HCV Epidemiology in the United States

This is a PDF version of the following document:
Module 1: Screening and Diagnosis of Hepatitis C Infection
Lesson 1: HCV Epidemiology in the United States

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HCV Incidence in the United States

Definitions of HCV Incidence

The incidence of hepatitis C virus (HCV) infection is defined as the number of new infections in a specific region over a specific time period; the incidence data is typically reported for a 1-year period, often in conjunction with cumulative and comparative multiyear data (Figure 1). The Centers for Disease Control and Prevention (CDC) defines the incidence of HCV in the United States (or in each state) as the number of acute HCV cases that occur per year, which is the closest proxy of actual new infections. The incidence rate is the number of cases per total population (typically defined as the number per 100,000 persons).

Method of Estimating HCV Incidence

Most individuals with acute HCV infection do not have a clinically evident illness, and most do not seek medical care. In addition, many cases of diagnosed acute hepatitis C are not reported. Thus, determining the true incidence of new HCV infections per year based on the number of reported cases requires highly complex epidemiology modeling techniques.[1] For each new acute HCV case that is reported in the United States, the CDC estimates there are approximately 13.9 actual new acute HCV cases (reported and unreported) that have occurred.[1,2] This high ratio (total estimated cases to actual reported cases) is primarily a result of the large proportion of persons with acute HCV who have asymptomatic or minimally symptomatic infection and do not seek medical care, or who have undiagnosed HCV infection (Figure 2); the passive HCV reporting system likely also contributes to the low number of reported acute HCV cases. The CDC provides several numbers related to the incidence of hepatitis C in the United States, including the number of reported acute cases, estimated number of acute clinical cases, estimated number of new infections, and rates per 100,000 persons at the state and national level.[2]

HCV Incidence Data

In 2023, a total of 4,966 new cases of acute hepatitis C were reported to the CDC and this corresponds to an estimated 69,000 new acute cases of HCV in 2023.[2] From 2010 to 2020, the number of estimated annual acute HCV infections steadily increased, but then leveled off during the years 2020-2023.[2] The increase in new HCV infections from 2010 to 2021 and the persistent high number of cases has been primarily attributed to the opioid epidemic and associated injection drug use, particularly among young adults.[3,4,5,6] The following summarizes CDC HCV surveillance data for 2021 based on specific groups and demographic factors (Figure 3).[2]

- **Sex**: The number of reported cases of acute HCV infections was roughly twice as high in males (3,321)

than in females (1,640), with males accounting for two-thirds of the acute HCV infections.[2]

- **Age Group**: The highest rate of reported acute infections involved persons 30–39 years of age, with the next highest number among persons 40–49 years of age.[2]
- **Race/Ethnicity**: The highest number of reported cases of acute HCV by race/ethnicity occurred in White persons, but the highest rates were in American Indian/Alaska Native persons.[2]
- **Urban/Rural**: Although 83% of cases were diagnosed in urban areas, the rate of acute HCV (cases per 100,000 population) was slightly higher in rural areas (1.8) versus urban areas (1.5).[2]

Importance of HCV Incidence Data

The United States HCV incidence data provide important information for monitoring trends in transmission patterns, developing hepatitis C prevention strategies, monitoring the effectiveness of implemented prevention plans, and identifying focal outbreaks or regional patterns of infection. In addition, valuable information emerges when data are categorized by age group, sex, race/ethnicity, and risk factor for acquiring HCV, as these data may inform major population-specific prevention strategies.

HCV Prevalence in United States

Definition of HCV Prevalence

The HCV prevalence is defined as the number (or percent) of persons in the total population living with HCV. Typically, HCV prevalence specifically refers to persons with active (HCV RNA-positive) HCV infection. The HCV prevalence in the United States is dynamic and is impacted by five factors: (1) number of new HCV infections, (2) number of persons who experience a spontaneous HCV cure, (3) number of treatment cures, (4) number of deaths, and (5) number of persons cured who acquire HCV again (Figure 4). Less frequently, the HCV prevalence data is given for all individuals who have ever been infected with HCV, which includes those with active HCV, persons who spontaneously resolved HCV, and those with HCV treatment-related cure. The prevalence rate of chronic hepatitis C is the number of persons living with HCV per population (typically defined as number of persons per 100,000 population).

HCV Prevalence Estimates

In the United States, HCV infection is the most common bloodborne infection. The best estimates of HCV prevalence derive from analysis of serum specimens taken from participants in the National Health and Nutrition Examination Survey (NHANES).[7,8,9,10,11,12] The NHANES surveys require some adjustments since they do not sample certain populations, such as persons who are incarcerated, persons without housing, nursing home residents, and persons on active military duty. The most recent estimate of HCV prevalence in the United States was generated from analyses of 2017 to 2020 NHANES survey data.[12] In this time period, there were an estimated 2.2 million persons who were HCV RNA positive (0.9% prevalence among adults).[12] The following summarizes NHANES HCV prevalence estimates by sex, age group, and race ethnicity (Figure 5).[12]

- **Sex**: In the United States, the estimated HCV prevalence for adult males is 1.4%, which is 2.8-fold higher than the 0.5% prevalence in adult females; among people living with HCV, males account for 73% and females 27%.[12]
- **Age Group**: More than 50% of people living with HCV are 55 years of age or older. Persons 55-64 years of age account for the highest number of people living with HCV, with an HCV prevalence of 2.4% .[12]
- **Race/Ethnicity**: Based on race/ethnicity, White people have the highest HCV prevalence, accounting for roughly 80% of people living with HCV.[12] The prevalence rate among White people was 5.0%, which is only slightly higher than the 4.8% prevalence rate in Black people.[12]
- **State and Region**: In the United States, 9 states each have more than 65,000 persons living with HCV; these states are California (318,900), Texas (202,500), Florida (151,000), New York (116,000), Pennsylvania (93,900), Ohio (89,600), Michigan (69,100), Tennessee (69,100), and North Carolina (66,400).[13] Five of these states (New York, Pennsylvania, Ohio, Tennessee, and North Carolina) are in the Appalachian region.[13] Together, these 9 states account for an estimated 52% of all persons living with HCV nationally.[13]

Newly Reported Chronic Hepatitis C Cases

In 2023, the CDC reported 101,525 persons in the United States with a new diagnosis of chronic HCV.[2] Persons 30–39 years of age had the highest numbers of reported new diagnoses of HCV, followed by persons 40–49 years of age.[2] Among the newly reported chronic HCV cases, 66% were male and 34% female.[2] (Figure 6)

Awareness of HCV Infection Status

Using the most recent NHANES data, investigators estimated only 56% of persons infected with HCV in the United States were aware of their HCV infection status.[14] Awareness of infection status was lower in

persons who were foreign-born and in persons with income below the poverty level.[14] These most recent NHANES data do not show a major improvement from a prior analysis of NHANES data (from 2001-2008) that reported 50% of persons infected with HCV were aware of their HCV infection status.[15] Awareness of HCV status may be higher among persons engaged in the private health care sector—a study involving persons with access to medical care in four private health care organizations during the years 2006 to 2008 showed an estimated 57% were aware of their HCV infection.[16]

HCV Genotype

In the United States, approximately 75% of chronic HCV infections are caused by hepatitis C genotype 1 (subtypes 1a or 1b), 15 to 20% by genotype 2 or 3, and less than 5% by genotypes 4, 5, or 6.[17,18,19] Among the genotype 1 infections, genotype 1a is more common than 1b.[19]

HCV-Related Deaths

The CDC reports for HCV-related deaths in the United States are based on death certificate data and likely underestimate the true number of HCV-related deaths.[2,20] During the years 2010 to 2021, the annual deaths attributed to HCV in the United States peaked in 2014 and 2015, followed by an overall decline from 2016 through 2023.[2] In 2023, there were 11,194 deaths with hepatitis C listed as the cause of death, and 71% of these deaths occurred in males.[2] The total number of HCV-related deaths was highest in White individuals.[2] (Figure 8)

Risk Factors for Acquiring HCV

Overview of Risk Factors for HCV Acquisition

Investigators and public health officials have identified multiple risk factors for acquiring HCV in the United States: injection drug use, history of receiving a blood product transfusion prior to July 1992, receipt of solid-organ transplantation, hemophilia with receipt of factor concentrates made before 1987, male-to-male sex, body tattoos, and intranasal cocaine use.[17,21,22,23] Among these, injection drug use is the most common and important risk factor for acquiring HCV in the United States. In the 1970s and 1980s, receipt of HCV-infected blood products or organs accounted for nearly 50% of new cases of HCV, but after the discovery of HCV as the cause of non-A, non-B hepatitis in 1989 and the introduction of blood screening tests in the early 1990s, the proportion of new HCV cases caused by contaminated blood or organs dramatically declined.[7,22,24,25]

Injection Drug Use

Injection drug use remains the most common risk factor for acquiring HCV in the United States, and in 2021, among the 1,449 reported cases of acute HCV for which risk factor information on drug use was available, 57% reported injection drug use as their risk factor for acquiring HCV.[26] Approximately 20 to 30% of persons who inject drugs become infected with HCV within the first 2 years of starting to inject drugs, and 50% within 5 years.[27] Transmission risk is greatest with “direct sharing” of needles and syringes, but may also occur indirectly via sharing injection paraphernalia, such as water, cookers, and cotton filters.[28,29,30] The incidence of HCV in persons who inject drugs markedly declined from early 1992-2002, likely due to the increased availability of needle exchange programs that arose in response to the HIV epidemic.[29,31] Since 2002, however, multiple reports have documented a surge in HCV infections in the United States among young persons who inject drugs, owing to the ongoing opioid epidemic and continued high rates of receptive needle and syringe sharing (Figure 7).[3,4,5,32,33]

Noninjection Drug Use

The role of noninjection drug use, such as snorting crack cocaine, powder cocaine, methamphetamines, or heroin, as a risk factor for acquiring hepatitis C remains controversial.[34] The risk of acquiring HCV is plausible with use of pipes that may cause burns in the oral mucosa (with possible open mouth sores) or use of straws or tubing that causes erosion of nasal membranes (with bleeding in the nasal passage). Sharing these blood-contaminated devices could then lead to HCV transmission. The prevalence of HCV in people who use noninjection drugs ranges from 2.3 to 35.3%. In some people, the use of noninjection drugs is a surrogate for other risk activities associated with HCV acquisition.

Sexual Exposure

The risk of acquiring HCV through sexual contact with a person who has HCV infection depends on one’s sex partners and the type of sex they engage in. Overall, sexual transmission has accounted for up to 15% of cases of HCV in the United States, but very close interrogation revealed that most cases of sexual transmission also involved injection drug use as a risk factor. Multiple studies involving monogamous heterosexual couples have shown a rate of HCV transmission of less than 1% per year, including one study among 500 serodifferent monogamous couples that reported a sexual transmission rate of 0.07% per year.[35,36,37,38,39] In recent years, however, multiple reports have identified cases of sexual transmission among men who have sex with men (MSM), particularly men with HIV who have sex with other men.[40,41,42,43] Specific factors identified with HCV transmission among MSM include coinfection with HIV, use of recreational drugs during sex, and certain sex practices that result in rectal bleeding or damage to the rectal mucosa, including fisting and sharing sex toys.[40,44]

Chronic Hemodialysis

The prevalence of HCV infection in persons receiving hemodialysis is approximately 8%, which is nearly 5-fold higher than the general United States population.[45] Several risk factors have been identified for dialysis patients acquiring HCV, including number of blood transfusions received, number of years on dialysis, mode of dialysis (hemodialysis poses a greater risk than peritoneal dialysis), and the prevalence of HCV in the dialysis unit. In the United States, multiple dialysis-associated HCV outbreaks have occurred. In most cases, HCV transmission likely resulted from inadequate infection control practices, particularly in situations when patients received dialysis immediately after a patient with HCV infection received dialysis.[46,47,48,49]

Receipt of Clotting Factor Concentrates

In the late 1970s through the mid-1980s, most persons with hemophilia acquired HCV infection via the receipt of contaminated plasma clotting factor concentrates.[50,51,52] In 1985, several companies introduced virus inactivation procedures for hemophilia blood products, and by 1987, these procedures were uniformly used, virtually eliminating the risk of transmission of HCV via clotting factor concentrates. Use of recombinant factor concentrate also provides an option for providing factor concentrate with no risk of viral contamination.

Receipt of Transfusion of Blood Products

In the 1960s, the risk of acquiring HCV from a blood transfusion was approximately 33%. The universal screening of blood and organ donors with the routine use of second-generation HCV antibody tests in 1992 nearly eliminated the subsequent risk of transfusion-associated HCV.[25,31,53] In 1999, the introduction of HCV nucleic acid testing (NAT) as a supplement to HCV antibody testing of blood products further reduced the risk of acquiring HCV from a blood transfusion.[25,54,55] The estimated risk of acquiring HCV from a blood transfusion decreased further following the introduction, in 1999, of HCV nucleic acid testing (NAT) as a supplement to HCV antibody testing of blood products.[54,55] Blood banks in the United States now use a combination of the third-generation enzyme-linked immunosorbent assay (ELISA) and NAT screening of mini-pool testing (16 samples). The current estimated risk of acquiring HCV from a transfusion in the United States is approximately 1 in 2 million.

Receipt of Immune Globulin

In the 1990s, scattered cases and outbreaks of HCV transmission via gamma globulin occurred in the United States and Europe.[56,57,58] Subsequently, advances in virus inactivation procedures have nearly eliminated any risk of HCV transmission with immune globulin, and the manufacturers of intravenous immune globulin use vigorous viral inactivation and removal procedures.

Organ and Tissue Transplantation

Rare cases of inadvertent HCV transmission via organ or tissue transplantation have occurred in the United States.[59,60] Most cases of transmission have involved HCV antibody-negative, HCV RNA-positive donors.[59,60] In 2013, the U.S. Public Health Service drafted updated guidelines for preventing HCV transmission through organ transplantation, and these guidelines recommend HCV RNA testing of all organ and tissue donors, which has further reduced the risk of inadvertent HCV transmission.[61] It should be noted, however, that owing to the safety profile and effectiveness of direct-acting antivirals for HCV, some institutions now allow for HCV-positive organ donations, with a plan to treat organ recipients post-transplant.

Perinatal

In the United States, due to the opioid epidemic, there has been a significant increase in HCV infection in recent years among women of childbearing age; this trend has raised concerns about a potentially significant increase in perinatal HCV infections.[62,63,64] Among pregnant women with chronic HCV, approximately 6% will transmit HCV to their child.[65,66,67] Nearly all cases of perinatal HCV transmission have involved mothers who had detectable HCV RNA in plasma during pregnancy. Women coinfected with HIV and HCV

have an approximately twofold higher risk of perinatal HCV transmission when compared with women who have HCV monoinfection.[65] The risk of HCV transmission via breastfeeding appears to be negligible.[65,66,67]

Household Contact

Acquiring HCV via nonsexual household contact with a person infected with HCV can occur, but the number of documented cases is extremely low.[68,69] Transmission in this setting would most likely involve sharing a razor or toothbrush, since this process could involve transmission via a blood-tainted device.

Tattoos and Piercings

In the United States, the risk of acquiring HCV from a licensed, regulated professional tattoo or piercing center is extremely low.[70] Tattoos performed in unregulated and unlicensed tattoo centers, such as with tattoos applied by friends or in prison, increase the risk for HCV acquisition.[70,71]

CDC Case Definitions and Reporting

CDC Hepatitis C Case Definitions

The CDC has established case definitions and reporting criteria for acute and for past (resolved) or present (chronic) hepatitis C infection.

Acute Hepatitis C—2020 Case Definition

The CDC 2020 Case Definition for Acute Hepatitis C infection includes clinical and laboratory criteria (Figure 9), along with a case classification as probable or confirmed.[72] Of note, a patient can have a confirmed case of acute HCV based on laboratory data alone (a hepatitis test conversion documented by a negative HCV antibody, HCV antigen, or NAT laboratory test result, followed within 12 months by a positive result with any of these tests). Symptomatic cases often go unreported for multiple reasons: many persons with symptomatic acute HCV do not seek medical care, the diagnosis may be missed, and medical providers may fail to report diagnosed cases. It is important not to report cases that have already been reported. A more detailed discussion of the Acute Hepatitis C 2020 Case Definition is included in the lesson *Diagnosis of Acute HCV Infection*.

Chronic Hepatitis C Virus Infection—2020 Case Definition

The CDC 2020 Case Definition for Chronic Hepatitis C includes clinical and laboratory criteria (Figure 10), as well as a case classification.[73] These cases pertain to persons with current (active) HCV infection and do not represent persons who spontaneously cleared HCV infection. Also, it is important not to report cases that have already been reported.

Perinatal Infection Hepatitis C Infection—2018 Case Definition

The CDC 2018 Case Definition for Hepatitis C, Perinatal Infection includes clinical criteria, laboratory criteria for diagnosis, criteria to distinguish a new case from an existing case, and a case classification.[74] A confirmed case requires the following:

- Infant who has a positive test for HCV RNA nucleic acid amplification test (NAAT), HCV antigen, or detectable HCV genotype at ≥2 months and ≤36 months of age and is not known to have been exposed to HCV via a mechanism other than perinatal.

Reporting Criteria

Persons identified with acute HCV should undergo an interview to determine an identifiable risk factor in the 2-week to 6-month time frame that preceded the onset of their illness. Similarly, the individual with past (resolved) or present (chronic) HCV infection should be interviewed to determine lifetime risk factors for HCV. The Viral Hepatitis Case Report form should be filled out for persons identified with either acute HCV infection or past/present HCV. Cases of HCV should be reported to a health department, which in turn submits reporting data to the CDC via the Nationally Notifiable Diseases Surveillance System (NNDSS).

Summary Points

- The estimated number of annual acute HCV infections in the United States increased significantly from 11,800 in 2010 to 69,800 in 2021.
- The recent increases in new HCV infections have primarily resulted from the ongoing opioid epidemic and the associated injection drug use.
- In 2021, the highest number of new HCV infections occurred in persons 30-39 years of age.
- In 2021, American Indian/Alaskan Native, White, and Black individuals were among the top three groups with the greatest prevalence rate of new HCV infections.
- Based on CDC estimates, there are 2.2 million persons living with HCV infection, corresponding to a 0.9% HCV prevalence among the adult population in the United States.
- The HCV prevalence is dynamic and impacted by the number of new HCV infections, the number of persons that spontaneously resolve their infection, the number of treatment cures, the number of deaths, and the number of cured persons who become reinfected.
- It is estimated that approximately 56% of persons with HCV infection are aware of their infection in the United States.
- Injection drug use is the most common risk factor for HCV acquisition; sexual transmission of HCV can occur, but this most often involves MSM; the risk among MSM is substantially higher in those with HIV.
- The number of annual deaths attributed to HCV has declined significantly in recent years, falling from 19,613 in 2014 to 13,895 in 2021, with most of the deaths involving males.
- The CDC has established a clear definition of acute, chronic, and perinatal HCV infection for reporting purposes as well as reporting guidelines.

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Figures

Figure 1 Concept of HCV Incidence

The HCV incidence refers to the number of people with new infection (acute HCV cases) reported over a specific period of time, typically a 1-year period (as shown by red box).

Illustration: David H. Spach, MD

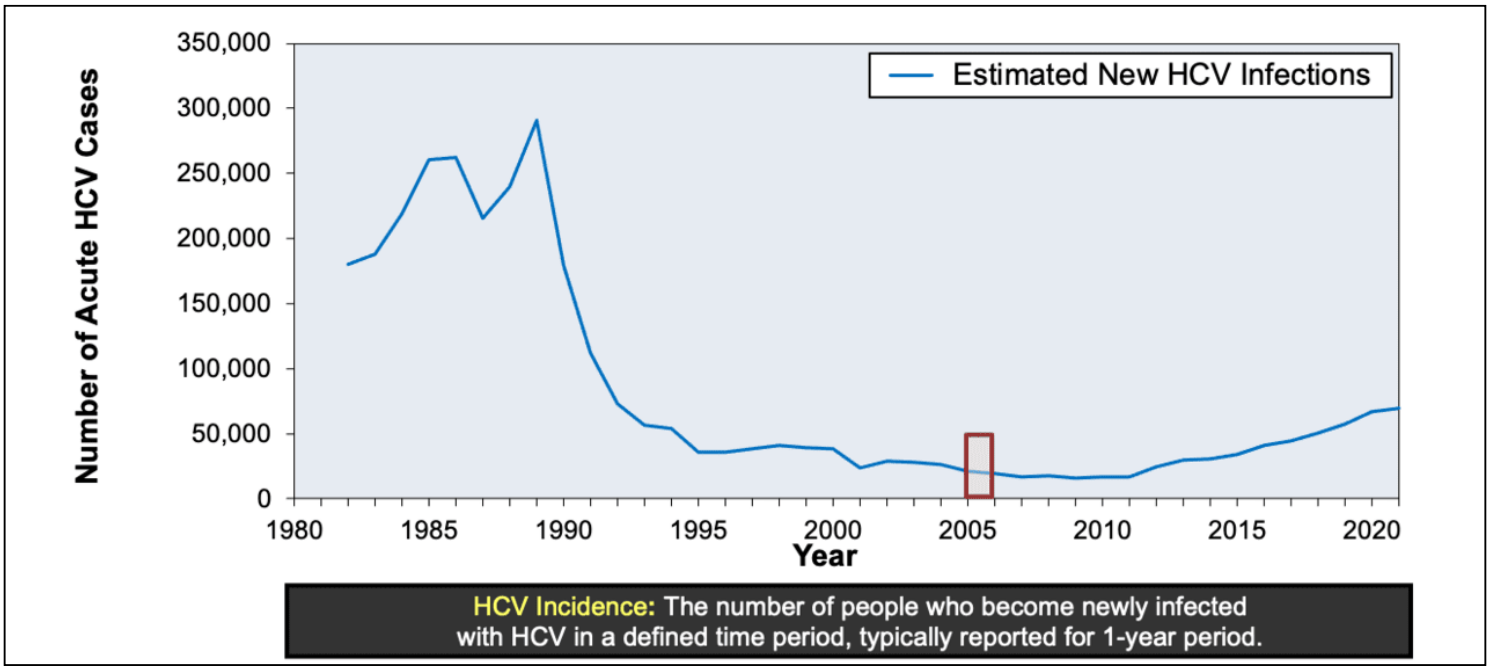

Figure 2 Conceptual View of Reported Cases Versus Actual Infections

As shown in this conceptual model, only a minor proportion of persons with acute (new) HCV infection have their case reported.

Source: modified from Klevens RM, Liu S, Roberts H, Jiles RB, Holmberg SD. Estimating acute viral hepatitis infections from nationally reported cases. Am J Public Health. 2014;104:482-7.

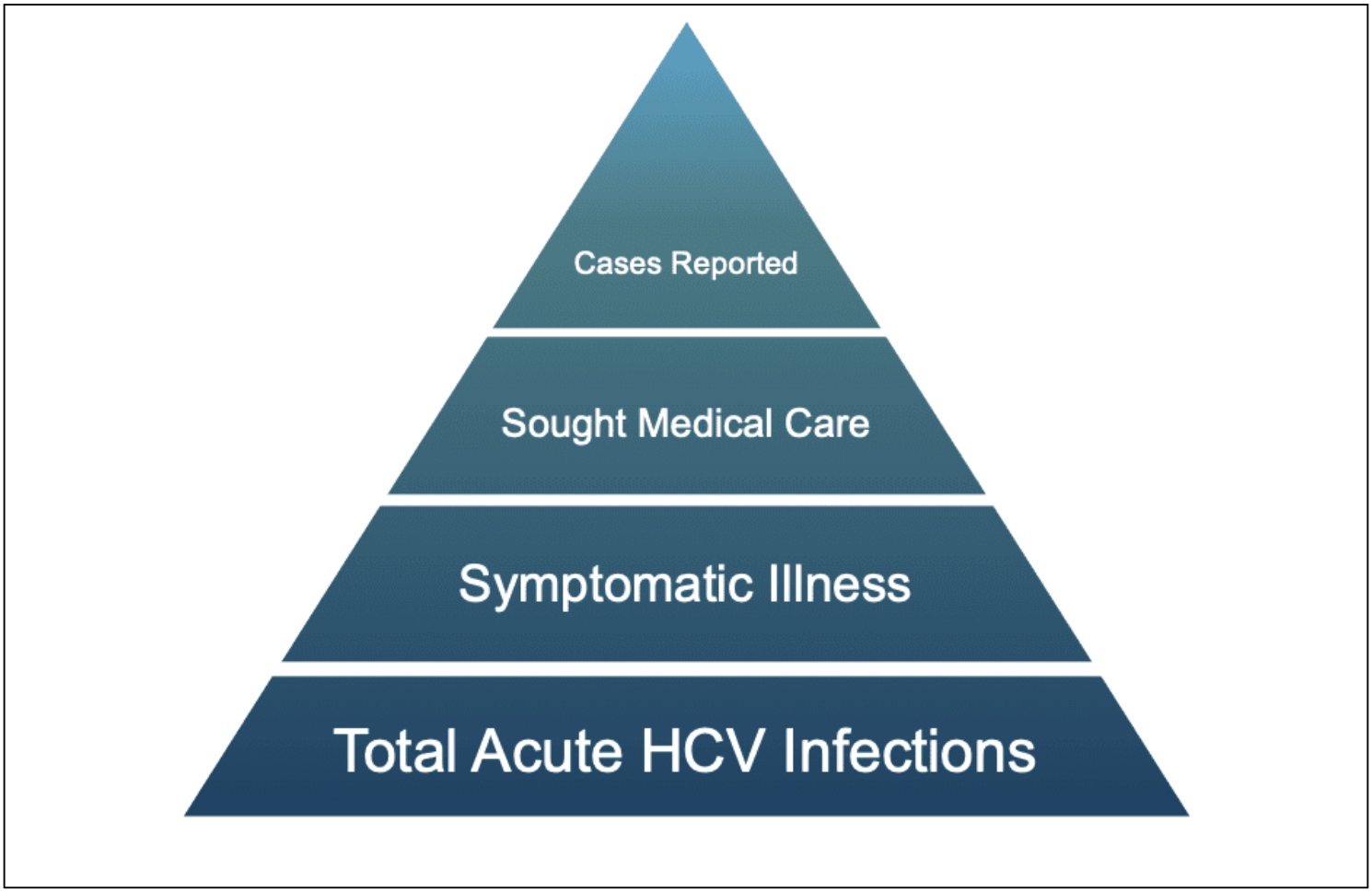

Figure 3 (Image Series) - Acute Cases of HCV, United States (Image Series) - Figure 3 (Image Series) - Acute Cases of HCV, United States
Image 3A: Acute Cases of HCV, United States, 2010-2023

Source: Centers for Disease Control and Prevention (CDC). 2023 Viral Hepatitis Surveillance Report—Hepatitis C. Published April 2025.

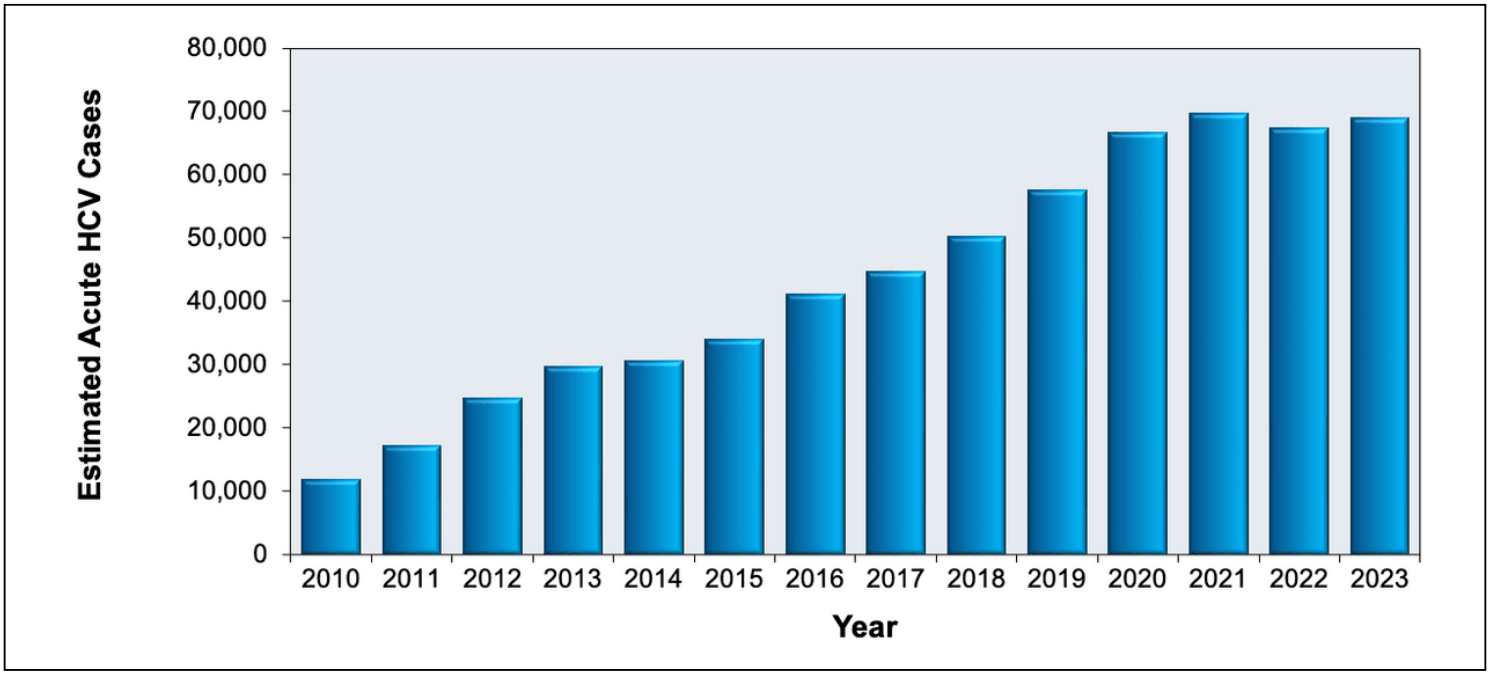

Figure 3 (Image Series) - Acute Cases of HCV, United States
Image 3B: Reported Rate of Acute HCV, by Sex, 2010-2023

Source: Centers for Disease Control and Prevention (CDC). 2023 Viral Hepatitis Surveillance Report—Hepatitis C. Published April 2025.

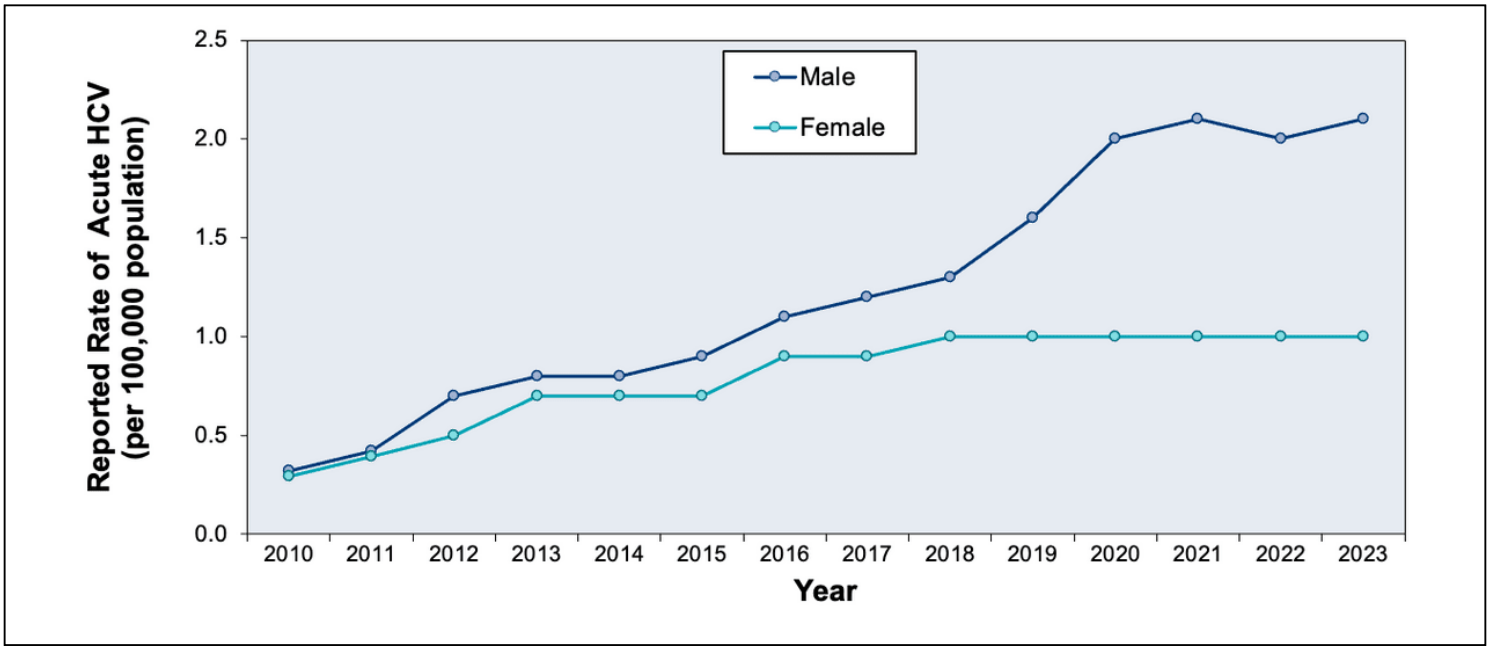

Figure 3 (Image Series) - Acute Cases of HCV, United States
Image 3C: Reported Cases of Acute HCV, by Age Group, 2023

Source: Centers for Disease Control and Prevention (CDC). 2023 Viral Hepatitis Surveillance Report—Hepatitis C. Published April 2025.

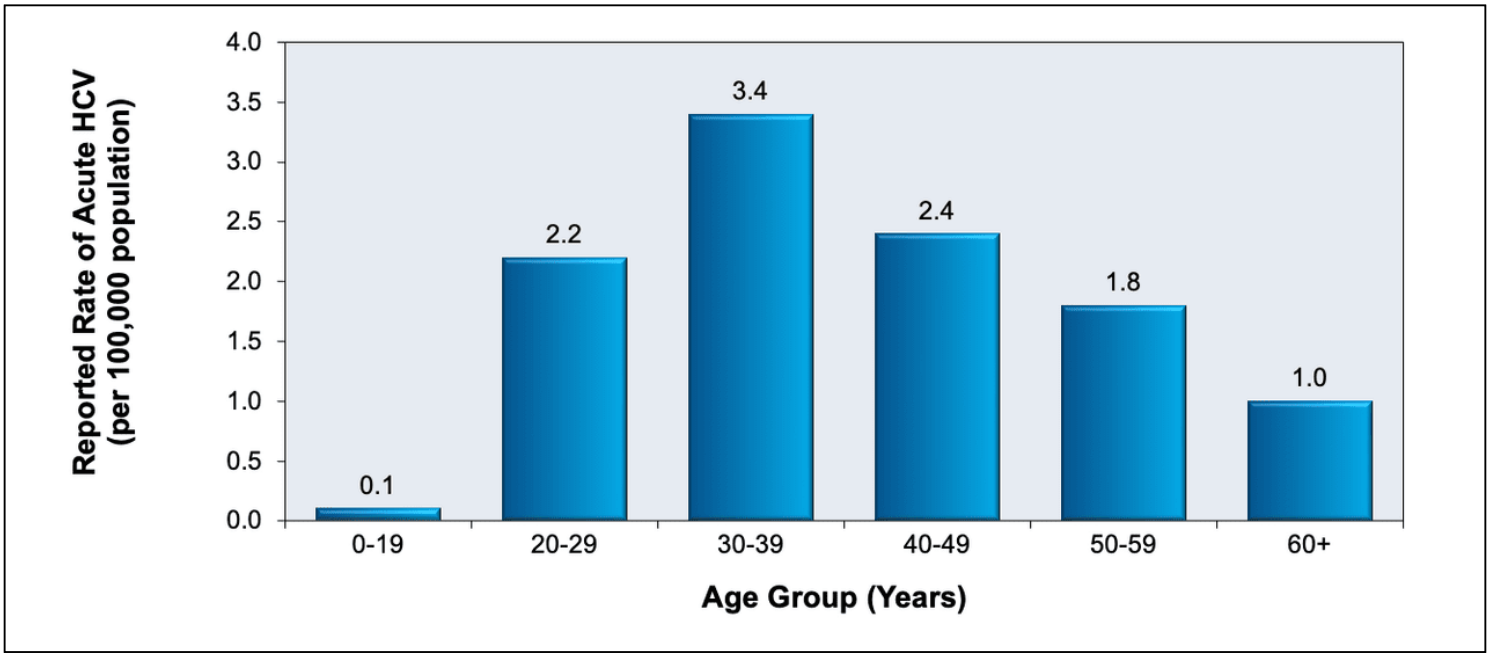

Figure 3 (Image Series) - Acute Cases of HCV, United States
Image 3D: Reported Rates of Acute HCV, by Race/Ethnicity, 2023

Source: Centers for Disease Control and Prevention (CDC). 2023 Viral Hepatitis Surveillance Report—Hepatitis C. Published April 2025.

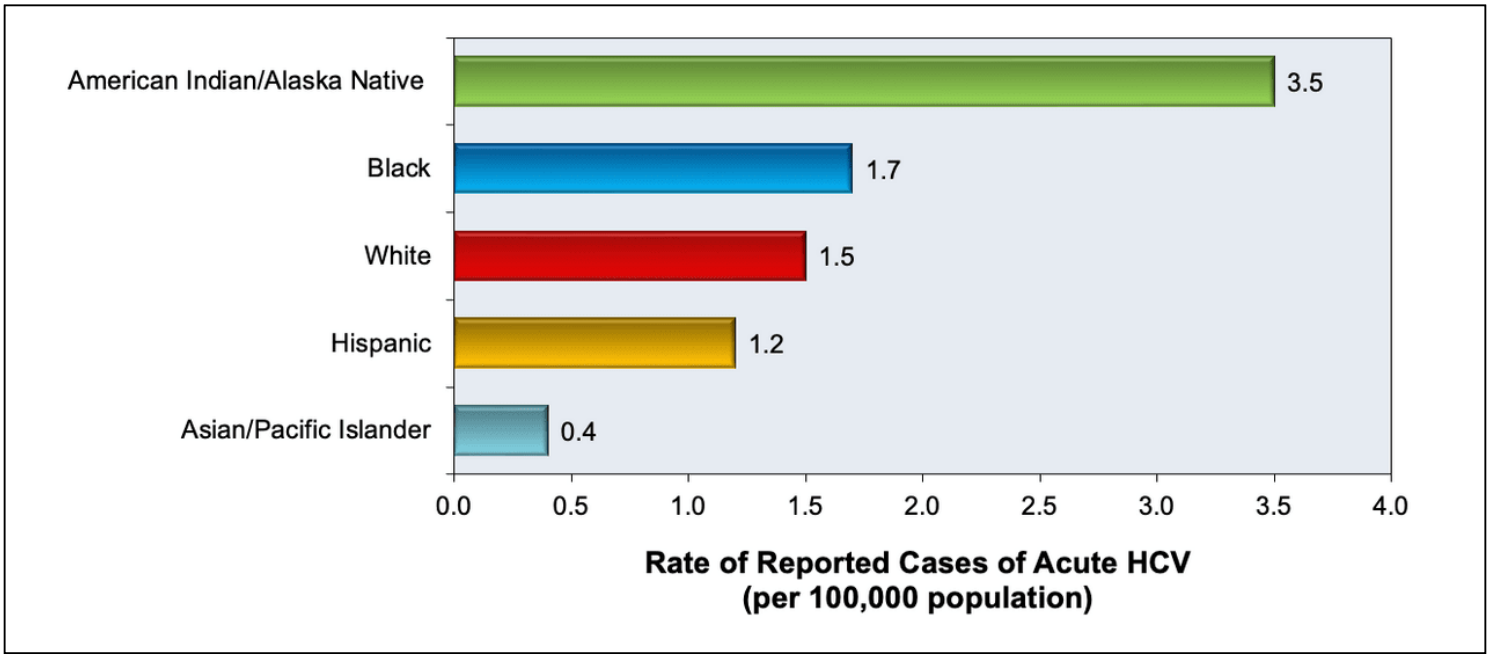

Figure 4 Dynamics of HCV Prevalence in the United States

This illustration shows the dynamics of HCV prevalence in the United States (persons living with chronic HCV infection) are impacted by multiple factors, as shown.

Source: Illustration by David H. Spach, MD

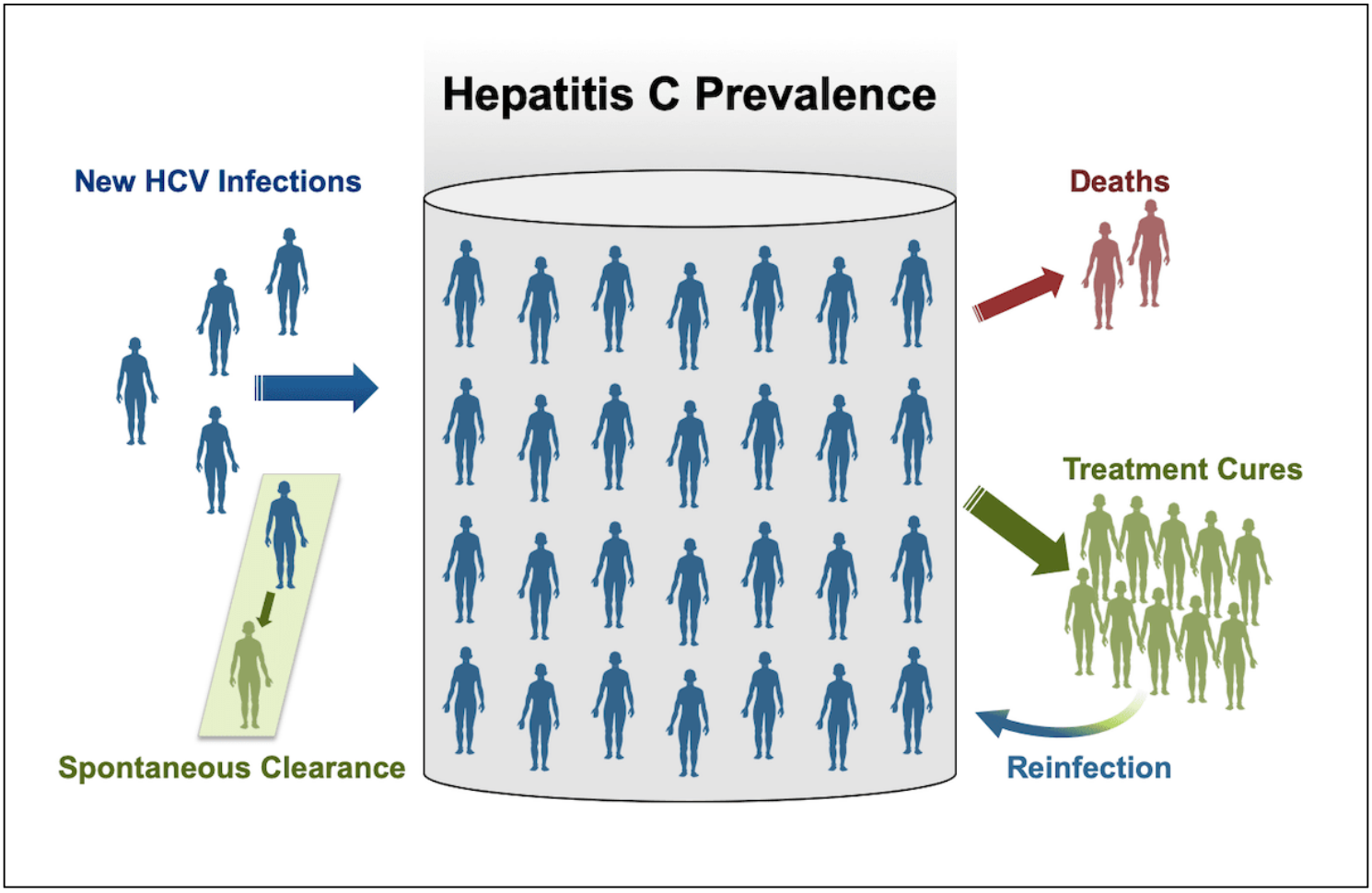

Figure 5 (Image Series) - NHANES HCV Prevalence Estimates, United States (Image Series) -
Figure 5 (Image Series) - NHANES HCV Prevalence Estimates, United States
Image 5A: NHANES Estimates HCV Prevalence, 2017-2020, by Sex

Source: Lewis KC, Barker LK, Jiles R, Gupta N. Estimated prevalence and awareness of hepatitis C virus infection among U.S. adults- National Health and Nutrition Examination Survey, January 2017-March 2020. Clin Infect Dis. 2023 Jul 7;ciad411.

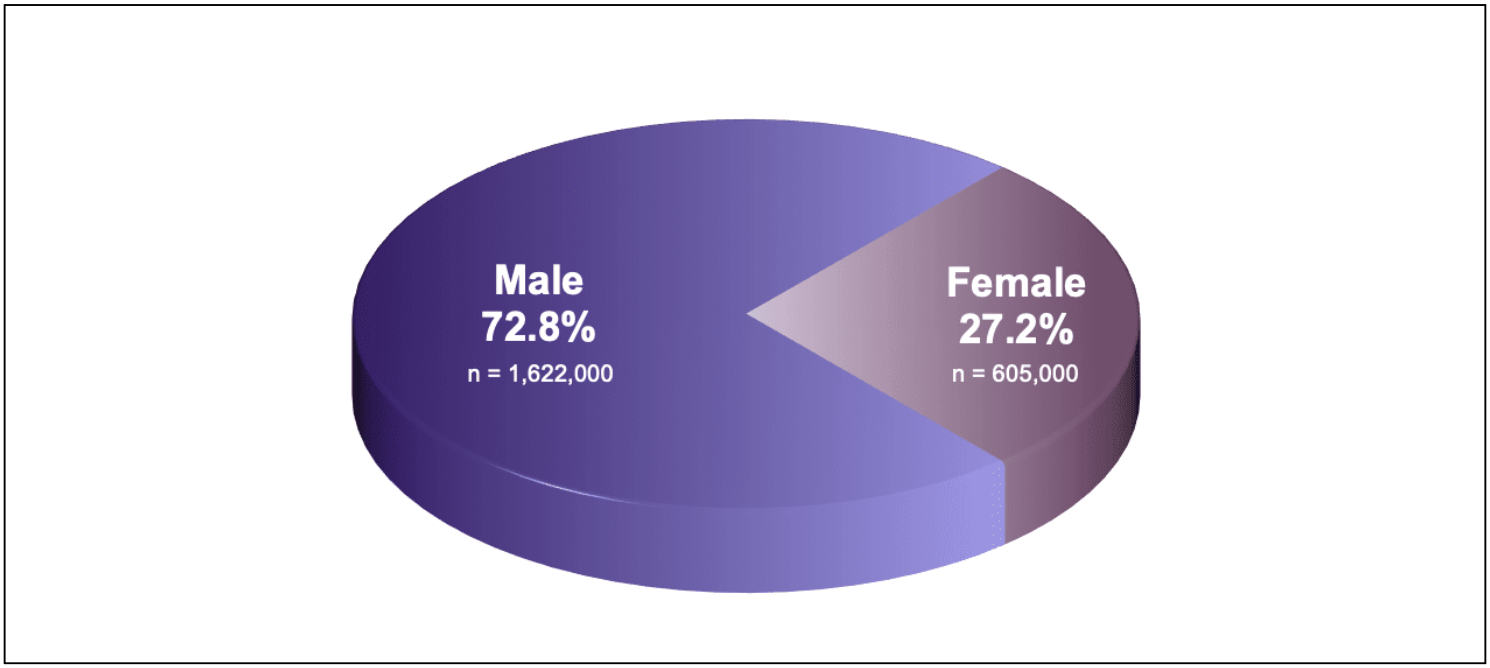

Figure 5 (Image Series) - NHANES HCV Prevalence Estimates, United States
Image 5B: NHANES Estimates HCV Prevalence, 2017-2020, by Age Group

Source: Lewis KC, Barker LK, Jiles R, Gupta N. Estimated prevalence and awareness of hepatitis C virus infection among U.S. adults- National Health and Nutrition Examination Survey, January 2017-March 2020. Clin Infect Dis. 2023 Jul 7;ciad411.

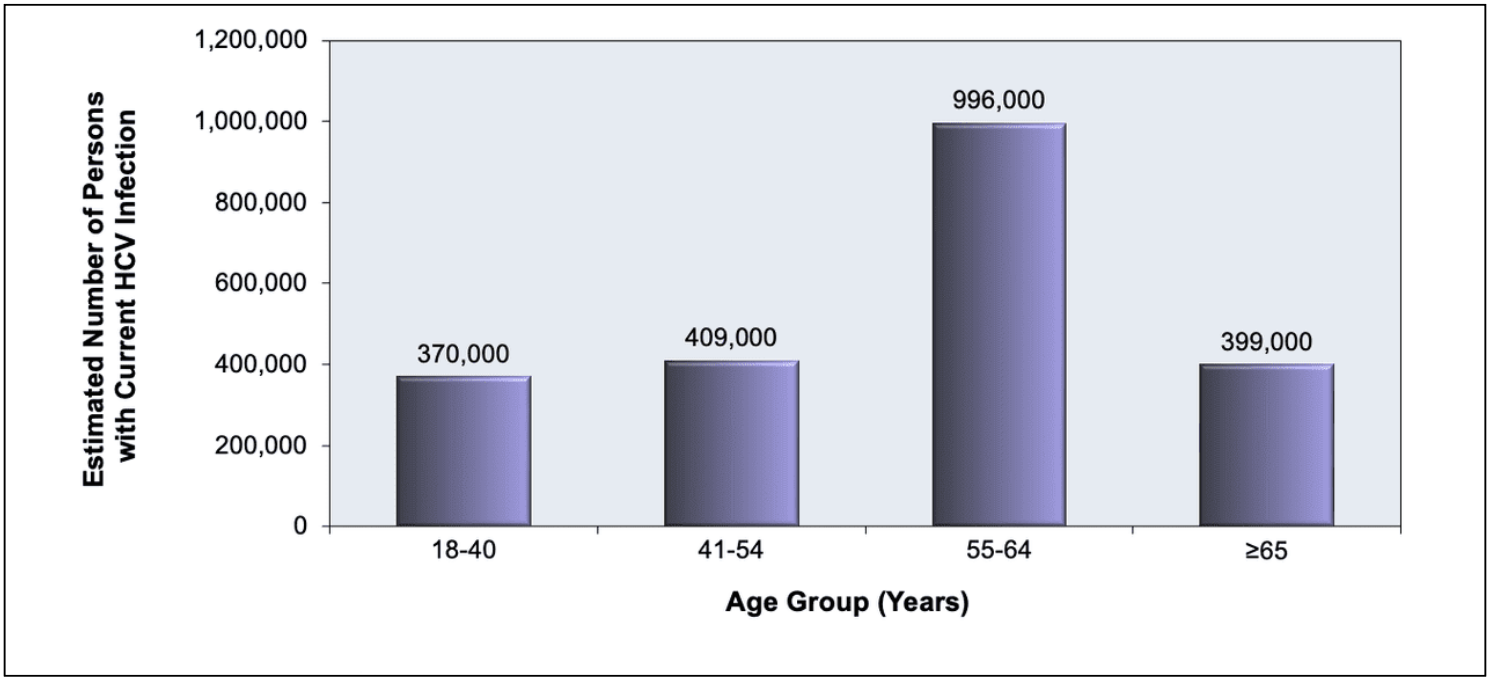

Figure 5 (Image Series) - NHANES HCV Prevalence Estimates, United States
Image 5C: NHANES Estimates HCV Prevalence, 2017-2020, by Race/Ethnicity

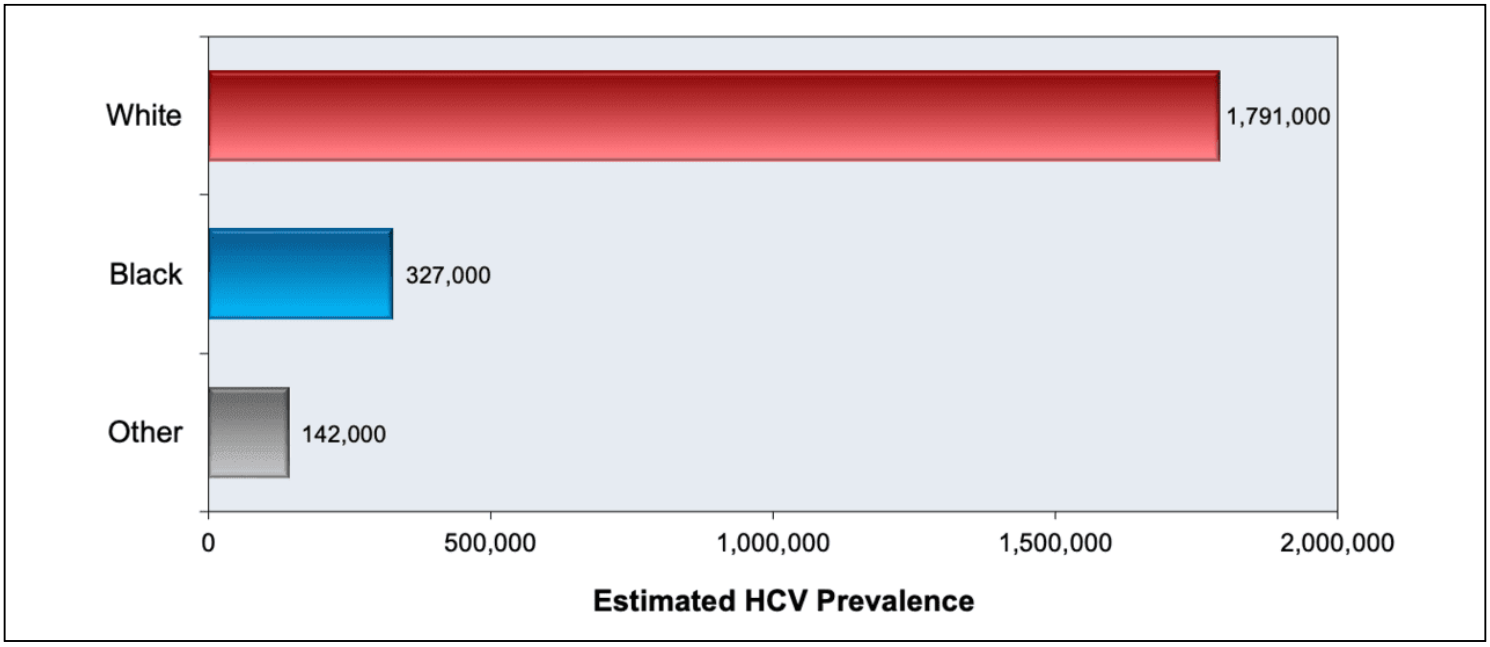

Figure 6 Newly Reported Cases of Chronic HCV infection — United States, 2023

Source: Centers for Disease Control and Prevention (CDC). 2021 Viral Hepatitis Surveillance Report—Hepatitis C. Published April 2025.

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Figure 7 Receptive Syringe or Needle Sharing Among People Who Inject Drugs (PWID) in the United States:

Source: Handanagic S, Finlayson T, Burnett JC, Broz D, Wejnert C. HIV Infection and HIV-Associated Behaviors Among Persons Who Inject Drugs - 23 Metropolitan Statistical Areas, United States, 2018. MMWR Morb Mortal Wkly Rep. 2021;70:1459-65.

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Figure 8 (Image Series) - HCV as a Cause of Death, United States (Image Series) - Figure 8 (Image Series) - HCV as a Cause of Death, United States
Image 8A: Annual HCV-Related Deaths, 2010 to 2023

Source: Centers for Disease Control and Prevention (CDC). 2023 Viral Hepatitis Surveillance Report—Hepatitis C. Published April 2025.

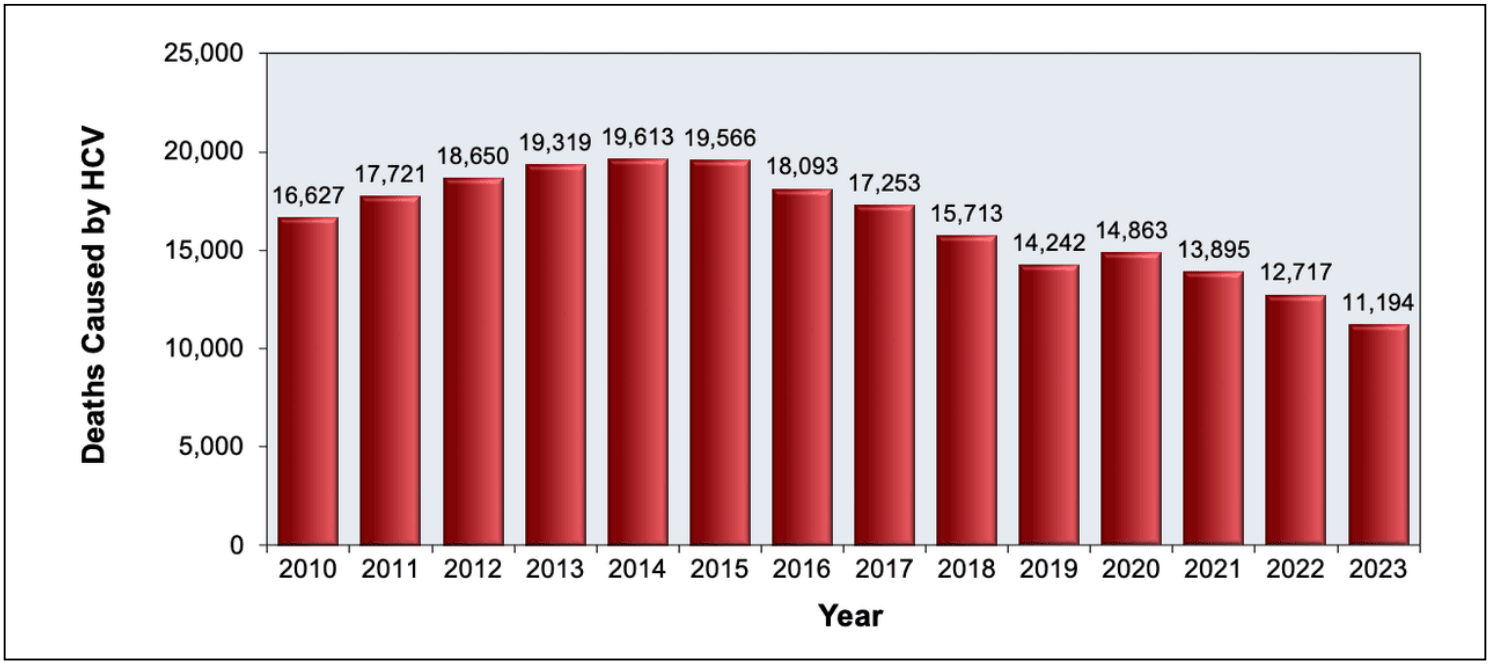

Figure 8 (Image Series) - HCV as a Cause of Death, United States
Image 8B: HCV as Cause of Death, by Sex, 2023

Source: Centers for Disease Control and Prevention (CDC). 2023 Viral Hepatitis Surveillance Report—Hepatitis C. Published April 2025.

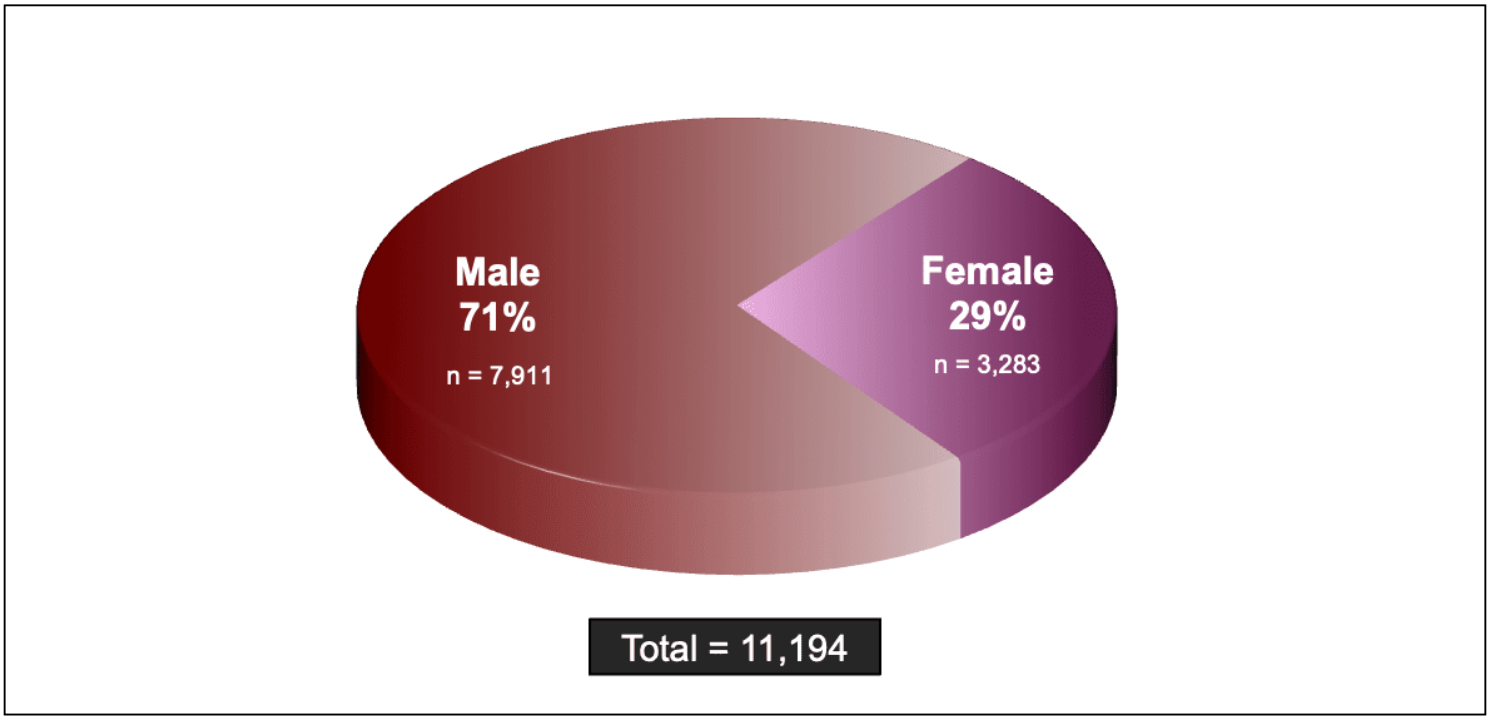

Figure 8 (Image Series) - HCV as a Cause of Death, United States
Image 8C: HCV as Cause of Death, by Race/Ethnicity, 2021

Source: Centers for Disease Control and Prevention (CDC). 2021 Viral Hepatitis Surveillance Report—Hepatitis C. Published August 2023.

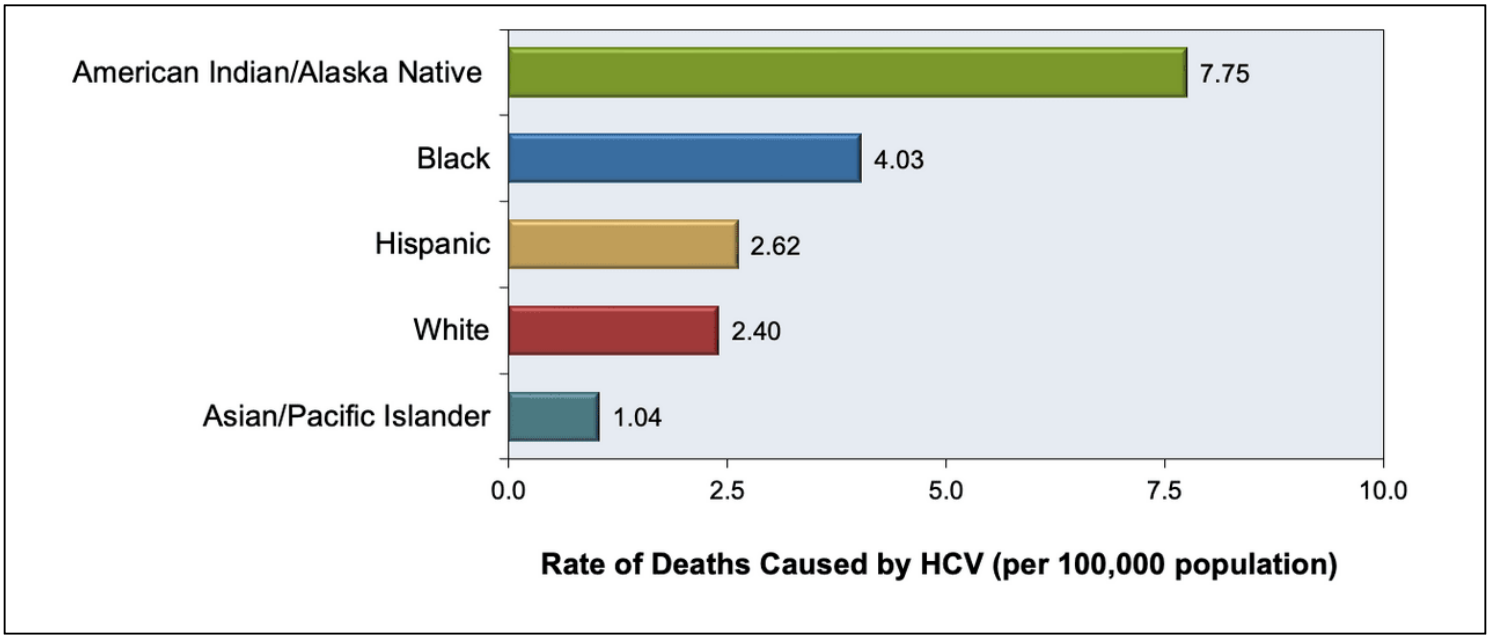

Figure 9 Acute Hepatitis C: 2020 Case Definition—Clinical and Laboratory Criteria

Source: Centers for Disease Control and Prevention (CDC)

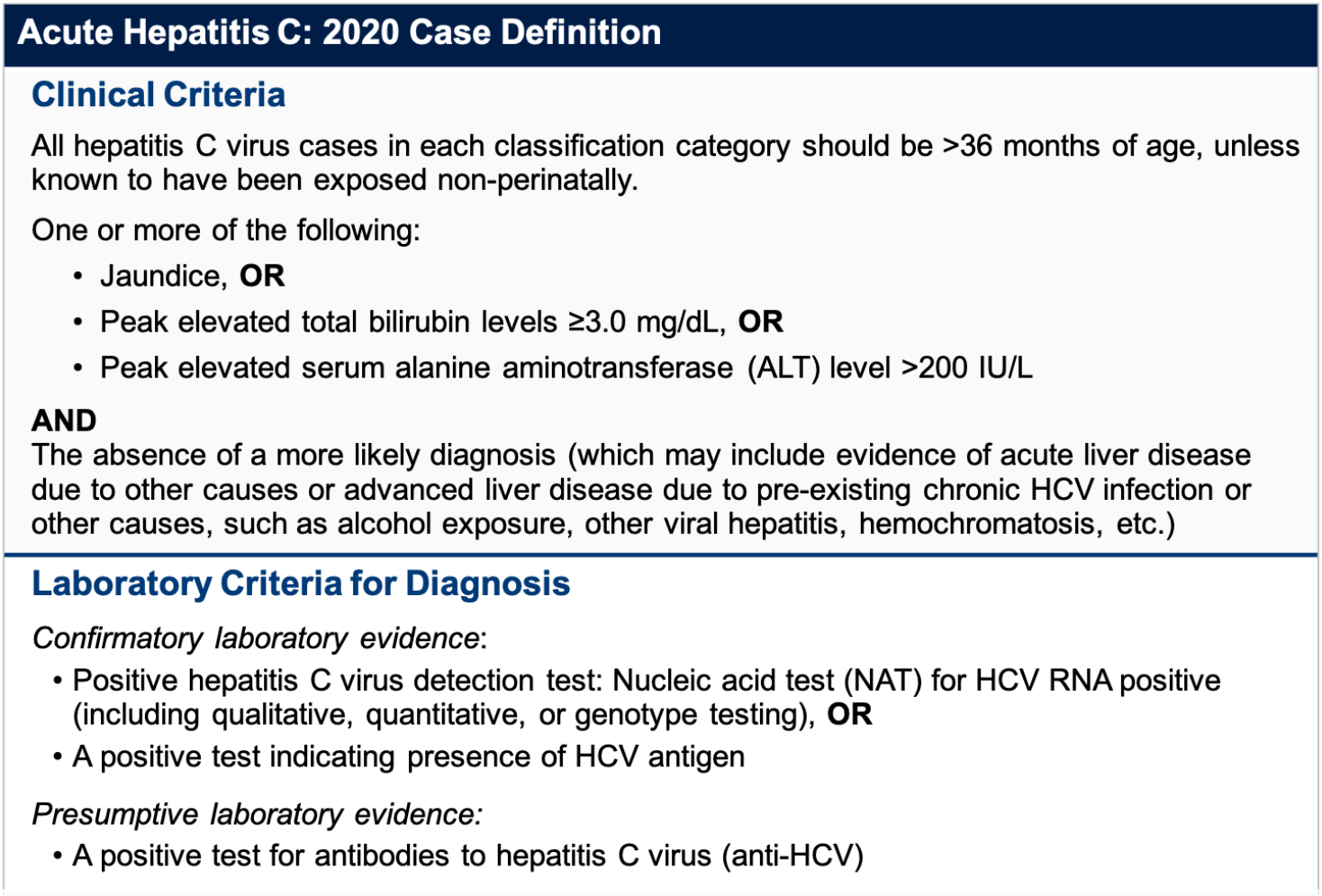

Figure 10 Chronic Hepatitis C: 2020 Case Definition—Clinical and Laboratory Criteria

Source: Centers for Disease Control and Prevention (CDC)