

Despite High Hepatitis C Virus Testing, Treatment Gaps Remain: A Study Among Syringe Services Program Participants in Massachusetts

LEAH C. SHAW, BA, MPH; KATIE B. BIELLO, MPH, PhD; DARIEN M. SPROESSER, BA, MPH; YUNI S. JIMENEZ, BA; MARGUERITE E. BEISER, BA, ANP-BC, AAHIVS; KATRINA BAUMGARTNER, MD; DOUGLAS S. KRAKOWER, MD; MICHELLE BORDEU, BS, MPH; MATTHEW J. MIMIAGA, MA, MPH, ScD; CHRISTOPHER M. BOSITIS, MD; ANGELA R. BAZZI, MPH, PhD

ABSTRACT

BACKGROUND: People who inject drugs are less likely to initiate hepatitis C virus (HCV) treatment, and less likely to achieve sustained virologic response if they do start, than the general population. The objective of this analysis was to examine whether healthcare experiences were associated with HCV testing and treatment outcomes among people who inject drugs in Massachusetts.

METHODS: We analyzed baseline data from an HIV prevention study, which enrolled participants from two Massachusetts syringe service programs from 2020 to 2025. We assessed lifetime HCV testing and treatment outcomes, sociodemographics, substance use behaviors, and healthcare experiences (e.g., comfort with providers) and calculated bivariate associations.

RESULTS: Among 185 participants (median age of 40, 43% cisgender women), 97% had ever been tested for HCV; 71% of those tested had ever received a positive test result. However, among those who tested positive, only 41% initiated treatment. Most participants reported comfort discussing their injection drug use with a provider (79%) and feeling welcome in medical clinics (75%). Cisgender men and those feeling welcome in medical clinics reported higher proportions of treatment initiation compared to their counterparts (both $p < 0.05$).

CONCLUSIONS: Despite pervasive testing and high treatment completion rates, treatment initiation remains suboptimal. Feeling welcome in medical clinics may be an important, modifiable indicator of HCV treatment engagement. The gap between HCV testing and treatment initiation persists. Understanding factors that shape HCV testing and treatment engagement can generate actionable insights for ongoing elimination efforts in New England.

KEYWORDS: Hepatitis C; injection drug use; homelessness; needle-exchange programs; community health

INTRODUCTION

Of the approximately 2.2 million people who inject drugs (PWID) in the United States (US), 40% are estimated to be living with the hepatitis C virus (HCV).¹ With short, highly effective (i.e., 95% cure), well-tolerated,² and cost-effective³ direct-acting antiviral (DAA) regimens, HCV is curable.^{4,5} However, despite the widespread availability of DAAs, treatment engagement is suboptimal: only about 20% of Medicaid enrollees initiate treatment within six months of diagnosis,⁶ and PWID are even less likely to initiate treatment.⁶

Massachusetts has a well-established system of HCV testing, surveillance,⁷ and pathways to community-based care, while sharing similar harm reduction infrastructure (e.g., availability of naloxone and safe supplies through community-based settings), overlapping drug use patterns (e.g., decreasing injection drug use), and a public health insurance landscape (e.g., expanded access to Medicaid) with Rhode Island. It is well understood that there are overlapping networks of PWID across New England, shown by prior work on sexual mobility and substance use as well as HCV genomic clusters.^{8,9}

Prior work with PWID within and beyond New England highlights the significance of trusting provider relationships and the detrimental impacts of stigma on HCV outcomes, including HCV treatment initiation and retention in care, leading to cure.^{10–12} Understanding the factors that shape HCV testing and treatment engagement among PWID in Massachusetts can therefore generate actionable insights for Rhode Island's ongoing elimination efforts.¹³

Our objective was to examine whether participant-reported healthcare experiences (e.g., comfort with providers, feeling welcome in medical settings) were associated with HCV testing and treatment outcomes among PWID in Massachusetts, with the aim of informing evidence-based strategies relevant to New England.

MATERIALS & METHODS

Study Design

"PrEP for Health" is a randomized controlled trial (NCT 04430257) focused on improving HIV pre-exposure prophylaxis uptake and retention among PWID recruited from two syringe service programs (SSPs) in Massachusetts between 2020 and 2025.¹⁴ Eligibility included age ≥ 18 years,

past-month injection drug use, and HIV-negative status. The Institutional Review Board at Fenway Health approved all study protocols, and each participant provided written informed consent.

Data Collection

Baseline surveys assessed HCV testing and treatment experiences (e.g., lifetime testing, receipt of positive test from a clinical provider, treatment initiation, treatment completion), sociodemographics (e.g., age, gender identity), substance use patterns (e.g., substances used in the past month, frequency of injection in the past month, drug-related overdose in the past three months), healthcare access and utilization (e.g., recent injection-associated infection, past-year HIV testing), and healthcare experiences (e.g., comfort with providers, feeling welcome in medical settings). Additional measure details are outlined in the Supplementary Materials. [Editor's note: Email the corresponding author for all supplementary material and tables.]

Analysis

We stratified variables by HCV testing and treatment experiences, and calculated medians and interquartile ranges for continuous variables and frequencies and row percentages for categorical variables (column percentages are shown in **Supplementary Table 1**). We report proportions and *p*-values from Chi-square tests for categorical variables with cell sizes ≥ 5 , Fisher's exact test for categorical variables with cell sizes < 5 , or Wilcoxon Rank Sum test for continuous variables. Bolded text indicates that a finding was statistically significant; **Supplemental Table 2** outlines the type of test and corresponding *p*-value for each statistical test.

RESULTS

Overall Sample

Among 185 participants, the median age was 40 years, 69% identified as non-Hispanic White, 55% as cisgender men, and 90% reported past-month homelessness or unstable housing [Table 1, Table 2]. Ninety percent of participants reported past-month homelessness or unstable housing, and over one-quarter (26%) had experienced a drug-related overdose in the past three months. Most people reported having a healthcare provider with whom they felt comfortable discussing their injection drug use (79%) and feeling welcome in medical clinics (75%).

HCV Testing & Treatment

Of the 179 (97%) participants who had ever been tested for HCV, 71% (*n*=127) had ever received a positive HCV test result. Among participants who had ever received a positive test (*n*=127), only 41% (*n*=52) had ever initiated treatment, and 32% had ever completed treatment (*n*=41). Among participants who had ever initiated treatment, 79% (*n*=41) reported completing treatment [Figure 1].

Table 1. Sociodemographics and other key variables of interest among a cohort of 185 people who use drugs in Massachusetts, across self-reported prior HCV testing and receipt of positive result. Row percentages are shown below; bolded values indicate statistical significance of $p < 0.05$.

	Overall, N=185	Tested, n=179 (97%)	Received positive result, n=127 (71%)
Age (years), median (IQR)	40 (34, 47)	40 (35, 47)	40 (36, 47)
Gender identity ^a			
Cisgender man	102 (55.1)	98 (96.1)	71 (72.5)
Cisgender woman	79 (42.7)	77 (97.5)	53 (68.8)
Non-binary or transgender	4 (2.2)	4 (100.0)	3 (75.0)
Race/ethnicity ^b			
White and non-Hispanic	128 (69.2)	125 (97.7)	95 (76.0)
Other race(s) and/or Hispanic of any race	57 (30.8)	54 (94.7)	32 (59.3)
Level of education			
Some high school	40 (21.6)	36 (90.0)	28 (77.8)
High school or GED	73 (39.5)	72 (98.6)	51 (70.8)
At least some college	72 (38.9)	71 (98.6)	48 (67.6)
Location of recruitment			
Cambridge	137 (74.1)	132 (96.4)	99 (75.0)
Lawrence	48 (26.0)	47 (97.9)	28 (59.6)
Homeless/unstably housed, past month ^c	167 (90.3)	161 (96.4)	113 (70.2)
Incarcerated, past three months ^d	25 (13.5)	23 (92.0)	17 (73.9)
Substances used, past month			
Opioids ^e	173 (93.5)	167 (96.5)	119 (71.3)
Stimulants ^f	175 (94.6)	169 (96.6)	121 (71.6)
Downers or sedatives ^g	130 (70.3)	127 (97.7)	94 (74.0)
Frequency of injection, past month			
One day a week or less	34 (18.5)	30 (88.2)	19 (63.3)
2 or more times per week	150 (81.5)	148 (98.7)	108 (73.0)
Overdose, past three months	49 (26.5)	48 (98.0)	36 (75.0)
STI testing, past three months	102 (55.1)	102 (100.0)	72 (70.6)
Comfort with provider			
Yes	146 (78.9)	144 (98.6)	100 (69.4)
No	39 (21.1)	35 (89.7)	27 (77.1)
Felt welcome in medical clinics ^h			
Yes	139 (75.1)	133 (95.7)	97 (72.9)
No	46 (24.9)	46 (100.0)	30 (65.2)

Footnotes: Please refer to the Supplementary Materials.

Table 2. Sociodemographics and other key variables of interest among a cohort of 185 people who use drugs in Massachusetts, across self-reported prior HCV treatment (tx) initiation and completion. Row percentages are shown below; bolded values indicate statistical significance of $p < 0.05$.

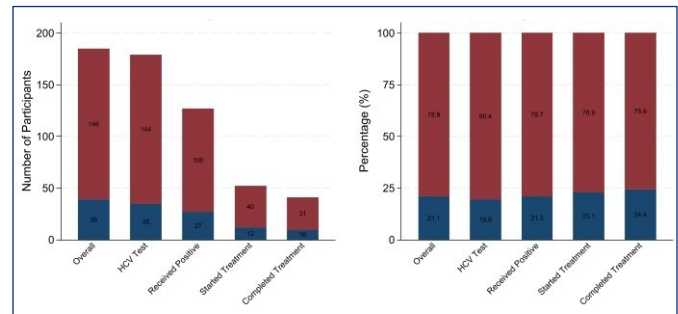
	Overall, N=185 (100%)	Initiated tx, n=52 (41%)	Completed tx, n=41 (79%)
Age (years), median (IQR)	40 (34, 47)	45 (37, 50)	46 (39, 51)
Gender identity ^a			
Cisgender man	102 (55.1)	37 (52.1)	28 (75.7)
Cisgender woman	79 (42.7)	13 (24.5)	12 (92.3)
Non-binary or transgender	4 (2.2)	2 (66.7)	1 (50.0)
Race/ethnicity ^b			
White and non-Hispanic	128 (69.2)	40 (42.1)	32 (80.0)
Other race(s) and/or Hispanic of any race	57 (30.8)	12 (37.5)	9 (75.0)
Level of education			
Some high school	40 (21.6)	10 (35.7)	9 (90.0)
High school or GED	73 (39.5)	21 (41.2)	15 (71.4)
At least some college	72 (38.9)	21 (43.8)	17 (81.0)
Location of recruitment			
Cambridge	137 (74.1)	44 (44.4)	34 (77.3)
Lawrence	48 (26.0)	8 (28.6)	7 (87.5)
Homeless or unstably housed, past month ^c	167 (90.3)	45 (39.8)	35 (77.8)
Incarcerated, past three months ^d	25 (13.5)	7 (41.2)	7 (100.0)
Substances used, past month			
Opioids ^e	173 (93.5)	47 (39.5)	37 (78.7)
Stimulants ^f	175 (94.6)	47 (38.8)	37 (78.7)
Frequency of injection, past month			
One day a week or less	34 (18.5)	8 (42.1)	6 (75.0)
2 or more times per week	150 (81.5)	44 (40.7)	35 (80.0)
Overdose, past three months	49 (26.5)	15 (41.7)	12 (80.0)
STI testing, past three months	102 (55.1)	31 (43.1)	24 (77.4)
Comfort with provider			
Yes	146 (78.9)	40 (40.0)	31 (77.5)
No	39 (21.1)	12 (44.4)	10 (83.3)
Felt welcome in medical clinics ^g			
Yes	139 (75.1)	45 (46.4)	36 (80.0)
No	46 (24.9)	7 (23.3)	5 (71.4)

Footnotes: Please refer to the Supplementary Materials.

Figure 1. HCV Testing and Treatment Cascade

[A] Absolute counts by trusted healthcare provider

[B] Proportions by trusted healthcare provider

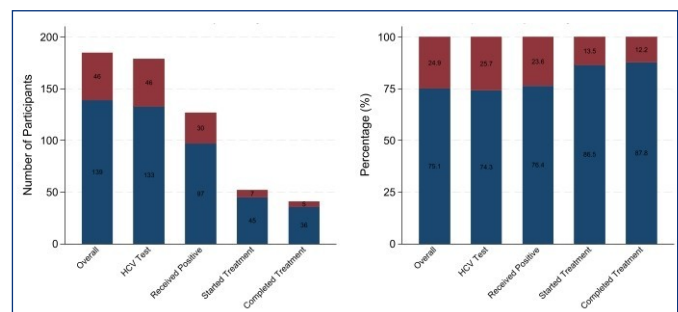


Dark blue: No trusted provider; Maroon: Trusted provider

Note: Bars stratified by trusted healthcare provider status

[C] Absolute counts by feeling welcome

[D] Proportions by feeling welcome



Dark blue: Felt welcome or neutral; Maroon: Did not feel welcome

Note: Bars stratified by report of feeling welcome in medical offices/clinics, in general

Sociodemographics

Cisgender women reported lower proportions of ever initiating treatment (25%, compared to 52% of cisgender men; $p < 0.01$). However, among women who had initiated treatment, 92% reported finishing treatment (compared to 76% of cisgender men; $p = 0.26$). Testing patterns did not differ by race/ethnicity; however, participants of a race(s) other than White and/or Hispanic received a positive test result less frequently (59%, compared to 76% of non-Hispanic and White counterparts; $p = 0.03$).

Substance Use Patterns

Participants who reported injecting drugs once a week or less reported less HCV testing (88%, compared to 99% among those who reported injecting ≥ 2 times per week; $p < 0.01$) and less receipt of positive test results (63%, compared to 73% of participants who reported injecting more often; not statistically significant with $p = 0.29$), yet they reported similar proportions of treatment initiation and completion.

Access & Utilization of the Healthcare System

Participants who had received treatment for an injection-associated infection (e.g., abscesses, endocarditis; $n = 51$) in

the past year exhibited a higher proportion of positive test results (80%) than the overall sample (71%), although this difference was not statistically significant ($p=0.10$).

Healthcare Experiences

Ninety-nine percent of participants who had a provider with whom they were comfortable discussing their injection drug use had ever been tested, compared to 90% of those who did not ($p<0.01$). Among participants who felt welcome in medical clinics ($n=139$), 133 (96%) reported ever being tested for HCV, and 41% had ever initiated treatment (compared to only 23% among those who did not feel welcome; $p=0.03$). Overall, 61% percent ($n=112$) of participants reported both positive healthcare experiences (e.g., having a provider, feeling welcome), whereas 6% ($n=12$) reported both negative experiences [Supplemental Table 3].

DISCUSSION

Among SSP-recruited participants in Massachusetts, lifetime HCV testing was nearly universal (97%), and most (71%) had ever received a positive test result. However, less than half (41%) of participants with a positive test result had ever initiated HCV treatment. Although more favorable than national trends,⁶ our observed gap between testing and treatment is concerning, given Massachusetts's longstanding infrastructure supporting community-based pathways to HCV care. While high testing rates may reflect how effectively SSPs and other community-based organizations are supporting this vulnerable population in accessing testing, the comparatively lower levels of treatment initiation highlight a critical area for improvement. This observed gap is significant across New England, where HCV elimination efforts are ongoing. We also found that, following HCV treatment initiation, most people complete treatment, underscoring the success of community-situated treatment pathways.

Notably, we observed signals that patient-reported healthcare experiences may impact some HCV treatment outcomes. Feeling welcome in medical clinics emerged as a potential indicator of treatment engagement and a modifiable lever for improving treatment uptake. Three-quarters of participants reported having a provider with whom they felt comfortable discussing their injection drug use with; unfortunately, this may not be easily replicated in jurisdictions with less robust harm reduction and public health infrastructure. Rhode Island's existing network of SSPs and its state-level commitment to harm reduction position it favorably to build on this model, though intentional investment in provider training and in fostering welcoming environments will likely be necessary to achieve this at scale, and could be more challenging in larger settings such as hospitals.

Some sociodemographic differences warrant acknowledgment, though our descriptive and exploratory focus limits extrapolation. Cisgender women reported lower treatment initiation (25%) but higher completion rates (92% among those who initiated), suggesting a need for low-threshold and gender-responsive models to improve treatment uptake in specific settings (e.g., detox facilities, homeless shelters). Participants identifying as race(s) other than White and/or Hispanic received positive test results less frequently; we cannot determine whether this reflects true differences in prevalence or differences in the disclosure of positive results. These patterns may support future lines of research to improve HCV care delivery and retention.

Although these data were collected from PWID in Massachusetts, they are relevant for policymakers and public health practitioners in Rhode Island. Estimates suggest that Rhode Island has the highest rate of HCV infection in New England (1,190 people/100k), surpassing Connecticut (650 people/100k) and Massachusetts (710 people/100k).^{15,16} Recognizing this, Rhode Island published an HCV elimination strategy for 2023, naming HCV as a public health priority and emphasizing robust reporting, opt-out testing, increased access, and community partnerships as central pillars of the plan.¹³ Alongside this strategy, HCV became a reportable disease in 2021.^{17,18} Despite this progress, the elevated burden of HCV in Rhode Island relative to its neighbors underscores that substantial work remains.

This study has limitations. Temporal misalignment between current participant-reported healthcare experiences and historic treatment episodes precludes causal inference. Our survey lacked important details about test results and treatment indications; for example, "receipt of a positive test" could mean a positive antibody test (without a treatment recommendation) or a viral test (with or without a treatment recommendation). Without this information, our results may be overestimating the treatment gap, since some people who received a positive test were not actually indicated to start HCV treatment. Additionally, our sample consisted of people already connected to SSPs (at least at baseline assessment), perhaps representing a population already engaged in harm reduction and broader healthcare services, which may limit generalizability. However, we think Rhode Island's robust harm reduction infrastructure,^{19,20} well-established HCV elimination strategy,¹³ and overlapping networks of PWID^{8,9} suggest that the results of our study are applicable to PWID in Rhode Island.

Among this sample of SSP-recruited PWID, lifetime HCV testing was nearly universal, but fewer than half reported ever initiating treatment. Feeling welcome in medical clinics, as one indicator of patients' healthcare experience, may represent an important and modifiable signal of HCV treatment engagement.

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Authors

- Leah C. Shaw, BA, MPH, School of Public Health, Brown University, Providence, Rhode Island.
- Katie B. Biello, MPH, PhD, School of Public Health, Brown University, Providence, Rhode Island; The Fenway Institute, Fenway Health, Boston, Massachusetts.
- Darien M. Sproesser, BA, MPH, The Fenway Institute, Fenway Health, Boston, Massachusetts.
- Yuni S. Jimenez, BA, The Fenway Institute, Fenway Health, Boston, Massachusetts.
- Marguerite E. Beiser, BA, ANP-BC, AAHIVS, Institute for Research, Quality, and Policy in Homeless Health Care, Boston Health Care for the Homeless Program, Boston, Massachusetts.
- Katrina Baumgartner, MD, Greater Lawrence Family Health Center, Lawrence, Massachusetts.
- Douglas S. Krakower, MD, The Fenway Institute, Fenway Health, Boston, Massachusetts; Beth Israel Deaconess Medical Center, Boston, Massachusetts.
- Michelle Bordeu, BS, MPH, The Fenway Institute, Fenway Health, Boston, Massachusetts.
- Matthew J. Mimiaga, MA, MPH, ScD, The Fenway Institute, Fenway Health, Boston, Massachusetts; Department of Epidemiology, Fielding School of Public Health, University of California, Los Angeles, California; Department of Psychiatry & Biobehavioral Sciences, David Geffen School of Medicine, University of California, Los Angeles, California; Center for LGBTQ+ Advocacy, Research, and Health, University of California, Los Angeles, California.
- Christopher M. Bositis, MD, Department of Family and Community Medicine, University of California, San Francisco, California.
- Angela R. Bazzi, MPH, PhD, Herbert Wertheim School of Public Health & Human Longevity, University of California, San Diego, La Jolla, California; Department of Community Health Sciences, Boston University School of Public Health, Boston, Massachusetts.

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Ethical approvals: Ethical approval to report this submission was obtained from the Fenway Health Institutional Review Board.

Disclaimer: The views expressed herein are those of the authors.

Correspondence

Leah C. Shaw, MPH
Brown University School of Public Health
121 S. Main Street, Providence, RI
leah_shaw@brown.edu