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HIV prevalence and HIV clinical outcomes of transgender and gender-diverse people in England

PD Kirwan^{1,2}, M Hibbert¹, M Kall¹, K Nambiar³, M Ross⁴, S Croxford¹, S Nash¹, L Webb⁵, A Wolton⁶, VC Delpech¹

¹Blood Safety, Hepatitis, Sexually Transmitted Infections and HIV Division, Public Health England, London, UK

²Medical Research Council Biostatistics Unit, University of Cambridge, Cambridge, UK

³Brighton and Sussex University Hospitals NHS Trust, Brighton, UK

⁴cliniQ, London, UK

⁵LGBT Foundation, Manchester, UK

⁶Chelsea and Westminster Hospital NHS Trust, London, UK

Abstract

Objectives—We provide the first estimate of HIV prevalence among trans and gender-diverse people living in England and compare outcomes of people living with HIV according to gender identity.

Methods—We analysed a comprehensive national HIV cohort and a nationally representative self-reported survey of people accessing HIV care in England (Positive Voices). Gender identity was recorded using a two-step question co-designed with community members and civil society. Responses were validated by clinic follow-up and/or self-report. Population estimates were obtained from national government offices.

Results—In 2017, HIV prevalence among trans and gender-diverse people was estimated at 0.46–4.78 per 1000, compared with 1.7 (95% credible interval: 1.6–1.7) in the general population. Of 94 885 people living with diagnosed HIV in England, 178 (0.19%) identified as trans or gender-diverse. Compared with cisgender people, trans and gender-diverse people were more likely to be London residents (57% vs. 43%), younger (median age 42 vs. 46 years), of white ethnicity (61% vs. 52%), under psychiatric care (11% vs. 4%), to report problems with self-care

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Correspondence to: PD Kirwan.

Correspondence: Mr Peter D Kirwan, Blood Safety, Hepatitis, Sexually Transmitted Infections and HIV Division, Public Health England, 61 Colindale Avenue, London NW9 5EQ, UK. Tel: 020 832 77550; fax: 020 8200 7868; peter.kirwan@phe.gov.uk.

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Author contributions

All authors jointly conceived the research study. PDK and MK extracted and analysed the data. PDK performed the data linkage and coordinated clinic follow-up. PDK and VCD drafted and finalized the paper. All authors critically appraised the manuscript and approved its submission.

(37% vs. 13%), and to have been refused or delayed healthcare (23% vs. 11%). Antiretroviral uptake and viral suppression were high in both groups.

Conclusions—HIV prevalence among trans and gender-diverse people living in England is relatively low compared with international estimates. Furthermore, no inequalities were observed with regard to HIV care. Nevertheless, trans and gender-diverse people with HIV report poorer mental health and higher levels of discrimination compared with cisgender people.

Keywords

gender identity; HIV; patient care; prevalence; transgender people

Introduction

The terms ‘transgender (trans)’ and ‘gender-diverse’ are used to refer to people who identify as a different gender from the sex (male/female) they were assigned at birth. This gender may be either man or woman, or a gender that does not fit into the existing cultural binary categorisation (such as genderqueer or non-binary). By contrast, ‘cisgender (cis)’ refers to people who identify with the gender they were assigned at birth.

There is a dearth of data regarding the size of the trans and gender-diverse population in the UK, with recent ‘tentative’ estimates in the range 200 000–500 000 [1], equating to around 168 000–420 000 people in England.

No estimates of HIV prevalence among trans and gender-diverse people exist in the UK [2]. In a meta-analysis from limited studies in 15 countries (not including the UK), it was suggested that up to one in five trans women may be living with HIV worldwide, with researchers calling for improved population estimates of trans people as well as HIV prevalence studies with larger sample sizes [3]. Meanwhile, even more limited information on HIV prevalence exists for trans men (with a few studies primarily in the United States [4,5]) and there are no data for non-binary and other gender-diverse people. These groups may be at high risk for HIV acquisition: a 2013 Canadian study showed that up to 60% of trans men may identify as men who have sex with men (MSM), with 10% engaging in high-risk sexual behaviours and 40% never having had a HIV test [6]. In the UK, MSM are at greatest risk of HIV, with an estimated 9% [95% credible interval (CI): 5–16% [7]] unaware of their HIV status in 2017, and trans MSM who engage in unprotected sex with cis MSM may be particularly at risk of HIV and other sexually transmitted infections (STIs) [8].

Trans and gender-diverse people may also have poorer access to HIV testing, and poorer clinical outcomes than their cis counterparts. Studies in the United States have found trans men and women to be insufficiently reached by HIV testing measures, and consequently more likely to be diagnosed at a late stage [9,10]. Trans women living with HIV report lower levels of antiretroviral treatment (ART) uptake and adherence than cis men and women [11–15], and trans men and women achieve lower rates of viral suppression [15,16]. These measures are contextspecific, however, and may not translate to other countries.

Worldwide, few studies of psychosocial issues, including stigma and mental health issues, experienced by those living with HIV have included trans and gender-diverse respondents. In the UK, trans people who completed The Stigma Survey of People living with HIV 2015 ($n = 31$) reported higher levels of mental health issues, as well as greater stigmatization and discrimination compared with cis participants [17]. These findings are consistent with studies in Asia and the Americas which showed that trans people were at greater risk of mental health issues, physical abuse, social isolation and economic hardship, as well as reporting high levels of stigmatisation and poorer clinical outcomes [18–21].

In 2015 Public Health England (PHE) worked closely with LGBTIQ and trans community members to develop a methodology for collecting and validating gender identity information in national HIV surveillance systems [2]. In this study, we present the first HIV prevalence estimates for trans and gender-diverse people living in England and describe the epidemiology and clinical outcomes of trans and gender-diverse people living with HIV as compared with cis people.

Methods

HIV surveillance data in the UK are collected, stored and analysed by PHE, as previously described [22]. Briefly, since 1982, data on new HIV and AIDS diagnoses in the UK have been reported by National Health Service (NHS) laboratories, hospitals and clinics. These data are supplemented with clinical updates sent by all HIV outpatient clinics to create a comprehensive national cohort of people diagnosed with HIV [the HIV and AIDS Reporting System (HARS)]. A linkage algorithm, described elsewhere [23], was used to match records within and between systems using a combination of pseudo-anonymized variables such as Soundex (coded form of the surname) [24], clinic number, and date of birth.

Until 2014, only binary (male/female) information on sex was collected, although this information could be updated if an individual's gender identity had changed at their most recent HIV attendance. In 2015, following consultation with members of the trans community and civil society, it was agreed to collect gender identity and gender assigned at birth information for all people attending for HIV care using the two-step question shown below (Box 1).

The Positive Voices survey is a cross-sectional survey of people attending for HIV care in England & Wales. Participants were randomly pre-selected to be nationally representative of all people accessing HIV care. The survey asked about a range of issues related to living with HIV and participants were asked to self-report their gender identity and whether this was the same gender assigned at birth using the two-step question in Box 1. Responses by participants were linked to their existing HARS records using a coded identifier. In total, 4357 people attending 72 HIV clinics in England completed the survey between January and September 2017 [25]. The Positive Voices study received a favourable ethical opinion by the London-Harrow Research Ethics Committee (13/LO/0279).

In this study, we determined the number of trans and gender-diverse people living with diagnosed HIV in England in 2017 using linked HARS cohort data (clinician-reported

gender identity) and/or, where available, a linked Positive Voices survey response (self-reported gender identity). Trans and gender-diverse individuals were those with a different gender at birth alongside any gender identity (including non-binary, in another way and prefer not to say). To allow for non-attendance, the denominator included: people seen for HIV care in 2015 and 2016 (but not 2017) and not known to have died (all death records are obtained from the Office for National Statistics), and those seen for care in 2017. People reported as trans or gender-diverse in HARS without a linked Positive Voices self-report were followed up with the reporting clinic for validation.

Data linkage and statistical analyses were performed using Stata 15.1 (StataCorp, College Station, TX, USA). Populations were described according to key demographic and clinical factors. Viral suppression was defined as having a viral load < 200 copies/mL and those with missing viral load were assumed not virally suppressed. The proportion engaged in care was measured as those seen for HIV care who reattended within 1 year. HIV prevalence was calculated per 1000 population using Office for National Statistics and Government Equalities Office estimates as the denominator [1]. Exact binomial proportion confidence intervals were calculated.

Results

Of the 94 885 people living with diagnosed HIV in England in 2017, 592 (0.62%) were initially reported as having a different gender at birth using the two-step question introduced in 2015. An additional 37 people had a different gender identity reported during attendances prior to 2015, whilst 37 people self-reported a different gender at birth through the Positive Voices survey only. Following clinic follow-up, 178 were confirmed as having trans or gender-diverse identities, representing 0.19% of all people diagnosed with HIV in England in 2017 (Table 1). Based on this numerator and an estimated 168 000-420 000 trans and gender-diverse people living in England as the denominator, the prevalence of diagnosed HIV in this population ranged between 0.42 and 1.06 per 1000 population (Table 1). It is of note, however, that whilst it is based on a much smaller sample, the Positive Voices 2017 survey results indicate that up to 800 ($37/4357 \times 94\ 885$) people living with HIV may identify as trans or gender-diverse, giving an upper limit of 4.40 per 1.000 prevalence. Applying the 2017 estimate of undiagnosed HIV infection for all people living with HIV of 8% (95% CI: 6–12%) [7], the overall prevalence of HIV among trans and gender-diverse people is estimated to be in the range 0.46–4.78 per 1000 in 2017 (using HARS as the lower bound and Positive Voices survey results as the upper bound estimates).

Of the 178 confirmed trans and gender-diverse people with diagnosed HIV, 140 (79%) identified as women or trans women, 12 (7%) as men or trans men, 20 (11%) as non-binary, and six (3%) described their gender in another way. Only two of the 26 people who identified as non-binary or described their gender in another way were coded as such in clinician-reported HARS data. The remaining 24 individuals self-reported this in Positive Voices.

Compared with cisgender people, trans and gender-diverse people living with HIV were more likely to live in London [57% (102/178) vs. 43% (40 683/94 707)] and to be of white

ethnicity [61% (108/178) vs. 52% (49 350/ 94 707)]. Trans and gender-diverse people were also younger, with more than two-thirds (70%; 124/178) aged under 50 in 2017 [median age = 42 years, interquartile range (IQR): 33–52] compared with 63% (59 495/94 707) of cis people (median = 46 years, IQR: 38–53) (Table 2).

Year of HIV diagnosis for trans and gender-diverse individuals ranged from 1989 to 2017, with 40% (71/178) having been first diagnosed in the past 5 years, compared with a quarter (26%; 24 922/94 707) of cis people. Late diagnosis rates (diagnosis with a CD4 count < 350 cells/mm³) in the past 5 years were similar (40% among trans and gender-diverse people and 42% among cis people). At their most recent attendance, 97% (172/178) of trans and gender-diverse people were on ART and, of those on ART, 87% (150/172) had a suppressed viral load [99% (150/152), excluding those with missing viral load]. The equivalent proportions for cis people were 96% (91 388/ 94 676) and 83% (76 025/91 388) [96% (76 025/79 027), excluding those with missing viral load], respectively (Table 2). ART coverage and viral suppression were 96% (134/140) and 90% (121/134), respectively, for trans women and 100% (38/38) and 76% (29/38) for trans men, non-binary and gender-diverse people.

Engagement in care among those seen in 2015 was 92% (138/150) among trans and gender-diverse people and 94% (77 584/82 115) among cis people. Extending follow-up by an additional year increased engagement to 93% and 96%, respectively (Table 2). Engagement in care was 100% (26/26) among non-binary and gender-diverse people, 91% (104/114) among trans women and 80% (8/ 10) among trans men.

Trans and gender-diverse people were more likely than cis people to be under active psychiatric care (11% vs. 4%), but not for any of the other clinical complexities captured through HARS (listed in Table 2). Trans and gender-diverse people were also more likely to be reported as a current sex worker compared with cis people (7% vs. 0.3%) (Table 2).

Of the 37 (0.85% of 4357) respondents in Positive Voices who identified differently from their gender at birth: 12 (32%) identified as women or trans women, none as men or trans men, 19 (51%) as non-binary and six (16%) described their gender in another way (Table 1). Trans and gender-diverse respondents were more likely to report feeling anxious or depressed compared with cis people (41% moderate to extreme feelings of anxiety or depression vs. 24%). This group also reported poorer general health than cis people (39% rated their health fair to very bad vs. 27%), were twice as likely to report having been refused healthcare or having had a medical procedure delayed (23% vs. 11%), and were three times as likely to report problems with self-care (e.g. washing and dressing) (37% vs. 13%).

Discussion

This is the first study to estimate HIV prevalence among trans and gender-diverse people living with HIV in England.

Using the available population size estimates for trans and gender-diverse people in England and comprehensive national HIV cohort data in combination with self-reported information,

we estimate a prevalence of HIV of 0.46–4.78 per 1000 in 2017, with the higher bound including a higher number of non-binary and gender-diverse people. This rate is similar to the HIV prevalence among the general population in England in 2017 of 1.7 (95% CI: 1.6–1.7) per 1000 and many times lower than the estimated prevalence among gay and bisexual men, the group with the highest HIV prevalence in England [7].

To estimate overall HIV prevalence, it is necessary to include those living with undiagnosed as well as diagnosed HIV. Globally, estimates of undiagnosed HIV prevalence among trans populations are high compared with cis populations [3] and many have cited structural barriers which can prevent or dissuade trans people from testing and being diagnosed with HIV [26–28]. Even the assumption that undiagnosed HIV accounts for up to 20% of the burden of HIV in this population in England would increase the overall HIV prevalence estimate only slightly, however (0.53–5.50 per 1000).

Population size estimates for trans and gender-diverse people in the UK split by gender identity were not available and HIV prevalence for trans men, trans women, non-binary or other gender-diverse people could not be directly estimated. Various European studies have reported a greater proportion of trans women than trans men, with a 2:1 ratio of trans women to trans men reported in Sweden and as high as 4:1 in Scotland [29–31]. The ratio of trans women to trans men living with diagnosed HIV in our study was much higher, at around 12:1, suggesting a greater prevalence of HIV among trans women than among trans men.

Globally, estimates of HIV prevalence among trans women are high; Baral *et al.* [3] give a pooled estimate of global HIV prevalence in this population of 19%, or 190 per 1000. In this meta-analysis prevalence was somewhat higher in the United States, pushing up the global estimate, and estimate precision varied according to the size of the study in each country. Among trans women in Australia, a country with a similar health system and anti-discrimination laws to England, HIV prevalence was estimated at 45 per 1000 (based on a single clinic audit [32]).

HIV prevalence estimates may be biased by several factors. For small populations, miscoding and data errors can have a significant effect. Through clinical follow-up we discovered that more than three-quarters of patients initially reported as trans or gender-diverse were incorrectly coded, largely due to data entry errors or use of ‘default’ codes. Without such robust follow-up procedures, the number of trans and gender-diverse people living with HIV would have been over-estimated in our study.

The converse is also true: of the 37 trans and gender-diverse-identifying Positive Voices survey respondents, nearly all trans women (11/12) were also reported as trans in their corresponding HARS clinical records; however, only 1/19 non-binary and 0/6 other gender-diverse people had their gender identity reported in the same way in HARS. This suggests that during these early phases of reporting gender identity, clinic staff may have focused on reporting trans men and women, and underreported non-binary and other gender-diverse people. Previous studies have shown that under-reporting is often due to healthcare staff not being aware of or not asking about gender identity [33]. Less commonly, people may choose not to disclose their gender identity [34]; however, these data reinforce the importance

of clinic staff asking patients to answer gender identity questions themselves, rather than answering on their behalf.

In this study, we also for the first time presented the psychosocial and HIV clinical outcomes of trans and gender-diverse people living with diagnosed HIV in England and compared these with cisgender people. Our findings indicate that the quality of HIV care in England is excellent for trans and gender-diverse people. This is in keeping with PHE data showing excellent outcomes for people living with HIV regardless of gender, sexuality and ethnicity and geography [7].

For those engaged in care, there was no difference in ART uptake or viral suppression, which highlights the high and equitable standard of care provided to people living with HIV in the UK. Our results are consistent with those of a cohort study in the United States which found equal levels of engagement in HIV care among trans individuals and cis men (slightly higher among cis women) and similar levels of ART uptake and viral suppression in trans and cis people with HIV [35]. In our study, engagement in care was only slightly lower among trans and gender-diverse individuals receiving care than among cis people, with similar trends seen for 2-year engagement in care. Maintaining high levels of engagement in care is important; those lost to follow-up are likely to have interrupted ART and, consequently, are more likely to have an unsuppressed viral load [36]. There is a risk that engagement in care and ART adherence among trans and gender-diverse people may be affected by a perception that ART could have a negative impact upon their hormones [14,37]. It is therefore vital that clinicians understand the importance of access to gender-affirming care for this population, including gender-affirming hormone treatment, and the impact of gender-affirming care on HIV care engagement [38,39].

Trans and gender-diverse people with HIV reported higher levels of anxiety and depression than cis respondents and were three times as likely to be under active psychiatric care. Whilst this may reflect, in part, an obligation for trans and gender-diverse people to seek psychiatric care for gender-related reasons, it also reflects higher rates of mental health issues among this group [18]. It has also been reported that trans people who access psychiatric care for gender-related reasons may sometimes be held longer than is necessary [40]. A limitation is that HIV data systems were only able to capture psychiatric care; it is probable that trans and gender-diverse people are also more likely to receive care from a psychologist, for conditions including gender dysphoria.

Trans and gender-diverse people living with HIV are also significantly affected by HIV-related stigma: The People Living with HIV Stigma Survey reported that trans respondents ($n = 31$) were significantly more likely than cis participants ($n = 1545$) to report worries about verbal harassment and experience exclusion from family gatherings. One in 10 trans participants in this survey reported physical assault in the preceding year, compared with one in 25 cis participants [17]. These findings suggest that HIV-related stigma may be exacerbated by stigma encountered because of other characteristics.

The two-step measure used in our study suffers from the limitation that sex at birth for gender-diverse individuals could not be discerned. It may have been advantageous to know

the proportions of people assigned male at birth and those assigned female at birth people in our cohort, as their outcomes, experiences of treatment and risks may well be different. The design of this two-step measure was informed by community feedback that asking trans and gender-diverse people directly about sex at birth is an intrusive question [41]. Whilst other two-step question formats exist, these may suffer from different limitations: fewer question responses (due to being perceived as intrusive), diagnostic masking, incorrect assumptions about a trans or gender-diverse person's health needs based on their assigned sex at birth, and poorer experiences of healthcare services.

The wide range of our prevalence estimate reflects the considerable uncertainty with which these estimates are made. As discussed earlier, results of the Positive Voices survey based on self-report suggest that non-binary and other gender-diverse people are likely to be under-reported by clinic staff. While clinic follow-up was largely successful in confirming trans gender identity, greater awareness of diverse gender identity and how to record this is required by healthcare staff.

Conclusions

People living with HIV are diverse and HIV clinical care is of a high standard for all. Once diagnosed, trans and gender-diverse people enjoy the full benefit of free and confidential HIV care through the NHS and have excellent clinical outcomes. Clinics should endeavour to be trans-inclusive, and more widespread use of clinics that cater specifically to the needs of trans and gender-diverse people (such as CliniQ, Clinic T and 56T) should be considered [42–44].

Estimates of HIV prevalence among trans and gender-diverse people in England are lower than estimates reported abroad. This may be because of greater access to free health promotion and HIV testing in the UK, as well as high rates of viral suppression, which eliminate the risk of transmission. Trans and gender-diverse people are still at risk of late HIV diagnosis and associated morbidity and mortality, however, and targeted testing campaigns should continue to promote HIV testing among these populations [45,46].

Trans and gender-diverse people with HIV in England reported poorer mental health than cis people with HIV and our results demonstrate the need for ongoing psychosocial support in HIV clinics. Better knowledge and awareness of trans and gender-diverse populations by clinical staff will help to improve the reporting of gender identity data in routine surveillance, leading to improved understanding of the needs of this population.

The British Association for Sexual Health and HIV (BASHH) has recently recommended improvements to trans and gender-diverse inclusion in sexual health clinics [38]. These include the use of a standardized questionnaire for all sexual health and HIV clinic attendees to self-report their gender identity, a necessary step to avoid the routine under-reporting of trans and gender-diverse people.

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Box 1**Two-step gender identity and gender assigned at birth question**

1. How do you identify your gender?
 - (1) Man (including trans man)
 - (2) Woman (including trans woman)
 - (3) Non-binary
 - (4) In another way
 - (5) Prefer not to say

2. Is this the same gender you were assigned at birth?
 - (1) Yes
 - (2) No
 - (3) Prefer not to say

Table 1
Proportion of people confirmed as trans and gender-diverse and estimated diagnosed HIV prevalence for Positive Voices and the HIV and AIDS Reporting System (HARS), England, 2017

	Positive Voices	HARS
Numerator	37	178
Denominator	4357	94 885
Proportion confirmed as trans and gender-diverse	0.85%	0.19%
Estimated diagnosed HIV prevalence per 1000 population ^a	1.76–4.40	0.42–1.06

^aUsing trans and gender-diverse population size estimate of 168 000–420 000.

Table 2
Demographic characteristics of trans and gender-diverse and cis people receiving HIV care in England, 2017

	Trans and gender-diverse (<i>n</i> = 178)		Cis (<i>n</i> = 94 707)	
	<i>N</i>	Proportion (95% CI)	<i>N</i>	Proportion (95% CI)
Gender identity				
Male or trans male	12	6.7% (3.5–11.5%)	65 010	68.6% (68.3–68.9%)
Female or trans female	140	78.7% (71.9–84.4%)	29 656	31.3% (31–31.6%)
Non-binary	20	11.2% (7–16.8%)	0	0% (0–0%)
In another way (gender-diverse)	5	2.8% (0.9–6.4%)	0	0% (0–0%)
Prefer not to say/not reported	1	0.6% (0–3.1%)	41	0% (0–0.1%)
Exposure to HIV				
Sexual contact	168	94.4% (89.9–97.3%)	87 345	92.2% (92.1–92.4%)
Injecting drug use	1	0.6% (0–3.1%)	1703	1.8% (1.7–1.9%)
Other	3	1.7% (0.3–4.8%)	3054	3.2% (3.1–3.3%)
Not known	6	3.4% (1.2–7.2%)	2605	2.8% (2.6–2.9%)
Ethnicity				
White	108	60.7% (53.1–67.9%)	49 350	52.1% (51.8–52.4%)
Black or Black British	21	11.8% (7.5–17.5%)	34 114	36% (35.7–36.3%)
Asian or Asian British	14	7.9% (4.4–12.8%)	3679	3.9% (3.8–4%)
Other/mixed	30	16.9% (11.7–23.2%)	5644	6% (5.8–6.1%)
Not known	5	2.8% (0.9–6.4%)	1920	2% (1.9–2.1%)
Country of birth				
UK	64	36% (28.9–43.5%)	38 403	40.5% (40.2–40.9%)
Outside UK	85	47.8% (40.2–55.4%)	46 912	49.5% (49.2–49.9%)
Not known	29	16.3% (11.2–22.6%)	9392	9.9% (9.7–10.1%)
Age in 2017 (years)				
< 15	0	0% (0–2.1%)	476	0.5% (0.5–0.5%)
15–24	5	2.8% (0.9–6.4%)	2850	3% (2.9–3.1%)
25–34	45	25.3% (19.1–32.3%)	13 123	13.9% (13.6–14.1%)
35–49	74	41.6% (34.2–49.2%)	43 046	45.5% (45.1–45.8%)
50–64	46	25.8% (19.6–32.9%)	29 908	31.6% (31.3–31.9%)
65+	8	4.5% (2–8.7%)	5304	5.6% (5.5–5.7%)
Year of HIV diagnosis				
2013–2017	71	39.9% (32.6–47.5%)	24 922	26.3% (26–26.6%)
2008–2012	36	20.2% (14.6–26.9%)	23 072	24.4% (24.1–24.6%)
2003–2007	33	18.5% (13.1–25%)	24 169	25.5% (25.2–25.8%)
1998–2002	19	10.7% (6.6–16.2%)	13 125	13.9% (13.6–14.1%)
1993–1997	14	7.9% (4.4–12.8%)	6131	6.5% (6.3–6.6%)
< 1993	5	2.8% (0.9–6.4%)	3288	3.5% (3.4–3.6%)
Place of residence				
London	102	57.3% (49.7–64.7%)	40 683	43% (42.6–43.3%)

	Trans and gender-diverse (n = 178)		Cis (n = 94 707)	
	N	Proportion (95% CI)	N	Proportion (95% CI)
Outside London	76	42.7% (35.3–50.3%)	54 024	57% (56.7–57.4%)
HIV treatment information (at latest attendance)				
On ART	172	96.6% (92.8–98.8%)	91 388	96.5% (96.4–96.6%)
Not on ART	6	3.4% (1.2–7.2%)	3288	3.5% (3.4–3.6%)
Virological suppression (at latest attendance, among those on treatment)				
Viral load < 200 copies/mL	150	87.2% (81.3–91.8%)	76 025	83.2% (82.9–83.4%)
Viral load ≥ 200 copies/mL or missing	22	12.8% (8.2–18.7%)	15 363	16.8% (16.6–17.1%)
Virological suppression (at latest attendance, among those on treatment, excluding missing)				
Viral load < 200 copies/mL	150	98.7% (95.3–99.8%)	76 025	96.2% (96.1–96.3%)
Viral load ≥ 200 copies/mL	2	1.3% (0.2–4.7%)	3002	3.8% (3.7–3.9%)
Late HIV diagnosis (of those diagnosed 2013–17)				
CD4 count < 350 cells/mm ³ within 3 months of HIV diagnosis	16	40% (24.9–56.7%)	9081	41.5% (40.9–42.2%)
CD4 count ≥ 350 cells/mm ³ within 3 months of HIV diagnosis	24	60% (43.3–75.1%)	12 792	58.5% (57.8–59.1%)
Engagement in care (seen 2015 and re-engaged in 2016)				
Engaged in care	138	92% (86.4–95.8%)	77 584	94.5% (94.3–94.6%)
Not engaged in care	12	8% (4.2–13.6%)	4531	5.5% (5.4–5.7%)
Two-year engagement in care (seen 2015 and re-engaged in 2016 or 2017)				
Engaged in care	139	92.7% (87.3–96.3%)	78 897	96.1% (95.9–96.2%)
Not engaged in care	11	7.3% (3.7–12.7%)	3218	3.9% (3.8–4.1%)
HIV care complexities (any point during 2015–17)				
Active TB and receiving treatment	2	1.1% (0.1–4%)	935	1% (0.9–1.1%)
Current AIDS-defining illness	5	2.8% (0.9–6.4%)	3897	4.1% (4–4.2%)
Chronic viral liver disease and receiving treatment	5	2.8% (0.9–6.4%)	2342	2.5% (2.4–2.6%)
Cancer and receiving treatment	3	1.7% (0.3–4.8%)	1389	1.5% (1.4–1.5%)
Severe unstable HIV-associated end organ disease	6	3.4% (1.2–7.2%)	3746	4% (3.8–4.1%)
Under active psychiatric care	19	10.7% (6.6–16.2%)	3883	4.1% (4–4.2%)
Persistent viraemia on ART	0	0% (0–2.1%)	470	0.5% (0.5–0.5%)
Sex worker (any point during 2015–17)	13	7.3% (3.9–12.2%)	260	0.3% (0.2–0.3%)
Prisoner (any point during 2015–17)	0	0% (0–2.1%)	647	0.7% (0.6–0.7%)

ART, antiretroviral therapy; CI, confidence interval; TB, tuberculosis.