



Department of
Health

Tennessee Viral Hepatitis Epidemiological Profile, 2022

Tennessee Department of Health, Viral Hepatitis Program | October 2023

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Executive Summary

This report presents surveillance data for conditions managed by the Viral Hepatitis Program at the Tennessee (TN) Department of Health (TDH) and focuses on reported cases of acute hepatitis B virus (HBV), chronic HBV, acute hepatitis C virus (HCV), chronic HCV, HCV positive pregnant females, perinatal HCV, and mortality from HBV and HCV.

There are a number of known transmission risks for HBV and HCV, many overlapping between the two conditions. The main routes of transmission occur primarily when blood containing the virus enters the bloodstream of susceptible individuals. These pathways include, but are not limited to:

- Past or present injection drug use
- Sharing drug preparation equipment (cotton, cookers, snorting straws, etc.)
- Use of unregulated tattooing equipment
- Blood transfusions or organ transplants prior to 1992
- Needle sticks in health care settings
- Being born to a parent living with HBV or HCV
- Sex with a person living with HBV or HCV (more common in HBV transmission)
- Sharing personal and household items that could come into contact with blood (razors, toothbrushes, diabetic equipment, etc.) and/or
- Infection control breaches in health care settings

Acute HBV, chronic HBV, acute HCV, chronic HCV, and perinatal HCV are reportable conditions in TN while HCV positive pregnant females is not a reportable condition. Demographic information, vital status, self-reported risk factors (acute HBV and acute HCV only), and laboratory results are collected. This data is stored in the National Electronic Disease Surveillance System (NEDSS) Base System (NBS), managed by the Viral Hepatitis Program, and used to create annual epidemiological profiles.

The data in this report are for information reported to TDH from 2016 to 2022, representing the first seven full years of viral hepatitis surveillance efforts, and all data are based on information reported to TDH as of September 2023. Note: In March 2020, TN diagnosed its first case of COVID-19. The COVID-19 pandemic likely resulted in fewer individuals seeking testing for infectious diseases, including HBV and HCV. As a result, any decreases observed during this time are likely not true decreases and must be interpreted with caution.

HBV

HBV is a potentially life-threatening liver infection caused by the hepatitis B virus.¹ HBV transmission is primarily through contact with infected blood or other body fluids.¹ HBV has been vaccine preventable since 1986 and has been a universally recommended childhood vaccination since 1991.² Despite this, HBV remains a major public health challenge in the U.S. Progression of acute to chronic HBV is highly dependent upon age: approximately 90% of infants with perinatal HBV develop chronic HBV, while only about 5% of adults with acute HBV

¹ <https://www.cdc.gov/hepatitis/hbv/hbvfaq.htm>

² <https://www.immunize.org/laws/>

develop chronic HBV.³ While there is no cure for HBV, treatment is available. Without treatment, people living with chronic HBV can die prematurely from cirrhosis or liver cancer.³ Strategies for the elimination of HBV include universal vaccination of infants beginning at birth, routine HBV screening of all pregnant women at first prenatal visit, vaccination of previously unvaccinated children and adults, and vaccination of adults at increased risk for HBV.

TN and two other Central Appalachia states had an 114% increase in acute HBV cases from 2006 to 2013. These increases were most pronounced among individuals who were non-Hispanic White, aged 30–39 years, and reported injection drug use.⁴ In 2021, TN had the 5th highest rate of acute HBV in the nation.⁵

HCV

HCV is a potentially life-threatening liver infection caused by the hepatitis C virus.⁶ HCV is the most common chronic bloodborne pathogen in the U.S.⁷ HCV is not vaccine preventable. Most cases of acute HCV are asymptomatic and, therefore, not diagnosed. Given that many acute HCV cases are asymptomatic, it is likely that some newly reported cases of chronic HCV (particularly among younger individuals) represent recently acquired HCV. Progression to chronic HCV occurs in about 75% of adults with acute HCV.⁸ Despite new therapies that can cure more than 95% of persons with chronic HCV, only about half of those living with HCV are aware of their status, and most have not received recommended care and treatment.⁸ Without diagnosis and treatment, people living with HCV may develop liver cancer, cirrhosis, or other life-threatening HCV-related diseases, and may unknowingly transmit the virus to others.⁶ Strategies for the elimination of HCV include one-time testing of all adults (18 years and older), testing of all pregnant persons during each pregnancy, ongoing testing of adults at increased risk for HCV, and treatment of any individual living with HCV aged three years and older.

TN and three other Central Appalachia states had an 364% increase in acute HCV cases from 2006 to 2012. These increases were most pronounced among individuals aged 30 years and younger who resided in nonurban areas.⁹ More recent data has demonstrated that HCV now heavily impacts multiple generations.¹⁰ In 2018, Millennials (adults in their 20s and 30s) accounted for 36.5% of chronic HCV cases, Baby Boomers (adults in their mid-50s to early 70s) accounted for 36.3% of chronic HCV cases, and Generation X (adults in their late 30s to early 50s) accounted for 23.1% of chronic HCV cases.¹⁰ In 2021, TN had the 8th highest rate of acute HCV in the nation.⁵

In 2018, TN experienced the beginning of a statewide hepatitis A virus (HAV) outbreak that occurred among people with risk factors that overlapped those typically found in individuals diagnosed with HBV and HCV, including recreational drug use (injection or non-injection). From 2018 to 2020, persons positive for more than one viral hepatitis condition via panel testing were classified as acute for each of the conditions if signs and symptoms were present and available laboratory and clinical data could not distinguish between the conditions.

³ <https://www.cdc.gov/hepatitis/hbv/hbvfaq.htm>

⁴ Harris AM, Iqbal K, Schillie S, et al. Increases in Acute Hepatitis B Virus Infections – Kentucky, Tennessee, and West Virginia, 2006–2013. *MMWR Morb Mortal Wkly Rep.* 2016; 65(3): 47–50.

⁵ <https://www.cdc.gov/hepatitis/statistics/2021surveillance/hepatitis-c/figure-3.2.htm>

⁶ <https://www.cdc.gov/hepatitis/hcv/hcvfaq.htm>

⁷ Hofmesiter MG, Rosenthal EM, Barker LK, Rosenberg ES, Barranco MA, Hall EW, Edlin BR, Mermin J, Ward JW, Ryerson AB. Estimating prevalence of hepatitis C Virus Infection in the United States, 2013–2016. *Hepatology.* 2018;69(3):1020–1031.

⁸ <https://www.hhs.gov/sites/default/files/National%20Viral%20Hepatitis%20Action%20Plan%202017-2020.pdf>

⁹ Zibbell JE, Iqbal K, Patel RC, et al. Increases in hepatitis C virus infection related to injection drug use among persons aged ≤30 years - Kentucky, Tennessee, Virginia, and West Virginia, 2006–2012. *MMWR Morb Mortal Wkly Rep.* 2015;64(17):453–458.

¹⁰ <https://www.cdc.gov/nchstp/newsroom/2020/hepatitis-c-impacting-multiple-generations.html>

In January 2020, the Centers for Disease Control and Prevention (CDC) updated the acute and chronic HCV surveillance case definitions which resulted in fewer HCV cases classified as probable starting on January 1, 2020.^{11,12} In April 2020, the CDC updated their HCV testing recommendations to include one-time testing of all adults (18 years and older) and testing of all pregnant persons during each pregnancy.¹³ CDC continued to recommend people with risk factors, including people who inject drugs, be tested regularly.¹³

¹¹ <https://ndc.services.cdc.gov/case-definitions/hepatitis-c-acute-2020/>

¹² <https://ndc.services.cdc.gov/case-definitions/hepatitis-c-chronic-2020/>

¹³ <https://www.cdc.gov/hepatitis/hcv/guidelinesc.htm>

Key Surveillance Findings From 2016 to 2022

Acute and Chronic HCV

- The rates of acute HCV peaked in 2019 and decreased significantly in 2020 due to the COVID-19 pandemic. The rate increased slightly in 2021, likely due to increased testing, and decreased again in 2022.
- The rate of chronic HCV decreased from 2016 to 2020, slightly increased in 2021, and decreased again in 2022.
- Individuals less than 45 years of age accounted for 76% of acute HCV cases and more than half of chronic HCV cases.
- Adult women of childbearing age (18–49) accounted for 33% of acute HCV cases and 27% of chronic HCV cases.

Acute and Chronic HBV

- The rates of acute HBV increased in 2017 to 2018 but have since been decreasing every year.
- The rates of chronic HBV decreased from 2016 to 2020 but have since been increasing every year.
- Men accounted for more than half of acute and chronic HBV cases every year.
- Individuals aged 30 years and older accounted for 93% of acute HBV cases and 87% of chronic HBV cases, demonstrating a likely HBV vaccination impact on those born before 1991.

HCV Positive Pregnant Females and Perinatal HCV Exposures

- From 2016–2021, the rate of HCV positive pregnant females decreased 25%.
- From 2016–2021, the rate of infants perinatally exposed to HCV decreased 18%.
- In 2021, there were 960 pregnancies among people with current HCV or evidence of prior exposure without subsequent HCV NAT confirmatory testing, potentially exposing 1,007 infants to HCV perinatally (47 pregnancies resulted in more than one birth).

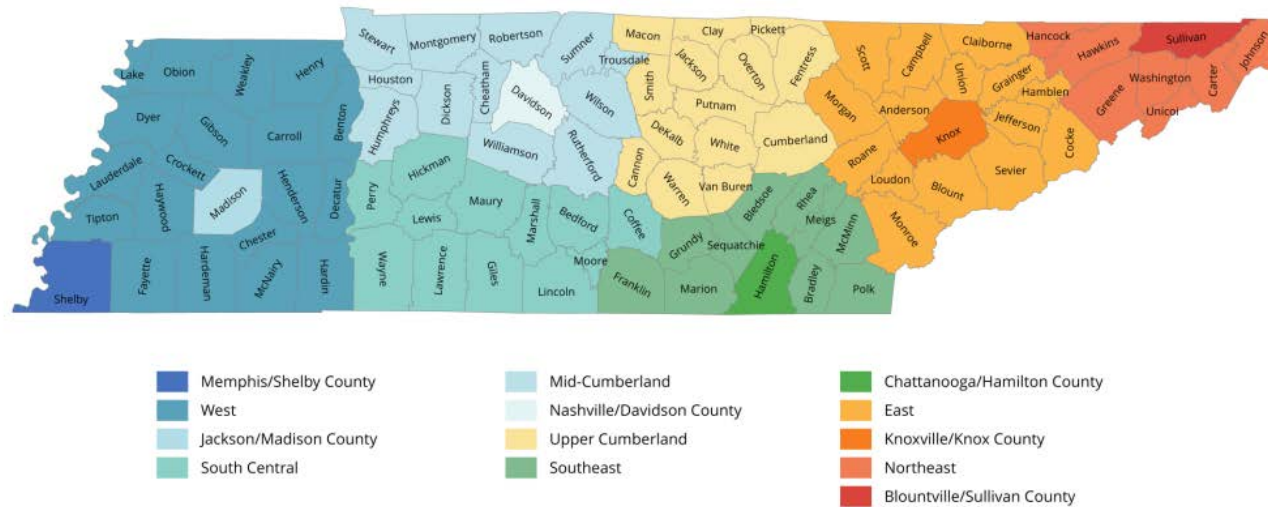
HBV and HCV-Associated Mortality

- From 2016–2021, the median age of HBV-associated deaths in TN was 61 years, the median age of HCV-associated deaths was 60 years and the median age of HBV and HCV co-infection associated deaths was 52. The median age of death for the general population in TN was 74 years.
- The leading underlying cause of death for those with HBV or HCV-associated deaths was related to liver disease. The leading underlying cause of death was related to heart disease for the general population in TN.

Tennessee Background

TN is a southern state which borders eight other states.⁸ TDH's Central Office is located in Nashville and partners with all of the state's 95 counties, which are divided into 13 public health regions. Six of the most populous counties operate as stand-alone metropolitan public health regions, and the remaining 89 counties are divided into seven rural public health regions. The rural public health regions are considered to be an extension of TDH, whereas TDH partners with the metropolitan public health regions through contractual agreements.

Figure 1: Tennessee Public Health Regions



Population

TN was home to 7,051,339 people in 2022.¹⁴ The population in TN increased by 140,533 people (2%) between 2020 and 2022.¹⁴ The most populous areas include: Memphis/Shelby County, Nashville/Davidson County, and the Mid-Cumberland Public Health Region.¹⁴

Age

The median age of TN residents in 2022 was 39 years, similar to that of the U.S. median age (39 years).¹⁴ The age distribution in TN roughly reflected that of the U.S. population overall.¹⁴

Race and Ethnicity

In 2022, TN's residents were predominantly non-Hispanic White (78%) followed by non-Hispanic Black (17%) and Hispanic (6%).¹⁴

Income and Federal Poverty Level

The median household income in TN in 2022 was \$58,516, compared to the U.S. median income of \$69,021; 13% of TN's population fell below the federal poverty level, which was greater than the U.S. average of 12%.¹⁴ There were noticeable racial and ethnic disparities in household income in TN. White households had a median income of \$69,826 in 2022, while Black and Hispanic households had median incomes of \$49,531 and \$58,385, respectively.¹⁴

Reportable Disease Regulations

Acute HBV and acute HCV are provider and laboratory reportable conditions in TN and require notification to TDH within one week of identification. Acute HBV and acute HCV have been reportable since 1995, although baseline data vastly improved in 2015 due to the development of the Viral Hepatitis Program. Chronic HCV became laboratory reportable in 2017, perinatal HCV became provider and laboratory reportable in 2019, and chronic HBV became laboratory reportable in 2019. Laboratory results are reported by providers and laboratories either directly into NBS, on paper, or via Electronic Laboratory Reporting (ELR).

Reportable Disease Regulations can be located here:

<https://www.tn.gov/health/cedep/reportable-diseases.html>

Provider Reportable Conditions can be located here: <https://www.tn.gov/content/dam/tn/health/documents/reportable-diseases/Provider-list-2022.pdf>

https://www.tn.gov/content/dam/tn/health/documents/reportable-diseases/2020_HowtoReport_ForHealthcareProviders.pdf

Laboratory Reportable Conditions can be located here: <https://www.tn.gov/content/dam/tn/health/documents/reportable-diseases/2022-Detailed-Laboratory-Guidance.pdf>

¹⁴ <https://www.census.gov/quickfacts/tn>

| Condition | Reportable in 2022 (Yes/No) | Barriers/Gaps |
|-------------------------------|-----------------------------|---|
| Acute HBV | Yes | <p>There is limited capacity to conduct surveillance and epidemiologic activities on chronic viral hepatitis conditions.</p> <p>Due to the large volume of cases, Viral Hepatitis Program staff investigate acute HBV cases and acute HCV cases.</p> <p>Viral Hepatitis Program staff conduct NBS surveillance activities on chronic HBV, chronic HCV cases, and perinatal HCV cases.</p> |
| Chronic HBV | Yes | |
| Acute HCV | Yes | |
| Chronic HCV | Yes | |
| HCV Positive Pregnant Females | No | |
| Perinatal HCV | Yes | |

Acute HBV

This section summarizes trends in acute HBV cases reported to TDH from 2016 to 2022.

The surveillance case definition for acute HBV can be located here:

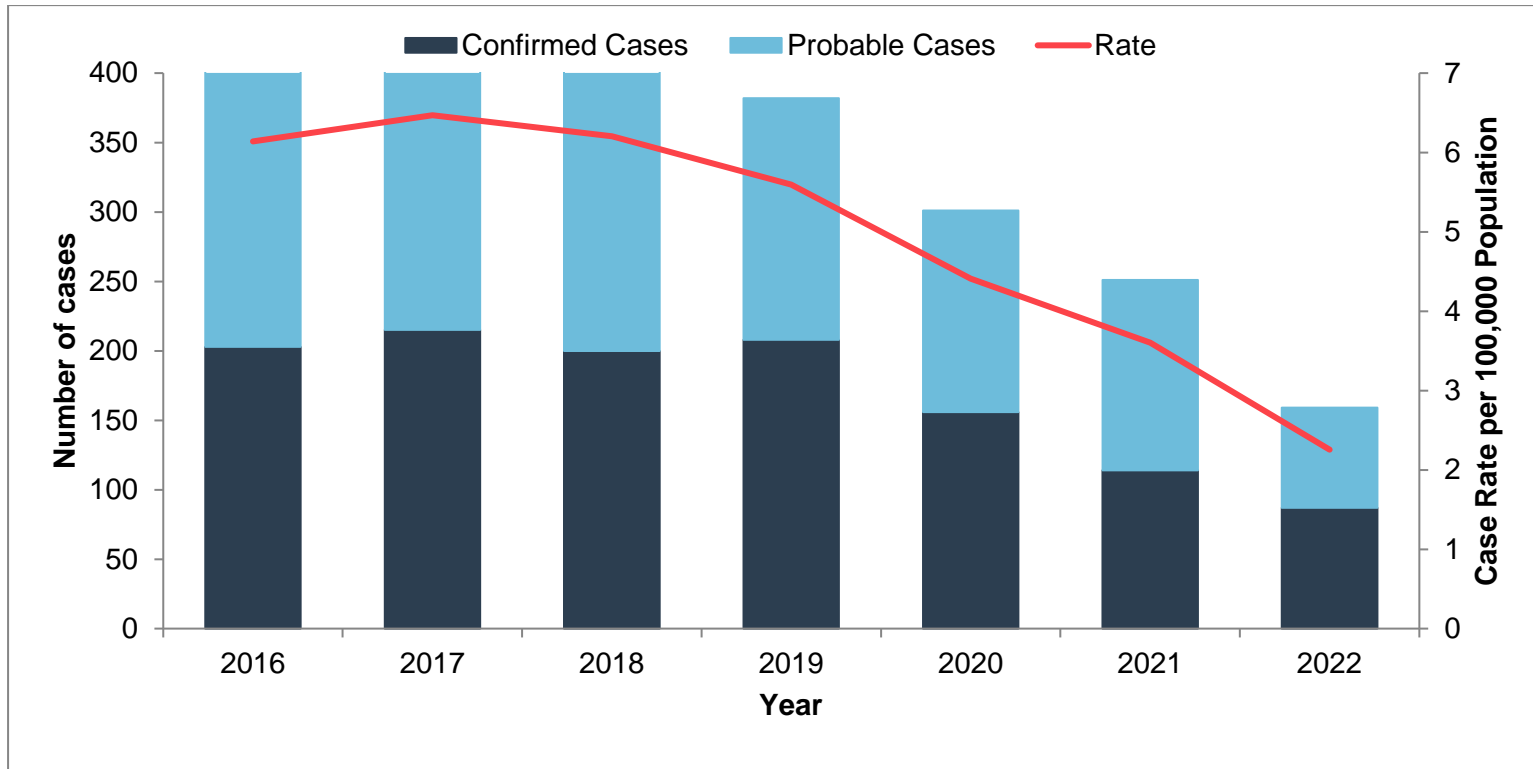
<https://ndc.services.cdc.gov/case-definitions/hepatitis-b-acute-2012/>

Of note, TDH has a specific case classification for probable acute HBV (see Glossary).

Table 1: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Acute HBV, Tennessee, 2016–2022

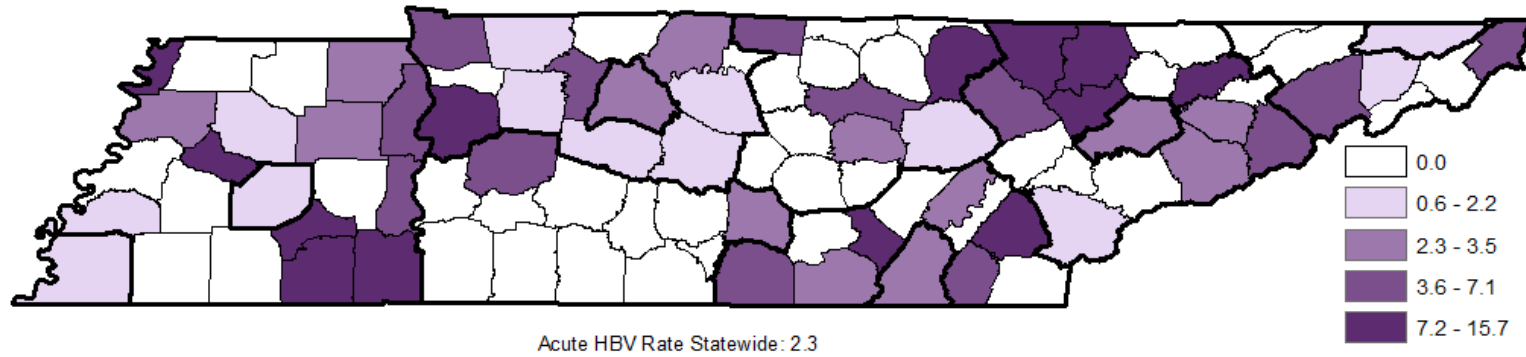
| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 408 | 6.1 | 434 | 6.5 | 420 | 6.2 | 382 | 5.6 | 301 | 4.4 | 251 | 3.6 | 159 | 2.3 |
| Confirmed Only | 203 | 3.1 | 215 | 3.2 | 200 | 3.0 | 208 | 3.0 | 156 | 2.3 | 114 | 1.6 | 87 | 1.2 |
| Probable Only | 205 | 3.1 | 219 | 3.3 | 220 | 3.2 | 174 | 2.5 | 145 | 2.1 | 137 | 2.0 | 72 | 1.0 |

Figure 2: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Acute HBV, Tennessee, 2016–2022



Rates of acute HBV increased from 2016 to 2017 and decreased in each year thereafter. As described in the Executive Summary, the decrease observed in 2020 was likely due to the COVID-19 impact on testing. The number of probable, confirmed cases and rates of acute HBV continue to decrease from 2021 to 2022.

Figure 3: Rates (per 100,000 population) of Confirmed and Probable Acute HBV by County, Tennessee, 2022



In 2022, acute HBV cases were reported in 52 counties in TN. Among these counties, 39 counties (75%) had acute HBV rates higher than the statewide acute HBV rate in 2022.

The counties with the highest acute HBV rates were largely found in eastern TN; however, there were some counties in the West, Mid Cumberland, and South Central Public Health Regions with higher acute HBV rates when compared to the eastern part of the state.

Table 2: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Acute HBV by Sex, Tennessee, 2016–2022*

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 408 | 6.1 | 434 | 6.5 | 420 | 6.2 | 382 | 5.6 | 301 | 4.4 | 251 | 3.6 | 159 | 2.3 |
| Female | 175 | 5.1 | 169 | 4.9 | 170 | 4.9 | 122 | 3.5 | 113 | 3.2 | 84 | 2.4 | 60 | 1.7 |
| Male | 232 | 7.2 | 265 | 8.1 | 250 | 7.6 | 259 | 7.8 | 188 | 5.5 | 167 | 4.9 | 99 | 2.9 |

* Numbers reported in each category might not add up to the total number of cases in a year because of missing data.

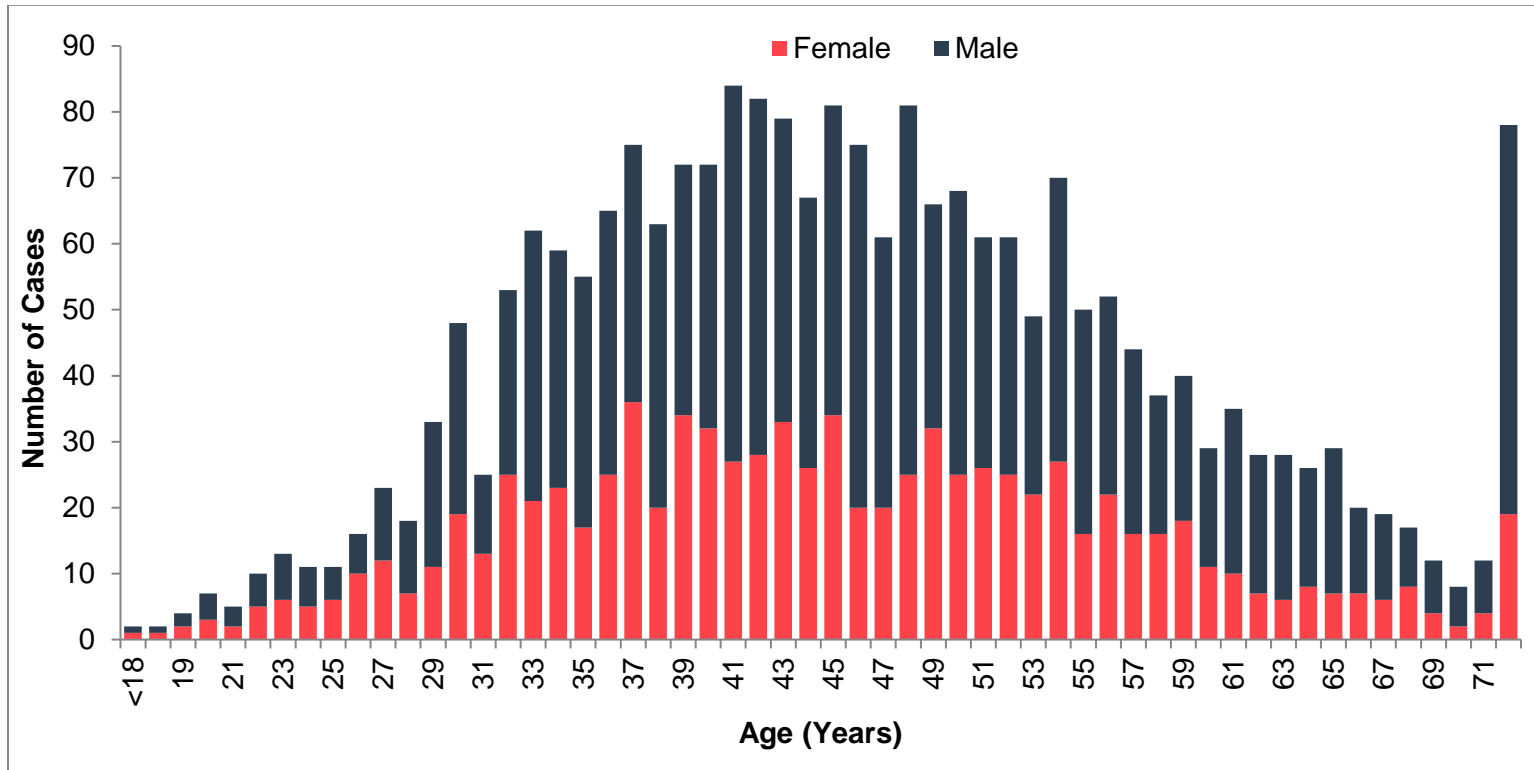
From 2016 to 2022, rates of acute HBV were consistently higher among males than females.

Table 3: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Acute HBV by Age Group, Tennessee, 2016–2022

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|------------|-------|------------|-------|------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 408 | 6.1 | 434 | 6.5 | 420 | 6.2 | 382 | 5.6 | 301 | 4.3 | 251 | 3.6 | 159 | 2.3 |
| <30 | 38 | 1.5 | 26 | 1.0 | 20 | 0.8 | 15 | 0.6 | 16 | 0.6 | 25 | 0.9 | 15 | 0.6 |
| 30-44 | 172 | 13.6 | 194 | 15.3 | 179 | 14.0 | 159 | 12.2 | 114 | 8.6 | 95 | 7.0 | 48 | 3.5 |
| 45+ | 198 | 7.1 | 214 | 7.5 | 221 | 7.7 | 208 | 7.2 | 171 | 5.8 | 131 | 4.4 | 96 | 3.2 |
| Confirmed | 203 | 3.1 | 215 | 3.2 | 200 | 3.0 | 208 | 3.0 | 156 | 2.3 | 114 | 1.6 | 87 | 1.2 |
| <30 | 23 | 0.9 | 16 | 0.6 | 11 | 0.4 | 6 | 0.2 | 12 | 0.5 | 12 | 0.5 | 8 | 0.3 |
| 30-44 | 95 | 7.5 | 102 | 8.0 | 91 | 7.1 | 94 | 7.2 | 62 | 4.7 | 48 | 3.5 | 26 | 1.9 |
| 45+ | 85 | 3.0 | 97 | 3.4 | 98 | 3.4 | 108 | 3.7 | 82 | 2.8 | 54 | 1.8 | 53 | 1.8 |
| Probable | 205 | 3.1 | 219 | 3.3 | 220 | 3.2 | 174 | 2.5 | 145 | 2.1 | 137 | 2.0 | 72 | 1.0 |
| <30 | 15 | 0.6 | 10 | 0.4 | 9 | 0.3 | 9 | 0.3 | 4 | 0.2 | 13 | 0.5 | 7 | 0.3 |
| 30-44 | 77 | 6.1 | 92 | 7.3 | 88 | 6.9 | 65 | 5.0 | 52 | 3.9 | 47 | 3.5 | 22 | 1.6 |
| 45+ | 113 | 4.0 | 117 | 4.1 | 123 | 4.3 | 100 | 3.4 | 89 | 3.0 | 77 | 2.6 | 43 | 1.4 |

From 2016 to 2022, rates of acute HBV were consistently higher among the 30–44-year-old age group when compared to the other two age groups. The lower rates in those less than 30 years old are likely due to recommendation for routine childhood vaccination against HBV in 1991.

Figure 4: Case Counts of Confirmed and Probable Acute HBV by Sex and Age, Tennessee, 2016–2022

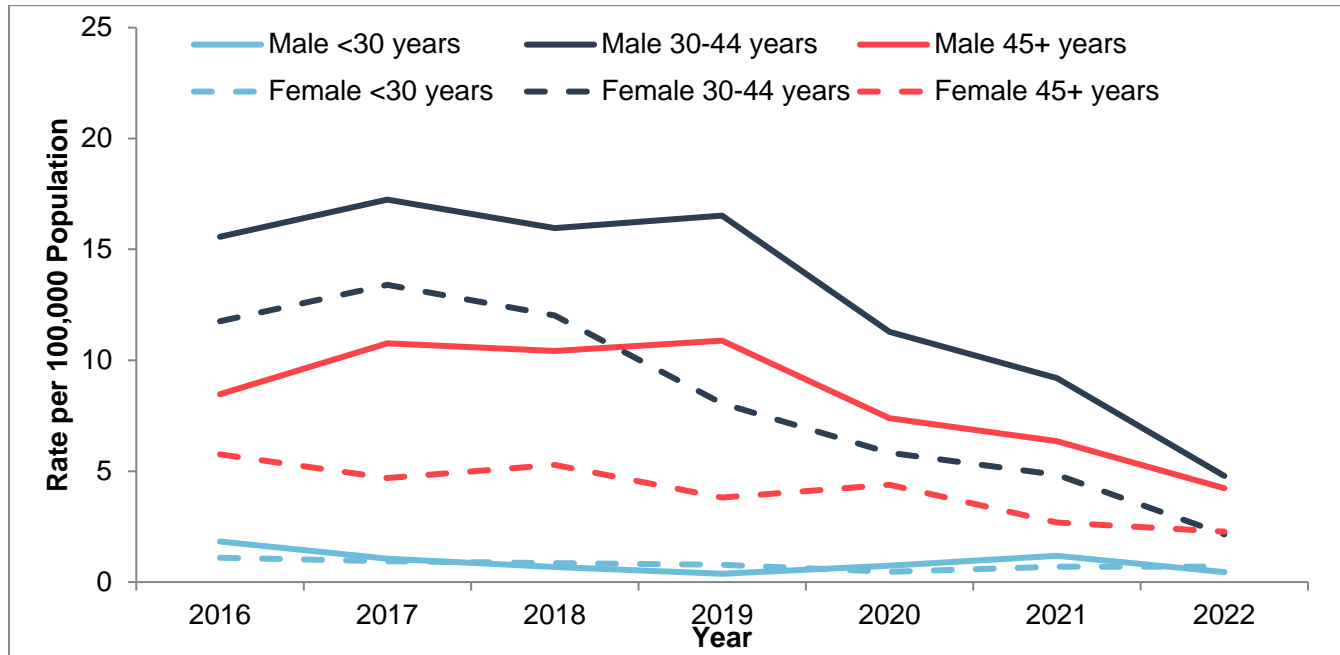


From 2016 to 2022, individuals aged 30 years and older accounted for 93% of all acute HBV cases.

Table 4: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Acute HBV by Sex and Age Group, Tennessee, 2016–2022

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|------------|-------|------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 408 | 6.1 | 434 | 6.5 | 420 | 6.2 | 382 | 5.6 | 301 | 4.3 | 251 | 3.6 | 159 | 2.3 |
| Female | 175 | 5.1 | 169 | 4.9 | 170 | 4.9 | 122 | 3.5 | 113 | 3.2 | 84 | 2.4 | 60 | 1.7 |
| <30 | 14 | 1.1 | 12 | 0.9 | 11 | 0.9 | 10 | 0.8 | 6 | 0.5 | 9 | 0.7 | 9 | 0.7 |
| 30-44 | 75 | 11.8 | 86 | 13.4 | 78 | 12.0 | 53 | 8.0 | 39 | 5.8 | 33 | 4.8 | 15 | 2.2 |
| 45+ | 86 | 5.8 | 71 | 4.7 | 81 | 5.3 | 59 | 3.8 | 68 | 4.4 | 42 | 2.7 | 36 | 2.3 |
| Male | 232 | 7.2 | 265 | 8.1 | 250 | 7.6 | 259 | 7.8 | 188 | 5.5 | 167 | 4.9 | 99 | 2.9 |
| <30 | 24 | 1.8 | 14 | 1.1 | 9 | 0.7 | 5 | 0.4 | 10 | 0.7 | 16 | 1.2 | 6 | 0.4 |
| 30-44 | 97 | 15.6 | 108 | 17.2 | 101 | 16.0 | 106 | 16.5 | 75 | 11.3 | 62 | 9.2 | 33 | 4.8 |
| 45+ | 111 | 8.5 | 143 | 10.8 | 140 | 10.4 | 148 | 10.9 | 103 | 7.4 | 89 | 6.3 | 60 | 4.2 |

Figure 5: Rates (per 100,000 population) of Confirmed and Probable Acute HBV by Sex and Age Group, Tennessee, 2016–2022

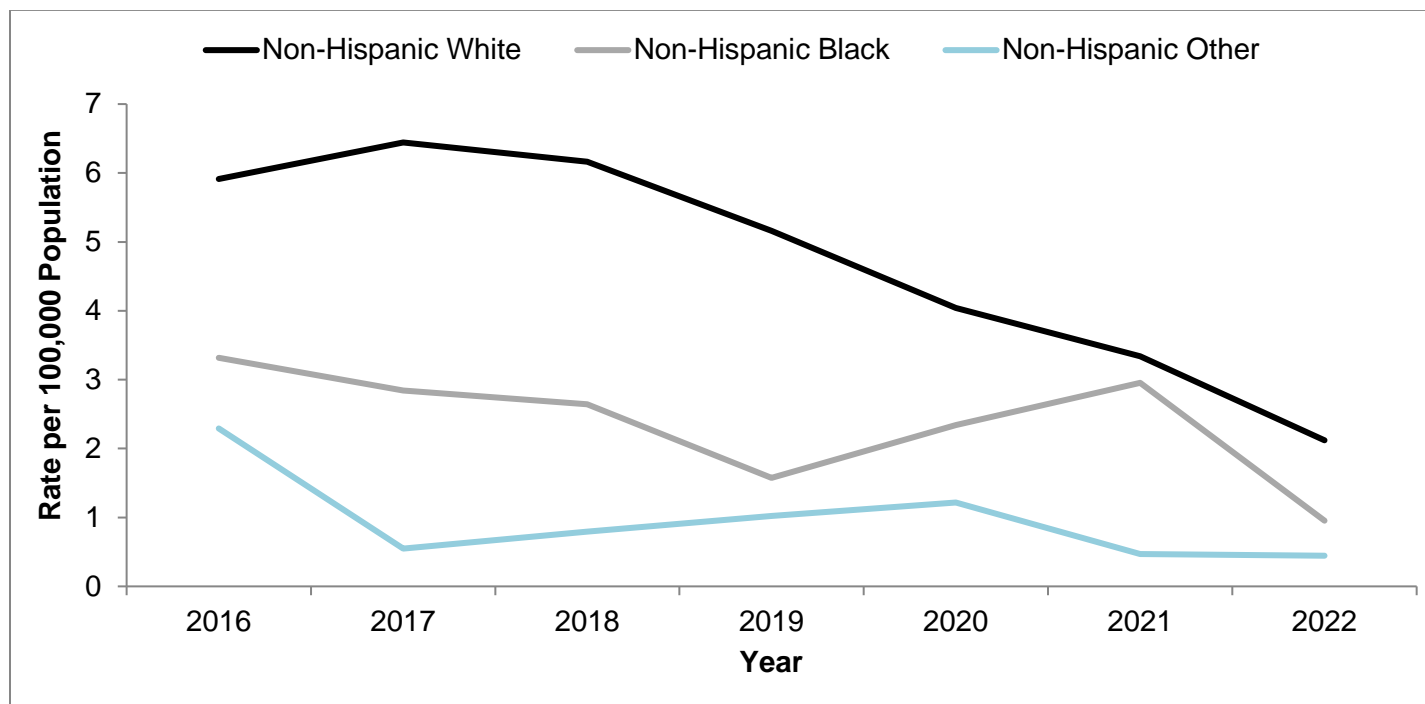


From 2016 to 2022, rates were consistently higher among males in the 30–44-year-old age and the 45+ age groups compared to females. The <30 age group saw similar rates between males and females from 2016 to 2022.

Table 5: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Acute HBV by Race/Ethnicity, Tennessee, 2016–2022

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-------|------------|-------|------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 408 | 6.1 | 434 | 6.5 | 420 | 6.2 | 382 | 5.6 | 301 | 4.4 | 251 | 3.6 | 159 | 2.3 |
| Non-Hispanic White | 292 | 5.9 | 320 | 6.4 | 308 | 6.2 | 259 | 5.2 | 205 | 4.0 | 170 | 3.3 | 109 | 2.1 |
| Non-Hispanic Black | 37 | 3.3 | 32 | 2.8 | 30 | 2.6 | 18 | 1.6 | 27 | 2.3 | 34 | 3.0 | 11 | 1.0 |
| Hispanic | 8 | 2.3 | 2 | 0.5 | 3 | 0.8 | 4 | 1.0 | 5 | 1.2 | 2 | 0.5 | 2 | 0.4 |
| Other | 10 | 4.0 | 10 | 3.9 | 8 | 3.0 | 14 | 5.1 | 16 | 5.6 | 19 | 6.4 | 22 | 7.2 |
| Unknown | 61 | - | 70 | - | 71 | - | 87 | - | 48 | - | 26 | - | 15 | - |

Figure 6: Rates (per 100,000 population) of Confirmed and Probable Acute HBV by Race/Ethnicity, Tennessee, 2016–2022

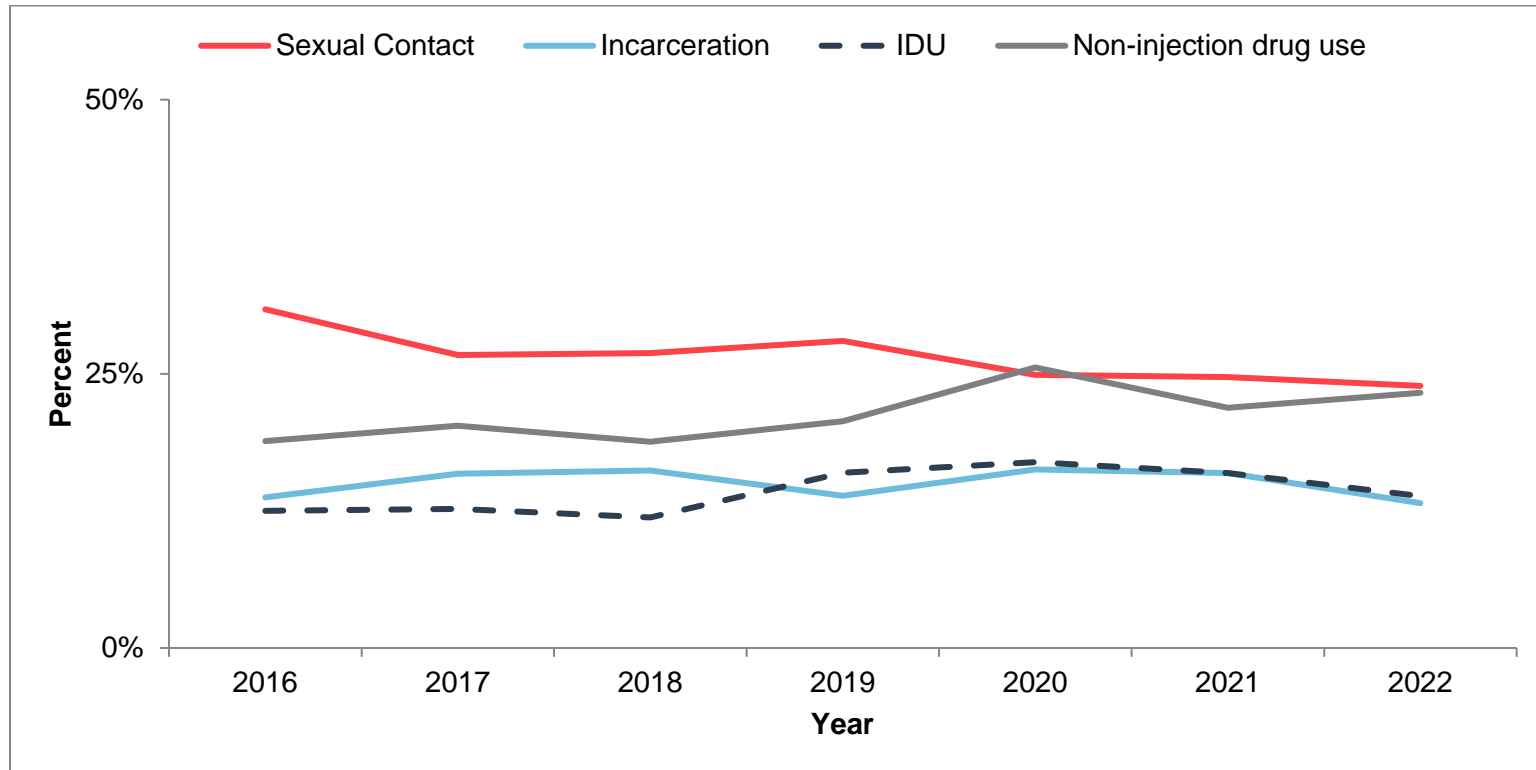


From 2016 to 2022, the rates of acute HBV were consistently higher among non-Hispanic Whites for those with race/ethnicity data reported.

Table 6: Cases of Confirmed and Probable Acute HBV, by Self-Reported Select Risk Factors, Tennessee, 2016–2022

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|------------------------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|
| | Cases | % | Cases | % | Cases | % | Cases | % | Cases | % | Cases | % | Cases | % |
| Total Cases | 408 | - | 434 | - | 420 | - | 382 | - | 301 | - | 251 | - | 159 | - |
| Sexual Contact | 126 | 30.9 | 116 | 26.7 | 113 | 26.9 | 107 | 28.0 | 75 | 24.9 | 62 | 24.7 | 38 | 23.9 |
| Past Incarceration | 56 | 13.7 | 69 | 15.9 | 68 | 16.2 | 53 | 13.9 | 49 | 16.3 | 40 | 15.9 | 21 | 13.2 |
| Injection Drug Use | 51 | 12.5 | 55 | 12.7 | 50 | 11.9 | 61 | 16.0 | 51 | 16.9 | 40 | 15.9 | 22 | 13.8 |
| Non-injection Drug Use | 77 | 18.9 | 88 | 20.3 | 79 | 18.8 | 79 | 20.7 | 77 | 25.6 | 55 | 21.9 | 37 | 23.3 |

Figure 7: Percentage of Confirmed and Probable Acute HBV with Select Self-Reported Risk Factors, Tennessee, 2016–2022



From 2016 to 2019, among acute HBV cases with self-reported risk factor information provided, on average, the highest proportion of cases reported sexual contact with a person living with HBV as a risk factor followed by non-injection drug use. However, in 2020 there was a slight increase in non-injection drug use that surpassed sexual contact as a self-reported risk factor. From 2021–2022, sexual contact with a person living with HBV returned to being the highest proportion of cases reported when compared to other risk factors. Self-reported risk factors were not mutually exclusive.

Chronic HBV

This section summarizes trends in chronic HBV cases reported to TDH from 2016 to 2022.

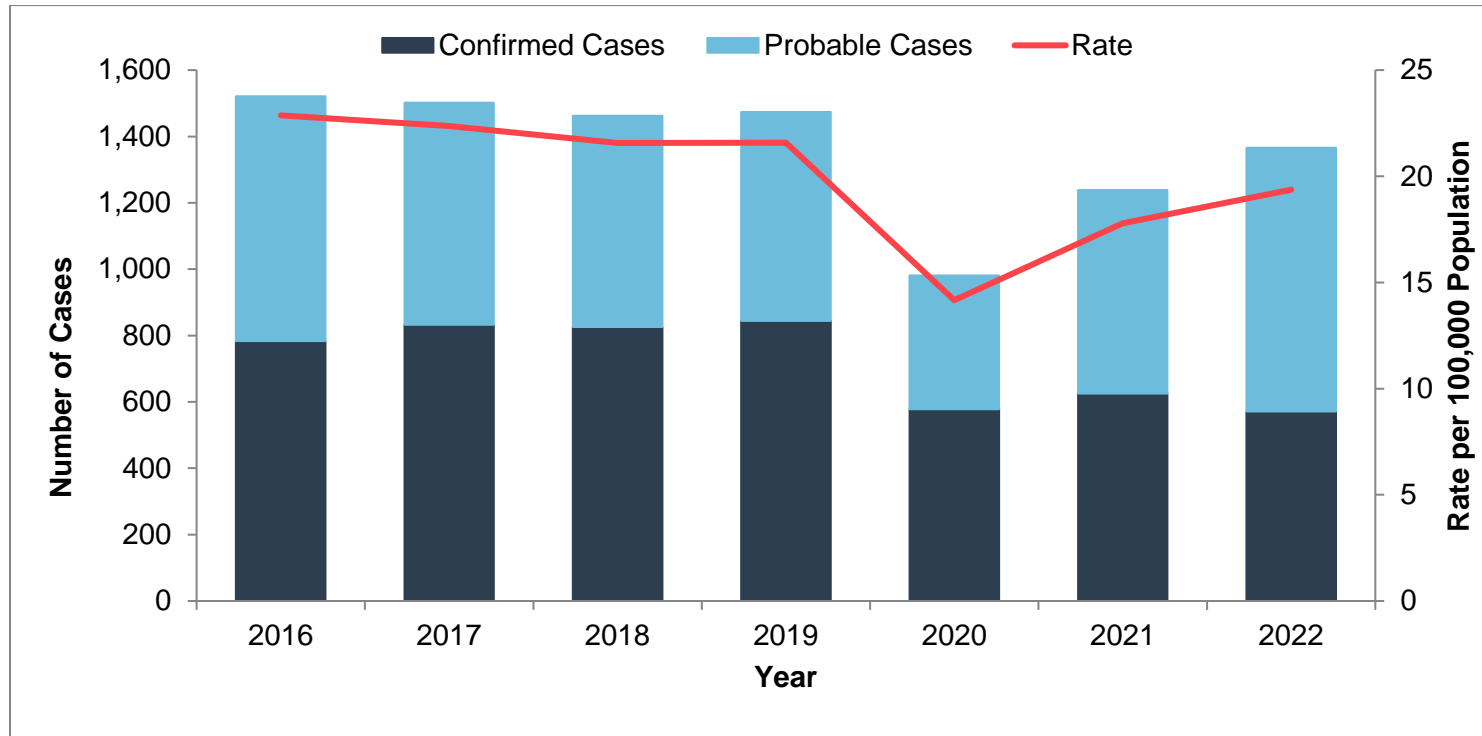
The surveillance case definition for chronic HBV can be located here:

<https://ndc.services.cdc.gov/case-definitions/hepatitis-b-chronic-2012/>

Table 7: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Chronic HBV, Tennessee, 2016–2022

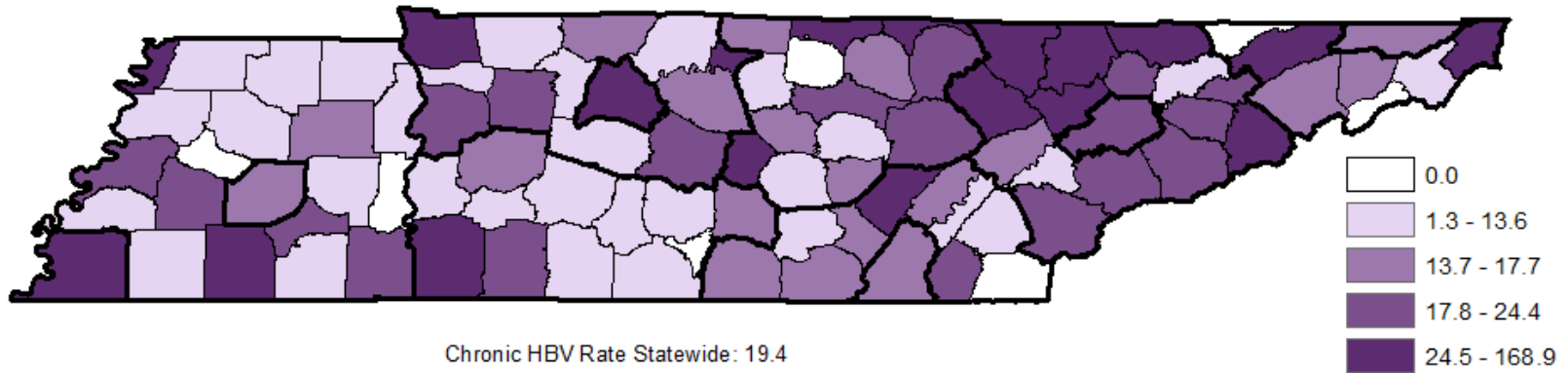
| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 1,521 | 22.9 | 1,502 | 22.4 | 1,462 | 21.6 | 1,474 | 21.6 | 981 | 14.2 | 11.3 | 17.8 | 1,366 | 19.4 |
| Confirmed Only | 783 | 11.8 | 833 | 12.4 | 826 | 12.2 | 844 | 12.4 | 578 | 8.3 | 11.3 | 9.0 | 571 | 8.1 |
| Probable Only | 738 | 11.1 | 669 | 10.0 | 636 | 9.4 | 630 | 9.2 | 403 | 5.8 | 11.3 | 8.8 | 795 | 11.3 |

Figure 8: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Chronic HBV, Tennessee, 2016–2022



Enhanced chronic HBV surveillance in TN began mid-2015, with the first complete year of centralized chronic HBV data available in 2019. Rates of chronic HBV remained relatively steady from 2016 to 2019 and decreased 35% in 2020. As described in the Executive Summary, the decrease observed in 2020 was likely due to the COVID-19 impact on testing. However, from 2020–2022, rates of chronic HBV have steadily been rising.

Figure 9: Rates (per 100,000 population) of Confirmed and Probable Chronic HBV by County, Tennessee, 2022



In 2022, chronic HBV cases were reported in 88 counties in TN. Among these counties, 33 counties (38%) had chronic HBV rates higher than the statewide chronic HBV rate in 2022.

The counties with the highest rates of chronic HBV were largely found in eastern TN; however, high rates of chronic HBV were also found in other counties outside of the East Tennessee region.

Table 8: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Chronic HBV by Sex, Tennessee, 2016–2022*

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 1,521 | 22.9 | 1,502 | 22.4 | 1,462 | 21.6 | 1,474 | 21.6 | 981 | 14.2 | 1,239 | 17.8 | 1,366 | 19.4 |
| Female | 604 | 17.7 | 523 | 15.2 | 534 | 15.4 | 532 | 15.2 | 331 | 9.4 | 425 | 12.0 | 550 | 15.3 |
| Male | 911 | 28.1 | 970 | 29.6 | 918 | 27.8 | 940 | 28.2 | 648 | 19.0 | 811 | 23.7 | 810 | 23.4 |

* Numbers reported in each category might not add up to the total number of cases in a year because of missing data.

From 2016 to 2022, rates of chronic HBV were consistently higher among males than females.

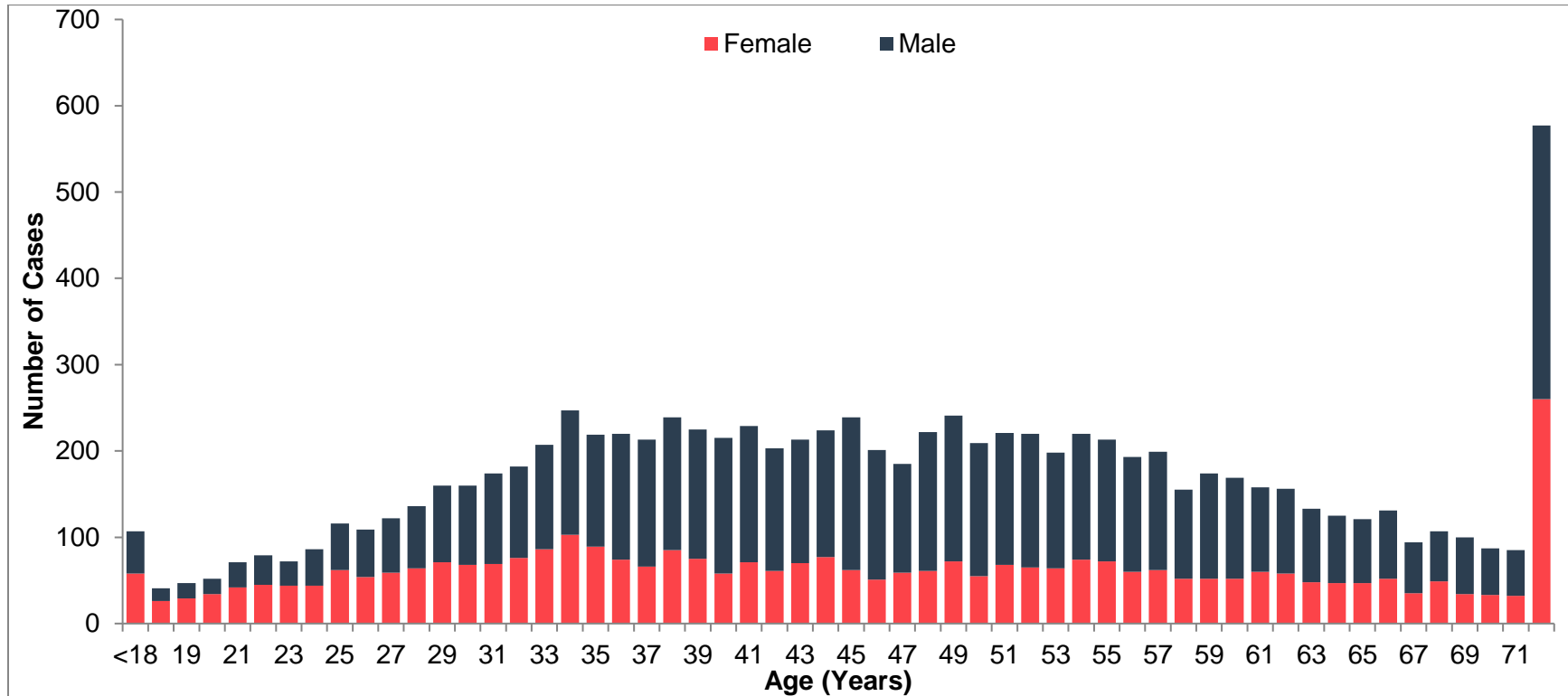
Table 9: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Chronic HBV by Age Group, Tennessee, 2016–2022*

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 1,521 | 22.9 | 1,502 | 22.4 | 1,462 | 21.6 | 1,474 | 21.6 | 981 | 14.2 | 1,239 | 17.8 | 1,366 | 19.4 |
| <30 | 234 | 9.0 | 196 | 7.5 | 197 | 7.5 | 178 | 6.8 | 95 | 3.6 | 135 | 5.1 | 169 | 6.3 |
| 30-44 | 504 | 40.0 | 527 | 41.6 | 498 | 38.8 | 490 | 37.7 | 346 | 26.0 | 396 | 29.2 | 427 | 30.8 |
| 45+ | 781 | 27.9 | 779 | 27.4 | 764 | 26.6 | 805 | 27.7 | 539 | 18.3 | 708 | 23.9 | 769 | 25.6 |
| Confirmed | 783 | 11.8 | 833 | 12.4 | 826 | 12.2 | 844 | 12.4 | 578 | 8.3 | 625 | 9.0 | 571 | 8.1 |
| <30 | 115 | 4.4 | 112 | 4.3 | 89 | 3.4 | 79 | 3.0 | 51 | 1.9 | 54 | 2.0 | 65 | 2.4 |
| 30-44 | 281 | 22.3 | 286 | 22.6 | 285 | 22.2 | 297 | 22.8 | 207 | 15.5 | 217 | 16.0 | 193 | 13.9 |
| 45+ | 387 | 13.8 | 435 | 15.3 | 452 | 15.7 | 468 | 16.1 | 320 | 10.9 | 354 | 11.9 | 313 | 10.4 |
| Probable | 738 | 11.1 | 669 | 10.0 | 636 | 9.4 | 630 | 9.2 | 403 | 5.8 | 614 | 8.8 | 795 | 11.3 |
| <30 | 119 | 4.6 | 84 | 3.2 | 108 | 4.1 | 99 | 3.8 | 44 | 1.7 | 81 | 3.1 | 104 | 3.9 |
| 30-44 | 223 | 17.7 | 241 | 19.0 | 213 | 16.6 | 193 | 14.8 | 139 | 10.4 | 179 | 13.2 | 234 | 16.9 |
| 45+ | 394 | 14.1 | 344 | 12.1 | 312 | 10.8 | 337 | 11.6 | 219 | 7.4 | 354 | 11.9 | 456 | 15.2 |

* Numbers reported in each category might not add up to the total number of cases in a year because of missing data.

From 2016 to 2022, rates of chronic HBV were consistently higher among the 30–44-year-old age group when compared to the other two age groups. The lower rates in those less than 30 years old are likely due to recommendation for routine childhood vaccination against HBV in 1991.

Figure 10: Case Counts of Confirmed and Probable Chronic HBV by Sex and Age, Tennessee, 2016–2022



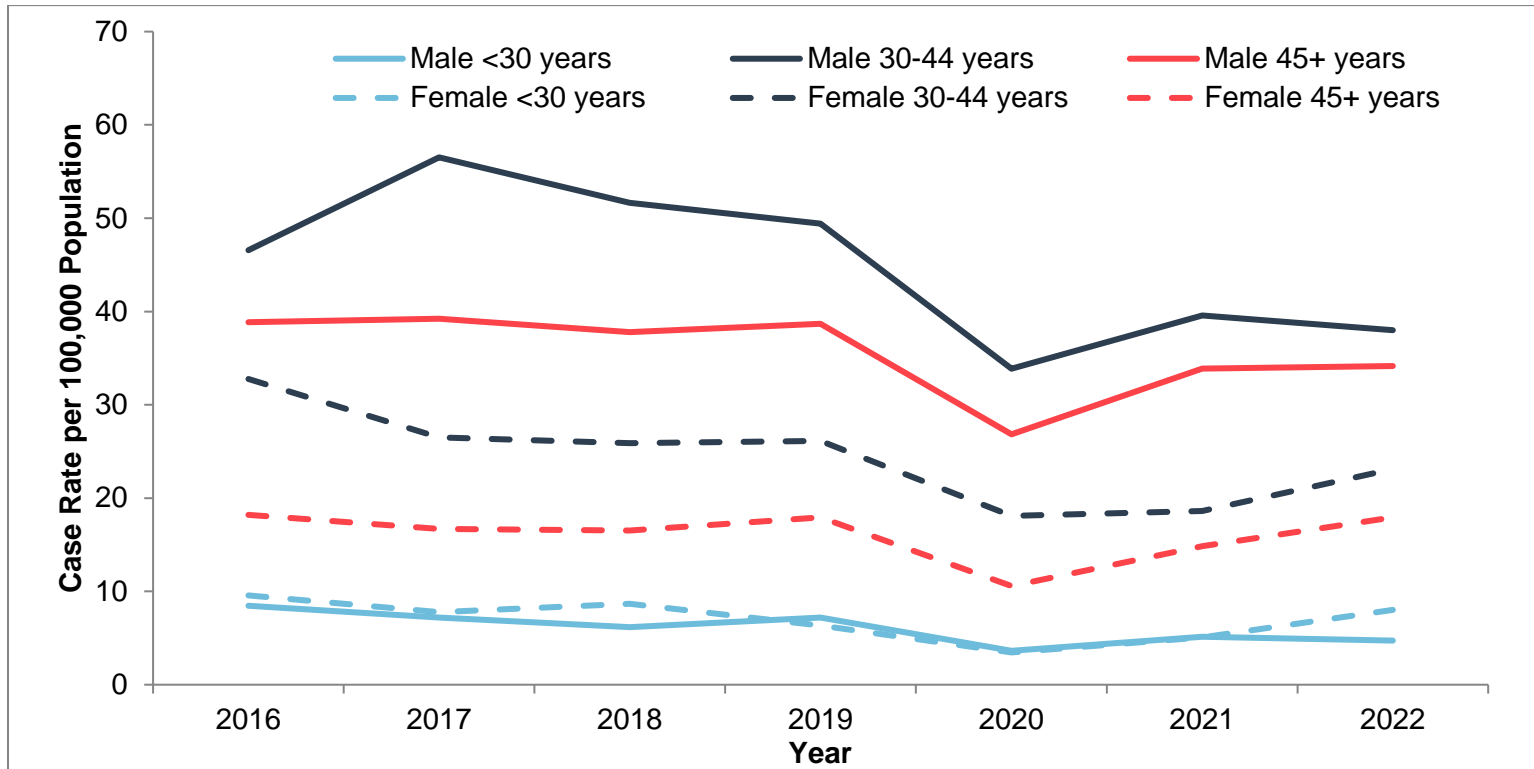
From 2016 to 2022, individuals aged 30 years and older accounted for 87% of all chronic HBV cases.

Table 10: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Chronic HBV by Sex and Age Group, Tennessee, 2016–2022*

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 1,521 | 22.9 | 1,502 | 22.4 | 1,462 | 21.6 | 1,474 | 21.6 | 981 | 14.2 | 1,239 | 17.8 | 1,366 | 19.4 |
| Female | 604 | 17.7 | 523 | 15.2 | 534 | 15.4 | 532 | 15.2 | 331 | 9.4 | 425 | 12.0 | 550 | 15.3 |
| <30 | 122 | 9.6 | 100 | 7.8 | 112 | 8.7 | 82 | 6.4 | 45 | 3.5 | 66 | 5.1 | 105 | 8.0 |
| 30-44 | 209 | 32.8 | 170 | 26.5 | 168 | 25.9 | 172 | 26.1 | 121 | 18.1 | 127 | 18.6 | 161 | 23.1 |
| 45+ | 272 | 18.2 | 253 | 16.7 | 253 | 16.5 | 278 | 17.9 | 164 | 10.6 | 232 | 14.8 | 284 | 17.9 |
| Male | 911 | 28.1 | 970 | 29.6 | 917 | 27.8 | 940 | 28.2 | 648 | 19.0 | 811 | 23.7 | 810 | 23.4 |
| <30 | 111 | 8.5 | 95 | 7.2 | 82 | 6.2 | 96 | 7.2 | 49 | 3.6 | 69 | 5.1 | 64 | 4.7 |
| 30-44 | 290 | 46.6 | 354 | 56.5 | 327 | 51.7 | 317 | 49.4 | 225 | 33.9 | 267 | 39.6 | 262 | 38.0 |
| 45+ | 509 | 38.9 | 521 | 39.2 | 508 | 37.8 | 526 | 38.7 | 374 | 26.8 | 475 | 33.9 | 484 | 34.1 |

* Numbers reported in each category might not add up to the total number of cases in a year because of missing data.

Figure 11: Rates (per 100,000 population) of Confirmed and Probable Chronic HBV by Sex and Age Group, Tennessee, 2016–2022

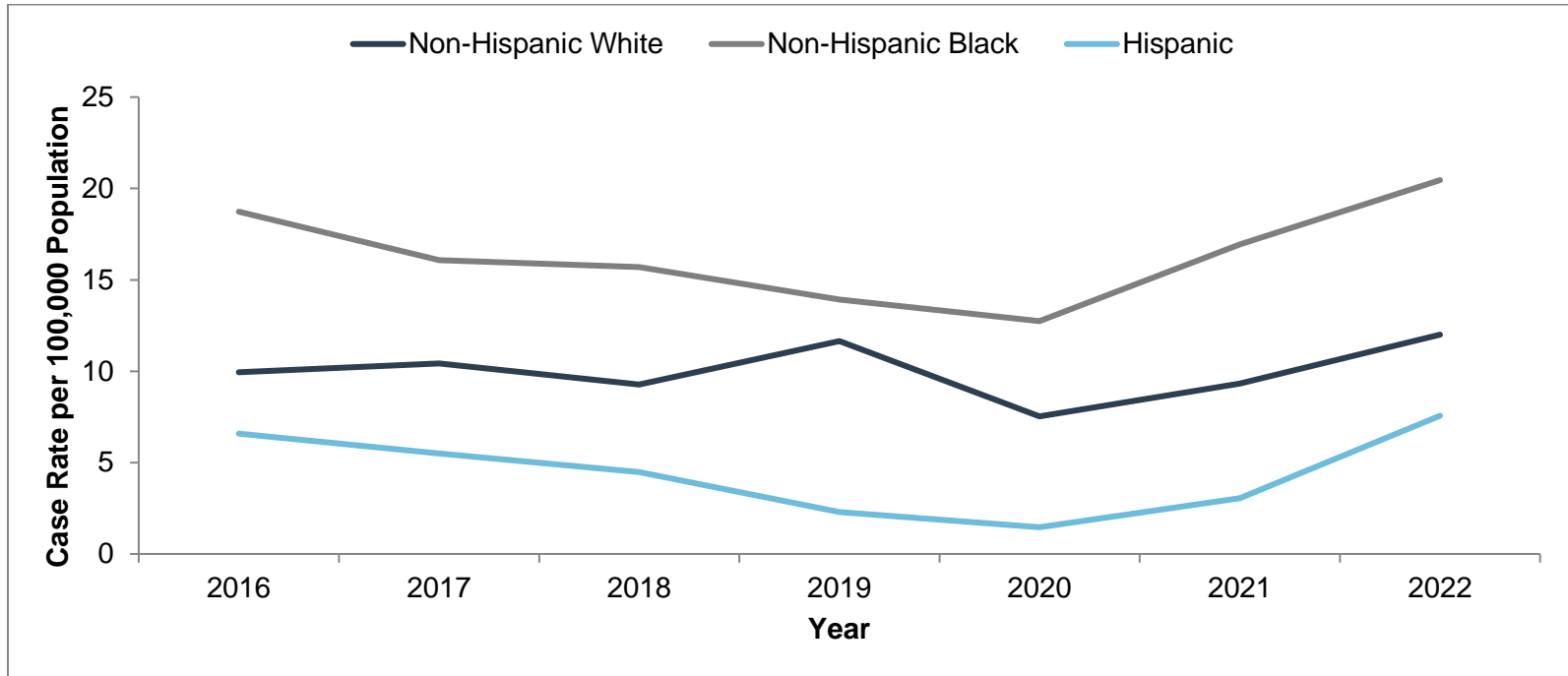


From 2016 to 2022, rates of chronic HBV among males and females have consistently been higher among the 30–44-year-old age group when compared to the other two age groups. Rates were consistently higher among males in the 30–44-year-old and 45+ year-old age groups compared to females.

Table 11: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Chronic HBV by Race/Ethnicity, Tennessee, 2016–2022

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|-------|-------------|-------|-------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 1,521 | 22.9 | 1,502 | 22.4 | 1,462 | 21.6 | 1,474 | 21.6 | 981 | 14.2 | 1,239 | 17.8 | 1,366 | 19.4 |
| Non-Hispanic White | 491 | 9.9 | 518 | 10.4 | 463 | 9.3 | 585 | 11.7 | 382 | 7.5 | 475 | 9.3 | 617 | 12.0 |
| Non-Hispanic Black | 209 | 18.7 | 181 | 16.1 | 178 | 15.7 | 159 | 13.9 | 147 | 12.7 | 195 | 16.9 | 236 | 20.5 |
| Hispanic | 23 | 6.6 | 20 | 5.5 | 17 | 4.5 | 9 | 2.3 | 6 | 1.5 | 13 | 3.0 | 34 | 7.6 |
| Other | 224 | 89.9 | 149 | 57.6 | 107 | 39.8 | 158 | 57.1 | 132 | 45.9 | 220 | 74.3 | 225 | 73.3 |
| Unknown | 574 | - | 634 | - | 697 | - | 563 | - | 314 | - | 336 | - | 254 | - |

Figure 12: Rates (per 100,000 population) of Confirmed and Probable Chronic HBV by Race/Ethnicity, Tennessee, 2016–2022



From 2016 to 2022, the rates of chronic HBV were consistently higher among non-Hispanic Blacks for those with race/ethnicity data reported.

Acute HCV

This section summarizes trends in acute HCV cases reported to TDH from 2016 to 2022.

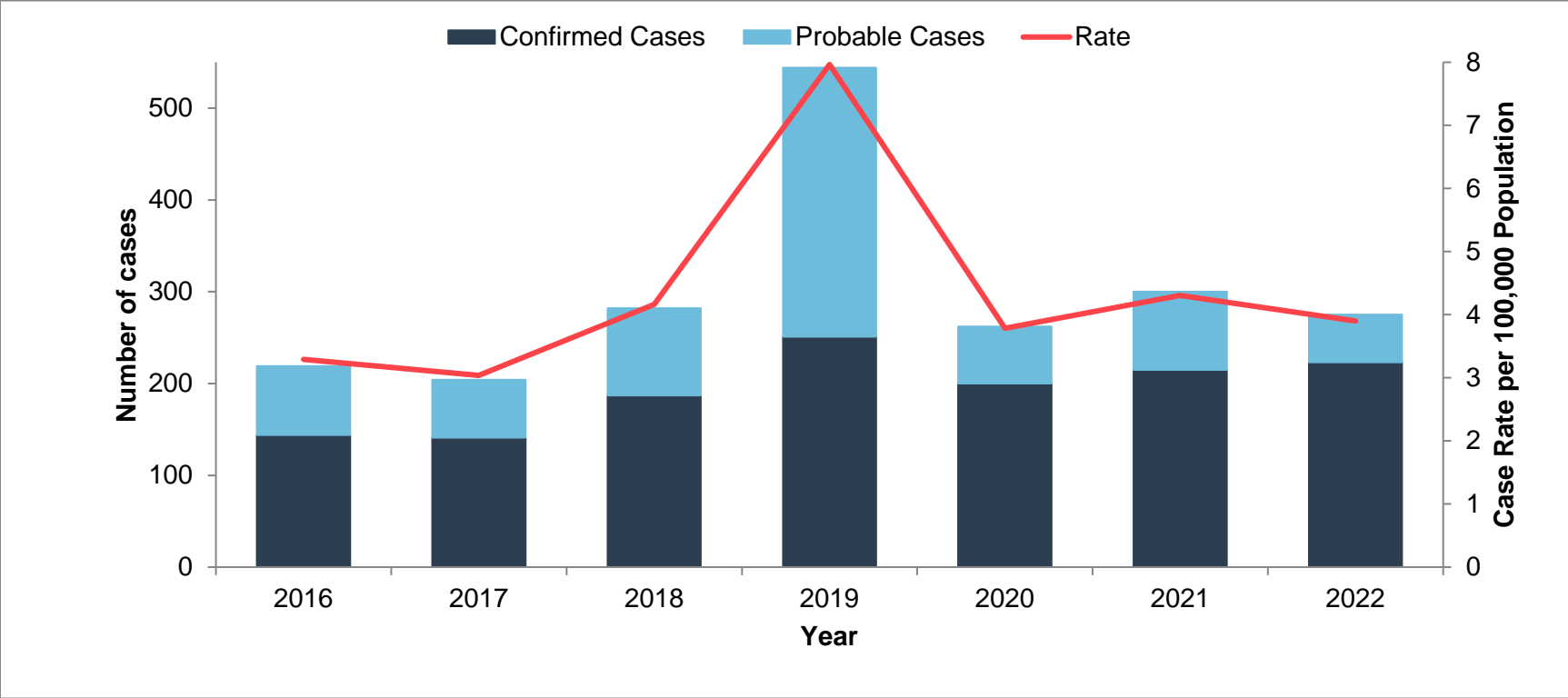
The surveillance case definition for acute HCV can be located here:

<https://ndc.services.cdc.gov/case-definitions/hepatitis-c-acute-2020/>

Table 12: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Acute HCV, Tennessee, 2016–2022

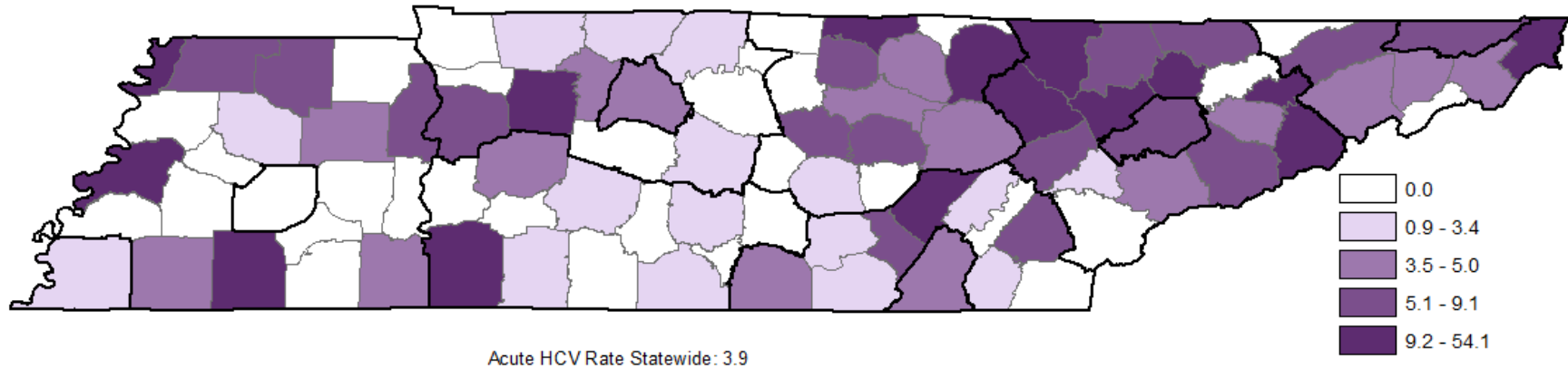
| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 219 | 3.3 | 204 | 3.0 | 282 | 4.2 | 544 | 8.0 | 262 | 3.8 | 300 | 4.3 | 275 | 3.9 |
| Confirmed Only | 144 | 2.2 | 141 | 2.1 | 187 | 2.8 | 251 | 3.7 | 200 | 2.9 | 215 | 3.1 | 223 | 3.1 |
| Probable Only | 75 | 1.1 | 63 | 0.9 | 95 | 1.4 | 293 | 4.3 | 62 | 0.9 | 85 | 1.2 | 52 | 0.7 |

Figure 13: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Acute HCV, Tennessee, 2016–2022



Rates of acute HCV remained relatively steady except in 2019 which was likely due to the HAV outbreak described in the Executive Summary. As described in the Executive Summary, the decrease observed in 2020 was likely due to the COVID-19 impact on testing. However, from 2020 to 2021, rates began to increase again and then slightly drop from 2021 to 2022.

Figure 14: Rates (per 100,000 population) of Confirmed and Probable Acute HCV by County, Tennessee, 2022



In 2022, acute HCV cases were reported in 63 counties in TN. Among these counties, 39 counties (62%) had acute HCV rates higher than the statewide acute HCV rate in 2022.

The counties with the highest acute HCV rates were largely found in the East Public Health Region. However, there were some counties in the West, South Central, and Mid Cumberland Health Regions with higher acute HCV rates. Counties housing state prisons also have significantly higher rates of acute HCV when compared to other counties across the state.

Table 13: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Acute HCV by Sex, Tennessee, 2016–2022*

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 219 | 3.3 | 204 | 3.0 | 282 | 4.2 | 544 | 8.0 | 262 | 3.8 | 300 | 4.3 | 275 | 3.9 |
| Female | 98 | 2.9 | 99 | 2.9 | 129 | 3.7 | 214 | 6.1 | 96 | 2.7 | 93 | 2.6 | 77 | 2.1 |
| Male | 121 | 3.7 | 105 | 3.2 | 152 | 4.6 | 330 | 9.9 | 166 | 4.9 | 206 | 6.0 | 198 | 5.7 |

* Numbers reported in each category might not add up to the total number of cases in a year because of missing data.

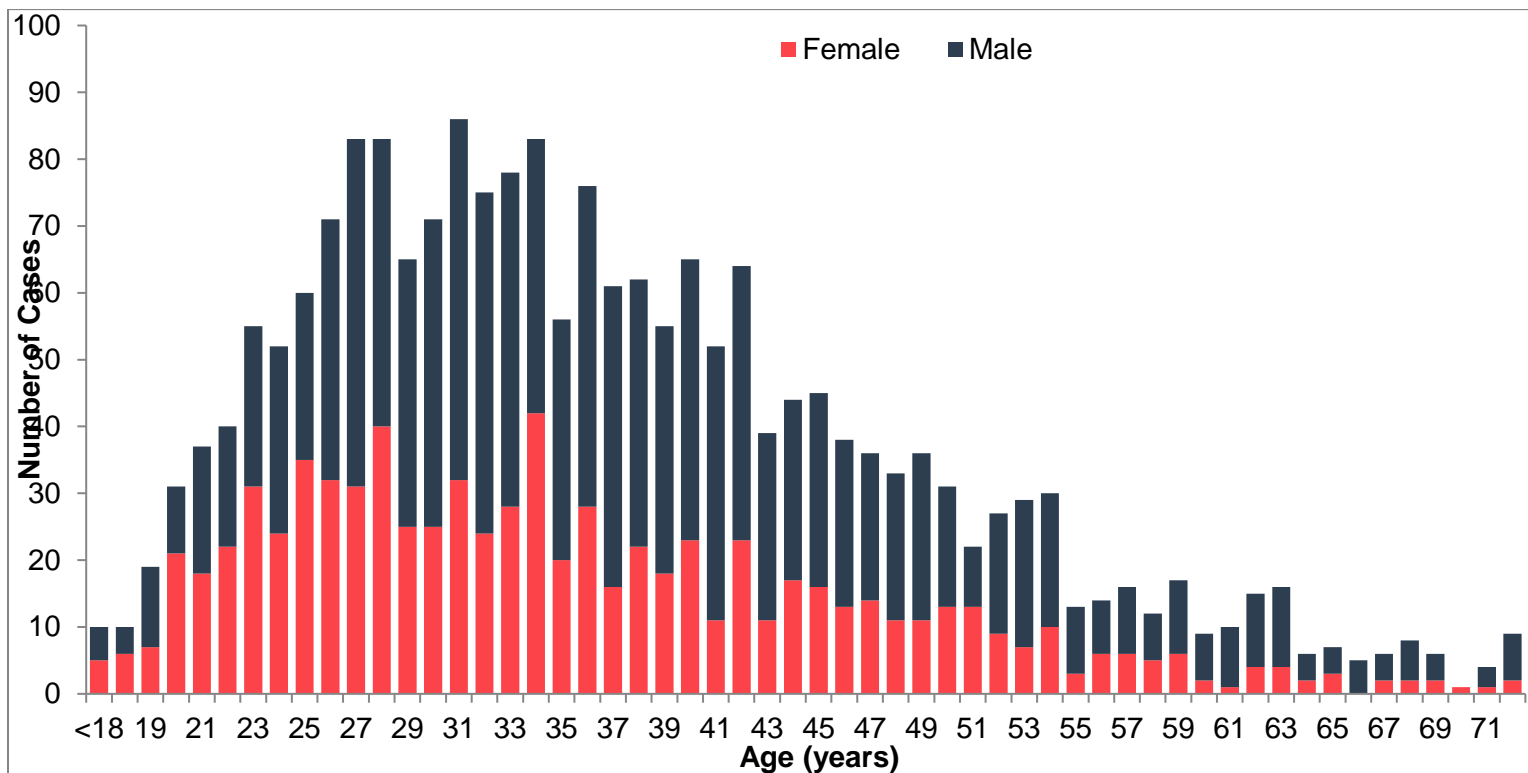
From 2016 to 2022, rates of acute HCV were consistently higher among males than females.

Table 14: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Acute HCV by Age Group, Tennessee, 2016–2022

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|-------|------------|-------|------------|-------|-------------|-------|-------------|-------|------------|-------|------------|-------|------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 219 | 3.3 | 204 | 3.0 | 282 | 4.2 | 544 | 8.0 | 262 | 3.8 | 300 | 4.3 | 275 | 3.9 |
| <30 | 76 | 2.9 | 68 | 2.6 | 107 | 4.1 | 135 | 5.2 | 79 | 3.0 | 84 | 3.2 | 68 | 2.6 |
| 30-44 | 96 | 7.6 | 90 | 7.1 | 128 | 10.0 | 287 | 22.1 | 124 | 9.3 | 126 | 9.3 | 117 | 8.4 |
| 45+ | 47 | 1.7 | 46 | 1.6 | 47 | 1.6 | 122 | 4.2 | 59 | 2.0 | 90 | 3.0 | 90 | 3.0 |
| Confirmed | 144 | 2.2 | 141 | 2.1 | 187 | 2.8 | 251 | 3.7 | 200 | 2.9 | 215 | 3.1 | 223 | 3.2 |
| <30 | 48 | 1.9 | 46 | 1.8 | 76 | 2.9 | 77 | 2.9 | 64 | 2.4 | 64 | 2.4 | 56 | 2.1 |
| 30-44 | 60 | 4.8 | 61 | 4.8 | 78 | 6.1 | 118 | 9.1 | 95 | 7.1 | 88 | 6.5 | 93 | 6.7 |
| 45+ | 36 | 1.3 | 34 | 1.2 | 33 | 1.1 | 56 | 1.9 | 41 | 1.4 | 63 | 2.1 | 74 | 2.5 |
| Probable | 75 | 1.1 | 63 | 0.9 | 95 | 1.4 | 293 | 4.3 | 62 | 0.9 | 85 | 1.2 | 52 | 0.7 |
| <30 | 28 | 1.1 | 22 | 0.8 | 31 | 1.2 | 58 | 2.2 | 15 | 0.6 | 20 | 0.8 | 12 | 0.5 |
| 30-44 | 36 | 2.9 | 29 | 2.3 | 50 | 3.9 | 169 | 13.0 | 29 | 2.2 | 38 | 2.8 | 24 | 1.7 |
| 45+ | 11 | 0.4 | 12 | 0.4 | 14 | 0.5 | 66 | 2.3 | 18 | 0.6 | 27 | 0.9 | 16 | 0.5 |

From 2016 to 2022, rates of acute HCV have consistently been higher among the 30–44-year-old age group when compared to the other two age groups.

Figure 15: Case Counts of Confirmed and Probable Acute HCV by Sex and Age, Tennessee, 2016–2022



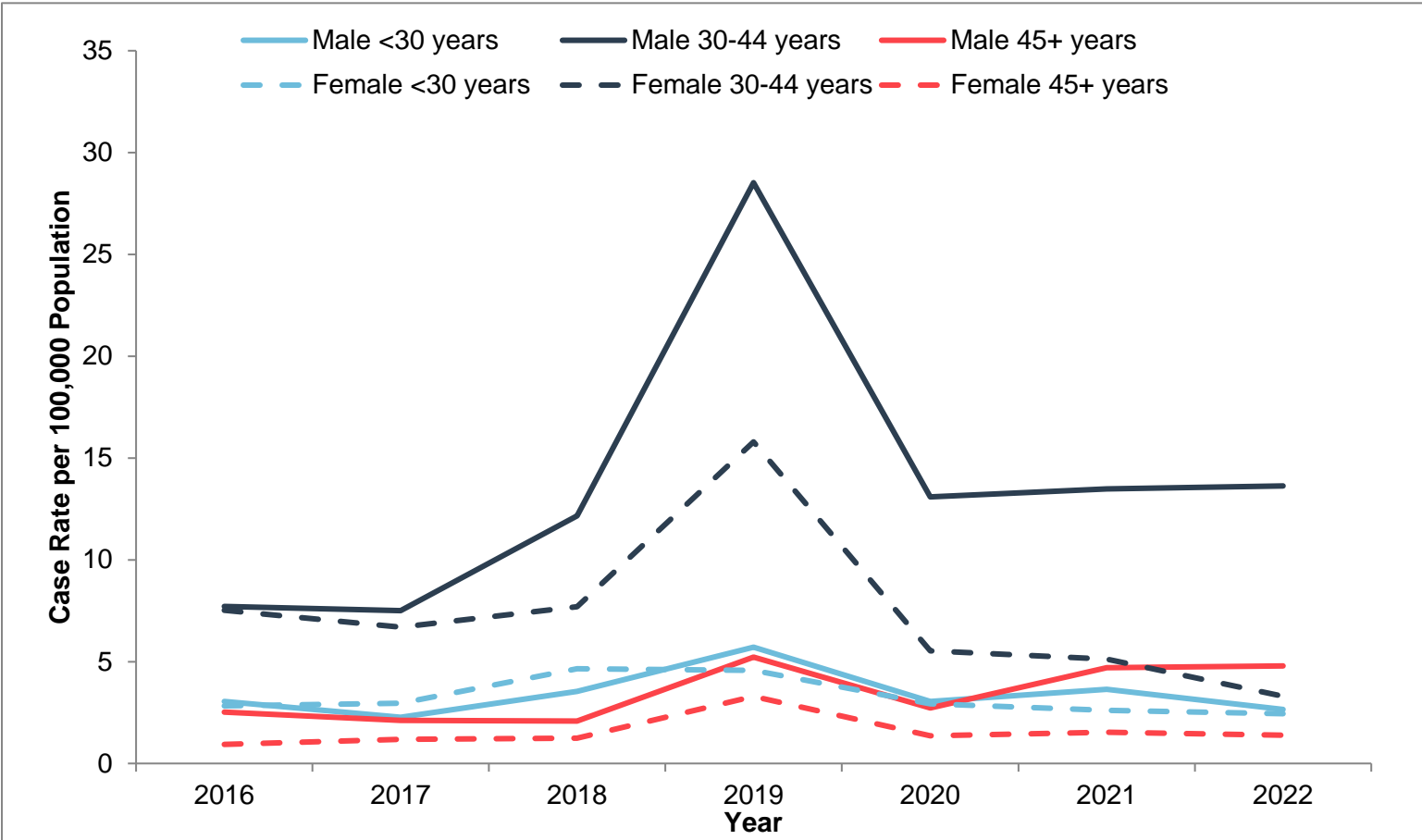
From 2016 to 2022, individuals less than 45 years of age accounted for 76% of all acute HCV cases.

Table 15: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Acute HCV by Sex and Age Group, Tennessee, 2016–2022*

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|-------|------------|-------|------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 219 | 3.3 | 204 | 3.0 | 282 | 4.2 | 544 | 8.0 | 262 | 3.8 | 300 | 4.3 | 275 | 3.9 |
| Female | 98 | 2.9 | 99 | 2.9 | 129 | 3.7 | 214 | 6.1 | 96 | 2.7 | 93 | 2.6 | 77 | 2.1 |
| <30 | 36 | 2.8 | 38 | 3.0 | 60 | 4.7 | 59 | 4.6 | 38 | 2.9 | 34 | 2.6 | 32 | 2.4 |
| 30-44 | 48 | 7.5 | 43 | 6.7 | 50 | 7.7 | 104 | 15.8 | 37 | 5.5 | 35 | 5.1 | 23 | 3.3 |
| 45+ | 14 | 0.9 | 18 | 1.2 | 19 | 1.2 | 51 | 3.3 | 21 | 1.4 | 24 | 1.5 | 22 | 1.4 |
| Male | 121 | 3.7 | 105 | 3.2 | 152 | 4.6 | 330 | 9.9 | 166 | 4.9 | 206 | 6.0 | 198 | 5.7 |
| <30 | 40 | 3.0 | 30 | 2.3 | 47 | 3.5 | 76 | 5.7 | 41 | 3.0 | 49 | 3.6 | 36 | 2.7 |
| 30-44 | 48 | 7.7 | 47 | 7.5 | 77 | 12.2 | 183 | 28.5 | 87 | 13.1 | 91 | 13.5 | 94 | 13.6 |
| 45+ | 33 | 2.5 | 28 | 2.1 | 28 | 2.1 | 71 | 5.2 | 38 | 2.7 | 66 | 4.7 | 68 | 4.8 |

* Numbers reported in each category might not add up to the total number of cases in a year because of missing data.

Figure 16: Rates (per 100,000 population) of Confirmed and Probable Acute HCV by Sex and Age Group, Tennessee, 2016–2022

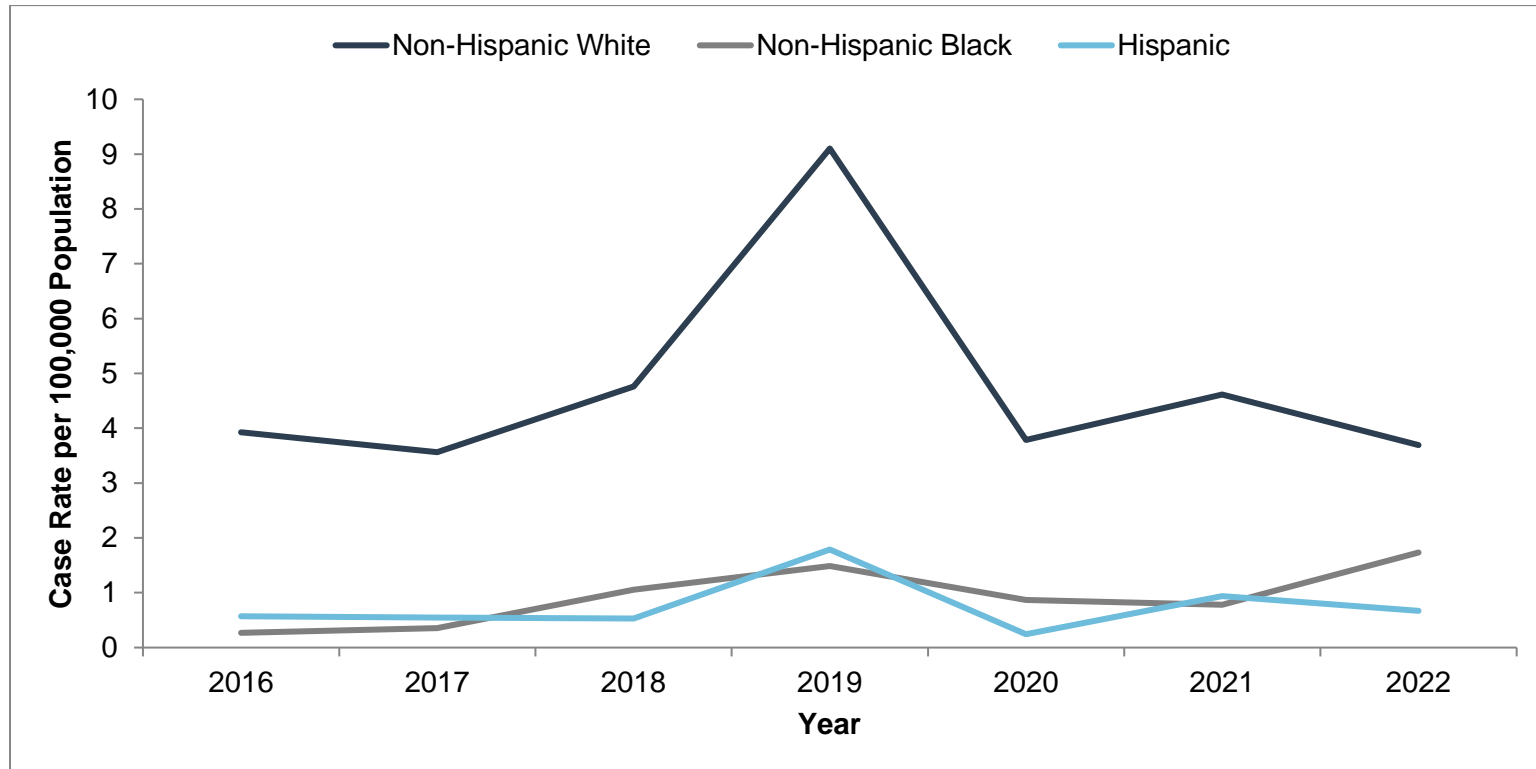


From 2016 to 2022, rates of acute HCV among males and females were generally higher among the 30–44-year-old age group when compared to the other two age groups.

Table 16: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Acute HCV by Race/Ethnicity, Tennessee, 2016–2022

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|-------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 219 | 3.3 | 204 | 3.0 | 282 | 4.2 | 544 | 8.0 | 262 | 3.8 | 300 | 4.3 | 275 | 3.9 |
| Non-Hispanic White | 194 | 3.9 | 177 | 3.6 | 238 | 4.8 | 457 | 9.1 | 192 | 3.8 | 235 | 4.6 | 190 | 3.7 |
| Non-Hispanic Black | 3 | 0.3 | 4 | 0.4 | 12 | 1.1 | 17 | 1.5 | 10 | 0.9 | 9 | 0.8 | 20 | 1.7 |
| Hispanic | 2 | 0.6 | 2 | 0.5 | 2 | 0.5 | 7 | 1.8 | 1 | 0.2 | 4 | 0.9 | 3 | 0.7 |
| Other | 3 | 1.2 | 6 | 2.3 | 6 | 2.2 | 11 | 4.0 | 13 | 4.5 | 24 | 8.1 | 40 | 13.0 |
| Unknown | 17 | - | 15 | - | 24 | - | 52 | - | 46 | - | 28 | - | 22 | - |

Figure 17: Rates (per 100,000 population) of Confirmed and Probable Acute HCV by Race/Ethnicity, Tennessee, 2016–2022

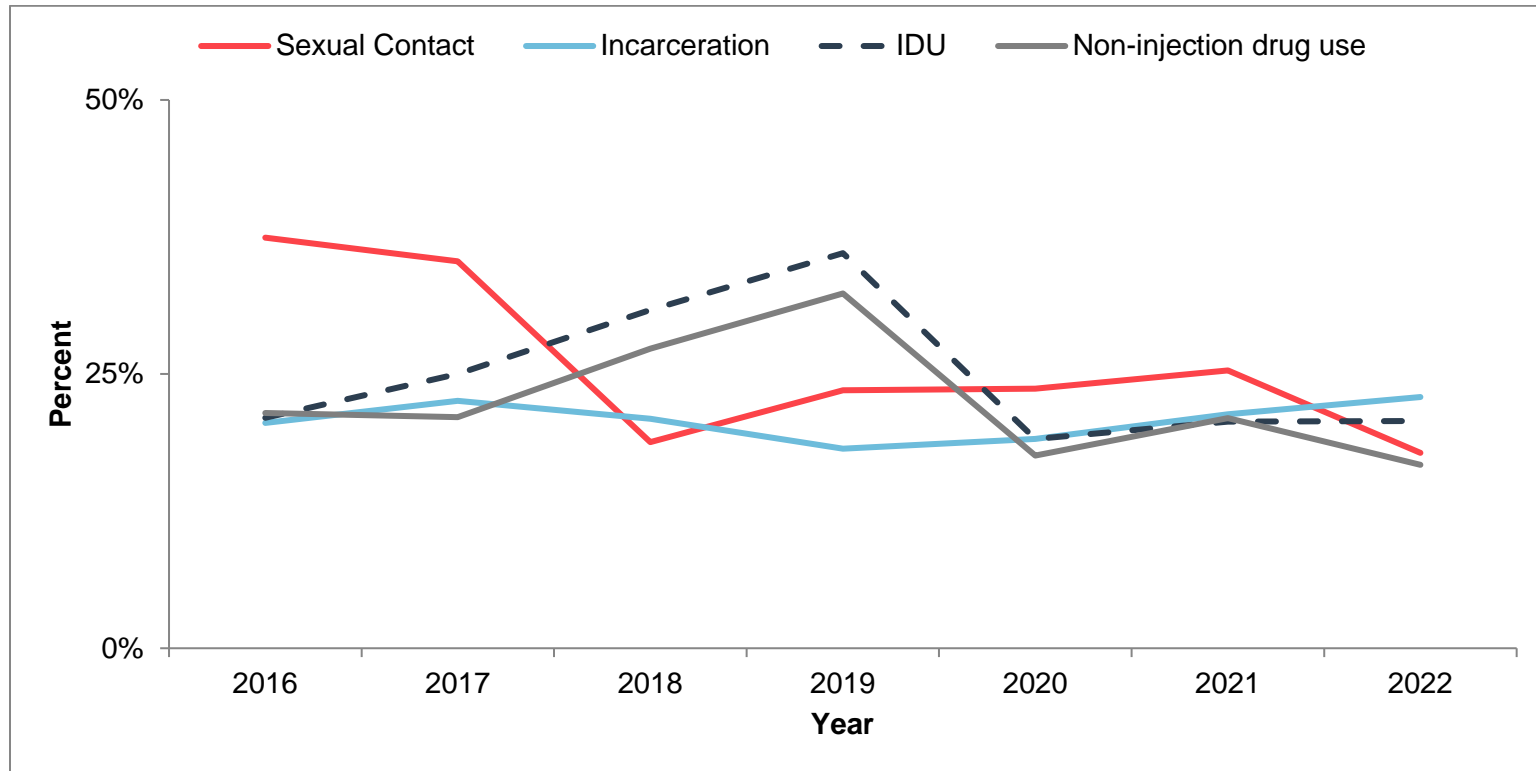


From 2016 to 2022, the rates of acute HCV were consistently higher among non-Hispanic Whites for those with race/ethnicity data reported.

Table 17: Case Counts of Confirmed and Probable Acute HCV with Select Self-Reported Risk Factors, Tennessee, 2016–2022

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|------------------------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|
| | Cases | % | Cases | % | Cases | % | Cases | % | Cases | % | Cases | % | Cases | % |
| Total Cases | 219 | - | 204 | - | 282 | - | 544 | - | 262 | - | 300 | - | 275 | - |
| Sexual Contact | 82 | 37.4 | 72 | 35.3 | 53 | 18.8 | 128 | 23.5 | 62 | 23.7 | 76 | 25.3 | 49 | 17.8 |
| Past Incarceration | 45 | 20.5 | 46 | 22.5 | 59 | 20.9 | 99 | 18.2 | 50 | 19.1 | 64 | 21.3 | 63 | 22.9 |
| Injection Drug Use | 46 | 21.0 | 51 | 25.0 | 87 | 30.9 | 196 | 36.0 | 50 | 19.1 | 62 | 20.7 | 57 | 20.7 |
| Non-injection Drug Use | 47 | 21.5 | 43 | 21.1 | 77 | 27.3 | 176 | 32.4 | 46 | 17.6 | 63 | 21.0 | 46 | 16.7 |

Figure 18: Percentage of Confirmed and Probable Acute HCV with Self-Reported Select Risk Factors, Tennessee, 2016–2022



From 2016 to 2022, among acute HCV cases with self-reported risk factor information provided, on average across all 7 years, the highest proportion of cases reported sexual contact with a person living with HCV as a risk factor followed by injection drug use and non-injection drug use. From 2016 to 2019, the proportion of individuals reporting history intravenous drug use increased nearly two-fold. Recently from 2021 to 2022, incarceration has begun to surpass all other risk factors. Self-reported risk factors were not mutually exclusive.

Chronic HCV

This section summarizes trends in chronic HCV cases reported to TDH from 2016 to 2022.

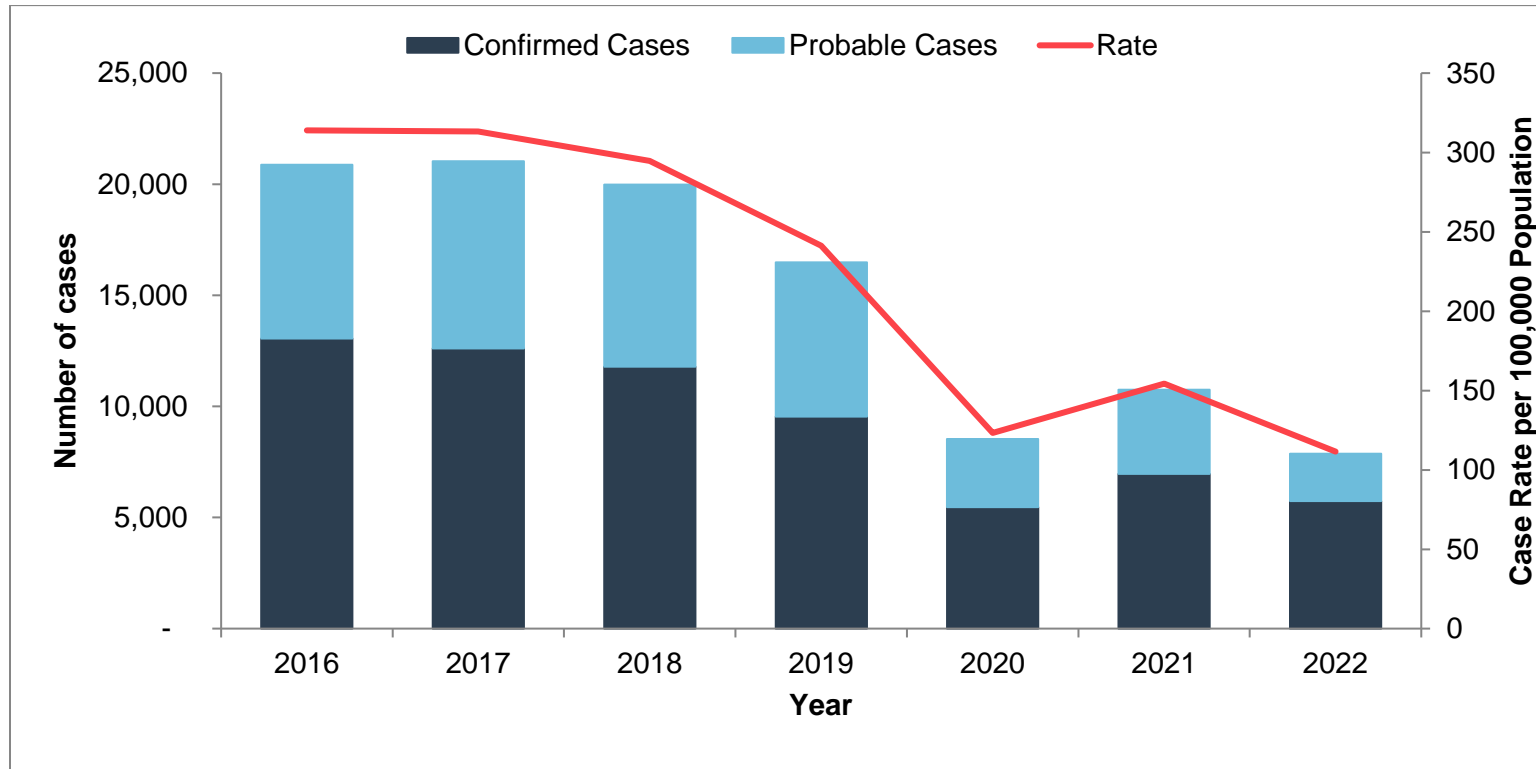
The surveillance case definition for chronic HCV can be found at:

<https://ndc.services.cdc.gov/case-definitions/hepatitis-c-chronic-2020/>

Table 18: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Chronic HCV, Tennessee, 2016–2022

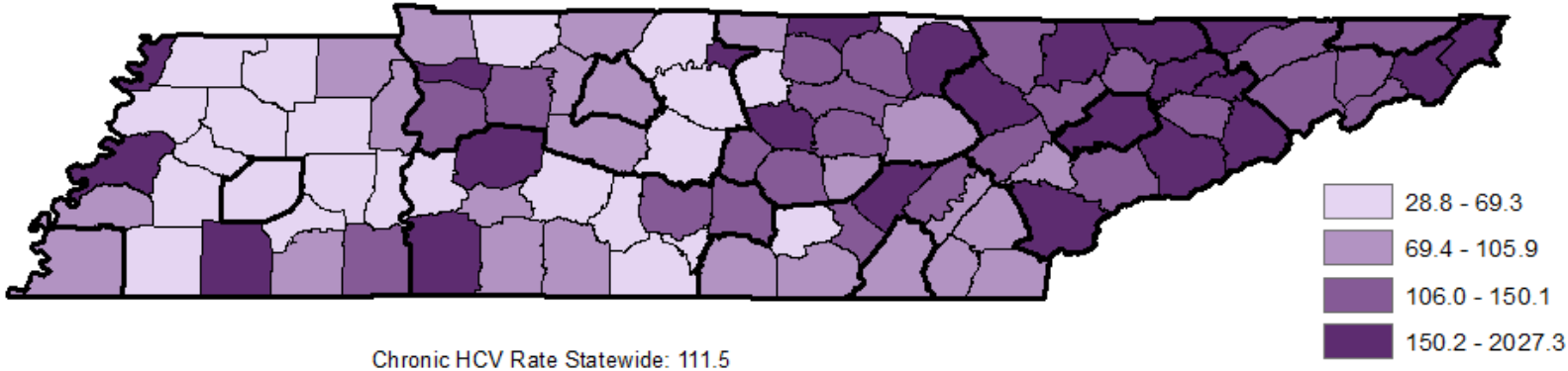
| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|--------|--------------|--------|--------------|--------|--------------|--------|--------------|-------|--------------|--------|--------------|-------|--------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 20,880 | 313.9 | 21,036 | 313.3 | 19,980 | 294.8 | 16,478 | 241.2 | 8,532 | 123.2 | 10,756 | 154.4 | 7,865 | 111.5 |
| Confirmed Only | 13,061 | 196.4 | 12,606 | 187.7 | 11,795 | 174.0 | 9,540 | 139.7 | 5,467 | 78.9 | 6,970 | 100.0 | 5,746 | 81.5 |
| Probable Only | 7,819 | 117.6 | 8,430 | 125.5 | 8,185 | 120.8 | 6,938 | 101.6 | 3,065 | 44.3 | 3,786 | 54.3 | 2,119 | 30.1 |

Figure 19: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Chronic HCV, Tennessee, 2016–2022



Enhanced chronic HCV surveillance in TN began mid-2015, with the first complete year of centralized chronic HCV data available in 2016. Rates of chronic HCV decreased from 2016 to 2020 with a temporary increase in 2021. As described in the Executive Summary, the decrease observed in 2020 was likely due to the COVID-19 impact on testing. The rate has since dropped from 2021 to 2022.

Figure 20: Rates (per 100,000 population) of Confirmed and Probable Chronic HCV by County, Tennessee, 2022



In 2022, chronic HCV cases were reported in all counties in TN. The counties with the highest chronic HCV rates were largely found in the East and Northeast Public Health Regions; however, there were some counties in the Upper Cumberland, South Central, and West Public Health Regions with high chronic HCV rates as well.

Table 19: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Chronic HCV by Sex, Tennessee, 2016–2020*

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|--------|--------------|--------|--------------|--------|--------------|--------|--------------|-------|--------------|--------|--------------|-------|--------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 20,880 | 313.9 | 21,036 | 313.3 | 19,980 | 294.8 | 16,478 | 241.2 | 8,532 | 123.2 | 10,756 | 154.4 | 7,865 | 111.5 |
| Female | 8,982 | 263.6 | 8,841 | 257.2 | 8,375 | 241.3 | 6,814 | 194.8 | 3,493 | 99.2 | 4,162 | 117.4 | 2,824 | 78.7 |
| Male | 11,704 | 360.7 | 11,964 | 365.1 | 11,562 | 349.6 | 9,619 | 288.7 | 4,993 | 146.6 | 6,554 | 191.5 | 5,001 | 144.4 |

* Numbers reported in each category might not add up to the total number of cases in a year because of missing data.

From 2016 to 2022, rates of chronic HCV were consistently higher among males than females.

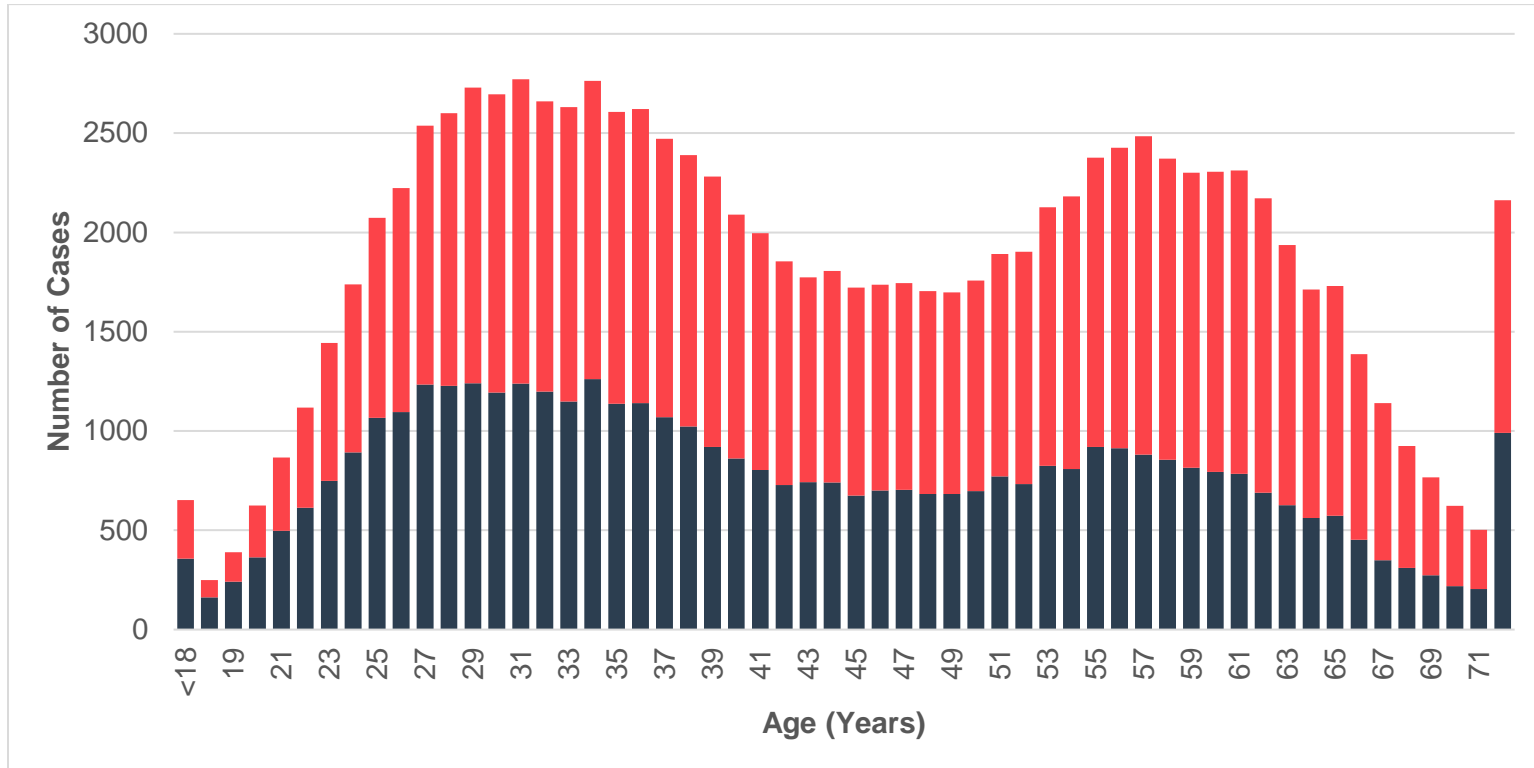
Table 20: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Chronic HCV by Age Group, Tennessee, 2016–2022*

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|--------|--------------|--------|--------------|--------|--------------|--------|--------------|-------|--------------|--------|--------------|-------|--------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 20,880 | 313.9 | 21,036 | 313.3 | 19,980 | 294.8 | 16,478 | 241.2 | 8,532 | 123.2 | 10,756 | 154.4 | 7,865 | 111.5 |
| <30 | 4,309 | 166.6 | 3,945 | 151.4 | 3,865 | 147.5 | 3,023 | 115.3 | 1,489 | 56.2 | 1,678 | 63.4 | 1,102 | 41.4 |
| 30-44 | 6,277 | 498.0 | 6,338 | 499.8 | 6,770 | 528.0 | 5,813 | 447.1 | 3,031 | 227.4 | 4,161 | 306.6 | 3,274 | 236.1 |
| 45+ | 10,256 | 365.8 | 10,709 | 376.8 | 9,314 | 323.8 | 7,638 | 262.6 | 4,005 | 136.0 | 4,905 | 165.4 | 3,478 | 115.9 |
| Confirmed | 13,061 | 196.4 | 12,606 | 187.7 | 11,795 | 174.0 | 9,540 | 139.7 | 5,467 | 78.9 | 6,970 | 100.0 | 5,746 | 81.5 |
| <30 | 2,571 | 99.4 | 2,353 | 90.3 | 2,350 | 89.7 | 1,820 | 69.4 | 1,019 | 38.5 | 1,128 | 42.6 | 810 | 30.4 |
| 30-44 | 3,776 | 299.6 | 3,819 | 301.2 | 4,104 | 320.1 | 3,583 | 275.6 | 2,087 | 156.6 | 2,881 | 212.3 | 2,442 | 176.1 |
| 45+ | 6,696 | 238.8 | 6,420 | 225.9 | 5,327 | 185.2 | 4,135 | 142.1 | 2,357 | 80.1 | 2,952 | 99.5 | 2,488 | 82.9 |
| Probable | 7,819 | 117.6 | 8,430 | 125.5 | 8,185 | 120.8 | 6,938 | 101.6 | 3,065 | 44.3 | 3,786 | 54.3 | 2,119 | 30.1 |
| <30 | 1,738 | 67.2 | 1,592 | 61.1 | 1,515 | 57.8 | 1,203 | 45.9 | 470 | 17.7 | 550 | 20.8 | 292 | 11.0 |
| 30-44 | 2,501 | 198.4 | 2,519 | 198.7 | 2,666 | 207.9 | 2,230 | 171.5 | 944 | 70.8 | 1,280 | 94.3 | 832 | 60.0 |
| 45+ | 3,560 | 127.0 | 4,289 | 150.9 | 3,987 | 138.6 | 3,503 | 120.4 | 1,648 | 56.0 | 1,953 | 65.8 | 990 | 33.0 |

*Numbers reported in each category might not add up to the total number of cases in a year because of missing data.

From 2016 to 2022, rates of chronic HCV were consistently higher among the 30–44-year-old age group when compared to the other two age groups.

Figure 21: Case Counts of Confirmed and Probable Chronic HCV by Sex and Age, Tennessee, 2016–2022



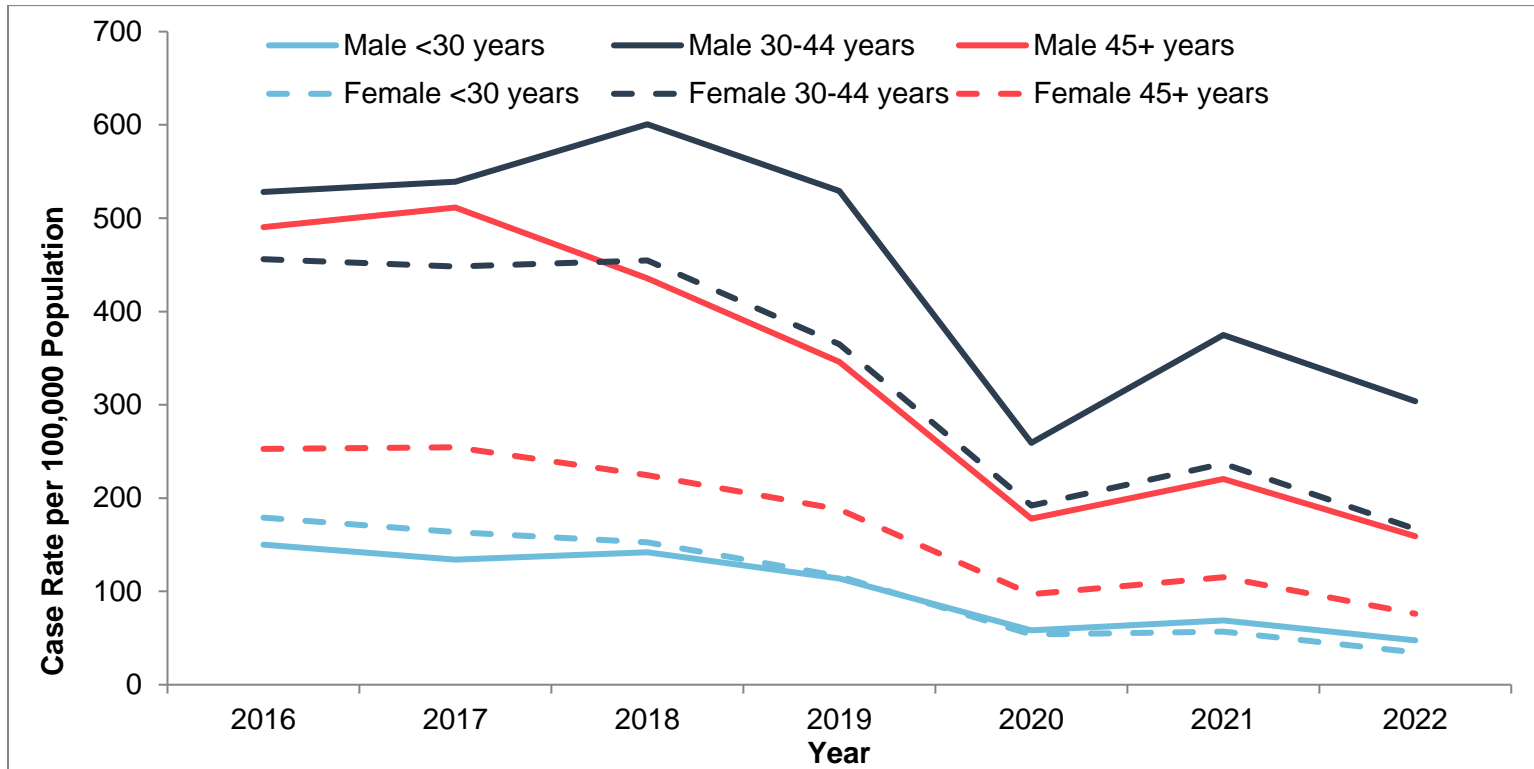
From 2016 to 2022, there was a clear bimodal distribution; the first mode among individuals less than 40 years of age and the second mode among baby boomers (persons born from 1945–1965).

Table 21: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Chronic HCV by Sex and Age Group, Tennessee, 2016–2022*

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|--------|--------------|--------|--------------|--------|--------------|--------|--------------|-------|--------------|--------|--------------|-------|--------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 20,880 | 313.9 | 21,036 | 313.3 | 19,980 | 294.8 | 16,478 | 241.2 | 8,532 | 123.2 | 10,756 | 154.4 | 7,865 | 111.5 |
| Female | 8,982 | 263.6 | 8,841 | 257.2 | 8,375 | 241.3 | 6,814 | 194.8 | 3,493 | 99.2 | 4,162 | 117.4 | 2,824 | 78.7 |
| <30 | 2,283 | 179.1 | 2,098 | 163.6 | 1,969 | 152.6 | 1,501 | 116.3 | 698 | 53.7 | 740 | 56.9 | 454 | 34.7 |
| 30-44 | 2,909 | 456.1 | 2,877 | 448.3 | 2,951 | 454.7 | 2,403 | 364.9 | 1,285 | 192.2 | 1,616 | 236.9 | 1,163 | 166.9 |
| 45+ | 3,775 | 252.7 | 3,852 | 254.5 | 3,442 | 224.7 | 2,910 | 187.8 | 1,507 | 97.2 | 1,799 | 115.0 | 1,204 | 76.1 |
| Male | 11,704 | 360.7 | 11,964 | 365.1 | 11,562 | 349.6 | 9,619 | 288.7 | 4,993 | 146.6 | 6,554 | 191.5 | 5,001 | 144.4 |
| <30 | 1,969 | 150.1 | 1,774 | 134.2 | 1,888 | 142.0 | 1,515 | 113.8 | 787 | 58.4 | 929 | 69.1 | 644 | 47.5 |
| 30-44 | 3,288 | 528.0 | 3,376 | 539.1 | 3,803 | 600.7 | 3,395 | 529.1 | 1,722 | 259.2 | 2,528 | 374.7 | 2,095 | 303.8 |
| 45+ | 6,424 | 490.4 | 6,793 | 511.4 | 5,856 | 435.6 | 4,705 | 346.1 | 2481 | 178.0 | 3,092 | 220.6 | 2,256 | 159.1 |

*Numbers reported in each category might not add up to the total number of cases in a year because of missing data.

Figure 22: Rates (per 100,000 population) of Confirmed and Probable Chronic HCV by Sex and Age Group, Tennessee, 2016–2022

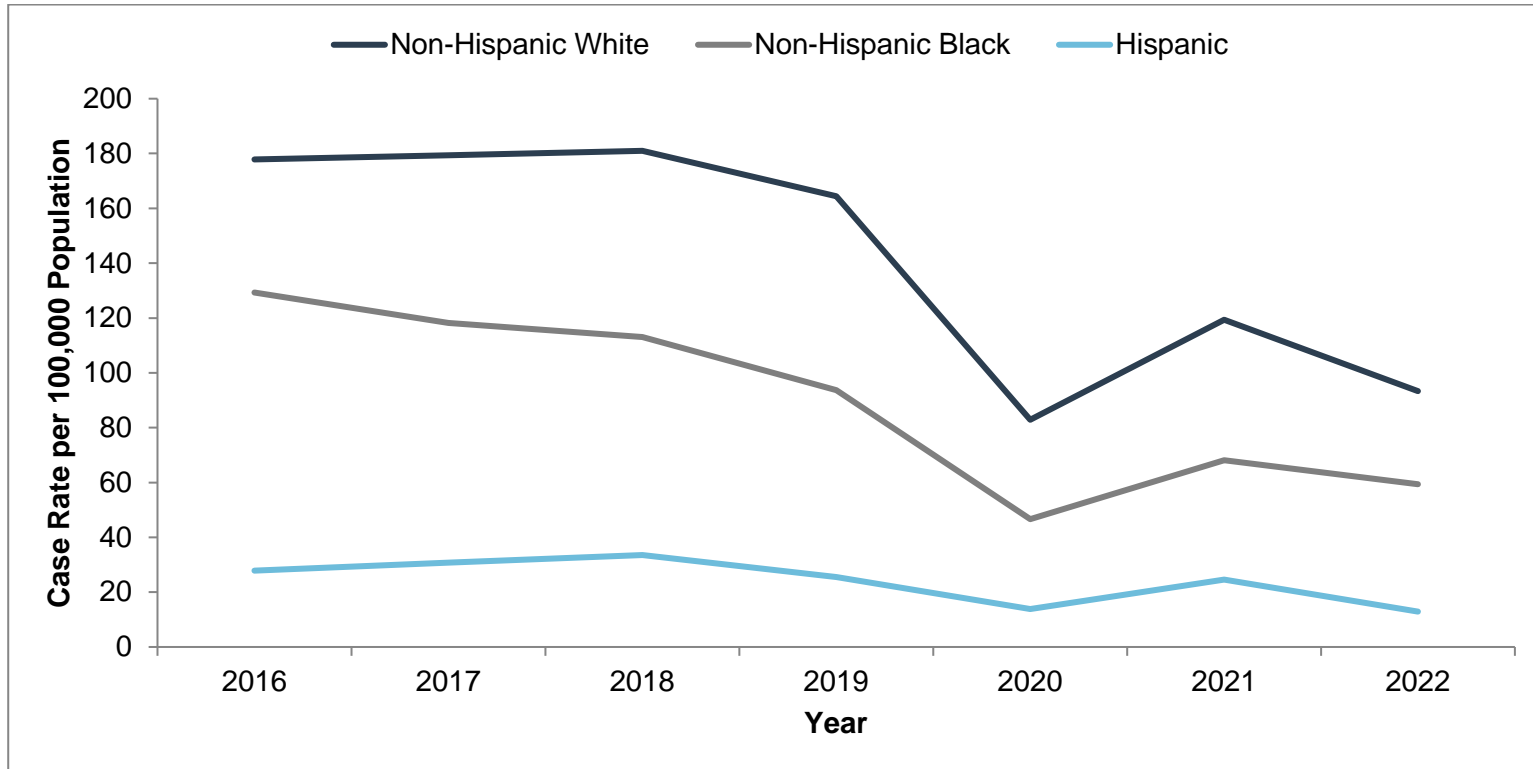


From 2016 to 2022, rates of chronic HCV among males and females were generally higher among the 30–44-year-old age group when compared to the other two age groups. Among all age groups, rates were consistently higher among males than females except in the <30-year-old age group from 2016–2019. However, from 2021 to 2022, the <30 male age group begins to have higher rates compared to the <30 female age group.

Table 22: Case Counts and Rates (per 100,000 population) of Confirmed and Probable Chronic HCV by Race/Ethnicity, Tennessee, 2016–2022

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|--------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 20,880 | 313.9 | 21,036 | 313.3 | 19,980 | 294.8 | 16,478 | 241.2 | 8,532 | 123.2 | 10,756 | 154.4 | 7,865 | 111.5 |
| Non-Hispanic White | 8,784 | 177.9 | 8,909 | 179.4 | 9,042 | 181.0 | 8,254 | 164.4 | 4,205 | 82.9 | 6,078 | 119.3 | 4,798 | 93.3 |
| Non-Hispanic Black | 1,442 | 129.3 | 1,330 | 118.2 | 1,283 | 113.1 | 1,069 | 93.7 | 538 | 46.6 | 785 | 68.2 | 685 | 59.4 |
| Hispanic | 97 | 27.8 | 112 | 30.8 | 127 | 33.5 | 100 | 25.5 | 57 | 13.9 | 105 | 24.6 | 58 | 12.9 |
| Other | 896 | 359.5 | 998 | 385.7 | 980 | 364.5 | 795 | 287.5 | 664 | 230.8 | 1,050 | 354.6 | 689 | 224.5 |
| Unknown | 9,661 | - | 9,687 | - | 8,548 | - | 6,260 | - | 3,068 | - | 2,738 | - | 1,635 | - |

Figure 23: Rates (per 100,000 population) of Confirmed and Probable Chronic HCV by Race/Ethnicity, Tennessee, 2016–2022



From 2016 to 2022, the rates of chronic HCV were consistently higher among non-Hispanic Whites for those with race/ethnicity data reported.

HCV Positive Pregnant Females and Perinatal HCV

Given the high rates of pregnancy reported among people with newly reported HCV, TDH began surveillance of HCV Positive Pregnant Females on January 1st, 2018, to quantify the burden of HCV among people giving birth and infants perinatally exposed to HCV in TN.

This section summarizes HCV trends among pregnant people and their infants in TN from 2018 to 2021. 2022 Birth Certificate Data is still provisional; therefore 2022 HCV Positive Pregnant Females and Perinatal HCV were not included in this report.

HCV Positive Pregnant Females

As there is no surveillance case definition for HCV Positive Pregnant Females, TDH developed a local case definition. This case definition was updated on January 1, 2023, historical and current cases were updated to align with this definition.

Laboratory data was used to determine the birth parent's HCV case status for each pregnancy as follows:

| Case Status | Definition |
|------------------|---|
| Confirmed | Birth parent had at least one positive HCV NAT laboratory report during pregnancy OR, in the absence of pregnancy laboratory report, at least one HCV NAT was conducted within 12 months prior to pregnancy and the last HCV NAT laboratory report prior to pregnancy was positive. |
| Probable | Birth parent's most recent HCV NAT laboratory report was conducted more than 12 months prior to pregnancy and was positive. OR Birth parent did not have HCV NAT laboratory test but had a positive anti-HCV laboratory report preceding or during pregnancy. |

Table 23: Case Counts and Rates per 1,000 Pregnancies Resulting in a Live Birth among Confirmed and Probable HCV Positive Pregnant Females, Tennessee, 2018–2021

| | 2018 | | 2019 | | 2020 | | 2021 | |
|--------------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 1,268 | 16.2 | 1,053 | 13.5 | 1,045 | 13.7 | 960 | 12.1 |
| Confirmed | 794 | 10.2 | 734 | 9.4 | 733 | 9.6 | 659 | 8.3 |
| Probable | 474 | 6.1 | 319 | 4.1 | 312 | 4.1 | 301 | 3.8 |

In 2021, there were 960 pregnancies among people with evidence of HCV during pregnancy. Since 2018, there has been a decreasing number of HCV Positive Pregnant Females.

Table 24: Case Counts and Rates per 1,000 Pregnancies Resulting in a Live Birth among Confirmed and Probable HCV Positive Pregnant Females by Age Group, Tennessee, 2018–2021

| | 2018 | | 2019 | | 2020 | | 2021 | |
|--------------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 1,268 | 16.2 | 1,053 | 13.5 | 1,045 | 13.7 | 960 | 12.1 |
| 15-24 | 259 | 10.7 | 216 | 9.1 | 177 | 7.8 | 154 | 6.8 |
| 25-29 | 524 | 21.6 | 404 | 16.9 | 409 | 17.6 | 326 | 13.7 |
| 30-34 | 322 | 16.8 | 291 | 15.0 | 311 | 16.0 | 313 | 14.9 |
| 35+ | 163 | 15.7 | 142 | 13.4 | 148 | 13.7 | 167 | 14.3 |

From 2018 to 2020, HCV Positive Pregnant Female rates were consistently higher among the 25–29-year-old age group when compared to the other age groups; however, in 2021 the 30–34-year-old age and 35+ age groups had higher rates when compared to the other age groups.

Table 25: Case Counts and Rates per 1,000 Pregnancies Resulting in a Live Birth among Confirmed and Probable HCV Positive Pregnant Females by Race/Ethnicity, Tennessee, 2018–2021

| | 2018 | | 2019 | | 2020 | | 2021 | |
|--------------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 1,268 | 16.2 | 1,053 | 13.5 | 1,045 | 13.7 | 960 | 12.1 |
| Non-Hispanic White | 1,156 | 22.2 | 970 | 18.9 | 944 | 19.0 | 874 | 16.7 |
| Non-Hispanic Black | 76 | 4.8 | 50 | 3.1 | 78 | 5.1 | 64 | 4.2 |
| Hispanic | 25 | 3.3 | 19 | 2.3 | 18 | 2.1 | 14 | 1.5 |
| Other | 8 | 3.4 | 11 | 4.8 | 4 | 1.8 | 5 | 2.3 |
| Unknown | 3 | 14.9 | 3 | 18.3 | 1 | 18.5 | 3 | 30.3 |

From 2018 to 2021, HCV Positive Pregnant Female rates were consistently higher among non-Hispanic Whites.

Perinatal HCV

The surveillance case definition for perinatal HCV can be located here:

<https://ndc.services.cdc.gov/case-definitions/hepatitis-c-perinatal-infection-2018/>

Laboratory data was used to determine perinatal HCV case status for each live birth as follows:

| Case Status | Definition |
|-------------|---|
| Confirmed | Child had positive HCV NAT laboratory report between 2 and 36 months of age |
| Probable | Child had positive anti-HCV laboratory report between 18 and 36 months of age |
| Suspect | Child was born to a person with HCV (probable or confirmed) during pregnancy OR child had positive HCV NAT laboratory report at less than 2 months of age OR child had positive anti-HCV laboratory report at less than 18 months of age |
| Not a Case | Child was not known to be born to a person with HCV (probable or confirmed) during pregnancy and had only negative HCV NAT laboratory report OR child was born to a person with HCV (probable or confirmed) during pregnancy and had only negative HCV NAT laboratory report between 2 and 36 months of age and/or negative anti-HCV laboratory report between 0 and 36 months of age |

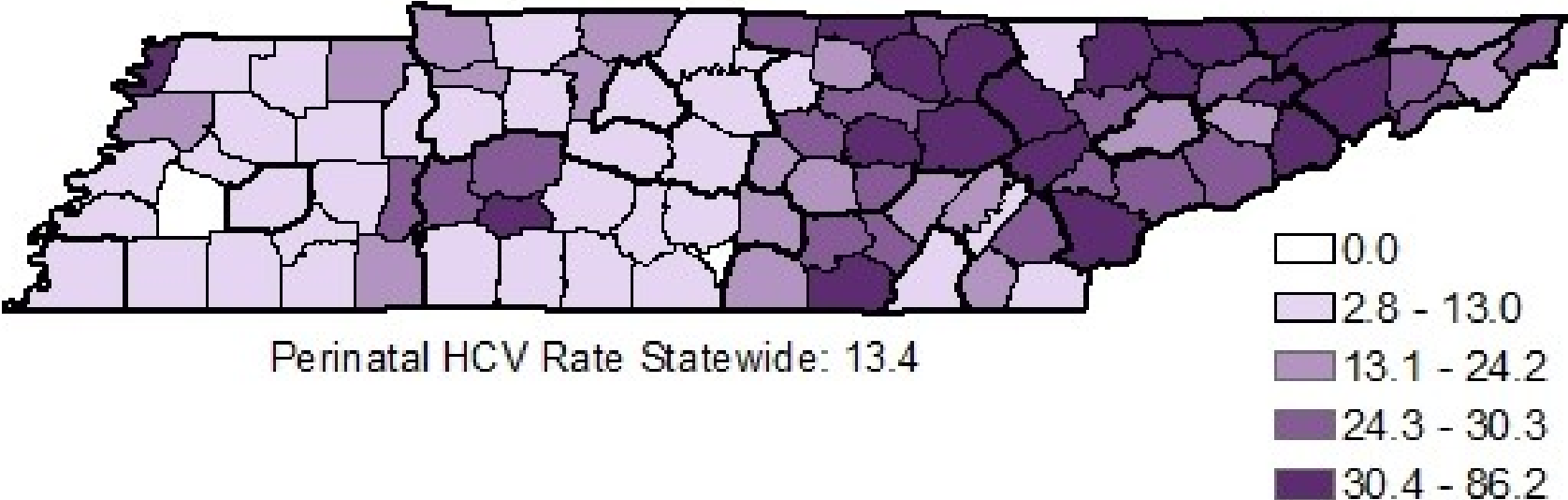
Table 26: Case Counts and Rates per 1,000 Live Births Among Perinatal HCV Exposures by Year of Birth and Case Status, Tennessee, 2018–2021*

| | 2018 | | 2019 | | 2020 | | 2021 | |
|------------------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Exposures | 1,371 | 17.0 | 1,152 | 14.3 | 1,158 | 14.7 | 1,140 | 13.9 |
| Confirmed | 17 | 0.2 | 22 | 0.3 | 25 | 0.3 | 16 | 0.2 |
| Probable | 5 | 0.1 | 5 | 0.1 | 3 | 0.0 | 4 | 0.0 |
| Suspect | 999 | 12.4 | 748 | 9.3 | 728 | 9.2 | 779 | 9.5 |
| Not a Case | 350 | 4.3 | 377 | 4.7 | 402 | 5.1 | 341 | 4.2 |

*This only includes children with known perinatal exposure to HCV

In 2021, there were 1,140 infants perinatally exposed to HCV. Of the 1,140 infants perinatally exposed to HCV, the majority (n=779; 68.3%) did not have proper HCV testing reported to TDH, thus leaving them a suspect case. A total of 16 infants were determined to have confirmed or probable HCV and 341 infants were determined not to have HCV. Of note, appropriate testing of infants remains a significant issue; however, given that anti-HCV negative results are not reportable in TN, it is possible infants are being tested and testing anti-HCV negative.

Figure 24: Rates of Perinatal HCV Exposures (per 1,000 Live Births) by County, Tennessee, 2021



In 2021, perinatal HCV exposures were reported in 93 counties in TN. Among these counties, 56 counties (59%) had perinatal HCV exposure rates higher than the statewide perinatal HCV exposure rate.

The counties with the highest perinatal HCV exposure rates were largely found in East, Northeast and Upper Cumberland Public Health Regions. Some counties demonstrated that 3% to 9% of all live births in 2021 were perinatally exposed to HCV.

Persons Living with HCV

This section summarizes demographics of people in TN currently living with HCV. This total is based on lab results reported to the Tennessee Department of Health from 2000 to 2021.¹⁵ It includes people with an Ab+ with no HCV RNA result or people whose last HCV RNA result was positive. Any person no longer living in TN based on their last reported lab result or any one deceased has been removed from the total.^{16,17}

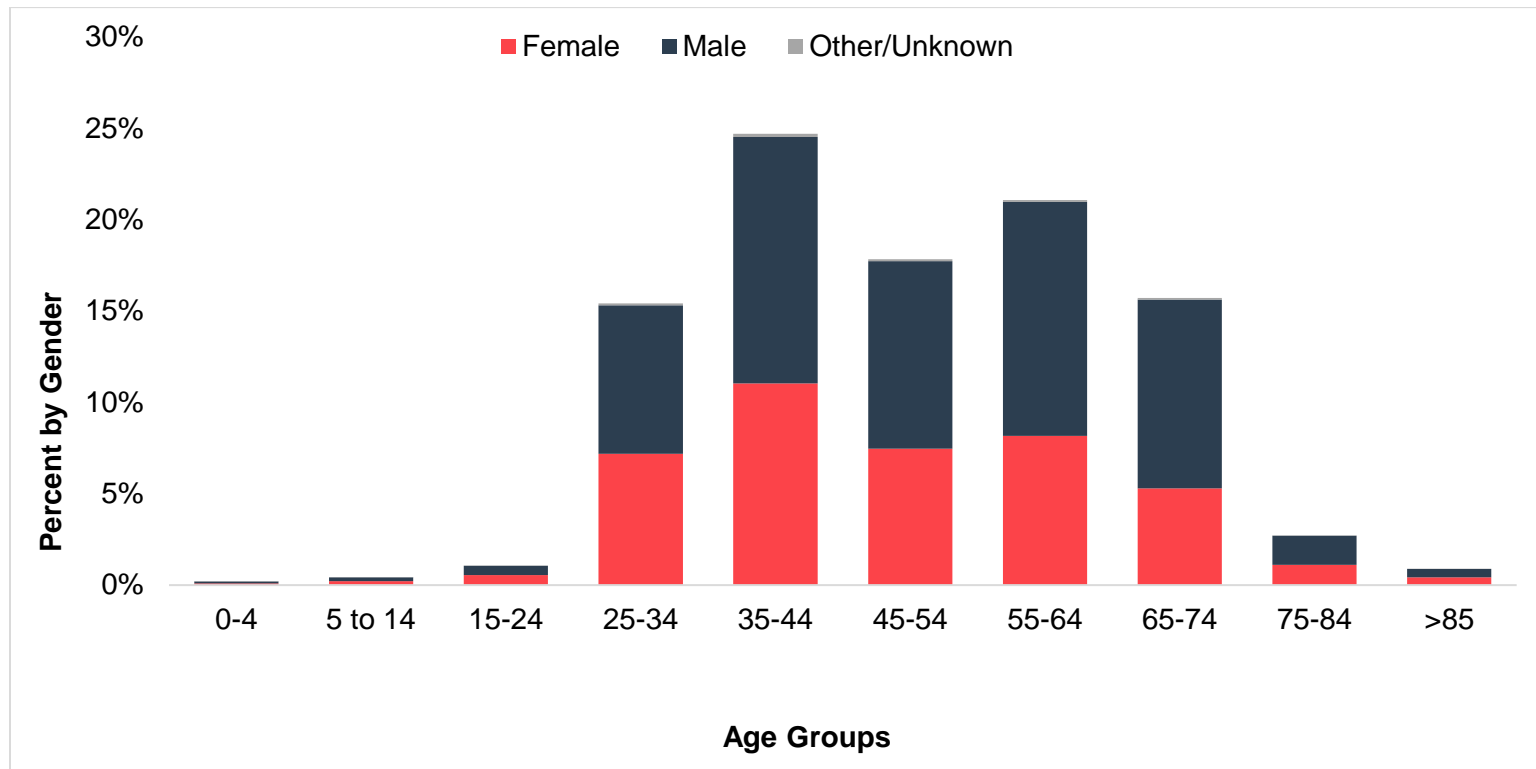
115,608
persons were living
with HCV in 2021

¹⁵ Replication Database. Tennessee National Electronic Disease Surveillance System (NEDSS) Base System (NBS). Accessed October 22, 2023.

¹⁶ Ibid.

¹⁷ Tennessee Department of Health Death Statistical File, 2000–2021. Accessed October 22, 2023.

Figure 25: Case Counts of Persons Living with HCV by Sex and Age, Tennessee, 2021



In 2021, the majority of persons living with HCV belonged to the age groups 35–44 and 55–64 following national trends.¹⁸

¹⁸ <https://www.cdc.gov/nchstp/newsroom/fact-sheets/hepatitis/hepatitis-c-by-the-numbers.html>

HBV and HCV-Associated Mortality

This section summarizes mortality trends among individuals with HBV and/or HCV infection listed as one of multiple causes of death per the following ICD-10 Codes (B16, B17.0, B18.0, B18.1, B17.1 and B18.2) and reported to the TDH Division of Viral Statistics from 2016 to 2021.^{19,20,21} Of note, mortality data for 2022 was not available at the time of report dissemination.

Although death certificate data can help characterize deaths associated with HBV and/or HCV, underreporting of HBV and/or HCV as an underlying cause or contributing cause of death does occur. Further, the 2020 mortality rate should be interpreted with caution, as there were overall increases in deaths due to the COVID-19 pandemic.

For the general population of TN from 2016-2021, the leading underlying cause of death was related to heart disease, which accounted for 19.3% of deaths, and the median age of death was 74 years.

Table 27: Frequently Listed Underlying Causes of Death among Individuals with HBV and/or HCV Infection as One of Multiple Causes of Death, Tennessee, 2016–2021

| Underlying Cause of Death | Percent of Underlying Causes of Death | | |
|---|---------------------------------------|---------------|-------------|
| | HBV Infection | HCV Infection | HBV and HCV |
| Viral Hepatitis | 40.9% | 31.1% | 43.2% |
| Hepatocellular Carcinoma | 7.0% | 12.9% | 6.9% |
| Malignant Neoplasms | 11.2% | 10.4% | 6.0% |
| Alcoholic Liver Disease | 6.5% | 9.0% | 9.5% |
| Heart Disease | 6.0% | 7.0% | 6.0% |
| Substance Use Disorder or Accidental Overdose | 3.3% | 3.9% | 9.5% |
| Malignant Neoplasm of Liver | 2.8% | 3.3% | 0.9% |
| Chronic Liver Disease & Cirrhosis | 1.9% | 3.1% | 3.4% |

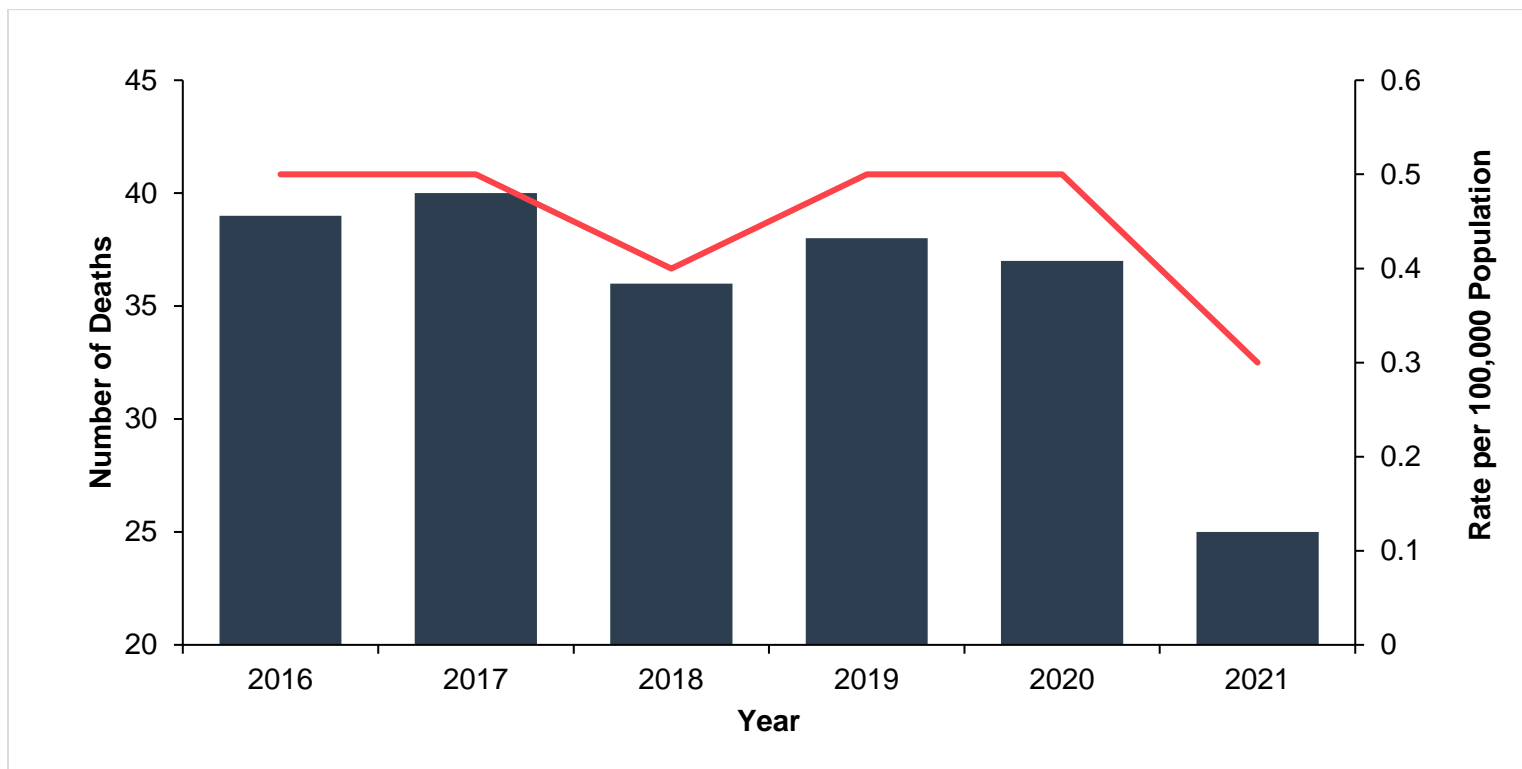
Some of the leading underlying causes of death for those with HBV or HCV-associated deaths were related to liver disease (i.e., hepatocellular carcinoma, alcoholic liver disease, malignant neoplasm of liver, chronic liver disease and cirrhosis). Comparatively, deaths related to heart disease for those with HBV or HCV-associated deaths were 6% and 7%, respectively, while heart disease accounted for 19.3% of deaths overall.

¹⁹ <https://www.cdc.gov/hepatitis/statistics/2021surveillance/hepatitis-b/table-2.8.htm>

²⁰ <https://www.cdc.gov/hepatitis/statistics/2021surveillance/hepatitis-c/table-3.7.htm>

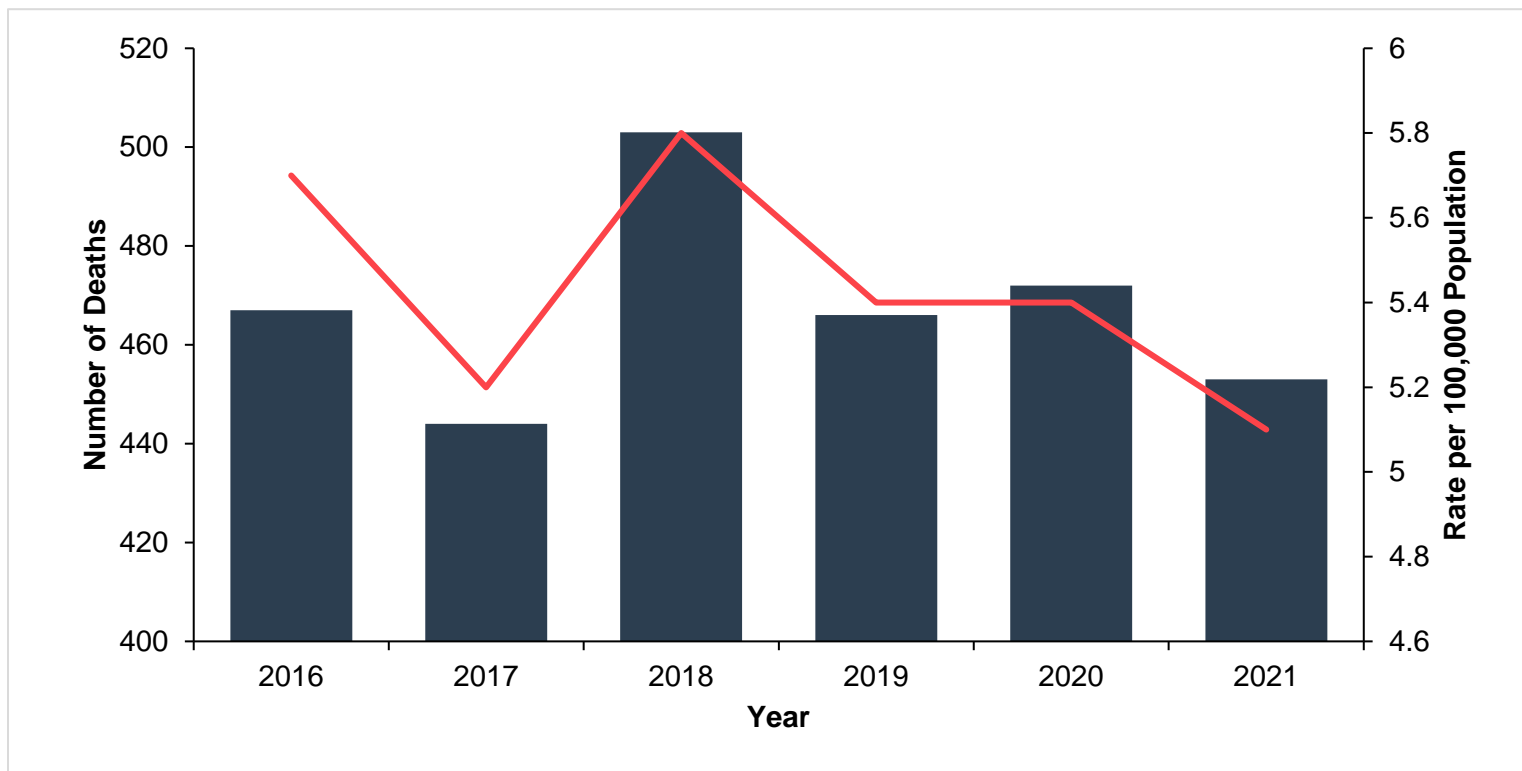
²¹ Tennessee Department of Health Death Statistical File, 2016–2021. Accessed October 11, 2023.

Figure 25: Number of Deaths and Age-Adjusted Death Rates (per 100,000 population) with HBV Listed as a Cause of Death, Tennessee, 2016–2021



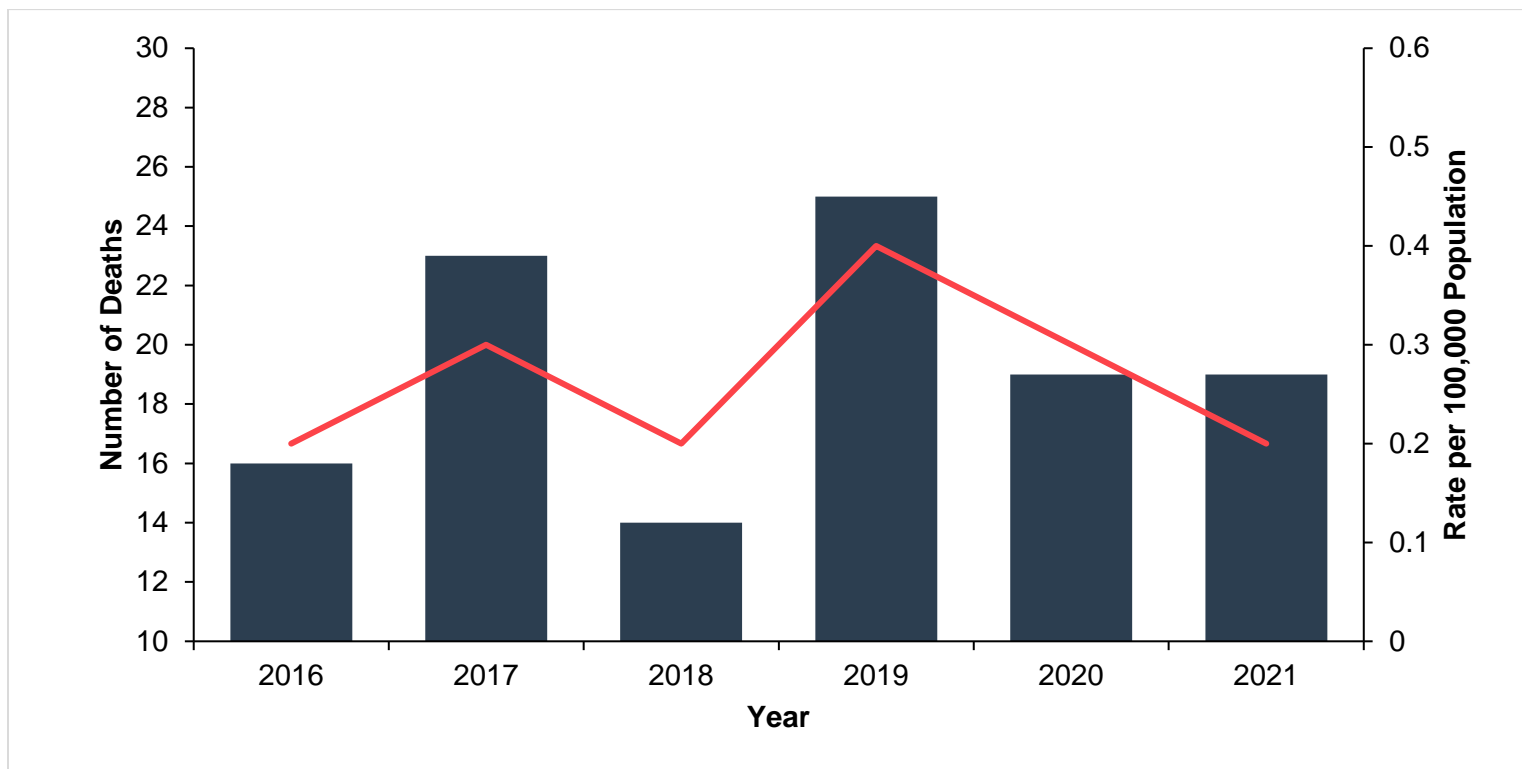
From 2016 to 2020, the age-adjusted HBV-associated death rates were relatively stable but declined substantially in 2021. The median age of HBV-associated deaths was 61 years. The age group with the highest percentage (29.3%) of HBV associated deaths were those aged 55–64.

Figure 26: Number of Deaths and Age-Adjusted Death Rates (per 100,000 population) with HCV Listed as a Cause of Death, Tennessee, 2016–2021



Age-adjusted HCV-associated death rates substantially increased from 2017 to 2018 and slightly increased again from 2019 to 2020. From 2020 to 2021 the rate declined. From 2016 to 2021 the median age of HCV-associated deaths was 60 years old. The age group with the highest percentage (44.7%) of HCV-associated deaths were those aged 55–64.

Figure 27: Number of Deaths and Age-Adjusted Death Rates (per 100,000 population) with HBV and HCV Co-Infection Listed as a Cause of Death, Tennessee, 2016–2021



From 2016 to 2021 the median age of HBV and HCV co-infection-associated deaths was 52 years old. The age group with the highest percentage (41.3%) of co-infection associated deaths were those aged 45–54. HBV and HCV co-infection associated deaths made up 35% of all HBV related deaths and 4% of those for HCV.

Table 28: Number of Deaths and Age-Adjusted Death Rates (per 100,000 population) with HBV or HCV Listed as a Cause of Death, by Sex, Tennessee, 2016–2021

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | |
|--------------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 522 | 7.9 | 507 | 7.6 | 553 | 8.2 | 529 | 7.7 | 528 | 7.9 | 497 | 7.1 |
| Female | 161 | 4.7 | 159 | 4.6 | 164 | 4.7 | 153 | 4.4 | 156 | 4.4 | 137 | 3.9 |
| Male | 361 | 11.1 | 348 | 10.6 | 389 | 11.8 | 376 | 11.3 | 372 | 10.9 | 360 | 10.5 |

From 2016 to 2021, the age-adjusted death rates associated with HBV or HCV were consistently higher among males than females.

Table 29: Number of Deaths and Age-Adjusted Death Rates (per 100,000 population) with HBV or HCV Listed as a Cause of Death, by Race/Ethnicity, Tennessee, 2016–2021

| | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | |
|--------------------|-------|-------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|
| | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Total Cases | 522 | 7.9 | 507 | 7.6 | 553 | 8.2 | 529 | 7.7 | 528 | 7.6 | 497 | 7.1 |
| Non-Hispanic White | 394 | 8.0 | 379 | 7.6 | 445 | 8.9 | 424 | 8.4 | 404 | 8.0 | 403 | 7.9 |
| Non-Hispanic Black | 114 | 10.2 | 110 | 9.8 | 95 | 8.4 | 90 | 7.9 | 108 | 9.4 | 79 | 6.9 |
| Hispanic | 5 | 1.4 | 3 | 0.8 | 5 | 1.3 | 5 | 1.3 | 6 | 1.5 | 3 | 0.7 |
| Other | 7 | 2.8 | 13 | 5.1 | 5 | 1.9 | 8 | 2.9 | 9 | 3.1 | 11 | 3.7 |
| Unknown | 2 | - | 2 | - | 3 | - | 2 | - | 1 | - | 1 | - |

From 2016 to 2021, the age-adjusted death rates associated with HBV or HCV were highest among non-Hispanic Blacks in 2016, 2017, and 2020 and non-Hispanic Whites in 2018, 2019 and 2021.

Glossary

Acute Viral Hepatitis: The early stage of a viral infection of the liver most commonly caused by one of three different hepatitis viruses (A, B, or C). Signs and symptoms of acute viral hepatitis include yellowing of the skin or eyes (jaundice), abdominal pain, vomiting, nausea, diarrhea, malaise, grey-colored stools, or dark urine.

Chronic Viral Hepatitis: A long-term illness that occurs when HBV or HCV remains in a person's body. Chronic viral hepatitis can lead to serious liver problems, including cirrhosis (scarring of the liver) or liver cancer.

Hepatitis B Virus (HBV): A double-stranded deoxyribonucleic acid (DNA) virus in the family Hepadnaviridae and genus *Orthohepadnavirus*. **HBV is vaccine preventable.**

Hepatitis B Core Antibody Total (anti-HBc): The presence of anti-HBc indicates previous or ongoing infection with HBV in an undefined time frame.

Hepatitis B Core IgM Antibody (IgM anti-HBc): The presence of IgM anti-HBc indicates recent infection with HBV (≤ 6 months).

Hepatitis B Surface Antibody (anti-HBs): The presence of anti-HBs indicates recovery and immunity from HBV, either naturally or through vaccination.

Hepatitis B Surface Antigen (HBsAg): The presence of HBsAg indicates that the person is living with HBV and can transmit the virus to others.

Probable Acute Hepatitis B (Local TDH Definition): 1) signs or symptoms (jaundice or ALT >100) of HBV, positive HBsAg, and unknown IgM anti-HBc; **OR** 2) in the absence of both signs and symptoms of HBV, HBsAg positive and positive IgM anti-HBc.

Hepatitis C Virus (HCV): An enveloped, single-stranded ribonucleic acid (RNA) virus in the family Flaviviridae and genus *Hepacivirus*. **HCV is not vaccine preventable.**

Hepatitis C Antibody (anti-HCV): The presence of antibodies to HCV in the blood indicates previous or current HCV infection.

Nucleic Acid Test (NAT): A molecular technique that tests for the presence of an infectious organism by testing for the presence of viral DNA (for HBV) and viral RNA (for HCV). NAT testing can be quantitative or qualitative and includes polymerase chain reaction (PCR) and genotype tests. The presence of viral DNA (for HBV) and viral RNA (for HCV) indicates the person is currently living with HBV and/or HCV.

Sustained Virologic Response (SVR): Patients are considered cured of HCV when the virus remains undetectable in their blood 12 weeks after the completion of their treatment, which is also known as a sustained virologic response.

Vertical Transmission (Perinatal Transmission): A pathogen transmitted from mother to baby in pregnancy or during childbirth. Both HBV and HCV can be transmitted vertically.

Window Period: The period of time after a person is exposed to a communicable disease but before evidence of infection are detectable via testing. During the window period, a patient's antibody and DNA (HBV) or RNA (HCV) tests will be negative even though the patient is living with the virus.

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