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**Estimating prevalence of hepatitis C virus infection in the United States, 2013–2016**

Megan G. Hofmeister,1,2 Elizabeth M. Rosenthal,3 Laurie K. Barker,1 Eli S. Rosenberg,3 Meredith A. Barranco,3 Eric W. Hall,4 Brian R. Edlin,5 Jonathan Mermin,5 John W. Ward,1,6 A. Blythe Ryerson1

1Division of Viral Hepatitis, Centers for Disease Control and Prevention, Atlanta, Georgia 2Epidemic Intelligence Service, Centers for Disease Control and Prevention, Atlanta, Georgia 3Department of Epidemiology and Biostatistics, University at Albany School of Public Health, State University of New York, Rensselaer, New York

4Department of Epidemiology, Rollins School of Public Health, Emory University, Atlanta, Georgia

5National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, Centers for Disease Control and Prevention, Atlanta, Georgia

6Program for Viral Hepatitis Elimination, The Task Force for Global Health, Decatur, Georgia

SUPPLEMENTARY MATERIALS INTENDED FOR ONLINE PUBLICATION ONLY

**Population-Specific Analytic Approaches**

*Incarcerated*

To estimate prevalence, we included a literature-based estimate of HCV prevalence for incarcerated individuals by calculating both the HCV antibody and HCV RNA prevalence from seven studies using a random effects model and study sample size as weights.(1-8) When necessary, HCV antibody prevalence estimates were adjusted to reflect HCV RNA prevalence as described in the methods. To estimate population size, we used the population estimate for incarcerated persons from the 2016 Bureau of Justice Statistics Correctional Population.(9)

*Homeless*

The HCV prevalence estimate for the homeless population was based on a published estimate from a Federally Qualified Health Center (FQHC) that exclusively serves homeless patients.(10) This estimate was a part of a larger analysis of five FQHCs, which did not provide the actual number of persons tested for HCV RNA in each FQHC. As a result, we adjusted the HCV RNA prevalence by the 92.4% of the population who were tested for HCV RNA as the product of the reported percent antibody prevalence and the percent RNA-positive among those antibody positive and tested for RNA. The homeless population size used in this analysis was restricted to unsheltered homeless, based on an assessment of NHANES and the American Community Survey methodological materials that suggested sheltered homeless individuals are included in both samples. This estimate was from the U.S. Department of Housing and Urban Development 2016 person-in-time counts.(11-15) Children younger than 18 years old, and adults from Guam, Puerto Rico, and the U.S. Virgin Islands were excluded from the national unsheltered homeless population size estimate to ensure consistency across the population size estimates.

*Active-duty military*

Insufficient evidence exists to suggest that the active-duty military population has differential risk for HCV infection higher than the general population after accounting for the age and sex distribution of this population.(16, 17) Thus, we applied the age- and sex-specific NHANES prevalence using publicly available 2013-2016 NHANES data to the 2016 active-duty military population for an overall active-duty military HCV prevalence.(18) Age groups used for NHANES and the military population estimates were 18-40 years old and ≥41 years old to match those of the active-duty military demographics report.(18) Active-duty military are included in the ACS estimate used for this analysis. Our analytic approach involved removing the active-duty military population size from the 2012-2016 ACS population on which the NHANES prevalence estimate is placed, multiplying the active-duty military population size by the abovementioned NHANES-based age-specific prevalence estimate, and adding the population back into the NHANES population with the new prevalence values.

*Nursing homes*

Similar to the active-duty military population, evidence is insufficient to suggest that the nursing home population has a greater risk for HCV than the general population after accounting for the age and sex distribution of the population.(16, 17) We applied the age- and sex-specific NHANES prevalence using publicly available 2013-2016 NHANES data to the 2016 scaled population to achieve a standardized estimate. To align with the National Survey of Long-Term Care Providers, age groups used were 50-64 years, 65-74 years, and ≥75 years.(19) The population size estimate for nursing home residents is from the 2013-2014 National Survey of Long-Term Care Providers.(19) This 2013-2014 estimate was scaled to the age and sex distribution of the 2016 ACS population using a ratio of 2016 to 2014 ACS population in six strata of the abovementioned age groups by sex.

**Divergences from other Work**

Previous methodology to achieve a more accurate national HCV prevalence estimate than can be obtained from NHANES data alone added the hospitalized population to the NHANES estimate (16); however, noninstitutionalized civilian patients in short-term hospitals are included in the ACS and NHANES sampling frames.(20, 21) The NHANES non-response adjustments would have accounted for persons hospitalized during all visits of the 8-week NHANES sampling period along with others who could not be contacted for any other reason. There is insufficient representative evidence that short-term hospitalized patients are at greater risk for HCV than the noninstitutionalized civilian population.(16, 17) Thus, the hospitalized population was not added to the NHANES-based 2013-2016 prevalence estimates.

Previous studies have established that residents of American Indian/Alaska Native (AI/AN) reservations and tribal lands have a higher prevalence of HCV.(16, 22) We performed a sensitivity analysis which included a prevalence estimate specific to people living in AI/AN areas. This involved a literature-based HCV prevalence estimate for people living in AI/AN areas from a recent article that reported HCV RNA prevalence among attendees of the Cherokee Nation Health Services.(22) Reviewing ACS methodology, we determined, in contrast to earlier approaches, that the ACS samples represent AI/AN lands including federal reservations and/or off-reservation trust lands, Oklahoma tribal statistical areas, tribal designated statistical areas, state reservations, state designated American Indian statistical areas, and Alaska Native village statistical areas.(20) The population living on these native lands, inclusive of all races, is included in the NHANES sampling frame.(21) Because these populations are included in the underlying ACS population but may not be fully represented in the NHANES sampling frame, we addressed this by analytically removing the 2012-2016 ACS population size for residents of native lands from the ACS-based NHANES population size, multiplying this by the literature-based HCV prevalence estimate, and adding the resulting numbers of persons infected back in to the sensitivity analysis results.

In a separate study of the overall HCV prevalence in the United States, the HCV prevalence among high-risk populations that were technically included in the NHANES sampling frame but are relatively few in number (e.g., persons who inject drugs [PWID] and hemophiliacs) was also added onto NHANES-based national estimates.(17) We performed a sub-analysis (not shown) to determine whether the NHANES national HCV prevalence was sufficient to account for the estimated increase in HCV prevalence among PWID. We concluded that the NHANES national HCV prevalence is the best representation of this largest high-risk group. For the remaining, smaller high-risk groups included in the NHANES sampling frame but potentially sparsely represented, population sizes were sufficiently small that it is reasonable to assume they would not have substantially altered the NHANES HCV prevalence estimate.

**Literature Review**

*Search terms*

The literature searches for the incarcerated population, homeless population, and people living in AI/AN areas were completed using PubMed on January 8, 2018. The search parameters were restricted to articles written in English, involving humans, and published January 1, 2013 through December 31, 2017. The exact search terms utilized were:

* (((("hepatitis C") OR "HCV") AND "prison") OR "jail") OR "correctional"
* ((((("hepatitis C") OR "HCV") AND "homeless") OR "homeless persons") OR "housing unstable") OR "housing insecure"
* ((((("hepatitis C") OR "HCV") AND "Native American") OR "American Indian") OR "Alaska Native") OR "Indian, North American"

*Results: People living in AI/AN areas*

The literature review for hepatitis C prevalence data for people living in AI/AN areas yielded 1,120 unique articles, of which only one met the inclusion criteria.(22) Mera *et al*. reported an HCV antibody prevalence of 4.3% and RNA prevalence of 3.4%.(22)

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