5	19.0
Delaware	23	26.3	9	10.0	33	17.7	Perry	4	21.5	4	17.2	8	19.0
Erie	11	22.3	6	10.9	18	16.3	Pickaway	12	38.0	3	9.0	15	22.6
Fairfield	23	29.1	11	12.2	33	20.1	Pike	4	21.2	2	9.1	5	14.8
Fayette	6	36.2	2	12.0	8	23.9	Portage	15	17.1	10	9.7	25	13.2
Franklin	118	22.8	74	11.7	192	16.5	Preble	5	21.8	4	12.4	9	16.9
Fulton	5	18.5	3	8.9	8	13.5	Putnam	3	13.8	3	13.8	6	14.1
Gallia	6	32.2	2	10.9	8	21.0	Richland	16	21.5	11	13.3	26	17.1
Geauga	11	16.9	5	8.5	16	12.5	Ross	11	25.3	6	14.3	17	19.5
Greene	20	22.9	15	14.4	35	18.3	Sandusky	9	26.9	4	10.7	14	18.3
Guernsey	5	20.2	2	7.7	8	13.7	Scioto	13	30.2	7	15.2	20	22.1
Hamilton	91	22.4	60	11.6	151	16.4	Seneca	8	23.8	4	13.1	12	18.3
Hancock	9	20.2	6	11.8	14	15.6	Shelby	4	12.4	2	9.2	6	10.7
Hardin	3	18.5	3	18.1	6	17.9	Stark	43	19.4	27	10.3	71	14.5
Harrison	2	15.5	<1	*	3	10.7	Summit	58	19.3	41	11.5	100	15.0
Henry	3	19.7	2	11.8	6	15.8	Trumbull	25	18.7	19	12.1	44	15.3
Highland	6	22.9	3	11.0	9	16.6	Tuscarawas	12	21.4	6	11.5	19	16.0
Hocking	4	28.0	2	12.4	7	19.0	Union	5	18.8	4	14.3	9	16.4
Holmes	4	18.7	3	13.4	7	16.2	Van Wert	3	15.6	2	9.5	5	12.1
Huron	8	24.8	6	16.3	14	20.0	Vinton	2	21.8	2	23.1	4	22.3
Jackson	5	28.2	4	18.2	9	22.3	Warren	26	23.8	15	11.7	41	17.2
Jefferson	10	19.2	5	10.6	15	14.3	Washington	13	33.3	7	18.0	20	25.2
Knox	6	19.4	6	15.5	12	17.4	Wayne	11	16.9	8	12.9	20	14.8
Lake	33	25.1	20	12.5	53	18.4	Williams	6	21.9	2	8.9	8	15.1
							Wood	11	17.7	9	12.8	21	15.1
							Wyandot	3	23.8	2	14.7	5	19.2

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2018; Surveillance, Epidemiology and End Results (SEER) Program, National Cancer Institute, 2018.

*Rate not presented when the count for 2011-2015 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:

http://www.odh.ohio.gov/health/cancer/ocisshs/ci_surv1.aspx

National Cancer Institute:

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

American Cancer Society:

<https://www.cancer.org/cancer/kidney-cancer.html>

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Acknowledgements

The following individuals contributed to this report:

John Kollman, M.S.; Holly L. Sobotka, M.S.
Ohio Department of Health

Sincere appreciation to the OCISS, cancer registrars, medical records technicians and other health professionals who improve the collection and quality of cancer data in Ohio.

Suggested Citation

Kidney & Renal Pelvis Cancer in Ohio, 2011-2015. Ohio Cancer Incidence Surveillance System, Ohio Department of Health, May 2018.

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The OCISS is supported in part by the State of Ohio and the Centers for Disease Control and Prevention (CDC), National Program of Cancer Registries, cooperative agreement number NU58DP006284. The contents are the sole responsibility of the authors and do not necessarily represent the official views of the CDC.