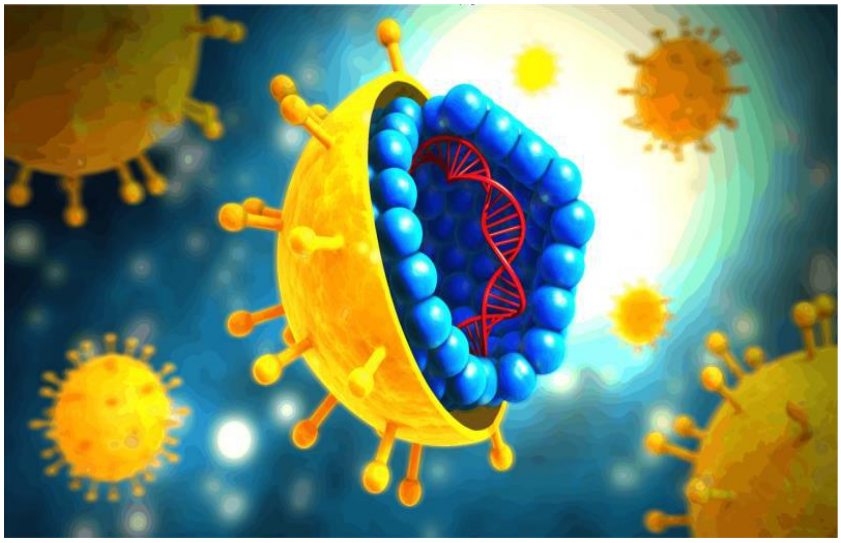
New Jersey
Hepatitis C Epidemiologic Profile



Issued July 2023

New Jersey Department of Health
COMMUNICABLE DISEASE SERVICE | INFECTIOUS AND ZOONOTIC DISEASE PROGRAM

CONTRIBUTORS

Author

Bernice Carr, MPH, MS
Epidemiologist, Communicable Disease Service, Infectious and Zoonotic Disease Program, Epidemiology, Environmental and Occupational Health, New Jersey Department of Health
Fellow, Leading Epidemiologists Advancing Data, Council of State and Territorial Epidemiologists

Mentor

Daniel Church, MPH
Epidemiologist, Viral Hepatitis Coordinator, Division of Epidemiology, Bureau of Infectious Disease and Laboratory Sciences, Massachusetts Department of Public Health

Contributors

Maryellen Wiggins MSN, RN, ACRN
Public Health Consultant, Hepatitis C Nurse
Stella Tsai, PhD, CIH
Research Scientist, Data Analyst Coordinator
Vibha Gujar, PhD, MS
Health Data Specialist
Mojisola Ojo, MPH
Epidemiologist
Communicable Disease Service, Infectious and Zoonotic Disease Program, Epidemiology, Environmental and Occupational Health, New Jersey Department of Health

Editors

Edward Lifshitz, MD, FACP
Medical Director
Kim Cervantes, MA, MPH, CIC
Program Manager
Laura Taylor, PhD, MCHES
Viral Hepatitis Coordinator
Keerti Kalluru, BSPH
Public Health Associate
Callie Shane
Management Assistant
Communicable Disease Service, Infectious and Zoonotic Disease Program, Epidemiology, Environmental and Occupational Health, New Jersey Department of Health

Acknowledgments

Council of State and Territorial Epidemiologists, Leading Epidemiologists Advancing Data Program
New Jersey Viral Hepatitis Elimination Advisor Group

CONTENTS

EXECUTIVE SUMMARY

Hepatitis C virus (HCV) is one of the most common types of viral hepatitis in the United States. An estimated 2.4 million people in the United States were living with hepatitis C during 2013–2016 (1). Hepatitis means inflammation of the liver. HCV does not only impact the liver but can affect an individual's overall health. HCV is transmitted by infected blood and blood products. HCV may present as either an acute or chronic illness. The most common method of transmission is intravenous drug use and the sharing of injecting equipment. People at greatest risk for HCV include people who use or used injection drugs, who have HIV infection or other comorbidities, certain occupations, and children born to mothers who have HCV.

HCV is one of the most frequently reported infectious diseases in the state of New Jersey. The yearly overview of HCV in New Jersey includes:

- About 100 to 145 acute HCV infections reported
- An average of 6820 new chronic cases reported
- Based on reported cases, about 470 babies who were exposed to HCV

This HCV epidemiologic profile describes the burden of HCV on the population of New Jersey over a five-year period, from 2016 through 2020. More specifically, the epidemiologic profile's three main purposes are to:

- Provide a description of HCV among the state's population/subpopulations in terms of sociodemographic, geographic, behavioral, and clinical characteristics.
- Describe the status of persons with HCV infection and provide some understanding of future HCV distribution.
- Identify characteristics of populations who are living with, or who are at high risk for, HCV in defined geographic areas and who need prevention or care services.

This epidemiologic profile can serve as a valuable tool at the state and local levels to assist in making hepatitis C related decisions around resource allocations for prevention and care resources, planning and evaluation programs, and policymaking. Moreover, this profile can be used to streamline the work of the New Jersey Department of Health (NJDOH) and its partners who are involved in viral hepatitis elimination planning.

ABBREVIATIONS

AASLD: American Association for the Study of Liver Diseases
ACA: Affordable Care Act
ACS: American Community Survey
AIDS: Acquired Immunodeficiency Syndrome
CDC: Centers for Disease Control and Prevention
CDS: Communicable Disease Service within the NJDOH
CDRSS: Communicable Disease and Surveillance System
DAA: Direct Acting Antiviral
DMHAS: Division of Mental Health and Addiction Services within the NJ Department of Human Services
EBC: Electronic Birth Registration
ELR: Electronic Laboratory Reporting
HCV: Hepatitis C Virus
HIV: Human Immunodeficiency Virus
ICD: International Classification of Diseases
IDSA: Infectious Diseases Society of America
IDU: Injection Drug Use
IZDP: Infectious and Zoonotic Disease Program within the NJDOH
MMC: Medicaid Managed Care
MSM: Men Who Have Sex with Men
NCI: National Cancer Institute
NCHS: National Center for Health Statistics
NHANES: National Health and Nutrition Examination Survey
NJAC: New Jersey Administrative Code
NJDOH: New Jersey Department of Health
NNDSS: National Notifiable Disease Surveillance System
PWID: People Who Inject Drugs
PWUD: People Who Use Drugs
RNA: Ribonucleic Acid
STD: Sexually Transmitted Diseases
US: United States

BACKGROUND

New Jersey Geographical Distribution and Population Overview

New Jersey is in the Mid-Atlantic region of the United States. It is about 150 miles long and 70 miles wide, comprising **8,722 square miles** and includes urban, suburban, and rural areas. New Jersey has a population of approximately nine million residents and borders two large metropolitan areas, New York City and Philadelphia (Figure 1). It is the most densely populated state in the United States and is composed of **21 counties** and **564 municipalities**. Hudson County is the smallest county (46.19 square miles), and Burlington County is the largest (798.58 square miles). The **capital of New Jersey is the City of Trenton**, located in Mercer County, which is also the approximate geographic center of the state (2).

Figure 1: State of New Jersey counties and transportation network

Source: State of New Jersey Profile (mit2019_section4_State_Profile.pdf (nj.gov)*)*

In 2018, the estimated population of New Jersey was **8,908,520** with 51% female and 49% male (3). The three most populous counties were Bergen, Middlesex, and Essex, whereas the three least populated counties were Salem, Cape May, and Warren (Figure 2). The **largest population by age group** was between **25 and 54 years** of age (Figure 3). When categorized by race alone or in combination, with one or more other races, the largest population was White 69.1%, followed by Black/African American 15%, then Asian 10.7% (Figure 4). In terms of Hispanic or Latino race, 79.40% of the population was non-Hispanic and 20.60% Hispanic. The proportion of foreign-born persons in 2018 was 22.8%, second highest in the nation after California (26.9%), and higher than the United States average of 13.7% (4), with most residing in northern counties: Hudson, Bergen, Passaic, Union, and Essex.

For public health planning and assessment purposes regarding HCV, NJDOH groups New Jersey counties into the following six public health regions:

Northwest:	Morris, Passaic, Sussex, Warren
Northeast	Bergen, Essex, Hudson
Central West:	Hunterdon, Mercer, Somerset
Central East:	Middlesex, Monmouth, Ocean, Union
Southwest:	Burlington, Camden, Gloucester, Salem
Southeast:	Atlantic, Cape May, Cumberland

Figure 2: New Jersey population by county, population estimate, 2018

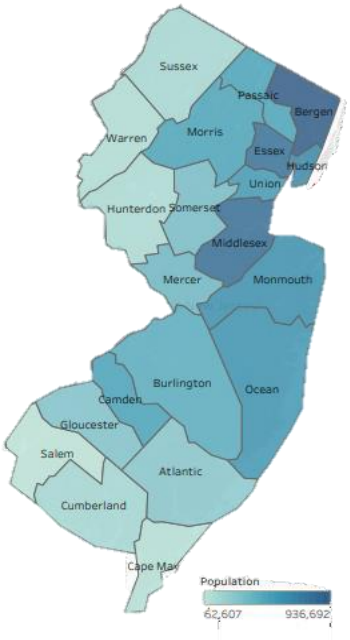
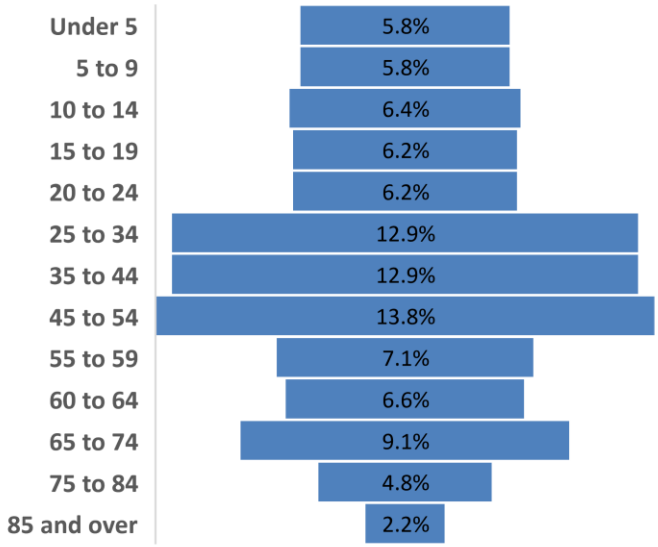
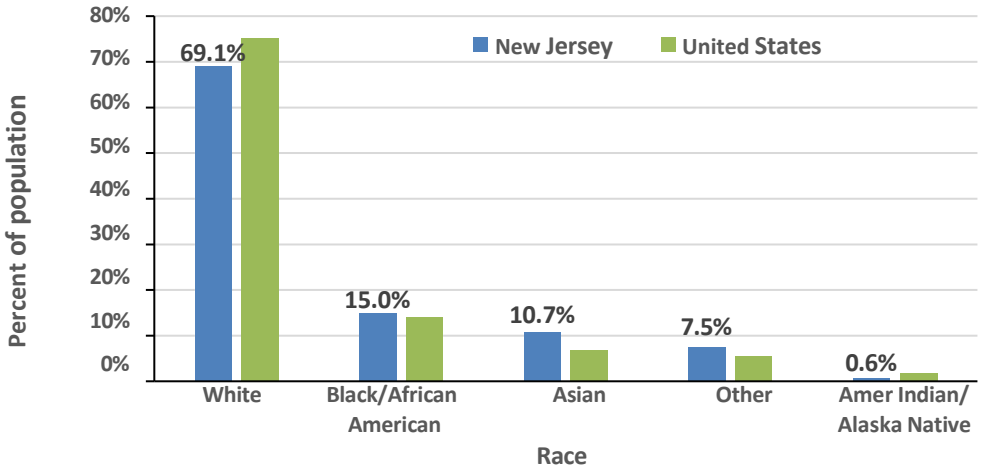


Figure 3: New Jersey population by age group, 2018



Source: American Community Survey (ACS)

Figure 4: New Jersey population by race, 2018



Source: American Community Survey

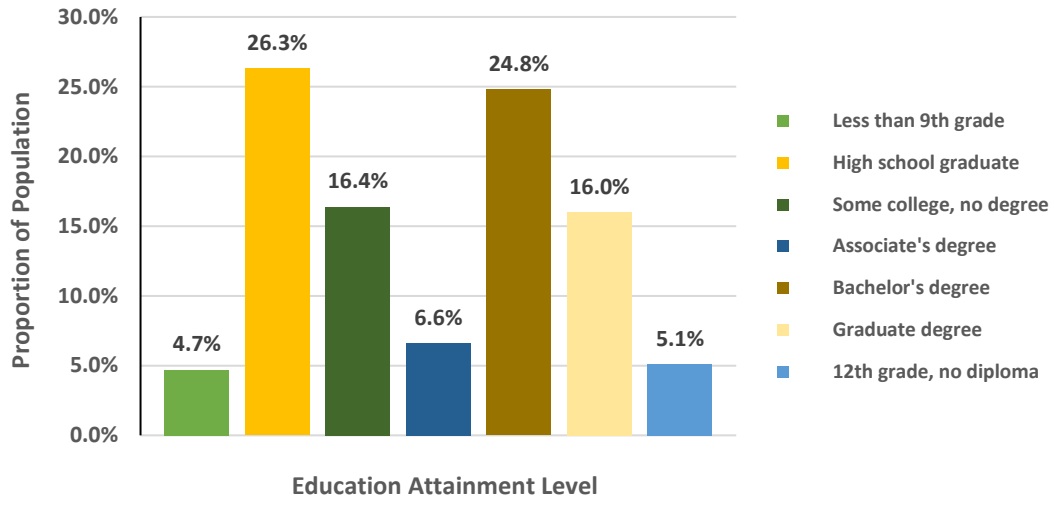
Social Characteristics/Social Determinants of Health

Social determinants indicators (i.e., social, behavioral, and environmental factors), such as education level and income, contribute substantially to an individual's health outcome. People with lower socioeconomic status are more likely to have unhealthy lifestyle behaviors and lack access to health care and information on preventive measures for communicable diseases.

Education Attainment

People who do not graduate from high school or attend college are less likely to be employed in safe, high-paying jobs and more likely to have health problems (5). In 2018, for the population aged 25 years and older in New Jersey, 9.8% did not graduate high school and fewer than 50% received a bachelor's degree or higher Figure 5 (6).

Figure 5: Education attainment for the population 25 years and over, 2018

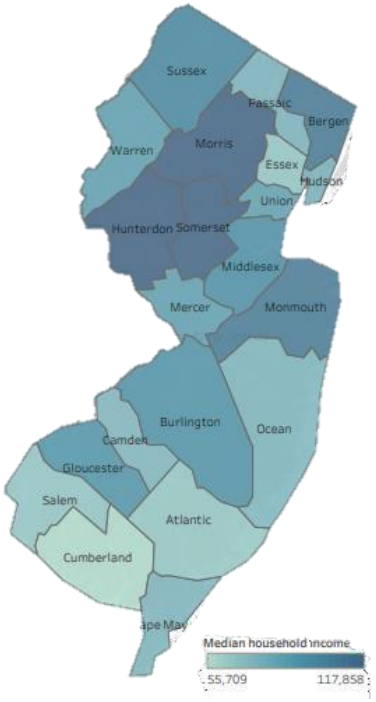


Source: American Community Survey

Median Household Income and Poverty Rate

Socioeconomic factors, such as poverty and living conditions, play a significant role in shaping infection risk and disease outcomes. Often, people in poverty live in crowded conditions, must continue to work when they are sick, encounter more stress, and are more likely than others to use drugs and alcohol (7). Based on the American Community Survey, the estimated median household income by New Jersey County for 2018 ranged from $55,709 to $117,858 (Figure 6) (6).

Figure 6: New Jersey median household income for the population 25 years and over, 2018 by county



Source: American Community Survey

Civilian Non-institutionalized Population Who Are Uninsured

A lack of health insurance is associated with decreased care seeking and uptake of HCV treatment, with cost being a driving factor. Having insurance coverage is associated with increased linkage to care, faster approval times for treatment, and subsequent retention in care (8). Since the Affordable Care Act (ACA) was enacted in March 2010, the number of uninsured persons in New Jersey decreased by 40% from 2010 to 2019 (9). In 2018, the overall proportion of uninsured, non-institutionalized residents under 65 years of age in New Jersey was 8.7%, with the highest proportion among the 26-34 age group, 15.1% (Figure 7). Of the non- institutionalized residents between 19 through 64 years old, 9.5% of those employed, and 22.8% of those not employed were uninsured (Table 1).

Figure 7: Percent of individuals uninsured by age group

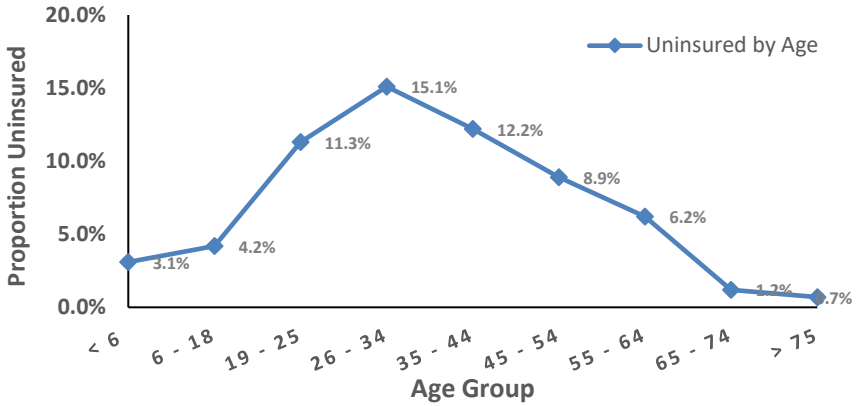


Table 1: Number of residents uninsured based on employment status, nativity, and race/ethnicity, 2018.

Categories	Total	Uninsured	Uninsured %
Employment Status			
Noninstitutionalized 19 to 64 years old	5,344,092	561,302	10.5%
In labor force	4,315,480	438,499	10.2%
Employed	4,112,267	392,099	9.5%
Unemployed	203,213	46,400	22.8%
Not in labor force	1,028,612	122,803	11.9%
Nativity			
Native born	6,784,192	297,209	4.4%
Foreign born	2,019,796	357,791	17.7%
Race and Hispanic Origin			
White	5,894,799	350,689	5.9%
Black	1,174,370	102,553	8.7%
American Indian/Alaska Native	20,790	3,732	18.0%
Asian	866,383	45,750	5.3%
Some other race	599,238	135,390	22.6%
Hispanic or Latino	1,822,422	315,286	17.3%

Source: American Community Survey

VIRAL HEPATITIS SURVEILLANCE AND EPIDEMIOLOGY IN NEW JERSEY

Testing for HCV Infection

Testing for HCV infection begins with either a rapid or laboratory-conducted assay for hepatitis C virus (HCV) antibody in blood. A nonreactive HCV antibody result indicates no HCV antibody detected. A reactive result indicates one of the following: 1) current HCV infection, 2) past HCV infection that has resolved, or 3) false positivity. A reactive result should be followed by nucleic acid testing (NAT) for HCV ribonucleic acid (RNA). If HCV RNA is detected, that indicates current HCV infection. If HCV RNA is not detected, that indicates either past, resolved HCV infection, or false HCV antibody positivity (10). Per N.J.A.C. 8:57, laboratories and health care providers must report all suspected cases of newly diagnosed acute and chronic cases of HCV within 24 hours of diagnosis to NJDOH (11).

Scope of Hepatitis C Disease in New Jersey

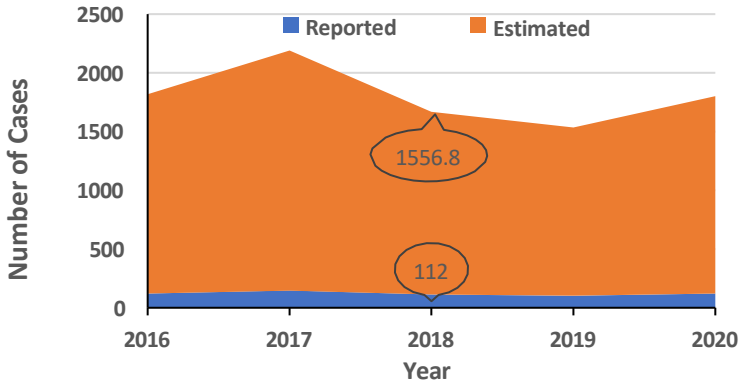
HCV represents one of the most common communicable diseases in New Jersey. On average, NJDOH receives more than 10,000 reports of hepatitis C annually. After data cleaning, deduplication, and case classification, the number of reports that meet the public health surveillance case definition for acute and chronic HCV and that were reported to the Centers for Disease Control and Prevention (CDC) during the 2016-2020 period ranged between 5,517 to 8,125 annually. Regarding overall prevalence of HCV in New Jersey, an analysis of serum specimens taken from participants in the National Health and Nutrition Examination Survey (NHANES) between 2013-2016 revealed a prevalence of 680 persons/100,000 population (12).

Acute Hepatitis C in New Jersey

Estimated Incidence of Hepatitis C in New Jersey

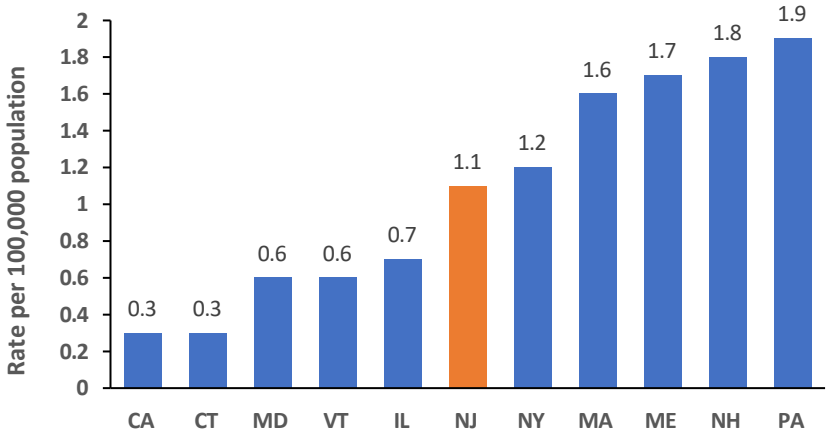
Despite being a reportable disease, many cases of diagnosed acute hepatitis C are not reported to NJDOH. Most individuals with acute HCV infection do not have a clinically evident illness and, as a result, do not seek medical care. Thus, determining the true incidence of new HCV infections per year based on the number of reported cases requires complex epidemiological modeling techniques. For each new acute HCV case that is reported in the United States, the CDC estimates there are approximately 13.9 actual cases of new acute HCV (13). Using these estimates, in New Jersey **the estimated number of new cases per year can be as high as 2,000** (Figure 8). In 2018, the actual number of acute cases reported was 112 compared to the estimated expected number of 1,557.

Figure 8: Estimated incidence of acute hepatitis C in New Jersey versus reported cases, 2016-2020



New Jersey's rate of acute cases ranked midway among states with reported acute hepatitis C data in 2018 (13) and that are similar in geographic location and/or population density (14) (Figure 9).

Figure 9: Rate per 100,000 population of reported cases of acute hepatitis C by selected states, 2018



Source: Centers for Disease Control and Prevention, and United States Census Bureau

Surveillance of Acute Hepatitis C in New Jersey

Between 2016 through 2020, 605 acute hepatitis C cases were reported to NJDOH (Figure 10). The increase in reported cases from 2016 to 2017 could be related to a change in the public health surveillance case definition applied in 2017[1]. More than 50% of reported acute HCV cases were between 25 and 50 years of age, with case rates were highest in Cumberland, Burlington, and Salem counties (Figure 11). The majority by gender at birth were male, 67.4%. In 2018, the rate of confirmed acute HCV cases in New Jersey was 1.1 per 100,000, compared to 1.2 per 100,000 population nationally. For each year over this five-year period, the most reported race for acute HCV cases was White, followed by Black/African American (cumulative data with numbers less than 5 were excluded) (Figure 12).

[1] Hepatitis C, Acute 2016 Case Definition; https://ndc.services.cdc.gov/case-definitions/hepatitis-c-acute-2016/

Figure 10: Total reported acute cases in New Jersey, 2016-2020

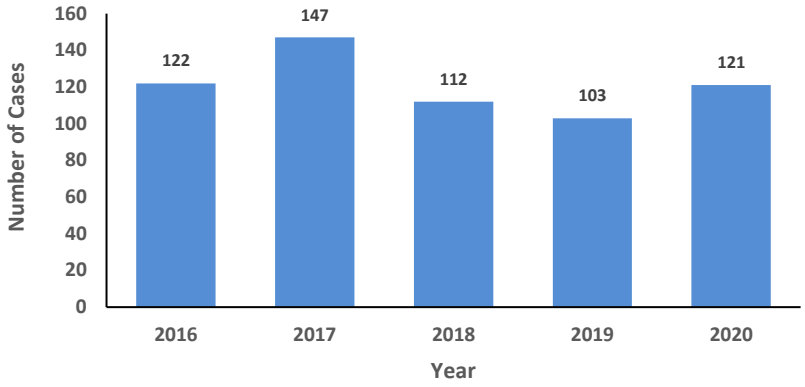


Figure 11: Characteristics of reported hepatitis C acute cases in New Jersey, 2016-2020

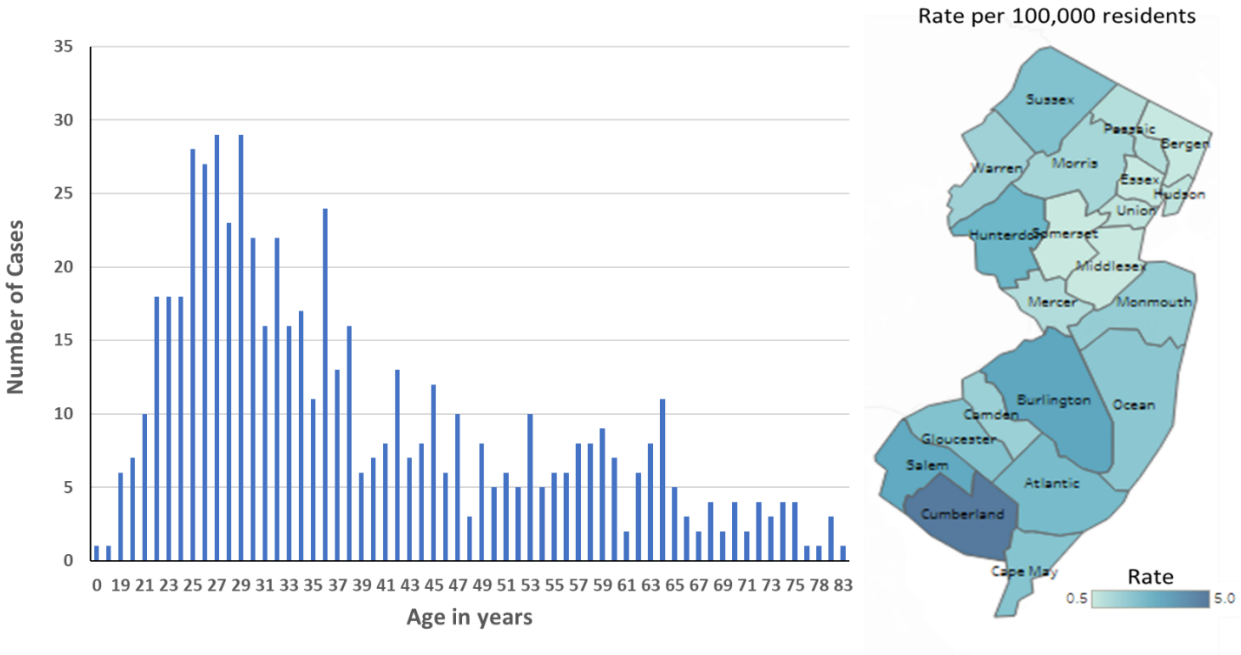
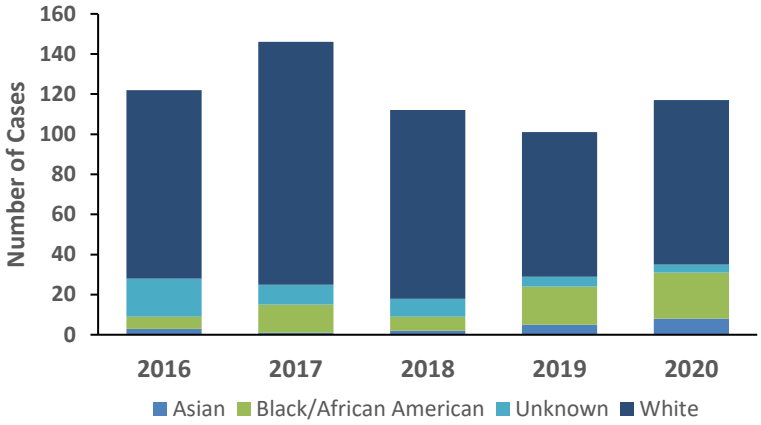


Figure 12: Reported acute hepatitis C cases by race in New Jersey, 2016-202



Source: New Jersey Department of Health, Communicable Disease Service

Risk Factor Characteristics of Acute Hepatitis C Viral Infections

HCV was historically a concern among the "baby boomer" population, those born between 1946-1964. However, in recent years, most new infections of HCV nationally and in New Jersey have been among people who share needles, syringes, or other equipment used to prepare and inject drugs (15). 2018 surveillance data for acute hepatitis C showed that 41 out of the 112 reported cases or **36.7% were people who use drugs/people who inject drugs (PWUD/PWID)**, and most were between the ages of 25-44 years. Other risk factors included unprotected sex (10.87%) and close contact with a person with confirmed hepatitis infection (7.25%). Approximately 20% to 30% of persons who inject drugs become infected with HCV within the first two years of starting injection drug use, and 50% become infected within five years of starting injection drug use (12).

Chronic Hepatitis C in New Jersey

Chronic Hepatitis C Surveillance in New Jersey

Between 2016 and 2020, there were a total of 34,098 reported chronic hepatitis C cases in New Jersey (Figure 13). Over the five-year period, the number of reported cases steadily declined, with a relatively larger decrease in 2020 (Figure 13) that may be due to COVID-19 and associated reductions in care seeking and testing. The distribution of reported chronic HCV cases by age, and gender is illustrated below. A bimodal age distribution with peaks occurring at age 30 years and 60 years is observed (Figure 14). This pattern is consistent with national trends (16). The highest case rates over the five-year period were in Cumberland, Cape May, and Camden counties (Figure 14). Most chronic HCV cases by gender at birth were male, 61.6%.

Figure 13: Total reported chronic cases in New Jersey, 2016-2020

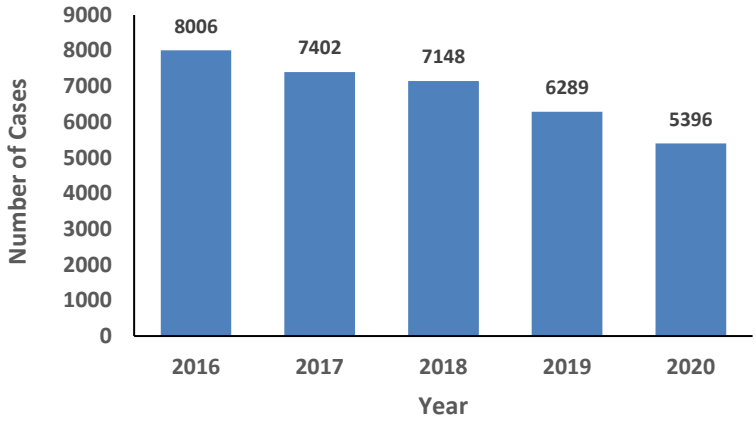
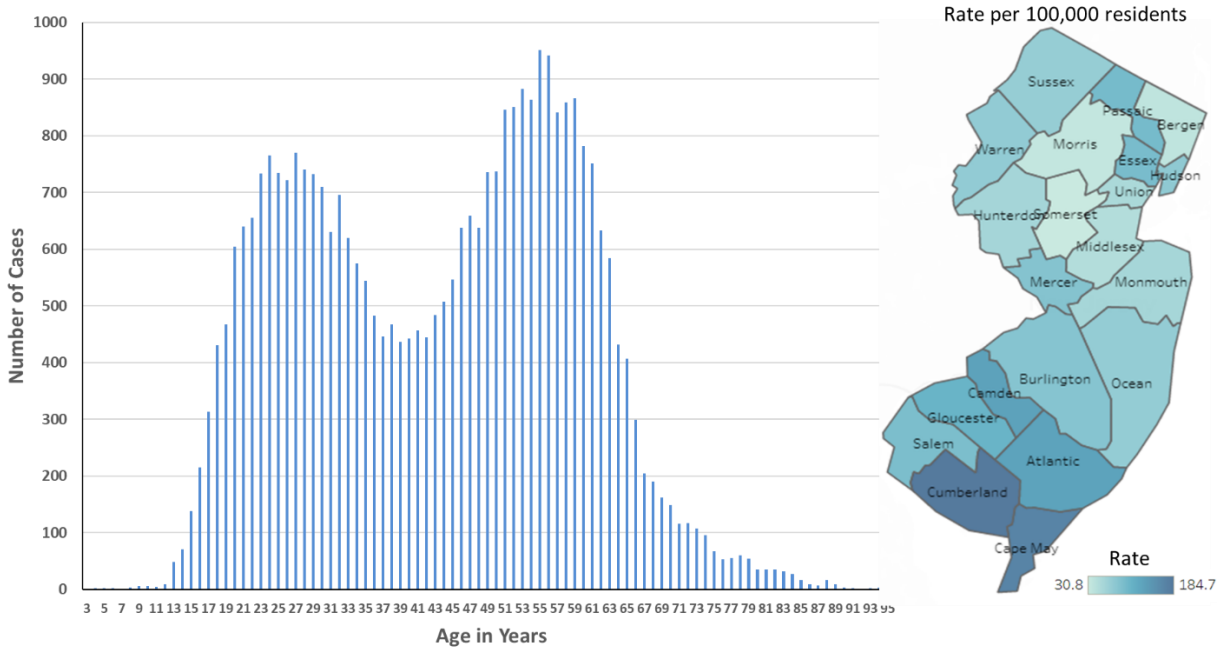
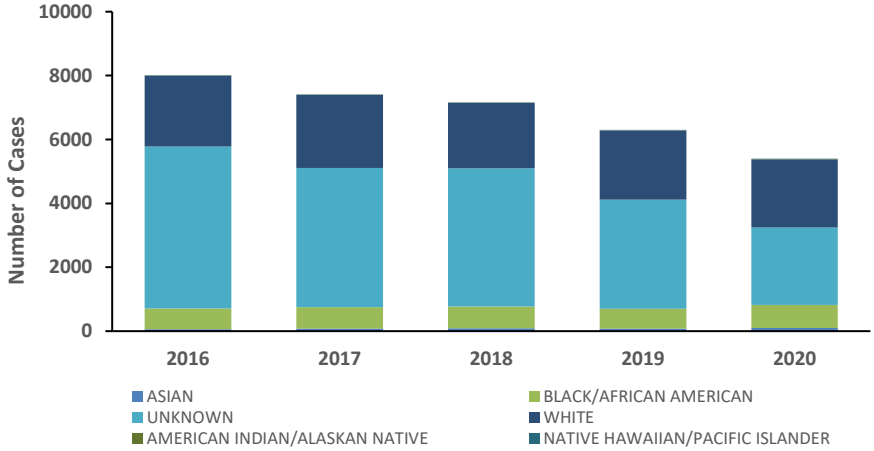


Figure 14: Characteristics of reported chronic hepatitis C cases in New Jersey, 2016-2020



Between 2016 and 2020, only 43% of reported chronic hepatitis C cases included information on race. Obtaining race information for reported chronic HCV cases has been a challenge due to the large number of cases and limited number of public health investigators at the local level focused on chronic hepatitis C. Like acute HCV cases for each year, the most frequently reported race for chronic HCV cases was White, followed by Black/African American (Figure 15). Unlike acute cases, the proportion of cases with ethnicity information is low for chronic cases.

Figure 15: Reported chronic hepatitis C cases by race a) and ethnicity b) in New Jersey, 2016-2020



Source: New Jersey Department of Health, Communicable Disease Service

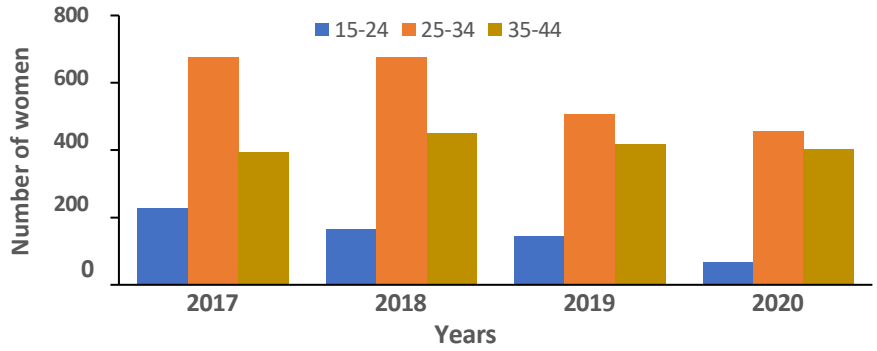
Perinatal Hepatitis C

The increase in HCV infection related to injection drug use in young adults has resulted in a corresponding increase among women of childbearing age, age 15 to 44, and women diagnosed during pregnancy (17). A doubling of HCV diagnoses among women of childbearing age was observed between 2006 and 2014, surpassing the number among women in older age cohorts (17). Vertical transmission of HCV occurs in approximately 5.8% of infants born to women who are infected with HCV and in up to twice as many infants born to women who have high HCV viral loads (18). In 2018, universal hepatitis C screening during pregnancy was recommended by the American Association for the Study of Liver Diseases (AASLD) and the Infectious Diseases Society of America (IDSA) (19). Hepatitis C screening is recommended for all pregnant women during each pregnancy.

NJDOH began monitoring babies born to pregnant people with known HCV infection in 2018. New Jersey recommends that babies are monitored until they reach 36 months of age to capture HCV laboratory test results. Additionally, NJDOH works with birthing facilities in New Jersey to ensure the birthing parent's HCV status is included on the electronic birth certificate. This process aims to better capture the HCV burden among this population and to identify babies born to HCV positive parents to ascertain perinatal HCV transmission.

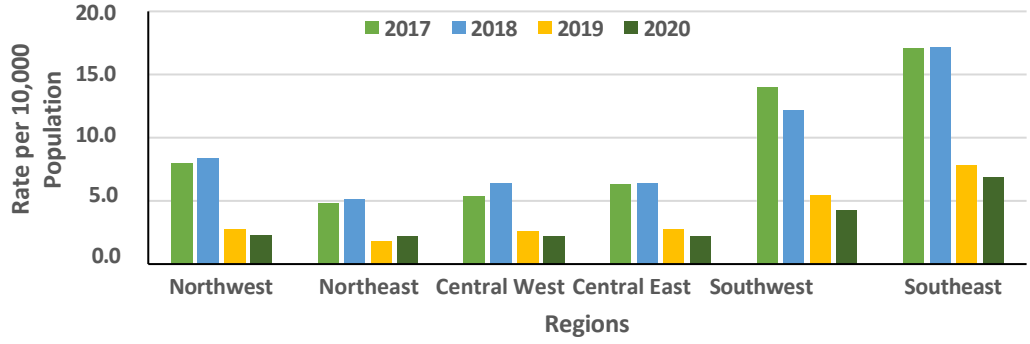
Between 2017 and 2020, the number of women of childbearing age infected with HCV was highest among those 25-34 years of age (Figure 16). The southern regions of the state had the highest rates of HCV-infected women of childbearing age per 10,000 population (Figure 17) and, similarly, had the highest rates of babies exposed to women infected with HCV (data was retrospectively collected for the year 2017) (Figure 18). Electronic birth certificate reporting varies widely by birthing hospital, which may impact regional estimates from 2018 to 2019. At least one birthing hospital in each region did not report any births associated with hepatitis C. In 2019, in the northeast region there were five hospitals who reported no births associated with hepatitis C. Ultimately, the number of babies in New Jersey who tested positive for HCV and met the perinatal HCV case definition in 2017, 2018, 2019, and 2020 was 6, 10, 11, and 8, respectively.

Figure 16: Number of reported women of childbearing age infected with HCV by age group, 2017-2020



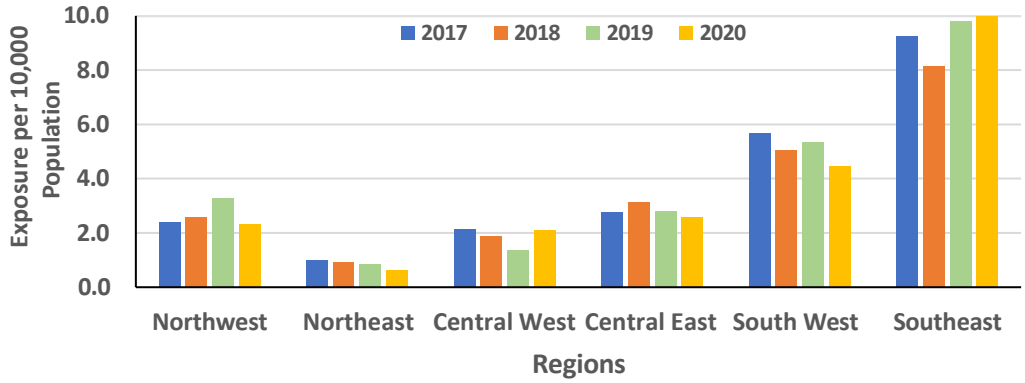
Source: New Jersey Department of Health, Communicable Disease Service

Figure 17: Rate of HCV-infected women of childbearing age per 10,000 population by region, 2017-2020



Source: New Jersey Department of Health, Communicable Disease Service

Figure 18: Rate of reported perinatal HCV exposure per 10,000 female population of childbearing age, by public health regions, 2017-2020



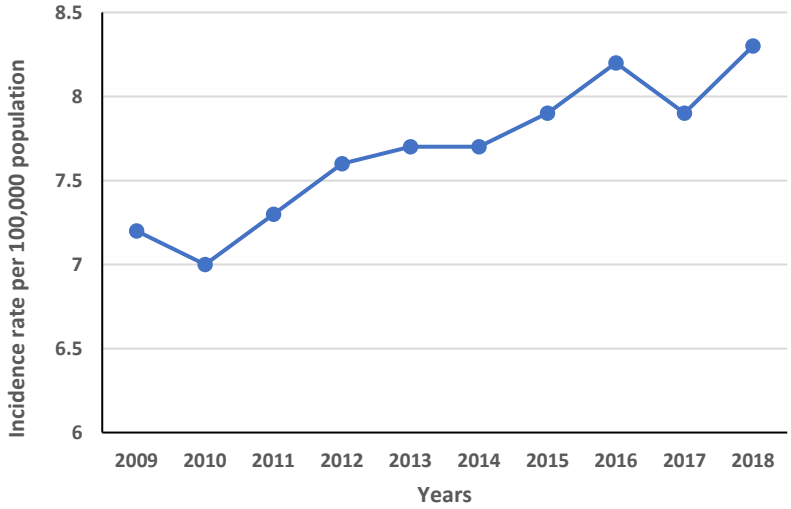
Source: New Jersey Department of Health, Communicable Disease Service

Morbidity and Mortality

Hepatocellular Cancer

Each year in the United States, around 31,000 people are diagnosed with liver cancer. Among people with certain liver cancers in the United States, more than 50% have HCV at the time of cancer diagnosis. Early detection and treatment of viral hepatitis could prevent 90,000 liver cancer deaths by 2030, starting with 2015 as the baseline year (20). In New Jersey, the observed incidence rates of liver and intrahepatic bile duct cancer steadily increased from 2009 through 2018 for all ages (Figure 19) (21). During 2018, 561 male and 211 female New Jersey residents were diagnosed with liver cancer (22).

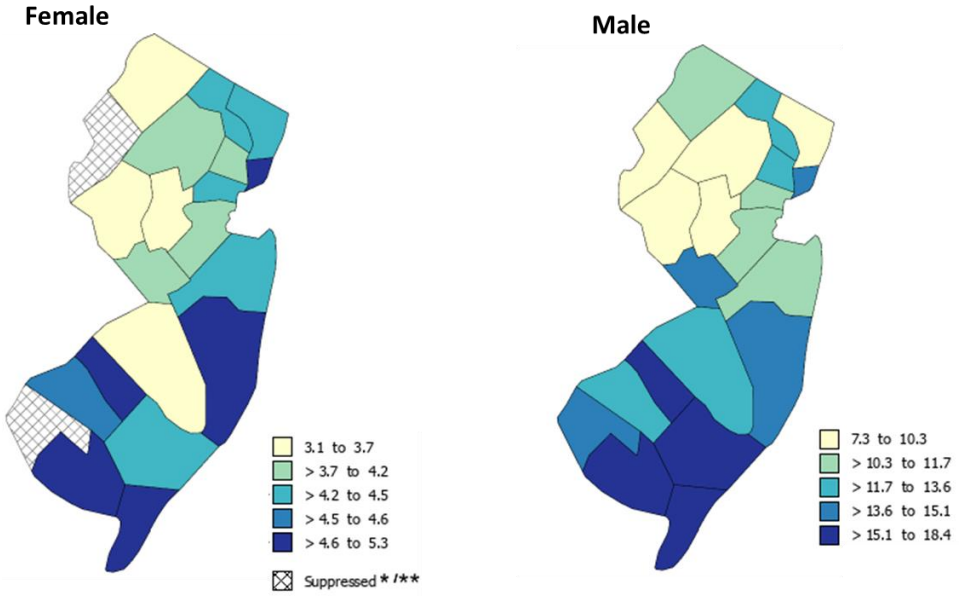
Figure 19: Observed liver and intrahepatic bile duct cancer incidence rates in New Jersey, 2009-2018



Source: National Cancer Institute

In New Jersey, the average incidence rates of liver and bile duct cancer vary by county and sex (Figure 20). Camden, Cape May, Cumberland, Hudson, and Ocean counties have the highest incidence rate for females whereas Atlantic, Camden, Cape May, and Cumberland counties have the highest incidence rate for males. Cancer of the liver is more common in older people and is more common in men than in women. In New Jersey, after brain and other nervous system cancers, liver and bile duct cancer had the greatest increase in incidence rates between 2014 and 2018 (23) (Figure 21).

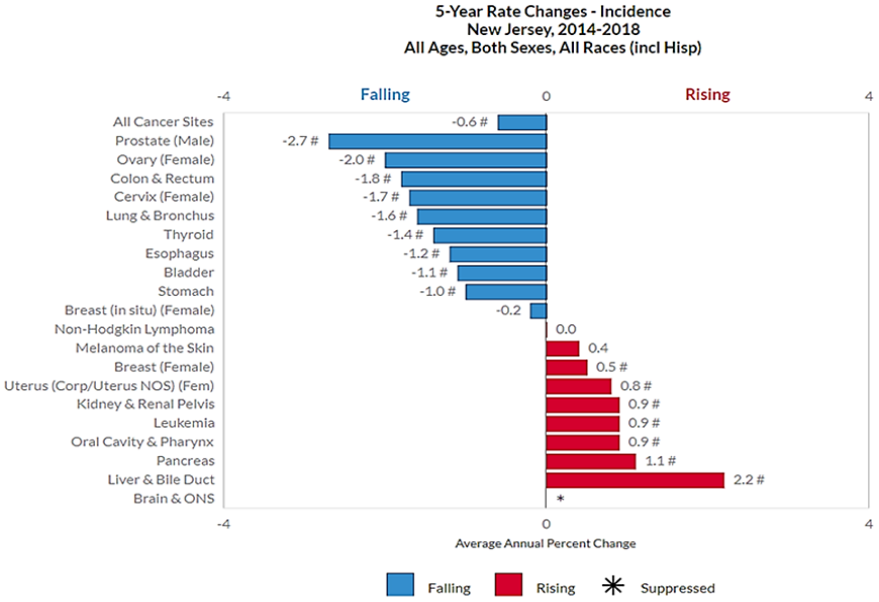
Figure 20: Average Incidence rates of liver and bile duct cancer in females and males by county, 2014-2018



Source: National Cancer Institute

**Data has been suppressed to ensure confidentiality and stability of rate estimates. Data is currently being suppressed if there are less than 16 counts in a period.*

Figure 21: Average annual percent change of different types of cancer, 2014-2018

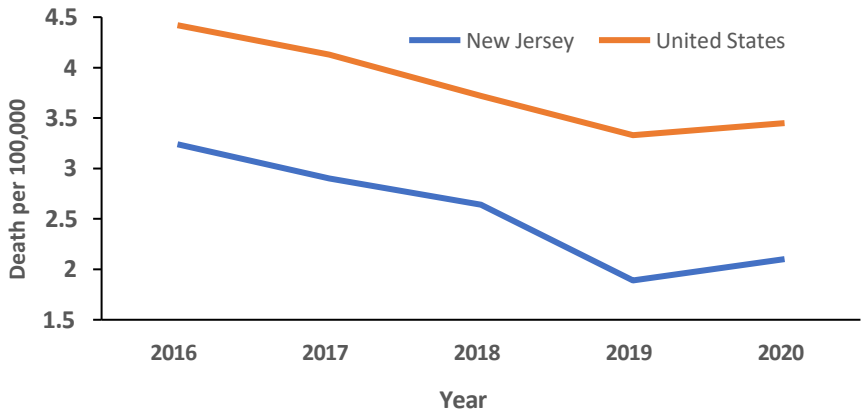


Source: National Cancer Institute

Hepatitis C as Cause of Death

Death certificate data is used to characterize deaths in the United States associated with hepatitis C (23). An overall decline in death rates associated with HCV is noted from 2016 through 2020 (Figure 22). This decline is consistent with the decrease in reported chronic HCV cases and could be related to people with chronic hepatitis C receiving treatment. The slight increase in 2020 could be due to fewer people receiving treatment and/or people with hepatitis C dying from causes related to COVID-19. Counties with the highest death rates of hepatitis C as the underlying cause of death from 2016 to 2020 were Essex, Hudson, Camden, Mercer, and Passaic, with crude rates of 1.5 to 1.1 per county population (24).

Figure 22: Deaths per 100,000 population where underlying cause of death was hepatitis C in New Jersey and the United States, 2016-2020

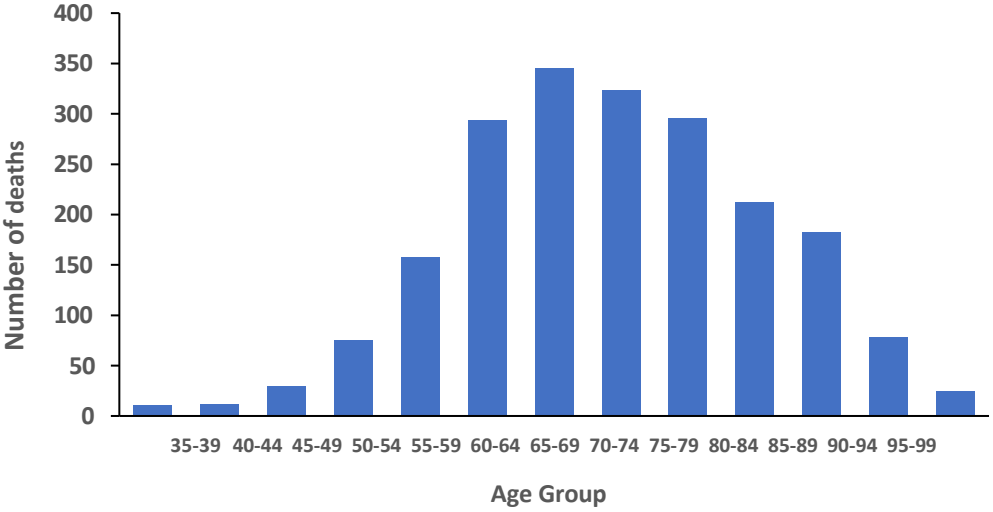


Source: Centers for Disease Control and Prevention

Liver Cancer as Cause of Death

Liver and intrahepatic bile duct cancer is the sixth leading cause of cancer death in the United States. The death rate was 6.6 per 100,000 population per year based on 2016-2020 age- adjusted deaths (21). In 2019, for every 100,000 people, there were eight new liver and intrahepatic bile duct cancer cases, and seven deaths. In New Jersey, between 2018 and 2020, there were 2048 liver cancer-related deaths reported, with a crude rate of 7.7 per 100,000 population (25). The number of liver cancer related deaths was largest among people aged 65-74 years (Figure 23).

Figure 23: Number of liver-related cancer deaths for New Jersey residents by age group, 2018-2020



Source: Centers for Disease Control and Prevention

VIRAL HEPATITIS IN SPECIAL POPULATIONS IN NEW JERSEY

HIV Co-infections

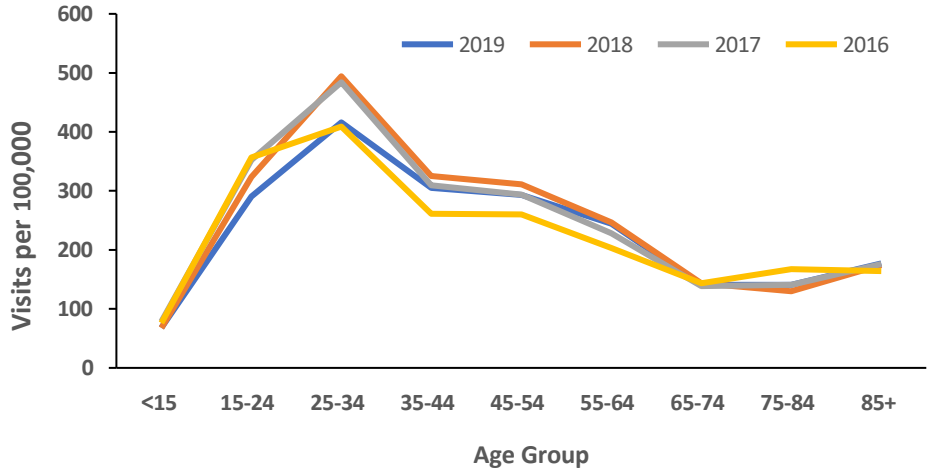
HCV and human immunodeficiency virus (HIV) are bloodborne viruses transmitted through direct contact with the blood of an infected person, and, as a result, co-infection with HIV and HCV is common. Among injection-drug users who have HIV, 62-80% are co-infected with HCV (26). Although transmission via injection-drug use remains the most common mode of HCV acquisition in the United States, sexual transmission is an important mode of acquisition among Men Who Have Sex with Men (MSM) with HIV who also have risk factors, including those who use non-injection drugs. HCV infection may also affect the management of HIV infection (26).

Of the 7,258 HCV cases reported to NJDOH in 2018, 258 (3.6%) were co-infected with HIV/AIDS. Over 60% of those infected with HCV or HIV/AIDS, resided in Essex, Hudson, Union, Passaic, and Middlesex counties. Fifty-two percent of the co-infected individuals were exposed to HIV/AIDS through injection drug use (IDU) or MSM/IDU, 2.8 times the proportion among the HIV/AIDS group that is not co-infected with HCV. Mortality was higher among HCV cases co-infected with HIV, 6.4% died between the beginning of 2018 through August 2019, compared to 2% for HCV cases not co-infected. The risk of mortality among HCV cases co-infected with HIV is greater than 3 times that of the HCV non co-infection group.

Persons Who Use or Inject Drugs

A deadly consequence of the opioid crisis is an increase in blood-borne infections, including viral hepatitis (27). PWUD or PWID are at risk for HCV infection through the sharing of needles and equipment used to prepare and inject drugs. In recent years, an emerging HCV epidemic has been occurring among young PWID, particularly in rural and suburban settings (28). Between 2016 and 2019, the highest rate of drug-related hospital visits were among persons 25-34 years of age, followed by persons 15-24 and 35-44 years of age (Figure 24) (29).

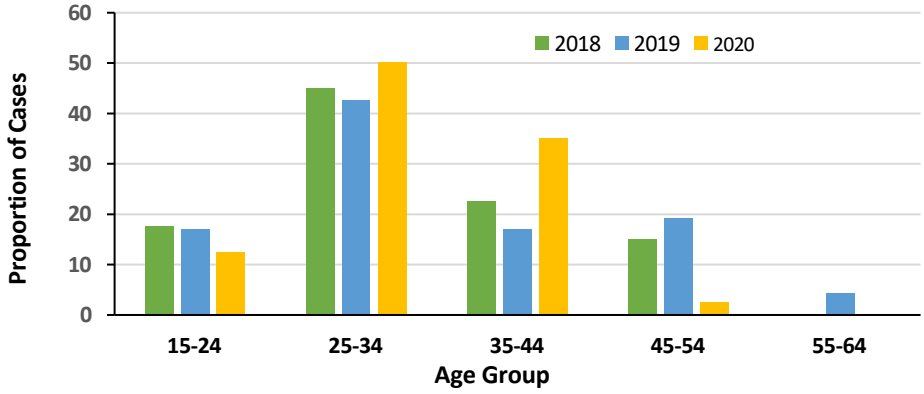
Figure 24: Rate of drug-related hospital visits per 100,000 population by age group in New Jersey, 2016-2019



Source: New Jersey Department of Health, Population Health

PWID/PWUD was the most frequently reported risk factor for reported acute hepatitis C cases in 2018, 2019, and 2020 at **36.6**%, **46.6**% and **33**%, respectively. Acute HCV cases between 25 through 34 years of age had the highest proportion of PWID/PWUD (Figure 25).

Figure 25: Proportion of reported acute HCV cases with identified PWID/PWUD by age group, New Jersey, 2018-2020



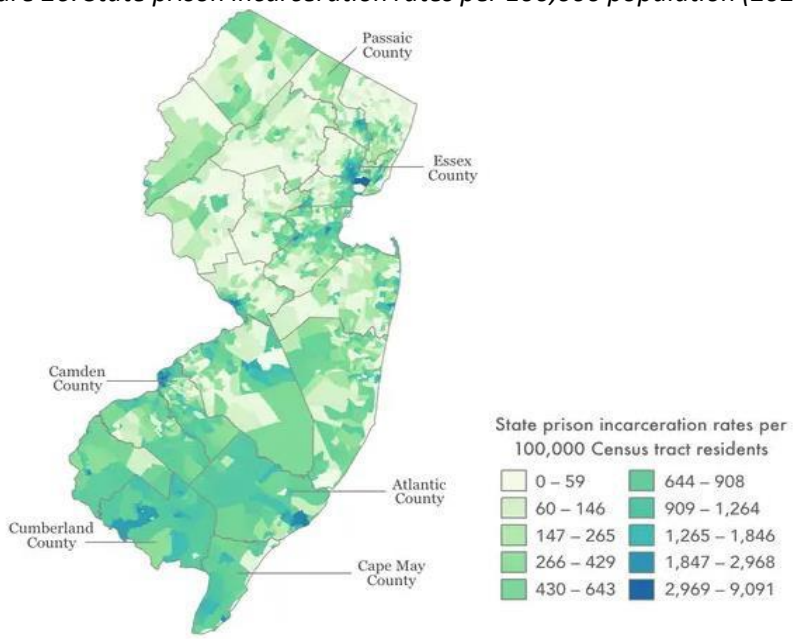
Source: *Source: New Jersey Department of Health, Communicable Disease Service*

Incarcerated individuals

Hepatitis C prevalence in U.S. correctional settings is disproportionately high because of disproportionately high incarceration rates among persons who use drugs (30). Compared with the general population, the prevalence of viral hepatitis and other bloodborne related diseases such as HIV is higher among people who are incarcerated, with hepatitis C rates 10 times higher in jails and prisons (31). The correctional institutions and jails in New Jersey that house

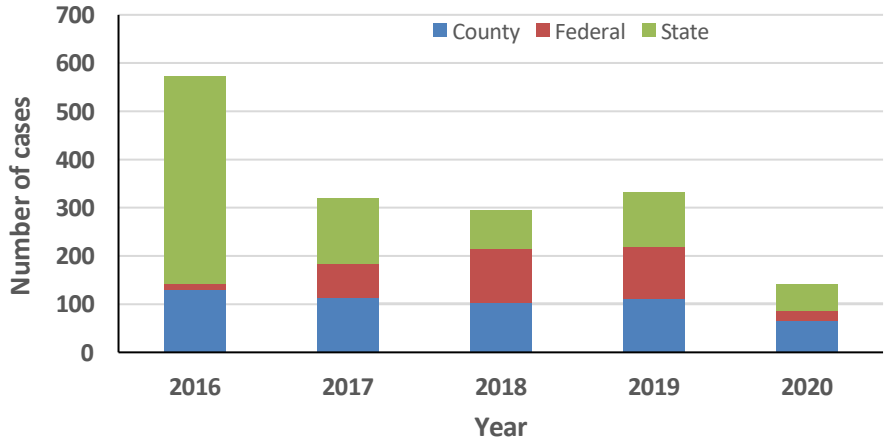
confined inmates are mainly federal, state, and county facilities. Six counties in New Jersey account for roughly a quarter of the state's population, however, more than half of the state's imprisoned population come from those counties (Figure 26) (32). Between 2016 and 2020, there has been an increased number of HCV reports from federal facilities and a decreased number from state facilities (Figure 27) (8).

Figure 26. State prison incarceration rates per 100,000 population (2020)



Source: Prison Policy Initiative

Figure 27: Number of cases reported with hepatitis C by correctional facility, 2016-2020



Source: New Jersey Department of Health, Population Health

ADDRESSING VIRAL HEPATITIS IN NEW JERSEY

Prevention and Education

Successful hepatitis C surveillance and prevention plans require strong collaboration. The goal of this collaboration is to use surveillance data to accurately identify high-impact settings and populations, linking those in need to services, and prevention of new infections. The NJDOH Communicable Disease Service (CDS) is continually working collaboratively with partners at the federal, state, and local levels to accomplish such goals.

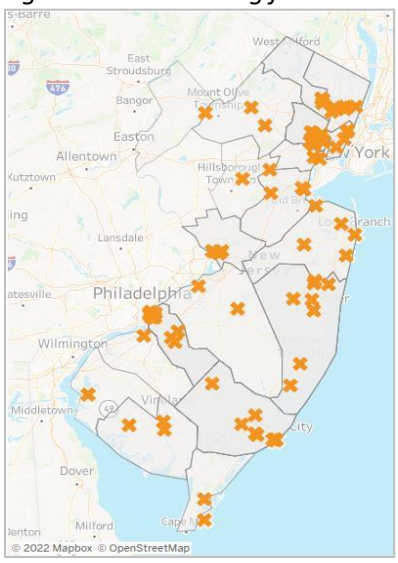
In October 2019, NJDOH participated in a statewide Viral Hepatitis Summit. This event drew 200 stakeholders and partners from across the state and served as the kickoff to the ongoing viral hepatitis elimination planning in the state. Elimination planning is an integrative and collaborative approach, with several focus areas, including HCV testing, data sharing, educational outreach, linkage to care, harm reduction and technical support.

Hepatitis C Testing

CDC's 2020 updated testing recommendations for HCV infection call for universal screening: a one-time hepatitis C testing regardless of age or setting prevalence among people with recognized conditions or exposures, routine periodic testing for people with ongoing risk factors, and ad hoc testing of any person who requests hepatitis C testing (33). One of the main goals of the CDS HCV program is to promote HCV testing with a focus on the populations most at-risk. CDS encourages health care providers, through education and outreach, to incorporate universal HCV testing using recommended diagnostic tests (Appendix Figure 30). Currently, New Jersey only requires positive HCV test results to be reported to the state. This makes it difficult to calculate the total number of individuals tested for HCV, as well as those who may develop an acute infection. Revised regulations targeted for 2024 are expected to include a requirement for the reporting of negative hepatitis C results. This should facilitate better understanding of the hepatitis C burden in New Jersey.

In New Jersey, 12 commercial labs conduct hepatitis C testing and report results via electronic laboratory reporting (ELR) to NJDOH, as do all 71 acute care hospitals and three public health laboratories (New Jersey, New York, and Florida). NJDOH has a viral hepatitis service locator interactive dashboard available to the public 24/7 (34). This dashboard includes an HCV testing facility locator as illustrated below (Figure 28).

Figure 28: HCV testing facilities in New Jersey.

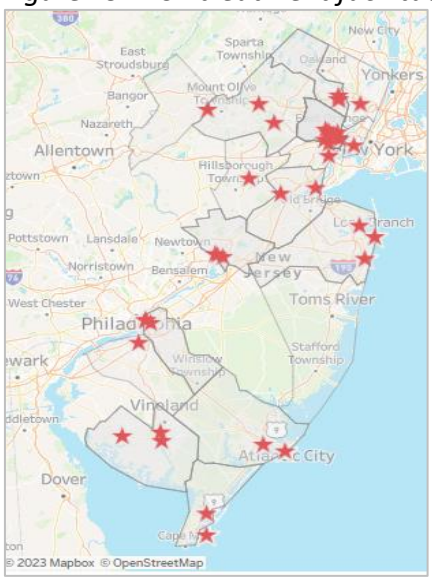


Source: New Jersey Department of Health

Hepatitis C Treatment

While there are many challenges regarding HCV treatment, both personal and systematic, NJDOH and other partners aim to address some of these barriers through elimination initiatives. Systematically, there have been some improvements. As of 2018, fibrosis restrictions for access to HCV treatment for Medicaid Managed Care (MMC) clients were lifted in New Jersey. There are also no restrictions on the time abstained from drug or alcohol use, prescriber, or retreatment restrictions. However, prior authorization requirements currently remain in place for HCV treatment from MMC plans. There are several free or low-cost providers in the state who provide HCV treatment, (34) (Figure 29), and HCV treatment is also provided in state correctional settings.

Figure 29: HCV treatment facilitates in New Jersey.



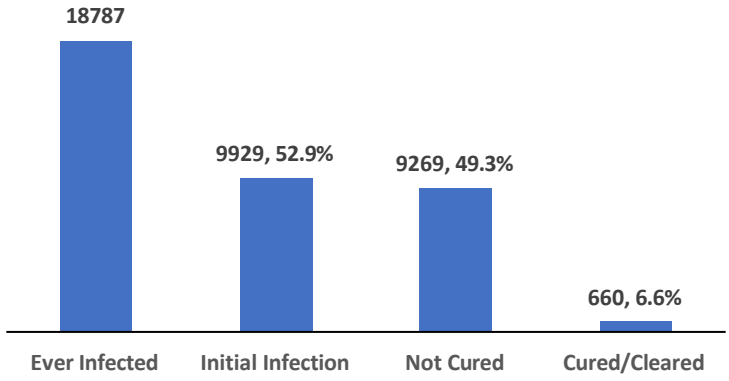
Source: New Jersey Department of Health

Laboratory Based HCV Clearance Cascade

Construction of an HCV testing cascade that quantifies screening and confirmatory testing can help public health agencies ensure equity in diagnosis and linkage to HCV care at the population level (35). Using CDC's guidance, a laboratory-based care cascade model was developed from HCV antibody and HCV RNA test results reported to the Communicable Disease Reporting and Surveillance System (CDRSS) for the first time for a resident between 2018 and 2020. Cases were evaluated for subsequent testing up to September 2022.

The HCV cure rate in New Jersey is low. The model shows that of the 18,787 persons who had a positive anti-HCV test during the evaluation period (ever infected), 52.9% had an initial positive HCV RNA reported (initial infection), with a subsequent positive HCV RNA 49.3% (not cured) and 6.6% had a subsequent negative HCV RNA (cured) reported (Figure 30). This cascade also suggests that infection status is unknown for nearly half of individuals who were ever infected.

Figure 30: Laboratory-based HCV clearance cascade for New Jersey, 2018–2020



In terms of specific populations, the HCV care cascade analysis highlights some disparities, (Table 2). Males are more likely to be infected with HCV, but less likely to receive confirmatory testing and to achieve cure compared to females. The cascade analysis also shows that the 15-34-years and 55-64 years age groups were most likely to not achieve cure despite receiving confirmatory test results.

Because only positive HCV laboratory results are required to be reported to NJDOH, determining the number of HCV infected persons who receive treatment is a challenge. A subset of laboratories and hospitals do provide negative laboratory HCV results to NJDOH. However, mandatory reporting of negative HCV results will better inform the progress of and gaps in HCV treatment in the state.

Table 2: Conditional proportions for the laboratory-based HCV clearance cascade by subpopulation

Characteristics	Ever Infected	No Viral Tests	No Viral Tests Proportion (%)	Initial Infection	Not Cured or Cleared	Not Cured or Cleared Proportion (%)
Age Group						
<15	106	55	0.3	40	39	0.4
15-34	4862	1709	9.1	2945	2754	27.7
35-44	3215	1269	6.8	1823	1716	17.3
45-54	2921	1325	7.1	1482	1382	13.9
55-64	4500	2186	11.6	2177	2008	20.2
65-74	2516	1218	6.5	1180	1099	11.1
75+	667	349	1.9	282	271	2.7
Sex at birth						
Female	7348	3393	18.1	3602	3355	33.8
Male	11415	4703	25	6318	5905	59.5
Unknown	24	15	0.1	9	9	0.1
Race/Ethnicity						
White, NH	7924	2932	15.6	4660	4303	43.3
Black, NH	2608	1114	5.9	1406	1322	13.3
Hispanic	1978	829	4.4	1075	1004	10.1
Asian, NH	27	14	0.1	12	12	0.1
Asian	382	172	0.9	185	177	1.8
Other/Unknown	5868	3050	16.2	2591	2451	24.7
Total	**18787**	**8111**	**43.2**	**9929**	**9269**	**93.4**

SUMMARY

In observing data over the period 2018 through 2020, the New Jersey Hepatitis C Epidemiologic Profile provides background information related to HCV disease burden and the overall landscape of HCV in the state. HCV is one of the most common communicable diseases in the state of New Jersey. From 2016 through 2020, there were 605 newly acquired, 34,098 chronic, and 35 perinatal cases reported to NJDOH. Not all individuals are aware of their hepatitis status, and there is significant underreporting of cases. Many individuals face various social constraints that impact infection risk, access to health care, and information on preventative measures for this communicable disease. Currently, the primary risk factor for HCV infection is injection drug use.

This profile points to the importance of appropriate testing, improved surveillance, aggressive prevention and education activities, and collaboration with various partners to keep New Jersey on track for HCV elimination. Furthermore, this document can be used as a resource for researchers, providers, policymakers, and all residents of New Jersey who are dedicated to the elimination of hepatitis C.

REFERENCES

1. *Estimating prevalence of hepatitis C virus infection in the United.* Hofmeister, Megan G. 3, Atlanta: Hepatology, 2019, Vol. 69.

2. State of New Jersey. 2019 New Jersey State Hazard Mitigation Plan. *Office of Emergency Management.* [Online] January 25, 2019. [Cited: March 7, 2022.] https://www.state.nj.us/njoem/mitigation/2019-mitigation-plan.shtml.

3. United States Census Bureau. Demographics and Housing Estimates, 2018: ACS 1-Year Estimates Subject Tables. *American Community Survey.* [Online] 2018. [Cited: May 20, 2022.] https://data.census.gov/table?q=DP05&g=0400000US34,34$0500000&y=2018.

4. Selected Social Characteristics in the United States, 2018: ACS 1-Year Estimates Subject Tables. *American Community Survey.* [Online] 2018. [Cited: May 27, 2022.] https://data.census.gov/table?q=Native+and+Foreign+Born&g=0100000US_0400000US06,34,36&tid=ACSDP1Y2018.DP02.

5. U.S. Department of Health and Human Services. Education Access and Quality. *Healthy People 2020.* [Online] [Cited: April 17, 2023.] https://health.gov/healthypeople/objectives-and-data/browse-objectives/education-access-and-quality.

6. United States Census Bureau. Selected Economic Characteristics. *American Community Survey.* [Online] 2018. [Cited: May 20, 2022.] https://data.census.gov/table?g=040XX00US34_050XX00US34001&tid=ACSDP1Y2018.DP03.

7. Vaida, Bara. Covering Health. *Association of Health Care Journalists.* [Online] September 27, 2018. [Cited: April 17, 2023.] https://healthjournalism.org/blog/2018/09/connecting-the-dots-between-social-determinants-and-infectious-diseases/.

8. Alexandra DeBose-Scarlett, Raymond Balise, Deukwoo Kwon, Susan Vadaparampil, Steven Xi Chen, Eugene R. Schiff, Gladys Patricia Ayala, and Emmanuel Thomas. Obstacles to Successful Treatment of Hepatitis C in Uninsured Patients from a Minority Population. *Journal of Translational Medicine.* 16, 2018, Vol. 178.

9. Healthinsurance.org. New Jersey and the ACA's Medicaid Expansion. *A Trusted Independent Health Insurance Guide Since 1994.* [Online] Healthinsurance.org, 1994-2023. [Cited: February 28, 2023.] https://www.healthinsurance.org/medicaid/new-jersey/.

10. Centers for Disease Control and Prevention. Laboratory Testing. *Viral Hepatitis.* [Online] March 28, 2019. [Cited: October 10, 2022.] https://www.cdc.gov/hepatitis/hcv/labtesting.htm.

11. State of New Jersey Department of Health. NJ Administrative Code. *Communicable Disease Service.* [Online] April 5, 2017. [Cited: May 20, 2022.] https://www.nj.gov/health/cd/imm_requirements/acode/index.shtml.

12. University of Washington. HCV Epidemiology in the United States. *Hepatitis C Online.* [Online] May 26, 2021. [Cited: July 25, 2022.] https://www.hepatitisc.uw.edu/go/screening-diagnosis/epidemiology-us/core-concept/all.

13. Hepatitis, Division of Viral. 2018 Surveillance Report. *Viral Hepatitis.* [Online] August 7, 2020. [Cited: July 22, 2022.] https://www.cdc.gov/hepatitis/statistics/2018surveillance/pdfs/2018HepSurveillanceRpt.pdf.

14. United States Census Bureau. Historical Population Density Data (1910-2020). *Census.gov.* [Online] April 26, 2021. [Cited: July 20, 2022.] https://www.census.gov/data/tables/time-series/dec/density-data-text.html.

15. Centers for Disease Control and Prevention. Hepatitis C Questions and Answers for Health Professionals. *Viral Hepatitis.* [Online] Division of Viral Hepatitis, National Center for HIV, Viral Hepatitis, STD, and TB Prevention, August 7, 2020. [Cited: July 22, 2022.] https://www.cdc.gov/hepatitis/hcv/hcvfaq.htm#b1.

16. Hepatitis C now heavily impacting multiple generations. *NCHHSTP Newsroom.* [Online] April 9, 2020. [Cited: June 21, 2021.] https://www.cdc.gov/nchhstp/newsroom/2020/hepatitis-c-impacting-multiple-generations.html.

17. Changing epidemiology, implications, and recommendations for hepatitis C in women of childbearing age and during pregnancy. Tatyana Kushner, Nancy Reau. New York: Journal of Hepatology, 2021, Vol. 74.

18. Alaya Koneru, et al. Increased Hepatitis C Virus (HCV) Detection in Women of Childbearing Age and Potential Risk for Vertical Transmission — United States and Kentucky, 2011–2014. *Morbidity and Mortality Weekly Report (MMWR).* 2016, Vol. 65, 28.

19. Sarah Schille et al. CDC Recommendations for Hepatitis C Screening Among Adults — United States, 2020. *Morbidity and Mortality Weekly Report (MMWR).* 2020, Vol. 69, 2.

20. Centers for Disease Control and Prevention. Viral Hepatitis & Liver Cancer Prevention Profile. *CDC Stacks.* [Online] March 23, 2018. [Cited: August 16, 2022.] https://stacks.cdc.gov/view/cdc/109302.

21. National Institute of Health. Cancer Stat Facts: Liver and Intrahepatic Bile Duct Cancer. *National Cancer Institute, Surveillance Epidemiology and End Results Program.* [Online] Surveillance Epidemiology and End Results Program, 2022. [Cited: September 14, 2022.] https://seer.cancer.gov/statfacts/html/livibd.html.

22. New Jersey Department of Health. Health Indicator Report of Incidence of Liver Cancer. New Jersey State Health Assessment Data. [Online] December 03, 2021. [Cited: July 25, 2022.] https://www-doh.state.nj.us/doh-shad/indicator/view/LiverCa.YearSex.html.

23. National Cancer Institute. Interactive Maps. *State Cancer Profiles.* [Online] September 14, 2022. [Cited: September 14, 2022.] https://statecancerprofiles.cancer.gov/map/map.withimage.php?34&county&001&035&00&1&01&0&1&5&0#results.

24. Centers for Disease Control and Prevention. *Viral Hepatitis.* [Online] Numbers and rates* of deaths with hepatitis C listed as a cause of death† among residents, by state or jurisdiction — United States,

2016-2020, August 17, 2022. [Cited: September 09, 2022.] https://www.cdc.gov/hepatitis/statistics/2020surveillance/hepatitis-c/table-3.7.htm.

25. About Underlying Cause of Death, 1999-2020. *CDC Wonder.* [Online] National Center for Health Statistics. National Vital Statistics, September 14, 2022. [Cited: September 14, 2022.] https://wonder.cdc.gov/ucd-icd10.html.

26. Prevention, Centers for Disease Control and People Coinfected with HIV and Viral Hepatitis. *Viral Hepatitis.* [Online] September 21, 2020. [Cited: September 19, 2022.] https://www.cdc.gov/hepatitis/populations/hiv.htm.

27. Persons Who Inject Drugs (PWID). *National Center for HIV, Viral Hepatitis, STD, and TB Prevention.* [Online] July 2018, 2018. [Cited: September 21, 2022.] https://www.cdc.gov/pwid/.

28. People Who Use or Inject Drugs and Viral Hepatitis. *Viral Hepatitis.* [Online] August 24, 2020. [Cited: September 21, 2022.] https://www.cdc.gov/hepatitis/populations/idu.htm.

29. New Jersey Department of Health. Drug Related Hospital Visits. Population Health. [Online] 2022. [Cited: September 16, 2022.] https://www.state.nj.us/health/populationhealth/opioid/opioid_hospital.shtml.

30. Center for Disease Control and Prevention. CDC Recommendations for Hepatitis C Screening Among Adults — United States, 2020. *Morbidity and Mortality Weekly Report (MMWR).* [Online] April 10, 2020. [Cited: September 21, 2022.] https://www.cdc.gov/mmwr/volumes/69/rr/rr6902a1.htm.

31. Centers for Disease Control and Prevention. CDC Recommendations for Correctional and Detention Settings. *National Center for HIV, Viral Hepatitis, STD, and TB Prevention.* [Online] April 18, 2022. [Cited: September 21, 2022.] https://www.cdc.gov/nchhstp/dear_colleague/2022/dcl-041822-correctional-health.html.

32. Emily Widra, Henal Patel, and Ronald Pierce. Where people in prison come from: The geography of mass incarceration in New Jersey. *Where people in prison come from.* [Online] June 2022. [Cited: April 17, 2023.] https://www.prisonpolicy.org/origin/nj/2020/report.html.

33. Centers for Disease Control and Prevention. Testing Recommendations for Hepatitis C Virus Infection. *Viral Hepatitis.* [Online] July 29, 2020. [Cited: February 14, 2023.] https://www.cdc.gov/hepatitis/hcv/guidelinesc.htm.

34. New Jersey Department of Health. New Jersey Department of Health Hepatitis Services Locator. [Online] March 2022. [Cited: February 14, 2023.] https://dashboards.doh.nj.gov/views/HepatitsServicesDashboard/Introduction?%3Aorigin=viz_share_link&%3Aembed=y&%3AisGuestRedirectFromVizportal=y&_gl=1*vahojy*_ga*MTEzNDM5OTUwLjE2NDg1NTg0NTU. *_ga_5PWJJG6642*MTY2OTA2Mjc0MS40MS4xLjE2NjkwNjI3NjQuM.

35. Quynh T Vo, Shauna Onofrey, Daniel Church, Kevin Cranston, Alfred DeMaria, R Monina Klevens. The Massachusetts Hepatitis C Testing Cascade 2014-2016. *Microbiology Insights.* 2019, Vol. 12.

APPENDIX

Figure 31. CDC recommended HCV testing sequence

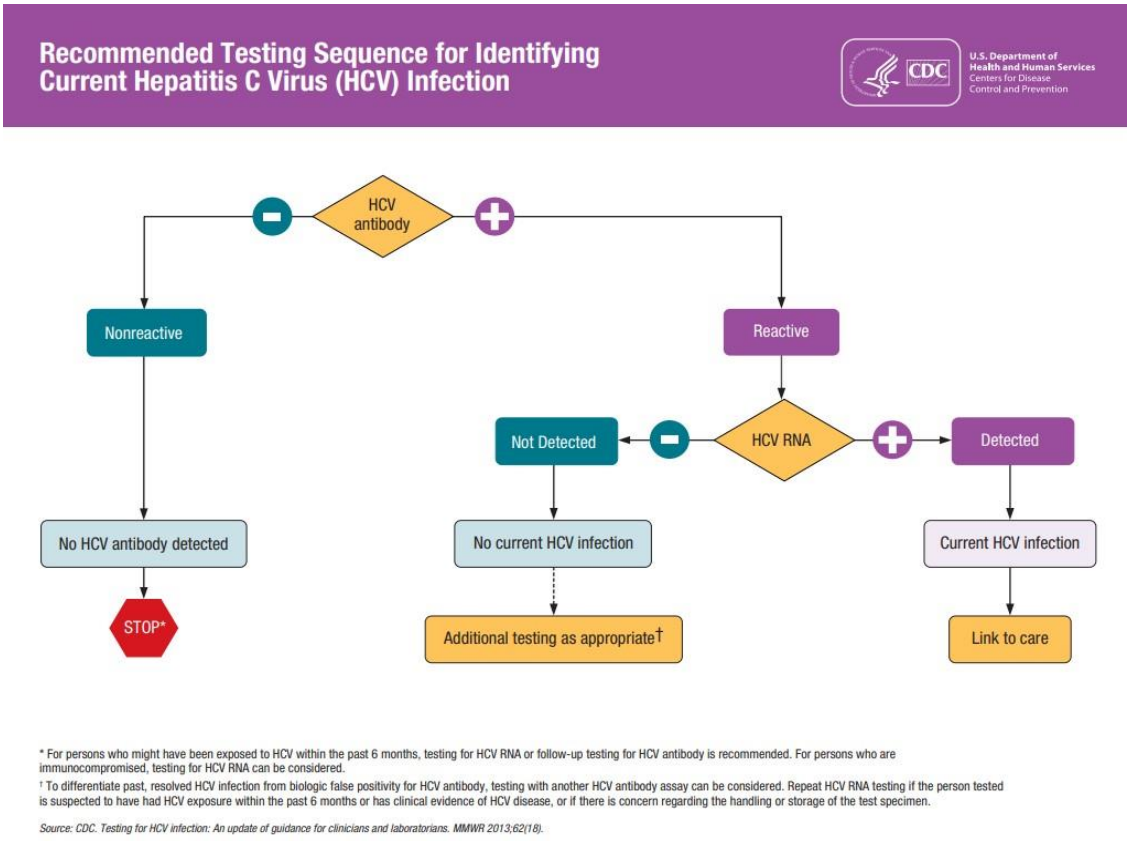


Figure 32. New Jersey median age by county, population estimate 2018

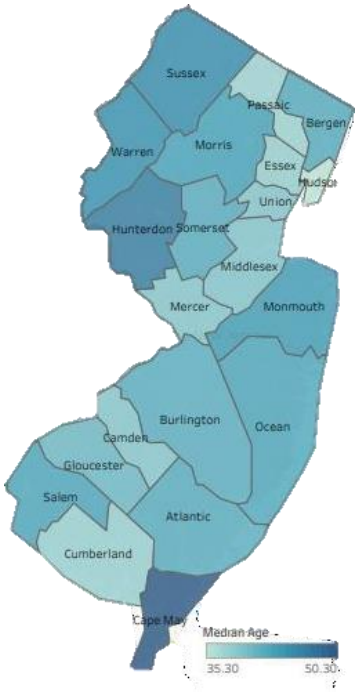
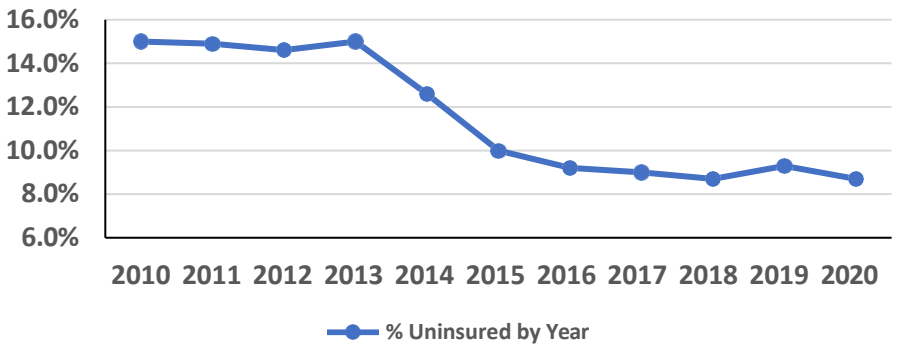


Table 3. Median household income and poverty rate for population 25 years and over based on education level

Population > 25 years/ Earnings and Poverty Rate	Earnings, all	Poverty % all	Earnings Male	Poverty % Male	Earnings Female	Poverty % Female
Population > 25 years	50,913	(X)	60,183	(X)	41,869	(X)
Less than high school graduate	24,963	22.4	30,484	19.1	18,126	25.5
High school graduate	34,431	10.1	41,717	7.7	27,460	12.3
Some college/Associate degree	42,079	7.5	51,474	5.7	35,177	9.1
Bachelor's degree	65,658	3.4	79,360	2.9	55,702	3.7
Graduate or professional degree	89,332	(X)	109,510	(X)	73,106	(X)

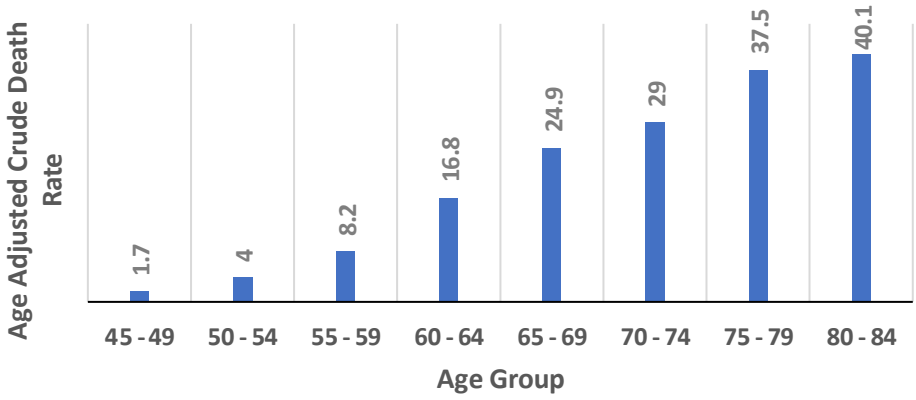
Source: American Community Survey (ACS)

Table 4. Percent of individuals uninsured by year for residents under the age 65 years



Source: New Jersey State Health Assessment Data

Figure 33. Age adjusted death rate, 2018-2020



*Age groups without population data were excluded
Source: Centers for Disease Control and Prevention