



Racial and Ethnic Disparities in HIV Testing in People Who Use Drugs Admitted to a Tertiary Care Hospital

Sami Hamdan, MD, MPH,^{1,*} Emma Smyth, BA,^{2,*} Meghan E. Murphy, MD,³ Emily D. Grussing, BS,³ Mingrui Wei, MPH,³ Ruben Guardado, MPH,² and Alysse Wurcel, MD, MS^{2,3}

Abstract

Ending the HIV epidemic requires increased testing, diagnosis, and linkage to care. In the past 10 years, rates of HIV have increased among people with substance use disorder (SUD). HIV testing is recommended during hospitalization. Despite rising rates of infections and recommendations, HIV testing remains suboptimal. This study sought to detect differences in HIV testing by race and ethnicity in people who use drugs (PWUD) admitted to Tufts Medical Center (TuftsMC). This study is a retrospective review of hospitalized PWUD admitted from January 1, 2017 to December 31, 2020. PWUD were identified through toxicology results, medication prescribed for SUD, and nursing intake questions. The primary outcome of interest was whether an HIV test was ordered during hospitalization. The indicator of interest was race and ethnicity. Of 13,486 PWUD admitted to TuftsMC, only 10% had an HIV test ordered. Compared with White patients, Black patients [adjusted odds ratio (AOR): 0.69, 95% confidence interval (CI) (0.59–0.83)] and Hispanic patients [AOR: 0.68, 95% CI (0.55–0.84)] had decreased odds of receiving an HIV test. Our report is the first to show racial and ethnic differences in HIV testing ordering for hospitalized PWUD. Without access to harm reduction tools and expanded systems-based testing strategies, the HIV epidemic will continue and disproportionately impact minoritized communities.

Keywords: HIV testing, HIV, HIV screening, racial disparities

Introduction

HIV SCREENING IS an evidence-based, cost-effective intervention that should be offered to everyone at least once, and multiple times to people who are at increased risk.^{1–3} To end the HIV epidemic, we must diagnose people, link them to treatment, and suppress their HIV viral loads to prevent transmission.^{4,5} This last piece is especially relevant, because an estimated 13–20% of infections are transmitted by people who are unaware of their HIV status.^{6,7} In 1993, the Centers for Diseases Control recommended that HIV testing be performed in outpatient and inpatient settings in hopes of

identifying all cases of HIV.⁸ Although there has been considerable advances to decrease barriers to HIV testing, operationalization of equitable access to HIV testing in the United States has remained suboptimal.^{9–12}

Efforts aimed at increasing HIV testing are of growing importance as new clusters of HIV infection emerge in networks of people who use drugs (PWUD).¹³ Until 2014, the proportion of new HIV infections attributed to injection drug use steadily decreased.¹⁴ However, over the past 5 years, the increase of fentanyl and methamphetamine injection and barriers to harm reduction tools have synergized to cause increased HIV spread in people who inject drugs

¹Department of Medicine, Tufts Medical Center, Boston, Massachusetts, USA.

²Division of Geographic Medicine and Infectious Diseases, Department of Medicine, Tufts Medical Center, Boston, Massachusetts, USA.

³Tufts University School of Medicine, Boston, Massachusetts, USA.

*Both authors contributed equally to this work.

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(PWID).^{15–17} People with cocaine, methamphetamine, and alcohol use disorder experience both increased risk of HIV infection and barriers to outpatient HIV diagnosis because of obstacles preventing access to primary care clinicians.^{18–22} Examples of outpatient preventative health care barriers include lack of health insurance, homelessness, incarceration, and stigma.^{23–25} A recent study showed that 90% of PWID experience missed opportunities of HIV and HCV testing during encounters with the health care system.¹⁴

Overlaid on the barriers to equitable health care access experienced by people who use and inject drugs is the multilayered impact of racism.²⁶ In 2012, the prevalence of HIV was 6.6-fold higher among Black people compared with White people.²⁷ One potential explanation for disparate expansion of HIV in Black communities is that the initial step of HIV diagnosis is delayed due to racism-influenced barriers to quality care.^{28,29} With little data available about HIV testing disparities in hospitalized patients, we investigated how HIV testing rates differed between racial and ethnic groups in a cohort of PWUD admitted to the hospital.

Methods

The dataset used in this analysis came from medical records of hospitalized PWUD admitted to Tufts Medical Center (TuftsMC) between January 1, 2017 and December 31, 2020. PWUD hospitalizations were classified using a slight variation of algorithm used in previous studies,³⁰ which involved hospitalized individuals having one of the following: (1) laboratory evidence of drug use, signaled by (A) a urine or serum toxicology screen, which showed fentanyl, opiates, cocaine, amphetamines, methamphetamine, or buprenorphine (B) positive serum alcohol level at the time of admission; (2) score of 8 or more on The Clinical Institute Withdrawal Assessment Alcohol (CIWA) scale, a 10-item scale used to assess the severity of alcohol withdrawal syndrome,³¹ and/or having a score of 2 or more on the Cut-down, Annoyed, Guilty, and Eye-Opener (CAGE) scale, a four-item scale used to assess for alcohol use disorder;³² (3) record of methadone, buprenorphine, naltrexone, acamprosate, or disulfiram prescription on outpatient medication list or during hospitalization; (4) nurse checked “Yes” to the question of “Do you use illicit drugs” during hospital admission nursing intake; (5) comments in the free-text notes section from nursing intake that suggest the patient used alcohol or drugs.

For the purpose of this research, we included people with alcohol use disorder within the definition of PWUD because people with alcohol use disorder can often exist with other drug use disorders, and the combination of disordered alcohol use with other drug use disorders is associated with increased risk of hospitalization.³³

The outcome variable was a binary variable coded as “Yes” and “No” for whether an HIV test was ordered during the hospitalization. The method of offering HIV testing (e.g., opt-in or opt-out) was not monitored for each patient interaction. The unit of analysis was hospitalization, not patient. This is relevant because one patient could have contributed multiple hospitalizations during the study period. The major indicator of interest in the analysis was race/ethnicity, which are grouped together in the TuftsMC electronic medical record into five categories: White, Black, Hispanic, Asian, and other. We used this classification schema in the study. Hos-

pitalizations with unknown or missing race and ethnicity data were excluded from the dataset. We did not know if admitted patients had an HIV diagnosis, although due to the overall low rates of hospitalizations for people with HIV,³⁴ we felt the number of PWUD admitted to the hospital with HIV would make up a small fraction of the overall number of PWUD admitted to the hospital during the study period. Length of stay was calculated from the admission and discharge date in days.

Among PWUD hospitalizations, we stratified for the kind of drug use disorder into five categories: alcohol, opioid, cocaine, methamphetamines, and polysubstance use. Alcohol use disorder was identified as having a positive alcohol toxicology screen, positive CAGE or CIWA score, or presence of acamprosate or disulfiram in the medication list. Opioid use was categorized as positive fentanyl, opiates, or buprenorphine on toxicology screens or documentation of prescribed methadone, buprenorphine, or naltrexone. Cocaine and methamphetamine use were identified based on their presence on urine or serum toxicology reports. “Polysubstance use” was classified as meeting any of the criteria for more than one of the above substances. We acknowledge this is a problematic term, as not all combinations of drugs have the same risks or treatment, and will mention this in the limitations.

A logistic regression was used to assess the relationship between HIV test ordered with race/ethnicity. Univariate and multivariate analyses were performed to test and compare the association. Interactions between race groups with other exposure variables were tested and the results of significant interaction in terms of race and age are presented. All logistic regression models were assessed with leverage and collinearity, no outlier was identified and removed from the total sample. We grouped drug use into the five groups of alcohol, opioid, cocaine, methamphetamine, and “use of more than one drug.” Categorical predictors were tested for overall statistical significance individually and with extra sum of squares F-test. A Chi-square test and a one-way analysis of variance (ANOVA) test were used to test the difference among racial groups by categorical variables and continuous variables, respectively. Statistical significance was defined as p value <0.05 . Data were analyzed using Stata/SE16.1. This research study was approved by the Tufts Health Sciences Institutional Review Board.

Results

After 1415 hospitalizations were excluded from the dataset because of missing or unknown race, the cohort included 13,486 hospitalizations (Table 1). Most patients were White (70%). Opioids were the most used single substance, with a prevalence of 40% in the cohort (Table 1). Only 48% of people included in the PWUD cohort answered “yes” to the question of illicit drug use on intake. Using CIWA and CAGE, 1980 hospitalizations were identified.

Only 10% of hospitalized patients with PWUD had an HIV test ordered. Black patients [adjusted odds ratio (AOR): 0.69, 95% confidence interval (CI) (0.59–0.83)] and Hispanic patients [AOR: 0.68, 95% CI (0.55–0.84)] had decreased odds of getting an HIV test compared with White patients (Table 2). The odds of receiving an HIV test increased by 0.22 with every 10-year decrease in age. Every 10 days of additional inpatient

TABLE 1. DEMOGRAPHICS, HOSPITALIZATION, AND SUBSTANCE USE CHARACTERISTICS

| | Total sample |
|--|-------------------|
| Characteristic | <i>n</i> = 13,426 |
| Age (year), mean (SD) | 47.1 (16.1) |
| Length of stay, median (IQR) | 2.0 (4.0) |
| Race, <i>n</i> (%) | |
| White | 9367 (70) |
| Black | 2352 (17) |
| Hispanic | 1246 (9) |
| Asian | 399 (3) |
| Other | 62 (1) |
| Discharge year, <i>n</i> (%) | |
| 2017 | 3140 (23) |
| 2018 | 3141 (23) |
| 2019 | 3598 (27) |
| 2020 | 3547 (27) |
| Same-day discharge | 1881 (14) |
| Alcohol/drug use pattern, ^a <i>n</i> (%) | |
| Alcohol use | 4459 (33) |
| Opioids use | 5404 (40) |
| Cocaine use | 1597 (12) |
| Methamphetamine use | 583 (4) |
| Polysubstance use | 6507 (48) |
| Prescribed med for opioid use or alcohol use | 2326 (17) |
| Answered Yes to “Do you use illicit drugs?” question on nursing intake | 6422 (48) |
| Outcome variable: was HIV testing ordered during the hospitalization? | |
| HIV test order | 1369 (10) |
| HIV test order on same day discharge | 56 (3) |
| HIV test result if ordered (<i>n</i> = 1369) | 1328 (97) |

^aPlease see Methods section for definition of drug use disorders. IQR, interquartile range; SD, standard deviation.

time was associated with 1.58 increased odds of receiving an HIV test. In the multivariable analysis, opioid, cocaine, and methamphetamine use were associated with increased odds of receiving an HIV test, as was having medications prescribed for substance use disorder (SUD) (Table 2).

Discussion

In this study, we found a low rate of HIV testing overall in PWUD admitted to the hospital and racial and ethnic disparities in HIV testing. Our report adds to the growing body of literature showing disparities in access to HIV services experienced by racially and ethnically minoritized people.³⁴ Barriers to HIV testing exist at the patient, clinician, organization, and policy levels, with further barriers imposed by racism at each of these levels.^{10,11,35–39}

Patients may decline HIV testing due to fear,⁴⁰ stigma,⁴¹ and mistrust in the health care system.^{42–45} Examples of clinician barriers include the consent process, competing priorities, and discomfort discussing HIV.⁹ In particular, many trainees and general practitioners do not know to screen for HIV or do not routinely screen for HIV.^{46,47} This can affect especially vulnerable patients, including older adults who have not been screened previously.⁴⁸ We do recommend more education and training for all physicians—inpatient and outpatient—so that they feel more comfortable discussing HIV testing, but we also know that education alone is not sufficient to overcome all the barriers to improving HIV testing in all clinical settings.

At the organizational level, the structure of medical care in the hospital often pushes clinicians to focus on acutely life-threatening issues, rather than preventative care or diagnosis and management of chronic issues. However, there are organizational changes that fit into current inpatient practices that can increase HIV testing. First, HIV testing should be offered as an “opt-out” question in all clinical settings.

TABLE 2. UNIVARIATE AND MULTIVARIABLE REGRESSION

| | Univariate | | | Multivariate | | |
|-----------------------------|------------|-----------|--------|--------------|-----------|--------|
| | OR | 95% CI | p | OR | 95% CI | p |
| Race | | | | | | |
| White | | | | | | |
| Black | 0.73 | 0.62–0.85 | <0.001 | 0.70 | 0.59–0.83 | <0.001 |
| Hispanic | 0.86 | 0.70–1.05 | 0.14 | 0.69 | 0.56–0.85 | 0.001 |
| Asian | 0.66 | 0.46–0.97 | 0.03 | 0.85 | 0.58–1.26 | 0.42 |
| Other | 0.72 | 0.29–1.79 | 0.48 | 0.7 | 0.28–1.79 | 0.46 |
| Age (in 10 years) | 0.78 | 0.75–0.81 | <0.001 | 0.76 | 0.73–0.79 | <0.001 |
| Length of stay (in 10 days) | 1.51 | 1.43–1.61 | <0.001 | 1.58 | 1.48–1.68 | <0.001 |
| Alcohol use | 0.71 | 0.63–0.80 | <0.001 | 1.05 | 0.92–1.21 | 0.46 |
| Opioids use | 2.45 | 2.19–2.74 | <0.001 | 1.72 | 1.48–1.99 | <0.001 |
| Cocaine use | 2.95 | 2.60–3.40 | <0.001 | 2.26 | 1.92–2.66 | <0.001 |
| Methamphetamine use | 3.5 | 2.89–4.25 | <0.001 | 1.44 | 1.15–1.79 | 0.001 |
| Polysubstance use | 1.81 | 1.61–2.03 | <0.001 | 1.39 | 1.22–1.59 | <0.001 |
| Prescribed med for SUD | 2.13 | 1.87–2.41 | <0.001 | 1.47 | 1.25–1.73 | <0.001 |
| Discharge year | | | | | | |
| 2017 | 1 | | | 1 | | |
| 2018 | 0.94 | 0.8–1.11 | 0.50 | 0.96 | 0.81–1.14 | 0.67 |
| 2019 | 1.02 | 0.87–1.19 | 0.80 | 1.08 | 0.92–1.28 | 0.34 |
| 2020 | 0.99 | 0.85–1.16 | 0.91 | 0.97 | 0.82–1.15 | 0.76 |

Please see Methods section for definition of drug use disorders. CI, confidence interval; OR, odds ratio; SUD, substance use disorder.

Switching to opt-out testing and framing HIV testing as a routine part of health care will reduce stigma and increase uptake. Second, given the rapid rise in electronic medical record-assisted decision making, HIV testing prompts for people with markers of SUD, like toxicology results, could be one avenue to improve HIV testing. Third, efforts to increase HIV testing in the emergency department (ED) have been successful, and need to be operationalized as part of routine emergency care.^{49–52} Recent studies have shown that PWUD utilize the ED more than the general population for routine health care,⁵³ EDs nationwide detected one in five new HIV diagnoses,⁵⁴ and that Black and Hispanic patients presenting to the emergency room are more likely to receive an HIV test.⁵⁵ More research is needed to understand why racial disparities in HIV testing differ between health care settings, but we also need to prioritize testing people who are at increased risk of not knowing their HIV status while they do interface with the health care system, and we need to do so in a manner that is inclusive and destigmatizing.

Finally, policies preventing HIV testing should be re-evaluated. The process for receiving consent for an HIV test varies across the United States and is often cumbersome. Massachusetts requires providers to obtain and document verbal consent, which can be uncomfortable and time consuming for providers.⁵⁶ “HIV exceptionalism,” a movement developed to protect people with and at risk of HIV from receiving less than exceptional health care, included requiring consent for treatment.⁵² HIV exceptionalism is rooted in anecdotal fear and stereotypes from the early days of the HIV epidemic, and test consent was justified then. Now, however, the consent process is a major reason why people are not getting tested, and there should be continued work with key stakeholders to make HIV testing a routine part of health care that is comfortable and accessible.^{9,57,58}

The findings in this study are subject to several limitations. The racial and ethnic classification system of the hospital electronic medical record does not align with the recommended racial and race classification, with race and ethnicity as separate classifications. Although we tried to include the most prevalent surrogate markers for drug use, we likely missed PWUD in the creation of the PWUD cohort. Separately, we were not able to differentiate between patients who were not offered HIV testing and patients who declined testing. The data were deidentified and represented admissions rather than individual patients, so an individual patient could have been admitted more than once and received an HIV test during some, but not all, of their hospitalizations. Similarly, another limitation is that we did not account for reason for admission and/or illness severity, which can impact HIV testing decision making. Our data also do not account for individuals who received an HIV test during a separate clinical interaction in another health care setting, which may have led them to decline a test during admission at our hospital or prompted their medical team to defer testing. Also, this study did not specify injection administration of drugs, but we did find that use of opioids, cocaine, and methamphetamine were each associated with increased odds of receiving an HIV test, which suggests that providers may target patients who inject drugs more than people who drink alcohol. We used “poly-substance use” as a marker of more than one drug use, but this is an oversimplified variable, missing the nuances of different drug use disorder combinations. We did not exclude people

with HIV from the database, but we expect this to be a relatively low percentage of the entire population of hospitalized PWUD.⁵⁹ Importantly, this study does not evaluate sex, gender, sexual orientation, or gender identity (SOGI). When evaluating and addressing the risks associated with HIV in patients with a history of substance use, incorporating SOGI-related metrics are essential for risk stratification as women, transgender patients, and men who have sex with men are at increased risk of medical comorbidities, discrimination, and psychosocial challenges.^{60,61} Further evaluation of outcomes for patients with HIV stratified by sexual orientation and gender identity is a necessary area for further research.⁶²

Despite these limitations, the study is one of the first to investigate barriers to HIV testing experienced by minoritized populations during hospitalization. With the parallel and intertwined goals of health equity and ending the HIV epidemic, increasing equitable access to HIV testing needs to be an explicit focus of hospital systems nationwide.

Authors' Contributions

S.H.: review and editing (equal). E.S.: original draft (lead), review and editing (equal), and visualization (lead). M.E.M.: review and editing. M.W.: investigation, software, and validity. E.D.G.: review and editing of drafts, and assistance with response to reviewers. R.G.: formal analysis, data curation, and validity. A.G.W.: supervision, project administration, review and editing, funding acquisition, conceptualization, and review and editing.

Author Disclosure Statement

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Address correspondence to:

*Alysse Wurcel, MD, MS
Division of Geographic Medicine
and Infectious Diseases
Department of Medicine
Tufts Medical Center
800 Washington Street
Boston, MA 02111
USA*

E-mail: awurcel@tuftsmedicalcenter.org