MDHHS

Michigan Department of Health & Human Services

2020 Hepatitis B and C Annual Surveillance Report

Viral Hepatitis Surveillance and Prevention Unit

Updated November 9, 2021

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Viral Hepatitis Data Summary

Table 1. Summary of Demographic Information by Type of Hepatitis, Michigan, 2020

	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	43	100%	713	100%	139	100%	4,356	100%	9,965,265	100%
Sex										
Male	32	74%	481	67%	90	65%	2,588	59%	4,905,240	49%
Female	11	26%	228	32%	49	35%	1,754	40%	5,060,025	51%
Unknown	0	0%	4	1%	0	0%	14	0%	0	0%
Race and Ethnicity										
White or Caucasian	29	67%	224	31%	110	79%	2,349	54%	7,477,400	75%
Black or African American	5	12%	145	20%	10	7%	703	16%	1,358,034	14%
Hispanic	2	5%	14	2%	5	4%	114	3%	507,353	5%
Asian	0	0%	102	14%	0	0%	32	1%	310,420	3%
American Indian or Alaskan Native	1	2%	2	0%	0	0%	32	1%	45,569	0%
Other	4	9%	55	8%	5	4%	200	5%	266,489	3%
Unknown	2	5%	171	24%	9	6%	926	21%	0	0%
Age										
Mean	48	-	50	-	38	-	48	-	n/a	-
Median	44	-	49	-	34	-	48	-	40	-
Range	23-79	-	0-97	-	15-81	-	0-103	-	n/a	-
0-19 years	0	0%	19	3%	5	4%	32	1%	2,446,992	25%
20-29 years	2	5%	68	10%	34	24%	622	14%	1,373,376	14%
30-39 years	12	28%	117	16%	54	39%	1,013	23%	1,193,084	12%
40-49 years	13	30%	154	22%	20	14%	578	13%	1,208,555	12%
50-59 years	5	12%	140	20%	13	9%	683	16%	1,398,189	14%
60+ years	11	26%	211	30%	13	9%	1,414	32%	2,345,069	24%
Unknown	0	0%	4	1%	0	0%	14	0%	0	0%

*Other MI population includes 2019 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 2020. 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 approximately 85% 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 2020. 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 43 cases of acute hepatitis B infection reported in Michigan in 2020 for a rate of 0.43 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 72% of acute hepatitis B cases in 2020.
- Receipt of a tattoo in the six months prior to diagnosis was the most commonly reported risk factor among 2020 acute hepatitis B cases.

Chronic Hepatitis B

- There were 713 new chronic hepatitis B diagnoses reported in Michigan in 2020 for a rate of 7.15 cases per 100,000 people.
- Males have shown higher rates of chronic hepatitis B than females since 2004.
- Asians are disproportionately affected by chronic hepatitis B with an infection rate of 32.86 per 100,000, compared to the state average of 7.15.
- For the fourth consecutive year, the proportion of chronic hepatitis B cases that are foreign-born was 60% or more.

Acute Hepatitis C

- There were 139 cases of acute hepatitis C reported in Michigan in 2020 for a rate of 1.39 cases per 100,000 people. This is a slight increase from rates reported in Michigan in 2019 (1.33), and higher than the national acute HCV rate of 1.30 cases per 100,000 reported in 2018.
- The median age of acute hepatitis C cases, 34 years old, was at least 10 years younger than that of other hepatitis case classifications.
- Case follow-up and completion of epidemiological risk factors was completed for about 58% of acute hepatitis C cases in 2020. 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 65% of acute hepatitis C cases.

Chronic Hepatitis C

- There were 4,356 new chronic hepatitis C diagnoses reported in Michigan in 2020 for a rate of 43.71 cases per 100,000 people.
- The rate of chronic hepatitis C is higher in Michigan males (52.76 per 100,000) versus females (34.66 per 100,000).
- American Indians and Alaskan Natives (70.22 per 100,000) and the "Other Race" population (75.05 per 100,000) have a higher rate of chronic hepatitis C infection than the general Michigan population.
- Case follow-up and completion of epidemiological risk factors were completed for about 37% of chronic hepatitis C cases in 2020. 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 a factor shared by 65% of cases. Incarceration was a risk factor in 60% of cases. Responses that were unknown or missing were excluded from these proportions.
- Where data were available, 77.71% of chronic hepatitis C cases were reported with genotype 1 infection, 12.37% with genotype 3, and 8.63% 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 2020.
- The average age of infants reported with perinatal hepatitis C was 17.5 months.
- Most infants with perinatal hepatitis C were male (60%).
- 90% of perinatal hepatitis C cases were white/Caucasian.
- Six out of the 10 reported cases (60%) 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 2020, the proportion of all chronic hepatitis C cases by year in adults under 40 years old has nearly doubled (from 22% in 2010 to 38% in 2020).
- A concurrent increase in heroin use has been evident within the same timeframe.
    - History of injection drug use in 18-39 year olds was reported in 83.1% of hepatitis C patients.
    - Between 2010 and 2020 there has been a 64.7% 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 26 cases of perinatal hepatitis C due to vertical transmission over the last six years, and a rate of 721.2 instances of treated neonatal abstinence syndrome (NAS) per 100,000 live births in 2018.
    - 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.

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

- From 2004-2019, there were 876 persons in Michigan reported with hepatitis B/HIV co-infection.
    - 89.0% of these persons are male.
    - In 2019 the primary modes of HIV transmission in the HIV/HBV co-infection group were men who have sex with men (MSM) at 53.3%.
- From 2004-2019, there were 1,754 persons in Michigan reported with hepatitis C/HIV co-infection.
    - 73.4% of these persons are male.
    - In 2019 the primary modes of HIV transmission in the HIV/HCV co-infection group were injection drug use (IDU) at 28.4% and MSM at 43.3%.
- 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 has 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.

Viral Hepatitis Outcomes

Hospitalization Data

- After a considerable increase in HCV-related hospitalizations from 2005 through 2017, the 2020 yearly total had decreased to a level nearly the same as 2005 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 and individuals on the waitlist has remained stable for the past 10 years, with 192 transplants in 2020 and 240 patients on the waitlist.

Viral Hepatitis and Liver Cancer

- The overall incidence for liver cancer in Michigan has increased by 57.4% between 2004 and 2018.
- The liver cancer rate among Black/African American males (18.7 cases per 100,000) remains high, and the gap in rates compared to white/Caucasian males (8.7 cases per 100,000) widened in 2018.
- The overall liver cancer mortality has increased by 25.3% between 2010 and 2019 in Michigan.
- In 2019, the Michigan liver cancer mortality rate was higher in Black/African American males (10.1 per 100,000) than it was in white/Caucasian males (5.2 per 100,000).

Viral Hepatitis-Related Mortality

- There were 303 deaths attributed to chronic hepatitis C in Michigan in 2020, a continuation of the downward trend documented for the past five years.

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 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 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 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 MDSS using standardized CDC case report forms (see page 10).

Michigan Disease Surveillance System
Mandatory reporting of communicable diseases can be accomplished via the Michigan Disease Surveillance System (MDSS). The MDSS 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. MDSS provides for the secure transfer, maintenance, and analysis of communicable disease surveillance information. MDSS has the capability to receive electronic laboratory reports directly from laboratories via HL7 messaging. Alternatively, cases can be manually entered into MDSS via the web portal by medical providers, laboratories or LHD staff. Cases that have been previously entered in 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 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 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.

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, 2020, and December 31, 2020, in 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 2019 were used to calculate rates in 2020. 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 2020. In general, this is not necessarily reflective of the true number of new infections that occurred in 2020 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 2020. Since the majority of 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 the majority of 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 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 MDSS, active surveillance of cases of public health importance, recruitment of laboratories to report into 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.

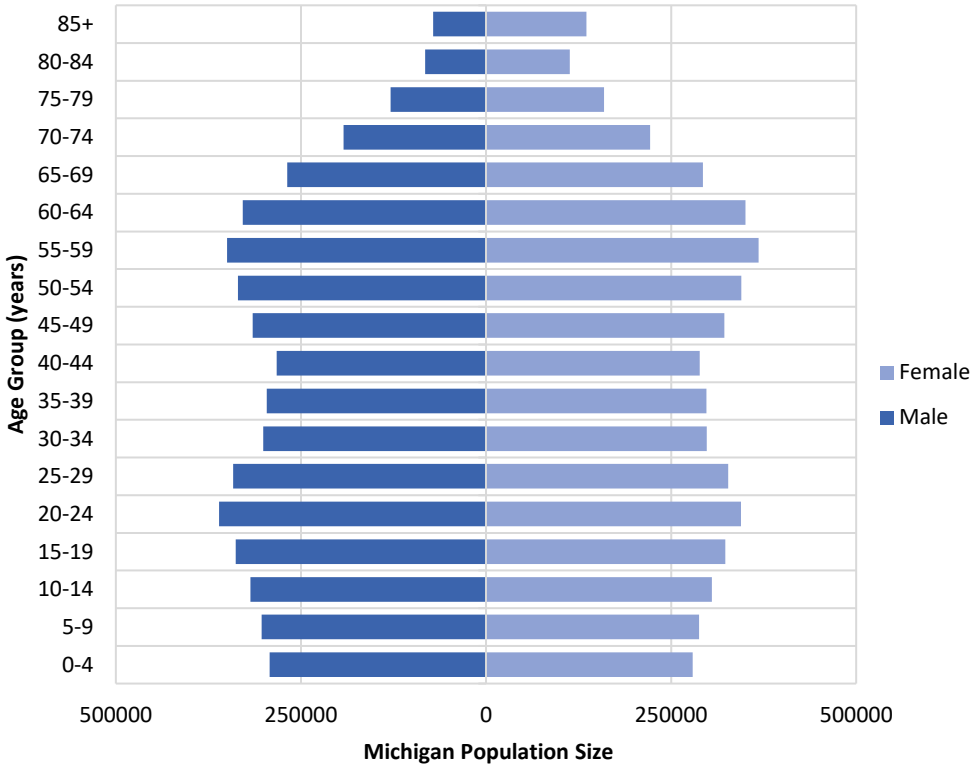
Michigan Viral Hepatitis Case Report Forms

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

Michigan Census and Demographics

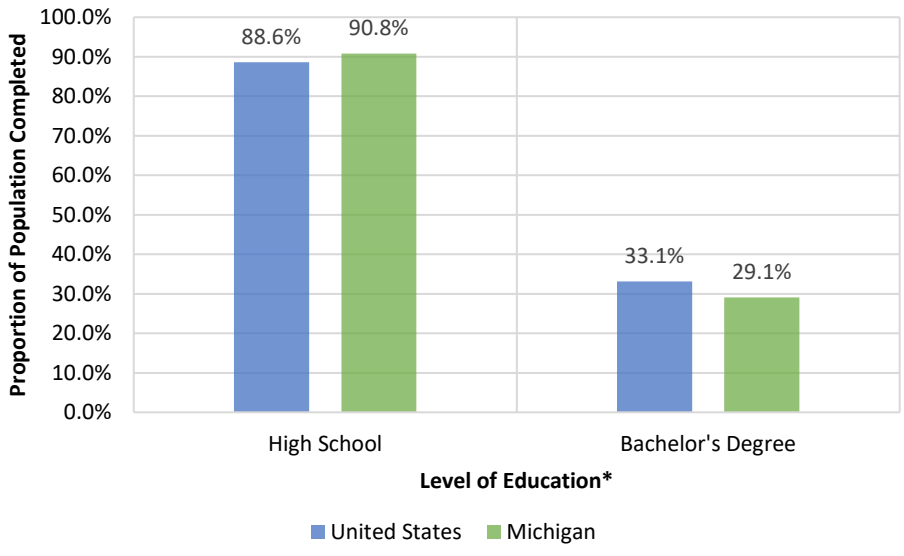
Population by Age, Sex & Education

Figure 1.1 Age and Sex: Michigan, 2019



In 2019, the Michigan population was 9,965,265; the 10th most populous state in the United States. Persons born between 1945 through 1965 amounted to 2,644,223 persons, or 26.5%, 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 16.7% of the total population. The median age was 40 years old.

Figure 1.2 Level of Education: Michigan and the U.S., 2019

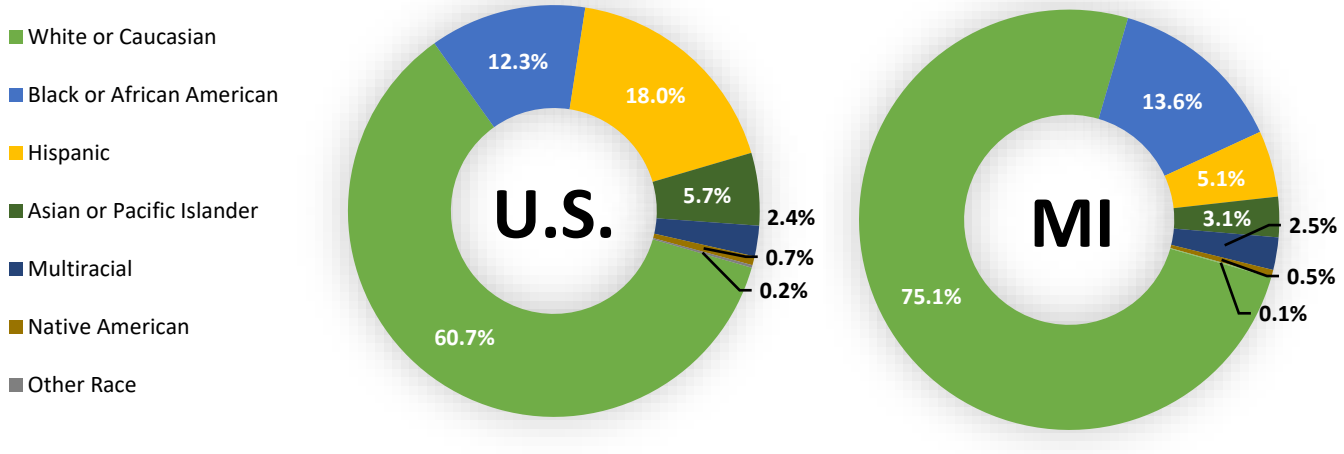


Looking at those aged 25 years and older, 90.8% of Michigan's population completed high school-which is greater than the national benchmark of 88.6%. A higher percentage of the national population, however, completed a bachelor's degree compared to the state of Michigan (33.1% vs 29.1%).

*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., 2019



According to the 2019 ACS estimates, the racial and ethnic composition of Michigan is 75.1% non-Hispanic white/Caucasian; 13.6% Black/African American; 5.1% Hispanic; 3.1% non-Hispanic Asian alone; 2.5% multiracial or other race. Nationally, non-Hispanic white/Caucasian persons make up 60.7% of the total, and the Hispanic population is 18.0%. The proportion of male and females within each racial/ethnic group is similar. Between 2010 and 2019, there was a 31% rise in Michigan's Asian/Pacific Islander and Multiracial populations and a 38.37% rise in Michiganders who classify as "Other" race.

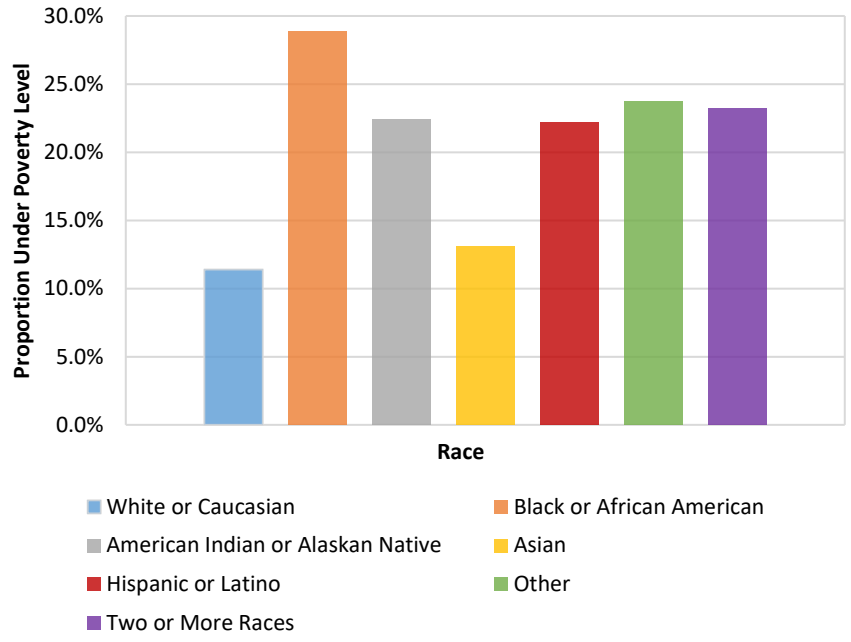
Table 1.1 Population by Race: Michigan, 2010-2019

	2010 Census		2019 ACS		2010-2019	
Race	**Population Count**	**Percent of Total**	**Population Count**	**Percent of Total**	**Change**	**Percent Change**
Total Population	9,883,640	100.00%	9,965,265	100.00%	81,625	0.83%
White or Caucasian	7,569,939	76.59%	7,477,400	75.03%	-92,539	-1.22%
Black or African American	1,383,756	14.00%	1,358,034	13.63%	-25,722	-1.86%
Hispanic	436,358	4.41%	507,353	5.09%	70,995	16.27%
Asian or Pacific Islander	238,660	2.41%	313,069	3.14%	74,409	31.18%
Multiracial	190,396	1.93%	250,188	2.51%	59,792	31.40%
Native American	54,665	0.55%	45,569	0.46%	-9,096	-16.64%
Other Race	9,866	0.10%	13,652	0.14%	3,786	38.37%

Source: The United States Census Bureau

Poverty, Income & Health Insurance

Figure 1.4 Population Under the Poverty Line by Race: Michigan, 2019



The poverty line is determined at a national level each year. In 2019 a family of four would be considered in poverty if the household income in the past 12 months was under $26,172. The Black community in Michigan had the highest rate of poverty in 2019 (28.9%), while the white population (11.4%) and Asian population (13.1%) 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 22-24%).

In 2019, 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 (5.5% vs 9.2%).

Figure 1.5 Health Insurance Coverage, Michigan and the U.S., 2019

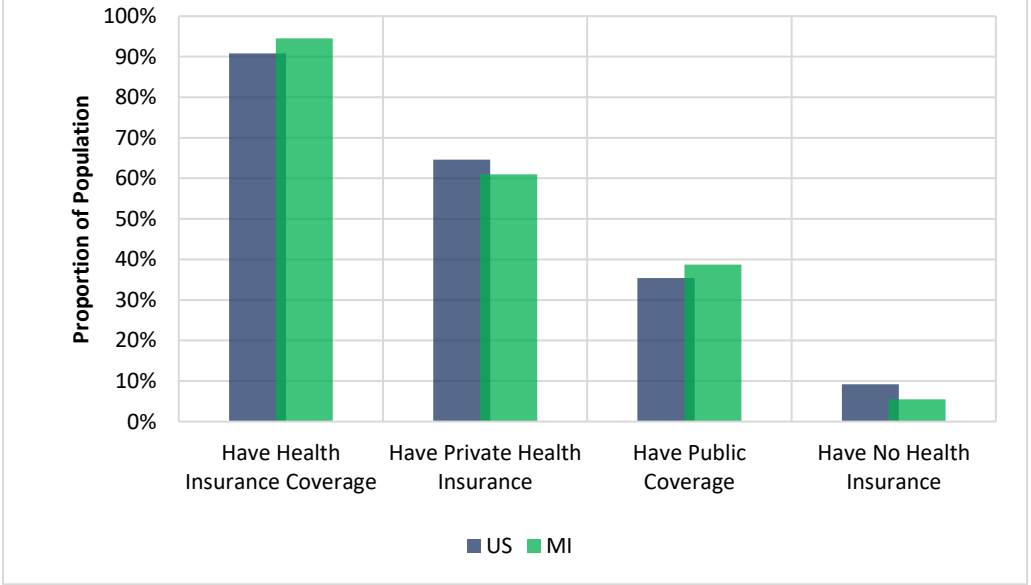
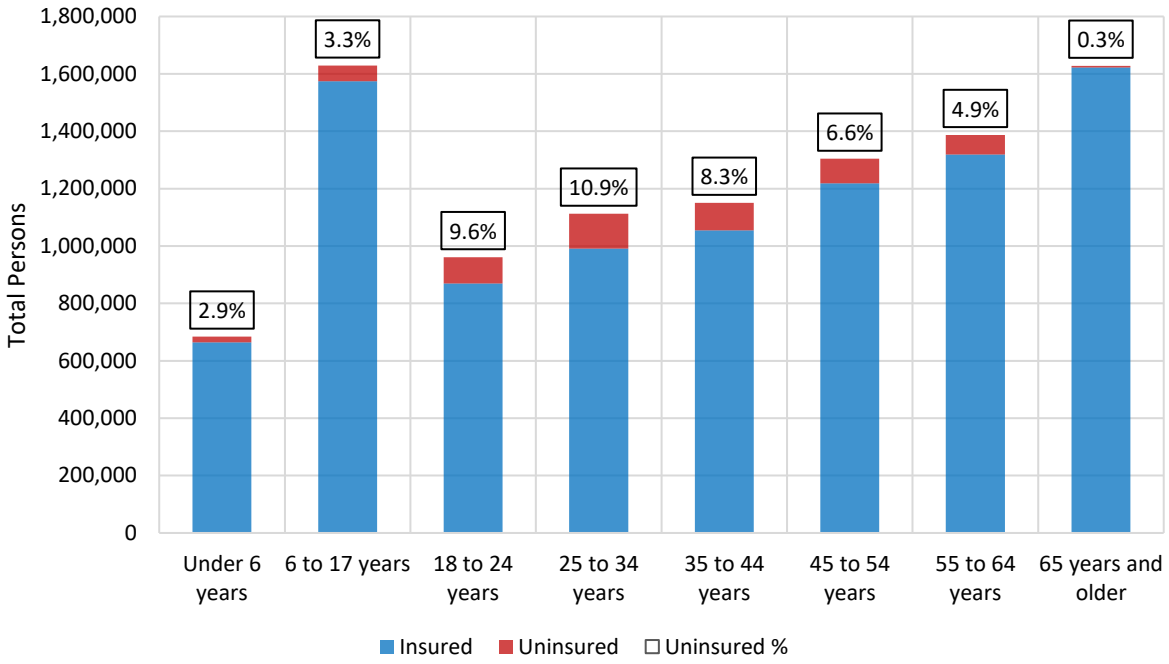
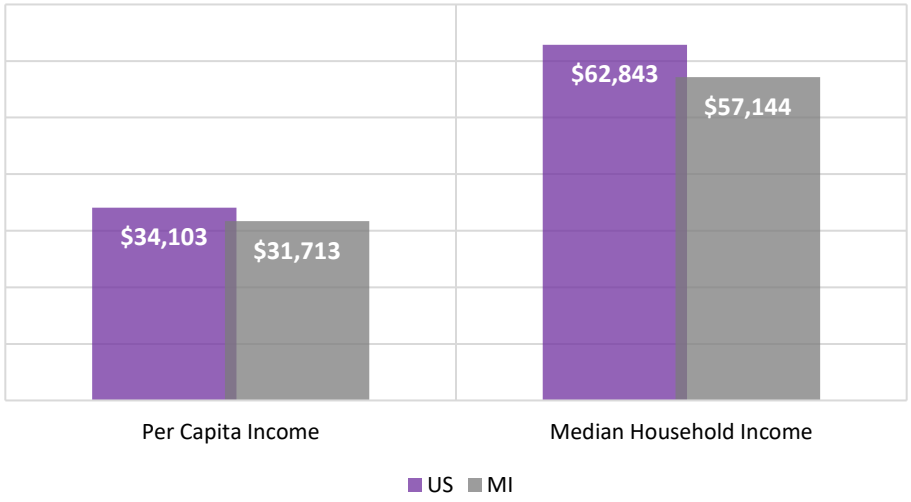


Figure 1.6 Michigan Population by Age Group, Proportion Insured, and Percent Uninsured, 2019



Michiganders aged 65 years and older along with the 6-to-17 year old population, 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 2019. The 25-to-34-year-old population was estimated to have the largest proportion of uninsured individuals (10.9%), followed by the 18-to-24-year-old (9.6%) and 35-to-44-year-old (8.3%) cohorts.

Figure 1.7 Income: Michigan and the U.S., 2019



The Michigan population had lower levels of income than that of the U.S. population. The average per capita income for Michigan ($31,713) was 7.5% lower than the U.S. average ($34,103), and the median household income for Michigan ($57,144) was approximately 10% below the national median ($62,843).

Acute Hepatitis B

Acute Hepatitis B—Incidence and Sex

Figure 2.1 Incidence of Acute Hepatitis B in Michigan and United States, 2012-2020

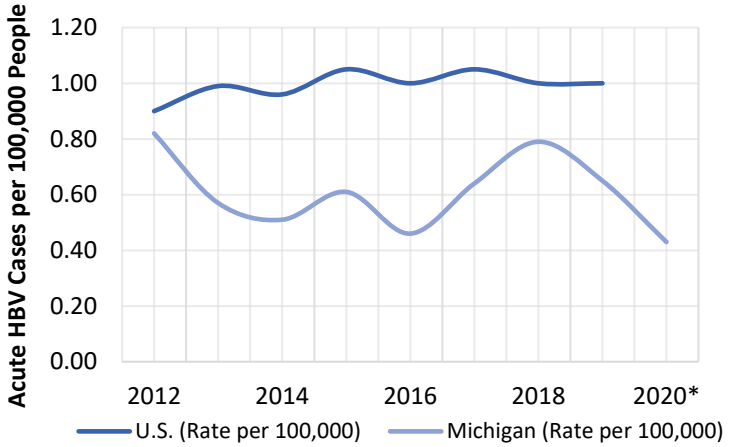


Table 2.1 Incidence of Acute Hepatitis B, Michigan and United States, 2016-2020

Year	Michigan Cases	Michigan (Rate per 100,000)	U.S. (Rate per 100,000)
2016	46	0.46	1.00
2017	64	0.64	1.05
2018	79	0.79	1.00
2019	65	0.65	1.00
2020	43	0.43	N/A

Following a two-year period of increased cases between 2016 and 2018, acute hepatitis B infections in Michigan decreased in 2019 and again in 2020. 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.

Figure 2.2 Number of Acute Hepatitis B Cases by Sex in Michigan, 2012-2020

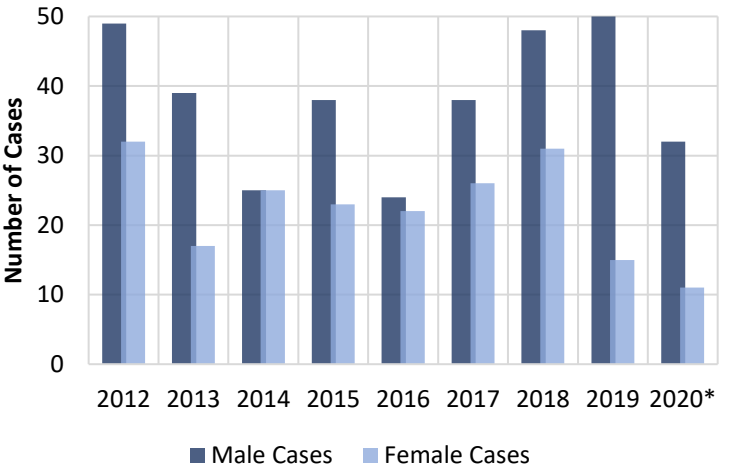


Table 2.2 Acute Hepatitis B Total Cases and Incidence Rate by Sex in Michigan, 2016-2020

Year	Male Cases	Male Incidence	Female Cases	Female Incidence
2016	24	0.49	22	0.44
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

Acute hepatitis B incidence had been increasing in males since 2016 but decreased by 36% in 2020. Despite that decrease males have traditionally had a higher rate of acute hepatitis B infections when compared to females, and that trend continues. In 2020 the number of acute hepatitis B cases in females continued to decrease from 2020, resulting in a new low of 11 cases.

*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, 2012-2020

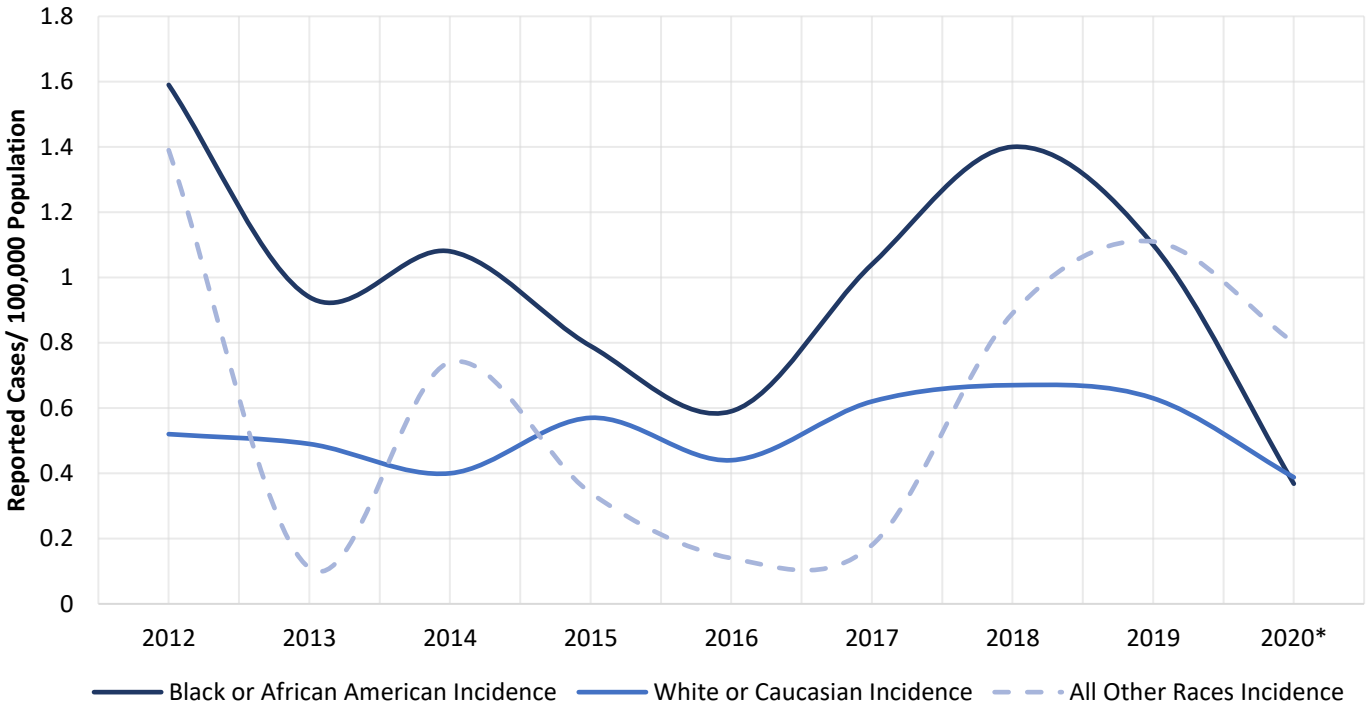


Table 2.3 Incidence of Acute Hepatitis B by Race and Ethnicity in Michigan, 2016-2020

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
2016	8	0.59	0	0.00	1	0.34	33	0.44	1	0.21	0	0.00
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

In 2020, persons classified as other race experienced acute hepatitis B infection at the highest rate in Michigan, followed by American Indian/Alaskan Native, white, Hispanic, Black, and Asian populations. Incidence rates in 2020 occur in contrast to previous years when, traditionally, the Black and Asian populations have had the highest incidence rates. This is likely 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, 2020 (n = 43)

Risk Behavior	Completed
Injection Drug User	77%
Used Street Drugs	70%
Hemodialysis	72%
Received Blood Products	77%
Received a Tattoo	72%
Accidental Needle Stick	60%
Contact of Person with Hepatitis B	74%
Other Surgery	65%
Oral Surgery or Dental Work	72%
Employed in Medical Field	70%
Employed as Public Safety Officer	72%
Incarceration Longer than 6 Months	70%
Any Part of Body Pierced (other than ear)	72%

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 72% 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 and but a sharp decrease from case follow-up rates reported in 2019 (95%). This is due to constraints on follow-up capacity resulting from demands of COVID-19 case follow-up.

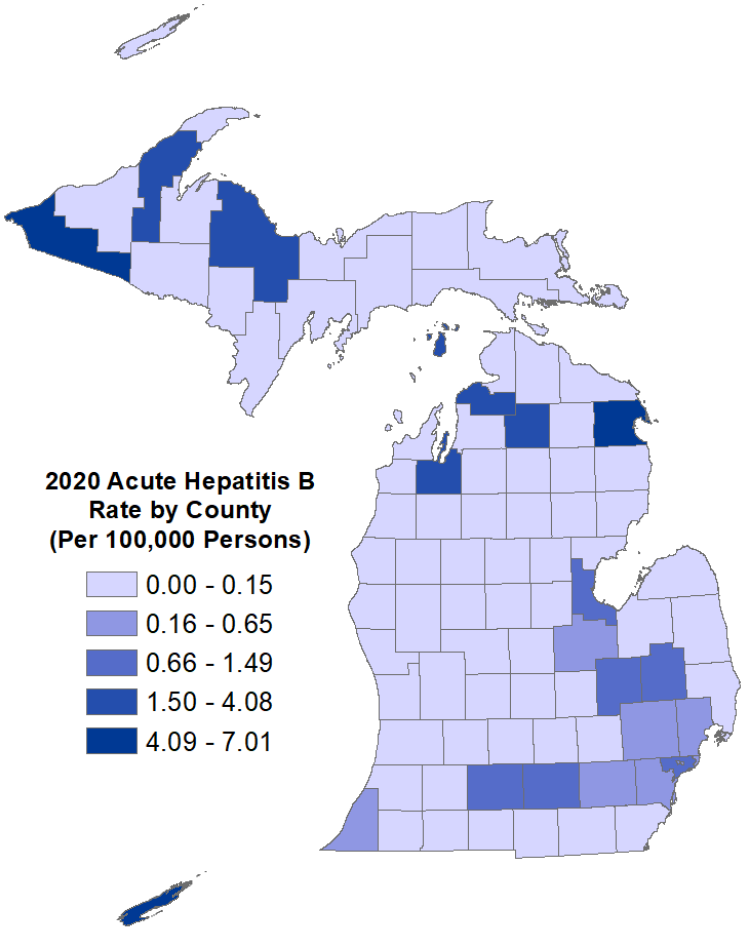
Table 2.4b Response of Completed Acute Hepatitis B Reports* by Risk Behavior in Michigan, 2020

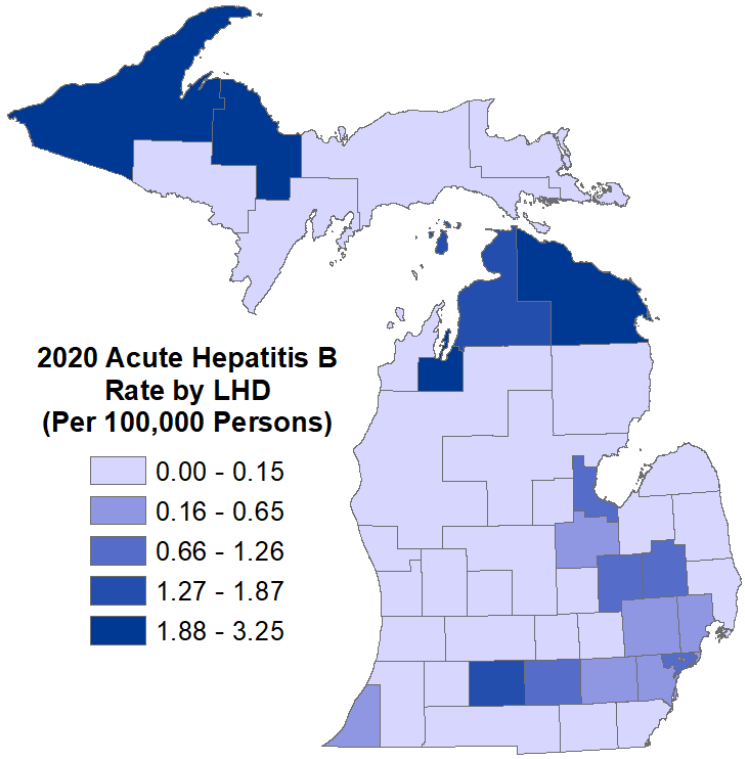
Risk Behavior	Yes*	No*	Unknown*	Yes Responses U.S. Wide 2019
Injection Drug User	21%	70%	9%	35.45%
Used Street Drugs	20%	70%	10%	
Hemodialysis	0%	94%	6%	2.63%
Received Blood Products	0%	85%	15%	0.31%
Received a Tattoo	23%	55%	23%	
Accidental Needle Stick	4%	65%	31%	6.11%
Contact of Person with Hepatitis B	6%	56%	38%	6.06%
Other Surgery	18%	71%	11%	9.53%
Oral Surgery or Dental Work	16%	65%	19%	
Employed in Medical Field	7%	80%	13%	0.13%
Employed as Public Safety Officer	0%	84%	16%	
Incarceration Longer than 6 Months	10%	73%	17%	
Any Part of Body Pierced (other than ear)	19%	61%	19%	

* 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. Receipt of a tattoo was the most common potential exposure, with 'Yes' being selected in 23% of cases with completed risk behavior questions. "Employed as Public Safety Officer" is the least likely risk exposure in 2019 with zero acute hepatitis B cases reporting this risk. In comparison to the nationwide proportion reported by the CDC, acute hepatitis B cases in Michigan are reporting history of injection drug use 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, 2012-2020

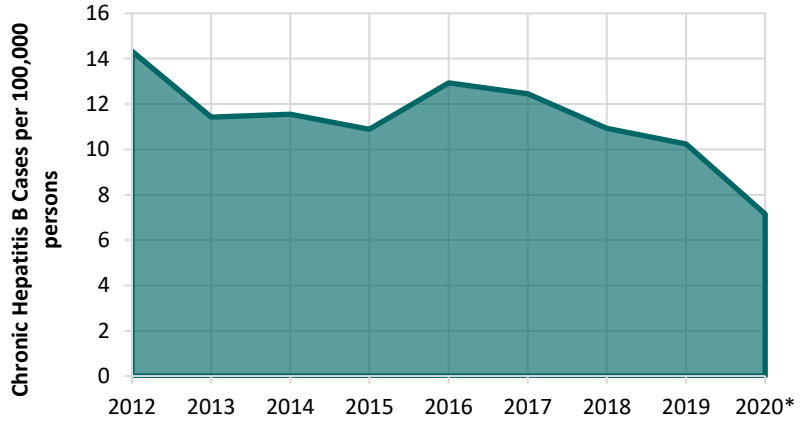


Table 3.1 Chronic Hepatitis B Cases per 100,000 Persons, Michigan, 2016-2020

Year	Michigan Cases	Michigan (Rate per 100,000)
2016	1283	12.93
2017	1237	12.46
2018	1089	10.93
2019	1024	10.24
2020	713	7.15

Following an increase in cases in 2016, cases have decreased through 2020. 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, 2012-2020

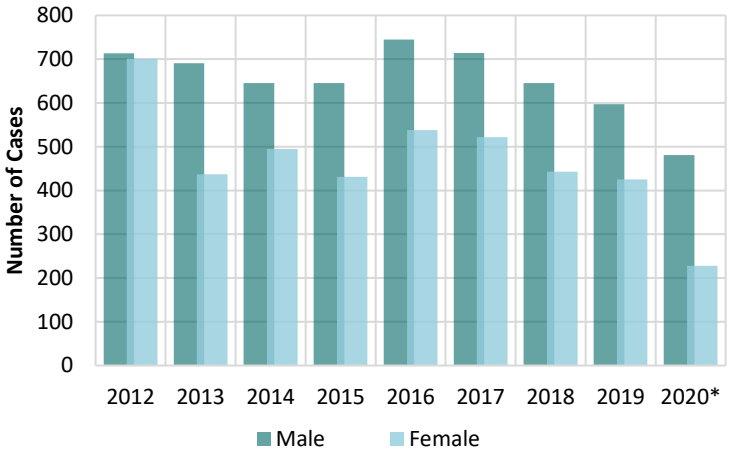


Table 3.2 Chronic Hepatitis B Cases per 100,000 Population by Sex in Michigan, 2016-2020

Year	Male	Male Incidence	Female	Female Incidence
2016	745	15.28	538	10.66
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

The rate of chronic HBV in males in Michigan has remained higher than the rate in females between the years of 2012 and 2020. The rate for males and females is at its lowest point in recent years. That decrease is largely due to greater emphasis on the removal of duplicate chronic HBV cases in MDSS, particularly among women of childbearing age. The considerable decrease in case counts 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

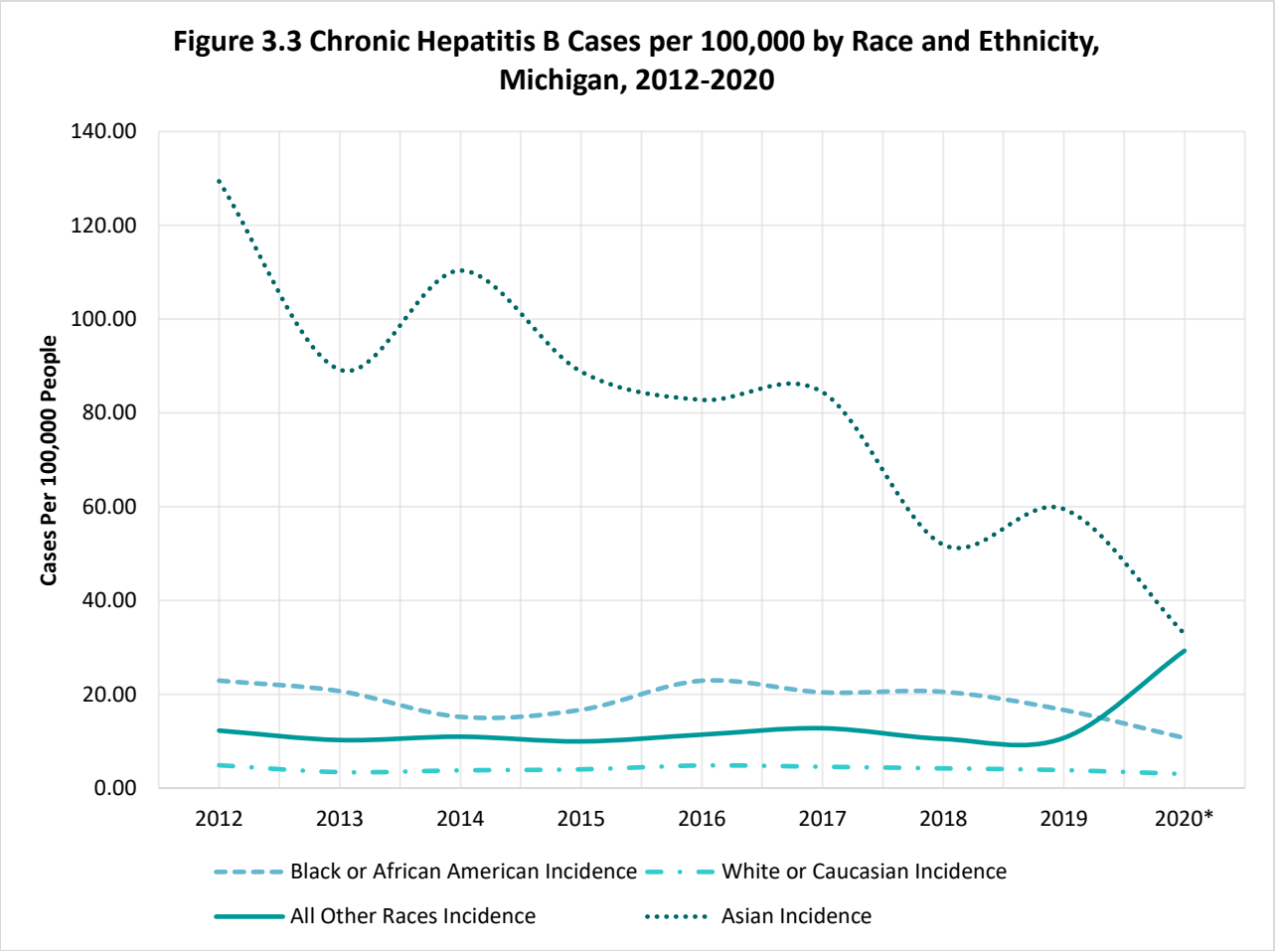


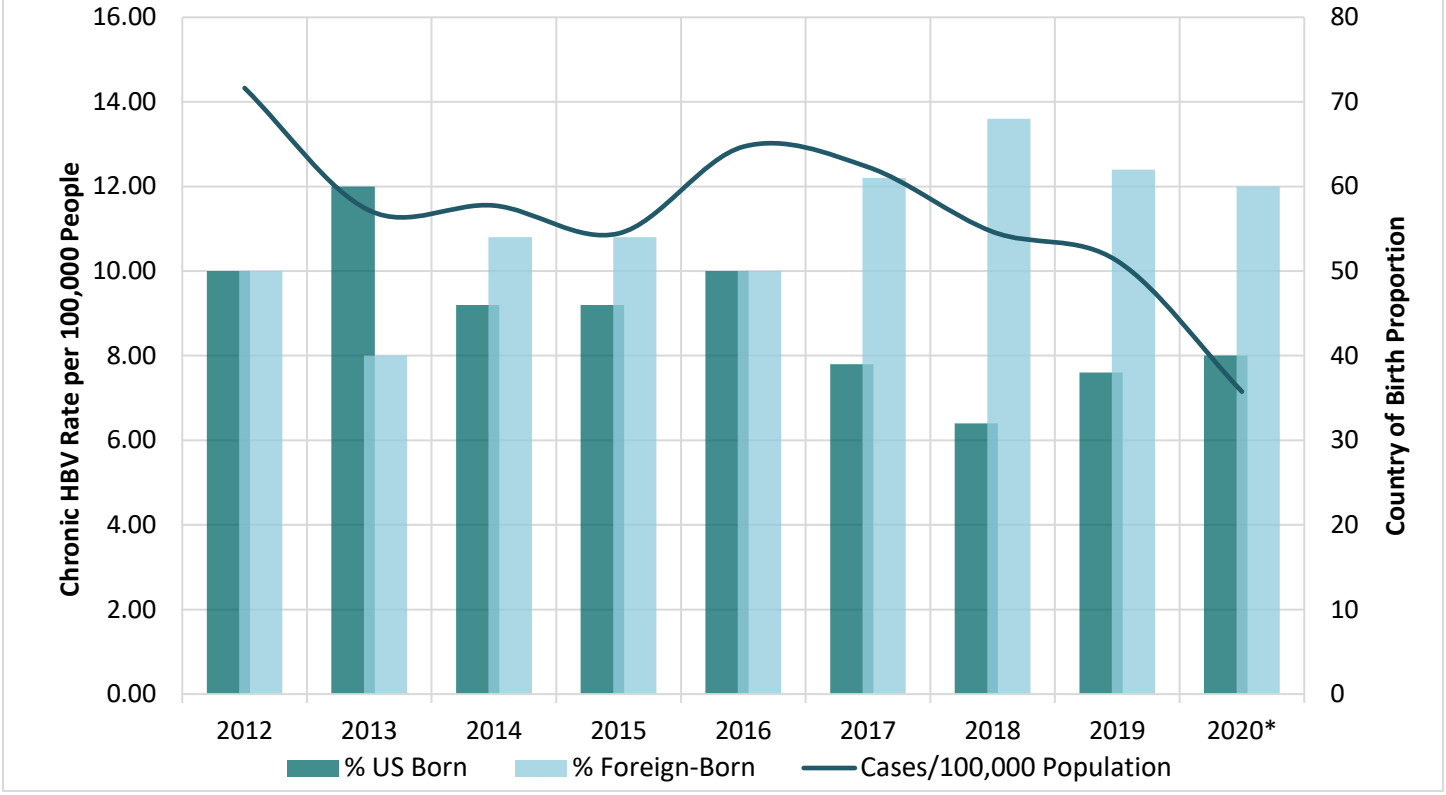
Table 3.3 Chronic Hepatitis B Cases per 100,000 by Race and Ethnicity, Michigan, 2016-2020

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
2016	312	22.89	2	4.34	242	82.79	361	4.82	24	4.94	63	25.33
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	20.64

In 2020, Asians had the highest rate (32.86 per 100,000) of chronic hepatitis B infection in Michigan, followed by those that classify as other race (20.64 per 100,000). The Asian infection rate of 32.68 is 10.9 times higher than the white/Caucasian rate (3.00 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

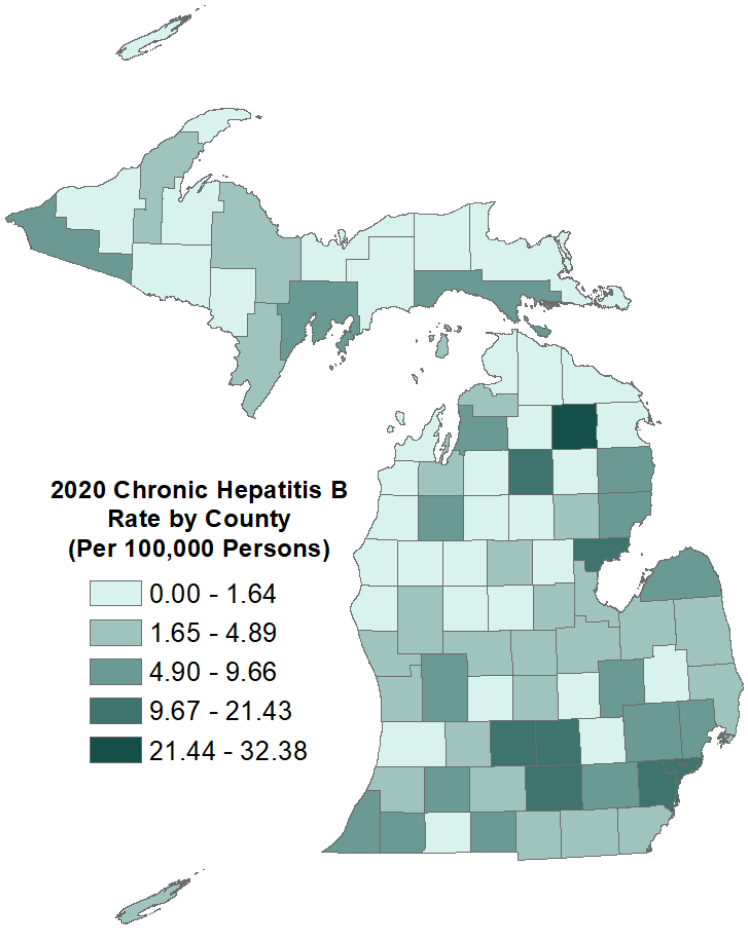
Figure 3.4 Chronic Hepatitis B Cases per 100,000 Population and Country of Birth in Michigan, 2012-2020

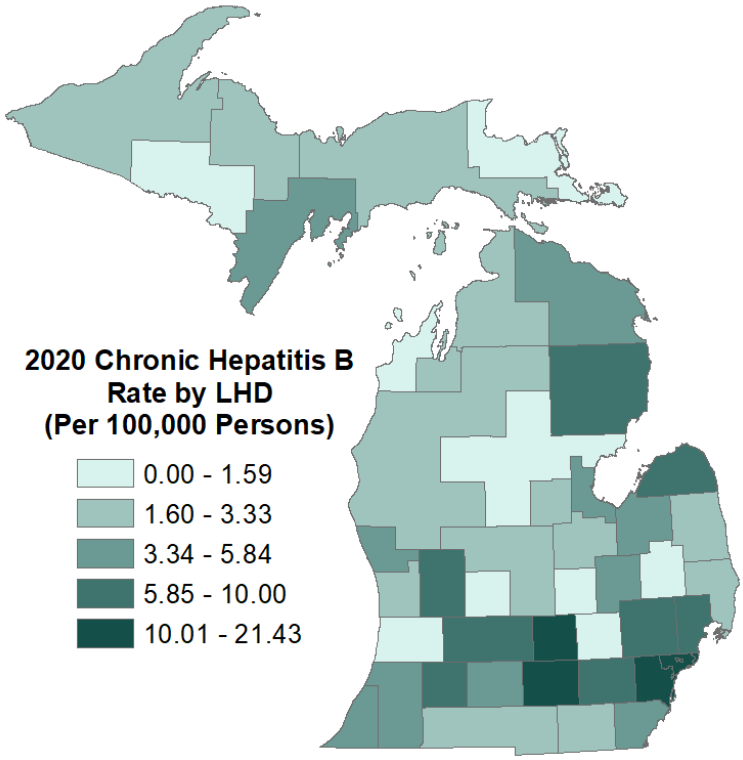


Hepatitis B is a vaccine preventable disease. While decreases in HBV have been observed in the U.S., countries outside the U.S. are still greatly impacted by HBV infection. To better understand the Michigan HBV population, we have categorized the proportion of incident cases that were born in the U.S. 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., 2012-2020

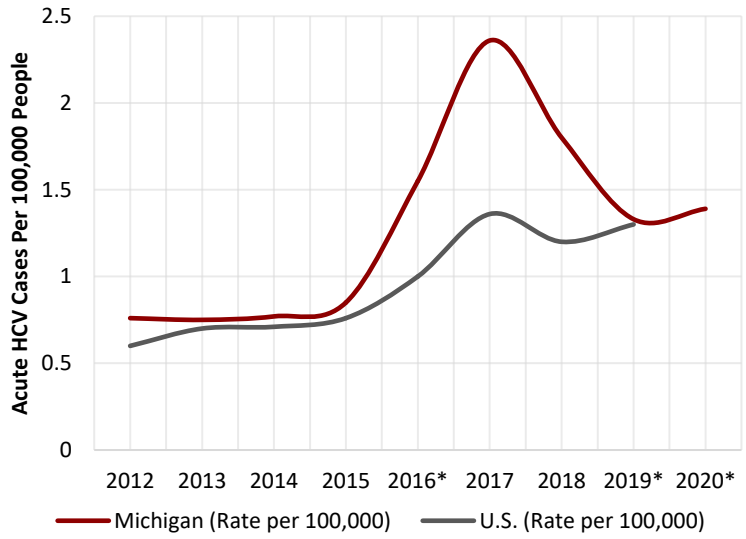


Table 4.1 Incidence of Acute Hepatitis C, Michigan and U.S., 2016-2020

Year	Michigan Cases	Michigan (Rate per 100,000)	U.S. (Rate per 100,000)
2016	154	1.55	1.00
2017	234	2.36	1.36
2018	179	1.80	1.20
2019	133	1.33	1.30
2020	139	1.39	N/A

The number of acute hepatitis C cases in Michigan remained relatively stable from 2012 to 2014 but increased slightly in 2015 before nearly doubling in 2016, increasing rapidly in 2017, and decreasing in 2018 and 2019 before a slight increase in 2020. 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 2020 located on page 30.

Figure 4.2 Incidence of Acute Hepatitis C by Sex, Michigan, 2012-2020

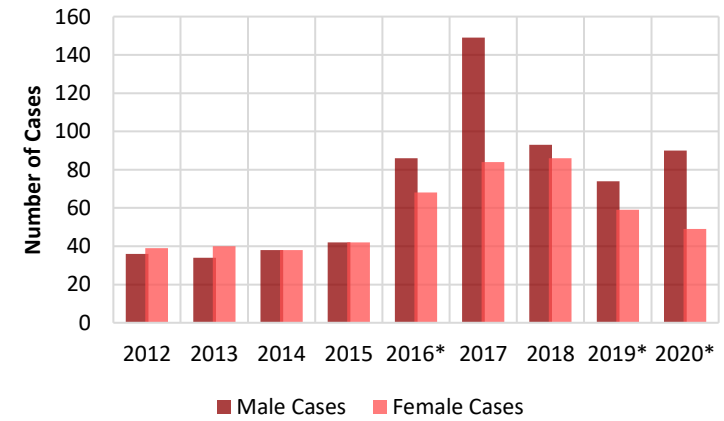


Table 4.2 Incidence of Acute Hepatitis C by Sex in Michigan, 2016-2020

Year	Male Cases	Male Incidence	Female Cases	Female Incidence
2016	86	1.76	68	1.35
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

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 as males registered nearly twice as many acute hepatitis C cases when compared to females. 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, 2012-2020

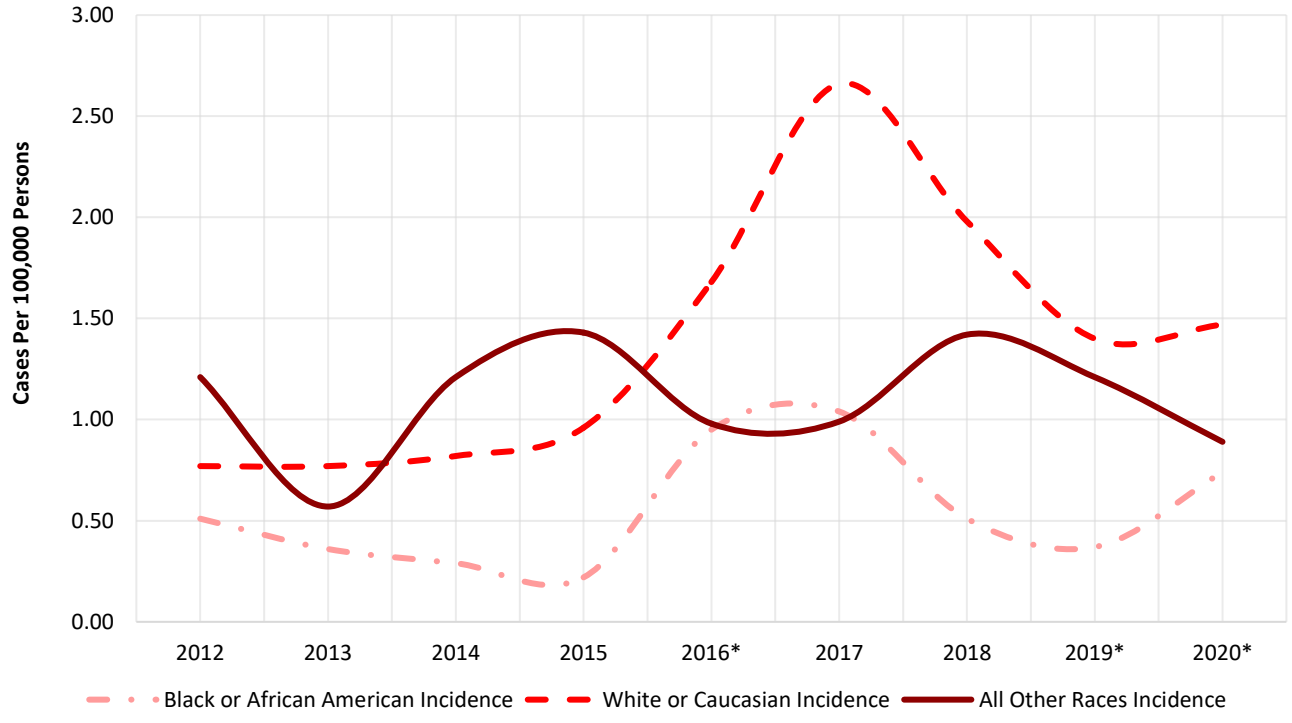


Table 4.3 Incidence of Acute Hepatitis C by Race and Ethnicity, Michigan, 2016-2020

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
2016	13	0.95	1	2.17	1	0.34	126	1.68	1	0.21	3	1.21
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

Nearly 80% of all the acute hepatitis C cases in 2020 were among white/Caucasians. White/Caucasians saw an increase from 0.96 cases per 100,000 in 2015 and peaked at 2.66 cases per 100,000 in 2017 before decreasing to 1.47 cases per 100,000 in 2020. Despite that decrease, the white/Caucasian had the second highest rate of any demographic, trailing only the other population group (1.88 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.

*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, 2020 (n= 139)

Risk Behavior	Completed
Injection Drug User	65%
Used Street Drugs	59%
Hemodialysis	59%
Received Blood Products	58%
Received a Tattoo	58%
Accidental Needle Stick	54%
Contact of Person with Hepatitis C	59%
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	60%
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 2020. 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 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.

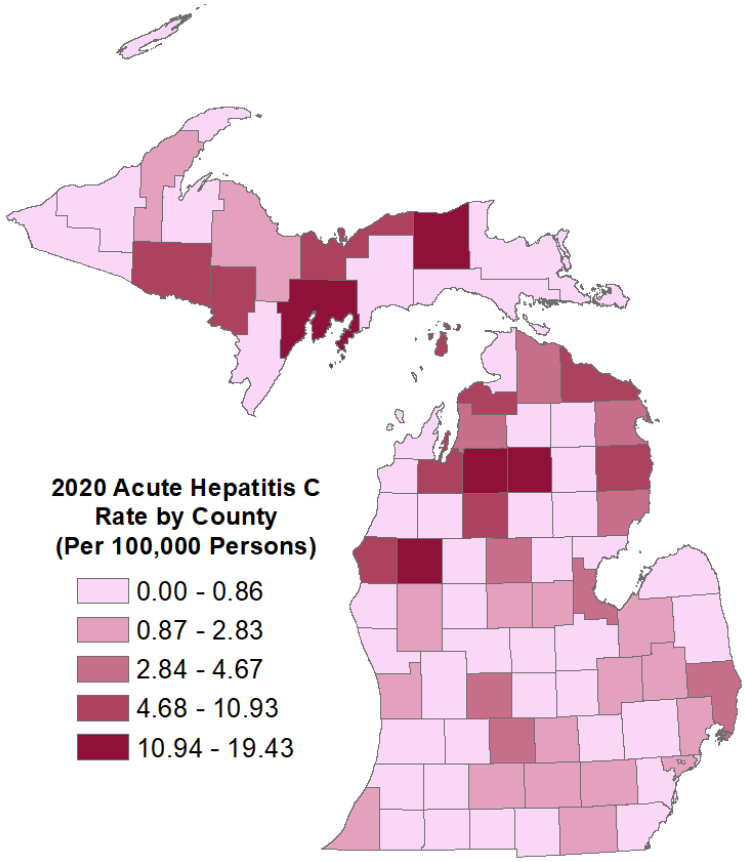
Table 4.4b Response of Completed Acute Hepatitis C Reports* by Risk Behavior, Michigan, 2020

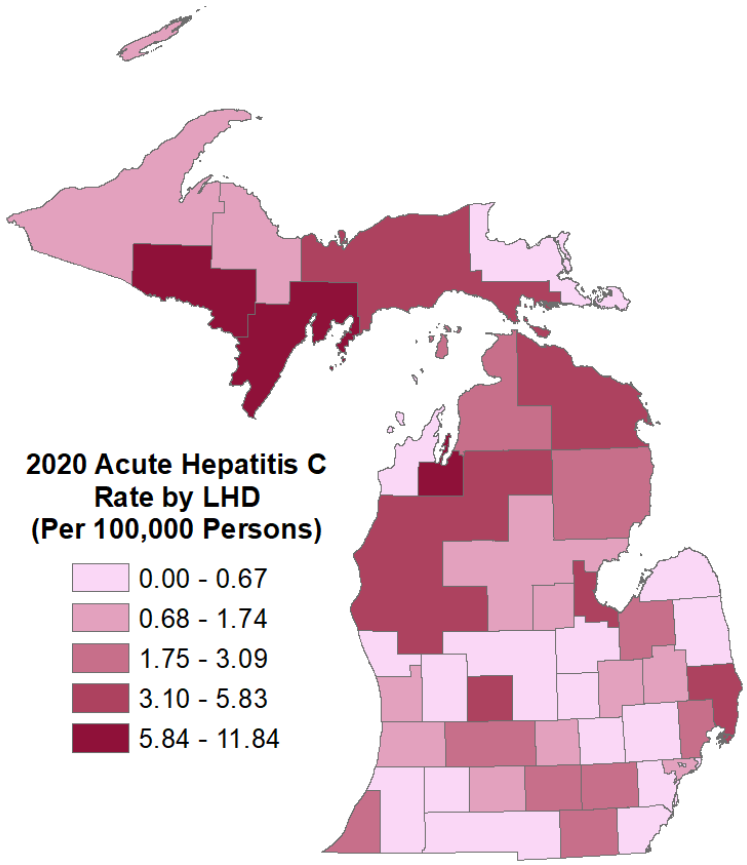
Risk Behavior	Yes*	No*	Unknown*	Yes Responses U.S. Wide 2019
Injection Drug User	63%	19%	19%	66.70%
Used Street Drugs	44%	23%	33%	
Hemodialysis	1%	71%	28%	4.66%
Received Blood Products	2%	64%	33%	0.27%
Received a Tattoo	30%	29%	41%	
Accidental Needle Stick	11%	51%	39%	9.31%
Contact of Person with Hepatitis C	28%	21%	51%	7.56%
Other Surgery	13%	51%	36%	16.78%
Oral Surgery or Dental Work	10%	44%	46%	
Employed in Medical Field	1%	64%	35%	0.54%
Employed as Public Safety Officer	1%	62%	37%	-
Incarceration Longer than 6 Months	42%	20%	38%	-
Any Part of Body Pierced (other than ear)	14%	36%	51%	-

* 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 2012-2020

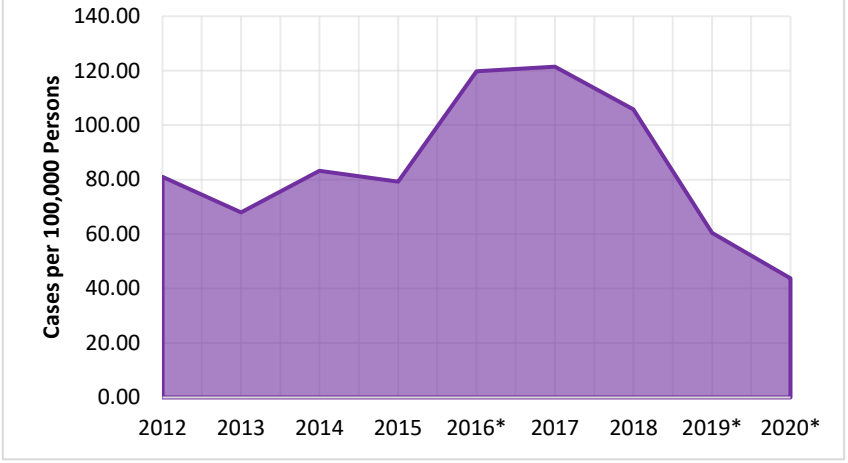


Table 5.1 Chronic Hepatitis C Cases per 100,000 Population in Michigan, 2016-2020

Year	Michigan Cases	Rate per 100,000
2016	11,883	119.76
2017	12,062	121.49
2018	10,545	105.85
2019	6,038	60.40
2020	4,356	43.71

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. 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, 2012-2020

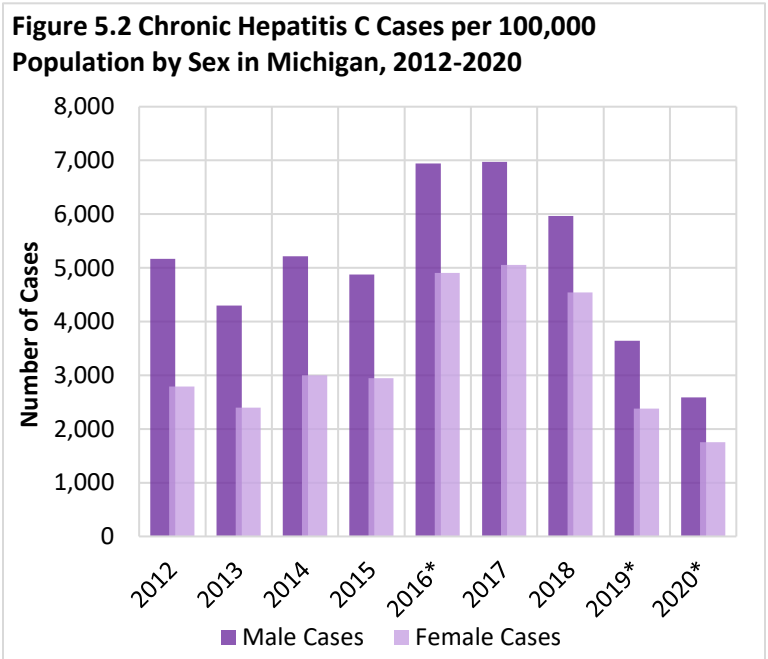


Table 5.2 Chronic Hepatitis C Cases per 100,000 Population by Sex in Michigan 2016-2020

Year	Male Cases	Male Incidence	Female Cases	Female Incidence
2016	6,946	142.42	4,906	97.23
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

Males account for most chronic hepatitis C cases reported each year since 2012. In 2020, 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, 2012-2020

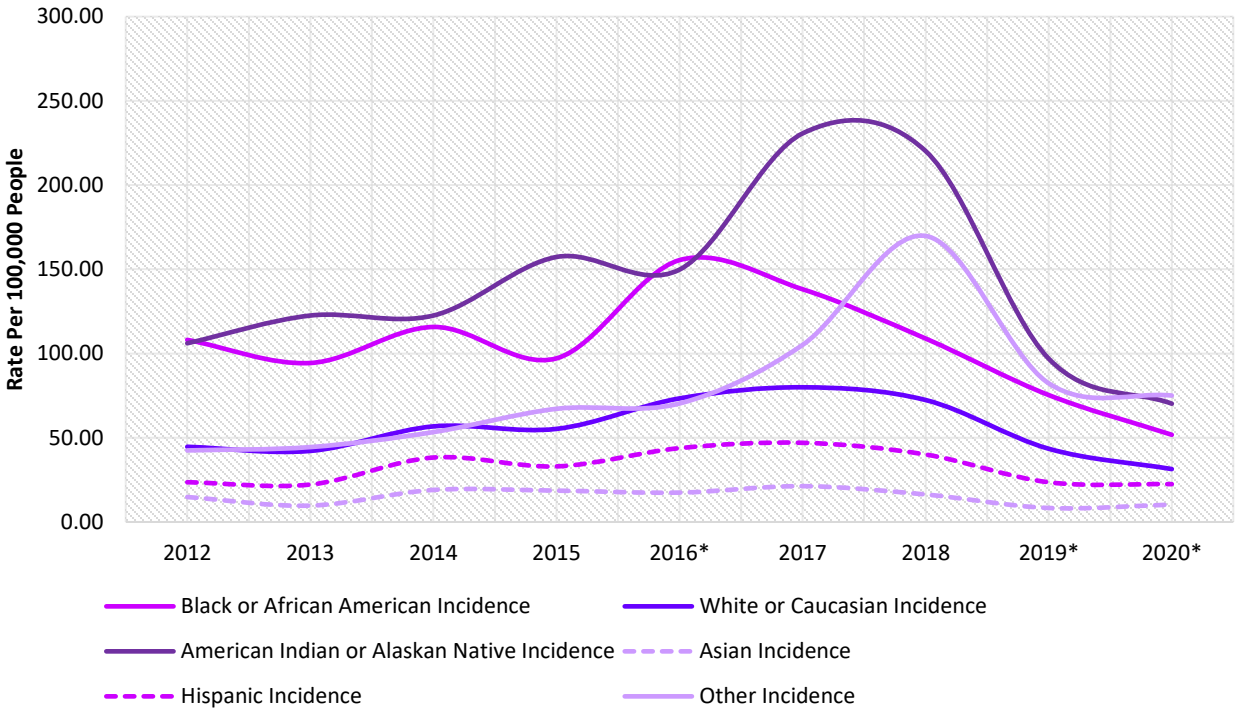


Table 5.3 Chronic Hepatitis C Cases per 100,000 by Race and Ethnicity in Michigan, 2016-2020

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
2016	2,119	155.46	69	149.82	51	17.45	5,492	73.36	213	43.83	175	70.35
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

In 2020, persons in the "Other" race category had the highest rate of chronic hepatitis C infection (96.95 per 100,000), followed by American Indians/Alaskan Natives (70.22 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, 2020 (n = 4,356)

Risk Behavior	Completed
Received Blood Transfusion Prior to 1992	37%
Received an Organ Transplant Prior to 1992	36%
Received Clotting Factor Concentrates Prior to 1992	36%
Hemodialysis	35%
Injection Drug User	39%
Incarcerated in Lifetime	37%
Treated for a Sexually Transmitted Disease in Lifetime	34%
Contact of Person with Hepatitis C	35%
Employed in Medical Field	35%

Table 5.4a shows the percentage of chronic hepatitis C risk behavior questions completed by local health department staff in 2020. 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 37% of case reports. This proportion has decreased when compared with recent 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.

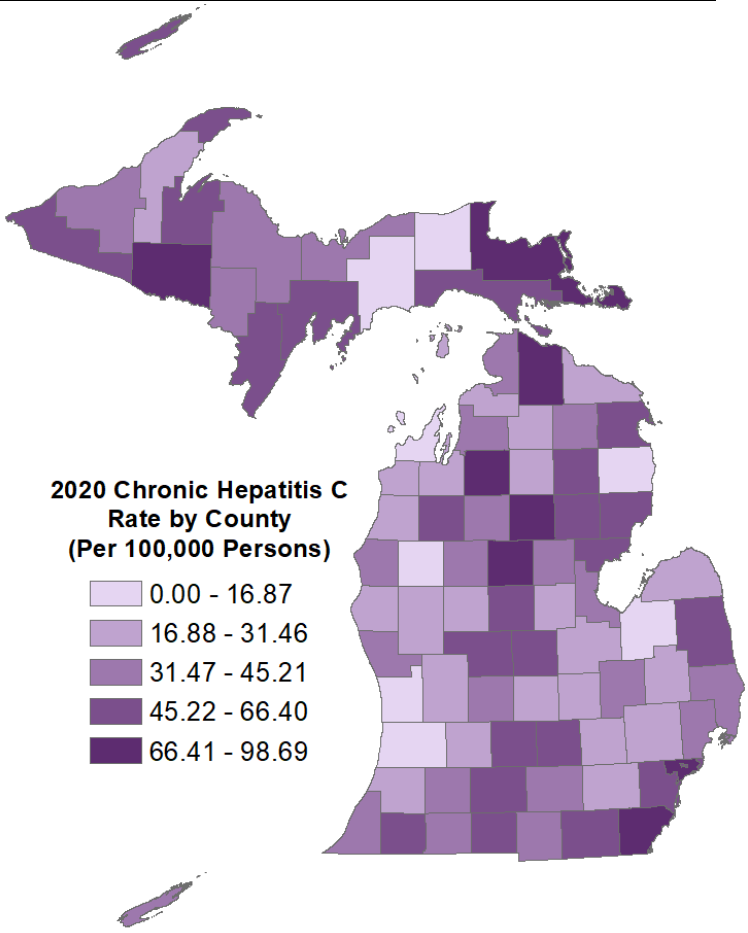
Table 5.4b Response of Completed Chronic Hepatitis C Reports* by Risk Behavior, Michigan, 2020

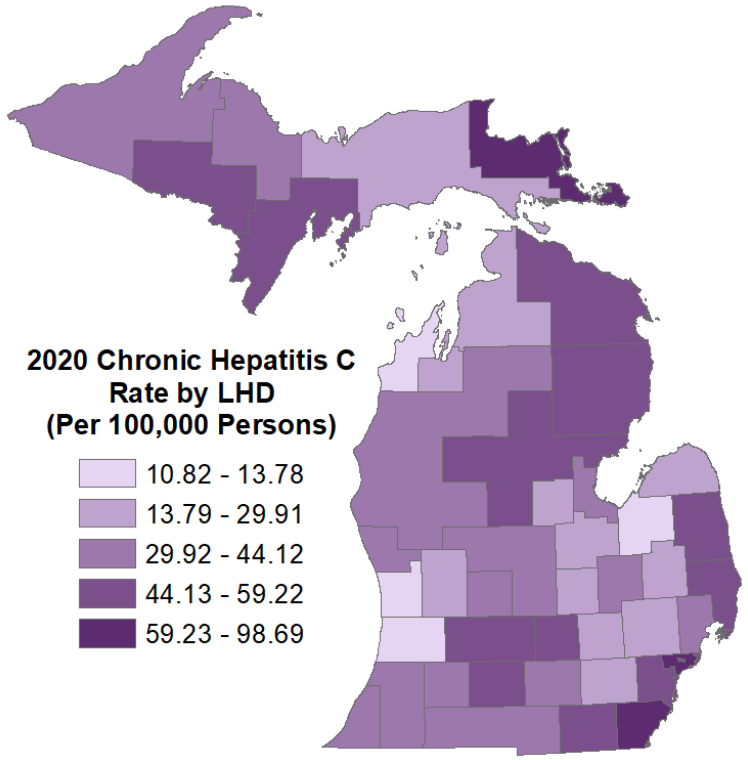
Risk Behavior	Yes*	No*
Received Blood Transfusion Prior to 1992	8%	92%
Received an Organ Transplant Prior to 1992	0%	100%
Received Clotting Factor Concentrates Prior to 1992	1%	99%
Hemodialysis	1%	99%
Injection Drug User	65%	35%
Incarcerated in Lifetime	60%	40%
Treated for a Sexually Transmitted Disease in Lifetime	28%	72%
Contact of Person with Hepatitis C	51%	49%
Employed in Medical Field	10%	90%

* 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

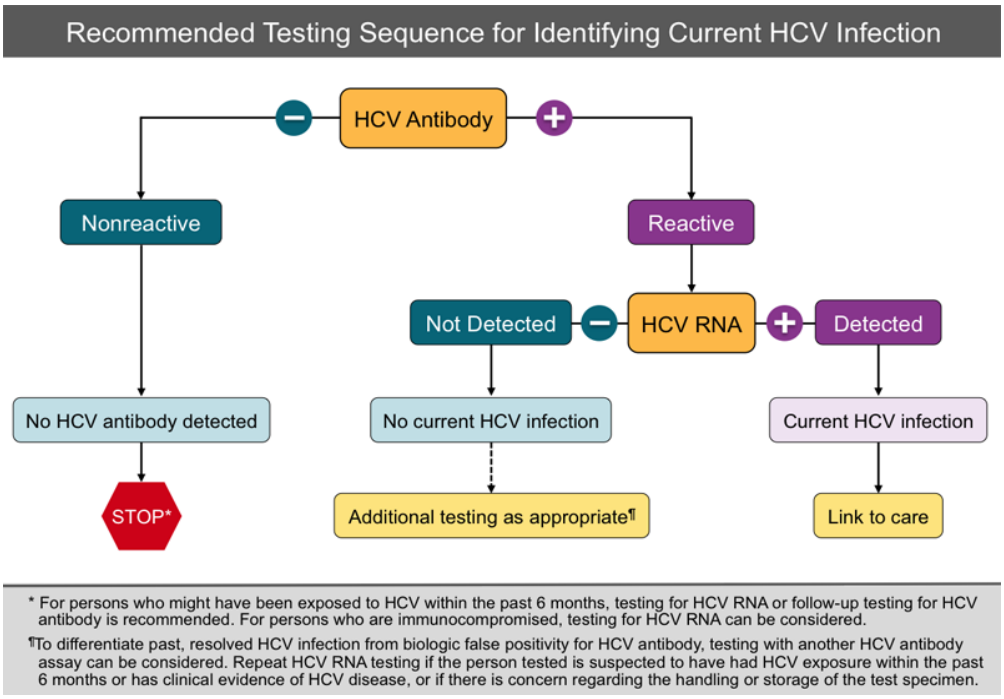
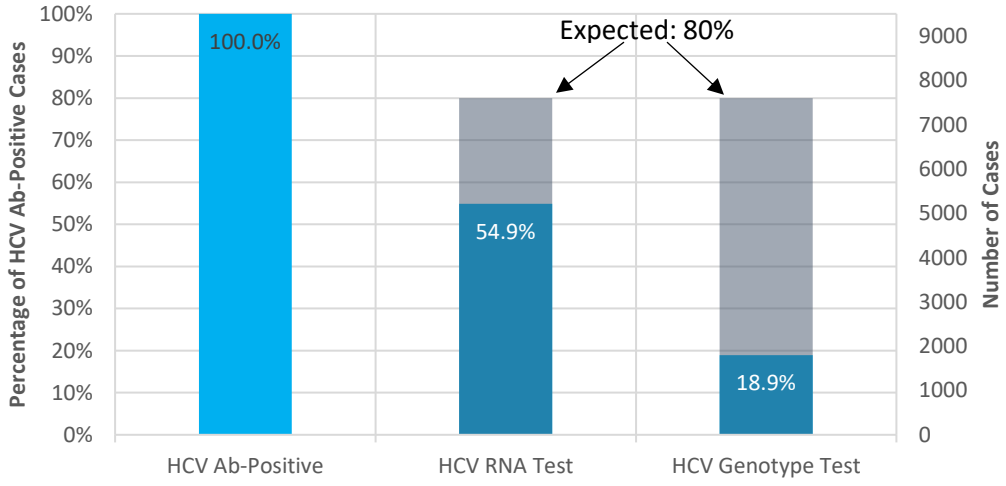


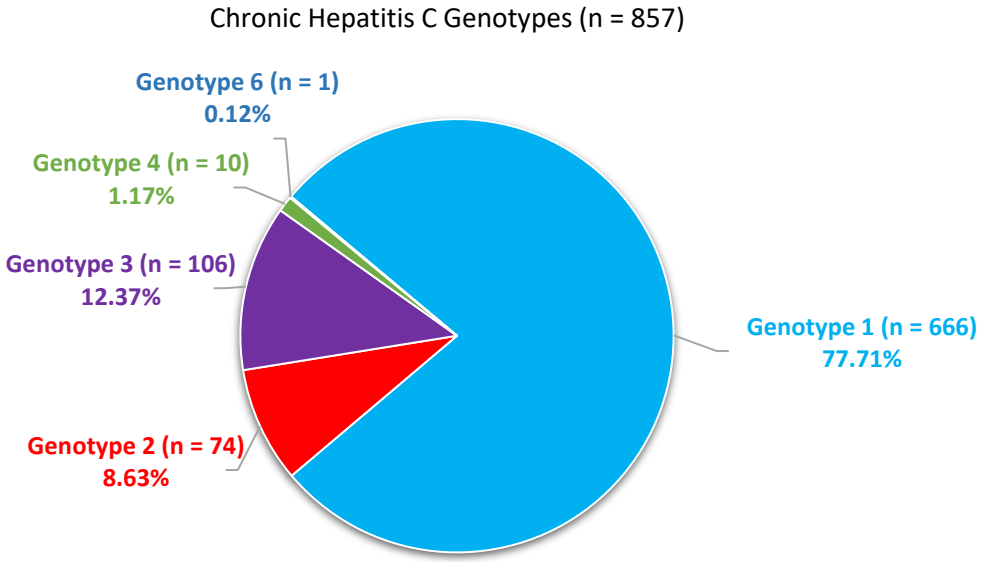
Figure 6.2 Number and Percentage of HCV Antibody-Positive Cases with an HCV RNA or HCV Genotype Test, 2020



Of the 4,505 cases of acute, chronic, and perinatal hepatitis C reported in Michigan in 2020, 4,153 (92.2%) cases were reported with a positive HCV antibody result. Of those cases, 54.9% were reported with positive HCV RNA test and even fewer (18.9%) 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 MDSS with a positive HCV antibody, there was evidence of only 19% 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, 2020



A total of 857 chronic HCV patients had a genotype result reported to MDHHS in 2020. Of these, 77.71% 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 2020.

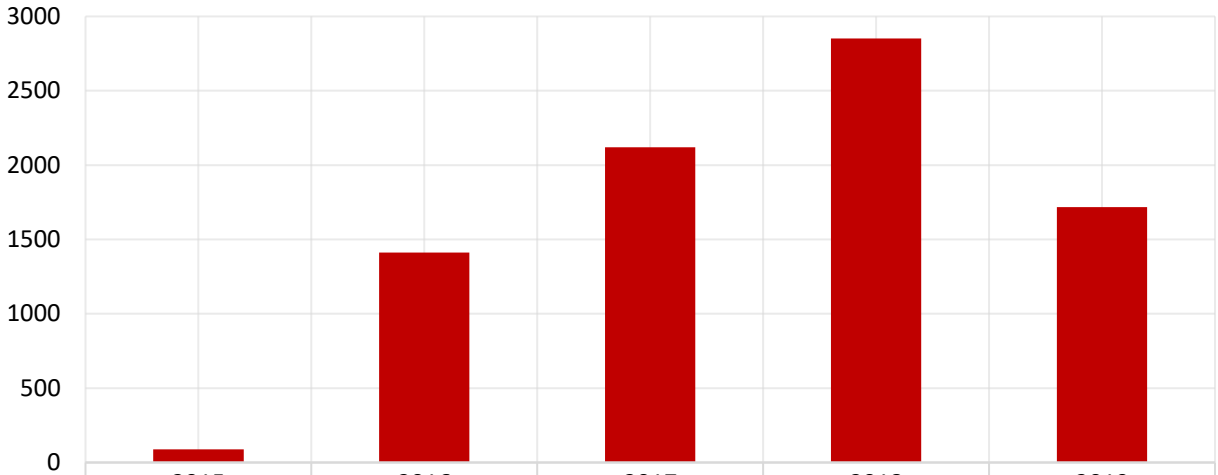
This pattern of genotypes is consistent with the expected annual proportions in Michigan. The data is also consistent with the national distribution, as the predominant genotypes nationwide are 1a, 1b, 2a, 2b, and 3a.

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 2019. 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 5,800 unique persons treated for HCV, approximately 12-25% 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, 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, 2015-2019



	2015	2016	2017	2018	2019
TOTAL	89	1412	2120	2851	1718
Victrelis					
Incivek					
Sovaldi	24	111	4	3	1
Harvoni	60	1019	1418	1032	164
Olysio	1	1			
Daklinza	2	84	4		
Viekira Pak	2	13	12		
Epclusa		151	417	726	773
Technivie		2	4		
Zepatier		31	170	63	29
Mavyret			64	972	716
Vosevi			27	54	27
Ledipasvir-Sofosbuvir					3
Sofosbuvir-Velpatasvir					5

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.

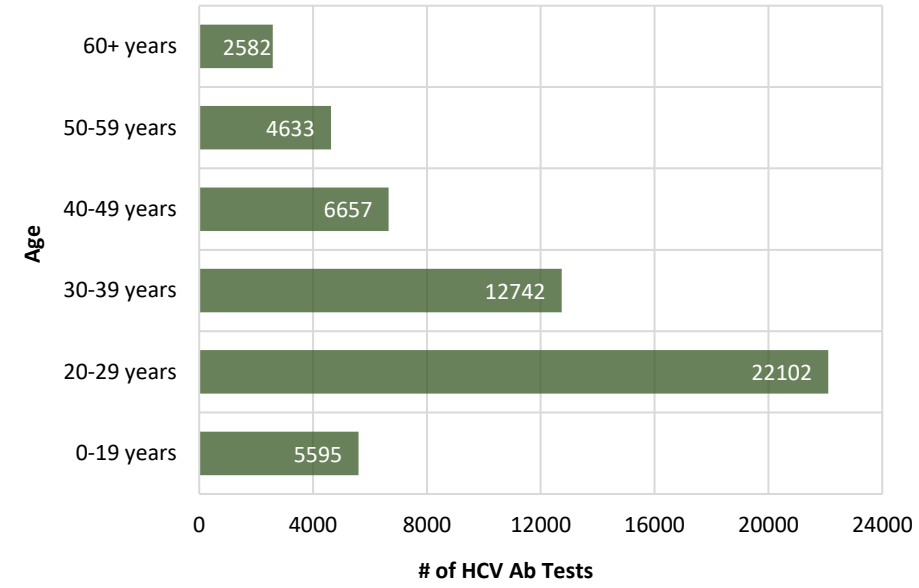
Some samples were deemed "unsatisfactory" because of poor shipping, packaging, or labeling, and therefore not tested.

Table 6.1 BOL HCV Antibody Tests, 2016-2020

Year	# of Samples Tested	# of Unsatisfactory or Not Tested	# Negative	# Positive	% Positive
2016	6,252	33	5,975	277	4.43%
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%

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%. HCV Ab positivity rates have continued to hover around 4-5%.

Figure 6.5 All HCV Antibody Tests by Age, 2012-2020



Of the 54,311 HCV Ab tests ran from 2012-2020, 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 4.8% of all individuals tested for HCV Ab.

Table 6.2 BOL HCV PCR Testing, 2016-2020

Year	# of Samples Tested	# of Unsatisfactory or Not Tested	# Negative	# Positive	% Positive
2016	378	15	222	154	40.96%
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%

Figure 6.6 BOL HCV PCR Testing by Year, 2014-2020

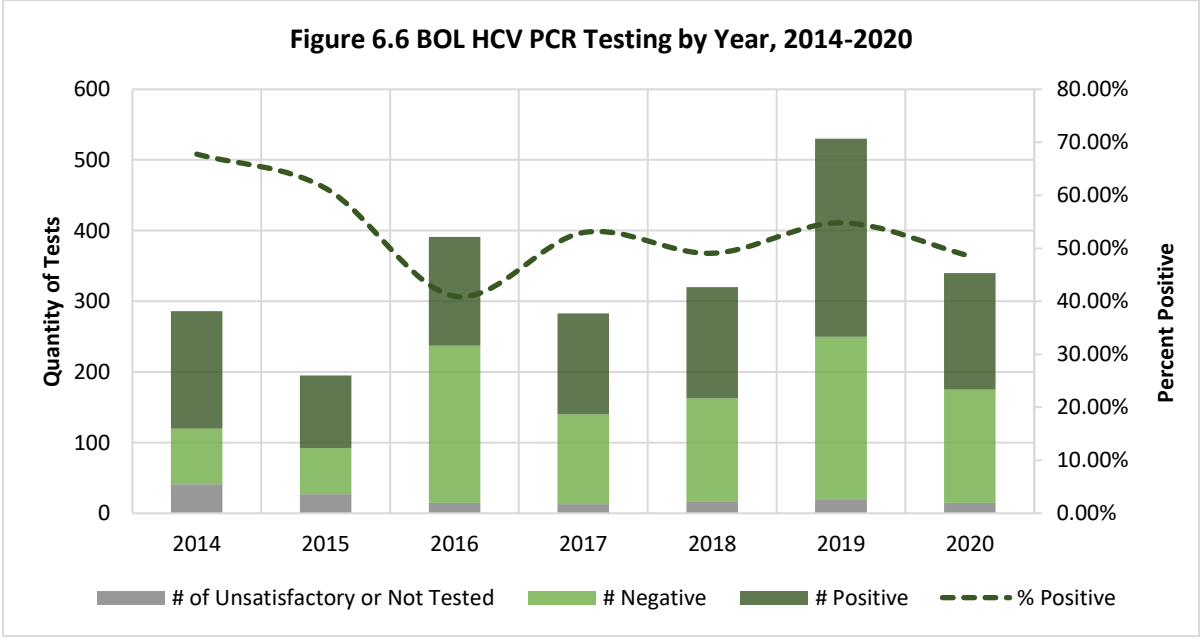
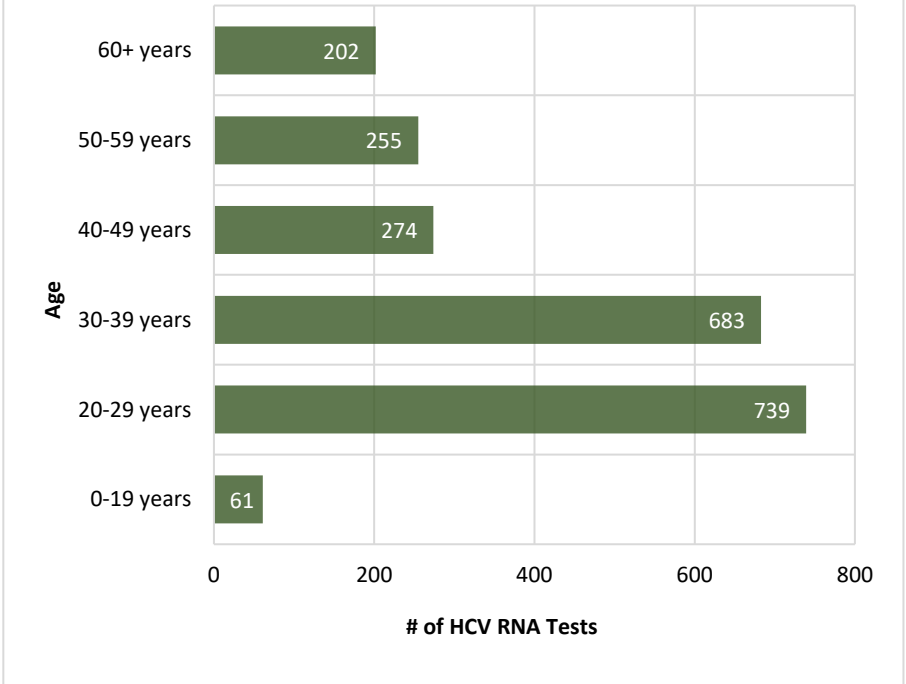


Figure 6.7 All HCV RNA Tests Stratified by Age, 2014-2020



The number of PCR tests conducted by the BOL has fluctuated from 2014 through 2020, with totals peaking in 2019 at 511 tests analyzed before decreasing to 311 tests in 2020. 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 54.8% in 2019 to 48.5% in 2020.

Of the 2,214 HCV RNA tests ran by BOL from 2014-2020, 33.4% of individuals were 20-29 years old. The smallest proportion of tests were found amongst those 0-19 years old (2.8%) and those 60 years of age and older (9.1%).

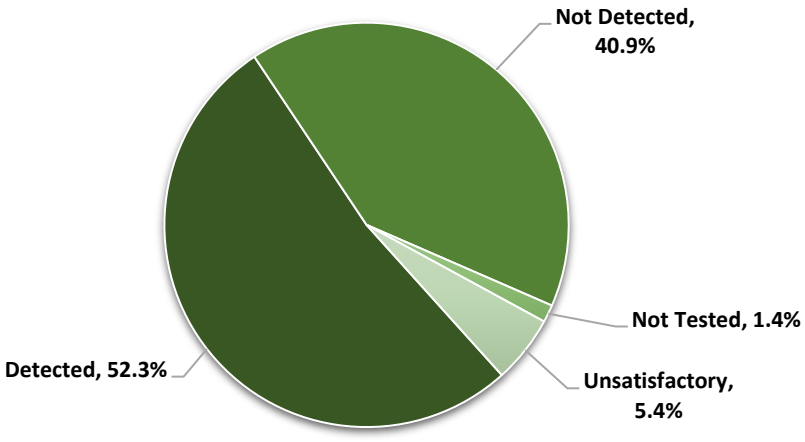
Table 6.3 BOL Patient Demographics for Patients Testing HCV Antibody/RNA Positive 2014-2020

Variable	n	%
N	1,788	
Sex		
Male	1,079	60.3%
Female	682	38.1%
Unknown	27	1.5%
Race		
American Indian or Alaskan Native	12	0.7%
Asian	4	0.2%
Black or African American	256	14.3%
Native Hawaiian or Pacific Islander	2	0.1%
White or Caucasian	1,324	74.0%
Multiracial	6	0.3%
Other	28	1.6%
Unknown	158	8.8%
Age		
0-19	47	2.6%
20-29	628	35.1%
30-39	522	29.2%
40-49	212	11.9%
50-59	211	11.8%
60+	143	8.0%

There were 1,788 patients who tested positive for both HCV antibody and RNA at BOL between 2014-2020. Just over half (60.3%) of individuals who tested positive were male. The majority (74.0%) of those who were positive were white/Caucasian, which was much higher than Black/African Americans who only made up 14.3% of positive test results. In addition, 35.1% of individuals who tested positive were 20-29 years old. This is much higher than the baby boomer population, which only accounted for about 11.4% 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 2014-2020



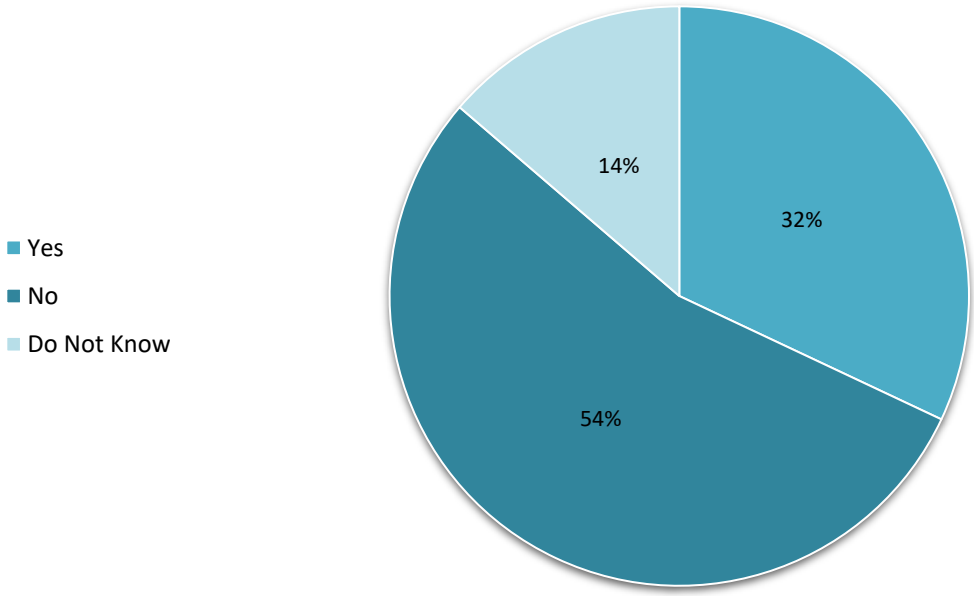
Of the 2,206 positive HCV screen tests, just over half (52.3%) had a positive PCR test result. 40.9% of positive HCV screen tests were negative by PCR. These numbers reflect all BOL HCV RNA results that were preceded by a reactive HCV antibody test through BOL.

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 2019 MIBRFS to determine demographic and behavioral factors associated with hepatitis C testing. Data collected from the MiBRFS in 2019 (N=6,023) was stratified based on HCV testing status and analyzed by various socio-demographic and behavioral factors.

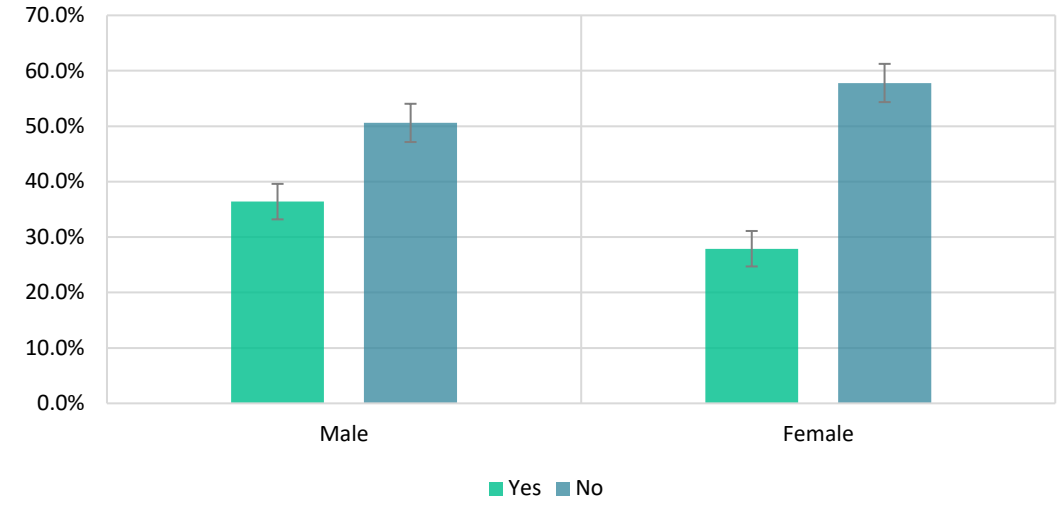
We hope to monitor trends in these data over time to determine if HCV testing is increasing. In addition, the information provided will help us develop targeted strategies to increase HCV testing.

Figure 6.9 MiBRFS "Have You Ever Been Tested for HCV?", 2019 (n=6,023)



A total of 6,023 participants responded to the question "Have you ever been tested for HCV" in the 2019 MiBRFS. Of these participants, 1,865 (32.0%) reported ever being tested for HCV while over half (54.3%, 3,258 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 2% while the non-tested proportion decreased by 4%.

Figure 6.10 MiBRFS "Ever tested for HCV?" by Sex, 2019



36.4% of men reported ever being tested for hepatitis C compared to women at 27.9%. Conversely, 57.8% of women reported never being tested versus 50.6% of men.

Table 6.4 MiBRFS "Ever tested for HCV?" by Race, 2019

Race	Yes	No
Caucasian	30.70% (29.0-32.5)	54.40% (52.5-56.2)
African American	42.00% (36.4-47.8)	48.30% (42.6-54.1)
Other/Multi-racial	45.80% (36.3-55.6)	39.40% (30.2-49.4)
Hispanic	29.10% (21.7-37.7)	64.80% (55.7-72.9)

Hispanics and Caucasians were less likely to have reported being tested for HCV (29.1% and 30.7%, 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, 2019

Age	Yes	No
18-49 years	31.40% (28.9-34.0)	54.70% (51.9-57.4)
50-69 years	37.00% (34.5-39.6)	50.00% (47.4-52.6)
70+ years	22.70% (20.2-25.5)	63.10% (60.0-66.1)

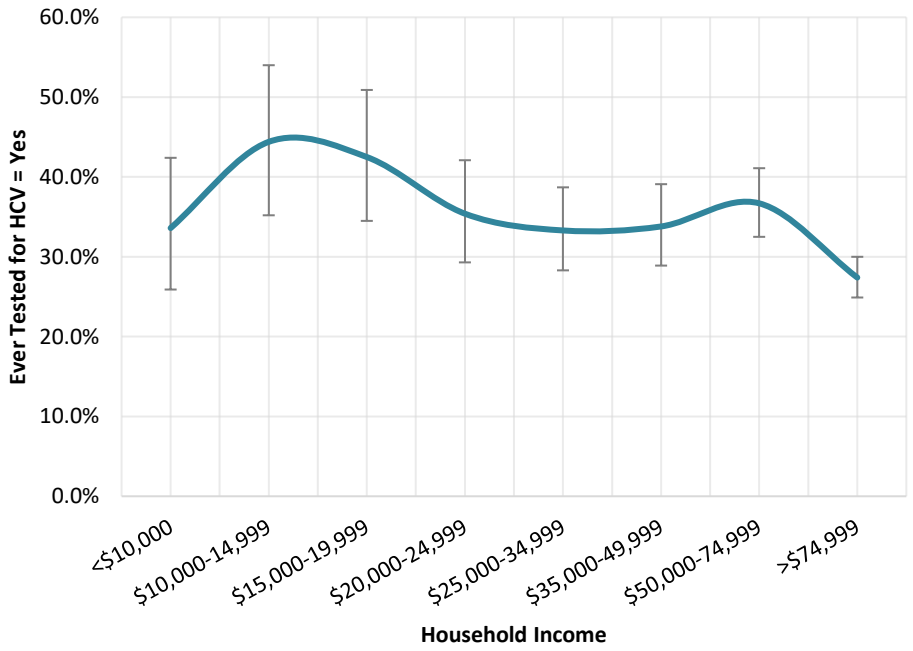
"Baby Boomers," persons approximately 54 to 74 years old at the time of the survey, were more likely to have reported ever being tested for HCV than those less than 50 years old (37.0% compared to 31.4%). Those over 70 years old were the least likely to report ever being tested for HCV (22.7%). This 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)	34.50% (28.4-41.2)
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)	55.90% (49.2-62.4)

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, 2019

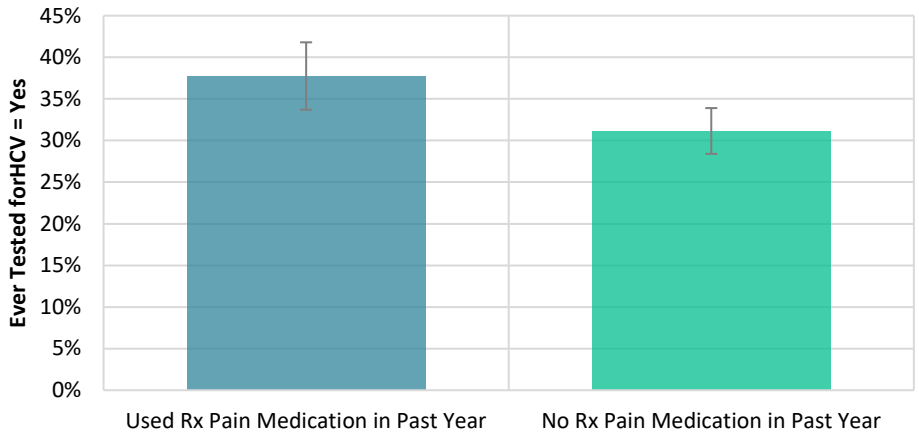


It is thought that those with lower income experience significant barriers to receiving diagnostic testing services.

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, with the exception of household income lower than $10,000. As household income increased, respondents became less likely to have been tested for HCV.

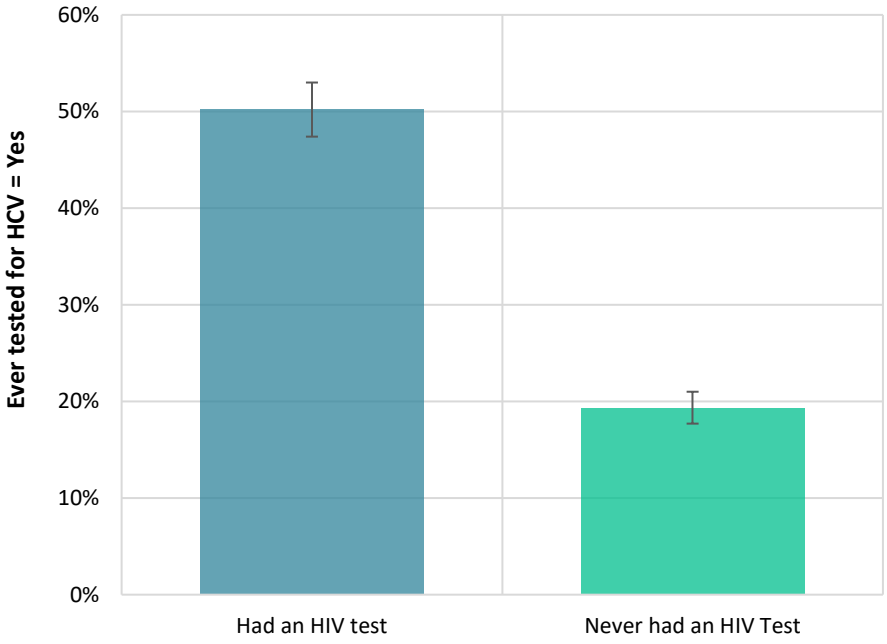
This might suggest that persons with higher income may be less likely to have risk factors for HCV exposure compared to those with lower income and awareness of testing may be heightened at lower income levels. It also indicates that low income may not be a major barrier to HCV testing as perception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

Figure 6.12 MiBRFS Ever tested for HCV? By use of Prescription Pain Medicatons in the Past Year, 2019



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 ever "abusing" Rx or OTC drugs were more likely to have ever been tested for HCV (38% vs. 31%).

Figure 6.13 MiBRFS Ever tested for HCV? By History of being tested for HIV, 2019



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, 50% reported also being tested for HCV while only 19% 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, 2020

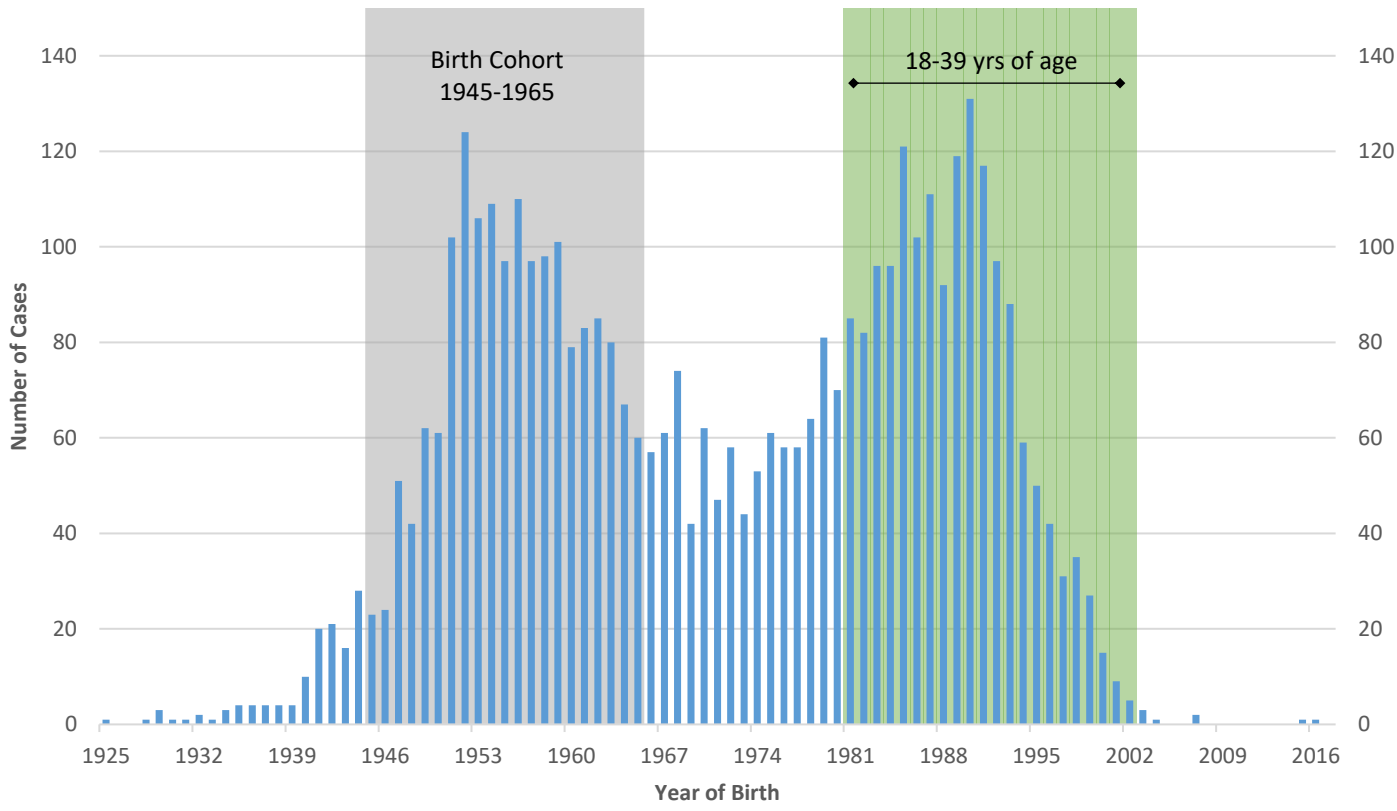


Figure 7.1 depicts the number of chronic hepatitis C cases reported to MDHHS by birth year in 2020. Since 1998 CDC has recommended HCV testing for persons with elevated risk of HCV infection, and then in 2012 those guidelines were expanded to recommend one time HCV testing for all persons born from 1945 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 has easily reported more hepatitis C cases each year in Michigan than any other cohort. As the screening recommendations have expanded and the landscape has shifted, data indicates a newer focus population.

In recent years a second “peak” of new chronic HCV diagnoses has 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. This will likely cause the 18-39 year old group to eclipse the new case count of the 1945-1965 birth cohort in the near future. 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, 2005-2020

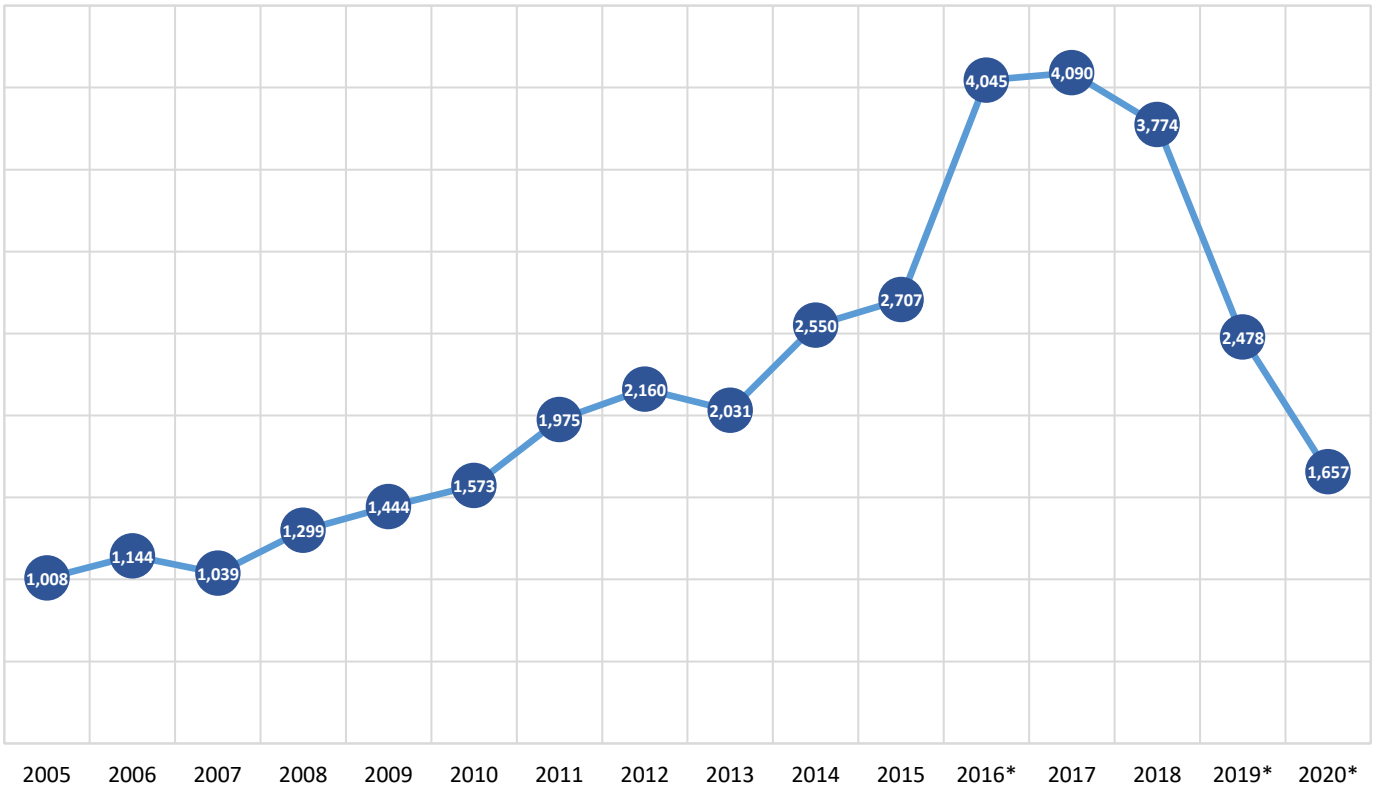


Table 7.1 Number and Percentage of Chronic Hepatitis C cases reported to MDHHS aged 18-39, 2011-2020

	2011	2012	2013	2014	2015	2016*	2017	2018	2019	2020
Total Cases	8,006	7,967	6,703	8,233	7,833	11,883	12,062	10,545	6,036	4,356
Number of Cases 18-39 Years Old	1,975	2,160	2,031	2,550	2,707	4,045	4,090	3,774	2,478	1,657
Percentage of Total Cases	25%	27%	30%	31%	35%	34%	34%	36%	41%	38%

From 2000 through 2017, the number of new HCV diagnoses among persons 18 to 39 years of age have increased year over year, except for 2013, before decreasing from 2018-2020 (Figure 7.2). Even so, the number of cases has increased over 450% between 2000 and 2020. 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. 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.

*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 2020 Chronic HCV Cases Aged 18-39 Years Old

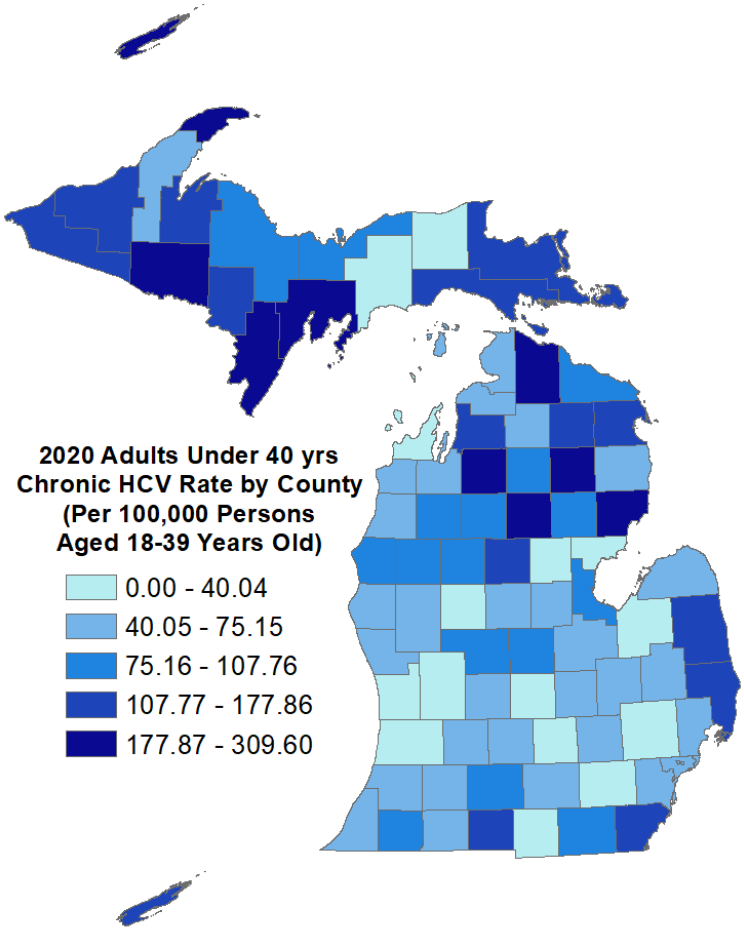
Age (n = 1,657)		
Median	31	
Mean	30.92	
Range	18 - 39	
Sex (n = 1,656)		Rate per 100,000
Female	754 (45.5%)	53.63
Male	901 (54.5%)	62.12
Race (n = 1,535)		Rate per 100,000
White	1108 (72.2%)	50.23
Black	112 (7.3%)	23.35
American Indian or Alaskan Native	19 (1.2%)	63.68
Asian	5 (0.3%)	3.55
Other Race	104 (6.8%)	Not Available
Hispanic Ethnicity (n = 1,114)		Rate per 100,000
Hispanic or Latinx	54 (4.8%)	28.92
Not Hispanic or Latinx	1060 (95.2%)	39.70
Arab Ethnicity (n = 558)		Rate per 100,000
Arab Ethnicity	8 (1.4%)	Not Available
Non-Arab	550 (98.6%)	Not Available
History of IVDU (n = 496)		
Yes	412 (83.1%)	
No	84 (16.9%)	

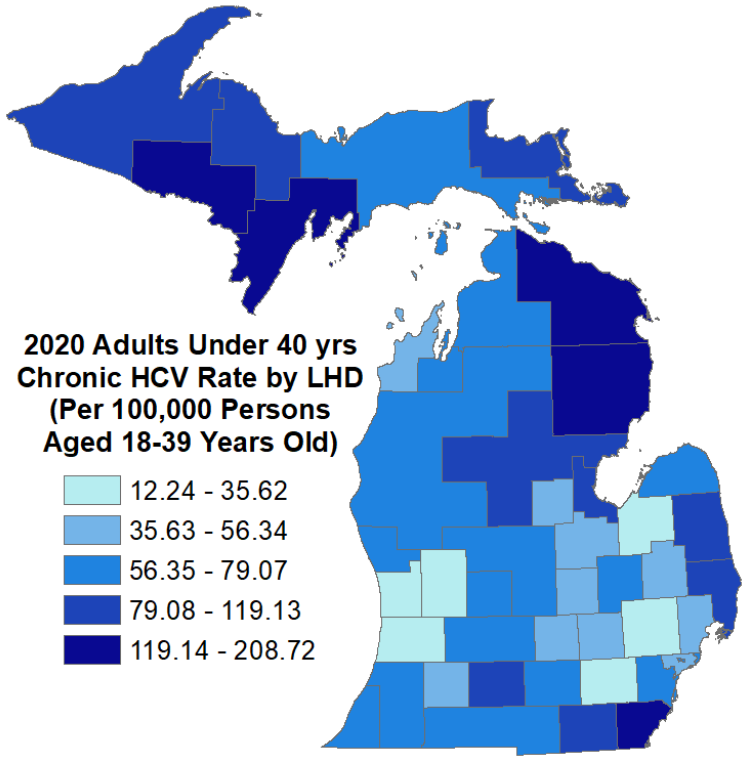
Previous studies conducted by MDHHS have shown injection drug use as the primary risk factor for HCV acquisition among those aged 18-39 years old. In many instances these clients reported sharing needles, syringes, and other injection drug works (such as cookers and cotton) which could have acted as 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 2020 (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 2020 chronic HCV cases among 18-39 year olds, 2020 heroin treatment admissions, and 2019 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, 2005-2020

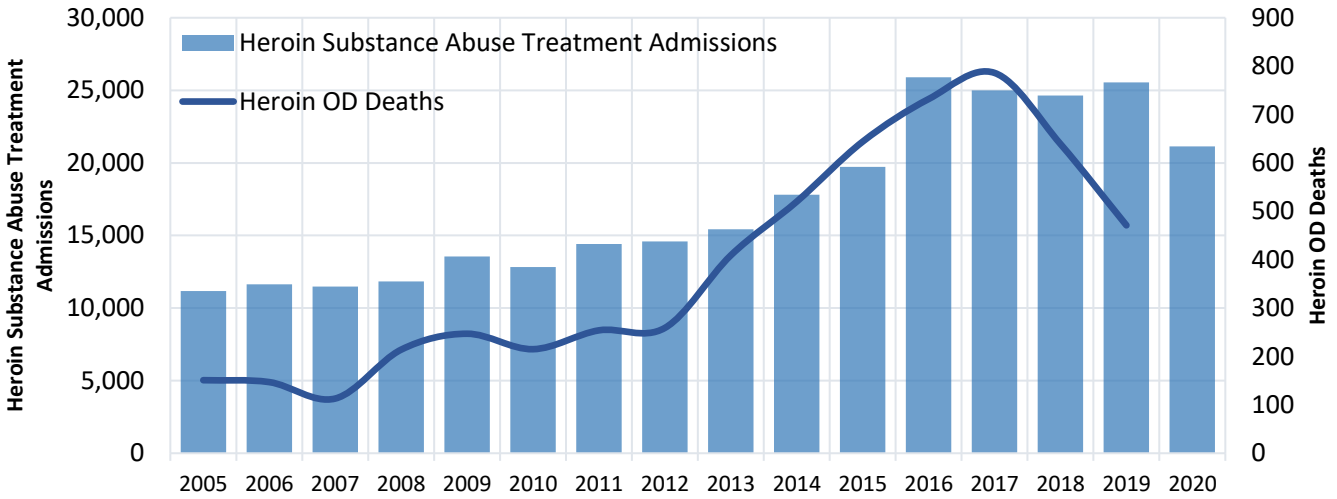


Table 8.1 Drug Overdose Deaths, Treatment Admissions and HCV in Michigan, 2011-2020

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
2011	1,359	368	254	14,413	1,975
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	-	-	-	21,140	1,657

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, non-heroin opioid deaths have risen nearly every year from 74 in 2000 up by 2,289% to 1,768 in 2019. Total drug poisoning deaths rose 305% from 581 in 2000 to 2,354 in 2019.

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

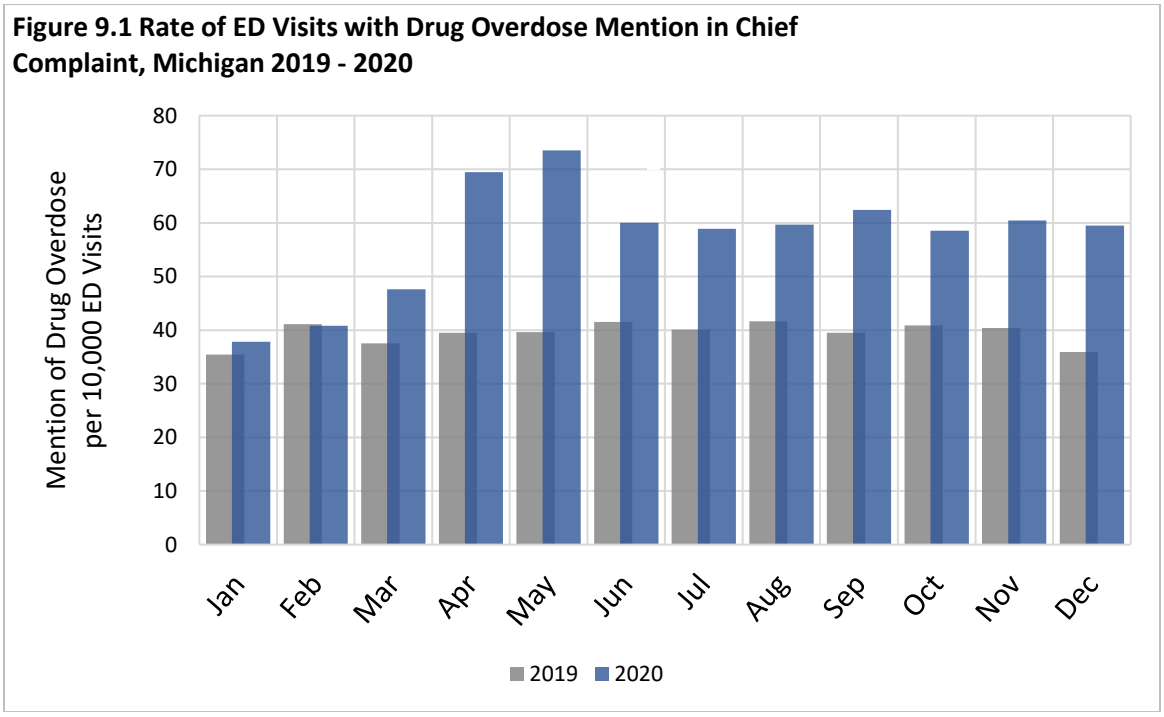
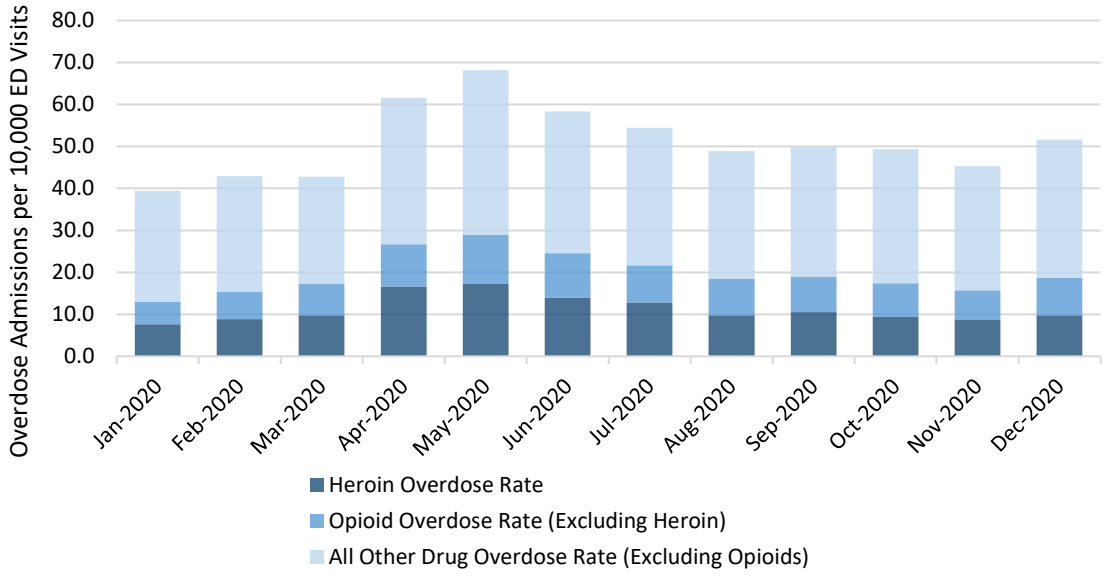


Figure 9.2 Rates of ED Visits with Overdose Diagnosis or Overdose Mentioned in the Chief Complaint, Michigan 2020



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

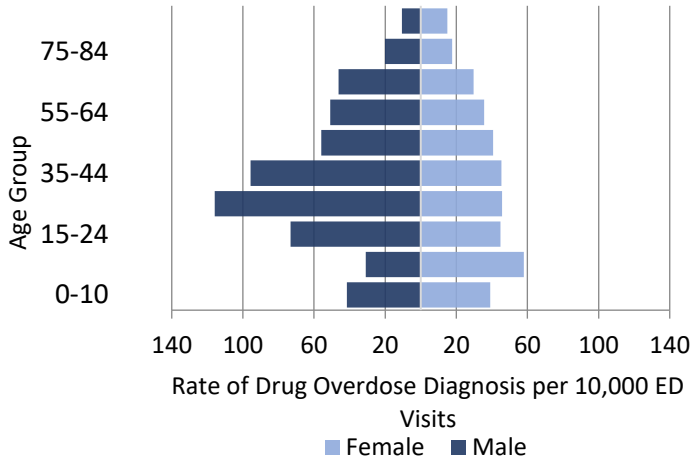
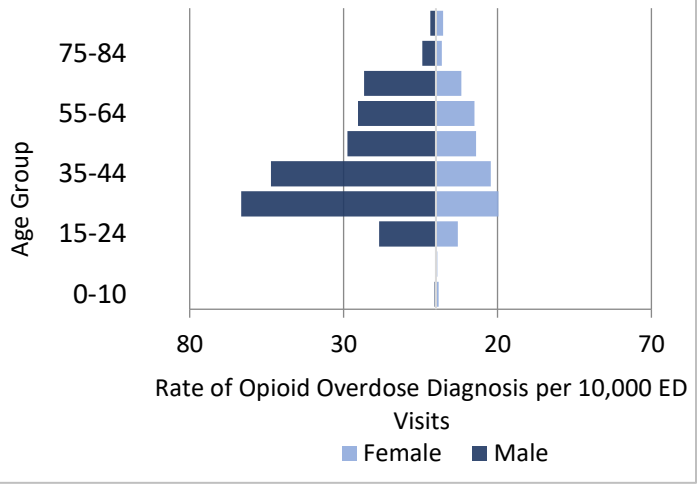
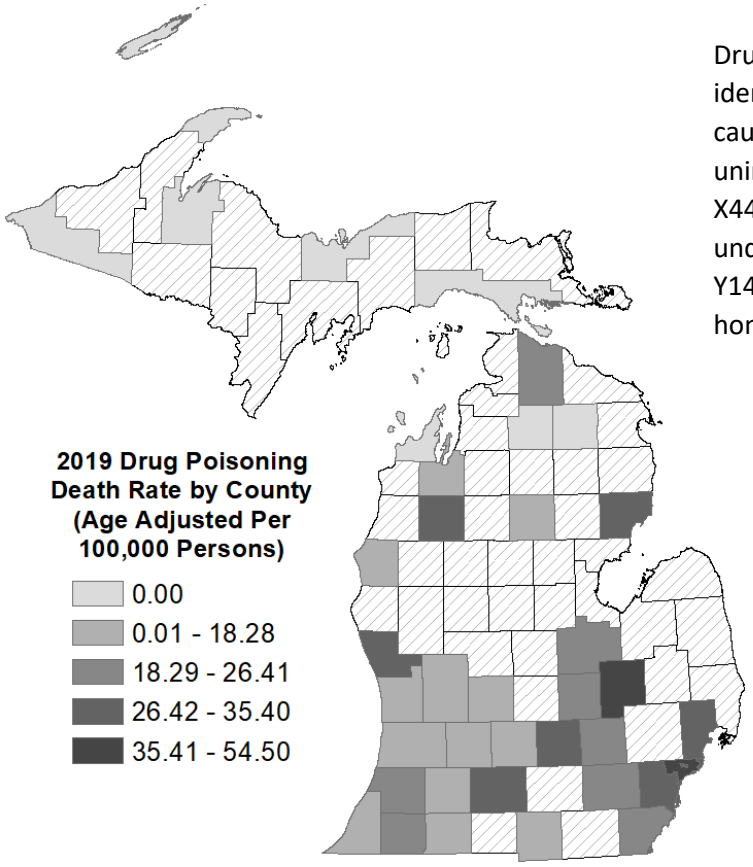


Figure 9.4 ED Overdose Visits by Age and Sex with Mention of Opioid, 2020

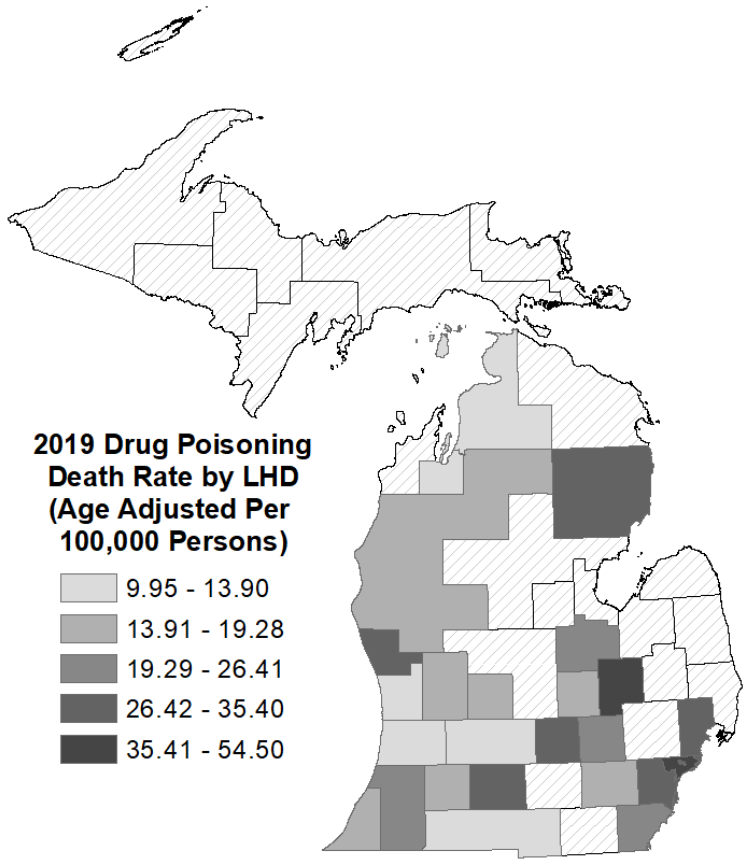


When stratifying by age and sex, the ED encounters appear to occur most frequently in the male adults under 40 (18-39 yr old) population than other age groups in 2020. This observation is consistent with trends and patterns of injection drug and opioid abuse in Michigan and subsequent risk for viral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

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

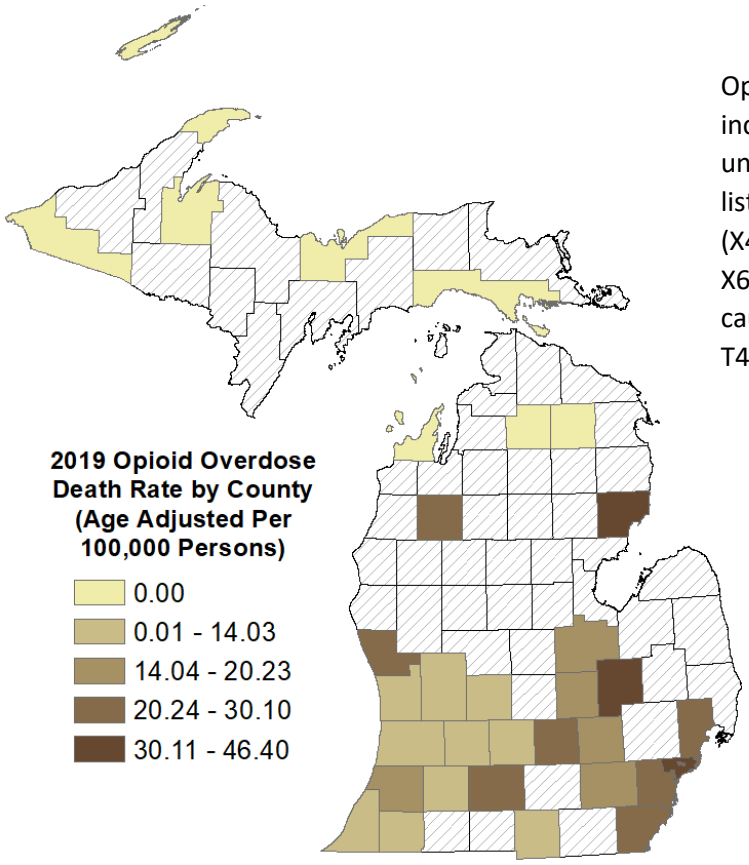


Drug overdose deaths are identified using underlying cause of death codes for unintentional poisoning (X40-X44), poisonings of undetermined intent (Y10-Y14), suicides (X60-X64), and homicides (X85).

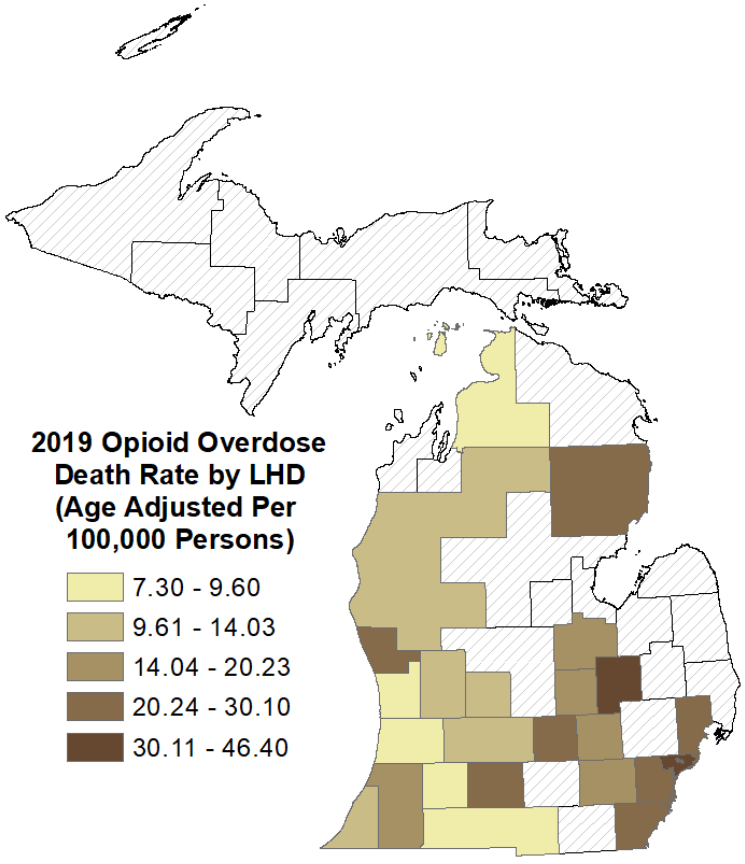


Data are suppressed if a drug is not specified in ≥90% of overdose death certificates or a jurisdiction reported less than five deaths

Opioid Overdose Death Rate Maps by County and Local Health Jurisdiction



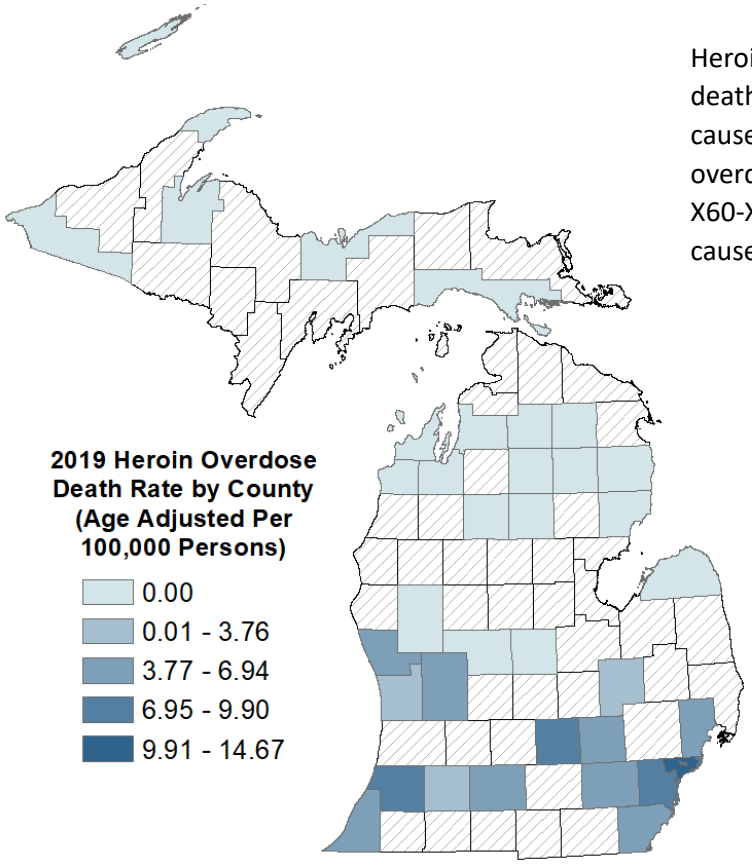
Opioid overdose deaths include deaths with an underlying cause of death listed as drug overdose (X40-X44, Y10-Y14, X60-X64, X85) and a related cause of death of T40.0-T40.4 or T40.6



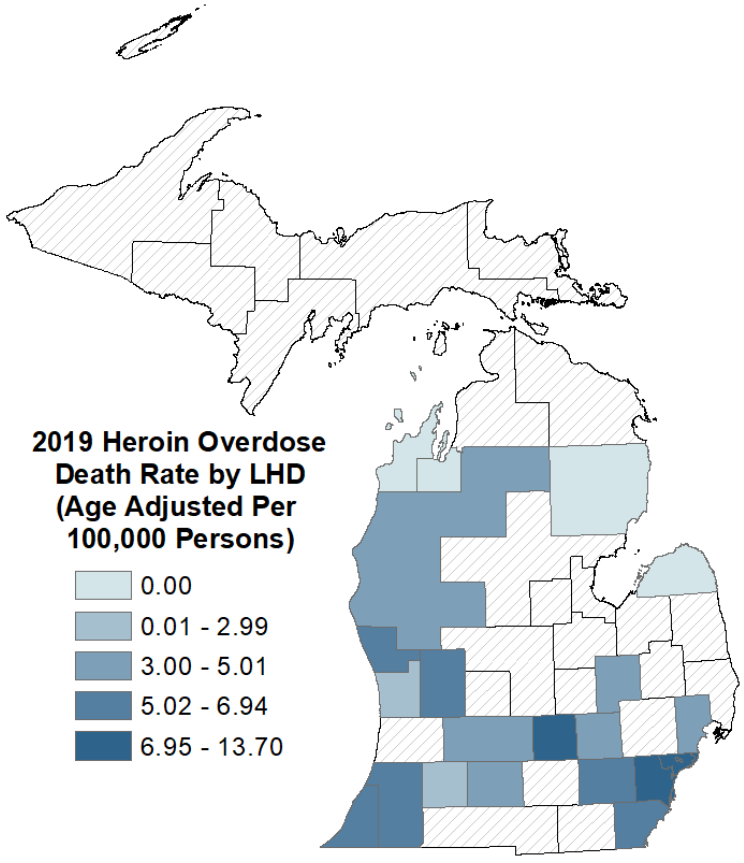
Data are suppressed if a drug is not specified in ≥90% of overdose death certificates or a jurisdiction reported less than five deaths

Heroin Overdose Death Rate Maps by County and Local Health Jurisdiction

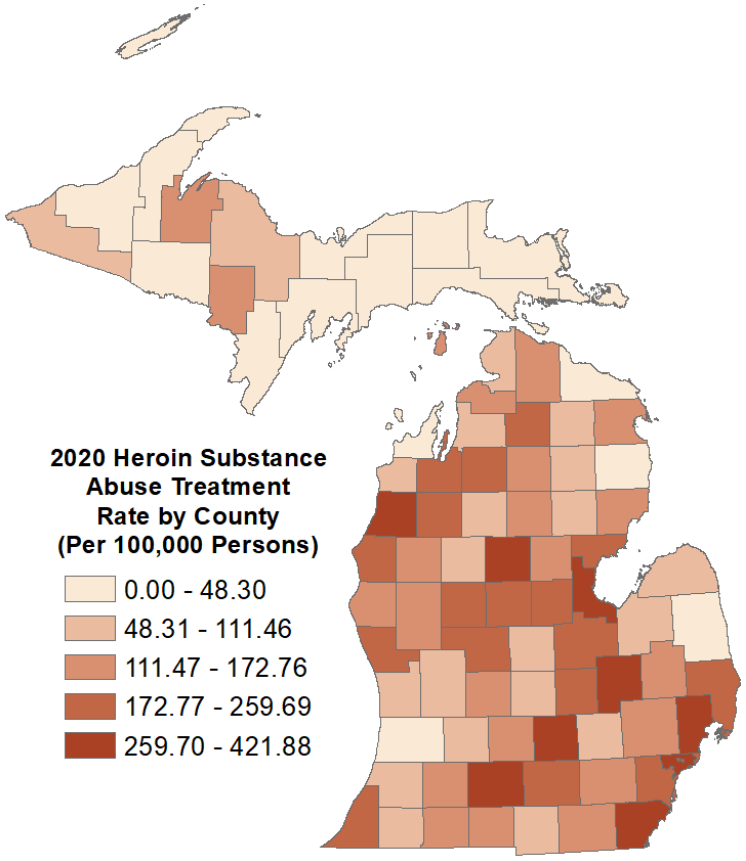
Heroin overdose deaths include deaths with an underlying cause of death listed as drug overdose (X40-X44, Y10-Y14, X60-X64, X85) and a related cause of death of T40.1



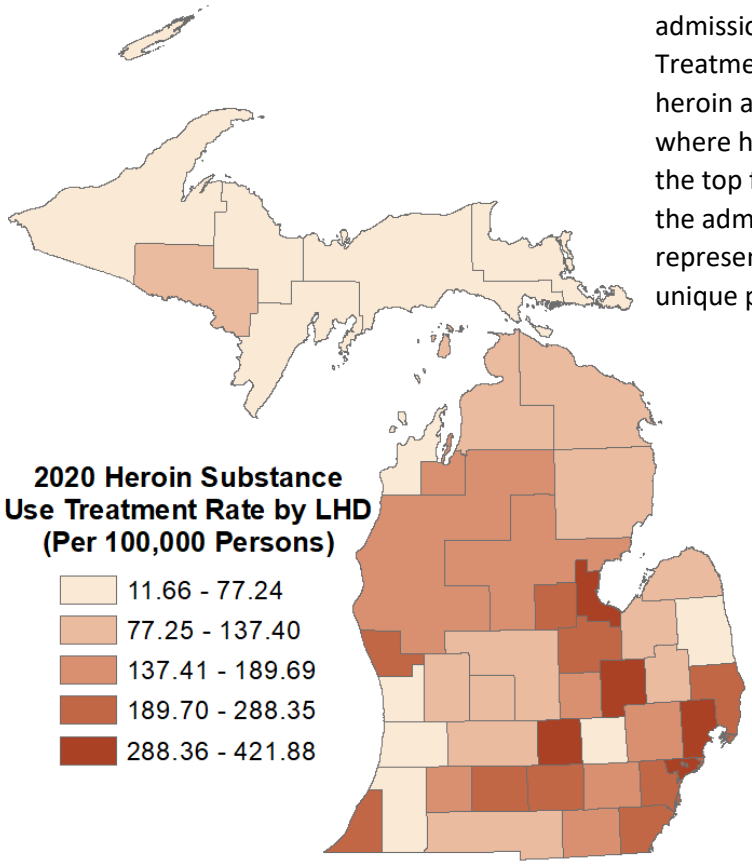
Data are suppressed if a drug is not specified in ≥90% of overdose death certificates or a jurisdiction reported less than five deaths



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



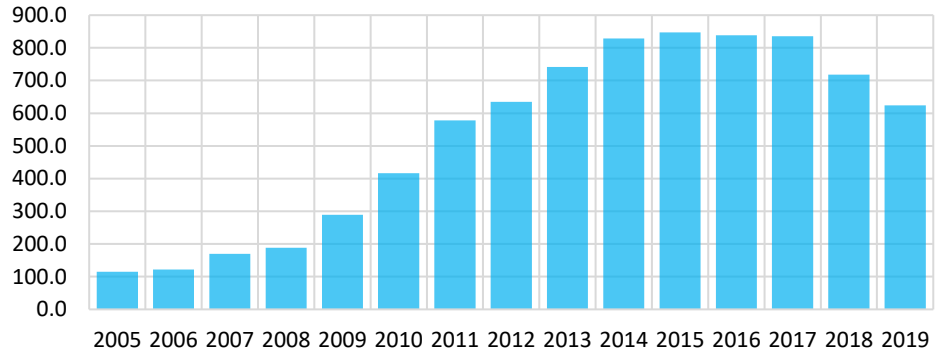
Heroin substance abuse treatment admissions are obtained from the Treatment Episode Dataset (TEDS). A heroin admission is any admission where heroin is self-identified as one of the top five substances responsible for the admission. These numbers represent unique admissions and not unique patients.



Neonatal Abstinence Syndrome (NAS)

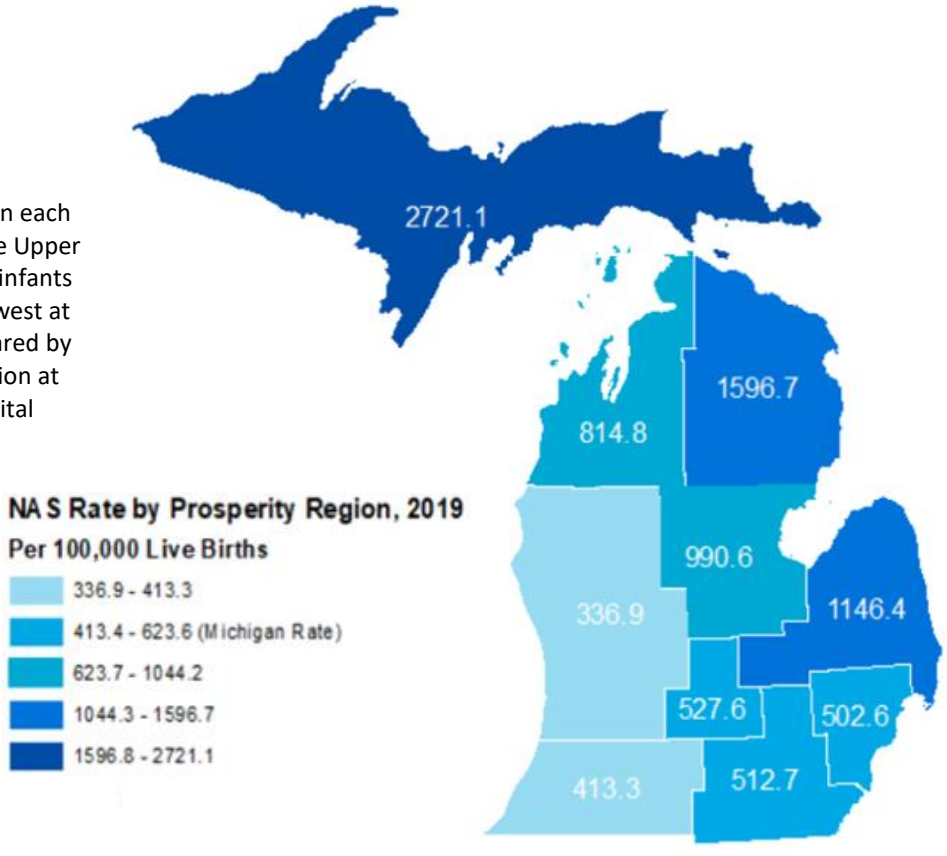
Neonatal Abstinence Syndrome (NAS) occurs in infants who are exposed to opioids in the womb before birth. These infants are born addicted to opioids and experience withdrawal symptoms after delivery. NAS typically occurs 48-72 hours after birth and symptoms include tremors, high-pitched crying, seizures, 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, 2005-2019



NAS incidence has mirrored the increase in opioid abuse in Michigan (Figure 10.1). In 2000, the rate of treated NAS in Michigan infants (from the Michigan Inpatient Database) was 41.2 per 100,000 live births. The rate has increased steadily, peaking at a rate of 761.2 treated NAS cases per 100,000 live births in 2015, a 1,747% increase. In recent years rates have begun to trend downward.

Figure 10.2 NAS Rate per 100,000 Live Births by Michigan Perinatal Quality Collaborative Prosperity Region, 2019



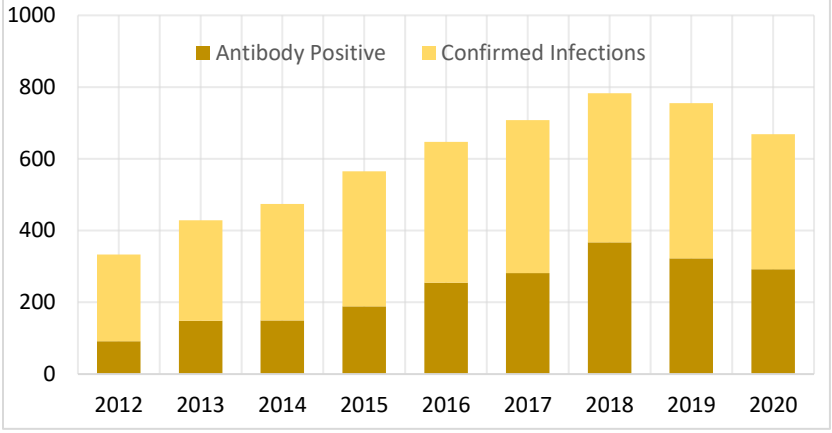
This map depicts the 2019 NAS rate per 100,000 in each of the perinatal regions in Michigan. Region 8, the Upper Peninsula, has the highest rate of NAS at 2,721.1 infants per 100,000 live births, while Region 6 has the lowest at 336.9 per 100,000 live births. This map was prepared by the Maternal and 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 2012-2020. 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 2020. 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, 2012-2020



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 20-29 years old.
- Be White/Caucasian, American Indian or Multiracial.
- 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, 2012-2020

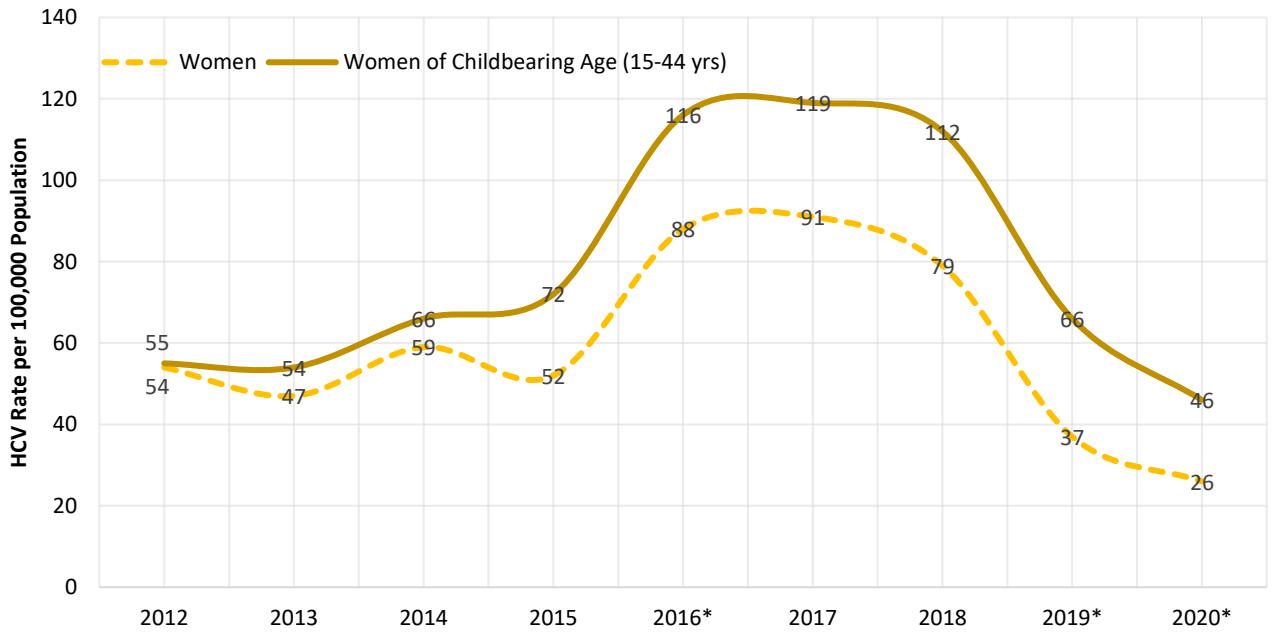
	Reported for HCV in MDSS?			
Birth Parent Characteristics	**Yes (n= 5,363)**		**No (n=994,360)**	
Age Group (in Years)				
<20	104	*1.94%*	55,588	*5.59%*
20-29	3,055	*56.96%*	522,923	*52.59%*
30-39	2,074	*38.67%*	390,651	*39.29%*
40-49	130	*2.42%*	24,974	*2.51%*
>50	0	*0.00%*	124	*0.01%*
Race				
American Indian	108	*2.01%*	4,326	*0.44%*
Asian	46	*0.86%*	34,114	*3.43%*
Black or African American	517	*9.64%*	185,542	*18.66%*
White or Caucasian	4,549	*84.82%*	718,234	*72.23%*
Other	108	*2.01%*	44,657	*4.49%*
Unknown	35	*0.65%*	3,616	*0.36%*
Prenatal Care Visits				
Less than 8 or no care	1,377	*25.68%*	108,640	*10.93%*
8 or greater	3,774	*70.37%*	861,916	*86.68%*
Education				
High school graduate or lower	4,806	*89.61%*	604,815	*60.82%*
Higher degree	455	*8.48%*	381,669	*38.38%*
Paysource				
Medicaid	4,222	*78.72%*	421,107	*42.35%*
Private Insurance	992	*18.50%*	546,322	*54.94%*
Smoking				
Yes	3,313	*61.78%*	173,022	*17.40%*
No	1,551	*28.92%*	752,069	*75.63%*
Married				
Yes	1,075	*20.04%*	576,749	*58.00%*
No	4,268	*79.58%*	417,204	*41.96%*
Self-Reported HCV				
Yes	2,434	*45.39%*	735	*0.07%*
No	2,828	*52.73%*	981,444	*98.70%*

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, 2012-2020



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 RNA lab results beginning in 2019, and/or the COVID-19 pandemic in 2020

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 getting HBV from their birth parent. Hepatitis B (hepB) 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 hepB 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 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 having HBV. It is extremely important to identify all HBsAg-positive pregnant persons prior to delivery so that their infants can receive HBIG and hepB vaccine within 12 hours of birth for immediate protection against HBV. For life-long protection, these infants need at least two additional doses of hepB vaccine and a post-vaccination serologic test (PVST) at nine to 12 months of age.

Figure 12.1 Michigan's Perinatal Hepatitis B Prevention Program (PHBPP), 2015-2019

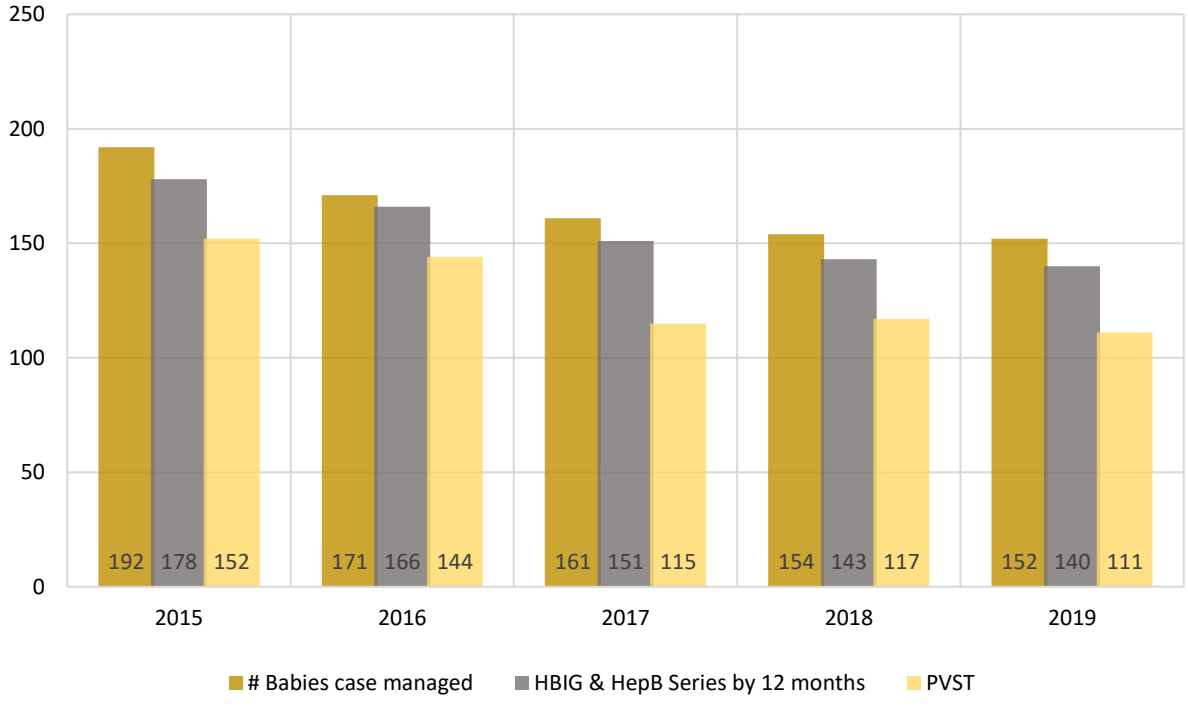


Table 12.1 Proportion of Infants Receiving HBV Treatment, Michigan and the United States, 2015-2019

	2015		2016		2017		2018		2019	
	MI	US	MI	US	MI	US	MI	US	MI	US
Percent of Infants Receiving PEP at Birth	99%	96%	99%	97%	100%	97%	99%	97%	100%	-
Percent of Infants with HBIG & Complete HepB Series by 12 Months	93%	83%	97%	82%	94%	82%	93%	84%	92%	-
Percent of Infants with PVST by End of Reporting Period 1	79%	63%	84%	64%	71%	65%	76%	67%	73%	-

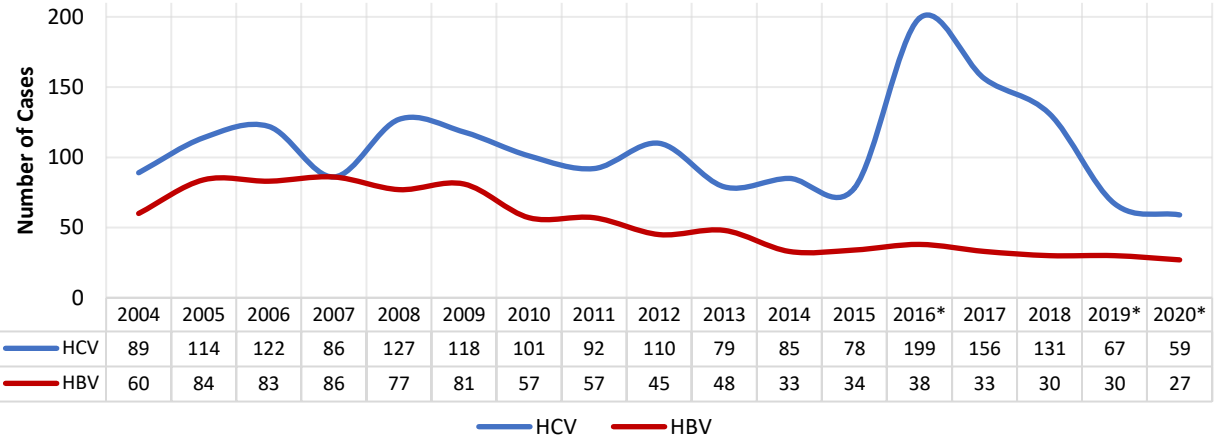
The Michigan PHBPP consistently performs above the national average in providing the appropriate prophylaxis to the infants born to HBV-infected individuals; however there is room for improvement. It is extremely important to identify all HBsAg-positive and HBV DNA positive pregnant persons so that we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

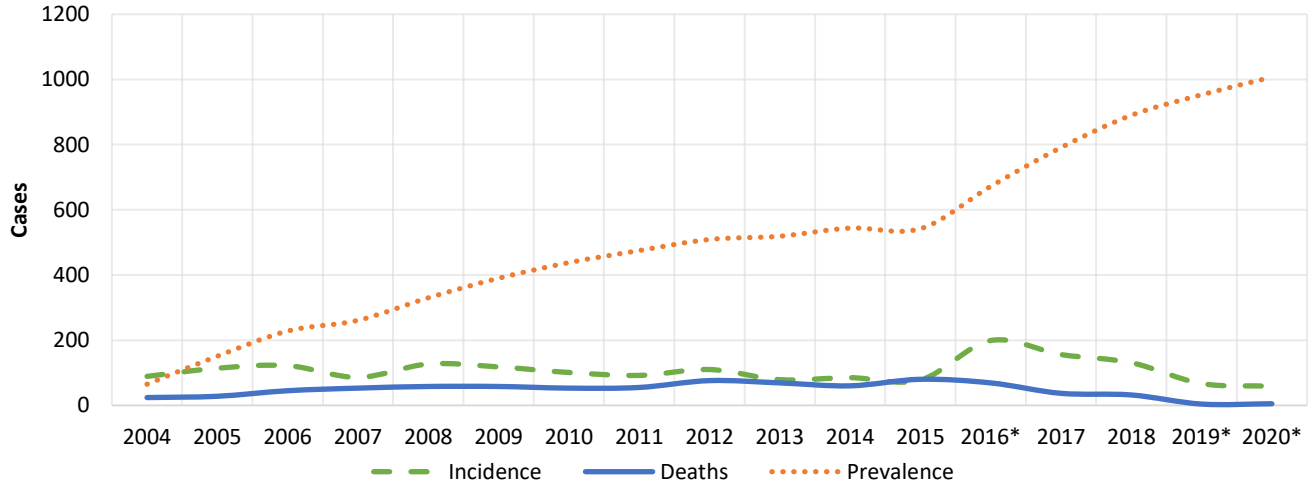
Figure 13.1 Count of Hepatitis B and Hepatitis C Cases Co-infected with HIV in Michigan, 2004-2019



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016*	2017	2018	2019*	2020*
HCV	89	114	122	86	127	118	101	92	110	79	85	78	199	156	131	67	59
HBV	60	84	83	86	77	81	57	57	45	48	33	34	38	33	30	30	27

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, largely 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. As one might suspect, HBV/HIV co-infection is more common among the men that have sex with men (MSM) population and thus tends to be more male and younger in age. HCV/HIV co-infection is 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, 2004-2019



*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 2019, 876 people were reported in Michigan with HBV/HIV co-infection. Table 13.1 shows a breakdown of the HBV/HIV co-infected population in 2020. The 2020 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, 2020

Variable	2020 HBV/HIV Co-infections		2004-2019 HBV/HIV Co-infections	
Total Co-infections	27	(100.0%)	876	
Sex				
Male	24	*(88.9%)*	781	*(89.2%)*
Female	3	*(11.1%)*	95	*(10.8%)*
Unknown	0	*(0.0%)*	0	*(0.0%)*
Race				
White or Caucasian	8	*(29.6%)*	252	*(28.8%)*
Black or African American	16	*(59.3%)*	566	*(64.6%)*
Hispanic	2	*(7.4%)*	28	*(3.2%)*
Asian	0	*(0.0%)*	6	*(0.7%)*
American Indian or Alaskan Native	0	*(0.0%)*	1	*(0.1%)*
Multi/Other/Unknown	1	*(3.7%)*	23	*(2.6%)*
HIV Transmission Risk				
MSM	14	*(51.9%)*	524	*(59.8%)*
IDU	0	*(0.0%)*	80	*(9.1%)*
MSM/IDU	1	*(3.7%)*	49	*(5.6%)*
Blood Recipient	0	*(0.0%)*	5	*(0.6%)*
Heterosexual	3	*(11.1%)*	79	*(9.0%)*
Perinatal	0	*(0.0%)*	2	*(0.2%)*
Unknown/Undetermined	9	*(33.3%)*	137	*(15.6%)*
Age at Coinfection				
0-19	0	*(0.0%)*	8	*(0.9%)*
20-29	0	*(0.0%)*	101	*(11.5%)*
30-39	6	*(22.2%)*	233	*(26.6%)*
40-49	3	*(11.1%)*	313	*(35.7%)*
50-59	15	*(55.6%)*	171	*(19.5%)*
60+	3	*(11.1%)*	50	*(5.7%)*

Between 2004 and 2019, 1,754 people were reported in Michigan with HIV/HCV co-infection. Table 13.2 shows a breakdown of the HCV/HIV co-infected population in 2020. The 2020 cases are similar to the historical cases in regard to 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, 2020

Variable	2020 HCV/HIV Co-infections		2004-2019 HCV/HIV Co-infections	
Total Co-infections	59		1,754	
Sex				
Male	47	*(79.7%)*	1,287	*(73.4%)*
Female	12	*(20.3%)*	458	*(26.1%)*
Unknown	0	*(0.0%)*	9	*(0.5%)*
Race				
White or Caucasian	21	*(35.6%)*	584	*(33.3%)*
Black or African American	32	*(54.2%)*	1,016	*(57.9%)*
Hispanic	5	*(8.5%)*	76	*(4.3%)*
Asian	0	*(0.0%)*	13	*(0.7%)*
American Indian or Alaskan Native	0	*(0.0%)*	1	*(0.1%)*
Multi/Other/Unknown	1	*(1.7%)*	64	*(3.6%)*
HIV Transmission Risk				
MSM	20	*(33.9%)*	438	*(25.0%)*
IDU	16	*(27.1%)*	696	*(39.7%)*
MSM/IDU	10	*(16.9%)*	219	*(12.5%)*
Blood Recipient	0	*(0.0%)*	43	*(2.5%)*
Heterosexual	4	*(6.8%)*	194	*(11.1%)*
Perinatal	0	*(0.0%)*	3	*(0.2%)*
Unknown/Undetermined	9	*(15.3%)*	161	*(9.2%)*
Age at Coinfection				
0-19	0	*(0.0%)*	11	*(0.6%)*
20-29	16	*(27.1%)*	147	*(8.4%)*
30-39	13	*(22.0%)*	269	*(15.3%)*
40-49	11	*(18.6%)*	472	*(26.9%)*
50-59	11	*(18.6%)*	607	*(34.6%)*
60+	8	*(13.6%)*	248	*(14.1%)*

Hepatitis C and HIV Co-infections Among MIDAP Beneficiaries

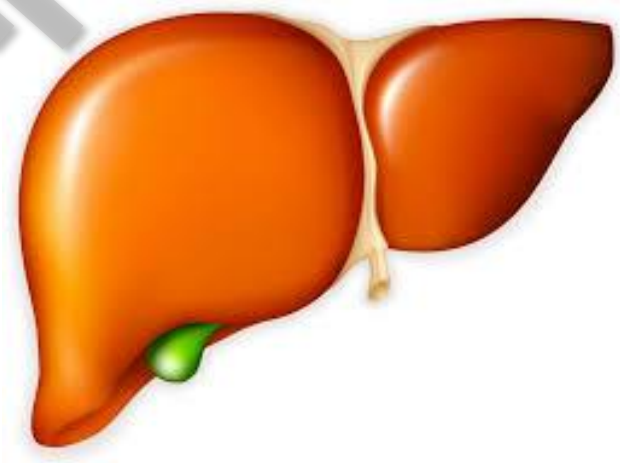
The Michigan Drug Assistance Program (MIDAP) is a Ryan White program that specifically covers the cost of health insurance and/or medication for people living with HIV. MIDAP can be useful for all medical needs – not just HIV. Beginning March 1, 2018, MIDAP began providing treatment assistance for hepatitis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

As of December 13, 2019, there were 3,040 active MIDAP beneficiaries, of which 3.0% 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, 2020

	2020 HCV/MIDAP Co-infections	
Total Co-infections	83	
Sex		
Male	71	*85.5%*
Female	12	*14.5%*
Unknown	0	*0.0%*
Race		
White or Caucasian	36	*43.4%*
Black or African American	39	*47.0%*
Hispanic	3	*3.6%*
Asian	3	*3.6%*
American Indian or Alaskan Native	0	*0.0%*
Multi/Other/Unknown	2	*2.4%*
HIV Transmission Risk		
MSM	34	*41.0%*
IDU	13	*15.7%*
MSM/IDU	8	*9.6%*
Blood Recipient	0	*0.0%*
Heterosexual	17	*20.5%*
Perinatal	0	*0.0%*
Unknown/Undetermined	11	*13.3%*
Age at Coinfection		
0-19	4	*4.8%*
20-29	17	*20.5%*
30-39	26	*31.3%*
40-49	18	*21.7%*
50-59	10	*12.0%*
60+	8	*9.6%*

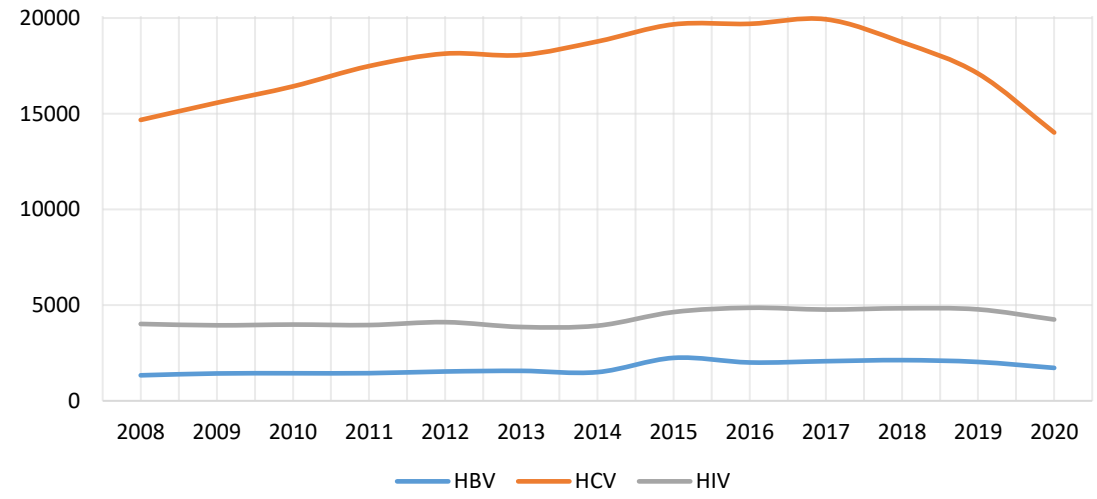
Viral Hepatitis Outcomes



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 2020, 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, 2008-2020

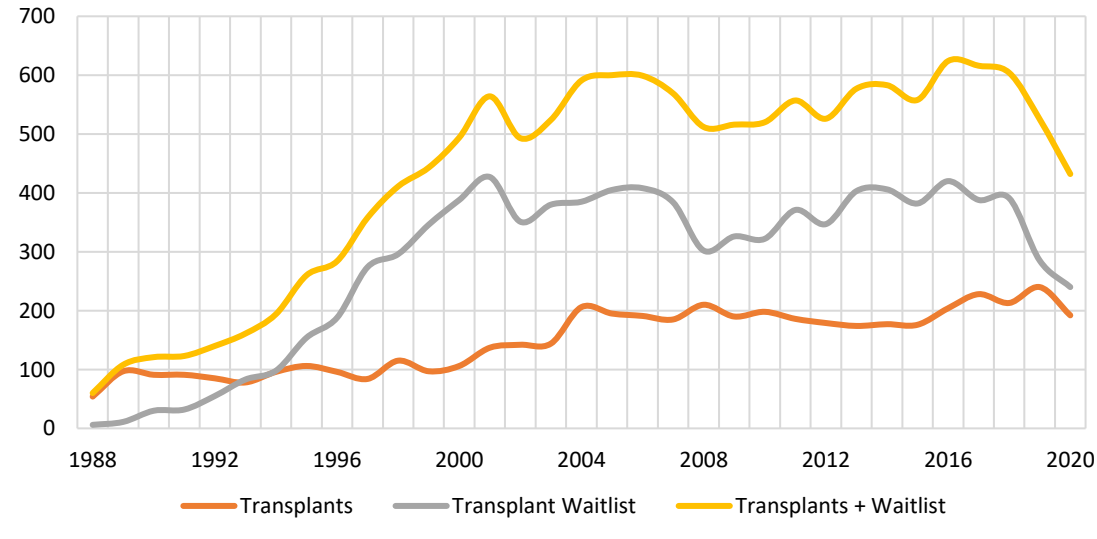


Note: Hospitalizations documenting hepatitis B include inpatient hospitalizations with ICD-9-CM codes for acute, chronic, or unspecified hepatitis B (07020, 07021, 07022, 07023, 07030, 07031, 07032, 07033, or V0261). Hospitalizations documenting hepatitis C include ICD-9-CM codes for acute, chronic, 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).

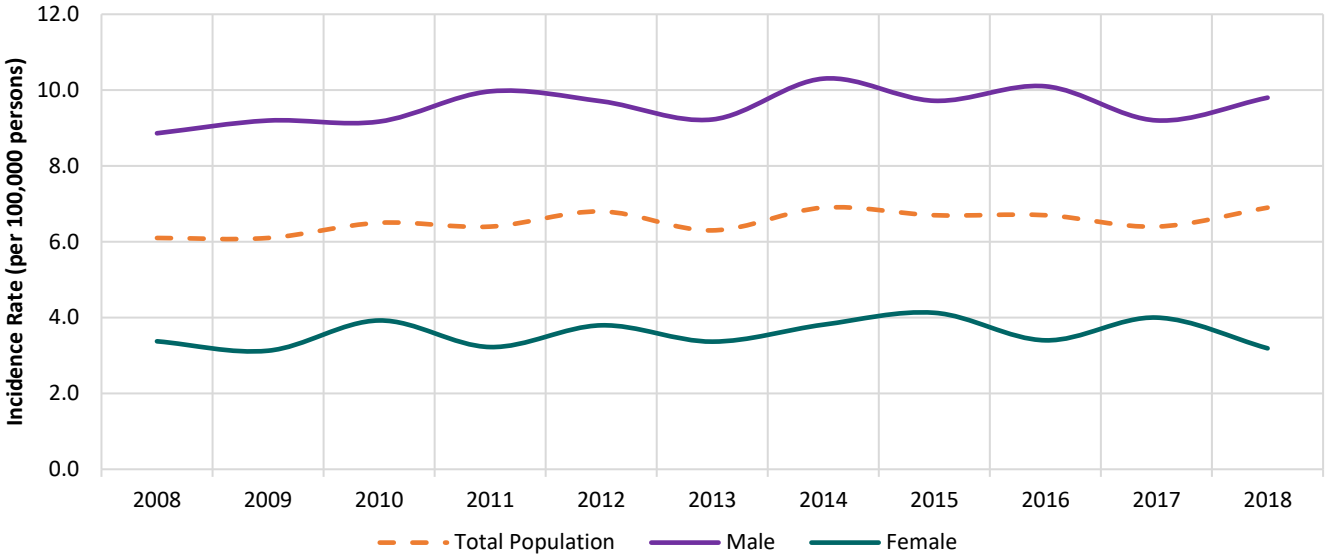
Counts of the number of individuals on the liver transplant waitlist and the number of liver transplants conducted in Michigan between 1988 and 2020 were requested through the United Network of Organ Sharing (UNOS, https://www.unos.org/).

Figure 14.2 Liver Transplants and Transplant Waitlist, Michigan, 1988-2020



Viral Hepatitis-Related Cancer & Mortality

Figure 15.1 Invasive Cancers of the Liver and Intrahepatic Bile Ducts in Michigan by Sex, 2008-2018



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 number of cases per year of liver and bile duct cancer have increased 33.3% between 2009 and 2018. Black/African American males experience an incidence rate that is approximately 2.2 times higher, on average, than white/Caucasian males. The incidence rate for Black/African American females tends to be similar to the state average, while white/Caucasian females have the lowest incidence rate of the specified race categories. 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.

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, 2009-2018

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
2009	706	6.1	361	7.9	154	2.9	116	18.8	36	4.7
2010	780	6.5	387	8.0	197	3.6	114	18.2	47	6.3
2011	767	6.4	419	8.8	156	2.9	122	18.3	42	5.5
2012	852	6.8	404	8.0	196	3.5	152	22.4	48	5.8
2013	797	6.3	404	7.9	173	3.0	133	18.8	48	6.0
2014	884	6.9	472	9.1	203	3.6	133	19.4	45	5.2
2015	874	6.7	448	8.5	206	3.6	130	19.2	66	7.6
2016	896	6.7	502	9.3	179	3.0	112	15.4	55	6.1
2017	873	6.4	459	8.3	220	3.7	119	16.3	53	5.8
2018	941	6.9	486	8.7	221	3.7	133	18.7	48	5.4

Table 15.1 shows the rate of new cases of liver and intrahepatic bile duct cancer per year from 2009 to 2018 in Michigan per 100,000 people. The overall rate of liver and intrahepatic bile duct cancer in Michigan was 6.9 per 100,000 in 2018. Black/African American males had an incidence rate of 18.7 per 100,000, which was 115% higher than that of White/Caucasian males (8.7 per 100,000). The incidence rate in Black/African American females (5.4 per 100,000) was 46% higher than that of White/Caucasian females (3.7 per 100,000) in 2018.

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, 2010 - 2019

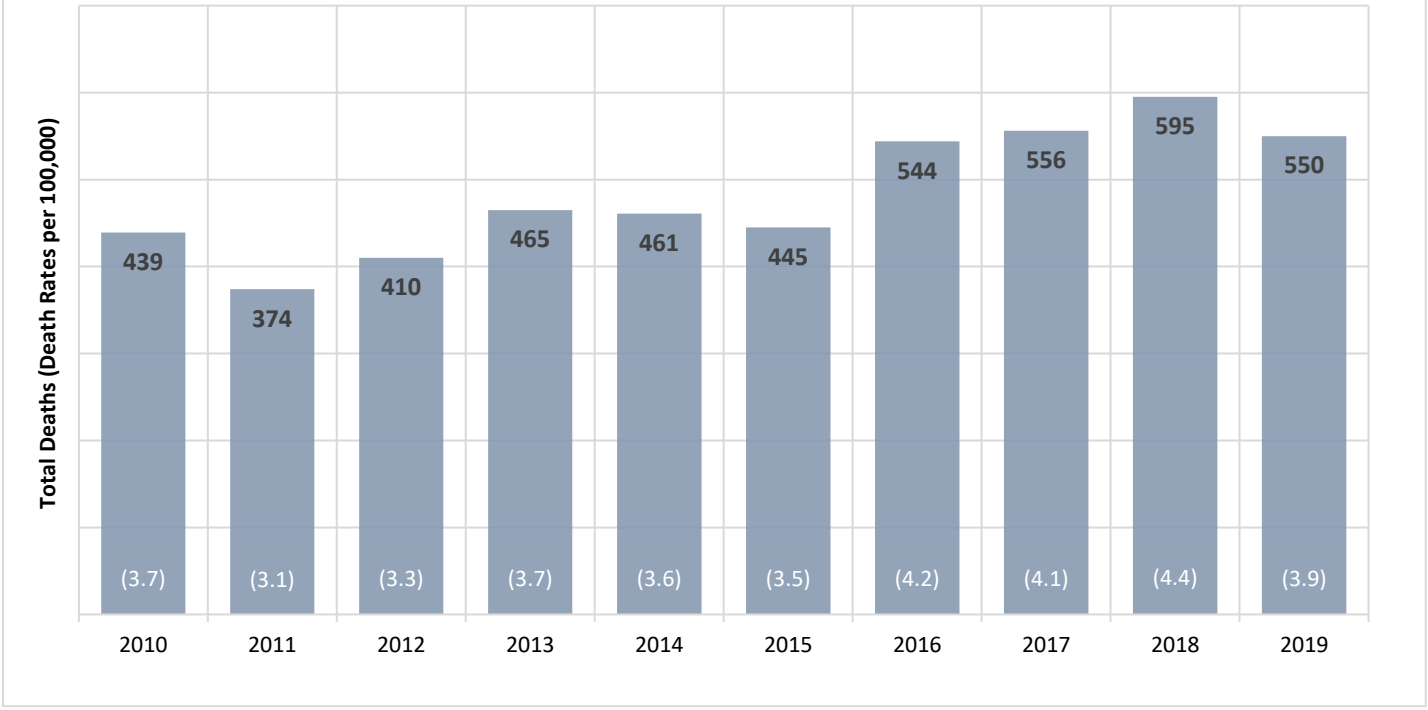


Figure 15.2 shows the number of deaths per year due to liver and intrahepatic bile duct cancer. This total has risen 25% from 2010 to 2019. Chronic infection with viral hepatitis, over time, can lead to liver cancer. 2019 saw the first decrease in liver and intrahepatic bile duct cancer since 2014. As 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 - 2019

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
2010	439	3.7	214	4.5	120	2.1	66	10.7	15	*
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

Table 15.2 shows the death rate per 100,000 Michigan population due to cancer of the liver and intrahepatic bile ducts between 2010 and 2019. The overall liver and intrahepatic bile duct cancer mortality rate in Michigan in 2019 was 3.9 per 100,000. Black/African American males show the highest death rates due to these cancers with a death rate of 10.1 per 100,000. The death rate in Black/African American males is 94% higher than the rate in white/Caucasian males (5.2 per 100,000). On the contrary, Black/African American females experienced the lowest mortality rate amongst the included racial groups in 2019.

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, 2015-2020

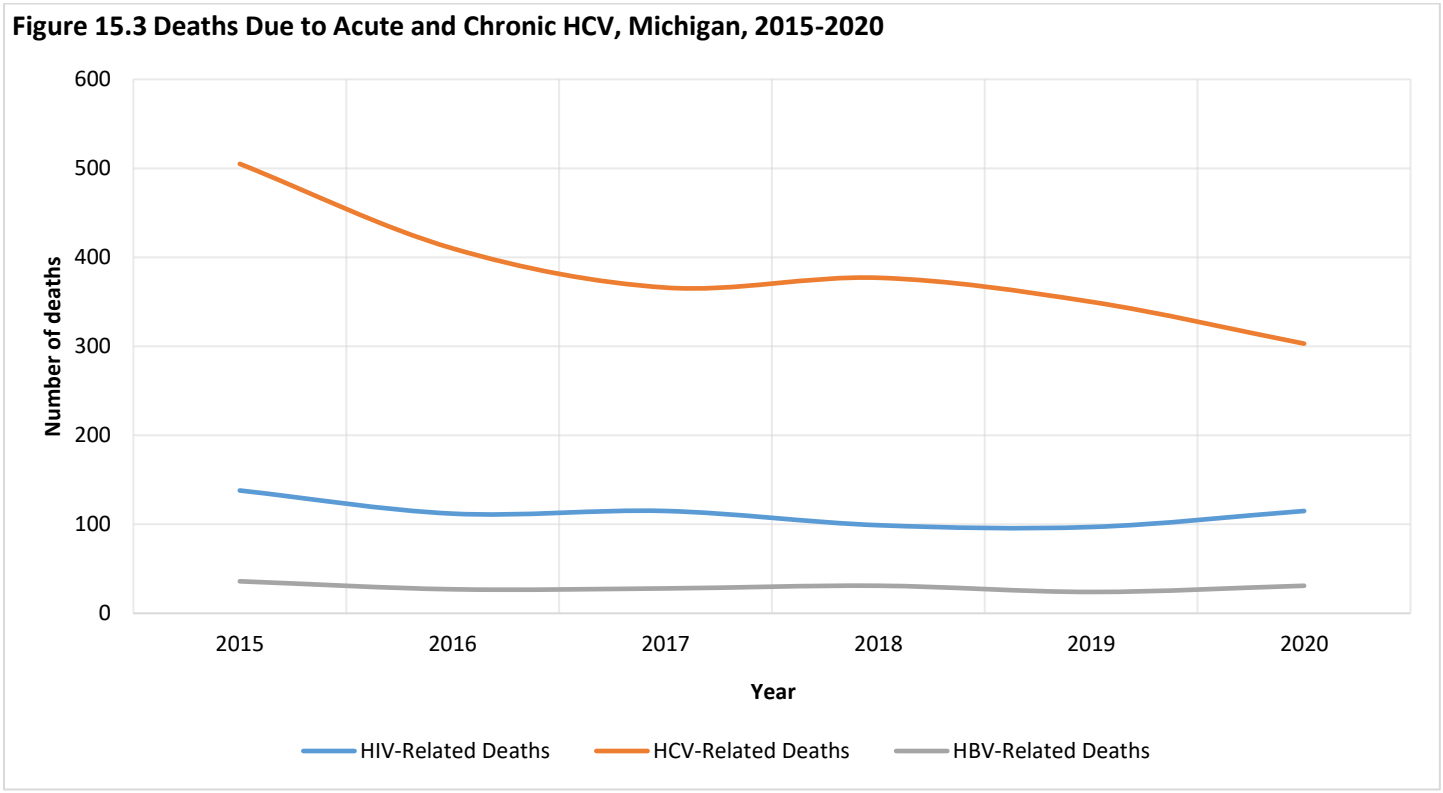


Figure 15.3 shows the number of deaths per year in Michigan residents between 2015 and 2020 due to acute and chronic HCV, according to death certificate data, in comparison to hepatitis B and HIV. The Vital Records and Health Statistics Section provides data on underlying causes of death in Michigan, 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 2020 there were 303 deaths attributed to HCV in Michigan (ICD-10: B17.1, B18.2, B19.2). Between 2015 and 2020, deaths due to chronic HCV decreased by 40%, likely resulting from the introduction of new medications that treat HCV infections, among other factors. From 2015 through 2020, HBV deaths (ICD-10: B16.2, B16.9, B18.1) decreased slightly from 36 to 31, while HIV-related deaths (ICD-10: B20-B24) were reduced from 138 to 115.

Hepatitis C Emerging Threats Project

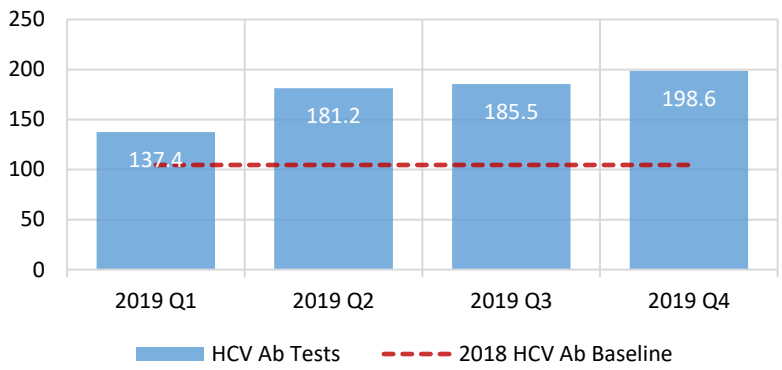
In 2017, the Viral Hepatitis Unit at MDHHS wrote a Proposal for Change, which supported the allocation of general funds to local health departments for HCV testing, case investigation, linkage to care, and follow-up. The $4.5 million proposal was supported in the governor's budget and eventually approved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

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 2019 - Q4 2019)

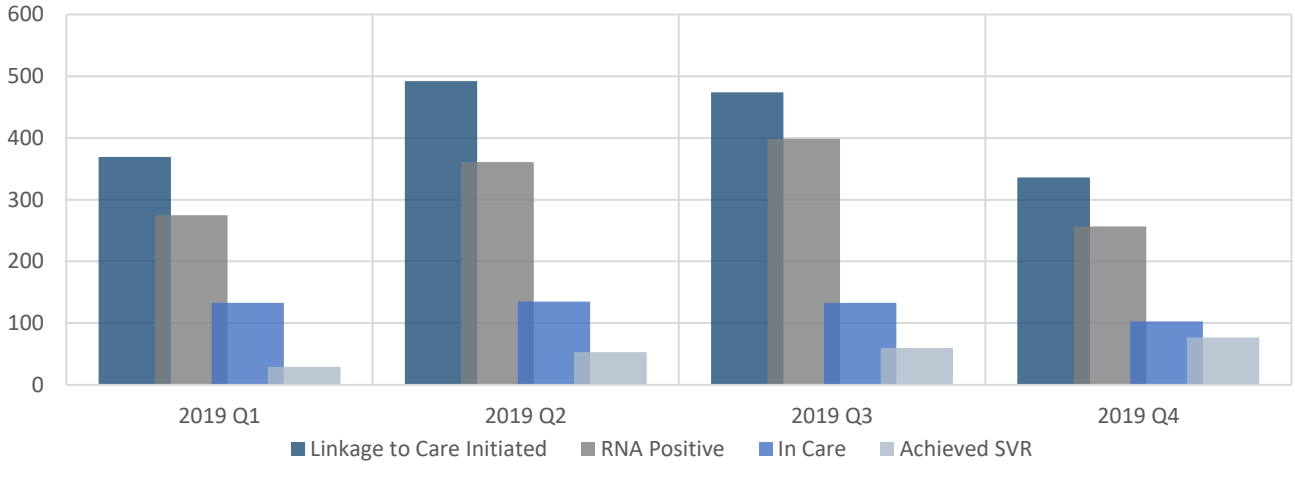


Hepatitis C Testing: Project dollars went to the Michigan Bureau of Laboratories (BOL) to continue to offer HCV antibody (Ab) and RNA testing services at no cost to our submitters. Since the start of the project (Jan 1, 2019 – Dec 31, 2019), funded health departments have submitted 7,027 HCV specimens to BOL.

Hepatitis C Case Investigation: Completion rates for fields found in the MDSS have increased. Specifically, demographics (6.0%), clinical info (1.2%), and epidemiological info (11.3%).

Hepatitis C Linkage to Care: Funded local health departments have reached out to 1,508 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 2019, of the individuals living with hepatitis C and contacted for linkage to care, 62.3% were linked to a hepatitis C treatment provider and so far 165 have been cured!

Figure 16.2 Linkage to Care Activities Perfomed by the Funded LHDs from Jan 1 - Dec 31, 2019

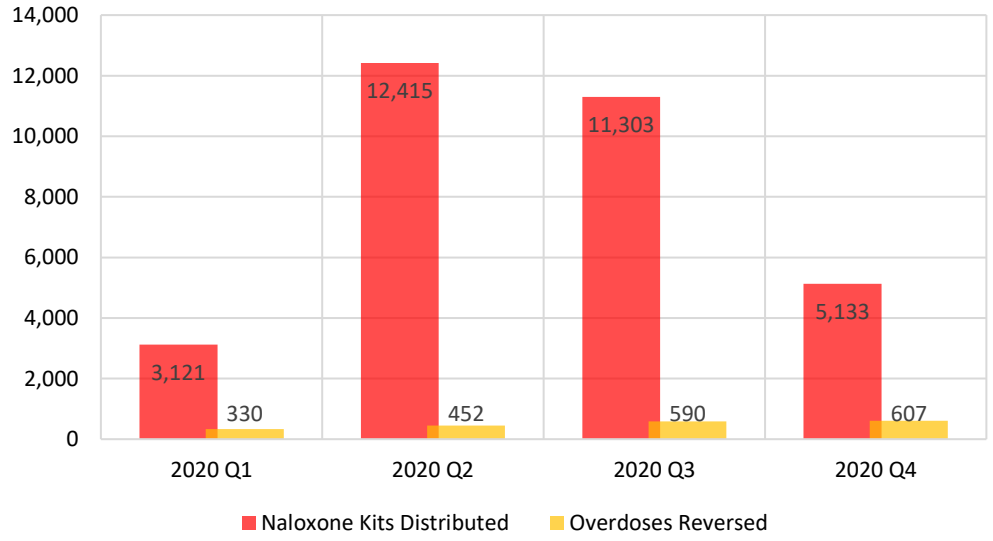


Harm Reduction and Syringe Service Programs

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).

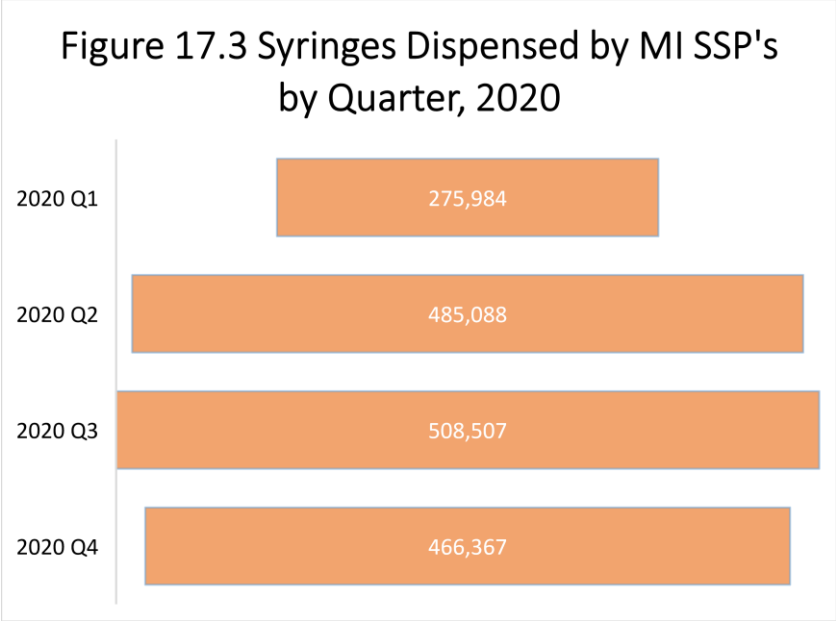
In fiscal year 2019, MDHHS invested approximately $1.25 million in harm reduction and SSPs in 15 different local health jurisdictions. With inclusion of all operating SSPs in Michigan, as of December 31, 2020, there is coverage across Michigan by a total of 25 programs operating 63 sites with six additional programs expected to open in the near future.

Figure 17.2 Naloxone Kits Distributed and Overdoses Reversed as Result of SSP, MI by Quarter, 2020



Since October 1, 2019, SSPs in Michigan:

- Provided 2,369 referrals to substance use treatment
- Served 18,300 participants directly
- Distributed 36,189 naloxone kits
- Reversed 2,267 overdoses
- Conducted 460 HIV tests
- Conducted 268 hepatitis C tests
- Distributed 2,012,858 sterile syringes



Appendices

Appendix A1: Hepatitis Data by County

County	Total Population	2020 Chronic HCV Cases	2020 Acute HCV Cases	2020 Chronic HBV Cases	2020 Acute HBV Cases	2020 Chronic HCV Rate*	2020 Acute HCV Rate*	2020 Chronic HBV Rate*	2020 Acute HBV Rate*
Alcona	10,353	1	1	1	0	9.66	9.66	9.66	0.00
Alger	9,151	3	1	0	0	32.78	10.93	0.00	0.00
Allegan	116,143	16	1	0	0	13.78	0.86	0.00	0.00
Alpena	28,520	15	1	0	2	52.59	3.51	0.00	7.01
Antrim	23,206	9	1	2	0	38.78	4.31	8.62	0.00
Arenac	15,070	9	0	2	0	59.72	0.00	13.27	0.00
Baraga	8,421	5	0	0	0	59.38	0.00	0.00	0.00
Barry	60,540	16	0	2	0	26.43	0.00	3.30	0.00
Bay	104,104	43	4	4	1	41.30	3.84	3.84	0.96
Benzie	17,615	4	0	0	0	22.71	0.00	0.00	0.00
Berrien	154,133	68	3	9	1	44.12	1.95	5.84	0.65
Branch	43,513	21	0	3	0	48.26	0.00	6.89	0.00
Calhoun	134,212	68	2	6	2	50.67	1.49	4.47	1.49
Cass	51,523	25	0	3	0	48.52	0.00	5.82	0.00
Charlevoix	26,188	6	2	1	1	22.91	7.64	3.82	3.82
Cheboygan	25,418	18	1	0	0	70.82	3.93	0.00	0.00
Chippewa	37,629	27	0	0	0	71.75	0.00	0.00	0.00
Clare	30,651	25	1	1	0	81.56	3.26	3.26	0.00
Clinton	78,389	20	0	2	0	25.51	0.00	2.55	0.00
Crawford	13,892	4	2	2	0	28.79	14.40	14.40	0.00
Delta	36,026	20	7	2	0	55.52	19.43	5.55	0.00
Detroit City	674,841	666	9	103	7	98.69	1.33	15.26	1.04
Dickinson	25,439	11	2	0	0	43.24	7.86	0.00	0.00
Eaton	109,456	62	4	15	0	56.64	3.65	13.70	0.00
Emmet	33,104	11	0	0	0	33.23	0.00	0.00	0.00
Genesee	407,875	152	7	22	4	37.27	1.72	5.39	0.98
Gladwin	25,279	9	0	0	0	35.60	0.00	0.00	0.00
Gogebic	15,061	10	0	1	1	66.40	0.00	6.64	6.64
Grand Traverse	92,181	26	8	2	3	28.21	8.68	2.17	3.25
Gratiot	40,916	21	0	2	0	51.32	0.00	4.89	0.00
Hillsdale	45,757	15	0	1	0	32.78	0.00	2.19	0.00
Houghton	36,070	11	1	1	1	30.50	2.77	2.77	2.77
Huron	31,349	8	0	2	0	25.52	0.00	6.38	0.00
Ingham	290,587	137	4	34	0	47.15	1.38	11.70	0.00
Ionia	64,300	23	3	1	0	35.77	4.67	1.56	0.00
Iosco	25,197	16	1	2	0	63.50	3.97	7.94	0.00
Iron	11,152	10	1	0	0	89.67	8.97	0.00	0.00
Isabella	70,688	35	2	0	0	49.51	2.83	0.00	0.00
Jackson	158,636	62	4	34	2	39.08	2.52	21.43	1.26
Kalamazoo	262,745	91	0	18	0	34.63	0.00	6.85	0.00
Kalkaska	17,585	13	3	0	0	73.93	17.06	0.00	0.00
Kent	648,121	172	3	42	1	26.54	0.46	6.48	0.15
Keweenaw	2,111	1	0	0	0	47.37	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	2020 Chronic HCV Cases	2020 Acute HCV Cases	2020 Chronic HBV Cases	2020 Acute HBV Cases	2020 Chronic HCV Rate*	2020 Acute HCV Rate*	2020 Chronic HBV Rate*	2020 Acute HBV Rate*
Lake	11,852	2	2	0	0	16.87	16.87	0.00	0.00
Lapeer	88,038	25	1	1	1	28.40	1.14	1.14	1.14
Leelanau	21,652	1	0	0	0	4.62	0.00	0.00	0.00
Lenawee	98,381	48	2	3	0	48.79	2.03	3.05	0.00
Livingston	189,754	54	1	3	0	28.46	0.53	1.58	0.00
Luce	6,338	1	1	0	0	15.78	15.78	0.00	0.00
Mackinac	10,780	6	0	1	0	55.66	0.00	9.28	0.00
Macomb	870,325	306	17	53	3	35.16	1.95	6.09	0.34
Manistee	24,457	6	0	0	0	24.53	0.00	0.00	0.00
Marquette	66,686	27	1	2	2	40.49	1.50	3.00	3.00
Mason	28,954	11	2	0	0	37.99	6.91	0.00	0.00
Mecosta	43,251	11	0	0	0	25.43	0.00	0.00	0.00
Menominee	23,074	15	0	1	0	65.01	0.00	4.33	0.00
Midland	83,355	23	1	2	0	27.59	1.20	2.40	0.00
Missaukee	15,028	5	1	0	0	33.27	6.65	0.00	0.00
Monroe	149,727	126	1	7	0	84.15	0.67	4.68	0.00
Montcalm	63,413	32	0	2	0	50.46	0.00	3.15	0.00
Montmorency	9,265	4	0	3	0	43.17	0.00	32.38	0.00
Muskegon	173,297	58	0	7	0	33.47	0.00	4.04	0.00
Newaygo	48,366	15	1	1	0	31.01	2.07	2.07	0.00
Oakland	1,253,185	362	0	98	3	28.89	0.00	7.82	0.24
Oceana	26,416	8	0	0	0	30.28	0.00	0.00	0.00
Ogemaw	20,898	12	0	1	0	57.42	0.00	4.79	0.00
Ontonagon	5,877	2	0	0	0	34.03	0.00	0.00	0.00
Osceola	23,290	10	0	0	0	42.94	0.00	0.00	0.00
Oscoda	8,248	5	0	0	0	60.62	0.00	0.00	0.00
Otsego	24,490	6	0	0	1	24.50	0.00	0.00	4.08
Ottawa	286,558	31	5	7	0	10.82	1.74	2.44	0.00
Presque Isle	12,714	4	1	0	0	31.46	7.87	0.00	0.00
Roscommon	23,851	18	0	0	0	75.47	0.00	0.00	0.00
Saginaw	191,821	44	0	5	1	22.94	0.00	2.61	0.52
St Clair	159,247	72	7	5	0	45.21	4.40	3.14	0.00
St Joseph	60,836	21	0	1	0	34.52	0.00	1.64	0.00
Sanilac	41,295	20	0	1	0	48.43	0.00	2.42	0.00
Schoolcraft	8,048	0	0	0	0	0.00	0.00	0.00	0.00
Shiawassee	68,340	19	0	0	0	27.80	0.00	0.00	0.00
Tuscola	52,939	6	1	2	0	11.33	1.89	3.78	0.00
Van Buren	75,358	20	0	3	0	26.54	0.00	3.98	0.00
Washtenaw	367,000	108	8	34	1	29.43	2.18	9.26	0.27
Wayne	1,082,458	560	6	131	5	51.73	0.55	12.10	0.46
Wexford	33,256	17	0	2	0	51.12	0.00	6.01	0.00
MDOC	38,053	245	1	14	0	643.84	2.63	36.79	0.00
State-wide†	9,965,265	4,356	139	713	43	43.71	1.39	7.15	0.43

*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	2020 Young Adult (18-39) HCV Cases	2020 Heroin Treatment Admissions	2019 Heroin Overdose Deaths	2020 Young Adult (18-29) HCV Rate*	2020 Heroin Treatment Admission Rate*	2019 Heroin Overdose Death Rate*
Alcona	10,353	1,632	1	5	0	61.27	48.30	0.00
Alger	9,151	2,276	2	2	0	87.87	21.86	0.00
Allegan	116,143	29,976	6	51	1	20.02	43.91	1.10
Alpena	28,520	6,517	8	35	0	122.76	122.72	0.00
Antrim	23,206	4,605	6	24	0	130.29	103.42	0.00
Arenac	15,070	3,155	1	32	0	31.70	212.34	0.00
Baraga	8,421	2,142	3	10	0	140.06	118.75	0.00
Barry	60,540	15,307	7	41	2	45.73	67.72	4.02
Bay	104,104	27,147	26	383	5	95.77	367.90	5.62
Benzie	17,615	3,604	2	16	0	55.49	90.83	0.00
Berrien	154,133	39,824	28	329	8	70.31	213.45	6.53
Branch	43,513	11,075	14	58	1	126.41	133.29	2.88
Calhoun	134,212	36,563	32	387	7	87.52	288.35	4.99
Cass	51,523	11,904	11	39	1	92.41	75.69	2.35
Charlevoix	26,188	5,734	3	41	1	52.32	156.56	6.30
Cheboygan	25,418	5,351	13	41	1	242.95	161.30	3.64
Chippewa	37,629	11,752	14	9	0	119.13	23.92	0.00
Clare	30,651	6,747	12	85	1	177.86	277.32	3.79
Clinton	78,389	20,899	6	71	0	28.71	90.57	0.00
Crawford	13,892	2,784	3	24	0	107.76	172.76	0.00
Delta	36,026	7,892	16	15	0	202.74	41.64	0.00
Detroit City	674,841	211,406	101	2,847	99	47.78	421.88	13.70
Dickinson	25,439	5,732	9	38	0	157.01	149.38	0.00
Eaton	109,456	30,440	22	150	4	72.27	137.04	4.22
Emmet	33,104	7,984	6	27	1	75.15	81.56	4.47
Genesee	407,875	108,851	68	1,429	15	62.47	350.35	3.76
Gladwin	25,279	5,183	1	40	1	19.29	158.23	5.07
Gogebic	15,061	3,564	6	9	0	168.35	59.76	0.00
Grand Traverse	92,181	24,280	16	172	0	65.90	186.59	0.00
Gratiot	40,916	12,541	11	34	0	87.71	83.10	0.00
Hillsdale	45,757	11,662	4	51	1	34.30	111.46	3.08
Houghton	36,070	13,268	9	14	0	67.83	38.81	0.00
Huron	31,349	6,697	4	33	0	59.73	105.27	0.00
Ingham	290,587	114,890	46	915	27	40.04	314.88	9.90
Ionia	64,300	18,738	11	87	2	58.70	135.30	3.13
Iosco	25,197	4,921	10	37	0	203.21	146.84	0.00
Iron	11,152	2,060	5	4	0	242.72	35.87	0.00
Isabella	70,688	31,900	22	129	1	68.97	182.49	0.51
Jackson	158,636	42,699	27	377	1	63.23	237.65	0.69
Kalamazoo	262,745	91,151	43	420	5	47.17	159.85	1.89
Kalkaska	17,585	4,348	10	32	1	229.99	181.97	8.23
Kent	648,121	206,468	70	636	35	33.90	98.13	6.03
Keweenaw	2,111	323	1	1	0	309.60	47.37	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	Young Adult (18-39) Population	2020 Young Adult (18-39) HCV Cases	2020 Heroin Treatment Admissions	2019 Heroin Overdose Deaths	2020 Young Adult (18-29) HCV Rate*	2020 Heroin Treatment Admission Rate*	2019 Heroin Overdose Death Rate*
Lake	11,852	2,342	2	14	1	85.40	118.12	4.61
Lapeer	88,038	21,300	12	112	1	56.34	127.22	1.66
Leelanau	21,652	4,111	1	10	0	24.32	46.19	0.00
Lenawee	98,381	26,302	23	161	3	87.45	163.65	3.34
Livingston	189,754	46,265	20	139	8	43.23	73.25	4.54
Luce	6,338	1,795	0	2	0	0.00	31.56	0.00
Mackinac	10,780	2,120	3	0	0	141.51	0.00	0.00
Macomb	870,325	240,515	131	3,151	44	54.47	362.05	5.01
Manistee	24,457	5,482	4	77	1	72.97	314.84	4.02
Marquette	66,686	22,153	22	47	0	99.31	70.48	0.00
Mason	28,954	6,502	7	75	2	107.66	259.03	9.25
Mecosta	43,251	14,729	4	80	1	27.16	184.97	1.28
Menominee	23,074	5,044	11	2	0	218.08	8.67	0.00
Midland	83,355	22,044	12	178	1	54.44	213.54	1.71
Missaukee	15,028	3,445	3	10	0	87.08	66.54	0.00
Monroe	149,727	38,141	53	416	8	138.96	277.84	5.89
Montcalm	63,413	17,023	16	138	0	93.99	217.62	0.00
Montmorency	9,265	1,585	2	9	0	126.18	97.14	0.00
Muskegon	173,297	47,715	32	365	12	67.06	210.62	6.94
Newaygo	48,366	11,710	8	75	0	68.32	155.07	0.00
Oakland	1,253,185	346,113	117	1,953	9	33.80	155.84	0.80
Oceana	26,416	6,166	4	40	3	64.87	151.42	16.68
Ogemaw	20,898	4,298	4	14	0	93.07	66.99	0.00
Ontonagon	5,877	835	1	1	0	119.76	17.02	0.00
Osceola	23,290	5,487	5	25	1	91.12	107.34	5.90
Oscoda	8,248	1,511	3	5	0	198.54	60.62	0.00
Otsego	24,490	5,937	4	55	0	67.37	224.58	0.00
Ottawa	286,558	89,888	11	167	8	12.24	58.28	2.99
Presque Isle	12,714	2,172	2	4	0	92.08	31.46	0.00
Roscommon	23,851	4,004	10	29	0	249.75	121.59	0.00
Saginaw	191,821	52,530	25	441	3	47.59	229.90	1.94
St Clair	159,247	39,374	46	381	7	116.83	239.25	5.69
St Joseph	60,836	15,651	8	70	1	51.11	115.06	1.71
Sanilac	41,295	9,446	11	15	0	116.45	21.95	0.00
Schoolcraft	8,048	1,442	0	0	1	0.00	0.00	18.65
Shiawassee	68,340	18,053	8	126	3	44.31	167.20	4.15
Tuscola	52,939	12,669	3	58	0	23.68	15.80	0.00
Van Buren	75,358	18,558	11	59	6	59.27	5.45	7.96
Washtenaw	367,000	143,174	51	570	18	35.62	155.31	5.52
Wayne	1,082,458	293,694	179	2,811	104	60.95	259.69	9.70
Wexford	33,256	8,257	7	72	2	84.78	216.50	5.08
MDOC	38,053	9,593	154	-	-	1,605.34	-	-
State-wide†	9,965,265	2,835,574	1,748	21,140	471	61.65	212.14	4.73

*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 B1: Hepatitis Data by Local Health Jurisdiction

Local Health Jurisdiction	Total Population	2020 Chronic HCV Cases	2020 Acute HCV Cases	2020 Chronic HBV Cases	2020 Acute HBV Cases	2020 Chronic HCV Rate*	2020 Acute HCV Rate*	2020 Chronic HBV Rate*	2020 Acute HBV Rate*
Allegan	116,143	16	1	0	0	13.78	0.86	0.00	0.00
Barry-Eaton	169,996	78	4	17	0	45.88	2.35	10.00	0.00
Bay	104,104	43	4	4	1	41.30	3.84	3.84	0.96
Benzie-Leelanau	39,267	5	0	0	0	12.73	0.00	0.00	0.00
Berrien	154,133	68	3	9	1	44.12	1.95	5.84	0.65
Branch-Hillsdale-St. Joseph	150,106	57	0	5	0	37.97	0.00	3.33	0.00
Calhoun	134,212	68	2	6	2	50.67	1.49	4.47	1.49
Central Michigan	188,829	106	3	3	0	56.14	1.59	1.59	0.00
Chippewa	37,629	27	0	0	0	71.75	0.00	0.00	0.00
Delta-Menominee	59,100	35	7	3	0	59.22	11.84	5.08	0.00
Detroit City	674,841	666	9	103	7	98.69	1.33	15.26	1.04
Dickinson-Iron	36,591	21	3	0	0	57.39	8.20	0.00	0.00
District Health Department #10	263,057	92	11	5	0	34.97	4.18	1.90	0.00
District Health Department #2	64,696	34	2	4	0	52.55	3.09	6.18	0.00
District Health Department #4	75,917	41	3	3	2	54.01	3.95	3.95	2.63
Genesee	407,875	152	7	22	4	37.27	1.72	5.39	0.98
Grand Traverse	92,181	26	8	2	3	28.21	8.68	2.17	3.25
Huron	31,349	8	0	2	0	25.52	0.00	6.38	0.00
Ingham	290,587	137	4	34	0	47.15	1.38	11.70	0.00
Ionia	64,300	23	3	1	0	35.77	4.67	1.56	0.00
Jackson	158,636	62	4	34	2	39.08	2.52	21.43	1.26
Kalamazoo	262,745	91	0	18	0	34.63	0.00	6.85	0.00
Kent	648,121	172	3	42	1	26.54	0.46	6.48	0.15
Lapeer	88,038	25	1	1	1	28.40	1.14	1.14	1.14
Lenawee	98,381	48	2	3	0	48.79	2.03	3.05	0.00
Livingston	189,754	54	1	3	0	28.46	0.53	1.58	0.00
Luce-Mackinac-Alger-Schoolcraft	34,317	10	2	1	0	29.14	5.83	2.91	0.00
Macomb	870,325	306	17	53	3	35.16	1.95	6.09	0.34
Marquette	66,686	27	1	2	2	40.49	1.50	3.00	3.00
Midland	83,355	23	1	2	0	27.59	1.20	2.40	0.00
Mid-Michigan	182,718	73	0	6	0	39.95	0.00	3.28	0.00
Monroe	149,727	126	1	7	0	84.15	0.67	4.68	0.00
Muskegon	173,297	58	0	7	0	33.47	0.00	4.04	0.00
Northwest Michigan	106,988	32	3	3	2	29.91	2.80	2.80	1.87
Oakland	1,253,185	362	0	98	3	28.89	0.00	7.82	0.24
Ottawa	286,558	31	5	7	0	10.82	1.74	2.44	0.00
Saginaw	191,821	44	0	5	1	22.94	0.00	2.61	0.52
Sanilac	41,295	20	0	1	0	48.43	0.00	2.42	0.00
Shiawassee	68,340	19	0	0	0	27.80	0.00	0.00	0.00
St Clair	159,247	72	7	5	0	45.21	4.40	3.14	0.00
Tuscola	52,939	6	1	2	0	11.33	1.89	3.78	0.00
Van Buren-Cass	126,881	45	0	6	0	35.47	0.00	4.73	0.00
Washtenaw	367,000	108	8	34	1	29.43	2.18	9.26	0.27
Wayne	1,082,458	560	6	131	5	51.73	0.55	12.10	0.46
Western Upper Peninsula	67,540	29	1	2	2	42.94	1.48	2.96	2.96
MDOC	38,053	245	1	14	0	643.84	2.63	36.79	0.00
Statewide†	9,965,265	4,356	139	713	43	43.71	1.39	7.15	0.43

*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	2020 Young Adult (18-39) HCV Cases	2020 Heroin Treatment Admissions	2019 Heroin Overdose Deaths	2020 Young Adult (18-29) HCV Rate*	2020 Heroin Treatment Admission Rate*	2019 Heroin Overdose Death Rate*
Allegan	116,143	29,976	6	51	1	20.02	43.91	1.10
Barry-Eaton	169,996	45,747	29	191	6	63.39	112.36	4.11
Bay	104,104	27,147	26	383	5	95.77	367.90	5.62
Benzie-Leelanau	39,267	7,715	3	26	0	38.89	66.21	0.00
Berrien	154,133	39,824	28	329	8	70.31	213.45	6.53
Branch-Hillsdale-St. Joseph	150,106	38,388	26	179	3	67.73	119.25	2.42
Calhoun	134,212	36,563	32	387	7	87.52	288.35	4.99
Central Michigan	188,829	56,476	51	340	4	90.30	180.06	2.29
Chippewa	37,629	11,752	14	9	0	119.13	23.92	0.00
Delta-Menominee	59,100	12,936	27	17	0	208.72	28.76	0.00
Detroit City	674,841	211,406	101	2,847	99	47.78	421.88	13.70
Dickinson-Iron	36,591	7,792	14	42	0	179.67	114.78	0.00
District Health Department #10	263,057	65,765	52	499	11	79.07	189.69	4.76
District Health Department #2	64,696	12,362	18	61	0	145.61	94.29	0.00
District Health Department #4	75,917	15,625	25	89	1	160.00	117.23	1.32
Genesee	407,875	108,851	68	1,429	15	62.47	350.35	3.76
Grand Traverse	92,181	24,280	16	172	0	65.90	186.59	0.00
Huron	31,349	6,697	4	33	0	59.73	105.27	0.00
Ingham	290,587	114,890	46	915	27	40.04	314.88	9.90
Ionia	64,300	18,738	11	87	2	58.70	135.30	3.13
Jackson	158,636	42,699	27	377	1	63.23	237.65	0.69
Kalamazoo	262,745	91,151	43	420	5	47.17	159.85	1.89
Kent	648,121	206,468	70	636	35	33.90	98.13	6.03
Lapeer	88,038	21,300	12	112	1	56.34	127.22	1.66
Lenawee	98,381	26,302	23	161	3	87.45	163.65	3.34
Livingston	189,754	46,265	20	139	8	43.23	73.25	4.54
Luce-Mackinac-Alger-Schoolcraft	34,317	7,633	5	4	1	65.51	11.66	3.47
Macomb	870,325	240,515	131	3,151	44	54.47	362.05	5.01
Marquette	66,686	22,153	22	47	0	99.31	70.48	0.00
Midland	83,355	22,044	12	178	1	54.44	213.54	1.71
Mid-Michigan	182,718	50,463	33	243	0	65.39	132.99	0.00
Monroe	149,727	38,141	53	416	8	138.96	277.84	5.89
Muskegon	173,297	47,715	32	365	12	67.06	210.62	6.94
Northwest Michigan	106,988	24,260	19	147	2	78.32	137.40	2.92
Oakland	1,253,185	346,113	117	1,953	9	33.80	155.84	0.80
Ottawa	286,558	89,888	11	167	8	12.24	58.28	2.99
Saginaw	191,821	52,530	25	441	3	47.59	229.90	1.94
Sanilac	41,295	9,446	11	15	0	116.45	36.32	0.00
Shiawassee	68,340	18,053	8	126	3	44.31	184.37	4.15
St Clair	159,247	39,374	46	381	7	116.83	239.25	5.69
Tuscola	52,939	12,669	3	58	0	23.68	109.56	0.00
Van Buren-Cass	126,881	30,462	22	98	7	72.22	77.24	5.67
Washtenaw	367,000	143,174	51	570	18	35.62	155.31	5.52
Wayne	1,082,458	293,694	179	2,811	104	60.95	259.69	9.70
Western Upper Peninsula	67,540	20,132	20	35	0	99.34	51.82	0.00
MDOC	38,053	9,593	154	-	-	1,605.34	-	-
Statewide†	9,965,265	2,835,574	1,748	21,140	471	61.65	212.14	4.80

*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 C1: Hepatitis Data by Region

Region	Total Population	2020 Chronic HCV Cases	2020 Acute HCV Cases	2020 Chronic HBV Cases	2020 Acute HBV Cases	2020 Chronic HCV Rate*	2020 Acute HCV Rate*	2020 Chronic HBV Rate*	2020 Acute HBV Rate*
1	1,080,216	438	15	94	2	40.55	1.39	8.70	0.19
3	1,105,821	373	16	45	7	33.73	1.45	4.07	0.63
5	959,003	346	6	45	3	36.08	0.63	4.69	0.31
6	1,519,157	433	19	61	1	28.50	1.25	4.02	0.07
7	442,422	167	20	12	7	37.75	4.52	2.71	1.58
8	301,863	149	14	8	4	49.36	4.64	2.65	1.33
2N	2,282,757	740	24	156	6	32.42	1.05	6.83	0.26
2S	2,274,026	1,460	24	275	13	64.20	1.06	12.09	0.57
MDOC	38,053	245	1	14	0	643.84	2.63	36.79	0.00
Statewide†	9,965,265	4,356	139	713	43	43.71	1.39	7.15	0.43

*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	2020 Young Adult (18-39) HCV Cases	2020 Heroin Treatment Admissions	2019 Heroin Overdose Deaths	2020 Young Adult (18-29) HCV Rate*	2020 Heroin Treatment Admission Rate*	2019 Heroin Overdose Death Rate*
1	1,080,216	323,751	167	2,024	47	51.58	187.37	4.69
3	1,105,821	281,384	181	2,782	26	64.32	251.58	2.63
5	959,003	270,009	160	1,454	32	59.26	151.62	3.64
6	1,519,157	465,415	204	1,916	67	43.83	126.12	4.79
7	442,422	100,200	100	678	7	99.80	153.25	1.85
8	301,863	82,398	102	154	1	123.79	51.02	0.50
2N	2,282,757	626,002	294	5,485	60	46.96	240.28	2.75
2S	2,274,026	686,415	384	6,644	229	55.94	292.17	10.21
MDOC	38,053	9,593	154	-	-	1,605.34	-	-
Statewide†	9,965,265	2,835,574	1,748	21,140	471	61.65	212.14	4.80

*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