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Estimated Prevalence and Awareness of Hepatitis C Virus Infection Among US Adults: National Health and Nutrition Examination Survey, January 2017–March 2020

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Abstract

During January 2017–March 2020, approximately 2.2 million noninstitutionalized civilian US adults had hepatitis C; one-third were unaware of their infection. Prevalence was substantially higher among persons who were uninsured or experiencing poverty. Unrestricted access to testing and curative treatment is needed to reduce disparities and achieve 2030 elimination goals.

Keywords

hepatitis C; HCV infection; NHANES

Hepatitis C is a leading cause of liver cancer and death from liver disease in the United States. The annual number of new hepatitis C virus (HCV) infections more than doubled during the last decade. In 2020, there were more than 65 000 estimated new infections and almost 15 000 hepatitis C-associated deaths [1]. As noted in the National Health and Nutrition Examination Survey (NHANES), approximately 2.1 million adults were estimated to have HCV infection during 2013–2016 [2]; only 56% were aware of their infection [3]. Despite the availability of curative treatment, a recent NHANES report demonstrates a lack of progress in HCV elimination, with 2.2 million people estimated to have had HCV infection during January 2017–March 2020 [4]. Here, we describe the prevalence of current HCV infection by demographic characteristics and estimate awareness of HCV infection

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status during January 2017–March 2020 to highlight disparities and inform hepatitis C elimination efforts.

METHODS

NHANES is a multistage, stratified probability survey. Data collected during January 2019–March 2020 were combined with data from 2017–2018 to form a nationally representative sample of the US noninstitutionalized civilian population during the 39-month period prior to the coronavirus disease 2019 (COVID-19) pandemic [5]. The National Center for Health Statistics (NCHS) Research Ethics Review Board approved data collection for NHANES.

Blood samples from NHANES participants were tested with an HCV antibody screening test; those with a reactive screening test received an HCV RNA test. Current HCV infection was defined as a person with detectable HCV RNA. Awareness of current HCV infection was defined as a person with detectable HCV RNA who answered "Yes" to the question, "Has a doctor or other health professional ever told you that you have hepatitis C?"

Estimates and 95% confidence intervals (CIs) of current HCV infection and awareness of HCV infection were calculated among persons aged ≥18 years. NHANES examination weights were adjusted to account for missing HCV RNA or HCV antibody results and redistributed within the same sex, age, and race and ethnicity group. Estimates were considered reliable based on published NCHS standards [6] unless otherwise specified. Population estimates were generated using the 2018 American Community Survey Public Use Microdata Sample file [5]. Current HCV infection prevalence was estimated by sex, age, race and ethnicity, health insurance type, and poverty status. Prevalence ratios were calculated to assess associations between demographic characteristics and HCV infection prevalence. Ratios with 95% CIs that excluded the value of 1.0 were considered statistically significant.

RESULTS

During January 2017–March 2020, the estimated prevalence of current HCV infection (HCV RNA reactive) was 0.9% (95% CI, 0.5%–1.4%), or 2.2 million (95% CI, 1.3–3.6 million) persons aged ≥18 years (Table 1). Approximately 67.7% (95% CI, 50.2%–82.2%) were aware of their infection; however, based on published NCHS standards, this estimate was considered unreliable because the absolute CI width was greater than 30% [6].

Persons aged 55–64 years were 6.4 times as likely to have current HCV infection compared with persons aged 18–40 years (prevalence ratio [PR] = 6.4; 95% CI, 2.5–16.4). Males were 2.9 times as likely as females to have current HCV infection (PR = 2.9; 95% CI, 1.1–7.7). Compared with persons of other races and ethnicities, non-Hispanic White and non-Hispanic Black persons were 5 times (PR = 5.0, 95% CI, 1.6–15.7) and 4.9 times (PR = 4.8; 95% CI, 1.7–14.1) as likely, respectively, to have current HCV infection. Prevalence was 5.3 times as high among persons experiencing poverty compared with persons not experiencing poverty (PR = 5.3; 95% CI, 2.3–12.2). Compared with persons with private insurance, persons with public insurance and persons with no insurance were 4.7 times (PR = 4.7; 95% CI, 1.6–14.3)

and 5.8 times (PR = 5.8; 95% CI, 1.7–19.8) as likely, respectively, to have current HCV infection (Table 1).

DISCUSSION

During the pre–COVID-19 pandemic period of January 2017 to March 2020, approximately 2.2 million adults had current HCV infection. Despite the availability of curative treatment, the prevalence of current HCV infection has remained largely unchanged since 2013–2016 [2]. In our analysis, persons experiencing poverty or lacking health insurance had substantially higher prevalence of current HCV infection compared with persons not experiencing poverty and persons with private insurance, highlighting the stark inequities associated with this disease. Recognizing these disparities and implementing programs to address these social determinants of health are critical to combating the hepatitis C epidemic in the United States.

Approximately 68% of persons with current HCV infection were aware of their infection, an improvement from the estimated 56% during 2013–2016 [3]. In April 2020, the Centers for Disease Control and Prevention released augmented hepatitis C screening guidance that recommended that all adults aged ≥18 years be screened at least once in their lifetime, with continued periodic testing for those with ongoing risk factors, and that all pregnant persons be screened during each pregnancy [7]. Implementation of universal screening is a crucial first step to diagnosis and linkage to treatment. Given evidence of dramatic decreases in hepatitis C testing during the COVID-19 pandemic [7, 8], intensified efforts are necessary to make up for lost gains.

Nearly a decade after the introduction of direct-acting antivirals, evidence shows that timely treatment for hepatitis C is still a significant challenge. A recent study found that <35% of continuously insured persons with hepatitis C receive treatment within 1 year of diagnosis. Treatment was even lower among persons in state-administered Medicaid plans [9]. Another analysis estimated that only 1.2 million persons were treated for hepatitis C during 2014–2020, approximately 170 000 persons annually, far below the established hepatitis C elimination goal of treating 260 000 persons annually [10].

Perhaps most illustrative of the disparities associated with this disease, persons experiencing poverty represented more than a third of all current HCV infections, with an HCV infection prevalence more than 5 times the prevalence of those not experiencing poverty. With expanded access to Medicaid under the Affordable Care Act for persons experiencing poverty, more persons with HCV infection could potentially access curative treatment. In addition, unrestricted access to treatment is crucial. A recent analysis found that Medicaid beneficiaries in states with Medicaid restrictions were 23% less likely to receive treatment than those in states without Medicaid restrictions [9]. Removing eligibility restrictions and preauthorization requirements that make it difficult for people to access hepatitis C treatment is essential to reducing disparities.

In our analysis, we estimated that more than half of adults with current HCV infection were aged ≥55 years; however, surveillance data illustrate that newly reported infections

are higher among persons aged 18–40 years [1]. One possible explanation for this apparent discrepancy may be the relatively lower rate of spontaneous clearance among older adults [11]. In addition, younger persons with HCV infection, who most commonly acquire HCV infection through injection drug use [1], may not be adequately represented in NHANES if they are less likely to participate in the survey. In any event, these findings illustrate the need to expand treatment across all age groups and ensure that treatment is offered along with comprehensive services, including harm reduction and treatment for substance use disorder. To reduce barriers and cure hepatitis C in as few visits as possible, treatment should be offered where people with hepatitis C already access services, including primary care offices, community clinics, syringe services programs, substance use treatment centers, and correctional facilities.

This analysis is subject to several limitations. First, because certain groups known to have high hepatitis C prevalence, such as persons in correctional settings and persons experiencing unsheltered homelessness, are excluded from the NHANES sampling frame, this analysis likely underestimates the true prevalence of hepatitis C in the United States. A prior study estimated that an additional 250 000 persons during 2013–2016 unaccounted for by NHANES were also infected with HCV [2]. Second, selection bias may be possible if groups with higher prevalence, such as persons who inject drugs, are less likely to participate in NHANES. Last, the small number of HCV-infected NHANES participants affects the statistical reliability of estimates for some demographic and insurance groups. Despite these limitations, the rigorous systematic design of NHANES allows for an examination of hepatitis C prevalence by important characteristics among a nationally representative sample, which is necessary to inform public health interventions.

Hepatitis C is a deadly disease that disproportionately affects persons who are medically underserved, are experiencing poverty, or have substance use disorder. Even though the NHANES design may yield conservative estimates, the number of persons estimated to have this curable infection is staggering. The Biden–Harris administration recently announced a bold initiative to eliminate hepatitis C in the United States [12]. To make this historic opportunity a reality, increased efforts to reach, test, and treat all people with hepatitis C with curative, life-saving medications are urgently needed to reduce disparities and achieve national hepatitis C elimination goals.

Data availability.

Data used in this study are publicly available and can be accessed via the National Centers for Health Statistics.

References

1. Centers for Disease Control and Prevention. Viral hepatitis surveillance report—United States, 2020. Available at: https://www.cdc.gov/hepatitis/statistics/2020surveillance/index.htm. Published September 2022. Accessed 1 December 2022.
2. Hofmeister MG, Rosenthal EM, Barker LK, et al. Estimating prevalence of hepatitis C virus infection in the United States, 2013–2016. Hepatology 2019; 69:1020–31. [PubMed: 30398671]

3. Kim HS, Yang JD, El-Serag HB, Kanwal F. Awareness of chronic viral hepatitis in the United States: an update from the National Health and Nutrition Examination Survey. J Viral Hepat 2019; 26:596–602. [PubMed: 30629790]

4. Quickstats: percentage of adults aged ≥18 years with current hepatitis C virus infection, by health insurance coverage—National Health and Nutrition Examination Survey, United States, January 2017—March 2020. MMWR Morb Mortal Wkly Rep 2022; 71:1035. [PubMed: 35951492]

5. Akinbami LJ, Chen TC, Davy O, et al. National Health and Nutrition Examination Survey, 2017–March 2020 prepandemic file: sample design, estimation, and analytic guidelines. Vital Health Stat 1 2022; 190:1–36.

6. Parker JD, Talih M, Malec DJ, et al. National Center for Health Statistics data presentation standards for proportions. Vital Health Stat 2 2017; 175:1–22. Available at: https://www.cdc.gov/nchs/data/series/sr_02/sr02_175.pdf. Accessed 18 December 2022.

7. Schillie S, Wester C, Osborne M, Wesolowski L, Ryerson AB. CDC recommendations for hepatitis C screening among adults—United States, 2020. MMWR Recomm Rep 2020; 69:1–17.

8. Kaufman HW, Bull-Otterson L, Meyer WA III, et al. Decreases in hepatitis C testing and treatment during the COVID-19 pandemic. Am J Prev Med 2021; 61: 369–76. [PubMed: 34088556]

9. Thompson WW, Symum H, Sandul A, et al. Vital signs: hepatitis C treatment among insured adults—United States, 2019–2020. MMWR Morb Mortal Wkly Rep 2022; 71:1011–7. [PubMed: 35951484]

10. Teshale EH, Roberts H, Gupta N, Jiles R. Characteristics of persons treated for hepatitis C using national pharmacy claims data, United States, 2014–2020. Clin Infect Dis 2022; 75:1078–80. [PubMed: 35171997]

11. Aisyah DN, Shallcross L, Hully AJ, O'Brien A, Hayward A. Assessing hepatitis C spontaneous clearance and understanding associated factors—a systematic review and meta-analysis. J Viral Hepat 2018; 25:680–98. [PubMed: 29345844]

12. Fleurence RL, Collins FS. A national hepatitis C elimination program in the United States: a historic opportunity. JAMA 2023; 329:1251–2. [PubMed: 36892976]

Table 1.

Prevalence of Hepatitis C Virus Infection Among U.S. Adults by Demographic Characteristics, January 2017–March 2020

Characteristic	Sample Size	Hepatitis C Virus RNA detected, No.	Prevalence, % (95% CI*)	Prevalence ratio (95% CI)	Population, No. (95% CI)
Overall	8269	89	0.9 (0.5-1.4)		2,228,000 (1,278,000-3,604,000)
Sex					
Male	4011	64	1.4 (0.6-2.5)	2.9 (1.1-7.7)	1,622,000 (764,000-3,007,000)
Female	4258	25	0.5 (0.2-1.0)	ref	605,000 (248,000-1,231,000)
Age, years					
18–40	2877	12	0.4 (0.2-0.7)	ref	370,000 (157,000-737,000)
41-54	1773	16	0.7 (0.3-1.4)	1.2 (0.6-6.1)	409,000 (176,000-806,000)
55-64	1605	38	2.4 (1.0-4.8)	6.4 (2.5-16.4)	996,000 (403,000-2,025,000)
65+	2014	23	0.8 (0.3-1.6)	2.1 (0.7-6.5)	399,000 (153,000-842,000)
Race and ethnicity					
Black, NH	2086	39	1.1 (0.6-1.8)	4.8 (1.7-14.1)	327,000 (189,000-524,000)
White, NH	2918	39	1.1 (0.5-2.1)	5.0 (1.6-15.7)	1,791,000 (830,000-3,360,000)
Other[†]	3265	11	0.2 (0.1-0.5)	ref	142,000 (47,000-328,000)
Health insurance[¶]					
Any public	3894	54	1.3 (0.6-2.6)	4.7 (1.6-14.3)	1,346,000 (596,000-2,597,000)
Only private	2983	11	0.3 (0.1-0.7)	ref	324,000 (89,000-824,000)
No insurance	1392	24	1.6 (0.8-3.0)	5.8 (1.7-19.8)	574,000 (273,000-1,058,000)
Poverty status[§]					
Below poverty guidelines	1410	40	2.8 (1.1-5.8)	5.3 (2.3-12.2)	795,000 (308,000-1,655,000)
At or above poverty guidelines	5726	31	0.5 (0.2-1.0)	ref	992,000 (466,000-1,846,000)
Missing	1133	18	1.5 (0.7-2.7)	2.8 (1.1-7.0)	477,000 (232,000-864,000)

Abbreviations: CI, confidence interval; NH, non-Hispanic

[a] All CIs account for the multistage, clustered survey design. Prevalence estimates are shown with Clopper-Pearson exact CIs; prevalence ratio estimates are shown with CIs derived from Taylor series variance estimates.

[b] Prevalence ratios were calculated using a predicted marginals from unadjusted regression models.

[c] Other category includes non-Hispanic Asian, multiple race, and all other races.

[d] Public insurance includes adults who report having Medicare, Medicaid, Medi-Gap, Children's Health Insurance Program, state-sponsored or other government health plans. Private insurance includes adults who do not report having any public insurance but have some form of private insurance. No insurance includes adults who reported no insurance or whose insurance status was unknown.

[e] Persons were considered experiencing poverty if their family income was below 100% of the federal poverty guidelines.