



Liver & Intrahepatic Bile Duct Cancer in Ohio, 2010-2014

Incidence and Mortality

In Ohio, liver and intrahepatic bile duct cancer (hereafter, referred to as liver and IBD cancer) accounted for 1.5 percent of new invasive cancer cases (incidence) reported to the Ohio Cancer Incidence Surveillance System (OCISS) from 2010 through 2014. The average annual number of new cases of liver and IBD cancer in Ohio during this time period was 935, and the average annual age-adjusted incidence rate was 6.5 cases per 100,000 (Table 1). This was 26 percent lower than the U.S. rate of 8.6 per 100,000. Estimated completeness of reporting for liver and IBD cancer in Ohio was 85 percent in 2010-2014, therefore the liver and IBD cancer incidence rates presented in this report may underestimate the true burden in Ohio. In Ohio, the liver and IBD cancer incidence rate among males (9.9 per 100,000) was 2.8 times the rate for females (3.6 per 100,000). In Ohio and the United States, liver and IBD cancer incidence rates were also high among blacks, Hispanics and those 65 and older.

An average of 796 deaths from liver and IBD cancer occurred each year in Ohio from 2010 to 2014 (Table 1). Ohio's average annual age-adjusted liver and IBD cancer mortality rate (5.6 per 100,000) was 11 percent lower than the U.S. mortality rate (6.3 per 100,000). For Ohio males, the liver and IBD cancer mortality rate (8.3 per 100,000) was 2.4 times the rate for Ohio females (3.4 per 100,000) in 2010-2014. In Ohio and the United States, liver and IBD cancer mortality rates were also high among blacks, Hispanics and those 65 and older.

Key Findings & Populations at High Risk

- In 2010-2014, the liver and IBD cancer incidence rate in Ohio was 26 percent lower than the U.S. rate, while the mortality rate in Ohio was 11 percent lower than the U.S. rate.
- For both incidence and mortality, liver and IBD rates were highest among males, blacks, Hispanics and those 65 and older.
- From 1996 to 2014, liver and IBD cancer incidence rates more than doubled in Ohio, while mortality rates increased approximately 33 percent.
- In Ohio, only one-third of liver and IBD cancers were diagnosed at an early (local) stage.
- The U.S. five-year relative survival probability for liver and IBD cancer was poor (17.6 percent) and varied considerably by stage at diagnosis, from 31.1 percent for those diagnosed at local stage to 2.8 percent for those diagnosed at distant stage.
- In 2010-2014, the vast majority (93.8 percent) of liver and IBD cancers were carcinomas and, of these, the majority (70.8 percent) were hepatocellular carcinomas.

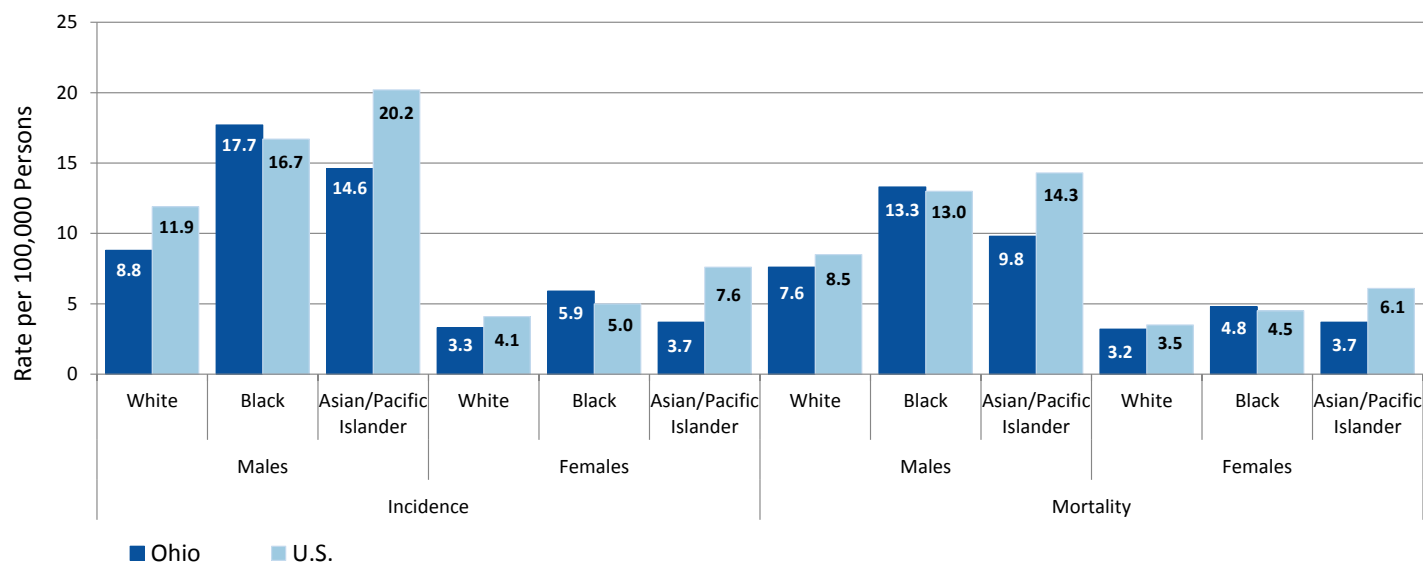
Table 1. Liver & IBD Cancer: Average Annual Number of Cases and Deaths and Age-adjusted Incidence and Mortality Rates per 100,000 Persons by Sex, Race, Ethnicity and Age Group in Ohio and the United States, 2010-2014

		Incidence			Mortality		
		Ohio Cases	Ohio Rate	U.S. Rate	Ohio Deaths	Ohio Rate	U.S. Rate
Total		935	6.5	8.6	796	5.6	6.3
Sex	Male	658	9.9	13.3	532	8.3	9.2
	Female	277	3.6	4.6	263	3.4	3.7
Race	White	734	5.8	7.8	657	5.2	5.8
	Black	169	11.2	10.1	124	8.5	8.2
	Asian/Pacific Islander	15	8.6	13.2	10	6.7	9.7
Ethnicity	Hispanic	19	8.9	9.1	14	7.2	13.2
Age Group	<65	485	3.6	4.7	337	2.5	2.8
	65+	451	26.6	35.4	459	27.0	30.3

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2017; Surveillance, Epidemiology and End Results Program, National Cancer Institute, 2017; Bureau of Vital Statistics, Ohio Department of Health, 2017; National Center for Health Statistics, 2017.

Liver & IBD Cancer Incidence and Mortality by Race and Sex

Figure 1. Liver & IBD Cancer: Average Annual Age-adjusted Incidence and Mortality Rates per 100,000 Persons by Race and Sex in Ohio, 2010-2014



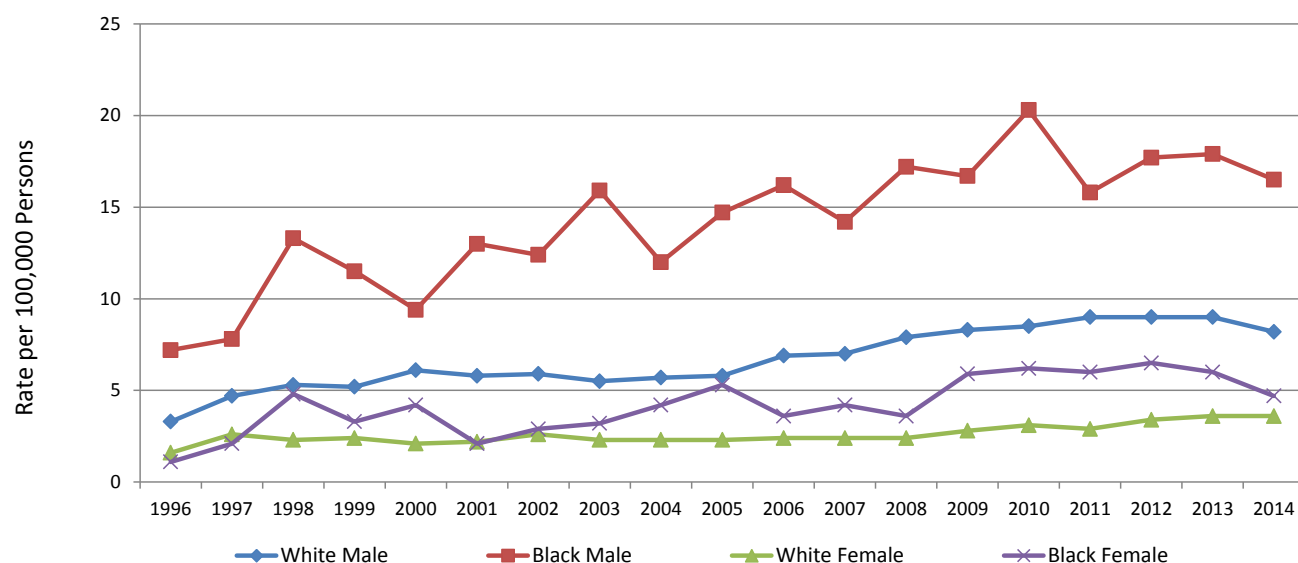
Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2017; Bureau of Vital Statistics, Ohio Department of Health, 2017.

As shown in Figure 1, in Ohio and the United States, liver and IBD cancer incidence rates were considerably higher (more than double) among males, compared to females. Among males, blacks had the highest liver and IBD cancer incidence rate (17.7 per 100,000) in Ohio in 2010-2014, followed by Asians/Pacific Islanders (14.6 per 100,000) and whites (8.8 per 100,000). Among females, blacks also had the highest liver and IBD cancer incidence rate (5.9 per 100,000) in Ohio, followed by Asians/Pacific Islanders (3.7 per 100,000) and whites (3.3 per 100,000). However, for both males and females, in the United States, liver and IBD cancer incidence rates were higher among Asians/Pacific Islanders, compared to blacks and whites.

Similar to incidence, in Ohio and in the United States, liver and IBD cancer mortality rates were considerably higher among males, compared to females. Among males, blacks had the highest liver and IBD cancer mortality rate (13.3 per 100,000) in Ohio in 2010-2014, followed by Asians/Pacific Islanders (9.8 per 100,000) and whites (7.6 per 100,000). Among females, blacks also had the highest liver and IBD cancer mortality rate (4.8 per 100,000) in Ohio, followed by Asians/Pacific Islanders (3.7 per 100,000) and whites (3.2 per 100,000). In the United States, for both males and females, liver and IBD cancer mortality rates were higher among Asians/Pacific Islanders, compared to blacks and whites (Figure 1).

Liver & IBD Cancer Incidence and Mortality Trends by Race and Sex

Figure 2. Liver & IBD Cancer: Trends in Annual Age-adjusted Incidence Rates per 100,000 Persons by Race and Sex in Ohio, 1996-2014

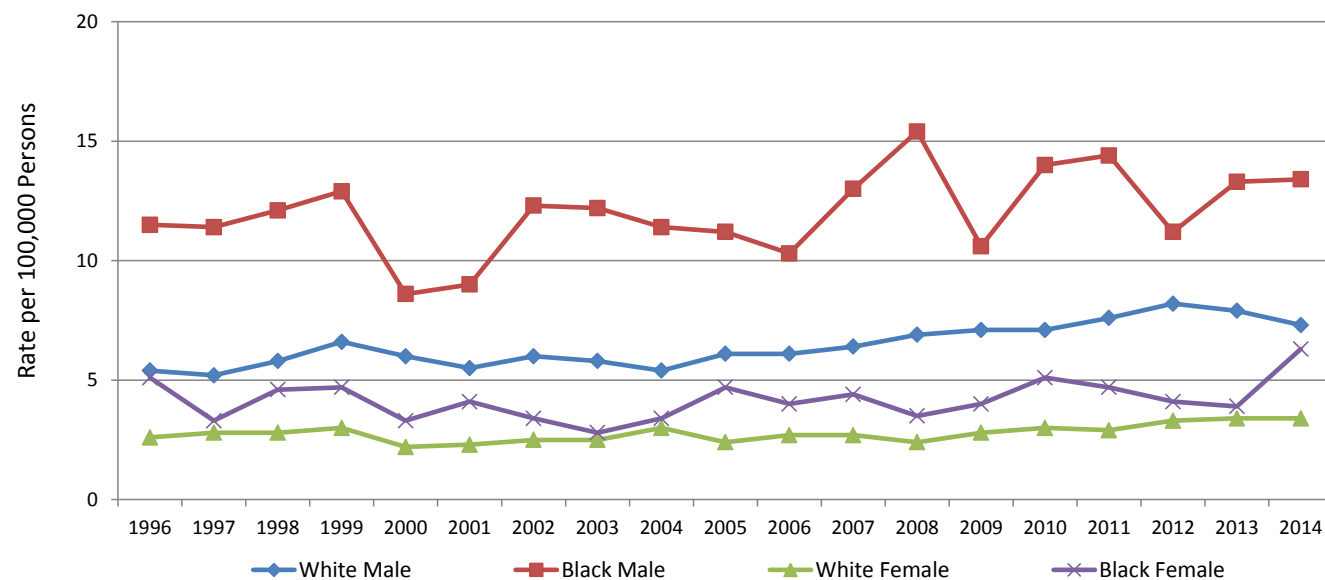


Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2017.

Figure 2 shows liver and IBD cancer incidence rates by year of diagnosis (1996 through 2014) and race-sex group. For each year, black males had the highest incidence rate. Liver and IBD cancer incidence rates more than doubled for each race-sex group from 1996 to 2014 in Ohio. This increase in incidence is consistent with what has been observed in the United States.

Figure 3 shows liver and IBD cancer mortality rates by year of death (1996 through 2014) and race-sex group. For each year, black males had the highest mortality rate. Liver and IBD cancer mortality rates increased about 33 percent from 1996 to 2014 for all race-sex groups combined in Ohio.

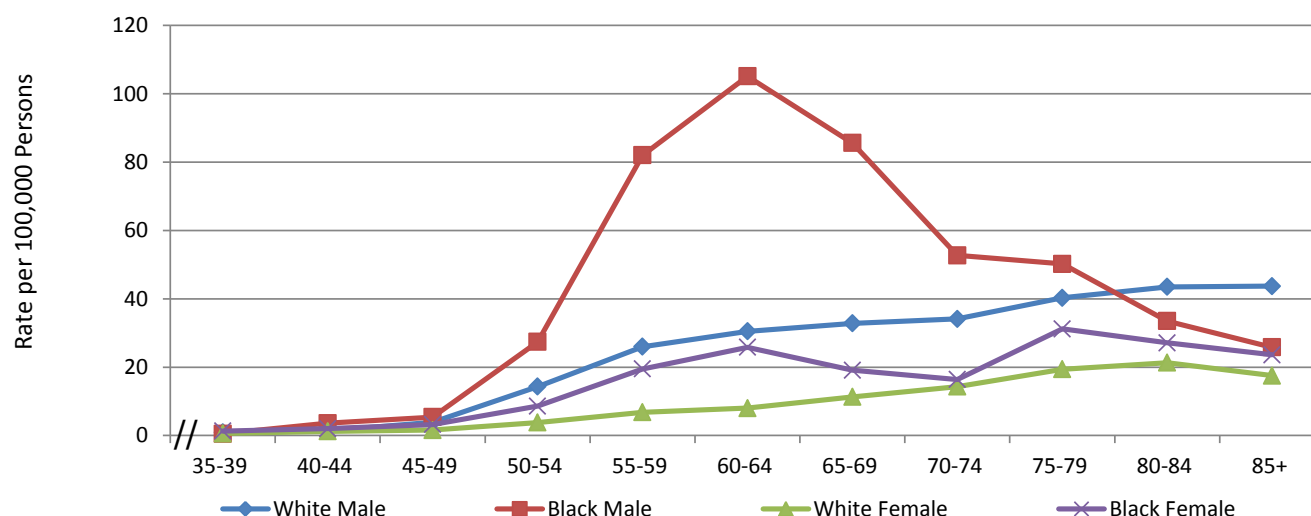
Figure 3. Liver & IBD Cancer: Trends in Annual Age-adjusted Mortality Rates per 100,000 Persons by Race and Sex in Ohio, 1996-2014



Source: Bureau of Vital Statistics, Ohio Department of Health, 2017.

Liver & IBD Cancer Incidence by Race, Sex and Age

Figure 4. Liver & IBD Cancer: Average Annual Age-specific Incidence Rates per 100,000 Persons by Race, Sex and Age Group in Ohio, 2010-2014

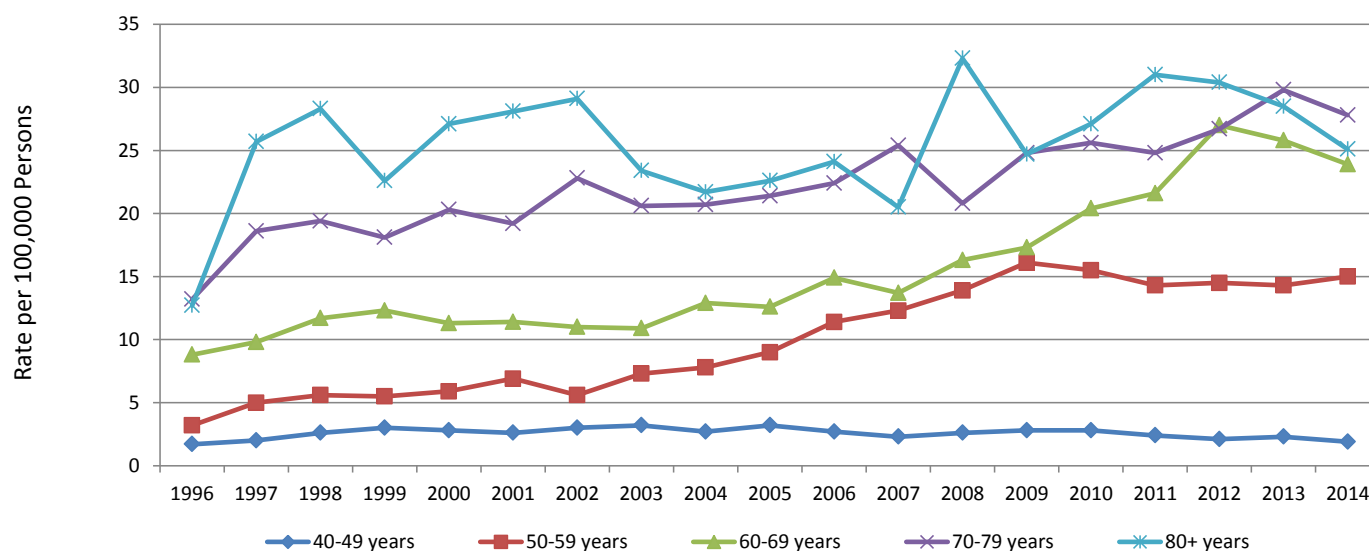


Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2017.

Figure 4 presents 2010-2014 age-specific liver and IBD cancer incidence rates by race-sex group. For black males, incidence rates increased considerably through ages 60-64, then decreased through ages 85+. For black females, incidence rates increased through ages 60-64, then fluctuated through ages 85+. Incidence rates increased relatively steadily with advancing age group for white males and white females.

Figure 5 shows trends in age-specific liver and IBD cancer incidence rates from 1996 through 2014. Among those ages 40-49 years, the liver and IBD cancer incidence rate remained stable from 1996 through 2014. Incidence rates more than doubled between 1996 and 2014 among those ages 50 and older, with the greatest increases occurring among those 50-59 years and those 60-69 years.

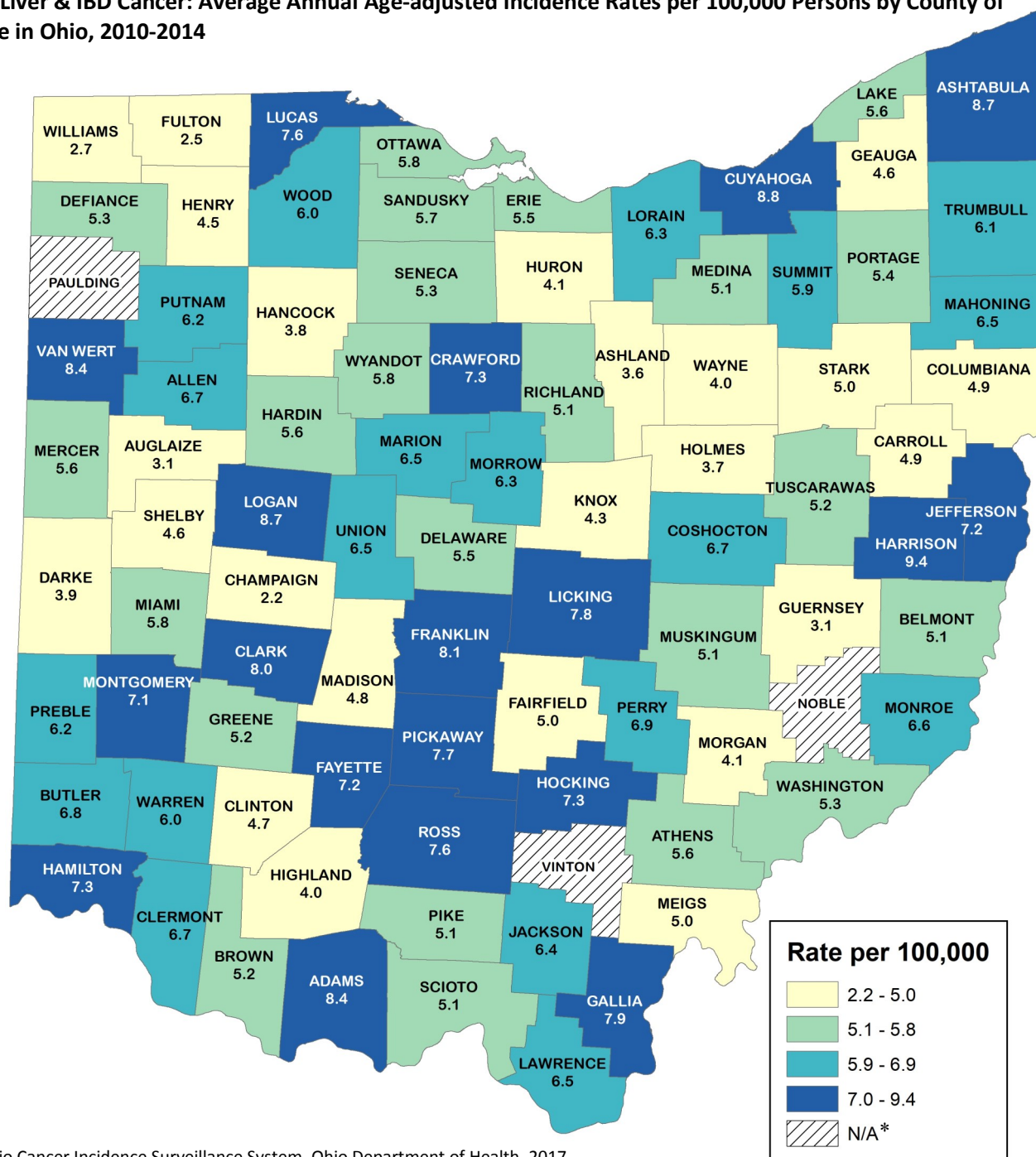
Figure 5. Liver & IBD Cancer: Trends in Annual Age-specific Incidence Rates per 100,000 Persons by Age Group in Ohio, 1996-2014



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2017.

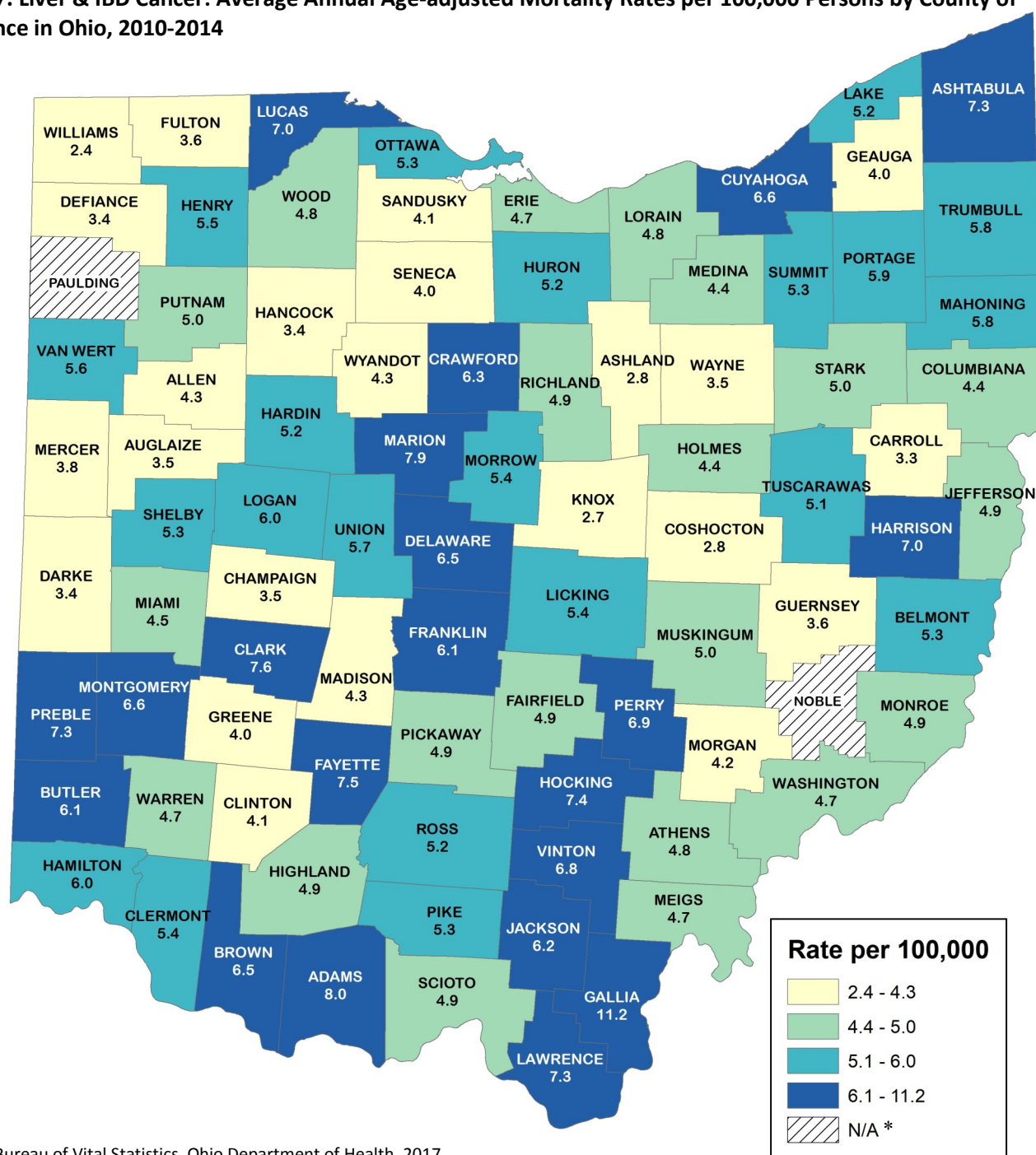
Liver & IBD Cancer Incidence by County of Residence

Figure 6. Liver & IBD Cancer: Average Annual Age-adjusted Incidence Rates per 100,000 Persons by County of Residence in Ohio, 2010-2014



Liver & IBD Cancer Mortality by County of Residence

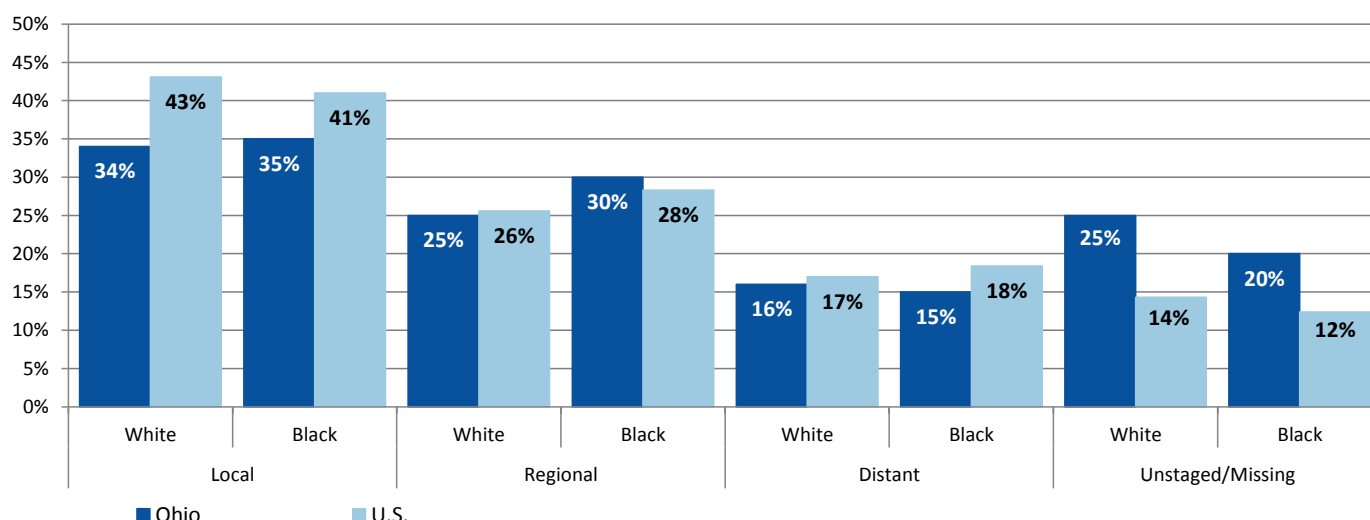
Figure 7. Liver & IBD Cancer: Average Annual Age-adjusted Mortality Rates per 100,000 Persons by County of Residence in Ohio, 2010-2014



Liver & IBD Cancer Stage at Diagnosis by Race

Figure 8 shows the proportion of liver & IBD cancers by stage at diagnosis and race in Ohio in 2010-2014. More than one-third of liver cancers were diagnosed at a local stage among both whites and blacks in Ohio, which is lower than the proportions of cases diagnosed at this early stage in the United States. There was a higher proportion of cases with an unstaged/missing stage at diagnosis for both blacks and whites in Ohio compared to the United States.

Figure 8. Liver & IBD Cancer: Proportion (%) of Cases by Stage at Diagnosis and Race in Ohio and the United States, 2010-2014

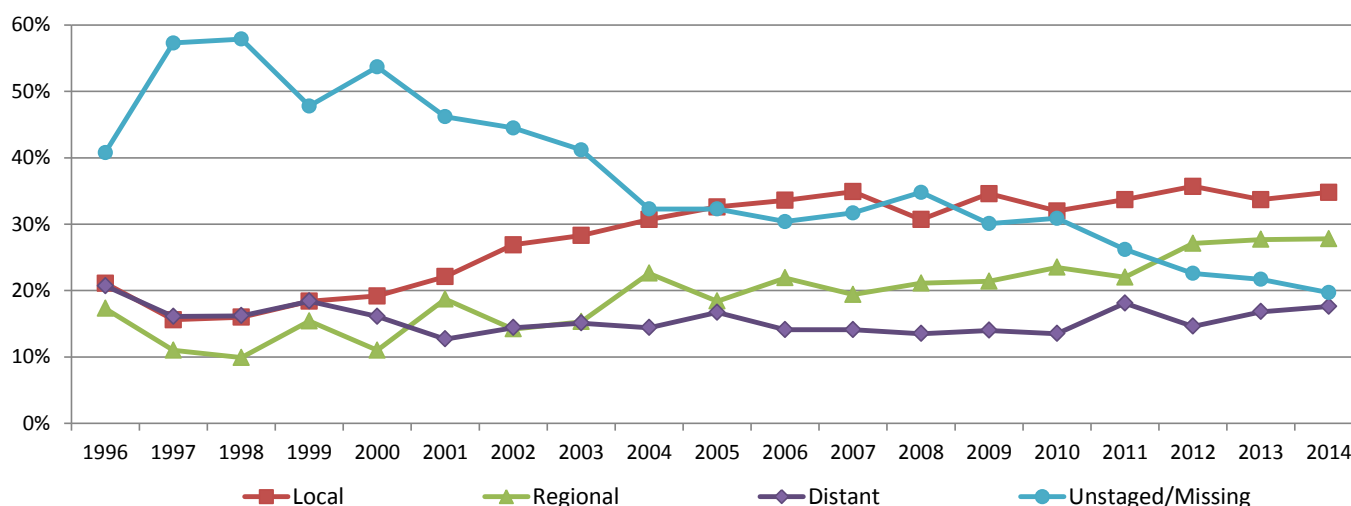


Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2017; Surveillance, Epidemiology and End Results Program, National Cancer Institute, 2017.

Note: Percentages may not sum to 100 because of rounding.

Figure 9 shows proportions of liver and IBD cancer cases diagnosed at each stage at diagnosis from 1996 to 2014. There was a decrease in the proportion of liver and IBD cancers with an unstaged/missing stage from 1996 to 2014, while there was an increase in the proportions of local and regional stage cancers. The proportion diagnosed at distant stage remained relatively stable from 1996 to 2014. Stage at diagnosis data by county is shown in Table 6 on page 15.

Figure 9. Liver & IBD Cancer: Trends in Proportion (%) of Cases by Stage at Diagnosis in Ohio, 1996-2014



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2017.

Liver & IBD Cancer by Histologic Type

Table 2 shows the proportions of liver and IBD cancer cases according to histologic type. Almost all (93.8%) liver and IBD cancers were carcinomas. In both Ohio and the United States, hepatocellular carcinoma was the most common type of carcinoma. In Ohio, carcinomas made up a lower percentage of liver and IBD cancers compared to the United States; this difference is largely accounted for by the higher percentage of unspecified liver and IBD cancers in Ohio.

Table 2. Liver & IBD Cancer: Average Annual Number and Proportion (%) of Cases by Histologic Type in Ohio and the United States, 2010-2014

	Ohio Cases	Ohio Percent	U.S. Percent
Carcinoma (8010-8576)	877	93.8%	97.2%
Hepatocellular carcinoma (8170-8175)	662	70.8%	72.7%
Cholangiocarcinoma (8032-8033, 8070-8071, 8140-8141, 8160, 8260, 8480-8481, 8490, 8560)	180	19.2%	20.6%
Other carcinoma ^a	35	3.7%	3.9%
Hepatoblastoma (8970)	7	0.8%	1.0%
Sarcoma^b	5	0.6%	0.8%
Unspecified (8000-8004)	44	4.7%	0.8%

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2017; Surveillance, Epidemiology and End Results Program, National Cancer Institute, 2017.

Note: Percentages may not sum to 100 due to rounding.

^a Other carcinomas include histologies 8010, 8012-8013, 8020-8022, 8031, 8035, 8041-8042, 8046, 8050, 8124, 8142, 8154, 8161-8162, 8180, 8190, 8211, 8240, 8246, 8249, 8255, 8290, 8310, 8323, 8337, 8440, 8450, 8453, 8470-8471, 8500, 8503, 8510, 8521, 8550, 8574, 8576.

^b Sarcoma includes histologies 8800-8806, 8810, 8815, 8830, 8850, 8852, 8854, 8890-8891, 8894-8896, 8900, 8910, 8920, 8935-8936, 8940, 8963, 8990, 9040-9041, 9044, 9120, 9124, 9130, 9133, 9150, 9180, 9220, 9260, 9364, 9473, 9500, 9540, 9560, 9581.

Liver & IBD Cancer Survival Probability

Table 3. Liver & IBD Cancer: Five-year Survival Probability (%) by Stage at Diagnosis, Age Group, Race and Sex in the United States, 2007-2013

	Age Group			White			Black		
	Total	<65 Years	65+ Years	All	Male	Female	All	Male	Female
All Stages	17.6%	21.3%	12.2%	16.8%	16.5%	17.6%	13.4%	12.8%	15.1%
Local	31.1%	36.2%	23.2%	29.6%	29.3%	30.4%	25.1%	23.6%	29.3%
Regional	10.7%	13.1%	6.6%	10.8%	10.4%	12.0%	7.0%	7.2%	6.8%
Distant	2.8%	3.7%	1.4%	3.0%	2.3%	5.0%	1.2%	1.2%	1.6%
Unstaged/Missing	6.4%	9.5%	3.6%	5.7%	5.5%	6.3%	6.3%	7.4%	4.6%

Source: Surveillance, Epidemiology and End Results Program, National Cancer Institute, 2017.

Table 3 shows the U.S. (SEER) five-year liver and IBD cancer relative survival probability in 2007-2013 by stage at diagnosis, age group, race and sex. The five-year relative survival probability for liver and IBD cancer was very low, especially for those diagnosed at regional (10.7 percent) and distant (2.8 percent) stages. For all stages combined, the survival probability was lower among blacks (13.4 percent) compared to whites (16.8 percent) and among those 65 and older (12.2 percent) compared to those younger than 65 (21.3 percent).

Liver & IBD Cancer Risk Factors and Populations at High Risk

Non-Modifiable Risk Factors:

- **Age:** Most liver cancers occur in people who are 60 years of age or older.
- **Sex:** Liver cancer is more than twice as common in men as women.
- **Race and ethnicity:** In the United States, Asians/Pacific Islanders, American Indians/Alaskan Natives and Hispanics have the highest rates of liver cancer, followed by blacks. Whites have the lowest rates of liver cancer.
- **Inherited metabolic diseases:** Diseases such as hemochromatosis (a disease in which too much iron is absorbed from food) increase liver cancer risk. Other rare diseases that increase the risk of liver cancer include: tyrosinemia, alpha1-antitrypsin deficiency, porphyria cutanea tarda, glycogen storage diseases and Wilson's disease.
- **Inflammatory bowel disease:** People with ulcerative colitis and Crohn's disease are at increased risk for bile duct cancer.
- **Chronic inflammation of the bile ducts:** Risk for bile duct cancer increases for individuals who have chronic inflammation of the bile ducts.

Potentially Modifiable Risk Factors:

Differences in liver cancer rates by sex and race/ethnicity are largely the result of differences in risk factor prevalence. In the United States, approximately 60 to 70 percent of liver cancers are potentially preventable.

- **Cirrhosis:** Individuals with cirrhosis, a disease where liver cells are damaged and replaced with scar tissue, are at increased risk for liver cancer. Most people who develop liver cancer have cirrhosis. Cirrhosis is often caused by alcohol abuse, chronic hepatitis B virus (HBV) or chronic hepatitis C virus (HCV) infections and/or obesity. Primary biliary cirrhosis, an autoimmune disease, can also cause cirrhosis.
- **Obesity/overweight:** Excess body weight accounts for approximately one-third of liver cancers in the United States. Liver cancer risk increases by 26 percent per 5 kg/m² increase in body mass index (BMI). People with non-alcoholic fatty liver disease, a condition common in obese people, can develop cirrhosis and are therefore more likely to develop liver cancer.
- **Chronic infection with HBV or HCV:** Chronic HCV infection is a leading cause of liver cancer in the United States, accounting for about 25 percent of liver cancers. While HBV infection is the most common cause of liver cancer worldwide, it accounts for approximately 5 percent of liver cancers in the United States. Hepatitis is transmitted through sharing contaminated needles, unprotected sex or childbirth.
- **Smoking:** Smoking increases the risk of liver cancer by about 50 percent.
- **Heavy alcohol use:** Heavy alcohol use increases the risk of liver cancer.
- **Type 2 diabetes:** Individuals with type 2 diabetes are at increased risk of liver cancer.
- **Anabolic steroids:** There is a slight increased risk of liver cancer for long-term anabolic steroid users.
- **Exposure to chemicals:** Exposure to vinyl chloride, a heavily regulated chemical used in making some plastics, increases risk of liver cancer. Thorium dioxide (Thorotrast) exposure, used in the past in certain x-ray tests, also increases risk.
- **Arsenic:** Drinking water from wells contaminated with naturally occurring arsenic over a long period of time increases liver cancer risk.
- **Aflatoxins:** While more common in tropical climates, long-term exposure to grains or nuts contaminated with aflatoxins (a cancer-causing substance produced by a fungus) increases risk of liver cancer. Food in the United States is tested for aflatoxins.
- **Infection with parasites:** Infection with the parasite that causes schistosomiasis increases liver cancer risk. While this parasite is not found in the United States, infection can occur in Asia, Africa and South America.

Liver & IBD Cancer Signs and Symptoms

Signs and symptoms of liver and IBD cancer are often not apparent in the early stages of the disease. For individuals at high risk, the National Comprehensive Cancer Center (NCCN) recommends alpha-fetoprotein (AFP) blood tests and ultrasounds every six to 12 months.

Some of the more common symptoms of liver and IBD cancer include:

- Unexplained weight loss
- Loss of appetite or feeling full after a small meal
- Nausea or vomiting
- Ongoing weakness or fatigue
- Fever not caused by other conditions
- Pain on the right side of the abdomen or near the right shoulder blade
- Enlarged liver, felt as a mass under the ribs on the right side
- Enlarged spleen, felt as a mass under the ribs on the left side
- Abdominal swelling or bloating
- Itching
- Jaundice (yellowing of the skin and eyes)
- Light-colored stools or dark urine

In addition, liver tumors can make hormones that may cause:

- High blood calcium levels
- Low blood sugar levels
- High red blood cell counts
- High cholesterol levels
- In males, gynecomastia (breast enlargement) and/or shrinkage of the testicles

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

Did You Know?

In the United States, the liver and IBD cancer incidence rate more than doubled over the past two decades and the mortality rate increased faster than that for any other cancer. The two primary factors contributing to the increase in incidence are a higher rate of hepatitis C virus infection among baby boomers (born between 1945 and 1965) and an increase in the prevalence of obesity and associated type 2 diabetes.

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., 2010-2014). 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 1996-2014 rates were calculated using bridged-race intercensal population estimates for July 1, 1996-July 1, 1999 (U.S. Census Bureau and National Center for Health Statistics, 2004); revised bridged-race intercensal population estimates for July 1, 2000-July 1, 2009 (U.S. Census Bureau and National Center for Health Statistics, 2012); and vintage 2015 bridged-race postcensal population estimates for July 1, 2010-July 1, 2015 (U.S. Census Bureau and National Center for Health Statistics, 2016).

Incidence: The number of cases diagnosed during a specified time period (e.g., 2010-2014). Liver & IBD cases were defined as follows: International Classification of Diseases for Oncology, Third Edition (ICD-O-3), codes C220-C221, excluding types 9050-9055, 9140, 9590-9992.

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., 2010-2014). Liver & IBD deaths were defined as follows: International Statistical Classification of Diseases and Related Health Problems, Tenth Edition (ICD-10), codes C220-C229.

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). Rates may be unstable and are not presented when the case 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 diagnosis, in the order of increasing spread, are *in situ*, local, regional and distant. In general, *in situ* and local 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.

Clinical Trials Information

Clinical trials test many types of treatments including new drugs, surgical procedures, radiation therapy and combinations of these. The goal of conducting clinical trials is to find better ways to treat cancer. To obtain information concerning clinical trials for liver and IBD cancer, talk to your healthcare provider or visit one of the following web sites:

- **National Cancer Institute:**
<http://www.cancer.gov/about-cancer/treatment/clinical-trials>
- **American Cancer Society:**
<http://www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html>
- **National Institutes of Health:**
<https://clinicaltrials.gov/>
- **Center Watch:**
<http://www.centerwatch.com/>
- **The Ohio State University Comprehensive Cancer Center—Arthur G. James Cancer Hospital and Richard J. Solove Research Institute:**
<http://cancer.osu.edu/cancer-specialties/clinical-trials>
- **The Cleveland Clinic:**
<http://my.clevelandclinic.org/departments/cancer/research-innovations/what-is-clinical-trial>
- **Case Western Reserve University Comprehensive Cancer Center:**
<http://cancer.case.edu/patientinfo/clinical-trials/>
- **University of Cincinnati:**
<http://cancer.uc.edu/patientcare/ClinicalTrials/Overview.aspx>
- **Toledo Community Hospital Oncology Program:**
<https://www.clinicaltrialsgps.com/ohio/toledo/toledo-community-hospital-oncology-program-ccop/facility-75791/>
- **Dayton Clinical Oncology Program:**
<http://dayton-clinical-oncology-program.org/>
- **Columbus Community Clinical Oncology Program:**
<http://columbusccop.org/index.php?page=cancer-related-sites-and-information>

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/liver>
<https://www.cancer.gov/types/liver/hp>
- **American Cancer Society:**
<https://www.cancer.org/cancer/liver-cancer.html>

Table 4. Liver & IBD Cancer: Average Annual Number of Cases and Age-adjusted Incidence Rates per 100,000 Persons by County of Residence and Sex in Ohio, 2010-2014

	Male		Female		Total			Male		Female		Total	
	Cases	Rate	Cases	Rate	Cases	Rate		Cases	Rate	Cases	Rate	Cases	Rate
Ohio	658	9.9	277	3.6	935	6.5	Lawrence	4	10.4	1	3.1	5	6.5
U.S.		13.3		4.6		8.6	Licking	9	9.7	6	6.1	15	7.8
Adams	2	12.9	<1	*	3	8.4	Logan	3	11.3	2	6.4	5	8.7
Allen	7	10.4	3	3.4	9	6.7	Lorain	17	9.1	8	3.9	25	6.3
Ashland	2	5.5	<1	*	2	3.6	Lucas	30	12.3	10	3.6	40	7.6
Ashtabula	8	13.4	3	4.8	11	8.7	Madison	2	8.0	<1	*	2	4.8
Athens	2	8.1	1	3.7	3	5.6	Mahoning	16	10.2	7	3.1	23	6.5
Auglaize	1	4.7	<1	*	2	3.1	Marion	5	12.3	<1	*	5	6.5
Belmont	3	6.2	2	4.3	5	5.1	Medina	7	6.8	4	3.6	10	5.1
Brown	2	6.7	1	3.9	3	5.2	Meigs	<1	*	<1	*	2	5.0
Butler	18	10.2	8	4.1	27	6.8	Mercer	2	7.5	1	4.0	3	5.6
Carroll	1	7.1	<1	*	2	4.9	Miami	4	7.2	3	4.4	7	5.8
Champaign	1	4.6	0	*	1	2.2	Monroe	1	9.6	<1	*	2	6.6
Clark	10	11.6	5	4.9	15	8.0	Montgomery	35	11.2	14	3.7	49	7.1
Clermont	10	9.2	6	4.9	16	6.7	Morgan	<1	*	<1	*	1	4.1
Clinton	2	6.1	1	3.4	3	4.7	Morrow	3	10.6	<1	*	3	6.3
Columbiana	5	7.8	2	2.5	7	4.9	Muskingum	4	8.4	1	2.3	5	5.1
Coshocton	2	11.5	<1	*	3	6.7	Noble	<1	*	0	*	<1	*
Crawford	3	10.1	2	4.9	5	7.3	Ottawa	3	10.0	<1	*	4	5.8
Cuyahoga	108	14.2	41	4.4	149	8.8	Paulding	0	*	<1	*	<1	*
Darke	2	5.6	1	2.4	3	3.9	Perry	2	8.5	1	5.2	3	6.9
Defiance	2	7.8	<1	*	3	5.3	Pickaway	3	10.6	2	5.1	5	7.7
Delaware	6	6.9	4	4.1	10	5.5	Pike	1	8.9	<1	*	2	5.1
Erie	5	8.9	1	2.4	6	5.5	Portage	8	9.3	2	1.9	10	5.4
Fairfield	7	8.0	2	2.3	9	5.0	Preble	2	9.0	1	3.8	4	6.2
Fayette	2	11.1	<1	*	3	7.2	Putnam	2	10.8	<1	*	2	6.2
Franklin	66	12.2	29	4.6	94	8.1	Richland	5	6.4	3	3.9	8	5.1
Fulton	1	3.6	<1	*	1	2.5	Ross	6	11.8	2	4.0	7	7.6
Gallia	3	13.6	<1	*	3	7.9	Sandusky	3	7.5	2	3.7	4	5.7
Geauga	5	7.6	1	2.2	6	4.6	Scioto	4	7.5	2	3.2	5	5.1
Greene	6	6.8	4	3.3	10	5.0	Seneca	2	7.8	1	3.2	4	5.3
Guernsey	1	5.7	<1	*	2	3.1	Shelby	2	7.4	<1	*	3	4.6
Hamilton	51	11.8	19	3.7	70	7.3	Stark	17	7.2	8	3.2	25	5.0
Hancock	2	3.4	2	4.2	3	3.8	Summit	29	9.0	13	3.3	41	5.9
Hardin	2	11.2	<1	*	2	5.6	Trumbull	13	9.0	6	3.6	19	6.1
Harrison	2	14.2	<1	*	2	9.4	Tuscarawas	4	7.1	2	3.5	7	5.2
Henry	1	7.1	<1	*	2	4.5	Union	2	9.3	1	4.0	3	6.5
Highland	2	6.8	<1	*	2	4.0	Van Wert	2	9.9	1	7.5	3	8.4
Hocking	3	13.7	<1	*	3	7.3	Vinton	<1	*	<1	*	<1	*
Holmes	1	5.9	<1	*	2	3.7	Warren	10	9.2	4	3.3	14	6.0
Huron	2	6.3	1	2.5	3	4.1	Washington	3	8.9	1	2.4	4	5.3
Jackson	2	10.4	<1	*	3	6.4	Wayne	4	6.2	2	2.2	6	4.0
Jefferson	5	10.9	2	3.9	7	7.2	Williams	1	3.7	<1	*	1	2.7
Knox	2	4.8	1	3.9	3	4.3	Wood	5	8.3	3	3.8	8	6.0
Lake	12	8.3	6	3.2	18	5.6	Wyandot	2	12.0	0	*	2	5.8

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2017; Surveillance, Epidemiology and End Results Program, National Cancer Institute, 2017.

Note: Low county numbers and rates may reflect underreporting for that county.

* Rate not presented when the count for 2010-2014 is less than five (i.e., the average annual count is less than one).

Table 5. Liver & IBD Cancer: Average Annual Number of Deaths and Age-adjusted Mortality Rates per 100,000 Persons by County of Residence and Sex in Ohio, 2010-2014

	Male		Female		Total			Male		Female		Total	
	Cases	Rate	Cases	Rate	Cases	Rate		Cases	Rate	Cases	Rate	Cases	Rate
Ohio	532	8.3	263	3.4	796	5.6	Lawrence	4	11.1	2	3.8	6	7.3
U.S.		9.2		3.7		6.3	Licking	6	6.8	4	3.9	10	5.4
Adams	2	10.4	1	6.1	3	8.0	Logan	2	6.3	2	5.5	3	6.0
Allen	4	7.3	2	1.9	6	4.3	Lorain	12	6.6	7	3.4	19	4.8
Ashland	1	4.8	<1	*	2	2.8	Lucas	27	11.8	10	3.2	37	7.0
Ashtabula	6	10.2	3	4.6	9	7.3	Madison	2	7.6	<1	*	2	4.3
Athens	2	6.3	1	3.3	3	4.8	Mahoning	14	8.8	7	3.2	20	5.8
Auglaize	1	4.3	<1	*	2	3.5	Marion	4	11.2	2	5.0	6	7.9
Belmont	2	5.5	3	5.2	6	5.3	Medina	5	6.0	4	3.3	9	4.4
Brown	2	8.2	1	4.9	4	6.5	Meigs	1	6.4	<1	*	2	4.7
Butler	16	9.3	8	3.7	24	6.1	Mercer	1	6.0	<1	*	2	3.8
Carroll	1	5.2	<1	*	1	3.3	Miami	3	5.0	3	4.0	6	4.5
Champaign	1	5.2	<1	*	2	3.5	Monroe	1	9.8	<1	*	1	4.9
Clark	9	10.2	6	5.7	14	7.6	Montgomery	31	10.0	16	3.9	46	6.6
Clermont	8	7.9	4	3.5	12	5.4	Morgan	1	9.6	<1	*	1	4.2
Clinton	2	5.9	<1	*	2	4.1	Morrow	2	8.1	<1	*	3	5.4
Columbiana	4	6.1	2	3.0	6	4.4	Muskingum	3	7.0	2	3.5	5	5.0
Coshocton	1	5.4	<1	*	1	2.8	Noble	<1	*	<1	*	<1	*
Crawford	3	11.0	1	2.8	4	6.3	Ottawa	2	6.8	1	3.9	4	5.3
Cuyahoga	79	10.5	35	3.6	114	6.6	Paulding	<1	*	<1	*	<1	*
Darke	2	5.3	<1	*	2	3.4	Perry	2	8.4	1	4.9	3	6.9
Defiance	1	4.6	<1	*	2	3.4	Pickaway	2	7.4	1	2.9	3	4.9
Delaware	6	8.1	5	5.1	11	6.5	Pike	1	9.0	<1	*	2	5.3
Erie	4	7.0	2	2.7	6	4.7	Portage	8	9.7	2	2.5	10	5.9
Fairfield	5	6.5	3	3.5	8	4.9	Preble	2	8.2	2	6.6	4	7.3
Fayette	2	9.1	1	5.8	3	7.5	Putnam	2	8.5	<1	*	2	5.0
Franklin	44	9.0	24	4.0	68	6.1	Richland	5	6.8	3	3.0	8	4.9
Fulton	<1	*	1	3.9	2	3.6	Ross	4	8.0	2	3.0	5	5.2
Gallia	3	15.9	1	7.1	4	11.2	Sandusky	2	4.4	1	3.5	3	4.1
Geauga	3	5.4	2	2.9	5	4.0	Scioto	4	8.4	1	2.2	5	4.9
Greene	6	6.5	2	1.8	8	4.0	Seneca	2	5.4	1	2.7	3	4.0
Guernsey	2	6.8	<1	*	2	3.6	Shelby	2	7.5	1	3.5	3	5.3
Hamilton	40	9.6	17	3.2	57	6.0	Stark	17	7.5	8	3.0	25	5.0
Hancock	2	3.6	1	3.0	3	3.4	Summit	23	7.5	14	3.6	38	5.3
Hardin	1	9.5	<1	*	2	5.2	Trumbull	12	8.7	5	3.3	18	5.8
Harrison	1	11.2	<1	*	2	7.0	Tuscarawas	5	8.2	2	2.4	7	5.1
Henry	1	8.1	<1	*	2	5.5	Union	2	9.7	<1	*	2	5.7
Highland	2	8.7	<1	*	3	4.9	Van Wert	1	5.6	1	6.0	2	5.6
Hocking	2	9.4	1	5.3	3	7.4	Vinton	<1	*	<1	*	1	6.8
Holmes	1	5.7	<1	*	2	4.4	Warren	7	6.5	4	3.1	11	4.7
Huron	2	6.9	2	4.2	4	5.2	Washington	3	8.3	1	2.0	4	4.7
Jackson	2	9.1	<1	*	2	6.2	Wayne	4	6.2	1	1.6	5	3.5
Jefferson	4	8.2	1	2.2	5	4.9	Williams	1	3.5	<1	*	1	2.4
Knox	1	2.6	1	2.6	2	2.7	Wood	4	7.2	2	2.8	7	4.8
Lake	10	7.5	6	3.2	16	5.2	Wyandot	1	8.6	<1	*	1	4.3

Source: Bureau of Vital Statistics, Ohio Department of Health, 2017; National Center for Health Statistics, 2017.

* Rate not presented when the count for 2010-2014 is less than five (i.e., the average annual count is less than one).

Table 6. Liver & IBD Cancer: Percentage of Cases by County of Residence and Stage at Diagnosis in Ohio, 2010-2014

	Early Stage %	Late Stage %	Unstaged/ Missing %	Average Annual Cases		Early Stage %	Late Stage %	Unstaged/ Missing %	Average Annual Cases
Ohio	34%	42%	24%	935	Lawrence	50%	42%	8%	5
U.S.	43%	43%	14%		Licking	29%	59%	12%	15
Adams	40%	33%	27%	3	Logan	32%	40%	28%	5
Allen	39%	30%	30%	9	Lorain	36%	39%	25%	25
Ashland	46%	36%	18%	2	Lucas	36%	39%	24%	40
Ashtabula	26%	46%	28%	11	Madison	33%	42%	25%	2
Athens	19%	63%	19%	3	Mahoning	20%	41%	40%	23
Auglaize	20%	60%	20%	2	Marion	27%	54%	19%	5
Belmont	26%	44%	30%	5	Medina	35%	50%	15%	10
Brown	33%	40%	27%	3	Meigs	25%	50%	25%	2
Butler	34%	41%	25%	27	Mercer	25%	38%	38%	3
Carroll	30%	40%	30%	2	Miami	46%	41%	14%	7
Champaign	33%	17%	50%	1	Monroe	50%	50%	0%	2
Clark	20%	35%	45%	15	Montgomery	40%	42%	18%	49
Clermont	40%	40%	21%	16	Morgan	80%	0%	20%	1
Clinton	39%	62%	0%	3	Morrow	47%	27%	27%	3
Columbiana	38%	32%	30%	7	Muskingum	30%	63%	7%	5
Coshocton	47%	47%	7%	3	Noble	*	*	*	*
Crawford	35%	26%	39%	5	Ottawa	21%	58%	21%	4
Cuyahoga	36%	40%	24%	149	Paulding	*	*	*	*
Darke	36%	57%	7%	3	Perry	20%	67%	13%	3
Defiance	21%	50%	29%	3	Pickaway	50%	33%	17%	5
Delaware	31%	49%	20%	10	Pike	33%	33%	33%	2
Erie	28%	38%	34%	6	Portage	31%	45%	24%	10
Fairfield	28%	42%	30%	9	Preble	17%	39%	44%	4
Fayette	50%	14%	36%	3	Putnam	33%	50%	17%	2
Franklin	39%	41%	20%	94	Richland	42%	32%	27%	8
Fulton	43%	43%	14%	1	Ross	30%	43%	27%	7
Gallia	44%	44%	13%	3	Sandusky	18%	55%	27%	4
Geauga	16%	45%	39%	6	Scioto	39%	46%	15%	5
Greene	22%	51%	28%	10	Seneca	44%	39%	17%	4
Guernsey	22%	44%	33%	2	Shelby	15%	23%	62%	3
Hamilton	36%	46%	18%	70	Stark	25%	38%	37%	25
Hancock	41%	53%	6%	3	Summit	33%	39%	29%	41
Hardin	22%	44%	33%	2	Trumbull	38%	40%	23%	19
Harrison	36%	36%	27%	2	Tuscarawas	27%	18%	55%	7
Henry	0%	63%	38%	2	Union	38%	38%	25%	3
Highland	25%	33%	42%	2	Van Wert	25%	31%	44%	3
Hocking	43%	21%	36%	3	Vinton	*	*	*	*
Holmes	38%	38%	25%	2	Warren	38%	44%	18%	14
Huron	0%	60%	40%	3	Washington	32%	55%	14%	4
Jackson	46%	23%	31%	3	Wayne	31%	38%	31%	6
Jefferson	31%	44%	25%	7	Williams	57%	43%	0%	1
Knox	25%	38%	38%	3	Wood	33%	53%	15%	8
Lake	29%	52%	19%	18	Wyandot	22%	56%	22%	2

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2017; Surveillance, Epidemiology and End Results Program, National Cancer Institute, 2017.

Early stage includes tumors diagnosed at local stage, and late stage includes tumors diagnosed at regional and distant stages.

* Values not presented when the count for 2010-2014 is less than five, i.e., the average annual count is less than one.

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