

Working Toward a Hep Free NYC

Hepatitis A, B and C in New York City: 2021 Annual Report

New York City Department of Health and Mental Hygiene

About This Report: This report was developed by the New York City Department of Health and Mental Hygiene and provides surveillance data and summaries of viral hepatitis program activities from January 1, 2021, through December 31, 2021. This report is required pursuant to Local Law 43 of 2015. For additional details about the use of denominators and definitions in this report, please see Appendix 1. For more information, email hep@health.nyc.gov.

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Introduction: Achieving a Hep Free NYC

As of 2019, more than 300,000 people are estimated to be living with hepatitis B or C in New York City (NYC). Without care and treatment, more than 75,000 people may progress to serious liver disease, liver cancer or premature death. The NYC Department of Health and Mental Hygiene (Health Department) works to improve the health of people affected by hepatitis B and C through:



Health Inequities in Viral Hepatitis

Not all New Yorkers have equitable access to viral hepatitis prevention and medical care. The Health Department takes a health equity approach in monitoring and responding to the viral hepatitis epidemic in NYC. The table below lists some of the priority groups for hepatitis B and C prevention, testing, and treatment due to structural barriers they face. All groups face challenges accessing health care due to structural racism, stigma or discrimination. Having low income due to historical exclusion from resources and opportunities is yet another barrier for priority groups. Though not exhaustive, this table gives context for current data trends.

Hepatitis B

Priority groups	Barriers to prevention	Barriers to testing and treatment
People born outside of the United States (U.S.)	Many New Yorkers born outside of the U.S. with hepatitis B received limited or no hepatitis B preventive care in their countries of birth.	Many New Yorkers born outside of the U.S. have limited or no health insurance.
Newborns of people living with hepatitis B	In NYC, complete hepatitis B vaccination and testing of newborns is not universal across all health care facilities.	
People of color	Structural racism and cultural and linguistic barriers impacting quality of care are among many barriers for people of color in accessing viral hepatitis health care services.	

Hepatitis C

Priority groups*	Barriers to prevention	Barriers to testing and treatment
People who use drugs	Criminalization of drug use and stigma of harm reduction are barriers to prevention.	Institutional discrimination (including in health care settings) against people who use drugs deters health care access.

People experiencing homelessness	Lack of affordable housing in NYC drives homelessness, which increases barriers in accessing prevention and care.	Limited to no health insurance and institutional discrimination are among several barriers to health care access.
People with criminal justice involvement	People with criminal justice involvement have limited access to health care during incarceration and can have issues accessing health insurance after incarceration.	
Men who have sex with men (MSM)	Institutional discrimination (including in health care settings) against MSM are among several strong barriers to health care access.	
People of color	Structural racism and cultural and linguistic barriers impacting quality of care are among many barriers for people of color in accessing viral hepatitis health care services.	

*Hepatitis C priority groups are also priority groups for hepatitis A and B prevention.

NYC Viral Hepatitis Elimination Plan

Recognizing the need for structural changes to effectively eliminate viral hepatitis in NYC, the Health Department worked with community stakeholders from 2020 to 2021 to develop a set of coordinated strategies to reduce the number of hepatitis C infections, improve the health of people living with hepatitis B and C, and reduce health inequities related to viral hepatitis infection.

In 2021, the Health Department released the Plan to Eliminate Viral Hepatitis as a Major Public Health Threat in NYC by 2030 (NYC Viral Hepatitis Elimination Plan). This plan proposes three goals:

1. Reduce new hepatitis C infections among people in NYC by 90% by 2030.
2. Reduce premature deaths among people with chronic hepatitis B and chronic hepatitis C in NYC by 65% by 2030; Improve the health of people living with hepatitis B and C in NYC.
3. Reduce health inequities related to viral hepatitis infection among people in NYC.

To achieve these goals, the NYC Viral Hepatitis Elimination Plan proposes more than 70 strategies across four key activities: awareness, education, and prevention; testing and linkage to care; treatment; and surveillance. These strategies aim to increase the availability, accessibility, acceptability, and quality of each activity to achieve elimination goals.

» Read the NYC Viral Hepatitis Elimination Plan at www1.nyc.gov/assets/doh/downloads/pdf/cd/viral-hepatitis-elimination-plan.pdf.

During the NYC Viral Hepatitis Elimination Plan implementation period (2022 to 2030), the Health Department will assess and annually report NYC’s progress implementing the strategies. See page 50 for the 2021 update.

Opportunities for Elimination

The data provided in this annual report highlight additional opportunities for enhancing existing interventions to accelerate progress toward viral hepatitis elimination. This information is provided on pages 6 and 7.

Hepatitis B in NYC: Opportunities for Elimination

As of 2019, about 243,000 people are living with hepatitis B in NYC. While the annual number of newly reported infections has declined since 2016, more efforts are needed to prevent new infections, improve outcomes, and reduce health disparities in people affected by hepatitis B.

What's Working

Patient navigation and care coordination programs support hepatitis B testing, treatment and prevention in populations at high risk for hepatitis B in NYC.

Testing

92%	Percentage of infants born to pregnant people living with hepatitis B in NYC in 2020 who were tested for hepatitis B	Hepatitis B testing of infants born to people living with hepatitis B supports treatment and prevention.
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Treatment

95%	Percentage of Check Hep B program ¹ participants who are eligible for hepatitis B treatment and started treatment any time between July 2014 and June 2021	Dedicated patient navigation programs support treatment initiation in people living with hepatitis B who need treatment.
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Prevention

96%	Percentage of infants born to pregnant people living with hepatitis B in NYC in 2020 who were given hepatitis B postexposure prophylaxis and vaccination	Monitoring and care coordination of pregnant people living with hepatitis B supports prevention of perinatal transmission.
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Opportunities for Elimination

The NYC Viral Hepatitis Elimination Plan recommends testing, treatment, and prevention to improve health outcomes and address health disparities in people living with hepatitis B in NYC.

Testing

57%	Percentage of Check Hep B program participants ¹ at risk for hepatitis B infection who were screened in 2018	The NYC Viral Hepatitis Elimination Plan proposes a hepatitis B screening goal of 90% by 2030.
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Treatment

73%	Percentage of Health Department tele-navigation program participants linked to hepatitis B medical care who were virally suppressed ² in 2021	The NYC Viral Hepatitis Elimination Plan proposes a hepatitis B viral suppression goal of 80% by 2030 for people eligible for treatment.
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Prevention

75%	Percentage of infants born in 2021 who received the hepatitis B vaccine birth dose within three days after birth	All newborns should receive the hepatitis B vaccine birth dose within 24 hours after birth.
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¹ NYC Health Department Viral Hepatitis Program-contracted navigation programs (see pages 39 to 43 for more information).

² Viral suppression is the goal of hepatitis B treatment to minimize negative health outcomes.

Hepatitis C in NYC: Opportunities for Elimination

As of 2019, about 86,000 people are living with hepatitis C in NYC. While the number of newly reported infections has declined since 2014, more efforts are needed to prevent new infections, improve outcomes and reduce health disparities in people affected by hepatitis C.

What's Working

Peer and patient navigation programs support hepatitis C testing, treatment and prevention in populations at high risk for hepatitis C in NYC.

Testing

92%	Percentage of people ever infected with hepatitis C ³ who completed viral diagnostic (hepatitis C RNA) testing	Percentage of hepatitis C confirmatory testing is high in NYC, mainly because of mandatory RNA reflex testing.
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Treatment

66%	Percentage of people with a positive viral diagnostic test who have been cured or cleared of the virus	More people in NYC are being cured of hepatitis C.
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Prevention

11,516	Number of peer navigation program ⁴ participants who received prevention services any time between July 2014 and June 2021	Expansion of hepatitis C peer navigation in syringe service programs (SSPs) can support hepatitis C prevention.
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Opportunities for Elimination

The NYC Viral Hepatitis Elimination Plan recommends testing, treatment, and prevention to improve health outcomes and address health disparities in people living with hepatitis C in NYC.

Testing

42%	Percentage of hepatitis C contracted program ⁴ participants screened in 2018	The NYC Viral Hepatitis Elimination Plan proposes a hepatitis C screening goal of 90% by 2030.
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Treatment

26%	Percentage of people reported with a viral diagnostic test in 2021 who initiated treatment	The NYC Viral Hepatitis Elimination Plan proposes a goal of 80% of people cured within one year of diagnosis by 2030.
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Prevention

22%	Percentage of hepatitis C peer navigation program participants at SSPs who received treatment ⁴	Connecting people to harm reduction services and treatment can prevent further transmission of hepatitis C.
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³ From July 2014 to December 2021

⁴ NYC Health Department Viral Hepatitis Program-contracted navigation programs (see pages 39 to 43 for more information)

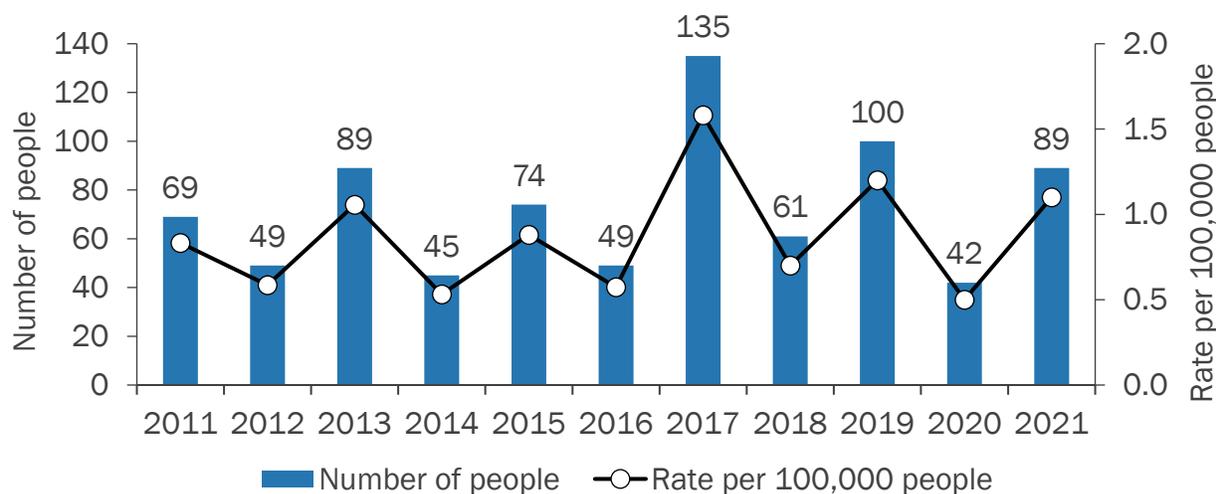
Surveillance

Each year, the Health Department monitors the number of people with newly reported hepatitis A, B, and C infections in NYC. The Health Department uses these data to describe trends over time and across groups, prevent new infections, and promote linkage to care and treatment. For more information, see the surveillance technical notes in Appendix 1.

Hepatitis A⁵



Figure 1. Number and rate of people reported with hepatitis A⁶ in NYC by year of diagnosis, 2011–2021



In 2011 and 2012, with the availability of hepatitis A vaccine and universal childhood vaccine recommendations, the number of reported hepatitis A infections declined in NYC. Increases in infections since 2013 were related to food handlers (2013), local clusters associated with restaurants and social networks (2015), or outbreaks among MSM (2017,⁷ 2019). The decrease in reported cases in 2020 was likely a result of less international travel, less close person-to-person contact, and changes in health care-seeking behavior during the first year of the COVID-19 pandemic. From late December 2020 through 2021, NYC received increasing reports of hepatitis A infections

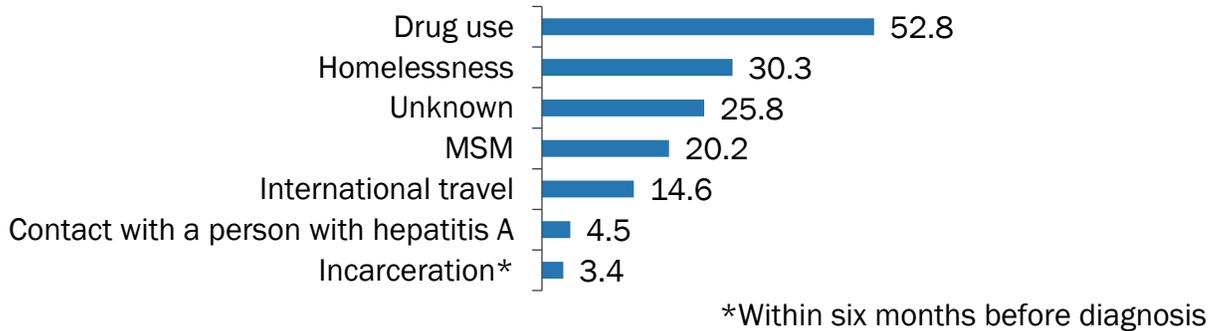
⁵ All data as of April 11, 2022

⁶ Case definition for acute hepatitis A: discrete onset of symptoms consistent with hepatitis A infection, positive anti-hepatitis A virus IgM or hepatitis A RNA nucleic acid amplification test, either jaundice or elevated total bilirubin levels or elevated serum alanine aminotransferase levels, and the absence of a more likely diagnosis.

⁷ For more information, visit dx.doi.org/10.15585/mmwr.mm6637a7

among people who use drugs and people experiencing homelessness, populations affected by ongoing outbreaks of hepatitis A nationwide.⁸

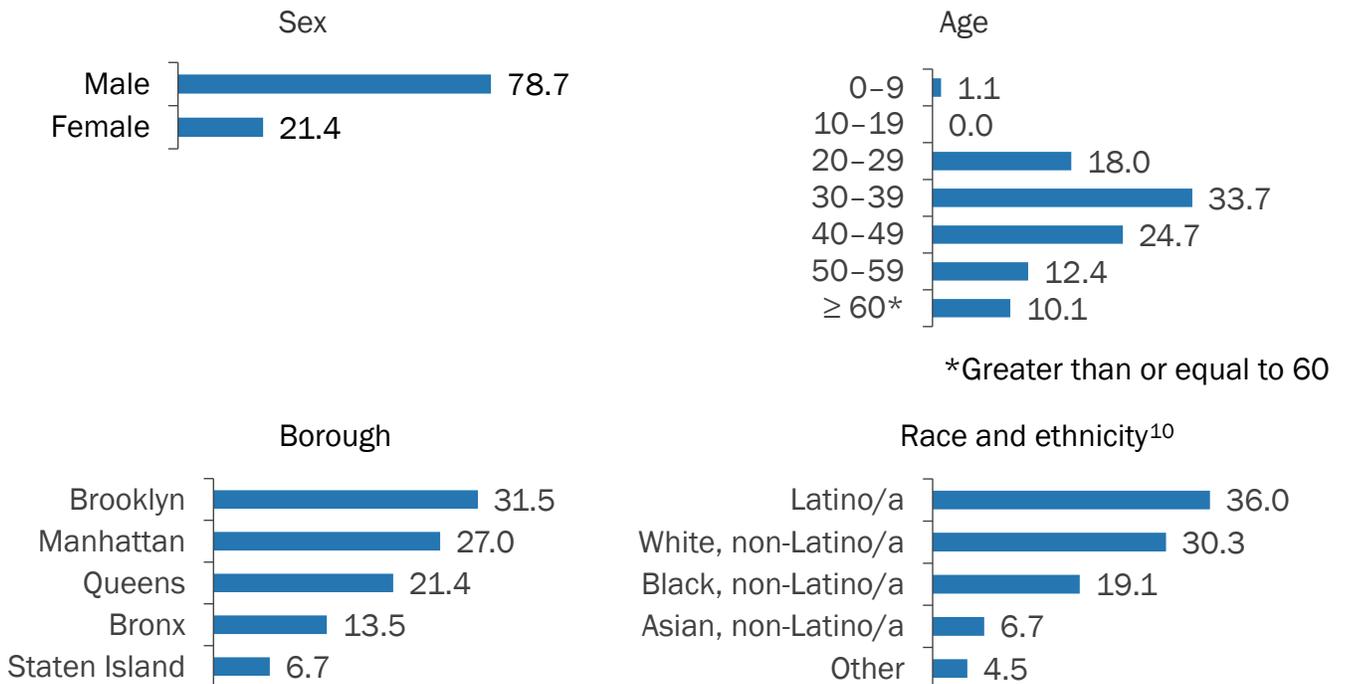
Figure 2. Percentage of people reported with hepatitis A in NYC by reported risk factors,⁹ 2021



Health Department Requirement

- Health care providers in NYC are required to report hepatitis A cases within 24 hours or in some cases immediately. For more information on reporting hepatitis A cases, see Appendix 2.

Figure 3. Percentage of people reported with hepatitis A in NYC by sex, age, race and ethnicity, and borough, 2021



» For full data, see Appendix 3.

⁸ For more information, visit cdc.gov/hepatitis/outbreaks/2017March-HepatitisA.htm

⁹ Not mutually exclusive

¹⁰ 3.4% of people had unknown race and ethnicity.

Health Department Recommendations

Health care providers should administer two doses of single-antigen hepatitis A vaccine at least six months apart to children beginning at age 1, as well as to the following groups:

- MSM
- Travelers to countries with high rates of hepatitis A, including countries in the Caribbean, Central and South America, Africa, Eastern Europe, and parts of Asia
- People with chronic liver disease, including hepatitis B and C
- People who use drugs (injection and non-injection)
- People experiencing homelessness, including those who live on the street, live in a shelter, access homeless services or otherwise do not have a permanent address
- People with HIV infection

For more information, read the full Centers for Disease Control and Prevention (CDC) recommendations at cdc.gov/hepatitis/hav/havfaq.htm#vaccine. People with limited or no health insurance can receive low- or no-cost hepatitis A vaccines at the Health Department's Immunization Clinic. For more information, visit nyc.gov/health/clinics.

Hepatitis A transmission has continued during the COVID-19 pandemic. Current CDC guidance allows for administration of COVID-19 vaccines and other vaccines, such as hepatitis A vaccine, without regard to timing, including vaccine co-administration (at the same time).¹¹

¹¹ For more information, visit cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html.

Acute Hepatitis B

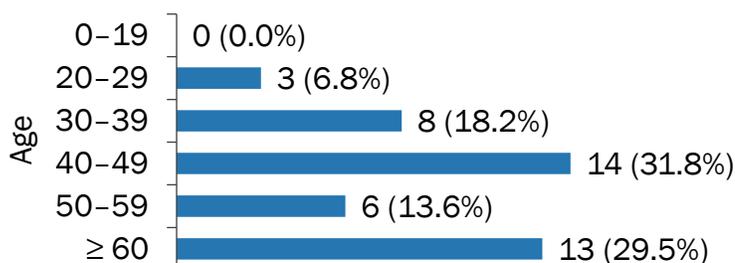
44 Number of people reported with acute hepatitis B in NYC in 2021

0.5 Rate per 100,000 people in NYC in 2021

Monitoring acute (initial infection or the six-month period following exposure to the virus) hepatitis B infections helps to determine where new infections occur, who is infected, and how to implement effective prevention activities.

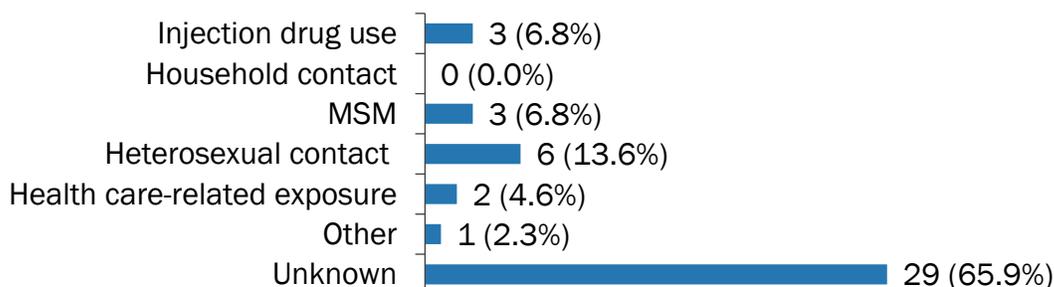
» For information on mandatory reporting of acute hepatitis B cases, see Appendix 2.

Figure 4. Number and percentage of people reported with acute hepatitis B in NYC by age, 2021



Sexual transmission was the most common reported risk factor for acute hepatitis B infection among those with a known risk.

Figure 5. Number and percentage of people reported with acute hepatitis B infection in NYC by reported risk factors,¹² 2021



» For full data, see Appendix 4.

Health Department Recommendations

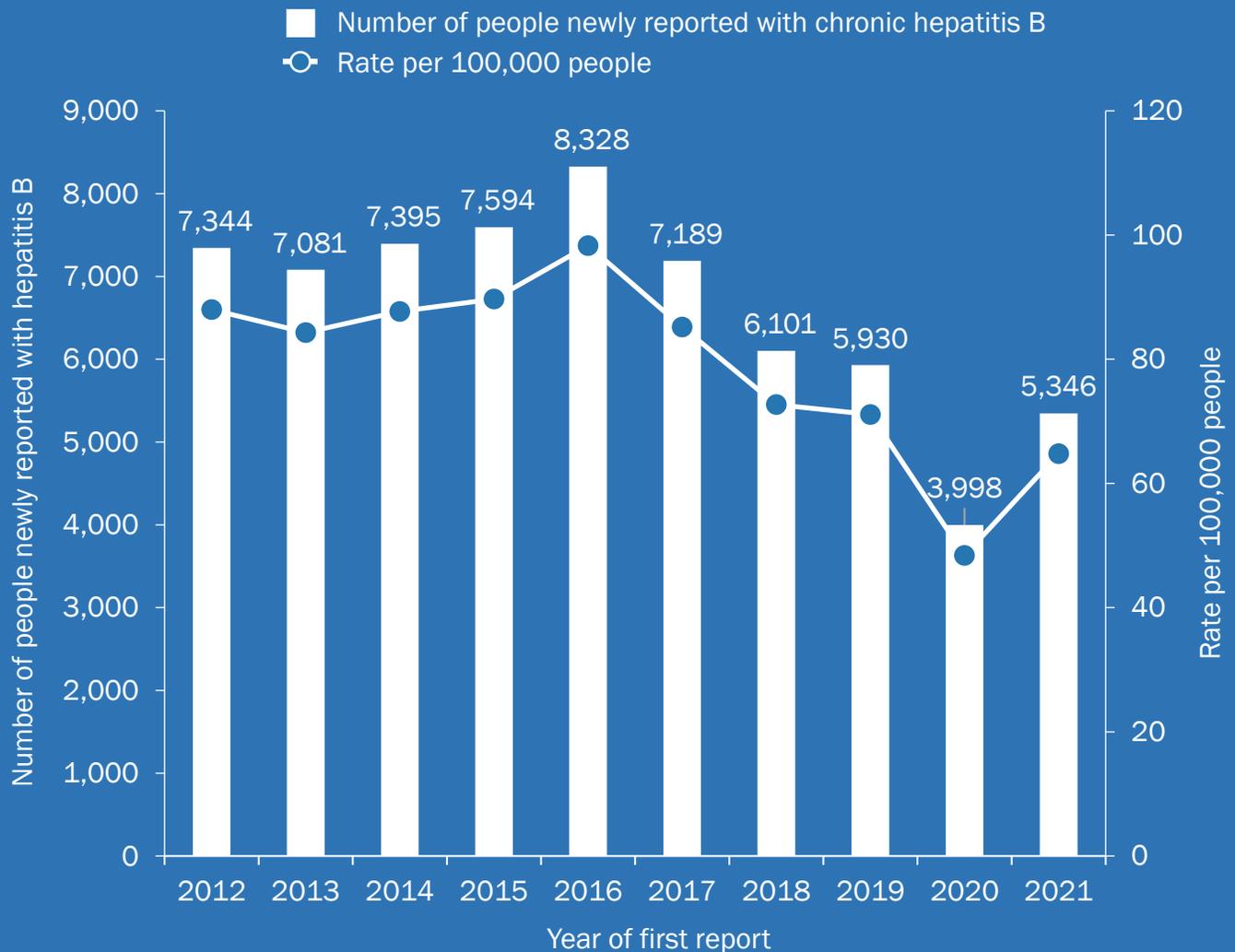
- Health care providers should offer postexposure prophylaxis (PEP) to people exposed to hepatitis B (for example, through sex, sharing drug use equipment or blood exposure) to prevent infection. For more guidance, visit [cdc.gov/hepatitis/hbv/pep.htm](https://www.cdc.gov/hepatitis/hbv/pep.htm).
- Health care providers should offer the hepatitis B vaccine to all adults ages 19 to 59 years and adults 60 years or older with risk factors for hepatitis B or without identified risk factors but seeking protection, as recommended by the Advisory Committee on Immunization Practices. For more guidance, visit [cdc.gov/hepatitis/hbv/vaccadults.htm](https://www.cdc.gov/hepatitis/hbv/vaccadults.htm).

¹² Mutually exclusive. Each patient is represented by the risk factor that poses the highest risk of hepatitis B infection. For example, a person who injected drugs and had a health care-related exposure is represented only once in the injection drug use category.

Chronic Hepatitis B

New reports of chronic hepatitis B have declined since 2016. During 2020, the lowest number of cases were reported since hepatitis B case reporting began in NYC, because fewer people accessed health care services during the COVID-19 pandemic and therefore fewer people were screened. However, in 2021, there was an increase in new reports to almost the same level as in 2019.

Figure 6. Number and rate of people newly reported with chronic hepatitis B in NYC by year of first report, 2012–2021



» In NYC, there are many programs that provide supportive services and no- or low-cost hepatitis B care and treatment. For more information, visit nyc.gov/health and search for **hepatitis B**.

Chronic Hepatitis B

As of 2019, the Health Department estimates that 243,000 people (2.9% of NYC residents) are living with chronic hepatitis B in NYC.¹³

5,346

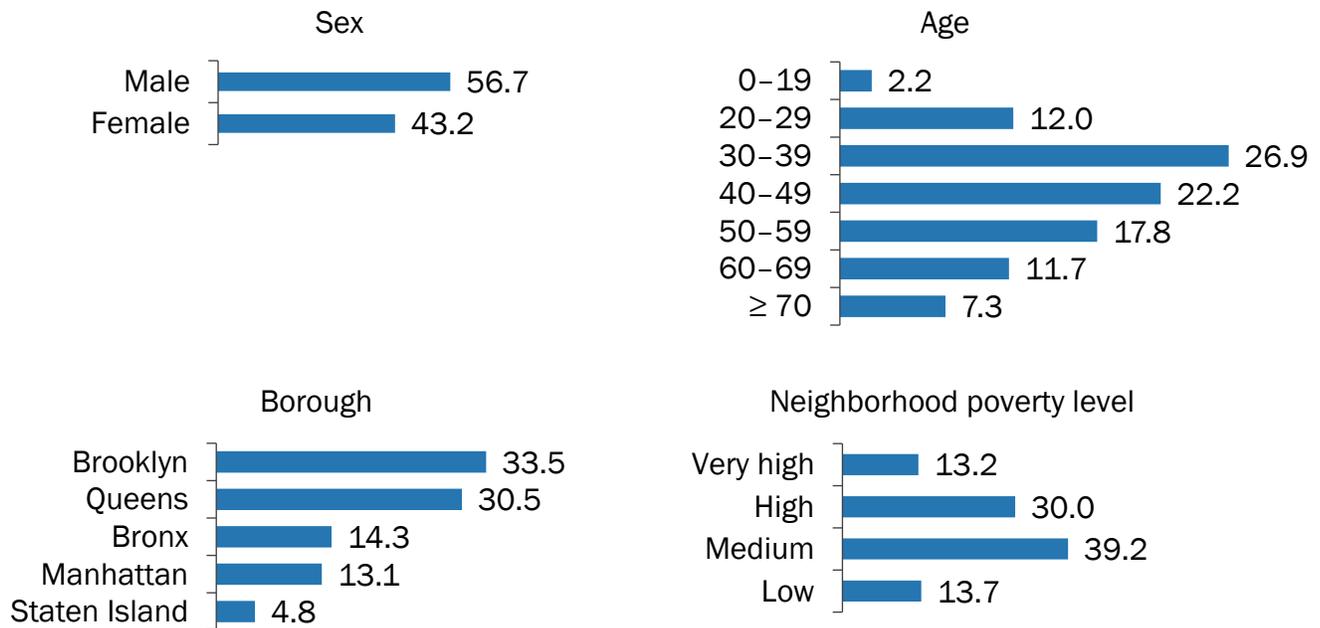
Number of people newly reported with chronic hepatitis B in NYC in 2021

64.8

Rate of newly reported chronic hepatitis B per 100,000 people in NYC in 2021

Characteristics of People Newly Reported With Chronic Hepatitis B

Figure 7. Percentage of people newly reported with chronic hepatitis B in NYC by sex, age, borough, and neighborhood poverty level, 2021¹⁴



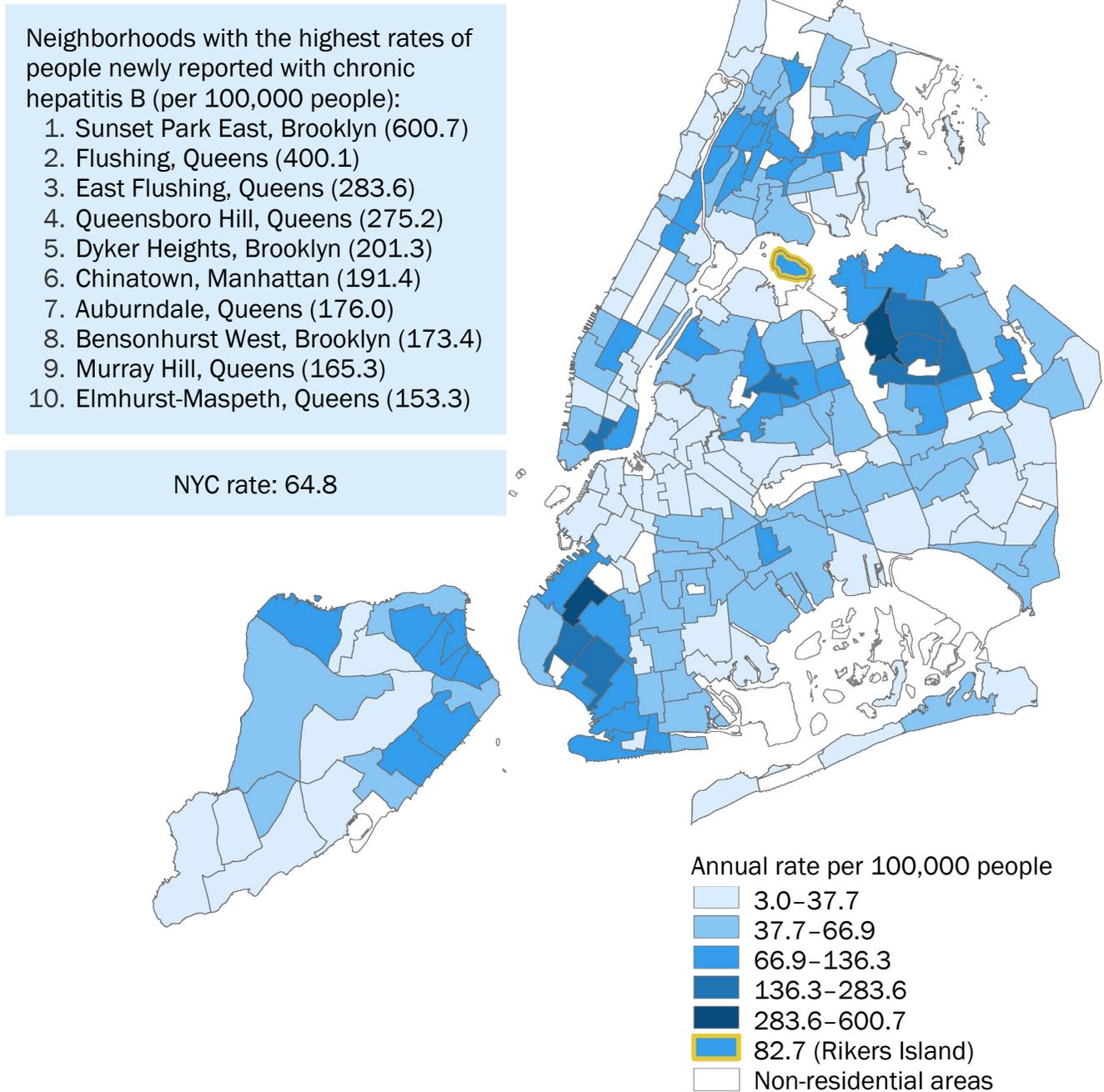
» For full data, see Appendix 5.

¹³ Estimate as of 2017. Learn about the methods the Health Department uses to calculate the hepatitis B prevalence estimate at journals.sagepub.com/doi/full/10.1177/0033354919882962.

¹⁴ Unknown responses are not presented in the charts.

Chronic Hepatitis B: Geographic Distribution

Figure 8. Rate of people newly reported with chronic hepatitis B in NYC by neighborhood tabulation area (NTA), 2021¹⁵



» For full data and map of NTAs, see Appendices 6 and 7.

¹⁵ NTAs could not be determined for 290 people (5.4%) based on their address at first report.

Perinatal Hepatitis B

Pregnant People Living With Chronic Hepatitis B Who Delivered a Live Infant in 2021

Hepatitis B can be transmitted from a pregnant person with hepatitis B to an infant during and after delivery. The Health Department tracks and provides case management services to pregnant people living with hepatitis B to prevent perinatal transmission.

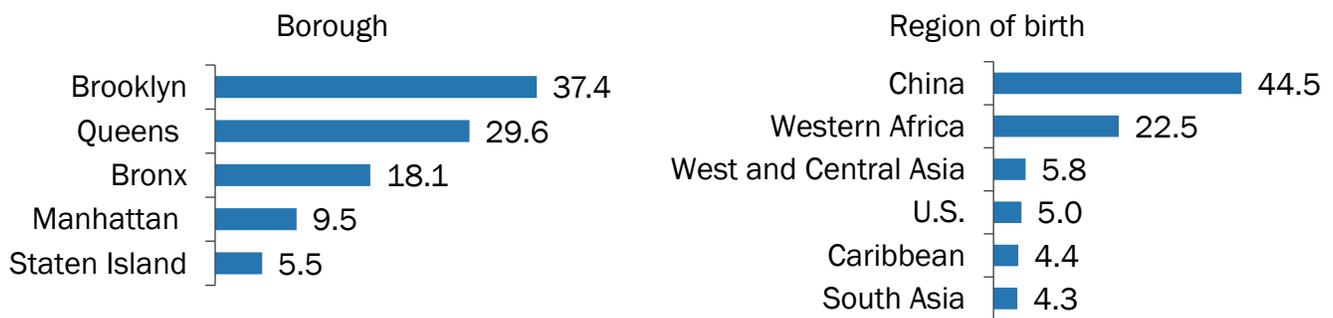
676

Number of pregnant people living with hepatitis B in NYC in 2021

95%

Percentage of pregnant people living with hepatitis B in NYC in 2021 who were born outside of the U.S.

Figure 9. Percentage of people living with hepatitis B who delivered a live infant in NYC by borough and region of birth, 2021



» For full data, see Appendix 8.

Hepatitis B Vaccination, Prophylaxis, and Testing at Birth for Infants Born in 2020

In 2020, 766 infants were born to a pregnant person with hepatitis B infection (see Appendix 9).

Figure 10. Percentage of infants born to pregnant people living with hepatitis B who received hepatitis B PEP, vaccination and testing, 2020

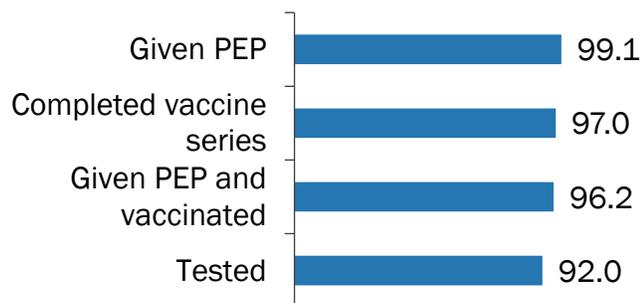
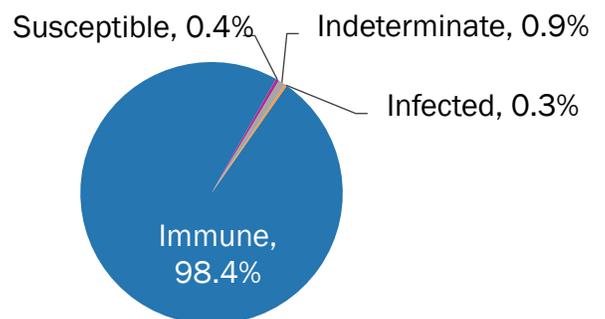


Figure 11. Test results of infants born to pregnant people living with hepatitis B in NYC, 2020



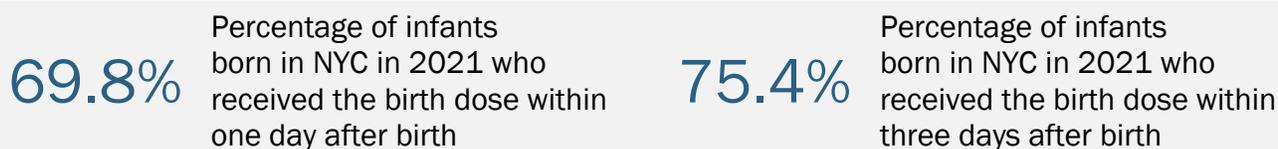
Health Department Recommendation

- Health care providers should administer PEP (including hepatitis B immune globulin and hepatitis B vaccine) within 12 hours after birth to all infants born to pregnant people living with hepatitis B. For more information, visit [cdc.gov/hepatitis/hbv/perinatalxmtn.htm](https://www.cdc.gov/hepatitis/hbv/perinatalxmtn.htm).

» For full data, see Appendix 9.

Hepatitis B Vaccination at Birth

To protect against hepatitis B infection, the CDC recommends hepatitis B vaccination of all infants at birth (known as “the birth dose”).¹⁶ In 2021, there were 99,007 infants born in NYC.



Health Department Recommendations

Health care providers should:

- Administer the hepatitis B vaccine to all infants within 24 hours after birth, followed by two or three additional doses for completion of the hepatitis B vaccine series.
- Ensure that all children complete the full hepatitis B vaccine series.
- Test infants born to pregnant people living with hepatitis B for hepatitis B immunity and infection between 9 and 12 months of age.
- To prevent transmission to infants and children, screen and immunize all household, needle-sharing, and sexual contacts of people living with chronic hepatitis B for hepatitis B.

» For more information, go to nyc.gov/health and search for **perinatal hepatitis B**.

Hepatitis B: Deaths

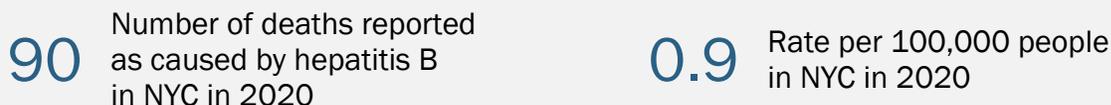
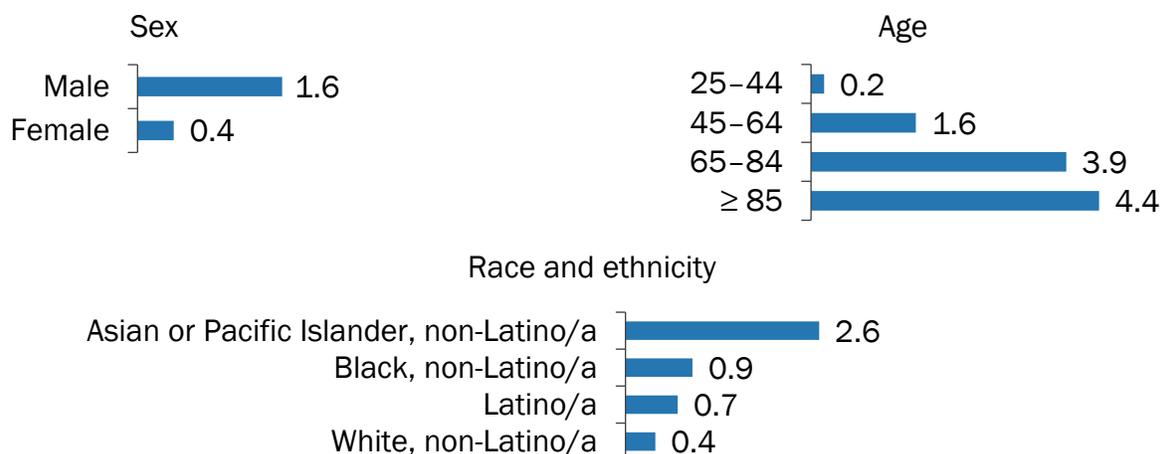


Figure 12. Age-adjusted or age-specific death rate per 100,000 people¹⁷ among NYC residents where hepatitis B is listed as the cause of death in 2020, by sex, age, and race and ethnicity



» For full data, see Appendix 10.

¹⁶ The CDC universal hepatitis B birth dose recommendation is to administer hepatitis B vaccine within 24 hours after birth to all medically stable infants weighing $\geq 2,000$ grams.

¹⁷ The population used in the rate constructions are based on the 2020 Census population estimates, 2021 vintage. However, the 2020 Census counts are substantially higher than the estimates, rendering potentially overestimated rates.

Leading Causes of Death Among Decedents With Hepatitis B

In 2021, the Health Department analyzed the leading causes of death among 1,613 decedents (people who had died) with hepatitis B in 2020. For full data, see Appendix 11.

Leading causes of death, all decedents with hepatitis B, 2020



Leading causes of death, premature decedents with hepatitis B, 2020

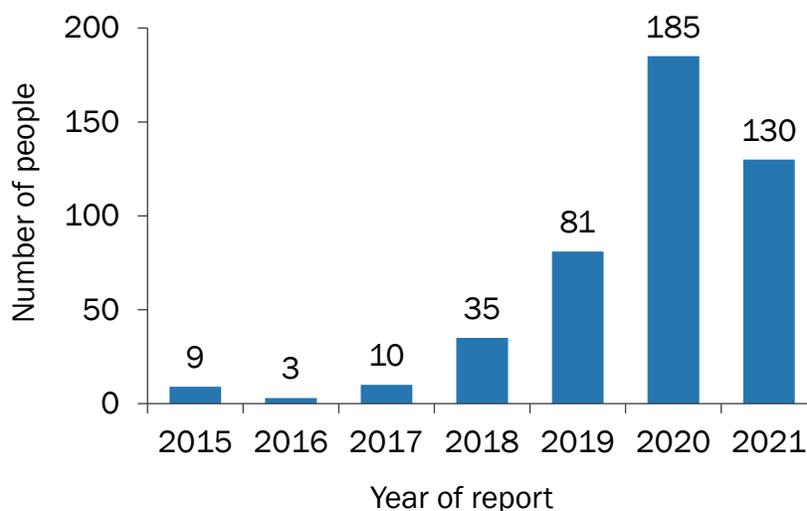


- | | |
|--|---|
| 1. Cancer (malignant neoplasms) | 8. Cerebrovascular disease |
| 2. COVID-19 | 9. Essential hypertension and renal diseases |
| 3. Heart diseases | 10. Viral hepatitis |
| 4. Diabetes | 11. Accidents except drug poisoning |
| 5. Drug-related | 12. Chronic liver disease and cirrhosis |
| 6. HIV | 13. All other causes |
| 7. Influenza and pneumonia | |

Acute Hepatitis C

Monitoring acute (initial infection or the six-month period following exposure to the virus) hepatitis C infections helps to determine where new infections occur, who is infected and how to implement effective prevention activities. The Health Department identifies acute infections from provider reports and during enhanced surveillance. In 2020 and 2021, the Health Department conducted enhanced surveillance investigations for newly reported people ages 18 to 34 years.

Figure 13. Number of people reported with acute hepatitis C in NYC, 2015–2021



In 2020, the Council of State and Territorial Epidemiologists (CSTE) implemented a new definition for acute hepatitis C. The addition of clinical criterion of peak elevated serum alanine aminotransferase (ALT) levels > 200 international units per liter (IU/L) in conjunction with a positive hepatitis C virus detection test drove the increase in acute hepatitis C cases in 2020. No providers reported cases of acute hepatitis C infection to the Health Department in 2021; acute hepatitis C cases in 2021 were identified through mandatory laboratory reporting of ALTs.

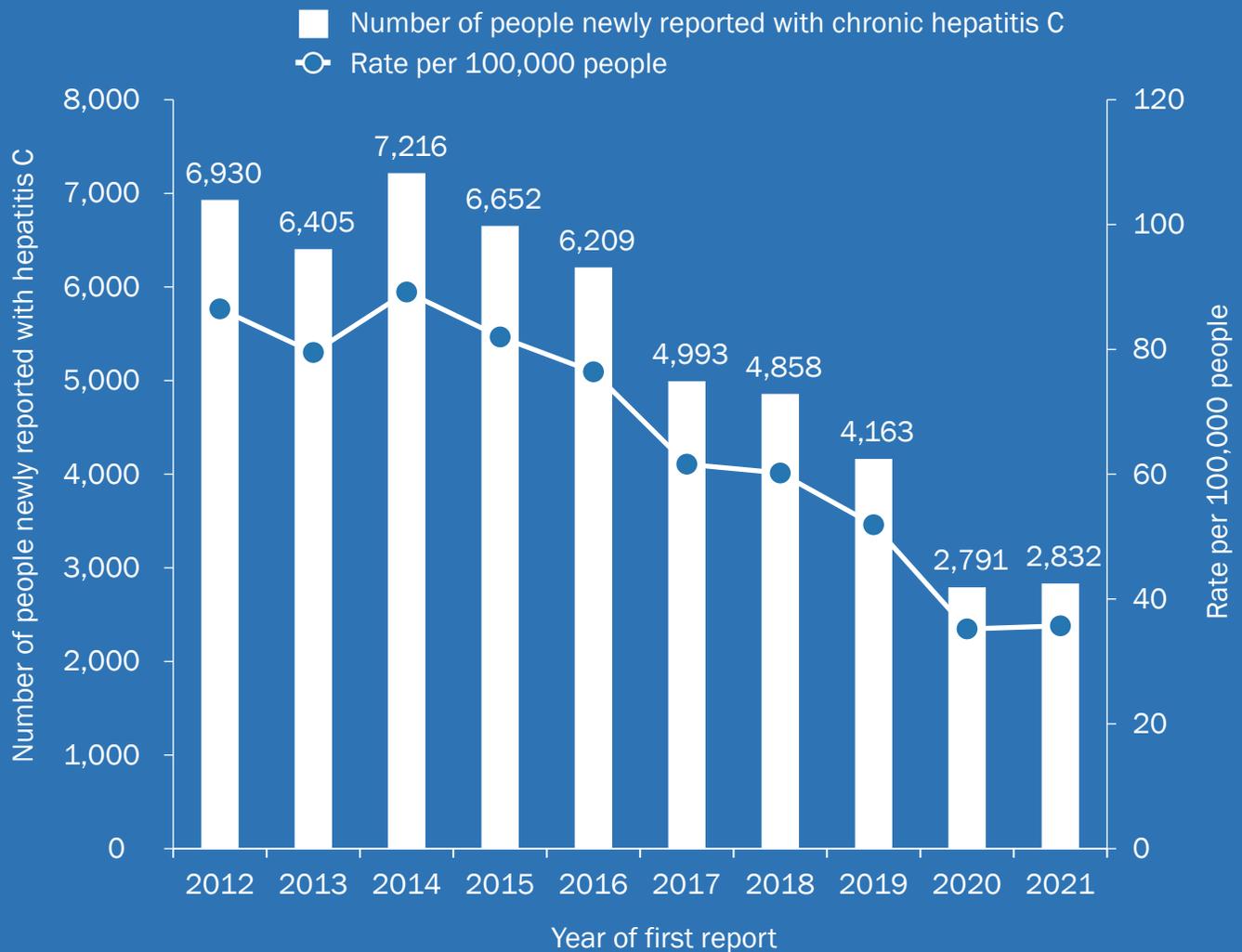
Health Department Requirement

- Health care providers in NYC are required to report all acute cases of hepatitis C within 24 hours. Reporting of acute hepatitis C cases helps to identify outbreaks and inform effective prevention programs. For more information on reporting acute hepatitis C cases, see Appendix 2.

Chronic Hepatitis C

Since 2012, newly reported cases of chronic hepatitis C have declined in NYC. Reported cases of chronic hepatitis C increased from 2020 to 2021, as more people accessed health care and screening services in 2021 following the height of the COVID-19 pandemic in 2020. Thousands of new cases of chronic hepatitis C continue to be reported each year.

Figure 14. Number and rate of people newly reported with chronic hepatitis C in NYC by year of first report, 2012–2021



Data notes: In 2016 and 2018, CSTE implemented new case definitions for chronic hepatitis C. Since 2018, people first reported with hepatitis C between ages 2 and 36 months were classified using the CSTE’s perinatal hepatitis C case definition and were excluded from total case counts. Perinatal hepatitis C case counts can be found on page 22.

Chronic Hepatitis C

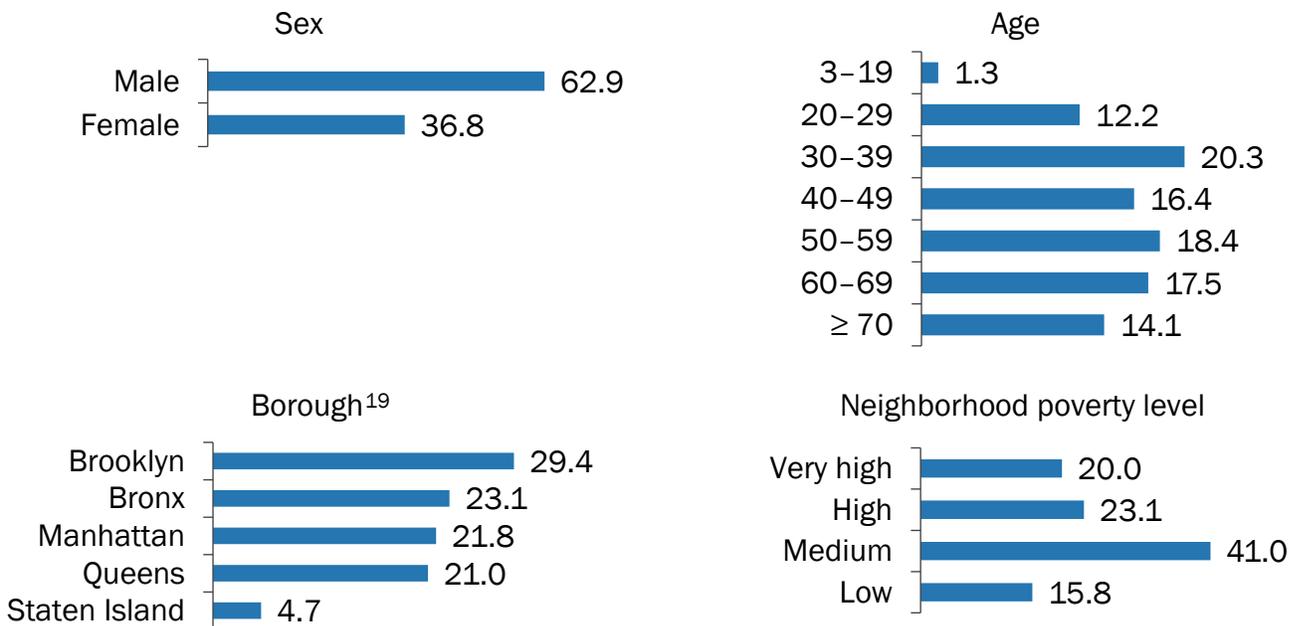
As of 2019, the Health Department estimates that 86,000 people (1% of NYC residents) are living with chronic hepatitis C.¹⁸

2,832 Number of people newly reported with chronic hepatitis C in NYC in 2021

35.7 Rate of newly reported chronic hepatitis C per 100,000 people in NYC in 2021

Characteristics of People Newly Reported With Chronic Hepatitis C

Figure 15. Percentage of people newly reported with chronic hepatitis C in NYC by sex, age, borough, and neighborhood poverty level, 2021



» For full data, see Appendix 12.

Health Department Recommendation

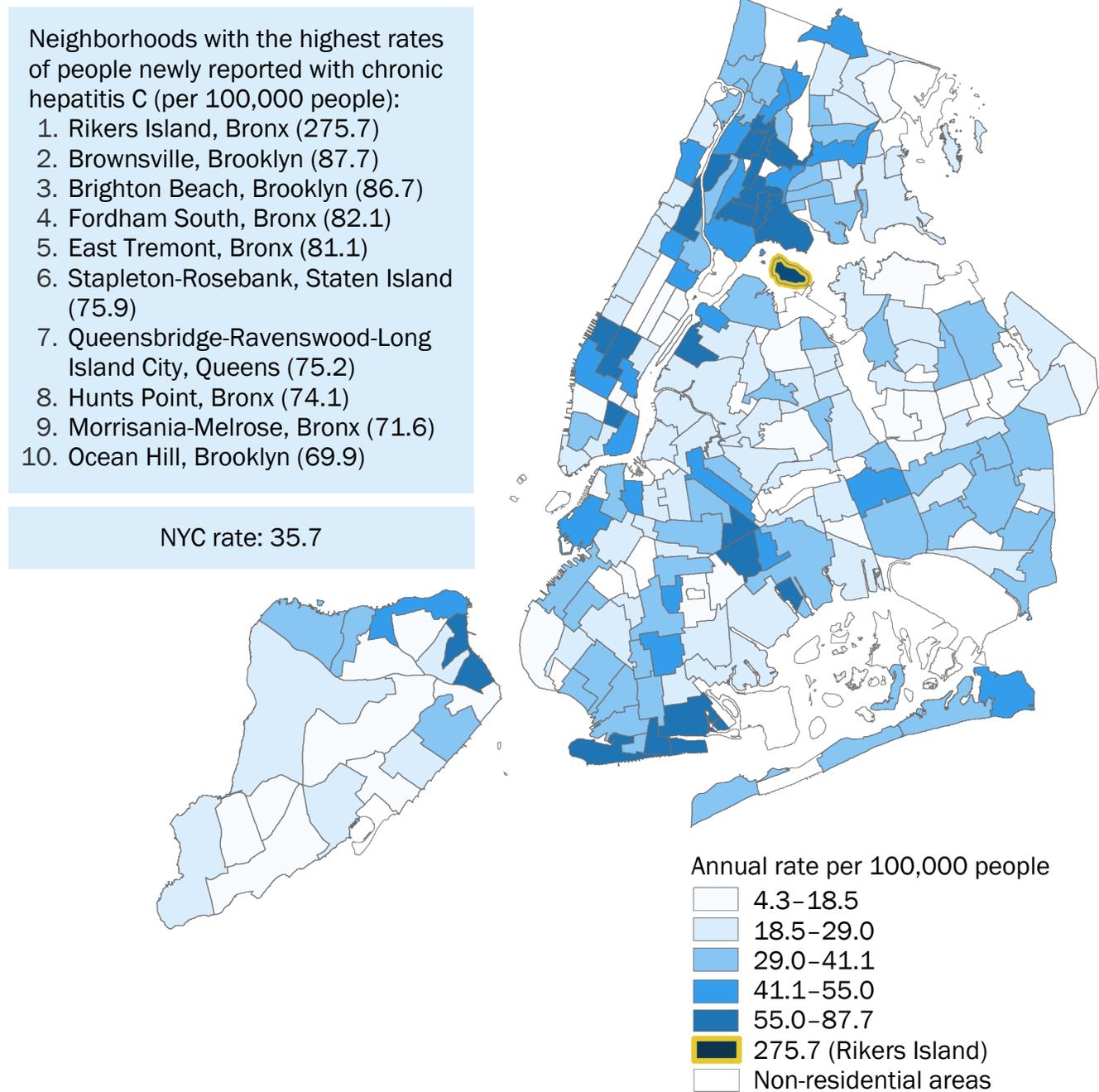
- Health care providers should screen all adults ages 18 to 79 years for hepatitis C according to 2020 U.S. Preventive Services Task Force guidelines. For more information, visit [uspreventiveservicestaskforce.org/uspstf/recommendation/hepatitis-c-screening](https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/hepatitis-c-screening).

¹⁸ Estimate as of 2017. For more information on how the hepatitis C prevalence estimate was calculated, visit dx.doi.org/10.1017/S095026881800170X.

¹⁹ The Bronx includes people in Rikers Island jail facilities.

Chronic Hepatitis C: Geographic Distribution

Figure 16. Rate of people newly reported with chronic hepatitis C in NYC by NTA,²⁰ 2021



» For full data and map of NTAs, see Appendices 7 and 13.

²⁰ NTA could not be determined for 121 people (4.3%) based on their address at first report.

Perinatal Hepatitis C

The Health Department monitors newly reported hepatitis C in people who can become pregnant (ages 15 to 44 years) as well as in children ages 0 to 36 months to identify perinatal transmission and prevention opportunities.

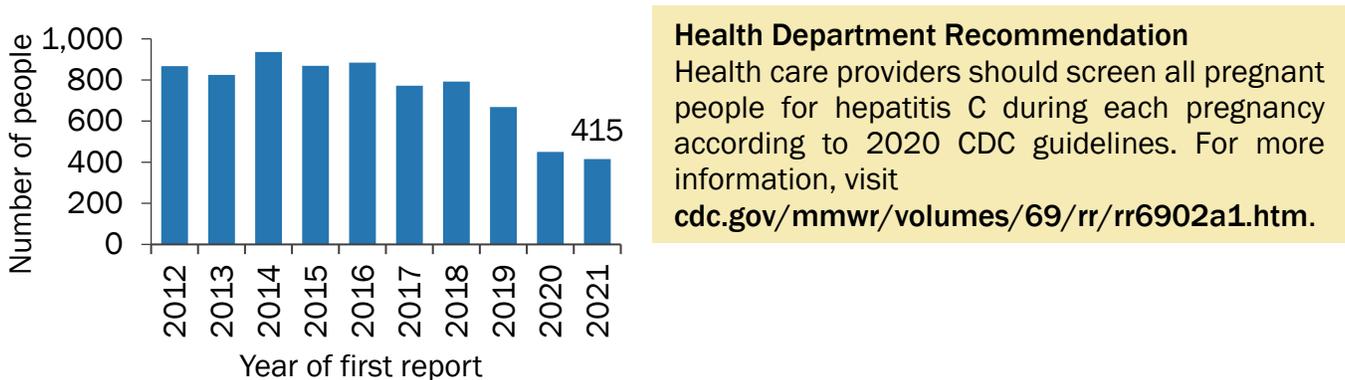
Hepatitis C: People Who Can Become Pregnant (Ages 15 to 44 Years)

Nationally, an increasing number of people who can become pregnant are becoming infected with hepatitis C. In NYC, the number of people who can become pregnant newly reported with chronic hepatitis C has been slightly declining since 2014.

415 Number of people who can become pregnant newly reported with chronic hepatitis C in NYC in 2021

23.1 Rate of people who can become pregnant newly reported with chronic hepatitis C per 100,000 people in NYC in 2021

Figure 17. Number of people who can become pregnant reported with chronic hepatitis C in NYC by year of first report, 2012–2021



Health Department Recommendation
 Health care providers should screen all pregnant people for hepatitis C during each pregnancy according to 2020 CDC guidelines. For more information, visit [cdc.gov/mmwr/volumes/69/rr/rr6902a1.htm](https://www.cdc.gov/mmwr/volumes/69/rr/rr6902a1.htm).

Characteristics of Children Newly Reported With Hepatitis C

In 2018, the Health Department began classifying children ages 0 to 36 months newly reported with hepatitis C in NYC using the 2018 CSTE perinatal hepatitis C case definition.

3 Number of children ages 0 to 36 months newly reported with hepatitis C in NYC in 2021

55% Percentage of children tested because the birthing parent was known to have hepatitis C in NYC in 2021

» For full data, see Appendix 14.

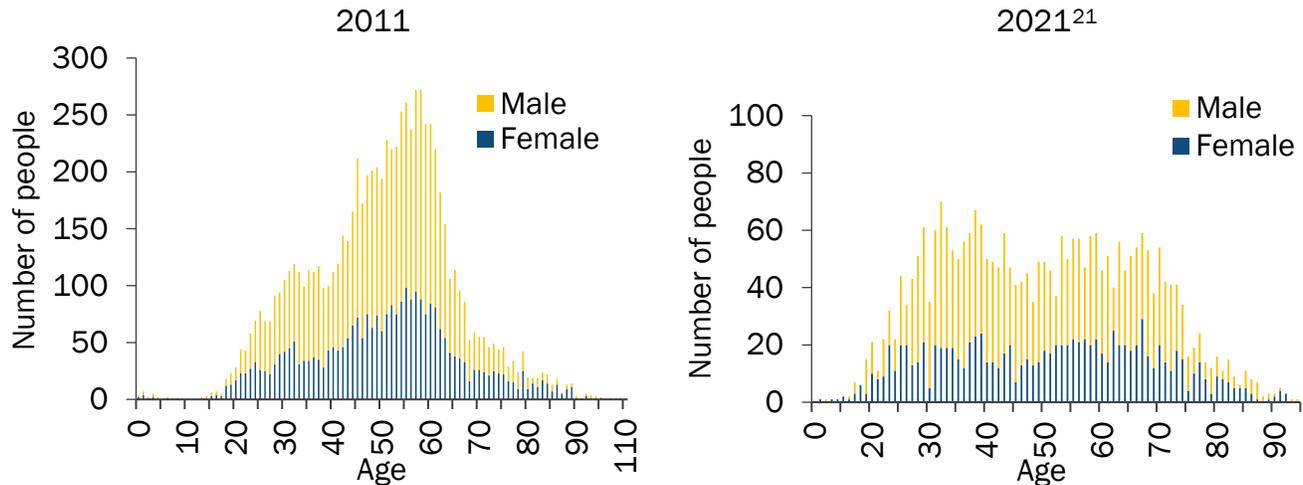
Health Department Recommendation

- Health care providers should test all children born to people living with hepatitis C for hepatitis C antibody at age 18 months or older, or hepatitis C RNA at age two months or older, according to the American Association for the Study of Liver Disease and Infectious Diseases Society of America. All people diagnosed with hepatitis C should be connected to care and treatment.
- For more guidance, visit hcvguidelines.org/unique-populations/children.

Chronic Hepatitis C: Age Distribution

In 2011, the age distribution of hepatitis C cases in NYC showed that cases were concentrated in baby boomers (people born between 1945 and 1965) with another peak starting to form for younger people. Ten years later, there was a distinct second peak showing a concentration of hepatitis C cases in younger people, who are likely to have been infected from recent drug use.

Figure 18. Age distribution of people reported with chronic hepatitis C in NYC, 2011 and 2021



Hepatitis C: People Ages 3 to 29 Years

The Health Department monitors trends of hepatitis C in people ages 3 to 29 years since new cases among young people are more likely to be recent infections. In 2021, 90.6% of people ages 3 to 29 years newly reported with chronic hepatitis C in NYC were ages 20 to 29 years.

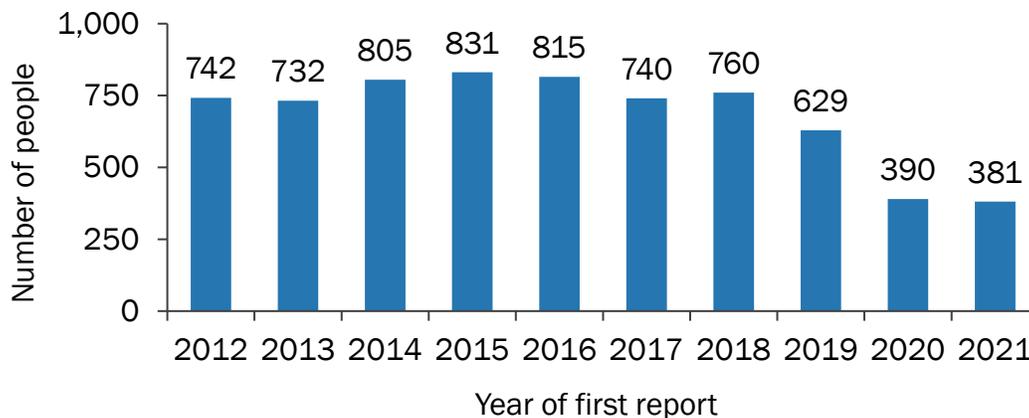
381

Number of people ages 3 to 29 years newly reported with chronic hepatitis C in NYC in 2021

13.7

Rate of newly reported chronic hepatitis C per 100,000 people ages 3 to 29 years in NYC in 2021

Figure 19. Number of people ages 3 to 29 years reported with chronic hepatitis C in NYC by year of first report, 2012–2021

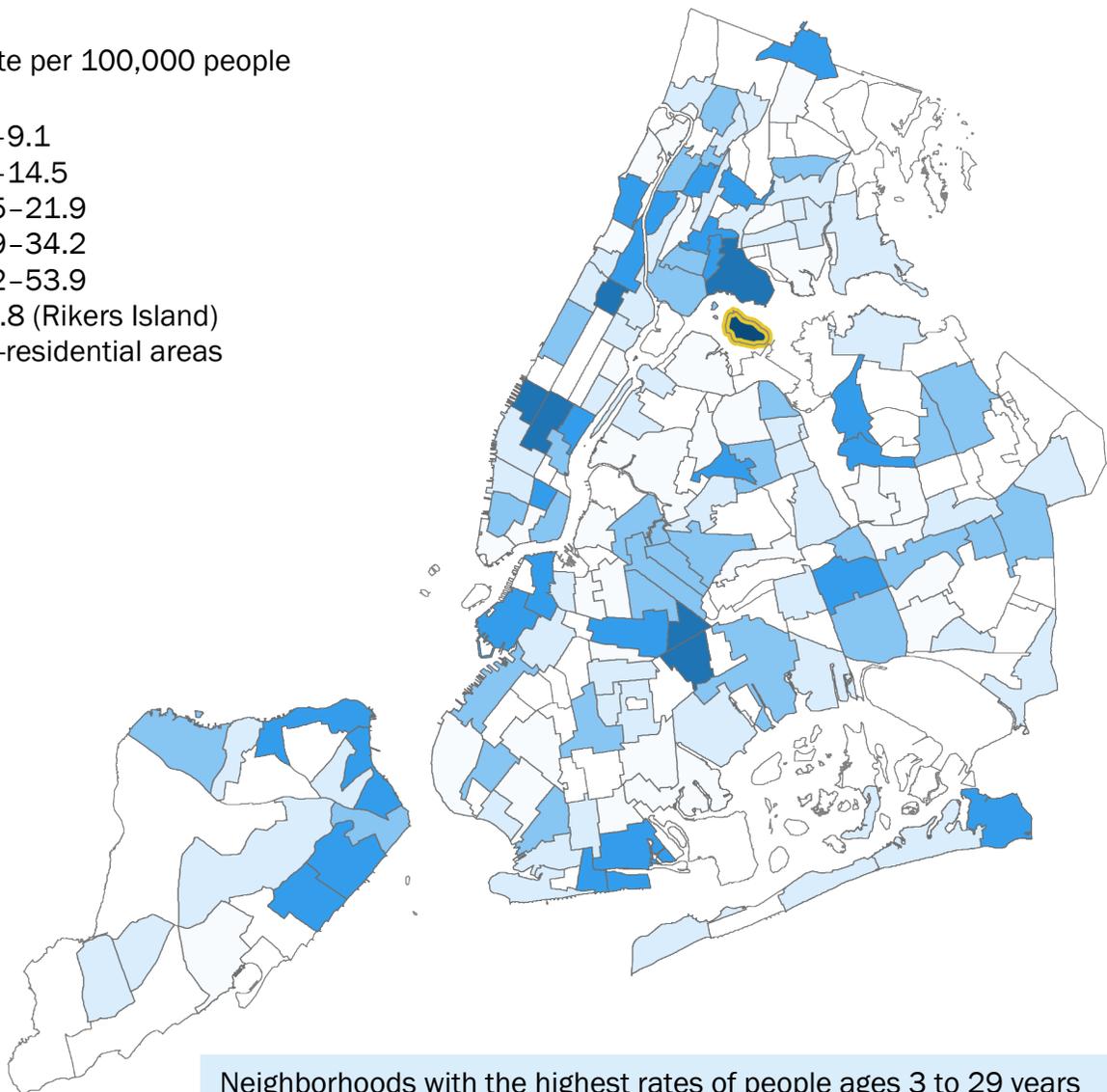
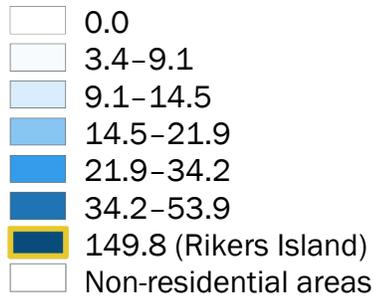


²¹ Starting in 2018, children ages 0 to 36 months reported with hepatitis C are reported as perinatal infection.

Geographic Distribution

Figure 20. Rate of people ages 3 to 29 years newly reported with chronic hepatitis C in NYC by NTA,²² 2021

Annual rate per 100,000 people



- Neighborhoods with the highest rates of people ages 3 to 29 years newly reported with chronic hepatitis C (per 100,000 people):
1. Rikers Island, Bronx (149.8)
 2. Ocean Hill, Brooklyn (53.9)
 3. Clinton, Manhattan (50.1)
 4. Midtown-Midtown South, Manhattan (49.6)
 5. Central Harlem South, Manhattan (43.1)
 6. Hunts Point, Bronx (37.5)
 7. Brownsville, Brooklyn (37.2)
 8. West New Brighton-New Brighton-St. George, Staten Island (34.2)
 9. Queensboro Hill, Queens (34.0)
 10. Sheepshead Bay-Gerritsen Beach-Manhattan Beach, Brooklyn (33.3)

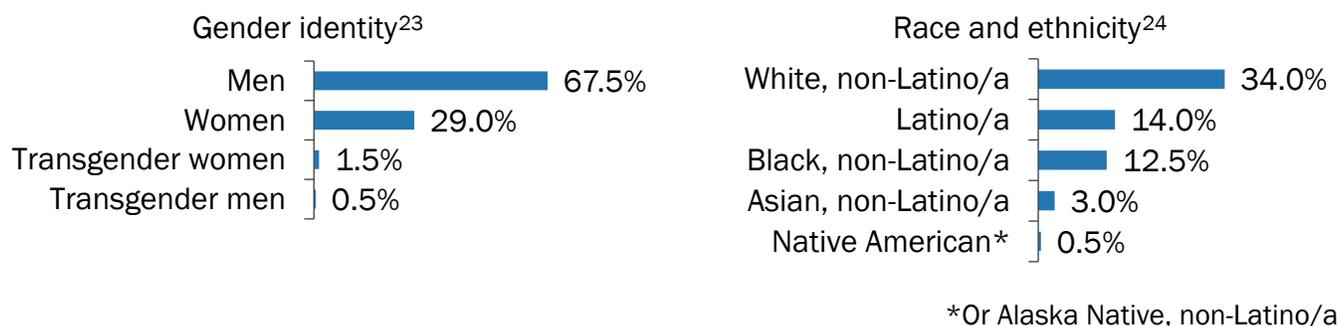
²² NTA could not be determined for 16 (4.2%) people based on their address at first report.

Enhanced Chronic Hepatitis C Surveillance of People Ages 18 to 34 Years

In 2021, the Health Department investigated 200 out of 301 (66.4%) people ages 18 to 34 years newly reported with chronic hepatitis C in NYC and their health care providers. Patients were interviewed for 74 (24.6%) investigations.

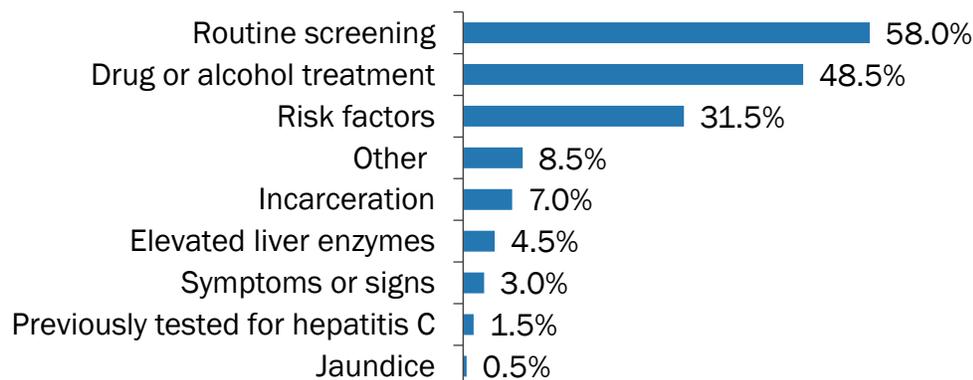
Patient Demographics

Figure 21. Characteristics of people ages 18 to 34 years newly reported with chronic hepatitis C in NYC in 2021 interviewed through enhanced surveillance (n=200)



Hepatitis C Screening

Figure 22. Reason for hepatitis C screening among people ages 18 to 34 years newly reported with chronic hepatitis C in NYC in 2021 interviewed through enhanced surveillance (n=200)²⁵



Access to Hepatitis C Health Care (n=200)

84%

Percentage of people ages 18 to 34 years with health insurance in NYC in 2021

20%

Percentage of people ages 18 to 34 years referred to Health Department navigator for linkage to care in NYC in 2021

²³ Gender identity was unknown for three (1.5%) people.

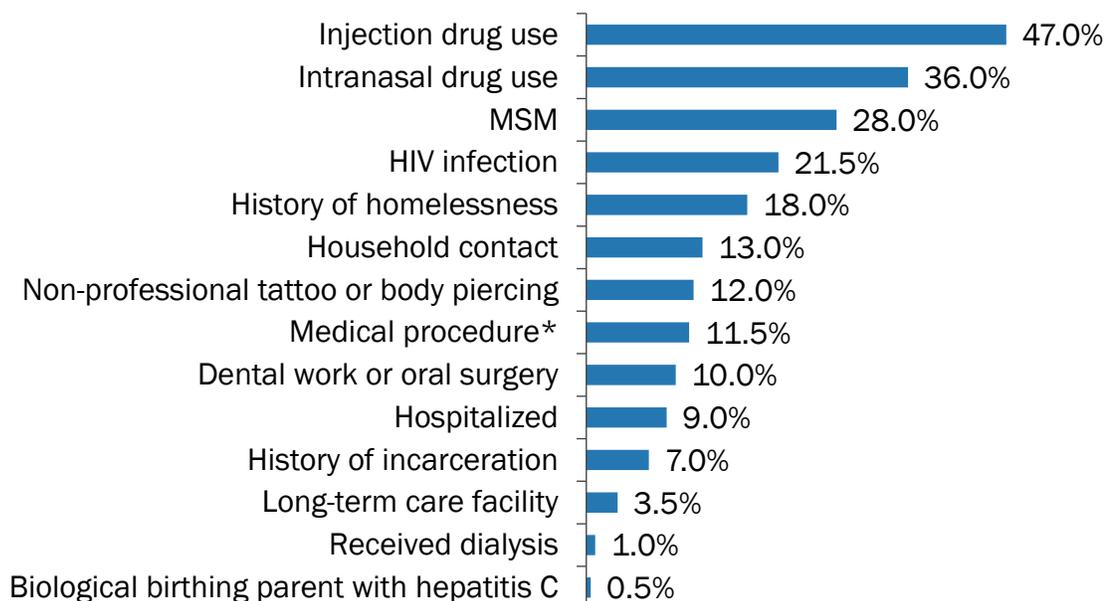
²⁴ Race and ethnicity were unknown for 65 (32.5%) people.

²⁵ Not mutually exclusive

Hepatitis C Risk Factors

In 2021, people with a history of injection or intranasal drug use made up nearly half (47%) of people ages 18 to 34 years newly reported with chronic hepatitis C in NYC.

Figure 23. Risk factors for hepatitis C infection among people ages 18 to 34 years newly reported with chronic hepatitis C in NYC in 2021 interviewed through enhanced surveillance (n=200)^{26,27}



*Involving injections, anesthesia or blood

Hepatitis C Health Care

22%

Percentage of 200 people ages 18 to 34 years treated for hepatitis C at the time of interview in NYC in 2021

27%

Percentage of 200 people ages 18 to 34 years vaccinated against hepatitis A and/or B as per provider interview in NYC in 2021

» For full hepatitis C enhanced surveillance data, see Appendix 15.

Health Department Recommendations

Health care providers should ensure that all people living with chronic hepatitis C are:

- Vaccinated for hepatitis A and B;
- Assessed for fibrosis or cirrhosis;
- Screened for liver cancer if cirrhotic; and
- Treated to cure infection.

For more information, see the Health Department’s City Health Information: Diagnosing and Managing Hepatitis C at www1.nyc.gov/assets/doh/downloads/pdf/chi/chi-37-2.pdf.

²⁶ Not mutually exclusive

²⁷ 41.5% of men interviewed reported as MSM.

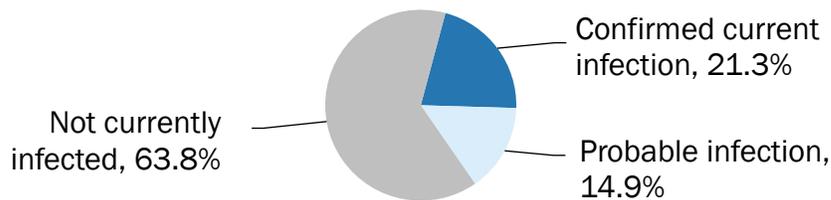
Hepatitis C Testing and Care Outcomes

Getting a positive hepatitis C test result is just the first step toward getting cured. The Health Department analyzes surveillance and laboratory data to determine how many people are currently infected, have received treatment for hepatitis C and have been cured. This information can be used to identify opportunities to eliminate hepatitis C.

Hepatitis C Diagnosis

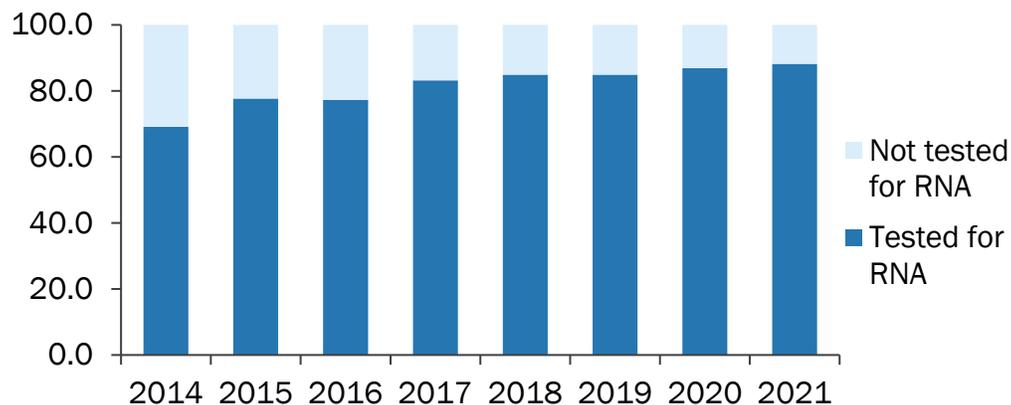
Hepatitis C viral (RNA) testing is an essential step in hepatitis C diagnosis to determine current infection status so those currently infected can initiate treatment. In 2021, 85.3% of people in NYC with a positive hepatitis C antibody test received an RNA test.

Figure 24. Test results of people in NYC with a positive hepatitis C antibody test who received an RNA test, 2021



The Health Department works with health care facilities to increase the number of people in NYC screened positive for hepatitis C antibody who have an RNA test (learn more on page 48). From 2014 to 2021, this percentage has increased from 69 to 88%.

Figure 25. Percentage of people in NYC with a positive hepatitis C antibody test who received an RNA test, 2014 to 2021

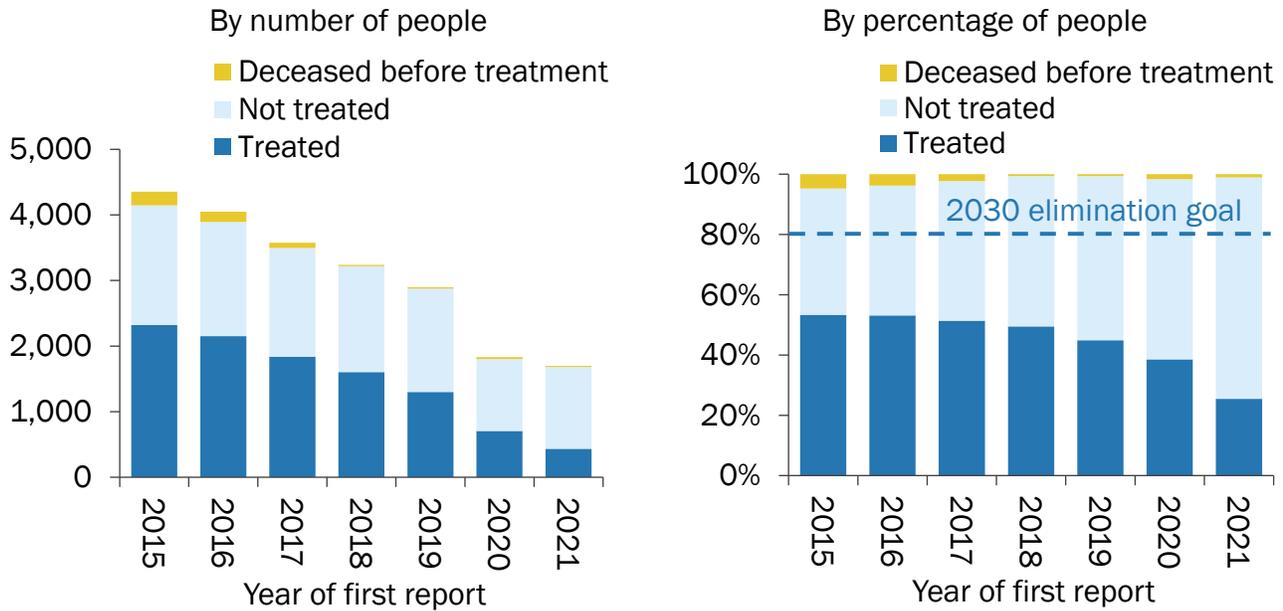


» For full data on the RNA and genotype test results of people newly reported with hepatitis C in NYC in 2021, see Appendix 16.

Hepatitis C Treatment

Hepatitis C treatment and cure are key steps toward achieving hepatitis C elimination goals.

Figure 26. Treatment initiation among people newly reported with a positive hepatitis C RNA test in NYC by year of first report, 2015-2021



Although nearly seven years have passed for people newly reported with hepatitis C during 2015, only 56% of them were RNA negative as of March 31, 2022. Some may have moved or died outside of NYC.

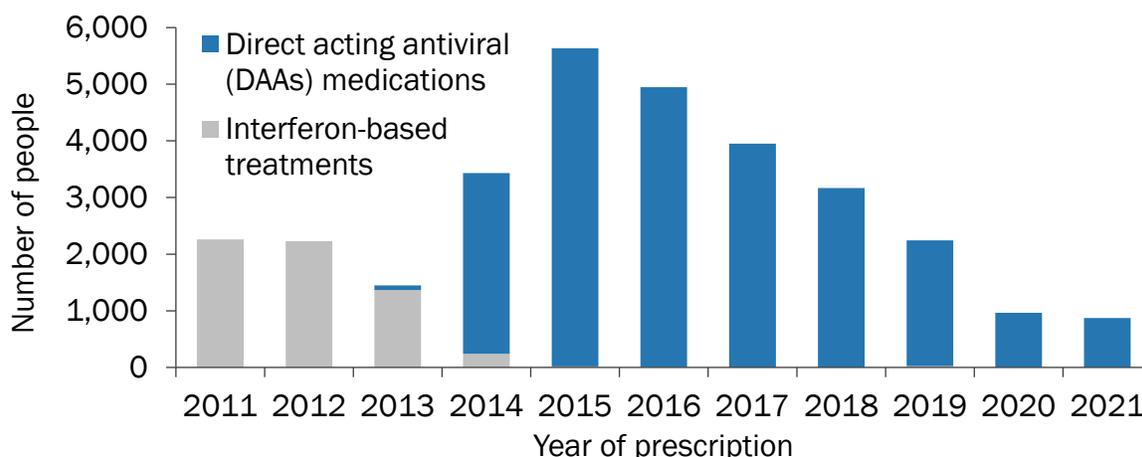
» For full data on treatment initiation in people newly reported with hepatitis C in NYC in 2021, see Appendix 17.

The NYC Viral Hepatitis Elimination Plan’s hepatitis C treatment goal is to increase the percentage of people treated and cured within one year of diagnosis (as indicated by a negative RNA test). To reach this goal, treatment should be initiated for more people newly diagnosed with hepatitis C.

Hepatitis C Treatment in Special Populations

Hepatitis C disproportionately affects people with low incomes, people with criminal justice involvement and people who are experiencing homelessness. The Health Department analyzes data from surveillance and other data registries to identify gaps in care for people facing structural barriers to hepatitis C care and treatment.

Figure 27. Hepatitis C medication prescriptions for people covered by Medicaid in NYC, 2011–2021



Data source: Salient New York State (NYS) Medicaid Enterprise System

In 2014, with the availability of all-oral direct acting antiviral (DAA) medication, treatment initiation increased for people living with hepatitis C in NYC enrolled in Medicaid. However, it has declined since 2015 as fewer people are being diagnosed with hepatitis C and people who are harder to reach are not engaged in services. More efforts are needed to identify these individuals and link them to care and treatment.

Hepatitis C Cure in People With Criminal Justice System Involvement, With Substance Use Disorders and Experiences With Homelessness

In 2021, the Health Department published an analysis of people in NYC who were cured of hepatitis C from 2015 to 2019. Of 13,952 people with a confirmed hepatitis C infection from 2015–2018, 49.8% were cured within 841 to 966 days (about 2.5 years). Homelessness, criminal justice system involvement, or substance use treatment was indicated for 4,304 (30.9%) people. For more information, visit doi.org/10.1177/00333549211049263.

Since 2017, the Health Department has provided patient navigation services via telephone to people with significant barriers to hepatitis C care. The Health Department also works with syringe services and substance use treatment programs to integrate hepatitis C screening and treatment services. Learn more on pages 37 and 48.

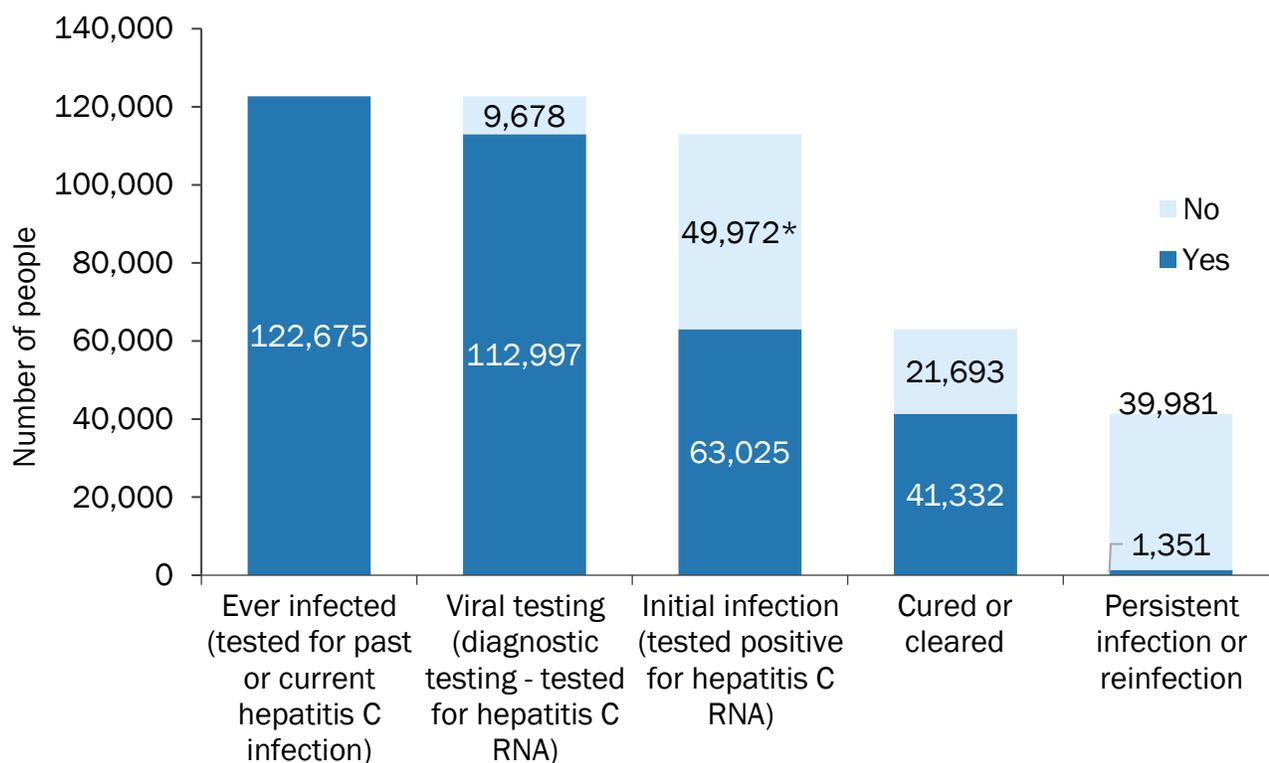
Health Department Recommendation

- To reach hepatitis C elimination goals, all people living with chronic hepatitis C should be treated and cured. Providers can refer patients to no- or low-cost hepatitis C care and treatment programs in NYC. For more information, see page 41 and visit nyc.gov/health/hepc.

Hepatitis C Clearance Cascade

In 2021, the CDC developed a new method for calculating the number and percentages of people who are tested for and cured of hepatitis C. This laboratory-based hepatitis C virus clearance cascade updates the NYC surveillance-based care cascade used in previous reports.

Figure 28. Laboratory-based hepatitis C virus clearance cascade for NYC, July 1, 2014–December 31, 2021



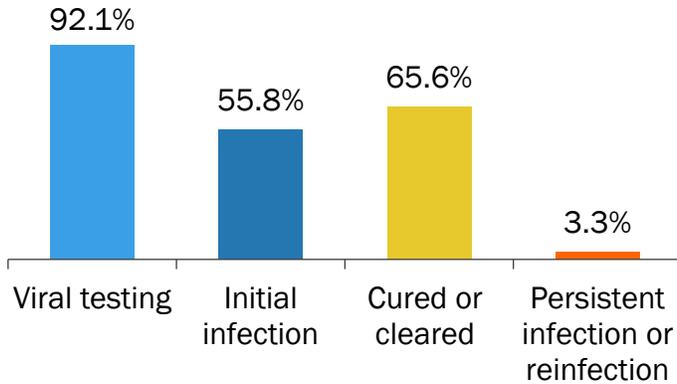
*Of 49,972 people who did not test positive for hepatitis C RNA, 581 people were reinfected or had a persistent infection.

What the cascade shows	Opportunities for intervention
Most (92%) of the 122,675 people who were ever infected with hepatitis C in NYC since July 2014 were tested to diagnose hepatitis C infection.	9,678 people in NYC have still not completed viral diagnostic testing.
Of the 63,025 people whose first RNA test was positive, more than half (55%) are no longer infected with hepatitis C.	More than 20,000 people in NYC have not been cured or cleared of their hepatitis C infection.
Of the 41,332 people who have been cured or cleared of the hepatitis C virus in NYC, 1,351 were reinfected or had a persistent infection.	Learn more about hepatitis C reinfection on page 32.

» For full data and to read the definitions for each category, see Appendix 18.

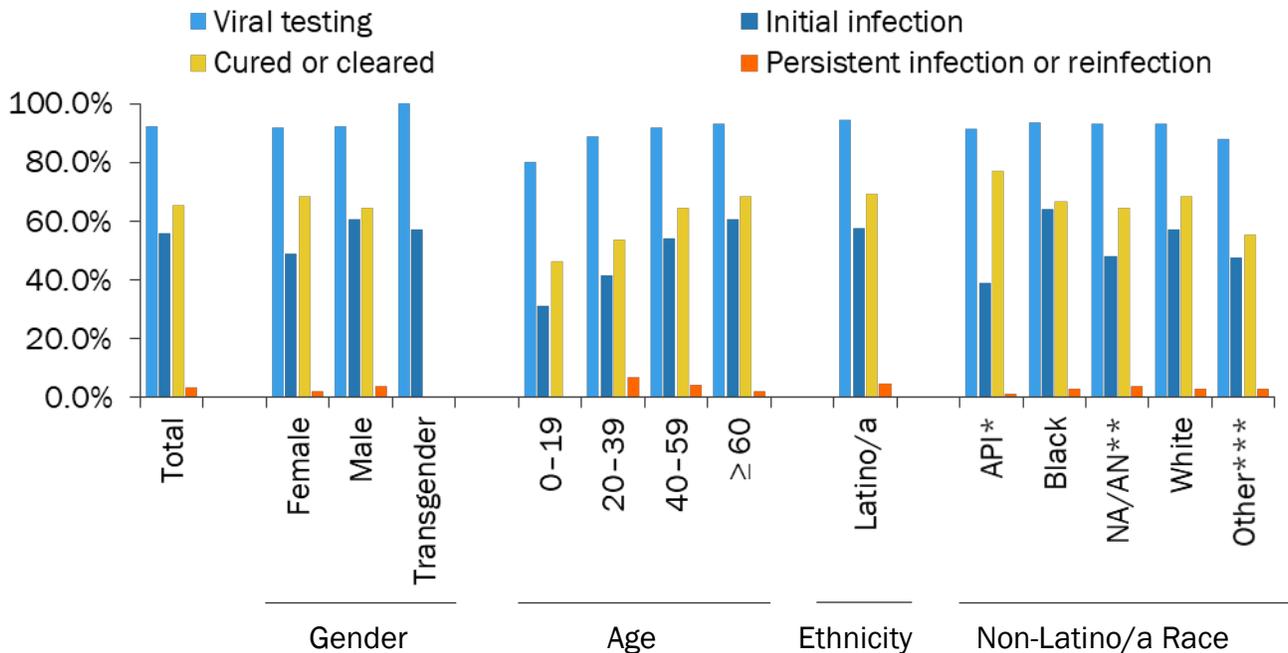
In addition to calculating the number of people tested and cured, the Health Department calculates the percentage of people at each stage of the hepatitis C care process to identify gaps in care.

Figure 29. Conditional proportions for laboratory-based hepatitis C virus clearance cascade for NYC, July 1, 2014–December 31, 2021



Of people who were ever infected with hepatitis C in NYC from July 2014 to December 2020, 92.1% received viral (hepatitis C RNA) testing by December 2021. Of this group, 55.8% had a positive RNA test (initial infection). Of the initial infection group, 65.6% have been cured or cleared of the virus. Of the cured or cleared group, 3.3% had a persistent infection or were reinfected.

Figure 30. Conditional proportions for laboratory-based hepatitis C virus clearance cascade for NYC by gender, age, and race and ethnicity, July 1, 2014–December 31, 2021



*Asian/Pacific Islander; **Native American or Alaska Native; ***Unknown

The percentage of people ever infected with hepatitis C in NYC who received a viral diagnostic (hepatitis C RNA) test is similar across subpopulations. A greater percentage of people age 40 or older were cured or cleared of hepatitis C compared to people under the age of 40. Persistent infection or reinfection was higher among people ages 20 to 39 years.

» For full data and to read the definitions for each category, see Appendix 18.

Hepatitis C Reinfection

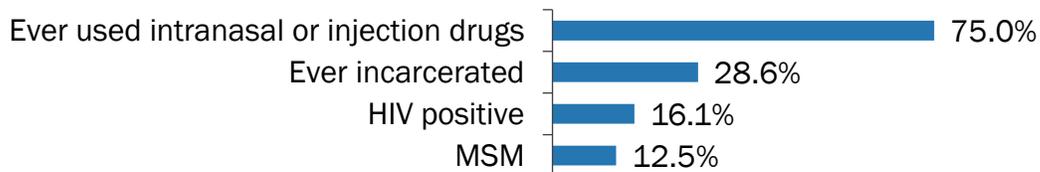
Understanding hepatitis C reinfection patterns helps to guide hepatitis C prevention and elimination efforts in NYC. The Health Department investigated 62 out of 118 (48%) people reported with a positive hepatitis C RNA test in 2020 after cure.²⁸ Of those, 56 (90%) people were identified as reinfected with hepatitis C by provider interviews and chart reviews.

80% Percentage of people living with hepatitis C reinfection in NYC who are male

46.5 Median age of people living with hepatitis C reinfection in NYC

Of people with a hepatitis C reinfection, 41% were reinfected one year or less from their estimated cure dates.

Figure 31. Number and percentage of people reinfected with hepatitis C infection in NYC by reported risk factors,²⁹ 2020



Drug use was the most common reported risk factor for hepatitis C reinfection.

» For full data, see Appendices 19 and 20.

Health Department Recommendations

Reinfection may occur in some people who continue to share drug use equipment or remain at risk for infection. However, the rate of hepatitis C reinfection is lower than the rate of initial infection among people who inject drugs.³⁰ Health care providers should:

- Test all adults once for hepatitis C infection and people with ongoing risk factors such as injection drug use annually.
- Retreat people who are reinfected with hepatitis C to reduce poor liver-related outcomes and to prevent ongoing transmission.
- Refer people who inject drugs to harm reduction services to prevent reinfection. Find harm reduction services in NYC at

www1.nyc.gov/site/doh/health/health-topics/alcohol-and-drug-use-services.page.

» For guidance on addressing drug use in primary care, visit www1.nyc.gov/assets/doh/downloads/pdf/chi/chi-35-3.pdf.

²⁸ Cure was determined for any person with a high-positive RNA test followed by a negative, indeterminate, or low positive (less than [$<$] 1,000 international units per milliliter [IU/mL]) RNA test. At least one negative RNA test must be reported at least four months after the date of the negative or low positive RNA test for the person to be considered cured.

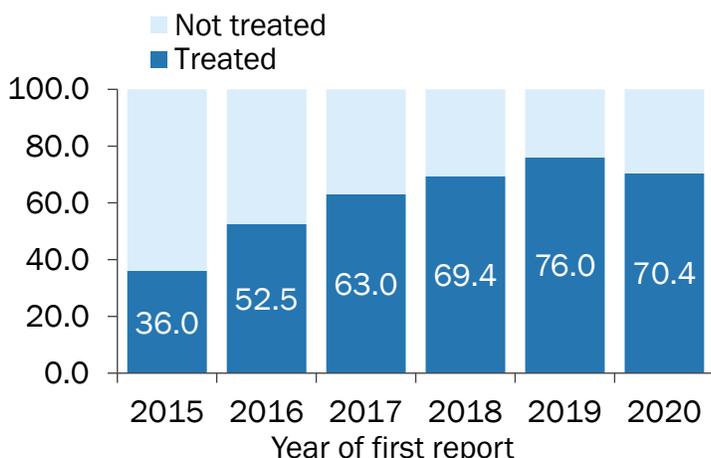
²⁹ Not mutually exclusive.

³⁰ For more information, visit hcvguidelines.org/unique-populations/pwid.

Hepatitis C and HIV Coinfection

The Health Department matches hepatitis C and HIV surveillance data to characterize NYC’s population with hepatitis C and HIV coinfection and identify opportunities to improve access to hepatitis C treatment.

Figure 32. Percentage of people living with confirmed chronic hepatitis C and HIV coinfection in NYC who initiated hepatitis C treatment by year of first report, 2015–2020



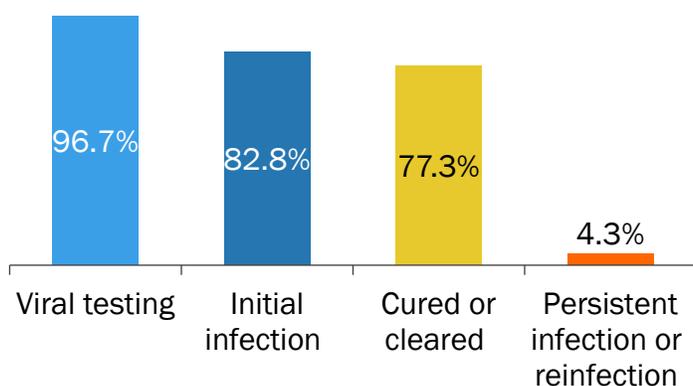
By the end of 2020, 70.4% of people living with HIV in NYC who had ever tested positive for hepatitis C RNA from 2014 to 2020 received treatment.

» For data on people reported with hepatitis C and HIV coinfection who initiated treatment, see Appendix 21.

Hepatitis C Clearance Cascade For People Living With HIV

The Health Department calculates the percentage of people at each stage of hepatitis C testing and cure using the laboratory-based hepatitis C virus clearance cascade.

Figure 33. Laboratory-based hepatitis C virus clearance cascade for people living with HIV ever infected with hepatitis C in NYC (n=11,157), July 1, 2014–December 31, 2021



In NYC, 96.7% of people reported with HIV and ever infected with hepatitis C (from July 2014 to December 2020) were tested for hepatitis C RNA (from July 2014 to December 2021). Of people tested, 82.8% had a positive RNA test (initial infection). Of people with a positive RNA test, 77.3% were cured or cleared of the hepatitis C virus. Of this group, 4.3% were reinfected or had a persistent infection.

» For full cascade data and to read the definitions for each category, see Appendix 22.

Health Department Recommendation

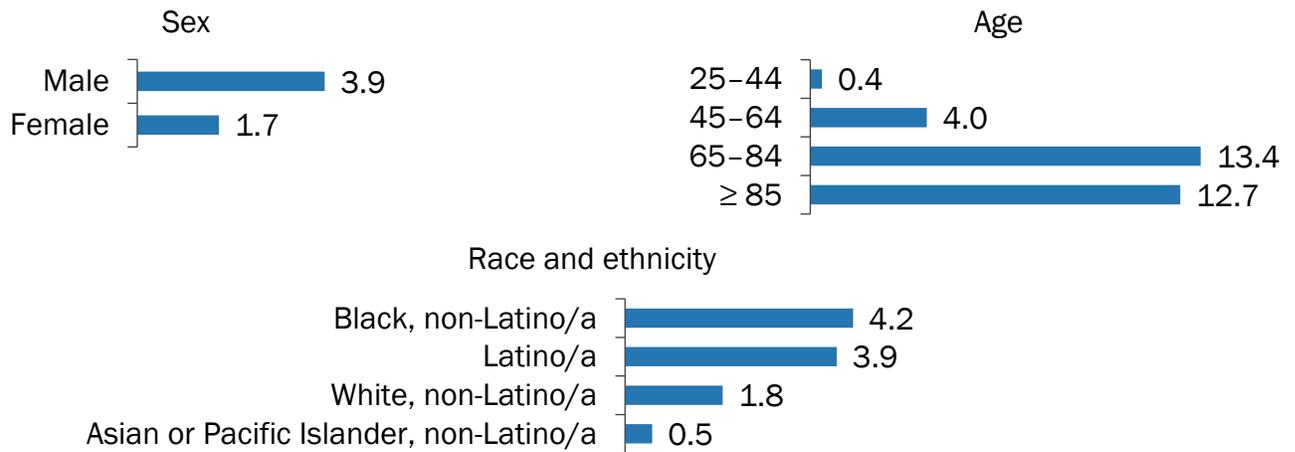
- Health care providers should prioritize hepatitis C screening and treatment in all patients with HIV. For more information, visit hcvguidelines.org/unique-populations/hiv-hcv.

Hepatitis C: Deaths

263 Number of deaths reported as caused by hepatitis C in NYC in 2020

2.7 Rate per 100,000 people in NYC in 2020

Figure 34. Age-adjusted or age-specific death rate per 100,000 people³¹ among NYC residents where hepatitis C is listed as the cause of death in 2020, by sex, age, and race and ethnicity



» For full data, see Appendix 23.

Leading Causes of Death Among Decedents With Hepatitis C

In 2021, the Health Department analyzed the leading causes of death among 4,505 decedents with hepatitis C in 2020. For full data, see Appendix 24.

Leading causes of death, all decedents with hepatitis C, 2020



Leading causes of death, premature decedents with hepatitis C, 2020



- 1. COVID-19
- 2. Heart diseases
- 3. Cancer
- 4. Drug-related
- 5. Diabetes
- 6. Chronic lower respiratory diseases
- 7. Influenza and pneumonia
- 8. HIV
- 9. Viral hepatitis
- 10. Essential hypertension and renal diseases
- 11. Chronic liver disease and cirrhosis
- 12. Accidents except drug poisoning
- 13. All other causes

³¹ The population used in the rate constructions are based on the 2020 Census population estimates, 2021 vintage. However, the 2020 Census counts are substantially higher than the estimates, rendering potentially overestimated rates.

Prevention and Screening

The Health Department promotes hepatitis A, B, and C prevention and screening among people at high risk of acquiring these infections, including people who use drugs; people who have sexual partner(s) with hepatitis A, B, or C; MSM; and infants born to pregnant people living with hepatitis B and C. The Health Department offers low- or no-cost hepatitis A and B vaccinations at its clinics, including to people who are underinsured or uninsured.

Hepatitis A and B Vaccinations

	Number of vaccine doses provided at Health Department clinics in 2021	Number of people who completed the vaccine series in NYC in 2021*
Hepatitis A	2,277	97,998
Hepatitis B	3,330	55,794

*As reported to the Citywide Immunization Registry (CIR); CIR data are less representative of adult vaccination

» For full data, see Appendices 25 and 26.

Viral Hepatitis in Correctional Facilities

Since 2013, New York City Health + Hospitals (NYC H+H)/Correctional Health Services has screened people in the NYC jails for hepatitis C. In 2018, Correctional Health Services implemented universal hepatitis C screening at the intake examination upon admission to jail. Correctional Health Services also provides vaccinations against hepatitis B.

1,918 Number of hepatitis C screening tests performed at intake examination in 2021³² **13%** Percentage of intake examinations with a hepatitis C screening test performed in 2021³⁵

63 Number of people who received hepatitis C treatment in NYC jails in 2021* **72** Number of people vaccinated against hepatitis B in NYC jails in 2021

*Includes those who completed or partially completed treatment while in NYC jails

» For guidance on providing primary care to patients with a history of criminal justice system involvement, see www1.nyc.gov/assets/doh/downloads/pdf/chi/chi-38-2.pdf.

³² Based on rapid test, antibody test or viral load test in 2021 for individuals who received an intake examination in 2021. Numerator excludes those who refused screening.

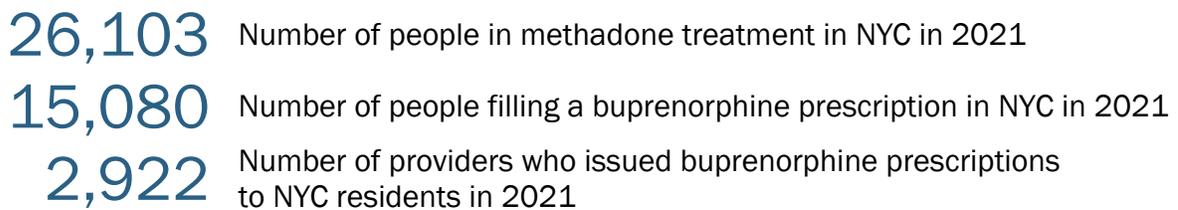
Syringe Service Programs and Medications for Addiction Treatment

The Health Department funds 15 syringe service programs across NYC to provide health care services to people who use drugs. Services include hepatitis B vaccination, hepatitis C testing and care coordination, overdose prevention and harm reduction education, distribution of sterile syringes and other drug use equipment to prevent the transmission of viral hepatitis and other blood-borne diseases, and access to buprenorphine treatment.



» For more information on syringe service programs in NYC, see the Epi Data Brief at www1.nyc.gov/assets/doh/downloads/pdf/epi/databrief110.pdf.

The Health Department works to expand access to methadone and buprenorphine, which are medicines for addiction treatment for people with opioid use disorder. Treatment with methadone and buprenorphine has been shown to reduce a person’s risk of getting hepatitis B and C and their risk of overdose.



Provisional data show that in 2020, 2,062 people died from drug overdose in NYC. The Health Department estimates there are more than 10,000 non-fatal overdoses each year. People with a history of non-fatal overdose are at risk for hepatitis B and C and should be tested and connected to care and treatment.

» For more information on drug overdose in NYC, see the Epi Data Brief at www1.nyc.gov/assets/doh/downloads/pdf/epi/databrief129.pdf.

Health Department Recommendations
 Health care providers should:

- Assess all patients for drug use and provide overdose and infection prevention services to patients who use drugs.
- Offer hepatitis A and B vaccination to patients who report current injection or intranasal drug use, are at risk for sexual transmission of hepatitis A and B, or have hepatitis C.
- Screen people who have had a non-fatal overdose for hepatitis B and C.

Health Department Tele-Navigation

The Health Department uses hepatitis B and C surveillance data to assess patient diagnosis and engagement in care and perform outreach. From 2017 to 2021, the Health Department reached out to 2,904 people living with hepatitis B or C by telephone to provide health care navigation services to support linkage to care and treatment.

965

Number of people living with hepatitis B or C in NYC called to offer tele-navigation services in 2021

474

Number of people living with hepatitis B or C in NYC reached and provided tele-navigation services in 2021

Hepatitis B Tele-Navigation Program

In 2021, the Health Department provided linkage to care services to 201 people living with hepatitis B in NYC.

61%

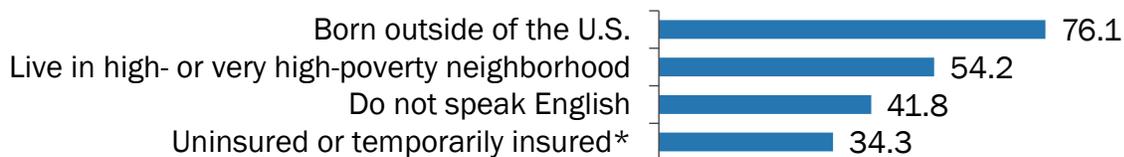
Percentage of people linked to hepatitis B medical care in 2021

73%

Percentage of people linked to hepatitis B medical care who were virally suppressed in 2021

Of those living with hepatitis B, the Health Department reached out to people who were pregnant, recently gave birth, or tested positive in the NYC Sexual Health Clinics.

Figure 35. Characteristics of people who received hepatitis B tele-navigation services in NYC, 2021



*Temporary Medicaid for pregnant people only

Increasing Follow-up Hepatitis B Care in the Postpartum Period

Pregnant people are routinely tested for hepatitis B to prevent perinatal transmission but may not receive appropriate hepatitis B education and referrals. Since 2017, the Health Department has contacted perinatal hepatitis B prevention program patients to offer culturally appropriate telephone patient navigation services with the goal of improving adherence with postpartum hepatitis B care. An analysis of 409 people who delivered a live infant between July 1, 2016–March 1, 2019, found those receiving telephone patient navigation services were 1.66 times as likely to see a hepatitis B care provider within six months of childbirth compared with those who did not. Read more at doi.org/10.1007/s10903-021-01240-5.

Hepatitis C Tele-Navigation Program

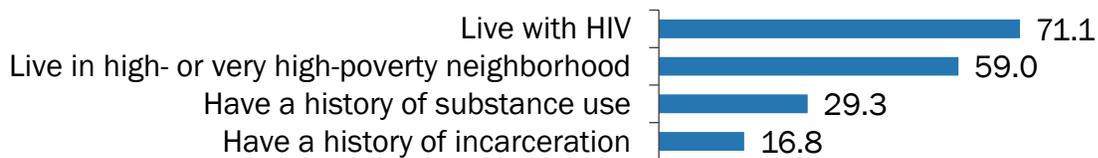
In 2021, the Health Department provided linkage to care services to 273 people living with hepatitis C in NYC.



*Defined by negative hepatitis C RNA test reported on a date after linkage to care

Of those living with hepatitis C, the Health Department reached out to people who were coinfectd with HIV, tested positive for hepatitis C in NYC jails or in NYC Sexual Health Clinics, were under the age of 30 and diagnosed with hepatitis C during 2021, or recently gave birth. Overall, 29% were ever tested at a substance use treatment facility.

Figure 36. Characteristics of people who received hepatitis C tele-navigation services in NYC, 2021^{33,34}



³³ History of substance use is defined as any hepatitis C laboratory report ever from a free-standing NYC substance use treatment center.

³⁴ History of incarceration is defined as any hepatitis C laboratory report ever from an NYC correctional facility.

Community Hepatitis Navigation Programs

The New York City Council Viral Hepatitis Initiative provides funding to community organizations to help people at risk for hepatitis B and C overcome barriers to testing, care and treatment. Since 2014, the initiative has enabled 30 community health organizations to hire and train hepatitis B and C patient and peer navigators.

Navigation Description

Peer and patient navigators are trained and employed to provide:

- Outreach and prevention (such as harm reduction) for people at risk for hepatitis B and C
- Health promotion and help accessing supportive services
- Navigation through complete hepatitis B and C testing
- Linkage to hepatitis A and B vaccination and hepatitis B and C care and treatment

Training Description

Training programs aim to:

- Build capacity of navigators and other service providers to support patients with hepatitis A, B and C through testing, care and treatment
- Equip navigators to educate people at risk for hepatitis B and C

Navigators are trained in:

- Peer and patient navigation program protocols
- Patient navigation approaches, including Motivational Interviewing
- Hepatitis B and C transmission, prevention, and recommended testing and care practices
- Trauma-informed care
- Mental health first aid
- Overdose prevention

Fiscal Year 2015 (FY15) to FY21 Program Outcomes

From July 1, 2014, through June 30, 2021:

194 Number of peer and patient navigators trained and employed at community organizations such as health centers, hospitals and syringe service programs

18,669 Number of people at risk for or living with hepatitis B or C who received hepatitis education and navigation services

7,542 Number of people who were linked to hepatitis B or C medical care

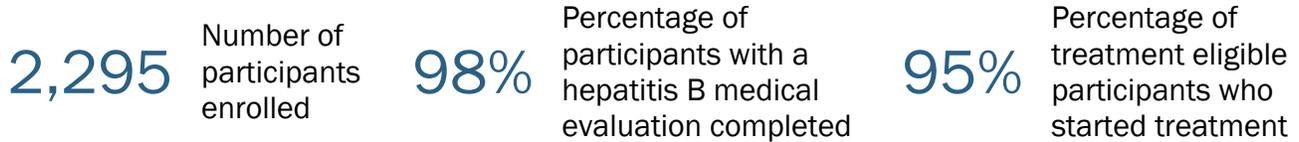
4,444 Number of people who initiated treatment for hepatitis B or C

Check Hep B Patient Navigation Program

Since 2014, the Viral Hepatitis Initiative has supported hospitals, health centers, and community organizations to provide patient navigation to people living with chronic hepatitis B. Check Hep B patient navigators help patients complete hepatitis B testing, evaluation, and treatment. In FY21 (July 1, 2020, through June 30, 2021), there were 12 navigators employed in the program who served 901 people living with chronic hepatitis B, including people served in previous years who need ongoing care coordination.

FY15 to FY21 Program Outcomes

From July 1, 2014, through June 30, 2021:



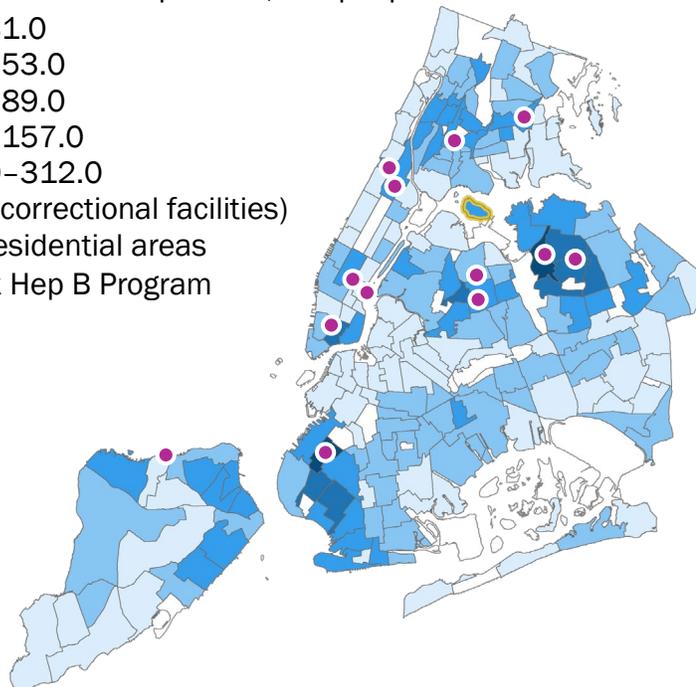
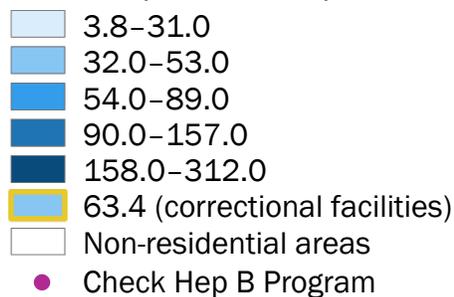
Participant Characteristics



Program Organizations

The map below shows the rate of people newly reported with chronic hepatitis B in NYC in 2021 by NTA and Check Hep B Patient Navigation Program locations.

Annual hepatitis B rate per 100,000 people



Health Centers and Hospitals

1. APICHA Community Health Center
2. BronxCare Health System
3. Charles B. Wang Community Health Center
4. NYC H+H/Bellevue Hospital
5. NYC H+H/Elmhurst Hospital
6. Montefiore Medical Center
7. NYU Seventh Avenue Family Health Center

Community Organizations

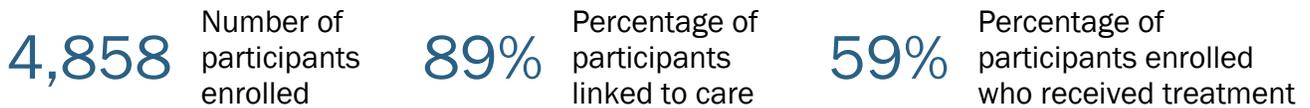
1. African Services Committee
2. Community Health Action of Staten Island
3. Korean Community Services

Check Hep C Patient Navigation Program

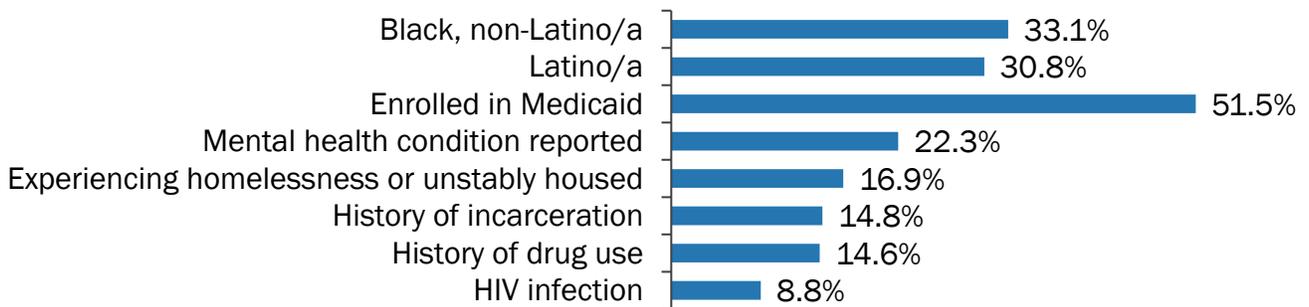
Since 2014, the Viral Hepatitis Initiative has supported health centers and hospitals to provide patient navigation to people living with chronic hepatitis C. Check Hep C patient navigators help patients complete hepatitis C testing, evaluation and treatment. In FY21 (July 1, 2020, through June 30, 2021), there were 12 navigators employed in the program who served 513 people living with chronic hepatitis C.

FY15 to FY21 Program Outcomes

From July 1, 2014, through June 30, 2021:



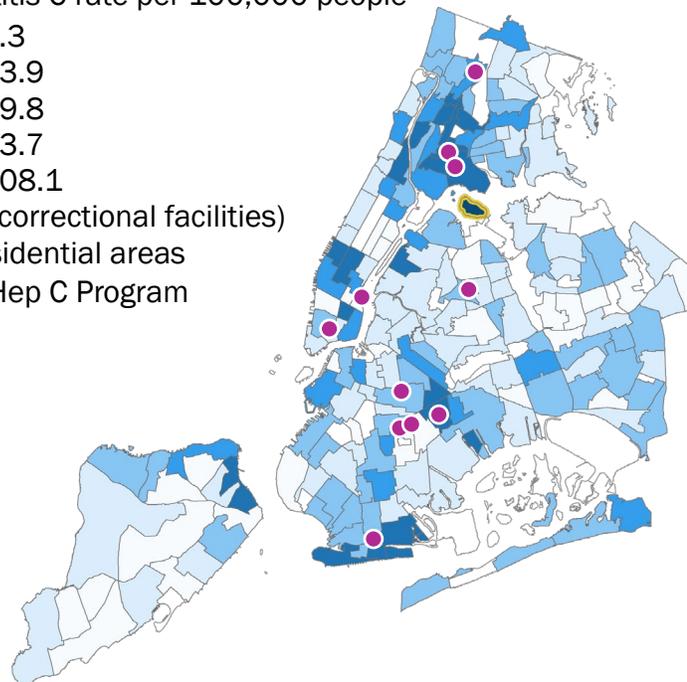
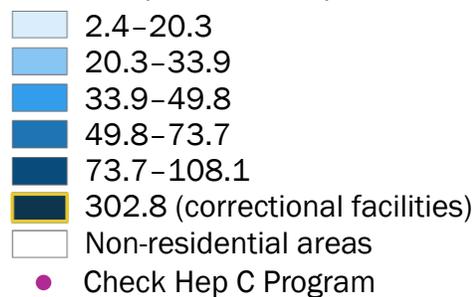
Participant Characteristics



Program Organizations

The map below shows the rate of people newly reported with chronic hepatitis C in NYC in 2021 by NTA and Check Hep C Patient Navigation Program health center and hospital locations.

Annual hepatitis C rate per 100,000 people



Health Centers and Hospitals

1. APICHA Community Health Center
2. Bedford-Stuyvesant Family Health Center
3. BronxCare Health System
4. Brownsville Multiservice Family Health Center
5. Community Healthcare Network
6. NYC H+H/Bellevue Hospital
7. NYC H+H/Coney Island Hospital
8. NYC H+H/Elmhurst Hospital
9. NYC H+H/Kings County Hospital
10. Kingsbrook Jewish Medical Center
11. Montefiore Comprehensive Health Care Center

Integration of Overdose Prevention in Hepatitis C Patient Navigation

From 2019 to 2022, the Health Department expanded the scope of its hepatitis C navigation programs to include overdose prevention services with the support of a multi-year CDC grant award. From September 1, 2019, through February 28, 2022,* this funding supported services for:

- 58** Number of navigators trained in overdose prevention counseling for hepatitis C patients
- 4,546** Number of people living with hepatitis C who received overdose prevention counseling
- 1,096** Number of people linked to integrated hepatitis C and medication-assisted treatment

*These data are provisional and may be subject to change.

Hep C Navigation in Syringe Service Programs

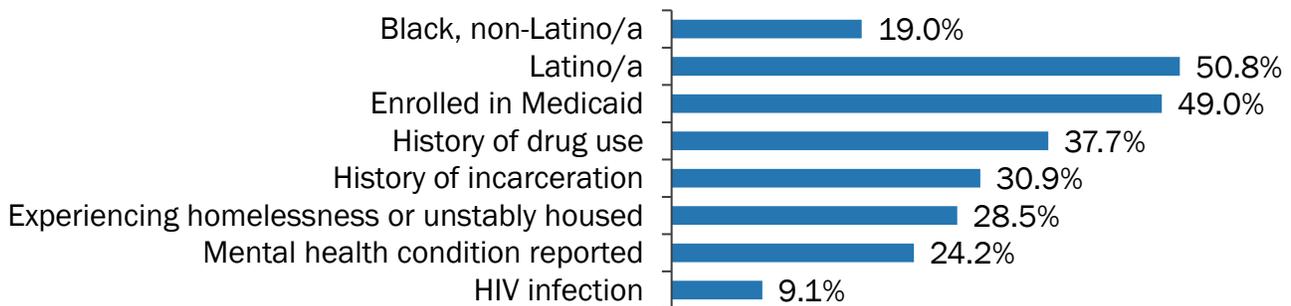
Since 2014, the Viral Hepatitis Initiative has supported SSPs in NYC to provide peer and patient navigation services to people at risk for hepatitis C. Peers use lived experience expertise to conduct outreach, prevention, and linkage to care, while patient navigators coordinate care and support retention in care to complete hepatitis C treatment. In FY21 (July 1, 2020, through June 30, 2021), there were 19 peer and patient navigators employed in the program who served 1,741 people at risk for hepatitis C.

FY15 to FY21 Program Outcomes

From July 1, 2014, through June 30, 2021:

- 11,516** Number of people at risk for hepatitis C who received education and prevention services
- 984** Number of participants with chronic hepatitis C linked to medical care
- 2,547** Number of participants who tested positive for hepatitis C
- 572** Number of participants with chronic hepatitis C who received treatment

Participant Characteristics**

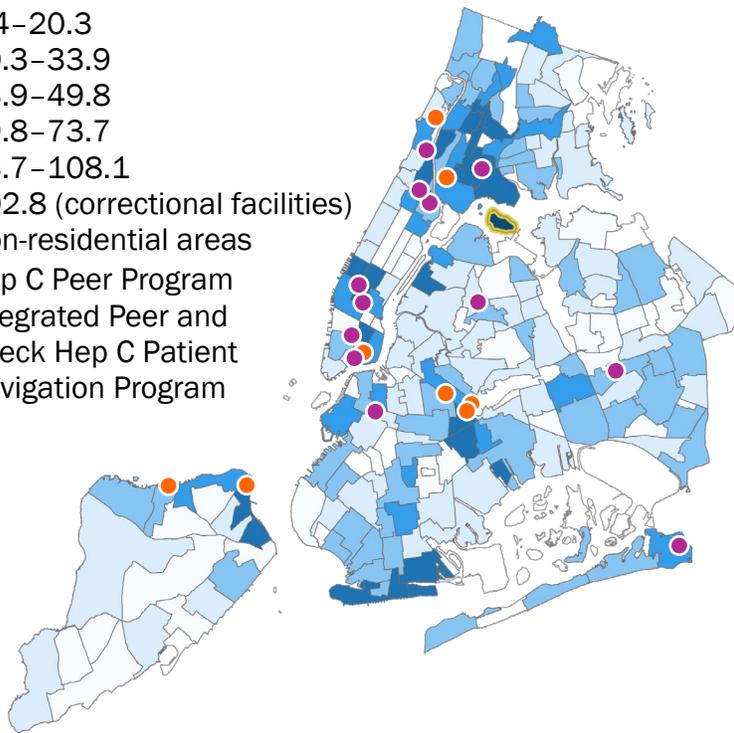
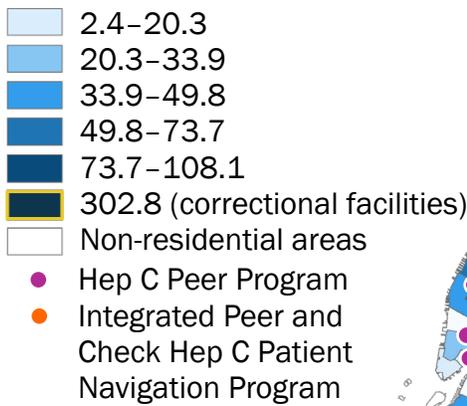


**Based on available data from 2,547 participants who tested positive for hepatitis C

Program Organizations

The map below shows the rate of people newly reported with chronic hepatitis C in NYC in 2021 by NTA and SSP locations.

Annual hepatitis C rate per 100,000 people



Hep C Peer Program

1. AIDS Center of Queens County
2. Harlem United FROST'D
3. Housing Works
4. New York Harm Reduction Educators
5. Positive Health Project
6. Safe Horizon Streetwork Project
7. St. Ann's Corner of Harm Reduction
8. VOCAL-NY

Integrated Hep C Peer and Check Hep C Program

1. Alliance for Positive Change
2. After Hours Project
3. BOOM!Health
4. Community Health Action of Staten Island
5. Family Services Network of New York
6. Praxis Housing Initiatives
7. Washington Heights CORNER Project

Impact of COVID-19 and Adaptations in Community Navigation Programs

In 2020 and 2021, the community organizations providing hepatitis B and C outreach and navigation services reported the following barriers brought on by the COVID-19 pandemic:

- Reduced office hours and outreach activities to protect the safety of staff and patients
- Limited hepatitis B and C testing services due to physical distancing requirements and reduced laboratory capacity, which delayed diagnosis and treatment initiation
- Patient apprehension to seek care to avoid exposure to COVID-19
- Psychosocial needs of patients exacerbated by the pandemic such as lack of housing, unemployment, food insecurity and mental health issues

Organizations adapted to provide navigation services via telephone. In 2021, navigators focused on reengaging patients and helping them to return to care for in-person or telemedicine appointments. Additionally, organizations integrated COVID-19 testing and vaccination activities into hepatitis navigation efforts to ensure people at risk for and living with hepatitis B and C received critical care given their increased risk for severe illness due COVID-19. During the COVID-19 pandemic, the Health Department provided support to programs on navigating health insurance requirements and accessing hepatitis B and C care, facilitated community of practice and learning meetings with navigators, and coordinated trainings for navigators and clinicians. Despite the additional responsibilities, the programs have met and even exceeded most goals for client engagement and linkage to and retention in care.

Health Care Provider Training and Workforce Development

Since 2014, the Viral Hepatitis Initiative has supported the Harm Reduction Coalition, Empire Liver Foundation, and, in 2018, the Hepatitis C Mentor and Support Group (HCMSG) to train peer and patient navigators and clinical providers in hepatitis B and C prevention, testing, linkage to care, evaluation and treatment.

Harm Reduction Coalition Navigation Training Program Outcomes

From July 1, 2014, through June 30, 2021:

58	Number of patient navigators trained and employed at health care facilities and community organizations	122	Number of SSP participants trained and employed as hepatitis C peer navigators
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Empire Liver Foundation Clinical Training Program Outcomes

Since 2014, Empire Liver Foundation has trained over 3,000 clinicians providing care for people at risk for hepatitis B and C. In FY21, specialized trainings included: Hepatitis B and HIV Coinfection, Universal Screening for Hepatitis C, Integrating Treatment for Hepatitis B and C via Telemedicine into Low-Threshold Care Models, Hepatitis B and C During Pregnancy, and A Minimal Monitoring Approach to Hepatitis C Treatment, among others.

» Visit empireliverfoundation.org to view a full list of training topics and request a training.

From July 1, 2020, through June 30, 2021:

Clinical training event	Number of clinician participants
Clinical hepatitis B and C grand rounds at health care facilities across NYC	236
Hepatitis C clinical training series	1,805
Hepatitis B clinical training series	298
Special topics viral hepatitis trainings	543

The four-course Hepatitis C Clinical Training Series reviews screening and treatment guidelines with a focus on issues related to people who use drugs. The series is designed to prepare clinicians with MD, DO, PA, NP, and PharmD credentials to either begin treating hepatitis C patients or increase the number of hepatitis C patients they treat. Evaluation data from 2017 to 2020 show that 67.4% of attendees felt able to treat hepatitis C independently after completing a training.

“The Perinatal Hepatitis C course was excellent. The information I received prepared [me] to discuss the issues regarding screening and treatment with my patients.”

– Participating nurse practitioner from a community health clinic in Brooklyn, NY

Hepatitis C Education for People At Risk

Since 2018, HCMSG has reached 572 people at risk for or living with hepatitis C through educational programs and support groups at more than 30 community-based organizations and substance use treatment and harm reduction programs. During COVID-19, HCMSG converted their public education curriculum into an online, interactive module viewed by 337 people at risk for hepatitis C. In FY21, HCMSG provided staff training and a demonstration of the online module to 182 care managers, health educators and other program staff at 22 organizations.

Capacity Building

The Health Department engages with organizations throughout NYC to build capacity to prevent, screen, and treat hepatitis B and C. The Health Department convenes coalition meetings, trains clinical and non-clinical providers, and conducts data-to-care quality improvement projects.

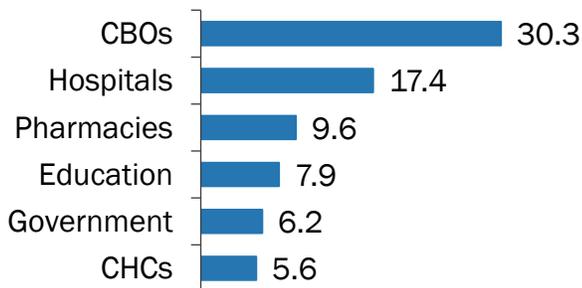
Hep Free NYC Community Coalitions

Since 2004, the Health Department has engaged with community health organizations to organize Hep Free NYC, a citywide network of health care providers, patients and public health professionals working together to prevent, manage, and treat hepatitis B and C in NYC.

178	Number of participating organizations in 2021	826	Number of unique meeting attendees in 2021	4,167	Number of social media followers*
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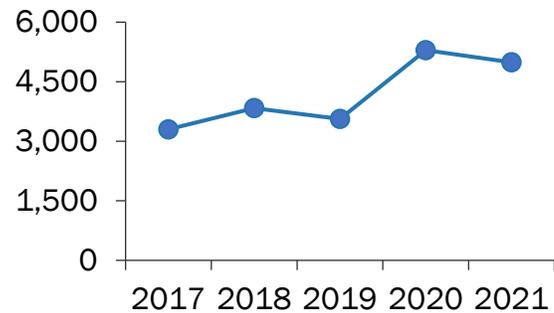
*Facebook, Instagram, Twitter and LinkedIn

Figure 37. Organizational makeup of Hep Free NYC meeting attendees by percentage, 2021*



*CBOs = community-based organizations, CHCs = community health centers; figure excludes other organizations.

Figure 38. Number of Hep Free NYC newsletter subscribers, 2017–2021



At Hep Free NYC meetings, attendees review the latest viral hepatitis data, share best practices in screening, and linkage to care and treatment, collaborate on special projects to meet community needs, and develop new patient referral relationships.

» To sign up for Hep Free NYC meeting invites and the Hep Free NYC newsletter, contact hep@health.nyc.gov.

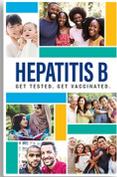
2021 Hep Free NYC Highlights

- Hep Free NYC led eight active committees, including the advocacy, awareness day planning, clinical education, communications, research and public awareness committees.
- The Coalition Against Hepatitis in People of African Origin NYC Committee and the South Asian Hepatitis Initiative developed a range of resources, including multilingual resources for African and South Asian communities.

Public Education

The Health Department produces and distributes free educational materials to community-based organizations and health care facilities to promote up-to-date hepatitis B and C health prevention, care and treatment, and referrals to NYC resources. In 2021, the Health Department developed new translations of its hepatitis B and hepatitis C educational resources.

Public Education Materials



“Hepatitis B: The Facts” (English, Spanish, Simplified Chinese, Traditional Chinese, French, Korean, Russian, Bengali, Albanian, Uzbek, Twi/Akan, Hausa): Booklet with basic information on hepatitis B testing, treatment, prevention and care



Hepatitis B Vaccine Palm Card (English, Spanish, Simplified Chinese, Traditional Chinese, French, Korean, Russian, Bengali, Albanian, Uzbek, Twi/Akan, Hausa): Palm card to track hepatitis B vaccine doses



“Hepatitis C and Your Liver” (English, Spanish, Arabic, Russian, Urdu, Bengali and Hindi): Booklet with basic information on hepatitis C testing, treatment, prevention and care



“Hepatitis C: Get Checked, Get Cured” (English, Spanish and Russian): Palm card with basic information on hepatitis C testing, treatment and prevention and care



“Your Liver Keeps You Healthy: Protect It” (English, Spanish and Chinese): Booklet with basic information on hepatitis A, B, and C testing, treatment, prevention and care



“Alcohol and Hepatitis” (English and Spanish): Palm card with alcohol reduction tips and action plan template



“Hepatitis C: Get Tested, Get Cured” (English, Spanish and Traditional Chinese): Poster promoting hepatitis C testing and treatment among baby boomers



“Hepatitis C Treatment: Before & Now” (English and Spanish): Poster promoting new hepatitis C treatments



“Get Hepatitis C Checked” (English and Spanish): Posters promoting hepatitis C testing



“Get Hepatitis C Cured” (English and Spanish): Posters promoting hepatitis C treatment

Public Education Materials



“Reduce Your Risk of Overdose, Hep C & HIV” (English, Spanish and Russian): Palm card with tips for reducing the harm of injection drug use



“Take Charge, Take Care” (English, Spanish and Russian): Booklet with basic information on safer drug use, including on preventing hepatitis C infection



“Buprenorphine” (English, Spanish, Russian, Traditional Chinese and Arabic): Pamphlet with basic information on buprenorphine safety, side effects and insurance coverage



“Your Guide to Syringe Service Programs” (English, Spanish and Russian): Palm card listing SSPs in NYC



“Fentanyl” (English, Spanish, Russian, Simplified Chinese and Traditional Chinese): Postcard with basic information on preventing opioid overdose

Provider Education Materials



“Preventing, Identifying and Managing Hepatitis B” (English): Clinical recommendations for hepatitis B prevention, diagnosis and management



“Diagnosing and Managing Hepatitis C” (English): Clinical recommendations for hepatitis C prevention, diagnosis and management



“Dear Colleague Letter: Hepatitis B and C Screening, Care, and Treatment Recommendations, 2020” (English)



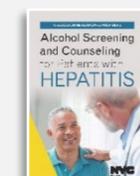
“Dear Colleague Letter: Hepatitis B Vaccination Recommendations, 2022” (English)



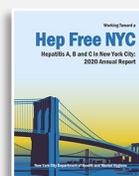
“Dear Colleague Letter: Universal Hepatitis C Screening is Recommended for Pregnant People, 2021” (English)



“Treat Addiction. Save Lives.” (English): Pamphlet with provider information on buprenorphine prescription and opportunities for training and preceptorship



“Alcohol Screening and Counseling for Patients with Hepatitis” (English): Alcohol counseling guidance for patients with hepatitis C; accompanies “Alcohol and Hepatitis” palm card



“Hepatitis A, B and C in New York City: 2020 Annual Report” (English): Annual report with 2020 viral hepatitis surveillance data and programmatic activities

» For more information or to order materials, contact hep@health.nyc.gov.

Health Department Training

The Health Department trains non-clinical service providers on effective outreach, prevention, testing, linkage to care and support through treatment. In 2021, the Health Department delivered 11 trainings, including Introduction to Viral Hepatitis and Hepatitis C Patient Navigation.

» See the Health Department training catalog at nychealthtraining.org/training.

	Number of trainings	Number of participants	Number of organizations represented
Introduction to Viral Hepatitis	6	124	58
Hepatitis C Patient Navigation	5	98	42

Clinical Practice Facilitation

Through the Clinical Practice Facilitation program, the Health Department supports acute care hospitals, community health centers, and other clinical settings where people at risk for hepatitis B or C seek care, to increase their clinical capacity to screen for and treat hepatitis B and C. Using surveillance data, Health Department staff identify health care facilities in high-prevalence areas or with large populations of patients with hepatitis B and/or C to participate in clinical practice improvement projects. Participating facilities engage in a tailored array of capacity building interventions, including:

- Querying electronic health records (EHR) and using surveillance data to assess screening and treatment rates
- Training clinical and non-clinical providers
- Implementing quality improvement projects
- Enrolling in peer-to-peer provider mentoring
- Participating in the Hep Free NYC community coalitions

Through these projects, participating facilities align workflows, data systems, resources, and staff training to increase hepatitis B and C screening and treatment rates. The Health Department provides support to improve access to care and clinical outcomes in people affected by hepatitis B and C through sustained systemic changes at participating facilities.

Hepatitis C Treatment via Telemedicine at Syringe Services Programs

In 2021, the Health Department completed a seven-month clinical practice facilitation project with two SSPs in Manhattan. Both sites offer low threshold hepatitis C treatment to people who use drugs. Patients at both sites were offered treatment on-site and/or via telemedicine. Many patients were experiencing homelessness and were hard to locate during the first few months of the COVID-19 pandemic. Sites offered cell phones and transportation support for medical labs to keep patients engaged. One site offered up to \$100 in gift cards. Over the course of the project, both sites diagnosed a total of 64 patients with chronic hepatitis C. Of the patients diagnosed, 41 (64%) were linked to care with a medical appointment and 23 (36%) started treatment by the end of the seven-month project.

Improving Hepatitis C Treatment Initiation at Substance Use Treatment Programs

In 2021, the Health Department worked with a drug rehabilitation center with an inpatient site in Brooklyn and an outpatient site in Manhattan. The goal of this 12-month project was to link people diagnosed with chronic hepatitis C to a provider, especially one with experience providing primary care to people who use drugs. The center hired and trained a patient navigator who used a surveillance-based patient list to identify patients with a positive hepatitis C RNA test admitted to the

center in the previous 12 months. The center developed a patient referral workflow to facilitate referrals to local providers and partnered with a primary care program to provide monthly hepatitis C testing at its outpatient site and hepatitis C treatment via telemedicine. During the project, 1,845 people were tested at the center’s inpatient or outpatient sites. Of those tested, 134 (7%) had a positive hepatitis C RNA test. Of those who tested positive, 41 (31%) were referred to treatment, 14 (10%) were linked to care, and 6 (4%) started treatment by the end of the project.

The Health Department also completed a 12-month project with a multi-site outpatient substance use treatment program in NYC to expand hepatitis C treatment options on-site and via telemedicine. The program recruited non-clinical and clinical staff for trainings led by the Health Department and Empire Liver Foundation, created a hepatitis C testing-to-treatment patient workflow, and reviewed surveillance and EHR reports. Of the 60 patients identified with a positive hepatitis C RNA test, 38 (63%) were linked to care, 34 (56%) started treatment, and 17 (28%) completed treatment by the end of the project. The program noted that when offered the option, patients overwhelmingly opted for treatment on-site. The patient navigator played a central role in engaging and educating patients. The program is continuously training staff on hepatitis C among people who use drugs and monitoring patients at all sites who may need treatment.

Program Evaluation: Building Clinical Capacity Since 2017

In 2021, the Health Department partnered with an evaluation specialist to develop a theory of change and an evaluation framework for its Clinical Practice Facilitation program.

29

Number of clinical practice facilitation projects from 2017 to 2021

19

Number of health care facilities participating in clinical practice facilitation projects from 2017 to 2021

Projects focused on practice improvement in hepatitis C screening and treatment. During these projects, health care facilities committed to making systemic changes in their hepatitis care practices examined surveillance and EHR data, created workflows and protocols, devoted staff time to trainings and shared best practices in community events. Most participating facilities implemented improved screening and care coordination protocols, initiated audit and feedback reports, improved their use of data for service advancements, and reported high satisfaction level post-project completion.

NYC Viral Hepatitis Elimination Plan: 2021 Update

Since the release of the NYC Viral Hepatitis Elimination Plan in 2021, the Health Department and community partners have made progress on several priority strategies.

» Learn more about the NYC Viral Hepatitis Elimination Plan on page 5.

Hepatitis B Elimination Strategies

Strategy	Status update
To increase accessibility of hepatitis B awareness, education and prevention:	
1.4 Expand no- or low-cost, adult hepatitis B vaccination for people who are uninsured or underinsured. Focus vaccination efforts on adults with comorbidities such as HIV and hepatitis C that can make it more difficult to clear acute hepatitis B infection. Offer testing co-located with vaccination, across a wide variety of health care facilities.	Hep Free NYC members joined the Hep B Foundation, Hep B United, and other stakeholders to advocate for expansion of the CDC Adult Immunization Program to increase support for adult hepatitis B vaccination programs. Continued advocacy is needed.
To increase acceptability of hepatitis B testing and linkage to care:	
2.8 Offer hepatitis B testing at community venues, especially those located in or serving communities with high hepatitis B prevalence or vulnerability, and alongside other types of testing to normalize hepatitis B screening as a part of routine health care.	The Health Department provided clinical training on the importance of hepatitis B testing (for more details, see page 44) and will collaborate with community partners to increase screening at community venues and normalize hepatitis B screening as a part of routine health care.
To increase accessibility of hepatitis B care and treatment:	
3.4 Advocate for Medicaid, Medicaid Managed Care Plans, and private insurance plans to require insurers to fully cover hepatitis B screening, treatment, lab work, routine ultrasound/liver cancer screening, and other related costs, without cost sharing.	The Health Department has and will continue to meet with the New York State Department of Health (NYSDOH) to identify mechanisms to expand coverage for the full range of hepatitis B care and continued advocacy by community members is needed.
3.5 Advocate to expand the NYSDOH AIDS Drug Assistance Program (ADAP) to include all hepatitis B treatment options for people with HIV and co-infected with hepatitis and to raise the income level for eligibility and simplify the application process.	The Health Department will increase awareness of the existing NYSDOH ADAP program that covers screening, serology, and two treatment options for hepatitis B among people living with HIV.
To increase availability of hepatitis B surveillance data:	
4.2 Amend the NYC Health Code to require laboratories to report the tests commonly used to monitor hepatitis B (for example, negative HBeAg).	The Health Department drafted language for NYC Health Code amendments to present to the Board of Health in FY23.

Hepatitis C Elimination Strategies

Strategy	Status update
To increase acceptability of hepatitis C awareness, education, and prevention:	
5.7 Develop additional trainings and materials for clinical providers that communicate the importance of delivering trauma-informed, stigma-free and harm reduction-oriented hepatitis C care. Ensure that clinical provider trainings include education about reinfection and cirrhosis follow-up care, and address the need for urgency in initiation of hepatitis C care.	The Health Department partnered with Empire Liver Foundation to deliver clinical education on harm reduction, re-infection, cirrhosis and liver cancer follow-up care, and the importance of initiating hepatitis C treatment for all including active drug users and people with HIV.
To increase accessibility of hepatitis C testing and linkage to care:	
6.5 Support increased funding for patient navigation programs (such as Check Hep C) for people living with hepatitis C.	The Hep Free NYC Advocacy Committee developed educational materials and organized a training session to support the Viral Hepatitis Initiative and to advocate for increased funding for patient navigation programs.
To increase accessibility of hepatitis C treatment:	
7.7 Advocate for Medicaid, Medicaid Managed Care Plans, and private insurance plans to make hepatitis C treatment and ongoing monitoring via telemedicine available and reimbursable beyond the COVID-19 public health emergency.	The FY23 NYS budget included telehealth payment parity that will require insurers to pay physicians the same rate for the same service whether the service is delivered in-person or via telehealth.
To increase acceptability of hepatitis C treatment:	
7.13 Expand efforts to aid facilities serving populations with a high prevalence of hepatitis C (such as federally qualified health centers (FQHCs), SSPs, opioid treatment programs (OTPs), alternatives to incarceration programs, and inpatient drug treatment programs) to have the capacity to treat on-site. Specifically, support OTPs in addressing the staffing and administrative barriers to providing and billing for hepatitis C treatment. This may include supporting the development of 340B applications and facilitating collaborations with community health centers.	The Health Department supported two organizations' applications for 340B certification to increase access to affordable hepatitis C medications. However, as of April 1, 2023, the NYS Medicaid pharmacy benefit will be moved under Medicaid Fee-For-Service Pharmacy Program which will effectively remove the ability for community health centers to purchase prescription drugs at a reduced price. Advocacy related to this issue will be ongoing.
To increase availability of hepatitis C surveillance data:	
8.2 Amend the NYC Health Code to require laboratories to report negative hepatitis C antibody results to enable the NYC Health Department to develop and share citywide and facility-specific screening rates and identify acute infections.	The Health Department drafted language for NYC Health Code amendments to present to the Board of Health in FY23.

Publications and Presentations

Publications

- Foster MA, Hofmeister MG, Albertson JP, et al. Hepatitis A virus infections among men who have sex with men - eight U.S. states, 2017-2018. *MMWR Morb Mortal Wkly Rep.* 2021;70(24):875-878.
- Kela-Murphy N, Moore MS, Verma CM, et al. The Hepatitis C Clinical Exchange Network: A local health department partnership with acute care hospitals to promote screening and treatment of hepatitis C virus infection. *J Public Health Manag Pract.* 2022;28(2), E413-E420.
- Moore MS, Bocour A. Association between time to first RNA-negative test result among people with hepatitis C virus infection and homelessness or testing at a correctional or substance use treatment facility, New York City. *Public Health Rep.* 2021 Oct 25:333549211049263.
- Schwartz J, Bocour A, Tang L, et al. Telephone patient navigation increases follow-up hepatitis B care in the postpartum period for immigrants living in New York City. *J Immigr Minor Health.* 2021; 23(6):1179–1186.
- Woodworth KR, Reynolds MR, Burkel V, et al. A preparedness model for mother-baby linked longitudinal surveillance for emerging threats. *Matern Child Health J.* 2021;25(2):198-206.

Posters and Presentations

- Ahmed S, Khan A, Khatun U, et al. Laying the groundwork for a Hep Free NYC South Asian Hepatitis Initiative to improve awareness and access to care. Presented at 2021 Hep B United/TB Elimination Alliance Summit. Nov 2021.
- Chu A, Mcleod A, Shaikh D, et al. Lessons of implementing integrated hepatitis C treatment services in a community-based opioid treatment program in New York City. Presented at APHA 2021 Annual Meeting and Expo. Oct 2021.
- Guerra K, Bocour A. Identifying hepatitis C reinfection among previously cured individuals with recurrent hepatitis C viremia in New York City. Presented at 2021 Council of State and Territorial Epidemiologists (CSTE) Annual Conference. Jun 2021.
- Guerra K, Bocour A. Using surveillance data to prospectively detect spatiotemporal clusters of newly reported chronic hepatitis C virus infections in New York City, July 2017–January 2020. Presented at 2021 Council of State and Territorial Epidemiologists (CSTE). Jun 2021.
- Tang L, Bocour A, Mikati T, et al. Improving hepatitis B and C care by increasing NYC Health Department screening and patient navigation services collaboration. Presented at 2021 Hep B United/TB Elimination Alliance Summit. Nov 2021.

References and Resources

Local and national hepatitis B and C epidemiological data:

- EpiQuery: Provides data on the health of New Yorkers from a variety of sources, including surveys, surveillance data and vital records (births and deaths): a816-health.nyc.gov/hdi/epiquery.
- New York City Department of Health and Mental Hygiene Hepatitis A, B and C Reports: www1.nyc.gov/site/doh/data/data-publications/hepatitis-abc-surveillance-data.page.
- Moore MS, Bocour A, Winters A. Surveillance-based estimate of chronic hepatitis B prevalence, New York City, 2016. *Public Health Reports*. 2019; 134(6):695-702.
- Bocour A, Greene SK, Laraque F, Winters A. Estimating the prevalence of chronic hepatitis C virus infection in New York City, 2015. *Epidemiol Infect*. 2018;146(12):1537-1542.

Viral hepatitis elimination planning:

- World Health Organization. Combating hepatitis B and C to reach elimination by 2030. Geneva, 2016. apps.who.int/iris/bitstream/handle/10665/206453/WHO_HIV_2016.04_eng.pdf.
- National Academies of Sciences, Engineering and Medicine, “A National Strategy for the Elimination of Hepatitis B and C: Phase Two Report”: nap.edu/24731.
- New York State Health Department, “Viral Hepatitis Strategic Plan 2016-2020”: health.ny.gov/publications/1806.pdf.
- New York State Health Department, “New York State Hepatitis C Elimination Plan”: health.ny.gov/diseases/communicable/hepatitis/hepatitis_c/docs/hepatitis_c_elimination_plan.pdf.

Clinical guidance on hepatitis screening, care and treatment:

- New York City Department of Health and Mental Hygiene, 2018. “Diagnosing and Managing Hepatitis C”: www1.nyc.gov/assets/doh/downloads/pdf/chi/chi-37-2.pdf.
- New York City Department of Health and Mental Hygiene, 2018. “Diagnosing and Managing Hepatitis B”: www1.nyc.gov/assets/doh/downloads/pdf/chi/chi-37-4.pdf.
- American Association for the Study of Liver Diseases Practice Guidelines: aasld.org/practice-guidelines.
- Schillie S, Wester C, Osborne M, Wesolowski L, Ryerson AB. CDC recommendations for hepatitis C screening among adults—United States, 2020. *MMWR Recommendations and Reports*. 2020 Apr 3;69(2):1.
- Dieterich DT, Ahn J, Bacon B, et al. A simplified algorithm for the management of hepatitis C infection. *Gastroenterology & Hepatology*. 2019 May;15(5 Suppl 3):1.
- Weng MK, Doshani M, Khan MA, et al. Universal hepatitis B vaccination in adults aged 19–59 years: Updated recommendations of the Advisory Committee on Immunization Practices—United States, 2022. *MMWR Morb Mortal Wkly Rep*. 2022;71:477–483.

For interpreting Health Department surveillance data:

- CSTE case definitions: ndc.services.cdc.gov.
- NTAs: www1.nyc.gov/site/planning/data-maps/open-data/dwn-nynta.page.

Appendices

Appendix 1: Surveillance technical data notes

When interpreting NYC hepatitis B and C surveillance data, please note:

- This report includes surveillance data on people who meet the CSTE’s current case definition for chronic hepatitis C confirmed or probable cases, which was implemented in 2016. Therefore, cases that are antibody positive with only negative RNA results are excluded from most analyses, unless otherwise specified. For more information, visit ndc.services.cdc.gov.
- Laboratories are required to report positive hepatitis B and C tests to the Health Department, as well as negative results for hepatitis C RNA tests and hepatitis B DNA tests. For more information about hepatitis labs reportable to the Health Department, visit wadsworth.org/sites/default/files/WebDoc/CDRG%20NYState%202020_101920%202.pdf.
- The Health Department often receives more than one hepatitis B or C laboratory report per person and uses automatic deduplication methods to identify multiple reports for the same person based on name, date of birth and other information. Only the first report is counted in the counts of newly reported cases for the year in which the person was first reported.
- The Health Department does not investigate all chronic hepatitis B and C cases, so only minimal information — patient name, address, date of birth and sex — from laboratory reports is available. Gender identity (how one lives or sees themselves — for example: woman, transgender woman, man, transgender man, nonbinary person, gender-nonconforming) is not consistently reported by all laboratories and is therefore underreported.
- The Health Department investigates all positive hepatitis B core IgM antibody reports and other positive hepatitis B reports that include significantly elevated liver function tests as potential cases of acute hepatitis B.
- Veterans Affairs (VA) health care facilities began reporting cases through routine surveillance at the end of 2016; therefore, people with viral hepatitis who receive health care at only VA facilities are not fully represented in this report.
- Differences in data between this report and previous reports may be related to factors such as delays in disease reporting, correction of errors and refinements in data processing (for example, the removal of duplicate reports).
- Many people with acute hepatitis B or C have no or mild symptoms. As a result, these infections might not be diagnosed at the time of infection. Therefore, surveillance data underestimate the true incidence of acute hepatitis B and C in NYC.
- Neighborhood poverty based on ZIP code was defined as the percentage of residents with incomes below 100% of the Federal Poverty Level (FPL), per American Community Survey data from 2016 to 2020. Neighborhood poverty categories are defined as follows:
 - Low (less than 10% below FPL)
 - Medium (10% to less than 20% below FPL)
 - High (20% to less than 30% below FPL)
 - Very high (greater than or equal to 30% below FPL)
 These categories are not applied to people whose first or most recently reported address is a NYC correctional facility.
- All people reported from a NYC correctional facility have been aggregated to Rikers Island in maps.
- Many patients with chronic hepatitis B or C are asymptomatic; as a result, many cases are not diagnosed or reported. Therefore, surveillance data underestimate the true level of chronic hepatitis B and C in NYC.
- Ten-year trends are shown for hepatitis A, chronic hepatitis B and C. Years prior to 2012 can be found on EpiQuery: a816-health.nyc.gov/hdi/epiquery.

Rates

- Rates presented include people newly reported to the Health Department. They are not prevalence rates or incidence rates.
- Age adjustment was performed using the following age categories: 0-24, 25-44, 45-64, 65-84 and ≥ 85 years, and weighted to the U.S. 2000 standard population.
- Rates stratified by age group are presented as age-specific rates (in other words, no age adjusting within a presented age stratum was performed).
- Denominators used throughout this report are intercensal estimates for 2020, except denominators for the Rikers Island population, which were provided by NYC Correctional Health Services.
- The jail at Rikers Island is part of the Bronx, although it has a Queens ZIP code (11370; note that ZIP code 11370 also includes parts of mainland Queens). Therefore, for numbers and rates presented by borough, Rikers Island cases are included with other Bronx cases.
- The Health Department is presenting maps using NYC NTAs, which are aggregations of census tracts that are subsets of NYC's 55 Public Use Microdata Areas. For details on NTAs, please see www1.nyc.gov/site/planning/data-maps/open-data/dwn-nynta.page.

Prevalence Estimates

- Hepatitis B and C prevalence estimates were updated for 2017 and used the methods described in Moore MS, et al. Surveillance-based estimate of chronic hepatitis B prevalence, New York City, 2016, and Bocour A, et al. Estimating the prevalence of chronic hepatitis C virus infection in New York City, 2015. Estimates will be updated annually contingent upon data availability.

Death Data

- Deaths occurring outside NYC or those of non-NYC residents are not included.
- Both underlying and contributing causes are included. Underlying cause of death is the disease or condition that set off the chain of events leading to death. Contributing causes of death are diseases, morbid conditions or injuries that either resulted in or contributed to death.
- Causes of death are coded using ICD-10 classifications. The codes used for hepatitis B are B16, B170, B180 and B181; and the codes used for hepatitis C are B171 and B182. Both acute and chronic hepatitis B and C are included as causes of death.
- Causes of death are not mutually exclusive.
- The population used in the rate constructions are based on the Census 2020 population estimates, 2021 vintage. However, the 2020 Census counts are substantially higher than the estimates, rendering rates potentially overestimated.

Appendix 2: Hepatitis A, B and C reporting in NYC

Laboratories are required to electronically report chronic hepatitis B and C tests to the Health Department. Providers should report all hepatitis A (IgM positive), and acute B and acute C cases (based on clinical criteria, such as jaundice) to the Health Department. The Health Department uses demographic and risk information to determine the characteristics of those infected with acute hepatitis B and C and to prevent ongoing transmission.

Health care providers can report hepatitis A, B and C cases:

- Online: Visit nyc.gov/nycmed.
- By mail: Download the Universal Reporting Form at www1.nyc.gov/assets/doh/downloads/pdf/hcp/urf-0803.pdf.
- By phone: Call the Health Department's Provider Access Line (PAL) at 866-NYC-DOH1 (866-692-3641).

Appendix 3: Characteristics of people reported with confirmed hepatitis A infection in NYC, 2021

Characteristics	Number	Percentage of each group	Rate per 100,000 people
Overall	89	100.0	1.1
Sex			
Female	19	21.4	0.4
Male	70	78.7	1.8
Age at time of report			
0–9	1	1.1	0.1
10–19	0	0.0	0.0
20–29	16	18.0	1.3
30–39	30	33.7	2.3
40–49	22	24.7	2.2
50–59	11	12.4	1.1
≥ 60	9	10.1	0.5
Borough of residence			
Bronx	12	13.5	0.9
Brooklyn	28	31.5	1.1
Manhattan	24	27.0	1.5
Queens	19	21.4	0.9
Staten Island	6	6.7	1.3
Neighborhood poverty level by ZIP code			
Low (< 10% below poverty)	10	11.2	0.6
Medium (10 to < 20%)	35	39.3	1.0
High (20 to < 30%)	30	33.7	1.7
Very high (≥ 30%)	14	15.7	1.3
Race and ethnicity			
Asian, non-Latino/a	6	6.7	0.5
Black, non-Latino/a	17	19.1	0.9
Latino/a	32	36.0	1.3
White, non-Latino/a	27	30.3	1.0
Other	4	4.5	2.2
Unknown	3	3.4	N/A
Risk factors (not mutually exclusive)			
Drug use	47	52.8	N/A
Homelessness	27	30.3	N/A
MSM	18	20.2	N/A
International travel	13	14.6	N/A
Contact with a person with hepatitis A	4	4.5	N/A
Incarceration within 6 months before diagnosis	3	3.4	N/A
Unknown	23	25.8	N/A

Appendix 4: Characteristics of people reported with acute hepatitis B in NYC, 2021

Characteristics	Number	Percentage of each group	Rate per 100,000 people
Overall	44	100.0	0.5
Sex			
Female	18	40.9	0.4
Male	26	59.1	0.7
Age at time of first report			
0–19	0	0.0	0.0
20–29	3	6.8	0.2
30–39	8	18.2	0.6
40–49	14	31.8	1.4
50–59	6	13.6	0.6
≥ 60	13	29.5	0.7
Borough of residence			
Bronx	10	22.7	0.7
Brooklyn	11	25.0	0.4
Manhattan	9	20.5	0.6
Queens	10	22.7	0.4
Staten Island	4	9.1	0.8
Neighborhood poverty level by ZIP code			
Low (< 10% below poverty)	9	20.5	0.5
Medium (10 to < 20%)	14	31.8	0.4
High (20 to < 30%)	10	22.7	0.6
Very high (≥ 30%)	11	25.0	1.0
Race and ethnicity			
Asian, non-Latino/a	4	9.1	0.3
Black, non-Latino/a	12	27.3	0.7
Latino/a	6	13.6	0.3
White, non-Latino/a	11	25.0	0.4
Multi-race	1	2.3	0.7
Unknown	10	22.7	N/A
Risk factors (mutually exclusive¹)			
Injection drug use (IDU)	3	6.8	N/A
Household contact with a person with hepatitis B	0	0.0	N/A
MSM	3	6.8	N/A
Heterosexual contact	6	13.6	N/A
Health care-related exposure	2	4.6	N/A
Other	1	2.3	N/A
Unknown	29	65.9	N/A

¹ “Mutually exclusive” means that each patient is represented by the risk factor that poses the highest risk of hepatitis B infection. For example, a person who injected drugs and had a health care-related exposure is represented only once, in the Injection drug use row. The table lists risk factors from highest to lowest risk.

Appendix 5: Characteristics of people reported with chronic hepatitis B in NYC, 2021

Characteristics	People newly reported in 2021			All people reported 2018–2021, regardless of year of first report	
	Number	Percentage of each group	Rate per 100,000 people	Number	Percentage of each group
Overall	5,346	100.0	64.8	101,066	100.0
Sex¹					
Female	2,312	43.2	53.6	41,778	44.7
Male	3,031	56.7	77.0	51,527	55.2
Unknown	2	0.1	N/A	98	0.1
Age at time of first report					
0–19	115	2.2	6.2	4,380	4.7
20–29	643	12.0	52.3	20,131	21.6
30–39	1,440	26.9	108.1	25,467	27.3
40–49	1,186	22.2	116.0	20,341	21.8
50–59	950	17.8	93.3	13,664	14.6
60–69	624	11.7	70.6	6,826	7.3
≥ 70	388	7.3	42.9	2,595	2.8
Borough of residence					
Bronx ²	766	14.3	54.7	9,813	10.5
Brooklyn	1,789	33.5	70.5	34,059	36.5
Manhattan	699	13.1	43.4	17,573	18.8
Queens	1,631	30.5	73.3	28,408	30.4
Staten Island	255	4.8	53.6	2,127	2.3
Unknown	206	3.9	N/A	1,424	1.5
Neighborhood poverty level by ZIP code³					
Low (< 10% below poverty)	733	13.7	40.4	12,629	13.5
Medium (10 to < 20%)	2,089	39.2	57.5	36,599	39.2
High (20 to < 30%)	1,599	30.0	92.1	30,844	33.1
Very high (≥ 30%)	704	13.2	65.8	11,404	12.2
Unknown	209	3.9	N/A	1,805	1.9

¹ People reported as transgender are excluded, as gender identity is not consistently reported by all laboratories and is therefore underreported.

² The Bronx includes 10 people reported in Rikers Island facilities and 118 people in 2018–2021.

³ Neighborhood poverty level data excludes people incarcerated at the time of first report. In 2021, there were 12 newly reported people incarcerated at the time of first report. In 2018–2021, there were 190 people who were incarcerated at the time of their most recent report.

Appendix 6: Number and rate of people newly reported with chronic hepatitis B by NTA in NYC, 2021¹

NTA name (code)	Number of cases	Rate per 100,000 people
Allerton-Pelham Gardens (BX31)	15	48.4
Annadale-Huguenot-Prince's Bay-Eltingville (SI01)	8	27.5
Arden Heights (SI48)	12	45.6
Astoria (QN70)	37	53.0
Auburndale (QN48)	35	176.0
Baisley Park (QN76)	12	33.4
Bath Beach (BK27)	28	83.4
Battery Park City-Lower Manhattan (MN25)	18	40.5
Bay Ridge (BK31)	35	44.8
Bayside-Bayside Hills (QN46)	28	66.9
Bedford (BK75)	15	19.6
Bedford Park-Fordham North (BX05)	28	49.5
Bellerose (QN43)	15	56.1
Belmont (BX06)	11	40.3
Bensonhurst East (BK29)	83	126.1
Bensonhurst West (BK28)	156	173.4
Borough Park (BK88)	98	99.7
Breezy Point-Belle Harbor-Rockaway Park-Broad Channel (QN10)	8	29.9
Briarwood-Jamaica Hills (QN35)	20	46.7
Brighton Beach (BK19)	30	86.9
Bronxdale (BX07)	13	33.8
Brooklyn Heights-Cobble Hill (BK09)	4	16.7
Brownsville (BK81)	25	52.4
Bushwick North (BK77)	13	24.7
Bushwick South (BK78)	27	35.8

NTA name (code)	Number of cases	Rate per 100,000 people
Cambria Heights (QN33)	4	19.0
Canarsie (BK50)	52	62.1
Carroll Gardens-Columbia Street-Red Hook (BK33)	6	13.9
Central Harlem North-Polo Grounds (MN03)	60	73.2
Central Harlem South (MN11)	34	71.6
Charleston-Richmond Valley-Tottenville (SI11)	5	22.1
Chinatown (MN27)	86	191.4
Claremont-Bathgate (BX01)	24	71.4
Clinton (MN15)	30	53.5
Clinton Hill (BK69)	13	34.1
Co-op City (BX13)	22	46.4
College Point (QN23)	27	113.4
Corona (QN25)	44	80.4
Crotona Park East (BX75)	17	72.8
Crown Heights North (BK61)	55	51.9
Crown Heights South (BK63)	19	49.8
Cypress Hills-City Line (BK83)	18	39.0
Douglas Manor-Douglaston-Little Neck (QN45)	18	36.1
DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill (BK38)	15	60.3
Dyker Heights (BK30)	88	201.3
East Concourse-Concourse Village (BX14)	54	85.5
East Elmhurst (QN27)	5	27.9
East Flatbush-Farragut (BK91)	29	57.7

¹ 290 people could not be assigned to an NTA based on their address at first report.

Appendix 6: Number and rate of people newly reported with chronic hepatitis B by NTA in NYC, 2021

NTA name (code)	Number of cases	Rate per 100,000 people
East Flushing (QN52)	71	283.6
East Harlem North (MN34)	20	34.0
East Harlem South (MN33)	25	44.1
East New York (BK82)	44	46.9
East New York (Pennsylvania Ave) (BK85)	20	75.5
East Tremont (BX17)	38	89.0
East Village (MN22)	13	32.2
East Williamsburg (BK90)	10	28.2
Eastchester-Edenwald-Baychester (BX03)	11	29.5
Elmhurst (QN29)	110	136.3
Elmhurst-Maspeth (QN50)	36	153.3
Erasmus (BK95)	15	54.8
Far Rockaway-Bayswater (QN15)	15	27.0
Flatbush (BK42)	62	62.0
Flatlands (BK58)	24	35.3
Flushing (QN22)	281	400.1
Fordham South (BX40)	21	77.7
Forest Hills (QN17)	35	40.8
Fort Greene (BK68)	9	28.0
Fresh Meadows-Utopia (QN41)	18	94.9
Ft. Totten-Bay Terrace-Clearview (QN47)	12	54.9
Georgetown-Marine Park-Bergen Beach-Mill Basin (BK45)	10	21.9
Glen Oaks-Floral Park-New Hyde Park (QN44)	7	28.8
Glendale (QN19)	7	20.9
Gramercy (MN21)	3	11.8
Grasmere-Arrochar-Ft. Wadsworth (SI14)	11	65.8
Gravesend (BK26)	24	80.1
Great Kills (SI54)	14	34.2

NTA name (code)	Number of cases	Rate per 100,000 people
Greenpoint (BK76)	5	13.2
Grymes Hill-Clifton-Fox Hills (SI08)	23	105.0
Hamilton Heights (MN04)	14	28.0
Hammels-Arverne-Edgemere (QN12)	16	39.5
Highbridge (BX26)	30	80.4
Hollis (QN07)	10	49.5
Homecrest (BK25)	18	41.0
Hudson Yards-Chelsea-Flatiron-Union Square (MN13)	32	39.4
Hunters Point-Sunnyside-West Maspeth (QN31)	38	50.8
Hunts Point (BX27)	10	39.2
Jackson Heights (QN28)	42	43.8
Jamaica (QN61)	29	54.1
Jamaica Estates-Holliswood (QN06)	10	36.8
Kensington-Ocean Parkway (BK41)	18	52.4
Kew Gardens (QN60)	6	27.7
Kew Gardens Hills (QN37)	23	63.6
Kingsbridge Heights (BX30)	13	39.1
Laurelton (QN66)	5	19.5
Lenox Hill-Roosevelt Island (MN31)	33	40.5
Lincoln Square (MN14)	18	27.8
Lindenwood-Howard Beach (QN57)	6	22.0
Longwood (BX33)	13	47.7
Lower East Side (MN28)	52	74.2
Madison (BK44)	21	51.4
Manhattanville (MN06)	9	39.9
Marble Hill-Inwood (MN01)	15	29.6

Appendix 6: Number and rate of people newly reported with chronic hepatitis B by NTA in NYC, 2021

NTA name (code)	Number of cases	Rate per 100,000 people
Mariner’s Harbor-Arlington-Port Ivory-Graniteville (SI12)	23	69.8
Maspeth (QN30)	24	76.2
Melrose South-Mott Haven North (BX34)	18	43.4
Middle Village (QN21)	20	50.5
Midtown-Midtown South (MN17)	25	78.4
Midwood (BK43)	32	61.0
Morningside Heights (MN09)	18	34.7
Morrisania-Melrose (BX35)	26	65.7
Mott Haven-Port Morris (BX39)	18	35.0
Mount Hope (BX41)	56	106.8
Murray Hill (QN51)	83	165.3
Murray Hill-Kips Bay (MN20)	17	35.8
New Brighton-Silver Lake (SI35)	15	86.9
New Dorp-Midland Beach (SI45)	18	85.5
New Springville-Bloomfield-Travis (SI05)	21	48.1
North Corona (QN26)	22	43.5
North Riverdale-Fieldston-Riverdale (BX22)	4	14.5
North Side-South Side (BK73)	15	24.3
Norwood (BX43)	33	84.5
Oakland Gardens (QN42)	25	85.6
Oakwood-Oakwood Beach (SI25)	10	48.8
Ocean Hill (BK79)	16	46.4
Ocean Parkway South (BK46)	5	25.2
Old Astoria (QN71)	7	29.1

NTA name (code)	Number of cases	Rate per 100,000 people
Old Town-Dongan Hills-South Beach (SI36)	23	86.5
Ozone Park (QN56)	15	66.2
Park Slope-Gowanus (BK37)	19	26.0
Parkchester (BX46)	24	78.5
Pelham Bay-Country Club-City Island (BX10)	10	37.7
Pelham Parkway (BX49)	13	46.2
Pomonok-Flushing Heights-Hillcrest (QN38)	24	69.3
Port Richmond (SI28)	6	30.8
Prospect Heights (BK64)	6	27.3
Prospect Lefferts Gardens-Wingate (BK60)	30	44.9
Queens Village (QN34)	17	32.0
Queensboro Hill (QN62)	55	275.2
Queensbridge-Ravenswood-Long Island City (QN68)	17	77.0
Rego Park (QN18)	11	39.4
Richmond Hill (QN54)	34	56.4
Ridgewood (QN20)	21	29.5
Rikers Island (BX98)	12	82.7
Rosedale (QN05)	10	39.5
Rossville-Woodrow (SI32)	4	19.1
Rugby-Renssen Village (BK96)	27	50.8
Schuylerville-Throgs Neck-Edgewater Park (BX52)	12	27.3
Seagate-Coney Island (BK21)	22	72.1

Appendix 6: Number and rate of people newly reported with chronic hepatitis B by NTA in NYC, 2021

NTA name (code)	Number of cases	Rate per 100,000 people
Sheepshead Bay-Gerritsen Beach-Manhattan Beach (BK17)	43	66.6
SoHo-TriBeCa-Civic Center-Little Italy (MN24)	21	48.5
Soundview-Bruckner (BX55)	15	41.6
Soundview-Castle Hill-Clason Point-Harding Park (BX09)	14	25.8
South Jamaica (QN01)	20	47.8
South Ozone Park (QN55)	28	36.0
Springfield Gardens North (QN02)	6	22.4
Springfield Gardens South-Brookville (QN03)	11	51.8
Spuyten Duyvil-Kingsbridge (BX29)	3	9.7
St. Albans (QN08)	16	31.0
Stapleton-Rosebank (SI37)	21	80.8
Starrett City (BK93)	5	39.7
Steinway (QN72)	16	36.0
Stuyvesant Heights (BK35)	19	28.6
Stuyvesant Town-Cooper Village (MN50)	3	12.6
Sunset Park East (BK34)	383	600.7
Sunset Park West (BK32)	47	91.6
Todt Hill-Emerson Hill-Heartland Village-Lighthouse Hill (SI24)	12	36.3
Turtle Bay-East Midtown (MN19)	17	33.8
University Heights-Morris Heights (BX36)	44	79.7

NTA name (code)	Number of cases	Rate per 100,000 people
Upper East Side-Carnegie Hill (MN40)	6	10.6
Upper West Side (MN12)	30	23.0
Van Cortlandt Village (BX28)	22	44.5
Van Nest-Morris Park-Westchester Square (BX37)	21	76.9
Washington Heights North (MN35)	11	15.7
Washington Heights South (MN36)	24	27.1
West Brighton (BK23)	6	32.0
West Concourse (BX63)	22	59.2
West Farms-Bronx River (BX08)	15	43.3
West New Brighton-New Brighton-St. George (SI22)	19	60.1
West Village (MN23)	10	15.7
Westchester-Unionport (BX59)	8	28.3
Westerleigh (SI07)	6	24.3
Whitestone (QN49)	34	109.9
Williamsbridge-Olinville (BX44)	33	50.2
Williamsburg (BK72)	1	3.0
Windsor Terrace (BK40)	2	8.8
Woodhaven (QN53)	35	60.9
Woodlawn-Wakefield (BX62)	13	29.9
Woodside (QN63)	35	86.1
Yorkville (MN32)	22	28.5

Appendix 7: NYC NTAs



Appendix 8: Demographic characteristics of pregnant people living with hepatitis B in NYC who delivered a live infant in 2021

Characteristics	Number	Percentage of each group
Overall	676	100.0
Borough of residence		
Bronx	122	18.1
Brooklyn	253	37.4
Manhattan	64	9.5
Queens	200	29.6
Staten Island	37	5.5
Race and ethnicity		
Asian/Pacific Islander, non-Latino/a	400	59.2
Black, non-Latino/a	164	24.3
Latino/a	24	3.6
White, non-Latino/a	61	9.0
Other	25	3.7
Unknown	2	0.3
Country of birth		
China	301	44.5
Uzbekistan	35	5.2
U.S.	34	5.0
Ghana	28	4.1
Guinea	21	3.1
Nigeria	18	2.7
Bangladesh	17	2.5
Dominican Republic	15	2.2
Liberia	13	1.9
Senegal	13	1.9
Unknown	3	0.4
Other	178	26.3

Appendix 8: Demographic characteristics of pregnant people living with hepatitis B in NYC who delivered a live infant in 2021 (continued)

Characteristics	Number	Percentage of each group
Region of birth ¹		
China	301	44.5
Western Africa	152	22.5
West and Central Asia	39	5.8
U.S.	34	5.0
Caribbean	30	4.4
South Asia	29	4.3
Europe	23	3.4
Mexico, Central and South America	22	3.3
East Asia (excluding China)	19	2.8
Southeast Asia	12	1.8
Middle East	8	1.2
Africa (excluding Western Africa)	4	0.6
Unknown	3	0.4

¹ Includes countries counted as separate regions for comparison with larger regions. Excludes regions that were not reported as a region of birth for any reported person (Australia/Oceania, Canada and Pacific Islands).

Appendix 9: Hepatitis B vaccination, post-exposure prophylaxis (PEP) and testing among infants born in 2020 to pregnant people living with hepatitis B, NYC

Characteristics	Number	Percentage of each group
Overall	766	100.0
PEP ¹ and vaccination status		
PEP	759	99.1
Vaccine series completion ²	743	97.0
PEP and vaccine series completion	737	96.2
Testing status		
Tested	705	92.0
Not tested	61	8.0
Test results ³		
Infected	2	0.3
Immune	694	98.4
Susceptible	3	0.4
Indeterminate	6	0.9

¹ Defined as administration of hepatitis B immune globulin and birth dose of hepatitis B vaccine series within one day of birth

² Defined as receiving three valid doses of hepatitis B vaccine including a dose given at age greater than or equal to 164 days. People counted in this category may or may not have received PEP as defined in footnote 1.

³ Percentage calculated out of those tested (n=705)

Appendix 10: Characteristics of decedents where hepatitis B is listed as the underlying cause or contributing cause of death, NYC, 2020

Characteristics	Number	Percentage of each group	Age-adjusted rate per 100,000 people ¹
Overall	90	100	0.9
Sex			
Female	22	24.4	0.4
Male	68	75.6	1.6
Race and ethnicity			
Asian/Pacific Islander, non-Latino/a	38	42.2	2.6
Black, non-Latino/a	19	21.1	0.9
Latino/a	18	20.0	0.7
White, non-Latino/a	13	14.4	0.4
Other/Unknown	2	2.2	N/A
Age			Age-specific rate per 100,000 population¹
0-24	0	0	0.0
25-44	6	6.7	0.2
45-64	32	35.6	1.6
65-84	44	48.9	3.9
≥ 85	8	8.9	4.4

¹ The population used in the rate constructions are based on the Census 2020 population estimates, 2021 vintage. However, the 2020 Census counts are substantially higher than the estimates rendering rates potentially overestimated.

Appendix 11: Leading causes of deaths among decedents with hepatitis B in 2020, by number

All Decedents

Cause of death	Number
Cancer	349
COVID-19	349
Heart diseases	330
Diabetes	62
Drug-related	57
HIV	42
Influenza and pneumonia	41
Cerebrovascular disease	34
Essential hypertension and renal diseases	32
Viral hepatitis	28
All other causes	289
Total	1,613

Premature Decedents

Cause of death	Number
Cancer	157
COVID-19	112
Heart diseases	99
Drug-related	51
HIV	28
Cerebrovascular disease	13
Viral hepatitis	12
Accidents except drug poisoning	11
Influenza and pneumonia	11
Diabetes	10
Chronic liver disease and cirrhosis	10
All other causes	106
Total	620

Appendix 12: Characteristics of people reported with chronic hepatitis C in NYC, 2021

Characteristics	People newly reported in 2021			All people reported 2018–2021, regardless of year of first report	
	Number	Percentage of each group	Rate per 100,000 people	Number	Percentage of each group
Overall	2,832	100.0	35.7	81,490	100.0
Sex¹					
Female	1,043	36.8	25.1	30,609	37.6
Male	1,781	62.9	47.1	50,784	62.3
Unknown	7	0.3	N/A	93	0.1
Age at time of first report²					
3–19	36	1.3	2.3	801	0.0
20–29	345	12.2	28.1	6,741	8.3
30–39	574	20.3	43.1	14,325	1.0
40–49	464	16.4	45.4	23,360	17.6
50–59	520	18.4	51.1	22,800	28.7
60–69	495	17.5	56.0	9,924	28.0
≥ 70	398	14.1	44.0	3,512	12.2
Unknown	N/A	N/A	N/A	27	4.3
Birth cohort					
1900–1944	161	5.7	33.9	5,690	7.0
1945–1965	975	34.4	56.9	48,803	59.9
1966–1983	898	31.7	47.7	19,753	24.2
1984–2018	798	28.2	20.6	7,244	8.9
Borough of residence					
Bronx ³	655	23.1	48.8	21,447	26.3
Brooklyn	833	29.4	34.3	24,039	29.5
Manhattan	616	21.8	39.4	18,139	22.3
Queens	596	21.0	27.8	14,295	17.5
Staten Island	132	4.7	28.7	3,569	4.4
Unknown	N/A	N/A	N/A	1	0.0
Neighborhood poverty level by ZIP code⁴					
Low (< 10% below poverty)	439	15.8	25.0	10,885	13.6
Medium (10 to < 20%)	1,144	41.0	32.7	29,801	37.1
High (20 to < 30%)	643	23.1	38.6	18,992	23.7
Very high (≥ 30%)	558	20.0	54.8	18,368	22.9
Unknown	4	0.1	N/A	2,195	2.7

¹ People reported as transgender are excluded, as gender identity is not consistently reported by all laboratories. In 2021, there was one person reported with a transgender identity.

² People newly reported in 2021 ages 0 to 2 years are classified using the 2018 CDC perinatal hepatitis C case definition and are reported in Appendix 13.

³ The Bronx includes forty people reported from Rikers Island facilities.

⁴ Neighborhood poverty level data excludes people incarcerated at the time of first report. In 2021, there were forty-four newly reported people incarcerated at the time of first report. In 2018–2021, there were 3,523 people incarcerated at time of their most recent report.

Appendix 13: Number and rate of people newly reported with chronic hepatitis C by NTA in NYC, 2021¹

NTA name (code)	Number of cases	Rate per 100,000 people
Allerton-Pelham Gardens (BX31)	8	26.7
Annadale-Huguenot-Prince's Bay-Eltingville (SI01)	4	14.1
Arden Heights (SI48)	4	15.7
Astoria (QN70)	14	20.6
Auburndale (QN48)	7	36.3
Baisley Park (QN76)	14	40.4
Bath Beach (BK27)	10	31.1
Battery Park City-Lower Manhattan (MN25)	10	23.4
Bay Ridge (BK31)	13	17.3
Bayside-Bayside Hills (QN46)	13	32.0
Bedford (BK75)	16	22.3
Bedford Park-Fordham North (BX05)	24	44.6
Bellerose (QN43)	6	23.2
Belmont (BX06)	10	38.3
Bensonhurst East (BK29)	24	37.9
Bensonhurst West (BK28)	28	32.3
Borough Park (BK88)	17	19.0
Breezy Point-Belle Harbor-Rockaway Park-Broad Channel (QN10)	10	38.5
Briarwood-Jamaica Hills (QN35)	7	17.0
Brighton Beach (BK19)	29	86.7
Bronxdale (BX07)	14	37.9
Brooklyn Heights-Cobble Hill (BK09)	1	4.4
Brownsville (BK81)	40	87.7
Bushwick North (BK77)	15	29.8
Bushwick South (BK78)	34	46.8

NTA name (code)	Number of cases	Rate per 100,000 people
Cambria Heights (QN33)	4	19.5
Canarsie (BK50)	21	26.0
Carroll Gardens-Columbia Street-Red Hook (BK33)	20	48.7
Central Harlem North-Polo Grounds (MN03)	50	63.3
Central Harlem South (MN11)	21	46.0
Charleston-Richmond Valley-Tottenville (SI11)	6	27.4
Chinatown (MN27)	9	20.5
Claremont-Bathgate (BX01)	22	68.9
Clinton (MN15)	33	60.1
Clinton Hill (BK69)	8	21.9
Co-op City (BX13)	8	17.3
College Point (QN23)	5	21.9
Corona (QN25)	13	24.8
Crotona Park East (BX75)	12	53.7
Crown Heights North (BK61)	35	34.4
Crown Heights South (BK63)	8	22.1
Cypress Hills-City Line (BK83)	11	24.9
Douglas Manor-Douglaston-Little Neck (QN45)	18	37.8
DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill (BK38)	5	20.7
Dyker Heights (BK30)	9	21.4
East Concourse-Concourse Village (BX14)	28	46.5
East Elmhurst (QN27)	6	34.8
East Flatbush-Farragut (BK91)	8	16.4

¹ One hundred twenty-one people could not be assigned to an NTA based on their address at first report.

Appendix 13: Number and rate of people newly reported with chronic hepatitis C by NTA in NYC, 2021

NTA name (code)	Number of cases	Rate per 100,000 people
East Flushing (QN52)	5	20.7
East Harlem North (MN34)	22	38.8
East Harlem South (MN33)	28	51.1
East New York (BK82)	32	35.6
East New York (Pennsylvania Ave) (BK85)	13	51.6
East Tremont (BX17)	33	81.1
East Village (MN22)	25	62.8
East Williamsburg (BK90)	8	23.1
Eastchester-Edenwald-Baychester (BX03)	7	19.5
Elmhurst (QN29)	20	25.8
Elmhurst-Maspeth (QN50)	8	35.3
Erasmus (BK95)	11	41.8
Far Rockaway-Bayswater (QN15)	23	43.8
Flatbush (BK42)	30	31.3
Flatlands (BK58)	19	29.0
Flushing (QN22)	26	38.1
Fordham South (BX40)	21	82.1
Forest Hills (QN17)	18	21.9
Fort Greene (BK68)	13	42.1
Fresh Meadows-Utopia (QN41)	1	5.5
Ft. Totten-Bay Terrace-Clearview (QN47)	0	0.0
Georgetown-Marine Park-Bergen Beach-Mill Basin (BK45)	10	22.8
Glen Oaks-Floral Park-New Hyde Park (QN44)	2	8.4
Glendale (QN19)	7	21.7
Gramercy (MN21)	2	8.0
Grasmere-Arrochar-Ft. Wadsworth (SI14)	3	18.5
Gravesend (BK26)	10	34.8
Great Kills (SI54)	10	25.2

NTA name (code)	Number of cases	Rate per 100,000 people
Greenpoint (BK76)	10	27.0
Grymes Hill-Clifton-Fox Hills (SI08)	4	19.0
Hamilton Heights (MN04)	12	24.8
Hammels-Arverne-Edgemere (QN12)	13	33.6
Highbridge (BX26)	21	59.0
Hollis (QN07)	6	30.6
Homecrest (BK25)	15	35.9
Hudson Yards-Chelsea-Flatiron-Union Square (MN13)	34	42.9
Hunters Point-Sunnyside-West Maspeth (QN31)	20	27.8
Hunts Point (BX27)	18	74.1
Jackson Heights (QN28)	16	17.3
Jamaica (QN61)	21	41.1
Jamaica Estates-Holliswood (QN06)	6	22.8
Kensington-Ocean Parkway (BK41)	7	21.4
Kew Gardens (QN60)	7	33.6
Kew Gardens Hills (QN37)	5	14.7
Kingsbridge Heights (BX30)	13	40.9
Laurelton (QN66)	8	31.9
Lenox Hill-Roosevelt Island (MN31)	14	17.8
Lincoln Square (MN14)	13	20.9
Lindenwood-Howard Beach (QN57)	5	18.9
Longwood (BX33)	16	61.7
Lower East Side (MN28)	32	46.9
Madison (BK44)	11	28.0
Manhattanville (MN06)	5	22.9
Marble Hill-Inwood (MN01)	16	32.7

Appendix 13: Number and rate of people newly reported with chronic hepatitis C by NTA in NYC, 2021

NTA name (code)	Number of cases	Rate per 100,000 people
Mariner's Harbor-Arlington-Port Ivory-Graniteville (SI12)	12	38.0
Maspeth (QN30)	7	23.1
Melrose South-Mott Haven North (BX34)	25	63.1
Middle Village (QN21)	3	7.8
Midtown-Midtown South (MN17)	19	60.8
Midwood (BK43)	25	50.0
Morningside Heights (MN09)	13	25.7
Morrisania-Melrose (BX35)	27	71.6
Mott Haven-Port Morris (BX39)	27	55.0
Mount Hope (BX41)	34	68.1
Murray Hill (QN51)	13	26.7
Murray Hill-Kips Bay (MN20)	23	49.5
New Brighton-Silver Lake (SI35)	3	18.0
New Dorp-Midland Beach (SI45)	5	24.6
New Springville-Bloomfield-Travis (SI05)	9	21.4
North Corona (QN26)	10	20.9
North Riverdale-Fieldston-Riverdale (BX22)	9	33.8
North Side-South Side (BK73)	13	21.9
Norwood (BX43)	16	43.0
Oakland Gardens (QN42)	2	7.1
Oakwood-Oakwood Beach (SI25)	3	15.1
Ocean Hill (BK79)	23	69.9
Ocean Parkway South (BK46)	6	32.3
Old Astoria (QN71)	12	51.6

NTA name (code)	Number of cases	Rate per 100,000 people
Old Town-Dongan Hills-South Beach (SI36)	9	35.0
Ozone Park (QN56)	4	18.3
Park Slope-Gowanus (BK37)	16	22.9
Parkchester (BX46)	7	23.8
Pelham Bay-Country Club-City Island (BX10)	6	23.4
Pelham Parkway (BX49)	10	37.0
Pomonok-Flushing Heights-Hillcrest (QN38)	5	14.9
Port Richmond (SI28)	7	37.4
Prospect Heights (BK64)	4	19.1
Prospect Lefferts Gardens-Wingate (BK60)	25	38.9
Queens Village (QN34)	19	37.0
Queensboro Hill (QN62)	5	25.9
Queensbridge-Ravenswood-Long Island City (QN68)	16	75.2
Rego Park (QN18)	11	40.7
Richmond Hill (QN54)	29	48.6
Ridgewood (QN20)	16	23.5
Rikers Island (BX98)	40	275.7
Rosedale (QN05)	9	36.8
Rossville-Woodrow (SI32)	2	9.9
Rugby-Remsen Village (BK96)	9	17.5
Schuylerville-Throgs Neck-Edgewater Park (BX52)	11	25.9
Seagate-Coney Island (BK21)	18	61.1

Appendix 13: Number and rate of people newly reported with chronic hepatitis C by NTA in NYC, 2021

NTA name (code)	Number of cases	Rate per 100,000 people
Sheepshead Bay-Gerritsen Beach-Manhattan Beach (BK17)	37	59.2
SoHo-TriBeCa-Civic Center-Little Italy (MN24)	15	36.0
Soundview-Bruckner (BX55)	11	32.0
Soundview-Castle Hill-Clason Point-Harding Park (BX09)	18	34.3
South Jamaica (QN01)	10	24.9
South Ozone Park (QN55)	23	30.7
Springfield Gardens North (QN02)	4	15.4
Springfield Gardens South-Brookville (QN03)	4	19.7
Spuyten Duyvil-Kingsbridge (BX29)	11	37.1
St. Albans (QN08)	15	30.0
Stapleton-Rosebank (SI37)	19	75.9
Starrett City (BK93)	8	65.3
Steinway (QN72)	13	30.1
Stuyvesant Heights (BK35)	23	35.9
Stuyvesant Town-Cooper Village (MN50)	1	4.3
Sunset Park East (BK34)	19	31.5
Sunset Park West (BK32)	19	38.6
Todt Hill-Emerson Hill-Heartland Village-Lighthouse Hill (SI24)	5	15.6
Turtle Bay-East Midtown (MN19)	11	22.4
University Heights-Morris Heights (BX36)	24	45.5

NTA name (code)	Number of cases	Rate per 100,000 people
Upper East Side-Carnegie Hill (MN40)	9	16.3
Upper West Side (MN12)	34	27.0
Van Cortlandt Village (BX28)	16	33.7
Van Nest-Morris Park-Westchester Square (BX37)	12	45.9
Washington Heights North (MN35)	19	28.0
Washington Heights South (MN36)	46	53.6
West Brighton (BK23)	7	38.1
West Concourse (BX63)	13	36.7
West Farms-Bronx River (BX08)	11	33.3
West New Brighton-New Brighton-St. George (SI22)	16	52.7
West Village (MN23)	11	17.7
Westchester-Unionport (BX59)	7	25.8
Westerleigh (SI07)	4	16.7
Whitestone (QN49)	3	10.0
Williamsbridge-Olinville (BX44)	18	28.6
Williamsburg (BK72)	3	10.2
Windsor Terrace (BK40)	4	18.5
Woodhaven (QN53)	14	25.3
Woodlawn-Wakefield (BX62)	18	43.0
Woodside (QN63)	10	25.4
Yorkville (MN32)	12	16.1

Appendix 14: Characteristics of children ages 0 to 36 months newly reported with hepatitis C in NYC, 2021

Characteristics	Number	Percentage of each group
Overall	11	100.0
Hepatitis C test results		
Confirmed ¹	3	27.3
Exposed (infection status unknown) ²	6	54.5
Not currently infected ³	2	18.2
Reason child was tested for hepatitis C⁴		
Birthing parent known to have hepatitis C	6	54.6
Birthing parent's current or past injection drug use	1	9.1
Other reason	1	9.1
Unknown	3	27.3
Sex		
Female	4	36.4
Male	7	63.6
Race and ethnicity		
Asian, non-Latino/a	0	0.0
Black, non-Latino/a	0	0.0
Latino/a	2	18.2
Multi-race	0	0.0
White, non-Latino/a	1	9.1
Other	3	27.3
Unknown	5	45.5
Borough of residence		
Bronx	4	36.4
Brooklyn	1	9.1
Manhattan	2	18.2
Queens	3	27.3
Staten Island	1	9.1
Other characteristics⁵		
Birthing parent previously reported to Health Department with hepatitis C	0	0.0
Child lives with biological birthing parent	5	57.1

¹ RNA positive between ages 2 to 36 months

² Antibody positive between ages 0 to 36 months or RNA positive between ages 0 to 2 months

³ RNA negative between ages 2 to 36 months or antibody negative between ages 18 to 36 months

⁴ Not mutually exclusive

⁵ Unknown for four children

Appendix 15: Characteristics of people ages 18 to 34 years newly reported with chronic hepatitis C in 2021 interviewed through enhanced surveillance (n=200)

Characteristics	Number	Percentage of each group
Interviewed		
Patient interview	74	37.0
Provider interview	172	86.0
Demographic information		
Gender identity		
Men	135	67.5
Women	58	29.0
Transgender women	3	1.5
Transgender men	1	0.5
Unknown	3	1.5
Borough of residence		
Bronx	47	23.5
Brooklyn	47	23.5
Manhattan	55	27.5
Queens	39	19.5
Staten Island	12	6.0
Race and ethnicity		
Asian, non-Latino/a	6	3.0
Black, non-Latino/a	25	12.5
Latino/a	28	14.0
Native American or Alaska Native, non-Latino/a	1	0.5
White, non-Latino/a	68	34.0
Other	7	3.5
Unknown	65	32.5
Place of birth		
U.S.	79	39.5
Outside of the U.S.	20	10.0
Unknown	101	50.5

Country of birth		
Brazil	1	5.0
Cuba	1	5.0
China	1	5.0
Dominican Republic	3	15.0
Georgia	1	5.0
Honduras	1	5.0
Hungary	1	5.0
Italy	1	5.0
Kazakhstan	1	5.0
Peru	1	5.0
Russia	2	10.0
Tibet	1	5.0
Unknown	5	25.0
Access to care		
Insurance status		
Insured	168	84.0
Not insured	10	5.0
Unknown	3	1.5
Missing	19	9.5
Referrals		
Referred to a linkage to care specialist	15	20.3
Referred to harm reduction services	3	4.1
Hepatitis A and B vaccination (provider question)		
Hepatitis A	7	3.5
Hepatitis B	16	8.0
Hepatitis A and B	23	11.5
Not vaccinated against either	46	23.0
Unknown	108	54.0

Appendix 15: Characteristics of people ages 18 to 34 years newly reported with chronic hepatitis C in 2021 interviewed through enhanced surveillance (n=200) (continued)

Characteristics	Number	Percentage of each group
Clinical assessment		
Why patient tested for hepatitis C¹		
Risk factors	63	31.5
Routine screening	116	58.0
Drug or alcohol treatment	97	48.5
Elevated liver enzymes	9	4.5
Jaundice	1	0.5
Previously tested for hepatitis C	3	1.5
Symptoms or signs	6	3.0
Incarceration	14	7.0
Dialysis	0	0.0
Other	17	8.5
Currently receiving treatment for hepatitis C		
Yes	43	21.5
No	56	28.0
Unknown	101	50.5
Did patient achieve cure?		
Yes	4	2.0
Treatment in progress	34	17.0
No	5	2.5
Unknown	157	78.5

Risk factors¹		
IDU	94	47.0
MSM	56	28.0 ²
Intranasal drug use	72	36.0
Contact with a household member with hepatitis C	26	13.0
HIV infection	43	21.5
History of homelessness	36	18.0
Medical procedure involving injections, anesthesia, or blood	23	11.5
Hospitalized	18	9.0
Dental work or oral surgery	20	10.0
Non-professional tattoo or body piercing	24	12.0
Long term care facility	7	3.5
Transfusion or transplant before 1992, or outside of the U.S.	0	0.0
Biological birthing parent with hepatitis C	1	0.5
Contact with blood through work	0	0.0
History of incarceration	14	7.0
Received dialysis	2	1.0
IDU		
Patient self-reported IDU	28	37.8
Self-reported IDU		
Ever shared needles	10	13.5
Ever shared drug supplies	12	16.2

¹ Not mutually exclusive

² 41.5% of men interviewed reported as MSM.

Appendix 16: RNA and genotype test results of people newly reported with chronic hepatitis C in NYC, 2021

Characteristics	Number	Percentage of each group
All new reports of hepatitis C	7,827	100.0
Any RNA test performed ¹	6,676	85.3
Case definition		
Not currently infected: antibody positive, RNA negative only	4,995	63.8
Probable: antibody positive only	1,167	14.9
Confirmed: antibody positive, RNA positive or genotype tested ²	1,665	21.3
Genotype test performed³		
Yes	814	48.9
No	851	51.1
Genotype⁴		
1a	372	45.7
1b	143	17.6
1 unspecified, 1 other, or 1a/1b	58	7.1
2	92	11.3
3	109	13.4
4	22	2.7
6	15	1.8
Mixed	3	0.4

¹ Based on the Health Department’s hepatitis C surveillance data as of March 31, 2022. Reporting of negative RNA test results to the Health Department was mandated on July 21, 2014.

² Twenty-three people only had a genotype result and no RNA positive result.

³ Genotype data are presented for patients who had a positive RNA or genotype test reported (n=1,665).

⁴ Percentage calculated out of those with a genotype test (n=814).

Appendix 17: Treatment initiation among people newly reported with a positive hepatitis C RNA test, 2015–2021

Report year	Initiated hepatitis C treatment		Did not initiate hepatitis C treatment		Deceased before initiating hepatitis C treatment ¹	
	Number	Percentage	Number	Percentage	Number	Percentage
2015	2,322	53.3	1,825	41.9	208	4.8
2016	2,151	53.1	1,743	43.1	154	3.8
2017	1,838	51.4	1,658	46.4	81	2.3
2018	1,603	49.5	1,616	49.9	20	0.6
2019	1,300	44.9	1,577	54.5	19	0.7
2020	706	38.5	1,096	59.8	30	1.6
2021	433	25.5	1,248	73.5	18	1.1

¹ Matching to 2018-2021 Office of Vital Statistics data incomplete

Appendix 18: Conditional proportions, time frame, and definitions for the 2021 hepatitis C virus clearance cascade

Conditional Proportions for 2021 Laboratory-based Hepatitis C Virus Clearance Cascade by Subpopulation

Characteristics	Ever infected	Viral testing		Initial infection		Cured/cleared		Persistent infection/reinfection	
	Number (1)	Number (2b)	Percentage (2b/1)	Number (3b)	Percentage (3b/2b)	Number (4b)	Percentage (4b/3b)	Number (5b)	Percentage (5b/4b)
Total	122,675	112,997	92.1	63,025	55.8	41,332	65.6	1,351	3.3
Gender Identity¹									
Female	50,854	46,650	91.7	22,746	48.8	15,527	68.3	339	2.2
Male	71,644	66,197	92.4	40,023	60.5	25,784	64.4	1,012	3.9
Transgender	7	7	100.0	4	57.1	0	0.0	0	0.0
Age²									
0–19	403	323	80.1	101	31.3	47	46.5	0	0.0
20–39	18,087	16,096	89.0	6,660	41.4	3,579	53.7	254	7.1
40–59	39,948	36,728	91.9	19,916	54.2	12,864	64.6	562	4.4
≥ 60	64,236	59,849	93.2	36,347	60.7	24,842	68.3	535	2.2
Race and ethnicity									
Asian/Pacific Islander ³	5,655	5,166	91.4	2,004	38.8	1,547	77.2	20	1.3
Black ³	30,598	28,641	93.6	18,368	64.1	12,239	66.6	347	2.8
Latino/a	26,726	25,262	94.5	14,580	57.7	10,082	69.1	462	4.6
Native American or Alaska Native ³	190	177	93.2	85	48.0	55	64.7	2	3.6
White ³	27,408	25,578	93.3	14,621	57.2	9,998	68.4	309	3.1
Other/Unknown	32,098	28,173	87.8	13,367	47.4	7,411	55.4	211	2.8

¹ One hundred seventy patients had a missing gender identity

² One person was missing a date of birth

³ Non-Latino/a

Time Frame and Definitions for the 2021 Laboratory-Based Hepatitis C Virus Clearance Cascade

- Cascade starting point. July 1, 2014, the date when hepatitis C virus RNA negative/“not detected” reporting was fully implemented in New York City.
- Evaluation time frame. The time period from the starting point to the analysis point (July 1, 2014).
- Step 1: Ever infected with hepatitis C. All individuals with any positive/“detected” hepatitis C virus test (anti-HCV, RNA, detectable genotype, or core antigen) performed from the starting point through the end of the “ever-infected” period (December 31, 2020). The test performance date is the specimen collection date (or laboratory result date if specimen collection date is not available).
- Step 2: Viral testing performed. This category includes all individuals who were ever infected (Step 1):
 - 2a – No hepatitis C viral test reported. All individuals who have no hepatitis C viral test performed by the end of the follow-up period (December 31, 2021).
 - 2b – Hepatitis C viral test performed. All individuals who have any hepatitis C viral test performed by the end of the follow-up period (December 31, 2021), regardless of result.
- Step 3: Initial infection status. This category includes all individuals with viral testing performed (Step 2b):
 - 3a – Initial hepatitis C virus infection cured or cleared. All individuals whose initial hepatitis C viral test result performed during the follow-up period (through December 31, 2021) was “not detected.”
 - 3b – Initial hepatitis C virus infection present. All individuals whose initial hepatitis C viral test result performed during the follow-up period (through December 31, 2021) was “detected.”
- Step 4: Cured or cleared. This category includes all individuals with an initial hepatitis C viral test result “detected” (Step 3b):
 - 4a – Hepatitis C virus infection not cured or cleared during the cascade time frame. All individuals where no subsequent hepatitis C viral test results were performed or where all subsequent hepatitis C viral test results during the follow-up period (through December 31, 2021) were “detected.”
 - 4b – Hepatitis C virus infection cured or cleared during the cascade time frame. All individuals where a subsequent hepatitis C viral test result “not detected” was performed during the follow-up period (through December 31, 2021).
 - Note: The cascade is unable to distinguish between cured (referring to successful treatment response) and cleared (referring to natural, spontaneous clearance).
 - Note: A patient with a single, detectable hepatitis C RNA result would populate all of the first four Steps: Step 1, Step 2b, Step 3b, and Step 4a.
- Step 5: Persistent infection or reinfection.
 - 5a – Persistent infection or reinfection. All individuals where a negative/“not detected” result (Step 3a) is followed by an hepatitis C viral test result positive/“detected.”
 - 5b – Persistent infection or reinfection. All individuals where a negative/“not detected” result (Step 4b) is followed by an hepatitis C viral test result positive/“detected.”
 - Note: The cascade is unable to distinguish among the reasons for persistent infection (for example, incomplete treatment, treatment failure, viral breakthrough), reinfection or false positive reports (rare). For simplicity, there is no minimum time period after a hepatitis C viral negative/“not detected” test result (cured or cleared) and before a subsequent hepatitis C

viral positive/“detected” test result occurs to qualify as a persistent infection or reinfection. Regardless of whether these infections represent persistent infections or reinfections, this group represents an important opportunity for linkage to care and treatment.

- Pre-direct acting antiviral (DAA) medication treatment and cure rates are not included in the cascade.
- All individuals who are known to be living outside the jurisdiction or deceased as of the end of the follow-up period (December 31, 2021) were excluded from the cascade.

Appendix 19: Number and percentage of people who had a recurrent hepatitis C RNA positive test, by clinical interpretation, 2020

Interpretation	Number	Percentage of each group
False positive	2	3.2
Reinfection	56	90.3
Relapse/treatment failure	4	6.5

Appendix 20: Number and percentage of people reinfected with hepatitis C infection in NYC, by gender, age at reinfection, time to reinfection and reported risk factors, 2020

Interpretation	Number	Percentage of each group
Overall	56	100.0
Gender		
Male	45	80.4
Female	11	19.6
Age at reinfection		
20–29	5	8.9
30–39	19	33.9
40–49	11	19.6
50–59	19	33.9
60–69	2	3.6
Time to reinfection		
≤ 1 year from cure date	23	41.1
> 1 year from cure date	33	58.9
Risk factors (not mutually exclusive)		
Ever used intranasal or injection drugs	42	75.0
Ever incarcerated	16	28.6
HIV-positive	9	16.1
MSM	7	12.5

Appendix 21: Characteristics of people reported with hepatitis C and HIV coinfection in NYC by end of 2020^{1,2}

Characteristics	Total		Initiated hepatitis C treatment by end of 2020 ³		Had not initiated hepatitis C treatment by end of 2020	
	Number	Percentage (column)	Number	Percentage (row)	Number	Percentage (row)
Overall	11,203	100.0	7,883	70.4	3,320	29.6
Gender						
Male	8,376	74.8	5,865	70.0	2,511	30.0
Female	2,619	23.4	1,887	72.1	732	27.9
Transgender	208	1.9	131	63.0	77	37.0
Age						
0–19	3	0.0	2	66.7	1	33.3
20–29	172	1.5	81	47.1	91	52.9
30–39	923	8.2	491	53.2	432	46.8
40–49	1,339	12.0	847	63.3	492	36.7
50–59	3,443	30.7	2,430	70.6	1,013	29.4
60–69	4,206	37.5	3,200	76.1	1,006	23.9
≥ 70	1,117	10.0	832	74.5	285	25.5
Current borough of residence						
Bronx	3,936	35.1	2,841	72.2	1,095	27.8
Brooklyn	2,761	24.6	1,990	72.1	771	27.9
Manhattan	2,803	25.0	1,898	67.7	905	32.3
Queens	1,387	12.4	913	65.8	474	34.2
Staten Island	316	2.8	241	76.3	75	23.7
Neighborhood poverty level by ZIP code⁴						
Low (< 10% below poverty)	1,122	10.0	774	69.0	348	31.0
Medium (10 to < 20%)	3,586	32.0	2,474	69.0	1,112	31.0
High (20 to < 30%)	2,919	26.1	2,106	72.1	813	27.9
Very high (≥ 30%)	3,547	31.7	2,516	70.9	1,031	29.1
Unknown	29	0.3	13	44.8	16	55.2
Race and ethnicity						
Asian/Pacific Islander, non-Latino/a	164	1.5	110	67.1	54	32.9
Black, non-Latino/a	4,494	40.1	3,106	69.1	1,388	30.9
Latino/a	4,678	41.8	3,349	71.6	1,329	28.4
White, non-Latino/a	1,816	16.2	1,282	70.6	534	29.4
Other ⁵	44	0.4	33	75.0	11	25.0
Unknown	7	0.1	3	42.9	4	57.1

Appendix 21: Characteristics of people reported with hepatitis C and HIV coinfection in NYC by end of 2020 (continued)^{1,2}

Characteristics	Total		Initiated hepatitis C treatment by end of 2020 ³		Had not initiated hepatitis C treatment by end of 2020	
	Number	Percentage (column)	Number	Percentage (row)	Number	Percentage (row)
Birth cohort						
Before 1945	374	3.3	263	70.3	111	29.7
1945–1965	7,703	68.8	5,737	74.5	1,966	25.5
1966–1983	2,545	22.7	1,589	62.4	956	37.6
1984–2017	581	5.2	294	50.6	287	49.4
Years since HIV diagnosis						
< 5	377	3.4	208	55.2	169	44.8
5–9	751	6.7	461	61.4	290	38.6
10–19	3,282	29.3	2,204	67.2	1,078	32.8
≥ 20	6,793	60.6	5,010	73.8	1,783	26.2
HIV viral load < 200 copies per mL at most recent lab in 2020						
Yes	7,293	65.1	6,072	83.3	1,221	16.7
No	1,454	13.0	884	60.8	570	39.2
Unknown (no HIV viral loads in 2020)	2,456	21.9	927	37.7	1,529	62.3

¹ Individuals were diagnosed with HIV and hepatitis C and living as of December 31, 2020, with at least one HIV or hepatitis C lab reported since January 1, 2014. Individuals with a residential address outside of NYC were excluded, as the Health Department only receives hepatitis C lab results for NYC residents. Individuals were considered to have a history of confirmed hepatitis C infection if they had at least one positive hepatitis C RNA test reported prior to the end of 2020.

² Demographic characteristics and HIV clinical characteristics were obtained from the NYC HIV surveillance registry. Hepatitis C outcomes were obtained from the NYC hepatitis C surveillance registry.

³ Individuals were considered to have initiated hepatitis C treatment if they had at least one negative hepatitis C RNA result reported after a positive RNA result prior to the end of 2020.

⁴ Based on ZIP code at most recent report.

⁵ Other race/ethnicity includes Native American and multiracial categories.

Appendix 22: Conditional proportions, time frame, and definitions for the 2021 hepatitis C virus clearance cascade for people coinfecting with hepatitis C and HIV

Conditional Proportions for the 2021 Laboratory-Based Hepatitis C Virus Clearance Cascade for People Coinfecting With Hepatitis C and HIV by Subpopulation

Characteristics	Ever infected	Viral testing		Initial infection		Cured/cleared		Persistent infection/reinfection	
	Number (1)	Number (2b)	Percentage (2b/1)	Number (3b)	Percentage (3b/2b)	Number (4b)	Percentage (4b/3b)	Number (5b)	Percentage (5b/4b)
Total	11,157	10,790	96.7	8,939	82.8	6,910	77.3	300	4.3
Gender identity¹									
Female	2,819	2,723	96.6	2,200	80.8	1,688	76.7	46	2.7
Male	8,330	8,059	96.7	6,731	83.5	5,221	77.6	254	4.9
Transgender	2	2	100.0	2	100.0	1	50.0	0	0.0
Age									
0–19	2	2	100.0	2	100.0	1	50.0	0	0.0
20–39	921	866	94.0	802	92.6	503	62.7	44	8.7
40–59	4,263	4,121	96.7	3,414	82.8	2,596	76.0	145	5.6
≥ 60	5,971	5,801	97.2	4,721	81.4	3,810	80.7	111	2.9
Race and ethnicity									
Asian/Pacific Islander ²	106	105	99.1	80	76.2	66	82.5	2	3.0
Black ²	4,374	4,226	96.6	3,663	86.7	2,824	77.1	106	3.8
Latino/a	4,013	3,932	98.0	3,130	79.6	2,487	79.5	143	5.7
Native American or Alaska Native ²	16	16	100.0	14	87.5	12	85.7	0	0.0
White ²	1,674	1,639	97.9	1,274	77.7	1,011	79.4	31	3.1
Other/Unknown	974	872	89.5	778	89.2	510	65.6	18	3.5

¹ Six patients had a missing gender identity

² Non-Latino/a

See Appendix 17 for the time frame and definitions.

Appendix 23: Characteristics of decedents where hepatitis C is listed as the underlying cause or contributing cause of death, NYC, 2020

Characteristics	Number	Percentage of each group	Age-adjusted rate per 100,000 people ¹
Overall	263	100	2.7
Sex			
Female	94	35.7	1.7
Male	169	64.3	3.9
Race and ethnicity			
Asian/Pacific Islander, non-Latino/a	7	2.6	0.5
Black, non-Latino/a	93	35.0	4.2
Latino/a	93	35.0	3.9
White, non-Latino/a	64	24.1	1.8
Other/Unknown	9	3.4	N/A
Age			Age-specific rate per 100,000 population ¹
0–24	0	0.0	0.0
25–44	10	3.8	0.4
45–64	79	30.0	4.0
65–84	151	57.4	13.4
≥ 85	23	8.7	12.7

¹ The population used in the rate constructions are based on the Census 2020 population estimates, 2021 vintage. However, the 2020 Census counts are substantially higher than the estimates, rendering rates potentially overestimated.

Appendix 24: Leading causes of deaths among decedents with hepatitis C in 2020, by number

All Decedents

Cause of death	Number
COVID-19	982
Heart diseases	942
Cancer	697
Drug-related	482
Diabetes	124
Chronic lower respiratory diseases	120
Influenza and pneumonia	106
HIV	104
Viral hepatitis	84
Essential hypertension and renal diseases	82
All other causes	782
Total	4,505

Premature Decedents

Cause of death	Number
Drug-related	416
COVID-19	294
Heart diseases	268
Cancer	203
HIV	60
Diabetes	48
Chronic liver disease and cirrhosis	44
Chronic lower respiratory diseases	44
Influenza and pneumonia	39
Accidents except drug poisoning	35
All other causes	306
Total	1,757

Appendix 25: Number of hepatitis A and B vaccines provided by Health Department facilities, 2021

Vaccine	Total hepatitis vaccine doses	Completed hepatitis vaccine series
Immunization clinics		
Hepatitis A only, ages 4 to 18 years	1,798	351
Hepatitis A only, ages 19 years and older	218	84
Hepatitis B only, ages 4 to 18 years	1,645	351
Hepatitis B only, ages 19 years and older	1,202	229
NYC Sexual Health Clinics		
Hepatitis A only	261	56
Hepatitis B only	483	22
Hepatitis A/B combination	744	78

¹ Total of hepatitis A and hepatitis B vaccine doses

² Total number of individuals who completed either hepatitis A or hepatitis B vaccine series in 2021

Appendix 26: Number of hepatitis A and B vaccines provided by NYC providers, 2021

Vaccine	Total hepatitis vaccine doses	Completed hepatitis vaccine series
Hepatitis A only, ages 0 to 18 years	198,475	95,123
Hepatitis A only, ages 19 years and older	10,637	2,384
Hepatitis B only, ages 0 to 18 years	202,378	46,455
Hepatitis B only, ages 19 years and older	74,809	8,737

