Pennsylvania Viral Hepatitis Surveillance Report 2013 - 2022

Bureau of Epidemiology

January 2025

pennsylvania
DEPARTMENT OF HEALTH

Abbreviations

Term	Abbreviation
American Communities Survey	ACS
Centers for Disease Control and Prevention	CDC
Council of State and Territorial Epidemiologists	CSTE
Federally Qualified Health Centers	FQHC
Hepatitis A virus	HAV
Hepatitis B virus	HBV
Hepatitis C virus	HCV
Pennsylvania Department of Health	PA DOH
Pennsylvania National Electronic Disease Surveillance System	PA-NEDSS
Viral Hepatitis Elimination	VHE

Executive Summary

This report summarizes hepatitis A, B and C surveillance data collected from case reports submitted to the Pennsylvania National Electronic Diseases Surveillance System (PA-NEDSS) from 2013 through 2022. This report excludes Philadelphia data as Philadelphia viral hepatitis surveillance data are summarized here. Viral hepatitis surveillance informs prevention and intervention efforts to control the spread of these infectious conditions. Hepatitis A and B are preventable by vaccination and hepatitis C is curable with appropriate diagnosis and treatment.

Summary of the key findings from this 2013-2022 Pennsylvania Viral Hepatitis Surveillance Report:

	Acute Hepatitis A	**Acute Hepatitis B**	**Chronic Hepatitis B***	**Acute Hepatitis C**	**Chronic Hepatitis C***
Total cases: 2013-2022	843	431	15966	694	136808
Gender most affected 2013-2022	Males	Males	Males	Males	Males
Age group (in years) most affected 2013-2022	20–39	40–64	40–64	20–39	20–39
Total cases: 2022	66	32	1856	69	8528
Average age (in years) of reported cases by gender: 2022	**Males**: 46 **Females**: 43	**Males**: 50 **Females**: 44	**Males**: 49 **Females**: 46	**Males**: 41 **Females**: 36	**Males**: 46 **Females**: 45
Highest rate/100,000 by race/ethnicity: 2022	Hispanic	White	Asian/Pacific Islander	White	Hispanic
Highest regional counts: 2022	Southeast (excluding Philadelphia)	Southwest	Southeast (excluding Philadelphia)	Southwest	Southeast (excluding Philadelphia)
Rate/100,000: 2022	0.5	0.3	14.4	0.5	66.1
Comparison with national rate: 2022	Lower	Lower	n/a†	Lower	n/a†

*Newly reported chronic cases

†National statistics are unavailable for chronic hepatitis B and chronic hepatitis C given not all jurisdictions report counts to CDC

This report highlights the significant burden of viral hepatitis across Pennsylvania and identifies disparities by age, sex, race/ethnicity and geography. Rates of viral hepatitis in Pennsylvania, excluding Philadelphia, are lower than national rates but counts of acute and chronic cases are substantial. This work informs viral hepatitis elimination planning and efforts to increase service access for populations in need including people who use drugs and people of reproductive age. The Pennsylvania Department of Health (PA DOH) will continue to partner with organizations that serve populations in need to increase service

delivery at facility types such as correctional institutions and Federally Qualified Health Centers (FQHC).

Background

Viral hepatitis refers to liver inflammation caused by different viruses, namely the hepatitis A, B, C, D, and E viruses. In the United States (U.S.), the most common types of viral hepatitis are hepatitis A, B, and C. These viruses pose varying degrees of health risks and are significant causes of acute and chronic liver disease.[1]

Hepatitis A is a vaccine-preventable liver disease caused by the hepatitis A virus (HAV).[2] HAV is usually transmitted person-to-person through the fecal–oral route, mainly through ingestion of contaminated food or water. Since 2016, transmission in the U.S. has been driven by person-to-person outbreaks among people who use drugs, people experiencing homelessness, and men who have sex with men.[3] Vaccination is the best way to prevent hepatitis A.[2] Most adults and older children with hepatitis A have symptoms that usually resolve within months after infection, although severe illness and death can occur, particularly in adults. Children younger than 6 years old usually don't' have symptoms (asymptomatic) of infections.[2] Signs and symptoms associated with hepatitis A can include one or more of the following: fever, fatigue, nausea, vomiting, loss of appetite, abdominal pain, dark urine, and clay-colored stools. Hepatitis A is usually a self-limited disease that does not result in chronic infection. No specific antiviral treatment is available. Severe cases are uncommon but may lead to liver transplantation and/or death. In Pennsylvania, hepatitis A vaccine has been required for childcare entry since 2006 but is not required for kindergarten entry.[4]

Hepatitis B is caused by hepatitis B virus (HBV). HBV is transmitted when blood, semen, or other bodily fluids from a person infected with the virus enters the body of someone who is uninfected.[5] This can happen through sexual contact; sharing needles, syringes, or other drug-injection equipment; or from mother to baby at birth. Acute HBV infection is a short-term illness that occurs within the first six months after exposure to the virus. No specific treatment is available for acute hepatitis B, but treatment is available for chronic hepatitis B. Acute infection can — but does not always — lead to chronic infection.[6] Progression to chronic disease is more likely if exposure occurs in infancy compared to adulthood. Prevention of perinatal transmission of hepatitis B is especially important for this reason. Chronic infection can cause cirrhosis (scarring) of the liver, liver cancer, liver failure, and death. Vaccination is the best way to prevent hepatitis B. In Pennsylvania, hepatitis B vaccine has been required for childcare entry since 1994 and for kindergarten entry since 1997.[7]

Hepatitis C is a liver infection caused by the hepatitis C virus (HCV). HCV is transmitted when someone comes into contact with blood from a person with HCV infection. It is the most common bloodborne illness in the United States, affecting more than 3 million people and is the leading cause of liver cancer and liver transplants.[8] Once a person is infected, HCV can cause acute or chronic infection. An acute infection is a short-term illness that happens within the first six months after exposure to the virus. During this time, many people do not show any symptoms which makes diagnosis difficult and leads to the underreporting of cases.

However, more than half of all acute infections lead to chronic infections which can have serious long-term health complications.[8] Like chronic hepatitis B, chronic hepatitis C can result in cirrhosis (scarring of the liver that results in diminished function), liver cancer, and death. Individuals might not be aware of their infection because they are not clinically ill in the early stages of their disease. The most effective way to prevent hepatitis C is by avoiding behaviors that can spread the disease, especially sharing injection drug use equipment.[8] No vaccine is available to prevent hepatitis C; however, curative treatment is available.

Characteristic	Hepatitis A	Hepatitis B	Hepatitis C
Main route of transmission	Fecal-oral	Blood, sexual	Blood
Incubation period	15-50 days	60-150 days	14-182 days
Vaccine available?	Yes	Yes	No
Treatment	Supportive care only	Yes	Yes
Perinatal transmission	No	Yes	Yes
Symptoms (Acute Infection)	Jaundice, fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, joint pain, dark urine, clay-colored stools, diarrhea	Jaundice, fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, joint pain, dark urine, clay-colored stools	Jaundice, fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, joint pain, dark urine, clay-colored stools

Pennsylvania Viral Hepatitis Elimination Planning

In 2019, the PA DOH selected 30 external partners to serve as Viral Hepatitis Elimination Planning Committee members tasked with drafting an elimination plan in partnership with PA DOH. In October 2019, the Planning Committee drafted Viral Hepatitis Elimination (VHE) plan goals and objectives[9] and they divided the VHE plan into four sections with corresponding workgroups to refine the goals and objectives under each section.

Prevention and Education

- Goal 1: Raise public awareness of viral hepatitis prevention and education as a statewide priority.
- Goal 2: Expand the availability of co-located viral hepatitis and harm reduction services and programs throughout the state.

Testing and Linkage to Care

- Goal 1: Ensure all Pennsylvanians know their hepatitis B and C status.
- Goal 2: Ensure all Pennsylvanians living with hepatitis B and/or C have access to sustainable, appropriate medical care and treatment.

Treatment Access

- Goal 1: Ensure that every individual living with hepatitis B and C in Pennsylvania receives treatment.

- Goal 2: Expand the number of hepatitis B and hepatitis C treatment providers in Pennsylvania.
- Goal 3: Significantly reduce stigma surrounding hepatitis B and C among patients and health care providers.

Data and Surveillance

- Goal 1: Continuously monitor the hepatitis B and C care cascade (measurement of access to all aspects of diagnosis and treatment) of every diagnosed Pennsylvanian.
- Goal 2: Continuously monitor hepatitis B and C-related morbidity and mortality.
- Goal 3: Ensure viral hepatitis data findings are comprehensively summarized for public consumption.

In 2021, PA DOH conducted listening session opportunities for people affected by viral hepatitis to share their experience navigating the disease in Pennsylvania. People with lived experience shared several themes:

- Barriers to diagnosis and treatment exist throughout the state, including insurance barriers, but community-based organizations can assist in reducing these barriers.
- Viral hepatitis has significantly affected people's lives, especially related to fear and anxiety over premature death and transmission to family members.

In 2023, PA DOH updated the Pennsylvania Viral Hepatitis Elimination Plan and published it here. This Viral Hepatitis Annual Report 1) aligns with the data and surveillance goals, providing an overview of the current burden of acute hepatitis A and acute and chronic hepatitis B and C within the state; and 2) provides a baseline for reviewing the progress as per the elimination plan as well as strategizing on areas for improvement/change.

Methods

Data Collection and Case Investigation

PA DOH retrieved 10 years of viral hepatitis case data from PA-NEDSS. PA DOH uses PA-NEDSS to collect and store information about cases of reportable disease, including viral hepatitis. PA-NEDSS allows health care systems, providers, and laboratories to submit information regarding reportable diseases (including acute and chronic viral hepatitis) to PA DOH, either electronically or manually. The information, along with information collected by public health investigators, is reviewed to determine if a case meets the Council of State and Territorial Epidemiologists (CSTE) case definition, either acute or chronic.[10] This information is assembled into datasets which PA DOH epidemiologists use to conduct analyses to inform interventions. This report excludes Philadelphia data as Philadelphia viral hepatitis surveillance data are managed separately and are summarized here.[11]

Data Cleaning

Case data included in this report are those submitted to the Centers for Disease Control and Prevention (CDC) through weekly reporting. We removed duplicate investigations that were submitted in multiple years. We also conducted a person-to-person match between PA-

NEDSS data and Pennsylvania Statewide Immunization Information System data to collect additional race and ethnicity data. PA DOH conducted data cleaning and preparation in the SAS Enterprise Guide platform.

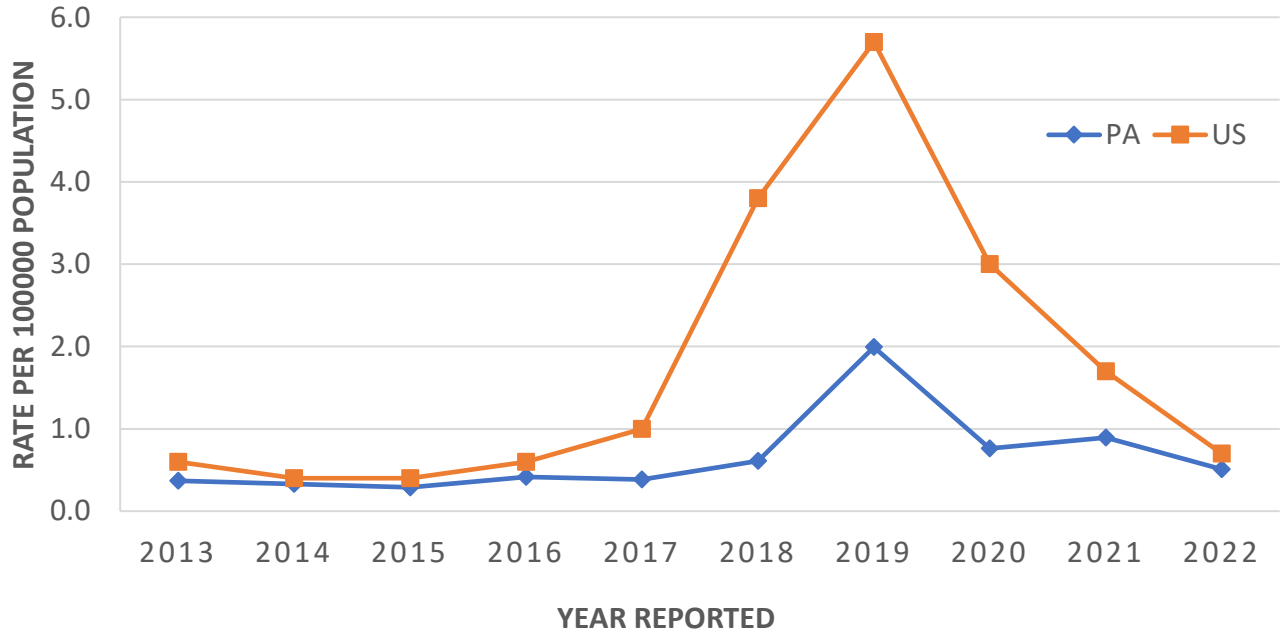
Data Summary
Figures and maps were created using RStudio version 4.2.1. We presented case counts and rates by age, sex, race, ethnicity and geographic region including state, county, and Pennsylvania Community Health District. We used the U.S. Census Bureau's American Communities Survey (ACS) one-year population estimates. We compared rates of acute hepatitis A, B and C in Pennsylvania, exclusive of Philadelphia, with national rates published by the CDC Division of Viral Hepatitis.[12]

Data Mapping
PA DOH used shapefiles from the 2020 U.S. Census to create county maps. We excluded cases associated with correctional settings for mapping purposes. To create perinatal hepatitis B and C exposure maps, we conducted a person-to-person match between PA-NEDSS data and the Pennsylvania birth registry to determine the number of infants born in 2022 to birthing parents living with hepatitis B and C by county of residence at time of pregnancy outcome.

Findings

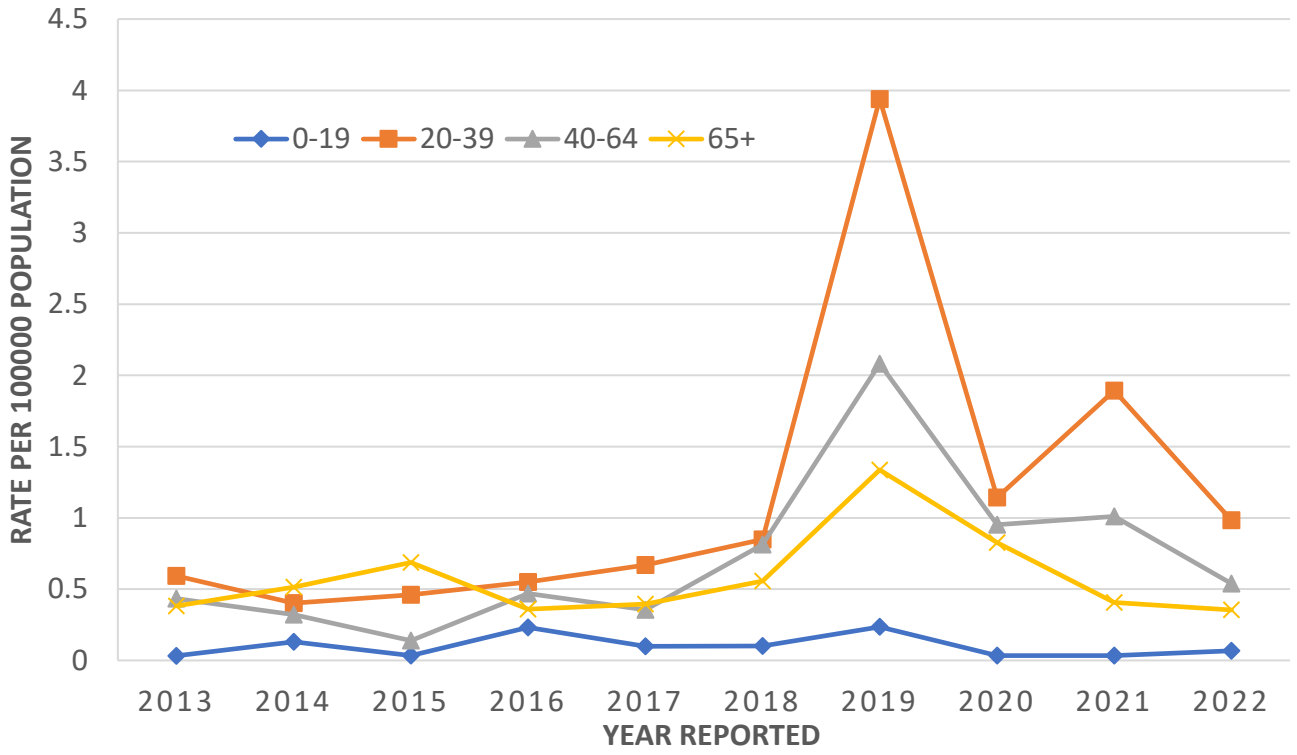
Acute Hepatitis A

Figure 1.1: Rates of reported acute hepatitis A, per 100,000 population, Pennsylvania, excluding Philadelphia, and US, 2013-2022.



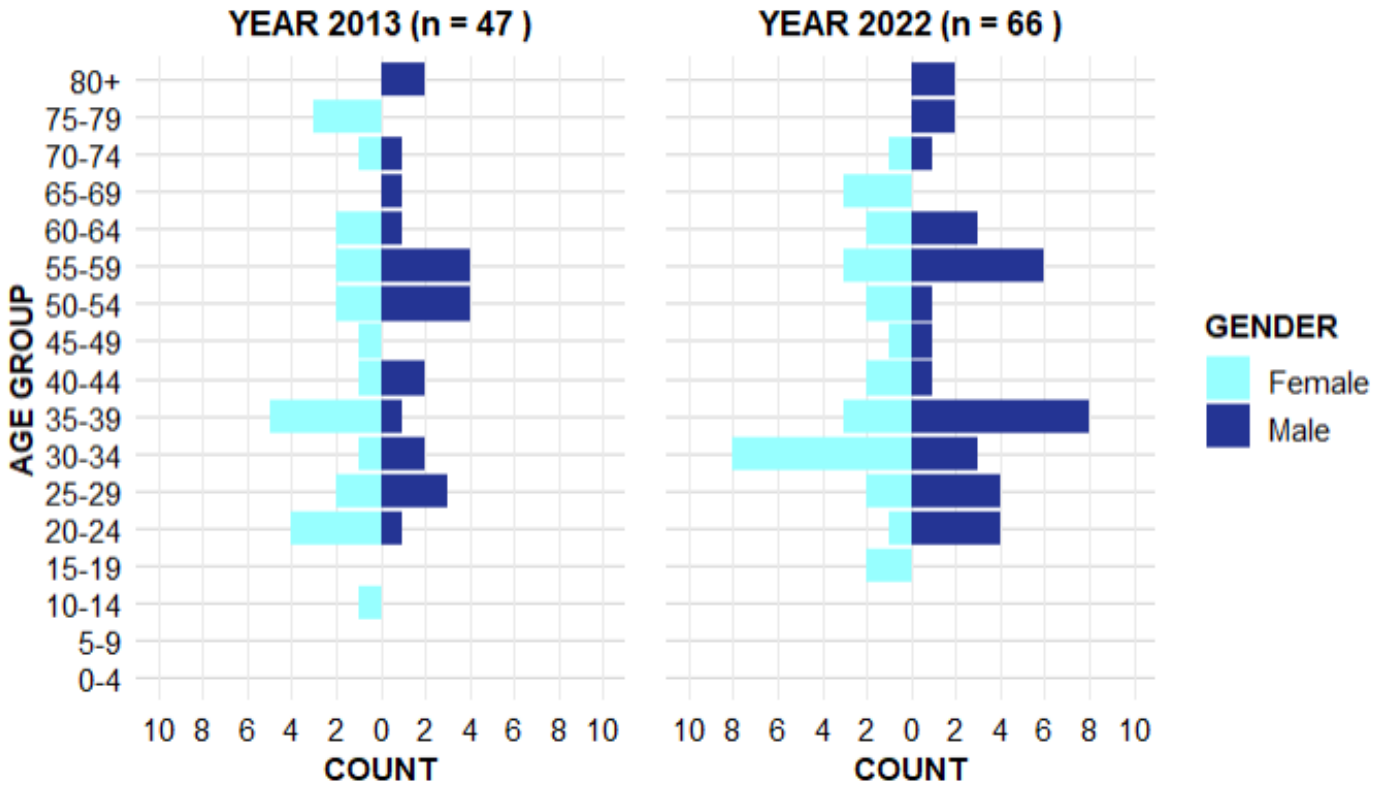
From 2013 to 2016 (**Figure 1.1**), the national and Pennsylvania rates of acute hepatitis A were relatively stable, with the national rates being slightly higher. Beginning in 2017, hepatitis A incidence increased in Pennsylvania and nationally due to widespread person-to-person outbreaks among people who use drugs and/or experiencing homelessness, peaking in 2019. Pennsylvania declared a person-to-person hepatitis A outbreak in 2018 and rates have declined since 2020.

Figure 1.2: Rates of reported acute hepatitis A, per 100,000 population, by age group, Pennsylvania, excluding Philadelphia, 2013 to 2022.



From 2013 to 2017, all age groups maintained relatively stable rates. There was, however, a peak for all age groups except 0–19-year-olds in 2019). Over time, 20–39-year-olds experienced the highest peak and post-2019, their rate decreased but remained elevated compared to the other age groups (**Figure 1.2**).

Figure 1.3: Age distribution of reported acute hepatitis A cases by sex, Pennsylvania, excluding Philadelphia, 2013 and 2022.



The average age of female hepatitis A case-patients was 44 and 43 years in 2013 and 2022 respectively, while the average age of males was 50 and 46 years in 2013 and 2022 respectively. (**Figure 1.3**).

Figure 1.4: Distribution of reported acute hepatitis A cases by race, Pennsylvania, excluding Philadelphia, 2022 (n=66).

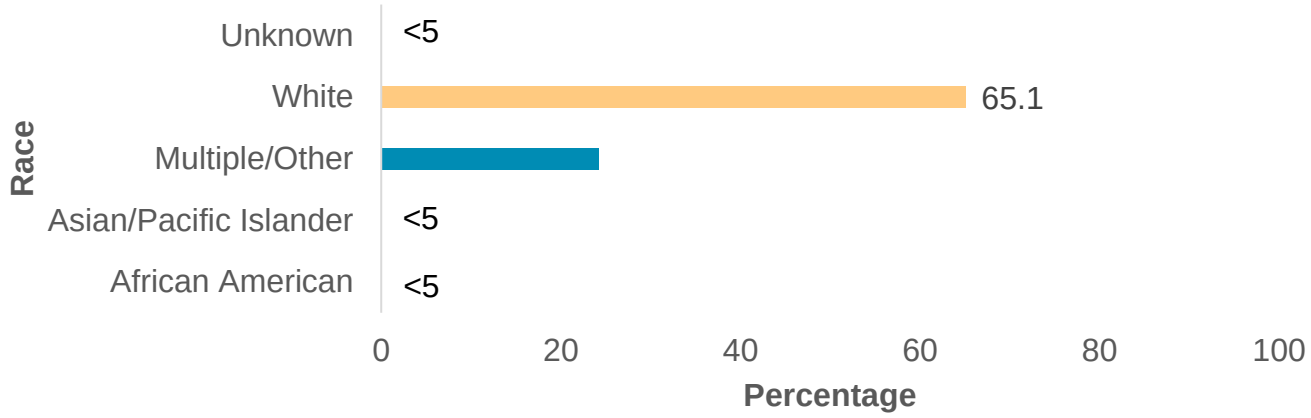


Figure 1.5: Distribution of reported acute hepatitis A cases by ethnicity, Pennsylvania, excluding Philadelphia, 2022 (n=66).

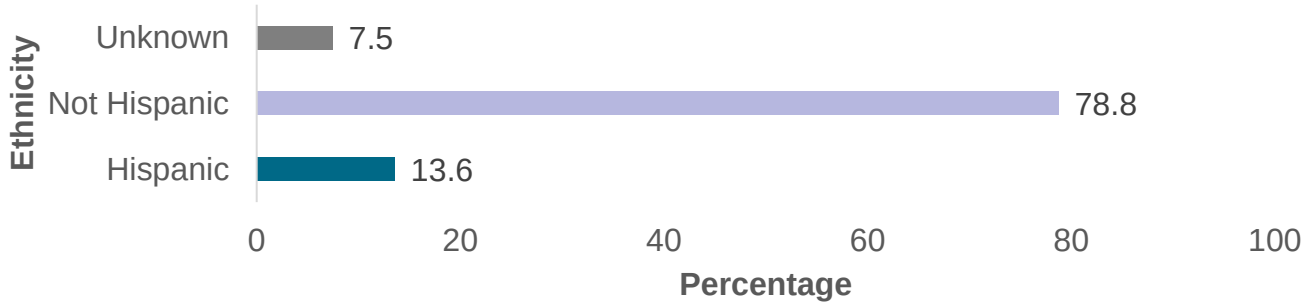
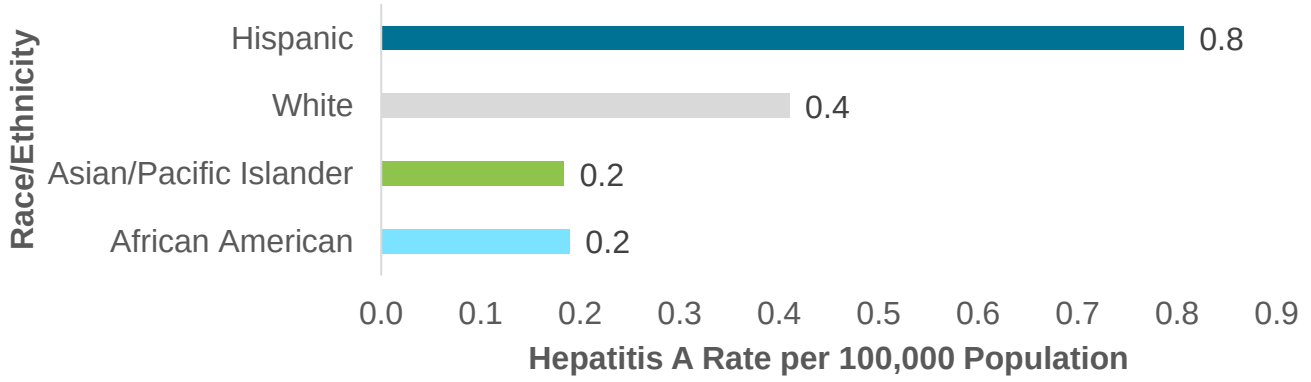
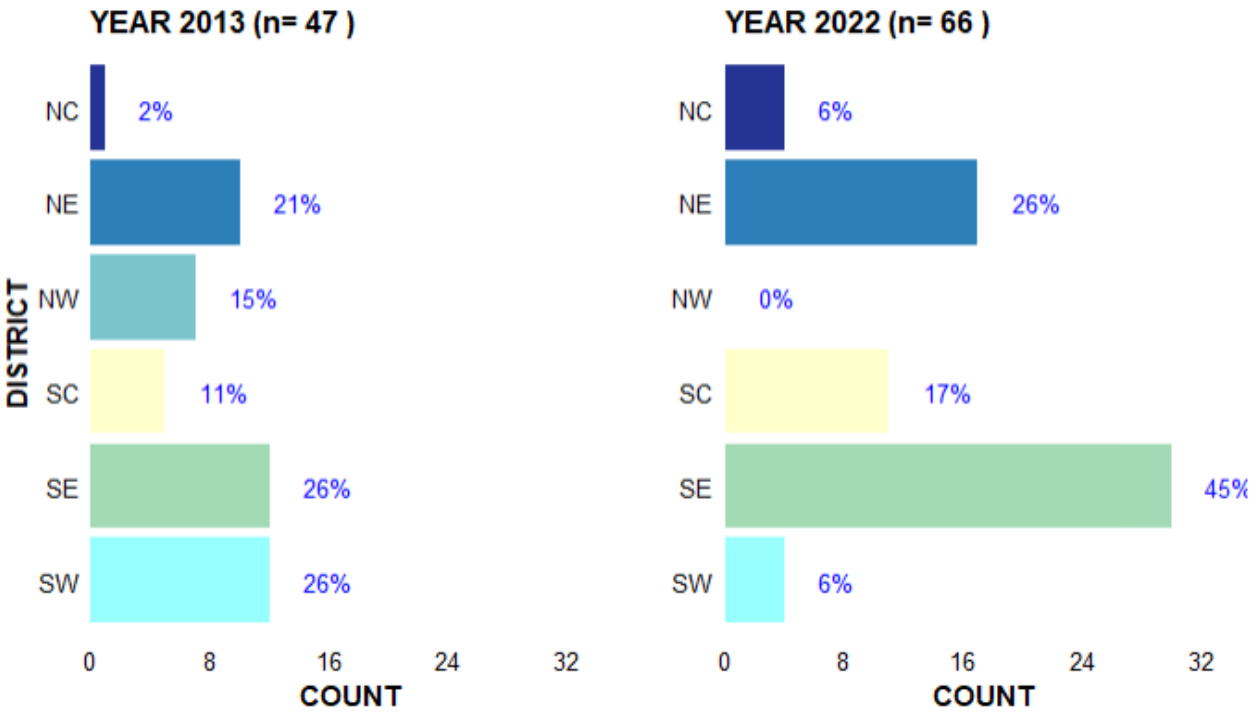


Figure 1.6: Acute hepatitis A rates per 100,000 population by race and ethnicity, Pennsylvania, excluding Philadelphia, 2022. NOTE: Categories are not mutually exclusive.



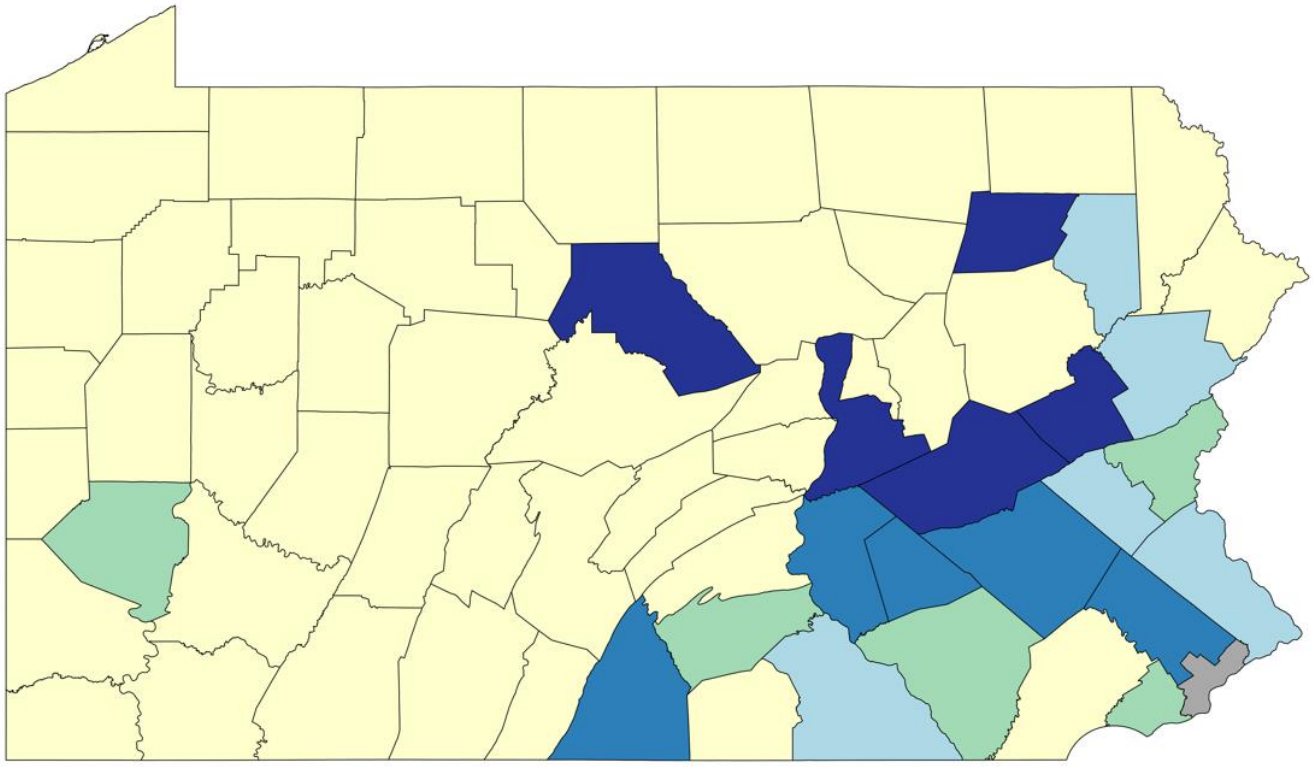
In 2022, the proportion of cases of acute hepatitis A was highest in persons identifying as white, but per population, people identifying as Hispanic experienced the highest rate (**Figure 1.4-1.6**).

Figure 1.7: Reported acute hepatitis A cases by PA DOH Community Health District, Pennsylvania, excluding Philadelphia, 2013 and 2022.



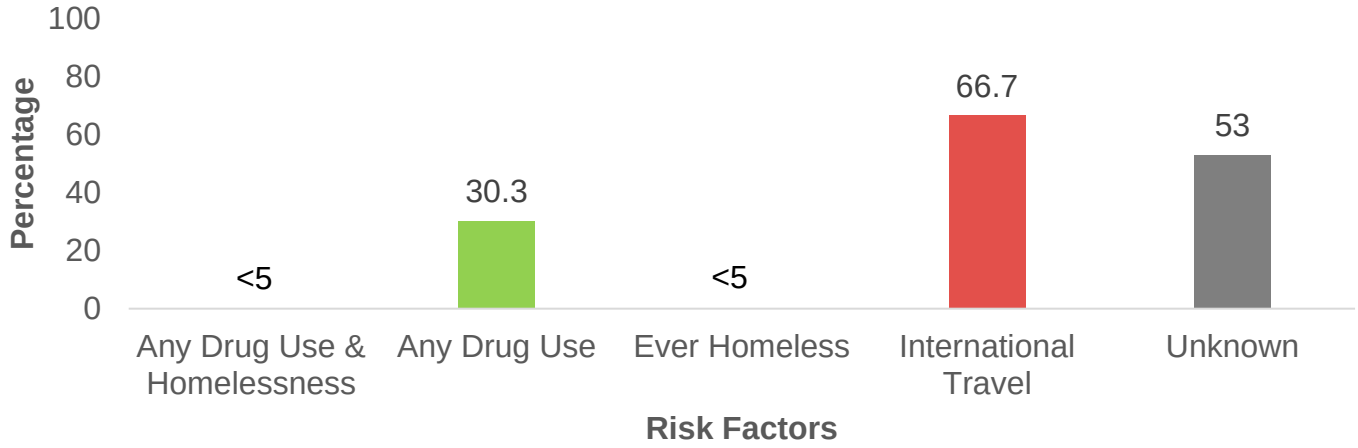
Acute hepatitis A cases reported in 2013 and 2022 occurred primarily in the eastern part of the state (**Figure 1.7 and 1.8**). By 2022, almost half of cases were reported in the Southeast District and cases increased in the Southcentral District as well (**Figure 1.7**).

Figure 1.8: Acute hepatitis A rates by county, per 100,000 population, Pennsylvania, excluding Philadelphia, 2022.



Rate per 100,000 Population	Pennsylvania County Names
No cases	ADAMS, ARMSTRONG, BEAVER, BEDFORD, BLAIR, BRADFORD, BUTLER, CAMBRIA, CAMERON, CENTRE, CHESTER, CLARION, CLEARFIELD, COLUMBIA, CRAWFORD, ELK, ERIE, FAYETTE, FOREST, FULTON, GREENE, HUNTINGDON, INDIANA, JEFFERSON, JUNIATA, LAWRENCE, LUZERNE, LYCOMING, MCKEAN, MERCER, MIFFLIN, MONTOUR, PERRY, PIKE, POTTER, SNYDER, SOMERSET, SULLIVAN, SUSQUEHANNA, TIOGA, UNION, VENANGO, WARREN, WASHINGTON, WAYNE, WESTMORELAND
(>0.0 - 0.4)	ALLEGHENY, CUMBERLAND, DELAWARE, LANCASTER, NORTHAMPTON
(>0.4 - 0.6)	BUCKS, LACKAWANNA, LEHIGH, MONROE, YORK
(>0.6 – 1.9)	BERKS, DAUPHIN, FRANKLIN, LEBANON, MONTGOMERY
(>1.9)	CARBON, CLINTON, NORTHUMBERLAND, SCHUYLKILL, WYOMING
	PHILADELPHIA (Excluded)

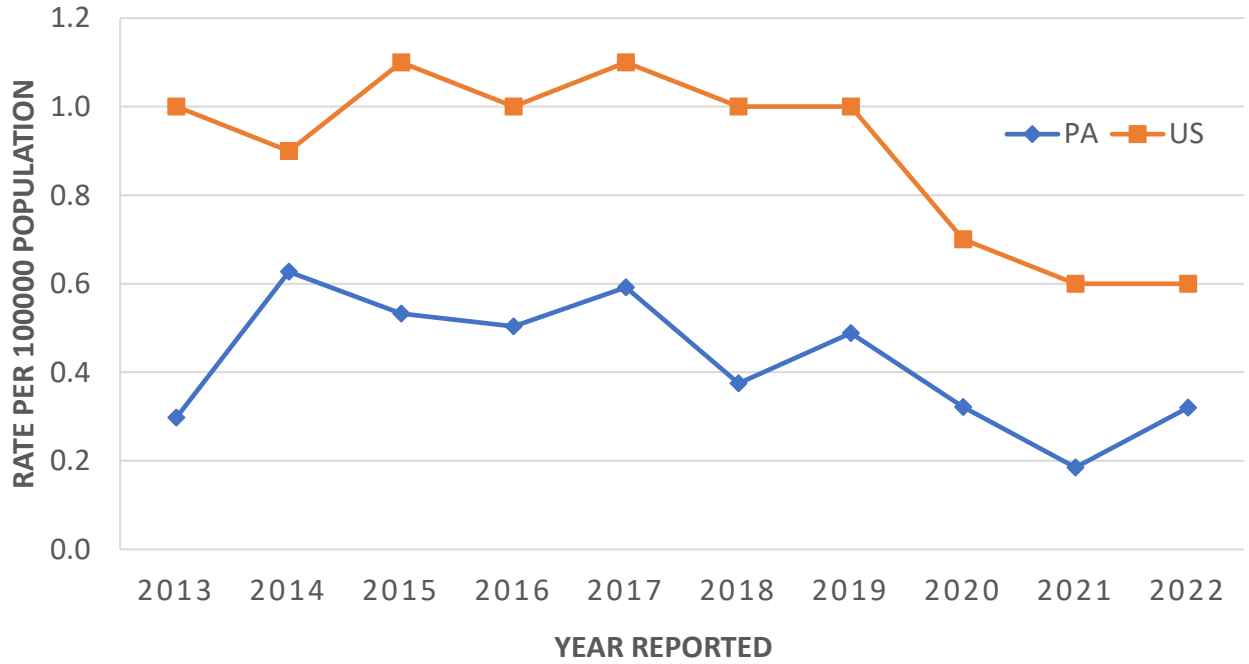
Figure 1.9: Acute Hepatitis A risk factors, Pennsylvania, excluding Philadelphia, 2022 (n=66).



In 2022, 30% of case-patients reported drug use, either injection or non-injection. The risk factors are unknown for over half of cases. The categories are mutually exclusive. (**Figure 1.9**).

Acute Hepatitis B

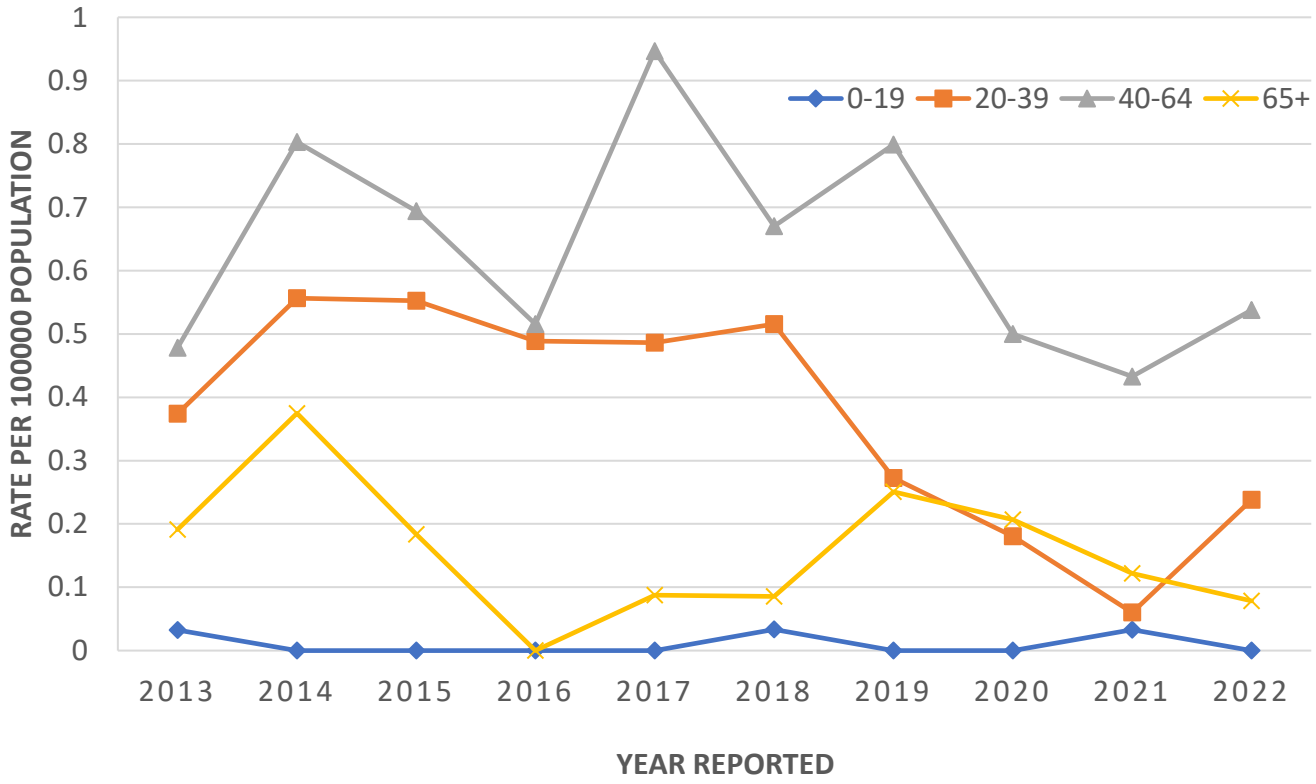
Figure 2.1: Rates of reported acute hepatitis B per 100,000 population, Pennsylvania, excluding Philadelphia, and US, 2013 to 2022.



The national and Pennsylvania rates of acute hepatitis B trended similarly, yet the U.S. rate exceeded the Pennsylvania rate over the decade (**Figure 2.1**). Both trends suggest a general

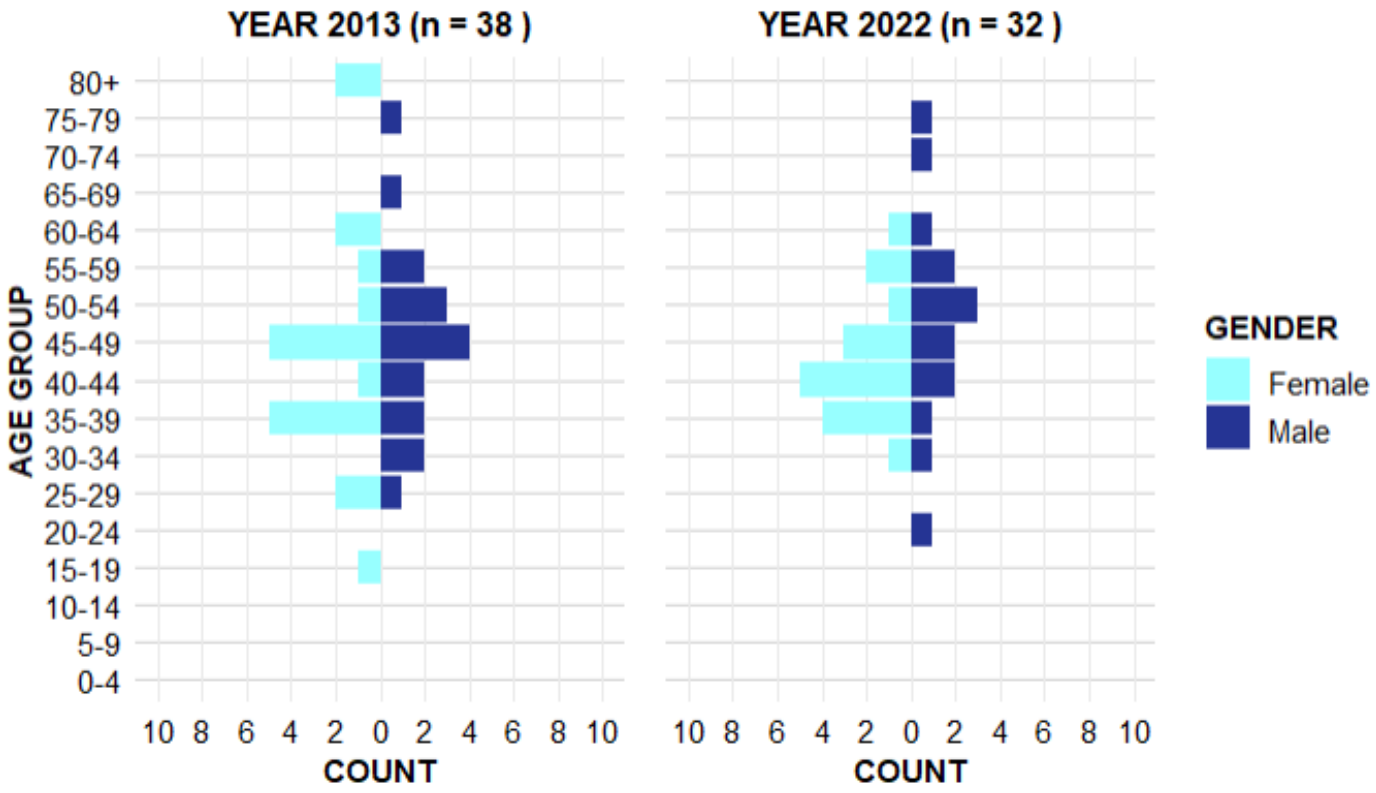
decrease in recent years likely due to health care interruptions during the COVID-19 pandemic, but the rate increased in Pennsylvania in 2022.

Figure 2.2: Rate of reported acute hepatitis B cases, per 100,000 population, by age group, Pennsylvania, excluding Philadelphia, 2013 to 2022.



Rates of acute hepatitis B remain highest for 40-64-year-olds (**Figure 2.2**). Rates have significantly decreased for 20-39-year-olds from 2018 to 2021 but increased in 2022. Rates also more recently decreased for those 65 and older (**Figure 2.2**).

Figure 2.3: Age distribution of reported acute hepatitis B cases by sex, Pennsylvania, excluding Philadelphia, 2013 vs 2022.



The average age of reported female acute hepatitis B case-patients was 46 and 44 years in 2013 and 2022 respectively, while the average for males was 47 and 50 years in 2013 and 2022 respectively. More cases were reported in 2013 than 2022 especially among males, whereas more young, female case-patients were reported in 2022 (**Figure 2.3**).

Figure 2.4: Distribution of reported acute hepatitis B cases by race, Pennsylvania, excluding Philadelphia, 2022 (n=32).

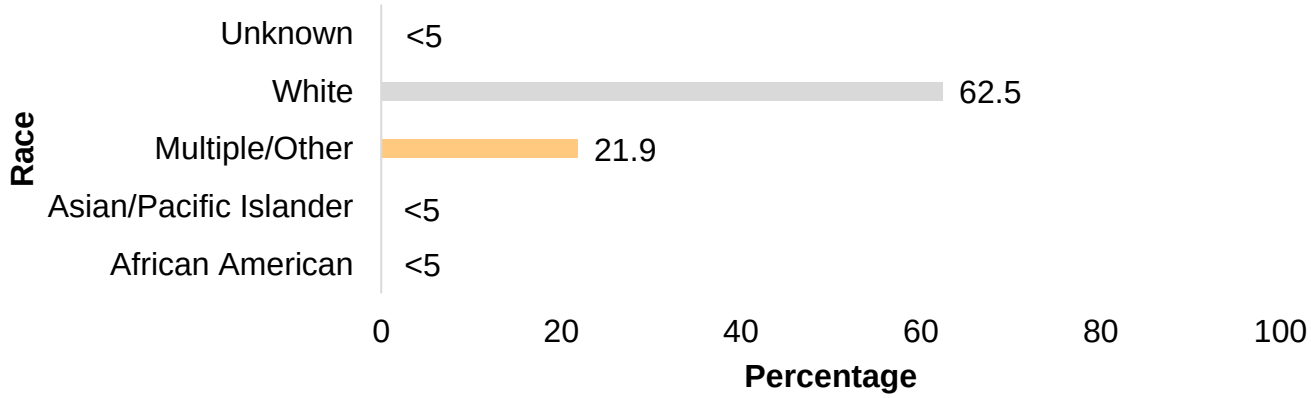


Figure 2.5: Distribution of reported acute hepatitis B cases by ethnicity, Pennsylvania, excluding Philadelphia, 2022 (n=32).

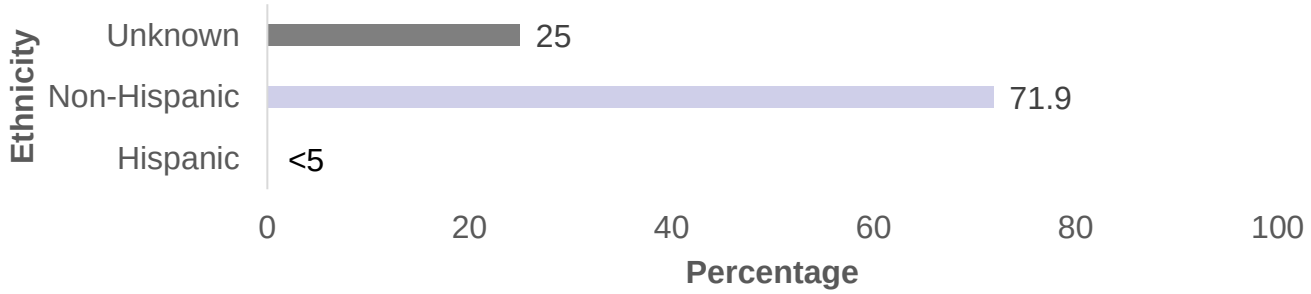
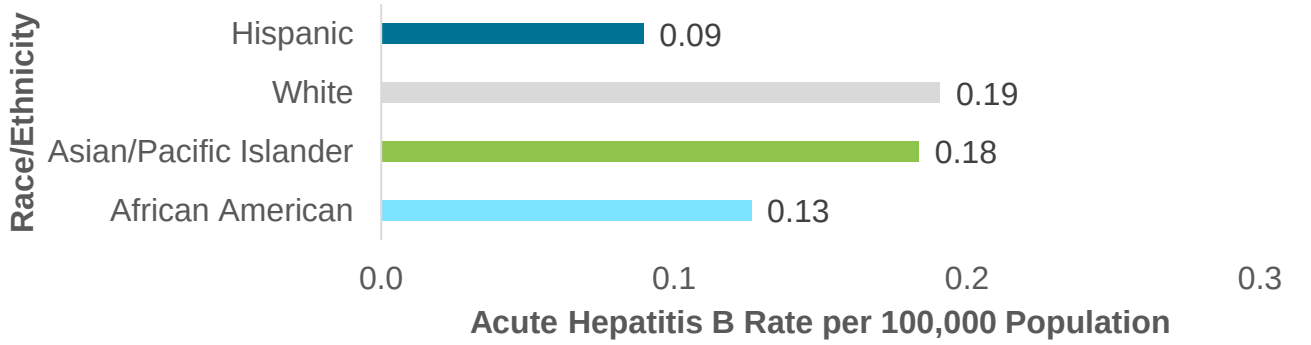
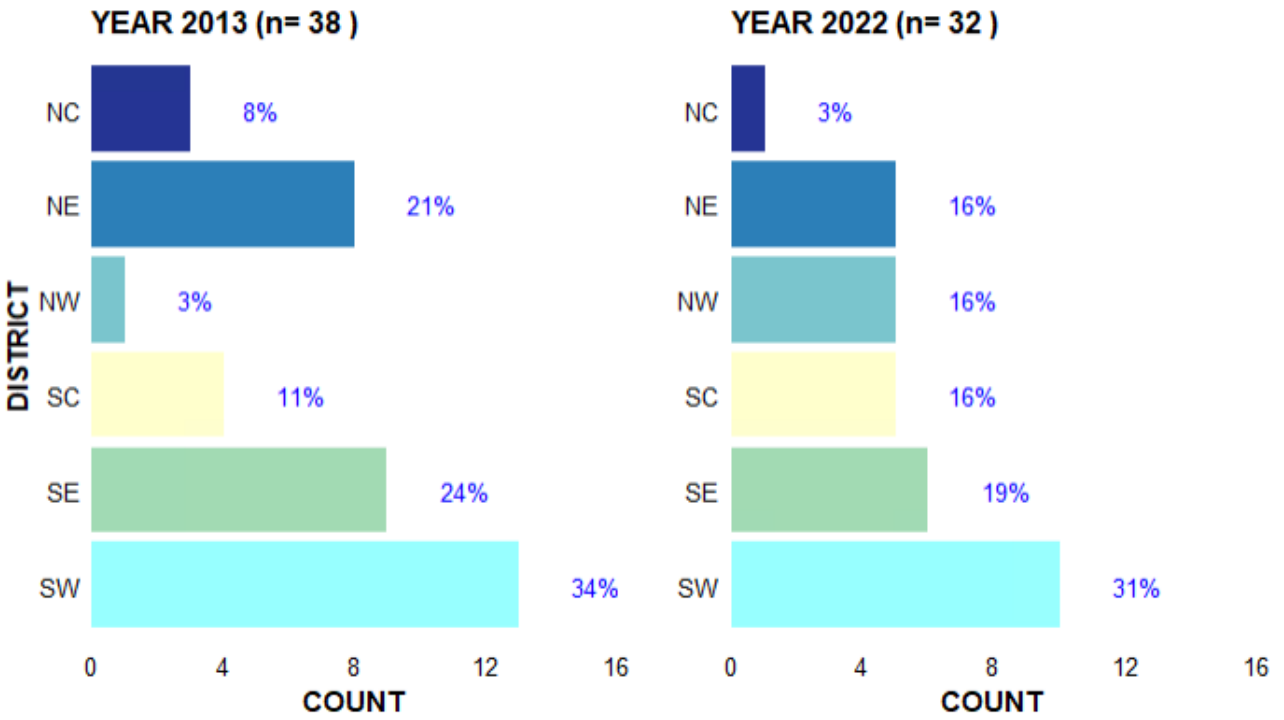


Figure 2.6: Acute hepatitis B rates per 100,000 population by race and ethnicity, Pennsylvania, excluding Philadelphia, 2022. Categories are not mutually exclusive.



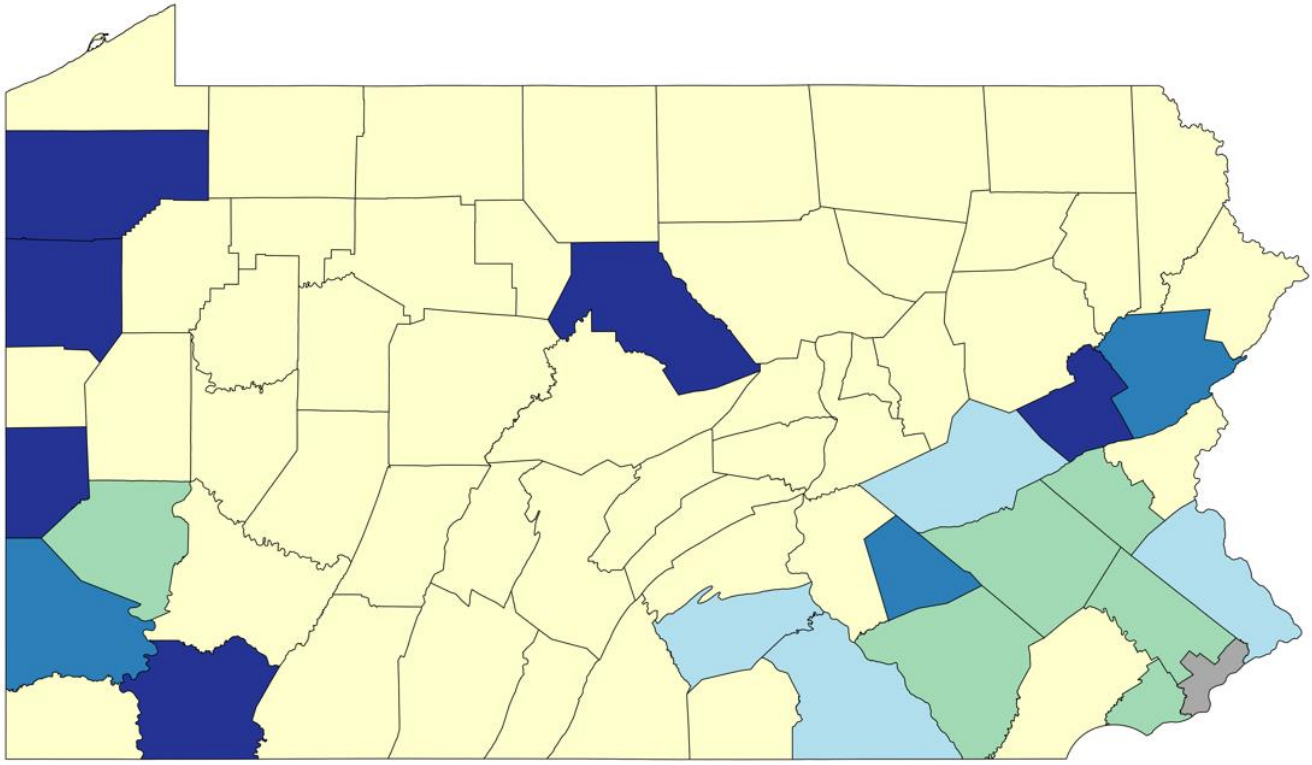
In 2022, the proportion of cases of acute hepatitis B was highest in persons identifying as white. Per population, people identifying as white or Asian/Pacific Islander experienced the two highest rates (**Figure 2.4-2.6**).

Figure 2.7: Reported acute hepatitis B cases by PA DOH Community Health District, Pennsylvania, excluding Philadelphia, 2013 and 2022.



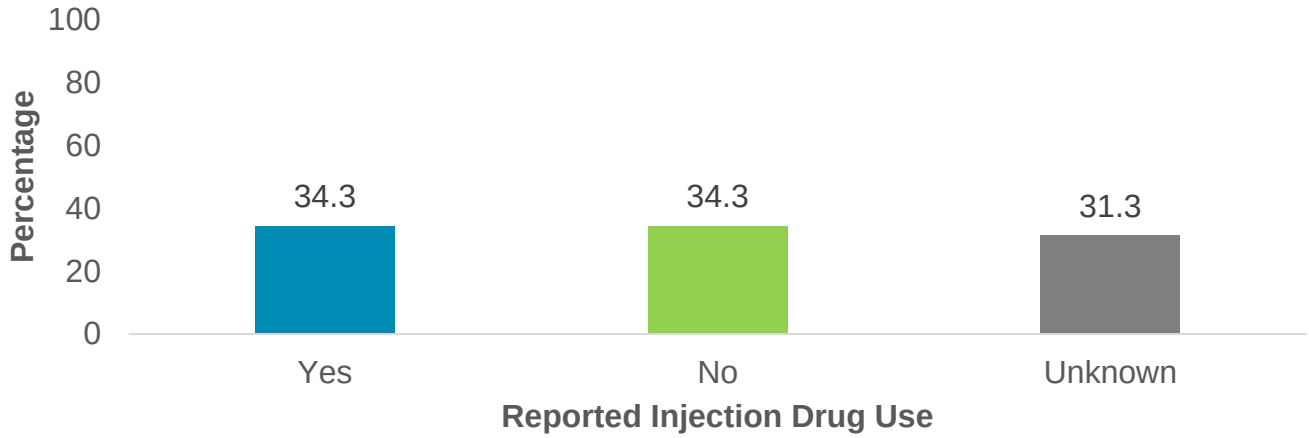
In both 2013 and 2022, a third of cases were reported in the Southwest District, but in 2022 more cases were reported in the Northwest District compared to 2013 (**Figure 2.7**). In 2022, high rates were observed in western Pennsylvania counties (**Figure 2.8**).

Figure 2.8: Acute hepatitis B rates by county, per 100,000 population, Pennsylvania, excluding Philadelphia, 2022.



Rate per 100,000 Population	County Names
No cases	ADAMS, ARMSTRONG, BEDFORD, BLAIR, BRADFORD, BUTLER, CAMBRIA, CAMERON, CENTRE, CHESTER, CLARION, CLEARFIELD, COLUMBIA, DAUPHIN, ELK, ERIE, FOREST, FRANKLIN, FULTON, GREENE, HUNTINGDON, INDIANA, JEFFERSON, JUNIATA, LACKAWANNA, LAWRENCE, LUZERNE, LYCOMING, MCKEAN, MIFFLIN, MONTOUR, NORTHAMPTON, NORTHUMBERLAND, PERRY, PIKE, POTTER, SNYDER, SOMERSET, SULLIVAN, SUSQUEHANNA, TIOGA, UNION, VENANGO, WARREN, WAYNE, WESTMORELAND, WYOMING
(>0.0 - 0.3)	ALLEGHENY, BERKS, DELAWARE, LANCASTER, LEHIGH, MONTGOMERY
(>0.3 – 0.7)	BUCKS, CUMBERLAND, SCHUYLKILL, YORK
(>0.7 – 1.5)	LEBANON, MONROE, WASHINGTON
(>1.5)	BEAVER, CARBON, CLINTON, CRAWFORD, FAYETTE, MERCER
	PHILADELPHIA (Excluded)

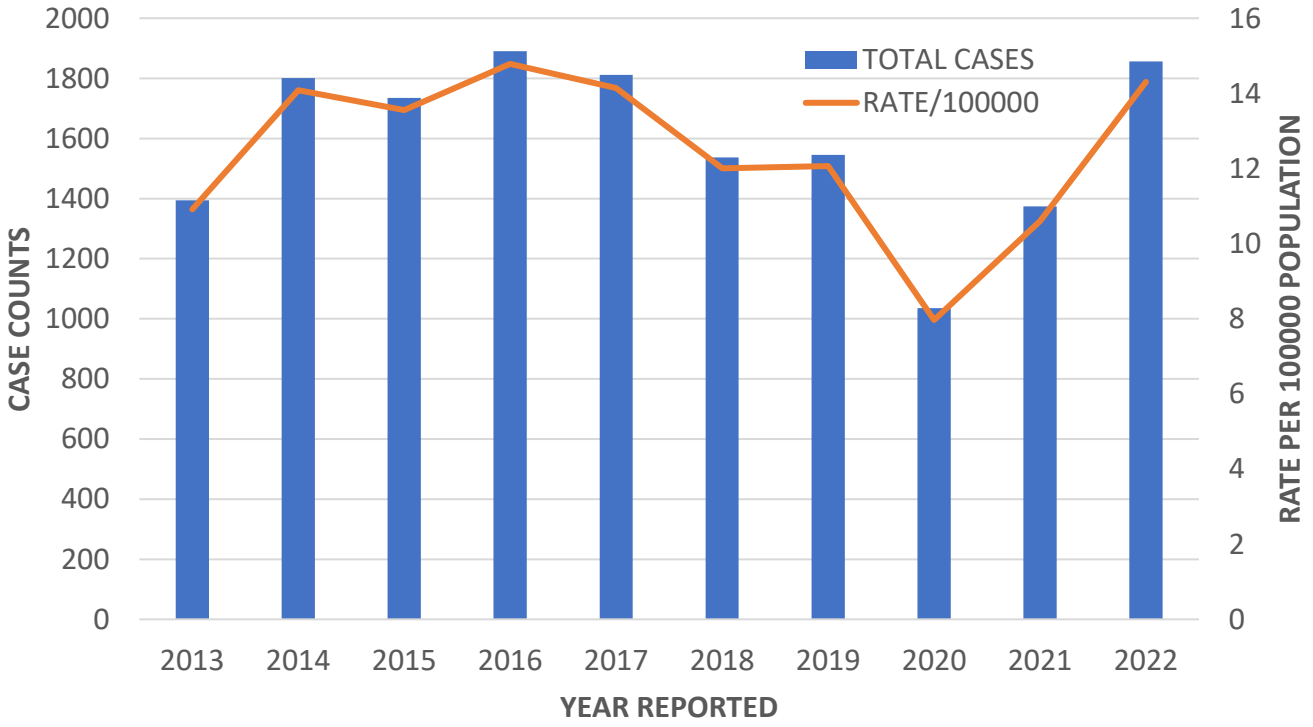
Figure 2.9: Reported injection drug usage among acute hepatitis B cases, Pennsylvania, excluding Philadelphia, 2022 (n=32).



In 2022, more than a third of case-patients reported a history of injection drug use (**Figure 2.9**).

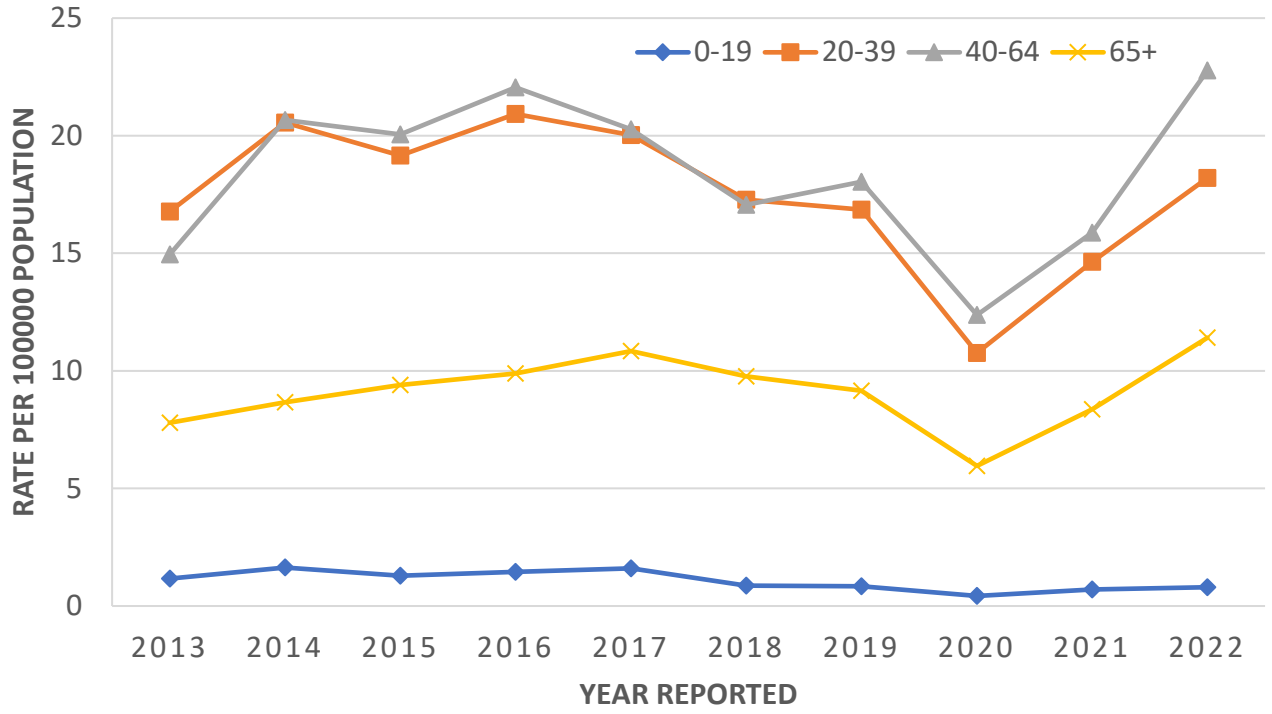
Chronic Hepatitis B

Figure 3.1: Case counts and rates of newly reported chronic hepatitis B, per 100,000 population, Pennsylvania, excluding Philadelphia, 2013 to 2022.



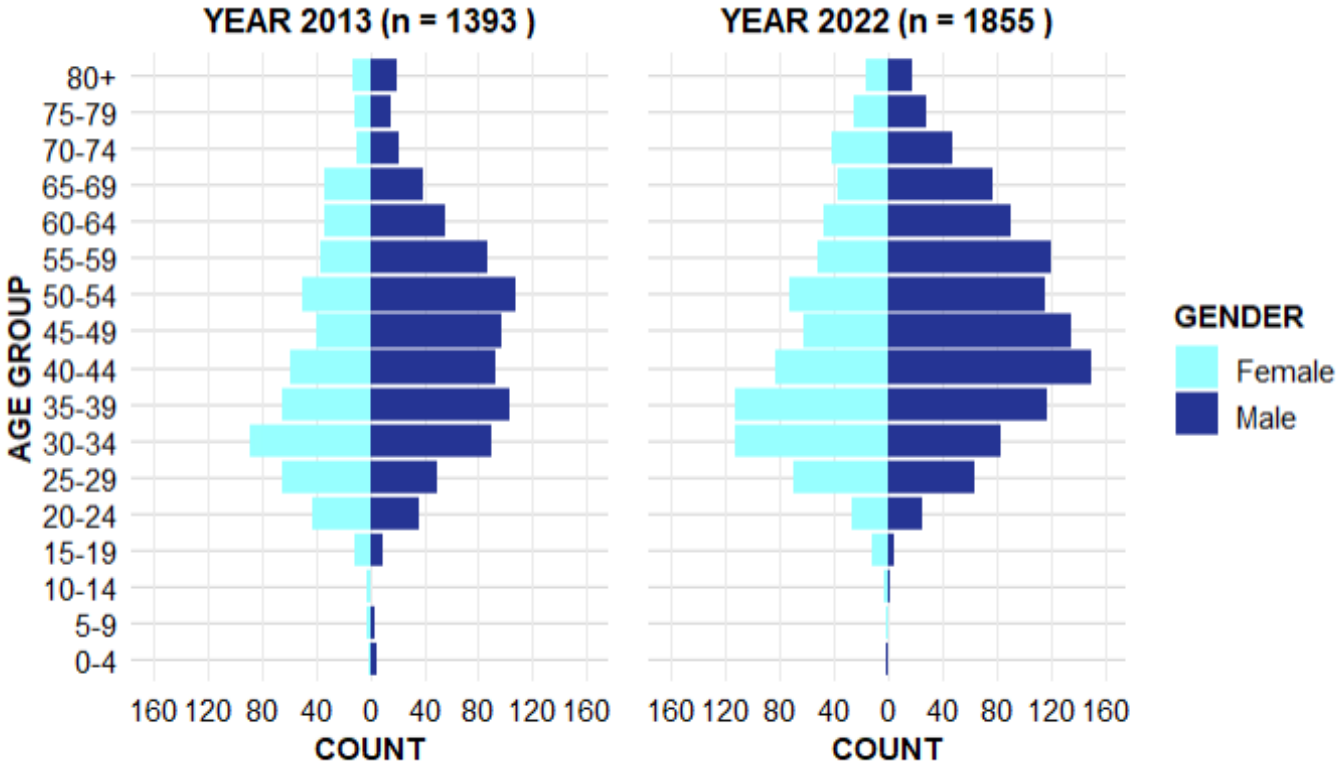
Total counts of newly reported chronic hepatitis B cases and rates decreased from 2017 to 2020 but increased to over 1,800 cases in 2022. (**Figure 3.1**).

Figure 3.2: Rates of reported newly reported chronic hepatitis B, per 100,000 population, by age group, Pennsylvania, excluding Philadelphia, 2013 to 2022.



Rates of chronic hepatitis B have been similar for 20–39-year-olds and 40–64-year-olds over time, but rates for 40-64-year-olds rose higher in 2022. Rates recently increased for those 65 and older (**Figure 3.2**).

Figure 3.3: Age distribution of reported newly reported chronic hepatitis B cases by sex, Pennsylvania, excluding Philadelphia, 2013 vs 2022. Cases with unknown gender were excluded from the figure.



The average age of reported chronic hepatitis B cases among females was 43 and 46 years in 2013 and 2022, while the average age for males was 46 and 49 years in 2013 and 2022 respectively. The age pyramids depict a similar curve in age and sex distribution comparing both 2013 and 2022, with more male cases reported in both years. Cases increased in 2022 and chronic hepatitis B affected more young females than males in 2022 (**Figure 3.3**).

Figure 3.4: Distribution of newly reported chronic hepatitis B cases by race, Pennsylvania, excluding Philadelphia, 2022 (n=1856).

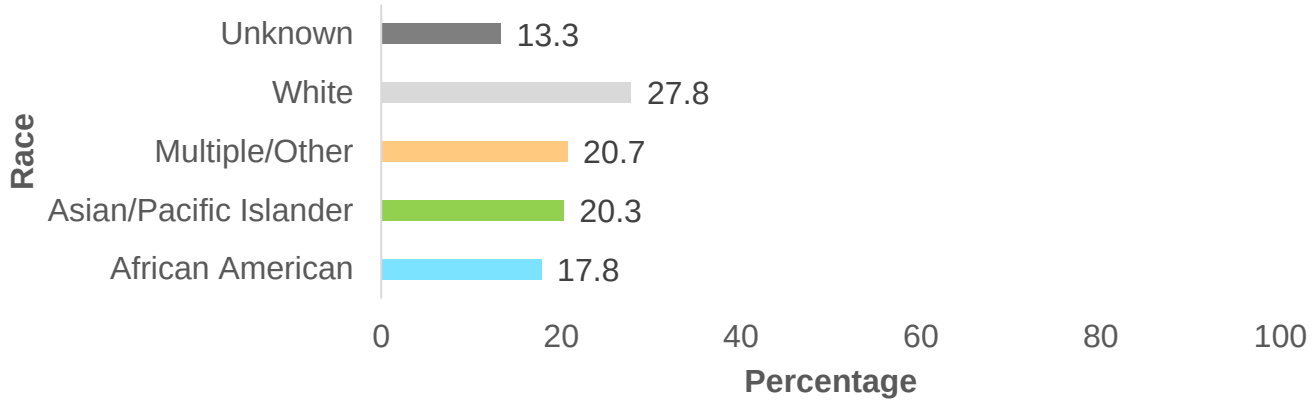


Figure 3.5: Distribution of newly reported chronic hepatitis B cases by ethnicity, Pennsylvania, excluding Philadelphia, 2022 (n=1856).

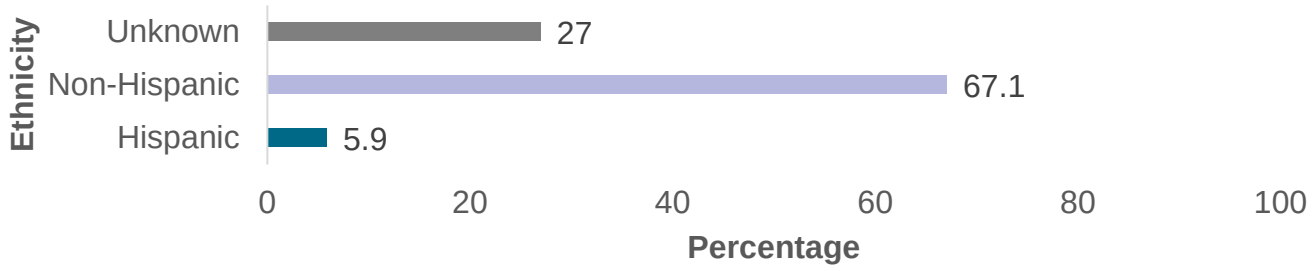
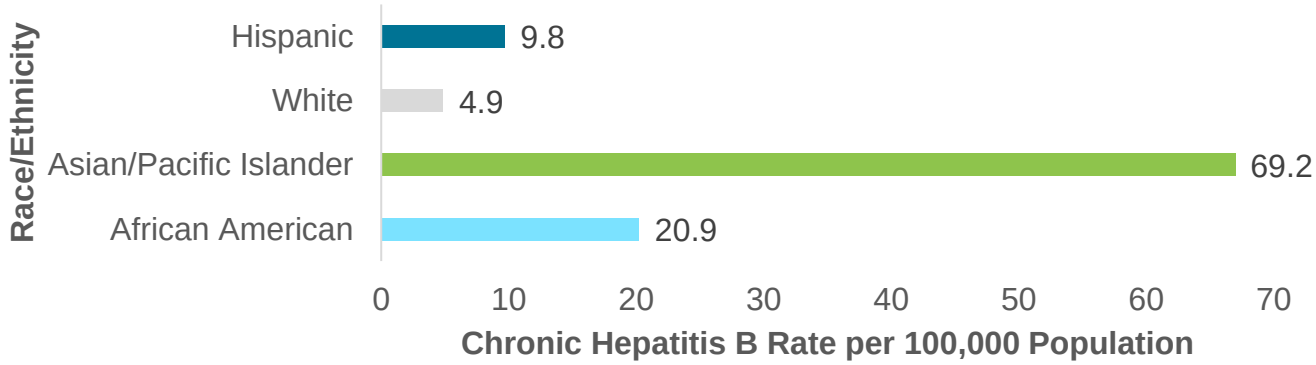
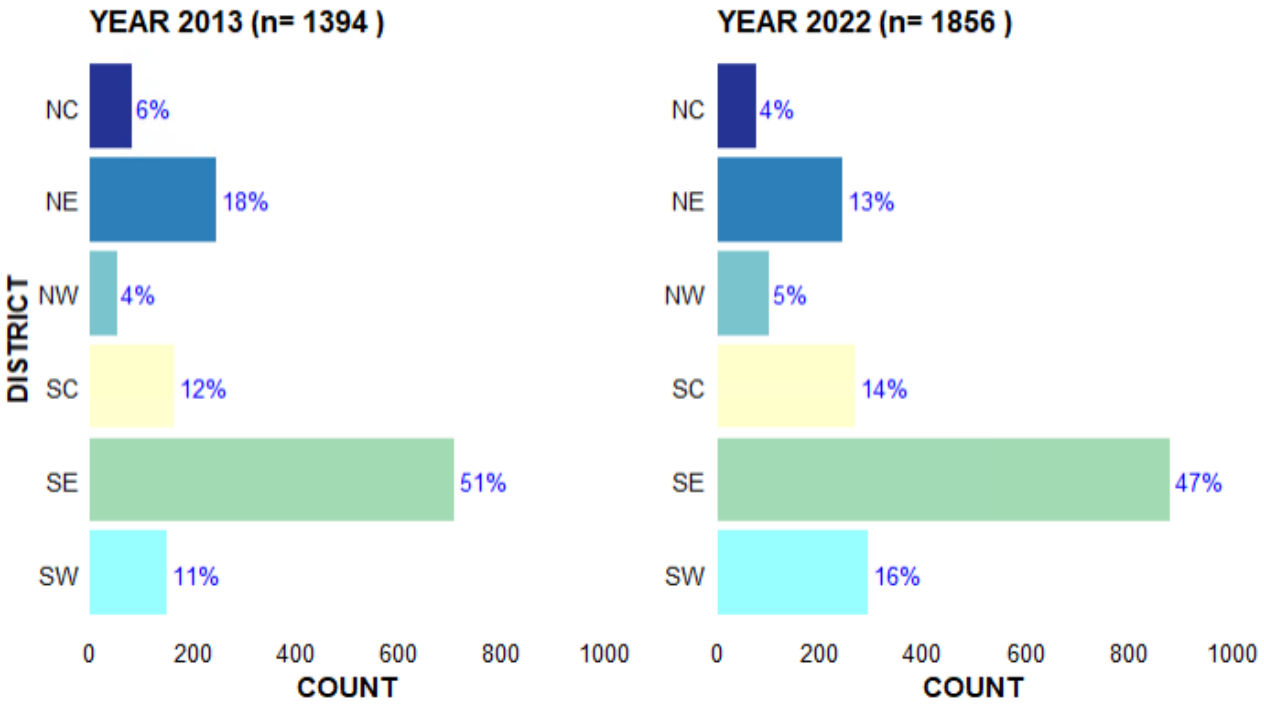


Figure 3.6: Newly reported chronic hepatitis B rates per 100,000 population by race and ethnicity, Pennsylvania, excluding Philadelphia, 2022. Categories are not mutually exclusive.



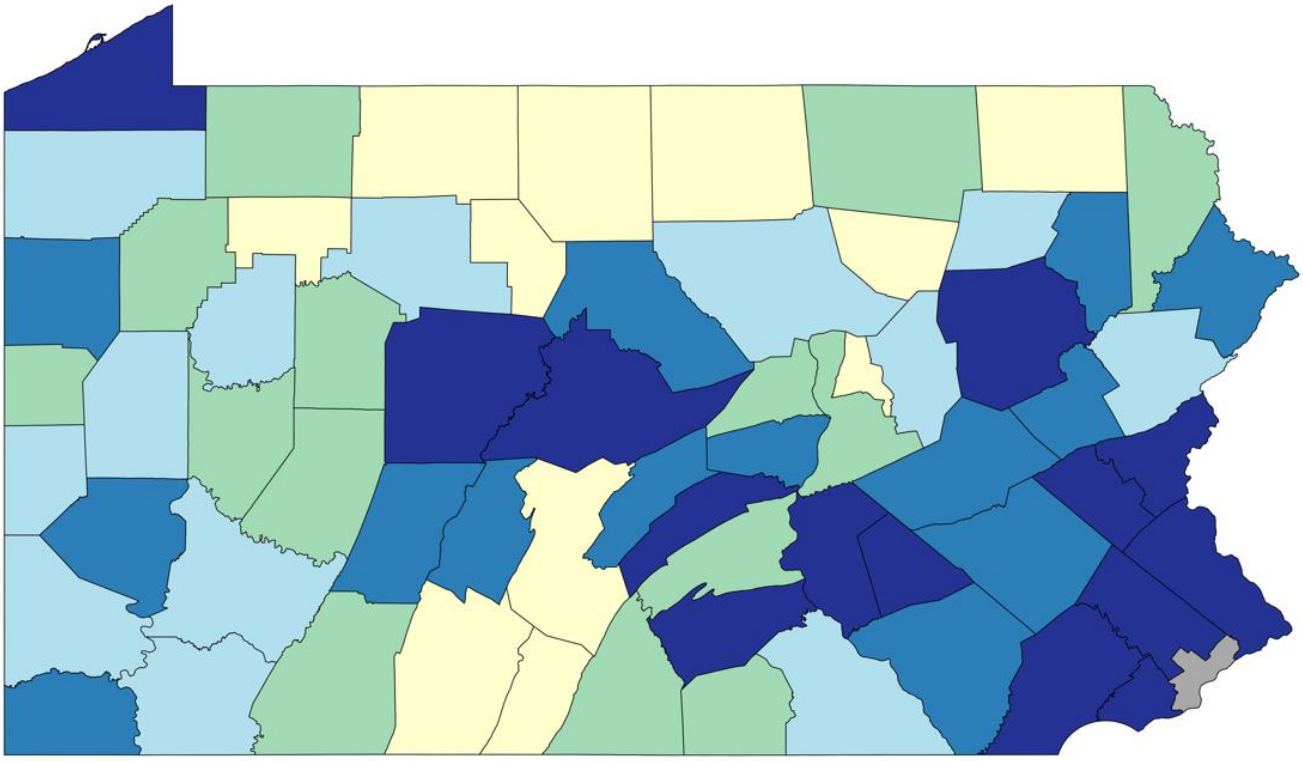
In 2022, the proportion of cases of chronic hepatitis B was highest in persons identifying as white but was followed closely by multiple race/other and Asian/Pacific Islanders. (**Figures 3.4-3.5**). Per population, people identifying as Asian/Pacific Islander experienced the highest rate by far (**Figure 3.6**).

Figure 3.7: Newly reported chronic hepatitis B cases by PA DOH Community Health District, Pennsylvania, excluding Philadelphia, 2013 and 2022.



The regional comparison remained similar from 2013 to 2022. The Southeast District had the highest proportion of chronic hepatitis B in both periods (**Figure 3.7**). Also, in 2022, the highest rates were concentrated in southeast Pennsylvania, but high rates by county occurred in other parts of the state as well (**Figure 3.8**).

Figure 3.8: Newly reported chronic hepatitis B rates by county, per 100,000 population, Pennsylvania, excluding Philadelphia, 2022.



Rate per 100,000 Population	County Names
No cases	BEDFORD, CAMERON, FOREST, FULTON, HUNTINGDON, MCKEAN, MONTOUR, POTTER, SULLIVAN, SUSQUEHANNA, TIOGA
(>0.0 - 5.2)	ADAMS, ARMSTRONG, BRADFORD, FRANKLIN, INDIANA, JEFFERSON, LAWRENCE, NORTHUMBERLAND, PERRY, SOMERSET, UNION, VENANGO, WARREN, WAYNE
(>5.2 - 7.9)	BEAVER, BUTLER, CLARION, COLUMBIA, CRAWFORD, ELK, FAYETTE, LYCOMING, MONROE, WASHINGTON, WESTMORELAND, WYOMING, YORK
(>7.9 - 12.7)	ALLEGHENY, BERKS, BLAIR, CAMBRIA, CARBON, CLINTON, GREENE, LACKAWANNA, LANCASTER, MERCER, MIFFLIN, PIKE, SCHUYLKILL, SNYDER
(>12.7)	BUCKS, CENTRE, CHESTER, CLEARFIELD, CUMBERLAND, DAUPHIN, DELAWARE, ERIE, JUNIATA, LEBANON, LEHIGH, LUZERNE, MONTGOMERY, NORTHAMPTON
	PHILADELPHIA (Excluded)

Perinatal Hepatitis B

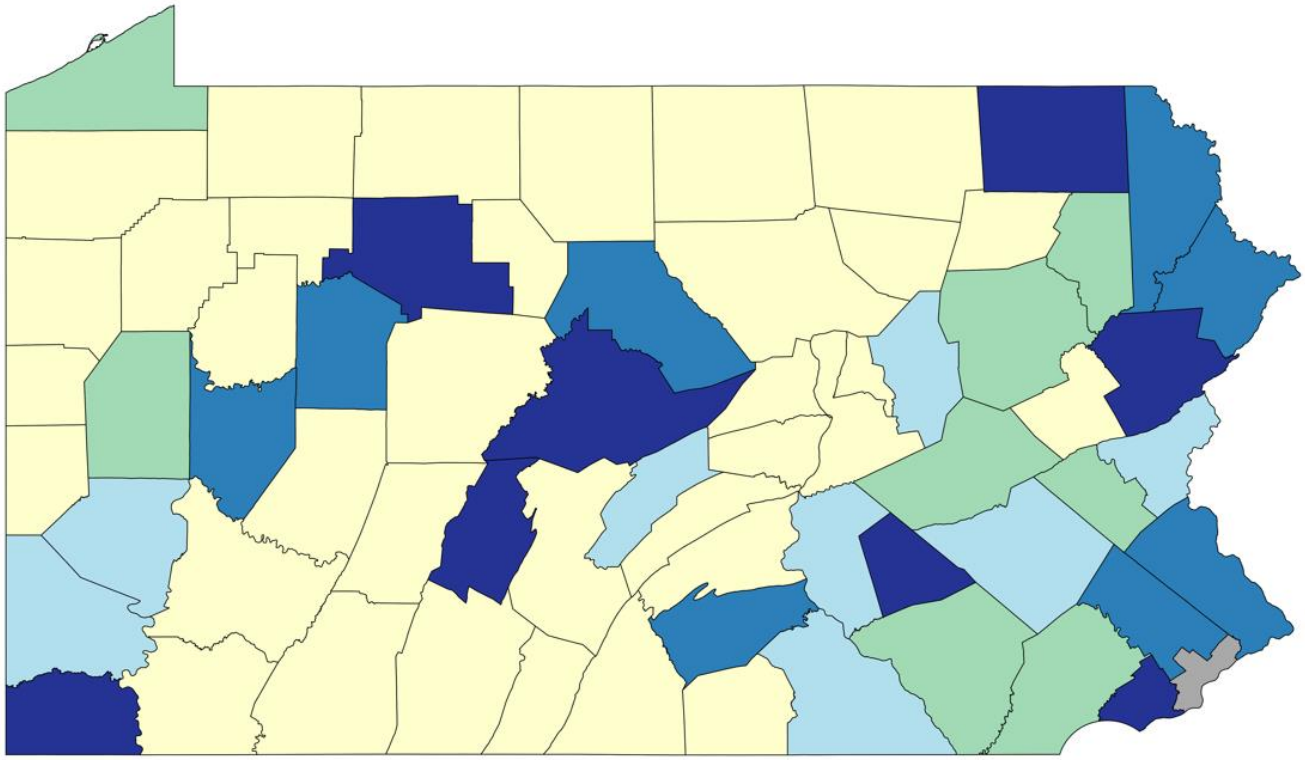
Table 4.1. Perinatal hepatitis B case counts, Pennsylvania, excluding Philadelphia, 2013 to 2022.

Disease	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Perinatal hepatitis B	7	5	4	1	2	3	2	0	1	0

Perinatal hepatitis B case counts decreased over the decade with no cases reported in 2022, which is a testament to the PA DOH Perinatal Hepatitis B Prevention Program (**Table 4.1**). This program follows pregnant women with hepatitis B to ensure that measures are taken to prevent transmission of the virus from mother to child.

In 2022, we observed that high rates of infants born to a mother living with chronic hepatitis B occurred across the state but were concentrated in central and eastern Pennsylvania (**Figure 4.1**).

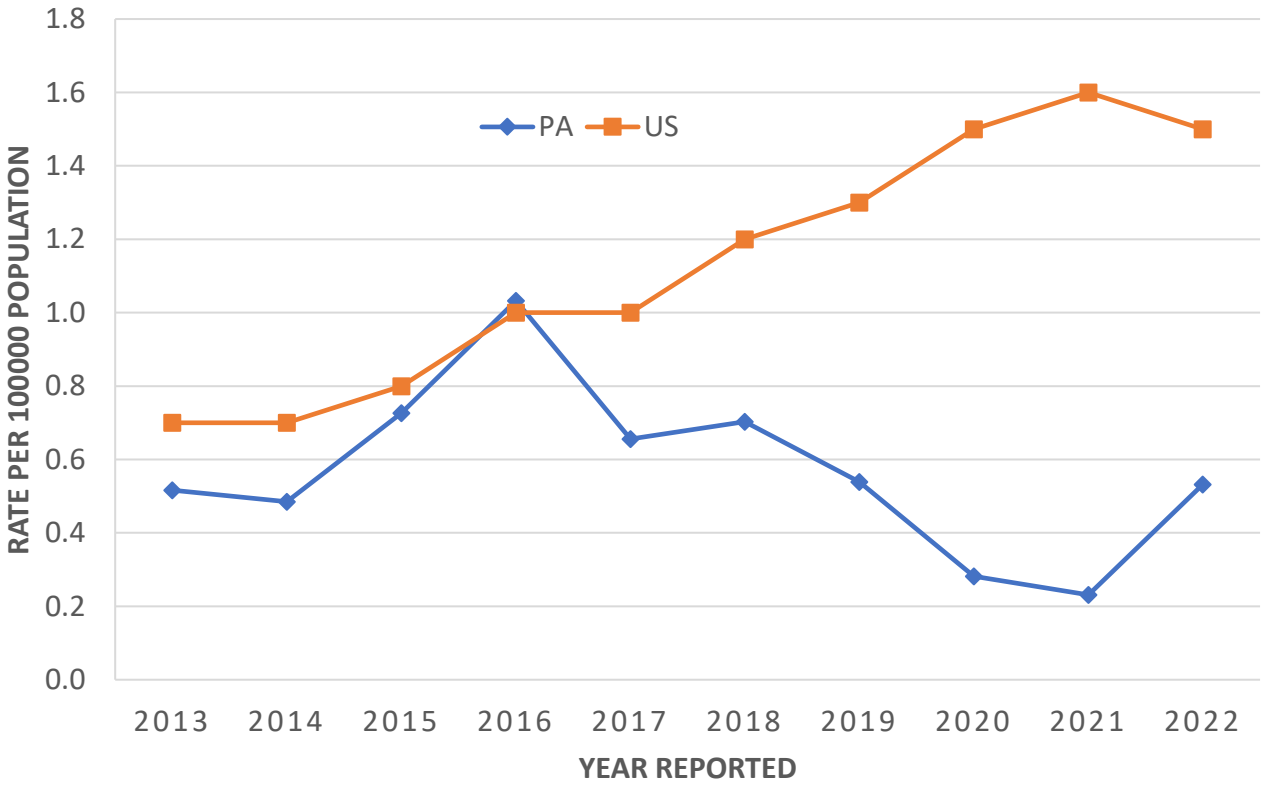
Figure 4.1: Rates of infants born to a mother living with chronic hepatitis B by county, per 100,000 births, Pennsylvania, excluding Philadelphia, 2022.



Rate per 100,000 Live Births	County Names
No affected births	ADAMS, BEAVER, BEDFORD, BRADFORD, CAMBRIA, CAMERON, CARBON, CLARION, CLEARFIELD, CRAWFORD, FAYETTE, FOREST, FRANKLIN, FULTON, HUNTINGDON, INDIANA, JUNIATA, LAWRENCE, LYCOMING, MCKEAN, MERCER, MONTOUR, NORTHUMBERLAND, PERRY, POTTER, SNYDER, SOMERSET, SULLIVAN, TIOGA, UNION, VENANGO, WARREN, WESTMORELAND, WYOMING
(>0.0 - 104.7)	BUTLER, CHESTER, ERIE, LACKAWANNA, LANCASTER, LEHIGH, LUZERNE, SCHUYLKILL
(>104.7 - 185.4)	ALLEGHENY, BERKS, COLUMBIA, DAUPHIN, MIFFLIN, NORTHAMPTON, WASHINGTON, YORK
(>185.4 - 248.7)	ARMSTRONG, BUCKS, CLINTON, CUMBERLAND, JEFFERSON, MONTGOMERY, PIKE, WAYNE
(>248.7)	BLAIR, CENTRE, DELAWARE, ELK, GREENE, LEBANON, MONROE, SUSQUEHANNA
	PHILADELPHIA (Excluded)

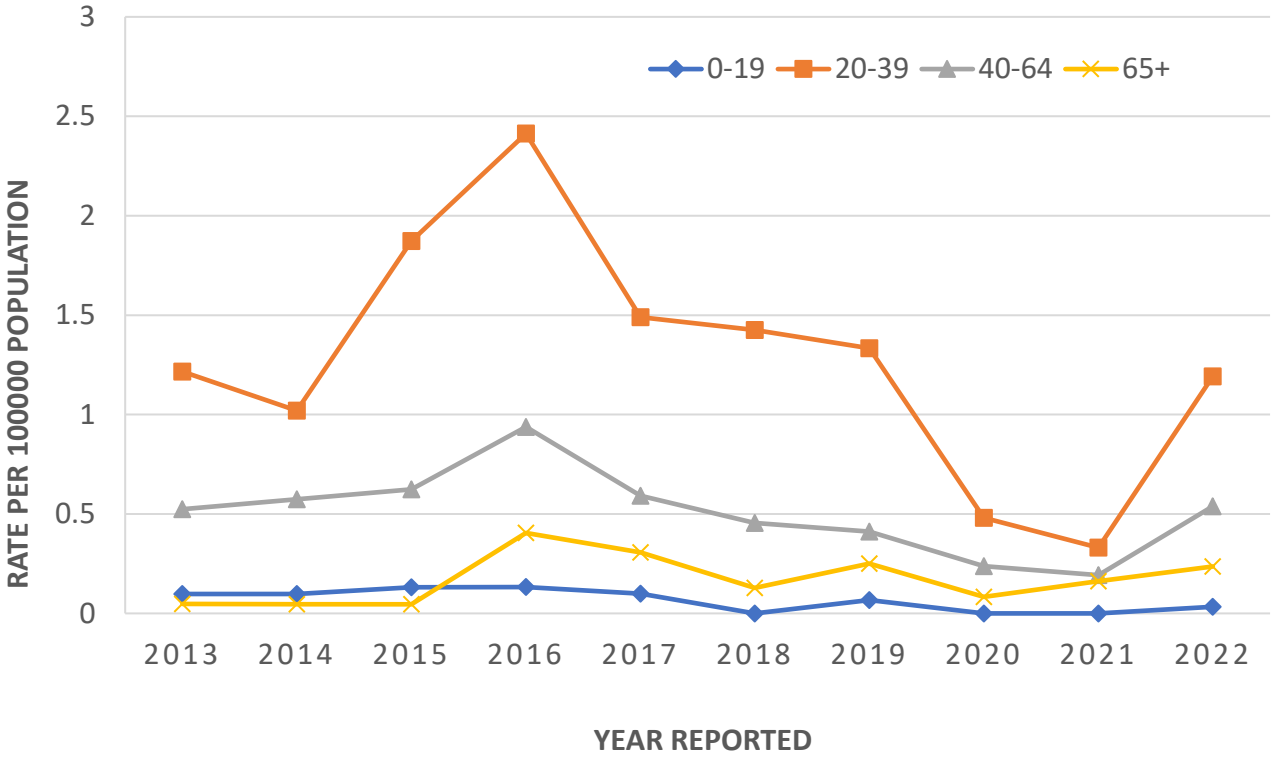
Acute Hepatitis C

Figure 5.1: Rates of reported acute hepatitis C, per 100,000 population, Pennsylvania, excluding Philadelphia, 2013 to 2022.



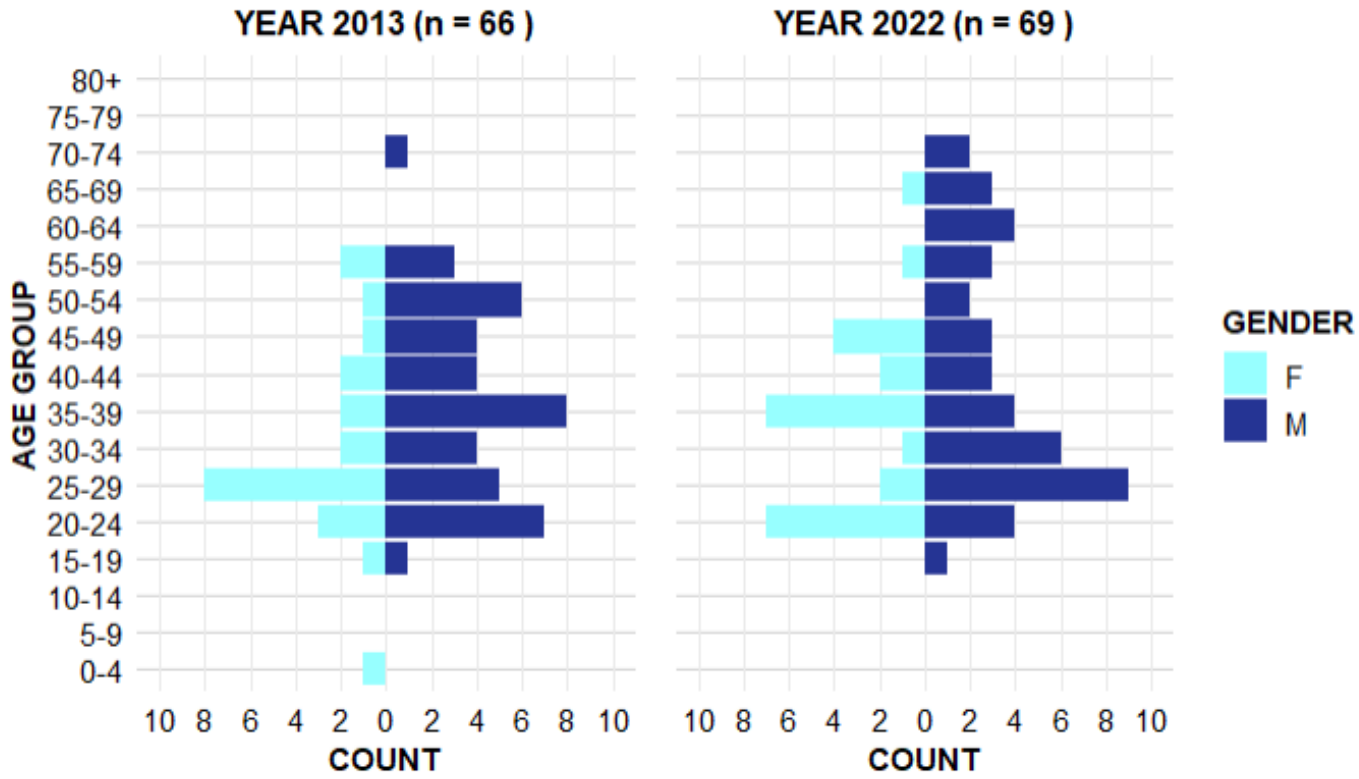
Rates of acute hepatitis C in the US steadily increased until 2021 (**Figure 5.1**). In contrast, acute hepatitis C rates in Pennsylvania decreased from 2016 through 2021, followed by an increase in 2022 (**Figure 5.1**).

Figure 5.2: Rates of acute hepatitis C cases by age, per 100,000 population, Pennsylvania, excluding Philadelphia, 2013 to 2022.



In the past decade, 20-39-year-olds have experienced the highest rate of acute hepatitis C in Pennsylvania, followed by 40-64-year-olds (**Figure 5.2**). For all age groups, except 0-19-year-olds, a peak in rates occurred in 2016, followed by a decline in rates through 2021 and an increase in 2022 (**Figure 5.2**).

Figure 5.3: Age distribution of reported acute hepatitis C cases by sex, Pennsylvania, excluding Philadelphia, 2013 and 2022.



The majority of case-patients in both 2013 and 2022 were younger than 45, but cases increased in 2022 among older individuals, specifically males (**Figure 5.3**). More cases also occurred among males compared to females in 2022. The average age of females affected in 2022 was 36 years compared to 32 years in 2013, whereas among the males, the average age in 2022 was 41 years compared to 38 years in 2013.

Figure 5.4: Distribution of reported acute hepatitis C cases by race, Pennsylvania, excluding Philadelphia, 2022 (n=69).

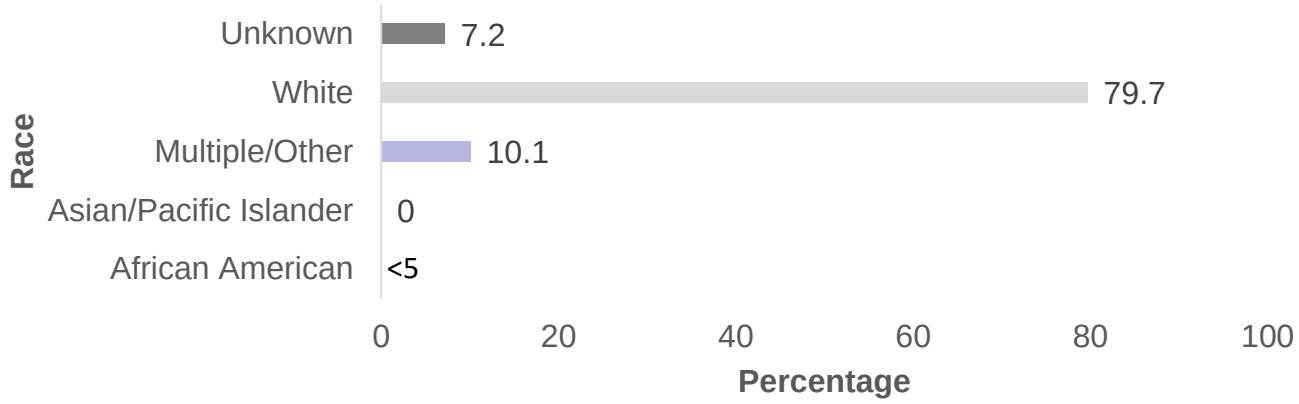


Figure 5.5: Distribution of reported acute hepatitis C cases by ethnicity, Pennsylvania, excluding Philadelphia, 2022 (n=69).

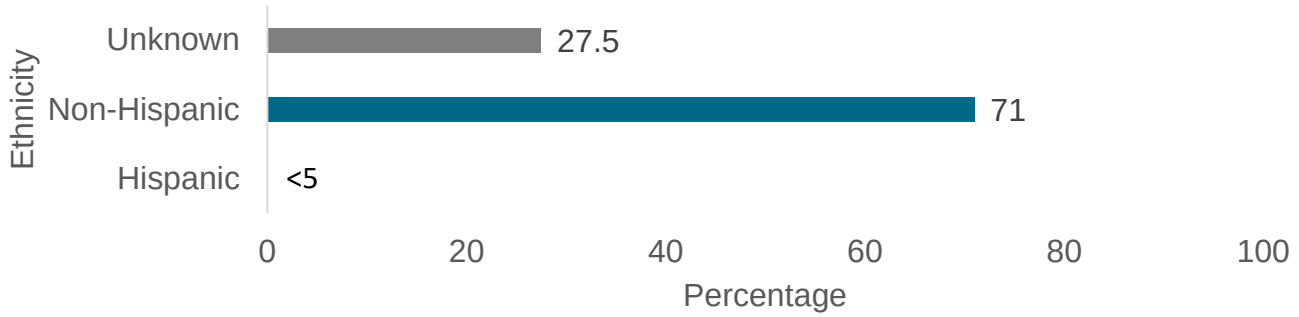
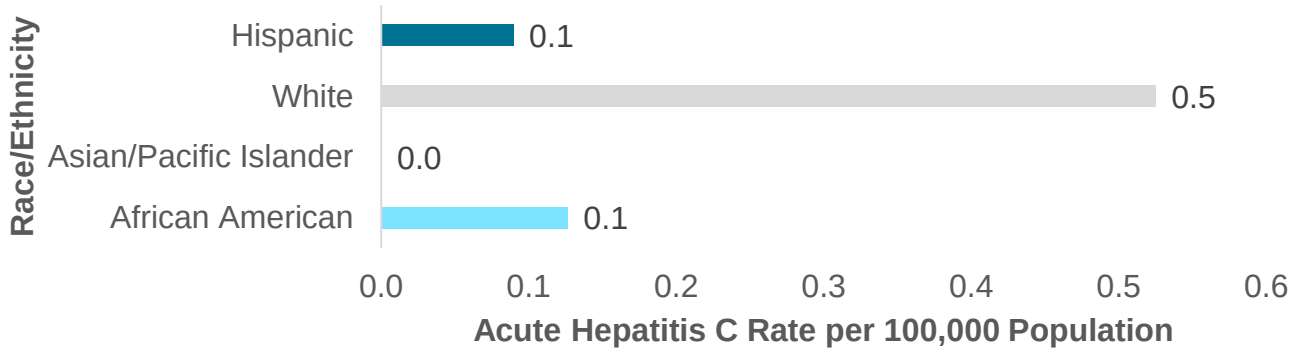
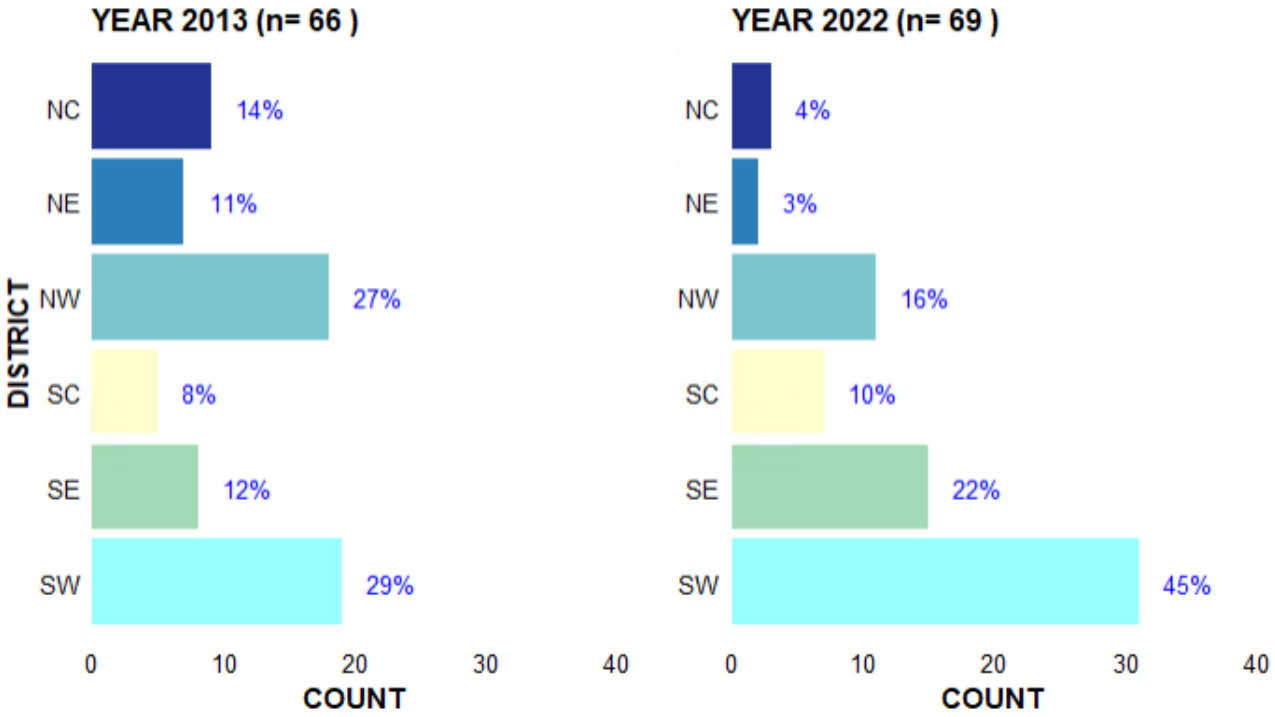


Figure 5.6: Acute hepatitis C rates per 100,000 population by race and ethnicity, Pennsylvania, excluding Philadelphia, 2022. Categories are not mutually exclusive.



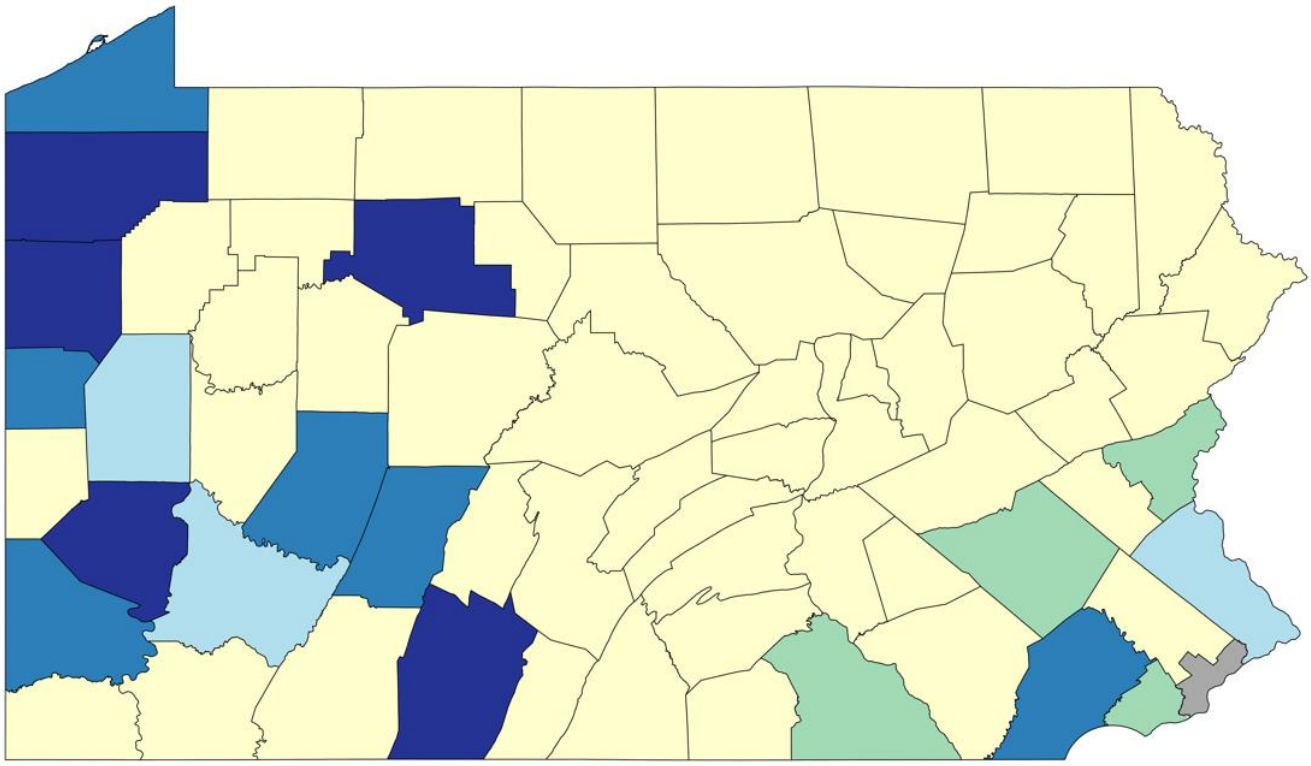
In 2022, most cases of acute hepatitis C occurred in people identifying as white and non-Hispanic. Per population, people identifying as white experienced the highest rate (**Figure 5.4-5.6**).

Figure 5.7: Reported acute hepatitis C cases by PA DOH Community Health District, Pennsylvania, excluding Philadelphia, 2013 and 2022.



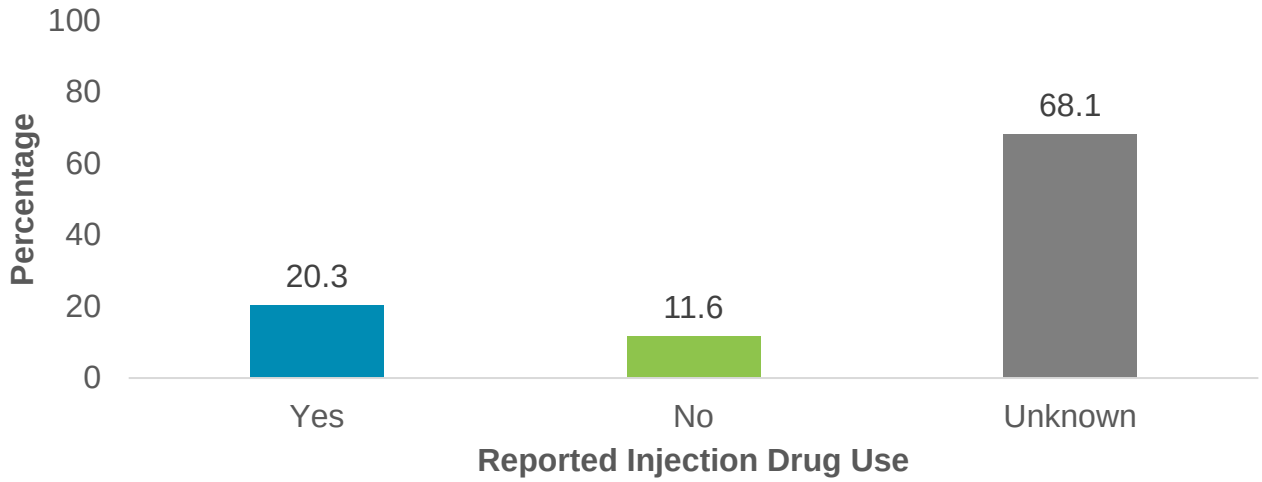
The proportion of cases in Northwest, Northcentral and Northeast Districts decreased from 2013 to 2022. The proportion of cases increased for the Southwest and Southeast Districts from 2013 to 2022 (**Figure 5.7**). Rates, which adjust for population, were highest in western Pennsylvania counties in 2022 (**Figure 5.8**).

Figure 5.8: Acute hepatitis C rates by county, per 100,000 population, Pennsylvania, excluding Philadelphia, 2022.



Rate per 100,000 Population	County Names
No cases	ADAMS, ARMSTRONG, BEAVER, BLAIR, BRADFORD, CAMERON, CARBON, CENTRE, CLARION, CLEARFIELD, CLINTON, COLUMBIA, CUMBERLAND, DAUPHIN, FAYETTE, FOREST, FRANKLIN, FULTON, GREENE, HUNTINGDON, JEFFERSON, JUNIATA, LACKAWANNA, LANCASTER, LEBANON, LEHIGH, LUZERNE, LYCOMING, MCKEAN, MIFFLIN, MONROE, MONTGOMERY, MONTOUR, NORTHUMBERLAND, PERRY, PIKE, POTTER, SCHUYLKILL, SNYDER, SOMERSET, SULLIVAN, SUSQUEHANNA, TIOGA, UNION, VENANGO, WARREN, WAYNE, WYOMING
(>0.0 - 0.5)	BERKS, DELAWARE, NORTHAMPTON, YORK
(>0.5 – 0.7)	BUCKS, BUTLER, WESTMORELAND
(>0.7 - 1.6]	CAMBRIA, CHESTER, ERIE, INDIANA, LAWRENCE, WASHINGTON
(>1.6)	ALLEGHENY, BEDFORD, CRAWFORD, ELK, MERCER
	PHILADELPHIA (Excluded)

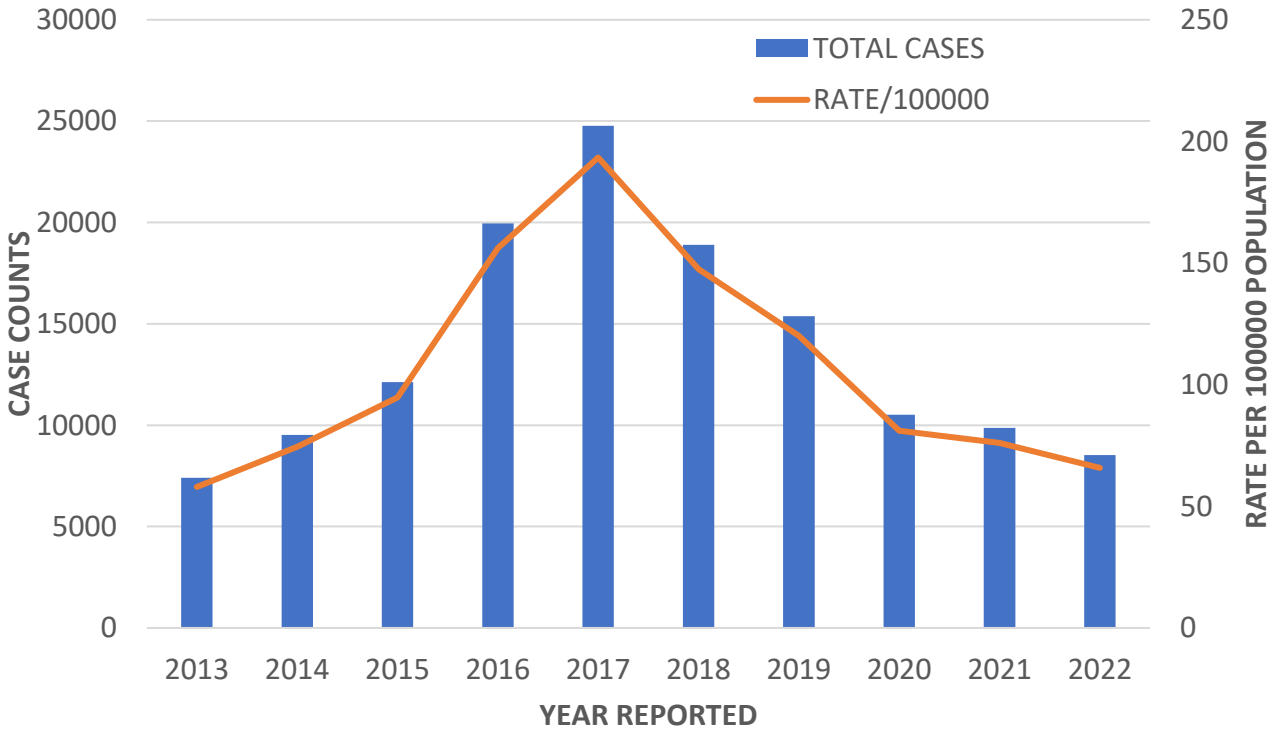
Figure 5.9: Reported injection drug usage among acute hepatitis C cases, Pennsylvania, excluding Philadelphia, 2022 (n=69).



Among 20% of acute hepatitis C cases reported injection drug use in 2022; however, information regarding history of injection drug use was missing for almost 70% (**Figure 5.9**).

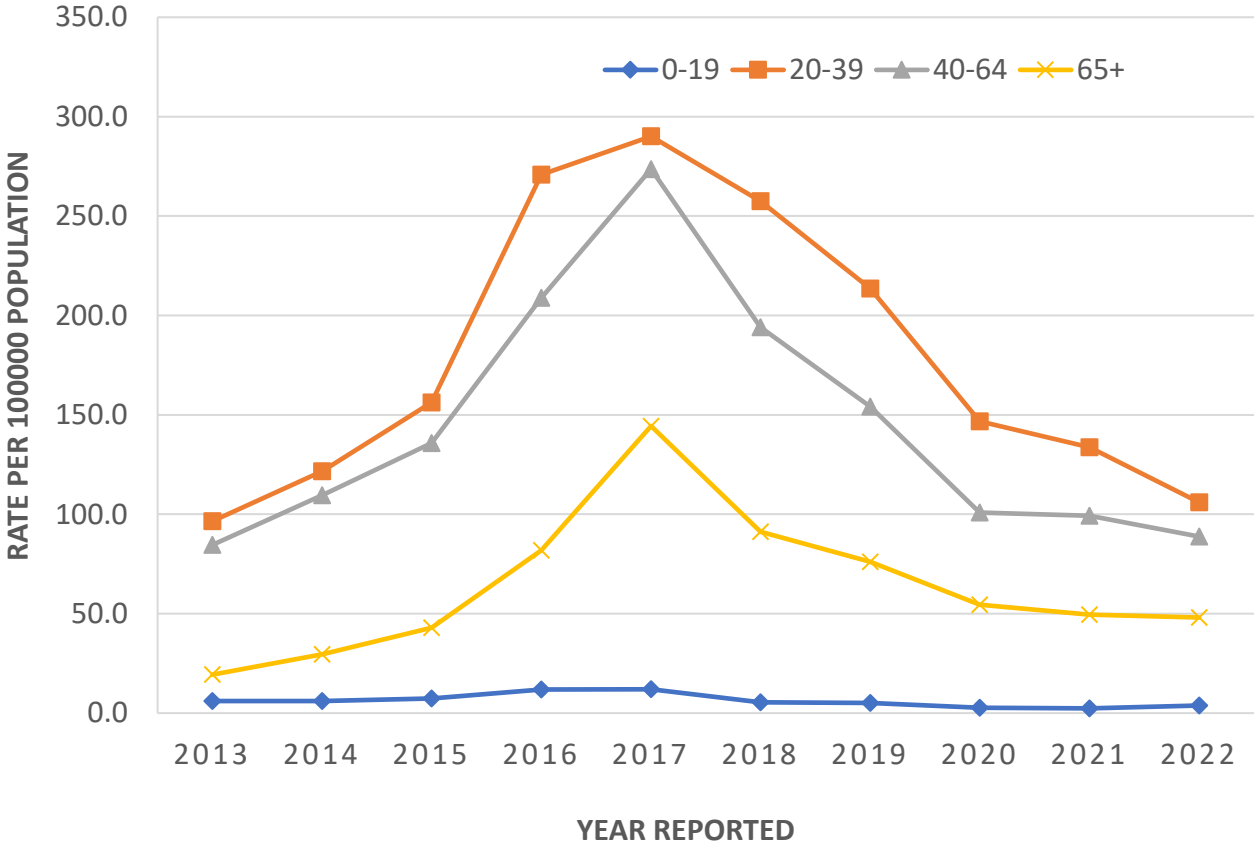
Chronic Hepatitis C

Figure 6.1: Rates of reported chronic hepatitis C by age, per 100,000 population, Pennsylvania, excluding Philadelphia, 2013 to 2022.



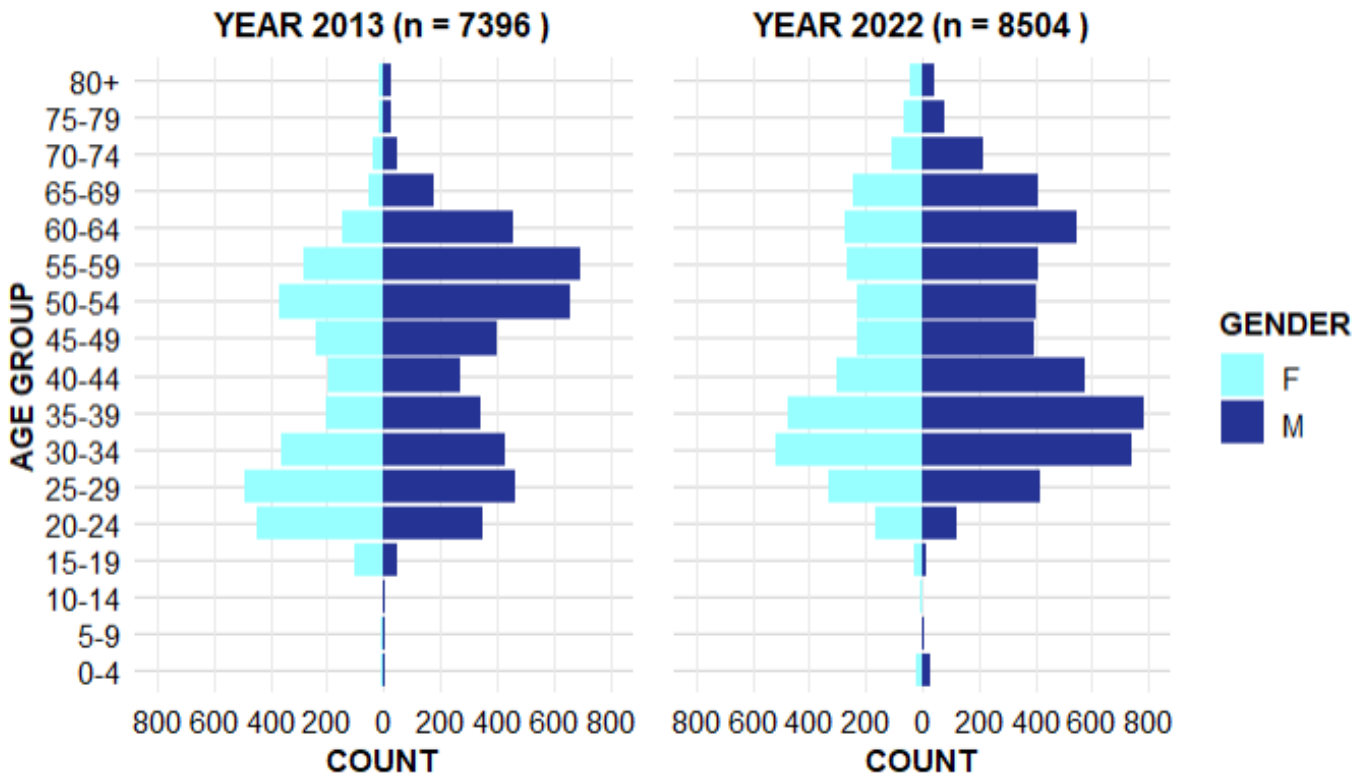
Chronic hepatitis C case counts and rate per 100,000 population showed an increasing trend from 2013, peaking in 2017 with almost 25,000 cases reported that year (**Figure 6.1**). Case counts then decreased with fewer than 10,000 cases reported in 2022.

Figure 6.2: Rates of reported chronic hepatitis C by age, per 100,000 population, Pennsylvania, excluding Philadelphia, 2013 to 2022.



Rates of chronic hepatitis C remained elevated throughout the decade in 20-39-year-olds followed by 40-64-year-olds (**Figure 6.2**). Rates peaked in 2017 and decreased for all age groups through 2022, except for individuals less than 20 years of age for whom rates remained low.

Figure 6.3: Age distribution of reported chronic hepatitis C cases by sex, Pennsylvania, excluding Philadelphia, 2013 and 2022. Cases with unknown gender were excluded from the figure.



In both 2013 and 2022, more males than females were reported with chronic hepatitis C (**Figure 6.3**). For both genders, the bimodal curve shifted which shows more young people affected in 2022 than in 2013. The average age of females affected in 2022 was 45 years compared to 39 years in 2013, whereas among the males the average age in 2022 was 46 years compared to 45 years in 2013.

Figure 6.4: Distribution of reported chronic hepatitis C cases by race, Pennsylvania, excluding Philadelphia, 2022 (n=8528).

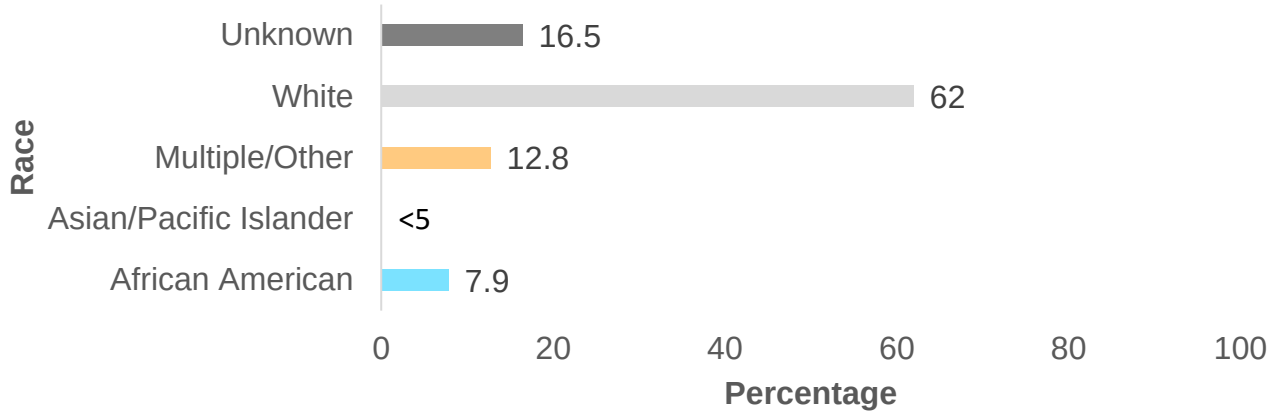


Figure 6.5: Distribution of reported chronic hepatitis C cases by ethnicity, Pennsylvania, excluding Philadelphia, 2022 (n=8528).

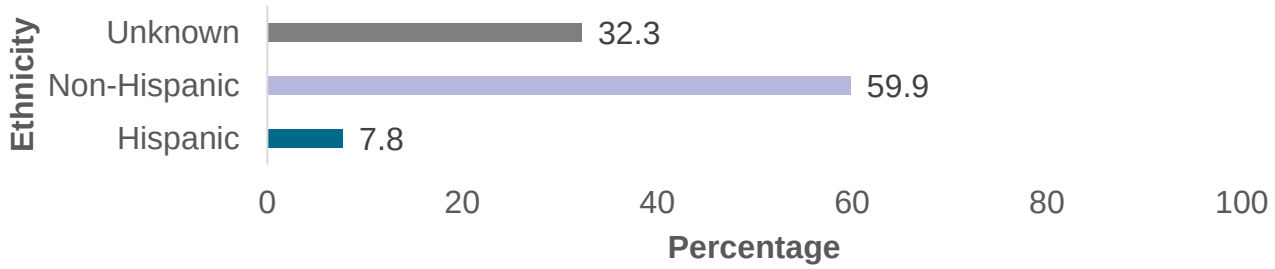
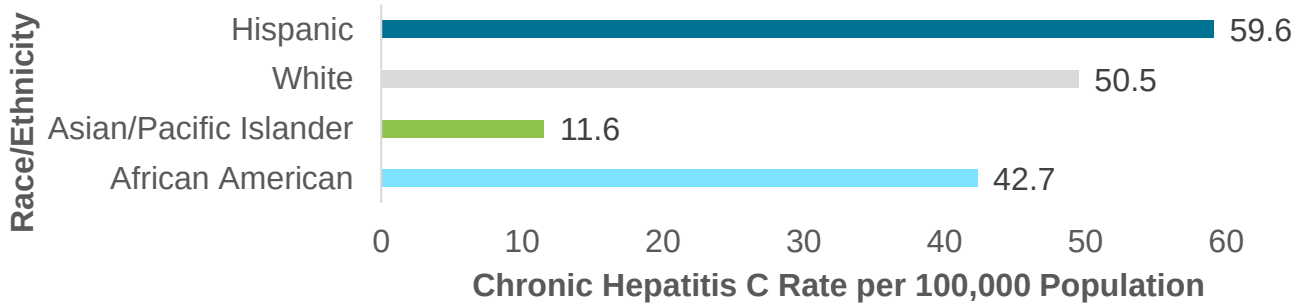
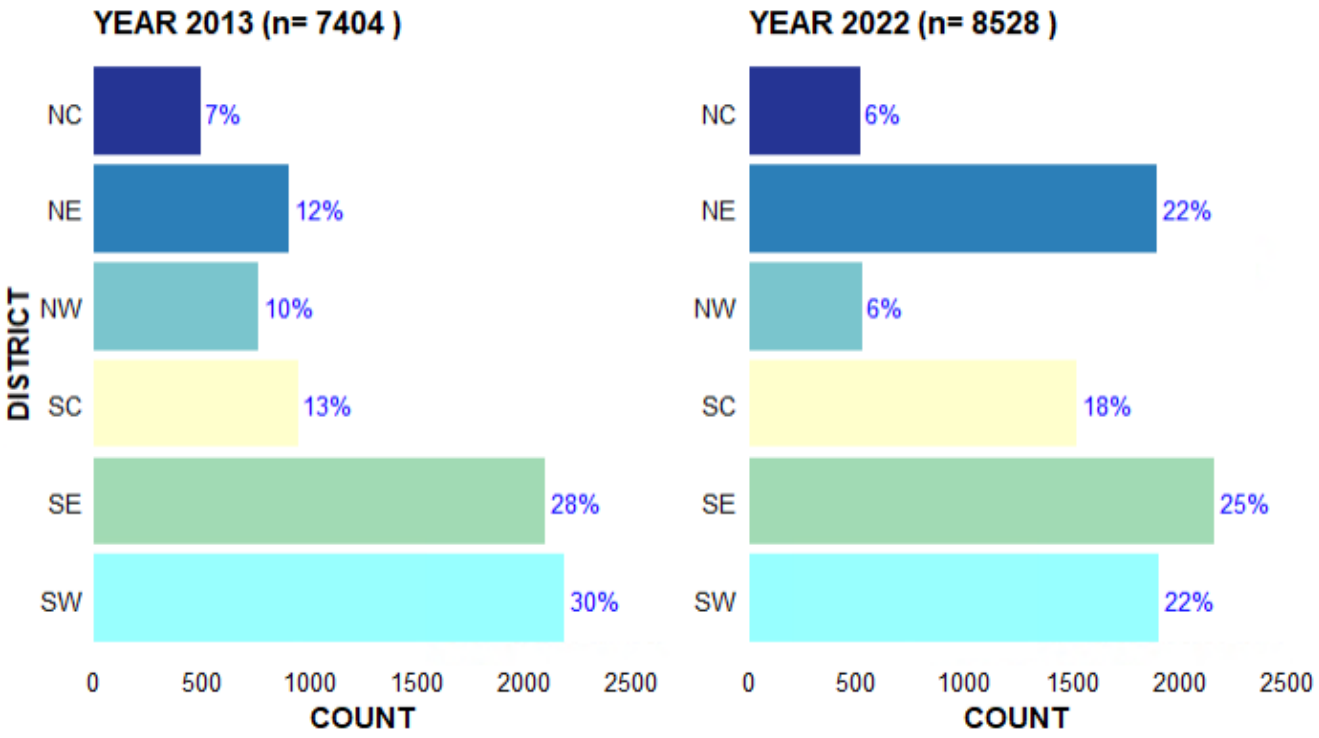


Figure 6.6: Chronic hepatitis C rates per 100,000 population by race and ethnicity, Pennsylvania, excluding Philadelphia, 2022. Categories are not mutually exclusive.



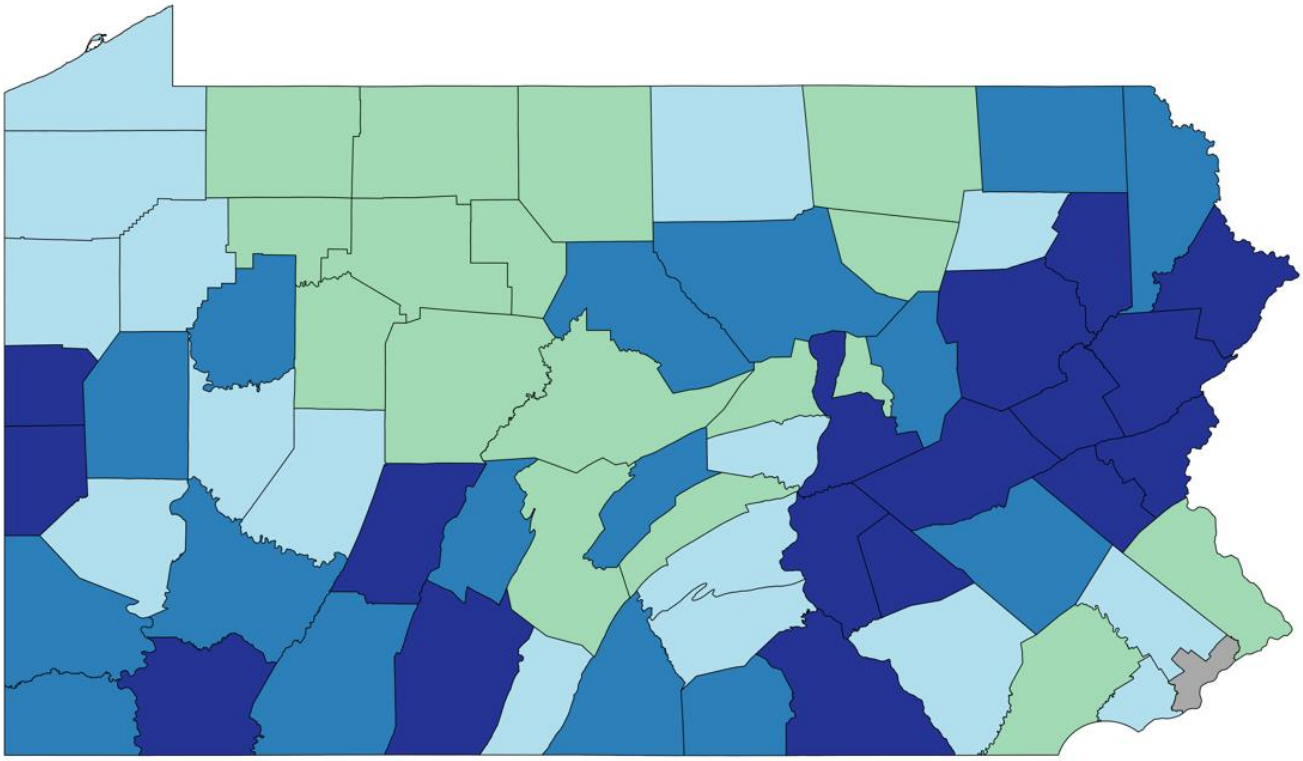
In 2022, the proportion of cases of chronic hepatitis C was highest in persons identifying as white. Per population, people identifying as Hispanic experienced the highest rate (**Figure 6.4-6.6**).

Figure 6.7: Reported chronic hepatitis C cases by PA DOH Community Health District, Pennsylvania, excluding Philadelphia, 2013 and 2022.



In contrast to 2013, we observed more cases of chronic hepatitis C reported in the Northeast District in 2022 (**Figure 6.7**). Case counts remained high in the Southcentral, Southwest, and Southeast Districts in 2022 (**Figure 6.7**). We also observed high rates of chronic hepatitis C in 2022 throughout the state, particularly in the northeast (**Figure 6.8**).

Figure 6.8: Rates of chronic hepatitis C by county per 100,000 population, Pennsylvania, excluding Philadelphia, 2022.



Rate per 100,000 Population	County Names
No cases	None
(>0.0 - 33.9)	BRADFORD, BUCKS, CAMERON, CENTRE, CHESTER, CLEARFIELD, ELK, FOREST, HUNTINGDON, JEFFERSON, JUNIATA, MCKEAN, MONTOUR, POTTER, SULLIVAN, UNION, WARREN
(>33.9 - 51.5)	ALLEGHENY, ARMSTRONG, CRAWFORD, CUMBERLAND, DELAWARE, ERIE, FULTON, INDIANA, LANCASTER, MERCER, MONTGOMERY, PERRY, SNYDER, TIOGA, VENANGO, WYOMING
(>51.5 - 66.4)	ADAMS, BERKS, BLAIR, BUTLER, CLARION, CLINTON, COLUMBIA, FRANKLIN, GREENE, LYCOMING, MIFFLIN, SOMERSET, SUSQUEHANNA, WASHINGTON, WAYNE, WESTMORELAND
(>66.4)	BEAVER, BEDFORD, CAMBRIA, CARBON, DAUPHIN, FAYETTE, LACKAWANNA, LAWRENCE, LEBANON, LEHIGH, LUZERNE, MONROE, NORTHAMPTON, NORTHUMBERLAND, PIKE, SCHUYLKILL, YORK
	PHILADELPHIA (Excluded)

Perinatal Hepatitis C

Table 7.1. Perinatal hepatitis C counts, Pennsylvania, excluding Philadelphia, 2018 to 2022.

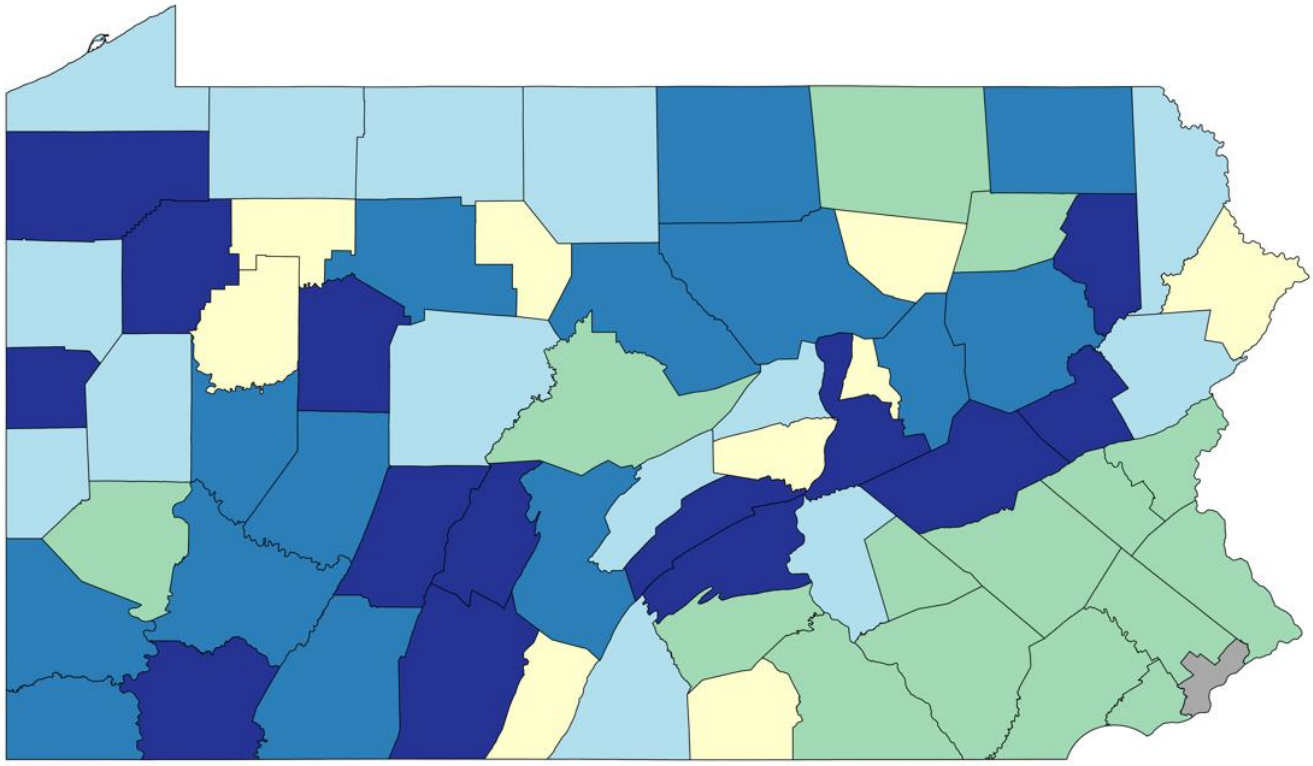
Disease	2018*	2019	2020	2021	2022
Perinatal hepatitis C	15	16	16	13	5

*Perinatal hepatitis C was not nationally notifiable until 2018.

Since 2018, PA DOH has conducted perinatal hepatitis C surveillance to accurately count perinatal hepatitis C cases and counts have decreased over time with only five cases reported in 2022 (**Table 7.1**). These cases are infants meeting the perinatal hepatitis C CSTE case definition.

In 2022, rates of perinatal hepatitis C exposures (i.e., infants born to mothers living with hepatitis C), were high throughout the state including western, central and northeastern Pennsylvania (**Figure 7.1**).

Figure 7.1. Rates of infants born to a mother living with chronic hepatitis C exposure by county per 100,000 live births, Pennsylvania, excluding Philadelphia, 2022.



Rate per 100,000 Live Births	County Names
No cases	ADAMS, CAMERON, CLARION, FOREST, FULTON, MONTOUR, PIKE, SNYDER, SULLIVAN
(>0.0 - 469.5)	ALLEGHENY, BERKS, BRADFORD, BUCKS, CENTRE, CHESTER, CUMBERLAND, DELAWARE, LANCASTER, LEBANON, LEHIGH, MONTGOMERY, NORTHAMPTON, WYOMING, YORK
(>469.5 - 734.5)	BEAVER, BUTLER, CLEARFIELD, DAUPHIN, ERIE, FRANKLIN, MCKEAN, MERCER, MIFFLIN, MONROE, POTTER, UNION, WARREN, WAYNE
(>734.5 - 1023.9)	ARMSTRONG, CLINTON, COLUMBIA, ELK, GREENE, HUNTINGDON, INDIANA, LUZERNE, LYCOMING, SOMERSET, SUSQUEHANNA, TIOGA, WASHINGTON, WESTMORELAND
(>1023.9)	BEDFORD, BLAIR, CAMBRIA, CARBON, CRAWFORD, FAYETTE, JEFFERSON, JUNIATA, LACKAWANNA, LAWRENCE, NORTHUMBERLAND, PERRY, SCHUYLKILL, VENANGO
	PHILADELPHIA (Excluded)

Limitations

There are several limitations to the data presented in this report. While this report is based on 2013 to 2022 PA-NEDSS surveillance data regarding cases that meet CDC/CSTE case definitions, this may not be reflective of the true number of people with infections during the surveillance period. People with acute viral hepatitis infection are usually asymptomatic; thus, the diagnosis is likely to be missed and not reported. Acute viral hepatitis may co-occur with another condition that may cause similar symptoms making viral hepatitis diagnosis difficult. With highly effective antiviral treatments available for hepatitis C, people may get infected with hepatitis C more than once. However, due to challenges in identifying them, we did not count hepatitis C reinfections in this surveillance report. Also, CDC case definitions occasionally change, and this may influence case counts over time. For example, hepatitis C acute and chronic case definitions changed in 2016 and 2020 to include more laboratory tests in the definitions. Furthermore, the case counts presented in this report likely represent an underestimation of the number of new cases given many people's limited access to viral hepatitis testing and diagnosis, especially among vulnerable populations at risk for viral hepatitis. Finally, the COVID-19 pandemic likely led to underreporting of viral hepatitis in 2020 and potentially 2021 as health care facilities prioritized resources and testing on COVID-19, and many people avoided seeking care for other conditions.

Discussion and Conclusions

Pennsylvania, excluding Philadelphia, reported more than 10,000 cases of viral hepatitis to CDC in 2022. This summary report identifies populations and regions with a higher burden of viral hepatitis that could benefit from enhanced prevention and control measures.

Hepatitis A case counts peaked in 2019 in Pennsylvania and nationwide due to ongoing person-to-person outbreaks among people experiencing homelessness, people who use drugs, and men who have sex with men. Pennsylvanians aged 20 to 39 years, and males, were most affected in 2022. Compared to other regions since 2018, the highest counts of hepatitis A occurred in southeastern Pennsylvania, but several northeast and northcentral counties experienced high rates in 2022. Per population in 2022, people identifying as Hispanic were most affected by hepatitis A. The epidemiology of hepatitis A has changed over the past decade. Prior to 2018 in PA, cases primarily acquired the disease through international travel and foodborne illness. Since 2018, PA has experienced person-to-person spread amongst people who use drugs, people experiencing homelessness, and men who have sex with men.[3] Hepatitis A continues to affect community members affected by drug use and homelessness, but not all cases report these risk factors. Of note, false positive hepatitis A IgM results can occur in older individuals.[13] Hepatitis A case counts decreased since the national person-to-person outbreak peaked in 2018, but in Pennsylvania, case counts have not yet returned to the levels seen prior to the start of the outbreak. Efforts to immunize at-risk populations against hepatitis A have continued since 2018 with almost 3,000 hepatitis A vaccine doses administered in 2019 at the height of the person-to-person outbreak by PA DOH and local health departments excluding Philadelphia. Vaccine campaigns continue

across the state to immunize Pennsylvanians with a particular focus on people who use drugs and/or are experiencing homelessness.

Acute hepatitis B decreased from 2019 to 2021 but increased again in 2022. Rates of acute hepatitis B are lower in Pennsylvania compared to national rates; however, we observed an increase in Pennsylvania in 2022 that was not observed nationally. Those aged 40 to 64 years old were most affected, but we also observed increases in 2022 in those aged 20 to 39 years old. Regionally, the southwest and northwest regions of Pennsylvania were most burdened with high case counts and rates. About one third reported injection drug use. Per population in 2022, people identifying as white were most affected by acute hepatitis B.

The burden of chronic hepatitis B increased in 2022 to levels last seen in 2016 with over 1,800 cases reported. People aged 40 to 64 years old were most affected over time, but rates increased even among those 65 and older. Southeast Pennsylvania bears the greatest burden of chronic hepatitis B but other urban and rural areas of Pennsylvania experience high rates as well. Per population in 2022, people identifying as Asian/Pacific Islander were most affected by chronic hepatitis B. Males with hepatitis B infections outnumber females, but females with the infection were younger which increases the risk of perinatal hepatitis B exposure. Detection of chronic hepatitis B in younger females could be due to screening efforts in pregnancy. Counts and rates of perinatal hepatitis B exposure are particularly high in Delaware County, Pennsylvania. Despite the number of pregnant people chronically infected with hepatitis B, PA DOH did not identify any perinatal hepatitis B cases in 2022. This is a testament to the enhanced prevention and control measures recommended and monitored by the PA DOH Perinatal Hepatitis B Prevention Program and PA County/Municipal Health Departments. Efforts continue to increase access to hepatitis B vaccine for adult at-risk populations across the Commonwealth. For example, adult hepatitis B vaccine for people diagnosed with opioid use disorder and/or stimulant use disorder became more widely available in 2023 through funding through the SAMHSA State Opioid Response grant.

Acute hepatitis C rates in Pennsylvania increased in 2022 for the first time since 2018. People 20 to 39 years old were most affected but rates increased for all ages in 2022 except for people younger than 20 years old. More males than females were affected in 2022. Western Pennsylvania experienced high counts and rates of acute hepatitis C in 2022, likely related to high rates of injection drug use in the area; however, injection drug use information was not obtained for almost 70% of cases in 2022. Per population in 2022, people identifying as white were most affected by acute hepatitis C. Acute hepatitis C rates in Pennsylvania remain lower than national rates and decreased over time until 2022. In general, acute hepatitis C is difficult to identify, as initial infection is often asymptomatic. Other reasons for undercounting of acute cases include limited hepatitis C testing, underreporting of other tests needed to meet the case definition (i.e., negative HCV tests, liver function tests), limited resources to robustly investigate cases, and difficulty determining if symptoms are due to infection, given that many persons with hepatitis C may have other conditions that cause similar symptoms. Limited resources for investigation contributes to the incompleteness of risk factor data, but even when patients are reached for interview, they may choose not to

disclose risk factors. The overall decrease through 2021 may have been related to a multitude of factors including increased access to hepatitis C treatment which prevents future transmission. In 2018, the Pennsylvania Department of Human Services released a Medical Assistance Bulletin which removed the prior authorization requirement for hepatitis C medications and thus increased the accessibility of hepatitis C medications statewide.[14]

Chronic hepatitis C case counts peaked in 2017 in Pennsylvania and continued to decrease in 2022. Despite this, in 2022, Pennsylvania reported the 4th highest chronic hepatitis C confirmed (HCV RNA positive) case count by state at 5,233 cases; this is consistent with Pennsylvania being the 5th most populous state.[15] This count includes cases from Philadelphia. People 20 to 39 years old were most affected in 2022. Case counts were highest in southeast Pennsylvania in 2022 but counts and rates were also high in urban and rural areas of southwest and northeast Pennsylvania. Per population in 2022, people identifying as Hispanic were most affected by chronic hepatitis C. More males than females were affected in 2022. Younger males and females were affected in 2022 compared to 2013. There were higher rates of perinatal hepatitis C exposure (i.e., infants born to a mother living with hepatitis C) in rural areas across the state. Perinatal hepatitis C case counts decreased over time but likely were undercounted. This may be due to lack of awareness of testing recommendations in pregnancy as well as lack of accessible testing. In 2023, CDC updated infant HCV testing guidelines in an effort to test infants earlier and increase linkage to care.[16]

Access to viral hepatitis services, including vaccination, testing, and linkage to care, is limited, especially for vulnerable populations such as people who use drugs and/or are experiencing homelessness. Drug and alcohol treatment facilities, FQHCs, and FQHC lookalikes, and correctional settings, serve populations at risk for viral hepatitis. PA DOH surveyed these facility types and found that access to viral hepatitis services was often limited.[17,18, 19] PA DOH continues to partner with organizations to increase service delivery at these priority facility types as part of viral hepatitis elimination planning and implementation.

CDC recently published a hepatitis C care cascade estimate by state to assess linkage to care and barriers to cure.[20] Nationally, an estimated 89% of patients who had a positive hepatitis C antibody test (indicating past or present exposure to the virus) had HCV RNA confirmatory testing (to determine present infection) completed. Of those, 70% had an active infection. Of those with an active infection only 35% showed evidence of hepatitis C cure or clearance. Comparatively, an estimated 92% of Pennsylvanians (including Philadelphians) who tested positive for hepatitis C antibody had HCV RNA confirmatory testing completed. Of those, 74% had an active infection. Of those with an active infection, 34% showed evidence of hepatitis C cure or clearance.[20] This report highlighted the need for additional resources to identify and link Pennsylvanians to hepatitis C care. CDC also published a report in 2022 indicating that people enrolled in Medicaid were 46% less likely to receive hepatitis C treatment compared to those with private insurance.[21] PA DOH and external advocates are partnering with the Pennsylvania Department of Human Services, Office of Medical Assistance, and Community HealthChoices managed care organizations to address barriers to viral hepatitis care. PA DOH will use the findings from this summary report to inform interventions required to achieve viral hepatitis elimination throughout the Commonwealth.

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