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## Characteristics of Transgender Residents of Massachusetts Cities With High HIV Prevalence

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### Abstract

Geographic context can influence individual risk in populations disproportionately susceptible to HIV infection, such as transgender people. We examined factors associated with residing in Massachusetts cities with the highest HIV prevalence (geographic “hotspots”) in a 2013 sample of 433 transgender adults who were not infected with HIV. Residing in hotspots was associated with older age, non-White race/ethnicity, low income, incarceration history, polydrug use, smoking, binge drinking, and condomless receptive anal sex during one's most recent sexual encounter with a partner who was assigned male sex at birth. Future research to understand the interpersonal and socio-structural factors that drive localized epidemics among transgender people is warranted.

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HIV typically clusters in geographic “hotspots” or areas with the highest HIV prevalence.<sup>1</sup> High-prevalence areas can pose transmission risks for uninfected individuals via multiple pathways, including social or sexual networks, shared behavioral norms, and neighborhood and environmental exposures.<sup>2-4</sup> Understanding the risk factors that fuel the HIV epidemic in hotspot areas may help those attempting to implement interventions develop targeted prevention programs for priority groups susceptible to HIV acquisition, including transgender people (individuals whose assigned birth sex differs from their gender identity or expression).

High HIV prevalence estimates have been documented in transgender communities, particularly among transgender women (those on the male-to-female spectrum),<sup>5-8</sup> for whom specific biological and behavioral risk factors (e.g., anal sex with cisgender [nontransgender] men, transactional sex, injection silicon use) may confer greater HIV risk relative to transgender men (those on the female-to-male spectrum).<sup>9-12</sup> However, burgeoning evidence suggests that transgender men, particularly those who have sex with cisgender men, are also at elevated risk for HIV.<sup>8,13-15</sup> Moreover, studies suggest that

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#### Contributors

J. M. White Hughto conceptualized and conducted the data analysis, interpreted the data, and led the writing of the article. S. L. Reisner and M. J. Mimiaga assisted in interpreting the data and in writing and editing the article.

#### Human Participant Protection

This study was approved by the institutional review board of Fenway Health. Informed consent was provided via electronic signature.

gender identity development and gender affirmation processes contribute to HIV risk taking (e.g., substance use to cope or sexual risk taking driven by the need to affirm one's gender identity) among transgender individuals across the gender continuum.<sup>16-18</sup>

Despite aspects of place (e.g., poverty, crime, incarceration) having been linked to HIV risks in cisgender populations,<sup>19-21</sup> little research has explored geographic risk factors among transgender individuals. The dearth of research on geographic risk factors in transgender populations is due in part to the lack of surveillance data capturing the geographic context of transgender people.<sup>22,23</sup> The absence of region-specific surveillance data limits our understanding of the health of transgender communities and decreases the likelihood that geo-targeted HIV prevention interventions will be developed and funded at the state and county levels. Our aim was to assess the sociodemographic and behavioral factors associated with living in an HIV hotspot in Massachusetts in a statewide sample of transgender adults.

## METHODS

A community-based convenience sample of 452 transgender and gender-nonconforming Massachusetts residents was purposively recruited from August to December 2013. Participants were recruited via in-person (community events, programming, and gatherings) or online (electronic listservs, e-mail, organizational Web site postings, social networking sites) contact. Eligible respondents were aged 18 years or older, self-identified as transgender or gender nonconforming (i.e., they had a gender identity or expression differing from their assigned birth sex), had lived in Massachusetts for at least 3 months in the preceding year, and had the ability to read or write at the fifth-grade level or higher in either English or Spanish. A total of 433 participants who were not infected with HIV and who resided in Massachusetts at the time of data collection were included in our analysis.

Respondents completed a 1-time, Web-based electronic survey. The majority of respondents completed the survey online (n = 384), with 49 respondents completing the survey in person at community events via electronic tablets. Details concerning the study methodology have been reported elsewhere.<sup>24</sup>

Demographic characteristics (age, race/ethnicity, income, and gender, the latter operationalized through a 2-step method to categorize respondents as male-to-female or female-to-male spectrum),<sup>25</sup> incarceration history, binge drinking during the preceding 3 months, polydrug use (use of 2 drugs) during the preceding 12 months, current cigarette smoking, and number of sexual partners in the preceding 6 months were assessed, along with whether respondents had engaged in condomless receptive anal sex with their most recent sexual partner. Using 2012 surveillance data<sup>26</sup> and residential zip codes, we coded participants as living in a hotspot if they resided in any zip code within Boston, Worcester, or Springfield (cities representing 40% of Massachusetts' HIV prevalence).

We assessed bivariate associations between individual-level characteristics and the hotspot variable. Factors significant in bivariate analyses ( $P < .05$ ) were included in an adjusted multivariable logistic regression model.

## RESULTS

Nearly one fifth of the sample resided in an HIV hotspot (Table 1). Factors associated with significantly increased odds of living in a hotspot were older age, non-White race/ethnicity, low income, a history of incarceration, polydrug use, current smoking, binge drinking, and condomless receptive anal sex during the most recent sexual encounter with a partner who was assigned male sex at birth (Table 2). Gender identity, HIV testing history, and number of recent sexual partners were not significant in the final model.

## DISCUSSION

In this sample of transgender residents of Massachusetts who were not infected with HIV, hotspot residents had elevated odds of socio-demographic and behavioral HIV risk factors relative to residents of lower prevalence areas. Our findings support the importance of understanding geographic contexts for at-risk populations often excluded from HIV surveillance efforts alongside other intersecting social determinants of health driving HIV infection, such as race/ethnicity and poverty.<sup>27-29</sup>

Individuals residing near one another may hold similar attitudes toward risk behaviors as well as be exposed to shared environmental risk factors (e.g., poverty, drug use).<sup>27</sup> Indeed, although substance use is an individual behavior, it is highly influenced by community norms<sup>30,31</sup> and may place individuals residing in substance-using communities at risk for HIV infection.<sup>10,27,32</sup> We found that transgender people reporting substance use (smoking, binge drinking, polydrug use) and the highest-risk sexual behavior (condomless receptive anal sex) were at greater odds of living in an HIV hotspot than those not reporting such behaviors. Although federal HIV/AIDS prevention funds are allocated to areas where the most HIV-infected individuals live,<sup>33</sup> interventions may not be tailored to transgender individuals in these areas. Culturally appropriate and geographically delineated strategies are needed to prevent HIV among transgender residents of HIV hotspots.

The geographic distribution of the HIV epidemic is affected by interrelated socio-structural factors and specific characteristics of at-risk populations. For example, area-specific factors such as employment access and criminal sentencing practices may contribute to regional disparities in income and incarceration.<sup>5,34,35</sup> Among transgender people specifically, widespread employment discrimination exists,<sup>36,37</sup> and studies show that fewer economic opportunities can lead to incarceration via street economies or use of substances as a coping mechanism.<sup>9,32,38,39</sup>

Incarceration poses a risk of HIV acquisition and has implications for the spread of HIV into the communities to which HIV-infected inmates are released.<sup>40,41</sup> Moreover, having a criminal record can further limit job opportunities and contribute to poor health.<sup>42,43</sup> Given that a significantly greater proportion of transgender people with low incomes and incarceration histories lived in an HIV hotspot, understanding how socioeconomic and criminal histories may uniquely drive HIV risk among transgender people living in areas of high HIV prevalence is an important next step for intervening with this population.

A number of limitations should be mentioned. Although our sample was diverse and encompassed all major regions of Massachusetts, our convenience sampling strategy may have resulted in selection bias and limited the representativeness of our data. In addition, the cross-sectional nature of our study suggests that the ordering of events cannot be determined; for example, our data do not provide concrete evidence that residing in a geographic HIV hotspot potentiates sexual and other behavioral risks or that one's sexual and other behavioral risks influence where one chooses to reside.

Owing to the small sample size, it was not possible to examine neighborhood-level differences within identified geographic hotspots. The broad categorization of participants at the city level may have concealed neighborhood-level differences that uniquely contribute to HIV risks among individuals residing in those neighborhoods (e.g., crime, poverty, access to health care).

Finally, we lacked a comparison group, and thus it is not possible to determine whether the associations found are unique to transgender individuals or, rather, an environmental artifact that affects everyone independent of gender identity and expression. However, previous research has documented the high rates of stigma and discrimination experienced by transgender individuals,<sup>37</sup> which, together with additional, overlapping psychosocial and geographic factors known to potentiate HIV spread, may create an escalating burden of risk among transgender individuals relative to the general population.

Geography, which is marked by social, structural, political, and economic factors, is a critical determinant of localized HIV epidemics that must be integrated into current and future health surveillance and monitoring of transgender people. Further research is necessary to understand the interplay between interpersonal and sociostructural factors that drive localized epidemics among transgender people.

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TABLE 1

Demographic and Behavioral Characteristics of Transgender People Residing or Not Residing in HIV Hotspot Cities: Massachusetts, 2013 (n|=433)

Characteristic	Resides in an HIV Hotspot City	
	No (n =359), Mean (SD) or % (No.)	Yes (n =74), Mean (SD) or % (No.)
Age, y	32.0 (12.4)	35.0 (14.5)
Survey mode		
Online	90.8 (326)	78.4 (58)
In person	9.2 (33)	21.6 (16)
Race		
White, not Hispanic	84.4 (303)	60.8 (45)
Black, not Hispanic	0.8 (3)	12.2 (9)
Hispanic	9.5 (34)	5.4 (4)
Multiracial	3.3 (12)	13.5 (10)
Other race, not Hispanic	2.0 (7)	8.1 (6)
Current gender identity <sup>a</sup>		
Male to female	24.5 (88)	39.2 (29)
GNC: male sex at birth	9.7 (35)	6.8 (5)
Female to male	32.6 (117)	28.4 (21)
GNC: female sex at birth	33.4 (120)	25.7 (19)
Education		
High school or less	12.2 (46)	18.9 (14)
Some college	29.5 (106)	31.0 (23)
College	34.8 (125)	28.4 (21)
Graduate school	22.8 (82)	21.6 (16)
Employment		
Employed for wages	42.9 (154)	25.7 (19)
Self-employed	8.9 (32)	8.1 (6)
Employed student	14.8 (53)	16.2 (12)
Student only	12.3 (45)	9.5 (7)
Out of work	6.4 (23)	13.5 (10)
Homemaker	1.1 (4)	0.0 (0)
Retired	1.7 (6)	2.7 (2)
Unable to work	9.8 (35)	14.9 (11)
Prefer not to answer	2.0 (7)	9.5 (7)
Income, \$		
<10 000	14.2 (51)	18.9 (14)
10 000–14 999	16.7 (60)	21.6 (16)
15 000–19 999	4.2 (15)	9.5 (7)
20 000–24 999	6.7 (24)	6.8 (5)
25 000–34 999	9.8 (35)	6.8 (5)
35 000–49 999	17.0 (61)	10.8 (8)

Characteristic	Resides in an HIV Hotspot City	
	No (n = 359), Mean (SD) or % (No.)	Yes (n = 74), Mean (SD) or % (No.)
50 000–74 999	18.1 (65)	14.9 (11)
75 000	13.1 (47)	10.8 (8)

*Note.* GNC = gender nonconforming. Hotspot cities were Boston, Worcester, and Springfield.

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TABLE 2

Results of Logistic Regression Models Examining Associations Between Demographic Characteristics or Behavioral Risk Factors and Living in HIV Hotspot Cities: Massachusetts, 2013

Characteristic or Risk Factor	Does Not Reside in an HIV Hotspot (n =359), % (No.)	Resides in an HIV Hotspot (n =74), % (No.)	Multivariable Adjusted Odds Ratio (95% Confidence Interval)
Age, y			
18–29 (ref)	56.6 (203)	55.4 (41)	1.00
30–39	12.2 (68)	18.9 (9)	0.72 (0.49, 1.07)
40–49	9.5 (47)	13.1 (7)	1.30 (0.84, 2.02)
50	23.0 (41)	11.4 (17)	2.44 <sup>***</sup> (1.66, 3.57)
Race			
White (non-Hispanic) (ref)	84.4 (303)	60.8 (45)	1.00
Non-White <sup>a</sup>	15.6 (56)	39.2 (29)	2.36 <sup>***</sup> (1.75, 3.19)
Income			
Higher (>\$35,000 annually) (ref)	31.4 (246)	25.7 (55)	1.00
Low (<\$35,000 annually)	68.6 (113)	74.3 (19)	1.37 <sup>*</sup> (1.05, 1.78)
Gender <sup>b</sup>			
Female-to-male spectrum (ref)	34.3 (123)	46.0 (34)	1.00
Male-to-female spectrum	65.7 (236)	54.1 (40)	1.20 (0.89, 1.61)
HIV testing history			
Never tested (ref)	20.3 (74)	14.9 (11)	1.00
Tested in past 6 mo	30.9 (111)	41.9 (31)	1.35 (0.89, 2.05)
Tested more than 6 mo in past	48.8 (175)	43.2 (32)	1.31 (0.88, 1.95)
Incarceration history <sup>c</sup>			
No (ref)	98.6 (354)	86.5 (64)	1.00
Yes	1.4 (5)	13.5 (10)	4.86 <sup>***</sup> (2.77, 8.51)
Polydrug use (past 12 mo) <sup>d</sup>			
No (ref)	58.5 (110)	44.6 (33)	1.00
Yes	41.5 (249)	55.4 (41)	1.54 <sup>*</sup> (1.12, 2.12)
Current smoker			
No (ref)	65.7 (236)	46.8 (43)	1.00
Yes	34.3 (123)	43.2 (31)	1.53 <sup>**</sup> (1.18, 1.98)
Binge drinking (past 3 mo)			
No (ref)	85.2 (306)	77.0 (57)	1.00
Yes	14.8 (53)	23.0 (17)	1.57 <sup>**</sup> (1.20, 2.05)
4 or more sex partners in past 6 mo			
No (ref)	91.9 (330)	90.5 (37)	1.00
Yes	8.1 (29)	9.5 (7)	0.74 (0.47, 1.16)

Characteristic or Risk Factor	Does Not Reside in an HIV Hotspot (n =359), % (No.)	Resides in an HIV Hotspot (n =74), % (No.)	Multivariable Adjusted Odds Ratio (95% Confidence Interval)
Condomless receptive anal sex during most recent sexual encounter with partner assigned male sex at birth <sup>e</sup>			
No (ref)	96.5 (347)	87.3 (65)	1.00
Yes	3.5 (12)	12.7 (9)	1.96 <sup>**</sup> (1.20, 3.21)

Note. Values are adjusted for survey modality.

<sup>a</sup>Black (non-Hispanic), Hispanic, multiracial, or other (non-Hispanic).

<sup>b</sup>Transgender and gender-nonconforming people were collapsed into 2 groups according to sex at birth and direction of gender identity (i.e., male-to-female spectrum vs female-to-male spectrum).

<sup>c</sup>Served time in a jail, prison, or other correctional facility.

<sup>d</sup>Use of 2 or more illicit drugs during the past year (marijuana, cocaine, crack, heroin, club drugs, methamphetamine, hallucinogens, downers, painkillers).

<sup>e</sup>Male-assigned sex at birth includes cisgender (nontransgender) men, transgender women, and gender-nonconforming people who were assigned male sex at birth.

\*  $P < .05$

\*\*  $P < .01$

\*\*\*  $P < .001$ .

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