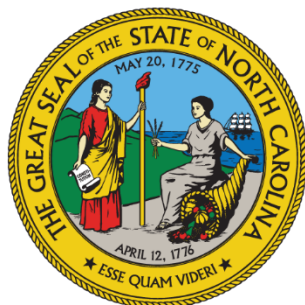


2022 North Carolina Hepatitis B/C Surveillance Report

**HIV/STD/Hepatitis Surveillance Unit
Division of Public Health
North Carolina Department of Health and Human Services
December 2023**



NC DEPARTMENT OF
**HEALTH AND
HUMAN SERVICES**
Division of Public Health

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<https://epi.publichealth.nc.gov/cd/stds/figures.html>

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Special Note:

The portable document format or PDF version of this document contains hyperlinks to related topics in other sections of the document. To navigate to the related topic, click the hyperlink in the table of contents.

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North Carolina Department of Health and Human Services (North Carolina DHHS) is an equal opportunity employer and provider (12/2022).

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About the Content of This Report

This document, the 2022 North Carolina Hepatitis B/C Surveillance Report, includes summary tables of surveillance reports and other information for acute hepatitis B, chronic hepatitis B, acute hepatitis C, and chronic hepatitis C. In some instances, total numbers of reports may not agree between separate cross-tabulations due to missing values for some variables.

Detailed data tables of acute hepatitis B, chronic hepatitis B, acute hepatitis C, and chronic hepatitis C by county of diagnosis/residence and demographics can be found in the 2022 North Carolina Hepatitis B/C Surveillance Data Tables excel file. This excel file can be downloaded from the Annual Reports page (<https://epi.dph.ncdhhs.gov/cd/stds/annualrpts.html>).

Rates are presented by age group, gender, race, and ethnicity for each disease and are expressed as cases per 100,000 population. Cases with a reported race of "other" were included in the unknown race category. Rates are also presented for counties across the state and are expressed as cases per 100,000 population. Rates are not available for unknown/unspecified categories (including age, gender, race, and ethnicity). Beginning with the 2021 Annual Report, rate denominators were estimated using the Census demographic population estimates for 2021 from the Census Bureau's Population Estimates Program (PEP). In this report, 2021 population estimates were used to calculate rates for both 2021 and 2022. More information about Census Population and Housing Estimates is available on the Census website (<https://www.census.gov/programs-surveys/popest/data/special-tab/content.html>). Use of these population denominators enabled calculation of rates for the multiple race category.

Rates that are based on a small number of cases (fewer than 10) should be viewed with caution and are considered unreliable because these rates have large standard errors and can vary widely with small changes in case numbers. Data are suppressed in this document for table cells with a population denominator less than 500, according to the North Carolina Department of Health and Human Services, Division of Public Health Communicable Disease Branch data release guidelines.

**Please note that 2020 data should be treated with caution due to the impact of the COVID-19 pandemic on accessing testing, treatment, and surveillance activities in North Carolina.*

Data Source: North Carolina Electronic Disease Surveillance System (NC EDSS) (data as of August 1, 2023) unless otherwise specified

Hepatitis B and C in North Carolina

Hepatitis B and C Reporting in North Carolina

In North Carolina, laboratory results and symptoms diagnostic of acute, chronic, and perinatal hepatitis B and acute hepatitis C are reportable by law to the North Carolina Department of Health and Human Services (NC DHHS). Statewide surveillance information is collected by the local health departments and sent to the North Carolina Division of Public Health. The acute classification for hepatitis B and C is based solely on provider reporting. Most of North Carolina's disease reporting, including chronic hepatitis B and C, is performed via electronic reporting from laboratories. Therefore, acute hepatitis B and C are very likely to be underreported; an additional contributor to underreporting is misclassification of asymptomatic acute cases as chronic.

Hepatitis B and C in North Carolina are required to be reported to the local health department following the schedule below*:

Within 24 Hours	Within 7 Days
Acute Hepatitis B	Chronic Hepatitis B
Perinatal Hepatitis B	Acute Hepatitis C

*Note reporting of chronic hepatitis C is required for laboratories reporting electronically, but not for providers not participating in electronic reporting in North Carolina; it is primarily reported in North Carolina by electronic lab reporting (ELR). Therefore, chronic hepatitis C does not have a provider timeframe for reporting to North Carolina Division of Public Health

Hepatitis B

Hepatitis B is a vaccine-preventable, mild-to-severe liver infection, caused by the hepatitis B virus (HBV), which can advance from acute to chronic.



Most acute infections range from asymptomatic or mild disease; some acute HBV infections will resolve on their own, while others will develop into chronic infection.



HBV is vaccine preventable. It is recommended that all children from birth to 18 years of age receive the vaccine, and all other adults receive it as soon as possible.



HBV can survive outside the body for at least 7 days and still cause infection.



Vertical transmission can also occur between an infected mother and her infant (perinatal HBV).



Treatment is generally not required for acute HBV, as the majority of acute diseases will self-clear 90-95% of the time. There is no cure for HBV at this time.



All 86 local health departments in NC are able to offer risk-based HBV screening to under and uninsured individuals through the NC State Laboratory of Public Health (NC SLPH).

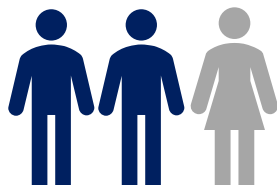


HBV is a leading cause of liver cancer.

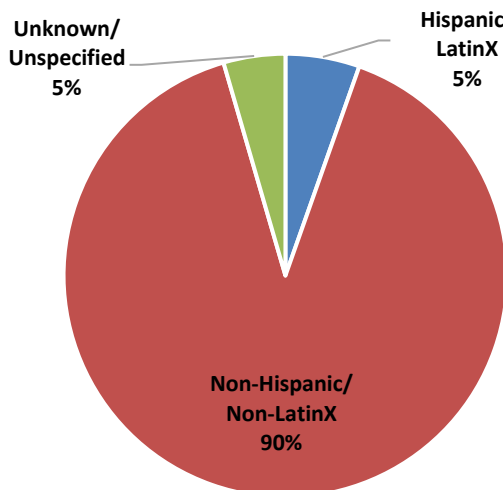
Acute Hepatitis B Disease Trends

2022 Summary		
Number of cases		111
Rate (per 100,000 population)		1.1
Percent change from 2021		-22.9%
Mean age (in years)		47
Gender	Number (%)	Rate
Male	72 (64.9)	1.4
Female	39 (35.1)	0.7
Unknown	0 (0.0%)	-
Race	Number (%)	Rate
American Indian/Alaska Native	2 (1.8%)	1.2
Asian/Pacific Islander	0 (0.0%)	0.0
Black/African American	26 (23.4)	1.1
White	79 (71.2)	1.1
Multiple Races	0 (0.0)	0.0
Unknown	4 (3.6)	-
Ethnicity	Number (%)	Rate
Hispanic/LatinX	6 (5.4)	0.6
Non-Hispanic/Non-LatinX	100 (90.1)	1.1
Unknown/Unspecified	5 (4.5)	-

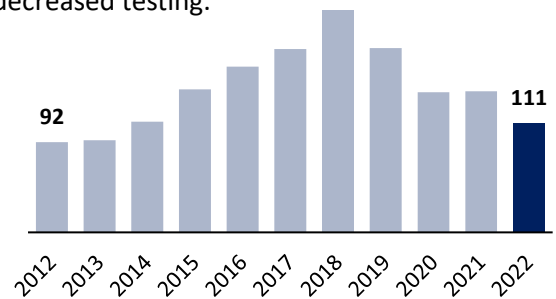
Nearly two-thirds (65%) of acute HBV cases were among men in 2022.



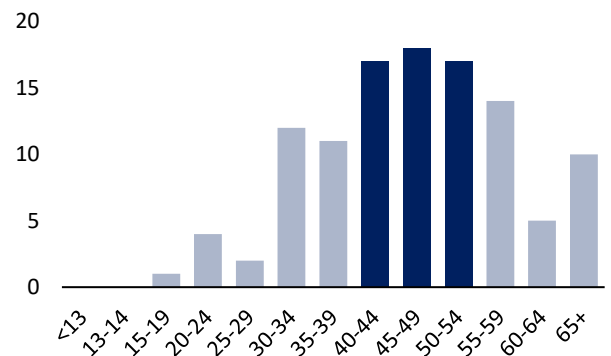
The majority of acute HBV cases were among non-Hispanic/non-LatinX people. Hispanic/LatinX people have accounted for 5% cases in 2022.



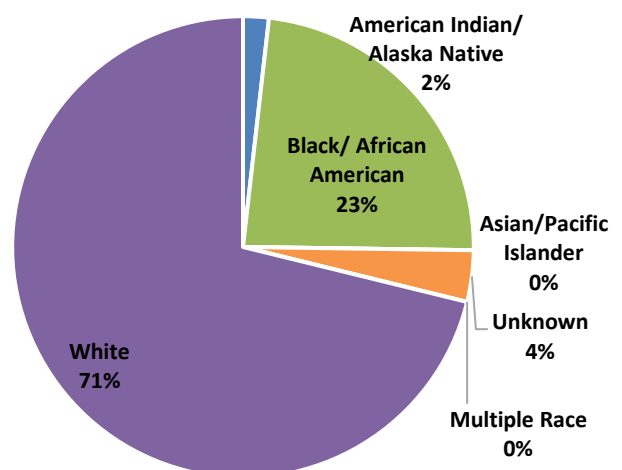
Reports of acute HBV cases peaked in 2018 and have since declined. Cases have not rebounded to pre-pandemic levels. This may be due in part to decreased testing.



Nearly half (47%) of acute HBV cases were among persons aged 40-54 years.



The majority of acute HBV cases were among White persons (71%), followed by Black/African American persons (23%).



Chronic Hepatitis B Disease Trends

2022 Summary

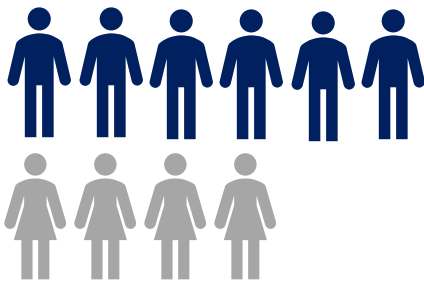
Number of cases	1,124
Rate (per 100,000 population)	10.7
Percent change from 2021	+8.4%
Mean age (in years)	48

Gender	Number (%)	Rate
Male	674 (60.0)	13.1
Female	450 (40.0)	8.3
Unknown	0 (0.0)	-

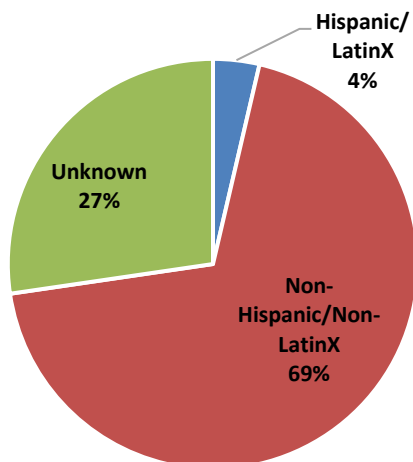
Race	Number (%)	Rate
American Indian/Alaska Native	11 (1.0)	6.5
Asian/Pacific Islander	264 (23.5)	70.5
Black/African American	287 (25.5)	12.2
White	310 (27.6)	4.2
Multiple Races	14 (1.2)	5.3
Unknown/Unspecified	238 (21.2)	-

Ethnicity	Number (%)	Rate
Hispanic/LatinX	41 (3.6)	3.8
Non-Hispanic/Non-LatinX	776 (69.0)	8.2
Unknown/Unspecified	307 (27.3)	-

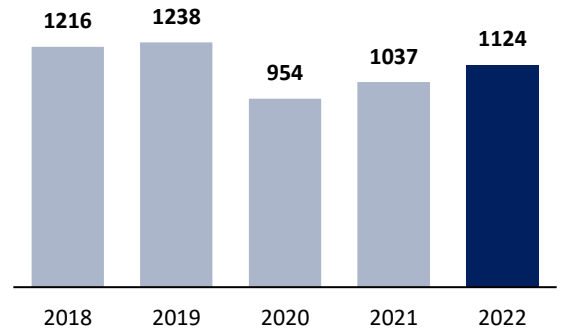
6 out of 10 chronic HBV cases reported in 2022 were among men.



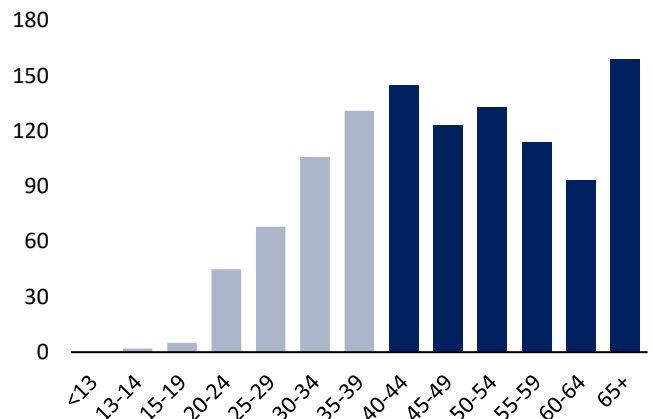
Reported chronic HBV cases were **predominantly non-Hispanic/non-LatinX persons**; however, ethnicity data is **missing** for more than one-quarter of cases in 2022.



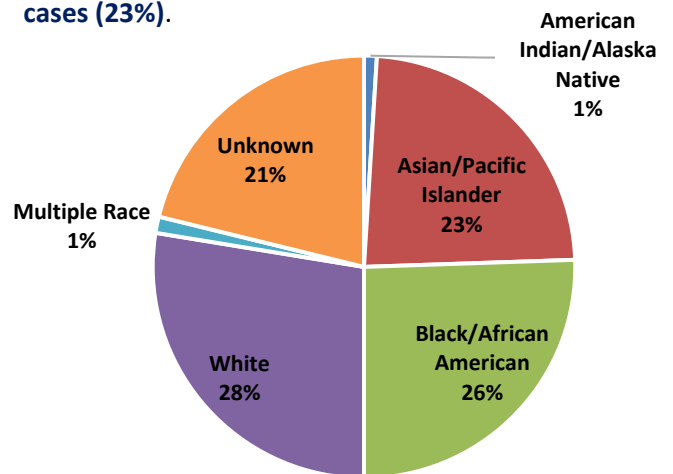
Reported chronic HBV cases slightly increased in 2022. Cases have **not rebounded to pre-pandemic levels**. This may be due in part to decreased testing.



Two-thirds (67%) of chronic cases reported in 2022 were among persons **40 years and older**.



While no new acute HBV cases were reported among **Asian/Pacific Islander persons** in 2022, this group accounted for nearly **one-fourth of chronic cases (23%)**.



Hepatitis C

Hepatitis C is a mild-to-severe liver infection, caused by the hepatitis C virus (HCV), which can advance from acute to chronic. There is no vaccine for HCV, but over 90% of HCV-infected people can be cured of HCV with direct acting antiviral therapies.



Most acute infections range from asymptomatic or mild disease; some acute HCV infections will resolve on their own, while 75-85% will develop into chronic infection.



The most common way HCV is transmitted in the US is through injection drug use (IDU).



Direct acting antiviral therapies to treat chronic HCV are associated with high cure rates (>95%), low likelihood of side effects, and lower risk of drug-drug interactions.



HCV is a leading cause of liver transplants and liver cancer.



There is no vaccine for HCV, but people infected with HCV should be vaccinated against hepatitis A and HBV.



Vertical transmission can also occur between an infected mother and her infant (perinatal HCV).



The CDC recommends a one-time HCV testing in all adults regardless of risk, except in settings where the prevalence of HV is less than 0.1% and in all pregnant women during every pregnancy.

Acute Hepatitis C Disease Trends

2022 Summary

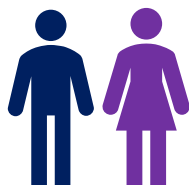
Number of cases	75
Rate (per 100,000 population)	0.7
Percent change from 2021	-28.6%
Mean age (in years)	39

Gender	Number (%)	Rate
Male	37 (49.3)	0.7
Female	38 (50.7)	0.7
Unknown	0 (0.0%)	-

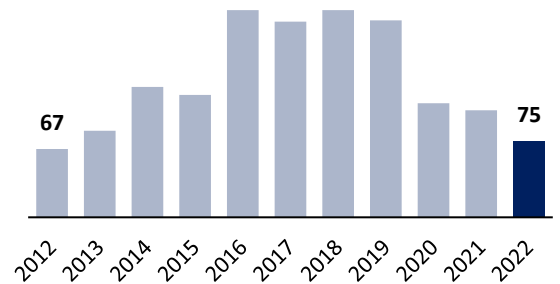
Race	Number (%)	Rate
American Indian/Alaska Native	2 (2.7)	1.2
Asian/Pacific Islander	0 (0.0)	0.0
Black/African American	4 (5.3)	0.2
White	59 (78.7)	0.8
Multiple Races	0 (0.0)	0.0
Unknown	10 (13.3)	-

Ethnicity	Number (%)	Rate
Hispanic/LatinX	6 (8.0)	0.6
Non-Hispanic/Non-LatinX	63 (84.0)	0.7
Unknown/Unspecified	6 (8.0)	-

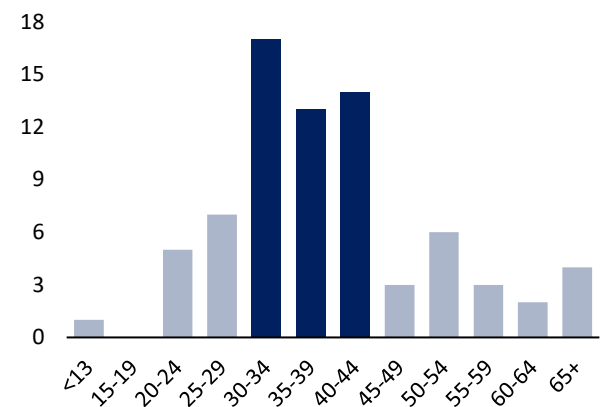
The percentage of acute HCV cases were **similar** among men (51%) and women (49%) in 2022.



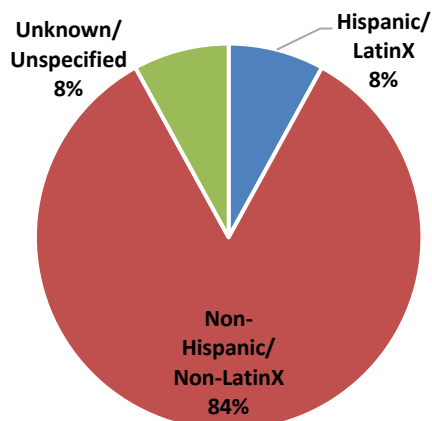
Acute HCV cases **declined** in 2022; cases have **not rebounded to pre-pandemic levels**. This may be due in part to decreased testing.



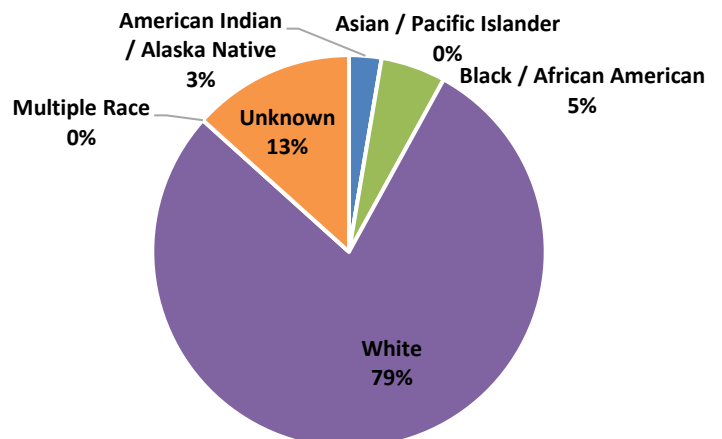
More than half (59%) of acute HCV cases in 2022 were among people **aged 30-44 years**.



Acute HCV cases in 2022 were **primarily (84%)** among **non-Hispanic/non-LatinX persons**.



Acute HCV cases in 2022 were **primarily (79%)** among **White persons**.



Chronic Hepatitis C Disease Trends

2022 Summary

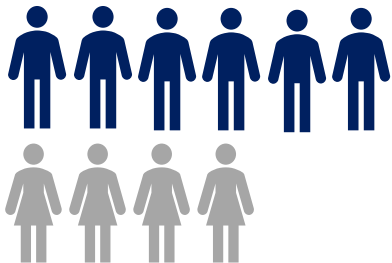
Number of cases	10,044
Rate (per 100,000 population)	95.2
Percent change from 2021	-21.0%
Mean age (in years)	47

Gender	Number (%)	Rate
Male	6,290 (62.6)	122.0
Female	3,749 (37.3)	69.5
Unknown	5 (0.0)	-

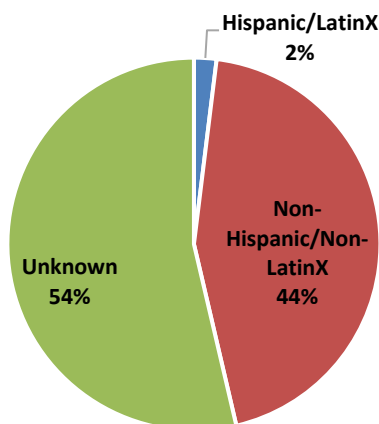
Race	Number (%)	Rate
American Indian/Alaska Native	117 (1.2)	69.2
Asian/Pacific Islander	63 (0.6)	16.8
Black/African American	1,447 (14.4)	61.6
White	4,436 (44.2)	60.0
Multiple Races	42 (0.4)	15.8
Unknown/Unspecified	3,939 (39.2)	-

Ethnicity	Number (%)	Rate
Hispanic/LatinX	196 (2.0)	18.2
Non-Hispanic/Non-LatinX	4,459 (44.4)	47.1
Unknown/Unspecified	5,389 (53.7)	-

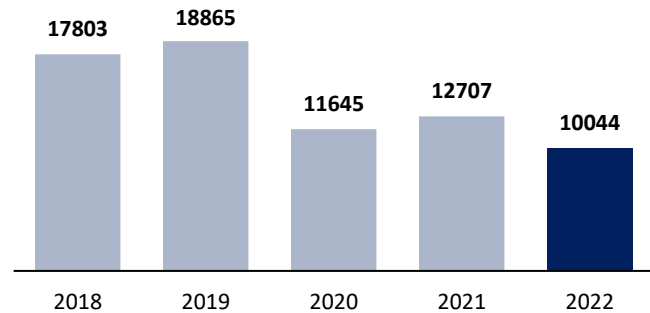
Approximately **6 out of 10** chronic HCV cases reported in 2022 were among men.



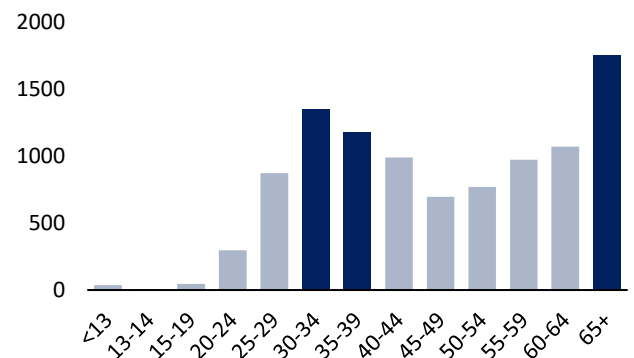
At least **44%** of chronic HCV cases reported in 2022 were among **non-Hispanic/non-LatinX** persons; however, more than 50% of cases were missing ethnicity data.



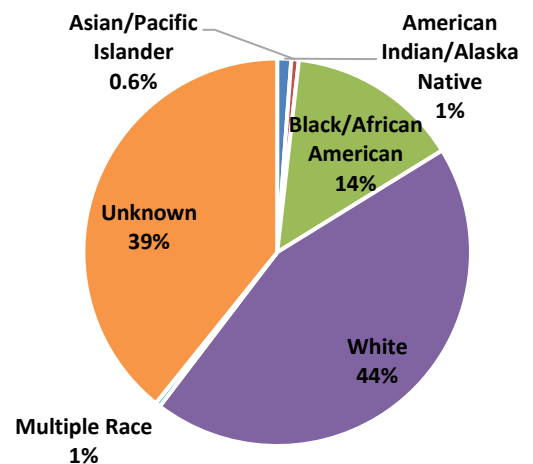
Chronic HCV cases reported in 2022 **declined**; cases have **not rebounded to pre-pandemic levels**. This may be due in part to decreased testing.



Chronic hepatitis C is most common among persons **ages 30-39 years** and **65 years and older**.

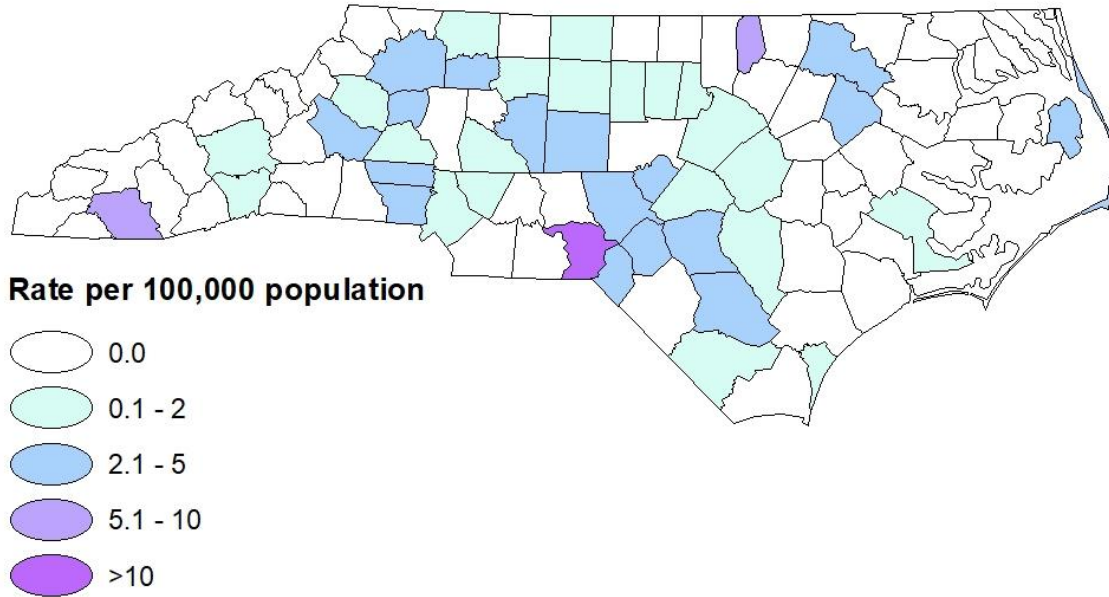


At least **44%** of chronic HCV cases reported in 2022 were among **White** persons; however, race data is **missing** for 39% of cases.



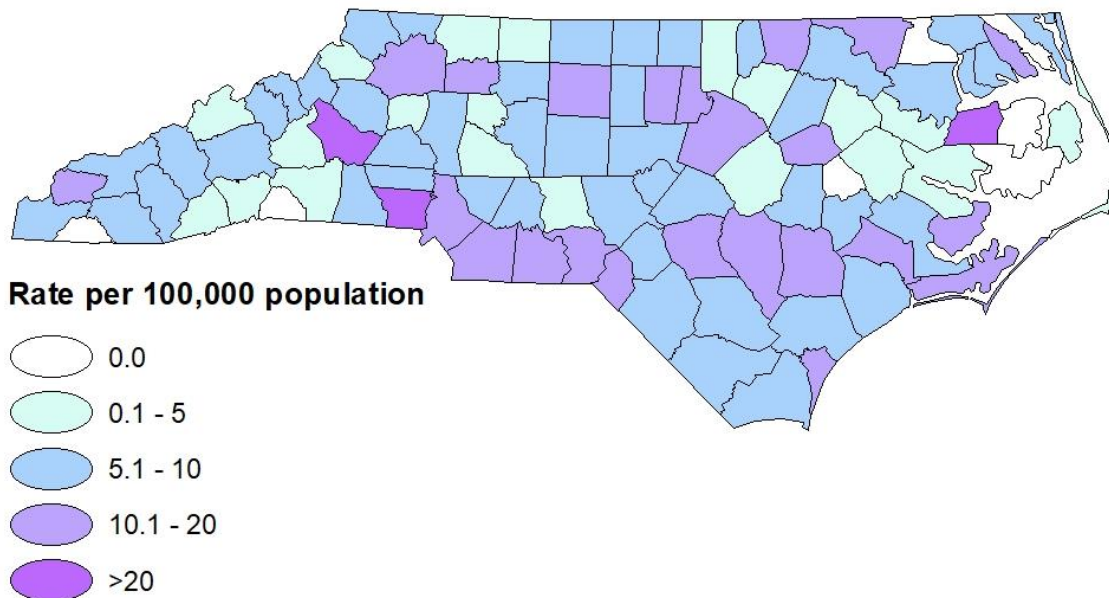
Hepatitis B and C Rate Maps by County of Residence at Diagnosis, 2022

Figure 1. Acute Hepatitis B Rates in North Carolina by County of Residence at Diagnosis, 2022



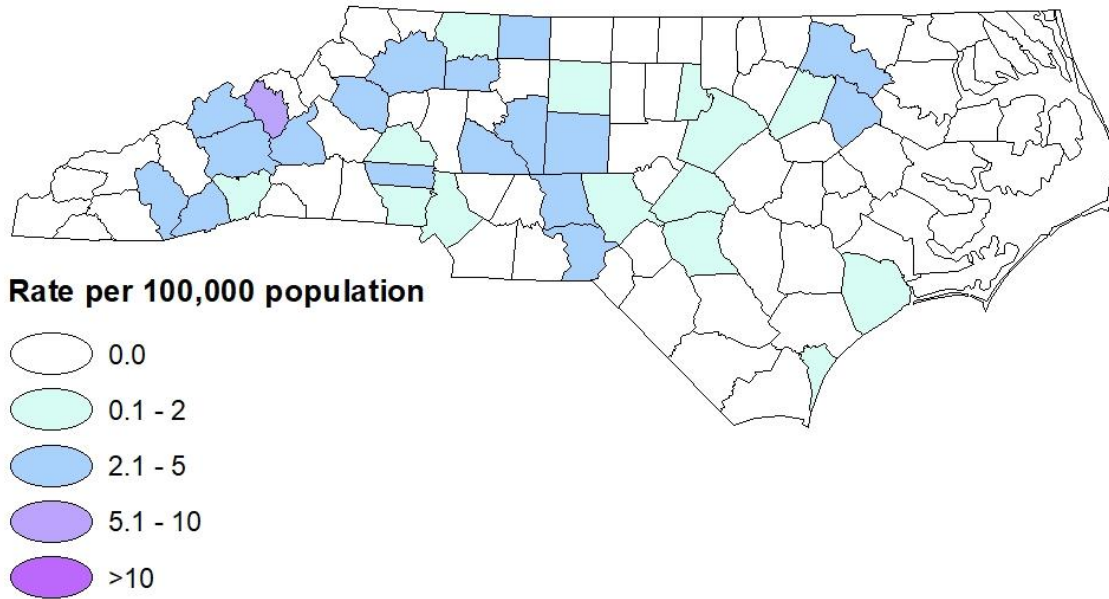
Data Source: North Carolina Electronic Disease Surveillance System (NC EDSS) (data as of August 1, 2023).

Figure 2. Diagnosed Chronic Hepatitis B Rates in North Carolina by County of Residence at Diagnosis, 2022



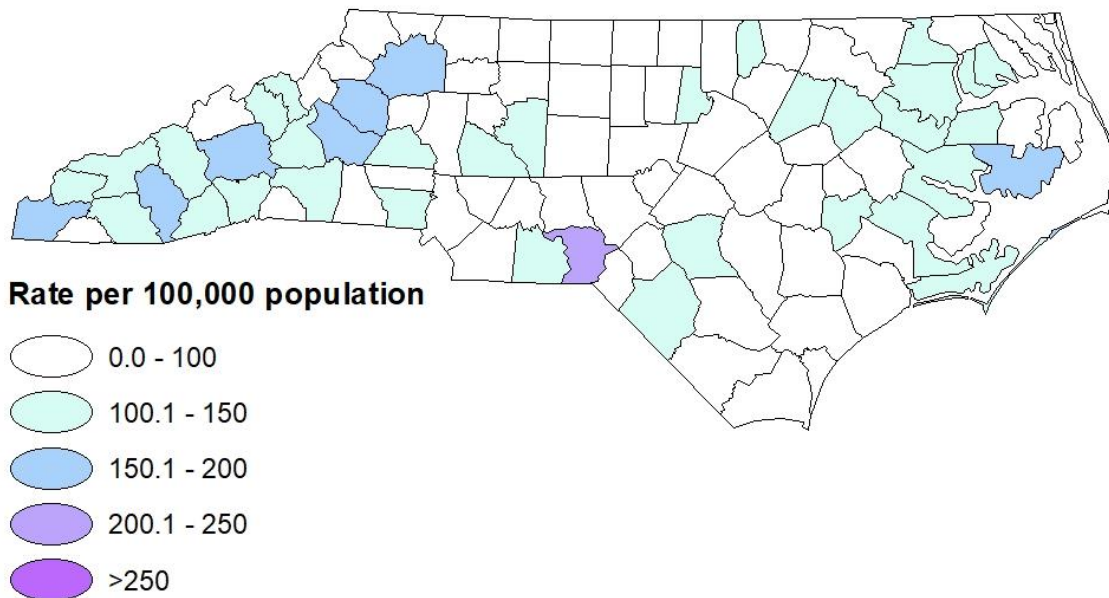
Data Source: North Carolina Electronic Disease Surveillance System (NC EDSS) (data as of August 1, 2023).

Figure 3. Acute Hepatitis C Rates in North Carolina by County of Residence at Diagnosis, 2022



Data Source: North Carolina Electronic Disease Surveillance System (NC EDSS) (data as of August 1, 2023).

Figure 4. Diagnosed Chronic Hepatitis C Rates in North Carolina by County of Residence at Diagnosis, 2022



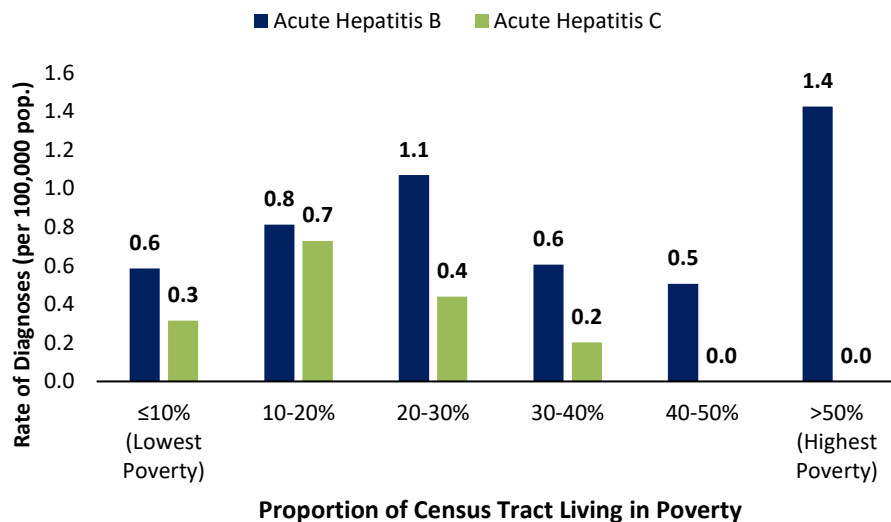
Note: Concentrations in some counties may be due to increased availability of testing.

Data Source: North Carolina Electronic Disease Surveillance System (NC EDSS) (data as of August 1, 2023).

Poverty and Hepatitis

While the North Carolina surveillance data shows higher hepatitis rates in some racial and ethnic groups, factors such as poverty and large gaps in wealth distribution may be driving these differences.⁹ People who cannot afford basic needs may also have trouble accessing quality health services, and may have had negative experiences with health systems that have discouraged them from accessing testing and care programs.⁹ For each person diagnosed with acute HBV or HCV in North Carolina in 2022, we calculated the proportion of the population living below the poverty line in their census tract of residence at the time of their diagnosis using five-year (2016-2020) estimates from the American Community Survey. This calculation estimated the neighborhood poverty level experienced for people newly diagnosed with acute HBV or HCV in North Carolina. Figure 6 shows the rate of newly diagnosed acute HBV and HCV by census tract poverty rate. This figure demonstrates that although people living at all levels of poverty get acute HBV and HCV, those living in census tracts with a higher proportion of residents residing below the federal poverty line are more likely to be diagnosed with HBV.

Figure 5. People Diagnosed with Acute Hepatitis B and C in North Carolina by Poverty Indicator[^], 2022



[^]Estimates of people living below the poverty line within a census tract and all population estimates obtained from the American Community Survey, 2016-2020, five-year estimate.

Data Sources: North Carolina Electronic Disease Surveillance System (NC EDSS) (data as of August 1, 2023), and 2016-2020 American Community Survey (ACS) five-year estimates (accessed from <https://data.census.gov/>).

⁹ Centers for Disease Control and Prevention. (2020). STD health equity. Updated March 2, 2020. Accessed September 2, 2022. Retrieved from <https://www.cdc.gov/std/health-disparities/default.htm#ftn5>.

Hepatitis B Disease Information

Hepatitis B is a vaccine-preventable, mild-to-severe liver infection, caused by the hepatitis B virus (HBV), which can advance from acute to chronic.

The Centers for Disease Control and Prevention (CDC) estimates that there are 880,000 people living with chronic HBV, with about 14,000 new infections a year in the United States.¹ Nationally, the rate of acute HBV has remained stable during 2010-2019, but declined in 2020 and 2021.² While the reduction in rate of acute hepatitis B during 2020 and 2021 may be related to hepatitis B prevention activities, it is also likely attributed to 1) disruptions in healthcare access resulting from the COVID-19 pandemic reducing the number of persons tested for HBV infection and 2) reassignment of viral hepatitis surveillance staff in health departments to work on the COVID-19 pandemic, thus limiting their ability to investigate laboratory reports and conduct medical provider follow-up and medical record review required to accurately determine acute case status.

Acute versus Chronic Hepatitis B

Acute infection ranges from asymptomatic or mild disease to — rarely — fulminant hepatitis. Some acute HBV infections will resolve on their own, while others will develop into chronic infection. Most people with chronic HBV infection have no outward symptoms of liver disease. However, some people may develop liver inflammation (elevation of aspartate aminotransferase [AST]/alanine aminotransferase [ALT]), cirrhosis, or hepatocellular carcinoma (a type of liver cancer).² Between 15% and 25% of people with chronic HBV will develop chronic liver disease, including cirrhosis, liver failure, or liver cancer.¹ Around 25% of people infected with chronic HBV in childhood and 15% of people infected with chronic HBV after childhood die prematurely from cirrhosis or liver cancer.²

Transmission of Hepatitis B

HBV can survive outside the body for at least seven days and still cause infection.² HBV can be transmitted through sex with an infected person, sharing drug use equipment, sharing personal items (such as toothbrushes and razors), and breaches in infection control resulting in outbreaks in health care facilities. Vertical transmission can also occur between an infected mother and her infant (perinatal HBV).¹ The majority of infections due to perinatal transmission diagnosed in North Carolina are found in people born in countries with moderate to high rates of endemicity (primarily Asian and African countries) who are now North Carolina residents.

People at risk for HBV include:

- Infants born to HBV-infected mothers;
- Sexual partners of HBV-infected people;
- Men who report sex with men;
- People who inject drugs;

¹Centers for Disease Control and Prevention (CDC) (2023). *What is Viral Hepatitis?* Updated March 9, 2023. Accessed September 8, 2023. Retrieved from <https://www.cdc.gov/hepatitis/abc/index.htm>.

²Centers for Disease Control and Prevention (CDC) (2020). *Hepatitis B Questions and Answers for Health Professionals*. Updated March 30, 2022. Accessed October 5, 2022. Retrieved from <https://www.cdc.gov/hepatitis/hbv/hbvfaq.htm#overview>.

- Household contacts of HBV-infected people;
- Health care and public safety workers at risk for occupational exposure; and
- Hemodialysis patients.²

Symptoms of Hepatitis B

Newly acquired HBV infections only cause symptoms in certain cases, and symptoms vary by age. Most children under the age of five are asymptomatic, while 30-50% of people older than five years of age have symptoms. People who are immunocompromised are also generally asymptomatic.² Symptoms for acute HBV include fever, fatigue, nausea, vomiting, abdominal pain, jaundice, and dark urine. If symptoms do occur, they begin on average 90 days after HBV exposure. Symptoms can typically last for several weeks but can persist up to six months.¹ Since acute infections can be asymptomatic and diagnostic criteria for chronic infections are relatively non-specific, a portion of the reported chronic cases may in fact be acute.³

Screening for Hepatitis B

Screening for HBV should be done for individuals born in countries where HBV prevalence is $\geq 2\%$, men who have sex with men, people who are HIV positive, household/sexual and needle sharing partners of HBV positive people, people who require immunosuppressive therapies, people undergoing hemodialysis, blood and tissue donors, pregnant women, infants born to HBV-infected mothers, chronic liver disease, end-stage renal disease, and people with elevated alanine aminotransferase levels.² All 85 local health departments in North Carolina are able to offer risk-based HBV screening to under and uninsured individuals through the North Carolina State Laboratory of Public Health (NC SLPH).

Treatment for Hepatitis B

Treatment is generally not required for acute HBV, as the majority of acute disease will self-clear 90-95% of the time. The decision to treat chronic HBV is based on serologic measurements and degree of liver inflammation. Several antiviral medications are available to treat HBV and are aimed at suppressing and decreasing the pathogenicity of the virus.¹ There is no cure for HBV at this time.

Vaccination for Hepatitis B

The first HBV vaccine became commercially available in the United States in 1982. There are three single-antigen and three combination vaccines available for HBV in the United States. The vaccination schedule most often used for children and adults is three intramuscular injections, the second and third doses administered at one and six months, respectively, after the first dose at birth.¹ It is recommended that all children from birth to 18 years of age receive the vaccine, and all other adults receive it as soon as possible.

¹Centers for Disease Control and Prevention (CDC) (2023). *What is Viral Hepatitis?* Updated March 9, 2023. Accessed September 8, 2023. Retrieved from <https://www.cdc.gov/hepatitis/abc/index.htm>.

²Centers for Disease Control and Prevention (CDC) (2020). *Hepatitis B Questions and Answers for Health Professionals*. Updated March 30, 2022. Accessed October 5, 2022. Retrieved from <https://www.cdc.gov/hepatitis/hbv/hbvfaq.htm#overview>.

³Centers for Disease Control and Prevention. (2012). Chapter 9: Hepatitis B - epidemiology and prevention of vaccine-preventable diseases. In W. Atkinson, S. Wolfe, & J. Hamborsky (Eds.). *The Pink Book: Course Textbook*, 12th edition, 2nd print (pp. 115-138). Washington DC: Public Health Foundation. Retrieved from <http://www.cdc.gov/vaccines/pubs/pinkbook/hepb.html>.

The Advisory Committee on Immunization Practices (ACIP) recommends vaccinations to the following people:

- All infants;
- Unvaccinated children under the age of 19;
- People at risk for infection by sexual exposure;
- People who inject drugs;
- Household contacts of HBV-infected people;
- Health care and public safety workers at risk for occupational exposure;
- Hemodialysis patients;
- People with diabetes;
- International travelers to countries with high or intermediate levels of endemic HBV;
- People who are infected with hepatitis C;
- People with HIV;
- People with chronic liver disease;
- People who are incarcerated; and
- People seeking protection from HBV.²

Hepatitis C Disease Information

Hepatitis C is a liver infection caused by the hepatitis C virus (HCV), which can advance from acute to chronic. The CDC estimates that over 2.2 million people are living with HCV, and that there are around 70,000 new infections in 2021 in the United States. HCV is a common reason for liver transplants in the United States.¹ In North Carolina, we estimate that at least 200,000 people are living with chronic HCV.

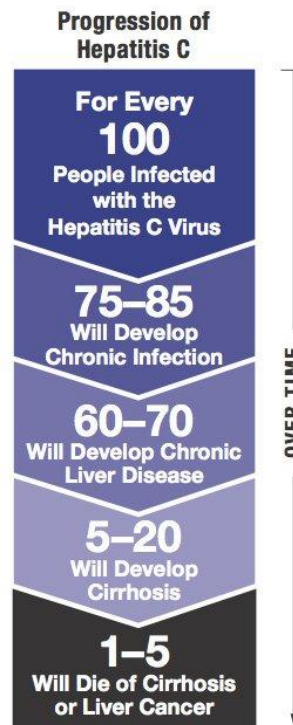
Acute versus Chronic Hepatitis C

HCV can be classified as acute (mild illness lasting a few weeks and up to six months) or chronic (greater than six months). Approximately 75-85% of those infected with HCV develop a chronic infection.⁴ Between 5% and 20% of people who develop chronic HCV will develop cirrhosis, and 1-5% will die from either cirrhosis or liver cancer (Figure 1).^{4,5}

¹Centers for Disease Control and Prevention (CDC) (2023). *What is Viral Hepatitis?* Updated March 9, 2023. Accessed September 8, 2023. Retrieved from <https://www.cdc.gov/hepatitis/abc/index.htm>.

⁴Centers for Disease Control and Prevention (CDC) (2020). *Hepatitis C Questions and Answers for Health Professionals*. Updated August 7, 2020. Accessed October 5, 2022. Retrieved from <https://www.cdc.gov/hepatitis/hcv/hcvfaq.htm#section2>.

⁵Image from Hepatitis Foundation International. Accessed on June 18, 2019. <https://hepatitisfoundation.org/HEPATITIS/Hepatitis-C.html>.

Figure 6. Progression of Hepatitis C⁵**Transmission of Hepatitis C**

HCV transmission occurs primarily through infected blood. The most common way HCV is transmitted in the United States is through injection drug use (IDU). HCV can also be transmitted through the receipt of blood (including blood products and organs), needlestick injuries in health care settings, and vertical transmission (HCV-infected mother-to-child). While infrequent, HCV can also be spread through sexual contact with an HCV-infected person, sharing personal items contaminated with infectious blood (such as toothbrushes and razors), unregulated tattooing, and other health care procedures that involve invasive procedures.⁴

People at increased risk for HCV include:

- People who inject drugs;
- Recipients of clotting factor concentrates made before 1987;
- Recipients of blood transfusions or solid organ transplants prior to July 1992;
- Children born to HCV-infected mothers;
- People with HIV;
- Health care workers with known exposure to HCV;
- Recipients of blood or organs from a donor who tested positive for HCV; and
- Hemodialysis patients.⁴

⁴Centers for Disease Control and Prevention (CDC) (2020). *Hepatitis C Questions and Answers for Health Professionals*. Updated August 7, 2020. Accessed October 5, 2022. Retrieved from <https://www.cdc.gov/hepatitis/hcv/hcvfaq.htm#section2>.

⁵Image from Hepatitis Foundation International. Accessed on June 18, 2019. <https://hepatitisfoundation.org/HEPATITIS/Hepatitis-C.html>.

Symptoms of Hepatitis C

The majority of people who newly acquire HCV are asymptomatic or have mild symptoms. Symptoms include fever, fatigue, nausea, vomiting, abdominal pain, joint pain, jaundice, dark urine, and clay-colored stool. If symptoms do occur, they begin on average two to 12 weeks after HCV exposure.⁴ The acute form of the infection is a short-term illness that occurs within the first six months after someone is exposed to the virus. Most people infected with chronic HCV are asymptomatic or have non-specific symptoms (like fatigue and depression).⁴ Progression of chronic liver disease is generally gradual, though can progress more quickly in certain subgroups (i.e. HIV coinfection). Most HCV infection is not recognized in asymptomatic people until they are screened for either blood donations, if routine screening is performed, or if elevated liver enzyme levels are detected during routine examinations.⁴

Screening for Hepatitis C

The CDC updated screening guidance for HCV in Spring 2020. The CDC recommends a one-time HCV testing in all adults (18 years and older), except in settings where the prevalence of HCV is less than 0.1%, and in all pregnant women during every pregnancy.⁵ The following guidance was also updated for screening for HCV⁵:

- **One-time hepatitis C testing regardless of age or setting prevalence among people with recognized conditions or exposures:**
 - People with HIV;
 - People 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;
 - People with selected medical conditions, including:
 - people who ever received maintenance hemodialysis; and
 - people with persistently abnormal ALT levels.
 - Prior recipients of transfusions or organ transplants, including:
 - people who received clotting factor concentrates produced before 1987;
 - people who received a transfusion of blood or blood components before July 1992;
 - people who received an organ transplant before July 1992; and
 - people 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; and
 - Children born to mothers with HCV infection.
- **Routine periodic testing for people with ongoing risk factors, while risk factors persist:**
 - People who currently inject drugs and share needles, syringes, or other drug preparation equipment; and
 - People with selected medical conditions, including:
 - people who ever received maintenance hemodialysis.

¹Centers for Disease Control and Prevention (CDC) (2023). *What is Viral Hepatitis?* Updated March 9, 2023. Accessed September 8, 2023. Retrieved from <https://www.cdc.gov/hepatitis/abc/index.htm>.

⁴Centers for Disease Control and Prevention (CDC) (2020). *Hepatitis C Questions and Answers for Health Professionals*. Updated Aug 7, 2020. Accessed October 5, 2022. Retrieved from <https://www.cdc.gov/hepatitis/hcv/hcvfaq.htm#section1>.

⁵Schillie S, Wester C, Osborne M, Wesolowski L, Ryerson AB (2020). *CDC Recommendations for Hepatitis C Screening Among Adults-United States, 2020*. MMWR Recomm Rep 3030;69(NO. RR-2): 1-17. Retrieved from: <https://www.cdc.gov/mmwr/volumes/69/rr/rr6902a1.htm>.

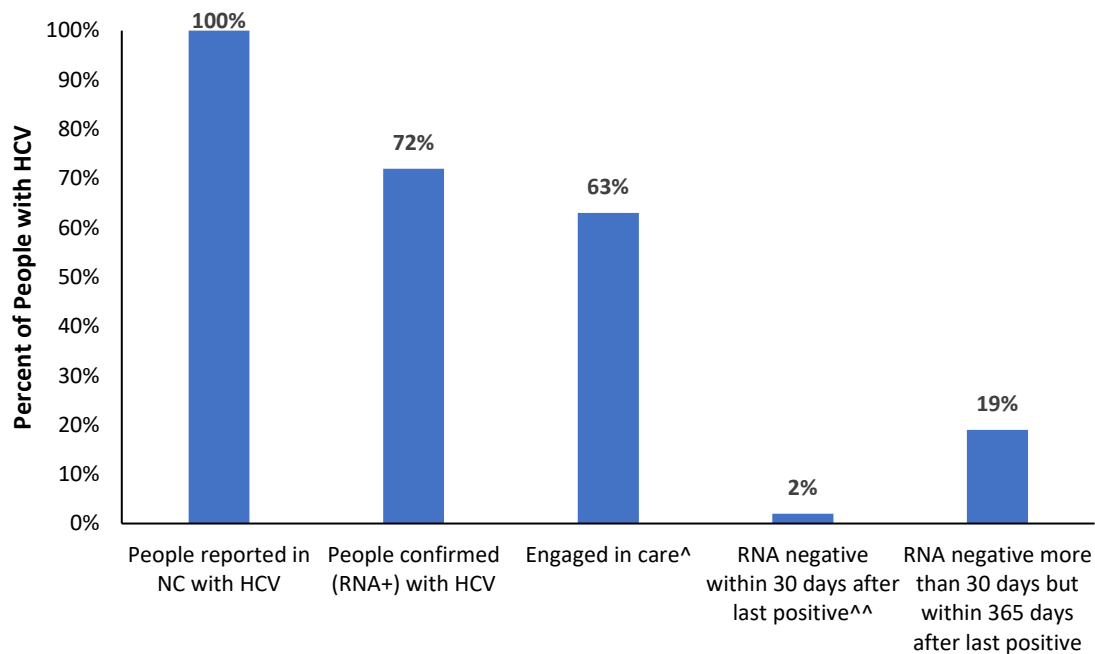
- **Any person who requests hepatitis C testing** should receive it, regardless of disclosure of risk, because many people may be reluctant to disclose stigmatizing risks

Treatment for Hepatitis C

Treatment was not recommended for acute HCV until 2020. In 2013, direct acting antiviral therapies to treat chronic HCV became available that are associated with high cure rates (>95%), low likelihood of side effects, and lower risk of drug-drug interactions. Over 90% of HCV-infected people can be cured of HCV within eight to 12 weeks of oral therapy.⁴

Figure 2 represents the North Carolina surveillance-based treatment cascade for cases from 2017 through 2021. Our treatment cascade includes any individual reported with acute or chronic HCV over the age of 3 in 2021 and living at the end of 2021. It is based on surveillance labs only, and negative lab reporting is not required by law in North Carolina. However, the state database does receive negative HCV viral tests when an HCV record matches to an individual in our surveillance system. Our surveillance-based HCV treatment cascade includes the proportion of HCV cases confirmed (RNA-positive), the proportion of confirmed cases engaged in care, the proportion of confirmed cases with a negative RNA HCV within 30 days after the last RNA-positive lab (potential indicator of natural clearance), and the proportion of confirmed cases with a negative RNA more than 31 days but within 365 days after the last positive (Figure 2). We use the last parameter as a proxy for sustained virologic response (SVR), as our data on SVR are incomplete. Since negative tests may not match to existing surveillance records, and people in treatment may not get a final RNA test, this is a minimum estimate of treatment and cure.

⁴Centers for Disease Control and Prevention (CDC) (2020). *Hepatitis C Questions and Answers for Health Professionals*. Updated Aug 7, 2020. Accessed October 5, 2022. Retrieved from <https://www.cdc.gov/hepatitis/hcv/hcvfaq.htm#section1>.

Figure 7. North Carolina Surveillance-Based Hepatitis C Treatment Cascade, 2017-2022

[^]Engaged in care is defined as having an additional RNA after their initial date of report to public health.

^{^^}RNA-negative less than 30 days of positive is a potential indicator of natural clearance, and therefore is its own parameter.

Negative RNA results are reported into the surveillance system only if an HCV record matches to a subsequent negative test.

Case definition for hepatitis C changed in 2016 and then again in 2020.

Includes people reported with acute hepatitis C starting in 2020.

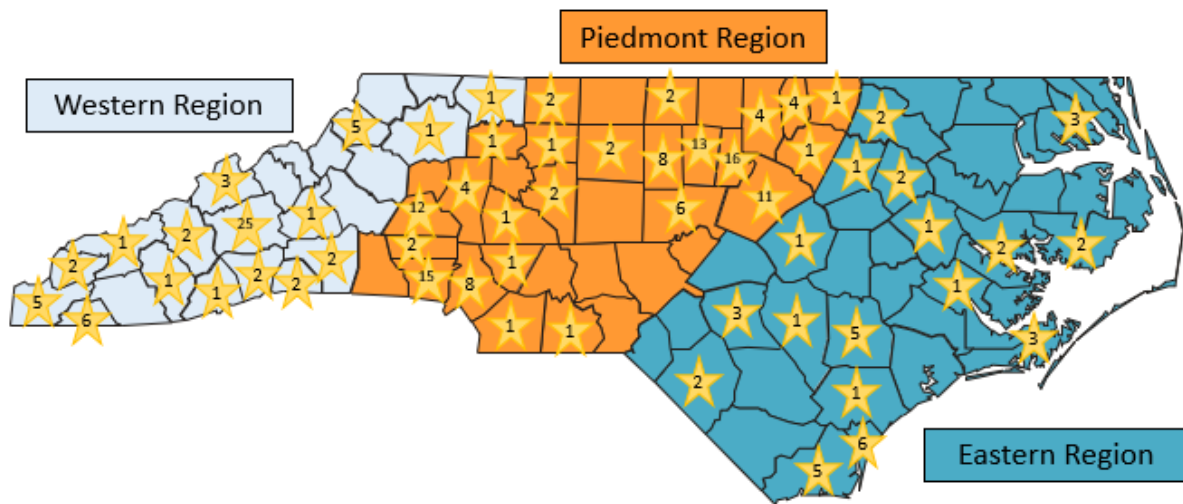
Data Source: North Carolina Electronic Disease Surveillance System (NC EDSS) (data as of August 1, 2023).

The North Carolina Viral Hepatitis Program (NCVHP) maintains a statewide bridge counselor program that aims to establish and promote linkage to care activities for HCV positive patients. In 2022, there were ten HCV bridge counselors in North Carolina; nine HCV bridge counselors are state funded. The HCV bridge counselors offer support and guidance to those who may otherwise have difficulty accessing both medical treatment and social services.

NCVHP, in collaboration with Duke University and the University of North Carolina-Chapel Hill, has developed a partnership to address limited resources for HCV treatment. Carolina Hepatitis C Academic Mentorship Program (CHAMP) is a telemedicine program designed to increase access to HCV treatment in North Carolina. CHAMP offers health care providers the opportunity to participate in a one-day boot camp, an intensive course on evaluation and treatment of patients with HCV. In addition to the boot camp, providers have biweekly conference calls with CHAMP mentors, which includes time for discussion of cases and continued education on effective treatment options. The CHAMP program also provides education and guidance around program development and linkage to resources for uninsured and underinsured patients. For more information about CHAMP, visit:

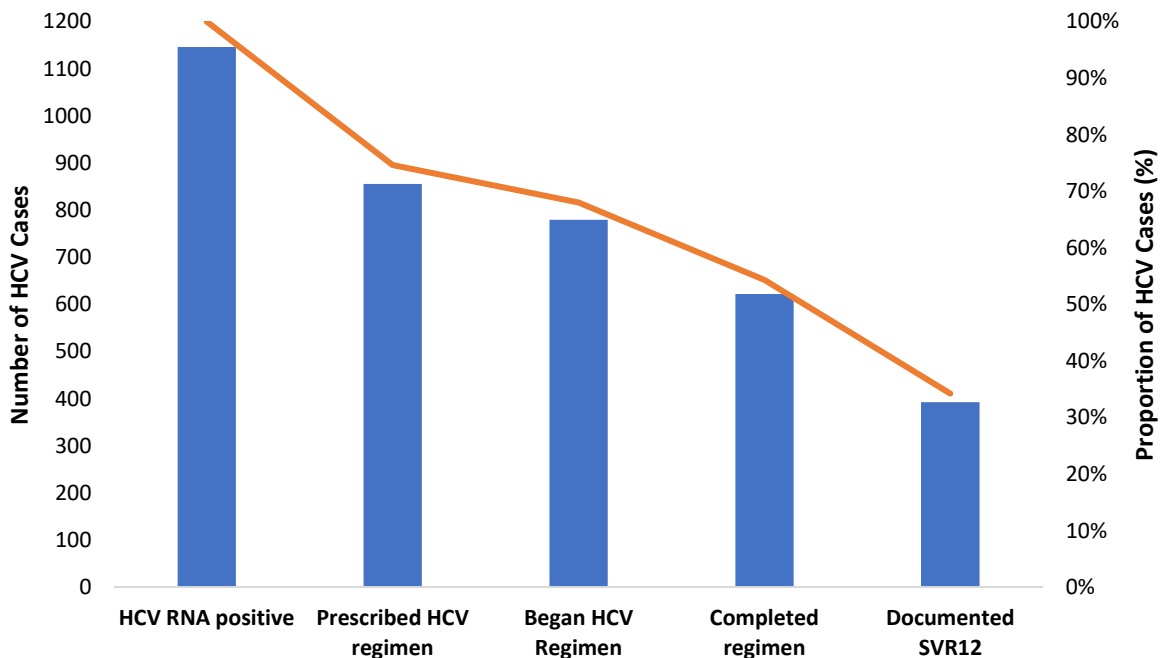
https://epi.dph.ncdhhs.gov/cd/hepatitis/CHAMP-Brochure_FINAL-WEB.pdf.

Figure 8. Number of CHAMP Providers since 2017 in North Carolina by County and Region



Along with the bridge counselor HCV treatment cascade, the NCVHP produces a CHAMP provider-based treatment cascade. Figure 5 shows all people seen by CHAMP providers from March 2017 (when the program started) until December 2021. During this time, 19,136 people were reported as screened for HCV by a CHAMP provider, with 1,146 people being HCV RNA positive. Of the 1,146 people confirmed with HCV, over 34% attained SVR12 (Figure 5).

Figure 5. North Carolina CHAMP Provider-Based Hepatitis C Treatment Cascade, 2017-2021



Data source: North Carolina CHAMP Provider data (as of July 7, 2022)

Prevention of Hepatitis C

There is no vaccine for HCV, but people infected with HCV should be vaccinated against hepatitis B and hepatitis A.

NCVHP manages several prevention projects, including a perinatal HCV pilot and a testing and outreach partnership with the North Carolina Harm Reduction Coalition (NCHRC). The NCHRC program provides harm reduction materials to syringe access programs and community-based organizations to prevent the transmission of hepatitis, HIV, and other STDs. For more information about NCHRC, visit:

<http://www.nchrc.org/>.

The Injury and Violence Prevention Branch oversees the North Carolina Safer Syringe Initiative. The initiative provides information about existing syringe access programs in the state, resources for health care providers and law enforcement agencies, testing and treatment programs, information about the syringe exchange law, and information for health departments, community-based organizations, and other agencies interested in starting their own access program. For more information, visit:

<https://www.ncdhhs.gov/divisions/public-health/north-carolina-safer-syringe-initiative>.

NCVHP has also created a regional drug user health resource guide. This guide contains regional specific information on low cost/free clinics, housing, food pantry and community means, hepatitis treatment providers, and syringe access programs. It also includes information on gastroenterologists, medication assisted treatment, behavioral health, and narcotics anonymous chapters. This resource guide is available online:

https://testyourwell.nc.gov/cd/hepatitis/DrugUserHealthResourceGuide_08102021.pdf.

Perinatal Hepatitis C

Rates of HCV nearly doubled during 2009-2014 among people with live births. From 2011 - 2014, the CDC estimates that 29,000 HCV-infected people gave birth each year. HCV can be transmitted from an infected birthing parent to the child during both pregnancy and childbirth. The CDC estimates that vertical transmission occurs in about 5.8% of all pregnancies.⁶ Perinatal HCV infection is confirmed if an infant between 2 and 36 months of age has a positive HCV RNA, HCV genotype, or HCV antigen.⁷ Perinatal HCV is not a reportable condition in all reporting jurisdictions, but the CDC reported 199 infants with HCV in 2021.⁸

Perinatal hepatitis C is not a reportable condition in North Carolina, so data on this condition are incomplete. Below are the results of an analysis where HCV cases reported during 2017-2021 were matched to birth records from the State Center for Health Statistics from 2017-2021.

- 32,555 women diagnosed with HCV and reported to NC during 2017-2021

⁶Centers for Disease Control and Prevention (2021). Test for Hepatitis C during every pregnancy. Updated May 27, 2021. Accessed October 5, 2022. Retrieved from <https://www.cdc.gov/knowmorehepatitis/hcp/Test-For-HepC-During-Pregnancy.htm>.

⁷Centers for Disease Control and Prevention (2021). Hepatitis C, perinatal infection 2018 case definition. Updated April 16, 2021. Accessed October 5, 2022. Retrieved from <https://ndc.services.cdc.gov/case-definitions/hepatitis-c-perinatal-infection-2018/>.

⁸Centers for Disease Control and Prevention (2023). 2021 Hepatitis Surveillance Report: Table 3.4. Number of newly reported cases of perinatal hepatitis C virus infection, by state or jurisdiction-United States, 2021. Updated August 7, 2023. Accessed September 12, 2023. Retrieved from <https://www.cdc.gov/hepatitis/statistics/2021surveillance/hepatitis-c/table-3.4.htm>.

- 16,880 total women of childbearing age (14-44 years of age)
- 604,039 live births in NC from Jan 2017 to Dec 2021 (from birth records)
 - 3,198 births had maternal HCV infection documented on birth certificate
- 2,023 /3,198 women in NC EDSS with HCV matched to birth records (63% of the cases identified on birth certificates)
 - 1,768 had confirmed HCV status (RNA-positive)
 - Using 5-7% vertical transmission rate, we expect to see between 88 and 124 perinatal HCV cases in NC
- 96 confirmed cases of perinatal HCV cases were reported during 2017-2021, which is within the expected range

In July 2021, the NCVHP started a perinatal HCV referral process available to all LHDs and providers across the state. The NC SLPH has authorized free HCV testing for all pregnant persons, aged 18 years and older. Screening during pregnancy is recommended per CDC, unless the prevalence is <0.1%. In North Carolina, HCV prevalence for people younger than 18 was <0.1% in 2021.

NCVHP has a perinatal HCV nurse, in charge of following the pregnant persons throughout their pregnancy, and the infant once they are born. The nurse supports postpartum birthing persons to be referred to treatment and care, while the infant will be followed to ensure testing occurs at the recommended time to determine HCV status.

Appendix A: Hepatitis B and C Surveillance Notes and Case Definitions

About the Authors

North Carolina law requires that diagnoses of certain communicable diseases, including STDs, be reported to local health departments that in turn report the information to the state. The HIV/STD/Hepatitis Surveillance Unit is the designated recipient for STD and viral hepatitis B (HBV) and hepatitis C (HCV) morbidity reports at the state level. From these reports, the HIV/STD/Hepatitis Surveillance Unit is responsible for aggregating these reports and providing county, regional, and statewide information about STDs and viral HBV and HCV to others, including the CDC. The HIV/STD/Hepatitis Surveillance Unit is part of the Communicable Disease Branch within the North Carolina Division of Public Health.

Hepatitis B Surveillance Data

Acute HBV case reports are people who have a confirmed acute illness with discrete onset of symptoms, jaundice or elevated serum aminotransferase levels (>100 IU/L), and either a positive IgM antibody to HBV core antigen (anti-HBc) or HBV surface antigen (HBsAg).¹⁰ Chronic HBV case reports are people who do not have discrete onset of symptoms with either a single HBsAg, HBV DNA, or HBV e antigen (HBeAg) positive lab (probable) or negative anti-HBc and a positive HBsAg, HBeAg, or HBV DNA.¹¹ Perinatal HBV are classified as children born to HBV-infected mothers who are ≤ 24 months of age and have one or more of the following: positive HBsAg (only if at least four weeks after last dose of HBV vaccine), positive HBeAg, or detectable HBV DNA.¹²

Hepatitis C Surveillance Data

Acute HCV case reports are people who have a confirmed acute illness with discrete onset of symptoms, jaundice or elevated serum aminotransferase levels, and meet the laboratory criteria of: serum alanine aminotransferase levels greater than seven times the upper limit of normal and IgM anti-hepatitis A negative, and IgM anti-HBc negative or HBsAg negative, and antibody to hepatitis C (anti-HCV) positive by EIA, verified by an additional assay (like a nucleic acid test for HCV RNA) or anti-HCV positive with a signal cut-off ratio predictive of a true positive as determined for the particular assay.¹³

¹⁰ Centers for Disease Control and Prevention. (2015). Guidelines for viral hepatitis surveillance and case management. Updated May 31, 2015. Accessed July 13, 2017. Retrieved from <https://www.cdc.gov/hepatitis/statistics/surveillanceguidelines.htm>.

¹¹ Centers for Disease Control and Prevention (2012). National Notifiable Disease Surveillance System (NNDSS): Hepatitis B, chronic 2012 case definition. <https://ndc.services.cdc.gov/case-definitions/hepatitis-b-chronic-2012/>.

¹² Centers for Disease Control and Prevention (2017). National Notifiable Disease Surveillance System (NNDSS): Hepatitis B, perinatal infection 2017 case definition. <https://ndc.services.cdc.gov/case-definitions/hepatitis-b-perinatal-virus-infection-2017/>.

¹³ Centers for Disease Control and Prevention. (2017). National Notifiable Disease Surveillance System (NNDSS): Hepatitis C, Acute 2016 Case Definition. Retrieved from <https://ndc.services.cdc.gov/case-definitions/hepatitis-c-acute-2016/>.

2020 Hepatitis C Case Definition

In 2020, the HCV case definition changed again, in order to account for asymptomatic cases. The new 2020 case definitions of acute and chronic HCV are outlined below.

Acute HCV

Clinical criteria should only include cases over the age of 36 months, and must have one of the following¹⁵:

- Jaundice; OR
- Peak elevated total bilirubin levels ≥ 3.0 mg/dL; OR
- Peak elevated serum alanin aminotransferase (ALT) levels >200 IU/L; AND
- The absence of a more likely diagnosis.

Laboratory criteria for acute HCV include¹⁵:

Confirmed

- Positive HCV virus detection: nucleic acid test (NAT) for HCV RNA (including qualitative, quantitative, or genotype); OR
- A positive test indicating presence of HCV viral antigens.

Probable

- A positive anti-HCV test (antibodies for HCV)

Chronic HCV

Clinical criteria is not available for chronic HCV. Only laboratory criteria is used to classify chronic HCV. Chronic HCV should only include cases over the age of 36 months, and must have one of the following laboratory criteria¹⁶:

Confirmed

- Positive HCV virus detection: nucleic acid test (NAT) for HCV RNA (including qualitative, quantitative, or genotype); OR
- A positive test indicating presence of HCV viral antigens.

Probable

- A positive anti-HCV test (antibodies for HCV)

Chronic HCV surveillance started in North Carolina in late 2016. These numbers are likely an underestimation, as chronic HCV is only reportable by electronic lab reporting. Risk of exposure data is not collected for chronic HCV cases, as these cases are not investigated at this time.

¹⁵ Centers for Disease Control and Prevention. (2021). National Notifiable Disease Surveillance System (NNDSS): Hepatitis C, Acute 2020 Case Definition. Retrieved from <https://ndc.services.cdc.gov/case-definitions/hepatitis-c-acute-2020/>.

¹⁶ Centers for Disease Control and Prevention. (2021). National Notifiable Disease Surveillance System (NNDSS): Hepatitis C, Chronic 2020 Case Definition. Retrieved from <https://ndc.services.cdc.gov/case-definitions/hepatitis-c-chronic-2020/>.