



THE BURDEN OF LIVER AND INTRAHEPATIC BILE DUCT CANCER IN RHODE ISLAND

Rhode Island Cancer Registry (RICR), December 2024

Liver and Intrahepatic Bile Duct Cancer (Liver Cancer) Overview

In the United States, the incidence of newly diagnosed liver cancer has nearly doubled from 4.6 cases per 100,000 individuals in 1995 to 8.8 cases per 100,000 individuals in 2021.^{1,2} In Rhode Island, liver cancer incidence and mortality has also increased from 1995 to 2021.^{2,3} Liver cancer is more common among males, with a rate more than two times higher in men when compared with women in the most recently reported three-year period (2019-2021) (Figure 1.1 and 1.2). Among males, the rate of new liver cancer cases has increased from 7.4 in 1995-1997 to a rate of 12.5 in 2019-2021 (Figure 1.2). Among women, the rate of new liver cancer cases has increased from a rate of 2.8 in 1995-1997 to a rate of 5.1 in 2019-2021 (Figure 1.1). Notably, there was a slight decline in incidence rate in 2020, which may be the result of disrupted health services during the COVID-19 pandemic that reduced cancer screening and diagnosis.⁴

Figure 1.1: Trend of Liver Cancer Incidence and Mortality in Rhode Island, Females, 1995-2021

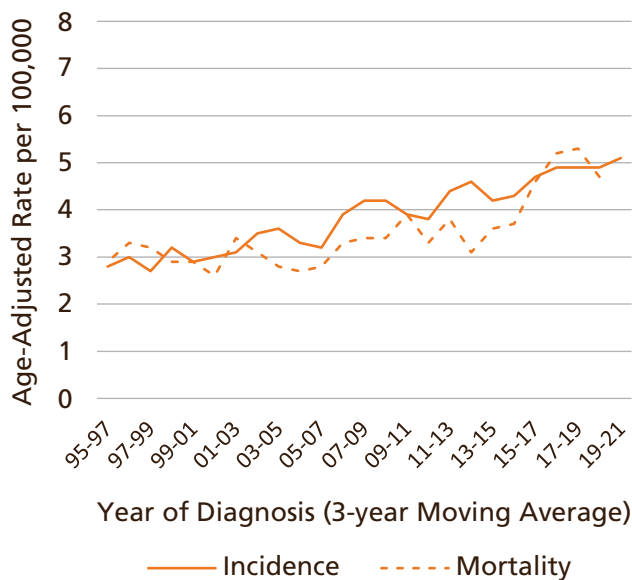
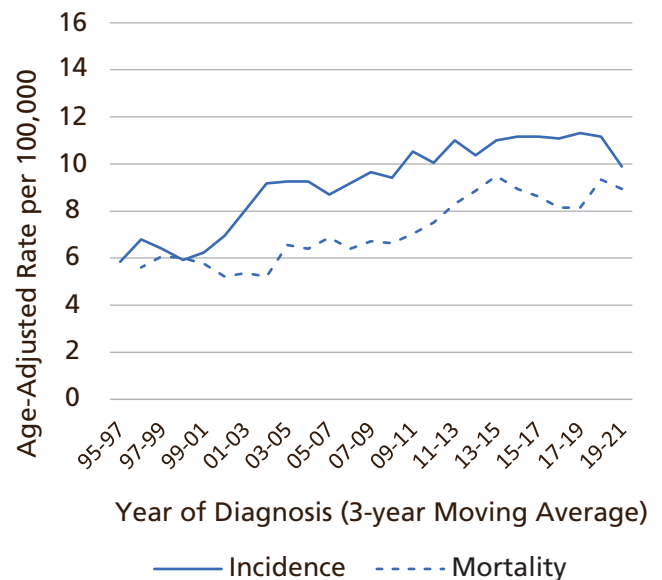


Figure 1.2: Trend of Liver Cancer Incidence and Mortality in Rhode Island, Males, 1995-2021



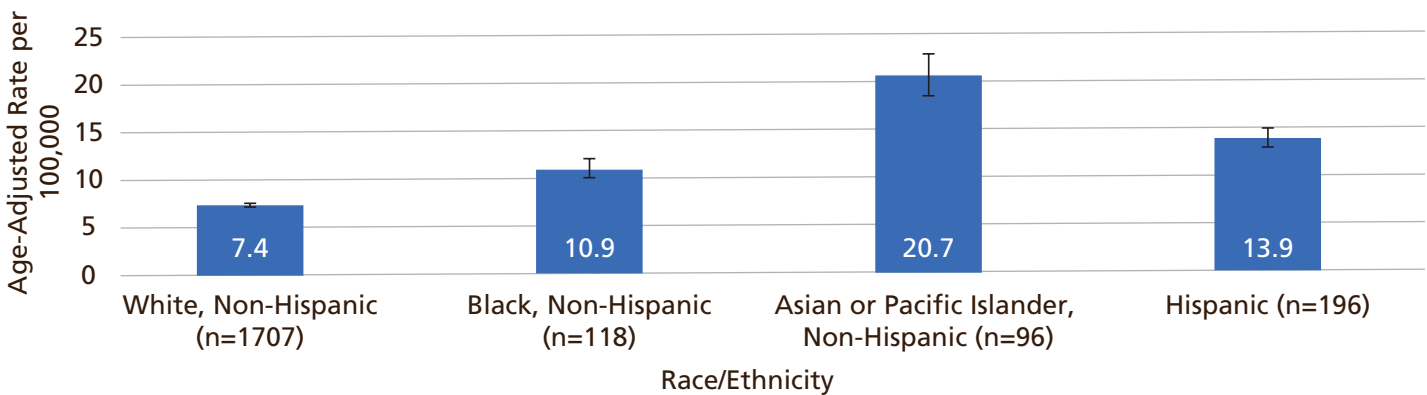
*Rates are per 100,000 and age-adjusted to the 2000 US Standard Population (19 age groups - Census P25-1130). Trends are displayed as a series of averages of subsets of subsequent three-year periods of data, called a moving average. This method was used to highlight long-term trends in the data and minimize fluctuations due to a relatively small population.

Source: Rhode Island Cancer Registry data, extracted December 2024; Note: Of liver and intrahepatic bile duct cancers diagnosed among Rhode Islanders from 2017-2021, 63% are hepatocellular carcinoma (HCC) and 27% are cholangiocarcinoma (bile duct cancer).²

Differences in Liver Cancer Incidence and Mortality by Race and Ethnic Background

In Rhode Island (2002-2021), the liver cancer burden was highest among Asian or Pacific Islanders (rate of 20.7 new cases per 100,000 individuals) followed by Hispanic individuals (rate of 13.9 new cases per 100,000 individuals) (Figure 2).^{3,5} In the United States in 2021, the liver cancer burden was greatest among American Indian or Alaskan Natives (rate of 13 new cases per 100,000 individuals) and Hispanic individuals (rate of 13 new cases per 100,000 individuals), followed by Asian and Pacific Islanders (rate of 10 new cases per 100,000 individuals).² Because the Rhode Island American Indian and Alaskan Native population reflects small numbers of individuals and small numbers of associated liver cancers, counts and rates were too small to report to ensure data privacy.

Figure 2: Liver and Intrahepatic Bile Duct Cancer 10 Year Age-Adjusted Incidence Rates, by Race/Ethnicity, Both Sexes, All Ages, All Stages, Malignant Cancers Only, Rhode Island, 2002-2021 (n=2117)



Source: Rhode Island Cancer Registry data, extracted December 2024. The racial/ethnic group American Indian/Native Alaskan, Non-Hispanic was excluded due to low case volumes. Data for smaller racial and ethnic groups are sometimes excluded or added to other groups to align with RIDOH policies on data privacy. These policies are in place to protect individuals' privacy in reporting. Counts (n) represent number of liver cancer cases.

Age and Staging at Liver Cancer Diagnosis

Liver cancers are most frequently diagnosed at age 50 or older (Figure 3). From 2017-2021, Rhode Island males, age 60-69, and females, age 70-79, were the most likely to be diagnosed with liver cancer (Figure 3). The National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program tracks cancer survival time using data from cancer patients across the nation. SEER data show that the younger a patient is when they are diagnosed with a primary liver cancer, the longer their average survival time.⁶ However, regardless of age at cancer diagnosis, five-year relative survival rates for liver cancer are lower than other cancers: 23% among those age 50-64, and 19% among people age 65 or older.⁷

For liver cancer stage at diagnosis, 36% of liver cancers that were diagnosed in Rhode Island residents were reported at the localized stage at initial diagnosis between 2017-2021; half of liver cancer cases were diagnosed at the more advanced stages of regional (25%) or distant (25%) (Figure 4). Unlike more common cancers (such as breast or prostate cancer), data from the SEER Program show that even when liver cancers are diagnosed with early stage of disease (such as a localized stage), survival rates are found to be less than 50% (five-year relative survival rate: 37%).⁷ When liver cancers are diagnosed at later stages (such as the regional or distant stage, when cancers have spread or metastasized), the 5-year survival rates decrease to 13% and 3%, respectively.⁷

Figure 3: Age at Liver Cancer Diagnosis
Rhode Island, 2017-2021 (n=639)

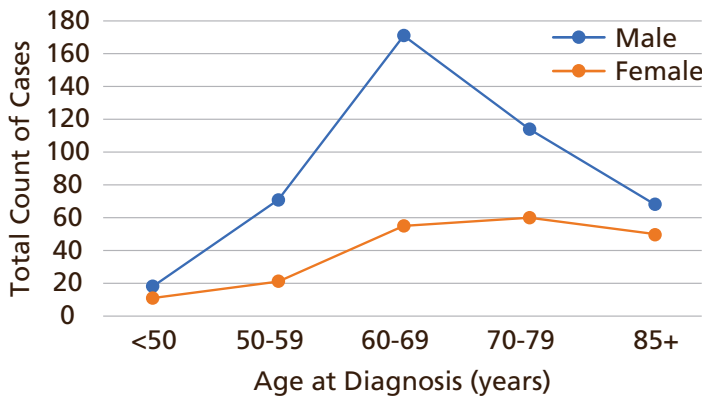
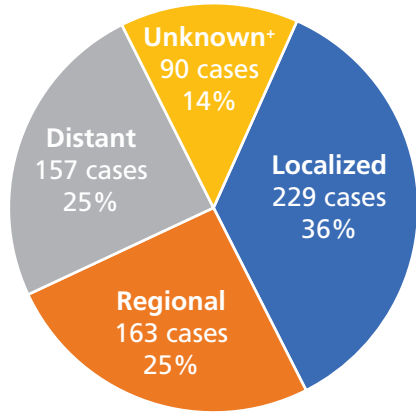


Figure 4: Staging at Liver Cancer Diagnosis*
Rhode Island, 2017-2021 (n=639)



Source: Rhode Island Cancer Registry data, extracted December 2024

*Cancer staging terminology: At localized stage, the cancer is confined to a primary site; in the regional stage the cancer has spread to regional lymph nodes; in the distant stage, cancer has metastasized.

+The unknown category may contain cases that were categorized as unstaged, unspecified, or death certificate only (DCO). The variable SEER Summary Stage 2000 was used to extract staging information for cancers diagnosed in 2012-2017. Summary Stage 2018 was used to extract staging information for cancers diagnosed in 2018-2021.

Risk Factors Associated with Liver Cancer

Many, but not all, patients who are diagnosed with liver cancer have liver cirrhosis caused by chronic viral hepatitis (HBV, hepatitis B virus; or HCV, hepatitis C virus), heavy consumption of alcoholic beverages, and/or metabolic dysfunction-associated steatotic liver disease (MASLD).

Table 1: Major Risk Factors Linked to Liver Cancer ⁸	
Risk Factor	Description
Chronic Hepatitis B (HBV) and/or Hepatitis C virus (HCV)	HBV and HCV are both viral infections that cause inflammation of the liver and cirrhosis - a disease resulting in damage to liver cells which are then replaced by scar tissue. In the US, infection with HCV is more common. In Asia, HBV is more common.
Heavy alcohol use, tobacco use, and/or obesity	These are modifiable risk factors that may increase risks of cirrhosis and liver cancer
Environmental and chemical exposure to substances: aflatoxins and anabolic steroids	Aflatoxins are carcinogens made by fungi that contaminate peanuts, wheat, rice, and other foods. Long-term exposure to aflatoxins is a major risk factor for liver cancer; however, it is more common in less developed and warmer countries than in the United States. Anabolic steroids are male hormones taken to increase muscle mass. Long-term use of these steroids can increase liver cancer risk.
Sex	Hepatocellular carcinoma (HCC), the most common liver cancer, is much more common in men than in women. Fibrolamellar HCC is more common in women. Behaviors relating to other risk factors (e.g., alcohol use and smoking) is the most likely reason for gender differences.
Race/ Ethnicity	In the US, Asian/ Pacific Islanders have the highest rates of liver cancer, followed by Hispanics, Native Americans, African Americans, and Non-Hispanic Whites. Most liver cancers are actually secondary or metastatic disease, meaning that these tumors actually started in another organ such as the pancreas, colon, stomach, or lung, and then spread (metastasized) to the liver. In Asia and Africa, primary liver cancer is more prevalent.

References

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- ² U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; <https://www.cdc.gov/cancer/dataviz>, released in June 2024.
- ³ Rhode Island Cancer Data (extracted December 2024). Rhode Island Cancer Registry.
- ⁴ Centers for Disease Control and Prevention. U.S. Cancer Statistics: Highlights from 2020 Mortality and Incidence with Comparison to 2019 Incidence to Assess the Effect of the COVID-19 Pandemic. USCS Data Brief, no. 35. Atlanta, GA: Centers for Disease Control and Prevention, US Department of Health and Human Services; 2023
- ⁵ United States Census Bureau Quick Facts: Rhode Island. Population Estimates, July 2020 <https://www.census.gov/quickfacts/fact/table/RI/PST045224>
- ⁶ Zhang, W. and Sun B. Impact of age on the survival of patients with liver cancer: an analysis of 27,255 patients in the SEER database. Oncotarget. 2015 Jan 21;6(2):633–641. doi: 10.18632/oncotarget.2719 <https://pmc.ncbi.nlm.nih.gov/articles/PMC4359244/>
- ⁷ Liver and Intrahepatic Bile Duct. SEER 5-Year Relative Survival Rates, 2014-2020 <https://seer.cancer.gov/statistics-network/explorer/>
- ⁸ American Cancer Society. Liver Cancer Risk Factors. <https://www.cancer.org/cancer/liver-cancer/causes-risks-prevention/risk-factors.html>

Acknowledgment

This report was supported by Cooperative Agreement Number NU58DP007118, funded by the Centers for Disease Control and Prevention.

