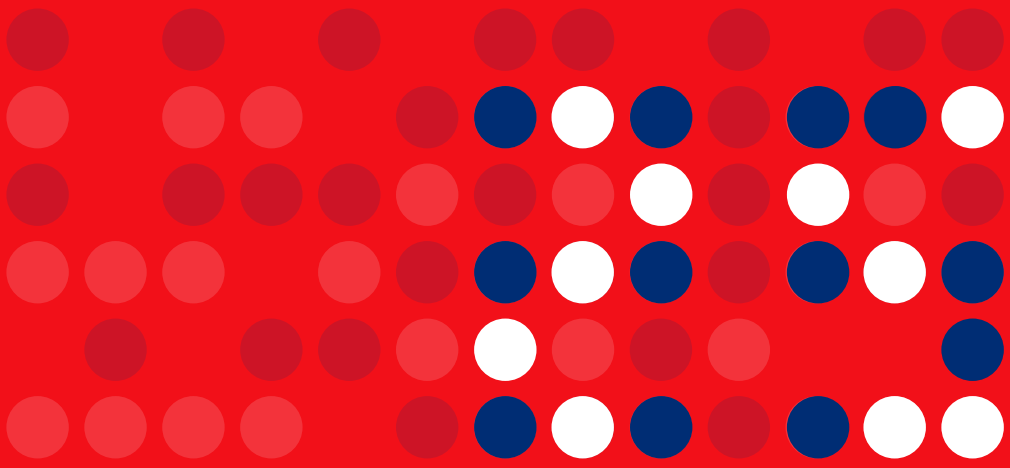
Human Immunodeficiency Virus (HIV)
Infection in the Netherlands

HIV Monitoring

HIV Monitoring Report 2025

Chapter 2: Prior use of pre-exposure prophylaxis



2. Prior use of pre-exposure prophylaxis

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Summary

The proportion of men who have sex with men (MSM) and transgender persons newly diagnosed with HIV in the Netherlands for whom information is recorded in their electronic medical records about use of PrEP prior to being diagnosed with HIV continues to increase and has reached 65.1% in 2024. The number and proportion of MSM and transgender people who reported prior use of PrEP continued to increase from 5.2% (19 of 366 individuals) in 2019 to 18.5% (52 of 281 individuals) in 2024.

For 464 MSM and transgender people there was information available why they did not use PrEP: 42.5% of these 464 individuals had indicated they would have wanted to do so, but either had no access to PrEP (22.5%), were on a PrEP waiting list when they tested HIV positive (2.2%), or tested HIV positive during screening for HIV before initiating PrEP (17.8%). A further 18.9% of MSM and transgender people indicated they did not know that PrEP existed. These proportions were fairly stable over time.

Of the 179 individuals who had used PrEP prior to their HIV diagnosis in the Netherlands, 25 (13.9%) had obtained PrEP through informal means, and 22 (12.3%, most of whom obtained PrEP through informal means) did not receive medical check-ups during PrEP-use.

Of the 144 individuals who reported prior use of PrEP and who received a genotypic resistance test prior to initiation of antiretroviral therapy (ART), 11.8% harboured resistance-associated mutations (RAMs) in the reverse transcriptase (RT) gene that are associated with the use of PrEP. All individuals in whom PrEP-associated RAMs had been detected, were still using PrEP at the moment they tested positive for HIV, or had discontinued PrEP only a few months earlier. When limiting this analysis to individuals who had tested HIV-positive while still using PrEP or within 3 months of discontinuing PrEP, 14 (22.6%) out of 62 tested individuals harboured PrEP-associated RAMs. Reassuringly, the virological treatment response after initiation of ART appears to be largely unaffected by the prior use of PrEP, also in those individuals where PrEP-associated RT RAMs had been detected.

Aims

Pre-exposure prophylaxis (PrEP) is the use of antiretroviral drugs by people without HIV, to prevent HIV acquisition. In the Netherlands, individuals at high risk of HIV acquisition are eligible for PrEP care at the Sexual Health Centers (SHC) of the municipal Public Health Services (GGD), via a national programme from 2019 to 2024, followed by a structural care provision. General practitioners can also prescribe PrEP. The primary target groups are men who have sex with men (MSM) and transgender persons. Prior to this national programme, PrEP use prescribed by other healthcare providers (mainly general practitioners) or accessed via informal routes like buyers' clubs, was monitored through demonstration programmes such as the AMPrEP study in Amsterdam.

In this section we describe time trends in the proportion of people aged 15 years and older who were newly diagnosed with HIV-1 since 2018 and who reported prior use of PrEP at the time of entry into HIV care in the Netherlands. The primary population of interest consisted of MSM and transgender persons, who constitute the main target populations for PrEP in the Netherlands. We compared demographic and other characteristics of MSM and transgender persons who reported prior use of PrEP with those who did not.
Among MSM and transgender persons who did not report prior use of PrEP, we investigated their reasons and barriers for not having used PrEP.

Among MSM and transgender persons who did report prior use of PrEP, we evaluated if HIV acquisition occurred while using PrEP or after discontinuation. Furthermore, we report on acquired HIV drug resistance as a potential consequence of acquiring HIV while still using PrEP, and we investigate possible impairment of the initial treatment response on first-line ART in this group.

Data collection

SHM collects data on prior use of PrEP in all people diagnosed with HIV who have entered care in one of the 24 Dutch HIV treatment centers since 1 January 2018. SHM has prospectively collected PrEP-related data from the electronic medical records (EMRs) of individuals with HIV first entering care, since July 2019. This is done in consultation and collaboration with the Dutch Association of HIV-Treating Physicians (*Nederlandse Vereniging van HIV Behandelaren*, NVHB), and the Dutch Nurses Association's HIV/AIDS nurse consultants unit ('*Verpleegkundigen & Verzorgenden Nederland – Verpleegkundig Consulenten Hiv*', V&VN VCH). Additionally, SHM retrospectively gathered information from the EMRs on prior use of PrEP among individuals who first entered care between January 2018 and June 2019.

The population of interest for this report consists of the primary target groups for PrEP in the Netherlands: MSM and transgender men and women. In this report, cisgender men were classified as MSM when the recorded mode of HIV acquisition was 'sexual contact with other men' or 'sexual contact with men and women'. Whenever cisgender men had another or unknown mode of HIV acquisition recorded but were known to have male sex partners, they were also included in the MSM group.

A substantial proportion of individuals entering HIV care in the Netherlands, were not born in the Netherlands, and some of them were already diagnosed with HIV before migrating to the Netherlands. Furthermore, some had used PrEP prior to migrating to the Netherlands, while others used PrEP while living in the Netherlands. When appropriate, the analyses take these factors into account.

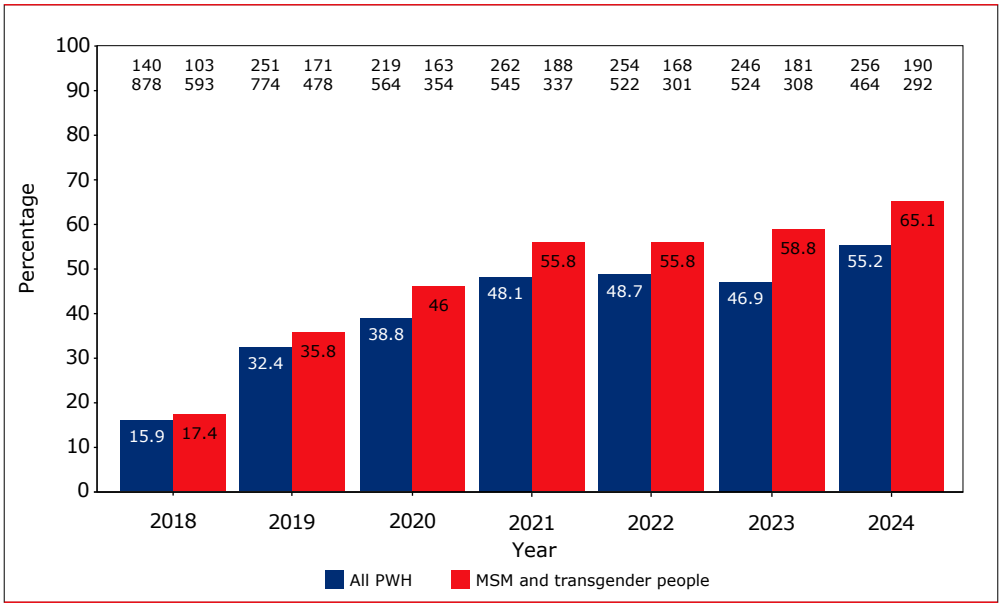
Of note, SHM does not record data about a person's race / ethnicity, nor can we identify second or third generation migrants. In our analyses, we make a distinction between those who are born in the Netherlands and those born in another country, irrespective of race / ethnicity and migrant status of their (grand)parents.

Population of interest

Between 1 January 2018 and 31 December 2024 4,271 persons aged 15 years and older were diagnosed with HIV and entered into HIV care. In the EMR of 1,628 (38.1%) individuals, information was recorded on prior use of PrEP. The proportion of individuals for whom this information was available in the EMR increased from 15.9% in 2018, to 55.2% in 2024 (Figure 2.1, blue bars).

Of the 4,271 individuals diagnosed with HIV between 2018 and 2024 and entering HIV care, 2,663 were from the primary target groups of the Dutch PrEP guideline: 2,515 cisgender MSM and 148 transgender persons. In the PrEP target groups, 1,164 (43.7%) out of 2,663 individuals had information about prior PrEP use available in the EMR: increasing from 17.4% in 2018 to 65.1% in 2024 (Figure 2.1, red bars).

Figure 2.1: *Number and proportion of individuals diagnosed with HIV per calendar year for whom information on prior use of PrEP is available.*



Legend: *The numbers in the top line are the number of individuals for whom information on prior use of PrEP is available in their electronic medical records. The second line is the total cohort size of each calendar year.*

The proportion of individuals newly entering in HIV care in the Netherlands, who were not born in the Netherlands, has been increasing over time. Of the 4,271 individuals, 1,840 (43.1%) were born in the Netherlands, and the remaining 2,431 (56.9%) individuals were migrants. Of these 2,431 individuals, 779 (32.0%) were already diagnosed with HIV before migrating to the Netherlands.
In the PrEP target groups of 2,663 MSM and transgender persons, 1,224 (46.0%) were born in the Netherlands, 1,439 (54.0%) were migrants of whom 924 individuals had been diagnosed with HIV in the Netherlands, and 513 had been diagnosed with HIV prior to migrating to the Netherlands.

The demographic characteristics of individuals from the PrEP target groups for whom EMR information on prior PrEP use was available were largely similar to those without this information (see *Table 2.1*). The likelihood of information on prior PrEP use being available varied considerably between HIV treatment centers, but was not dependent on the size of the population in care in the HIV treatment centers.

Table 2.1: Comparison of characteristics of MSM and transgender persons (ie PrEP target groups) who did or did not have information available on prior PrEP use.

	Info on PrEP available	No info available	p-value
Number of subjects	1164 (43.7%)	1499 (56.3%)	
Age	33.7 (27.1-45.5)	34.7 (27.5-47.8)	0.091
HIV acquisition group			0.671
MSM	1102 (94.7%)	1413 (94.3%)	
Other men	0 (0.0%)	0 (0.0%)	
Women	0 (0.0%)	0 (0.0%)	
Transgender people	62 (5.3%)	86 (5.7%)	
Region of birth			0.439
Born in the Netherlands	531 (45.6%)	693 (46.2%)	
Migrant, western background	283 (24.3%)	334 (22.3%)	
Migrant, non-western background	350 (30.1%)	472 (31.5%)	
Documented seroconversion in NL or before migration*			0.009
In the Netherlands	433 (68.5%)	491 (60.9%)	
Before migration to the Netherlands	198 (31.3%)	315 (39.1%)	
Unknown / uncertain	1 (0.2%)	0 (0.0%)	
Recent HIV acquisition			
Tested pos. <365 days after last neg. test	415 (35.7%)	321 (21.4%)	<.001
Tested pos. <180 days after last neg. test	242 (20.8%)	159 (10.6%)	<.001
CD4 at HIV diagnosis	473 (291-678)	428 (236-630)	<.001

***Legend:** * Calculated for migrants only.*

PrEP awareness and uptake

For 464 (48.2%) of the 962 MSM and transgender people who reported no prior PrEP use and who had been newly diagnosed with HIV in the Netherlands, information was available on their reasons for not using PrEP. 'Presumed to be at low risk for HIV' (22.3%), 'Wanted to use PrEP but had no access' (22.5%), and 'Not knowing PrEP existed' (18.9%), were the most commonly reported reasons. In total, 83 (17.8%) individuals had wanted to start using PrEP but tested positive for HIV at screening before entry into PrEP care. Ten individuals (2.2%) reported that they tested HIV positive while on a PrEP programme waiting list.

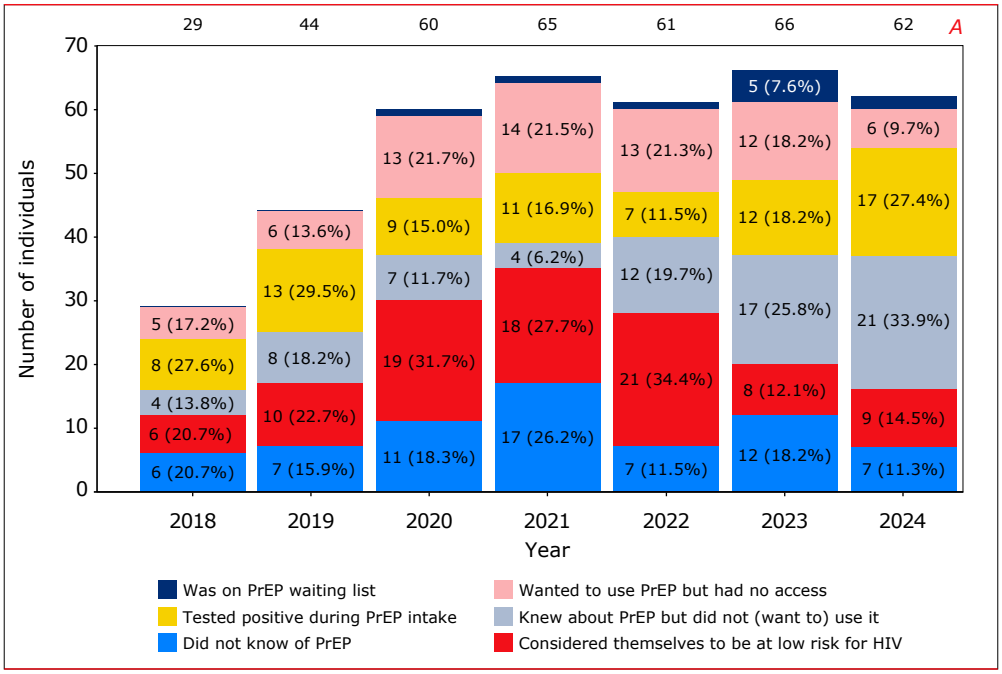
Of the individuals who reported they tested positive for HIV at screening before entry into PrEP care, 51.2% had evidence of a recent infection. Of the individuals who reported they tested positive for HIV while on a waiting list for PrEP care, 50.0% had evidence of a recent infection.

Figure 2.2A shows time trends in the reported reasons for not having used PrEP in MSM and transgender persons. The proportion of individuals reporting they knew about PrEP but did not (want to) use it increased over the years and was 33.9% in 2024.

Individuals indicating that they 'Considered themselves to be at low risk for HIV' (median 39.6 years), 'Did not know of PrEP' (38.6 years), or 'Knew about PrEP but did not (want to) use it' (37.4 years), were older than those who indicated that they 'Tested positive during PrEP intake' (33.5 years), 'Wanted to use PrEP but had no access' (31.6 years), or 'Were on the PrEP waiting list' (33.2 years).

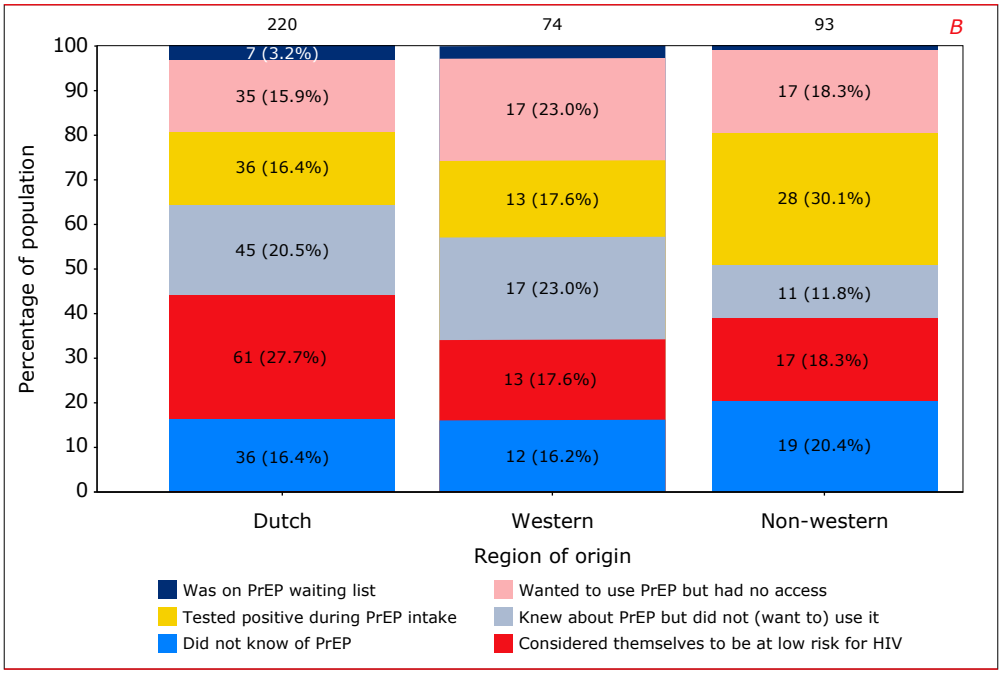
We also compared the reasons for not having used PrEP between people born in the Netherlands, and those originating from western or non-western countries (Figure 2.2B). People born in the Netherlands most frequently reported 'Presumed to be at low risk for HIV'. People born in non-western countries most often reported either 'Tested positive for HIV at screening before entry into a PrEP programme' or 'Not knowing PrEP existed'.

Figure 2.2A: *Time trends in the reported reasons for not having used PrEP in MSM and transgender persons newly diagnosed with HIV in the Netherlands.*



Legend: *The numbers in the top line are the total number of MSM and transgender persons per calendar year for whom the reason was known why they had not used PrEP.*

Figure 2.2B: *Reported reasons for not having used PrEP in MSM and transgender persons newly diagnosed with HIV in the Netherlands, stratified by region of birth.*



Legend: *The numbers in the top line are the total number of people born on the Netherlands, in western countries, and in non-western countries for whom the reason was known why they had not used PrEP.*

Prior use of PrEP

Of the 1,628 individuals for whom information on prior use of PrEP was available in the EMR, the majority (1,420, 87.2%) reported no prior use, whereas 208 (12.8%) reported having used PrEP previously (*Table* 2.2).

Table 2.2: Comparison of individuals with and without prior use of PrEP.

	Prior use of PrEP	No prior use, target groups, diagnosed in NL	No prior use, other groups, diagnosed abroad	p-value
Number of subjects	208 (17.8%)	774 (66.2%)	188 (16.1%)	
Age	32.4 (26.9-42.7)	36.7 (28.9-49.7)	27.8 (24.1-33.4)	<.001
HIV acquisition group				<.001
MSM	192 (92.3%)	738 (95.3%)	172 (91.5%)	
Other men	6 (2.9%)	0 (0.0%)	0 (0.0%)	
Women	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Transgender people	10 (4.8%)	36 (4.7%)	16 (8.5%)	
Region of birth				<.001
Born in the Netherlands	94 (45.2%)	438 (56.6%)	0 (0.0%)	
Migrant, western background	53 (25.5%)	149 (19.3%)	82 (43.6%)	
Migrant, non-western background	61 (29.3%)	187 (24.2%)	106 (56.4%)	
Documented seroconversion in NL or before migration*				<.001
In the Netherlands	100 (87.7%)	335 (100%)	0 (0.0%)	
Before migration to the Netherlands	13 (11.4%)	0 (0.0%)	188 (100%)	
Unknown / uncertain	1 (0.9%)	0 (0.0%)	0 (0.0%)	
Recent HIV acquisition				
Tested pos. <365 days after last neg. test	156 (75.0%)	227 (29.3%)	36 (19.1%)	<.001
Tested pos. <180 days after last neg. test	103 (49.5%)	131 (16.9%)	11 (5.9%)	<.001
CD4 at HIV diagnosis	570 (382-730)	434 (250-610)	600 (380-849)	<.001
Late presenter (CD4<350)	41 (19.8%)	292 (37.7%)	44 (23.8%)	<.001
Very late presenter (CD4<200 or AIDS)	13 (6.3%)	155 (20.0%)	15 (8.0%)	<.001
Reason known for not having used PrEP	208 (100%)	387 (50.0%)	79 (42.0%)	<.001
Reasons for not having used PrEP				
Did not know of PrEP		67 (17.3%)	21 (26.6%)	
Presumed to be at low risk for HIV		91 (23.5%)	13 (16.5%)	
Knew PrEP but did not want to use it		73 (18.9%)	3 (3.8%)	
Tested positive at PrEP intake		77 (19.9%)	6 (7.6%)	
Wanted PrEP but had no access		69 (17.8%)	36 (45.6%)	
Was on PrEP waiting list		10 (2.6%)	0 (0.0%)	

*Legend: target group = MSM and transgender people; n.a. = not applicable; * Calculated for migrants only.*

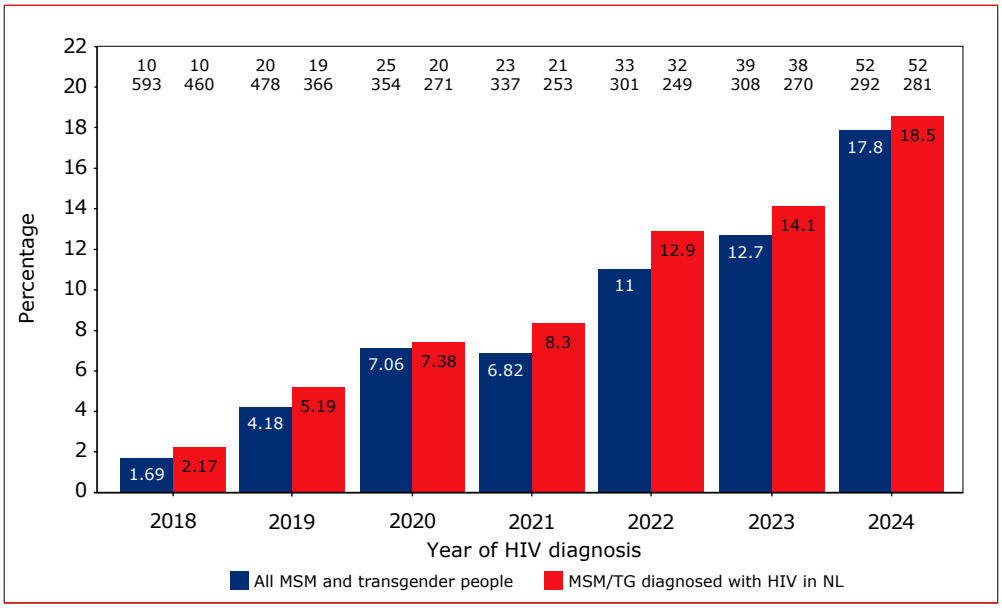
Of the 208 people who reported prior use of PrEP, 202 were from the primary target groups for PrEP in the Netherlands: 192 MSM and 10 transgender persons. The remaining 6 individuals were all cisgender heterosexual men, 4 of whom had

used PrEP prior to migrating to the Netherlands. Of the 208 individuals who reported prior PrEP use, 114 (54.8%) were born abroad. Among these, 85 had used PrEP in the Netherlands, and 29 had used PrEP prior to migrating to the Netherlands, of whom 13 had already been diagnosed with HIV before migration (*Table 2.3*).

Individuals who reported prior use of PrEP were younger and had higher CD4 counts at diagnosis compared to those diagnosed in the Netherlands who did not use PrEP.

We calculated percentages of prior PrEP use of all 2,150 MSM and transgender people who were newly diagnosed with HIV in the Netherlands between 2018 and 2024. We conservatively assumed that when no explicit mention was made in the EMR about prior use of PrEP, the individuals had not used it. The percentage of MSM and transgender people newly diagnosed with HIV in the Netherlands for whom prior PrEP use was recorded in the EMR has increased since 2019 (Ptrend<0.0001, see Figure 2.3, red bars), with 2.2% in 2018, 5.2% in 2019, 7.4% in 2020, 8.3% in 2021, 12.9% in 2022, 14.1% in 2023, and 18.5% in 2024. When also including MSM and transgender people who were diagnosed with HIV prior to migrating to the Netherlands (n=2,663), the proportions remained similar (see Figure 2.3, blue bars).

Figure 2.3: *Time trends in the number and proportion of MSM and transgender people newly diagnosed with HIV who reported prior use of PrEP.*



Legend: *The numbers in the top line are the number of people who reported prior use of PrEP. The numbers in the second line are the cohort size of that calendar year.*

***Box 2.1:** Socio-demographic and -economic determinants of using PrEP*

We combined data of 879 men who have sex with men (MSM) and transgender persons newly diagnosed with HIV between 2019 and 2024 from whom information on prior PrEP use was available, with registry data from Statistics Netherlands. Of these 879 individuals, 147 had used PrEP prior to HIV diagnosis. Reasons for not using PrEP were: perceived themselves to be at low risk or did not want to use it (n=136), did not know about PrEP (n=72), wanted to use PrEP, but had no access or tested positive for HIV while on the waiting list for PrEP (n=150), or unknown reason (n=374). We assessed missed opportunities and inequities in PrEP uptake using multinomial regression. This model allowed us to simultaneously compare socio-demographic and -economic characteristics over multiple groups: 1) Used PrEP (reference category), 2) perceived themselves at low risk or did not want to use it, 3) did not know about PrEP, 4) had no access, and 5) unknown.

In the multivariable multinomial model, older individuals were somewhat more likely to report not knowing about PrEP before HIV diagnosis, albeit not statistically significant (adjusted relative risk ratio (aRRR)=1.32, 95%CI=0.98-1.78). Individuals with a first generation migration background were less likely to report low perceived risk as the reason for not using PrEP (aRRR=0.46, 95%CI=0.22-0.94). No other factors were identified.

	Low perceived risk / did not want to use PrEP aRRR (95%CI)	**Did not know about PrEP** aRRR (95%CI)	**Wanted to use PrEP but could not** aRRR (95%CI)	**Unknown reason** aRRR (95%CI)
Age, per 10 year increase	1.15 (0.90–1.48)	1.32 (0.98–1.78)	0.99 (0.76–1.28)	1.05 (0.85–1.30)
Migration background				
None	REF	REF	REF	REF
1st generation	0.46 (0.22–0.94)	1.76 (0.75 – 4.11)	1.07 (0.53–2.15)	0.79 (0.44–1.41)
2nd generation	0.93 (0.37–2.33)	1.62 (0.48–5.52)	1.64 (0.68–3.99)	1.08 (0.50–2.35)
Living alone				
No	REF	REF	REF	REF
Yes	0.89 (0.43–1.87)	0.64 (0.27–1.54)	0.71 (0.33–1.52)	0.52 (0.28–0.98)
Highest education level				
High	REF	REF	REF	REF
Low	0.86 (0.35–2.13)	1.88 (0.53–6.60)	0.50 (0.18–1.37)	1.20 (0.58–2.47)
Middle	1.43 (0.69–2.98)	2.81 (0.95–8.37)	1.67 (0.81–3.45)	1.37 (0.74–2.56)
Unknown	1.95 (0.87–4.37)	3.26 (1.08–9.80)	1.24 (0.54–2.88)	1.56 (0.78–3.11)
Level of urbanization of place of residence				
Highest level of urbanization	REF	REF	REF	REF
High level of urbanization	1.93 (0.97–3.81)	1.44 (0.59–3.54)	0.88 (0.41–1.87)	1.58 (0.87–2.88)
Medium – low level of urbanization	0.88 (0.43–1.80)	1.45 (0.61–3.41)	0.99 (0.49–2.00)	1.25 (0.69–2.23)

Access to PrEP and usage patterns

The characteristics of all 208 individuals who reported prior use of PrEP are shown in *Table 2.3*, with a stratification by those who used PrEP in the Netherlands and those who used it while still living abroad. Migrants who initiated PrEP before they migrated to the Netherlands but continued PrEP after they migrated to the Netherlands are included in the former group.

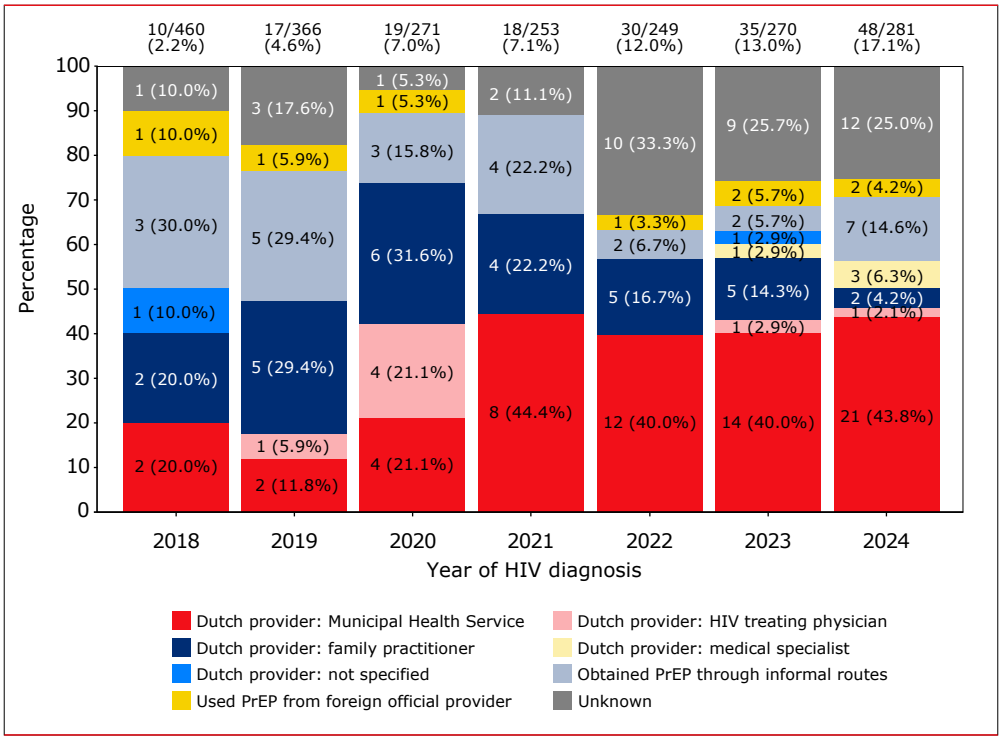
Of the 208 individuals who reported prior PrEP use, 29 (13.9%) were migrants who had used PrEP before moving to the Netherlands. The remaining 179 individuals had used PrEP in the Netherlands, among them 6 had started PrEP prior to migration but continued using it after they arrived in the Netherlands. In the remainder of this chapter we will report on these 179 individuals who used PrEP while living in the Netherlands.

Of the 179 individuals who had used PrEP in the Netherlands, 106 (59.2%) obtained it from a healthcare provider in the Netherlands (see Table 2.3), comprising the Municipal Public Health Service (n=63), family practitioner (29), HIV treatment center (7), and other medical specialist (4). There was no further detailed information available for 3 individuals. The remaining individuals for whom this information was recorded, obtained their PrEP: through informal routes like buyers' club/ internet/store outside the Netherlands (20); from a healthcare provider outside the Netherlands (8); or from a friend living with HIV who had donated some of their own medication (5). There was no information available about the PrEP provider for the remaining 40 individuals.

Dosage schedule information was available for 114 individuals. Of these, 74 (41.3%) reported on-demand use, 36 (20.1%) reported daily use, and 4 (2.2%) reported having used PrEP less than a week. For the remaining 65 individuals (36.3%), no dosage schedule information was available.

Of the 179 individuals who had used PrEP in the Netherlands, 65 (36.3%) had regular medical check-ups at the Municipal Public Health Service, 9 (5.0%) attended an HIV treatment center, 18 (10.1%) were seen by a family practitioner, and 5 (2.8%) were monitored by a medical specialist other than HIV treatment center staff. Twenty two individuals (12.2%) reported that they did not have any medical check-ups, and there was no information available for the remaining 60 individuals (33.5%). Most of the 22 individuals who reported they had received no medical check-ups had obtained PrEP via informal means, only 4 of them had received PrEP from a healthcare provider in the Netherlands (and 2 of these 4 had used PrEP for less than 1 month). Figure 2.4 shows the time trends in the PrEP providers of the MSM and transgender people who had used PrEP while living in the Netherlands.

Figure 2.4: Time trends in the number and proportion of MSM and transgender people newly diagnosed with HIV reporting prior use of PrEP while living in the Netherlands, stratified by PrEP provider.



The median (IQR) number of days between the last dose of PrEP and testing HIV-positive was calculated only for those individuals for whom the relevant dates were known with sufficient precision (to within a month), and was 31 (0-136) days. A total of 48 (26.8%) individuals tested HIV-positive while still using PrEP. Of the 131 individuals who did not test HIV-positive while taking PrEP, 51 reported having tested HIV-seronegative after their last use of PrEP, while 53 did not have an HIV-test shortly after discontinuing PrEP. There was no information available for the remaining 27 individuals.

Table 2.3: characteristics of individuals who reported use of PrEP.

	PrEP used in the Netherlands	PrEP used abroad	p-value
Number of subjects	179 (86.1%)	29 (13.9%)	
Age	32.5 (26.9-44.5)	31 (26.1-35.1)	0.265
HIV acquisition group			0.001
MSM	170 (95.0%)	22 (75.9%)	
Other men	2 (1.1%)	4 (13.8%)	
Women	0 (0.0%)	0 (0.0%)	
Transgender people	7 (3.9%)	3 (10.3%)	
Region of birth			<.001
Born in the Netherlands	94 (52.5%)	0 (0.0%)	
Migrant, western background	41 (22.9%)	12 (41.4%)	
Migrant, non-western background	44 (24.6%)	17 (58.6%)	
STD diagnosed at entry into care			
HBV (HBV surface antigen positive)	1 (0.6%)	1 (3.4%)	0.139
HBV (HBV core antibody positive)	23 (12.8%)	4 (13.8%)	0.888
HCV (antibody positive)	6 (3.4%)	2 (6.9%)	0.357
Syphilis (RPR/VDRL positive)	53 (29.6%)	10 (34.5%)	0.596
PrEP started before migrating to the Netherlands	6 (3.4%)	29 (100%)	
PrEP provider			<.001
Provider in the Netherlands	106 (59.2%)	0 (0.0%)	
- Public Health Service	63 (35.2%)	0 (0.0%)	
- HIV treatment center	7 (3.9%)	0 (0.0%)	
- Family practitioner	29 (16.2%)	0 (0.0%)	
- Medical specialist	4 (2.2%)	0 (0.0%)	
- No info	3 (1.7%)	0 (0.0%)	
Provider outside of the Netherlands	8 (4.5%)	10 (34.5%)	
Obtained PrEP through informal routes	20 (11.2%)	6 (20.7%)	
From friend living with HIV	5 (2.8%)	1 (3.4%)	
No info	40 (22.3%)	12 (41.4%)	
Seroconversion during PrEP use			
Tested HIV-positive while on PrEP	48 (26.8%)	3 (10.3%)	
HIV-negative test performed after last dose of PrEP	51 (38.9%)	8 (30.8%)	
No HIV-negative test performed after last dose of PrEP	53 (40.5%)	16 (61.5%)	
Unknown if HIV test was performed after last dose of PrEP	27 (20.6%)	2 (7.7%)	
Diagnosed in the Netherlands or before migration			<.001
In the Netherlands	179 (100%)	16 (55.2%)	
Before migration to the Netherlands	0 (0.0%)	13 (44.8%)	
Days between last PrEP use and testing HIV-positive**	31 (0-136)	92 (32-290)	0.101

	PrEP used in the Netherlands	PrEP used abroad	p-value
Recent HIV acquisition			
Tested pos. <365 days after last neg. test	143 (79.9%)	13 (44.8%)	<.001
Tested pos. <180 days after last neg. test	97 (54.2%)	6 (20.7%)	<.001
CD4 at HIV diagnosis	557 (380-730)	570 (460-720)	0.622
PrEP schedule			0.120
On demand	74 (41.3%)	6 (20.7%)	
Daily	36 (20.1%)	9 (31.0%)	
No data	65 (36.3%)	14 (48.3%)	
Used PrEP <1 week	4 (2.2%)	0 (0.0%)	
Duration of PrEP use (days), median (IQR)	122 (30-320)	60 (30-180)	0.644
Routine medical check-ups while on PrEP			<.001
Public Health Service	65 (36.3%)	0 (0.0%)	
Family practitioner	18 (10.1%)	0 (0.0%)	
HIV treatment center	9 (5.0%)	0 (0.0%)	
Other healthcare provider	5 (2.8%)	3 (10.3%)	
No medical check-ups	22 (12.3%)	3 (10.3%)	
No data	60 (33.5%)	23 (79.3%)	
Resistance test performed after testing HIV-positive	144 (80.4%)	11 (37.9%)	<.001
Resistance associated mutations in RT			
M184VI	17 (11.8%)	2 (18.2%)	
K65R	2 (1.4%)	0 (0.0%)	
K70EG	0 (0.0%)	0 (0.0%)	

*Legend: * Calculated for migrants only; ** Zero days means person was diagnosed with HIV during PrEP use STI sexually transmitted infection.*

Prior use of PrEP and HIV drug resistance

Genotypic resistance tests were performed in 144 (80.4%) of the 179 individuals who reported having used PrEP in the Netherlands when first entering HIV care. Reverse transcriptase (RT) resistance-associated mutations (RAM)[a], associated with the use of PrEP, were detected in 17 individuals (11.8%). All 17 individuals harboured an M184VI RT RAM, which reduces susceptibility to lamivudine and emtricitabine, and 2 of these individuals also harboured a K65R RT RAM, which is selected for by tenofovir and reduces susceptibility to tenofovir, abacavir, lamivudine and emtricitabine. Selection of K65R has been described to occur more readily in individuals harbouring HIV-1 subtype C, however, these 2 individuals harboured HIV-1 subtype B. It is very unlikely these mutations were already present in the source (i.e. the person they acquired HIV from) and hence would represent transmitted HIV resistance.

a All RT RAMs mentioned in this chapter start and end with capital letters; i.e. M184VI ends in the capital letter 'i' and should not be confused with the number 1.

Among the 73 individuals who had tested HIV-positive while still using PrEP or within 3 months of discontinuing PrEP, 62 had received a genotypic resistance test, and 14 (22.6%) harboured PrEP-associated RAMs.

In the 29 individuals who had used PrEP prior to migrating to the Netherlands, 11 had genotypic resistance test results available. Of these, 2 showed M184VI RT resistance-associated mutations.

For ease of comparing individuals with and without detected RAMs and those not tested, we provide Appendix Table 2.1, which contains the same data as Table 2.3 but stratified by presence of RAMs.

Prior use of PrEP and response to antiretroviral therapy (ART)

We investigated the virological treatment response to first-line antiretroviral therapy in 193 individuals who reported prior use of PrEP, were diagnosed with HIV in the Netherlands, and subsequently initiated ART. Data on virological treatment response were available for 185 of these 193 individuals. This group included 18 of the 19 individuals (17 who had used PrEP in the Netherlands and an additional 2 who had used PrEP prior to migrating to the Netherlands) with M184VI (with or without K65R) RT RAM, all of whom started a regimen containing an integrase inhibitor. Ten of these 18 individuals received a combination of an integrase inhibitor and a protease inhibitor, with or without additional nucleoside-analogue RT inhibitors (NRTIs).

Of the individuals with either no baseline resistance test results, or whose test showed no evidence of the M184VI or K65R RT RAM, 174 initiated a first-line regimen consisting of:

- an integrase inhibitor plus two NRTIs (n=123)
- a protease inhibitor plus two NRTIs (n=3)
- an integrase inhibitor plus a protease inhibitor, with or without additional NRTIs (n=34)
- an integrase inhibitor plus a non-nucleoside RT inhibitor (n=1)
- a non-nucleoside RT inhibitor plus two NRTIs (n=6)
- lamivudine / dolutegravir (n=7)

The 18 individuals with an RT RAM had a median follow-up time of 147.7 weeks (IQR 56.3-262.7) after initiating ART. In one of these 18 individuals who had an M184VI (but not K65R) RT RAM, the first-line regimen was discontinued due to a persistent suboptimal virological efficacy. This individual's plasma viral load had

initially become undetectable three months after starting tenofovir alafenamide / emtricitabine / bictegravir. However, in the following two-year period all eight recorded viral load measurements showed detectable viremia. The highest recorded value was 253 copies/ml. Eventually, ART was switched to a triple-class regimen consisting of two NRTI, an INSTI, and a boosted protease inhibitor, after which the viral load durably became undetectable. Later, the regimen was simplified to a two-class single-tablet regimen (bictegravir / TAF / emtricitabine). The remaining 17 individuals with M184VI (two of them also had a K65R) all achieved an optimal treatment response with sustained viral suppression below 200 copies/ml after initiating cART.

For the 174 individuals with no evidence of M184VI (with or without K65R RT RAM) in the baseline resistance test, or for whom no test data were available, all 167 individuals with viral load measurements available at least four months after the initiation of ART showed an adequate initial virological treatment response (defined as a decrease to below 200 copies/ml). The median follow-up time was 100.4 weeks (IQR 48.4-186.9). In 16 individuals a viral rebound (defined as having a viral load measurement above 200 copies/ml following an initial treatment response) was recorded. In two of these individuals, the viral load decreased slowly but steadily over time and eventually reached undetectable. In five of these 16 individuals, the viral rebound was attributed to temporary interruption of ART, which re-suppressed after restarting the same or another ART regimen. In two individuals virological failure occurred: both were switched to a second line regimen after which the viral load durably re-suppressed. In the remaining cases, there was a single or two consecutive viral load measurements above 200 copies/ml without apparent lapse in medication intake, after which viral load suppression was achieved again without changing the regimen.

Summary and Conclusions

The number and proportion of newly diagnosed MSM and transgender individuals entering HIV care who reported prior use of PrEP has continued to rise over time. In 2024, 18.5% (n=52) of newly diagnosed MSM and transgender people reported prior use of PrEP (see also Chapter 1). However, this is probably a conservative estimate, as individuals for whom no explicit information about prior PrEP use was recorded in their EMR were considered not to have used PrEP. The observed increase over time is likely only partly explained by greater awareness or improved documentation by health care providers, suggesting a true rise in PrEP use among this population. The total number of people who use PrEP in the Netherlands is increasing, both through SHC's and via general practitioners, thereby contributing to more reports of prior PrEP use among people diagnosed with HIV.

The group of individuals who reported prior PrEP use is highly heterogeneous. Of the 208 individuals who reported prior PrEP use, 29 (13.9%) were migrants who had used PrEP before moving to the Netherlands. Among the 179 individuals who used PrEP in the Netherlands, 106 (59.2%) obtained it from a healthcare provider in the Netherlands, while others accesses PrEP through informal channels or from providers abroad. Notably, six individuals who used PrEP did not belong to one of the target groups for PrEP in the Netherlands: these were either migrants who used PrEP prior to migration, or individuals who obtained PrEP through informal means.

Of those who had used PrEP in the Netherlands, 48 (26.8%) were diagnosed with HIV while still using PrEP. Of the 144 individuals who reported prior use of PrEP and who received a genotypic resistance test prior to initiation of ART, 17 (11.8%) were found to harbour resistance mutations that were probably associated with continued PrEP use after seroconversion. Reassuringly, the virological response to ART initiation appeared to be unaffected by prior PrEP use, even in those with detected resistance associated mutations; almost all achieved and maintained viral suppression after starting ART.

A substantial proportion (42.5%) of MSM and transgender people who reported not using PrEP, and for whom information on reasons was available, indicated they would have wanted to use PrEP, but either had no access to PrEP (22.5%), were on a PrEP waiting list at the time when they tested HIV positive (2.2%), or tested HIV positive during screening process before initiating PrEP (17.8%). HIV screening during the intake for PrEP care contributes to earlier detection of HIV.

These findings highlight the importance of improving access to PrEP and ensuring timely initiation for those at risk, as well as the continued need for education, monitoring, and support for individuals using PrEP—both to prevent HIV acquisition and to manage potential drug resistance if HIV infection occurs during PrEP use.

Appendix Table 2.1: *characteristics of individuals who reported use of PrEP, stratified by presence of resistance associated mutations.*

	RAMs detected	No RAMs detected	Not tested, no data	p-value
Number of subjects	19 (9.1%)	136 (65.4%)	53 (25.5%)	
Age	30.9 (27.1-47)	31.8 (26.7-41.3)	33.6 (28.9-43.5)	0.512
HIV acquisition group				0.603
MSM	19 (100%)	126 (92.6%)	47 (88.7%)	
Other men	0 (0.0%)	3 (2.2%)	3 (5.7%)	
Women	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Transgender people	0 (0.0%)	7 (5.1%)	3 (5.7%)	
Region of birth				0.006
Born in the Netherlands	12 (63.2%)	69 (50.7%)	13 (24.5%)	
Migrant, western background	4 (21.1%)	29 (21.3%)	20 (37.7%)	
Migrant, non-western background	3 (15.8%)	38 (27.9%)	20 (37.7%)	
STD diagnosed at entry into care				
HBV (HBV surface antigen positive)	0 (0.0%)	2 (1.5%)	0 (0.0%)	0.586
HBV (HBV core antibody positive)	2 (10.5%)	20 (14.7%)	5 (9.4%)	0.592
HCV (antibody positive)	1 (5.3%)	4 (2.9%)	3 (5.7%)	0.645
Syphilis (RPR/VDRL positive)	5 (26.3%)	40 (29.4%)	18 (34.0%)	0.767
PrEP started before migrating to the Netherlands	3 (15.8%)	12 (8.8%)	20 (37.7%)	
PrEP provider				0.032
Provider in the Netherlands	15 (78.9%)	75 (55.1%)	16 (30.2%)	
- Public Health Service	9 (47.4%)	47 (34.6%)	7 (13.2%)	
- HIV treatment center	2 (10.5%)	2 (1.5%)	3 (5.7%)	
- Family practitioner	4 (21.1%)	23 (16.9%)	2 (3.8%)	
- Medical specialist	0 (0.0%)	2 (1.5%)	2 (3.8%)	
- No info	0 (0.0%)	1 (0.7%)	2 (3.8%)	
Provider outside the Netherlands	0 (0.0%)	9 (6.6%)	9 (17.0%)	
Obtained PrEP through informal routes	1 (5.3%)	17 (12.5%)	8 (15.1%)	
From friend living with HIV	0 (0.0%)	4 (2.9%)	2 (3.8%)	
No info	3 (15.8%)	31 (22.8%)	18 (34.0%)	
Seroconversion during PrEP use				
Tested HIV-positive while on PrEP	13 (68.4%)	29 (21.3%)	9 (17.0%)	<.001
HIV-testing following end of PrEP				<.001
HIV-negative test performed after last dose of PrEP	5 (83.3%)	41 (38.3%)	13 (29.5%)	
No HIV-negative test performed after last dose of PrEP	0 (0.0%)	48 (44.9%)	21 (47.7%)	
Unknown if HIV test was performed after last dose of PrEP	1 (16.7%)	18 (16.8%)	10 (22.7%)	

	RAMs detected	No RAMs detected	Not tested, no data	p-value
Diagnosed in the Netherlands or before migration				<.001
In the Netherlands	17 (89.5%)	134 (98.5%)	43 (81.1%)	
Before migration to the Netherlands	1 (5.3%)	2 (1.5%)	10 (18.9%)	
Unknown / uncertain	1 (5.3%)	0 (0.0%)	0 (0.0%)	
Days between last PrEP use and testing HIV-positive**	0 (0-6.8)	55 (3-184)	38 (3-273)	0.001
Recent HIV acquisition				
Tested pos. <365 days after last neg. test	15 (78.9%)	104 (76.5%)	37 (69.8%)	0.584
Tested pos. <180 days after last neg. test	13 (68.4%)	65 (47.8%)	25 (47.2%)	0.224
CD4 at HIV diagnosis	557 (472-708)	540 (365-718)	605 (380-777)	0.371
ARVs used for PrEP				0.034
TDF/FTC	13 (68.4%)	67 (49.3%)	17 (32.1%)	
Genvoya	0 (0.0%)	0 (0.0%)	1 (1.9%)	
Dolutegravir	0 (0.0%)	0 (0.0%)	1 (1.9%)	
Unspecified	6 (31.6%)	69 (50.7%)	34 (64.2%)	
PrEP schedule				<.001
On demand	10 (52.6%)	58 (42.6%)	12 (22.6%)	
Daily	9 (47.4%)	26 (19.1%)	10 (18.9%)	
No data	0 (0.0%)	48 (35.3%)	31 (58.5%)	
Used PrEP <1 week	0 (0.0%)	4 (2.9%)	0 (0.0%)	
Duration of PrEP use (days)	58 (30-142)	182 (29-344)	61 (15-231)	0.624
Routine medical check-ups while on PrEP				0.011
Public Health Service	10 (52.6%)	47 (34.6%)	8 (15.1%)	
Family practitioner	2 (10.5%)	14 (10.3%)	2 (3.8%)	
HIV treatment center	2 (10.5%)	3 (2.2%)	4 (7.5%)	
Other healthcare provider	0 (0.0%)	4 (2.9%)	4 (7.5%)	
No medical check-ups	0 (0.0%)	20 (14.7%)	5 (9.4%)	
No data	5 (26.3%)	48 (35.3%)	30 (56.6%)	
Resistance test performed after testing HIV-positive	19 (100%)	136 (100%)	0 (0.0%)	<.001
Resistance associated mutations in RT				
M184VI	19 (100%)	0 (0.0%)	0 (0.0%)	
K65R	2 (10.5%)	0 (0.0%)	0 (0.0%)	
K70EG	0 (0.0%)	0 (0.0%)	0 (0.0%)