Treating Hepatitis C in Individuals With Previous Incarceration: The Veterans Health Administration, 2012–2019

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To determine whether the Veterans Health Administration's (VHA) hepatitis C (HCV) treatment campaign reached marginalized populations, we compared HCV care by previous incarceration status with Veterans Aging Cohort Study data. Of those with and those without previous incarceration, respectively, 40% and 21% had detectable HCV, 59% and 65% underwent treatment ($P = .07$); 92% and 94% of those who completed treatment achieved sustained virologic response. The VHA HCV treatment effort was successful and other systems should replicate those efforts. (*Am J Public Health*. 2023;113(2):162–165. https://doi.org/10.2105/AJPH.2022.307152)

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The Veterans Health Administration (VHA) is the country's largest provider of hepatitis C (HCV) treatment and has identified universal treatment of patients with HCV as a strategic goal. The VHA has recommended broad testing eligibility and reflex confirmation testing since at least 2012.[1] Treatment eligibility has been expanded to include patients regardless of fibrosis stage or comorbid substance use disorders, and treatment is provided at minimal out-of-pocket cost.[1]

INTERVENTION AND IMPLEMENTATION

The VHA developed hepatitis C innovation teams to identify and minimize barriers to treatment of difficult to reach populations by implementing direct outreach programs, increasing staffing for patients experiencing homelessness, expanding pharmacy prescribing privileges, expanding telehealth services, and integrating HCV treatment into opioid treatment programs.[2] As of December 2017, the VHA treated approximately 70% of all those across their system with HCV viremia.[3]

Although engaging difficult to reach populations was a goal of the program, we do not know whether VHA efforts resulted in equitable HCV screening, treatment, and outcomes among disenfranchised populations. Individuals with previous incarceration have disproportionately higher rates of HCV but experience myriad barriers to health care, including decreased access to employment and health insurance, social instability, and discrimination in the health system.[4] Previous incarceration is associated with worse health outcomes in other chronic diseases, including HIV and hypertension,[5,6] thus examining their outcomes would provide a strong indicator of equitable access to care in the VHA.

PLACE, TIME, AND PERSONS

The Veterans Aging Cohort Study (VACS) survey sample is part of an ongoing national observational cohort study of veterans in care with and without HIV at eight sites. Our analytic sample included 1632 participants with and 1477 without HIV who completed a survey between October 2012 and June 2019, answered the survey question about the personal history of incarceration, and were born between 1945 and 1965. Of the 3109 participants in the analytic sample, 96% were male, 64% Black, 27% White, and 8% Hispanic; their ages ranged from 49 to 70 years.

PURPOSE

After the development of a highly effective and tolerated treatment of HCV, the VHA pursued a goal of universal treatment in an effort to eradicate HCV in its patient population.[2] To understand whether individuals with previous incarceration were included in these efforts, we used data from VACS to compare the HCV treatment cascade steps between those with and those without previous incarceration. Because the cohort was initially designed to study HIV, we also ran analyses comparing the treatment cascade steps between those with and those without HIV, stratified by previous incarceration status.

EVALUATION AND ADVERSE EFFECTS

We linked VACS data to the VHA electronic health records, including laboratory and pharmacy data, via the Clinical Data Warehouse; the methods have been described elsewhere.[7] We included these HCV treatment cascade steps[8]: HCV screening, viral load (VL) confirmation, initiation of direct-acting antiviral (DAA) treatment starting January 1, 2014 (the year DAAs became available), completion of DAA treatment by February 19, 2019, VL suppression at last test, and sustained virologic response (SVR). All participants were eligible for screening per the US Preventive Service Task Force recommendations during the study period, using HCV antibody or RNA polymerase chain reaction VL tests.

We considered those with a positive VL to have chronic HCV and to be eligible for DAA treatment. DAA initiation was based on receiving at least one DAA medication fill in the VHA. We identified DAA completion by patients having at least eight weeks of DAA medication filled in the VHA, the minimum recommended time according to guidelines.[9] We measured VL suppression at last test because more than 90% with undetectable VL after treatment completion will remain so at 12 weeks, but some may not return for follow-up lab testing.[10] We considered SVR achieved by the presence of an undetectable VL at least 12 weeks after treatment completion, reflecting current clinical guidelines.

Of the 3109 VACS participants included in this study, 1817 (58%) reported a history of incarceration. HCV screening was conducted in 99% of those with and those without previous incarceration; and VL confirmation occurred for 99% and 98% of those with and those without previous incarceration, respectively. HCV prevalence was 40% and 21% among those with and those without previous incarceration, respectively ($P < .001$). Figure 1 shows the treatment cascade by previous incarceration among the 993 patients eligible for treatment. Among those with HCV, 599 (60%) underwent treatment (59% previous incarceration, 65% without previous incarceration; $P = .07$), and 541 (55%) completed therapy (53% previous incarceration, 59% without previous incarceration; $P = .11$). The treatment cascade was also similar by HIV status (Figure 2).

Of the 599 who initiated treatment, 90% for those with and those without previous incarceration completed eight weeks of treatment. Of the 541 who completed eight weeks of treatment, more than 98% had VL suppression at last test and 93% achieved SVR (92% previous incarceration, 94% without previous incarceration; $P = .58$).

SUSTAINABILITY

This model can serve as an example for other health care systems to achieve high rates of HCV cure. Tactics that can be applied to other systems include broad testing and treatment eligibility and reflex testing for positive screens, expanding prescribing privileges to include pharmacists, broadening telehealth services, integrating HCV treatment into opioid treatment programs and homeless shelters, and minimizing cost sharing.

PUBLIC HEALTH SIGNIFICANCE

Amid a historic effort to reduce barriers to HCV care in the VHA, HCV cascade outcomes were similar among those with and those without self-reported previous incarceration in those born from 1945 to 1965 and participating in VACS. Screening and confirmation of HCV occurred in more than 98% of cases including among those with previous incarceration, which is substantially higher than other published screening rates.[11] DAA initiation, treatment completion, and viral suppression were slightly lower for those with previous incarceration than those without previous incarceration, but the differences were not statistically significant. Of those who initiated treatment, a high and similar percentage (> 90%) in those with and those without previous incarceration completed treatment and achieved SVR. Future research should also evaluate whether the treatment cascade differs by region or recent incarceration.

The VHA's provision of universal and systematized delivery of HCV treatment can be used as a model for increasing both resources and

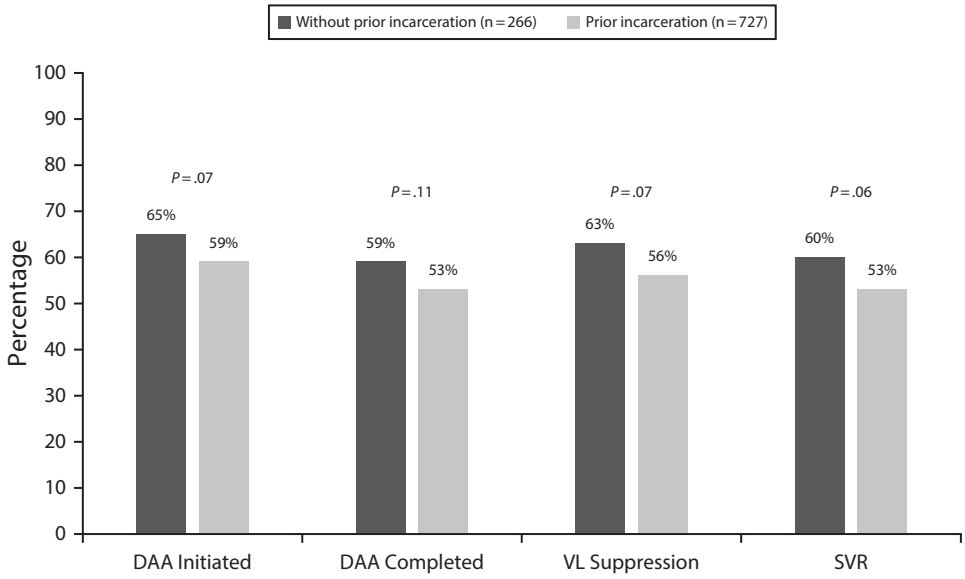

FIGURE 1— HCV Treatment Cascade by Previous Incarceration Status Among Those in the Veterans Aging Cohort Study Survey Sample With Confirmed Chronic HCV: United States, October 2012–June 2019

Note. DAA = direct-acting antiviral; HCV = hepatitis C; SVR = sustained virologic response at 12 wk; VL = viral load. Study population size was n = 993.

public health infrastructure to combat HCV and other infectious diseases, in addition to reducing disparities. For the United States to achieve the World Health Organization's goal of HCV eradication by 2030, urgent attention should be paid to understanding which VHA-initiated efforts could be replicated in other health care systems or used for public health strategies outside the VHA. AJPH

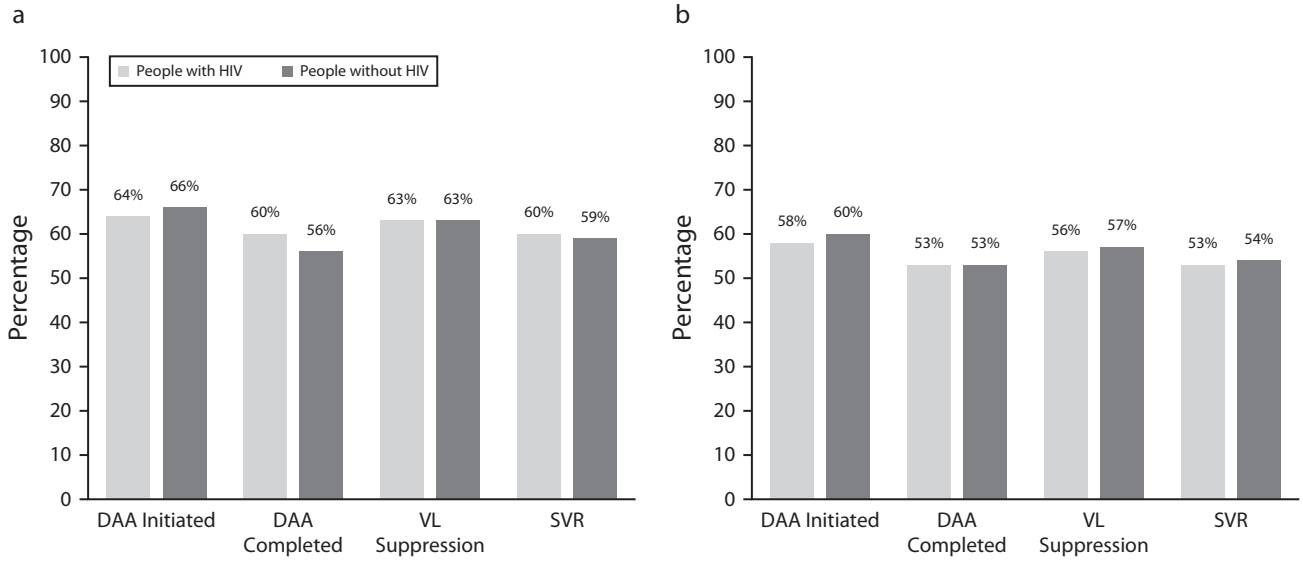

FIGURE 2— HCV Treatment Cascade by HIV Among Those in the Veterans Aging Cohort Study Survey Sample With Confirmed Chronic HCV and (a) Without Prior Incarceration and (b) With Prior Incarceration: United States, October 2012–June 2019

Note. DAA = direct-acting antiviral; HCV = hepatitis C; SVR = sustained virologic response at 12 wk; VL = viral load. Study population size was n = 993. There were no statistically significant differences in the treatment cascade steps by HIV status (all $P \geq .5$).

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CONTRIBUTORS

L. Hawks drafted and designed the tables and figures and wrote the first draft of the article. L. Hawks, E. A. Wang, A. C. Justice, and K. A. McGinnis conceptualized the study design. L. Hawks and K. A. McGinnis verified the underlying data. K. McInnes analyzed the data. All authors approved the final study design, contributed to reviewing and editing the final draft, had access to the data, and accept responsibility to submit the article for publication.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest or financial disclosures.

HUMAN PARTICIPANT PROTECTION

The institutional review boards at all eight VACS locations (Atlanta, GA; Baltimore, MD; Bronx, NY; New York City, NY; Houston, TX; Los Angeles, CA; Pittsburgh, PA; and Washington, DC) approved this study. All participants provided written consent before enrollment.

REFERENCES

1. Belperio PS, Chartier M, Ross DB, Alaigh P, Shulkin D. Curing hepatitis C virus infection: best practices from the US Department of Veterans Affairs. *Ann Intern Med.* 2017;167(7):499–504. https://doi.org/10.7326/M17-1073
2. Gonzalez R, Park A, Yakovchenko V, et al. HCV elimination in the US Department of Veterans Affairs. *Clin Liver Dis (Hoboken).* 2021;18(1):1–6. https://doi.org/10.1002/cld.1150
3. Belperio PS, Chartier M, Gonzalez RI, et al. Hepatitis C care in the Department of Veterans Affairs: building a foundation for success. *Infect Dis Clin North Am.* 2018;32(2):281–292. https://doi.org/10.1016/j.idc.2018.02.011
4. Nowotny KM, Kuptsevych-Timmer A. Health and justice: framing incarceration as a social determinant of health for Black men in the United States. *Sociology Compass.* 2018;12(3): e12566. https://doi.org/10.1111/soc4.12566
5. Howell BA, Long JB, Edelman EJ, et al. Incarceration history and uncontrolled blood pressure in a multi-site cohort. *J Gen Intern Med.* 2016;31(12): 1496–1502. https://doi.org/10.1007/s11606-016-3857-1
6. Iroh PA, Mayo H, Nijhawan AE. The HIV care cascade before, during, and after incarceration: a systematic review and data synthesis. *Am J Public Health.* 2015;105(7):e5–e16. https://doi.org/10.2105/AJPH.2015.302635. [Erratum in: *Am J Public Health*. 2018;108(3):e18].
7. Justice AC, Dombrowski E, Conigliaro J, et al. Veterans Aging Cohort Study (VACS): overview and description. *Med Care.* 2006;44(8 suppl 2):S13–S24. https://doi.org/10.1097/01.mlr.0000223741.02074.66
8. Maier MM, Ross DB, Chartier M, Belperio PS, Backus LI. Cascade of care for hepatitis C virus infection within the US Veterans Health Administration. *Am J Public Health.* 2016;106(2):353–358. https://doi.org/10.2105/AJPH.2015.302927
9. American Association for the Study of Liver Diseases; Infectious Diseases Society of America. Simplified HCV Treatment Algorithm for Treatment-Naive Adults Without Cirrhosis. 2020. Available at: https://www.hcvguidelines.org/treatment-naive/simplified-treatment. Accessed March 31, 2021.
10. Corcorran MA, Kim HN. Monitoring during and after HCV treatment. October 12, 2020. Available at: https://www.hepatitisc.uw.edu/go/treatment-infection/monitoring/core-concept/all. Accessed March 31, 2021.
11. Rodriguez CV, Rubenstein KB, Linas B, Hu H, Horberg M. Increasing hepatitis C screening in a large integrated health system: science and policy in concert. *Am J Manag Care.* 2018;24(5): e134–e140.