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Gaps along the HIV care continuum: findings among a population seeking sexual health care services in New York City

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Abstract

Background—Linkage/re-linkage to HIV care for virally unsuppressed persons with new sexually transmitted infections is critical for ending the HIV epidemic. We quantified HIV care continuum gaps, and viral suppression, among HIV-positive patients attending New York City (NYC) sexual health clinics (SHC).

Methods—1,649 HIV-positive patients and a 10% sample of 11,954 patients with unknown HIV status on clinic visit date (DOV) were matched against the NYC HIV registry. Using registry diagnosis dates, we categorized matched HIV-positive patients as “new-positives” (newly diagnosed on DOV), “recent-positives (diagnosed 90 days before DOV), “prevalent-positives” (diagnosed >90 days before DOV), and “unknown-positives” (previously diagnosed, but status unknown to clinic on DOV). We assessed HIV care continuum outcomes before and after DOV for new-positives, prevalent-positives, and unknown-positives using registry laboratory data.

Results—In addition to 1,626 known HIV-positive patients, 5% of the unknown sample (63/1,196) matched to the registry, signifying that about 630 additional HIV-positive patients attended SHCs. Of new-positives, 65% were linked to care after DOV. Of prevalent-positives, 66% were in care on DOV; 43% of the out-of-care were re-linked after DOV. Of unknown-positives, 40% were in care on DOV; 21% of the out-of-care re-linked after DOV. Viral suppression was

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achieved by: 88% of in-care unknown-positives, 76% in-care prevalent-positives, 50% new-positives, 42% out-of-care prevalent-positives, and 16% out-of-care unknown-positives.

Conclusions—Many HIV-positive persons, including those with uncontrolled HIV infection, attend SHCs and potentially contribute to HIV spread. However, HIV status often is not known to staff, resulting in missed linkage/re-linkage to care opportunities. Better outcomes could be facilitated by real-time ascertainment of HIV status and HIV care status.

Keywords

HIV status; HIV care continuum; sexual health clinics

Background

Expanded testing and earlier treatment of HIV infection is essential to ending HIV epidemics [1, 2]. Adherence to antiretroviral therapy (ART) for HIV can reduce HIV viral load (VL) to undetectable levels and vastly reduce the risk of onward HIV transmission, thus HIV-positive individuals need to know that they are infected, be engaged in regular HIV care, and receive and adhere to treatment.

The epidemiological synergy between HIV and other sexually transmitted infections (STIs) has been recognized for decades [3–5]. Coinfection with STIs may augment shedding of HIV virus [6], making some HIV-positive patients more infectious. A diagnosis of an STI in a person with HIV who is not virally suppressed is a sentinel public health event, and persons with uncontrolled HIV and recent infection with, or exposure to, STI represent an important population for public health efforts to focus on in order to limit the spread of HIV.

Little is known about rates of viral suppression among HIV-positive persons seeking STI care, and to what extent sexual health/STI clinics can play a role in limiting HIV spread through improving linkage to and engagement in HIV care. In order to assess gaps in HIV care and viral suppression both at the time of and subsequent to clinic visit, we matched a cohort of New York City (NYC) sexual health clinic (SHC) attendees whose HIV-positive status was *known to clinic staff* at the time of visit, and a 10% sample of clinic attendees whose HIV status (positive or negative) was *unknown to clinic staff* at the time of visit, to the citywide HIV surveillance registry. Actionable information about such gaps can inform and drive the development of scalable interventions for assessing and improving HIV care continuum outcomes during encounters at front-line, public sector service delivery settings such as sexual health clinics.

Methods

Study Population

The NYC Department of Health and Mental Hygiene (DOHMH) operates 8 SHCs that serve anyone 12 years old without regard for insurance or immigration status. Services include STI testing and treatment, and HIV testing, counseling, and linkage to care. HIV testing is conducted on an opt-out basis; the standard of care is to offer a rapid or acute HIV test to all patients who have not tested for HIV or were documented as HIV-negative but not tested in

the previous 3 months, and to all patients with suspected acute HIV infection. Clinic staff link patients newly diagnosed with HIV in SHCs to HIV primary care through referral to a network of HIV providers curated and established by the DOHMH. Referring staff contact providers within 7 days following a scheduled appointment to verify if the patient attended, and contact patients approximately 60 days after diagnosis to assess whether they are still in care. Referrals are made for previously positive patients who report being out of care at time of SHC visit.

Patients were eligible for this study if they either: 1) tested for HIV and were newly diagnosed on the day of clinic visit (DOV); 2) were known to be previously diagnosed with HIV; or 3) had unknown HIV status as of DOV. Newly diagnosed patients had neither previously tested positive at the SHCs nor self-reported an HIV-positive status. Previously diagnosed patients were known to clinic staff as such either by positive test in the SHCs before 2012 or by self-reported positive status at the first clinic visit in 2012. Patients had an unknown HIV status as of the end of their last clinic visit in 2012 if they were not known to be positive and did not have a recorded HIV test result on or within 90 days prior to DOV.

Data Matching

In October 2014, all patients documented by the clinics to be newly or previously diagnosed at the time of their clinic visits in 2012 were matched against the HIV surveillance registry (“the registry”) to confirm positive HIV status and diagnosis dates relative to SHC DOV. Additionally, a 10% random sample of patients for whom HIV status was unknown to clinic staff on DOV was checked against the registry to determine the proportion with diagnosed and reported HIV infection. The registry contains information on all HIV/AIDS diagnoses in NYC, and all HIV-related laboratory test results (CD4 count, VL, genotypes) for persons living with HIV in NYC [7]. The matching process uses deterministic matching of patient identifiers, and has been described previously [8]. Laboratory testing data to evaluate HIV care continuum outcomes (i.e., proportion in care, virally suppressed) for matched patients were extracted from the registry for the year prior to and year after varied DOVs of interest, as described in the *HIV Care Continuum Measures* section.

Epidemiologic classification

We assessed discordance between patients’ SHC documentation of HIV status on DOV (newly diagnosed, known to be previously diagnosed, or had an unknown HIV status) and “true” HIV status using information from the match. Individuals were ultimately classified according to registry information because the registry includes population-based information on HIV diagnoses from all NYC providers, whereas SHCs only have their own test results and patient self-report of HIV status.

Patients were reassigned into 4 categories for analysis according to match results: 1) “new-positives” (i.e., persons newly diagnosed on DOV), 2) “recent-positives” (persons diagnosed 90 days prior to DOV), 3) “prevalent-positives” (persons diagnosed >90 days prior to DOV), and 4) “unknown-positives” (persons previously diagnosed, but with HIV status unknown to SHC staff on DOV). Based on the 10% sampling fraction, the number of unknown-positives attending the SHCs was extrapolated from the proportion of the study

sample that matched to the registry. We described differences in demographics, HIV transmission risk, and STI diagnoses between groups, using a combination of SHC medical record and registry diagnosis-related data.

HIV Care Continuum Measures

We constructed HIV care continuums for new-positives, prevalent-positives, and unknown-positives. We did not examine the care continuum for recent-positives because care status classification at time of clinic visit (which influences linkage efforts) for this analysis relied on a minimum of 3 months since HIV diagnosis date, which some recent-positives did not have time to accrue. We examined unknown-positives separately from other previously diagnosed HIV cases to understand care outcomes specifically among persons for whom there was no information that could impact linkage/re-linkage to care at the time of clinic visit.

Longitudinal registry data on CD4 and VL were used to assess care status and viral suppression status before and after an SHC visit of interest. That visit was defined as the first visit when a patient's positive HIV status was known to SHC staff, and for whom a linkage/re-linkage to care intervention was possible. As the last DOV in 2012 was used to ascertain the most up-to-date HIV status for patients with HIV status unknown to SHC staff, the visit of interest for unknown-positives was that last visit.

Linkage to care was defined for new-positives as the presence of 1 HIV laboratory (CD4/VL) test within 3 months after the HIV diagnosis date; tests conducted within 0–7 days of diagnosis were excluded as they could represent tests involved with making an HIV diagnosis rather than a linkage event [9]. Prevalent-positives and unknown-positives were considered to have been in HIV care if they had 2 laboratory tests at least 3 months apart in the 12 months preceding their first clinic DOV in 2012. Re-linkage to care (for those out-of-care in the year leading up to the clinic visit) was defined as the presence of 1 test in the registry within 3 months after the first DOV in 2012.

Retention in care was defined as 2 laboratory tests at least 3 months apart in the year after the SHC visit at which patients tested positive (for new-positives), first SHC DOV in 2012 (prevalent-positives), or last SHC DOV in 2012 (unknown-positives).

Viral suppression was defined as quantitative VL of 200 copies/mL at the last test within the year after: visit at which patients tested positive (for new-positives), first DOV in 2012 (prevalent-positives), or last DOV in 2012 (unknown-positives) (Table 1). An infectiousness threshold (VL threshold that increases risk for transmission) was defined as VL of >1,500 copies/mL [10, 11] using the same time points as described for the viral suppression measurement.

We stratified prevalent-positives and unknown-positives according to whether they had been in HIV care prior to the SHC visit, and constructed HIV care continuums for all groups. We calculated confidence intervals around estimates related to HIV care continuum outcomes for the 10% sample of unknown-positives, but not for other groups for which we had complete enumeration of population sizes. Viral suppression was assessed both among

persons who were and were not retained in care. Finally, we estimated the proportion of unsuppressed persons (VL>200) in each group that had VL above the infectiousness threshold.

Analyses were performed using SAS 9.2 (SAS Institute, Cary, NC). The NYC DOHMH considered this project to be public health surveillance that does not meet the Office of Human Research Protections definition of human subjects research.

Results

In 2012, 67,359 patients attended the NYC SHCs. Of those, 50,863 tested negative for HIV at the SHCs, either at or within 3 months before their last 2012 clinic visit. Anonymous HIV testing (with no additional patient information for further analysis) was performed for 2,893 patients. The remaining 13,603 were eligible for this study. Of those, 419 were newly diagnosed at a SHC in 2012, 1,230 were known to clinic staff to be HIV-positive, and the remaining 11,954 patients had an unknown HIV status as of their last clinic visit in 2012 (Figure 1).

Matching

A total of 1,626 of 1,649 patients known to be HIV-positive matched to the registry. Of the 10% sample of patients with an unknown HIV status (n=1,196), 63 (5.3%) matched with an HIV diagnosis date prior to SHC DOV, signifying that HIV prevalence among those of unknown status was 5.3% (95% CI: 4.4%–6.7%) and that a projected ~630 additional HIV-positive patients attended SHCs in 2012. Most patients (94.8%; 1,563/1,649) documented as being diagnosed with HIV on/before DOV matched to the registry; all but one of the 419 patients who were newly diagnosed with HIV on DOV matched, and 1,145 of 1,230 patients (93.1%) who were known by SHC staff to be previously diagnosed matched (Figure 1). Thus, according to match results there was an estimated total of 2,193 diagnosed and reported HIV-positive patients who attended the SHCs in 2012 (i.e., 630 + 418 + 1,145). Of these, 28.7% (630/2,193) had an unknown HIV status on DOV, 19.1% (418/2,193) were newly diagnosed on DOV, and 52.2% (1,145/2,193) had been previously diagnosed.

Epidemiologic re-classification and descriptive epidemiology

Table 2 presents the discordance between epidemiologic categorization of matched patients (N=1,626) according to information available to SHC staff on DOV, versus information confirmed during the registry match. Among the 418 patients who were ‘newly diagnosed’ on SHC DOV, 351 (84%) were in fact newly diagnosed with HIV in NYC; the remaining 67 patients had a registry diagnosis date prior to DOV (N=33 90 days prior, N=34 >90 days prior). Among previously diagnosed patients (N=1,145), 93 were considered recently diagnosed according to a self-reported first HIV-positive test or a SHC-administered positive test 90 days prior to the 2012 visit; however, 60 (64.5%) of these patients were confirmed as recently diagnosed, and the remaining 33 (36.5%) had a registry diagnosis date >90 days prior to DOV. Thus, final epidemiologic re-classifications according to registry information were: 351 new-positives, 93 recent-positives, 1,119 prevalent-positives, and 63 unknown-positives.

Most matched patients were male (92.7%), non-Hispanic black or Hispanic (80.1%), and native English speakers (88.1%). The median age of patients at the time of SHC visit was 34 years (range 17–76), while the median age at time of HIV diagnosis was 28 years (range 0–73). Of male cis-gender and male transgender patients with known transmission risk, 89.7% (1,198/1,336) and 90.1% (10/11) reported sex with men, respectively; heterosexual sex constituted the dominant HIV transmission risk among female patients (77.9%; 53/68) (Table 3). Of matched patients, 1,288 were evaluated for STIs on DOV; almost half (46.1%; 594/1,288) were diagnosed with one or more of the following: syphilis (n=264 diagnoses), trichomoniasis (3), first clinical episode of herpes simplex virus infection (45), chlamydia (215), gonorrhea (186).

There were key differences among patient groups. Median age at the time of clinic visit was less for new-positives (26 years) and recent-positives (29) compared to prevalent-positives (36) and unknown-positives (44); notably, almost two-thirds (63.5%; 95% CI: 51.1%–74.3%) of unknown-positives were aged 40 years at time of clinic visit. Of the 86% of men with known transmission risk, unknown-positives were more likely to report non-MSM risk (e.g., injection drug use and heterosexual risk) compared with other groups; 25.4% (95% CI: 15.8%–38.3%) of unknown-positives vs. 9.8% of prevalent-positives, 6.3% of recent-positives, and 2.2% of new-positives did not report sex with other men. A smaller proportion of unknown-positives (15.4%; 95% CI: 6.8%–28.1%) had STI compared to other groups (range: 46.2%–58.3%).

HIV care continuum outcomes before and after SHC visit

Two-thirds of prevalent-positives (66.3%; 742/1,119) and just over one-third of unknown-positives (39.7%; 95% CI: 28.5%–52.0%) had evidence of being in HIV care at the time of clinic visit.

Overall, 52.0% (398/766) of patients were linked or re-linked to HIV care within 3 months after SHC visit: 64.7% (227/351) of new-positives, 43.2% (163/377) of previously out-of-care prevalent-positives, and 21.0% of the 38 previously out-of-care unknown-positives (95% CI: 11.1%–36.3%) (Figure 2).

Overall, 1,011 of 1,165 patients (86.8%) who were linked or in care were retained in HIV care in the year following SHC visit. Retention rates varied by patient group as follows: 89.0% (202/227) of new-positives, 86.0% (638/742) of in-care prevalent-positives, 86.5% (141/163) of previously out-of-care prevalent-positives, 96.0% (95% CI: 80.5%–99.3%) of 25 in-care unknown-positives, and 75.0% (95% CI: 40.9%–92.8%) of 8 previously out-of-care unknown-positives.

Overall, 60.0% (919/1,533) of patients achieved viral suppression. By patient group: 50.1% (176/351) of new-positives, 75.6% (559/740) of in-care prevalent-positives, 40.8% (158/381) of out-of-care prevalent-positives, 88.0% (95% CI: 70.0%–96.8%) of 25 in-care unknown-positives, and 15.8% (95% CI: 7.4%–30.4%) of 38 out-of-care unknown-positives were virally suppressed. Viral suppression was higher at 78.8% (797/1,011) among the patients who were retained in care during the year after SHC visit. By patient group: 77.2% (156/202) of new-positives, 80.6% (514/638) of in-care prevalent-positives, 72.3% (102/141)

of out-of-care prevalent-positives, 91.7% (95% CI: 74.1%–97.7%) of 24 in-care unknown-positives, and 50.0% (95% CI: 18.8%–81.2%) of 6 out-of-care unknown-positives were virally suppressed (Figure 2). Among virally unsuppressed patients, 72.8% (251/345) had VL above the infectiousness threshold: 100% of out-of-care unknown-positives, and a range for other groups from 66.7% (in-care unknown-positives) to 76.3% (out-of-care prevalent-positives).

Discussion

Many HIV-positive persons attending NYC SHCs report their HIV-positive status but have suboptimal HIV care. Further, there is a substantial number of patients who do not disclose that they are HIV-positive, and a subset of them have the poorest HIV care outcomes of all HIV-positive SHC patients. To end the HIV epidemic, it is critical to be able to identify and assist HIV-positive persons who may be out of HIV care and virally unsuppressed, especially those with a newly diagnosed STI, so that they remain healthy and to prevent the onward transmission of HIV. Visits for sexual health care services are opportunities to provide such assistance.

The National HIV/AIDS Strategy includes goals of increasing the percentage of HIV-diagnosed persons who are virally suppressed to at least 80% by the year 2020. In NYC in 2013, 72% of newly diagnosed persons in NYC were linked to care within 3 months, 56% were retained in care, and 78% of people in HIV care were virally suppressed [12]. We found similar or better care continuum outcomes for our cohort of SHC patients, with 65% of newly diagnosed patients getting timely linkage to care, 87% of all HIV-positive patients being retained in care, and 79% of those in care achieving viral suppression. However, there were notable disparities. Certain subgroups, such as those we found to be out-of-care at the time of their clinic visits, experienced significantly poorer outcomes of re-linkage to care and viral suppression.

We characterized an especially vulnerable, and sizable, population of HIV-positive patients who did not report a positive HIV status on clinic DOV, did not test that day, and did not have a recent SHC HIV test result on record. Since 2006, the NYC SHCs have utilized a combined consent to STI care and opt-out HIV testing which has been associated with an increased proportion of patients leaving a clinic with a known HIV status. However, HIV status is not known to clinic staff for 18% of patients at the time of visit; this issue likely pertains to many clinics providing sexual health services, and may be amplified in the absence of opt-out HIV testing protocols. Five percent of these patients were diagnosed and reported with HIV, accounting for almost one-third of all HIV-diagnosed patients seeking services at the clinics. Compared with other groups, HIV-positive patients whose HIV status was unknown to clinic staff and were found not to be in care prior to the visit had the worst HIV care outcomes; they were least likely to link/re-link to HIV care within 3 months of SHC visit, and least likely to be retained in care and virally suppressed in the subsequent year. Those who were virally unsuppressed had viral loads exceeding the infectiousness threshold of 1,500 copies/mL and were potentially at risk of transmitting HIV. Given that fully one-quarter of HIV-positive male patients with an unknown HIV status were not known to be MSM (compared to less than 10% of men known to be HIV-positive), it is important

for staff not to make assumptions about lower HIV risk among men who do not report male partners, and to encourage HIV testing during a clinic visit.

The ability to ascertain HIV status and care status in real-time (e.g., while the patient is still in clinic) would be invaluable in efforts to improve care outcomes. We found that in addition to the number of HIV-infected patients among those with an unknown status, 16% of patients considered by clinic staff as “newly diagnosed” were actually prevalent cases and 36% of those considered to have been recently diagnosed had been diagnosed for some time, which has implications for efforts around re-engagement in care. Re-linkage efforts are crucially needed; one-third of known positive patients and almost two-thirds of those with unknown HIV status were not in HIV care at the time of clinic visit. The development and use of informatics applications, such as the Louisiana Public Health Information Exchange (LaPHIE), would be beneficial with regard to such efforts. LaPHIE links the state’s HIV surveillance database to electronic medical record systems to aid providers in identifying, in real-time, HIV-infected patients without adequate clinical monitoring and enabling immediate linkage to HIV care [13, 14]. To improve patient care, such innovative technology could be expanded beyond a focus on out-of-care patients, and include HIV serostatus for all patients and current HIV care status for all those previously HIV-diagnosed.

Our study has limitations. First, patients who visited NYC SHCs but lived outside of NYC or moved away in the year after the clinic visit may not have received HIV care in NYC and their laboratory tests would not be reported to the HIV registry, leading us to misclassify them as out-of-care. Only 4.6% of clinic patients had non-NYC addresses, but there was variation by patient group, with prevalent-positives having the smallest proportion with non-NYC addresses (3.4%) and unknown-positives having the largest (9.5%). However, in a sensitivity analysis that excluded non-NYC residents, estimates for all HIV care continuum outcomes for all patient groups remained virtually unchanged, suggesting minimal misclassification. Second, the presence of test results in the registry was used as a proxy for HIV-related care visits. Previous analyses comparing medical record and HIV surveillance data in NYC, however, have found high (>85%) agreement between the two, particularly for retention in care measures [9, 15]. Third, our VL measure using the last test in the year after SHC visit may not reflect viral suppression status at the time of the visit; given possible spikes in VL associated with STI [16, 17], it would be important to know about VL on DOV, which has implications for HIV transmissibility. Finally, findings on HIV care continuum outcomes among our study population of HIV-positive patients seeking sexual health care may not be generalizable to other patient populations.

We used HIV care continuum data to identify important gaps in care among a population that poses a substantial risk for onward HIV transmission. Actions to reduce disparities in HIV care outcomes are reliant on better provider ascertainment of HIV status and care status. Regardless of type of clinical setting, providers diagnosing STIs should discuss HIV status and HIV care status with all patients; encourage patients with an unknown HIV status to test; and stress the importance of engagement in HIV care for persons found to be HIV infected. As of late 2016, NYC SHC patients diagnosed in clinic and those who self-report being out-of-care can be seamlessly linked to treatment through immediate provision of ART at the clinic, and efficiently linked to care through patient navigation services that offer

risk-reduction counseling, behavioral and psychosocial services, insurance benefits navigation, referral to a partnering HIV care provider, and follow-up efforts to ensure that patients were indeed connected with referral providers. Such services are expected to positively impact linkage rates and downstream outcomes such as retention in care and viral suppression. They are particularly important because despite immense progress in HIV treatment, a recent study found that fewer than half of gay and bisexual men were aware that people with HIV should start ART as soon as they are diagnosed, and only one-quarter knew about treatment as prevention (i.e., that adherence to ART significantly reduces the risk of passing HIV on to one's partners) [18]. Providing a systematic means of accessing real-time information on care status could greatly enhance the effectiveness of these services to improve both individual and public health outcomes.

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Figure 1.

Patient population, New York City Sexual Health Clinics, 2012

^aRecently tested patients were not tested for HIV at their last visit to the clinics in 2012, but tested HIV negative at the clinics in the 90 days prior to their last visit in 2012 (and were not due for another test yet), and had never previously tested positive at BSTDC clinic or self-reported a previous positive test.

Figure 2.

HIV care continuum outcomes after the clinic visit among clinic patients who matched to the HIV registry, by match category, New York City Sexual Health Clinics, 2012

^aBased on estimates from sample of 63 persons (representing 630 patients) determined to be unknown-positives attending New York City sexual health clinics

NOTE: Viral suppression measured among patients with evidence of retention in HIV care

Table 1

HIV care continuum measures and definitions

		Linkage to Care HIV lab test within 3 months of:	Re-linkage to care HIV lab test within 3 months of:	Retention in care 2 lab tests at least 3 months apart in year after:	Viral suppression Quantitative VL <200 copies/mL at last test within year after:
New-positives		Clinic visit date with positive test	X	Clinic visit date with positive test	Clinic visit date with positive test
Prevalent-positives	In care at time of clinic visit ^a	X	X	First clinic visit in 2012	First clinic visit in 2012
	Out of care at time of clinic visit	X	First clinic visit in 2012	First clinic visit in 2012	First clinic visit in 2012
Unknown-positives	In care at time of clinic visit ^a	X	X	Last clinic visit in 2012	Last clinic visit in 2012
	Out of care at time of clinic visit	X	First clinic visit in 2012	Last clinic visit in 2012	Last clinic visit in 2012

^aPrevalent-positives and unknown-positives were considered to have been in HIV care if they had >2 laboratory tests at least 3 months apart in the year preceding their first clinic visit date in 2012.

Table 2

Information on HIV status available at time of clinic visit among patients who matched to the HIV registry, versus reclassification according to registry diagnosis information, New York City Sexual Health Clinics, 2012

		HIV status known at time of sexual health clinic visit			Total
		Newly diagnosed	Previously Diagnosed HIV diagnosis 90 days before clinic visit (n=93)	Unknown HIV Status HIV diagnosis >90 days before clinic visit (n=1052)	
Epidemiologic re-classification according to HIV registry match	New-positive^a	351	0	0	351
	Recent-positive^b	33	60	0	93
	Prevalent-positive^b	34	33	1052	1119
	Unknown-positive^c	0	0	0	63 ^d
		418	1145	63	1626

^a patients who were newly diagnosed on clinic visit date

^b patients who were diagnosed prior to clinic visit date

^c patients who were previously diagnosed, but with unknown status on clinic visit date

^d sample of 63 persons represents 630 patients determined to be unknown-positives attending New York City sexual health clinics.

Table 3

Characteristics of clinic patients who matched to the HIV registry, by match category, New York City Sexual Health Clinics, 2012

	All		New-Positive		Recent-Positive		Prevalent-Positive		Unknown-Positive ^d	
	n	%	n	%	n	%	n	%	n	%
	N=1,626		N=351		N=93		N=1,119		N=63	
Sex/Gender										
Male	1508	92.7	332	94.6	78	83.9	1042	93.1	56	88.9
Female	107	6.6	19	5.4	15	16.3	68	6.1	5	7.9
Transgender	11	0.7	0	0.0	0	0.0	9	0.8	2	3.2
Race/ethnicity										
White	283	17.4	70	19.9	14	15.0	193	17.2	6	9.5
Black	832	51.2	155	44.1	44	47.3	596	53.3	37	58.7
Hispanic	471	29.0	112	31.9	33	35.5	306	27.3	20	31.7
Other ^b /unknown	40	2.5	14	4.0	2	2.1	24	2.1	0	0.0
Age at STI clinic visit										
Median (range)	34 (17–76)		26 (18–68)		29 (17–71)		37 (18–76)		44 (17–68)	
<20	32	2.0	18	5.1	6	6.4	5	0.4	3	4.8
20–29	542	33.3	214	61.0	45	48.4	278	24.8	6	9.5
30–39	447	27.5	75	21.4	26	28.0	331	29.6	14	22.2
40–49	371	22.8	29	8.3	7	7.5	320	28.6	15	23.8
50+	234	14.4	15	4.3	9	9.7	185	16.5	25	39.7
Age at HIV diagnosis										
Median (range)	28 (0–73)		26 (18–68)		29 (17–71)		29 (0–73)		32 (0–52)	
<20	106	6.5	18	5.1	6	6.4	78	7.0	4	6.3
20–29	804	49.4	214	61.0	45	48.4	521	46.6	24	38.1
30–39	470	28.9	75	21.4	26	28.0	351	31.4	18	28.6
40–49	190	11.7	29	8.3	7	7.5	139	12.4	15	23.8
50+	56	3.4	15	4.3	9	9.7	30	2.7	2	3.2
Primary language spoken										

	All		New-Positive		Recent-Positive		Prevalent-Positive		Unknown-Positive ^a	
	n	%	n	%	n	%	n	%	n	%
	N=1,626		N=351		N=93		N=1,119		N=63	
English	1433	88.1	308	87.7	75	80.6	997	89.1	53	84.1
Other	193	11.9	43	12.2	18	19.3	122	10.9	10	15.9
HIV transmission risk										
Males										
MSM	1198	79.5	284	85.5	59	75.6	821	86.9	34	60.7
IDU	86	5.7	3	0.9	2	2.6	72	7.6	9	16.1
Heterosexual ^c	48	3.2	4	1.2	3	3.8	36	3.8	5	8.9
Perinatal	2	0.1	0	0.0	0	0.0	2	0.2	0	0.0
Unknown	172	11.4	41	12.3	14	17.9	14	1.4	8	14.2
Females										
IDU	13	12.1	0	0.0	1	6.7	12	17.7	0	0.0
Heterosexual ^c	53	49.5	7	36.8	10	6.7	34	50.0	2	40.0
Perinatal	2	1.9	0	0.0	0	0.0	1	1.5	1	20.0
Unknown	39	36.4	12	63.2	4	2.7	21	30.9	2	40.0
Transgender										
MSM	10	90.1	0	0.0	0	0.0	9	100.0	1	50.0
IDU	1	9.9	0	0.0	0	0.0	0	0.0	1	50.0

^a Sample n of 63 persons represents 630 patients determined to be unknown-positives attending New York City sexual health clinics.

^b Includes Native American, Asian/Pacific Islander, Multi-race, "Other" race/ethnicity

^c Includes people who had heterosexual sex with a person they know to be HIV-infected, and injection drug user, or a person who has received blood products. For females only, also includes history of sex work, multiple sex partners, sexually transmitted disease, crack/cocaine use, sex with a bisexual male, probable heterosexual transmission as noted in medical record, or sex with a male and negative history of injection drug use.