2023

SAINT LOUIS COUNTY
Public Health

Viral Hepatitis 2023 Annual Surveillance Report

SAINT LOUIS COUNTY DEPARTMENT OF PUBLIC HEALTH

6121 NORTH HANLEY ROAD, BERKELY, MO 63134

Contents

Data Source: Missouri Department of Health and Senior Services
Bureau of Vital Statistics, Bureau of Health Care Analysis and Data Dissemination, &
The Missouri Health and Surveillance Information System (WebSurv)
This report is updated annually. Last updated 10/25/2024 (OC)

Saint Louis County Department of Public Health

Mission

To promote, protect, and improve the health and environment of the community.

Vision

Healthy people, healthy environment, equitable communities.

Values

We believe in:

- Being a public health leader in the community
- Providing equitable access to services and resources
- Being responsive to the changing needs of our community
- Operating in an ethical, transparent, and fiscally responsible manner
- Serving our community with dignity and respect

Reporting Preparation

This report was prepared by the St. Louis County Department of Public Health, Divisions of Communicable Disease Prevention and Communicable Disease Response:

- Viral Hepatitis Program
- Communicable Disease Investigation Program
- Epidemiology Program

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Introduction

The Saint Louis County Department of Public Health Viral Hepatitis and Communicable Disease Investigation Programs

The Saint Louis County Department of Public Health (DPH) Communicable Disease Investigation Program investigates possible cases of acute hepatitis A infection. The investigation process typically begins when the program receives lab results indicating that a person is potentially infected with hepatitis A virus (HAV). Investigators will then verify the diagnosis via interviews with the patient and/or the healthcare provider. If acute hepatitis A infection is confirmed, investigators conduct a thorough case and contact investigation, including identifying potential sources of exposure, identifying exposed contacts, determining susceptibility of exposed contacts, and identifying contacts eligible for post-exposure prophylaxis. Investigators will also provide the case, family members, and contacts with education about the virus, transmission, and control measures.

The Viral Hepatitis Program at DPH performs hepatitis B and C disease investigations. The program includes receiving positive laboratory results of hepatitis B virus (HBV) and hepatitis C virus (HCV), conducting investigations of people with hepatitis B and/or C, identifying contacts of people with hepatitis B and/or C and referring them to testing and treatment if needed, and disseminating information about hepatitis B and C.

Lacking dedicated funding for HCV case investigations but recognizing an increasing need for HCV surveillance, DPH delegated an investigator to investigate HCV case reports starting in 2016. At that time DPH investigated reports of HCV infection in persons aged 30 years or younger, or reports which included clinical or laboratory evidence of acute infection (e.g., jaundice, elevated liver enzymes). Starting in 2022, DPH expanded the program to investigate newly reported cases in persons up to age 35. The program also works with Washington University's Infectious Disease Clinic and the St. Louis County jail to assist and coordinate HCV testing and treatment for inmates. All cases of hepatitis B are investigated either with request for additional lab results or through a case investigation. During case investigations, the investigator seeks additional information from reporting providers and hepatitis B and/or C cases to provide a more complete representation of the case. When it is possible to contact individual cases directly, the investigator conducts informational phone calls to discuss exposures and risk factors, provide education, and offer referrals for necessary services. The case is then classified as either chronic or acute based on available data.

In 2023, DPH investigated 21 suspected cases of acute hepatitis A. It was determined that 16 (76.2%) did not meet the case definition of hepatitis A and 5 cases (23.8%) were determined to be confirmed cases. There were 638 suspected hepatitis B cases reported in 2023. Of these 114 were determined to be cases of chronic hepatitis B and 521 did not meet case definition. Three cases of acute infections were identified. Of the 117 cases, 55 (47.0%) were able to be investigated, and of the 521 no cases, 112 (21.5%) were investigated. This does not include cases of hepatitis B in a pregnant person. Information on perinatal transmission of hepatitis B is included in the Perinatal Hepatitis B Prevention Program Annual Report. There were 1,588 suspected hepatitis C cases reported in 2023. Of these, 330 were determined to be cases of chronic hepatitis C and 1,249 did not meet

case definition. Nine cases of acute infection were identified. Of the 339 cases, 19 (5.6%) were investigated, and of the 1,249 no cases, 2 (1.6%) were investigated. As stated earlier, only cases of hepatitis C who meet set criteria are investigated by DPH staff.

Surveillance Methods

Hepatitis A, B, C are reportable conditions in Missouri and positive laboratory reports of hepatitis cases are received by DPH from providers in the region.

Hepatitis A, acute and chronic forms of hepatitis B, and acute and chronic forms of hepatitis C have different case definitions based on clinical and laboratory criteria defined by the Centers for Disease Control and Prevention (CDC). The most recent definitions were adopted in 2019 for hepatitis A, 2012 for hepatitis B, and 2020 for hepatitis C. Recalling that many hepatitis cases are not able to be interviewed or investigated, these definitions may pose barriers to accurately defining some cases. See Appendix B for completed epidemiological definitions.

The data presented in this report are driven by surveillance activities conducted by DPH and are likely not reflective of the true burden, distribution, prevalence, and incidence of viral hepatitis in St. Louis County. The data presented are indicative of the surveillance capacity of the department. For more information about the data see Appendix A.

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Executive Summary

The epidemiologic profile of viral hepatitis provides information about the distribution of HAV, HBV, and HCV in St. Louis County. This report will be used by DPH to assess the burden from viral hepatitis and to assist in prioritization of prevention, interventions, and treatment efforts.

As shown in **Table 1**, St. Louis County was ranked one of the lowest among all jurisdictions in Missouri with reported cases of hepatitis A from 2019 through 2023. This is partially due to the hepatitis A vaccine requirement for all food handlers in St. Louis County, which went into effect in 1999. St. Louis City and Franklin County also have vaccine requirements for food handlers in the region. Food handlers have a higher risk of transmitting the virus to others while infectious. In addition, some counties were also hit with an outbreak of hepatitis A that extended into 2019 among people who inject drugs which increased rates among those jurisdictions.

Table 1: Rates of Hepatitis A Cases by top 19 Counties or Jurisdictions in Missouri and St. Louis County per 100,000
Missouri, 2019-2023

Rank	Jurisdiction	Rate	Rank	Jurisdiction	Rate
1	CRAWFORD	37.9	11	OZARK	11.1
2	HOWELL	30.0	12	DOUGLAS	11.0
3	MADISON	21.0	13	ST FRANCOIS	9.0
4	FRANKLIN	19.9	14	MARIES	6.9
5	DALLAS	17.8	15	HICKORY	6.7
6	GASCONADE	17.6	16	RIPLEY	6.4
7	OREGON	14.1	17	JASPER	6.3
8	LACLEDE	12.3	18	INDEPENDENCE	6.2
9	GREENE	12.1	19	PEMISCOT	6.1
10	TEXAS	11.9	**76**	**ST LOUIS**	**0.5**

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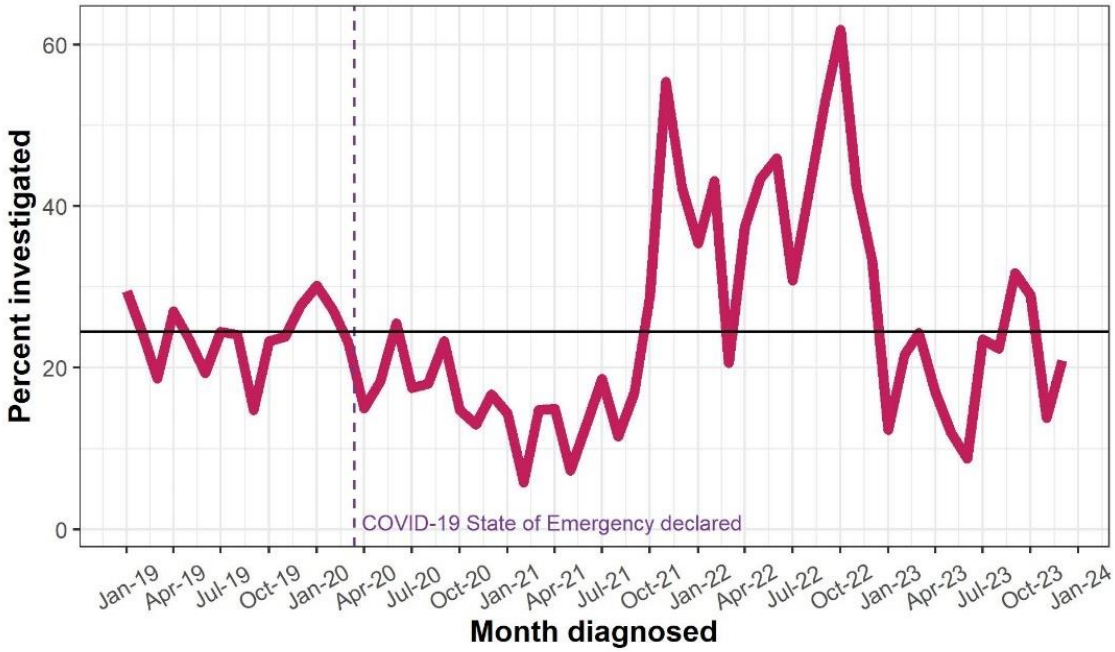
St. Louis County declared a state of emergency on March 13, 2020, due to the first diagnosed case of COVID-19 in the county. Due to the public health emergency, many resources at DPH were reassigned to COVID-related activities. As shown in **Figure 1**, although many programs at DPH were impacted, the percent of hepatitis B and C cases interviewed did not fall too far below the average percent of cases interviewed of 24.5% during 2019 through 2023; however, majority of the months from March 2020 through October 2021 were below that average. In addition, months in 2023 were also below the average partially due to staffing changes.

Figure 1: Percent of Reported Hepatitis B and C Cases Investigated by Month and Year

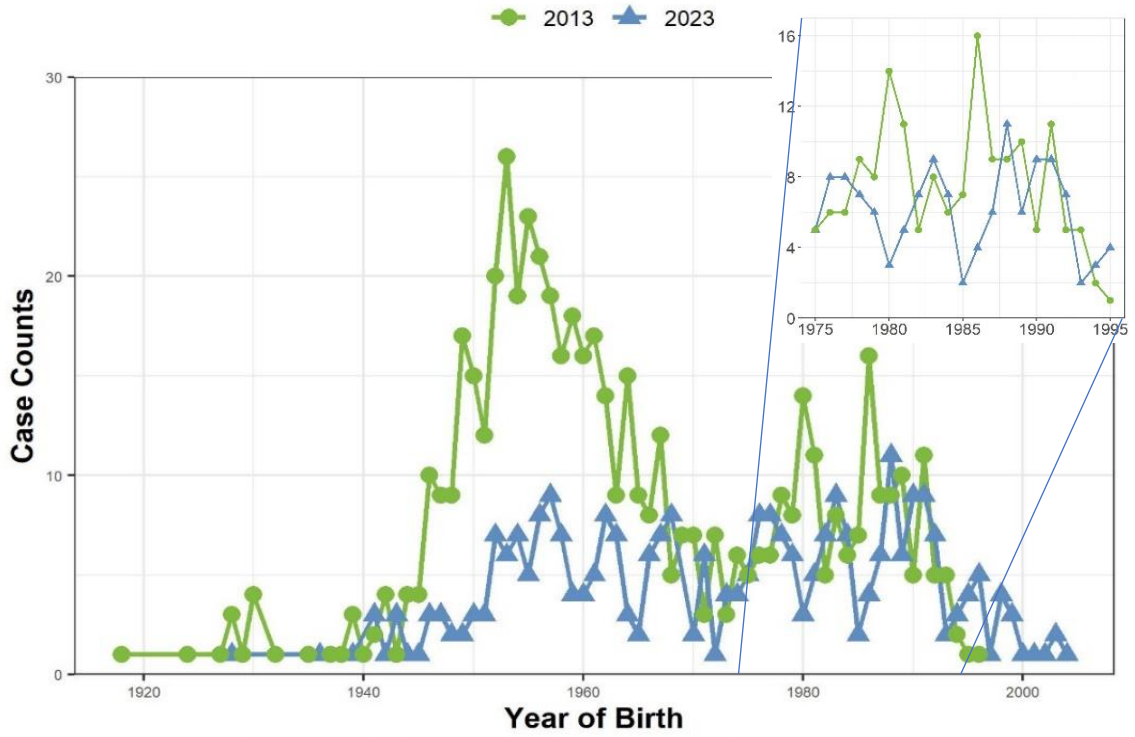
St. Louis County, MO, 2019-2023



Source: Missouri Department of Health and Senior Services (DHSS)

In St. Louis County, cases of hepatitis C have started to decline while increasing in the United States. The national increase in cases has been linked to injection drug use (IDU) and the opioid crisis. This change in transmission of HCV has shifted the traditional age demographic of those affected. Traditionally, people born 1945 to 1965, or "baby boomers", were the group most affected by hepatitis C due to unsafe medical practices used in the mid- to late 1900s, including reusing glass and metal syringes and through untested donated blood products. Once blood supply screening for HCV was introduced in 1992, nosocomial transmission largely ceased. However, in recent years, there has been substantial increase in hepatitis C cases, both acute and chronic, in persons aged 35 years and younger.

Figure 2: Rates of Reported Acute and Chronic Hepatitis C Cases by Year of Birth
St. Louis County, MO, 2013 and 2023



Source: Missouri Department of Health and Senior Services (DHSS).

As shown in **Figure 2**, comparisons of cases reported in 2013 and 2023 show the difference in the populations affected by hepatitis C. Cases reported in 2013 have a distinct peak for people born between 1945 and 1965 which is absent for cases reported in 2023.

Additional Key Findings

Hepatitis A

- There were 27 confirmed cases of hepatitis A from 2019 through 2023. Most cases were in residents who live in the West region (40.7%) or identify as White (48.1%).

Hepatitis B

- The rate of reported acute and chronic hepatitis B cases was 9.6 cases per 100,000 population from 2019 through 2023. Rates in residents who identify as Asian were 5.5 times higher than the St. Louis County rate, and 26.5 times higher than the rate among residents who identify as White.
- Rates of acute and chronic hepatitis B increased from 7.9 cases per 100,000 population in 2021 to 10.9 cases per 100,000 population in 2023.
- During 2019 to 2023, there were 19 reported cases of acute hepatitis B in St. Louis County.
- For hepatitis B associated hospitalizations and emergency department discharges, rates are highest for residents who identify as Asian or Black, male residents, residents aged 45 and older, and residents who live in neighborhoods with high or very high levels of poverty.

Hepatitis C

- The rate of reported acute and chronic hepatitis C cases was 33.0 cases per 100,000 population from 2019 through 2023. Rates among residents who identify as Black were 1.4 times higher than the St. Louis County rate, and 2.9 times higher than the rate among residents who identify as White.
- Rates of acute and chronic hepatitis C decreased from 43.6 cases per 100,000 population in 2019 to 27.4 cases per 100,000 population in 2023.
- During 2019 to 2023 there were 25 newly reported cases of acute hepatitis C.
- The rate of live births to a positive hepatitis C pregnant person has been increasing from 2.4 per 1,000 live births in 2013 to 5.2 per 1,000 live births in 2022. DPH currently does not investigate or conduct surveillance on perinatal hepatitis C cases.
- Hospitalizations and emergency department visits remained stable during the report period. Residents living in neighborhoods with high levels of poverty had rates of hospitalizations 4.6 times higher than residents living in neighborhoods with low levels of poverty. In addition, residents living in neighborhoods with high levels of poverty had rates of emergency department visits 5.4 times higher than residents living in neighborhoods with low levels of poverty.

Mortality

- The rate of viral hepatitis associated deaths has decreased by 44.4% from 2.6 deaths per 100,000 in 2018 to 1.4 deaths per 100,000 in 2022.
- On average there are approximately 19 HCV-associated deaths and 3 HBV-associated deaths per year in 2018 through 2022.

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Hepatitis A

Introduction

Hepatitis A is a highly contagious liver infection caused by the hepatitis A virus. Symptoms can last up to 2 months and include fatigue, nausea, stomach pain, and jaundice.[1] It is different from the other viral hepatitis infections included in this report in that it is transmitted through the fecal-oral route. This typically happens through either close person-to-person contact with an infected person, sexual contact with an infected person, and/or ingestion of contaminated food or water. People who are at increased risk for infection from HAV include: international travelers; men who have sex with men (MSM); people who use injection or noninjection drugs; people with occupational risk for exposure; people who anticipate close personal contact with an international adoptee; and people experiencing homelessness.[2]

In 2022, according to the Centers for Disease Control and Prevention (CDC), there were 2,265 new cases of hepatitis A reported in the United States. However, the estimate for actual number of true infections is closer to 4,500.[3] Cases from 2021 to 2022 decreased by 59% but cases remain 1.6 times higher than what was reported in 2015. Persons aged 30-39 years had the highest rates of hepatitis A, and 58% of cases occurred among non-Hispanic White persons.[3]

Hepatitis A is preventable. The best way to prevent an infection is by receiving the full, two dose vaccine series. In the United States, the hepatitis A vaccine has been licensed for use in people 1 year or age and older and is typically started around 12 months.[4] The vaccination for hepatitis A is not a required vaccination for kindergarten entry in Missouri, however, it is required in food handlers working in St. Louis County. Nationally, the prevalence of self-reported hepatitis A vaccination was approximately 41.9% during 2015 through March 2020.[5] In addition, immune globulin can provide short-term protection, both pre- and postexposure, and should be administered within 2 weeks after exposure for the maximum protection.[6] Other prevention techniques includes handwashing after using the bathroom, changing diapers, and before preparing or eating food.

Acute Hepatitis A

During 2019 through 2023, there were 27 confirmed cases of hepatitis A in St. Louis County. The peak of reported cases was reported in 2020 for St. Louis County (1.0 cases per 100,000 population) and in 2019 for both Missouri (5.9 cases per 100,000 population) and the United States (5.7 cases per 100,000 population) as shown in **Figure 3**. This was largely due to the outbreaks that occurred from 2016 through 2019 among people who use drugs and people experiencing homelessness. Cases for both Missouri and the United States have been declining since 2019 with the most recent rates of 0.3 cases per 100,000 in Missouri and 0.7 cases per 100,000 in the United States. Data for the United States is currently not available for 2023, however, during this time there was a multistate outbreak linked to organic strawberries so an increase in cases may be observed. Healthy People 2030 established a target of 0.4 cases of hepatitis A per 100,000 population which St. Louis County reached in 2021 and 2022; however, that was not the case for the most recent year. As stated earlier, St. Louis County requires all food handlers to have a hepatitis A vaccine which helps reduce the number of cases seen in the county. For the

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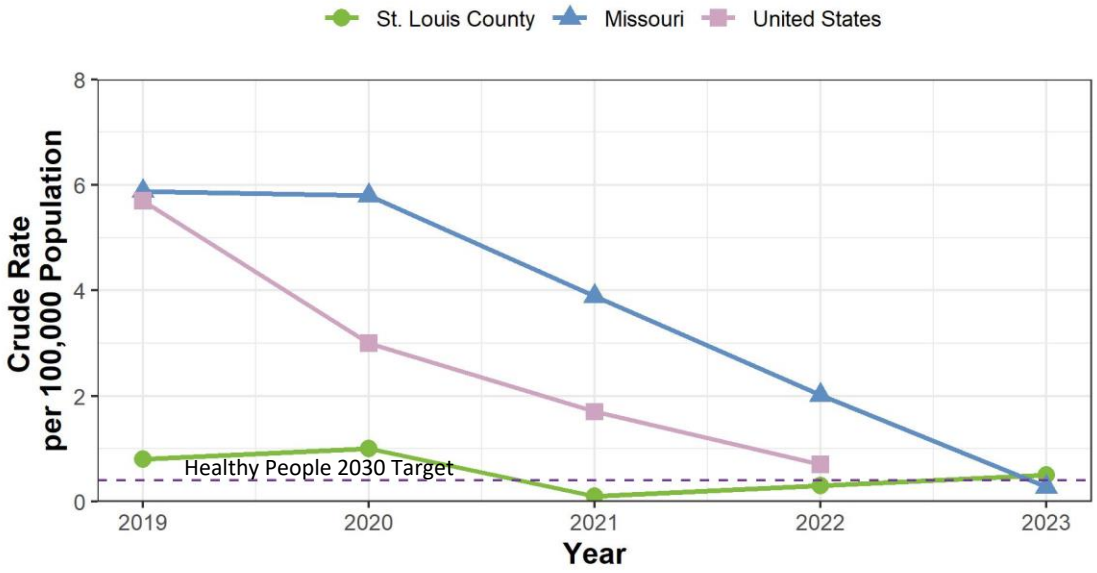
reported cases that were successfully interviewed, 63.6% reported travel outside of the county.

Figure 3: Rates of Hepatitis A in St. Louis County, Missouri, and the United States by year
St. Louis County, Missouri, and the United States, 2019-2023



Source: Missouri Department of Health and Senior Services (DHSS), Centers for Disease Control and Prevention, & Healthy People 2030

The most common symptoms reported by cases included jaundice (74.1%), fatigue (55.6%), dark urine (51.9%), nausea (40.7%) and vomiting (40.7%). Most of the reported cases were residents of the West region (40.7%), followed by the Outer North region (25.9%), the Inner North region (14.8%), the Central region (11.1%), and the South region (7.4%). As shown in **Table 2**, most cases in both St. Louis County and Missouri self-identified as White or non-Hispanic. Most cases in the county were in residents who identify as female while in the state it was for those who identify as male.

Table 2: Percent of Demographics in Reported Hepatitis A Cases for St. Louis County and Missouri
St. Louis County and Missouri, 2019-2023

	St. Louis County		Missouri	
	Demographic	Percent	Demographic	Percent
Race				
	Asian	7.4%	Asian	0.3%
	Black	14.8%	Black	3.9%
	Multi Race	7.4%	Multi Race	1.4%
	White	48.1%	White	85.3%
	Unknown/Other	22.2%	Unknown/Other	9.2%
Ethnicity				
	Hispanic	3.7%	Hispanic	3.9%
	Non-Hispanic	74.1%	Non-Hispanic	76.4%
	Unknown	22.2%	Unknown	19.7%
Sex				
	Female	55.6%	Female	39.2%
	Male	44.4%	Male	60.8%

Hepatitis B

Introduction

Hepatitis B is a vaccine-preventable liver infection caused by the hepatitis B virus. It is typically spread through blood, semen, or other body fluids from a person infected via sexual contact, sharing needles, syringes, or other drug-injection equipment, or during pregnancy or delivery.[7] For most people, hepatitis B is a short-term illness, however, for others, it can become a long-term, chronic infection. Those with a chronic infection are at risk for life-threatening health issues like liver disease or liver cancer. With hepatitis B, the age at which a person is exposed is an important factor. Approximately 9 in 10 infants who become infected go on to develop life-long chronic infection. The risk goes down as age increases – the odds of developing a chronic infection are roughly 3 in 10 for children infected between the ages of 1 and 5 years, and only 1 in 20 for people infected as adults.

People with acute hepatitis B are typically treated through supportive care, and those with chronic infections can be treated with antiviral drugs with further monitoring for signs of liver disease progression. The symptoms of hepatitis B range from being asymptomatic to fulminant hepatitis. Acute hepatitis B symptoms typically include fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, dark urine, clay-color stool, joint pain, or jaundice, and can appear any time between 8 weeks to 5 months after exposure.[8] Those with chronic hepatitis B are typically asymptomatic but can develop cirrhosis or hepatocellular carcinoma.

Those at an increased risk for HBV infection include:[9]

- Infants born to people with hepatitis B
- People born in certain countries where hepatitis B is common
- People born in the US who were not vaccinated as infants and whose parents were born in countries with high rates of hepatitis B
- People how have been in jail or prison
- People who inject drugs (PWID), or share needles, syringes, or other types of drug equipment
- Sex partners of people who have hepatitis B
- Men who have sex with men
- People who live with someone who has hepatitis B
- Health care and public safety workers who are exposed to blood on the job
- People who have medical conditions such as:
    - People who have hepatitis C
    - People who have sexually transmitted infections, such as human immunodeficiency virus
    - People who are on dialysis
    - People who have liver damage or inflammation

According to the CDC, there were 2,126 new cases of acute hepatitis B reported in 2022 with an estimate of 13,800 new cases.[10] There was a decrease in the rate of acute infection in 2020 which remained stable for 2021 and 2022. Some of the decrease can be because of health care-seeking behavior and testing during the pandemic. With rates remaining stable, it does suggest that there has been some reduction in HBV transmission unrelated to the pandemic. Most acute hepatitis B cases were in persons aged 40-59

years (52%). In addition, there were 16,729 cases of chronic hepatitis B newly reported in the United States.[10] The rate of newly chronic hepatitis B cases among non-Hispanic Asian and Pacific Islander persons was 11.2 times as high as among non-Hispanic White persons. People who identify as Asian and Pacific Islander had the lowest rate of reported acute hepatitis B cases. This likely reflects many infections being acquired outside the United States. Most newly reported chronic cases occurred in persons 30 years and older (89%). There were approximately 1,797 hepatitis B-associated deaths among United States residents in 2022 with an age-adjusted rate of 0.44 cases per 100.000 population.[10]

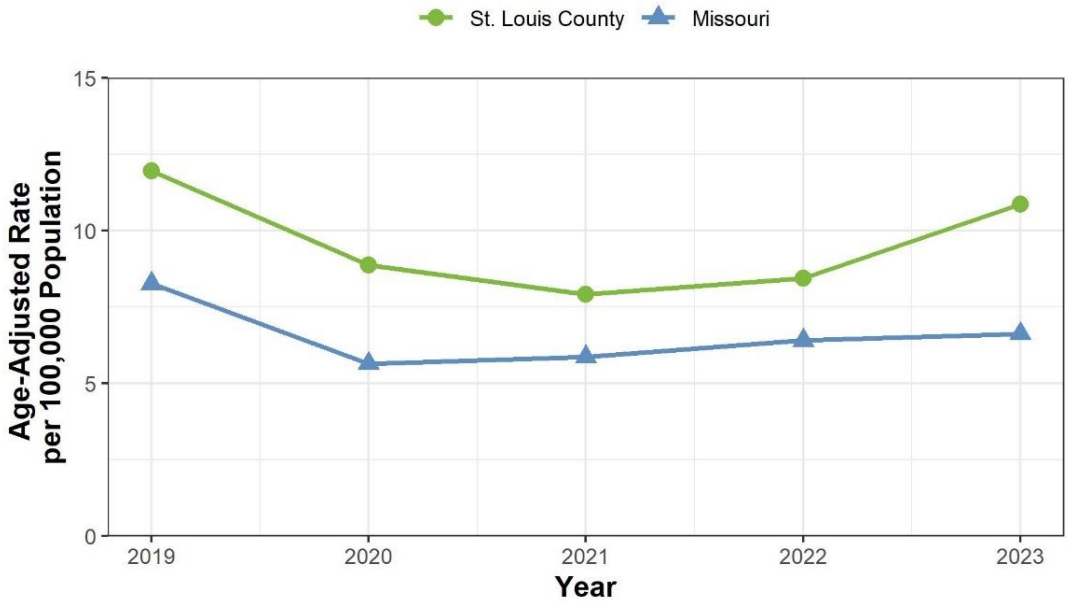
Hepatitis B is preventable through vaccination. The latest recommendation from the Advisory Committee of Immunization Practices (ACIP) recommends that the following people should receive the vaccine:[11]

- All infants
- All children and adolescents younger than 19 who have not been vaccinated
- Adults 19-59
- Adults 60 and older with risk factors for hepatitis B

For more information on vaccine for hepatitis, see Appendix D.

As shown in **Figure 4**, the rates of reported hepatitis B cases dropped from 12.0 cases per 100,000 population in 2019 to 10.9 cases per 100,000 in 2023. In 2019, 125 cases were reported in St. Louis County while 117 were reported in 2023. Rates in St. Louis County are higher compared to Missouri. The rates also dropped in Missouri from 8.3 cases per 100,000 in 2019 to 6.6 cases per 100,000 in 2023.

Figure 4: Rates of Reported Acute and Chronic Hepatitis B Cases in St. Louis County and Missouri by Year
St. Louis County and Missouri, 2019-2023



Source: Missouri Department of Health and Senior Services (DHSS)

Table 3: Rates of Reported Acute and Chronic Hepatitis B Cases per 100,000 Population by Demographics

St. Louis County, MO, 2019-2023

	Rate	95% Confidence Interval	Average Count per Year
St. Louis County			
Total County	**9.6**	**8.7 to 10.5**	**102**
Gender			
Female	**7.2**	6.1 to 8.3	41
Male	**12.4**	11.0 to 13.9	61
Age Group			
18-24	**2.1**	0.7 to 3.5	2
25-44	**14.3**	12.2 to 16.4	35
45-64	**16.0**	13.9 to 18.2	43
65+	12.2	9.9 to 14.5	22
Race or Ethnicity			
Asian	**52.9**	43.2 to 62.7	24
Black or African American	9.3	7.6 to 11.0	22
White	**2.0**	1.4 to 2.5	16
Region			
Central	10.8	8.2 to 13.4	15
Inner North	11.9	9.6 to 14.2	21
Outer North	7.9	6.0 to 9.8	15
South	8.9	7.0 to 10.8	21
West	8.2	6.7 to 9.7	26

Rates that are bold and red are above the overall St. Louis County rate while rates that are bold and blue are below.

Source: Missouri Department of Health and Senior Services (DHSS)

Case Definition: Rates were age-adjusted (except age groups). Data groups with less than 5 cases during the 5-year period are suppressed.

As shown in **Table 3**, there are an average of 102 cases of chronic and acute hepatitis B reported in St. Louis County each year. The rate of new reported cases from 2019 through 2023 was 9.6 cases per 100,000 population. Rates were significantly higher for male residents, residents aged 25 to 64, and residents who identify as Asian. Rates were significantly lower for female residents, residents aged 18 to 24, and residents who identify as White. Race was unknown in 36.8% of cases and ethnicity was unknown in 69.4% of cases.

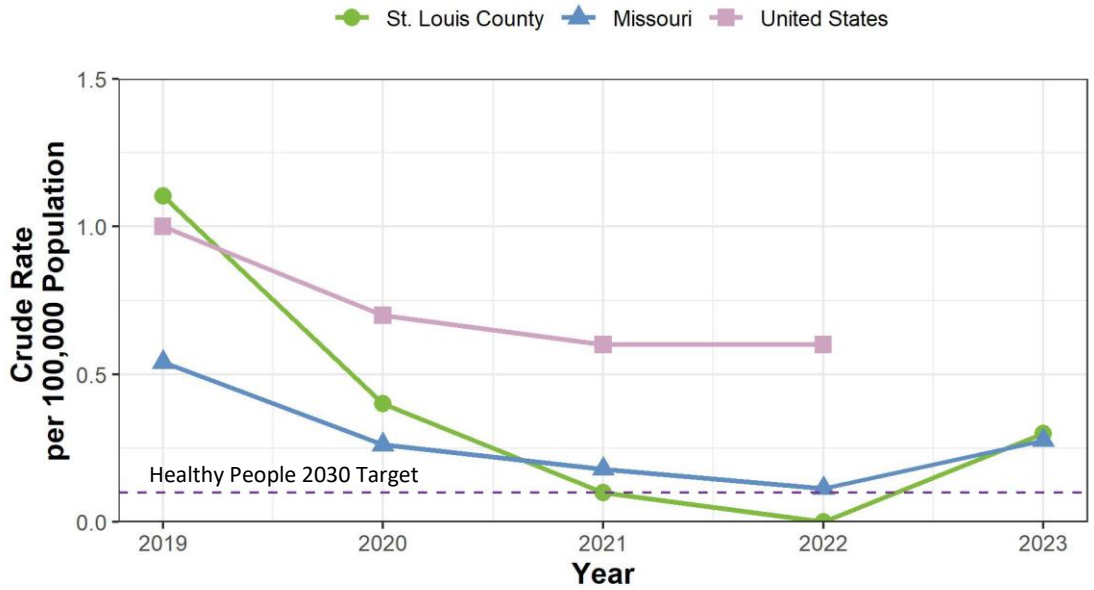
Acute Hepatitis B

Acute hepatitis B is a reportable condition in Missouri and has been nationally notifiable since 1996. Surveillance on acute hepatitis B is difficult for a multitude of reasons. It can be complicated to classify because of the required clinical and laboratory data needed. For example, not all patients report symptoms, and not all patients are able to be interviewed to gather clinical information. Also, patients may not seek care or be tested for hepatitis B because the symptoms they are experiencing can be like those of other common illnesses. The lack of testing or seeking care has resulted in an underestimation of both acute and chronic cases. In addition, negative hepatitis B lab reports are not automatically reported in Missouri as they are in other states. Missing symptom data or proper lab data can result in misclassification. Because of the many difficulties surrounding case classifications of hepatitis B, a new case definition was developed and voted on in 2023. The new case definition will be implemented starting in 2024.

During 2019 to 2023, there were 19 reported cases of acute hepatitis B in St. Louis County. The peak of acute hepatitis B cases were reported in 2019 for all jurisdictions as shown in Figure 5. There were no cases of acute hepatitis reported in 2022 in the county. Rates dropped from 1.2 cases per 100,000 population in 2019 to 0.2 cases per 100,000 population in 2023. Both Missouri and St. Louis County had an increase in acute cases from 2022 to 2023. Data for the United States in not yet available for 2023. Healthy People 2030 established a target of 0.1 cases of acute hepatitis B per 100,000 which St. Louis County accomplished in 2021 and 2022 but not for the other years displayed.

Figure 5: Rates of Acute Hepatitis B in St. Louis County, Missouri, and the United States by Year

St. Louis County, Missouri, and the United States, 2019-2023



Source: Missouri Department of Health and Senior Services (DHSS) & Centers for Disease Control and Prevention, & Healthy People 2030

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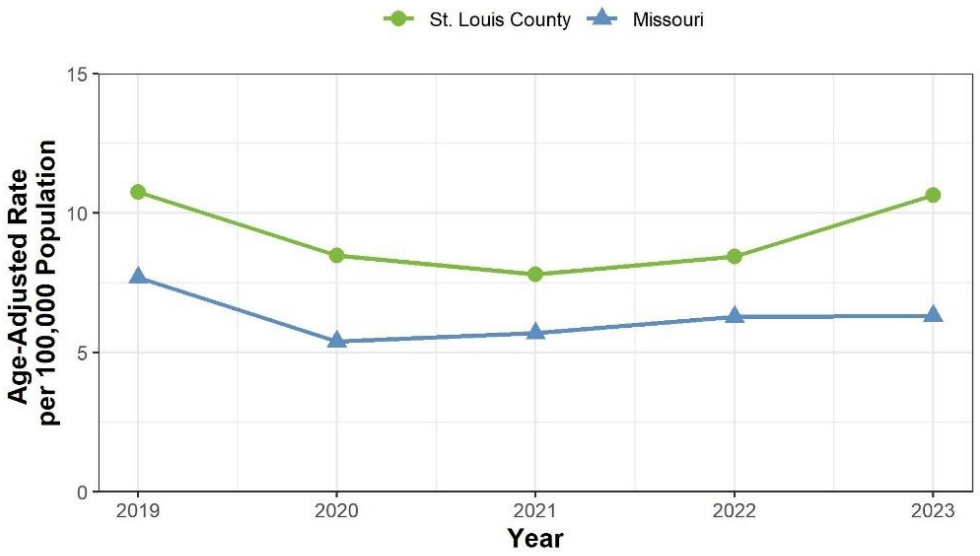
Chronic Hepatitis B

Chronic hepatitis B has been nationally notifiable since 2003 and is reportable in Missouri. Surveillance of chronic hepatitis B is difficult, as detection and diagnosis largely rely on screening of asymptomatic patients. Healthy People 2030 has set the goal that the proportion of people who know they have chronic hepatitis B increased by 90% by 2030.[12] The most recent data indicates that only 32.4% people in the United States know they have chronic hepatitis B. The CDC recently updated their screening recommendations which can be found in Appendix C.

Figure 6: Rates of Chronic Hepatitis B in St. Louis County and Missouri by Year
St. Louis County and Missouri, 2019-2023



Source: Missouri Department of Health and Senior Services (DHSS)

From 2019 through 2023 there were 490 reported cases of chronic hepatitis B in St. Louis County. There was a slight decrease from 2018 at 10.7 cases per 100,000 population to 2023 at 10.6 cases per 100,000 population. St Louis County has had rates higher than the state of Missouri throughout the reporting period (**Figure 6**).

Chronic Hepatitis B by Region

From 2019 through 2023, the Inner North region had the highest rate of chronic hepatitis B (11.1 cases per 100,000 population), followed by the Central region (10.2 per 100,000), the South region (8.5 per 100,000), the West region (8.1 per 100,000), and the Outer North region (7.6 per 100,000) (**Figure 7**).

Figure 7: Rates of Chronic Hepatitis B by Geographic Region per 100,000 Population
St. Louis County, MO, 2019-2023

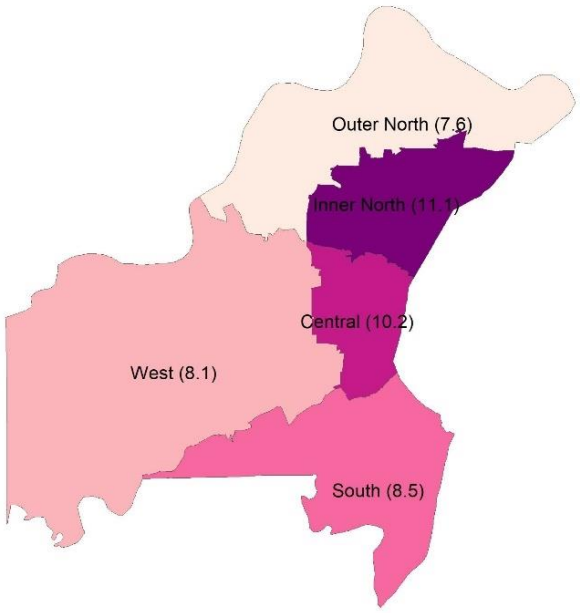
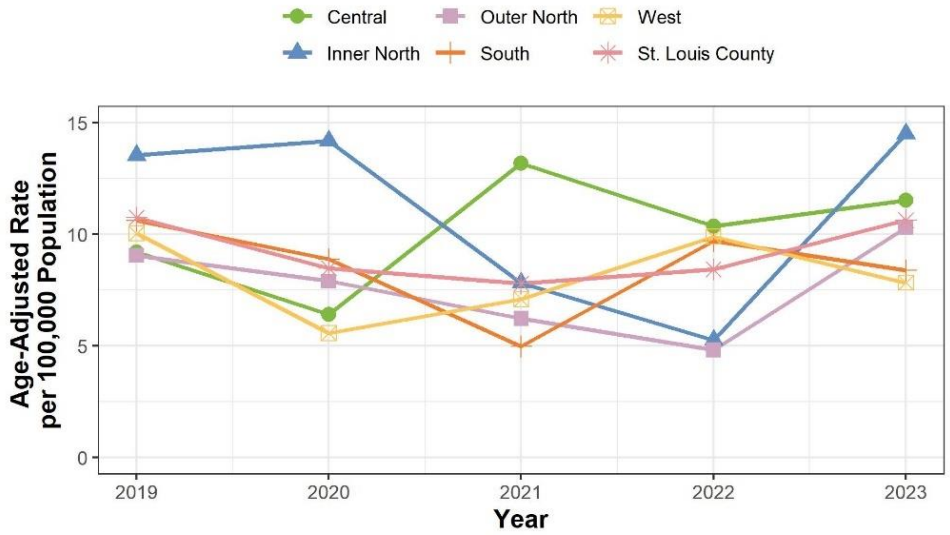


Figure 8: Rates of Chronic Hepatitis B by Geographic Region by Year
St. Louis County, MO, 2019-2023



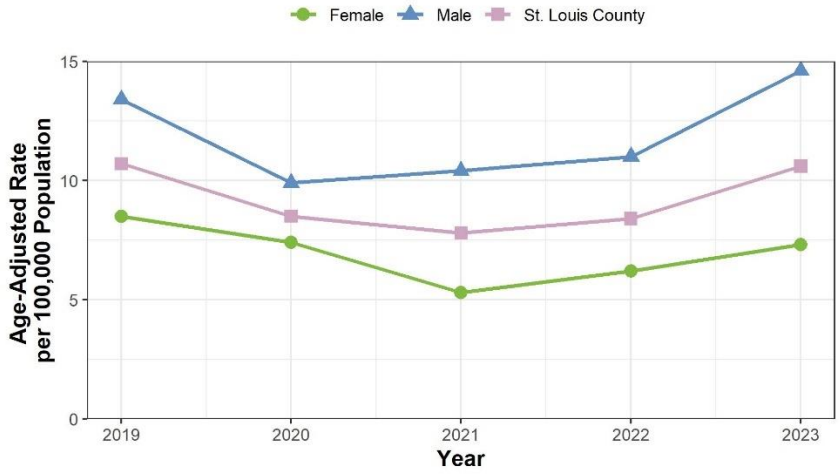
Source: Missouri Department of Health and Senior Services (DHSS).

From 2019 through 2023, the Central region (9.2 cases per 100,000 to 11.5 cases per 100,000), Inner North region (13.5 cases per 100,000 to 14.5 cases per 100,000), and Outer North region (9.0 cases per 100,000 to 10.3 cases per 100,000) all saw an increase in rates of chronic hepatitis B. The South region (10.6 cases per 100,000 to 8.4 cases per

100,000) and the West region (10.0 cases per 100,000 to 7.8 cases per 100,000) all saw a decrease in rates of chronic hepatitis B (**Figure 8**).

Chronic Hepatitis B by Sex, Race, Ethnicity, and Age Group

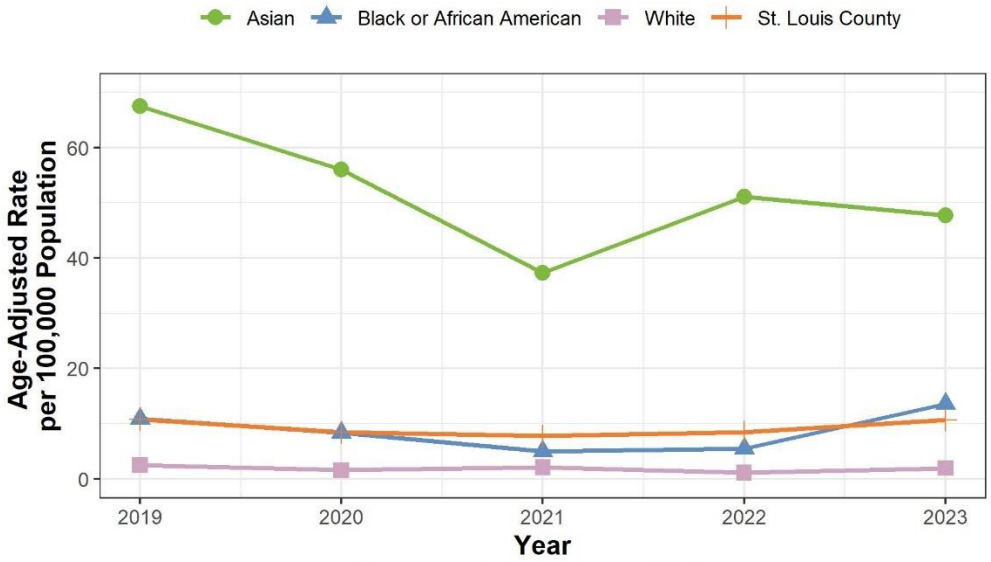
Figure 9: Rates of Chronic Hepatitis B by Sex and Year
St. Louis County, MO, 2019-2023



Source: Missouri Department of Health and Senior Services (DHSS).

In 2023, 59.6% of newly reported chronic hepatitis B cases were among male residents. The rate of newly reported chronic hepatitis B cases was 2.0 times higher for male residents (14.6 cases per 100,000 population) than female residents (7.3 cases per 100,000 population) as shown in **Figure 9**. Rates in males have increased 9.0% since 2019 while rates in females have decreased 14.1% from 2019 to 2023.

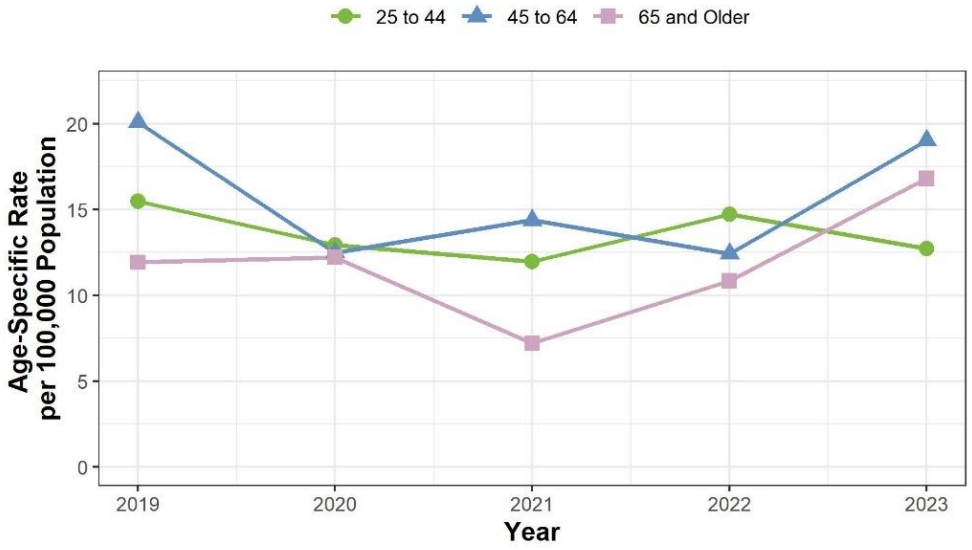
Figure 10: Rates of Chronic Hepatitis B by Race and Year
St. Louis County, MO, 2019-2023



Source: Missouri Department of Health and Senior Services (DHSS).

Race was reported in 65.8% of chronic hepatitis B cases in 2023. Of those with race reported, 28.1% were among residents who identify as Black, 21.5% were among residents who identify as Asian, and 14.9% were among residents who identify as White. In 2023 (and throughout the report's period), Asian residents had the highest rates of chronic hepatitis B with 47.7 cases per 100,000 compared to Black residents (13.6 cases per 100,000) and White residents (1.9 cases per 100,000) (**Figure 10**). Rates have remained stable for White and Black residents from 2019 through 2023, where there was a 29.3% drop in cases in Asian residents. There were too few cases among residents who identify as Hispanic/Latino, American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, and residents of more than once race to calculate reliable rates for these groups.

Figure 11: Rates of Chronic Hepatitis B by Age Group and Year
St. Louis County, MO, 2019-2023



Source: Missouri Department of Health and Senior Services (DHSS).

In 2023, the highest rate of newly reported chronic hepatitis B was among individuals 45 to 64 years old (19.0 cases per 100,000 population) followed by individuals 65 years and older (16.8 cases per 100,000) and individuals 25 to 44 years old (12.7 cases per 100,000) as shown in **Figure 11**. Cases have dropped from 2018 to 2023 for residents aged 25 to 64 but have increased by 41.2% for residents 65 and older.

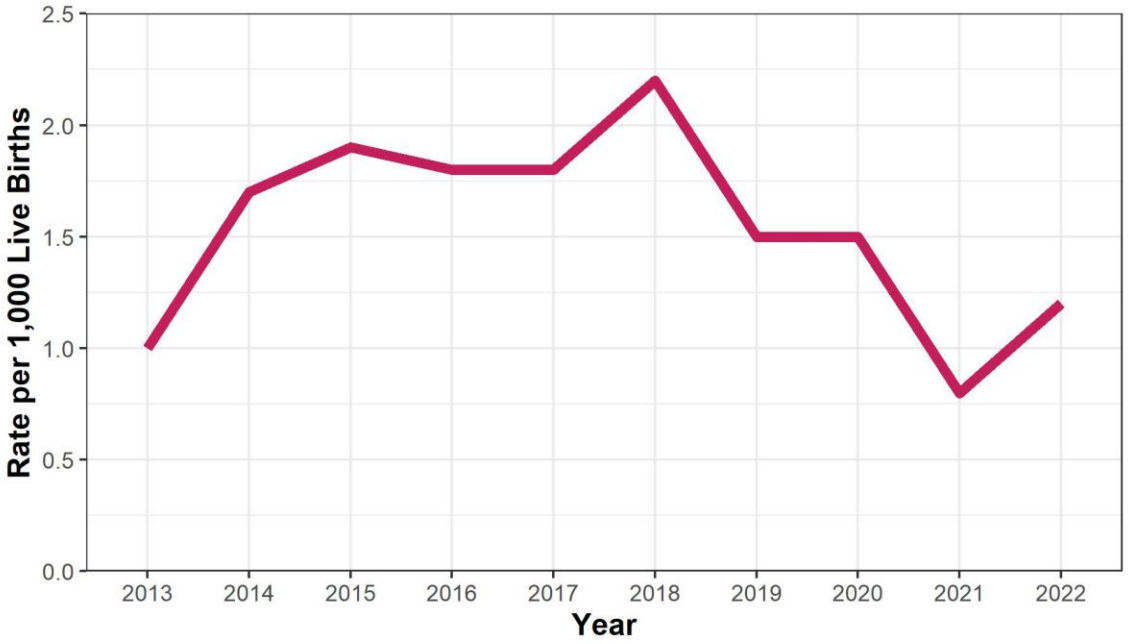
Perinatal Hepatitis B

Transmission of HBV which occurs during childbirth is called perinatal transmission. Without appropriate preventative measures, approximately 90% of infants who become infected will develop chronic HBV infections. The risk of transmission can be reduced by more than 90% if newborns are given appropriate post-exposure prophylaxis.

Through the Perinatal Hepatitis B Prevention program (PHBPP), DPH provides case management to pregnant St. Louis County residents who are infected with HBV and their infants.[13] Services provided by the DPH PHBPP include: educating pregnant people with HBV about the infection; working with parents and health care providers to ensure newborns receive appropriate PEP; and ensuring infants complete the hepatitis B vaccine series and receive timely post-vaccination serology testing.

In 2022, the rate of live births delivered by pregnant persons with HBV was 1.2 per 1,000 live births. Rates in St. Louis County had been decreasing from the peak observed in 2018 (2.2 per 1,000 live births) but saw a slight increase from 2021 (0.8 per 1,000 live births). As shown in **Figure 12**, the rate has increased by 20% from 2013 to 2022. For additional data points and information on the PHB program at DPH, see the latest Perinatal Hepatitis B Report.

Figure 12: Rates of Live Births Delivered by Pregnant Persons with HBV by Year
St. Louis County, MO, 2013-2022



Source: Missouri Department of Health and Senior Services (DHSS), Bureau of Vital Statistics.

Hepatitis B Hospitalizations and Emergency Department Discharges

Inpatient Hospitalizations

Hospital stays among St. Louis County residents with a hepatitis B diagnosis occur with common co-diagnoses (not including childbirth stays) including septicemia, diseases of the heart, chronic liver disease and cirrhosis, and respiratory failure.

From 2018 to 2022 the rates of hepatitis B associated hospitalizations was 7.2 hospitalizations per 100,000 population. There were, on average, 82 hospitalizations with a hepatitis B diagnosis per year in St. Louis County. Rates were significantly higher for residents aged 45 and older, residents who identify as Asian or Black, residents who live in neighborhoods with high to very high levels of poverty, and residents who live in the Inner North region. Rates were significantly lower in female residents, residents aged 25-44, residents who identify as White, residents who live in neighborhoods with low poverty, and residents who live in the Central or West regions (Table 4).

Table 4: Rates of Hepatitis B Associated Hospitalizations per 100,000 Population by Demographics
St. Louis County, MO, 2018-2022

	Rate	95% Confidence Interval	Average Count per Year
St. Louis County			
Total County	7.2	6.4 to 8.0	82
Gender			
Female	**5.3**	4.3 to 6.2	33
Male	9.3	8.0 to 10.5	49
Age Group			
25-44	**4.8**	3.5 to 6.0	12
45-64	**13.3**	11.4 to 15.3	35
65+	**18.8**	16.0 to 21.6	34
Race			
Asian	**23.5**	17.5 to 29.5	9
Black or African American	**15.6**	13.5 to 17.8	35
White	**3.8**	3.0 to 4.6	35
Poverty Levels			
Low	**5.0**	4.1 to 5.8	34
Medium	8.7	6.9 to 10.6	20
High	**22.5**	16.0 to 29.0	9
Very high	**17.9**	13.1 to 22.7	9
Region			
Central	**3.9**	2.1 to 5.7	7
Inner North	**14.3**	11.5 to 17.1	31
Outer North	5.7	3.9 to 7.5	13
South	5.5	3.7 to 7.2	18
West	**2.5**	1.5 to 3.6	12

Rates that are bold and red are above the overall St. Louis County rate while rates that are bold and blue are below.

Source: Missouri Department of Health and Senior Services (DHSS), Patient Abstract System.

Case Definition: Hospitalizations with a diagnosis code of hepatitis B (ICD-10 codes: B16, B17.0, B18.0, and B18.1) listed. Hospitalizations with a diagnosis code related to pregnancy or childbirth (ICD-10 codes: O00-O99) were excluded in the hospital analysis. Rates were age-adjusted (except age groups). Data groups with less than 5 cases during the 5-year period are suppressed.

Emergency Department Discharges

For patients who sought care in the emergency room (ED), septicemia, diseases of the heart, and chronic lower respiratory disease were the top co-diagnosis among emergency department discharges with hepatitis B. In St. Louis County, the average yearly rate of hepatitis B associated discharges was 7.4 per 100,000 population from 2018 to 2022. Rates were significantly higher for individuals aged 45 and older, residents who identify as Asian or Black, residents who live in neighborhoods with high or very high levels of poverty, and residents who live in the Inner North region as shown in **Table 5**. Rates were significantly lower in residents who identify as White, residents who live in neighborhoods with low levels of poverty, and residents who live in the Central and West regions.

Table 5: Rates of Hepatitis B Associated Emergency Dischargers per 100,000 Population by Demographics
St. Louis County, MO, 2018-2022

	Rate	95% Confidence Interval	Average Count per Year
St. Louis County			
Total County	7.4	6.6 to 8.2	83
Gender			
Female	6.2	5.1 to 7.2	37
Male	8.8	7.5 to 10.0	46
Age Group			
25-44	5.6	4.3 to 7.0	14
45-64	**13.3**	11.3 to 15.2	35
65+	**18.7**	15.9 to 21.5	33
Race or Ethnicity			
Asian	**22.4**	16.4 to 28.3	9
Black or African American	**16.6**	14.3 to 18.8	38
White	**3.8**	3.1 to 4.6	33
Poverty Levels			
Low	**4.9**	4.0 to 5.7	33
Medium	10.2	8.2 to 12.3	23
High	**19.1**	13.0 to 25.1	8
Very high	**20.9**	15.8 to 26.0	10
Region			
Central	**4.9**	3.1 to 6.6	7
Inner North	**18.6**	15.8 to 21.5	32
Outer North	7.7	5.8 to 9.6	15
South	7.4	5.6 to 9.2	19
West	**2.7**	1.8 to 3.6	11

Rates that are bold and red are above the overall St. Louis County rate while rates that are bold and blue are below.

Source: Missouri Department of Health and Senior Services (DHSS), Patient Abstract System.

Case Definition: Hospitalizations with a diagnosis code of hepatitis B (ICD-10 codes: B16, B17.0, B18.0, and B18.1) listed. Rates were age-adjusted (except age groups). Data groups with less than 5 cases during the 5-year period are suppressed.

Hepatitis C

Introduction

Hepatitis C is an inflammation of the liver caused by the hepatitis C virus. It is the most common blood borne disease in the United States. According to the World Health Organization, an estimated 50 million people have chronic hepatitis C virus infection.[14]

HCV is primarily transmitted through infected blood. Previously, blood transfusions, organ transplants, and other medical procedures caused nearly 50% of HCV infections, but after the development of testing measures for the blood supply in 1992, transmission from these sources rapidly declined.[15] Currently, injection drug use (IDU) is the most common means of HCV transmission in the United States with more than half of reported cases with risk information reporting injection drug use.[16] The virus can also be transmitted through sexual contact, from mother to child, and by unlicensed tattoo or piercing practices, although these transmission methods are much less common. In addition to persons who inject drugs, higher risk populations for hepatitis C infection include healthcare professionals and persons born between 1945 and 1965. For healthcare professionals, the virus is an occupational hazard due to potential contact with an infected patient's blood through a needle stick.[17,18]

Hepatitis C infections can be either acute or chronic. Among those exposed to HCV, an estimated 75%-85% will develop chronic infection, while the remainder will spontaneously clear the virus. Chronic HCV infection involves chronic inflammation of the liver which can lead to liver fibrosis, cirrhosis, hepatocellular carcinoma, and death.[19] Of those who are chronically infected, an estimated 5% to 20% will develop cirrhosis over a prolonged period. In addition, those with cirrhosis face a 25% risk of progressing to end-stage liver disease or hepatocellular carcinoma.[20] Hepatitis C is among the leading causes of liver transplants in the United States.[21] Infection from hepatitis C also increases a person's susceptibility to other diseases which may worsen the damage the virus causes to the liver; nearly all patients with hepatitis C have at least one comorbidity.[22] Infection with HBV and human immunodeficiency virus (HIV) and HCV comorbidities of interest due to their shared modes of transmission; between 5%-10% of people with HCV are co-infected with HIV while the percentage of HBV/HCV co-infection is unknown.[23,15] HCV has also been linked to the development of type 2 diabetes and atherosclerosis and has been shown to increase the risk of cardiovascular events in those infected.[24]

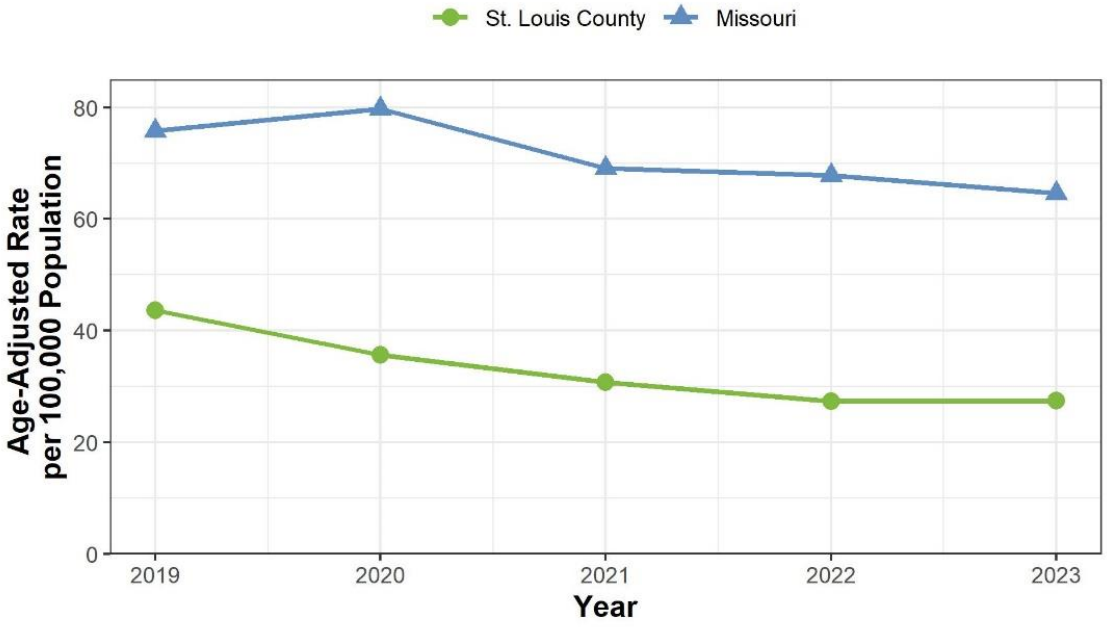
According to the CDC, there were 4,848 new cases of acute hepatitis C reported in 2022 with an estimate of 67,400 new cases.[25] This was a decrease of 6% from what was reported in 2021. There was a change to the case definition in 2020. The new definition is more sensitive which could account for the increase of cases. Rates were highest among persons aged 30-39 years and for those who identify as non-Hispanic American Indian/Alaska Native. Also, during 2022, there were 93,805 cases of newly reported chronic hepatitis C in the United States.[25] Approximately 65% of newly reported cases occurred in men and affects multiple generations, with infections highest among two age groups: 25-45 and 55-70.

The HCV treatment guidance from the American Associated for the Study of Liver Diseases and the Infectious Diseases Society of American recommends that all patients

with chronic HCV infection should be treated except for those with short life expectancies (less than 12 months) that cannot be remediated by treated HCV or by performing a liver transplant.[26] The development of direct-acting antiviral drugs has increased the effectiveness of HCV treatments to success rates of over 90%, but treatments remain prohibitively expensive despite financial assistance programs.[27,28] In Missouri, Project Hep Cure is available which covers treatment at no cost to the patient for those who have MO HealthNet coverage. For more information see Project Hep Cure.

Cases of hepatitis C in St. Louis County dropped from 43.6 cases per 100,000 population in 2019 to 27.4 cases per 100,000 in 2023. In 2019, 482 cases were reported while 298 cases were reported in 2023. Unlike hepatitis B, the rate of hepatitis C remains lower in St. Louis County than in Missouri. Rates in Missouri also dropped from 2019 at 75.8 cases per 100,000 to 64.6 cases per 100,000 in 2023 (**Figure 13**). There was a change in the case definition for hepatitis C in 2020 to assist with improving identification of acute cases.

Figure 13: Rates of Reported Acute and Chronic Hepatitis C Cases in St. Louis County and Missouri by Year
St. Louis County and Missouri, 2019-2023



Source: Missouri Department of Health and Senior Services (DHSS)

Of the cases who were interviewed (n=163), the top symptoms reported were abdominal cramps (9.8%), nausea (8.0%), vomiting (4.9%), and fatigue (3.7%). Most cases investigated reported no symptoms (24.5%). The top reported risk factor was patient injected drugs not prescribed by a doctor (32.5%). Approximately 55.8% of interviewed cases reported either a history or current form of substance use.

Table 6: Rates of Reported Acute and Chronic Hepatitis C Cases per 100,000 Population by Demographics

St. Louis County, MO, 2019-2023

	Rate	95% Confidence Interval	Average Count per Year
St. Louis County			
Total County	**33.0**	**31.4 to 34.7**	**356**
Gender			
Female	**22.2**	20.3 to 24.1	126
Male	**45.5**	42.7 to 48.3	230
Age Group			
0-17	**0.8**	0.3 to 1.3	2
18-24	**17.7**	13.7 to 21.7	15
25-44	**56.9**	52.7 to 61.1	141
45-64	**43.5**	39.9 to 47.0	115
65+	**46.4**	42.0 to 50.9	83
Race or Ethnicity			
Asian	**5.8**	2.6 to 9.0	3
Black or African American	**47.1**	43.2 to 51.0	113
Hispanic or Latino	**12.1**	6.8 to 17.4	3
Multiple Races	**6.5**	3.0 to 10.1	2
White	**16.1**	14.7 to 17.4	105
Region			
Central	**18.7**	15.2 to 22.2	26
Inner North	**71.0**	65.3 to 76.8	130
Outer North	36.5	32.3 to 40.6	71
South	**23.6**	20.6 to 26.7	53
West	**17.3**	15.2 to 19.4	53

Rates that are bold and red are above the overall St. Louis County rate while rates that are bold and blue are below.

Source: Missouri Department of Health and Senior Services (DHSS)

Case Definition: Rates were age-adjusted (except age groups). Data groups with less than 5 cases during the 5-year period are suppressed.

As shown in **Table 6**, there were an average of 356 cases of chronic and acute hepatitis C reported in St. Louis County each year. The rate of new reported case from 2019 through 2023 was 33.0 cases per 100,000 population. Rates were significantly higher for residents who identify as male, residents aged 25 and older, residents who identify as Black, and residents who live in the Inner North. Rates were significantly lower for residents who identify as female, residents aged 24 and younger, residents who identify as either Asian, Hispanic/Latino, Multiple Races, or White, and residents who live in the Central, South or West regions. Race was unknown for 36.1% of cases and ethnicity was unknown in 65.3% of cases.

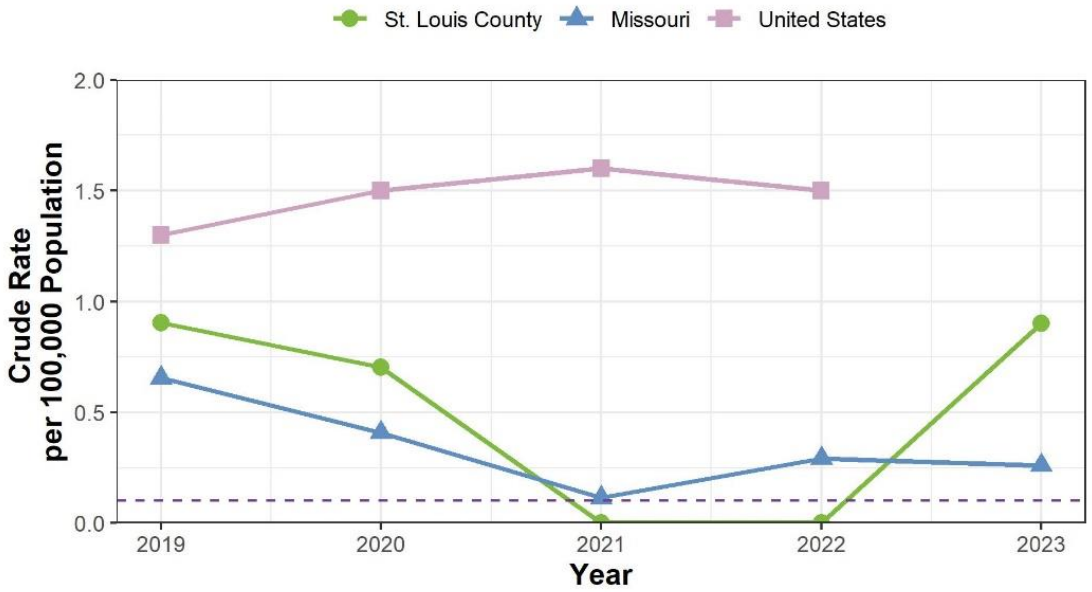
Acute Hepatitis C

Acute hepatitis C is a reportable condition in Missouri and has been nationally notifiable since 1994. However, since most hepatitis C cases are asymptomatic, most new cases of hepatitis C are not recognized, diagnosed, or reported. DPH began investigating a subset of reported hepatitis C cases in mid-2016 to classify as acute or chronic, gather additional information, and provide education.

During 2019 to 2023 there were 25 newly reported cases of acute hepatitis C. The peak of hepatitis C cases were reported in 2023 at 0.9 cases per 100,000 population for St. Louis County while it peaked in 2019 at 0.7 cases per 100,000 for Missouri as shown in **Figure 14**. Healthy People 2030 has a goal to reduce the rate of acute hepatitis C cases to 0.1 per 100,000. This goal has not been met by St. Louis County, Missouri, or the United States. In 2021 and 2022, St. Louis County had zero cases classified as acute, however, this may be due to limited abilities to investigate cases resulting in acute cases being classified as chronic. Data for the United States are not yet available for 2023.

Figure 14: Rates of Acute Hepatitis C in St. Louis County, Missouri, and the United States by Year

St. Louis County, Missouri, and the United States 2019-2023

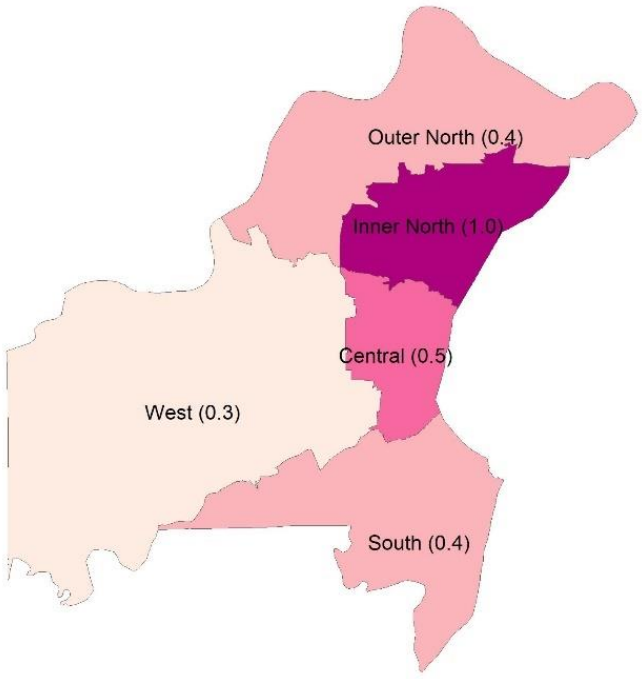


Source: Missouri Department of Health and Senior Services (DHSS) & Centers for Disease Control and Prevention

Acute Hepatitis C by Region

From 2019 to 2023 the rate of acute hepatitis C in St. Louis County was 0.6 cases per 100,000 population. By region, the rates of acute hepatitis C were highest in the Inner North region (1.0 cases per 100,000) followed by the Central region (0.5 cases per 100,000), Outer North and South regions (0.4 cases per 100,000), and the West region (0.3 cases per 100,000) (**Figure 15**).

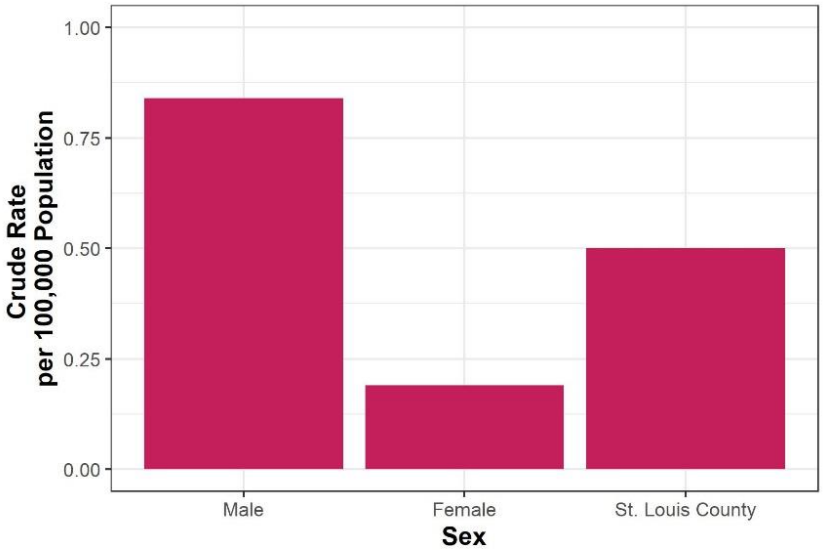
Figure 15: Rates of Acute Hepatitis C by Geographic Region per 100,000 Population
St. Louis County, MO, 2019-2023



Acute Hepatitis C by Sex, Race, Ethnicity, and Age Group

From 2019 to 2023, the rate of acute hepatitis C was 0.8 cases per 100,000 population for residents who identify as male and 0.2 cases per 100,000 population for residents who identify as female as shown in **Figure 16**. Males made up 80.0% of cases during this reporting period.

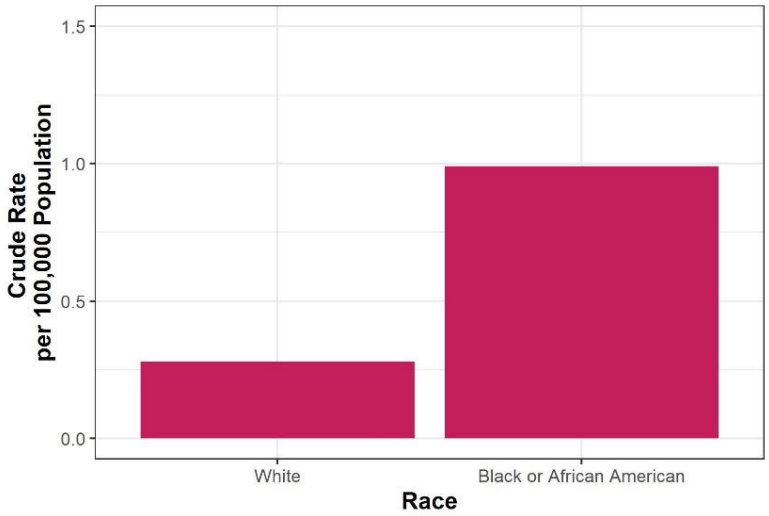
Figure 16: Rates of Acute Hepatitis C by Sex
St. Louis County, MO, 2019-2023



Source: Missouri Department of Health and Senior Services (DHSS).

Race was known for 84.0% of reported cases of acute hepatitis C. As shown in **Figure 17**, the rate in residents who identify as Black was 3.6 times higher than the rate in residents who identify as White (1.0 cases per 100,000 population; 0.3 cases per 100,000 population). There were too few cases among residents who identify as Hispanic or Latino, Asian, American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, and residents of more than one race to calculate reliable rates for these groups.

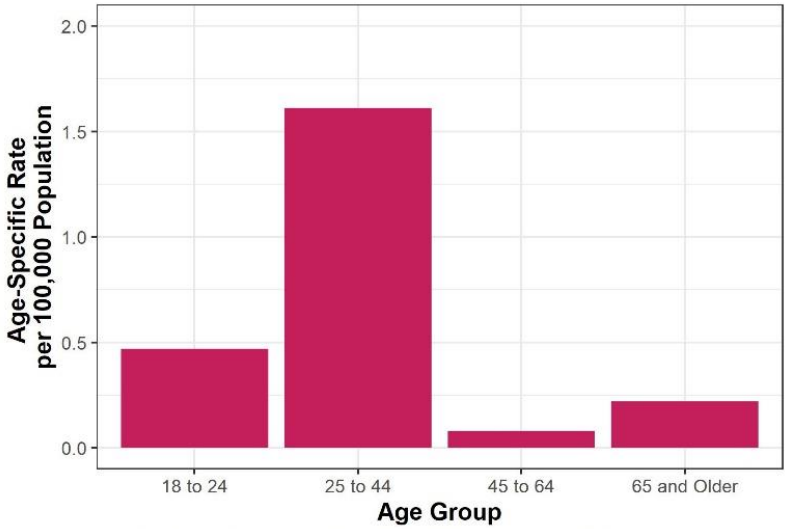
Figure 17: Rates of Acute Hepatitis C by Race
St. Louis County, MO, 2019-2023



Source: Missouri Department of Health and Senior Services (DHSS).

From 2019 to 2023, among cases investigated and classified as acute, the highest rate of acute hepatitis C was among individuals 25 to 44 years of age (1.6 cases per 100,000 population) (**Figure 18**). However, since the investigations by DPH focus on cases aged either 30 years or 35 years or younger, this rate may be artificially high compared to other age groups which are not being targeted for investigations.

Figure 18: Rates of Acute Hepatitis C by Age Group
St. Louis County, MO, 2019-2023



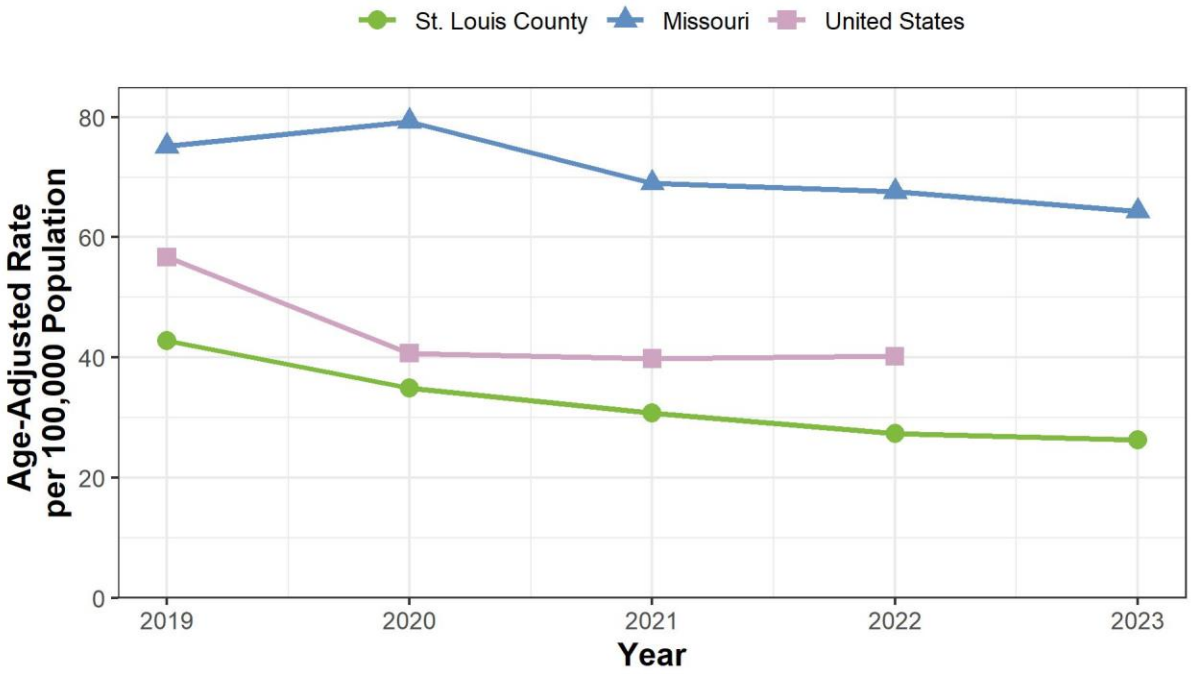
Source: Missouri Department of Health and Senior Services (DHSS).

Chronic Hepatitis C

Chronic hepatitis C has been nationally notifiable since 2003 and is reportable in Missouri. Since chronic hepatitis C is generally an asymptomatic condition, testing for and diagnosis of cases of chronic hepatitis C often occurs only at later stages of the disease, if at all.

Figure 19: Rates of Chronic Hepatitis C in St. Louis County, Missouri, and the United States by Year

St. Louis County, Missouri, and the United States, 2019-2023



Source: Missouri Department of Health and Senior Services (DHSS)

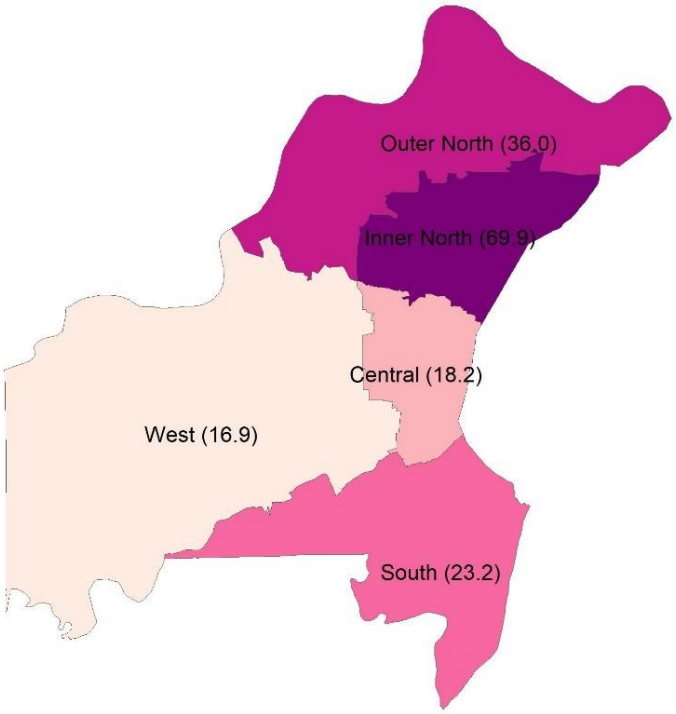
In St. Louis County, rates of reported chronic hepatitis C declined by 38.6% from 42.8 cases per 100,000 population in 2019 to 26.3 cases per 100,000 in 2023. Cases in Missouri declined by 14.4% from 75.1 cases per 100,000 in 2018 to 64.3 cases per 100,000 in 2023. Chronic hepatitis C rates in the county remained lower than Missouri, and the United States. Data for 2023 were not available for the United States (**Figure 19**).

Chronic Hepatitis C by Region

From 2019 through 2023, the Inner North region had the highest rates of chronic hepatitis C (69.9 cases per 100,000 population), followed by the Outer North region (36.0 cases per 100,000), the South region (23.2 cases per 100,000), the Central region (18.2 cases per 100,000), and the West region (16.9 cases per 100,000). (**Figure 20**). All regions throughout the county had a drop in rates during the report period.

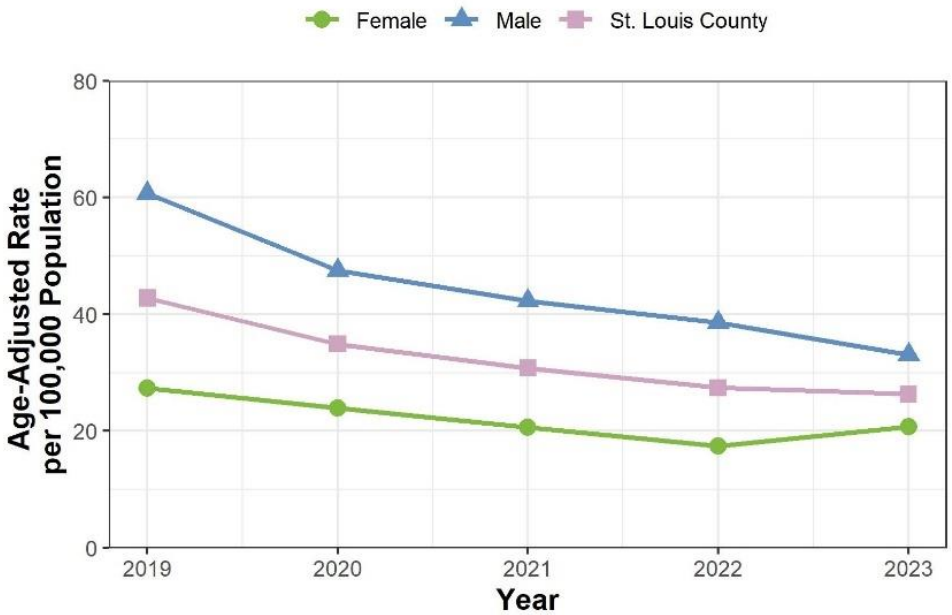
Data Source: Missouri Department of Health and Senior Services
Bureau of Vital Statistics, Bureau of Health Care Analysis and Data Dissemination, &
The Missouri Health and Surveillance Information System (WebSurv)
This report is updated annually. Last updated 10/25/2024 (OC)

Figure 20: Rates of Chronic Hepatitis C by Geographic Region per 100,000 Population
St. Louis County, MO, 2019-2023



Chronic Hepatitis C by Sex, Race, Ethnicity, and Age Group

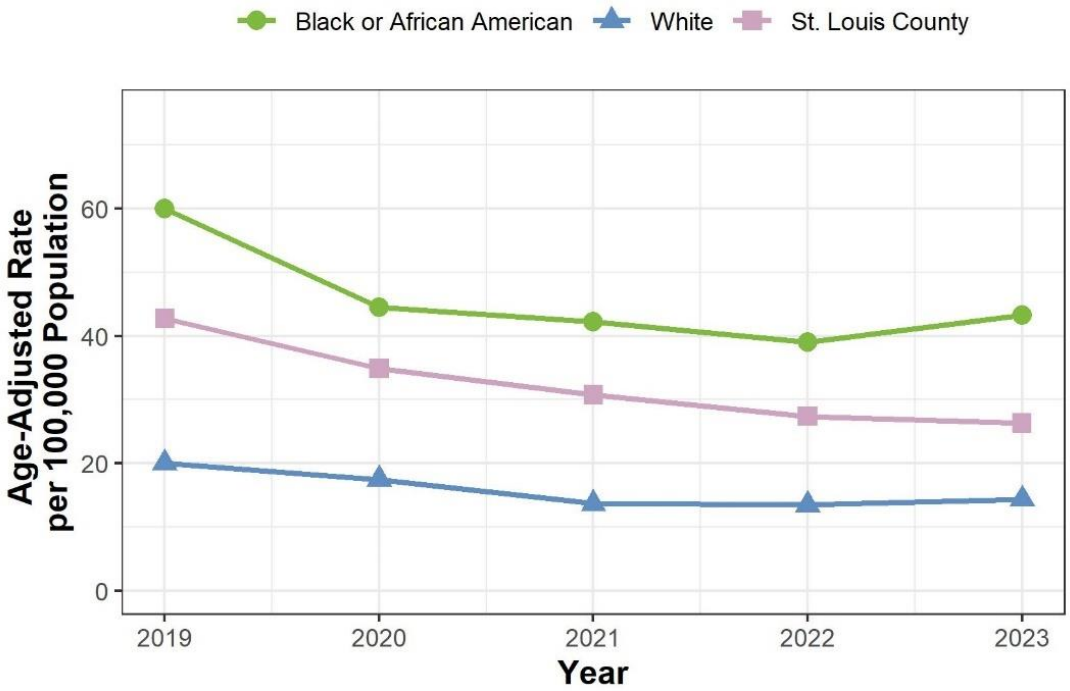
Figure 21: Rates of Chronic Hepatitis C by Sex and Year
St. Louis County, MO, 2019-2023



Source: Missouri Department of Health and Senior Services (DHSS).

In 2023, 59.2% of newly reported chronic hepatitis C cases were among male residents. In 2019, the rate of newly reported chronic hepatitis C cases was 2.2 times higher for male residents (60.7 cases per 100,000 population) than female residents (27.3 cases per 100,000 population). In 2023, cases were only 1.6 times higher for male residents (33.1 cases per 100,000) than female residents (20.7 cases per 100,000) (**Figure 21**).

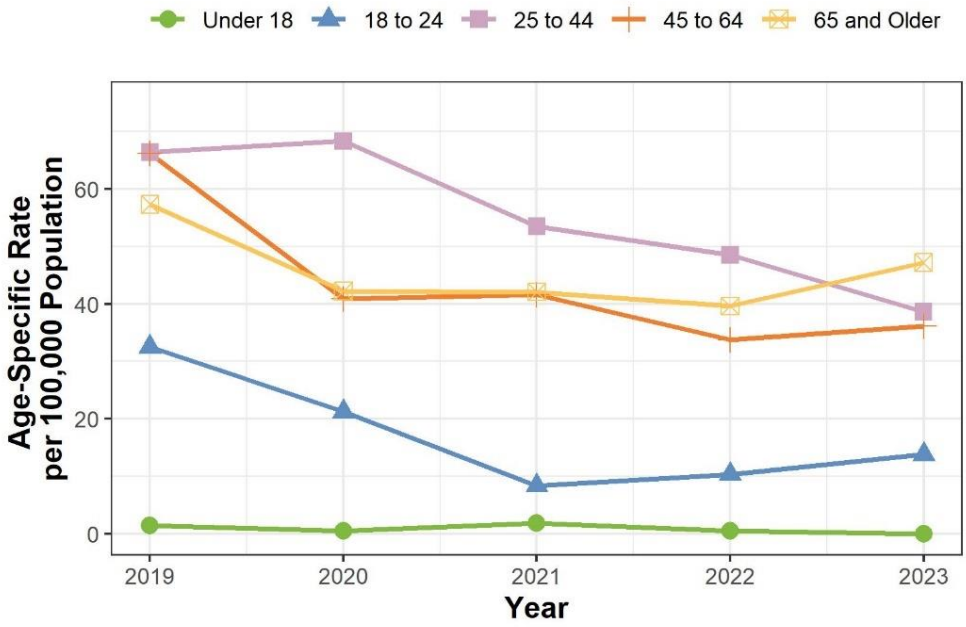
Figure 22: Rates of Chronic Hepatitis C by Race and Year
St. Louis County, MO, 2019-2023



Source: Missouri Department of Health and Senior Services (DHSS).

Race was reported in 68.9% of chronic hepatitis C cases in 2023. Of those with race reported, 52.0% were among residents who identify as Black and 46.0% were among residents who identify as White. Black residents had the highest rate of chronic hepatitis C with 43.3 cases per 100,000 population compared to residents who identify as White with 14.3 cases per 100,000 population as shown in **Figure 22**. Chronic hepatitis C rates for both Black and White residents have declined since 2019: 27.8% for residents who identify as Black and by 28.9% for residents who identify as White. There were too few cases among residents who identify as Hispanic/Latino, Asian, American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, and residents of more than once race to calculate reliable rates for these groups.

Figure 23: Rates of Chronic Hepatitis C by Age Group and Year
St. Louis County, MO, 2019-2023



Source: Missouri Department of Health and Senior Services (DHSS).

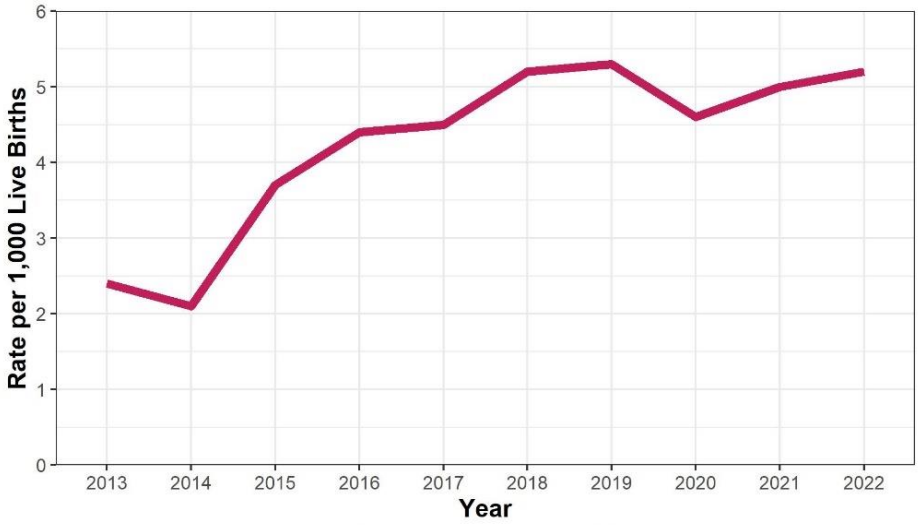
In 2023, the highest rate of chronic hepatitis C was among individuals 65 and older (47.2 cases per 100,000 population), followed by individuals 25 to 55 years old (38.6 cases per 100,000), and individuals aged 45 to 64 (36.1 cases per 100,000) as shown in **Figure 23**. All age groups saw a decrease in reported cases from 2019 to 2023.

Perinatal Hepatitis C

Perinatal hepatitis C refers to the mother-to-child transmission of HCV. The risk of an infected mother transmitting HCV to her infant is approximately 4%-8% per pregnancy, however, the risk is higher (8%-15%) if the pregnant person has a high HCV viral load or is coinfected with human immunodeficiency virus (HIV).[19] Currently, there is limited information on the actual mode of transmission but it appears both intrauterine transmission and infection at time of delivery are both possible. According to the CDC, all pregnant persons should be screened for HCV antibodies (anti-HCV) during each pregnancy, except in settings where the prevalence of HCV infection is <0.1%. Pregnant persons with any known risk factors should be tested regardless of prevalence.[19] Pregnant persons with known HCV infection, can be monitored throughout the pregnancy and monitoring HCV exposed infants can lead to early identification of infection. Infants exposed to HCV can be tested for HCV RNA as early as 2 months of age. Children should wait to be tested for anti-HCV no sooner than age 18 months, and treatment, if needed, can begin once the child reaches age 3.[29]

In the United States, rates of HCV infections among reproductive-aged persons have drastically increased. Specifically, rates of acute infections more than tripled among reproductive-aged persons from 2010 through 2021, from 0.8 to 2.5 per 100,000 population among persons aged 20-29 years and from 0.6 to 3.5 among persons aged 30-39. Due to the increases of acute and chronic infections, rates of HCV during pregnancy have increased by 20% during 2016-2020.[30] In 2022, there were 197 newly reported cases of perinatal hepatitis C virus infection in the United States.[25] The rates of live births delivered by pregnant persons with HCV has increased in St. Louis County. As shown in **Figure 24**, the rate in 2013 was 2.4 per 1,000 live births and peaked in 2019 at 5.3 per 1,000 live births. The latest rate in 2022 was at a slight decrease at 5.2 per 1,000 live births. DPH currently does not investigate or conduct surveillance on perinatal hepatitis C cases. DPH may expand the program to investigate perinatal hepatitis C cases, a condition which became nationally notifiable in 2018.

Figure 24: Rate of Live Births Delivered by Pregnant Persons with HCV by Year
St. Louis County, MO, 2013-2022



Source: Missouri Department of Health and Senior Services (DHSS), Bureau of Vital Statistics.

Hepatitis C Hospitalizations and Emergency Department Discharges

Inpatient Hospitalizations

Hospital stays involving hepatitis C have been on the rise. In St. Louis County, the top co-diagnoses included mood (affective) disorders, diseases of the heart, septicemia, and schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders.

From 2018 to 2022 the rate of hepatitis C associated hospitalization was 43.3 hospitalizations per 100,000 population. There were, on average, 629 hospitalizations with a hepatitis C diagnosis per year in St. Louis County. Rates were significantly higher for male residents, residents aged 25 and older, residents who identify as Black, residents who live in neighborhoods with medium to very high levels of poverty, and for residents who live in the Inner and Outer North regions. Rates were significantly lower in female residents, residents aged 18 to 24, residents who identify as White, residents who live in neighborhoods with low levels of poverty, and for residents who live in the Central, South, or West regions of the county (**Table 7**).

Table 7: Rates of Hepatitis C Associated Hospitalizations per 100,000 Population by Demographics

St. Louis County, 2018-2022

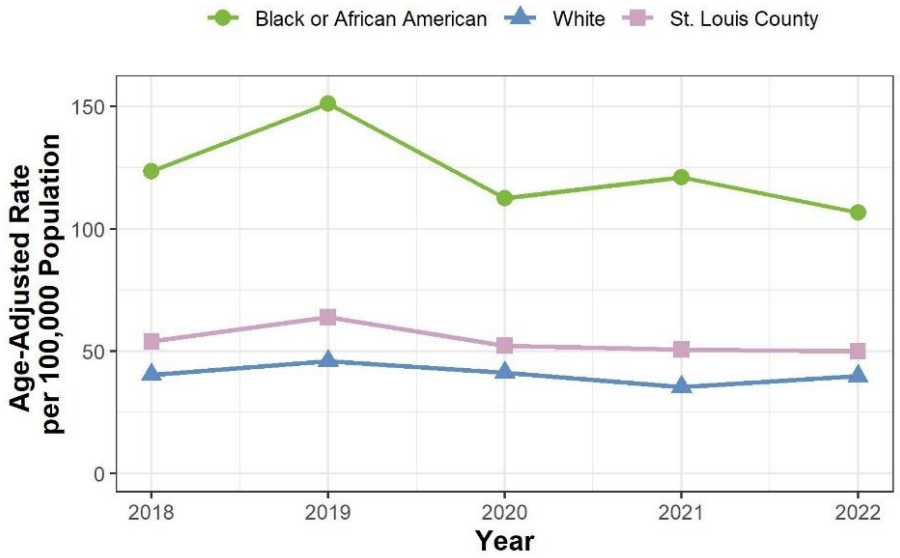
	Rate	95% Confidence Interval	Average Count per Year
St. Louis County			
Total County	43.3	41.1 to 45.5	629
Gender			
Female	**30.5**	27.9 to 33.0	230
Male	**58.1**	54.4 to 61.8	399
Age Group			
18-24	**7.8**	5.5 to 10.2	8
25-44	**52.7**	49.1 to 56.3	163
45-64	**73.0**	68.9 to 77.1	242
65-150	**96.3**	90.5 to 102.0	215
Race or Ethnicity			
Black or African American	**98.2**	91.7 to 104.7	318
White	**32.5**	30.2 to 34.8	296
Poverty Levels			
Low	**35.1**	32.8 to 37.3	237
Medium	**74.1**	68.5 to 79.8	175
High	**130.7**	114.1 to 147.2	61
Very high	**160.5**	145.0 to 176.0	95
Region			
Central	**35.6**	30.8 to 40.3	49
Inner North	**131.8**	123.7 to 139.9	260
Outer North	**76.0**	69.9 to 82.1	157
South	41.9	37.7 to 46.0	99
West	**17.0**	14.8 to 19.3	61

Rates that are bold and red are above the overall St. Louis County rate while rates that are bold and blue are below.

Source: Missouri Department of Health and Senior Services (DHSS), Patient Abstract System.

Case Definition: Hospitalizations with a diagnosis code of hepatitis C (ICD-10 codes: B17.1 and B18.2) listed. Rates were age-adjusted (except age groups). Data groups with less than 5 cases during the 5 year period are suppressed.

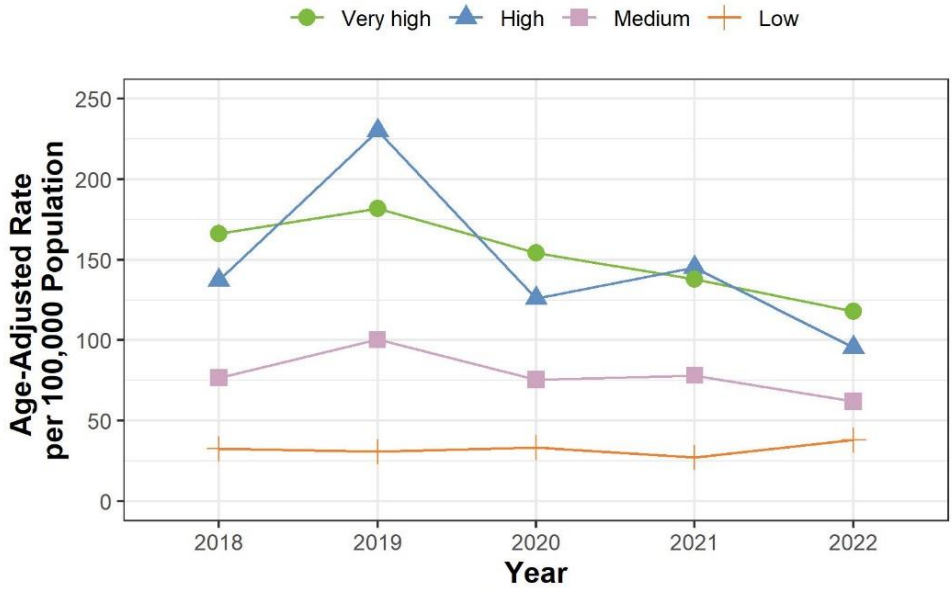
Figure 25: Rates of Hepatitis C Associated Hospitalizations by Race
St. Louis County, MO, 2018-2022



Source: Missouri Department of Health and Senior Services (DHSS), Patient Abstract System.

Hospitalization rates remained somewhat stable for residents who identify as White from 2018 (40.3 hospitalizations per 100,000 population) to 2022 (39.7 hospitalizations per 100,000). Rates for residents who identify as Black peaked in 2019 at 151.2 hospitalizations per 100,000 and has been decreasing ever since to a low of 106.6 hospitalizations per 100,000 in 2022. Hospitalization rates remain 2.7-3.4 times higher than rates for residents who identify as White (**Figure 25**).

Figure 26: Rates of Hepatitis C Associated Hospitalizations by Neighborhood Poverty Level
St. Louis County, MO, 2018-2022



Source: Missouri Department of Health and Senior Services (DHSS), Patient Abstract System.

As shown in Figure 26, hospitalization rates decreased from 166.3 hospitalizations per 100,000 in 2018 to 117.9 hospitalizations per 100,000 in 2022 for residents living in neighborhoods with very high poverty. Rates in neighborhoods with high poverty decreased from 137.3 hospitalizations per 100,000 in 2018 to 95.5 hospitalizations per 100,000 in 2022. Neighborhoods with high poverty had a large spike in 2019 (230.2 hospitalizations per 100,000). Rates for residents living in neighborhoods with medium and low levels of poverty saw little changes from 76.7 hospitalizations per 100,000 and 32.7 hospitalizations per 100,000 in 2018 to 62.1 hospitalizations per 100,000 and 38.0 hospitalizations per 100,000 in 2022.

Data Source: Missouri Department of Health and Senior Services
Bureau of Vital Statistics, Bureau of Health Care Analysis and Data Dissemination, &
The Missouri Health and Surveillance Information System (WebSurv)
This report is updated annually. Last updated 10/25/2024 (OC)

Emergency Department Discharges

For patients in St. Louis County, who sought care in the emergency room (ED), diseases of the heart, mood (affective) disorders, and septicemia were the top co-diagnoses among ED discharges with hepatitis C. Rates of hepatitis C associated discharges was 54.7 ED discharges per 100,000 population from 2018 to 2022 with an average of 637 discharges per year. Rates were significantly higher from the overall county rate for males, residents aged 25 and older, residents who identify as Black, residents who living in neighborhoods with medium to very high levels of poverty, and residents who live in the Inner or Outer North regions as shown in **Table 8**. Rates were significantly lower in females, those aged 24 and younger, residents who identify as White, residents living in neighborhoods with low levels of poverty and residents who live in the Central, South, and West regions.

Table 8: Rates of Hepatitis C Associated Emergency Discharges per 100,000 Population by Demographics
St. Louis County, MO, 2018-2022

	Rate	95% Confidence Interval	Average Count per Year
St. Louis County			
Total County	54.7	52.5 to 56.9	637
Gender			
Female	**36.3**	33.7 to 38.8	225
Male	**75.6**	71.9 to 79.4	412
Age Group			
0-17	**0.5**	0.1 to 0.8	1
18-24	**8.6**	5.8 to 11.4	7
25-44	**64.0**	59.5 to 68.5	159
45-64	**97.1**	91.8 to 102.4	258
65+	**118.9**	111.7 to 126.0	212
Race or Ethnicity			
Black or African American	**133.3**	126.5 to 140.0	345
White	**37.6**	35.4 to 39.9	277
Poverty Levels			
Low	**31.9**	29.8 to 34.1	218
Medium	**72.7**	67.2 to 78.3	172
High	**130.2**	113.6 to 146.7	61
Very high	**173.4**	157.3 to 189.5	103
Region			
Central	**35.8**	31.1 to 40.6	49
Inner North	**137.7**	129.4 to 146.0	273
Outer North	**79.4**	73.2 to 85.7	164
South	**40.3**	36.2 to 44.4	95
West	**14.0**	12.0 to 16.1	50

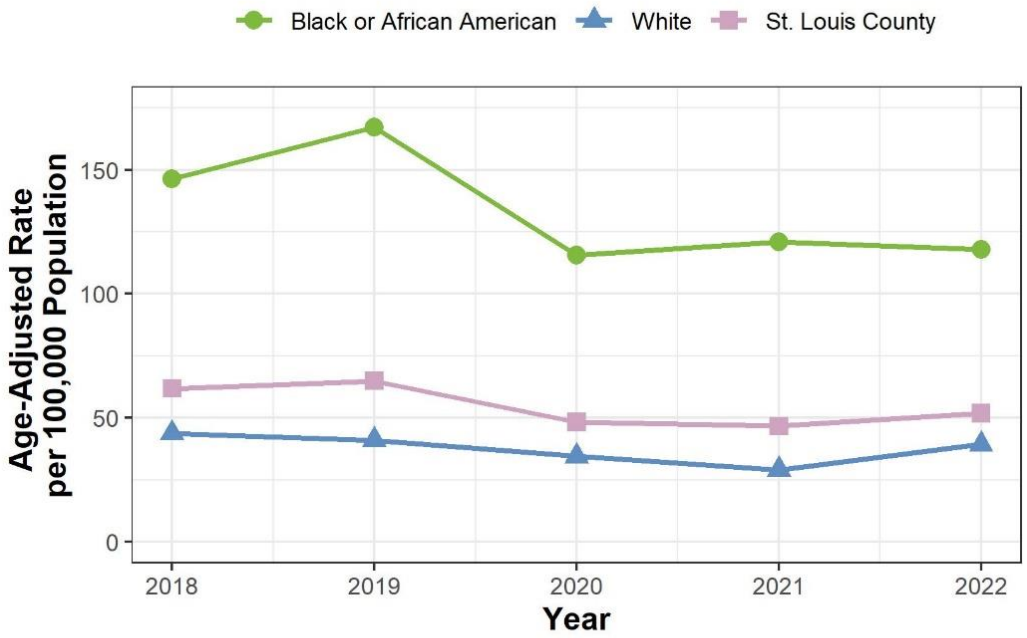
Rates that are bold and red are above the overall St. Louis County rate while rates that are bold and blue are below.

Source: Missouri Department of Health and Senior Services (DHSS), Patient Abstract System.

Case Definition: Hospitalizations with a diagnosis code of hepatitis C (ICD-10 codes: B17.1 and B18.2) listed. Rates were age-adjusted (except age groups). Data groups with less than 5 cases during the 5 year period are suppressed.

Data Source: Missouri Department of Health and Senior Services
Bureau of Vital Statistics, Bureau of Health Care Analysis and Data Dissemination, &
The Missouri Health and Surveillance Information System (WebSurv)
This report is updated annually. Last updated 10/25/2024 (OC)

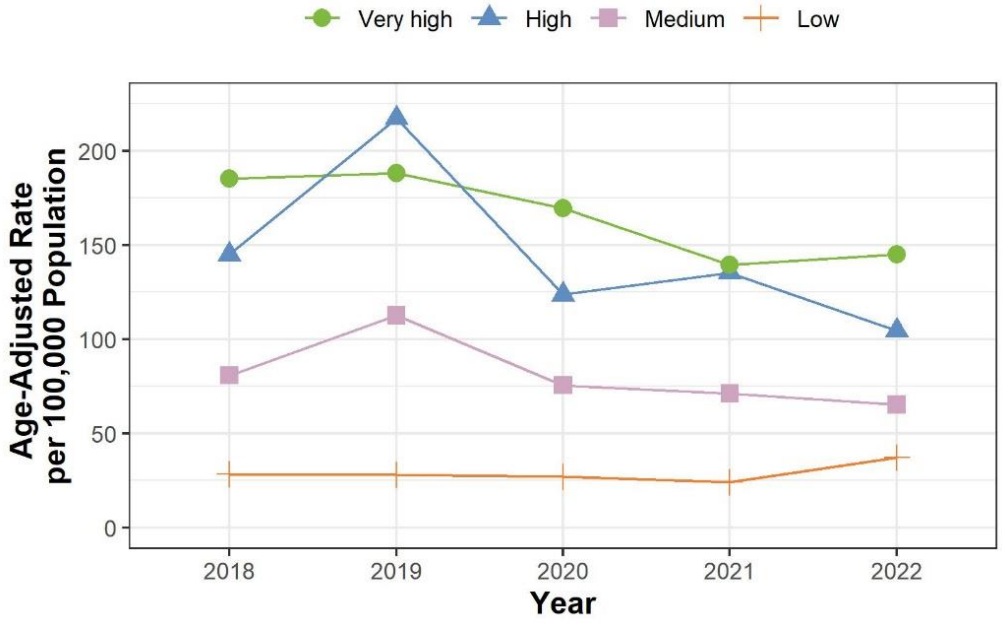
Figure 27: Rates of Hepatitis C Associated Emergency Discharges by Race
St. Louis County, MO, 2018-2022



Source: Missouri Department of Health and Senior Services (DHSS), Patient Abstract System.

ED discharge rates remained somewhat stable for White residents from 2018 (43.8 ED discharges per 100,000 population) to 2022 (39.3 ED discharges per 100,000). Rates for Black residents have decreased from 2018 (146.2 ED discharges per 100,000) to 2022 (117.9 ED discharges per 100,000). ED discharge rates remain 3.0-4.2 times higher than rates for White residents (**Figure 27**).

Figure 28: Rates of Hepatitis C Associated Emergency Discharges by Neighborhood Poverty Level
St. Louis County, MO, 2018-2022



Source: Missouri Department of Health and Senior Services (DHSS), Patient Abstract System.

As shown in **Figure 28**, ED discharge rates decreased from 185.1 ED discharges per 100,000 population in 2018 to 145.0 ED discharges per 100,000 in 2022 for residents living in neighborhoods with very high poverty. Rates in neighborhoods with high poverty saw a sharp increase from 2018 to 2019 (144.9 ED discharges per 100,000; 217.2 ED discharges per 100,000 and reached a low in 2022 at 104.6 ED discharges per 100,000. Rates for residents living in neighborhoods with medium poverty also saw an increase from 2018 to 2022 (80.8 ED discharges per 100,000; 112.7 ED discharges per 100,000) and reached a low in 2022 at 65.3 ED discharges per 100,000. Neighborhoods with low levels of poverty saw little change from 28.3 ED discharges per 100,000 in 2018 to 37.2 ED discharges per 100,000 in 2022.

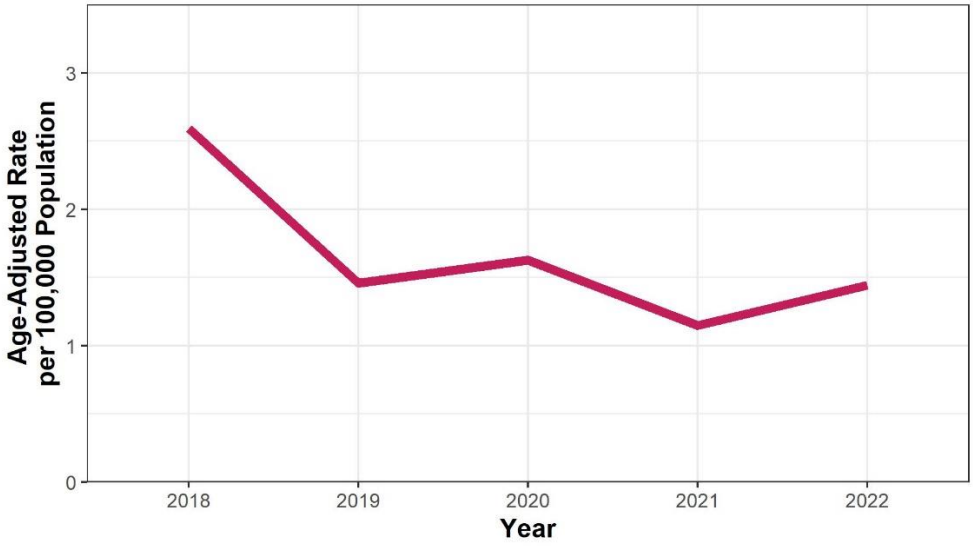
Viral Hepatitis Mortality

Overall Viral Hepatitis-Associated Mortality

In 2020, the leading causes of death in St. Louis County were heart disease, cancer, and COVID-19.[31] Viral hepatitis is not listed in the leading causes of death in the county; however, hepatitis is under-documented on death certificates and persons with hepatitis listed as a cause of death represent a fraction of deaths among hepatitis-infected persons.[32] Due to the COVID-19 pandemic, data should be interpreted with caution due to the overall increase in US mortality.

As shown in Figure 29, the rate of viral hepatitis associated deaths has decreased by 44.4% from 2.6 deaths per 100,000 population in 2018 to 1.4 deaths per 100,000 population in 2022. Apart from small increases in 2020 and 2021, overall, deaths have been on the continuous decline. On average there are approximately 19 HCV-associated deaths and 3 HBV-associated deaths per year in 2018 through 2022.

Figure 29: Rates of Viral Hepatitis Associated Mortality by Year
St. Louis County, MO, 2018-2022



Source: Missouri Department of Health and Senior Services (DHSS), Bureau of Vital Statistics

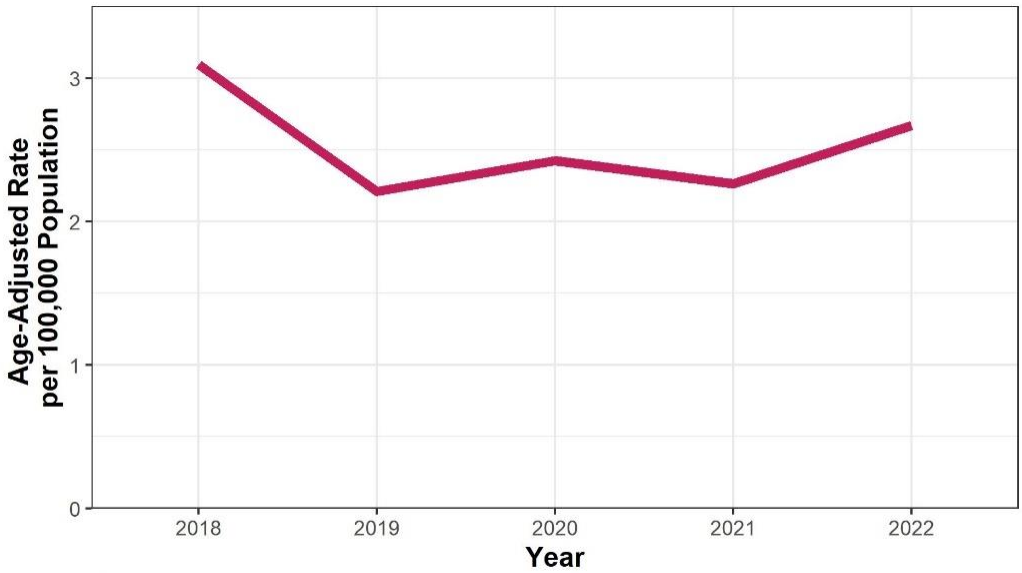
Hepatocellular Carcinoma-Associated Mortality

Hepatocellular carcinoma (HCC) is the most common type of liver cancer. There are non-viral related risk factors for the development of end-stage liver disease, but HCV and HBV remained important factors. The majority of hepatitis C associated HCC occurs in cirrhotic livers however, HCC can arise in patients with a chronic infection of hepatitis B without cirrhosis.[33] There has been a reduction in HCC related HCV due to the introduction of direct acting antiviral therapy to clear HCV.

From 2018 to 2022, the rate of HCC associated mortality was 2.5 deaths per 100,000 population. Rates were highest in 2018 at 3.1 deaths per 100,000 population and lowest in 2019 at 2.2 deaths per 100,000 population. Rates have increased by 22.7% from 2019 to 2022 (2.7 deaths per 100,000) (Figure 30).

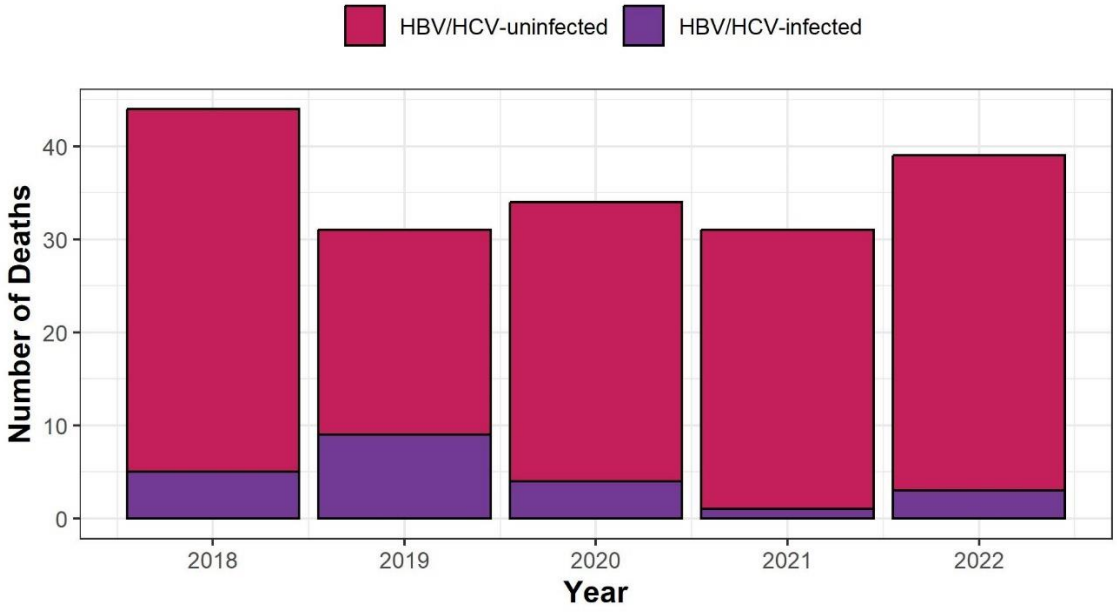
Hepatocellular Carcinoma-Associated Deaths and Hepatitis B and C

Figure 30: Rates of Hepatocellular Carcinoma Associated Mortality by Year
St. Louis County, MO, 2018-2022



Source: Missouri Department of Health and Senior Services (DHSS), Bureau of Vital Statistics

Figure 31: Deaths Associated with Hepatocellular Carcinoma by HBV/HCB-Infection Status
St. Louis County, MO, 2018-2022



Source: Missouri Department of Health and Senior Services (DHSS), Bureau of Vital Statistics

The overall percentage of deaths with HCC associated with HBV or HCV from 2018 to 2022 was 12.3%. Percentages during this timeframe ranged from 3.2% in 2021 to 29.0% in 2019 as shown in **Figure 31**.

Hepatitis B- Associated Mortality

According to the World Health Organization (WHO), HBV contributes to approximately 820,000 deaths per year globally.[32] For most people, HBV is an acute condition that doesn't cause permanent damage but for others, HBV can be fatal, typically due to liver damage or failure.

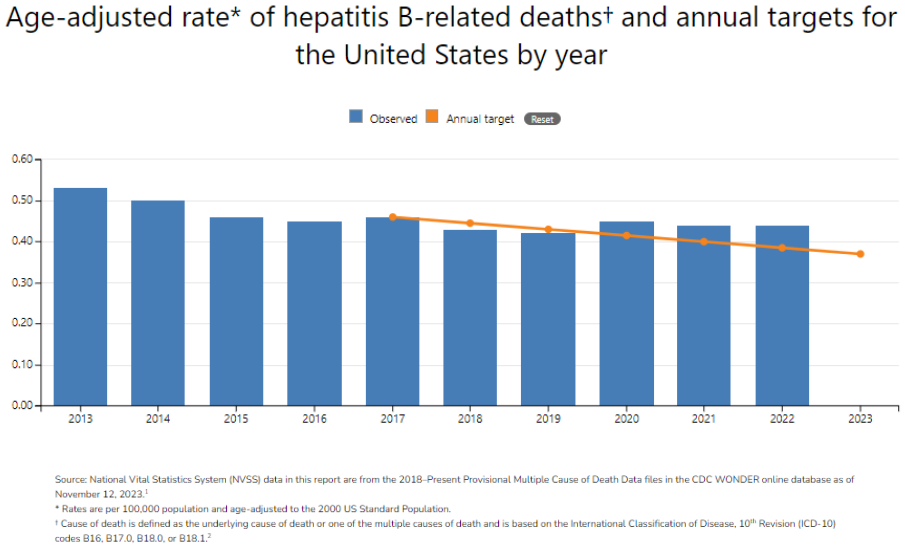
The National Viral Hepatitis Progress Report created a goal to reduce the reported rates of hepatitis B-related deaths by 20%.[2] There has been some progress in reaching that goal, but progress has stalled as shown in **Figure 32**. The age-adjusted hepatitis B-related mortality rate decreased from 0.53 deaths per 100,000 population in 2013 to 0.44 deaths per 100,000 in 2022. The target rate for 2020 was 0.40. To meet the 2025 goal of 0.37 deaths per 100,000, there needs to be a 16% reduction from the 2022 rate.

According to the CDC, the reduction can best be achieved by:[2]

- Implementing CDC's expanded screening and testing recommendations for hepatitis B.
- Increasing access to care and appropriate treatment for persons with chronic hepatitis B.
- Developing training, technical assistance, and tools for primary care and other health care providers to support implementation of hepatitis B testing and referral care.
- Using digital technology and telemedicine models to expand access to specialty health care providers.
- Developing innovative and useful clinical decision support tools that increase implementation of hepatitis B screening, testing, and linkage to care.
- Conducting cost-benefit analyses to determine how payer policies can be revised to expand access to hepatitis B services.
- Supporting research and development for new and more effective anti-viral therapies with the goal of a functional cure for hepatitis B.

Figure 32: 2024 National Viral Hepatitis Progress Report, Reduce Reported Rate of Hepatitis B-Related Deaths by 20% or More

United States, 2013-2023

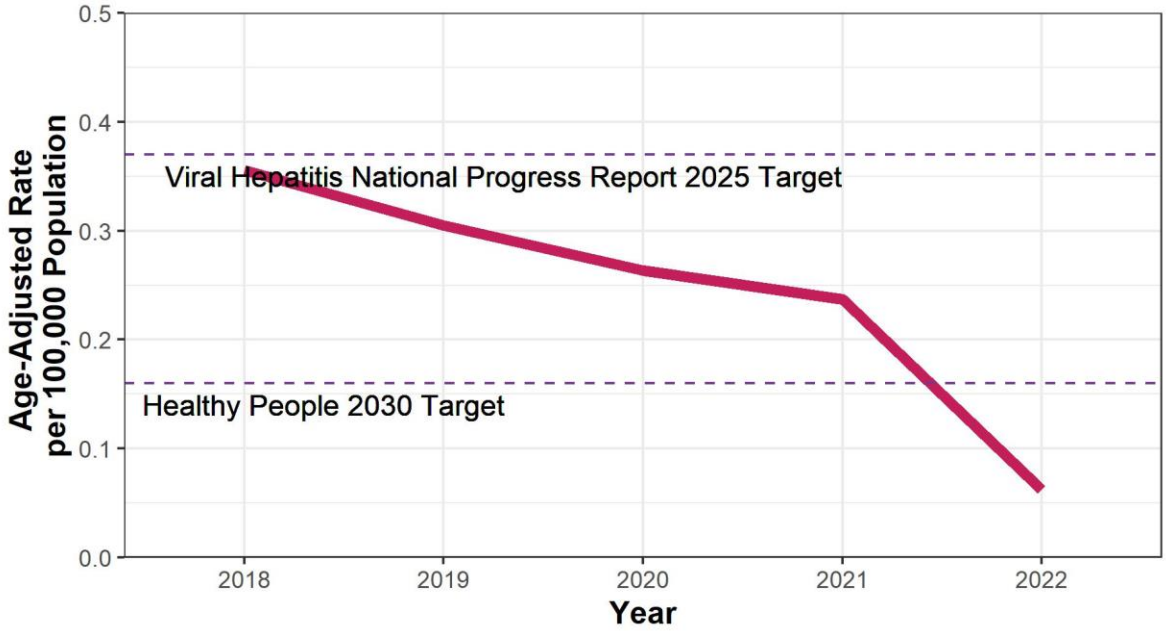


Data Source: Missouri Department of Health and Senior Services
Bureau of Vital Statistics, Bureau of Health Care Analysis and Data Dissemination, &
The Missouri Health and Surveillance Information System (WebSurv)
This report is updated annually. Last updated 10/25/2024 (OC)

In St. Louis County, the age-adjusted rate of death due to hepatitis B as the primary or underlying cause of death was 0.25 per 100,000 population from 2018 to 2022. Rates of death ranged from a high of 0.36 per 100,000 in 2018 to a low of 0.06 per 100,000 in 2022. Rates in 2022 were below the Healthy People 2030 Target of 0.16 deaths per 100,000. Rates in St. Louis County have consistently remained under the 2025 National Viral Hepatitis target of 0.37 deaths. The relatively small number of HBV deaths means deaths cannot be stratified by demographics.

Figure 33: Rates of Hepatitis B Associated Mortality Compared to the National Targets by Year

St. Louis County, MO, 2018-2022



Source: Missouri Department of Health and Senior Services (DHSS), Bureau of Vital Statistics, CDC Viral Hepatitis National Progress Report, & Healthy People 2030

Hepatitis C- Associated Mortality

Hepatitis C virus infection can cause mortality due to the liver damage it causes over years of infection which can result in the development of fatal conditions such as liver cancer, liver failure, hepatorenal syndrome (kidney failure due to liver damage), and others. Acute hepatitis C infection rarely results in death; chronic hepatitis C is primarily the pathway through which hepatitis C causes mortality. Access to care, including time of diagnosis and consistency of care, cost of treatment, and comorbidities of HCV all contribute to hepatitis C-associated mortality.

Hepatitis C increases the risk of all-cause mortality among those infected, a risk which remains elevated even after treatment.[34] Due to the extended duration of chronic hepatitis C, it is likely that the rise in hepatitis C infections in recent years is not reflected in these mortality data. However, hepatitis C already presents a mortality burden on the St. Louis County and United States population and this burden may increase in the future. The CDC reported that the age-adjusted hepatitis C-related mortality rate decreased from 3.72 per 100,000 population in 2018 to 2.89 per 100,000 population in 2022 in the United States.[25]

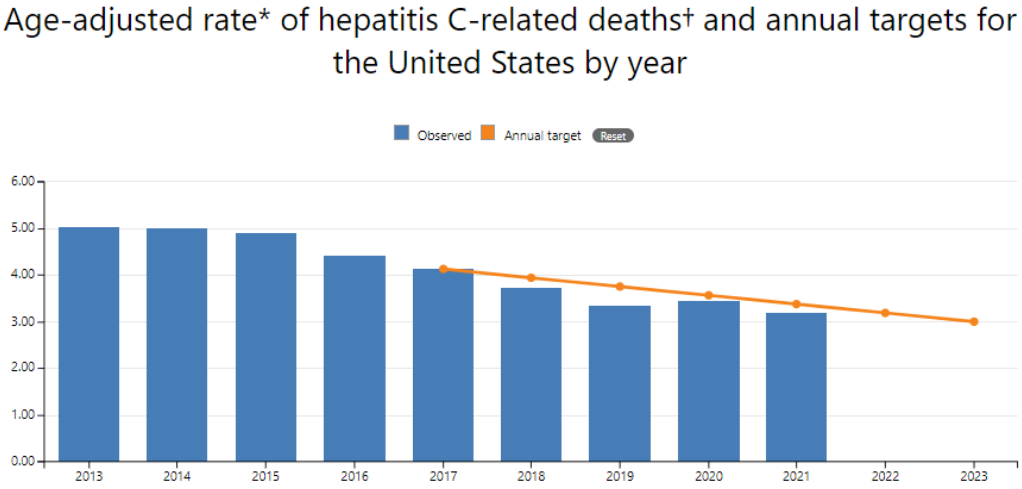
The National Viral Hepatitis Progress Report created a goal to reduce the reported rates of hepatitis C-related deaths by 20%.[2] There has been some progress in reaching that goal as shown in Figure 34. The age-adjusted hepatitis C-related mortality rate decreased from 5.03 per 100,000 in 2013 to 3.18 per 100,000 in 2021. The target rate for 2021 was 3.38. To meet the 2025 goal of 3.00 deaths per 100,000, there needs to be a 6% reduction from the 2021 rate.

According to the CDC, the reduction can be achieved by:[2]

- Increasing access to screening and testing for hepatitis C.
- Increasing access to timely curative treatment by lowering costs, eliminating policy barriers (for example, prior authorization requirements), improving navigation to care, and integrating treatment into routine primary care.
- Building the capacity of the health care system to identify and link persons with hepatitis C to care (such as through electronic health record solutions and telemedicine).
- Supporting continuing medical education and implementing educational campaigns to encourage universal hepatitis C screening among adults.

Data Source: Missouri Department of Health and Senior Services
Bureau of Vital Statistics, Bureau of Health Care Analysis and Data Dissemination, &
The Missouri Health and Surveillance Information System (WebSurv)
This report is updated annually. Last updated 10/25/2024 (OC)

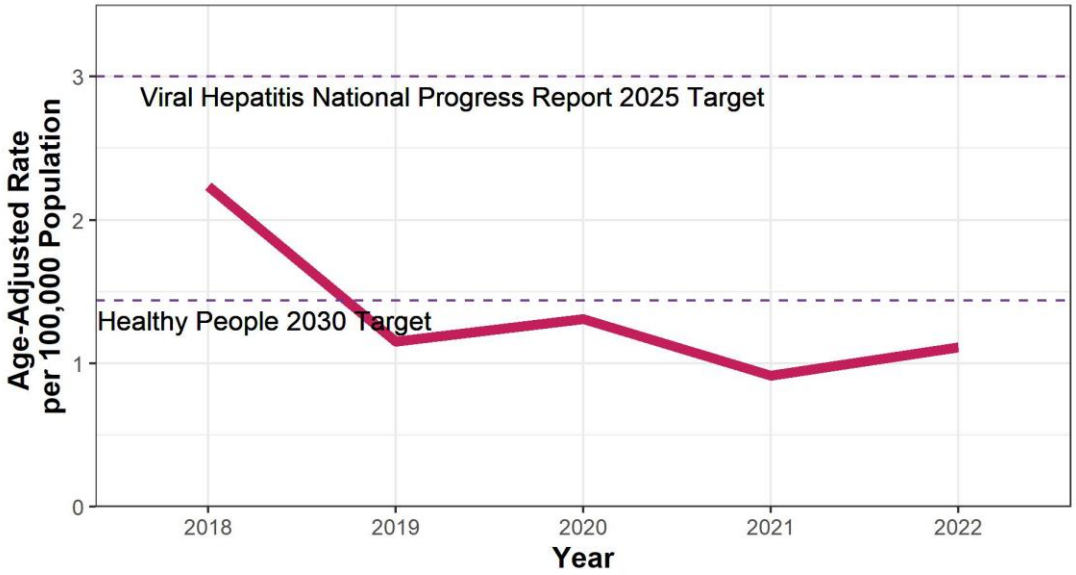
Figure 34: 2024 National Viral Hepatitis Progress Report, Reduce Reported Rate of Hepatitis C-Related Deaths by 20% or More
United States, 2013-2023



Source: National Vital Statistics System (NVSS) data in this report are from the 2018–Present Provisional Multiple Cause of Death Data files in the CDC WONDER online database as of November 12, 2023.[1]
* Rates are per 100,000 and age-adjusted to the 2000 US Standard Population.
† Cause of death is defined as the underlying cause of death or one of the multiple causes of death and is based on the International Classification of Disease, 10th Revision (ICD-10) codes B17.1 or B18.2.[2]

In St. Louis County, the age-adjusted rate of death due to hepatitis C as the cause or underlying cause of death was 1.33 per 100,000 population from 2018 to 2022. Rates of death ranged from a high of 2.24 per 100,000 in 2018 to a low of 0.91 per 100,000 in 2021. As shown in **Figure 35**, the rates from 2018 through 2022 were below the Viral Hepatitis National Progress Report 2025 of 3.0, and the rates from 2019 through 2022 were below the Healthy People 2030 target of 1.4.

Figure 35: Rates of Hepatitis C Associated Mortality Compared to National Targets by Year
St. Louis County, MO, 2018-2022



Source: Missouri Department of Health and Senior Services (DHSS), Bureau of Vital Statistics, CDC Viral Hepatitis National Progress Report, & Healthy People 2030

As shown in **Table 9** the age-adjusted hepatitis C associated mortality rate from 2018 to 2022 was 1.3 per 100,000 population. Rates were significantly higher in those aged 45 and older, people who identify as Black, and people living in the Inner North region. There were too few deaths among residents under age 45 and who identify as Hispanic or Latino, Asian, American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, and residents of more than one race to calculate reliable rates for these groups.

Table 9: Rates of Hepatitis C Associated Mortality per 100,000 Population by Demographics
St. Louis County, MO, 2018-2022

	Rate	95% Confidence Interval	Average Count per Year
St. Louis County			
Total County	1.3	1.0 to 1.7	19
Gender			
Female	0.7	0.3 to 1.0	5
Male	2.2	1.5 to 2.9	14
Age Group			
45-64	**2.8**	1.9 to 3.7	7
65+	**5.9**	4.3 to 7.5	11
Race or Ethnicity			
Black or African American	**3.8**	2.7 to 5.0	10
White	0.8	0.4 to 1.2	8
Poverty Levels			
Low	0.8	0.4 to 1.2	7
Medium	1.7	0.8 to 2.6	4
High	2.9	0.2 to 5.6	2
Very high	4.1	1.6 to 6.7	3
Region			
Central	1.3	0.3 to 2.3	2
Inner North	**3.6**	2.1 to 5.0	8
Outer North	1.8	0.8 to 2.8	4
South	0.5	-0.0 to 1.0	2
West	0.7	0.1 to 1.2	3

Rates that are bold and red are above the overall St. Louis County rate while rates that are bold and blue are below.

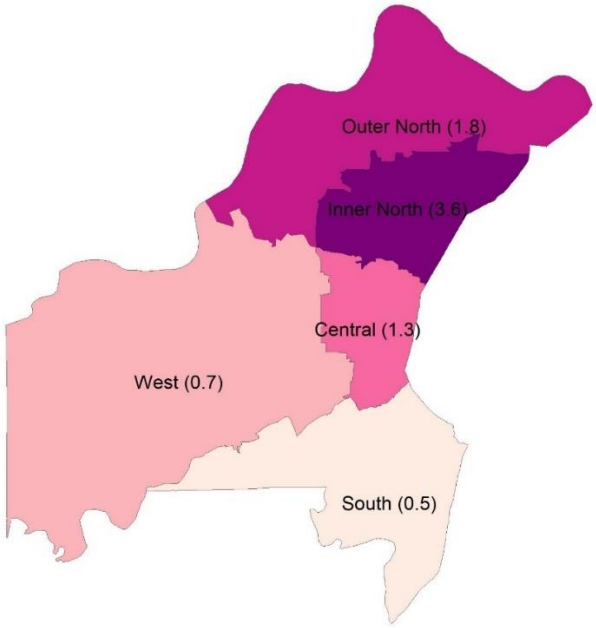
Source: Missouri Department of Health and Senior Services (DHSS), Bureau of Vital Statistics.

Case Definition: Deaths due to hepatitis C (ICD-10 codes: B17.1 and B18.2) listed as the underlying or a contributing cause of death. Rates were age-adjusted (except age groups). Data groups with less than 5 cases during the 5 year period are suppressed.

Mortality by Region

The age-adjusted mortality rate from 2018 to 2022 attributable to HCV-associated causes was highest in the Inner North region of St. Louis County (3.6 per 100,000 population) as shown in **Figure 36**. Rates were lowest in the South region at 0.5 per 100,000.

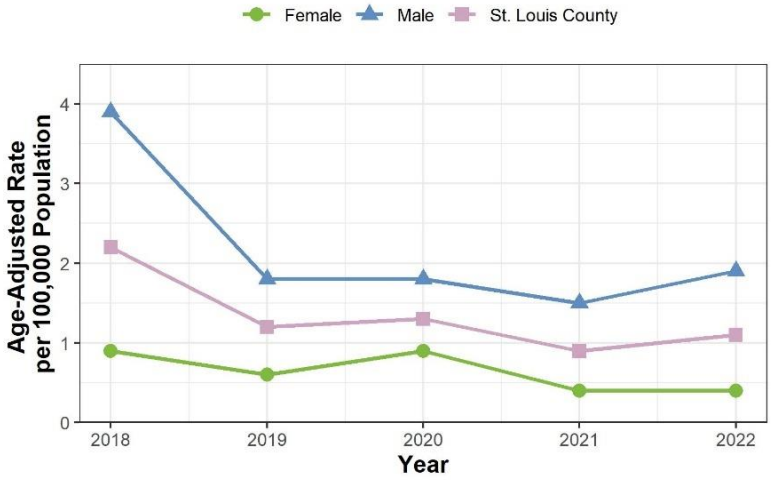
Figure 36: Rates of Hepatitis C Associated Mortality per 100,000 Population by Region
St. Louis County, MO, 2018-2022



Mortality by Sex, Race, Ethnicity, and Age Group

From 2018 to 2022, age-adjusted mortality associated with HCV infection was higher among male residents (2.2 per 100,000 population) when compared to female residents (0.7 per 100,000 population). Rates have declined for both male and females from 2018 to 2022 as shown in Figure 37. Rates were lowest for female residents in 2022 (0.4 per 100,000) while being the second highest for male residents (1.9 per 100,000).

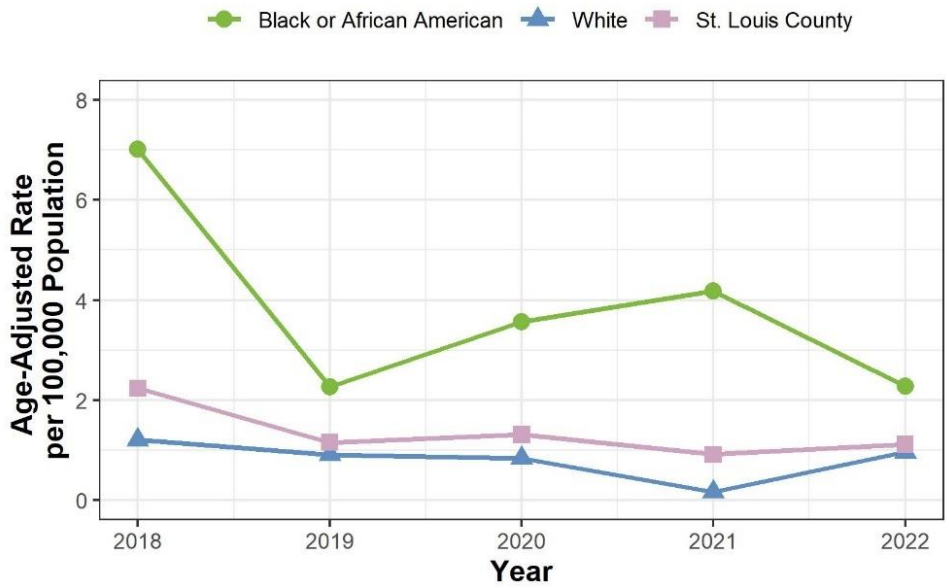
Figure 37: Rates of Hepatitis C Associated Mortality by Sex
St. Louis County, MO, 2018-2022



Source: Missouri Department of Health and Senior Services (DHSS), Bureau of Vital Statistics.

The age-adjusted mortality associated with HCV infection was higher among Black residents (3.8 per 100,000 population) when compared to White residents (0.8 per 100,000 population). Rates for White residents remain consistent while rates for Black residents have some variability. Rates were increasing for Black residents but saw a decline in 2022 while there was a slight increase for White residents as shown in **Figure 38**.

Figure 38: Rates of Hepatitis C Associated Mortality Race
St. Louis County, MO, 2018-2022



Source: Missouri Department of Health and Senior Services (DHSS), Bureau of Vital Statistics.

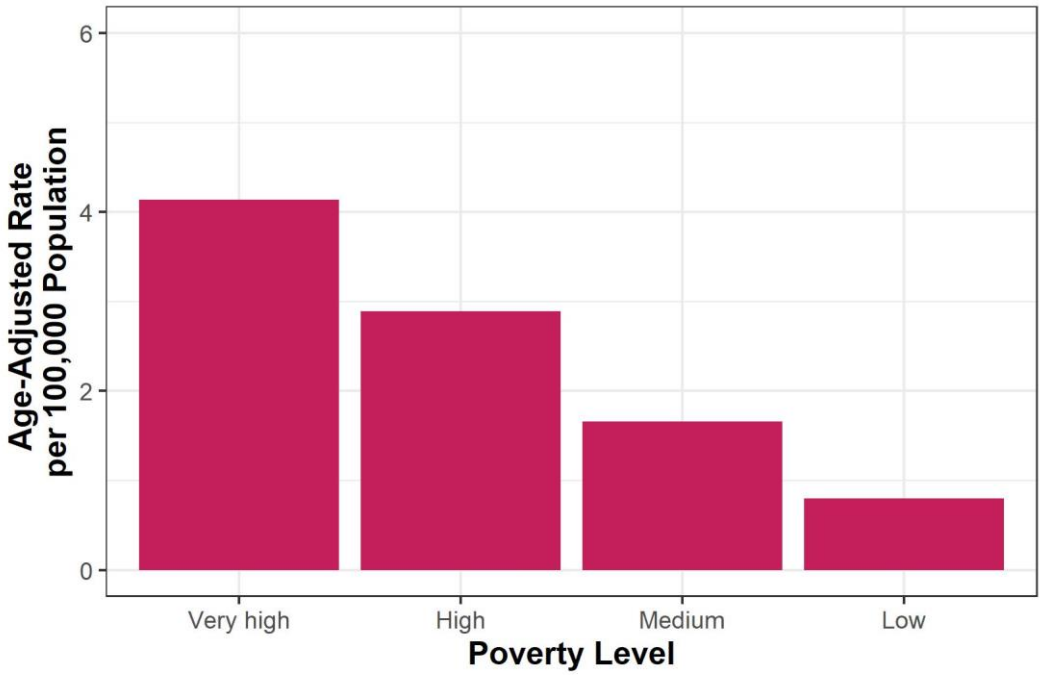
Baby boomers- defined here as persons born between 1945 and 1965- remain the most heavily affected age group for hepatitis C associated mortality with 75.3% of HCV-associated deaths from 2018 to 2022. From 2018 to 2022, 65- to 74-year-olds had the highest rate of mortality (7.3 per 100,000 population), followed by 55- to 64-years-olds (4.7 per 100,000 population), people aged 75- to 84-year-olds (3.1 per 100,000 population), and people aged 85 years and older (2.3 per 100,000 population).

Mortality by Neighborhood Poverty Level

As shown in **Figure 39**, from 2018 to 2022, age-adjusted rates for hepatitis C associated mortality were highest in neighborhoods with very high and high levels of poverty (4.1 per 100,000; 2.9 per 100,000). Neighborhoods with medium levels of poverty were also above the overall rate in St. Louis County (1.7 per 100,000). Rates were lowest in neighborhoods with low levels of poverty at 0.8 per 100,000 population.

Figure 39: Rates of Hepatitis C Associated Mortality by Neighborhood Poverty Level

St. Louis County, MO, 2018-2022



Source: Missouri Department of Health and Senior Services (DHSS), Bureau of Vital Statistics.

Drug Overdose Deaths in Saint Louis County

Unsafe injection drug use behavior is a major risk factor and transmission method for hepatitis C. The Saint Louis County Department of Public Health described substance use among drug overdose deaths in St. Louis County in its most recent Drug-Involved Deaths data brief.

Key findings from the data brief are:[35]

- In 2022, drug-involved deaths in St. Louis County decreased for the first time since 2015.
- Between 2019 and 2022, mortality rates were highest among adults aged 25-44.
- Disparities in drug-involved mortality continue to persist, with Black men dying at a rate 2.5 times higher than any other demographic group.
- In 2022, the drug-involved mortality rate was 47.2 deaths per 100,000 population.
- Between 2018 and 2022, drug-involved deaths occurred at the highest rates within ZIP codes in the Inner North and Out North geographic regions.

Data Source: Missouri Department of Health and Senior Services
Bureau of Vital Statistics, Bureau of Health Care Analysis and Data Dissemination, &
The Missouri Health and Surveillance Information System (WebSurv)
This report is updated annually. Last updated 10/25/2024 (OC)

Next Steps and Recommendations

Resources and dedicated funding for hepatitis surveillance are lacking nationwide. The Saint Louis County Department of Public Health and the community we serve would benefit greatly from increased resources dedicated to viral hepatitis to improve and expand our surveillance efforts beyond a subset of cases. Due to the large volume of hepatitis B and C reports, DPH is unable to investigate each case, preventing the surveillance data from reflecting the true distribution, incidence, and prevalence of hepatitis B and C. In addition, to improve health for the community, healthcare providers should screen and test according to the CDC guidelines. Treatment should be available and provided for those who meet the treatment criteria.

For More Information:

Saint Louis County Department of Public Health Hepatitis Page:
https://stlouiscountymo.gov/st-louis-county-departments/public-health/divisions/communicable-disease-response/hepatitis/

Project Hep Cure:
https://dss.mo.gov/mhd/hepc/

Missouri Department of Public Health:
https://health.mo.gov/living/healthcondiseases/communicable/hepatitisa/index.php
https://health.mo.gov/living/healthcondiseases/communicable/hepatitisb/index.php
https://health.mo.gov/living/healthcondiseases/communicable/hepatitisc/

Centers for Disease Control and Prevention:
https://www.cdc.gov/hepatitis/index.html

Data Source: Missouri Department of Health and Senior Services
Bureau of Vital Statistics, Bureau of Health Care Analysis and Data Dissemination, &
The Missouri Health and Surveillance Information System (WebSurv)
This report is updated annually. Last updated 10/25/2024 (OC)

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Appendix A: Notes about the Data

Data Source:

Data on viral hepatitis cases were obtained from the Missouri Health Surveillance Information System (WebSurv). The database is maintained by the Missouri Department of Health and Senior Services (MDHSS). Missouri's communicable disease reporting law, 19 CSR 20-20.020, requires reporting of hepatitis A within one calendar day of first knowledge or suspicion and it requires reporting of acute and chronic hepatitis B or C within three days of knowledge to the local health authority or MDHSS. Information on doses of hepatitis A and hepatitis B vaccine were obtained from MDHSS's vaccine registry, ShowMeVax. Hospital discharge, and birth and death records for years 2018 to 2022 were obtained from MDHSS Bureau of Vital Statistics and the Bureau of Health Care Analysis & Data Dissemination. Patient Abstract System (PAS) records include discharge records of patients discharged from treatment within the state of Missouri. Population estimates were obtained from U.S. Census Bureau API and American Community Survey data collected by the United States Census Bureau for the years 2019 to 2022.

Analysis:

Crude rates, age-adjusted rates, and the respective 95% confidence intervals for case, hospital, birth, and mortality data were using RStudio version 1.2.5 using county-level and tract-level population estimates from the American Community Survey. Apart from proportions and age-group-specific rates, all rates were age-adjusted to census year 2000 age group distribution using the following age groups: 0-4, 5-14, 15-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, and 85+ years. Due to data delays during the COVID- 19 pandemic, population denominator estimates were drawn from American Community Survey data (ACS) using 5-year estimates for county, ZIP Code, and tract-level populations. The five St. Louis County geographic regions were determined from Saint Louis County Planning Division region maps by assigning each census tract a matching region. Neighborhood poverty levels were based on the 5-year estimates from the American Community Survey from 2018-2022. Each census tract was assigned one of four categories of percent below federal poverty level: low (0 to < 10 percent); medium (10 < 20 percent); high (20 < 30 percent); and very high (30 to 100 percent). Maps were made with RStudio 4.2.2.

Data:

Diagnoses were identified from vital records and hospital discharge records using International Classification of Diseases, Tenth Revision (ICD-10). Cases were defined per diagnostic coding listed in **Table 10** below. As case identification was restricted to use of diagnostic codes, underestimation of counts and rates is expected. Unless otherwise specified, analyses of hospital records were restricted to discharge records from inpatient acute medical/surgical units/facilities, inpatient psychiatric units/facilities, inpatient physician rehabilitation unit/facilities, and outpatient emergency departments.

Probable and confirmed cases of hepatitis B and C are included in case counts and rates. St. Louis County includes cases in county residents who reside in a state correction facility; these cases are not counted in Missouri's printed data on hepatitis. DPH recognize that there are gender identities beyond male and female. However, when stratifying by

sex, transgender persons are categorized according to the sex they were assigned at birth, in accordance with CDC reporting guidelines.

Table 10: Diagnostic Coding Used for Case Definitions

Condition/Diagnosis	Diagnostic Codes
Hepatitis B	B16, B17.0, B18.0, B18.1
Hepatitis C	B17.1, B18.2
Hepatocellular carcinoma	C22.0
Viral Hepatitis	B15-B17
Chronic liver disease and cirrhosis	K70, K73-K74

Suppression Rules:

For cells with exact (non-average) counts and rates are suppressed if the denominator population is less than 100,000 and the number of cases is between 1 and 5. For subgroups with mutually exclusive categories where the sum of cases in the categories add up to the county-level total, if a single category is suppressed, an additional category is suppressed to disallow overcoming of suppression with simple addition/subtraction. These suppression rules are an adaptation of suppression rules for CDC National Environmental Public Health Tracking Network

Appendix B: Surveillance Definitions[1]

Hepatitis A

2019 Case Definition:

Clinical Criteria:

- An acute illness with a discrete onset of any sign or symptom consistent with acute viral hepatitis (e.g., fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, abdominal pain, or dark urine), **AND**
    - Jaundice or elevated total bilirubin levels >= 3.0 mg/dL **OR**
    - Elevated serum alanine aminotransferase (ALT) levels > 200 IU/L, **AND**
    - The absence of a more likely diagnosis

Case Classification: **Confirmed**

- A case that meets the clinical criteria and is IgM anti-HAV positive, **OR**
- A case that has hepatitis A virus RNA detected by NAAT (such as PCR or genotyping), **OR**
- A case that meets the clinical criteria and occurs in a person who had contact (e.g., household, or sexual) with a laboratory-confirmed hepatitis A case 15-50 days prior to onset of symptoms.

[1] **Centers for Disease Control and Prevention. National Notifiable Diseases Surveillance System (NNDSS). Surveillance Case Definitions.** https://ndc.services.cdc.gov/

Acute Hepatitis B

2012 Case Definition: The most recent clinical criteria for acute hepatitis B is an acute illness with a discrete onset of any sign or symptom consistent with acute viral hepatitis (e.g., fever, headache, malaise, anorexia, vomiting, diarrhea, and abdominal pain), **AND**

- Jaundice **OR**
- Elevated serum alanine aminotransferase (ALT) levels >100 IU/L.

A documented negative hepatitis B surface antigen laboratory test result within 6 months prior to a positive test result does not require an acute clinical presentation to meet the surveillance case definition.

Case Classification: Confirmed

- A case that meets clinical case definition, does not have known chronic hepatitis B, and is laboratory confirmed

Chronic Hepatitis B

2012 Case Definition: The most recent clinical criteria for chronic hepatitis B is there are no symptoms required.

Case Classification: **Probable**

- A person with a single HBsAg positive or HBV DNA positive or HBeAg positive lab result and does not meet the case definition for acute hepatitis B.

Case Classification: **Confirmed**

- Immunoglobulin M antibodies to hepatitis B core antigen AND a positive result on one of the following tests: hepatitis B surface antigen, hepatitis B e antigen, or nucleic acid test for hepatitis B virus DNA **OR**
- HBsAg positive or nucleic acid test for HBV DNA positive or HBeAg positive two times at least 6 months apart.

Perinatal Hepatitis B

2017 Case Definition: Perinatal HBV infection in a child <= 24 months of age may range from asymptomatic to fulminant hepatitis.

Case Classification: **Probable**

- A child born in the US and mother's hepatitis B status is unknown **AND**
  - Positive for HBsAg at >= 1 month of age and <= 24 months of age **OR**
  - Positive for HBeAg or HBV DNA >= 9 months of age and <= 24 months of age

Case Classification: **Confirmed**

- Child born in the US to a HBV-infected mother **AND**
  - Positive for HBsAg at >= 1 month of age and <= 24 months of age **OR**
  - Positive for HBeAg or HBV DNA >= 9 months of age and <= 24 months of age

Data Source: Missouri Department of Health and Senior Services
Bureau of Vital Statistics, Bureau of Health Care Analysis and Data Dissemination, &
The Missouri Health and Surveillance Information System (WebSurv)
This report is updated annually. Last updated 10/25/2024 (OC)

Acute Hepatitis C

2020 Case Definition: The most recent clinical criteria for acute hepatitis C case is someone who is older than 36 months of age (unless known to have been exposed non-perinatally), has the absence of a more likely diagnosis, and has one or more of the following:

- Jaundice, **OR**
- Peak elevated total bilirubin levels >= 3.0 mg/Dl, **OR**
- Peak elevated serum alanine aminotransferase (ALT) levels >200 IU/L

Case Classification: **Probable**

- A case that meets clinical criteria and has presumptive laboratory evidence, **AND**
- Does not have a hepatitis C virus detection test reported, **AND**
- Has no documentation of anti-HCV or HCV RNA test conversion within 12 months

Case Classification: **Confirmed**

- A case meets clinical criteria and has confirmatory laboratory evidence, **OR**
- A documented negative HCV antibody followed within 12 months by a positive HCV antibody test (anti-HCV test conversion) in the absence of a more likely diagnosis, **OR**
- A documented negative HCV antibody OR negative hepatitis C virus detection test (in someone without a prior diagnosis of HCV infection) followed within 12 months by a positive hepatitis C virus detection test (HCV RNA test conversion) in the absence of a more likely diagnosis.

Chronic Hepatitis C

2020 Case Definition: The most recent clinical criteria for acute hepatitis C case is someone who is older than 36 months of age (unless known to have been exposed non-perinatally), has the absence of a more likely diagnosis, and has one or more of the following:

- Jaundice, **OR**
- Peak elevated total bilirubin levels >= 3.0 mg/Dl, **OR**
- Peak elevated serum alanine aminotransferase (ALT) levels >200 IU/L

Case Classification: **Probable**

- A case that does not meet OR has no report of clinical criteria, **AND**
- Has presumptive laboratory evidence, **AND**
- Has no documentation of anti-HCV or RNA test conversion within 12 months, **AND**
- Does not have an HCV RNA detection test reported.

Case Classification: **Confirmed**

- A case that does not meet OR has no report of clinical criteria, **AND**
- Has confirmatory laboratory evidence, **AND**
- Has no documentation of anti-HCV or HCV RNA test conversion within 12 months.

Perinatal Hepatitis C

2018 Case Definition: The CDC defines a perinatal hepatitis C case with an infant who has a positive test for HCV RNA nucleic acid amplification test (NAAT), HCV antigen, or detectable HCV genotype at >= 2 months and <=36 months of age and is not known to have been exposed to HCV via a mechanism other than perinatal.

Data Source: Missouri Department of Health and Senior Services
Bureau of Vital Statistics, Bureau of Health Care Analysis and Data Dissemination, &
The Missouri Health and Surveillance Information System (WebSurv)
This report is updated annually. Last updated 10/25/2024 (OC)

Appendix C: Testing and Screening Recommendations

Persons Recommended for Hepatitis B Screening and Testing[2]

In these guidelines, "screening" refers to conducting serologic testing of asymptomatic persons not known to be at increased risk for exposure to HBV. "Testing" refers to conducting serologic testing of persons with symptoms or who are identified to be at increased risk for exposure to HBV.

Screening is recommended for the following persons:

- All adults aged ≥18 years at least once during a lifetime
- All pregnant persons* during each pregnancy, preferably in the first trimester, regardless of vaccination status or history of testing

Testing is recommended for the following persons:

- Everyone with a history of risk for HBV infection, regardless of age, if they might have been susceptible during the period of risk. Susceptible persons include those who have never been infected with HBV (i.e., total anti-HBc negative) and either did not complete a HepB vaccine series per ACIP recommendations or who are known vaccine non-responders.
- Susceptible persons, regardless of age, with ongoing risk should be tested periodically, while risk persists.
- Offer testing if the risk for exposure occurred after previous HBV serologic testing and while the person was susceptible.
- Anyone who requests HBV testing. These persons should receive testing, regardless of disclosure of risk, because many persons might be reluctant to disclose stigmatizing risks.
- Persons who have an increased risk for acquiring HBV infection, including the following:
- Infants born to HBsAg-positive pregnant persons
- Persons born in regions with HBV infection prevalence of ≥2%
- U.S.-born persons not vaccinated as infants whose parents were born in regions with HBV infection prevalence of ≥8%
- Persons who are injecting drug users or have a history of IDU
- Persons incarcerated or formerly incarcerated in a jail, prison, or other detention setting
- Persons with HIV infection
- Persons with HCV infection or a past HCV infection
- Men who have sex with men
- Persons with STIs or past STIs or multiple sex partners
- Household contacts or former household contacts of persons with known HBV infection
- Needle-sharing or sexual contacts of persons with known HBV infection
- Persons on maintenance dialysis, including in-center or home hemodialysis and peritoneal dialysis
- Persons with elevated ALT or AST levels of unknown origin

[2] Conners EE, Panagiotakopoulos L, Hofmeister MG, et al. Screening and Testing for Hepatitis B Virus Infection: CDC Recommendations — United States, 2023. MMWR Recomm Rep 2023;72(No. RR-1):1–25. DOI: http://dx.doi.org/10.15585/mmwr.rr7201a1

Providers should follow these recommendations when offering screening and testing:

- During the initial screening, test for HBsAg, anti-HBs, and total anti-HBc.
    - Screening with the three tests (triple panel) can help identify persons who have an active HBV infection and could be linked to care, have resolved infection and might be susceptible to reactivation (e.g., immunosuppressed persons), are susceptible and need vaccination, or are vaccinated. Anti-HBs of ≥10 mIU/mL is a known correlate of protection only when testing follows a complete HepB vaccine series.
- After the collection of blood for serologic testing, persons who have not completed a vaccine series should be offered vaccination per ACIP recommendations at the same visit or at an associated provider visit. Blood collection before vaccination is recommended because transient HBsAg positivity has been reported for up to 18 days after vaccination.
    - Providers do not need to wait for the serologic testing results to administer the first or next dose of vaccine.
    - Although screening can identify persons who are unvaccinated and susceptible to HBV infection, screening should not be a barrier to HepB vaccination, especially in populations that have decreased engagement with or access to health care. In settings where testing is not feasible or is refused by the patient, vaccination of persons should continue according to ACIP recommendations. Serologic testing should continue to be offered at future visits.

Table 11: Interpretation of Screening Test Results for Hepatitis B Virus Infection and Recommended Actions

Clinical state	HBsAg	Anti-HBs	Total anti-HBc*	IgM anti-HBc	Action†
Acute infection	Positive	Negative	Positive	Positive	Link to HBV infection care
Chronic infection	Positive	Negative	Positive	Negative§	Link to HBV infection care
Resolved infection	Negative	Positive	Positive	Negative	Counsel about HBV infection reactivation risk
Immune (immunity inferred from receipt of previous vaccination)	Negative	Positive¶	Negative	Negative	Reassure if history of HepB vaccine series completion; if partially vaccinated, complete vaccine series per ACIP recommendations
Susceptible, never infected	Negative	Negative**	Negative	Negative	Offer HepB vaccine per ACIP recommendations
Isolated core antibody positive††	Negative	Negative	Positive	Negative	Depends on cause of positive result

Abbreviations: ACIP = Advisory Committee on Immunization Practices; anti-HBs = antibody to hepatitis B surface antigen; HBcAg = hepatitis B core antigen; HBsAg = hepatitis B surface antigen; HBV = hepatitis B virus; HepB = hepatitis B; IgG = immunoglobulin G; IgM anti-HBc = immunoglobulin M antibodies to hepatitis B core antigen; total anti-HBc = total antibody to hepatitis B core antigen.

* Total anti-HBc is a measure of both IgM and IgG antibodies to HBcAg.

† **Source:** Abara WE, Qaseem A, Schillie S, et al. Hepatitis B vaccination, screening, and linkage to care: best practice advice from the American College of Physicians and the Centers for Disease Control and Prevention. Ann Intern Med 2017;167:794–804.

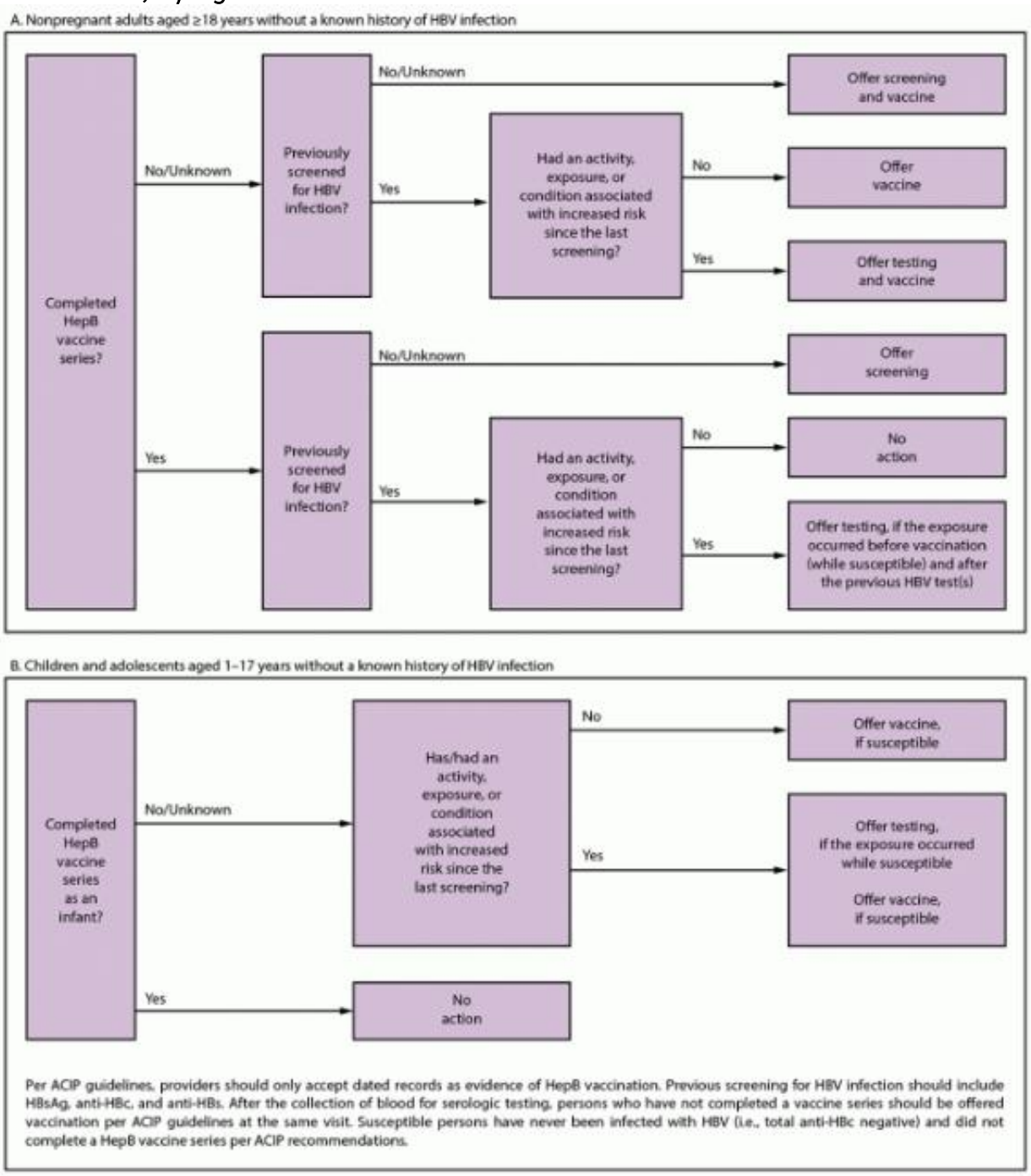
§ IgM anti-HBc also might be positive in persons with chronic infection during severe HBV infection flares or reactivation.

¶ Immune if anti-HBs concentration is >10 mIU/mL after vaccine series completion.

** Anti-HBs concentrations might wane over time among vaccine responders (**Source:** Schillie S, Vellozzi C, Reingold A, et al. Prevention of hepatitis B virus infection in the United States: recommendations of the Advisory Committee on Immunization Practices. MMWR Recomm Rep 2018;67[No. RR-1]:1–31).

†† Can be the result of a past infection when anti-HBs levels have waned, occult infection, passive transfer of anti-HBc to an infant born to an HBsAg-positive gestational parent, a false positive, or mutant HBsAg strain that is not detectable by laboratory assay.

Figure 40: Incorporating Hepatitis B Virus Screening and Testing into a Clinic Workflow, by Age



Abbreviations: ACIP = Advisory Committee on Immunization Practices; anti-HBc = antibody to hepatitis B core antigen; anti-HBs = antibody to hepatitis B surface antigen; HBV = hepatitis B virus; HBsAg = hepatitis B surface antigen; HepB = hepatitis B.

Data Source: Missouri Department of Health and Senior Services
Bureau of Vital Statistics, Bureau of Health Care Analysis and Data Dissemination, &
The Missouri Health and Surveillance Information System (WebSurv)
This report is updated annually. Last updated 10/25/2024 (OC)

Persons Recommended for Hepatitis C Testing[3]

Universal hepatitis C screening:

- Hepatitis C screening at least once in a lifetime for all adults aged ≥18 years, except in settings where the prevalence of HCV infection (HCV RNA-positivity) is <0.1%
- Hepatitis C screening for all pregnant women during each pregnancy, except in settings where the prevalence of HCV infection (HCV RNA-positivity) is <0.1%

One-time hepatitis C testing regardless of age or setting prevalence among persons with recognized risk factors or exposures:

- Persons with HIV
- Persons who ever injected drugs and shared needles, syringes, or other drug preparation equipment, including those who injected once or a few times many years ago
- Persons with selected medical conditions, including persons who ever received maintenance hemodialysis and persons with persistently abnormal ALT levels
- Prior recipients of transfusions or organ transplants, including persons who received clotting factor concentrates produced before 1987, persons who received a transfusion of blood or blood components before July 1992, persons who received an organ transplant before July 1992, and persons who were notified that they received blood from a donor who later tested positive for HCV infection
- Health care, emergency medical, and public safety personnel after needle sticks, sharps, or mucosal exposures to HCV-positive blood
- Children born to mothers with HCV infection

Routine periodic testing for persons with ongoing risk factors, while risk factors persist:

- Persons who currently inject drugs and share needles, syringes, or other drug preparation equipment
- Persons with selected medical conditions, including persons who ever received maintenance hemodialysis

Any person who requests hepatitis C testing should receive it, regardless of disclosure of risk, because many persons might be reluctant to disclose stigmatizing risks

[3] Schille S, Wester C, Osborne M, Wesolowski L, Ryerson AB, CDC Recommendations for Hepatitis C Screening Among Adults – United States, 2020. MMWR Recomm Rep 2020;69(No. RR-2):1-17. DOI:http://dx.doi.org/10.15585.mmwr.rr6902a1.

Appendix D: Vaccination Information

Vaccinations at John C. Murphy

At DPH's John C. Murphy location, approximately 646 doses of hepatitis B vaccine and 1,137 doses of hepatitis A vaccine were given in 2023. These represent doses and not necessarily completed series.

Table 12: Number of Doses of Hepatitis A and B Vaccines given at John C. Murphy St. Louis County, MO, 2019-2023

Vaccine	Doses Administered
Hep A, Pediatric/Adolescent	315
Hep A, Adult	777
Hep B, Pediatric/Adolescent	184
Hep B, Adult	221
Hep A/B	45
DTaP-HepB-IPV	72
DTap-IPV-Hib-HepB	124

Source: Missouri Department of Health and Senior Services (DHSS), ShowMeVax

Hepatitis A Vaccination[4]

Children need 2 doses of hepatitis A vaccine:

- First dose: 12 through 23 months of age
- Second dose: at least 6 months after the first dose

Infants 6 through 11 months old traveling outside of the United States when protection against hepatitis A is recommended should receive 1 dose of hepatitis A vaccine. These children should still get 2 additional doses at the recommended ages for long-lasting protection.

Older children and adolescents 2 through 18 years of age who were not vaccinated previously should be vaccinated.

Adults who were not vaccinated previously and want to be protected against hepatitis A can also get the vaccine.

Hepatitis A vaccine is also recommended for the following people:

- International travelers
- Men who have sexual contact with other men
- People who use injection or non-injection drugs
- People who have occupational risk for infection
- People who anticipate close contact with an international adoptee

[4] **Centers for Disease Control and Prevention. Hepatitis A VIS. *Vaccine Information Statements (VIS).* October 15, 2021. Accessed on September 9, 2024 from https://www.cdc.gov/vaccines/hcp/vis/vis-statements/hep-a.html**

- People experiencing homelessness
- People with HIV
- People with chronic liver disease

In addition, a person who has not previously received hepatitis A vaccine and who has direct contact with someone with hepatitis A should get hepatitis A vaccine as soon as possible and within 2 weeks after exposure.

Hepatitis A vaccine may be given at the same time as other vaccines.

Hepatitis B Vaccination[5]

Hepatitis B vaccine is usually given as 2, 3, or 4 shots.

Infants should get their first dose of hepatitis B vaccine at birth and will usually complete the series at 6-18 months of age. The birth dose of hepatitis B is an important part of preventing long-term illness in infants and the spread of hepatitis B in the United States.

Anyone 59 years of age or younger who has not yet gotten the vaccine should be vaccinated.

Hepatitis B vaccination is recommended for adults 60 years or older at increased risk of exposure to hepatitis B who were not vaccinated previously. Adults 60 years or older who are not at increased risk and were not vaccinated in the past may also be vaccinated.

Hepatitis B vaccine may be given as a stand-alone vaccine, or as part of a combination vaccine (a type of vaccine that combines more than one vaccine together into one shot).

Hepatitis B vaccine may be given at the same time as other vaccines.

[5] **Centers for Disease Control and Prevention. Hepatitis B VIS. *Vaccine Information Statements (VIS).* May 12, 2023. Accessed on September 9, 2024 from https://www.cdc.gov/vaccines/hcp/vis/vis-statements/hep-b.html.**

Appendix E: Data Tables

Mortality Data:

Table 13: Associated Deaths for Individual Years for St. Louis County

St. Louis County, MO, 2018-2022

	2018			2019			2020			2021			2022		
	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI
Hepatitis C- Associated	31	2.2	1.1 to 3.3	17	1.2*	0.3 to 2.0	19	1.3*	0.5 to 2.2	12	0.9*	0.2 to 1.6	14	1.1*	0.4 to 1.8
Hepatocellular Carcinoma	44	3.1	1.8 to 4.4	31	2.2	1.1 to 3.3	34	2.4	1.3 to 3.6	31	2.3	1.2 to 3.4	39	2.7	1.4 to 3.9
Viral Hepatitis	35	2.6	1.4 to 3.8	20	1.5*	0.6 to 2.3	23	1.6	0.7 to 2.6	15	1.1*	0.4 to 1.9	19	1.4	0.6 to 2.3
Liver Disease and Cirrhosis	140	10.9	8.5 to 13.2	129	9.9	7.7 to 12.1	159	12.0	9.5 to 14.5	193	15.0	12.3 to 17.7	215	16.2	13.3 to 19.1

Source: Missouri Department of Health and Senior Services, Bureau of Vital Records

Case Definition: The above table includes any death that involved either Hepatitis C (B18.2, B17.1), Hepatocellular Carcinoma (C22.0), Viral Hepatitis (B15.0-B19.9), Liver Disease and Cirrhosis (K70, K73, K74). Data points with a * had a RSE >30 and should be interpreted with caution.

Hospitalization and Emergency Department Data:

Table 14. Hepatitis B-Associated Hospitalizations per 100,000 Population

St. Louis County, MO, 2018-2022

Rates that are bold and red are above the overall St. Louis County rate while rates that are bold and blue are below.

	2018			2019			2020			2021			2022		
	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI
St. Louis County	**96**	**8.8**	**6.8 to 10.7**	**95**	**9.0**	**7.1 to 10.9**	**90**	**8.5**	**6.7 to 10.4**	**86**	**7.4**	**5.6 to 9.2**	**100**	**9.1**	**7.1 to 11.0**
Gender															
Male	58	11.3	8.1 to 14.4	53	10.3	7.3 to 13.3	44	8.4	5.7 to 11.2	36	6.2	3.8 to 8.7	54	10.2	7.2 to 13.2
Female	38	6.6	4.3 to 8.9	42	7.9	5.5 to 10.4	46	8.6	6.1 to 11.2	50	8.4	5.7 to 11.0	46	8.2	5.6 to 10.7
Age Group															
25-44	28	11.5	7.2 to 15.7	25	10.2	6.2 to 15.2	29	11.7	7.5 to 16.0	16	6.4	3.3 to 9.5	17	6.8	3.5 to 10.0
45-64	34	12.5	8.3 to 16.7	37	13.8	9.3 to 18.2	29	11.0	7.0 to 15.0	30	11.4	7.3 to 15.4	47	**18.3**	13.0 to 23.5
65+	31	**18.0**	11.7 to 24.3	31	**17.6**	11.4 to 23.8	31	**17.2**	11.2 to 23.3	40	**22.1**	15.3 to 29.0	36	**19.5**	13.2 to 25.9
Race															
Asian	22	**52.4**	30.3 to 74.5	16	**41.3**	23.1 to 59.6	19	**40.8**	21.5 to 60.0	10	**23.2**	9.6 to 36.8	10	20.6*	7.4 to 33.8
Black or African American	30	13.4	9.0 to 17.9	34	**16.1**	11.3 to 20.8	34	**15.7**	10.9 to 20.4	48	**20.0**	14.4 to 25.6	41	**18.7**	13.5 to 23.8
White	39	**4.1**	2.2 to 5.9	40	**5.1**	3.2 to 7.0	33	**3.6**	1.9 to 5.4	26	**3.1**	1.6 to 4.7	43	**4.8**	2.7 to 6.8
Neighborhood Poverty															
Very High	7	17.7*	4.6 to 30.8	7	**25.3**	12.1 to 38.4	Suppressed			Suppressed			7	15.4*	3.3 to 27.4
High	11	15.1*	5.2 to 25.0	16	**27.2**	15.1 to 39.4	Suppressed			Suppressed			19	20.5	10.1 to 30.9
Medium	30	12.2	7.9 to 16.5	33	13.1	8.4 to 17.8	31	13.6	8.5 to 18.8	24	9.7	5.3 to 14.2	28	11.0	6.6 to 15.3
Low	48	6.7	4.6 to 8.8	40	5.6	3.7 to 7.5	27	5.6	3.4 to 7.7	39	5.0	3.2 to 6.8	46	6.4	4.4 to 8.4
Geographic Area															
Central	14	9.4*	3.7 to 15.1	13	10.1	4.6 to 15.6	9	7.5*	2.9 to 12.1	5	3.4*	0.1 to 6.8	10	7.3*	2.5 to 12.0
Inner North	24	12.3	6.9 to 17.8	33	**20.7**	14.2 to 27.1	30	**17.6**	11.5 to 23.6	30	**16.8**	10.6 to 23.0	44	**25.4**	17.8 to 33.0
Outer North	16	9.5	5.1 to 13.9	11	5.9*	2.2 to 9.5	13	7.0	3.0 to 11.0	23	11.1	5.9 to 16.3	11	6.2	2.6 to 9.8
South	27	11.2	6.4 to 16.0	18	7.6	3.6 to 11.5	23	9.1	4.6 to 13.5	17	7.3	3.5 to 11.2	20	8.8	4.6 to 12.9
West	15	4.6	2.1 to 7.2	20	5.7	2.7 to 8.6	15	4.5	1.9 to 7.0	11	**3.2***	1.1 to 5.4	15	**4.1***	1.6 to 6.6

Source: Missouri Department of Health and Senior Services. Bureau of Health Care Analysis and Data Dissemination

Case Definition: The above table includes any inpatient hospitalization that include hepatitis B as one of the diagnosis codes. Cases with less than 5 are restricted. Data points with a * had a RSE >30 and should be interpreted with caution. Age groups are in years.

Data Source: Missouri Department of Health and Senior Services
Bureau of Vital Statistics, Bureau of Health Care Analysis and Data Dissemination, &
The Missouri Health and Surveillance Information System (WebSurv)
This report is updated annually. Last updated 9/11/2024 (OC)

Table 15. Hepatitis C- Associated Hospitlizations per 100,000 Population

St. Louis County, MO, 2018-2022

Rates that are bold and red are above the overall St. Louis County rate while rates that are bold and blue are below.

	2018			2019			2020			2021			2022		
	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI
St. Louis County	**654**	**54.0**	**49.0 to 59.0**	**739**	**63.8**	**58.5 to 69.2**	**594**	**52.2**	**47.4 to 57.0**	**589**	**50.7**	**45.9 to 55.4**	**571**	**50.0**	**45.3 to 54.7**
Gender															
Male	410	**72.3**	64.0 to 80.7	489	**89.5**	80.4 to 98.7	357	**66.5**	58.7 to 74.4	384	**69.6**	61.6 to 77.7	356	**64.9**	57.2 to 72.6
Female	244	**38.6**	32.7 to 44.4	250	**41.8**	35.9 to 47.7	235	**39.2**	33.5 to 45.0	205	**34.0**	28.6 to 39.4	215	**37.0**	31.5 to 42.5
Age Group															
25-44	135	55.2	45.9 to 64.5	206	**84.0**	72.5 to 95.4	177	**71.6**	61.0 to 82.1	147	58.7	49.2 to 68.1	151	60.1	50.5 to 69.6
45-64	294	**107.8**	95.5 to 120.2	270	**100.4**	88.5 to 112.4	218	**82.5**	71.5 to 93.4	226	**85.5**	74.4 o 96.7	203	**78.8**	68.0 to 89.7
65+	212	**123.0**	106.4 to 139.5	250	**141.9**	124.3 to 159.5	190	**105.6**	90.6 to 120.6	209	**115.7**	100.0 to 131.4	214	**116.1**	100.6 to 131.7
Race															
Black or African American	329	**123.6**	108.8 to 138.4	393	**151.2**	135.0 to 167.3	287	**112.5**	98.8 to 126.3	312	**121.0**	106.7 to 135.3	271	**106.6**	93.3 to 120.0
White	308	**40.3**	35.1 to 45.5	329	**46.0**	40.6 to 51.4	299	**41.2**	36.0 to 46.5	260	**35.4**	30.4 to 40.3	286	**39.7**	34.5 to 45.0
Neighborhood Poverty															
Very High	80	**185.1**	140.9 to 229.4	94	**188.2**	146.4 to 230.1	68	**169.6**	129.1 to 210.2	57	**139.4**	105.3 to 173.5	93	**145.0**	114.5 to 15.4
High	116	**144.9**	112.8 to 176.9	144	**217.2**	179.8 to 254.6	107	**123.7**	96.8 to 150.6	125	**135.2**	108.5 to 162.0	50	**104.6**	73.5 to 135.6
Medium	238	**80.8**	68.7 to 02.9	308	**112.7**	98.4 to 127.1	178	**75.6**	63.2 to 87.9	178	**71.2**	59.1 to 83.3	175	65.3	54.3 to 76.2
Low	216	**28.3**	23.9 to 32.8	207	**28.0**	23.7 to 32.4	206	**27.1**	22.9 to 31.3	189	**24.1**	20.0 to 28.2	269	**37.2**	32.3 to 42.1
Geographic Area															
Central	51	**32.4**	21.5 to 43.3	49	**38.0**	27.4 to 48.7	48	**36.2**	25.6 to 46.8	51	37.1	26.4 to 47.8	47	**34.5**	24.2 to 44.7
Inner North	269	**128.7**	110.4 to 146.9	327	**162.5**	142.2 to 182.8	242	**122.2**	105.0 to 139.4	241	**128.2**	110.5 to 145.8	223	**118.2**	101.1 to 135.4
Outer North	156	**72.7**	59.1 to 86.4	194	**94.8**	79.5 to 110.0	150	**74.4**	60.9 to 88.0	152	**68.9**	55.5 to 82.3	133	**69.0**	56.5 to 81.6
South	85	**38.0**	29.4 to 46.6	106	**46.5**	36.9 to 56.1	97	40.8	31.6 to 49.9	98	40.7	31.4 to 50.0	108	43.4	33.7 to 53.1
West	91	**26.1**	19.8 to 32.4	63	**18.7**	13.5 to 23.9	57	**15.6**	10.7 to 20.5	40	**11.3**	7.3 to 15.4	52	**13.7**	9.1 to 18.3

Source: Missouri Department of Health and Senior Services, Bureau of Health Care Analysis and Data Dissemination
Case Definition: The above table includes any inpatient hospitalization that include hepatitis C as one of the diagnosis codes. Cases with less than 5 are restricted. Data points with a * had a RSE > 30 and should be interpreted with caution.

Data Source: Missouri Department of Health and Senior Services
Bureau of Vital Statistics, Bureau of Health Care Analysis and Data Dissemination, &
The Missouri Health and Surveillance Information System (WebSurv)
This report is updated annually. Last updated 9/11/2024 (OC)

Table 16. Hepatitis C- Associated Emergency Department Discharges per 100,000 Population

St. Louis County, MO, 2018-2022

Rates that are bold and red are above the overall St. Louis County rate while rates that are bold and blue are below.

	2018			2019			2020			2021			2022		
	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI
St. Louis County	**738**	**61.8**	**56.5 to 67.2**	**753**	**64.9**	**59.5 to 70.3**	**559**	**48.2**	**43.6 to 52.9**	**549**	**46.6**	**42.0 to 51.2**	**587**	**51.8**	**47.0 to 56.5**
Gender															
Male	473	**84.8**	75.8 to 93.8	502	**92.7**	83.4 to 102.0	346	**63.7**	56.0 to 71.4	364	**65.9**	58.1 to 73.7	374	**70.8**	62.9 to 78.7
Female	265	**41.9**	35.8 to 48.0	251	**40.7**	34.7 to 46.6	212	**34.5**	29.1 to 40.0	185	**29.4**	24.3 to 34.5	213	**34.9**	29.4 to 40.4
Age Group															
25-44	162	66.3	56.1 to 76.5	203	**82.7**	71.4 to 94.1	154	62.3	52.4 to 72.1	127	50.7	41.9 to 59.5	147	58.5	49.0 to 67.9
45-64	341	**125.1**	111.8 to 138.3	292	**108.6**	96.2 to 121.1	218	**82.5**	71.5 to 93.4	227	**85.9**	74.7 to 97.1	211	**81.9**	70.9 to 93.0
65+	219	**127.0**	110.2 to 143.9	246	**139.7**	122.2 to 157.1	184	**102.2**	87.5 to 117.0	189	**104.6**	89.7 to 119.5	224	**121.5**	105.6 to 137.5
Race															
Black or African American	390	**146.2**	130.1 to 162.3	433	**167.3**	150.3 to 184.1	298	**115.5**	101.5 to 129.5	310	**120.9**	106.7 to 135.2	295	**117.9**	103.9 to 131.8
White	329	**43.8**	38.4 to 49.1	301	**41.0**	35.8 to 46.2	253	**34.5**	29.7 to 39.4	227	**29.1**	24.5 to 33.7	277	**39.3**	34.1 to 44.4
Neighborhood Poverty															
Very High	80	**185.1**	140.9 to 229.4	94	**188.2**	146.4 to 230.0	68	**169.6**	129.1 to 210.2	57	**139.4**	105.3 to 173.5	93	**145.0**	114.5 to 175.4
High	116	**144.9**	112.8 to 176.9	114	**217.2**	179.8 to 254.6	107	**123.7**	96.8 to 150.6	125	**135.2**	108.5 to 162.0	50	**104.6**	73.5 to 135.6
Medium	238	**80.8**	68.7 to 92.9	308	**112.7**	98.4 to 127.1	178	**75.6**	63.2 to 87.9	178	**71.2**	59.1 to 83.3	175	65.3	54.3 to 76.2
Low	216	**28.3**	23.9 to 32.8	207	**28.0**	23.7 to 32.4	206	**27.1**	22.9 to 31.3	189	**24.1**	20.0 to 28.2	269	**37.2**	32.3 to 42.1
Geographic Area															
Central	62	**41.0**	28.9 to 53.0	49	**38.6**	27.9 to 49.3	41	**30.7**	20.9 to 40.5	49	35.2	24.7 to 45.7	46	**33.9**	23.8 to 44.1
Inner North	311	**149.6**	130.0 to 169.2	354	**174.5**	153.4 to 195.6	250	**123.5**	106.0 to 141.0	213	**113.0**	96.4 to 129.5	239	**128.2**	110.4 to 146.0
Outer North	181	**85.1**	70.4 to 99.8	201	**99.4**	83.9 to 115.0	145	**70.8**	57.5 to 84.0	157	**71.0**	57.4 to 84.6	136	**70.7**	58.0 to 83.4
South	102	**46.9**	37.5 to 56.3	97	**41.6**	32.4 to 50.8	87	35.9	27.2 to 44.6	88	35.0	26.2 to 43.8	103	42.4	32.9 to 51.9
West	75	**21.8**	16.1 to 27.5	52	**15.8**	11.1 to 20.5	36	**10.2**	6.3 to 14.1	34	**9.0**	5.2 to 12.7	51	**13.4**	8.9 to 18.0

Source: Missouri Department Health and Senior Services, Bureau of Health Care Analysis and Data Dissemination
Case Definition: The above table includes any discharge from the Emergency Department that include hepatitis C as one of the diagnosis codes. Cases with less than 5 are restricted. Data points with a * had a RSE >30 and should be interpreted with caution.

Data Source: Missouri Department of Health and Senior Services
Bureau of Vital Statistics, Bureau of Health Care Analysis and Data Dissemination, &
The Missouri Health and Surveillance Information System (WebSurv)
This report is updated annually. Last updated 9/11/2024 (OC)

Case Data:

Table 17. Newly Reported Chronic and Acute Hepatitis B per 100,000 Population

St. Louis County, MO, 2019-2023

Rates that are bold and red are above the overall St. Louis County rate while rates that are bold and blue are below.

	2019			2020			2021			2022			2023		
	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI
St. Louis County	**125**	**12.0**	**9.8 to 14.2**	**94**	**8.9**	**7.0 to 10.8**	**83**	**7.9**	**6.1 to 9.7**	**90**	**8.4**	**6.6 to 10.3**	**117**	**10.9**	**8.7 to 13.0**
Gender															
Male	71	14.5	11.0 to 18.0	53	10.7	7.7 to 13.7	52	10.7	7.7 to 13.6	55	11.0	8.0 to 14.1	74	15.2	11.6 to 18.7
Female	54	9.8	7.0 to 12.5	41	7.4	5.0 to 9.8	30	5.3	3.2 to 7.3	35	6.2	4.0 to 8.5	43	7.3	4.8 to 9.8
Age Group															
25-44	44	**17.9**	12.6 to 23.2	33	13.3	8.8 to 17.9	30	12.0	7.7 to 16.3	37	14.7	10.0 to 19.5	33	13.1	8.6 to 17.6
45-64	57	**21.2**	15.7 to 26.7	36	13.6	9.2 to 18.1	39	**14.8**	10.1 to 19.4	32	12.4	8.1 to 16.7	49	**19.0**	13.7 to 24.4
65+	21	11.9	6.8 to 17.0	22	12.2	7.1 to 17.3	13	7.2	3.3 to 11.1	20	10.9	6.1 to 15.6	33	17.9	11.8 to 24.0
Race															
Asian	30	**67.5**	42.5 to 92.6	24	**56.0**	34.4 to 77.6	19	**37.3**	18.6 to 56.1	24	**51.1**	30.6 to 71.5	24	**47.7**	27.3 to 68.1
Black or African American	29	12.7	8.3 to 17.1	19	8.7	5.2 to 12.2	13	5.0	2.1 to 7.9	13	5.5	2.5 to 8.4	34	14.5	9.7 to 19.2
White	21	**2.9**	1.5 to 4.3	15	**1.7***	0.6 to 2.9	17	**2.3**	1.0 to 3.5	12	**1.1***	0.1 to 2.2	17	**1.9***	0.7 to 3.2
Geographic Area															
Central	13	11.2	5.7 to 16.7	10	6.4*	1.6 to 11.2	20	14.1	7.4 to 20.8	14	10.4	4.8 to 16.0	16	11.5	5.5 to 17.5
Inner North	28	15.3	9.4 to 21.3	26	15.3	9.7 to 21.0	14	7.8	3.6 to 12.1	10	5.3*	1.6 to 8.9	27	15.5	9.6 to 21.5
Outer North	20	10.3	5.4 to 15.2	15	7.9	3.6 to 12.2	12	6.2*	2.5 to 10.0	8	4.8*	1.7 to 7.9	20	10.3	5.4 to 15.2
South	25	12.1	7.4 to 16.8	24	9.7	5.1 to 14.2	11	5.0*	1.9 to 8.1	24	9.8	5.1 to 14.3	20	8.4	4.2 to 12.6
West	35	10.5	6.6 to 14.4	17	5.6	2.9 to 8.3	22	7.1	4.1 to 10.1	30	9.9	6.4 to 13.4	28	8.0	4.6 to 11.4

Source: Missouri Department of Health and Senior Services, The Missouri Health and Surveillance Information System (WebSurv)
Case Definition: The above table includes newly reported cases of chronic or acute hepatitis B cases. Cases with less than 5 are restricted. Data points with a * had a RSE >30 and should be interpreted with caution. Age groups are in years.

Data Source: Missouri Department of Health and Senior Services
Bureau of Vital Statistics, Bureau of Health Care Analysis and Data Dissemination, &
The Missouri Health and Surveillance Information System (WebSurv)
This report is updated annually. Last updated 9/11/2024 (OC)

Table 18. Newly Reported Chronic and Acute Hepatitis C per 100,000 Population

St. Louis County, MO, 2019-2023

Rates that are bold and red are above the overall St. Louis County rate while rates that are bold and blue are below.

	2019			2020			2021			2022			2023		
	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI	Count	Rate	95% CI
St. Louis County	**482**	**43.6**	**39.3 to 48.0**	**379**	**35.7**	**31.8 to 39.5**	**331**	**30.8**	**27.2 to 34.3**	**292**	**27.4**	**24.0 to 30.7**	**298**	**27.4**	**24.0 to 30.8**
Gender															
Male	324	**62.2**	54.7 to 69.6	241	**48.8**	42.4 to 55.3	214	**42.3**	36.3 to 48.3	193	**38.6**	32.9 to 44.2	178	34.9	29.4 to 40.4
Female	158	**27.6**	22.9 to 32.3	138	**24.2**	19.8 to 28.6	117	**20.6**	16.6 to 24.7	99	**17.4**	13.7 to 21.2	119	21.1	17.0 to 25.2
Age Group															
25-44	168	**68.5**	58.1 to 78.8	176	**71.2**	60.7 to 81.7	134	**53.5**	44.4 to 62.5	122	**48.5**	39.9 to 57.1	105	**41.8**	33.8 to 49.8
45-64	178	**66.2**	56.5 to 75.9	108	40.8	33.1 to 48.6	110	41.6	33.8 to 49.4	87	33.8	26.7 to 40.9	94	36.5	29.1 to 43.9
65+	103	**58.5**	47.2 to 69.8	76	42.2	32.7 to 51.7	76	42.1	32.6 to 51.5	73	39.6	30.5 to 48.7	87	**47.2**	37.3 to 57.1
Race															
Black or African American	155	**62.7**	52.5 to 72.8	109	45.4	36.9 to 53.9	103	42.2	34.0 to 50.4	93	**39.1**	31.2 to 46.9	106	**45.0**	36.6 to 53.3
White	137	**20.2**	16.8 to 23.7	118	**18.2**	14.9 to 21.5	86	**13.7**	10.9 to 16.5	91	**13.5**	10.5 to 16.4	95	**15.1**	12.1 to 18.2
Geographic Area															
Central	27	**18.9**	11.0 to 26.8	33	23.7	14.9 to 32.5	26	**18.5**	10.8 to 26.1	20	**13.9**	7.2 to 20.6	26	18.0	10.3 to 25.6
Inner North	187	**98.3**	82.9 to 113.6	126	**64.5**	52.1 to 76.9	132	**73.8**	60.7 to 86.8	108	**63.4**	51.4 to 75.3	97	**56.7**	45.4 to 68.0
Outer North	113	58.1	46.5 to 69.8	74	38.4	28.9 to 47.9	50	24.8	17.1 to 32.5	55	28.5	20.5 to 36.6	62	32.5	23.9 to 41.0
South	77	32.5	24.3 to 40.7	55	25.4	18.5 to 32.3	56	25.3	18.3 to 32.3	34	**15.4**	9.9 to 20.8	45	19.9	13.6 to 26.2
West	59	**20.0**	15.0 to 25.0	67	**23.1**	17.7 to 28.4	39	**13.1**	9.1 to 17.0	59	**18.2**	13.3 to 23.2	39	**11.5**	7.5 to 15.4

Source: Missouri Department of Health and Senior Services, The Missouri Health and Surveillance Information System (WebSurv)
Case Definition: The above table includes newly reported cases of chronic or acute hepatitis C cases. Cases with less than 5 are restricted. Data points with a * had a RSE >30 and should be interpreted with caution. Age groups are in years.

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