Is patient navigation used by people with HIV who need it? An assessment from the Medical Monitoring Project, 2015–2017

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Abstract

We (1) estimated the prevalence of not getting patient navigation despite feeling a need for the service (unmet subjective need) or despite having unsuppressed viral load (unmet objective need) among people with HIV (PWH), (2) determined reasons why PWH did not use the service, and (3) determined factors associated with unmet need for patient navigation. We used combined data from the 2015 to 2017 cycles of the Medical Monitoring Project (MMP), an HIV surveillance system designed to produce nationally representative estimates of the characteristics of adults with diagnosed HIV infection in the United States. Six percent reported unmet subjective need and 28% had unmet objective need for patient navigation. When needs were combined, more than a third had unmet need for the service. Among PWH with unmet subjective need for patient navigation, 77% reported lack of knowledge about patient navigation as a reason for non-use. Younger age, female gender, racial/ethnic minority status, limited health literacy, homelessness, incarceration history, lack of health insurance/coverage, non-injection drug use, depression, and recent HIV diagnosis were associated with unmet subjective or objective need for patient navigation. One in three PWH did not use patient navigation despite needing the service. Lack of knowledge about patient navigation was a barrier to use, calling for increased availability and promotion of such services. PWH with social and economic vulnerabilities were less likely to get patient navigation when needed. It is important to address the question of how to make this service available to everyone who needs it.

Keywords

HIV patient navigation; unmet subjective need; unmet objective need

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Disclaimer

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the U.S. Centers for Disease Control and Prevention.

INTRODUCTION

Patient navigation is a patient-centered healthcare delivery model wherein patients manage their healthcare needs with the assistance of patient navigators, who help resolve barriers to care. Patient navigation was initially developed to reduce barriers to cancer care and was adapted for people with HIV (PWH), who often have multiple and complex healthcare needs. Although there is no standard definition or standard duties of a patient navigator in HIV care settings[1], patient navigators help PWH link to and remain retained in care by working individually with patients to reduce structural, financial, and personal barriers to care[2]. For example, patient navigators might schedule medical appointments, send appointment reminders, accompany PWH to appointments, assist with health insurance or transportation, or make referrals to social services[3–6]. Patient navigators may improve PWH's knowledge and skills required to engage in care and adhere to antiretroviral therapy (ART) by promoting self-efficacy, positive health expectations, and goal-setting behaviors[4]. In addition to removing structural and process barriers which providers tend to focus on[7], patient navigators, specifically peer navigators, can also address relational concerns (e.g., fear, stigma, a lack of social support) of PWH[7,8].

A systematic review[1] showed that patient navigation can enhance linkage to and retention in care and viral suppression among PWH. Patient navigation is a promising strategy, particularly for PWH with a history of incarceration[4,5,9,10]. For PWH leaving jail, patient navigation offers support that allows them to maintain levels of HIV care engagement achieved while incarcerated. Common features of such programs include accompaniment to the initial primary care visit upon release from jail and activities that address post-release issues, such as lack of transportation, housing, employment, stigma, and discrimination. Additionally, patient navigation can improve engagement in care and viral suppression of PWH experiencing homelessness by transitioning them to more stable housing[11]. Thus, patient navigation can optimize the health of PWH—specifically PWH with subsistence needs who are out of care or at risk for falling out of care — and ultimately prevent onward HIV transmission.

As evidence for patient navigation accumulates, it is important to improve our understanding of the population of PWH in the United States (US) who may benefit from this strategy. Unfortunately, there is a gap in the literature; we do not know how many PWH have an unmet need for patient navigation, who they are, and why they are not getting the service. Thus, our objectives are to (1) estimate the prevalence of PWH in the US who needed patient navigation but did not get it (i.e., had unmet need for patient navigation), using two measures of need, namely, subjective and objective need, (2) determine reasons why PWH who had a subjective need for patient navigation did not use the service, and (3) determine demographic, socioeconomic, and clinical factors associated with unmet need for patient navigation.

METHODS

MMP design and data collection

The Medical Monitoring Project (MMP) is an annual cross-sectional survey designed to produce nationally representative estimates of behavioral and clinical characteristics of adults with diagnosed HIV in the United States[12]. We analyzed combined data from the 2015–2017 cycles of MMP.

Briefly, MMP used a two-stage sampling method. During the first stage, 23 project areas were sampled from all states in the United States, the District of Columbia, and Puerto Rico. During the second stage, simple random samples of persons with diagnosed HIV aged 18 years and older were drawn for each participating state/territory from the National HIV Surveillance System (NHSS), a census of persons with diagnosed HIV in the United States. Data were collected via phone or face-to-face interviews and medical record abstractions during June 2015–May 2018.

All sampled states and one territory participated in MMP. Response rates for adults with diagnosed HIV ranged from 40%–46%. Data were weighted based on known probabilities of selection at state or territory and person levels. Additionally, data were weighted to adjust for person nonresponse and post-stratified to NHSS population totals[13]. MMP methods have been described in detail elsewhere[14].

Ethics statement

MMP data collection is a part of routine public health surveillance, and thus, determined to be non-research[15]. Participating states or territories obtained local institutional review board approval to collect data, when required. Informed consent was obtained from all participants.

Measures

Outcome measures—We used three outcomes to capture different types of unmet need for patient navigation—subjective need, objective need, and either subjective or objective need. Patient navigation was defined in the questionnaire as follows: "The next question is about patient navigation services. This is someone whose job is to help you get the best medical care for you. For example, a patient navigator might help you talk to your doctor about your care or go with you to your medical appointments." Participants were asked: "During the past 12 months, did you get patient navigation services?" (yes/no). Those who responded 'yes' were considered to have had their needs met (i.e., having unmet subjective need=0 [no], having unmet objective need=0 [no]), while those who responded 'no' were asked "During the past 12 months, have you needed patient navigation services?" Those who responded 'yes' were coded as having unmet subjective need for patient navigation (1 [yes], and 0 [no] otherwise, irrespective of their viral load status [suppressed or unsuppressed]). Those who responded "no" or "I don't know" and whose medical records indicated that any of their viral load tests were detectable (>200 copies/mL) or had no viral load tests in the past 12 months were coded as having unmet objective need for patient navigation=1 (yes), and 0 (no) otherwise. Given that patient navigation interventions are often found to be positively associated with viral suppression[1], we used unsuppressed viral load among those

who did not receive navigation services as an objective indicator of need for the service. Lastly, we created a variable that combined unmet subjective need and unmet objective need for patient navigation.

Reasons for not using patient navigation among those who reported subjective need—Participants who reported unmet subjective need for patient navigation were asked if they were not able to get this service for any of the reasons listed in Table 2 (yes/no). Participants could report multiple reasons.

Potential correlates—We assessed age in years, gender, race/ethnicity, foreign-born, English proficiency (based on responses to "How well do you speak English?"), health literacy (based on responses to "How confident are you filling medical forms by yourself?"), education, and poverty. Household income, homelessness, and health insurance or coverage were measured in the past 12 months. Participants also reported whether they had engaged in binge drinking in the past 30 days (had 5 alcoholic beverages in a single sitting [4 for women]), whether they had engaged in alcohol use before or during sex, non-injection drug use, non-injection drug use before or during sex, and high-risk sex (defined as having engaged in condomless vaginal or anal sex with an HIV-negative or unknown status partner while not sustainably virally suppressed nor partner protected by pre-exposure prophylaxis [PrEP]) in the past 12 months.) Participants were also categorized into four sexual risk groups based on self-reported sexual behaviors in the past 12 months or self-identified sexual orientation. (See Table 3 for specific categories.)

Depression in the past 2 weeks (no depression, other depression, major depression) was measured using the Patient Health Questionnaire (PHQ-8)[16], an 8-item scale measuring frequency of depressed mood. Participants were categorized into recently (i.e., within 12 months) vs. not recently diagnosed with HIV, based on self-reported date of first HIV positive test. When self-reported date of diagnosis was missing, records from the NHSS were used instead. We also captured whether participants sought care from a Ryan White-funded facility or not.

Analytic Methods

Statistical analyses were conducted using SAS 9.4 (SAS Institute, Cary, North Carolina) and SAS-callable SUDAAN 10.0.1 (RTI International, Research Triangle Park, North Carolina) and accounted for clustering, unequal selection probabilities, and non-response. We calculated frequencies, weighted percentages, and associated 95% confidence intervals (CIs) for each outcome measure. Bivariate associations between each outcome measure and selected characteristics were evaluated using unadjusted prevalence ratios (PR) and 95% confidence intervals. We constructed multivariable logistic regression models to compute the adjusted prevalence ratios (APR). Collinearity among the independent variables was assessed. Characteristics with p-value less than 0.1 at bivariate analysis were entered in the initial multivariable model. Next, manual backward stepwise model selection was performed, with a p-value of 0.05 criterion for retention of variables in the final model. We retained age, gender, and race/ethnicity in the final model regardless of p-value to control for basic demographic characteristics. Models were compared through the Akaike's information

criterion (AIC). Model adequacy was evaluated using Hosmer and Lemeshow goodness-of-fit test. Variances of the regression parameters and prevalence ratios were computed by the Taylor linearization method, assuming a with-replacement (WR) design.

RESULTS

Approximately 6% of PWH reported unmet subjective need for patient navigation. The percentage was much higher (28%) for unmet objective need. More than a third of PWH did not use patient navigation despite having either a subjective or an objective need for the service (Table 1). Among PWH who reported unmet subjective need for patient navigation, more than three-quarters (77%) reported lack of information to access the service or knowledge that the service existed as a reason for not using the service. About a quarter cited lack of money or insurance for not using the service. (Table 2)

Table 3 shows multivariable correlates of unmet subjective, objective, and subjective or objective need for patient navigation. For subjective need for patient navigation, women were more likely and transgender persons were less likely than men to report unmet need. Hispanics and persons of "other races/ethnicities" were more likely than non-Hispanic whites to report unmet need. Persons with limited health literacy (vs. adequate health literacy) and who experienced homelessness in the past 12 months (vs. not), used non-injection drugs (vs. not) were more likely to report unmet need. PWH with health insurance/coverage (private, public, Ryan White/ADAP only) were less likely than those with no health insurance to report unmet need. An additional analysis (results not shown in Table 3) found no differences in the prevalence of unmet subjective need for patient navigation among PWH with different types of health insurance coverage.

For objective need for patient navigation, younger age groups (18–44) were more likely than PWH who were 55+ years old, and non-Hispanic blacks were more likely than non-Hispanic whites to have unmet need. PWH with limited English proficiency (vs. English proficient) were less likely to have unmet need. PWH who were incarcerated in the past 12 months (vs. not), used non-injection drugs in the past 12 months (vs. did not) were more likely to have unmet need. PWH with health insurance/coverage (private, public, Ryan White/ADAP only) were less likely than those with no health insurance to report unmet need. An additional analysis (results not shown in Table 3) found no differences in the prevalence of unmet objective need for patient navigation among PWH with different types of health insurance coverage.

Multivariable correlates of unmet subjective or objective need for patient navigation were age, race/ethnicity, English proficiency, homelessness, incarceration history, health insurance/coverage, non-injection drug use, depression, and recent HIV diagnosis. PWH who had been diagnosed with HIV within 12 months (vs. longer) were more likely to report unmet need. Directions of associations for other variables were the same as those reported for the other two outcomes.

DISCUSSION

We found that approximately one in three PWH did not use patient navigation despite needing the service either subjectively or objectively. Unmet need for patient navigation may be underestimated when only subjective need is considered. Patient navigation is often found to be positively associated with viral suppression[1]. Unmet need increased more than four-fold (6% to 28%) when using unsuppressed viral load in the past 12 months as an indicator of objective need for patient navigation, illustrating the importance of considering multiple measures of need.

Most PWH with an unmet subjective need for patient navigation cited not knowing how to access the service or that such service existed as a reason for non-use. This lack of knowledge calls for increased availability of patient navigation and its visibility by social marketing, social media, word of mouth, and other means of communication.

Multivariable correlates of patient navigation service non-utilization varied by whether the need for the service was subjective or objective. Regardless of the type of need, lack of health insurance or coverage and non-injection drug use consistently predicted unmet need. Although patient navigation is designed to optimize the health of PWH with subsistence needs, our findings suggest that PWH who could benefit most from the service are not receiving it. Across the outcomes, we found that PWH with social/economic vulnerabilities (e.g., younger age, racial/ethnic minority status, limited health literacy, homelessness, incarceration history, depression) were less likely to receive patient navigation when they needed it, and this was true even when health insurance/coverage status was statistically controlled. It is particularly unfortunate that PWH with a history of incarceration had an unmet need for patient navigation because research shows that this strategy can improve their health outcomes,[5,9,10]. Similarly, homeless PWH, also more likely to report an unmet need for patient navigation, could improve their health by transitioning into more stable housing with the help of patient navigators[11]. Based on these findings, programs might prioritize PHW with social/economic vulnerabilities to receive patient navigation upon being diagnosed with HIV or at a clinic appointment.

A quarter of PWH who did not use patient navigation but felt the need for the service cited lack of money or insurance as a reason for non-use. As noted above, lack of health insurance/coverage was a consistent predictor of unmet need for patient navigation. There were no differences in unmet subjective and objective needs among PWH with different types of health insurance/ coverage (e.g., public vs. private), suggesting that PWH are less likely to have an unmet need for patient navigation if they have some form of health coverage. The New York City Care Coordination Program[17,18] is an evidence-informed intervention that includes patient navigation as one of the primary components. This program was funded through Ryan White Part A (under the "medical case management" service category), and clients were able to access patient navigation services for free if they were enrolled in that program. Given that there is no standard definition of HIV patient navigation[1], it is unlikely that the service *per se* would be directly covered by private or public health insurance plans. It is possible that these plans could link PWH to clinics that provide patient navigation as part of their comprehensive HIV care coordination services.

Given the promise of patient navigation for improving patient outcomes, it is important to explore how to best pay for the cost of patient navigation to implement this strategy at a larger scale, making it available to everyone who needs it.

One unexpected finding was that PWH with limited English proficiency were less likely than those who were proficient to have unmet objective need for patient navigation. This finding was contrary to the finding for unmet subjective need, for which English proficiency was not associated with the outcome, and bivariate analysis showing that the prevalence of unmet subjective need was slightly higher among PWH with limited English proficiency compared with those who were proficient. Given how we defined unmet objective need for patient navigation, some of the findings on unmet objective need may be explained by the fact that certain groups of PWH are more likely not to have sustained viral suppression. It is still unknown why PWH with English proficiency may be more likely than PWH with limited English proficiency to not to have sustained viral suppression, which is a topic for further investigation.

This paper is subject to the following limitations. First, the data are cross-sectional, thus no causality can be established. Second, not all PWH who were sampled participated in MMP. However, results were adjusted for nonresponse using standard methodology[19]. Even with suboptimal response rates, there is value in results that employ unbiased sampling methods[20,21]. Third, except for the clinical indicators (e.g., viral loads) obtained from medical records, data were self-reported and thus subject to social desirability and recall biases. Fourth, the definition of patient navigation provided in the questionnaire may not have comprehensively captured the range of tasks that a patient navigator performs, which may have led to under-reporting of service utilization or the extent to which participants subjectively felt the need for the service. Further, given that there are no standard duties of a patient navigator in HIV care settings[1], the term "patient navigation" may have been interpreted differently by the study participants. Fifth, MMP does not collect information about the healthcare setting for PWH who are in care nor information on healthcare settings in which patient navigators are retained. Information like this would help estimate the proportion of PWH receiving care in settings that are most likely to provide patient navigation. Additionally, MMP does not provide information on how patient navigation services are provided thus no assessment can be made for how this strategy is implemented across the United States. Lastly, because of the way we defined objective need, the findings on unmet objective need may be driven by differences between groups in sustained viral suppression. Multivariable correlates that were *unique to* unmet objective need, such as younger age and black racial status may be interpreted with caution, as these variables have been consistently reported as factors associated with unsuppressed viral load[22–26].

Despite evidence that patient navigation can improve the HIV care continuum outcomes[1], one in three PWH did not use the service despite needing it. Lack of knowledge about how to access this service or that such service existed was a barrier to use, calling for increased availability and promotion of patient navigation. PWH with social and economic vulnerabilities were less likely to get patient navigation when needed, suggesting that the service is not reaching those who could benefit the most. It is important to address the question of how to make this service available to everyone who needs it.

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Table 1.

Estimated prevalence of unmet subjective or objective need for patient navigation among people with HIV, United States, Medical Monitoring Project, 2015–2017

	n	%[*] (95% CI)
Total	13254	100
Unmet subjective need [**] for patient navigation	625	6.1 (5.3–6.9)
Unmet objective need [***] for patient navigation	2950	28.2 (26.9–29.5)
Unmet subjective or objective need for patient navigation	3575	34.4 (32.9–35.9)

[*] Percentages are weighted percentages.

[**] Unmet subjective need for patient navigation was defined as not getting patient navigation services despite reporting need for the service in the past 12 months, irrespective of viral load status (suppressed or unsuppressed).

[***] Unmet objective need for patient navigation was defined as not getting patient navigation, not reporting need for the service, but did not have sustained viral suppression over the past 12 months.

Table 2.

Estimated prevalence of reasons[*] for not using patient navigation services among people with HIV with an unmet subjective need[**] for the service, United States, Medical Monitoring Project, 2015–2017

	n	Column%[***] (95% CI)
Total	625	100
Because I didn't have enough money or insurance	132	24.7 (18.8–30.6)
Because I couldn't find the information I needed to get the service or didn't know it existed	504	77.4 (72.4–82.4)
Because the service didn't meet my needs or I wasn't eligible for it	110	18.0 (13.4–22.7)
Because of personal reasons (I was afraid or embarrassed to get the service or I had other things going on…that made it difficult to get it)	135	24.0 (19.1–29.0)

[*]
Participants were able to report multiple reasons.

[**]
Unmet subjective need for patient navigation was defined as not getting patient navigation services despite reporting need for the service in the past 12 months, irrespective of viral load status (suppressed or unsuppressed).

[***]
Percentages are weighted percentages.

Table 3.

Associations between demographic, socioeconomic and clinical characteristics and unmet need for patient navigation services among people with HIV, United States, Medical Monitoring Project, 2015–2017

	Unmet subjective need for patient navigation*					Unmet objective need for patient navigation***					Unmet subjective or objective need for patient navigation				
	n	%*** (95% CI#)	p-value	APR# (95% CI)	p-value	n	% (95% CI)	p-value	APR (95% CI)	p-value	n	% (95% CI)	p-value	APR (95% CI)	p-value
TOTAL [Row%] [out of 7692]	625	6.1 (5.3–6.9)				2950	28.2 (26.9–29.5)				3575	34.4 (32.9–35.9)			
Demographics															
Age at the time of interview (years)			0.061		0.577			<.0001		<0.001			<.0001		<0.001
18–24	12	9.8 (4.3–15.2)		1.49 (0.82–2.70)		108	43.0 (34.7–51.2)		1.60 (1.25–2.06)		120	52.7 (45.0–60.3)		1.55 (1.28–1.88)	
25–34	90	7.4 (5.1–9.7)		1.17 (0.83–1.66)		515	35.0 (31.8–38.1)		1.38 (1.22–1.55)		605	42.4 (38.8–45.9)		1.31 (1.18–1.46)	
35–44	122	6.5 (5.1–7.9)		1.03 (0.77–1.37)		638	32.5 (29.6–35.4)		1.31 (1.17–1.46)		760	39.0 (36.3–41.7)		1.23 (1.13–1.35)	
45–54	212	6.2 (5.0–7.4)		1.12 (0.89–1.41)		906	26.1 (24.3–27.8)		1.08 (0.97–1.20)		1118	32.3 (30.2–34.4)		1.07 (0.98–1.17)	
>=55	189	4.9 (3.6–6.2)		Reference		783	23.8 (21.8–25.7)		Reference		972	28.7 (26.5–30.9)		Reference	
Gender			0.006		0.001			0.836		0.801			0.166		0.061
Male	422	5.8 (4.9–6.7)		Reference		2096	28.1 (26.6–29.6)		Reference		2518	33.9 (32.2–35.5)		Reference	
Female	196	7.4 (6.2–8.6)		1.29 (1.06–1.56)		810	28.7 (26.9–30.5)		0.99 (0.91–1.07)		1006	36.2 (34.0–38.3)		1.04 (0.97–1.12)	
Transgender	7	2.8 (0.1–5.6)+^		0.36 (0.15–0.85)		42	29.1 (20.7–37.6)		0.91 (0.68–1.22)		49	32.0 (22.8–41.1)		0.79 (0.60–1.04)	
Race/Ethnicity			0.002		0.027			<.0001		0.002			<.0001		<0.001

	Unmet subjective need for patient navigation *					Unmet objective need for patient navigation **					Unmet subjective or objective need for patient navigation				
	n	%*** (95% CI#)	p-value	APR# (95% CI)	p-value	n	% (95% CI)	p-value	APR (95% CI)	p-value	n	% (95% CI)	p-value	APR (95% CI)	p-value
White, non-Hispanic	139	4.5 (3.4–5.6)		Reference		729	24.6 (21.9–27.4)		Reference		868	29.2 (26.4–32.0)		Reference	
Black, non-Hispanic	222	5.4 (4.5–6.4)		1.01 (0.77–1.32)		1450	33.0 (31.3–34.8)		1.30 (1.15–1.48)		1672	38.5 (36.8–40.2)		1.25 (1.12–1.39)	
Hispanic/Latino	201	8.5 (5.2–11.7)		1.69 (1.07–2.66)		582	24.6 (22.0–27.1)		1.04 (0.89–1.22)		783	33.1 (30.1–36.0)		1.15 (1.03–1.29)	
Other	63	9.2 (6.6–11.9)		1.67 (1.07–2.61)		189	27.1 (22.3–32.0)		1.05 (0.88–1.26)		252	36.3 (31.0–41.6)		1.15 (0.99–1.34)	
Foreign born			0.028	---	---			<.0001	---	---			<.0001	---	---
No	545	6.3 (5.4–7.2)		---		2602	29.2 (27.8–30.6)		---		3147	35.5 (34.0–37.1)		---	
Yes	74	4.7 (3.5–5.9)		---		336	22.3 (19.9–24.8)		---		410	27.0 (24.4–29.6)		---	
English proficiency			0.817	---	---			<.0001	---	0.014			0.002	---	<0001
Not proficient	165	6.4 (3.0–9.9)		---		538	23.0 (20.4–25.6)		0.87 (0.77–0.97)		703	29.5 (26.0–32.9)		0.89 (0.80–0.99)	
Proficient	459	6.0 (5.3–6.7)		Reference		2412	29.5 (28.0–31.0)		Reference		2871	35.6 (34.0–37.2)		Reference	
Health literacy			<.0001		0.005			0.041		---			0.155		---
Limited health literacy	227	9.7 (7.7–11.6)		1.43 (1.11–1.84)		614	26.1 (23.6–28.6)		---		841	35.8 (33.0–38.7)		---	
Adequate health literacy	395	5.0 (4.3–5.8)		Reference		2330	28.8 (27.5–30.2)		---		2725	33.9 (32.4–35.4)		---	
Socioeconomic															
Education			0.070	---	---			0.131	---	---			0.157	---	---

	Unmet subjective need for patient navigation*					Unmet objective need for patient navigation**					Unmet subjective or objective need for patient navigation				
	n	%*** (95% CI#)	p-value	APR# (95% CI)	p-value	n	% (95% CI)	p-value	APR (95% CI)	p-value	n	% (95% CI)	p-value	APR (95% CI)	p-value
Less than High school, no diploma	134	7.4 (6.0–8.8)		---		525	26.5 (24.2–28.8)		---		659	34.0 (31.4–36.6)		---	
High school diploma or GED	160	6.6 (4.9–8.3)		---		811	29.6 (27.3–32.0)		---		971	36.2 (33.5–38.9)		---	
More than high school	331	5.5 (4.5–6.4)		---		1610	28.1 (26.6–29.6)		---		1941	33.6 (31.9–35.4)		---	
Household income			<.0001	---	---			0.809	---	---			0.190	---	---
0 – 19,999	388	7.6 (6.3–8.9)		---		1530	27.5 (26.0–29.0)		---		1918	35.1 (33.4–36.9)		---	
20,000 – 39,999	128	6.0 (4.6–7.3)		---		571	27.5 (24.6–30.4)		---		699	33.5 (30.3–36.6)		---	
40,000 – 74,999	42	3.3 (1.9–4.7)		---		369	28.4 (24.7–32.1)		---		411	31.7 (27.8–35.6)		---	
>= 75,000	29	2.3 (1.3–3.3)		---		262	29.4 (25.9–32.8)		---		291	31.7 (28.2–35.2)		---	
Poverty			<.0001	---	---			0.402	---	---			0.002	---	---
Above poverty level	265	4.7 (3.9–5.6)		---		1437	27.3 (25.3–29.3)		---		1702	32.1 (30.0–34.1)		---	
At or below poverty level	322	7.8 (6.5–9.2)		---		1295	28.5 (26.7–30.3)		---		1617	36.4 (34.5–38.3)		---	
Homelessness			<.0001		0.006			0.002		---			<.0001		0.001
No	515	5.5 (4.7–6.4)		Reference		2617	27.7 (26.4–29.1)				3132	33.3 (31.7–34.8)		Reference	
Yes	110	12.4 (9.0–15.7)		1.59 (1.14–2.21)		332	33.5 (29.8–37.2)				442	45.9 (41.5–50.3)		1.18 (1.07–1.30)	

	Unmet subjective need for patient navigation *					Unmet objective need for patient navigation **					Unmet subjective or objective need for patient navigation				
	n	%*** (95% CI#)	p-value	APR# (95% CI)	p-value	n	% (95% CI)	p-value	APR (95% CI)	p-value	n	% (95% CI)	p-value	APR (95% CI)	p-value
Incarceration history			0.004		---			<.0001		0.007			<.0001		0.004
No	576	5.9 (5.0–6.8)		---		2727	27.7 (26.3–29.0)		Reference		3303	33.6 (32.0–35.1)		Reference	
Yes	48	9.7 (6.8–12.7)		---		221	38.4 (33.8–43.0)		1.22 (1.06–1.40)		269	48.2 (43.0–53.4)		1.21 (1.07–1.36)	
Health insurance or coverage			<.0001		<0.001			<.0001		0.005			<.0001		<0.001
Private insurance	158	4.3 (3.2–5.5)		0.24 (0.15–0.37)		961	27.9 (25.5–30.3)		0.66 (0.51–0.84)		1119	32.3 (29.7–34.8)		0.49 (0.42–0.57)	
Public insurance (excluding RW/ADAP# only)	395	6.4 (5.4–7.5)		0.26 (0.18–0.36)		1701	28.3 (26.7–29.9)		0.66 (0.51–0.84)		2096	34.8 (33.0–36.5)		0.49 (0.42–0.57)	
RW/ADAP Only	39	6.1 (3.8–8.5)		0.24 (0.14–0.42)		209	25.3 (21.6–29.0)		0.55 (0.40–0.74)		248	31.5 (27.9–35.2)		0.42 (0.34–0.50)	
No insurance coverage	26	25.7 (16.2–35.2)		Reference		52	49.1 (38.0–60.3)		Reference		78	74.7 (65.2–84.3)		Reference	
Risk behavior															
Binge drinker			0.084		---			0.306		---			0.059		---
No	523	5.9 (5.0–6.8)		---		2446	28.0 (26.6–29.3)		---		2969	33.9 (32.3–35.4)		---	
Yes	100	7.4 (5.7–9.1)		---		484	29.4 (26.7–32.2)		---		584	36.8 (33.7–40.0)		---	
Alcohol use before or during sex			0.230					0.371					0.171		
No	202	5.7 (4.5–7.0)		---		1049	28.0 (25.7–30.3)		---		1251	33.8 (31.3–36.3)		---	

	Unmet subjective need for patient navigation*					Unmet objective need for patient navigation**					Unmet subjective or objective need for patient navigation				
	n	%*** (95% CI#)	p-value	APR# (95% CI)	p-value	n	% (95% CI)	p-value	APR (95% CI)	p-value	n	% (95% CI)	p-value	APR (95% CI)	p-value
Yes	147	6.7 (5.4–8.0)		---		717	29.4 (26.9–31.9)		---		864	36.1 (33.4–38.8)		---	
Non-injection drug use			0.002		0.001			<.0001		0.001			<.0001		<0.001
No	389	5.2 (4.1–6.3)		Reference		1934	26.5 (25.1–27.9)		Reference		2323	31.7 (30.0–33.4)		Reference	
Yes	234	8.4 (6.8–9.9)		1.48 (1.17–1.86)		1006	32.1 (29.9–34.4)		1.15 (1.06–1.25)		1240	40.5 (37.9–43.2)		1.20 (1.13–1.29)	
Non-injection drug use before or during sex			0.000		---			0.000		---			<.0001		---
No	213	5.0 (3.9–6.1)		---		1216	27.1 (25.0–29.2)		---		1429	32.1 (29.8–34.3)		---	
Yes	133	9.0 (6.9–11.1)		---		556	32.8 (30.0–35.6)		---		689	41.8 (38.7–44.9)		---	
Sexual risk behavior			0.485		---			0.408		---			0.660		---
No	276	6.4 (5.3–7.5)		---		1150	27.6 (25.8–29.4)		---		1426	34.0 (32.0–36.0)		---	
Yes	341	5.9 (4.9–6.9)		---		1748	28.6 (26.7–30.5)		---		2089	34.6 (32.6–36.6)		---	
Same/opposite gender sexual behavior/orientation			0.034		---			0.389		---			0.126		---
MSM	269	5.7 (4.7–6.7)		---		1363	27.3 (25.6–29.1)		---		1632	33.0 (31.3–34.8)		---	
MSW only	142	5.9 (4.6–7.1)		---		694	29.5 (26.9–32.0)		---		836	35.4 (32.6–38.2)		---	

	Unmet subjective need for patient navigation *					Unmet objective need for patient navigation **					Unmet subjective or objective need for patient navigation				
	n	%*** (95% CI#)	p-value	APR# (95% CI)	p-value	n	% (95% CI)	p-value	APR (95% CI)	p-value	n	% (95% CI)	p-value	APR (95% CI)	p-value
WSM	190	7.4 (6.2–8.7)		---		790	28.7 (26.8–30.6)		---		980	36.2 (33.9–38.5)		---	
Others	24	5.0 (2.7–7.3)		---		103	29.5 (23.6–35.3)		---		127	34.5 (28.0–40.9)		---	
Clinical															
Depression			<.0001		<0.001			0.494		---			<.0001		<0.001
No depression	352	4.3 (3.5–5.2)		Reference		2284	28.1 (26.5–29.7)		---		2636	32.4 (30.8–34.1)		Reference	
Other depression	99	8.8 (6.3–11.2)		1.67 (1.29–2.16)		316	27.6 (24.2–30.9)		---		415	36.4 (33.0–39.8)		1.05 (0.96–1.16)	
Major depression	166	16.1 (13.3–18.9)		2.95 (2.18–3.99)		333	30.2 (26.8–33.6)		---		499	46.4 (42.7–50.1)		1.35 (1.23–1.48)	
Recently diagnosed with HIV (<1 year)			0.329		---			0.003		---			<.0001		0.014
No	621	6.1 (5.2–6.9)		---		2909	28.1 (26.8–29.4)		---		3530	34.2 (32.7–35.7)		Reference	
Yes	4	10.6 (0.0–22.4)+^		---		41	46.1 (33.2–59.0)		---		45	56.7 (45.4–68.1)		1.39 (1.10–1.76)	
Ryan White HIV/ AIDS program-funded facility			0.047		---			0.984		---			0.379		---
No	146	4.6 (3.7–5.6)		---		725	25.6 (22.7–28.6)		---		871	30.3 (27.1–33.5)		---	
Yes	430	6.3 (5.1–7.4)		---		1855	25.7 (24.5–26.9)		---		2285	32.0 (30.4–33.5)		---	

*
Unmet subjective need for patient navigation was defined as not getting patient navigation service despite reporting need for the service in the past 12 months, irrespective of viral load status (suppressed or unsuppressed).

**
Unmet objective need for patient navigation was defined as not getting patient navigation, not reporting need for the service, but did not have sustained viral suppression over the past 12 months

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Percentages are weighted percentages.

#CI = Confidence Interval; APR = Adjusted Prevalence Ratio; RW = Ryan White HIV/AIDS Program; ADAP = AIDS Drug Assistance Program

+Coefficient of Variation (CV)>=0.30, indicating that the estimate is not reliable with high variance.

^
Values with a denominator sample size <30, values with an absolute CI width of between 0.05 and 0.30, and a relative CI width 130% are marked with # and should be interpreted with caution