MDHHS

Michigan Department of Health & Human Services

2021 Hepatitis B and C Annual Surveillance Report

Viral Hepatitis Surveillance and Prevention Unit

Updated May 18, 2022

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Viral Hepatitis Data Summary

Table 1. Summary of Demographic Information by Type of Hepatitis, Michigan, 2021

	Acute Hepatitis B	% Acute Hepatitis B	Chronic Hepatitis B	% Chronic Hepatitis B	Acute Hepatitis C	% Acute Hepatitis C	Chronic Hepatitis C	% Chronic Hepatitis C	MI Population	% MI Population
n	36	100%	642	100%	129	100%	4,412	100%	9,973,907	100%
Sex										
Male	22	61%	397	62%	78	60%	2,639	60%	4,911,965	49%
Female	14	39%	243	38%	51	40%	1,758	40%	5,061,942	51%
Unknown	0	0%	2	0%	0	0%	15	0%	0	0%
Race and Ethnicity										
White or Caucasian	30	83%	191	30%	107	83%	2,524	57%	7,428,622	74%
Black or African American	3	8%	158	25%	4	3%	750	17%	1,342,592	13%
Hispanic	1	3%	14	2%	3	2%	125	3%	521,203	5%
Asian	0	0%	119	19%	1	1%	43	1%	314,736	3%
American Indian or Alaskan Native	1	3%	2	0%	1	1%	40	1%	42,931	0%
Other	0	0%	41	6%	4	3%	268	6%	323,823	3%
Unknown	1	3%	117	18%	9	7%	662	15%	0	0%
Age										
Mean	47	-	51	-	41	-	48	-	n/a	-
Median	44	-	51	-	36	-	45	-	40	-
Range	31-75	-	4-97	-	18-99	-	5-100	-	n/a	-
0-19 years	0	0%	16	2%	2	2%	36	1%	2,427,988	24%
20-29 years	0	0%	58	9%	34	26%	569	13%	1,373,662	14%
30-39 years	13	36%	121	19%	38	29%	1,158	26%	1,204,555	12%
40-49 years	10	28%	104	16%	14	11%	649	15%	1,193,489	12%
50-59 years	8	22%	134	21%	16	12%	684	16%	1,374,362	14%
60+ years	5	14%	209	33%	25	19%	1,311	30%	2,399,851	24%
Unknown	0	0%	0	0%	0	0%	5	0%	0	0%

*Other MI population includes 2020 5-year ACS census estimates of "some other race" and "two or more races"

The summary table above was created to illustrate the differences in the demographic make-up between the various viral hepatitis classifications. For instance, males were more likely to have had a diagnosis of all viral hepatitis classifications in 2021. There are some notable racial differences among reported hepatitis cases. Asians had a higher proportion of hepatitis B diagnoses when compared to hepatitis C. White/Caucasians comprise a large majority of the acute hepatitis C cases, accounting for nearly 90% of cases reported with a known race. While American Indians and Alaskan Natives make up a minority of all cases, it should be noted that they are more likely to have a hepatitis C diagnosis than a hepatitis B diagnosis. The mean age for cases of acute hepatitis C is lower in comparison to the other viral hepatitis case classifications. More detailed information on each viral hepatitis case classification can be found in subsequent sections of this report.

This report presents hepatitis B and C data collected from case reports submitted to the Michigan Disease Surveillance System (MDSS) for calendar year 2021. Performing surveillance for viral hepatitis infections is important for identifying trends in rates of infection, characterizing high-risk groups, informing and evaluating prevention programs, and identifying outbreaks. Below is a summary of the key findings from this year's report for the various hepatitis B and C case classifications, focus populations, and hepatitis-related health outcomes.

Acute Hepatitis B

- There were 36 cases of acute hepatitis B infection reported in Michigan in 2021 for a rate of 0.36 cases per 100,000 people. This is below the most recent national rate of acute HBV infection (1.00 per 100,000).
- Case follow-up and completion of epidemiological risk factors was completed for 94% of acute hepatitis B cases in 2021.
- Use of street drugs in the six months prior to diagnosis was the most commonly reported risk factor among 2021 acute hepatitis B cases.

Chronic Hepatitis B

- There were 642 new chronic hepatitis B diagnoses reported in Michigan in 2021 for a rate of 6.44 cases per 100,000 people.
- Males continue to exhibit higher rates of chronic hepatitis B than females since 2004.
- Asians are disproportionately affected by chronic hepatitis B with an infection rate of 37.81 per 100,000, compared to the state average of 6.44.
- For the fifth consecutive year, the proportion of chronic hepatitis B cases that are foreign-born was 60% or more.

Acute Hepatitis C

- There were 129 cases of acute hepatitis C reported in Michigan in 2021 for a rate of 1.29 cases per 100,000 people. This is a slight decrease from 2020 and nearly matches the most recent national acute HCV rate of 1.30 cases per 100,000 reported in 2018.
- The median age of acute hepatitis C cases, 36 years old, was at least 8 years younger than that of other viral hepatitis infections and the only condition with a median age lower than that of the Michigan general population.
- Case follow-up and completion of epidemiological risk factors was completed for about 58% of acute hepatitis C cases in 2021. This is lower than previous years due to constraints on follow-up resources resulting from the COVID-19 pandemic response.
    - Where data were available, injection drug use was reported by 58% of acute hepatitis C cases.

Chronic Hepatitis C

- There were 4,412 new chronic hepatitis C diagnoses reported in Michigan in 2021 for a rate of 44.24 cases per 100,000 people.
- The rate of chronic hepatitis C is higher in Michigan males (53.73 per 100,000) versus females (34.73 per 100,000).
- American Indians and Alaskan Natives (93.17 per 100,000), the "Other Race" population (82.76 per 100,000), and Blacks (55.86 per 100,000) have a higher rate of chronic hepatitis C infection than the Michigan general population.
- Case follow-up and completion of epidemiological risk factors were completed for about 40% of chronic hepatitis C cases in 2020. This is a slight increase from 2020 but remains lower than previous years due to constraints on follow-up resources resulting from the COVID-19 pandemic response.
    - Where data were available, injection drug use was a factor shared by 54% of cases. Incarceration was a risk factor in 43% of cases. Responses that were unknown or missing were excluded from these proportions.
- Where data were available, 76.69% of chronic hepatitis C cases were reported with genotype 1 infection, 9.32% with genotype 3, and 8.62% with genotype 2.
- A marked decrease in chronic hepatitis C cases was seen in 2020. This decrease in case counts can be largely attributed to the COVID-19 pandemic and its impact on accessibility to routine screening.

Perinatal Hepatitis C

- There were 10 cases of perinatal hepatitis C reported in Michigan in 2021.
- The approximate average age of infants reported with perinatal hepatitis C was 24 months.
- Most infants with perinatal hepatitis C were male (80%).
- 70% of perinatal hepatitis C cases were white/Caucasian.
- 100% of perinatal hepatitis C cases were documented to be born to a hepatitis C-infected person.

Focus Populations

Hepatitis C in Adults Under 40 Years of Age

- From 2010 through 2021, the proportion of all chronic hepatitis C cases by year in adults under 40 years old has nearly doubled (from 22% in 2010 to 40% in 2021).
- A concurrent increase in heroin use has been evident within the same timeframe.
    - History of injection drug use was reported in 78.0% of hepatitis C patients aged 18-39 years.
    - Between 2010 and 2021 there has been a 45% increase in Michigan heroin substance use treatment admissions.
    - From 2010 through 2020 heroin overdose deaths in Michigan have increased by 119%.
- The opioid epidemic has impacted both young males and females. As a result, we have seen 36 cases of perinatal hepatitis C due to vertical transmission over the last seven years, and a rate of 624.1 instances of treated neonatal abstinence syndrome (NAS) per 100,000 live births in 2020.
    - Due to underreporting of chronic HCV cases, the number of vertically transmitted perinatal HCV cases is likely underestimated. The estimated total perinatal HCV cases in Michigan between 2012-2018 ranges from 252 to 756 infants.
- This population in Michigan's northern lower peninsula and upper peninsula is disproportionately affected by hepatitis C and NAS when compared to other regions of the state.

Viral Hepatitis and Human Immunodeficiency Virus (HIV) Co-infection

- From 2004-2020, there were 903 persons in Michigan reported with hepatitis B/HIV co-infection.
    - 89.0% of these persons are male.
    - In 2021, 25 new coinfections were identified and the primary modes of transmission in the HIV/HBV co-infection group were men who have sex with men (MSM) at 52.0%.
- From 2004-2020, there were 1,813 persons in Michigan reported with hepatitis C/HIV co-infection.
    - 73.6% of these persons are male.
    - In 2021, 74 new coinfections were identified and the primary modes of transmission in the HIV/HCV co-infection group were injection drug use (IDU) at 40.5% and MSM at 56.7%.
- Incidence of HBV/HIV co-infections has continued to decline. As a result of better HIV linkage to care and treatment, co-infected individuals are living longer lives and thus prevalence of both HBV/HIV co-infection and HCV/HIV co-infection are increasing.
- Incidence of HIV/HCV co-infection had steadily declined, likely due in part to access of HCV direct-acting antivirals that can cure people living with hepatitis C in just 8-12 weeks. In 2021, however there were more HIV/HCV coinfections identified than 2019 and 2020.

Viral Hepatitis Outcomes

Hospitalization Data

- After a considerable increase in HCV-related hospitalizations from 2005 through 2017, the 2021 yearly total had decreased to it's lowest level in 15 years while total hospitalizations due to hepatitis B and HIV have remained steady.

Transplant Data

- Trends in liver transplantation may be indicative of increasing disease progression and morbidity associated with long-term HBV and/or HCV infection. The total of liver transplants has remained fairly stable over the past 15 years. The transplant waitlist had been stable over the same span until 2018, when a downward trend began and resulted in 50% reduction in persons on the waitlist from 2018-2021.

Viral Hepatitis and Liver Cancer

- The overall incidence for liver cancer in Michigan has increased by 62.0% between 2004 and 2019.
- The liver cancer rate among Black/African American males (19.0 cases per 100,000) remains high, and the gap in rates compared to white/Caucasian males (8.5 cases per 100,000) widened in 2018.
- The overall liver cancer mortality has increased by 62.6% between 2011 and 2020 in Michigan.

Viral Hepatitis-Related Mortality

- There were 310 deaths attributed to chronic hepatitis C in Michigan in 2021 which a slight increase from 2020. This is the first increase documented since 2018.

Background and Technical Notes

INTRODUCTION

The Michigan Department of Health and Human Services (MDHHS) requires medical providers and laboratories to report cases of communicable diseases, including viral hepatitis, in accordance with Michigan's Communicable Disease Rules. Cases are reported to MDHHS via the Michigan Disease Surveillance System (MDSS), a web-based communicable disease reporting system developed for the state of Michigan. Providers and laboratories can enter cases manually or send cases via HL7 electronic laboratory report (ELR). The MDSS is compliant with CDC's National Notifiable Disease Surveillance System (NNDSS) and has been in use in Michigan since 2004. Case reporting is accomplished in the MDSS via standard HTML demographic data collection fields with an enhanced viral hepatitis reporting form for disease-specific data. This report will primarily highlight acute, chronic, and perinatal hepatitis B and C surveillance, along with updates regarding populations of higher risk. MDHHS follows the current CDC Guidelines for Viral Hepatitis Surveillance and Case Management for reporting, investigating, and maintaining quality assurance in viral hepatitis surveillance. Viral hepatitis surveillance data is submitted to CDC weekly in accordance with Morbidity and Mortality Weekly Report (MMWR) notification standards. Cases are classified according to the most recently published CDC/CSTE case definitions.

BACKGROUND

"Hepatitis" means inflammation of the liver and can stem from both infectious and non-infectious causes. The most common types of viral hepatitis are hepatitis A (HAV), hepatitis B (HBV), and hepatitis C (HCV). These viruses can produce an acute illness characterized by nausea, malaise, abdominal pain, and jaundice, although many of these acute infections are asymptomatic or cause only mild disease. HAV is transmitted from person to person via ingestion of food and water contaminated with human waste while HBV and HCV are both blood-borne pathogens. Many persons infected with HBV or HCV are unaware they are infected. Unlike HAV, both HBV and HCV can produce chronic infections that often remain clinically silent for decades while increasing the risk for liver disease and hepatocellular carcinoma. Viral hepatitis is the leading cause of liver cancer and the most common reason for liver transplantation in the United States. The CDC estimates that up to 5.7 million Americans are living with chronic hepatitis; most do not know they are infected due to the often asymptomatic nature of chronic infections.

Hepatitis B Virus

HBV is transmitted through contact with the blood or body fluids of an infected person, most often through sharing infected injection drug use equipment, from sexual contact with an infected person, or during childbirth. Transmission of HBV also can occur among persons who have prolonged contact with someone who is HBV-infected (e.g., household contacts). Most people do not experience any symptoms during the acute infection phase. However, some people have acute illness with symptoms that last several weeks, including jaundice, dark urine, extreme fatigue, nausea, vomiting and abdominal pain. In some people, the hepatitis B virus can also cause a chronic liver infection that can later develop into cirrhosis of the liver or liver cancer.

The risk for chronic HBV infection decreases with increasing age at infection. Among infants who acquire HBV infection birth, as many as 90% become chronically infected, whereas 30%–50% of children infected at age 1–5 years become chronically infected. This percentage is smaller among adults, in whom approximately 5% of all acute HBV infections progress to chronic infection.

In the United States, 850,000-2.2 million persons are estimated to be infected with the virus, most of whom are unaware of their infection status. Worldwide, approximately 257 million people have chronic HBV infection and about 887,000 died in 2015 due to the acute or chronic consequences.

Effective hepatitis B vaccines have been available in the United States since 1981, and the CDC recommends vaccination of all infants at birth. Several oral drugs are now available, leading to viral suppression in 90% of patients taking one of these new oral medications.

Hepatitis C Virus

HCV is transmitted primarily through exposure to infected blood, which can result from sharing infected injection drug use equipment, needlestick injuries involving contaminated blood, receipt of blood or blood products before the availability of a standard screening test in 1992 and inadequate infection control in healthcare settings. Much less often, HCV transmission occurs among infants born to HCV-infected persons or during sexual contact. HCV is not spread by sneezing, coughing, or kissing. The best way to prevent HCV infection is by avoiding behaviors that can spread the virus, especially sharing injection drug use equipment.

The incubation period for HCV is two weeks to six months. Following initial infection, approximately 80% of people do not exhibit any symptoms. Those who are symptomatic may experience fever, fatigue, decreased appetite, nausea, vomiting, abdominal pain, dark urine, and jaundice. No laboratory distinction can be made between acute and chronic HCV infection. Diagnosis of chronic infection is made on the basis of anti-HCV positive results upon repeat testing and the presence of HCV in the blood. About 75–85% of newly infected persons develop chronic infection and 60–70% of chronically infected people develop chronic liver disease; 5–20% of chronically infected people develop cirrhosis and 1–5% die from cirrhosis or liver cancer.

With an estimate of up to 5.5 million chronically infected persons nationwide, HCV infection is the most common blood-borne infection in the United States. Worldwide, about 71 million people are chronically infected with HCV, and approximately 399,000 people die every year from HCV-related liver diseases.

Since no vaccine is available for preventing HCV infection, other prevention activities, such as not sharing injection drug equipment and consistently implementing and practicing infection control in healthcare settings, are vital. Linkage to care and treatment is critical to improving health outcomes for persons found to be infected with HCV. Such linkage is particularly important considering the major advancements that have been made in treatment of hepatitis C. HCV direct-acting antivirals have few side effects or contraindications and can clear HCV infection in 8-24 weeks with a success rate of 90-95%.

TECHNICAL NOTES

Michigan Communicable Disease Reporting Requirements
Michigan's communicable disease rules are promulgated under the authority conferred on the Department of Health and Human Services by Section 5111 of Act No. 368 of the Public Health Acts 1978, as amended, being 333.5111 of the Michigan Compiled Laws. MDHHS maintains a list of conditions, including viral hepatitis, which must be reported by physicians, other authorized health care professionals and laboratories to the local health department in which the patient resides.

Michigan is a "home rule state," in which local governments have direct control over local health departments (LHD). Therefore, LHDs function as administratively autonomous units, separate from MDHHS. MDHHS provides administration of the MDSS, expert consultation and other support as needed to LHDs. Physicians and laboratories report diseases to LHDs, which have authority to investigate and follow-up on the case in accordance with their own priorities and available resources.

Michigan has adopted standardized case definitions for hepatitis A, HIV, perinatal hepatitis B and C, and acute and chronic hepatitis B and C, which were developed and approved by the Council of State and Territorial Epidemiologists and CDC (see page 10). Cases of acute and chronic hepatitis B and C are reported via the MDSS using standardized CDC case report forms (see page 10).

Michigan Disease Surveillance System
Mandatory reporting of communicable diseases can be accomplished via the MDSS, which is a web-based communicable disease reporting system developed for the State of Michigan. The MDSS facilitates coordination among LHDs, MDHHS and federal public health agencies. The MDSS provides for the secure transfer, maintenance, and analysis of communicable disease surveillance information. The MDSS has the capability to receive electronic laboratory reports directly from laboratories via HL7 messaging. Alternatively, cases can be manually entered into the MDSS via the web portal by medical providers, laboratories or LHD staff. Cases that have been previously entered in the MDSS are matched with incoming cases by a process known as deduplication. The MDSS deduplicates both the client and the disease event based on an algorithm of name, sex, and date of birth. Case reporting is accomplished in the MDSS via standard HTML demographic data collection fields with an enhanced viral hepatitis reporting form for disease-specific data. MDHHS submits weekly de-identified individual case reports to CDC via the National Notifiable Disease Surveillance System Modernization Initiative, a computerized public health surveillance information system. The MDSS is limited by binary sex data fields. Where possible, and when not referring explicitly to data pulled from this database, MDHHS has attempted to use inclusive language around gender that still names key risk factors related to HCV transmission.

The data in this report includes all cases which meet the CDC/CSTE case definitions referenced in "Web Links to Case Definitions and Case Report Forms" on page 11. Data includes cases with referral dates between January 1, 2021, and December 31, 2021, in the MDSS.

Viral hepatitis case counts were affected by the COVID-19 pandemic. Due to the volume and nature of COVID-19, accessibility to hepatitis testing was likely restricted and resources for case follow-up were constrained.

Local Health Jurisdiction Structure
The state of Michigan is divided into eight public health preparedness regions that are serviced by 45 health jurisdictions comprised of 84 counties. These local health departments, functioning as administratively autonomous units, provide basic public health services, including communicable disease-related services, to all Michigan citizens and health care providers. The MDHHS provides expert consultation, reference level diagnostic laboratory services, and support to local health departments. MDHHS's public health laboratory performs hepatitis serologic and molecular testing for public health partners.

Determination of Rates
When calculating rates for years prior to 2010, 2000 Michigan Census data was used. 2010 Census data was used for rates in the years 2010 - 2015. The U.S. Census Bureau's American Communities Survey (ACS) five-year population estimates for 2020 were used to calculate rates in 2021. All rates were calculated per 100,000 persons in the Michigan population. Michigan Census data used in the annual report can be found at: https://data.census.gov/cedsci/

National Benchmarks
References to national benchmarks come from CDC Division of Viral Hepatitis statistics via the National Notifiable Disease Surveillance System (NNDSS). National statistics used in the annual report can be found at: http://www.cdc.gov/hepatitis/Statistics/index.htm

Data Limitations
There are several limitations to the data presented in this report. As a result, conclusions drawn from the data in this report should be interpreted with caution and with the appropriate recognition of these limitations. As described earlier, this report compiles data on new viral hepatitis diagnoses, which meet CDC/CSTE case definitions, reported to the MDSS in the year 2021. In general, this is not necessarily reflective of the true number of new infections that occurred in 2021 nor the total number of individuals infected with viral hepatitis currently living in Michigan. Rather, these numbers are a rough approximation of the number of new viral hepatitis diagnoses for the year. This should not, however, imply that these infections were contracted in the year 2021. Since most newly diagnosed viral hepatitis infections are chronic in nature, our data has limited utility in deciphering the date of exposure or infection acquisition for these cases.

New case definitions and changes in reporting capacity for acute and chronic hepatitis C cases have been implemented since 2016. The 2016 case definition change lowered the threshold for inclusion as a case. As a result, increases in HCV case counts and rates since 2015 may be, at least in part, indicative of the change in case counting methodology. The marked reduction in HCV cases for 2019 when compared with 2018 comes because of electronic lab reporting for nonreactive HCV RNA tests, which began January 1, 2019. Prior to implementation, many cases lacking a known RNA status were classified as probable cases in accordance with the CDC case classification rules. Viral hepatitis case counts were also affected by the COVID-19 pandemic. Due to the volume and nature of COVID-19, accessibility to hepatitis testing was likely restricted and resources for case follow-up were constrained.

Like many reportable diseases, cases of viral hepatitis are largely underreported. CDC estimates suggest that only about 8-10% of acute HBV and 15-17% of acute HCV cases are reported each year. This is mainly due to the infections resulting in subclinical disease in most individuals. Most viral hepatitis infections are asymptomatic and thus the infected person never seeks medical care and is not aware of their infection status until symptoms of the chronic infection develop later in life. Indeed, it is estimated that up to 75% of individuals infected with HCV do not know they are infected. CDC data approximates that, nationwide, 850,000 to 2.2 million individuals (about 0.3-0.7% of the U.S. population) and 3.5 million (about 1% of the U.S. population) are infected with HBV and HCV respectively. Extrapolating that to the Michigan population, we would then expect approximately 30,000-70,000 Michiganders to be infected and living with HBV and 107,000 with HCV.

It should be noted that individuals who clear their HCV infection spontaneously (in about 25% of those exposed to the virus) or via antiviral treatment are still counted as cases in our disease surveillance system and are not removed from our case counts. Also, individuals who are repeatedly infected with HCV are only counted once in their lifetime in our surveillance system.

The Michigan Department of Corrections (MDOC) conducts HCV screening for new inmates, and they report cases to the MDSS as with any provider. Inmates who are positive for HCV are entered into the MDSS under the county where their correctional facility is located. All MDOC cases are removed from LHD case counts.

Enhanced Viral Hepatitis Surveillance, 2013-current
Starting in 2013 the Viral Hepatitis Unit initiated a plan to improve viral hepatitis surveillance in Michigan. New surveillance activities in this plan included: additional deduplication of cases in the MDSS, active surveillance of cases of public health importance, recruitment of laboratories to report into the MDSS electronically, and enhanced auditing and quality assurance of acute and chronic viral hepatitis cases. These enhancements to routine surveillance activities resulted in more reliable and complete information on viral hepatitis diagnoses. Large discrepancies in the data between 2013 and prior years may be a result of these enhanced surveillance efforts and not necessarily indicative of true disease trends.

Web Links to Case Definitions and Case Report Forms
Please refer to these National Notifiable Disease Surveillance System Case Definitions.

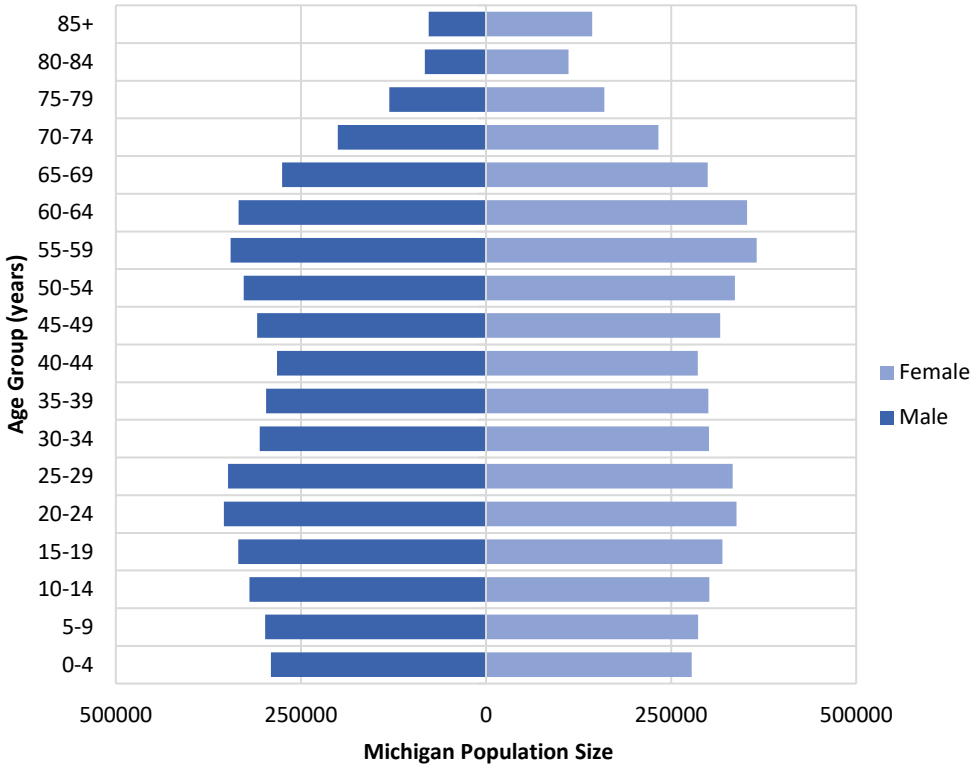
Michigan Viral Hepatitis Case Report Forms

- Hepatitis A
- Perinatal Hepatitis B
- Acute Hepatitis B
- Chronic Hepatitis B
- Perinatal Hepatitis C
- Acute Hepatitis C
- Chronic Hepatitis C

Michigan Census and Demographics

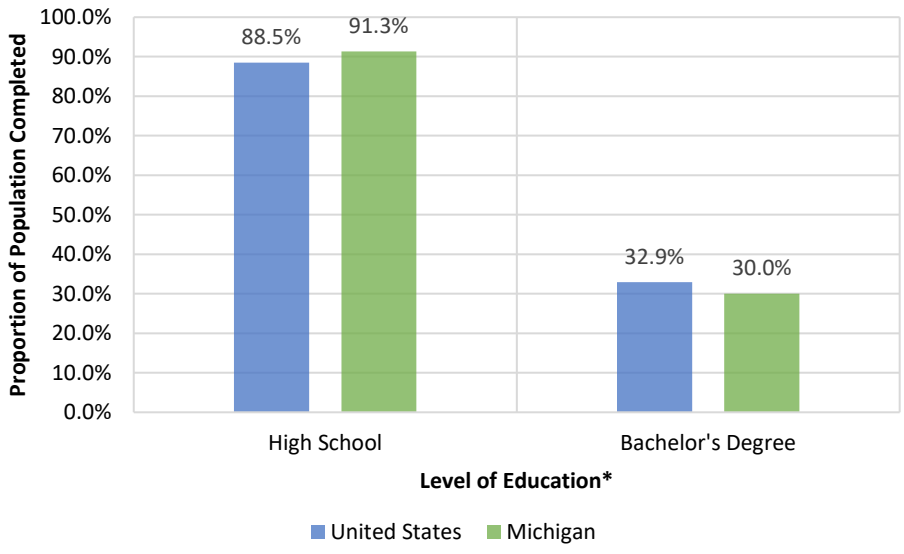
Population by Age, Sex & Education

Figure 1.1 Age and Sex: Michigan, 2020



In 2020, the Michigan population was 9,973,907; the 10th most populous state in the United States. Persons born between 1945 through 1965 amounted to approximately 27% of the total population. Females and males made up approximately the same proportion, but there was a notably higher percentage of females than males among the older population (75+ years old). About 78% of the total population was 18 years old or greater, and residents aged 65 and older comprised 17.1% of the total population. The median age was 40 years old.

Figure 1.2 Level of Education: Michigan and the U.S., 2020

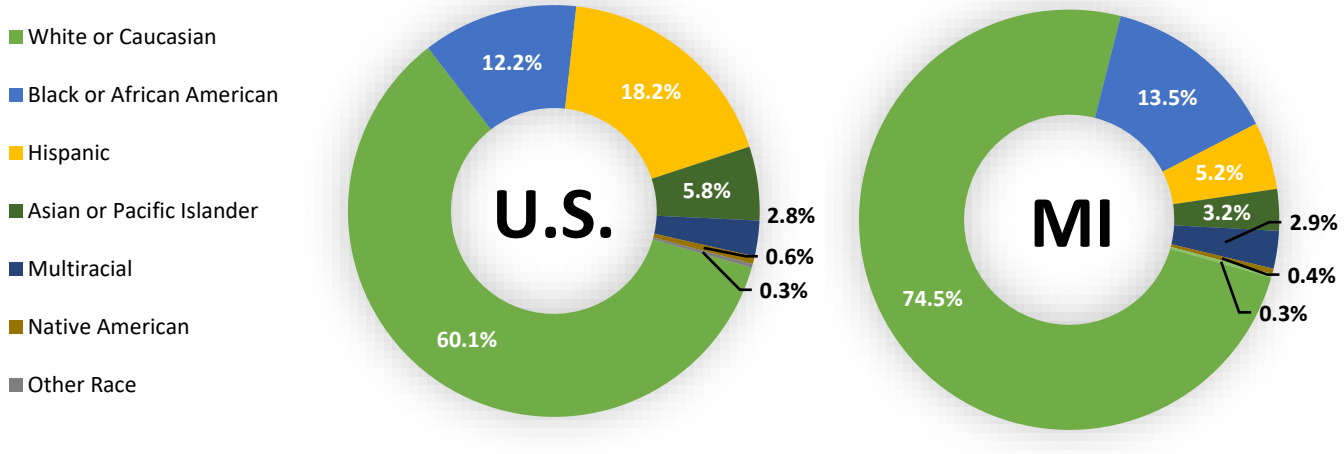


Looking at those aged 25 years and older, 91.3% of Michigan's population completed high school-which is greater than the national benchmark of 88.5%. A higher percentage of the national population, however, completed a bachelor's degree compared to the state of Michigan (32.9% vs 30.0%).

*Individuals who completed some college but did not finish a degree are still noted as high school graduates. Those considered to have completed a bachelor's degree include persons who finished any type of education higher than a bachelor's degree.

Population by Race & Ethnicity

Figure 1.3 Race and Ethnicity: Michigan and U.S., 2020



According to the 2020 ACS estimates, the racial and ethnic composition of Michigan is 74.5% non-Hispanic white/Caucasian; 13.5% Black/African American; 5.2% Hispanic; 3.2% non-Hispanic Asian alone; 2.9% multiracial or other race. Nationally, non-Hispanic white/Caucasian persons make up 60.1% of the total, and the Hispanic population is 18.2%. The proportion of male and females within each racial/ethnic group is similar. Between 2010 and 2020, there was a 33% rise in Michigan's Asian/Pacific Islander, a 54.36% increase in the Multiracial population, and a 176.17% rise in Michiganders who classify as "Other" race, while the Native American population has been reduced by 21.47%.

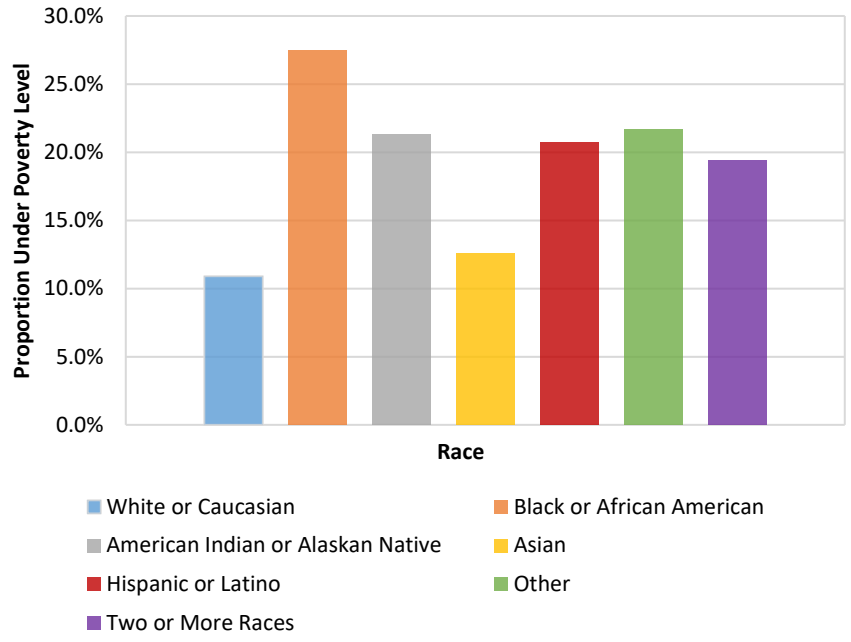
Table 1.1 Population by Race: Michigan, 2010-2020

	2010 Census		2020 ACS		2010-2020	
Race	**Population Count**	**Percent of Total**	**Population Count**	**Percent of Total**	**Change**	**Percent Change**
Total Population	9,883,640	100.00%	9,973,907	100.00%	90,267	0.91%
White or Caucasian	7,569,939	76.59%	7,428,622	74.48%	-141,317	-1.87%
Black or African American	1,383,756	14.00%	1,342,592	13.46%	-41,164	-2.97%
Hispanic	436,358	4.41%	521,203	5.23%	84,845	19.44%
Asian or Pacific Islander	238,660	2.41%	317,411	3.18%	78,751	33.00%
Multiracial	190,396	1.93%	293,901	2.95%	103,505	54.36%
Native American	54,665	0.55%	42,931	0.43%	-11,734	-21.47%
Other Race	9,866	0.10%	27,247	0.27%	17,381	176.17%

Source: The United States Census Bureau

Poverty, Income & Health Insurance

Figure 1.4 Population Under the Poverty Line by Race: Michigan, 2020



The poverty line is determined at a national level each year. In 2020 a family of four would be considered in poverty if the household income in the past 12 months was under $26,496. The Black community in Michigan had the highest rate of poverty in 2020 (27.5%), while the white population (10.9%) and Asian population (12.6%) had the lowest rates of poverty. The American Indian/Alaskan Native and Hispanic/Latino populations, along with the multiracial population, showed similar percentages under the poverty line (approximately 19-22%). These proportions are all slightly lower than the previous data year.

In 2020, about 95% of Michigan's population was covered by public or private insurance, which was slightly higher than the U.S. population (91%). Consequently, the uninsured proportion of Michigan's population was smaller than the national proportion (5.4% vs 8.7%).

Figure 1.5 Health Insurance Coverage, Michigan and the U.S., 2020

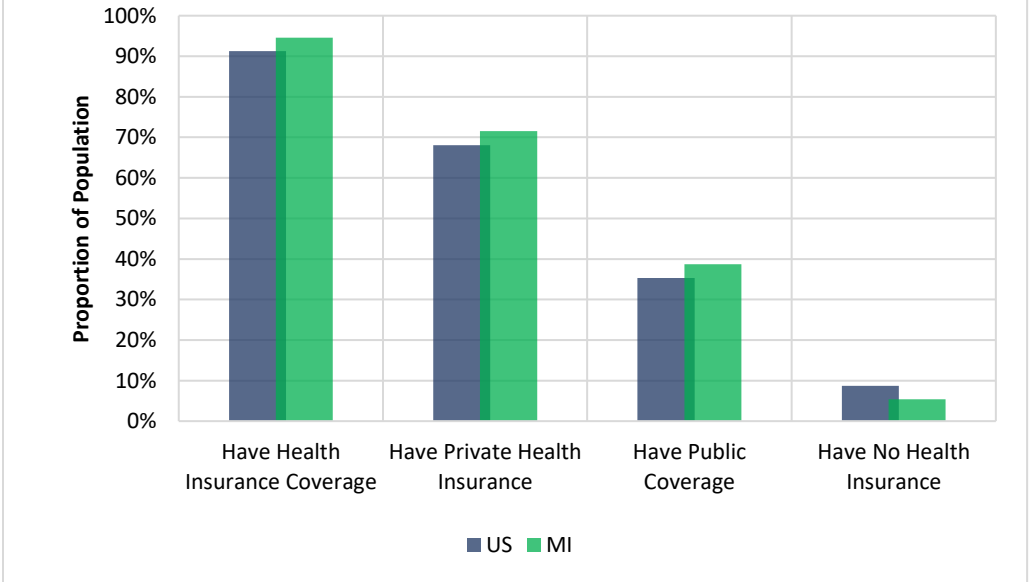
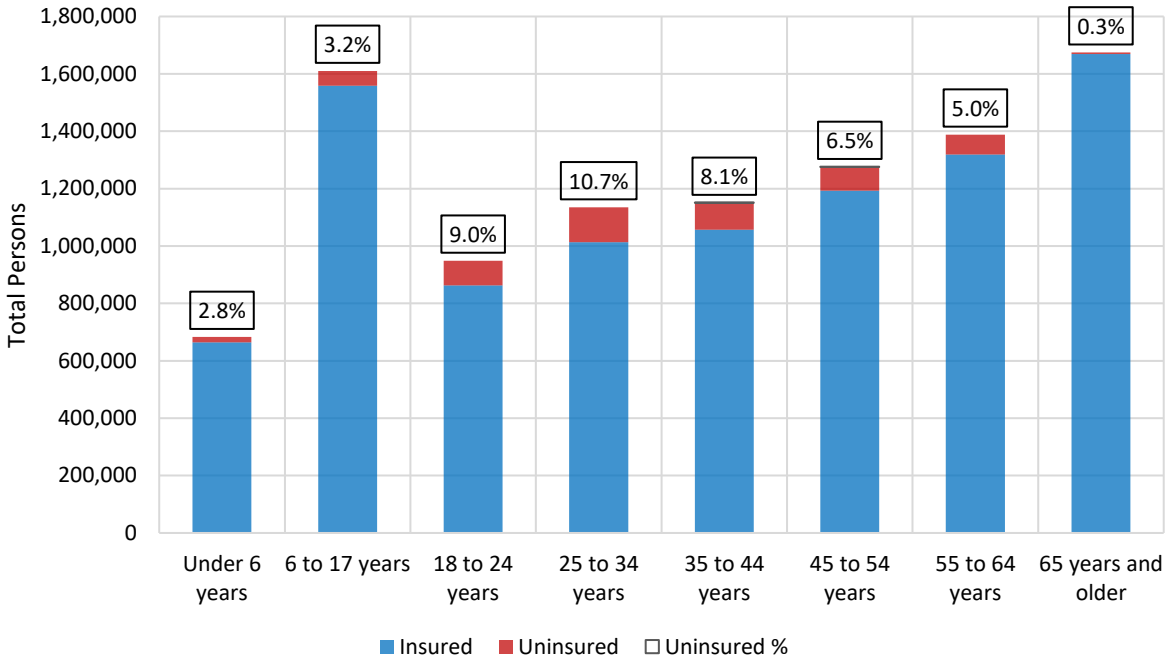
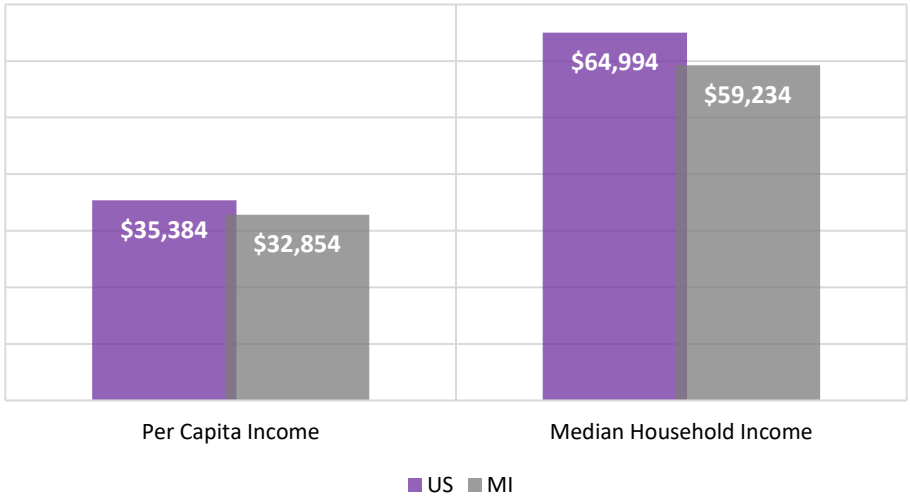


Figure 1.6 Michigan Population by Age Group, Proportion Insured, and Percent Uninsured, 2020



Michiganders aged 65 years and older, along with those aged 6 to 17 years, encompass the largest portion of the population in this designation and are estimated to have insurance coverage of 96% or higher. In contrast, the young adult and middle-aged Michiganders were more likely to be uninsured in 2020. The 25-to-34-year-old population was estimated to have the largest proportion of uninsured individuals (10.7%), followed by the 18-to-24-year-old (9.0%) and 35-to-44-year-old (8.1%) cohorts.

Figure 1.7 Income: Michigan and the U.S., 2020



The Michigan population had lower levels of income than that of the U.S. population. The average per capita income for Michigan ($32,854) was 7.7% lower than the U.S. average ($35,384), and the median household income for Michigan ($59,234) was approximately 10% below the national median ($64,994).

Acute Hepatitis B

Acute Hepatitis B—Incidence and Sex

Figure 2.1 Incidence of Acute Hepatitis B in Michigan and United States, 2013-2021

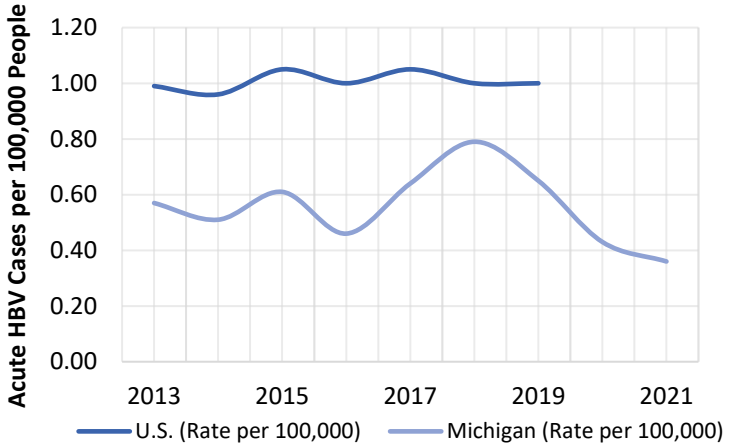


Table 2.1 Incidence of Acute Hepatitis B, Michigan and United States, 2017-2021

Year	Michigan Cases	Michigan (Rate per 100,000)	U.S. (Rate per 100,000)
2017	64	0.64	1.05
2018	79	0.79	1.00
2019	65	0.65	1.00
2020*	43	0.43	N/A
2021	36	0.36	N/A

Following a two-year period of increased cases between 2016 and 2018, acute hepatitis B infections in Michigan have been decreasing. The Michigan acute hepatitis B incidence rate has been historically lower than the U.S. incidence rate. National hepatitis B data is not yet available for 2020 or 2021.

Figure 2.2 Number of Acute Hepatitis B Cases by Sex in Michigan, 2013-2021

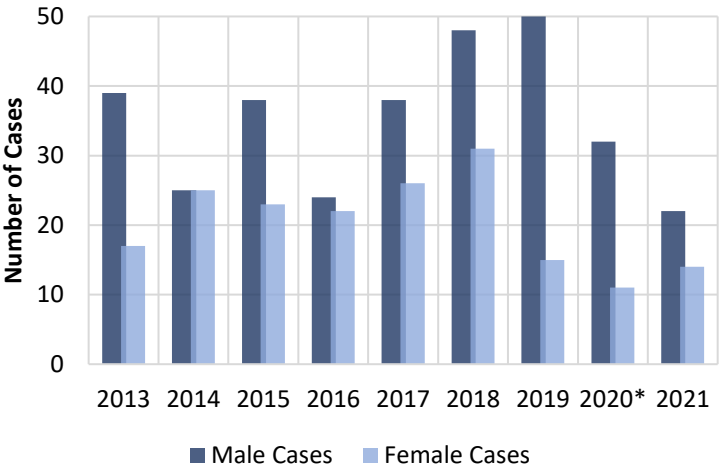


Table 2.2 Acute Hepatitis B Total Cases and Incidence Rate by Sex in Michigan, 2017-2021

Year	Male Cases	Male Incidence	Female Cases	Female Incidence
2017	38	0.78	26	0.52
2018	48	0.98	31	0.61
2019	50	1.01	15	0.30
2020*	32	0.65	11	0.22
2021	22	0.45	14	0.28

Acute hepatitis B incidence has been decreasing in males since reaching a high in 2019. Males have traditionally had a higher rate of acute hepatitis B infections when compared to females, and that trend continues. In 2021 the number of acute hepatitis B cases in females increased slightly from 2020.

*Pronounced reductions in case counts and/or rates may be due, in part, to the COVID-19 pandemic in 2020

Acute Hepatitis B—Race and Ethnicity

Figure 2.3 Incidence of Acute Hepatitis B by Race in Michigan, 2013-2021

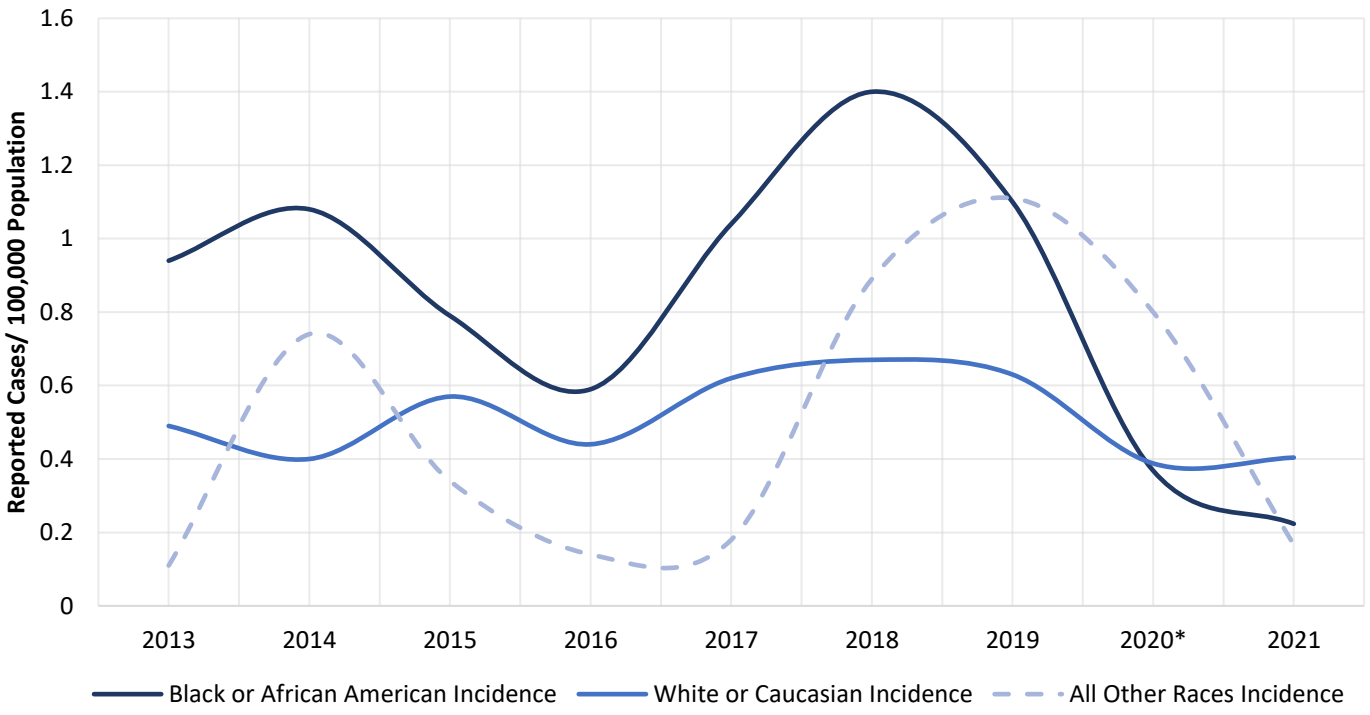


Table 2.3 Incidence of Acute Hepatitis B by Race and Ethnicity in Michigan, 2017-2021

Year	Black or African American Cases	Black or African American Incidence	American Indian or Alaskan Native Cases	American Indian or Alaskan Native Incidence	Asian Cases	Asian Incidence	White or Caucasian Cases	White or Caucasian Incidence	Hispanic Cases	Hispanic Incidence	Other Cases	Other Incidence
2017	14	1.04	0	0.00	1	0.34	45	0.62	1	0.20	1	0.36
2018	19	1.40	0	0.00	3	0.98	50	0.67	2	0.40	2	0.04
2019	15	1.10	0	0.00	2	0.95	47	0.63	1	0.19	0	0.00
2020*	5	0.37	1	2.19	0	0.00	29	0.39	2	0.39	6	2.25
2021	3	0.22	1	2.33	0	0.00	30	0.40	0	0.00	1	0.31

In 2021, persons classified as American Indian/Alaskan Native experienced acute hepatitis B infection at the highest rate in Michigan, followed by White/Caucasian, Other, and Black/African American populations. Incidence rates in 2021 have decreased in all races except for American Indian/Alaskan Native and White/Caucasian. Traditionally, the Black/African American and Asian populations have had the highest incidence rates. This change may be due to disproportionate reduction of case counts and case follow-up capacity, a consequence of the COVID-19 pandemic.

*Pronounced reductions in case counts and/or rates may be due, in part, to the COVID-19 pandemic in 2020

Acute Hepatitis B—Risk Behaviors

Table 2.4a Completeness of Acute Hepatitis B Reports by Risk Behavior in Michigan, 2021 (n = 36)

Risk Behavior	Completed
Injection Drug User	97%
Used Street Drugs	94%
Hemodialysis	94%
Received Blood Products	94%
Received a Tattoo	100%
Accidental Needle Stick	92%
Contact of Person with Hepatitis B	94%
Other Surgery	89%
Oral Surgery or Dental Work	92%
Employed in Medical Field	94%
Employed as Public Safety Officer	97%
Incarceration Longer than 6 Months	94%
Any Part of Body Pierced (other than ear)	92%

Table 2.4a shows the percentage of acute HBV risk behavior questions that were completed by local health department disease investigators in the MDSS case report form. A risk behavior was considered completed if the question was marked as "Yes," "No," or "Unknown." Acute HBV epidemiologic information questions were completed for approximately 94% of case reports. This is an increase from the 70% of acute HBV questions completed in the year 2012 before enhanced viral hepatitis surveillance funding

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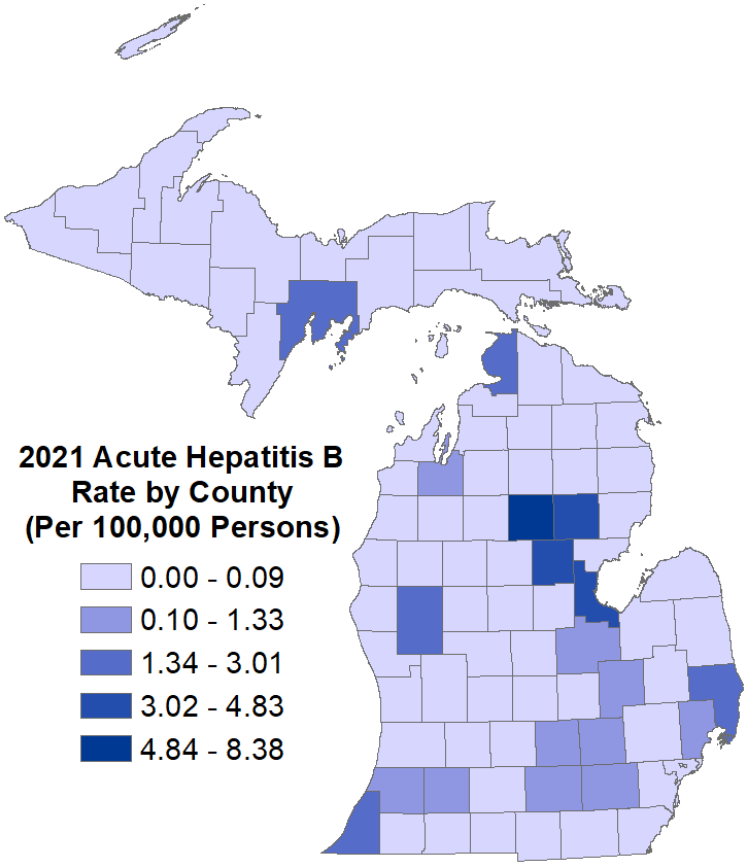
Table 2.4b Response of Completed Acute Hepatitis B Reports* by Risk Behavior in Michigan, 2021

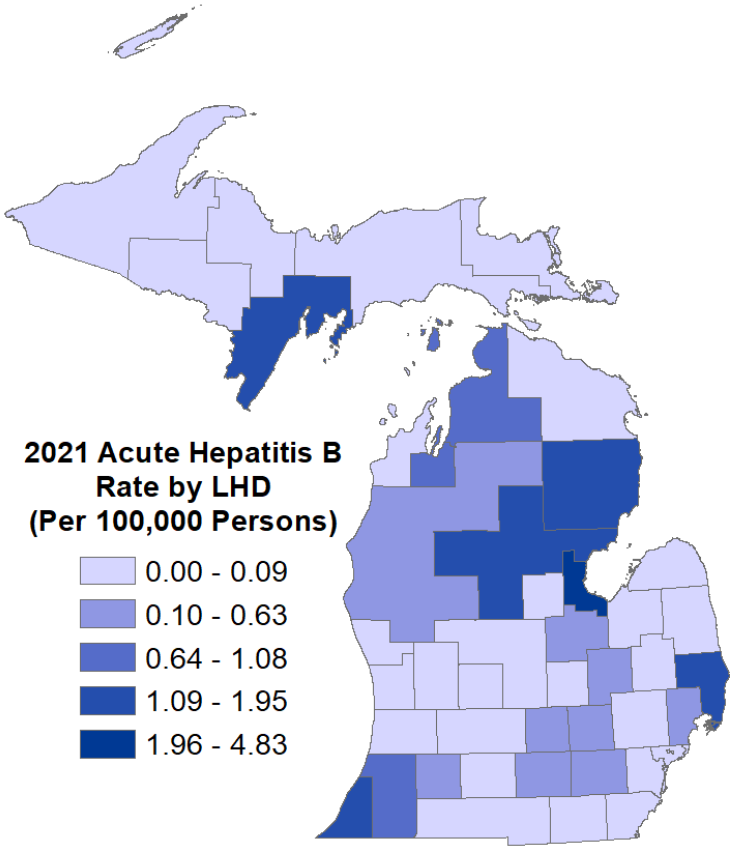
Risk Behavior	Yes*	No*	Unknown*	Yes Responses U.S. Wide 2019
Injection Drug User	14%	69%	17%	35.45%
Used Street Drugs	35%	53%	12%	
Hemodialysis	0%	82%	18%	2.63%
Received Blood Products	12%	68%	21%	0.31%
Received a Tattoo	28%	47%	25%	
Accidental Needle Stick	3%	73%	24%	6.11%
Contact of Person with Hepatitis B	12%	44%	44%	6.06%
Other Surgery	19%	59%	22%	9.53%
Oral Surgery or Dental Work	27%	48%	24%	
Employed in Medical Field	6%	71%	24%	0.13%
Employed as Public Safety Officer	0%	77%	23%	
Incarceration Longer than 6 Months	12%	62%	26%	
Any Part of Body Pierced (other than ear)	3%	67%	30%	

* Percentages calculated based upon those who completed the field; excludes missing data

Table 2.4b shows the HBV acquisition risk factors reported by clients in the six weeks to six months prior to onset of symptoms. "Used Street Drugs" was the most common potential exposure, with 'Yes' being selected in 35% of cases with completed risk behavior questions. "Employed as Public Safety Officer" and "Hemodialysis" are the least commonly reported risk exposures in 2021 with zero acute hepatitis B cases reporting these risks. In comparison to the nationwide proportion reported by the CDC, acute hepatitis B cases in Michigan are reporting "Injection Drug User" at a lower frequency.

Acute Hepatitis B Rate Maps by County and Local Health Jurisdiction





Chronic Hepatitis B

Chronic Hepatitis B—Incidence and Sex

Figure 3.1 Chronic Hepatitis B Cases per 100,000 Persons, Michigan, 2013-2021

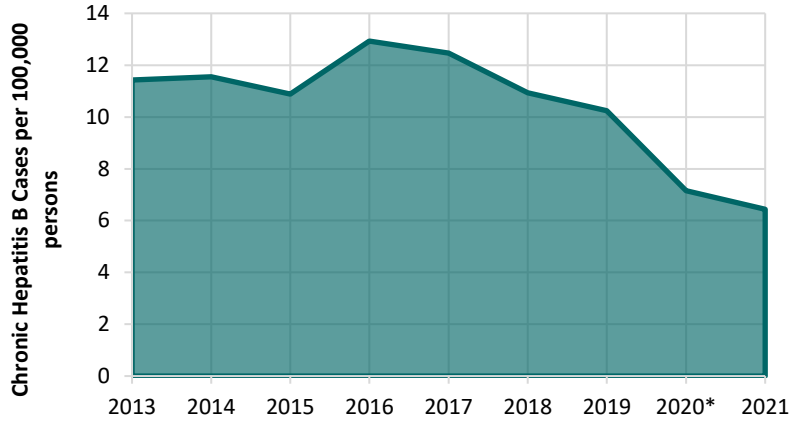


Table 3.1 Chronic Hepatitis B Cases per 100,000 Persons, Michigan, 2017-2021

Year	Michigan Cases	Michigan (Rate per 100,000)
2017	1237	12.46
2018	1089	10.93
2019	1024	10.24
2020*	713	7.15
2021	642	6.44

Following an increase in cases in 2016, cases have decreased through 2021. There is no national benchmark for comparing rates of chronic HBV infection. Decreases in cases after 2012 may be due, in part, to increased deduplication efforts and removal of redundant cases by MDHHS staff. Increases in the number of cases reported in 2016 may be explained by improved laboratory reporting from some Michigan health systems and/or more frequent ordering of hepatitis panels because of a hepatitis A outbreak occurring at that time.

Figure 3.2 Chronic Hepatitis B Cases per 100,000 Population by Sex, Michigan, 2013-2021

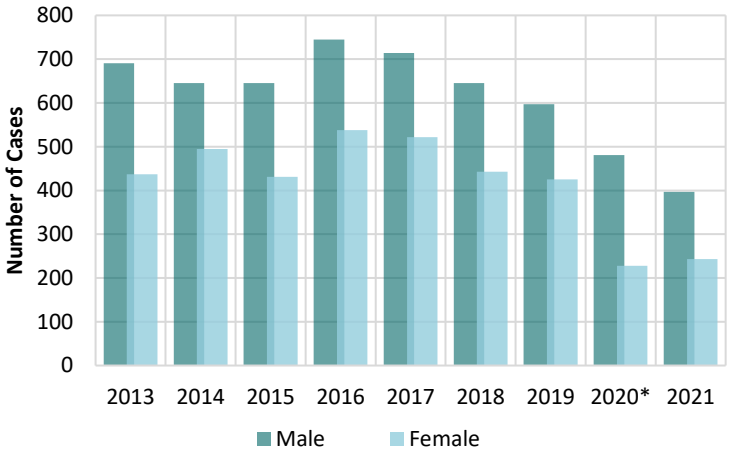


Table 3.2 Chronic Hepatitis B Cases per 100,000 Population by Sex in Michigan, 2017-2021

Year	Male	Male Incidence	Female	Female Incidence
2017	714	14.62	522	10.33
2018	645	13.14	443	8.76
2019	597	12.12	425	8.38
2020*	481	9.81	228	4.51
2021	397	8.08	243	4.8

The rate of chronic HBV in males in Michigan has remained higher than the rate in females between the years of 2013 and 2021. The rate for males is at its lowest point in recent years. The rate for females increased 6.4% from last year. The overall decrease in case counts since 2019 can be largely attributed to the COVID-19 pandemic and its impact on accessibility to routine screening.

*Pronounced reductions in case counts and/or rates may be due, in part, to the COVID-19 pandemic in 2020

Chronic Hepatitis B—Race and Ethnicity

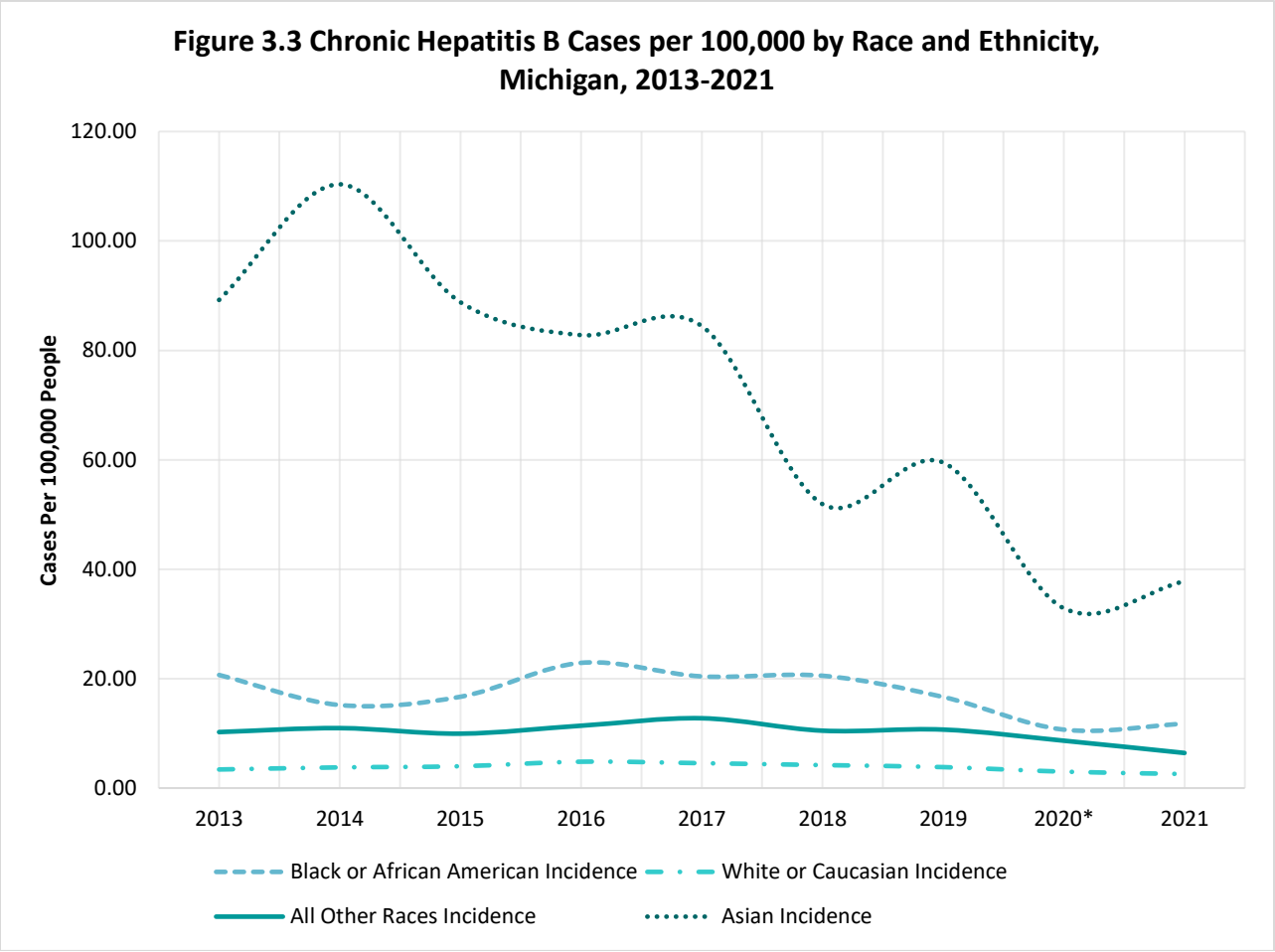


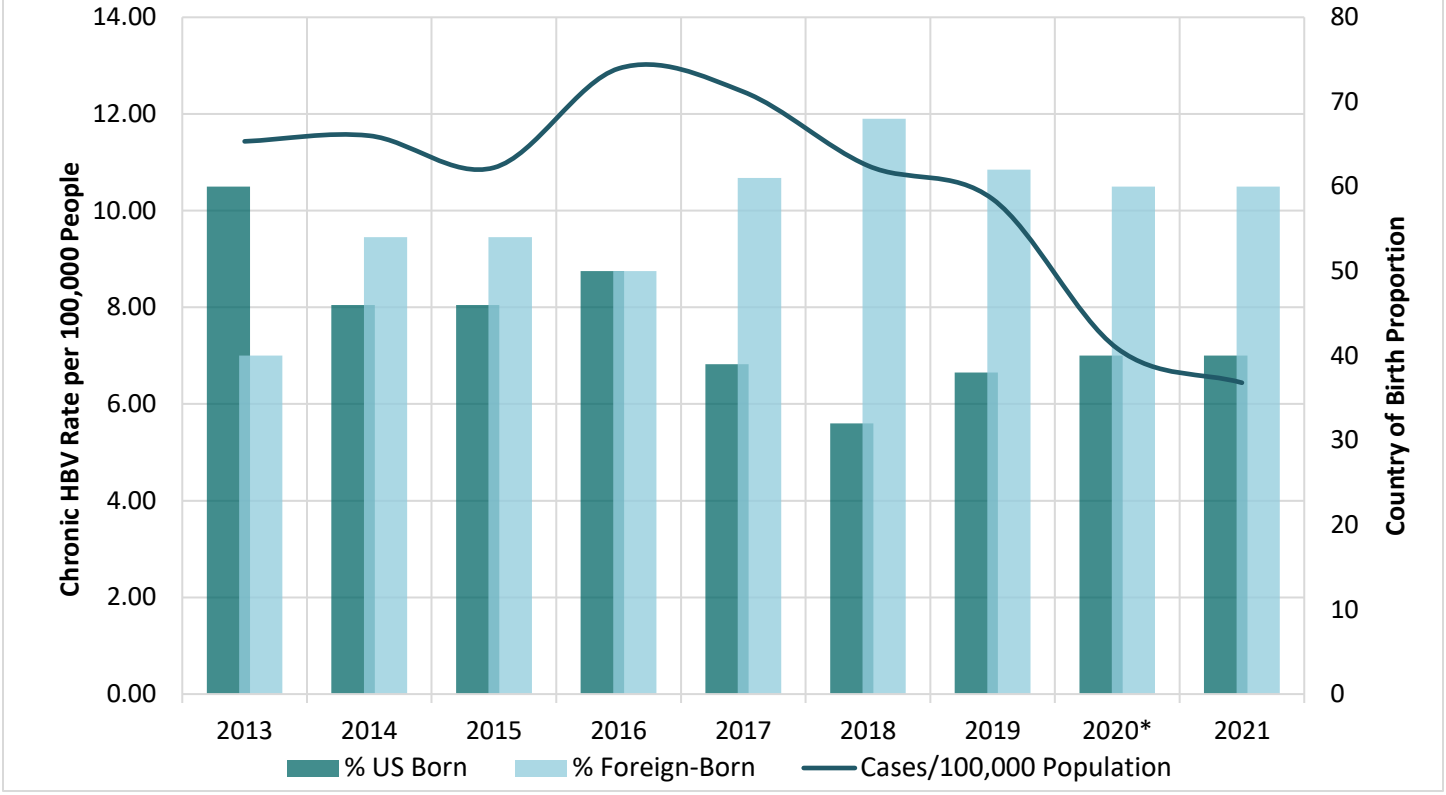
Table 3.3 Chronic Hepatitis B Cases per 100,000 by Race and Ethnicity, Michigan, 2017-2021

Year	Black or African American Cases	Black or African American Incidence	American Indian or Alaskan Native Cases	American Indian or Alaskan Native Incidence	Asian Cases	Asian Incidence	White or Caucasian Cases	White or Caucasian Incidence	Hispanic Cases	Hispanic Incidence	Other Cases	Other Incidence
2017	275	20.41	2	4.66	246	84.44	340	4.55	18	3.66	84	30.56
2018	279	20.53	1	2.20	159	51.90	314	4.20	13	2.58	72	25.53
2019	227	16.65	4	8.62	193	59.50	286	3.83	18	3.48	67	24.95
2020*	145	10.68	2	4.39	102	32.86	224	3.00	14	2.76	55	26.64
2021	158	11.77	2	4.66	119	37.81	191	2.57	14	2.69	41	12.66

In 2021, Asians had the highest incidence rate (37.81 per 100,000) of chronic hepatitis B infection in Michigan, followed by those that classify as Other race (12.66 per 100,000). The Asian infection rate is 14.7 times higher than the White/Caucasian rate (2.57 cases per 100,000). Asian-Americans are the target of CDC's KNOW HEPATITIS B campaign due to this disparity.

*Pronounced reductions in case counts and/or rates may be due, in part, to the COVID-19 pandemic in 2020

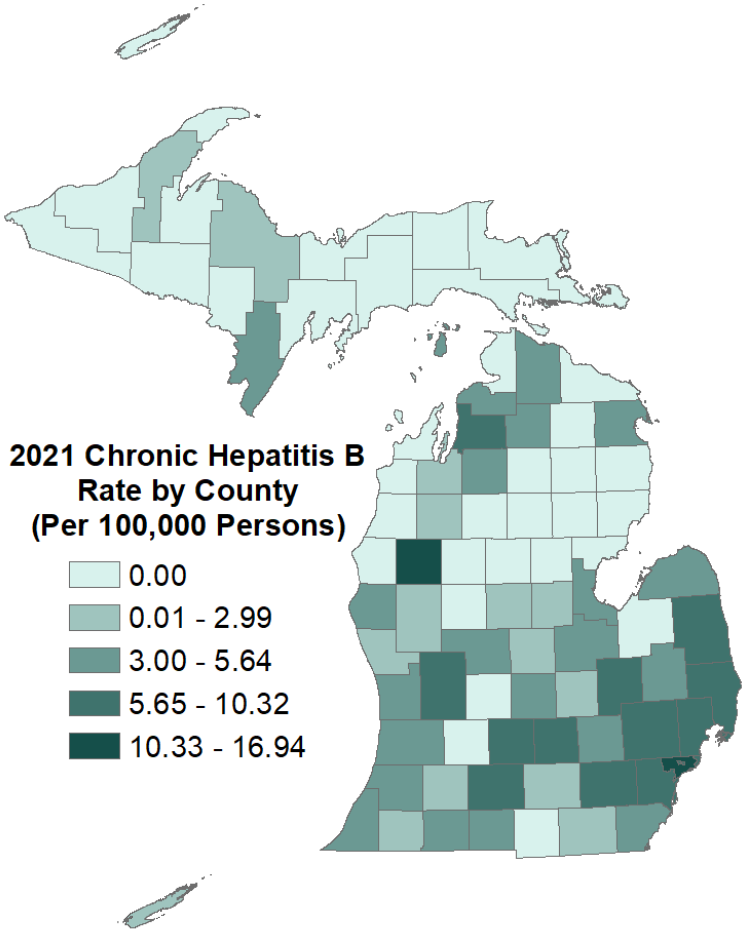
Figure 3.4 Chronic Hepatitis B Cases per 100,000 Population and Country of Birth in Michigan, 2013-2021

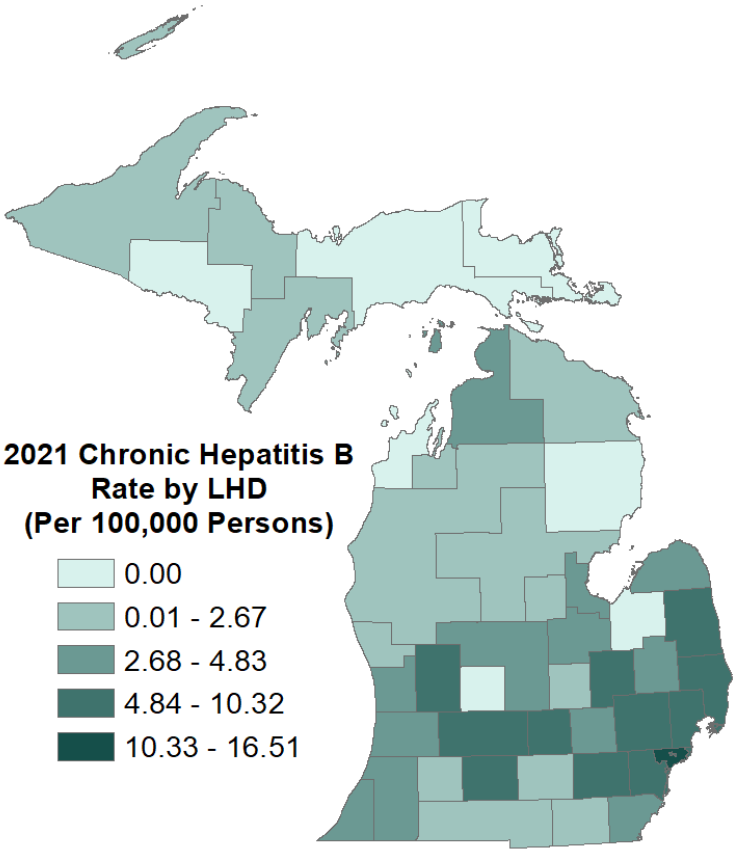


Hepatitis B is a vaccine preventable disease. While decreases in HBV have been observed in the U.S., countries outside the U.S. are still greatly impacted by HBV infection. To better understand the Michigan HBV population, we have categorized the proportion of incident cases that were born in the U.S. versus those born in other countries. When comparing the original country of birth among HBV-infected individuals in Michigan, more people were born outside the United States than in the United States.

*Pronounced reductions in case counts and/or rates may be due, in part, to the COVID-19 pandemic in 2020

Chronic Hepatitis B Rate Maps by County and Local Health Jurisdiction





Acute Hepatitis C

Acute Hepatitis C—Incidence and Sex

Figure 4.1 Incidence of Acute Hepatitis C, Michigan and U.S., 2013-2021

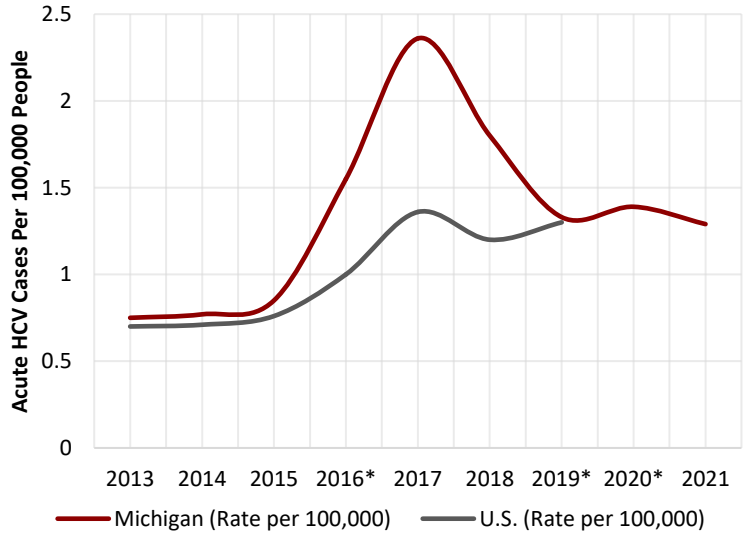


Table 4.1 Incidence of Acute Hepatitis C, Michigan and U.S., 2017-2021

Year	Michigan Cases	Michigan (Rate per 100,000)	U.S. (Rate per 100,000)
2017	234	2.36	1.36
2018	179	1.80	1.20
2019*	133	1.33	1.30
2020*	139	1.39	N/A
2021	129	1.29	N/A

The number of acute hepatitis C cases in Michigan remained relatively stable from 2013 to 2014 but increased slightly in 2015 before nearly doubling in 2016, increasing rapidly in 2017, and decreasing from 2018-2019 before a slight increase in 2020. There was a slight decrease from 2020 to 2021. A CDC/CSTE acute hepatitis C case definition change in January 2016 is at least partially responsible for this sharp increase, along with the concurrent hepatitis A outbreak resulting in an increased ordering of hepatitis panels and, in turn, increased hepatitis C detection. The reduction of cases in 2019 is likely attributable to the introduction of negative HCV RNA electronic lab reporting, which reduced the number of probable acute cases. Michigan acute hepatitis C infection rates have closely followed published national benchmarks. There are incidence maps of acute hepatitis C infections by county and local health jurisdiction for 2021 located on page 30.

Figure 4.2 Incidence of Acute Hepatitis C by Sex, Michigan, 2013-2021

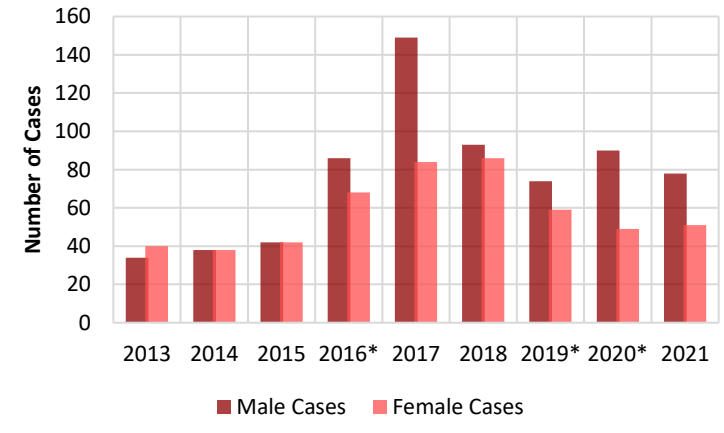


Table 4.2 Incidence of Acute Hepatitis C by Sex in Michigan, 2017-2021

Year	Male Cases	Male Incidence	Female Cases	Female Incidence
2017	149	3.05	84	1.66
2018	93	1.90	86	1.7
2019*	74	1.50	59	1.16
2020*	90	1.80	49	0.97
2021	78	1.59	51	1.01

Historically, the difference in acute hepatitis C diagnoses between males and females was minimal but became more substantial in 2016 when males began to experience higher rates. In 2019 the difference in acute hepatitis C diagnoses in males and females narrowed, but the gap widened again in 2020 and narrowed slightly in 2021. Again, increases in case counts in 2016-2017 may be related to case counting methodology because of the change in case definition, as well as heightened awareness and testing due to the concurrent hepatitis A outbreak in Michigan.

*Pronounced fluctuations in case counts may be a result of a case definition change in 2016, electronic reporting of negative HCV RNA lab results beginning in 2019, and/or the COVID-19 pandemic in 2020

Acute Hepatitis C—Race and Ethnicity

Figure 4.3 Incidence of Acute Hepatitis C by Race and Ethnicity, Michigan, 2013-2021

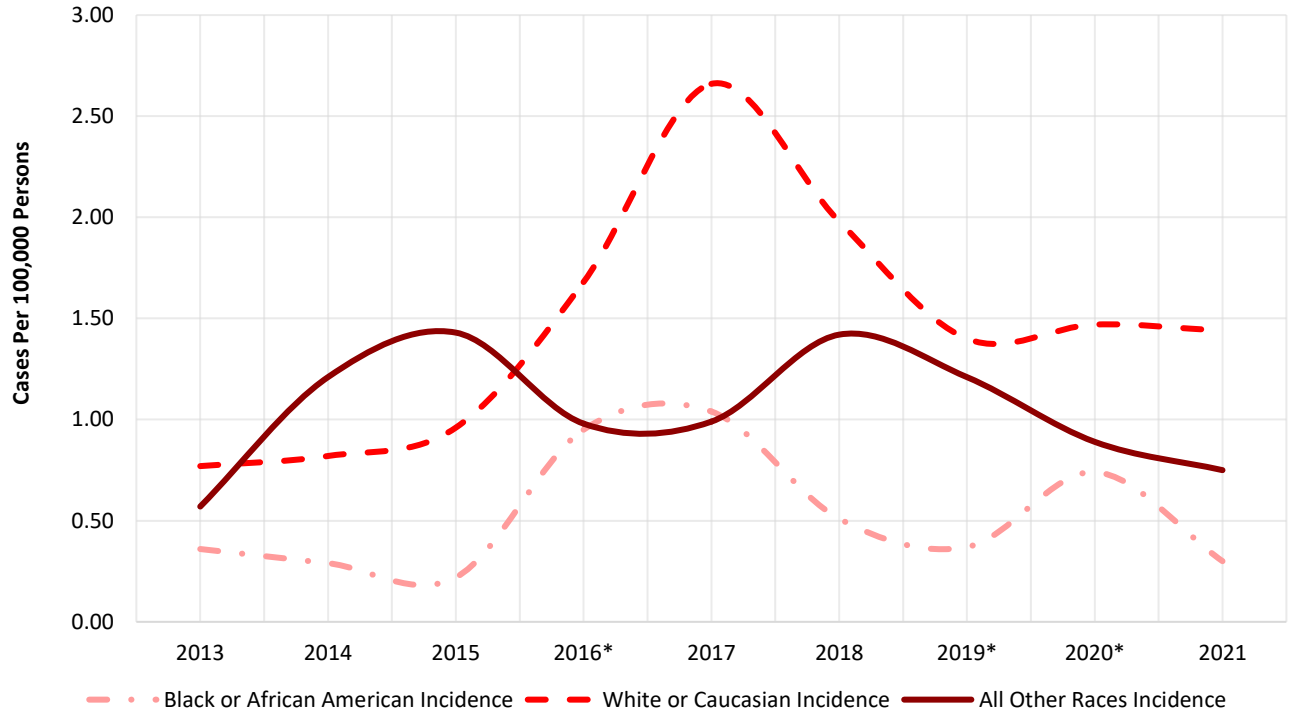


Table 4.3 Incidence of Acute Hepatitis C by Race and Ethnicity, Michigan, 2017-2021

Year	Black or African American Cases	Black or African American Incidence	American Indian or Alaskan Native Cases	American Indian or Alaskan Native Incidence	Asian Cases	Asian Incidence	White or Caucasian Cases	White or Caucasian Incidence	Hispanic Cases	Hispanic Incidence	Other Cases	Other Incidence
2017	14	1.04	1	2.33	1	0.34	199	2.66	8	1.63	1	0.36
2018	7	0.51	2	4.40	3	0.98	148	1.98	9	1.78	2	0.74
2019*	5	0.37	1	2.15	0	0.00	105	1.40	9	1.74	4	1.49
2020*	10	0.74	0	0.00	0	0.00	110	1.47	5	0.99	5	1.88
2021	4	0.30	1	2.33	1	0.32	107	1.44	3	0.58	4	1.24

Nearly 83% of all the acute hepatitis C cases in 2021 were among White/Caucasians. White/Caucasians saw a decrease from 2.66 cases per 100,000 in 2017 to 1.44 cases per 100,000 in 2021. Despite that decrease, the White/Caucasian population had the second highest rate of any demographic, trailing only the American Indian/Alaskan Native group (2.33 cases per 100,000). It should be noted that increases in case counts in these populations may be a result of the 2016 case definition change and hepatitis A outbreak. In addition, the decrease in case counts in 2019 may be a result of the introduction of negative HCV RNA electronic lab reporting. Further decreases in 2020 may be a result of the COVID-19 pandemic.

*Pronounced fluctuations in case counts may be a result of a case definition change in 2016, electronic reporting of negative HCV RNA lab results beginning in 2019, and/or the COVID-19 pandemic in 2020

Table 4.4a Completeness of Acute Hepatitis C Reports by Risk Behavior, Michigan, 2021 (n= 129)

Risk Behavior	Completed
Injection Drug User	64%
Used Street Drugs	58%
Hemodialysis	59%
Received Blood Products	60%
Received a Tattoo	60%
Accidental Needle Stick	56%
Contact of Person with Hepatitis C	60%
Other Surgery	52%
Oral Surgery or Dental Work	57%
Employed in Medical Field	56%
Employed as Public Safety Officer	57%
Incarceration Longer than 6 Months	58%
Any Part of Body Pierced (other than ear)	58%

Table 4.4a shows the percentage of acute HCV risk behavior questions that were completed by local health department staff in 2021. A risk behavior was considered completed if the question was marked as "Yes," "No," or "Unknown." Most questions were answered with a response rate of 58% or higher. This proportion has remained stable since 2020 but decreased when compared to the 87% completion percentage from 2019; however the COVID-19 pandemic and necessary public health response resulted in very limited resources for hepatitis C follow-up. According to the CDC, the national proportion for completeness of acute HCV case report forms was 47.5% in 2016.

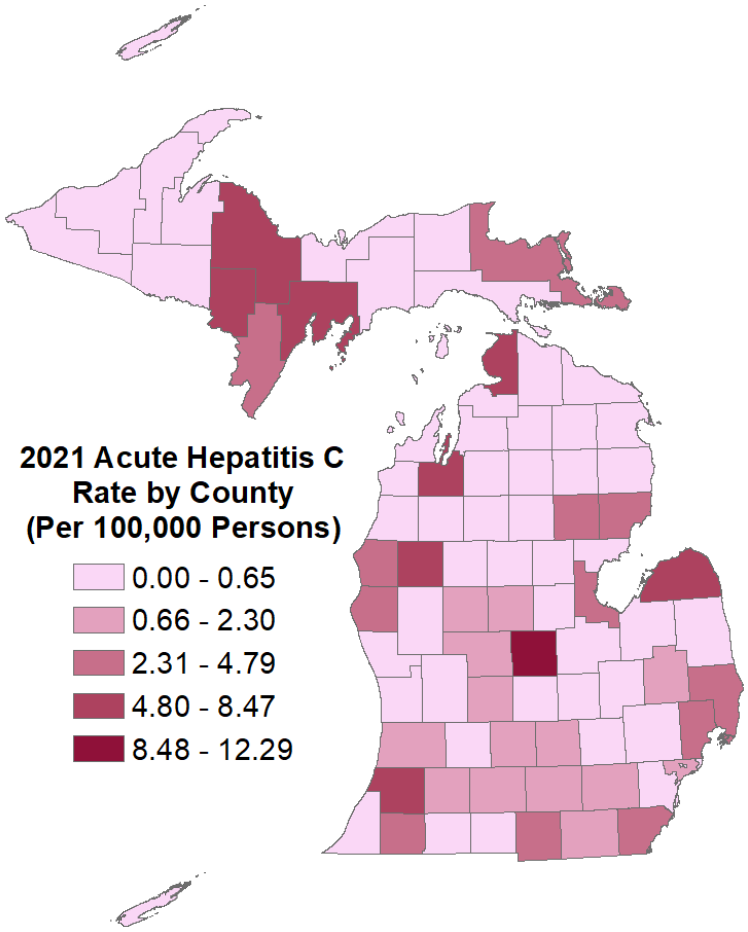
Table 4.4b Response of Completed Acute Hepatitis C Reports* by Risk Behavior, Michigan, 2021

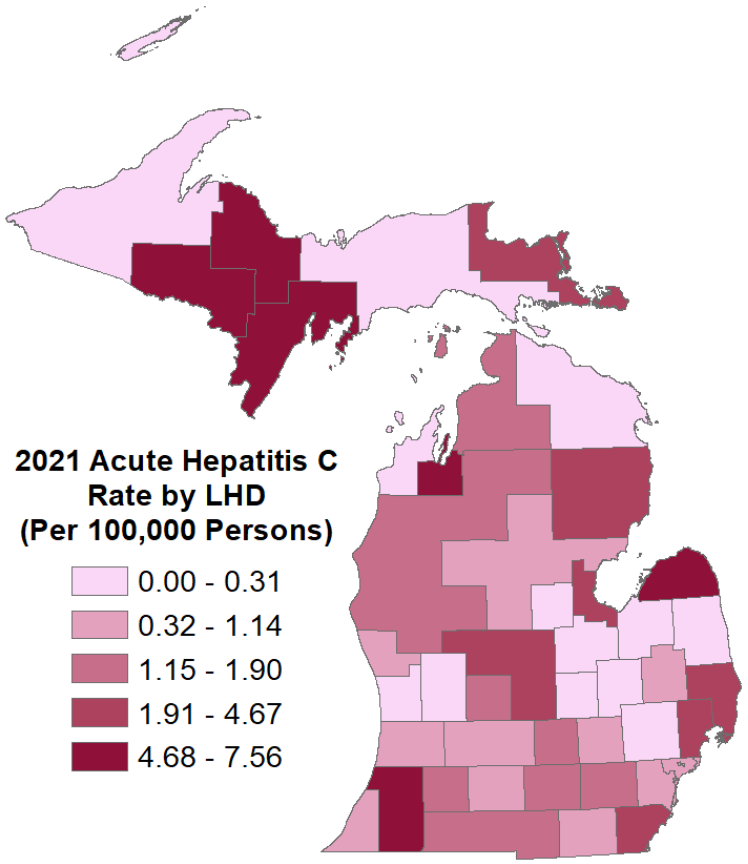
Risk Behavior	Yes*	No*	Unknown*	Yes Responses U.S. Wide 2019
Injection Drug User	50%	37%	13%	66.70%
Used Street Drugs	48%	31%	21%	
Hemodialysis	3%	71%	26%	4.66%
Received Blood Products	5%	58%	36%	0.27%
Received a Tattoo	24%	34%	42%	
Accidental Needle Stick	6%	51%	43%	9.31%
Contact of Person with Hepatitis C	18%	26%	56%	7.56%
Other Surgery	16%	54%	30%	16.78%
Oral Surgery or Dental Work	11%	49%	41%	
Employed in Medical Field	6%	61%	33%	0.54%
Employed as Public Safety Officer	0%	70%	30%	-
Incarceration Longer than 6 Months	25%	34%	36%	-
Any Part of Body Pierced (other than ear)	8%	48%	44%	-

* Percentages calculated based upon those who completed the field; excludes missing data

Table 4.4b shows the responses among the completed questions by risk behavior. Injection drug use stands out as the predominant risk for acquiring HCV infection, as is reported in the literature, and similar to reports from previous years.

Acute Hepatitis C Rate Maps by County and Local Health Jurisdiction





Chronic Hepatitis C

Chronic Hepatitis C—Incidence and Sex

Figure 5.1 Chronic Hepatitis C Cases per 100,000 Persons in Michigan 2013-2021

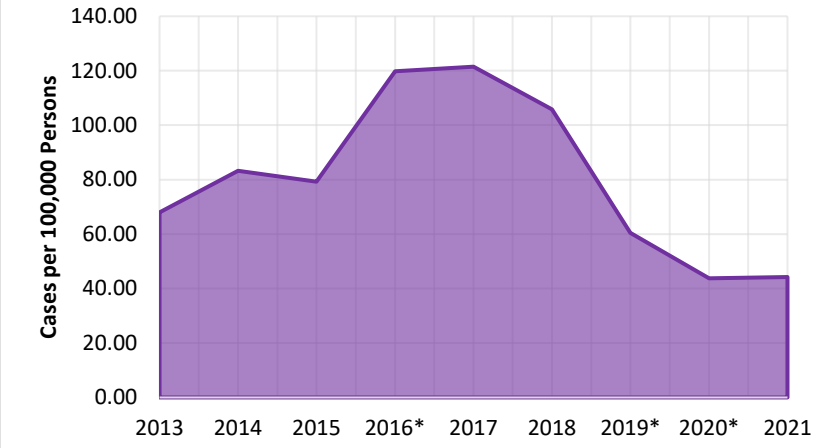


Table 5.1 Chronic Hepatitis C Cases per 100,000 Population in Michigan, 2017-2021

Year	Michigan Cases	Rate per 100,000
2017	12,062	121.49
2018	10,545	105.85
2019*	6,038	60.40
2020*	4,356	43.71
2021	4,412	44.24

The trend of newly reported chronic hepatitis C infections remained relatively stable through 2015 but underwent a notable 51.1% increase in 2016 before stabilizing again in 2017, then decreasing by 59% from 2018 through 2020 before stabilizing again in 2021. A slight decrease in 2013 cases may be due to increased deduplication efforts and removal of redundant cases by MDHHS Viral Hepatitis Surveillance staff. The 2016 increase may be due to the change in the chronic hepatitis C case definition, while the 2019 decrease may be due to the introduction of negative electronic lab reporting of HCV RNA results. This resulted in a more complete diagnostic assessment and ultimately reduced the number of probable chronic hepatitis C cases drastically. The continued decrease in 2020 can, in part, be attributed to the COVID-19 pandemic and its impact on accessibility to routine screening. There is no nationally available benchmark for comparing rates of chronic hepatitis.

Figure 5.2 Chronic Hepatitis C Cases per 100,000 Population by Sex in Michigan, 2013-2021

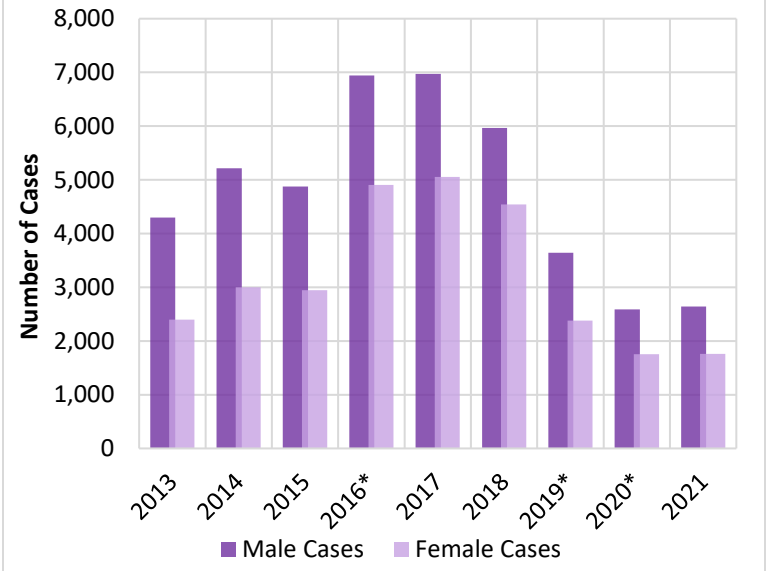


Table 5.2 Chronic Hepatitis C Cases per 100,000 Population by Sex in Michigan 2017-2021

Year	Male Cases	Male Incidence	Female Cases	Female Incidence
2017	6,973	142.80	5,054	100.18
2018	5,969	121.64	4,540	89.81
2019*	3,641	73.90	2,380	46.95
2020*	2,588	52.76	1,754	34.66
2021	2,639	53.73	1,758	34.73

Males account for most chronic hepatitis C cases reported each year since 2012. In 2021, the rate of chronic hepatitis C reports was over 1.5 times higher in males than females. The marked increase in chronic cases reported in 2016 is likely representative of the change in the national HCV surveillance case definition, while the decrease in cases reported in 2019 is likely due to the introduction of negative HCV RNA electronic lab reporting, followed by a continued decrease in 2020 partially due to the COVID-19 pandemic and its impact on accessibility to routine screening.

*Pronounced fluctuations in case counts may be a result of a case definition change in 2016, electronic reporting of negative HCV RNA lab results beginning in 2019, and/or the COVID-19 pandemic in 2020

Chronic Hepatitis C—Race and Ethnicity

Figure 5.3 Chronic Hepatitis C Cases per 100,000 by Race and Ethnicity in Michigan, 2013-2021

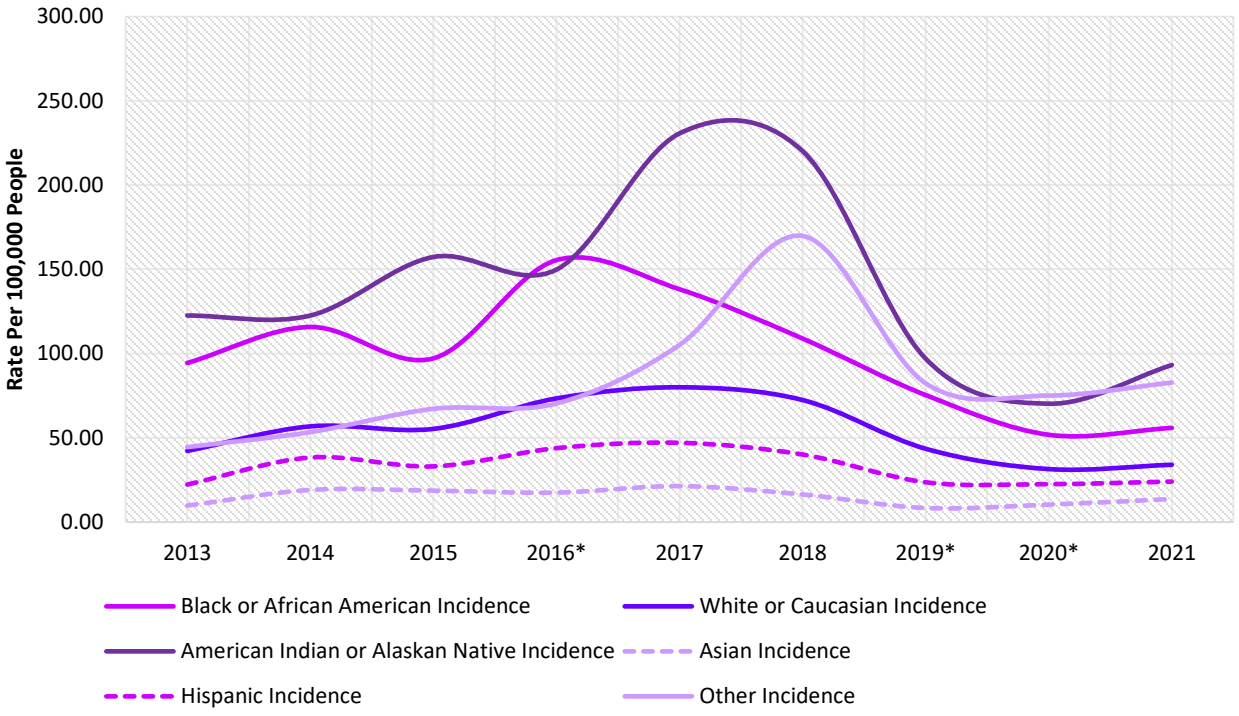


Table 5.3 Chronic Hepatitis C Cases per 100,000 by Race and Ethnicity in Michigan, 2017-2021

Year	Black or African American Cases	Black or African American Incidence	American Indian or Alaskan Native Cases	American Indian or Alaskan Native Incidence	Asian Cases	Asian Incidence	White or Caucasian Cases	White or Caucasian Incidence	Hispanic Cases	Hispanic Incidence	Other Cases	Other Incidence
2017	1,861	138.15	99	230.67	62	21.28	5,977	79.96	231	47.01	295	105.12
2018	1,480	108.88	100	220.16	50	16.32	5,413	72.40	202	40.05	459	169.80
2019*	1,027	75.34	45	96.95	27	8.32	3,250	43.47	122	23.58	221	82.30
2020*	703	51.77	32	70.22	32	10.31	2,349	31.41	114	22.47	200	75.05
2021	750	55.86	40	93.17	43	13.66	2,524	33.98	125	23.98	268	82.76

In 2021, American Indian/Alaskan Natives had the highest rate of chronic hepatitis C infection (93.17 per 100,000), followed by persons in the ”Other” race category (82.76 per 100,000). “Other” race includes multiracial individuals and those reporting some other race alone. These groups are disproportionately affected compared to other racial groups. Increases in case counts and rates between 2015 and 2016-2018 may be the result of the change in the national HCV case definition. The decrease in case counts in 2019 and 2020 may be the result of negative HCV RNA electronic lab reporting and the COVID-19 pandemic and its impact on accessibility to routine screening, respectively.

*Pronounced fluctuations in case counts may be a result of a case definition change in 2016, electronic reporting of negative HCV RNA lab results beginning in 2019, and/or the COVID-19 pandemic in 2020

Chronic Hepatitis C—Risk Behaviors

Table 5.4a Completeness of Chronic Hepatitis C Reports by Risk Behavior, Michigan, 2021 (n = 4,412)

Risk Behavior	Completed
Received Blood Transfusion Prior to 1992	43%
Received an Organ Transplant Prior to 1992	40%
Received Clotting Factor Concentrates Prior to 1992	40%
Hemodialysis	39%
Injection Drug User	45%
Incarcerated in Lifetime	43%
Treated for a Sexually Transmitted Disease in Lifetime	38%
Contact of Person with Hepatitis C	39%
Employed in Medical Field	39%

Table 5.4a shows the percentage of chronic hepatitis C risk behavior questions completed by local health department staff in 2021. A risk behavior was considered completed if the question was marked as 'Yes', 'No', or 'Unknown.' Chronic hepatitis C epidemiologic information questions were completed on 40% of case reports. While this is an increase since 2020, it is a decrease compared to previous years. This is at least partially due to the COVID-19 pandemic and the necessary public health response that limited resources for hepatitis C follow-up. In 2012, before viral hepatitis surveillance funding, the chronic HCV risk factor completeness was less than 30%. There is no national comparison for completion of chronic hepatitis C case report forms.

Table 5.4b shows the responses among the completed questions by risk behavior. Injection drug use, incarceration, and being a contact of a person with hepatitis C were the most common risk behaviors associated with chronic hepatitis C.

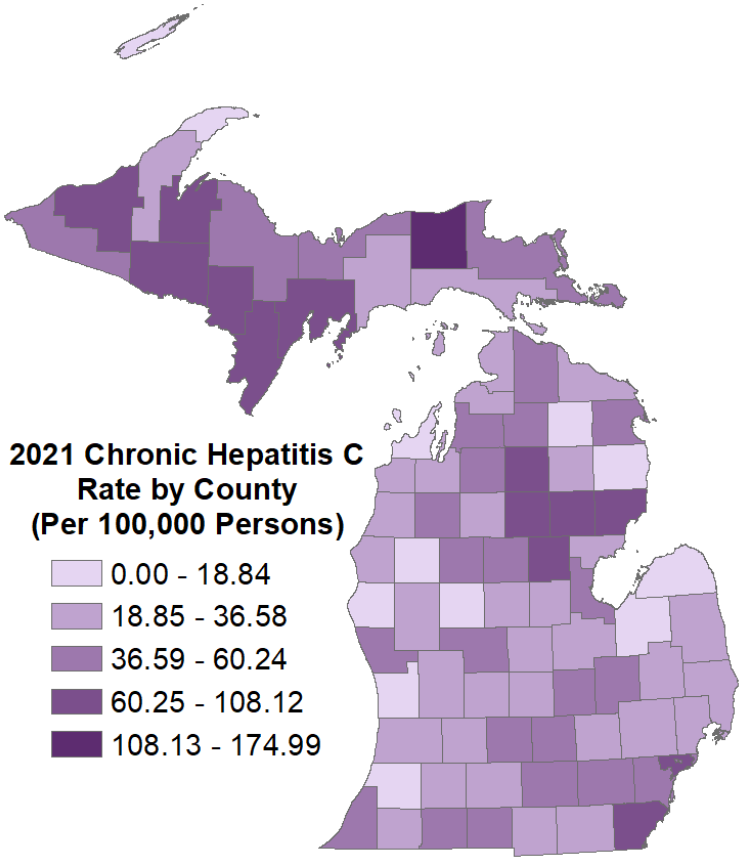
Table 5.4b Response of Completed Chronic Hepatitis C Reports* by Risk Behavior, Michigan, 2021

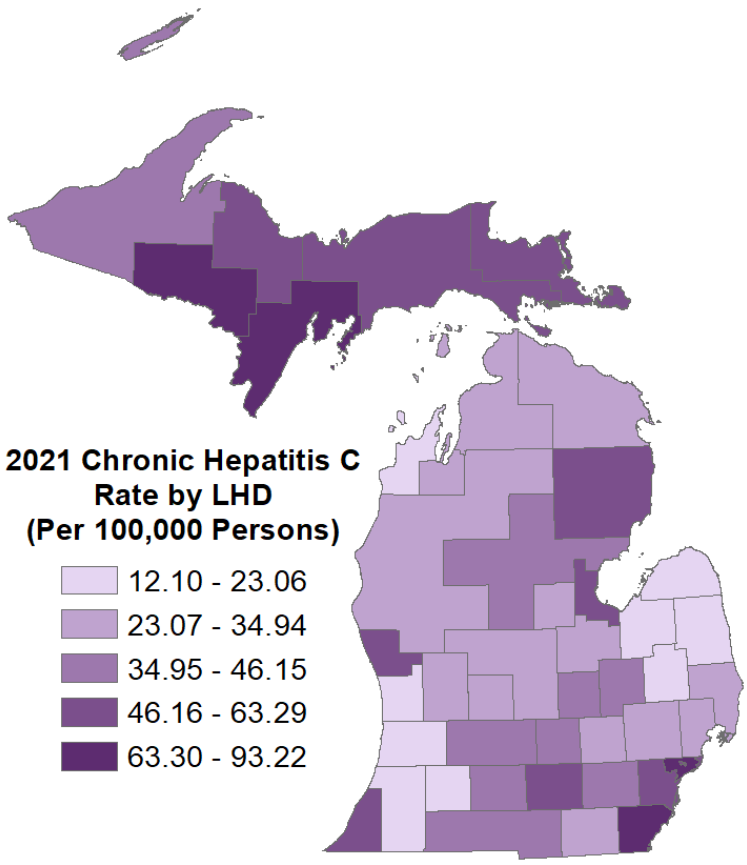
Risk Behavior	Yes*	No*
Received Blood Transfusion Prior to 1992	7%	93%
Received an Organ Transplant Prior to 1992	0%	100%
Received Clotting Factor Concentrates Prior to 1992	0%	100%
Hemodialysis	2%	98%
Injection Drug User	54%	46%
Incarcerated in Lifetime	43%	57%
Treated for a Sexually Transmitted Disease in Lifetime	17%	83%
Contact of Person with Hepatitis C	46%	54%
Employed in Medical Field	9%	91%

* Percentages calculated based upon those who completed the field; excludes missing/unknown data

Note: Risk factors and responses are not mutually exclusive

Chronic Hepatitis C Rate Maps by County and Local Health Jurisdiction





Hepatitis C Testing & Treatment

Hepatitis C—Testing and Genotype Data

Figure 6.1 CDC Recommended Testing Algorithm for Hepatitis C Virus Infection

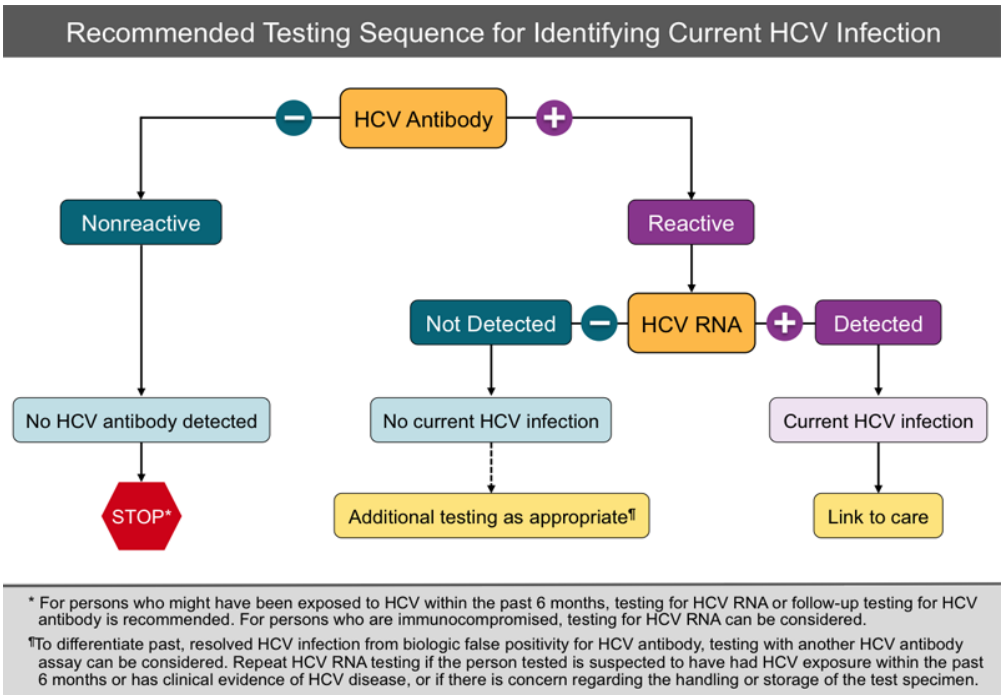
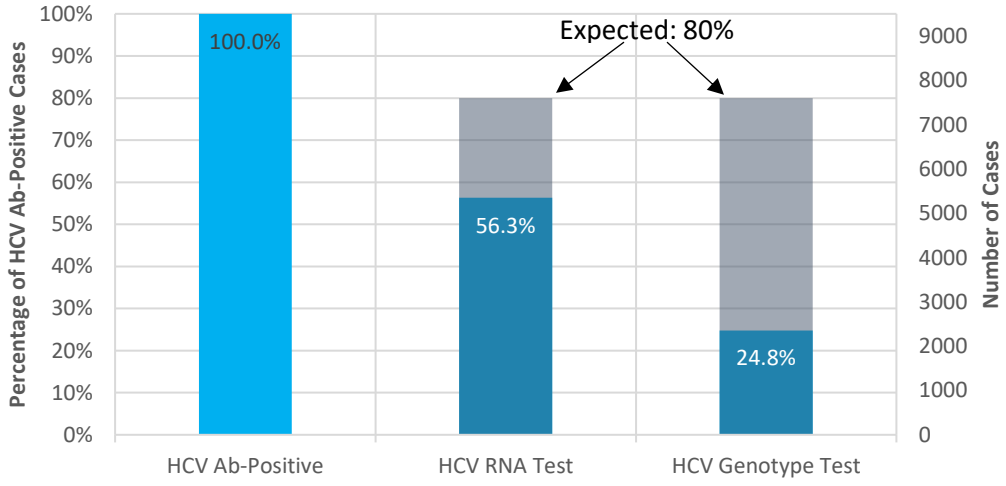


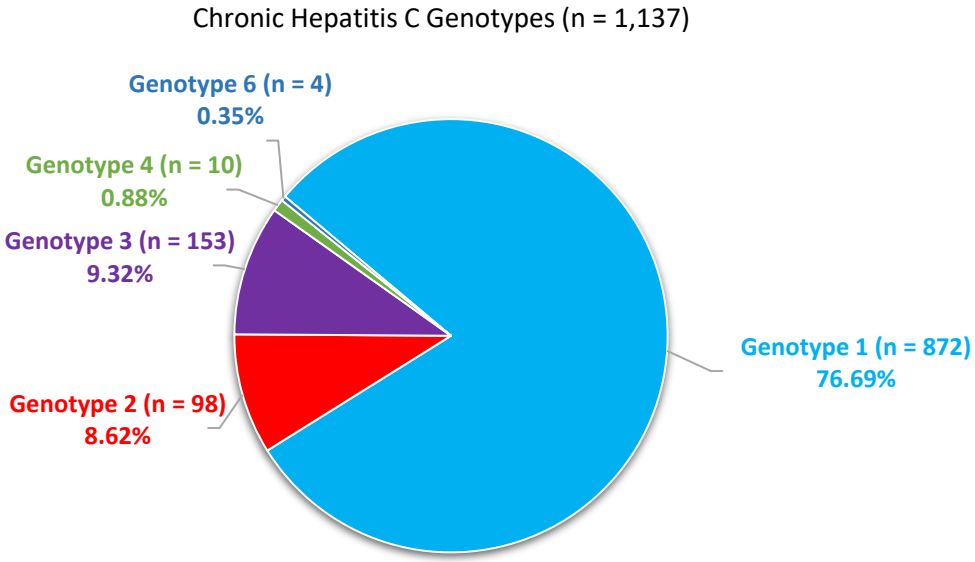
Figure 6.2 Number and Percentage of HCV Antibody-Positive Cases with an HCV RNA or HCV Genotype Test, 2021



Of the 4,551 cases of acute, chronic, and perinatal hepatitis C reported in Michigan in 2021, 4,169 (91.6%) cases were reported with a positive HCV antibody result. Of those cases, 56.34% were reported with positive HCV RNA test and even fewer (24.8%) were reported with genotype results. Starting in 2019, negative HCV RNA lab results became reportable through electronic lab messages. Since 20-25% of persons exposed to HCV clear infection, we would expect 75-80% of those with a positive HCV antibody to have a positive HCV RNA test, if the testing algorithm is being followed by all providers. These data suggest a gap in getting HCV antibody-positive patients confirmatory testing and genotype testing which indicates engagement in follow-up for treatment.

With the advent of pangenotypic HCV treatment regimens, HCV genotyping is no longer required prior to treatment initiation for all individuals. In those with evidence of cirrhosis and/or past unsuccessful HCV treatment, treatment regimens may differ by genotype and thus pretreatment genotyping is recommended. For noncirrhotic treatment-naive patients, although genotyping may impact the preferred treatment approach, it is not required if a pangenotypic regimen is used. Of the patients reported to the MDSS with a positive HCV antibody, there was evidence of only 25% receiving an HCV genotype test, suggesting that many patients are not yet being evaluated for HCV therapy.

Figure 6.3 Proportion of Genotypes of Chronic Hepatitis C Cases Reported, Michigan, 2021



A total of 1,137 chronic HCV patients had a genotype result reported to MDHHS in 2021. Of these, 76.69% were reported with genotype 1 infection. Genotypes 3 and 2 made up the majority of non-genotype 1 specimens. The remaining specimens were either genotype 4 or 6, which made up just over 1% of all genotyped specimens in 2021.

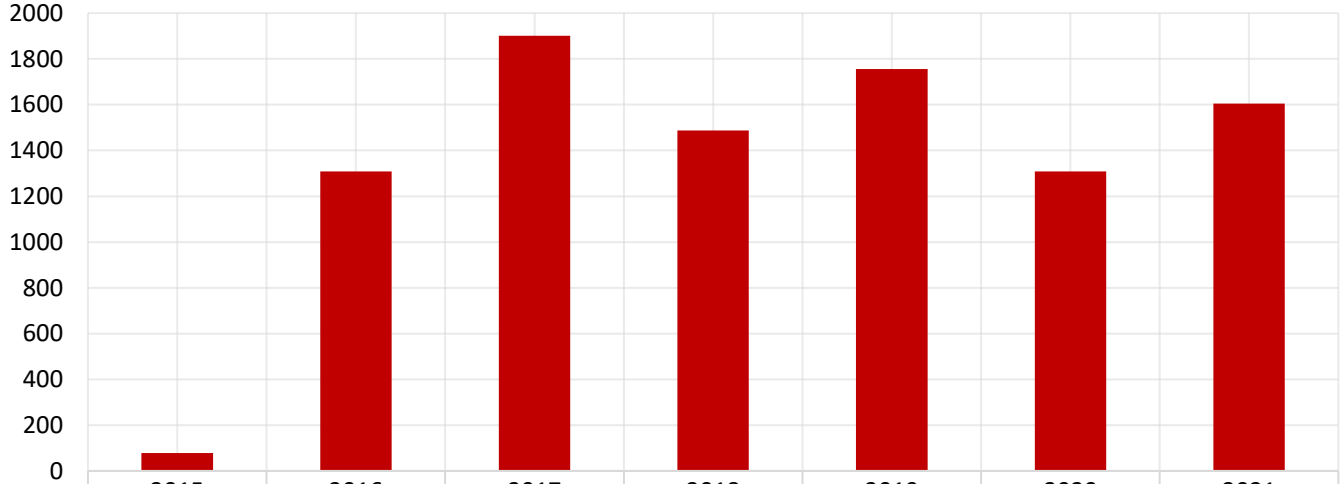
This pattern of genotypes is consistent with the expected annual proportions in Michigan. The data is also consistent with the national distribution, as the predominant genotypes nationwide are 1a, 1b, 2a, 2b, and 3a.

Viral Hepatitis Medicaid Data

With the expansion of newly approved HCV treatments in recent years, we now see many instances in which these direct-acting antivirals can effectively cure a patient of their HCV infection, greatly reducing the risk of cirrhosis, hepatocellular carcinoma, and death. However, as previously described, patients often need to go through a cascade of testing to have an HCV medication prescribed.

Figure 6.4 looks at the number of Michigan Medicaid patients that were prescribed various HCV treatments from 2015 to 2021. Recent data shows that Michigan Medicaid/Child Health Insurance Program covers approximately 2.3 million persons. With an estimated 1-2% HCV infection rate in the population, there would be 23,000-46,000 Medicaid-insured persons with HCV infection. According to these data, with 9,441 unique persons treated for HCV, approximately 20-41% of the HCV-infected Medicaid population has been prescribed an HCV direct-acting antiviral. Again, the data suggest that increased efforts to test and treat HCV infection are needed to help reduce risk of future morbidity and mortality associated with chronic HCV infection. It is encouraging to see a significant number of patients being prescribed HCV medications but the decrease in 2019 through 2021, even with reduced restrictions on HCV prior authorizations, may indicate the need for additional awareness of qualification for treatment.

Figure 6.4 Total Number of Medicaid Members with Prescriptions, by Medication, 2015-2021



	2015	2016	2017	2018	2019	2020	2021
TOTAL	78	1308	1901	1487	1755	1308	1604
Daklinza	2	82	4	1			
Epclusa		161	383	420	793	515	32
Harvoni	53	1004	1251	573	188	1	1
Mavyret	1	11	84	460	751	776	1565
Olysio	1						
Sovaldi	24	107	4	1			
Technivie		2	3				
Viekira	2	17	32	1			
Vosevi	1	19	33	24	22	16	10
Zepatier		31	163	40	32	13	2

MDHHS Bureau of Laboratories Hepatitis C Testing

The MDHHS Bureau of Laboratories (BOL) has historically performed testing for HCV antibody (Ab). In 2014, the virology lab began performing HCV RNA testing for all specimens testing positive for HCV Ab in recognition of CDC's HCV testing algorithm. The data below look at the number of tests conducted by the BOL, positivity rates, and the demographic characteristics of patients tested.

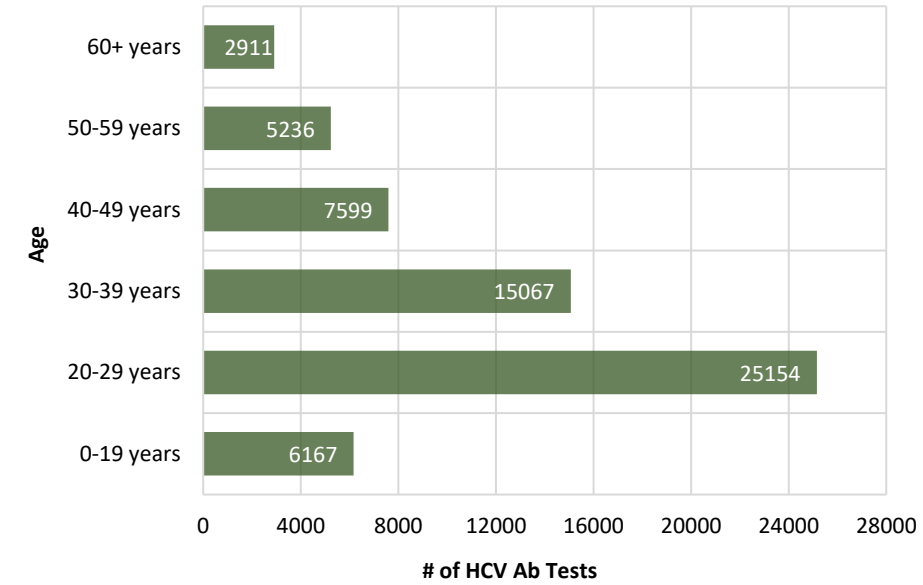
Some samples were deemed "unsatisfactory" because of poor shipping, packaging, or labeling, and therefore not tested.

Table 6.1 BOL HCV Antibody Tests, 2017-2021

Year	# of Samples Tested	# of Unsatisfactory or Not Tested	# Negative	# Positive	% Positive
2017	7,130	46	6,849	281	3.94%
2018	8,054	51	7,683	320	3.97%
2019	11,507	63	10,980	527	4.60%
2020	7,286	34	6,915	337	4.63%
2021	7,929	40	7,605	284	3.60%

In 2016, the number of HCV Ab tests conducted by the MDHHS BOL were approximately twice as many as previous years. Testing continued to increase in 2017-2019, as MDHHS has continually engaged in efforts to increase hepatitis C testing through BOL. Capacity for HCV Ab testing was reduced due to the COVID-19 pandemic. Consequently, the number of samples tested in 2020 was reduced by 36.7%. Testing remained lower but slightly increased in 2021. HCV Ab positivity rates have continued to hover around 4-5%.

Figure 6.5 All HCV Antibody Tests by Age, 2012-2021



Of the 62,134 HCV Ab tests ran from 2012-2021, most individuals tested were between 20-29 years old. The smallest proportion of tests were run amongst those 60 years of age and older, making up only 4.7% of all individuals tested for HCV Ab.

Table 6.2 BOL HCV PCR Testing, 2017-2021

Year	# of Samples Tested	# of Unsatisfactory or Not Tested	# Negative	# Positive	% Positive
2017	270	13	127	143	52.96%
2018	320	16	147	157	49.06%
2019	511	19	231	280	54.80%
2020	340	15	160	165	48.53%
2021	473	25	221	227	47.99%

Figure 6.6 BOL HCV PCR Testing by Year, 2014-2021

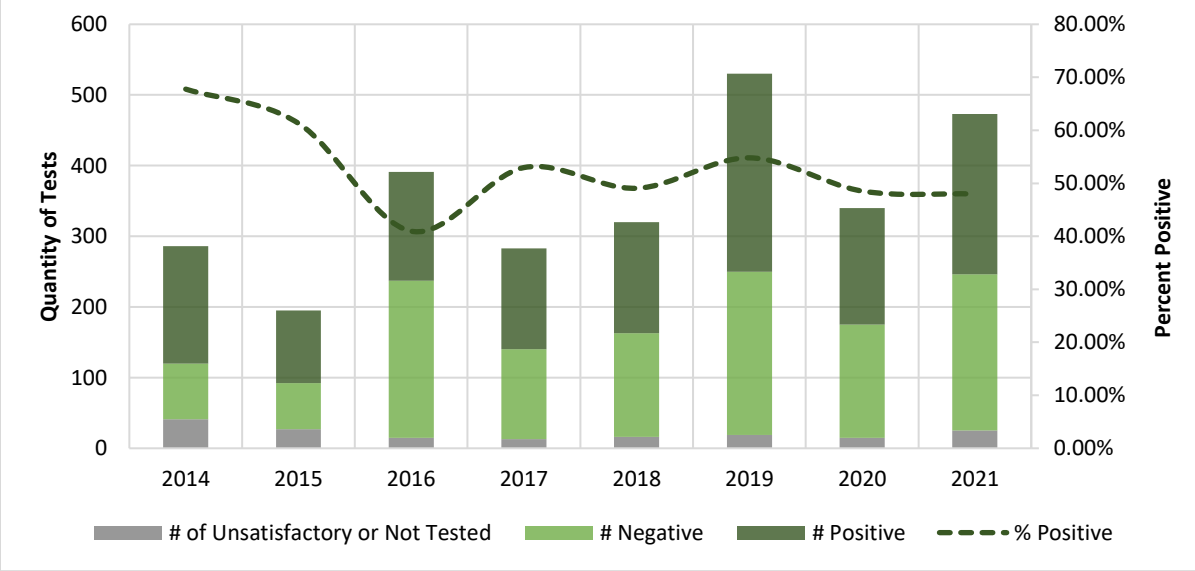
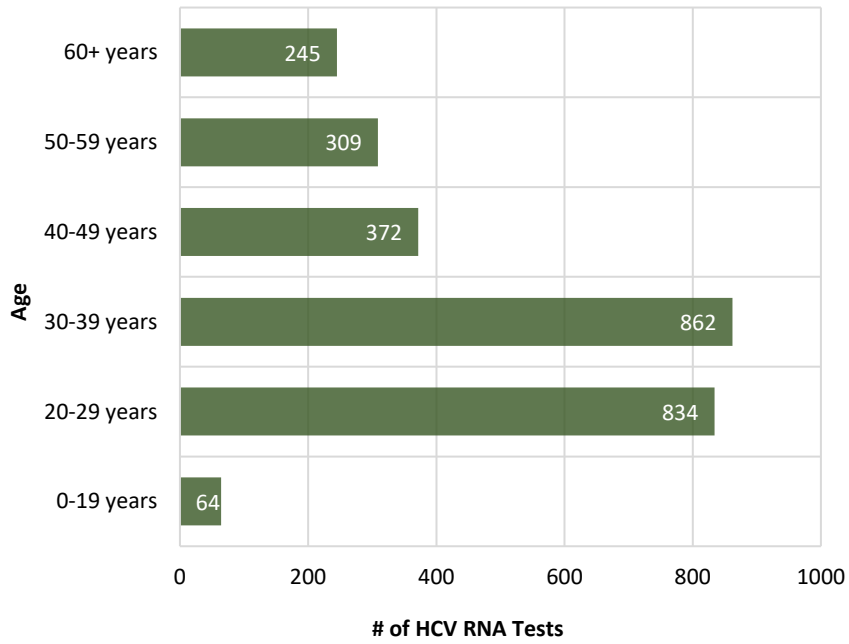


Figure 6.7 All HCV RNA Tests Stratified by Age, 2014-2021



The number of PCR tests conducted by the BOL has fluctuated from 2014 through 2021, with totals peaking in 2019 at 511 tests analyzed before decreasing to 311 tests in 2020 and rising again to 473 in 2021. Hepatitis C testing capacity may have been reduced in 2020 due to necessity to focus resources on COVID-19 testing. The percentage of tests that yielded positive results decreased from 48.5% in 2020 to 47.99% in 2021.

Of the 2,686 HCV RNA tests ran by BOL from 2014-2021, 32.1% of individuals were 30-39 years old, followed closely by 31.0% of individuals aged 20-29 years old. The smallest proportion of tests were found amongst those 0-19 years old (2.4%) and those 60 years of age and older (9.1%).

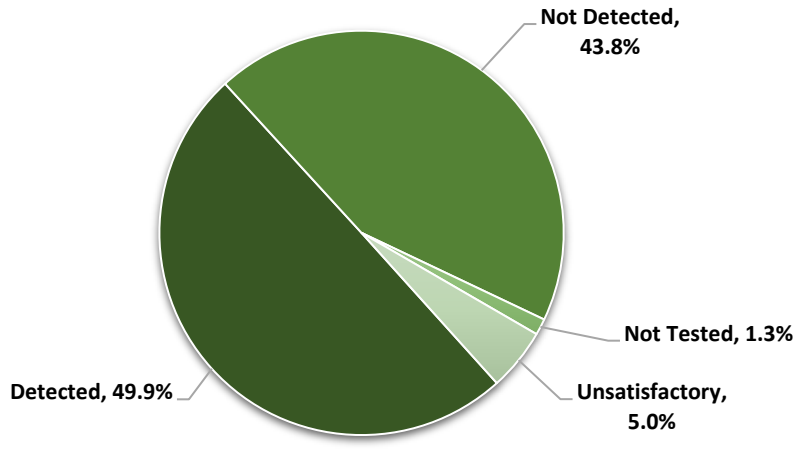
Table 6.3 BOL Patient Demographics for Patients Testing HCV Antibody/RNA Positive 2014-2021

Variable	n	%
N	1,901	
Sex		
Male	1,138	60.0%
Female	730	38.4%
Unknown	33	1.7%
Race		
American Indian or Alaskan Native	13	0.7%
Asian	5	0.3%
Black or African American	265	13.9%
Native Hawaiian or Pacific Islander	3	0.2%
White or Caucasian	1,403	73.8%
Multiracial	6	0.3%
Other	31	1.6%
Unknown	177	9.3%
Age		
0-19	47	2.5%
20-29	653	34.4%
30-39	575	30.2%
40-49	231	12.2%
50-59	219	11.5%
60+	151	5.2%

There were 1,901 patients who tested positive for both HCV antibody and RNA at BOL between 2014-2021. Just over half (60.0%) of individuals who tested positive were male. The majority (73.8%) of those who were positive were white/Caucasian, which was much higher than Black/African Americans who only made up 13.9% of positive test results. In addition, 34.4% of individuals who tested positive were 20-29 years old. This is much higher than the baby boomer population, which only accounted for about 11.5% of positive test results.

Many of our specimen submitters are local health department health clinics. These data may be indicative of patient populations that often utilize local health departments for health services.

Figure 6.8 PCR Test Results following a Positive HCV Antibody Test 2014-2021



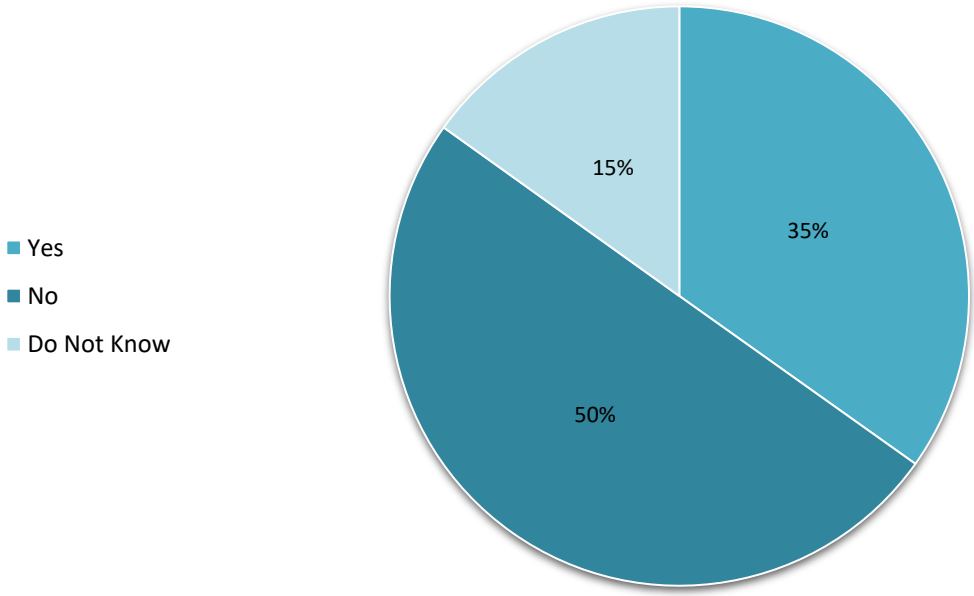
Of the 2,763 positive HCV screen tests, just about half (49.9%) had a positive PCR test result. 43.8% of positive HCV screen tests were negative by PCR. These numbers reflect all BOL HCV RNA results that were preceded by a reactive HCV antibody test through BOL.

Hepatitis C—MI Behavioral Risk Factor Survey Data

The Michigan Behavioral Risk Factor Surveillance System (MiBRFSS) is composed of annual, state-level telephone surveys of Michigan residents, aged 18 years and older. These annual state-level surveys also known as Michigan Behavioral Risk Factor Surveys (MiBRFS) act as the only source of state-specific, population-based estimates of the prevalence of various behaviors, medical conditions, and preventive health care practices among Michigan adults. The MDHHS Viral Hepatitis Unit added the question "Have you ever been tested for Hepatitis C Virus?" to the 2020 MIBRFS to determine demographic and behavioral factors associated with hepatitis C testing. Data collected from the MiBRFS in 2020 (N=4,290) was stratified based on HCV testing status and analyzed by various socio-demographic and behavioral factors.

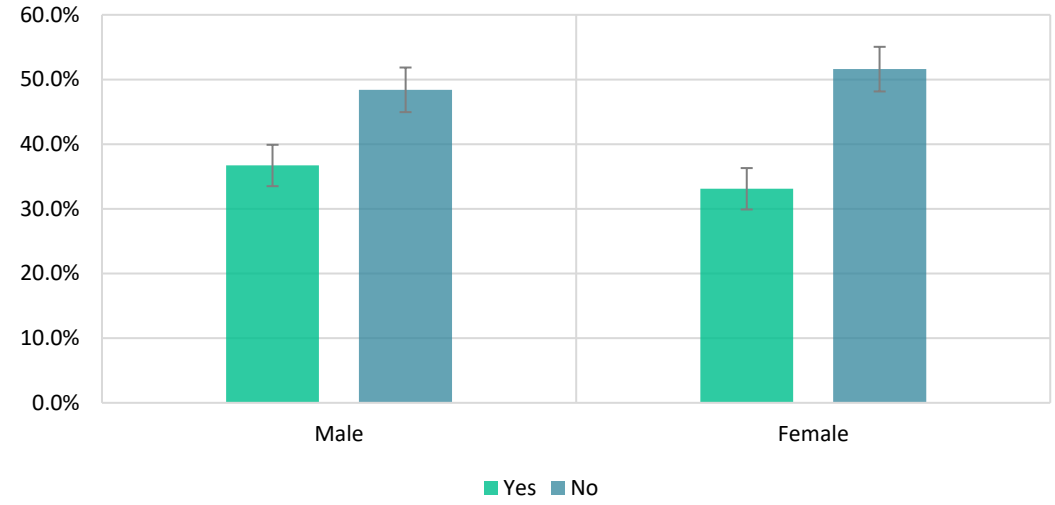
We hope to monitor trends in these data over time to determine if HCV testing is increasing. In addition, the information provided will help us develop targeted strategies to increase HCV testing.

Figure 6.9 MiBRFS "Have You Ever Been Tested for HCV?", 2020 (n=4,290)



A total of 4,290 participants responded to the question "Have you ever been tested for HCV" in the 2020 MiBRFS. Of these participants, 1,408 (35.0%) reported ever being tested for HCV while half (50.0 %, 2,195 participants) of respondents had never been tested for HCV. One time hepatitis C testing is recommended for all persons over 18 years of age. When compared to the 2016 iteration of this survey, the proportion of those having been tested increased by 5% while the non-tested proportion decreased by 8%.

Figure 6.10 MiBRFS "Ever tested for HCV?" by Sex, 2020



36.7% of men reported ever being tested for hepatitis C compared to women at 33.1%. Conversely, 51.6% of women reported never being tested versus 48.4% of men.

Table 6.4 MiBRFS "Ever tested for HCV?" by Race, 2020

Race	Yes	No
Caucasian	32.70% (30.7-34.8)	50.60% (48.5-52.8)
African American	46.30% (40.1-52.7)	44.50% (38.3-50.8)
Other/Multi-racial	43.00% (31.2-55.6)	45.10% (33.5-57.2)
Hispanic	35.70% (25.4-47.4)	52.90% (41.1-64.4)

Hispanics and Caucasians were less likely to have reported being tested for HCV (35.7% and 32.7%, respectively) compared to other racial groups. When compared to the 2016 MiBRFS survey, the proportion ever tested increased across all races.

Table 6.5 MiBRFS "Ever tested for HCV?" by Age, 2020

Age	Yes	No
18-49 years	35.60% (32.6-38.7)	50.10% (47.0-53.3)
50-70 years	38.80% (35.9-41.9)	48.40% (45.3-51.5)
71+ years	24.40% (21.3-27.8)	53.00% (49.3-56.8)

"Baby Boomers," persons approximately 54 to 74 years old at the time of the survey, were more likely to have reported ever being tested for HCV than those less than 50 years old (38.8% compared to 35.6%). Those over 70 years old were the least likely to report ever being tested for HCV (24.4%). This is in contrast with the 2016 MiBRFS survey, where the 18-49 year old cohort reported the highest rate of testing.

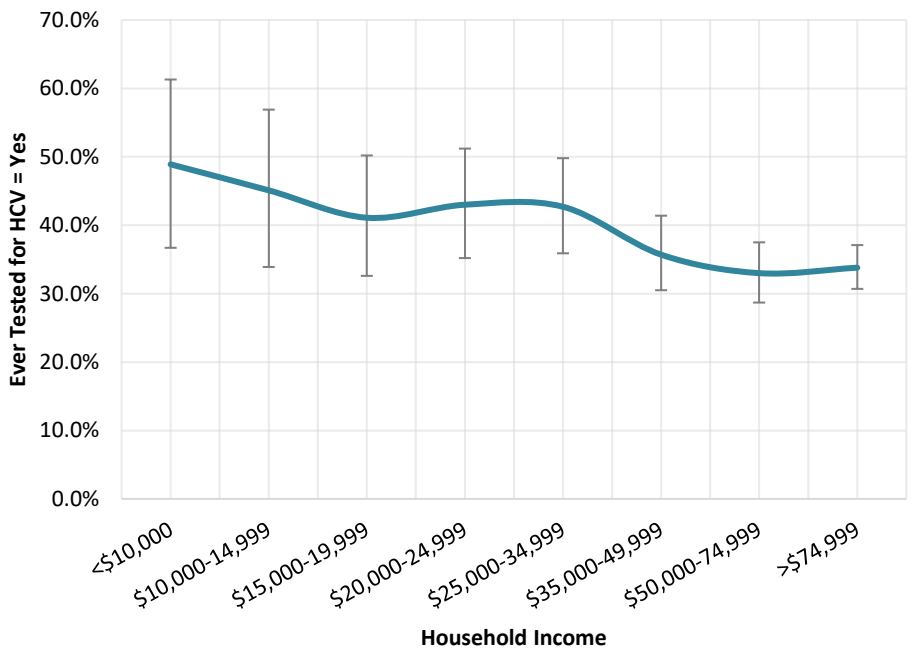
Table 6.6 MiBRFS "Ever tested for HCV?" by Insurance Type, 2019

	Private	Medicaid	Medicare	Healthy Michigan	Medicaid + Medicare	None*
Yes	31.50% (29.2-33.8)	38.50% (32.5-44.8)	30.90% (28.2-33.7)	34.00% (23.5-46.3)	40.00% (32.5-48.0)	36.30% (28.7-44.7)
No	53.50% (51.1-55.9)	51.70% (45.4-58.0)	56.10% (53.2-59.0)	50.90% (39.1-62.7)	48.50% (40.7-56.3)	54.00% (45.7-62.1)

*Note: The 2020 MiBRFS included insurance status as a binary variable, thus the "None" category in Table 6.6 is the only data point that was updated with 2020 data. The remaining data is current as of 2019.

Not having insurance or having public insurance is often seen as a barrier to receiving HCV testing. However, according to the BRFSS survey, persons with Medicaid or Healthy Michigan Plan were more likely to be tested for HCV than those with private insurance. Of the public insurance options, members of both Medicare and Medicaid were the most likely to have ever been tested for HCV (40.0%). The proportion of persons with private health insurance that were tested for HCV (31.5%) was lower than all insurance options, which the exception of Medicare alone (30.9%).

Figure 6.11 MiBRFS Ever tested for HCV? by Household Income, 2020

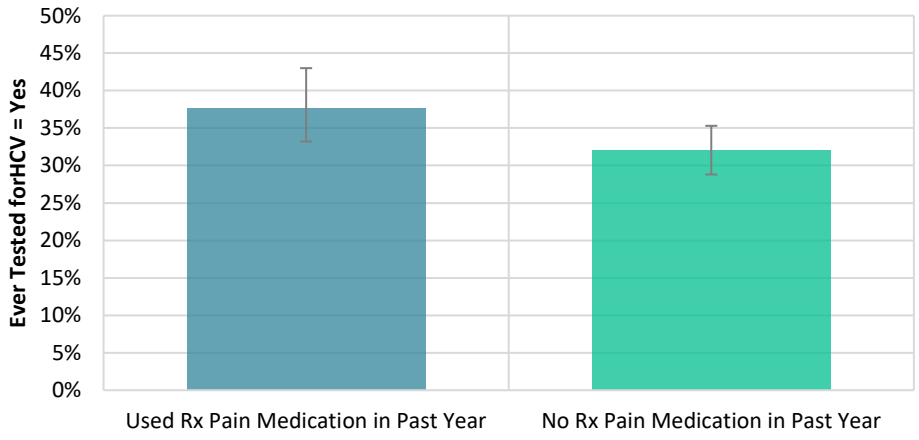


It is thought that those with lower income experience significant barriers to receiving diagnostic testing services.

However, according to the survey data, there has been a tendency toward an inverse correlation between household income and likelihood of ever being tested for HCV, apart from household income lower than $10,000. As household income increased, respondents became less likely to have been tested for HCV.

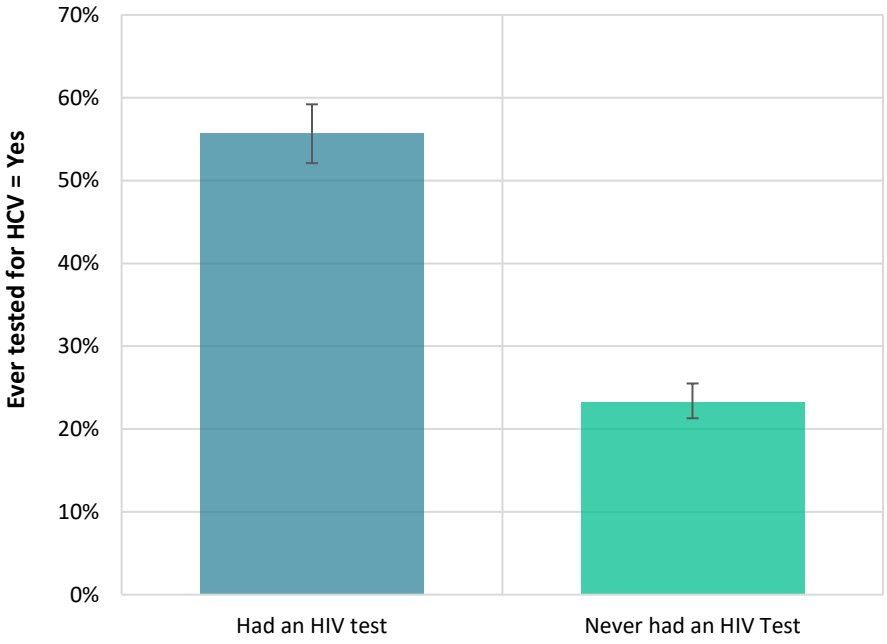
This might suggest that persons with higher income may be less likely to have risk factors for HCV exposure compared to those with lower income and awareness of testing may be heightened at lower income levels. It also indicates that low income may not be a major barrier to HCV testing as perception might suggest.

Figure 6.12 MiBRFS Ever tested for HCV? By use of Prescription Pain Medicatons in the Past Year, 2020



The relationship between prescription opioid abuse, heroin use, and the risk of bloodborne pathogen transmission when sharing injection drug use equipment has been well established in recent years. These data show that those who reported using pain medications prescribed by a doctor were more likely to have ever been tested for HCV (38% vs. 32%).

Figure 6.13 MiBRFS Ever tested for HCV? By History of being tested for HIV, 2020



HIV and HCV share modes of transmission and many patients have risk factors for both HIV and HCV.

These data show that individuals who had an HIV test were more likely to have ever been tested for HCV than those who never had an HIV test. Of the persons surveyed who had an HIV test, 56% reported also being tested for HCV while only 23% of those that never had an HIV test had ever been tested for HCV.

The information suggests that co-location of HIV and HCV testing services may help increase HCV screening.

Focus Populations

Adults Under 40 (18-39 years of age)

Figure 7.1 Number of Chronic Hepatitis C Cases Reported to MDHHS by Year of Birth, 2021

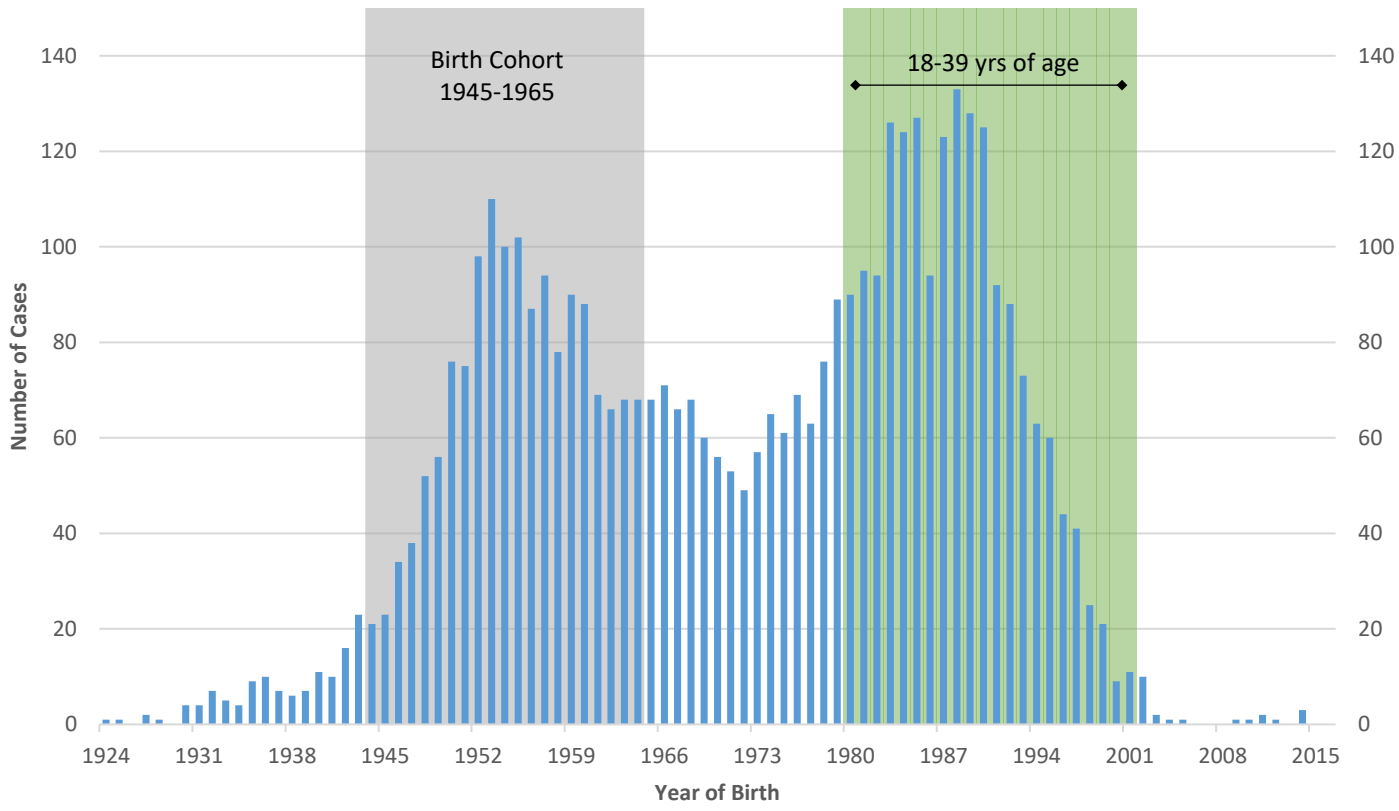


Figure 7.1 depicts the number of chronic hepatitis C cases reported to MDHHS by birth year in 2021. Since 1998 the CDC has recommended HCV testing for persons with elevated risk of HCV infection, and in 2012 those guidelines were expanded to recommend one time HCV testing for all persons born from 1945 through 1965, regardless of risk factors. More recently, those recommendations have changed to a once in a lifetime screening for all adults aged 18 years and older, as well as all pregnant individuals during each pregnancy. Traditionally, the cohort with birth year from 1945 to 1965 easily reported more hepatitis C cases each year in Michigan than any other cohort. As the screening recommendations expanded and the landscape has shifted, data indicates a newer focus population.

In recent years a second “peak” of new chronic HCV diagnoses developed in adults under 40 (18-39 yrs old). An emerging epidemic of hepatitis C infections in adults under 40 has been identified in areas across the U.S. and in Michigan. The primary driver of this increase in hepatitis C cases is sharing of injection drug equipment and works, which is enhanced by the concurrent opiate and heroin epidemics. In 2021 these factors, among others, caused the 18–39-year-old cohort to eclipse the new case count of the 1945-1965 birth cohort for the first time in MI. The quantity of MI cases reported in 2020 for each age cohort was virtually equal. In response to the rapid increase of HCV cases in younger populations CDC began recommending one-time hepatitis C testing of all adults (18 years and older) and all pregnant individuals during every pregnancy in 2020.

Figure 7.2 Number of Chronic Hepatitis C Cases Reported to MDHHS by Year, 18-39 Years of Age, 2005-2021

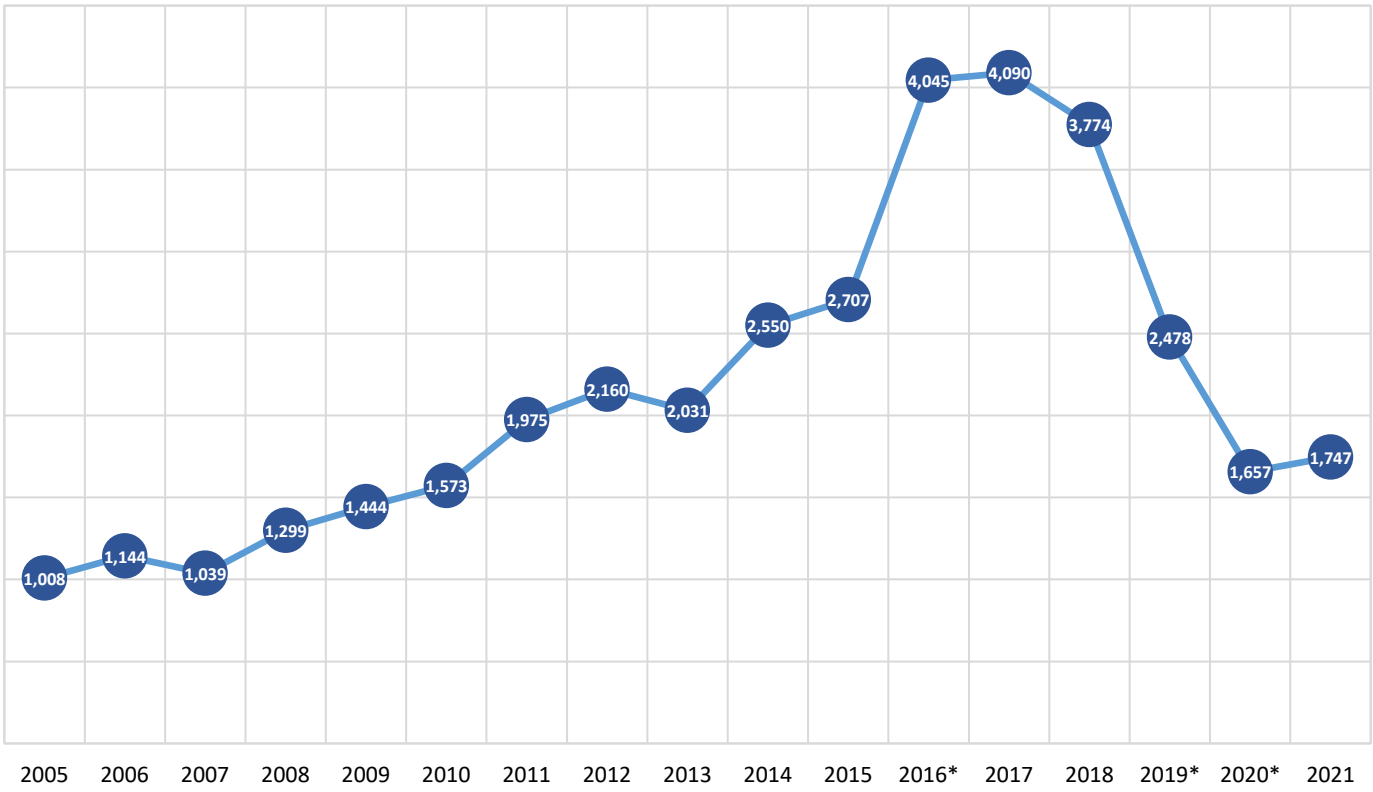


Table 7.1 Number and Percentage of Chronic Hepatitis C cases reported to MDHHS aged 18-39, 2012-2021

	2012	2013	2014	2015	2016*	2017	2018	2019*	2020*	2021
Total Cases	7,967	6,703	8,233	7,833	11,883	12,062	10,545	6,036	4,356	4,412
Number of Cases 18-39 Years Old	2,160	2,031	2,550	2,707	4,045	4,090	3,774	2,478	1,657	1,747
Percentage of Total Cases	27%	30%	31%	35%	34%	34%	36%	41%	38%	40%

From 2005 through 2017, the number of new HCV diagnoses among persons 18 to 39 years of age increased year over year, except for 2013, before decreasing from 2018-2020 (Figure 7.2). Even so, the number of cases has increased nearly 500% between 2000 and 2021. The dramatic rise in new HCV diagnoses in this population from 2015 to 2016 can be largely explained by a change in the case definition. A sharp decrease in 2019 can be attributed to the expanded capacity to receive negative HCV RNA lab results electronically, followed by another reduction in cases attributed to the COVID-19 pandemic and its impact on accessibility to routine screening in 2020. In 2021, the number of reported cases increased compared to 2020. Table 7.1 shows that the proportion of all reported cases that were between the ages of 18 and 39 had been increasing over the past decade until 2020, however, that increase appears again in 2021.

*Pronounced fluctuations in case counts may be a result of a case definition change in 2016, electronic reporting of negative HCV RNA lab results beginning in 2019, and/or the COVID-19 pandemic in 2020

Table 7.2 Epidemiologic Summary of 2021 Chronic HCV Cases Aged 18-39 Years Old

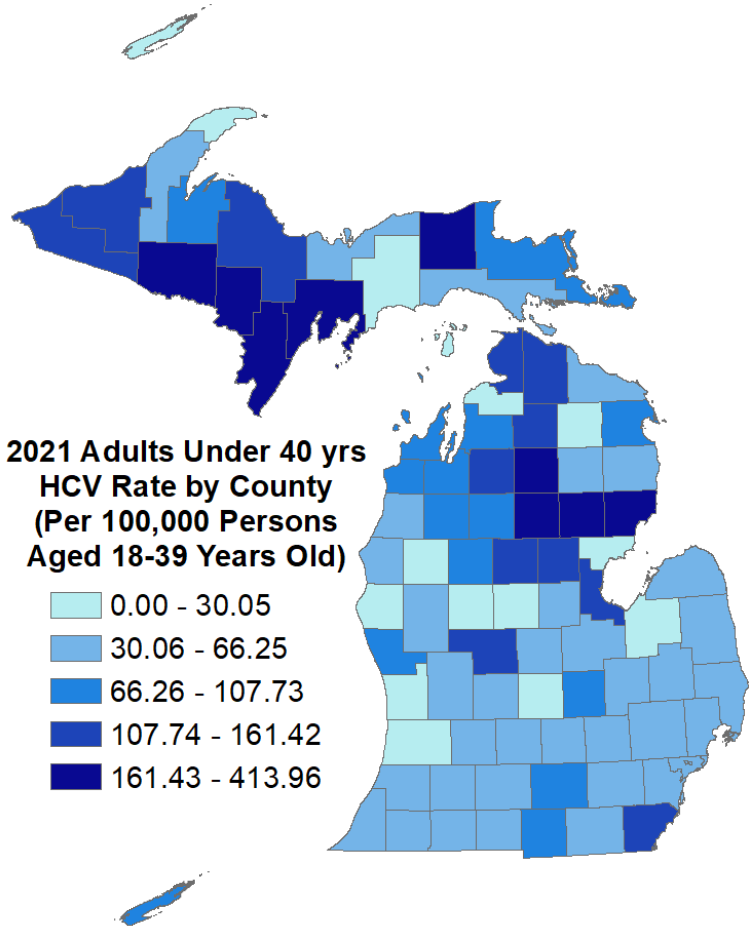
Age (n = 1,747)		
Median	32	
Mean	31.31	
Range	18 - 39	
Sex (n = 1,742)		**Rate per 100,000**
Female	763 (43.8%)	54.38
Male	979 (56.2%)	67.93
Race (n = 1,460)		**Rate per 100,000**
White	1184 (81.1%)	58.28
Black	138 (9.5%)	29.79
American Indian or Alaskan Native	18 (1.2%)	79.90
Asian	19 (1.3%)	14.11
Other Race	100 (6.9%)	Not Available
Hispanic Ethnicity (n = 1,178)		**Rate per 100,000**
Hispanic or Latinx	43 (3.7%)	22.49
Not Hispanic or Latinx	1135 (96.3%)	42.78
Arab Ethnicity (n = 526)		**Rate per 100,000**
Arab Ethnicity	7 (1.3%)	Not Available
Non-Arab	519 (98.7%)	Not Available
History of IVDU (n = 495)		
Yes	386 (78.0%)	
No	109 (22.0%)	

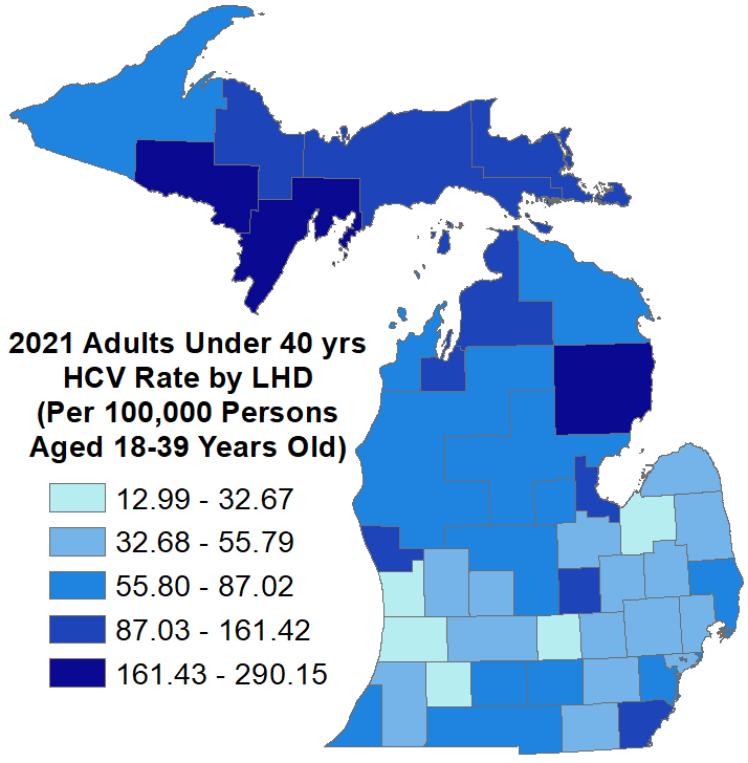
Previous studies conducted by MDHHS have shown injection drug use to be the primary risk factor for HCV acquisition among those aged 18-39 years. In many instances these clients reported sharing needles, syringes, and other injection drug works (such as cookers and cotton) which could act as vectors for HCV transmission. Increases in indicators of heroin and opioid use (see subsequent pages) are correlated with the rise in HCV cases in the 18-39 year old population (i.e. more substance use leading to more HCV transmission).

A demographic breakdown of the chronic HCV cases aged 18-39 years old who were diagnosed in 2021 (Table 7.2) shows that the vast majority were White/Caucasian, non-Hispanic, and non-Arab with a distribution skewed towards males. Where injection drug use information was available on these patients, 83.1% reported a history of IVDU.

Maps of the rates of 2021 chronic HCV cases among those aged 18-39 years, 2021 heroin treatment admissions, and 2020 opioid overdose deaths and heroin overdose deaths by county and local health jurisdiction can be found on the subsequent pages.

Adults Under 40 (18-39 years old) HCV Case Rate Maps by County and Local Health Jurisdiction





Drug Poisoning and Drug Treatment Data

Figure 8.1 Number Heroin Substance Abuse Treatments Admissions and Deaths in Michigan, 2006-2021

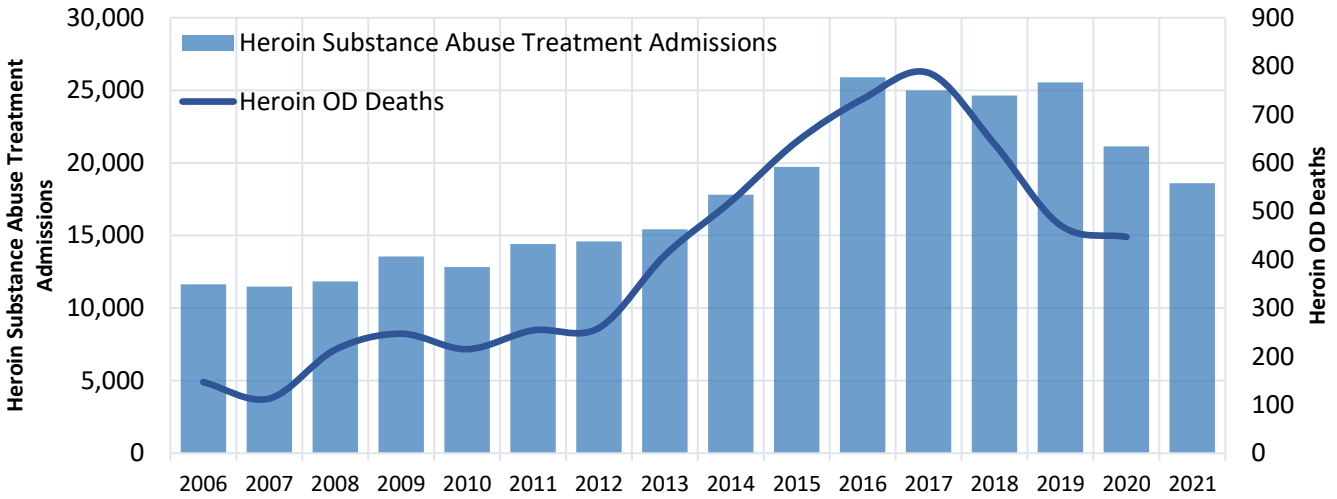


Table 8.1 Drug Overdose Deaths, Treatment Admissions and HCV in Michigan, 2012-2021

Year	All Drug Poisoning Deaths	Opioid OD Deaths	Heroin OD Deaths	Heroin Substance Abuse Treatment Admissions	Number of Chronic HepC Cases 18-39 Years Old
2012	1,300	389	259	14,596	2,160
2013	1,535	432	409	15,419	2,031
2014	1,745	481	520	17,800	2,550
2015	1,991	634	644	19,728	2,707
2016	2,376	1,001	732	25,910	4,045
2017	2,686	1,229	786	24,994	4,090
2018	2,599	1,361	639	24,650	3,774
2019	2,354	1,768	471	25,538	2,478
2020	2,738	2,171	447	21,140	1,657
2021	-	-	-	18,604	1,747

Table 8.1 depicts that Michigan has seen a parallel increase in the number of heroin overdose deaths and heroin substance abuse treatment admissions from 2000-2016. Treatment admission as well as heroin overdose deaths have decreased concurrently since 2016-2017. Despite this decrease, treatment admissions have still doubled since 2005, while the number of heroin overdose deaths has tripled since 2005. Similarly, opioid deaths have risen nearly every year from 74 in 2000 up by 2,834% to 2,171 in 2020. Total drug poisoning deaths rose 371% from 581 in 2000 to 2,738 in 2020.

Heroin overdose death data is obtained from Michigan death records. Drug poisoning deaths include those with ICD-10 primary or underlying cause code X40-44, X60-64, X85 and Y10-14. The drug causing the poisoning can be specified or unspecified. Heroin deaths are those that specify a related ICD-10 cause code of T40.1. Opioid deaths are those with specified ICD-10 codes T40.2-T40.4, with no mention of T40.1 (heroin). All deaths may have other underlying or related causes.

Heroin substance abuse treatment admissions are obtained from the Treatment Episode Dataset (TEDS). A heroin admission is defined as any admission where heroin is self-identified as one of the top five substances responsible for the admission. These numbers represent unique admissions and not unique patients as patients can be admitted multiple times at different facilities.

Note: Marked increase in 2016 HCV cases and decrease in 2019 HCV cases were due to case definition changes and electronic reporting of negative HCV RNA lab results, respectively, while a decrease in 2020 can be attributed to the COVID-19 pandemic and its impact on accessibility to routine screening.

Emergency Department Syndromic Surveillance Data

Emergency department (ED) syndromic surveillance system data can also be used as an indicator for injection drug and substance use in the population.

Emergency Department visit data potentially related to injection drug use are obtained through the Michigan Syndromic Surveillance System (MSSS). MSSS reporting is voluntary and not all hospitals participate in submitting ED data. This system captures chief complaints and diagnoses from emergency department (ED) visits in Michigan but does not have universal coverage across the state. Certain EDs submit with enhanced feeds, which can report ICD-10-CM diagnosis codes. Diagnosis codes result in more accurate overdose identification than chief complaint mentions of overdose.

It is important to note that MSSS data are subject to several data quality issues, such as intermittent data feed drops, transitioning systems, and incomplete statewide coverage. These technical difficulties make these data difficult to interpret and should be taken into consideration. This report cannot definitively state the frequency of overdoses in Michigan. It is certainly possible that ED-related injection drug use complaints may be missed by the query and/or that we may be counting some ED complaints that are unrelated to injection drug use. With these limitations in mind, MSSS data can be an effective tool for monitoring ED-trends in a population over time.

The data in Figure 9.1 indicate that rates of ED visits that mention drug overdose have remained relatively stable in 2019 and 2020.

Figure 9.1 Rate of ED Visits with Drug Overdose Mention in Chief Complaint, Michigan 2019 - 2020

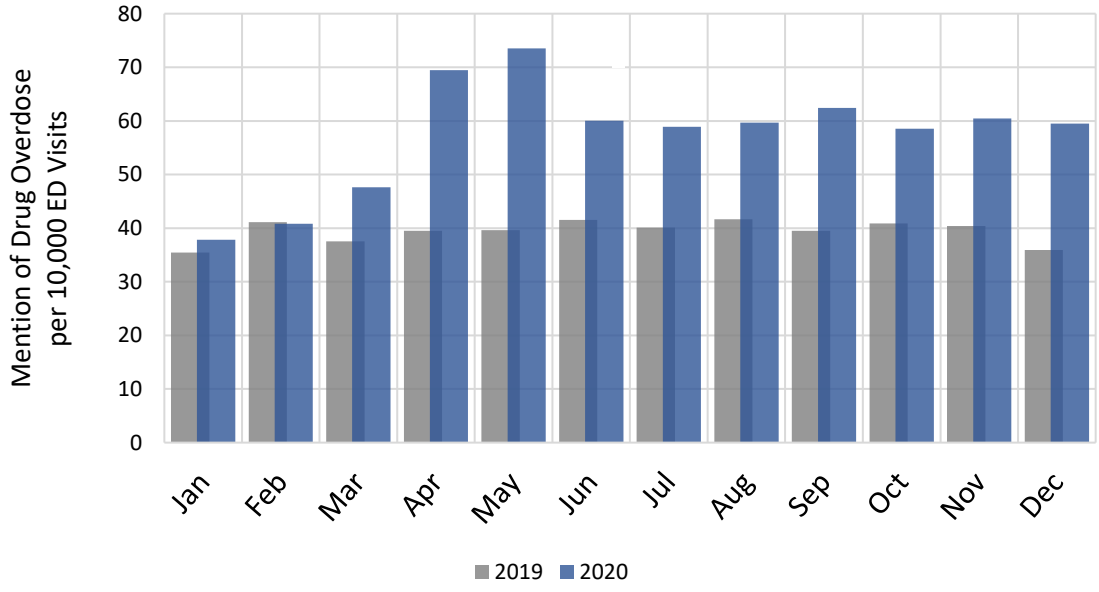
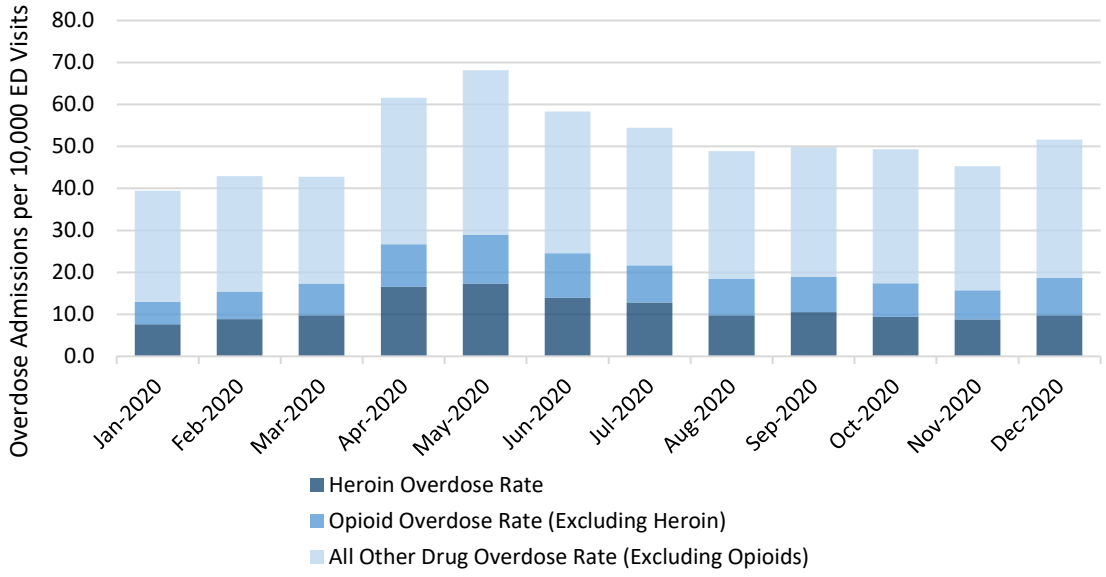


Figure 9.2 Rates of ED Visits with Overdose Diagnosis or Overdose Mentioned in the Chief Complaint, Michigan 2020



When stratifying by specific drug, the ED encounters experienced a modest increase in rate during April through July, driven by an increase in heroin overdose admission rate, before stabilizing and maintaining a consistent proportion in terms of specific drug mentioned, with about 22% of reported ED mentioning heroin, while 17% mention other opioids, and 61% with mention of other drugs.

Figure 9.3 ED Overdose Visits by Age and Sex with Mention of Any Drug, 2020

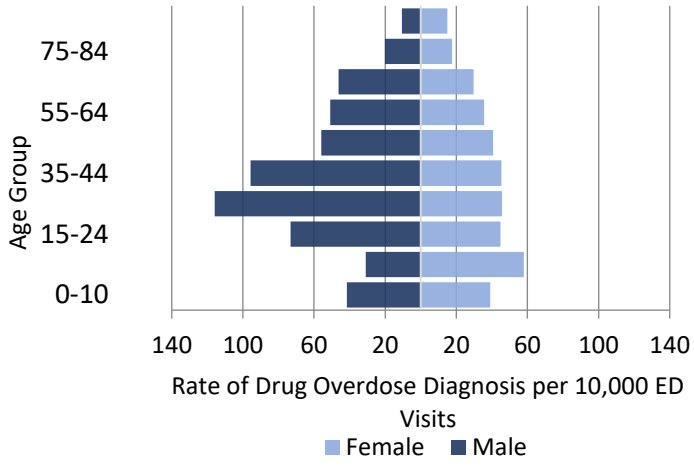
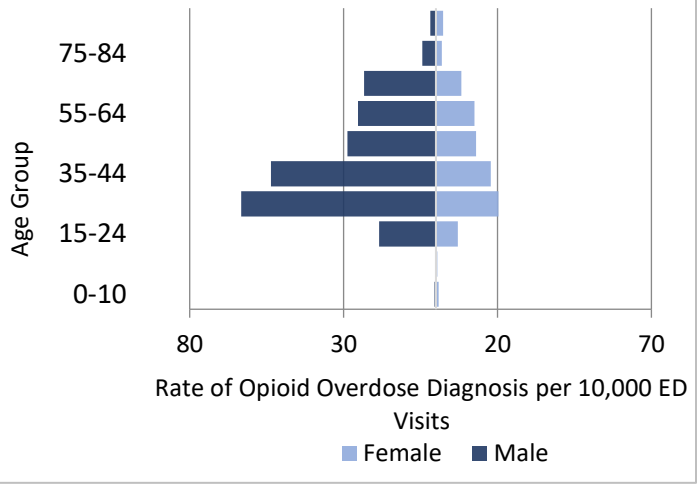
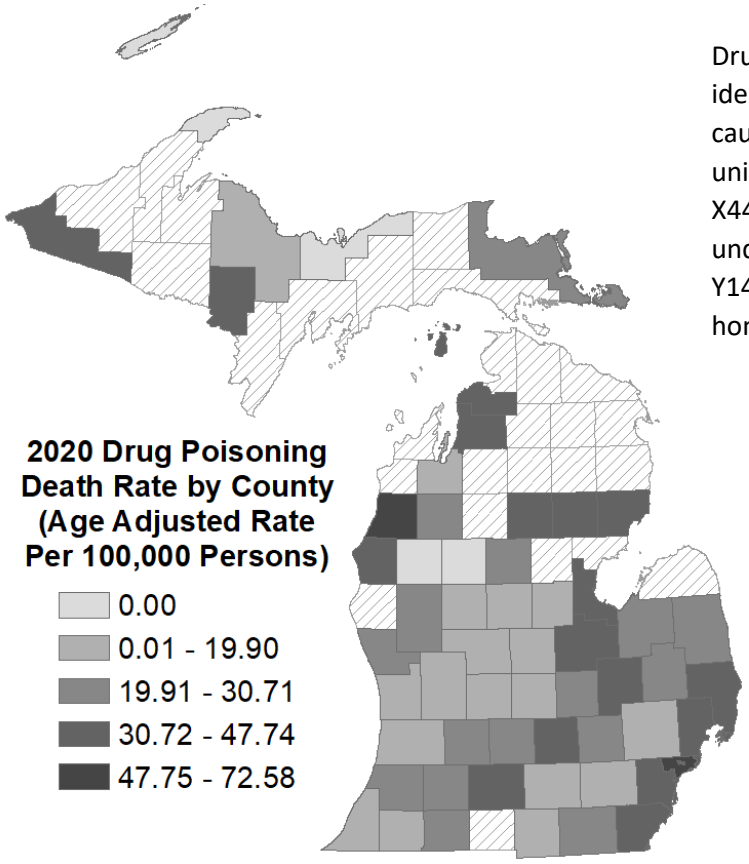


Figure 9.4 ED Overdose Visits by Age and Sex with Mention of Opioid, 2020

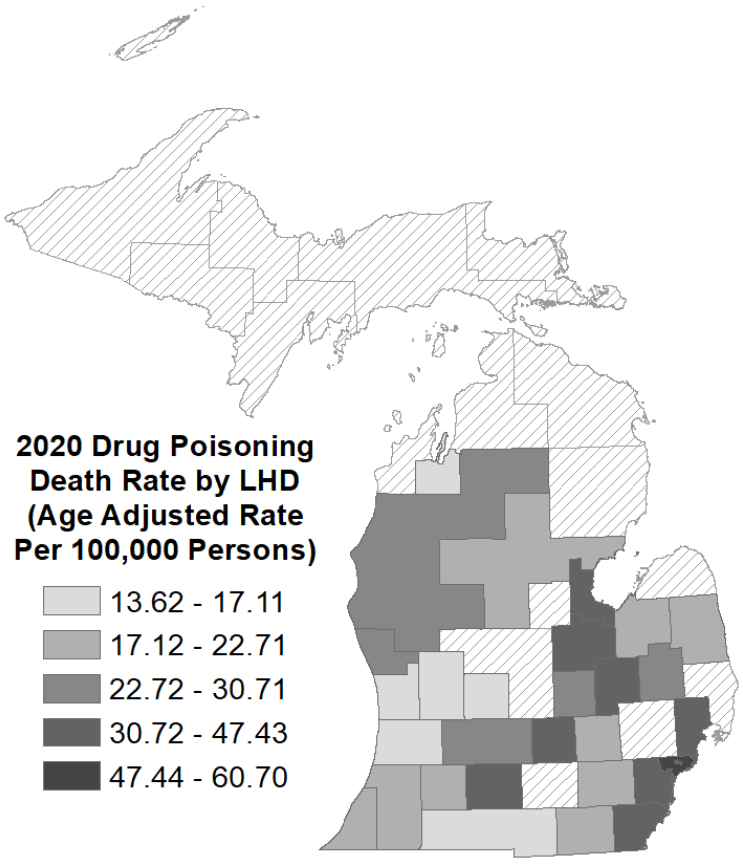


When stratifying by age and sex, the ED encounters appear to occur most frequently in the male adults under 40 (18-39 yr old) population than other age groups in 2020. This observation is consistent with trends and patterns of injection drug and opioid abuse in Michigan and subsequent risk for viral pathogens like HCV.

Total Drug Poisoning Death Rate Maps by County and Local Health Jurisdiction

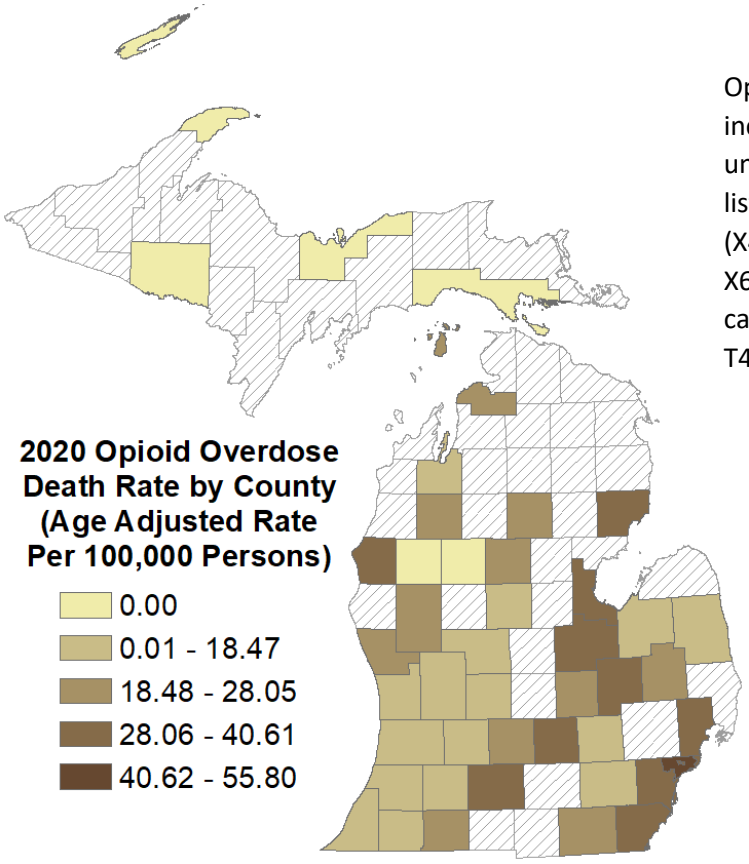


Drug overdose deaths are identified using underlying cause of death codes for unintentional poisoning (X40-X44), poisonings of undetermined intent (Y10-Y14), suicides (X60-X64), and homicides (X85).

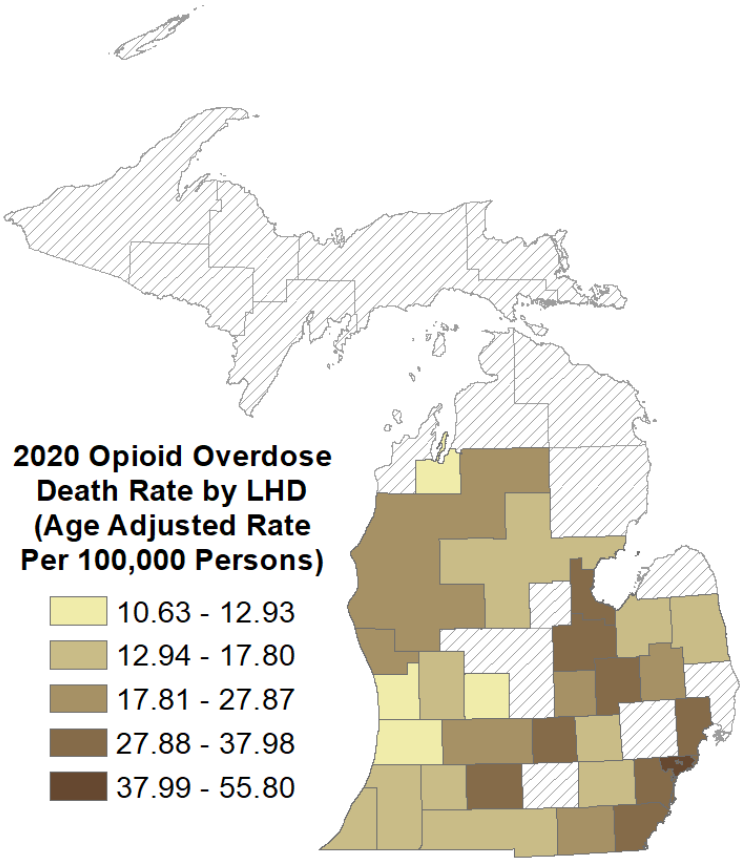


Data are suppressed if a drug is not specified in ≥90% of overdose death certificates or a jurisdiction reported less than five deaths

Opioid Overdose Death Rate Maps by County and Local Health Jurisdiction



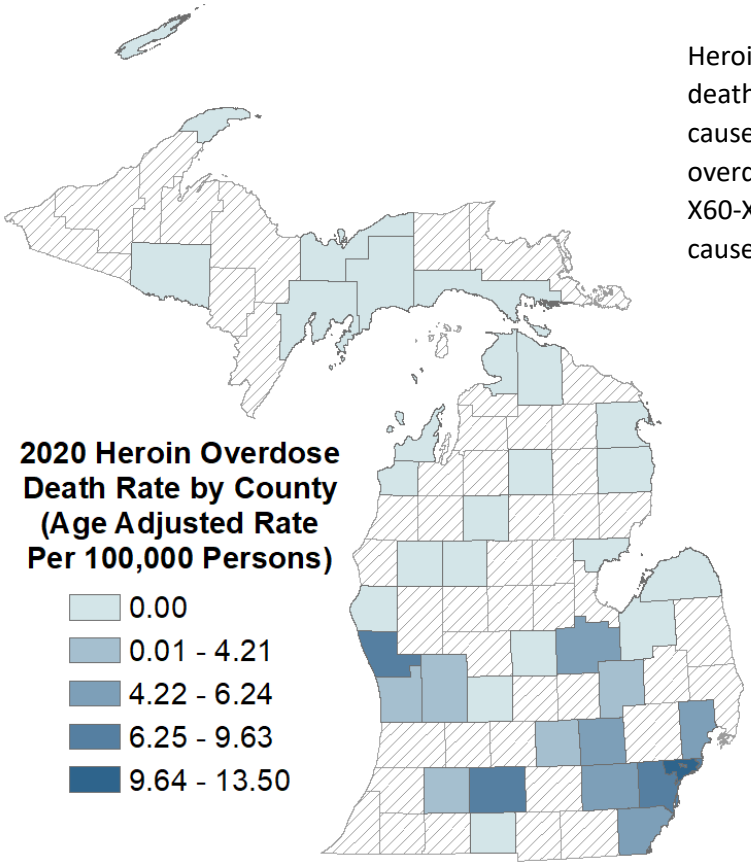
Opioid overdose deaths include deaths with an underlying cause of death listed as drug overdose (X40-X44, Y10-Y14, X60-X64, X85) and a related cause of death of T40.0-T40.4 or T40.6



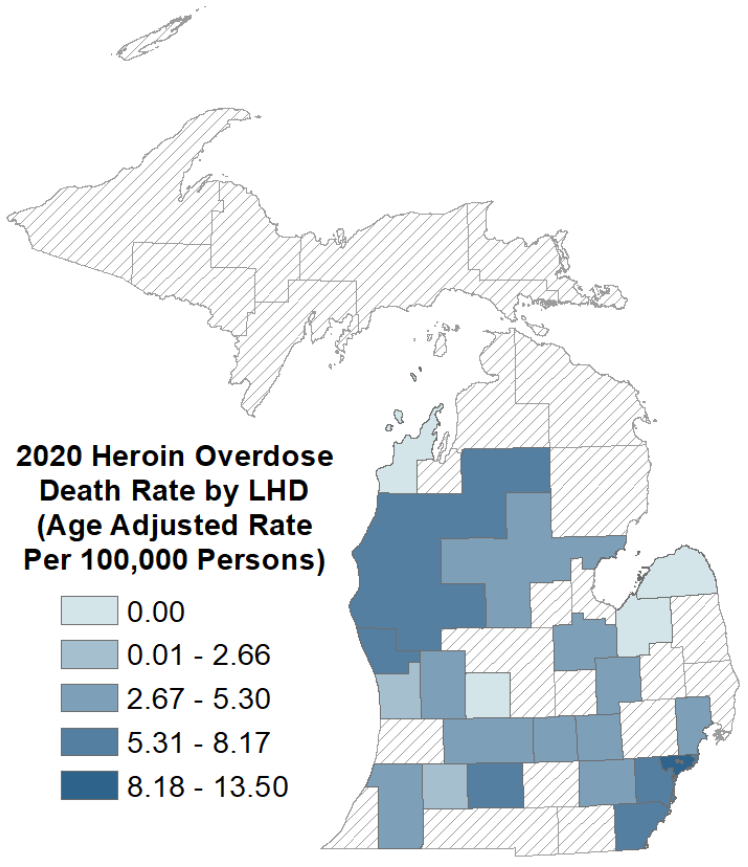
Data are suppressed if a drug is not specified in ≥90% of overdose death certificates or a jurisdiction reported less than five deaths

Heroin Overdose Death Rate Maps by County and Local Health Jurisdiction

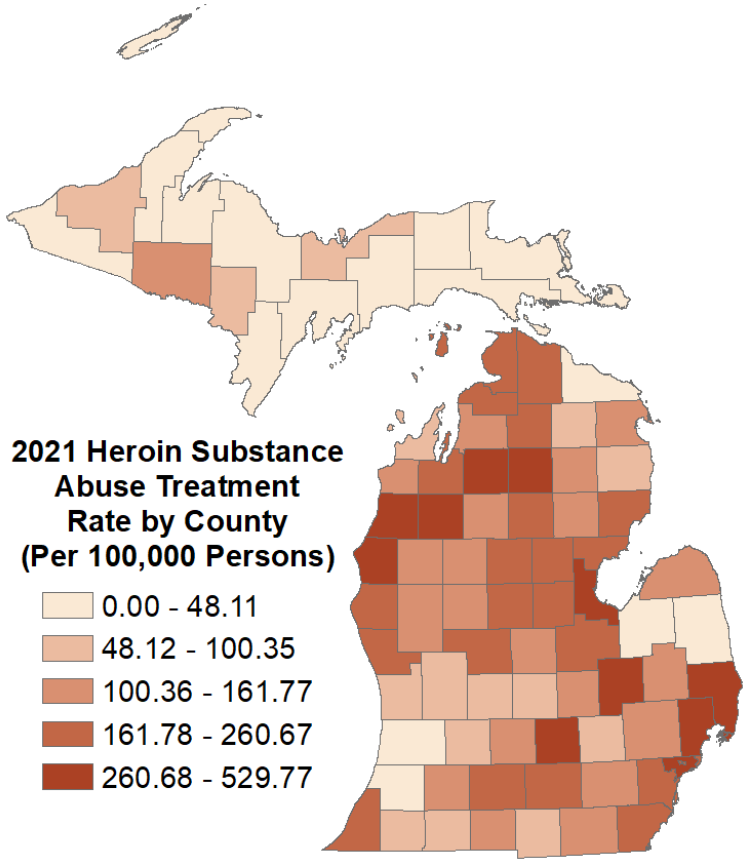
Heroin overdose deaths include deaths with an underlying cause of death listed as drug overdose (X40-X44, Y10-Y14, X60-X64, X85) and a related cause of death of T40.1



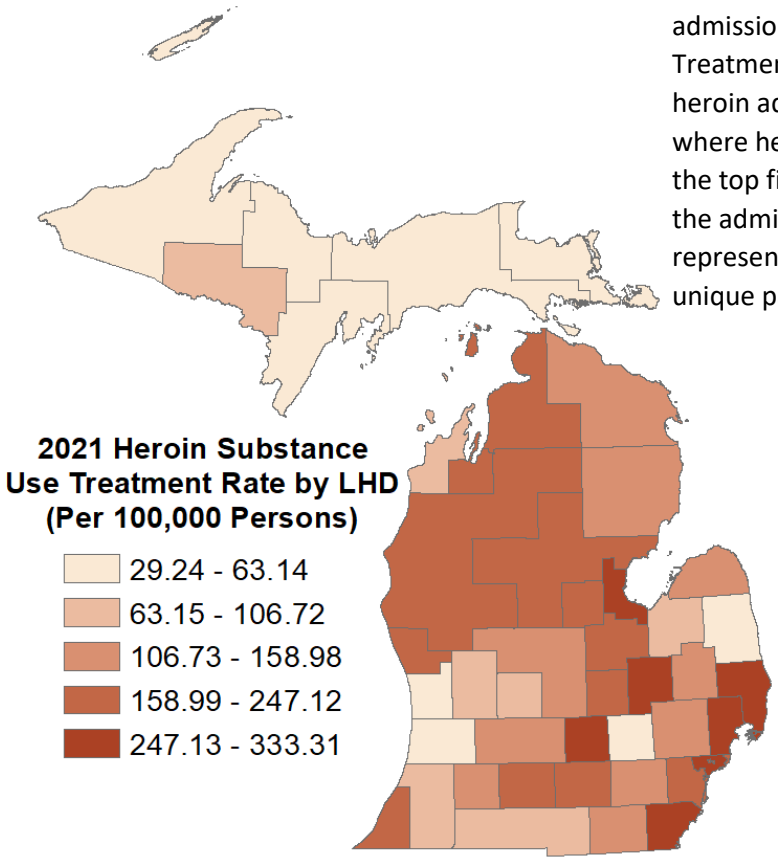
Data are suppressed if a drug is not specified in ≥90% of overdose death certificates or a jurisdiction reported less than five deaths



Treatment Episode Data Sets (TEDS) Rate Maps by County and Local Health Jurisdiction



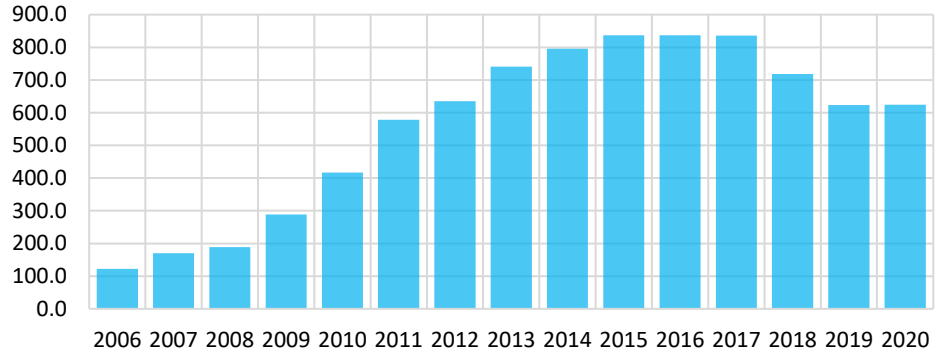
Heroin substance abuse treatment admissions are obtained from the Treatment Episode Dataset (TEDS). A heroin admission is any admission where heroin is self-identified as one of the top five substances responsible for the admission. These numbers represent unique admissions and not unique patients.



Neonatal Abstinence Syndrome (NAS)

Neonatal Abstinence Syndrome (NAS) occurs in infants who are exposed to opioids in the womb before birth. These infants are born addicted to opioids and experience withdrawal symptoms after delivery. NAS typically occurs 48-72 hours after birth and symptoms include tremors, high-pitched crying, seizures, feeding difficulties and temperature instability. Babies born with NAS may have additional health problems such as birth defects, low birth weight, small head circumference and developmental and behavioral disorders. Infants born with NAS often face extended stays in the hospital after birth. Trends in NAS and areas in which NAS is common may indicate heightened risks, especially among reproductive-age women, for things like HIV, HCV, and subsequent perinatal HCV transmission.

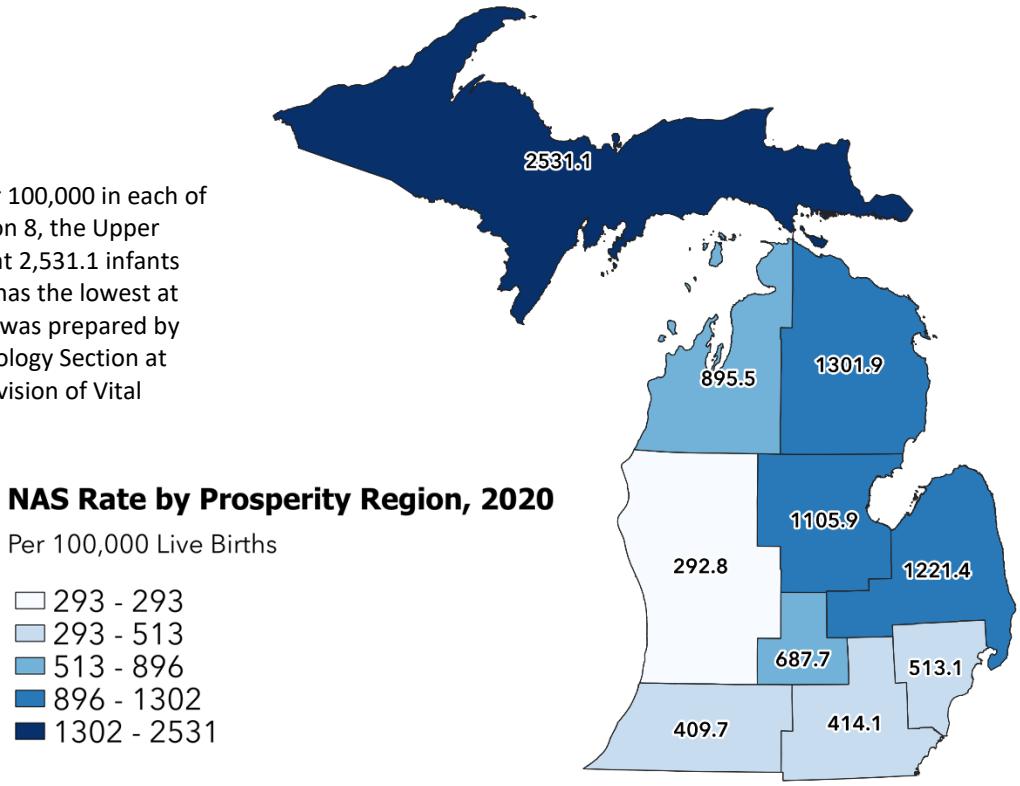
Figure 10.1 Rate of Treated Neonatal Abstinence Syndrome among Michigan Infants by Year, 2006-2020



NAS incidence has mirrored the increase in opioid abuse in Michigan (Figure 10.1). In 2001, the rate of treated NAS in Michigan infants was 48.8 per 100,000 live births. The rate has increased steadily, peaking at a rate of 837.1 treated NAS cases per 100,000 live births in 2016, a 1,615% increase. In recent years rates have begun to trend downward, however between 2019 and 2020 there was a slight increase in rates from 623.6 NAS cases per 100,000 live births in 2019 to 624.1 NAS cases per 100,000 live births.

Figure 10.2 NAS Rate per 100,000 Live Births by Michigan Perinatal Quality Collaborative Prosperity Region, 2020

This map depicts the 2020 NAS rate per 100,000 in each of the perinatal regions in Michigan. Region 8, the Upper Peninsula, has the highest rate of NAS at 2,531.1 infants per 100,000 live births, while Region 6 has the lowest at 292.8 per 100,000 live births. This map was prepared by the Maternal and Child Health Epidemiology Section at MDHHS using data from the MDHHS Division of Vital Records and Health Statistics.

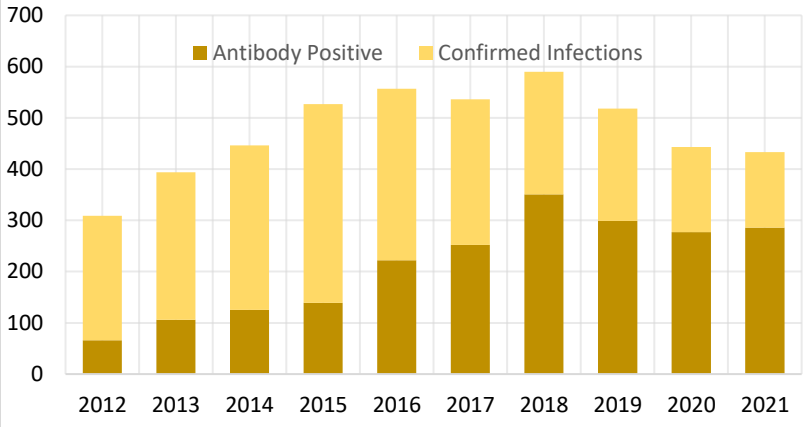


Perinatal Hepatitis C

MDHHS conducted a review of birth records matched with HCV-infected persons in Michigan, based on name, from 2012-2021. This review provided insight on trends in the rate of infants born to HCV-infected persons and allowed for comparison of demographics and risk factors between HCV-infected vs. non-infected persons.

National data indicates an upward trend in births to HCV-infected persons, which was evident in statewide data from 2012 through 2018 before beginning to decrease in 2019 and continuing through 2021. That decrease may be due, in part, to electronic reporting of negative HCV RNA lab results beginning in 2019, and/or the COVID-19 pandemic in 2020 (Figure 11.1).

Figure 11.1 Number of babies born to HCV-Infected Persons in Michigan, 2012-2021



A review of birth records indicates that persons who give birth and were reported to be HCV-infected are generally more likely than the non-infected population to:

- Be 20-39 years old.
- Be White/Caucasian or American Indian.
- Seek less prenatal care.
- Be less educated.
- Use Medicaid as payment for care.
- Smoke.
- Drink alcohol.
- Be single.
- Self-report HCV.
- Be infected with hepatitis B virus.
- Have previous sexually transmitted disease(s).

Table 11.1 Demographics from Michigan Birth Records, 2012-2021

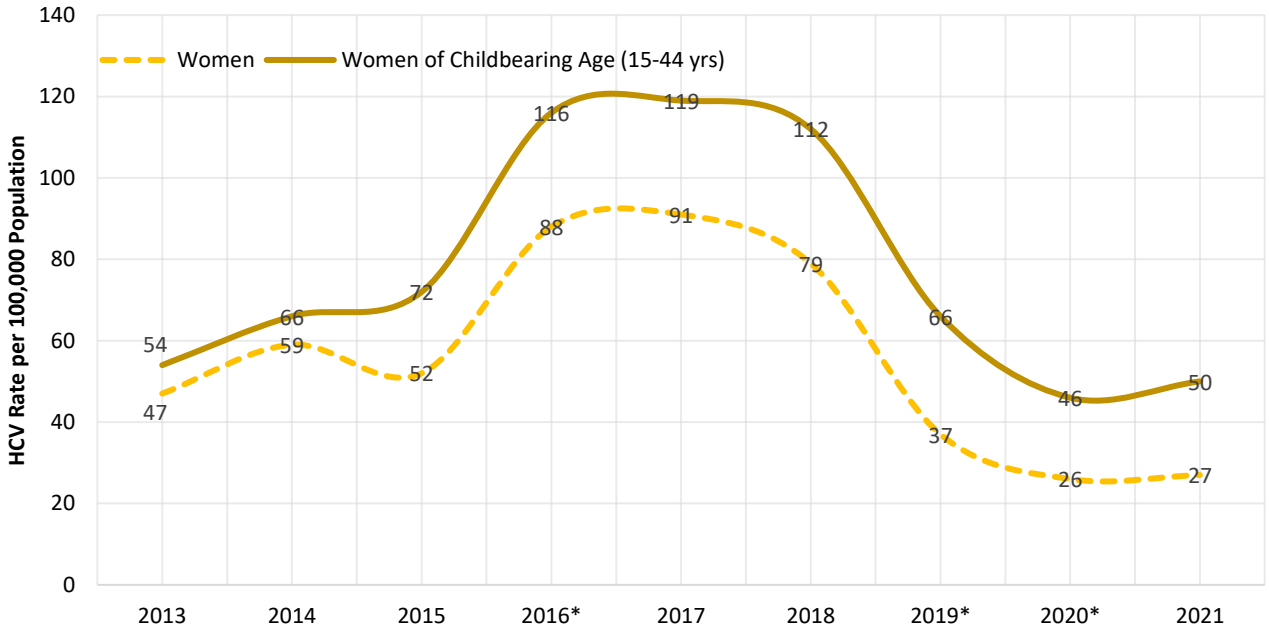
	Reported for HCV in MDSS?			
Birth Parent Characteristics	**Yes (n= 4,753)**		**No (n=1,043,822)**	
Age Group (in Years)				
<20	89	*1.87%*	57,507	*5.51%*
20-29	2,618	*55.08%*	549,593	*52.65%*
30-39	1,931	*40.63%*	414,806	*39.74%*
40-49	115	*2.42%*	26,420	*2.53%*
>50	0	*0.00%*	132	*0.01%*
Race				
American Indian	104	*2.19%*	4,895	*0.47%*
Asian	34	*0.72%*	37,608	*3.60%*
Black or African American	480	*10.10%*	194,796	*18.66%*
White or Caucasian	4,008	*84.33%*	757,667	*72.59%*
Other	90	*1.89%*	45,504	*4.36%*
Unknown	30	*0.63%*	4,145	*0.40%*
Prenatal Care Visits				
Less than 8 or no care	1,224	*25.75%*	114,973	*11.01%*
8 or greater	3,314	*69.72%*	908,168	*87.00%*
Education				
High school graduate or lower	4,280	*90.05%*	637,477	*61.07%*
Higher degree	392	*8.25%*	402,758	*38.58%*
Paysource				
Medicaid	3,564	*74.98%*	445,764	*42.70%*
Private Insurance	1,052	*22.13%*	574,089	*55.00%*
Smoking				
Yes	3,200	*67.33%*	193,553	*18.54%*
No	1,422	*29.92%*	850,209	*81.45%*
Married				
Yes	1,192	*25.08%*	597,384	*57.23%*
No	3,541	*74.50%*	450,557	*43.16%*
Self-Reported HCV				
Yes	2,077	*43.70%*	3,365	*0.32%*
No	2,579	*54.26%*	1,032,852	*98.95%*

It is estimated that perinatal HCV infection occurs in 5 to 15% of babies born to HCV-infected persons. The number of women of childbearing age infected with HCV continues to rise because of the increasing trends in injection drug use. In fact, the rate of HCV in women aged 15-44 has surpassed that of the rest of Michigan's female population (Figure 11.2). Perinatal HCV, therefore, is becoming an increasingly important public health issue. There is no intervention to reduce the risk of vertical transmission of HCV as there is with perinatal HBV. It is not currently recommended to treat pregnant individuals for HCV infection. However, HCV direct-acting antivirals are now approved to treat children as young as 3 years old.

From 2009-2014 the US has experienced an 89% increase in present HCV infections in persons at the time of birth, increasing from 1.8 to 3.4 instances per 1,000 births. Michigan was estimated to have a rate of 2.6-5.0 HCV infections among pregnant individuals for every 1,000 live births in 2014. Using that estimate, the number of incident perinatal HCV cases in Michigan in 2014 ranged between 15 and 85 cases per year. Although HCV screening is recommended during every pregnancy, these approximations are very likely to be underestimated due to undiagnosed HCV infections in pregnant individuals.

The new case definition for perinatal hepatitis C, established in 2018, states that a perinatal hepatitis C case is between the ages of 2 months and 36 months old and must have record of a positive HCV nucleic acid test (qualitative, quantitative, or genotype). Under this case definition, there were 55 instances of reported perinatal hepatitis C between 2012 and 2020, which is more than twice the number of perinatal HIV and HBV infections combined. The 55 perinatal HCV cases are likely an underestimation because approximately 50-75% of the HCV-infected population is undiagnosed, and infants are often not tested or tested inaccurately.

Figure 11.2 Number of Hepatitis C Cases per 100,000 Population, Women of Childbearing Age compared to Total Women, 2013-2021



The MDSS is limited by binary sex data fields and where possible and when not referring explicitly to data pulled from this database, MDHHS has attempted to use inclusive language around gender that still names key risk factors related to HCV transmission.

*Pronounced fluctuations in case counts may be a result of a case definition change in 2016, electronic reporting of negative HCV

Perinatal Hepatitis B

Hepatitis B Virus (HBV) infection in a pregnant individual poses inherent risk to the infant at birth, as perinatal transmission is a known risk factor for HBV infection. CDC estimates the number of births to HBV-infected persons (most common test at pregnancy is the hepatitis B surface antigen (HBsAg) test) by using prevalence of HBV infection by race/ethnicity as well as country of birth for persons giving birth. The current CDC estimation of expected births to HBsAg-positive persons nationwide (based on 2018 data), has slightly decreased to 19,456 per year, and 311-460 per year in Michigan.

The MDHHS Immunization Division Perinatal Hepatitis B Prevention Program (PHBPP)'s mission is to identify HBV-infected pregnant women and coordinate proper care and treatment of the babies born to them. Even with our efforts to provide the appropriate prophylaxis, we are not identifying all pregnant HBV-infected women prior to delivery.

Since 2016, Michigan has required physicians, health care providers and laboratories to report pregnancy status for all women of childbearing age (10-60 years of age). Identifying HBsAg-positive pregnant women prenatally is key to protecting babies from getting HBV. However, less than half of the lower level of CDC's estimated births are being identified in Michigan.

More than 98% of all babies, if treated appropriately, will be protected from contracting an HBV infection from their birth parent. Hepatitis B vaccine has been available in the U.S. since 1981 and has been proven to be safe and effective in preventing HBV transmission. CDC recommends hepatitis B vaccine and hepatitis B immune globulin (HBIG) within 12 hours of birth for all babies born to HBsAg-positive persons. CDC now recommends vaccination within 24 hours of birth for all medically stable babies, weighing more than 2,000 grams and born to HBsAg-negative individuals as a "safety net."

Infants who acquire an HBV infection at birth are 90% more likely to become chronically infected and 25% of these infants will have liver cancer or even die from the effects of the infection. It is extremely important to identify all HBsAg-positive pregnant persons prior to delivery so that their infants can receive HBIG and hepatitis B vaccine within 12 hours of birth for immediate protection against HBV. For life-long protection, these infants need at least two additional doses of hepatitis B vaccine and a post-vaccination serologic test (PVST) at 9-12 months of age.

Figure 12.1 Michigan's Perinatal Hepatitis B Prevention Program (PHBPP), 2016-2020

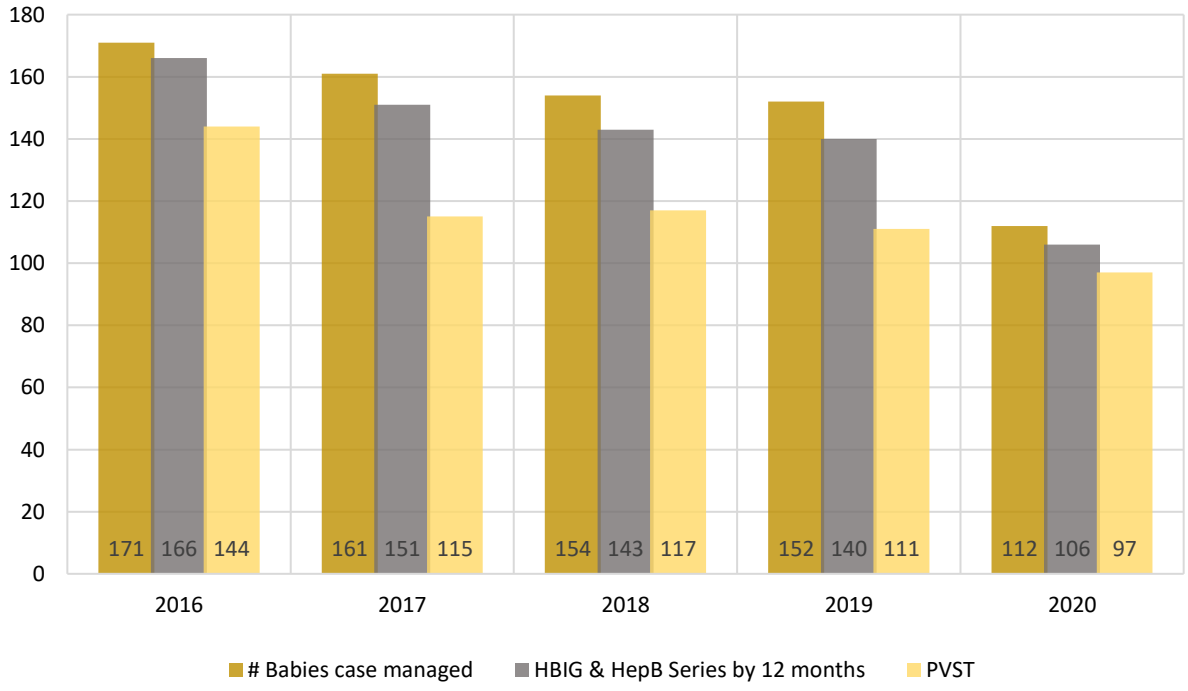


Table 12.1 Proportion of Infants Receiving HBV Treatment, Michigan and the United States, 2016-2020

	2016		2017		2018		2019		2020	
	MI	US	MI	US	MI	US	MI	US	MI	US
Percent of Infants Receiving PEP at Birth	99%	97%	100%	97%	99%	97%	100%	-	98%	-
Percent of Infants with HBIG & Complete HepB Series by 12 Months	97%	82%	94%	82%	93%	84%	92%	-	95%	
Percent of Infants with PVST by End of Reporting Period 1	84%	64%	71%	65%	76%	67%	73%	-	87%	-

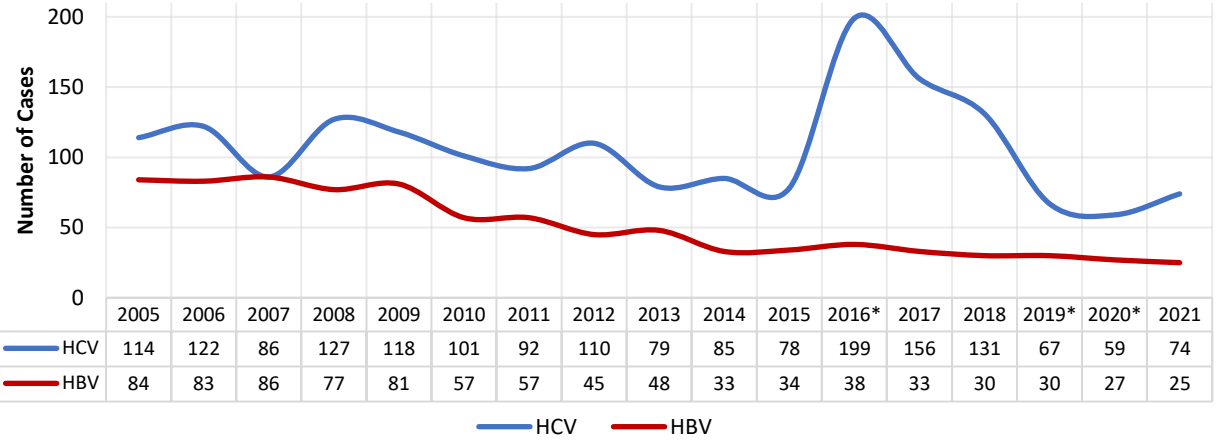
The Michigan PHBPP consistently performs above the national average in providing the appropriate prophylaxis to the infants born to HBV-infected individuals; however there is room for improvement. It is extremely important to identify all HBsAg-positive and HBV DNA positive pregnant persons so that we can continue to provide the appropriate prophylaxis starting at birth.

For more information, go to www.Michigan.gov/HepatitisB or call 517-388-4815, 517-897-3236 or 517-242-8319.

Hepatitis and HIV Co-infections

Positive health outcomes for individuals with HIV/HBV or HIV/HCV co-infections are significantly lower than individuals who are mono-infected with either of the viruses. To assess the burden of viral hepatitis and HIV co-infection in Michigan, MDHHS staff performed a match between HIV cases reported in the Enhanced HIV/AIDS Reporting System (eHARS) and viral hepatitis cases reported in the MDSS.

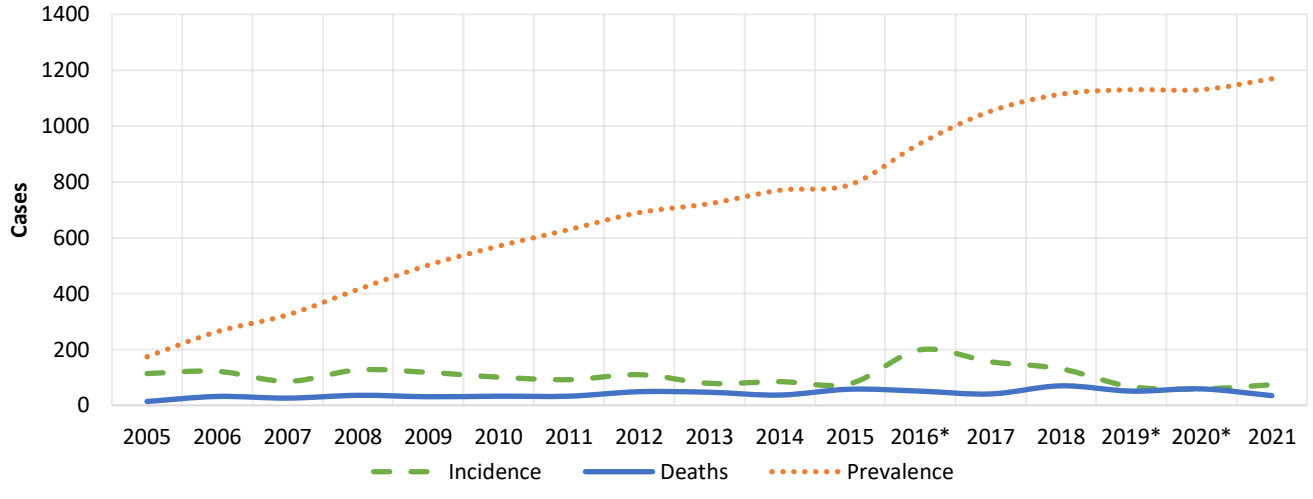
Figure 13.1 Count of Hepatitis B and Hepatitis C Cases Co-infected with HIV in Michigan, 2005-2021



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016*	2017	2018	2019*	2020*	2021
HCV	114	122	86	127	118	101	92	110	79	85	78	199	156	131	67	59	74
HBV	84	83	86	77	81	57	57	45	48	33	34	38	33	30	30	27	25

In general, the number of new HBV/HIV matches has trended downward in recent years. HIV/HCV matches also trended downward until 2016 when a new HCV case definition was instituted. This change is largely responsible for the increase in matches in 2016 and 2017. Individuals who are co-infected are living longer, mainly because of improvements in linkage to care and highly effective therapies, resulting in increased prevalence of both co-infections (Figure 13.2). Tables 13.1 and 13.2 look at the demographic breakdown of both HBV/HIV and HCV/HIV co-infections. HBV/HIV co-infection is more common among the men that have sex with men (MSM) population. HCV/HIV co-infection tends to be most associated with intravenous drug use and follows the demographics of people who are living with HIV and inject drugs.

Figure 13.2 Prevalence of Diagnosed HCV-HIV Co-infections in Michigan, 2005-2021



*Pronounced fluctuations in case counts may be a result of a case definition change in 2016, electronic reporting of negative HCV RNA lab results beginning in 2019, and/or the COVID-19 pandemic in 2020

Between 2004 and 2020, 903 people were reported in Michigan with HBV/HIV co-infection. Table 13.1 shows a breakdown of the HBV/HIV co-infected population in 2021. The 2021 cases are similar to the historical cases in regard to race and sex. MSM is the predominant risk factor in the HBV and HIV co-infected population with an age that tends to be over 30 years old.

Table 13.1 Hepatitis B and HIV Co-Infection Data in Michigan, 2021

Variable	2021 HBV/HIV Co-infections		2004-2020 HBV/HIV Co-infections	
Total Co-infections	25	(100.0%)	903	
Sex				
Male	21	*(84.0%)*	805	*(89.1%)*
Female	4	*(16.0%)*	98	*(10.9%)*
Unknown	0	*(0.0%)*	0	*(0.0%)*
Race				
White or Caucasian	6	*(24.0%)*	260	*(28.8%)*
Black or African American	13	*(52.0%)*	582	*(64.5%)*
Hispanic	3	*(12.0%)*	30	*(3.3%)*
Asian	0	*(0.0%)*	6	*(0.7%)*
American Indian or Alaskan Native	0	*(0.0%)*	1	*(0.1%)*
Multi/Other/Unknown	3	*(12.0%)*	24	*(2.7%)*
HIV Transmission Risk				
MSM	12	*(48.0%)*	538	*(59.6%)*
IDU	1	*(4.0%)*	80	*(8.9%)*
MSM/IDU	1	*(4.0%)*	50	*(5.5%)*
Blood Recipient	0	*(0.0%)*	5	*(0.6%)*
Heterosexual	4	*(16.0%)*	82	*(9.1%)*
Perinatal	0	*(0.0%)*	2	*(0.2%)*
Unknown/Undetermined	7	*(28.0%)*	146	*(16.2%)*
Age at Coinfection				
0-19	0	*(0.0%)*	8	*(0.9%)*
20-29	4	*(16.0%)*	101	*(11.2%)*
30-39	6	*(24.0%)*	239	*(26.5%)*
40-49	1	*(4.0%)*	316	*(35.0%)*
50-59	7	*(28.0%)*	186	*(20.6%)*
60+	7	*(28.0%)*	53	*(5.9%)*

Between 2004 and 2020, 1,813 people were reported in Michigan with HIV/HCV co-infection. Table 13.2 shows a breakdown of the HCV/HIV co-infected population in 2021. The 2021 cases were skewed more male compared to the historical cases regarding sex, but MSM was the predominant risk factor for HCV/HIV co-infection (as was the case in 2019), and the age distribution has shifted toward younger persons. In comparison, IDU was the predominant risk factor in the HCV and HIV co-infected population from 2004-2018, with an age generally over 30 years old. However, in recent years there has been a shift from IDU risk to MSM risk in this co-infected population. While sexual transmission of HCV is rare, it has been reported in HIV-infected MSM populations.

Table 13.2 Hepatitis C and HIV Co-Infection Data in Michigan, 2021

Variable	2021 HCV/HIV Co-infections		2004-2020 HCV/HIV Co-infections	
Total Co-infections	74		1,813	
Sex				
Male	60	*(81.1%)*	1,334	*(73.6%)*
Female	14	*(18.9%)*	470	*(25.9%)*
Unknown	0	*(0.0%)*	9	*(0.5%)*
Race				
White or Caucasian	39	*(52.7%)*	605	*(33.4%)*
Black or African American	28	*(37.8%)*	1,048	*(57.8%)*
Hispanic	4	*(5.4%)*	81	*(4.5%)*
Asian	0	*(0.0%)*	13	*(0.7%)*
American Indian or Alaskan Native	1	*(1.4%)*	1	*(0.1%)*
Multi/Other/Unknown	2	*(2.7%)*	65	*(3.6%)*
HIV Transmission Risk				
MSM	28	*(37.8%)*	458	*(25.3%)*
IDU	16	*(21.6%)*	712	*(39.3%)*
MSM/IDU	14	*(18.9%)*	229	*(12.6%)*
Blood Recipient	0	*(0.0%)*	43	*(2.4%)*
Heterosexual	5	*(6.8%)*	198	*(10.9%)*
Perinatal	1	*(1.4%)*	3	*(0.2%)*
Unknown/Undetermined	10	*(13.5%)*	170	*(9.4%)*
Age at Coinfection				
0-19	0	*(0.0%)*	11	*(0.6%)*
20-29	12	*(16.2%)*	163	*(9.0%)*
30-39	31	*(41.9%)*	282	*(15.6%)*
40-49	7	*(9.5%)*	483	*(26.6%)*
50-59	12	*(16.2%)*	618	*(34.1%)*
60+	12	*(16.2%)*	256	*(14.1%)*

Hepatitis C and HIV Co-infections Among MIDAP Beneficiaries

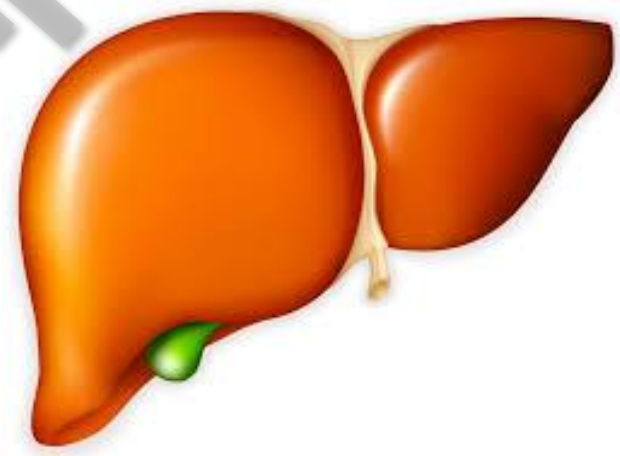
The Michigan Drug Assistance Program (MIDAP) is a Ryan White program that specifically covers the cost of health insurance and/or medication for people living with HIV. MIDAP can be useful for all medical needs – not just HIV. Beginning March 1, 2018, MIDAP began providing treatment assistance for hepatitis C medications for eligible individuals at no cost. To learn more visit, www.Michigan.gov/Dap.

As of December 13, 2021, there were 3,190 active MIDAP beneficiaries, of which approximately 3% were identified to be living with HIV and co-infected with hepatitis C.

Table 13.3 Hepatitis C and HIV MIDAP Co-Infections data in Michigan, 2021

	2021 HCV/MIDAP Co-infections	
Total Co-infections	87	
Sex		
Male	73	*83.9%*
Female	14	*16.1%*
Unknown	0	*0.0%*
Race		
White or Caucasian	38	*43.7%*
Black or African American	40	*46.0%*
Hispanic	4	*4.6%*
Asian	3	*3.4%*
American Indian or Alaskan Native	0	*0.0%*
Multi/Other/Unknown	2	*2.3%*
HIV Transmission Risk		
MSM	34	*39.1%*
IDU	14	*16.1%*
MSM/IDU	8	*9.2%*
Blood Recipient	0	*0.0%*
Heterosexual	17	*19.5%*
Perinatal	0	*0.0%*
Unknown/Undetermined	14	*16.1%*
Age at Coinfection		
0-19	4	*4.6%*
20-29	17	*19.5%*
30-39	26	*29.9%*
40-49	18	*20.7%*
50-59	12	*13.8%*
60+	10	*11.5%*

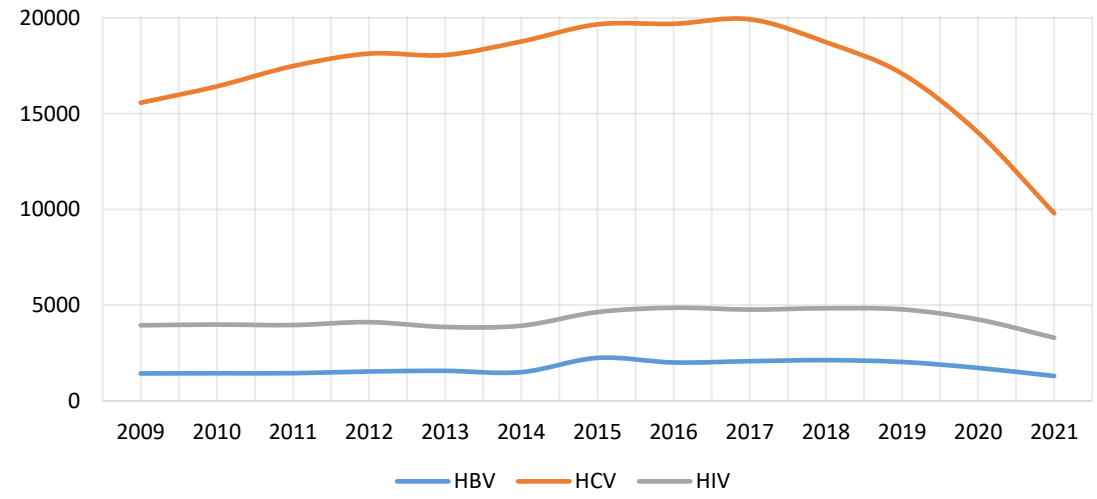
Viral Hepatitis Outcomes



Viral Hepatitis Hospitalizations and Liver Transplants

Trends in hospitalization totals are indicative of a marked increase in health complications as a result of HCV. Figure 14.1 indicates that hospitalizations attributed to hepatitis C increased from 2008-2017 before starting to decrease from 2018 through 2021, while total hospitalizations due to HBV and HIV each stayed relatively steady. Despite the recent decrease in HCV-related hospitalizations, the volume is still staggering, at over three times as many admissions as HIV.

Figure 14.1 Hospitalizations Due to HBV, HCV and HIV, Michigan, 2009-2021

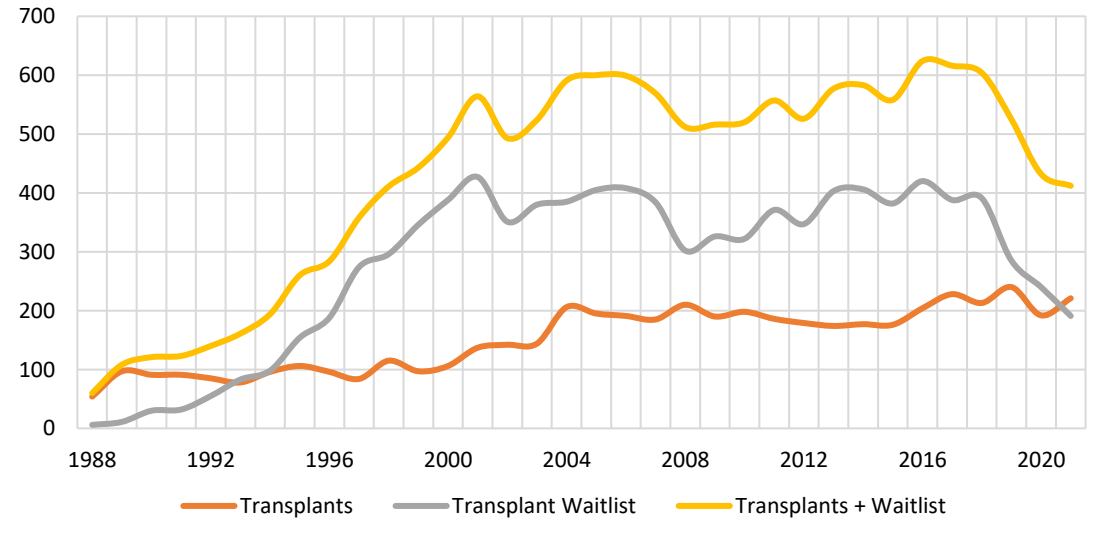


Note: Hospitalizations documenting hepatitis B include inpatient hospitalizations with ICD-9-CM codes for acute, chronic, or unspecified hepatitis B (07020, 07021, 07022, 07023, 07030, 07031, 07032, 07033, or V0261). Hospitalizations documenting hepatitis C include ICD-9-CM codes for acute, chronic, or unspecified hepatitis C (07041, 07044, 07054, 07059, 07070, 07071, or V0262). Hospitalizations documenting HIV include inpatient hospitalizations with ICD-9-CM codes 042, 07953, 79571, or V08.

Liver transplantation may be indicated for individuals with hepatocellular carcinoma (HCC). HBV and HCV infection increases the risk of development of HCC; therefore, trends in liver transplantation may be indicative of increasing disease progression and morbidity associated with long-term HBV and/or HCV infection. However, these data should be interpreted with caution as there are many other indicators for liver transplantation independent of viral hepatitis (e.g. alcoholic cirrhosis).

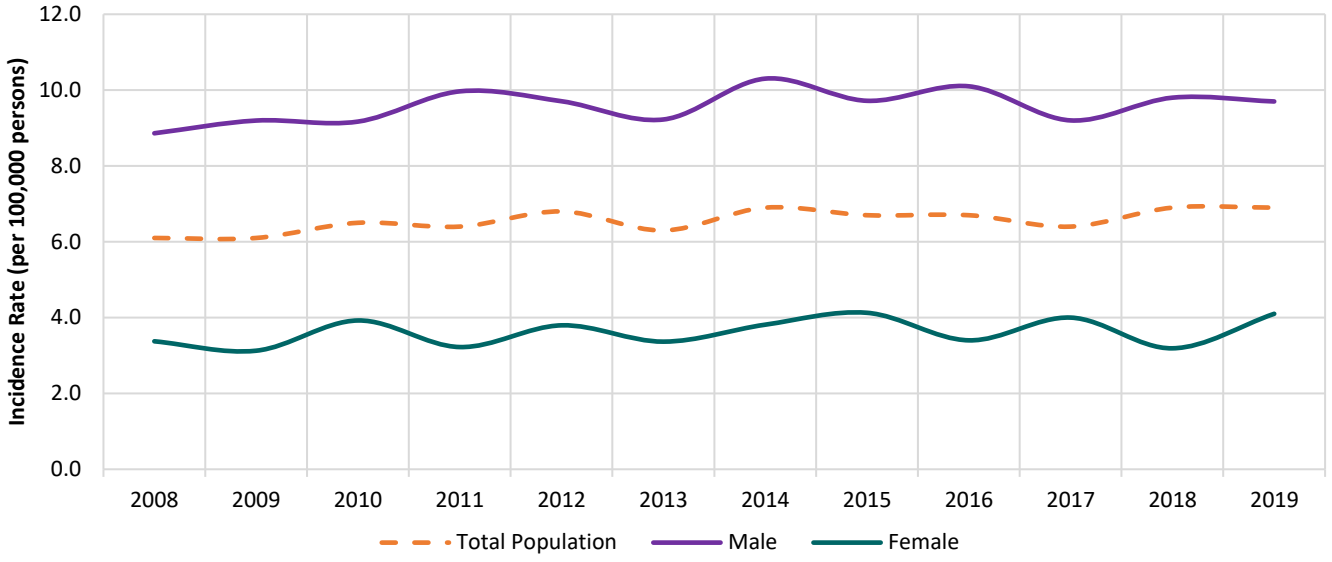
Counts of the number of individuals on the liver transplant waitlist and the number of liver transplants conducted in Michigan between 1988 and 2021 were requested through the United Network of Organ Sharing (UNOS, https://www.unos.org/).

Figure 14.2 Liver Transplants and Transplant Waitlist, Michigan, 1988-2021



Viral Hepatitis-Related Cancer & Mortality

Figure 15.1 Invasive Cancers of the Liver and Intrahepatic Bile Ducts in Michigan by Sex, 2008-2019



Viral hepatitis is a primary risk factor for the development of liver cancer. Figure 15.1 shows the age-adjusted rate of liver and intrahepatic bile duct cancer by sex. The rate of invasive cancers of the liver and bile ducts is approximately 2.5 times higher in males than females.

Table 15.1 Incidence Rates of Invasive Cancers of the Liver and Intrahepatic Bile Ducts by Age-adjusted Rates of Race and Sex in Michigan, 2010-2019

Year of Diagnosis	Total		White or Caucasian Male		White or Caucasian Female		Black or African American Male		Black or African American Female	
	Incidence	Rate	Incidence	Rate	Incidence	Rate	Incidence	Rate	Incidence	Rate
2010	783	6.6	391	8.1	198	3.6	116	18.7	45	6.1
2011	778	6.5	425	8.9	162	3.0	123	18.4	41	5.3
2012	867	6.9	415	8.2	204	3.7	154	22.7	47	5.6
2013	863	6.8	437	8.5	192	3.3	145	20.5	48	6.0
2014	897	7.0	479	9.2	205	3.6	135	19.7	46	5.3
2015	930	7.2	475	9.0	214	3.7	138	20.5	71	8.3
2016	999	7.4	559	10.5	212	3.6	119	16.5	56	6.2
2017	1023	7.5	539	9.8	258	4.3	136	18.8	62	7.1
2018	942	6.9	485	8.7	222	3.7	133	18.7	49	5.5
2019	969	6.9	486	8.5	251	4.1	135	19.0	38	4.2

Table 15.1 shows the rate of new cases of liver and intrahepatic bile duct cancer per year from 2010 to 2019 in Michigan per 100,000 people. The number of cases per year of liver and bile duct cancer have increased 23.8% between 2010 and 2019. Black/African American males experience an incidence rate that is approximately 2.2 times higher, on average, than white/Caucasian males. In 2019, the incidence rate for Black/African American females is only slightly higher than that of white/Caucasian females, which is the smallest difference in incidence rates that we have seen. Without improved efforts to test and treat persons with HBV and HCV infection, the rate of liver cancer may continue to rise, particularly as the population with greatest viral hepatitis prevalence (those born between 1945-1965) ages.

Figure 15.2 Mortality Due to Invasive Cancer of the Liver and Intrahepatic Bile Ducts and Age-Adjusted Death Rates by Race and Sex in Michigan, 2011 - 2020

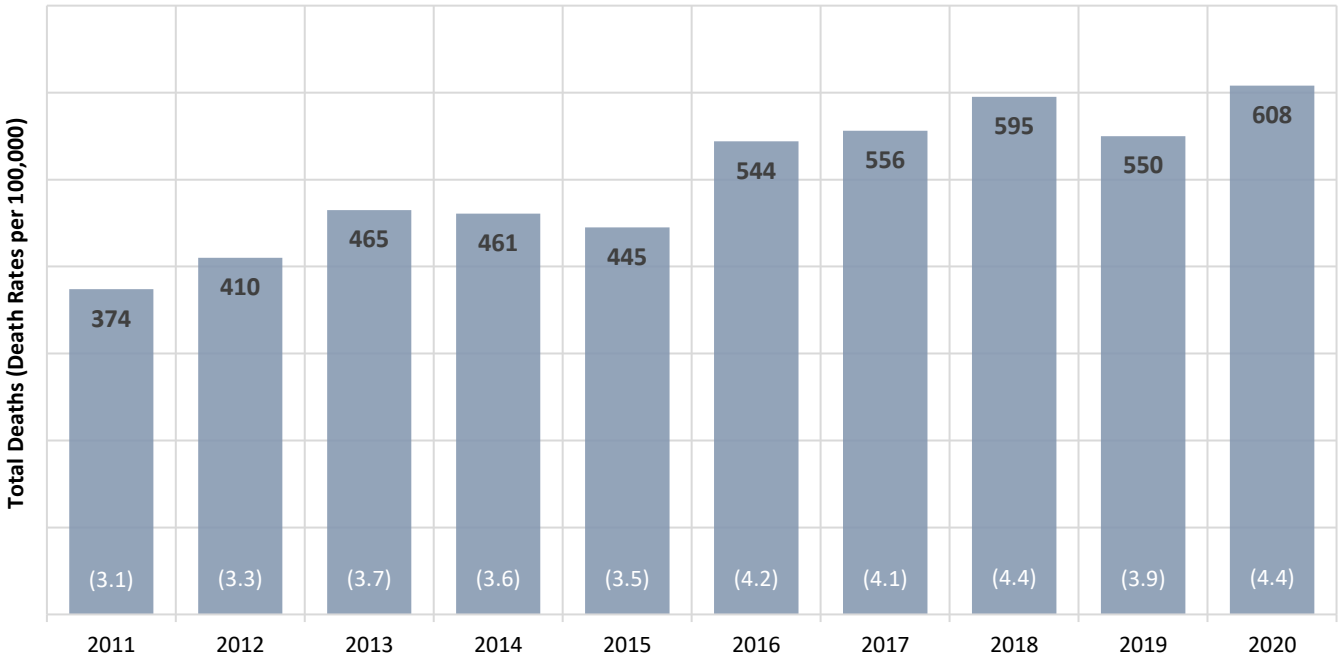


Figure 15.2 shows the number of deaths per year due to liver and intrahepatic bile duct cancer. This total has risen 63% from 2011 to 2020. Chronic infection with viral hepatitis, over time, can lead to liver cancer. As rates of liver cancer morbidity correlate directly with liver cancer mortality, improved efforts to test and treat viral hepatitis infections may help to continue improving these trends.

Table 15.2 Numbers of Deaths Due to Invasive Cancer of the Liver and Intrahepatic Bile Ducts and Age-Adjusted Death Rates by Race and Sex in Michigan, 2010 - 2020

Year of Death	Total		White or Caucasian Male		White or Caucasian Female		Black or African American Male		Black or African American Female	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
2011	374	3.1	197	4.1	91	1.6	63	10.2	17	*
2012	410	3.3	197	4.1	112	2.0	59	8.9	17	*
2013	465	3.7	227	4.5	129	2.2	65	9.3	27	3.4
2014	461	3.6	226	4.4	119	2.1	64	8.9	36	4.3
2015	445	3.5	218	4.2	121	2.1	60	9.9	26	3.1
2016	544	4.2	291	5.6	138	2.4	54	7.8	38	4.4
2017	556	4.1	293	5.4	156	2.5	64	8.7	23	2.5
2018	595	4.4	309	5.7	142	2.3	72	10.5	38	4.2
2019	550	3.9	292	5.2	147	2.3	71	10.1	20	2.0
2020	608	4.4	319	5.8	168	2.7	65	9.8	31	3.5

Table 15.2 shows the death rate per 100,000 Michigan population due to cancer of the liver and intrahepatic bile ducts between 2011 and 2020. The overall liver and intrahepatic bile duct cancer mortality rate in Michigan in 2020 was 4.4 per 100,000. Black/African American males show the highest death rates due to these cancers with a death rate of 9.8 per 100,000. The death rate in Black/African American males is 1.7 times higher than the rate in white/Caucasian males (5.8 per 100,000). White/Caucasian females experienced the lowest mortality rate amongst the included racial groups in 2020.

While not all liver cancers are a direct result of viral hepatitis, viral hepatitis remains a primary risk factor for development of liver cancer. These data highlight racial disparities in liver cancer data that may be reflective of disparities seen in viral hepatitis infection.

Figure 15.3 Deaths Due to Acute and Chronic HCV, Michigan, 2015-2021

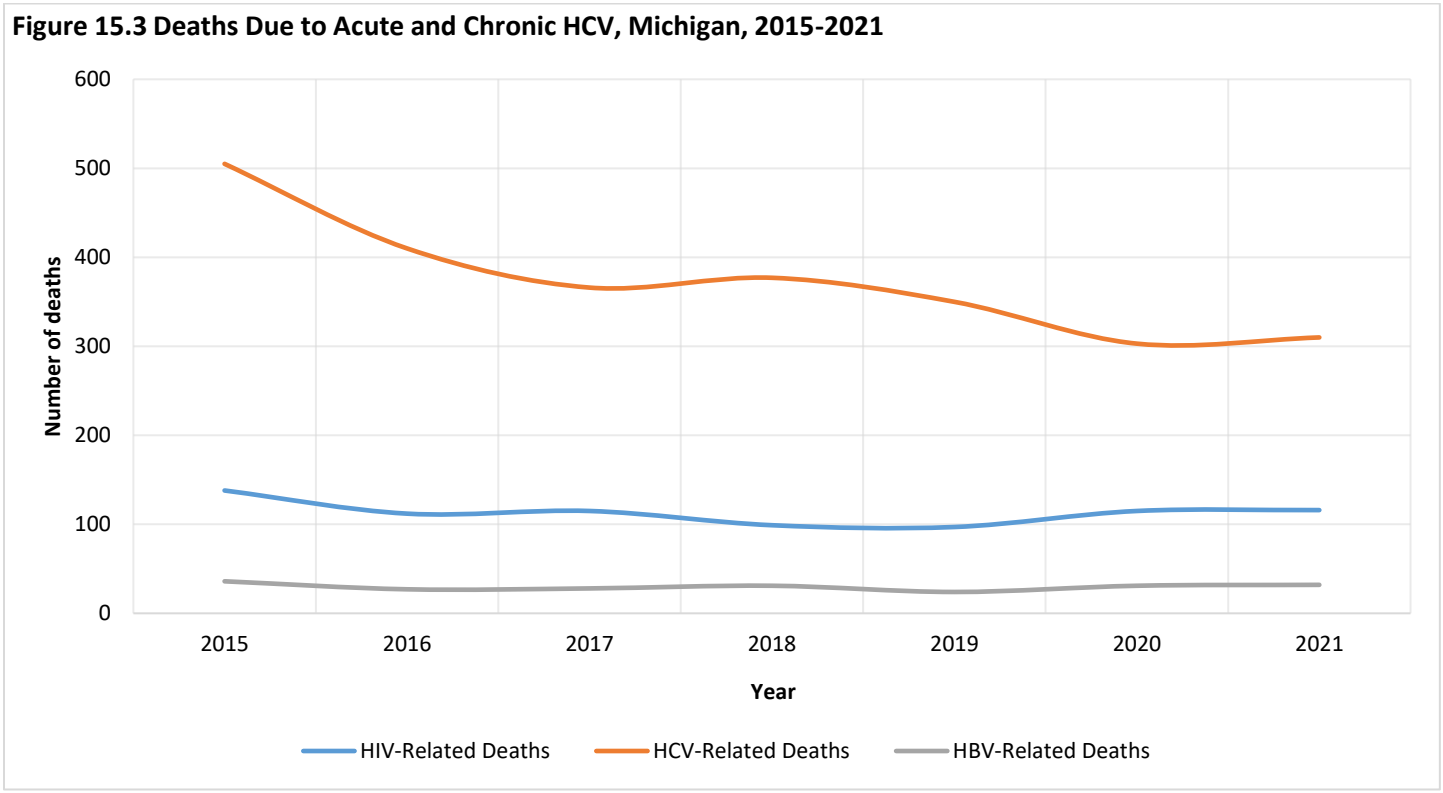


Figure 15.3 shows the number of deaths per year in Michigan residents between 2015 and 2021 due to acute and chronic HCV, according to death certificate data, in comparison to hepatitis B and HIV. The Vital Records and Health Statistics Section provides data on underlying causes of death in Michigan, which is classified using the Tenth Revision of the International Classification of Diseases (ICD-10). Deaths included those with any mention of these three conditions at any position in their death certificate.

In 2021 there were 310 deaths attributed to HCV in Michigan (ICD-10: B17.1, B18.2, B19.2). Between 2015 and 2021, deaths due to chronic HCV decreased by 39%, likely resulting from the introduction of new medications that treat HCV infections, among other factors. From 2015 through 2021, HBV deaths (ICD-10: B16.2, B16.9, B18.1) decreased slightly from 36 to 32 per year, while HIV-related deaths (ICD-10: B20-B24) were reduced from 138 to 116.

Viral Hepatitis Programming

Hepatitis C Emerging Threats Project

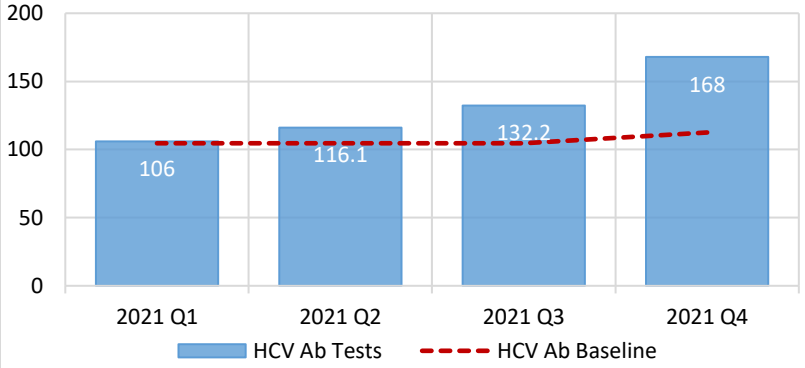
In 2017, the Viral Hepatitis Unit at MDHHS wrote a Proposal for Change, which supported the allocation of general funds to local health departments for HCV testing, case investigation, linkage to care, and follow-up. The $4.5 million proposal was supported in the governor's budget and eventually approved by the Michigan legislature at $1 million.

The project goal was to fund each local health jurisdiction, but a shortage of funds prompted an effort to prioritize a smaller cohort. Therefore, it was decided that funding would be allocated to the 10 jurisdictions with the highest HCV case burden in 2017, according to the MDSS. Disbursement of funds and project implementation began on January 1, 2019. Starting in quarter 4 of 2021, funding was reduced, which forced the group of funded jurisdictions to shrink to 6 health departments. As such, the change in HCV Ab baseline in figure 16.1 corresponds with the remaining jurisdictions initial baseline average.

Table 16.1 Local Health Departments participating in the HCV Emerging Threats Project

Funded Local Health Departments	2017 Hepatitis C Cases
Detroit City	1,941
Wayne County	1,360
Oakland County	1,010
Macomb County	896
Genesee County	647
Kent County	564
Ingham County	351
St. Clair County	271
Muskegon County	264
Kalamazoo County	259

Figure 16.1 Combined average number of HCV specimens submitted to BOL from the funded LHDs (Project Period: Q1 2021 - Q4 2021)

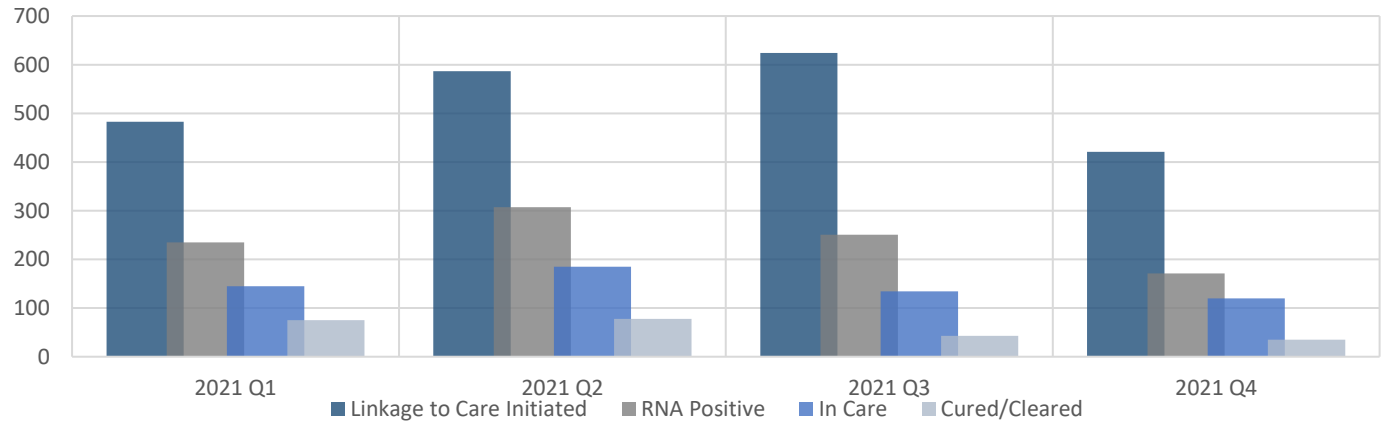


Hepatitis C Testing: Project dollars went to the Michigan Bureau of Laboratories (BOL) to continue to offer HCV antibody (Ab) and RNA testing services at no cost to our submitters. Since the start of the project (Jan 1, 2019 – Dec 31, 2021), funded health departments have submitted 15,976 HCV specimens to BOL.

Hepatitis C Case Investigation: Completion rates for fields found in the MDSS have increased. Specifically, demographics with a 13.2%. Completion rates in other areas of case follow-up were adversely affected due to resource constraints during the COVID-19 pandemic.

Hepatitis C Linkage to Care: In calendar year 2021, funded local health departments reached out to 2,115 individuals to offer linkage to care activities such as informing cases of their HCV lab result, encouraging confirmatory HCV testing (if needed), providing viral hepatitis education, and helping to refer and navigate cases through the complex process of hepatitis C treatment (e.g., PCP, HCV treatment providers, insurance). In 2021, of the individuals living with hepatitis C and contacted for linkage to care, 584 were linked to care for hepatitis C and 231 have documented cure (or viral clearance).

Figure 16.2 Linkage to Care Activities Perfomed by the Funded LHDs from Jan 1 - Dec 31, 2021

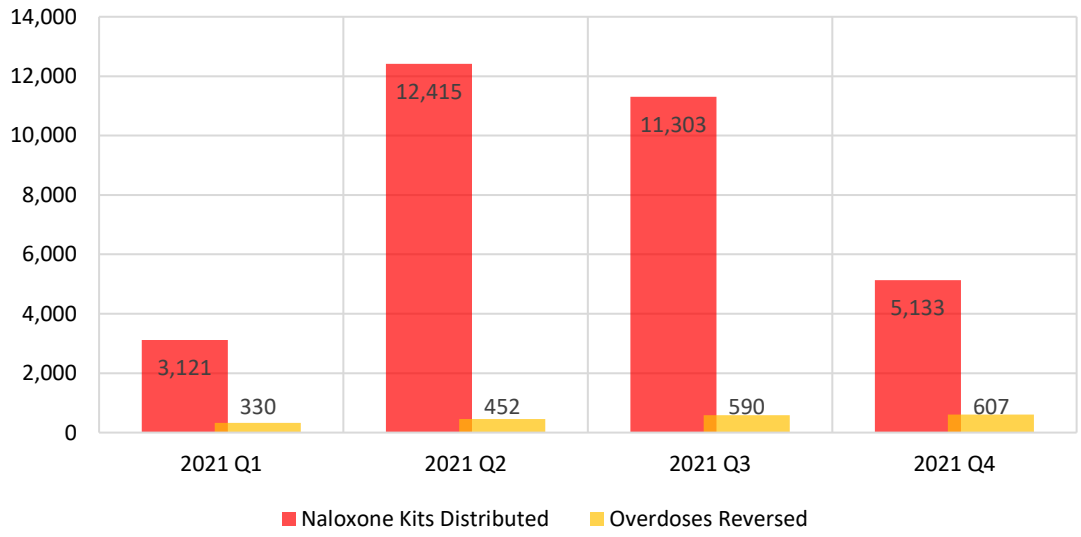


Harm Reduction and Syringe Service Programs

As viral hepatitis data has indicated year after year, there is growing concern for dissemination of infectious disease through use of injection drugs. In response to this pressing issue, MDHHS has supported development of a statewide harm reduction platform, which includes provision of funds for several existing and start-up syringe service programs (SSPs). Harm reduction is a respectful, non-judgmental approach to reducing the harms of substance use that meets people where they are at. This approach has been proven effective in SSPs and can reduce HCV and HIV prevalence by as much as 50%, reduce fatal and non-fatal overdoses, and increase access to substance use disorder treatment and recovery services (which can often include hepatitis C testing and linkage to care).

In fiscal year 2019, MDHHS invested approximately $1.25 million in harm reduction and SSPs in 15 different local health jurisdictions. With inclusion of all operating SSPs in Michigan, as of December 31, 2021, there is now coverage across Michigan by a total of 35 programs operating 80 sites with 2 additional programs expected to open in the near future.

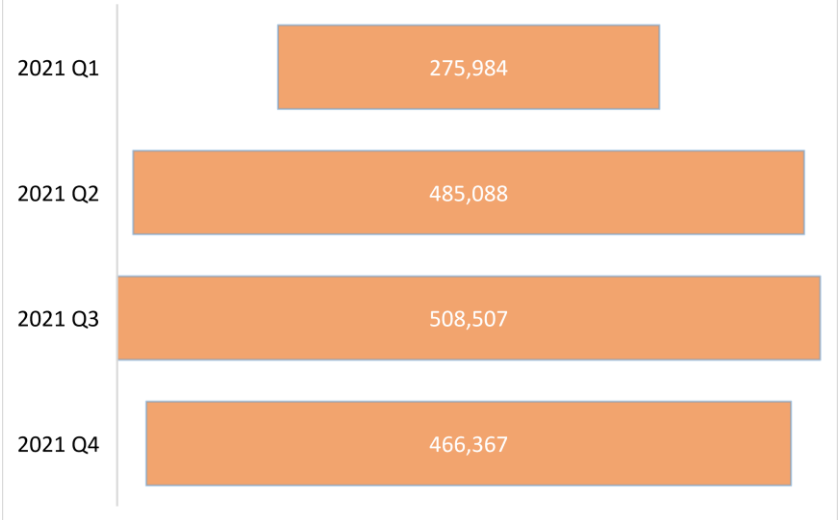
Figure 17.2 Naloxone Kits Distributed and Overdoses Reversed as Result of SSP, MI by Quarter, 2021



From the start of data collection through 2021, SSPs in Michigan:

- Provided 5,708 referrals to substance use treatment
- Served 45,546 participants directly
- Distributed 86,727 naloxone kits
- Reversed 6,263 overdoses
- Conducted 1,944 HIV tests
- Conducted 1,153 hepatitis C tests
- Distributed 6.2 million sterile syringes

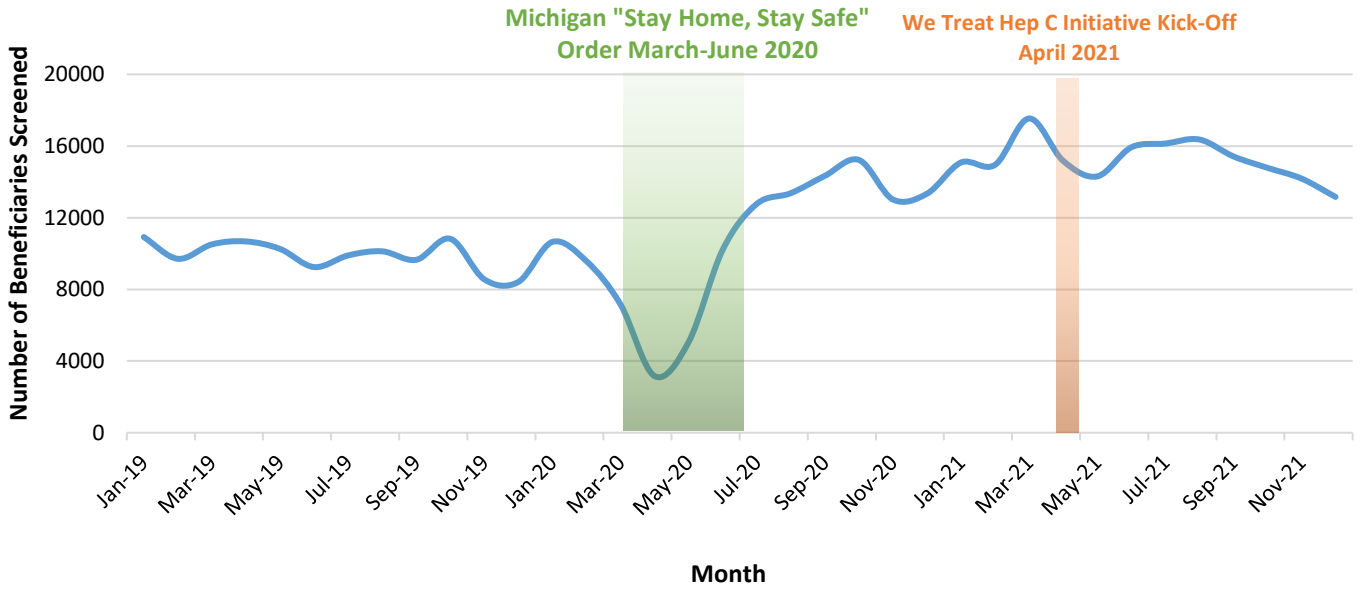
Figure 17.3 Syringes Dispensed by MI SSP's by Quarter, 2021



We Treat Hep C Initiative

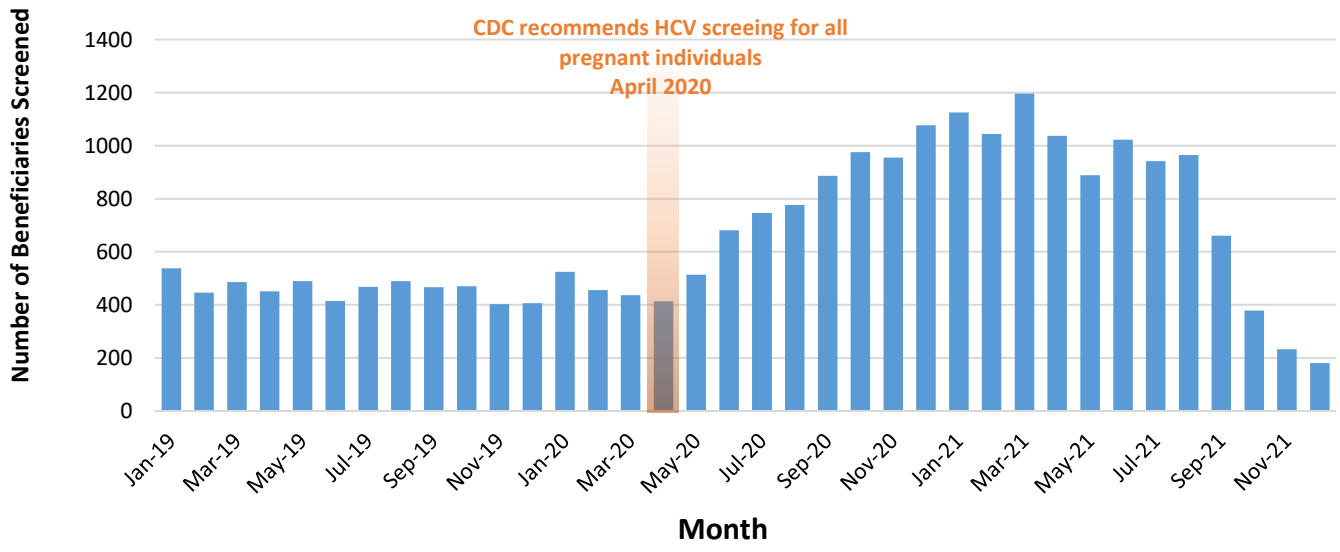
In an effort to eliminate hepatitis C in Michigan, MDHHS partnered with research-based global biopharmaceutical company, AbbVie, to launch the We Treat Hep C Initiative, effective April 1st, 2021. As part of the initiative, the antiviral MAVYRET no longer requires prior authorization, making it available to all Medicaid and Healthy Michigan Plan beneficiaries at little to no cost. Additionally, the initiative emphasized outreach and partnership with the state's clinical community to increase the number of prescribers screening and treating patients impacted by HCV. Provided by our collaborators at the Michigan Medicaid Program, the following data illustrates the progress achieved during the first year of the We Treat Hep C Initiative.

Figure 18.1 Medicaid Beneficiaries Tested By Month, 2018-2021



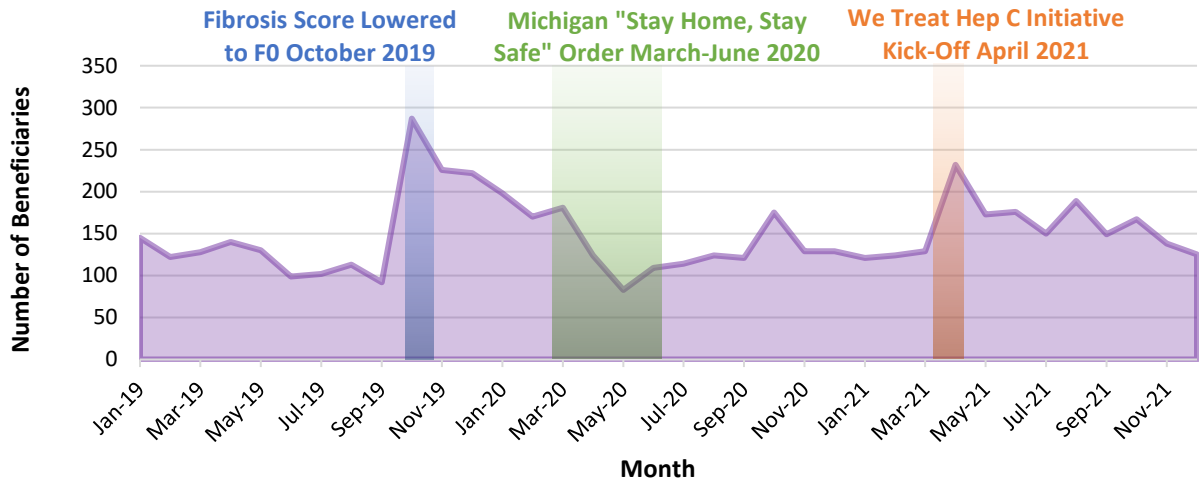
Throughout 2021, the average number of Medicaid beneficiaries tested for HCV per month increased compared to averages from previous years. Of note, testing volume decreased dramatically between March and May of 2020, likely caused by effects from the "Stay Home, Stay Safe" order due to the COVID-19 Pandemic. Even so, the 2021 monthly average of 15,279 beneficiaries tested per month exceeds averages from 2019 and 2020 of 9,898 and 10,656 beneficiaries, respectively.

Figure 18.2 Medicaid Beneficiaries Tested for HCV During Pregnancy*, 2018-2021



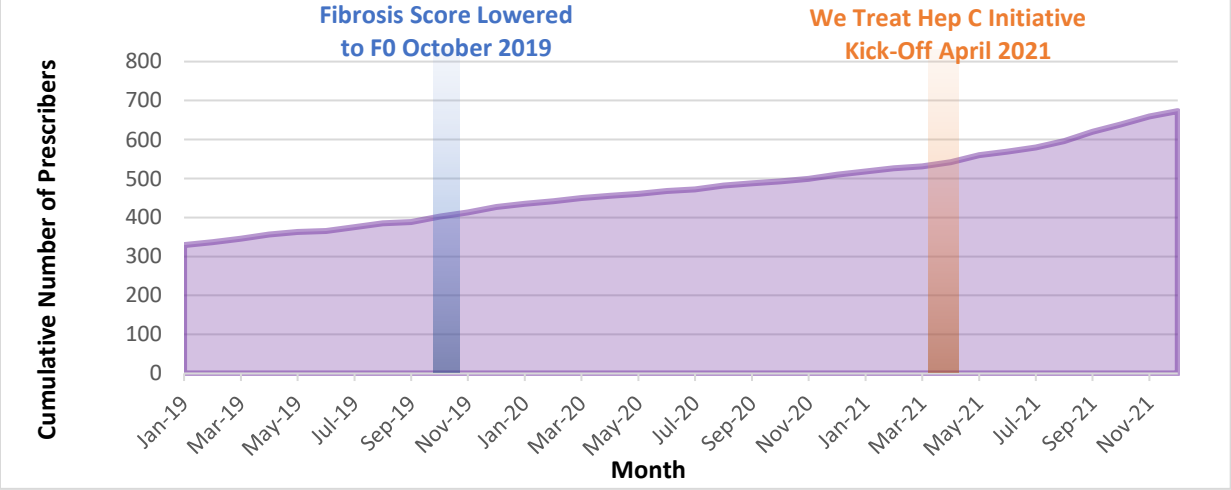
Furthermore, the number of pregnant Medicaid beneficiaries tested per month for HCV increased as well. As of April 2020, the CDC recommends screening all pregnant individuals for hepatitis C, regardless of age, corresponding with the marked increase seen in the data and continuing through 2021. However, it should be noted that the data only includes individuals whose pregnancies have ended and does not represent currently pregnant individuals. This aspect of the data likely contributes to the rapid decrease in testing volume seen in the later months of 2021 and into the beginning of 2022.

Figure 18.3 Medicaid Beneficiaries that Started HCV Treatment, 2018-2021



Treatment starts saw marked increases after major events related to HCV treatment. For example, in October of 2018 and 2019, liver fibrosis score requirements for treatment were lowered from F1 to F0, respectively, after which, the number of beneficiaries starting HCV treatment spiked. Another dramatic increase in treatment starts occurred in April of 2021, after the launch of the We Treat Hep C Initiative.

Figure 18.4 Cumulative Total of Prescribers of HCV Treatment for Medicaid Beneficiaries, 2018-2021



The number of providers prescribing treatment for HCV has been increasing since 2018. After April of 2021, when the We Treat Hep C Initiative launched, the rate of increase for the total number of prescribers grew, a trend that we hope continues into the initiative's second year. Not only this, but providers new to this group should continue to prescribe treatment for HCV to aid in the goal of eventual elimination.

As we continue into the next year of the We Treat Hep C initiative, we plan to further delve into this data to track our progress and to examine where more support is needed as we take steps towards hepatitis C elimination in Michigan.

Appendices

Appendix A1: Viral Hepatitis Data by County

County	Total Population	2021 Chronic HCV Cases	2021 Acute HCV Cases	2021 Chronic HBV Cases	2021 Acute HBV Cases	2021 Chronic HCV Rate*	2021 Acute HCV Rate*	2021 Chronic HBV Rate*	2021 Acute HBV Rate*
Alcona	10,396	1	0	0	0	9.62	0.00	0.00	0.00
Alger	9,098	4	0	0	0	43.97	0.00	0.00	0.00
Allegan	117,104	27	1	5	0	23.06	0.85	4.27	0.00
Alpena	28,431	11	0	1	0	38.69	0.00	3.52	0.00
Antrim	23,301	9	0	2	0	38.62	0.00	8.58	0.00
Arenac	15,013	3	0	0	0	19.98	0.00	0.00	0.00
Baraga	8,337	8	0	0	0	95.96	0.00	0.00	0.00
Barry	61,045	12	0	0	0	19.66	0.00	0.00	0.00
Bay	103,506	59	3	5	5	57.00	2.90	4.83	4.83
Benzie	17,703	4	0	0	0	22.60	0.00	0.00	0.00
Berrien	153,797	78	1	5	3	50.72	0.65	3.25	1.95
Branch	43,428	18	0	2	0	41.45	0.00	4.61	0.00
Calhoun	133,943	49	1	8	0	36.58	0.75	5.97	0.00
Cass	51,613	15	2	1	0	29.06	3.87	1.94	0.00
Charlevoix	26,197	6	0	1	0	22.90	0.00	3.82	0.00
Cheboygan	25,435	11	0	1	0	43.25	0.00	3.93	0.00
Chippewa	37,418	21	1	0	0	56.12	2.67	0.00	0.00
Clare	30,655	15	0	0	0	48.93	0.00	0.00	0.00
Clinton	78,957	19	0	3	0	24.06	0.00	3.80	0.00
Crawford	13,904	9	0	0	0	64.73	0.00	0.00	0.00
Delta	35,874	28	3	0	1	78.05	8.36	0.00	2.79
Detroit City	672,351	561	7	111	0	83.44	1.04	16.51	0.00
Dickinson	25,373	22	2	0	0	86.71	7.88	0.00	0.00
Eaton	109,730	63	1	10	0	57.41	0.91	9.11	0.00
Emmet	33,175	12	2	0	1	36.17	6.03	0.00	3.01
Genesee	406,770	174	0	26	2	42.78	0.00	6.39	0.49
Gladwin	25,312	20	0	0	1	79.01	0.00	0.00	3.95
Gogebic	14,715	7	0	0	0	47.57	0.00	0.00	0.00
Grand Traverse	92,640	27	7	2	1	29.15	7.56	2.16	1.08
Gratiot	40,692	10	5	1	0	24.57	12.29	2.46	0.00
Hillsdale	45,707	13	2	0	0	28.44	4.38	0.00	0.00
Houghton	35,890	9	0	1	0	25.08	0.00	2.79	0.00
Huron	31,105	5	2	1	0	16.07	6.43	3.21	0.00
Ingham	290,923	122	5	22	1	41.94	1.72	7.56	0.34
Ionia	64,401	17	1	0	0	26.40	1.55	0.00	0.00
Iosco	25,213	21	1	0	0	83.29	3.97	0.00	0.00
Iron	11,099	12	0	0	0	108.12	0.00	0.00	0.00
Isabella	70,363	16	1	2	0	22.74	1.42	2.84	0.00
Jackson	158,174	82	3	2	1	51.84	1.90	1.26	0.63
Kalamazoo	264,322	60	4	6	1	22.70	1.51	2.27	0.38
Kalkaska	17,725	10	0	1	0	56.42	0.00	5.64	0.00
Kent	652,617	200	2	40	0	30.65	0.31	6.13	0.00
Keweenaw	2,102	0	0	0	0	0.00	0.00	0.00	0.00

*Rates are calculated per 100,000 persons in the population

†Due to cases without a defined jurisdiction, state-wide totals may include cases that were not included in jurisdiction counts

County	Total Population	2021 Chronic HCV Cases	2021 Acute HCV Cases	2021 Chronic HBV Cases	2021 Acute HBV Cases	2021 Chronic HCV Rate*	2021 Acute HCV Rate*	2021 Chronic HBV Rate*	2021 Acute HBV Rate*
Lake	11,805	1	1	2	0	8.47	8.47	16.94	0.00
Lapeer	87,975	20	1	3	0	22.73	1.14	3.41	0.00
Leelanau	21,649	4	0	0	0	18.48	0.00	0.00	0.00
Lenawee	98,310	30	1	2	0	30.52	1.02	2.03	0.00
Livingston	190,832	59	1	9	1	30.92	0.52	4.72	0.52
Luce	6,286	11	0	0	0	174.99	0.00	0.00	0.00
Mackinac	10,781	3	0	0	0	27.83	0.00	0.00	0.00
Macomb	870,893	255	25	62	5	29.28	2.87	7.12	0.57
Manistee	24,539	5	0	0	0	20.38	0.00	0.00	0.00
Marquette	66,403	40	4	1	0	60.24	6.02	1.51	0.00
Mason	29,062	8	1	0	0	27.53	3.44	0.00	0.00
Mecosta	43,481	6	1	0	0	13.80	2.30	0.00	0.00
Menominee	22,902	16	1	1	0	69.86	4.37	4.37	0.00
Midland	83,445	23	0	1	0	27.56	0.00	1.20	0.00
Missaukee	15,075	4	0	0	0	26.53	0.00	0.00	0.00
Monroe	150,000	104	7	6	0	69.33	4.67	4.00	0.00
Montcalm	63,516	35	1	3	0	55.10	1.57	4.72	0.00
Montmorency	9,270	0	0	0	0	0.00	0.00	0.00	0.00
Muskegon	173,679	95	1	3	0	54.70	0.58	1.73	0.00
Newaygo	48,687	14	0	1	1	28.76	0.00	2.05	2.05
Oakland	1,255,340	380	1	103	1	30.27	0.08	8.20	0.08
Oceana	26,545	5	1	1	0	18.84	3.77	3.77	0.00
Ogemaw	20,895	17	1	0	1	81.36	4.79	0.00	4.79
Ontonagon	5,802	4	0	0	0	68.94	0.00	0.00	0.00
Osceola	23,323	11	0	0	0	47.16	0.00	0.00	0.00
Oscoda	8,282	2	0	0	0	24.15	0.00	0.00	0.00
Otsego	24,613	10	0	1	0	40.63	0.00	4.06	0.00
Ottawa	289,162	35	0	10	0	12.10	0.00	3.46	0.00
Presque Isle	12,687	4	0	0	0	31.53	0.00	0.00	0.00
Roscommon	23,863	17	0	0	2	71.24	0.00	0.00	8.38
Saginaw	191,166	50	0	7	1	26.16	0.00	3.66	0.52
St Clair	159,285	44	6	11	3	27.62	3.77	6.91	1.88
St Joseph	60,789	26	0	2	0	42.77	0.00	3.29	0.00
Sanilac	41,179	9	0	3	0	21.86	0.00	7.29	0.00
Schoolcraft	8,031	2	0	0	0	24.90	0.00	0.00	0.00
Shiawassee	68,176	29	0	1	0	42.54	0.00	1.47	0.00
Tuscola	52,683	9	0	0	0	17.08	0.00	0.00	0.00
Van Buren	75,416	12	6	4	1	15.91	7.96	5.30	1.33
Washtenaw	368,385	170	7	38	2	46.15	1.90	10.32	0.54
Wayne	1,080,708	565	5	93	1	52.28	0.46	8.61	0.09
Wexford	33,433	16	0	1	0	47.86	0.00	2.99	0.00
MDOC	33,617	390	0	14	0	1,160.13	0.00	41.65	0.00
State-wide†	9,973,907	4,412	129	642	36	44.24	1.29	6.44	0.36

*Rates are calculated per 100,000 persons in the population

†Due to cases without a defined jurisdiction, state-wide totals may include cases that were not included in jurisdiction counts

Appendix A2: Heroin Data by County

County	Total Population	Young Adult (18-39) Population	2021 Young Adult (18-39) HCV Cases	2021 Heroin Treatment Admissions	2020 Heroin Overdose Deaths	2021 Young Adult (18-39) HCV Rate*	2021 Heroin Treatment Admission Rate*	2020 Heroin Overdose Death Rate*
Alcona	10,396	1,678	<5	8	0	N/A	76.95	0.00
Alger	9,098	2,224	<5	5	0	N/A	54.96	0.00
Allegan	117,104	30,793	<5	44	<5	N/A	37.57	N/A
Alpena	28,431	6,517	5	36	0	76.72	126.62	0.00
Antrim	23,301	4,781	<5	27	N/A	N/A	115.87	N/A
Arenac	15,013	3,139	0	30	0	0.00	199.83	0.00
Baraga	8,337	2,109	<5	3	N/A	N/A	35.98	N/A
Barry	61,045	15,620	6	33	<5	38.41	54.06	N/A
Bay	103,506	26,328	36	345	<5	136.74	333.31	N/A
Benzie	17,703	3,921	<5	28	0	N/A	158.17	0.00
Berrien	153,797	39,205	24	315	<5	61.22	204.82	N/A
Branch	43,428	11,138	7	56	0	62.85	128.95	0.00
Calhoun	133,943	36,409	22	331	10	60.42	247.12	7.80
Cass	51,613	12,003	5	34	<5	41.66	65.87	N/A
Charlevoix	26,197	5,822	<5	55	<5	N/A	209.95	N/A
Cheboygan	25,435	5,306	7	48	0	131.93	188.72	0.00
Chippewa	37,418	11,529	11	18	N/A	95.41	48.11	N/A
Clare	30,655	6,758	8	73	<5	118.38	238.13	N/A
Clinton	78,957	21,131	6	59	N/A	28.39	74.72	N/A
Crawford	13,904	2,899	6	39	0	206.97	280.49	0.00
Delta	35,874	7,870	20	17	0	254.13	47.39	0.00
Detroit City	672,351	210,952	110	2,204	98	52.14	327.80	13.50
Dickinson	25,373	5,864	15	25	N/A	255.80	98.53	N/A
Eaton	109,730	30,647	17	162	<5	55.47	147.64	N/A
Emmet	33,175	8,106	11	63	0	135.70	189.90	0.00
Genesee	406,770	108,252	59	1,171	16	54.50	287.88	3.99
Gladwin	25,312	5,155	6	56	<5	116.39	221.24	N/A
Gogebic	14,715	2,877	<5	5	N/A	N/A	33.98	N/A
Grand Traverse	92,640	24,656	23	214	<5	93.28	231.00	N/A
Gratiot	40,692	12,435	7	55	0	56.29	135.16	0.00
Hillsdale	45,707	11,644	10	43	N/A	85.88	94.08	N/A
Houghton	35,890	12,586	6	15	N/A	47.67	41.79	N/A
Huron	31,105	6,568	<5	37	0	N/A	118.95	0.00
Ingham	290,923	113,254	37	846	12	32.67	290.80	4.21
Ionia	64,401	19,109	9	52	0	47.10	80.74	0.00
Iosco	25,213	4,975	13	50	<5	261.31	198.31	N/A
Iron	11,099	2,063	8	12	0	387.78	108.12	0.00
Isabella	70,363	29,953	9	125	<5	30.05	177.65	N/A
Jackson	158,174	42,550	35	376	N/A	82.26	237.71	N/A
Kalamazoo	264,322	93,146	30	359	7	32.21	135.82	2.66
Kalkaska	17,725	4,375	5	61	<5	114.29	344.15	N/A
Kent	652,617	211,326	82	504	26	38.80	77.23	3.98
Keweenaw	2,102	355	0	0	0	0.00	0.00	0.00

*Rates are calculated per 100,000 persons in the population

†Due to cases without a defined jurisdiction, state-wide totals may include cases that were not included in jurisdiction counts

Note: Due to internal data suppression guidelines, some aggregate counts and corresponding rates required censorship

County	Total Population	Young Adult (18-39) Population	2021 Young Adult (18-39) HCV Cases	2021 Heroin Treatment Admissions	2020 Heroin Overdose Deaths	2021 Young Adult (18-39) HCV Rate*	2021 Heroin Treatment Admission Rate*	2020 Heroin Overdose Death Rate*
Lake	11,805	1,965	0	14	0	0.00	118.59	0.00
Lapeer	87,975	21,450	9	117	<5	41.96	132.99	N/A
Leelanau	21,649	4,123	<5	12	0	N/A	55.43	0.00
Lenawee	98,310	26,098	14	141	<5	53.64	143.42	N/A
Livingston	190,832	47,826	19	109	8	39.73	57.12	4.56
Luce	6,286	1,691	7	0	N/A	413.96	0.00	N/A
Mackinac	10,781	2,172	<5	4	0	N/A	37.10	0.00
Macomb	870,893	241,223	103	2,514	46	42.70	288.67	5.30
Manistee	24,539	5,691	<5	130	N/A	N/A	529.77	N/A
Marquette	66,403	21,328	25	29	N/A	117.22	43.67	N/A
Mason	29,062	6,574	<5	84	<5	N/A	289.04	N/A
Mecosta	43,481	14,819	<5	66	<5	N/A	151.79	N/A
Menominee	22,902	4,901	11	9	N/A	224.44	39.30	N/A
Midland	83,445	22,456	14	166	N/A	62.34	198.93	N/A
Missaukee	15,075	3,657	<5	17	0	N/A	112.77	0.00
Monroe	150,000	38,410	62	391	7	161.42	260.67	6.24
Montcalm	63,516	16,802	21	123	<5	124.99	193.65	N/A
Montmorency	9,270	1,607	0	8	N/A	0.00	86.30	N/A
Muskegon	173,679	47,762	49	404	14	102.59	232.61	8.17
Newaygo	48,687	12,059	5	56	<5	41.46	115.02	N/A
Oakland	1,255,340	349,362	133	1,617	N/A	38.07	128.81	N/A
Oceana	26,545	6,419	<5	52	0	N/A	195.89	0.00
Ogemaw	20,895	4,435	10	33	N/A	225.48	157.93	N/A
Ontonagon	5,802	795	<5	3	N/A	N/A	51.71	N/A
Osceola	23,323	5,522	5	29	0	90.55	124.34	0.00
Oscoda	8,282	1,610	<5	12	N/A	N/A	144.89	N/A
Otsego	24,613	6,017	7	63	<5	116.34	255.96	N/A
Ottawa	289,162	93,090	14	162	7	15.04	56.02	2.58
Presque Isle	12,687	2,257	<5	4	N/A	N/A	31.53	N/A
Roscommon	23,863	4,229	10	51	<5	236.46	213.72	N/A
Saginaw	191,166	51,978	29	463	8	55.79	242.20	4.73
St Clair	159,285	39,243	26	443	N/A	66.25	278.12	N/A
St Joseph	60,789	15,707	9	61	<5	57.30	100.35	N/A
Sanilac	41,179	9,325	<5	26	<5	N/A	38.14	N/A
Schoolcraft	8,031	1,539	0	1	0	0.00	1.90	0.00
Shiawassee	68,176	17,507	18	122	<5	102.82	161.77	N/A
Tuscola	52,683	12,599	<5	48	0	N/A	13.03	0.00
Van Buren	75,416	18,757	8	71	<5	42.65	6.57	N/A
Washtenaw	368,385	141,005	67	513	17	47.52	139.26	4.97
Wayne	1,080,708	292,933	178	2,297	80	60.76	212.55	7.60
Wexford	33,433	8,354	9	96	<5	107.73	287.14	N/A
MDOC	33,617	7,707	251	-	-	3,256.78	-	-
State-wide†	9,973,907	2,843,325	1,821	18,604	447	64.04	186.53	4.54

*Rates are calculated per 100,000 persons in the population

†Due to cases without a defined jurisdiction, state-wide totals may include cases that were not included in jurisdiction counts

Note: Due to internal data suppression guidelines, some aggregate counts and corresponding rates required censorship

Appendix B1: Viral Hepatitis Data by Local Health Jurisdiction

Local Health Jurisdiction	Total Population	2021 Chronic HCV Cases	2021 Acute HCV Cases	2021 Chronic HBV Cases	2021 Acute HBV Cases	2021 Chronic HCV Rate*	2021 Acute HCV Rate*	2021 Chronic HBV Rate*	2021 Acute HBV Rate*
Allegan	117,104	27	1	5	0	23.06	0.85	4.27	0.00
Barry-Eaton	170,775	75	1	10	0	43.92	0.59	5.86	0.00
Bay	103,506	59	3	5	5	57.00	2.90	4.83	4.83
Benzie-Leelanau	39,352	8	0	0	0	20.33	0.00	0.00	0.00
Berrien	153,797	78	1	5	3	50.72	0.65	3.25	1.95
Branch-Hillsdale-St. Joseph	149,924	57	2	4	0	38.02	1.33	2.67	0.00
Calhoun	133,943	49	1	8	0	36.58	0.75	5.97	0.00
Central Michigan	188,529	82	1	2	3	43.49	0.53	1.06	1.59
Chippewa	37,418	21	1	0	0	56.12	2.67	0.00	0.00
Delta-Menominee	58,776	44	4	1	1	74.86	6.81	1.70	1.70
Detroit City	672,351	561	7	111	0	83.44	1.04	16.51	0.00
Dickinson-Iron	36,472	34	2	0	0	93.22	5.48	0.00	0.00
District Health Department #10	264,256	78	4	6	1	29.52	1.51	2.27	0.38
District Health Department #2	64,786	41	2	0	1	63.29	3.09	0.00	1.54
District Health Department #4	75,823	26	0	2	0	34.29	0.00	2.64	0.00
Genesee	406,770	174	0	26	2	42.78	0.00	6.39	0.49
Grand Traverse	92,640	27	7	2	1	29.15	7.56	2.16	1.08
Huron	31,105	5	2	1	0	16.07	6.43	3.21	0.00
Ingham	290,923	122	5	22	1	41.94	1.72	7.56	0.34
Ionia	64,401	17	1	0	0	26.40	1.55	0.00	0.00
Jackson	158,174	82	3	2	1	51.84	1.90	1.26	0.63
Kalamazoo	264,322	60	4	6	1	22.70	1.51	2.27	0.38
Kent	652,617	200	2	40	0	30.65	0.31	6.13	0.00
Lapeer	87,975	20	1	3	0	22.73	1.14	3.41	0.00
Lenawee	98,310	30	1	2	0	30.52	1.02	2.03	0.00
Livingston	190,832	59	1	9	1	30.92	0.52	4.72	0.52
Luce-Mackinac-Alger-Schoolcraft	34,196	20	0	0	0	58.49	0.00	0.00	0.00
Macomb	870,893	255	25	62	5	29.28	2.87	7.12	0.57
Marquette	66,403	40	4	1	0	60.24	6.02	1.51	0.00
Midland	83,445	23	0	1	0	27.56	0.00	1.20	0.00
Mid-Michigan	183,165	64	6	7	0	34.94	3.28	3.82	0.00
Monroe	150,000	104	7	6	0	69.33	4.67	4.00	0.00
Muskegon	173,679	95	1	3	0	54.70	0.58	1.73	0.00
Northwest Michigan	107,286	37	2	4	1	34.49	1.86	3.73	0.93
Oakland	1,255,340	380	1	103	1	30.27	0.08	8.20	0.08
Ottawa	289,162	35	0	10	0	12.10	0.00	3.46	0.00
Saginaw	191,166	50	0	7	1	26.16	0.00	3.66	0.52
Sanilac	41,179	9	0	3	0	21.86	0.00	7.29	0.00
Shiawassee	68,176	29	0	1	0	42.54	0.00	1.47	0.00
St Clair	159,285	44	6	11	3	27.62	3.77	6.91	1.88
Tuscola	52,683	9	0	0	0	17.08	0.00	0.00	0.00
Van Buren-Cass	127,029	27	8	5	1	21.25	6.30	3.94	0.79
Washtenaw	368,385	170	7	38	2	46.15	1.90	10.32	0.54
Wayne	1,080,708	565	5	93	1	52.28	0.46	8.61	0.09
Western Upper Peninsula	66,846	28	0	1	0	41.89	0.00	1.50	0.00
MDOC	33,617	390	0	14	0	1,160.13	0.00	41.65	0.00
Statewide†	9,973,907	4,412	129	642	36	44.24	1.29	6.44	0.36

*Rates are calculated per 100,000 persons in the population

†Due to cases without a defined jurisdiction, state-wide totals may include cases that were not included in jurisdiction counts

Appendix B2: Heroin Data by Local Health Jurisdiction

Local Health Jurisdiction	Total Population	Young Adult (18-39) Population	2021 Young Adult (18-39) HCV Cases	2021 Heroin Treatment Admissions	2020 Heroin Overdose Deaths	2021 Young Adult (18-39) HCV Rate*	2021 Heroin Treatment Admission Rate*	2020 Heroin Overdose Death Rate*
Allegan	117,104	30,793	4	44	<5	12.99	37.57	N/A
Barry-Eaton	170,775	46,267	23	195	7	49.71	114.19	4.34
Bay	103,506	26,328	36	345	<5	136.74	333.31	N/A
Benzie-Leelanau	39,352	8,044	7	40	0	87.02	101.65	0.00
Berrien	153,797	39,205	24	315	<5	61.22	204.82	N/A
Branch-Hillsdale-St. Joseph	149,924	38,489	26	160	<5	67.55	106.72	N/A
Calhoun	133,943	36,409	22	331	10	60.42	247.12	7.80
Central Michigan	188,529	54,756	38	364	7	69.40	193.07	4.50
Chippewa	37,418	11,529	11	18	N/A	95.41	48.11	N/A
Delta-Menominee	58,776	12,771	31	26	N/A	242.74	44.24	N/A
Detroit City	672,351	210,952	110	2,204	98	52.14	327.80	13.50
Dickinson-Iron	36,472	7,927	23	37	N/A	290.15	101.45	N/A
District Health Department #10	264,256	66,812	39	615	13	58.37	232.73	6.08
District Health Department #2	64,786	12,698	25	103	N/A	196.88	158.98	N/A
District Health Department #4	75,823	15,687	13	96	N/A	82.87	126.61	N/A
Genesee	406,770	108,252	59	1,171	16	54.50	287.88	3.99
Grand Traverse	92,640	24,656	23	214	<5	93.28	231.00	N/A
Huron	31,105	6,568	3	37	0	45.68	118.95	0.00
Ingham	290,923	113,254	37	846	12	32.67	290.80	4.21
Ionia	64,401	19,109	9	52	0	47.10	80.74	0.00
Jackson	158,174	42,550	35	376	N/A	82.26	237.71	N/A
Kalamazoo	264,322	93,146	30	359	7	32.21	135.82	2.66
Kent	652,617	211,326	82	504	26	38.80	77.23	3.98
Lapeer	87,975	21,450	9	117	<5	41.96	132.99	N/A
Lenawee	98,310	26,098	14	141	<5	53.64	143.42	N/A
Livingston	190,832	47,826	19	109	8	39.73	57.12	4.56
Luce-Mackinac-Alger-Schoolcraft	34,196	7,626	9	10	N/A	118.02	29.24	N/A
Macomb	870,893	241,223	103	2,514	46	42.70	288.67	5.30
Marquette	66,403	21,328	25	29	N/A	117.22	43.67	N/A
Midland	83,445	22,456	14	166	N/A	62.34	198.93	N/A
Mid-Michigan	183,165	50,368	34	237	N/A	67.50	129.39	N/A
Monroe	150,000	38,410	62	391	7	161.42	260.67	6.24
Muskegon	173,679	47,762	49	404	14	102.59	232.61	8.17
Northwest Michigan	107,286	24,726	23	208	N/A	93.02	193.87	N/A
Oakland	1,255,340	349,362	133	1,617	N/A	38.07	128.81	N/A
Ottawa	289,162	93,090	14	162	7	15.04	56.02	2.58
Saginaw	191,166	51,978	29	463	8	55.79	242.20	4.73
Sanilac	41,179	9,325	4	26	<5	42.90	63.14	N/A
Shiawassee	68,176	17,507	18	122	<5	102.82	178.95	N/A
St Clair	159,285	39,243	26	443	N/A	66.25	278.12	N/A
Tuscola	52,683	12,599	3	48	0	23.81	91.11	0.00
Van Buren-Cass	127,029	30,760	13	105	6	42.26	82.66	4.76
Washtenaw	368,385	141,005	67	513	17	47.52	139.26	4.97
Wayne	1,080,708	292,933	178	2,297	80	60.76	212.55	7.60
Western Upper Peninsula	66,846	18,722	13	26	N/A	69.44	38.90	N/A
MDOC	33,617	7,707	251	-	-	3,256.78	-	-
Statewide†	9,973,907	2,843,325	1,821	18,604	447	64.04	186.53	4.54

*Rates are calculated per 100,000 persons in the population

†Due to cases without a defined jurisdiction, state-wide totals may include cases that were not included in jurisdiction counts

Note: Due to internal data suppression guidelines, some aggregate counts and corresponding rates required censorship

Appendix C1: Viral Hepatitis Data by Region

Region	Total Population	2021 Chronic HCV Cases	2021 Acute HCV Cases	2021 Chronic HBV Cases	2021 Acute HBV Cases	2021 Chronic HCV Rate*	2021 Acute HCV Rate*	2021 Chronic HBV Rate*	2021 Acute HBV Rate*
1	1,081,501	427	18	50	3	39.48	1.66	4.62	0.28
3	1,102,940	413	8	46	10	37.45	0.73	4.17	0.91
5	961,457	297	15	33	5	30.89	1.56	3.43	0.52
6	1,527,296	458	10	62	1	29.99	0.65	4.06	0.07
7	443,640	159	9	10	4	35.84	2.03	2.25	0.90
8	300,111	187	11	3	1	62.31	3.67	1.00	0.33
2N	2,285,518	679	32	176	9	29.71	1.40	7.70	0.39
2S	2,271,444	1,400	26	248	3	61.63	1.14	10.92	0.13
MDOC	33,617	390	0	14	0	1,160.13	0.00	41.65	0.00
Statewide†	9,973,907	4,412	129	642	36	44.24	1.29	6.44	0.36

*Rates are calculated per 100,000 persons in the population

†Due to cases without a defined jurisdiction, state-wide totals may include cases that were not included in jurisdiction counts

Appendix C2: Heroin Data by Region

Region	Total Population	Young Adult (18-39) Population	2021 Young Adult (18-39) HCV Cases	2021 Heroin Treatment Admissions	2020 Heroin Overdose Deaths	2021 Young Adult (18-39) HCV Rate*	2021 Heroin Treatment Admission Rate*	2020 Heroin Overdose Death Rate*
1	1,081,501	323,092	163	1,913	30	50.45	176.88	2.94
3	1,102,940	279,948	188	2,562	34	67.16	232.29	3.48
5	961,457	272,778	115	1,304	35	42.16	135.63	3.81
6	1,527,296	472,158	210	1,744	59	44.48	114.19	4.05
7	443,640	102,318	102	952	17	99.69	214.59	4.85
8	300,111	79,903	112	146	N/A	140.17	48.65	N/A
2N	2,285,518	629,828	262	4,574	N/A	41.60	200.13	N/A
2S	2,271,444	683,300	417	5,405	202	61.03	237.95	8.83
MDOC	33,617	7,707	251	-	-	3,256.78	-	-
Statewide†	9,973,907	2,843,325	1,821	18,604	447	64.04	186.53	4.54

*Rates are calculated per 100,000 persons in the population

†Due to cases without a defined jurisdiction, state-wide totals may include cases that were not included in jurisdiction counts

Note: Due to internal data suppression guidelines, some aggregate counts and corresponding rates required censorship