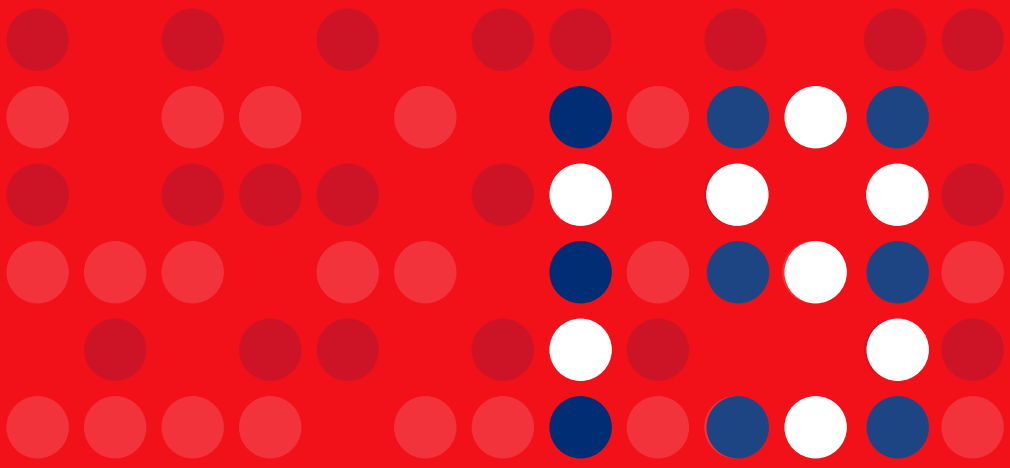
Human Immunodeficiency Virus (HIV)
Infection in the Netherlands

HIV Monitoring

HIV Monitoring Report 2019

Chapter 1: The HIV epidemic in the Netherlands



About Stichting HIV Monitoring

Stichting HIV Monitoring (SHM), the Dutch HIV monitoring foundation, was founded in 2001 and appointed by the Dutch minister of Health, Welfare and Sport as the executive organisation for the registration and monitoring of HIV-positive individuals in the Netherlands.

In collaboration with the HIV treatment centres in the Netherlands, SHM has developed a framework for systematically collecting HIV data for the long-term follow up of all registered individuals. The Netherlands is the only country in the world to have such a framework, which enables healthcare professionals to aspire to the highest standard of HIV care.

SHM contributes to the knowledge of HIV by studying the course of the infection and the effect of its treatment. To this end, SHM follows the treatment of every HIV-positive man, woman and child in care in the Netherlands and registered in the national observational HIV cohort, ATHENA. Continuous collection of data is carried out at 24 HIV treatment centres and subcentres and 4 paediatric HIV centres in the Netherlands. Patient data are collected and entered into the database in a pseudonymised form for storage and analysis. In this way SHM is able to comprehensively map the HIV epidemic and HIV treatment outcomes in the Netherlands.

Our mission

To further the knowledge and understanding of all relevant aspects of HIV infection, including comorbidities and co-infections (such as viral hepatitis), in HIV-positive persons in care in the Netherlands.

www.hiv-monitoring.nl

HIV Monitoring

Monitoring Report 2019

Human Immunodeficiency Virus (HIV) Infection in the Netherlands

Interactive PDF user guide

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Words and numbers that are underlined are links — clicking on them will take you to further information within the document or to a web page (in a new window) if they are a url (e.g., http://www.cdc.gov/hiv/guidelines/).

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Monitoring programme report

1. The HIV epidemic in the Netherlands

Ard van Sighem and Eline Op de Coul

Introduction

As of May 2019, 30,124 HIV-positive individuals had been registered by Stichting HIV Monitoring (SHM). Following registration, further clinical data were collected for 29,449 (97.8%) of the individuals, while the remaining 675 (2.2%) persons objected to the collection of their data. Among the 29,449 individuals with clinical data, 28,375 were registered in one of the HIV treatment centres in the Netherlands (*Figure 1.1*) and 1,246 were registered in the St. Elisabeth Hospital in Willemstad, Curaçao (see *Chapter 9*); 172 people had been registered both in the Netherlands and in Curaçao.

Of the 28,375 people registered in the Netherlands, the majority were diagnosed with HIV-1 (26,976; 95%). A small group of people, 100 in total, were diagnosed with HIV-2, while 67 people had antibodies against both HIV-1 and HIV-2. Serological results were not available in the SHM database for 1,232 individuals, a group that mostly comprised people who were registered before the official start of the AIDS Therapy Evaluation in the Netherlands (ATHENA) study and for whom only limited data were therefore collected.

This chapter will first focus on the characteristics of HIV-1-positive individuals at the time of diagnosis or at the time of entering HIV care, followed by a brief overview of the group of people who are HIV-2-positive. The second part will discuss the HIV-1-positive individuals who were still in care at the end of 2018.

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Box 1.1: Definitions of infection, diagnosis, entry into care, and registration.

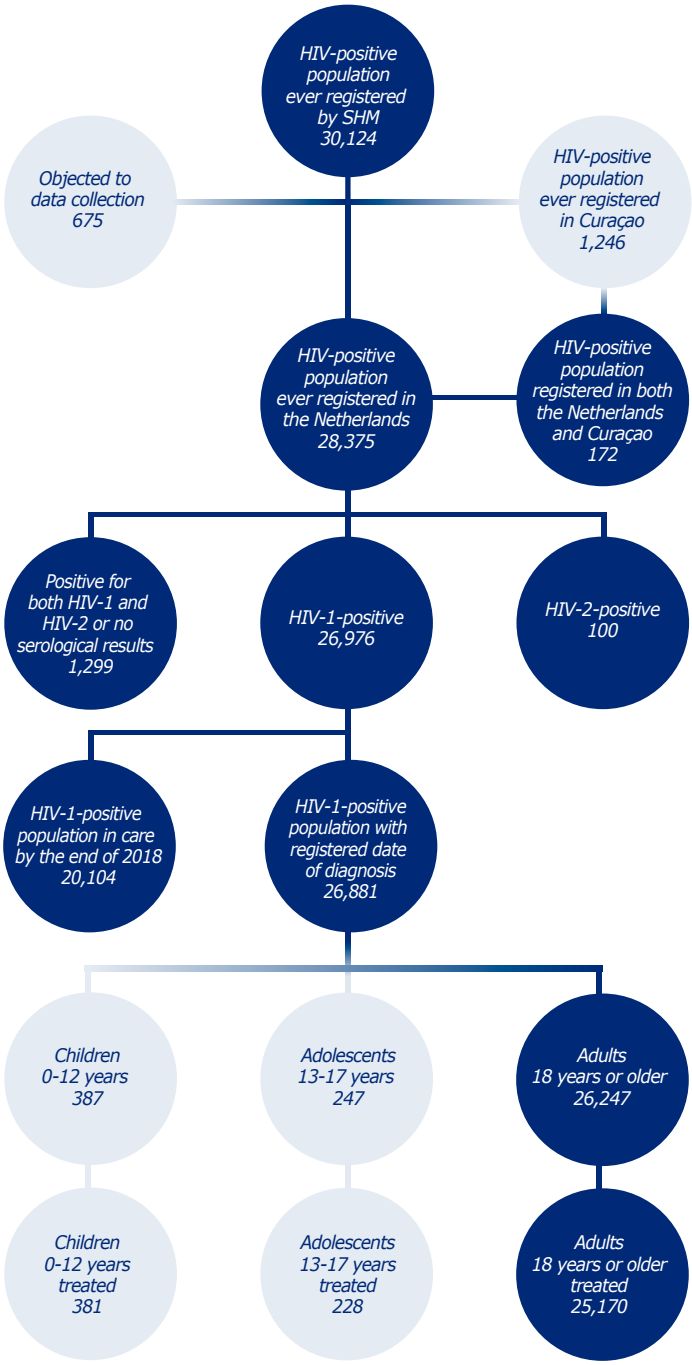
Infection	The moment an individual acquires an HIV infection. The time of infection is often unknown.
Diagnosis	The moment an individual is newly diagnosed with an HIV infection. The time of diagnosis can be weeks, months, or even years after infection.
Entry into care	The moment an HIV-positive individual is first linked to care in an HIV treatment centre, which usually is within a few weeks of HIV diagnosis.
Registration	The moment an HIV-positive individual in care is notified to SHM by their treating HIV physician or nurse and registered in the SHM database. Registration is usually within a few months of entering care, but can take longer. Collection of demographic and clinical data from the time of HIV diagnosis can only be done after an HIV-positive individual is registered with SHM.

Population – HIV-1

HIV-1-positive individuals

Altogether, 26,247 individuals were ever diagnosed with HIV-1 as adults and had a recorded date of diagnosis (*Figure 1.1*). The majority of these 26,247 adults were men who have sex with men (MSM; 15,829 (60%)), while 3,549 other men (14%) and 4,279 (16%) women reported having acquired their HIV infection through heterosexual contact (*Appendix Table 1.1*). For 775 (3%) individuals, the reported mode of transmission was injecting drug use, while for 330 (1%) individuals infection occurred through exposure to contaminated blood. Other and unknown modes of transmission accounted for the remaining 6% (1,485) of infections.

Figure 1.1: Overview of the HIV-positive population registered by Stichting HIV Monitoring (SHM) as of the end of 2018.

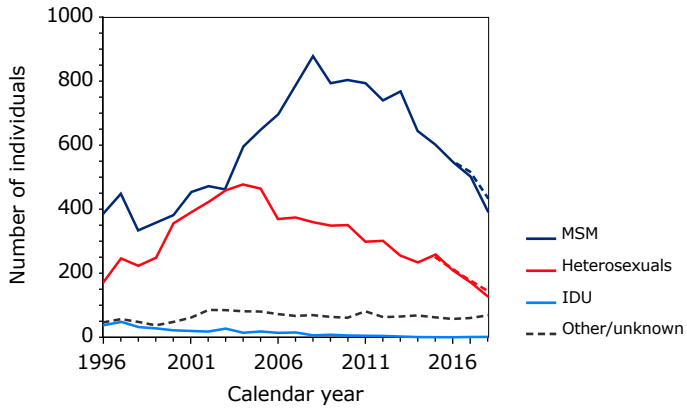


Decreasing number of diagnoses

From the 1990s until 2008, the annual number of new diagnoses in the entire population increased from approximately 650 to well above 1,300 (*Appendix Table 1.1*). From 2009 onwards, the registered number of new diagnoses has steadily declined. In 2018, the decreasing trend continued and the number of new HIV diagnoses, taking into account a projected backlog[a] in registration of HIV cases, was approximately 664.

In MSM, the annual number of diagnoses was approximately 400 in 1996 and increased to more than 850 in 2008 (*Figure 1.2*). Thereafter, the number of diagnoses decreased gradually to approximately 437 in 2018. In individuals who acquired their HIV infection via heterosexual contact, the number of new diagnoses has declined to approximately 150 cases per year in the last few years. As shown later in this chapter, this decline in the heterosexual population is largely the result of a reduced number of diagnoses in people born abroad. Finally, injecting drug use is now rarely reported as the most probable mode of transmission, which reflects the decreasing popularity of injecting drugs.

Figure 1.2: *Annual number of new HIV-1 diagnoses among adults, according to most likely mode of transmission. In 2018, men who have sex with men (MSM) accounted for 66% of new diagnoses, infections via heterosexual contact for 22%, infections via injecting drug use (IDU) for 0%, and infections via other or unknown modes of transmission for 12% of the annual number of new diagnoses. The dotted lines indicate the number of diagnoses after the projected backlog in registration of HIV cases (3% in 2017, 11% in 2018) is taken into account (See Box 1.1).*



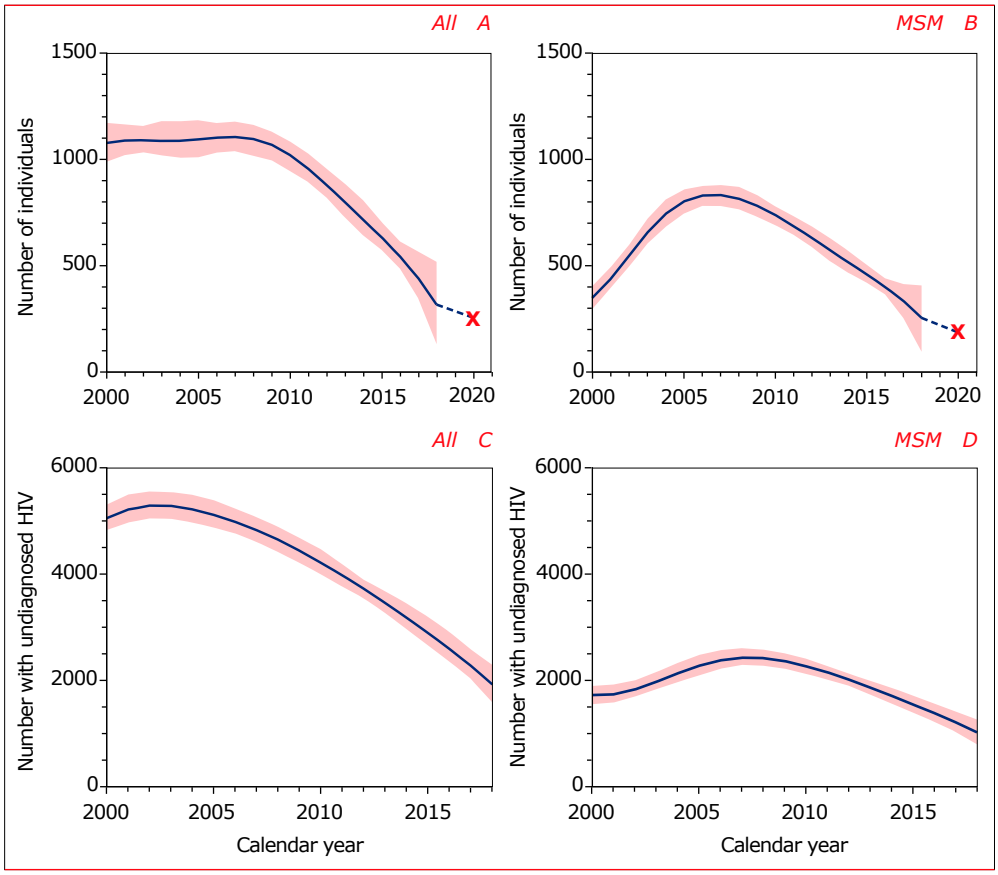
Legend: *MSM=men who have sex with men; IDU=injecting drug users.*

a *As it may take some time before people living with HIV are registered in the SHM database by their treating physician, there is some backlog for the most recent calendar years. Based on past trends, this backlog is estimated to be 3% in 2017 and 11% in 2018.*

Decreasing number of newly-acquired infections

The observed changes over time in the number of HIV diagnoses are, in part, a consequence of changes in the annual number of newly-acquired HIV infections. According to the European Centre for Disease Prevention and Control (ECDC) HIV Modelling Tool, there were approximately 1,000 newly-acquired HIV infections each year between 2000 and 2010[1]. Thereafter, the number of new infections decreased continuously over time to 320 (95% confidence interval (CI), 130-520) in 2018 (*Figure 1.3A*). In MSM, the annual number of newly-acquired HIV infections reached a peak of approximately 800 around 2007 and thereafter has continued to decrease to around 250 (95% CI, 90-410) in 2018 (*Figure 1.3B*). Since 2000, the number of people estimated to be living with undiagnosed HIV has also decreased, although this decrease was less pronounced among MSM (*Figure 1.3C* and *1.3D*).

Figure 1.3: *Estimated annual number of newly-acquired HIV infections and number of people living with undiagnosed HIV in the entire HIV-positive population in the Netherlands (A, C) and in men who have sex with men (B, D). The cross indicates UNAIDS' target for 2020 of achieving a 75% reduction in the number of newly-acquired HIV infections since 2010.*



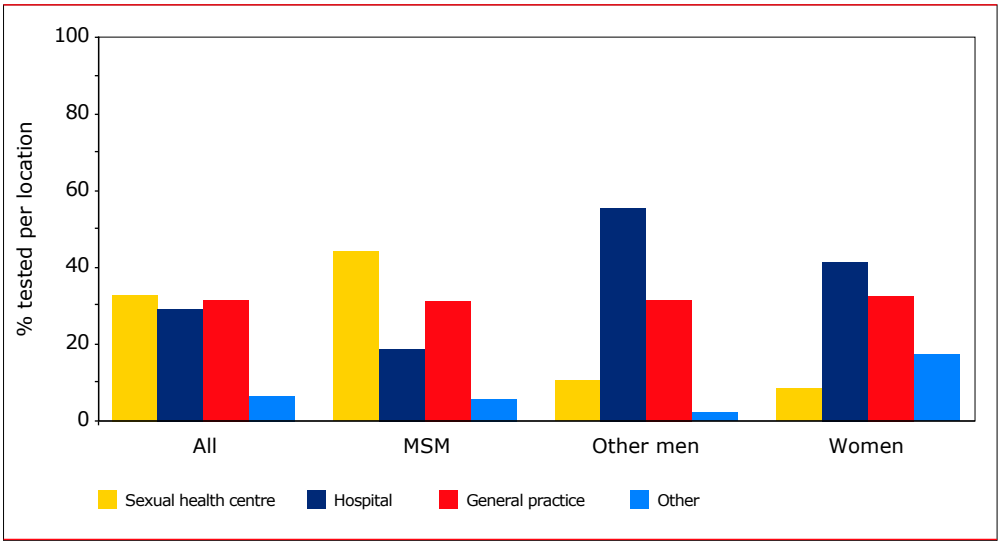
Towards a 75% reduction in newly-acquired HIV infections by 2020

In 2016, the United Nations General Assembly committed to achieving a 75% reduction by 2020 in the annual number of newly-acquired HIV infections compared with 2010[2,3]. The decreasing trend in the estimated annual number of newly-acquired infections in the Netherlands over the years shows that the Netherlands is on course to achieving this goal. In 2018, there were 320 newly-acquired HIV infections, which is a reduction of 69% compared to 2010. The UNAIDS' 2020 target (for the Netherlands implying 260 or fewer newly-acquired HIV infections in 2020) may already be reached in 2019 if current trends in the number of infections continue (*Figure 1.3A*). Among MSM, a reduction of 66% had been achieved by 2018 and, as in the overall population, the UNAIDS' 2020 target may also be met in 2019 (*Figure 1.3B*).

Setting in which HIV is diagnosed

Information on the setting in which HIV was diagnosed in the Netherlands was available for 1,991 (90%) of the 2,220 people diagnosed in 2016 or later, while 129 (6%) individuals were known to have been diagnosed abroad. Overall, 33% of these 1,991 individuals received their first HIV-positive test result at a sexual health centre, 29% at a hospital, and 32% at a general practice (*Figure 1.4*). Among those diagnosed at sexual health centres, 90% were MSM, 6% were other men, and 3% were women. These proportions are similar to those directly reported by sexual health centres in 2018[4].

***Figure 1.4:** Proportion of individuals diagnosed in 2016 or later, stratified by location of testing and transmission risk group.*



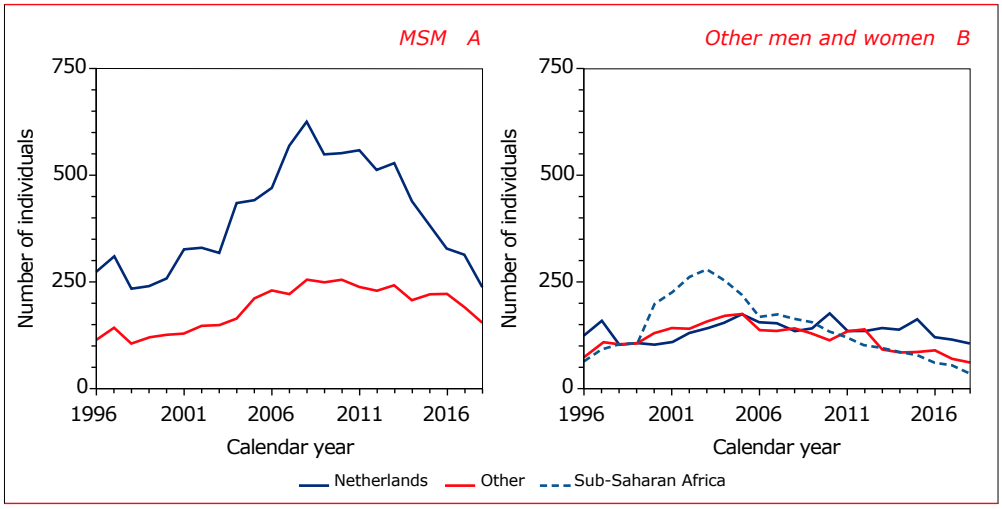
***Legend:** MSM=men who have sex with men.*

Geographical region of origin

In total, 11,552 (44%) people diagnosed with HIV as adults were born outside the Netherlands. Of the people who acquired HIV via homosexual contact, 68% originated from the Netherlands, 11% from other European countries, 7% from South America, and 4% from the Caribbean (*Figure 1.5A*). In recent years (i.e., in those diagnosed in, or after, 2016), the proportion of MSM of Dutch origin was 61% (*Appendix Table 1.2*), while minor changes were observed in the proportion of MSM from western and central Europe and the Caribbean.

Among women and other men, only 37% originated from the Netherlands, while 33% originated from sub-Saharan Africa, 9% from South America, 5% from the Caribbean, and 4% from south and south-east Asia (*Figure 1.5B*). However, the number of new diagnoses among sub-Saharan Africans dropped sharply after 2003, probably partly as a result of stricter immigration laws that came into effect in the Netherlands around that time. From 2016 onwards, 48% of the newly-diagnosed women and other men were of Dutch origin, and 21% originated from sub-Saharan Africa.

Figure 1.5: *Annual number of diagnoses by region of origin among (A) men who have sex with men (MSM) and (B) other people aged 18 years or older at the time of diagnosis. Of the 1,480 MSM diagnosed in 2016 or later, 904 (61%) originated from the Netherlands, 181 (12%) from other European countries, 120 (8%) from South America, and 86 (6%) from the Caribbean. Among the other 740 people diagnosed in 2016 or later, 358 (48%) originated from the Netherlands, 59 (8%) from other European countries, 155 (21%) from sub-Saharan Africa, 69 (9%) from South America, 32 (5%) from the Caribbean, and 29 (4%) from south and south-east Asia. Note: data collection for 2017 and 2018 has not yet been finalised.*



Legend: *MSM=men who have sex with men.*

Overall, 21% of the people newly diagnosed since 2016 were living in the Amsterdam public health service (PHS) region at the time of diagnosis and 14% were living in the Rotterdam-Rijnmond PHS region. These proportions were 14% and 12%, respectively, for people of Dutch origin and 30% and 16%, respectively, for people originating from other countries. Among MSM, 24% were living in Amsterdam at the time of diagnosis and 14% were living in Rotterdam, while in other groups these proportions were 16% and 14%, respectively. Other PHS regions with at least 4% of new diagnoses since 2016 were Haaglanden (6%, including Den Haag), Utrecht (6%), Hart voor Brabant (5%, including Den Bosch and Tilburg), and Gelderland-Midden (4%, including Arnhem).

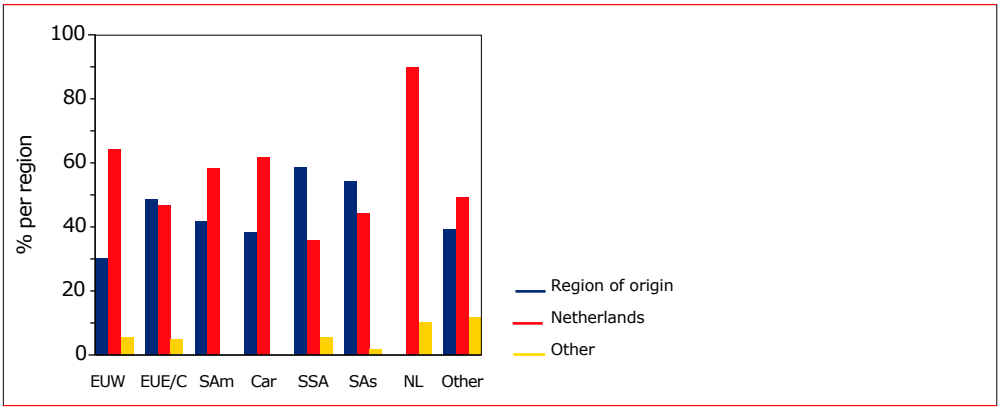
HIV diagnosis before arriving in the Netherlands

Since February 2018, SHM has been recording the date of arrival in the Netherlands for newly-registered HIV-positive individuals born abroad. Of the 1,075 people *newly-registered* in 2018 or up to May 2019, 472 (44%) were born in the Netherlands and 603 (56%) had been born abroad. In total, 307 (51%) foreign-born individuals were diagnosed after arrival and 286 (47%) were already diagnosed with HIV before moving to the Netherlands, while for the remaining 10 individuals born abroad, the date of arrival was not available yet. Among the 307 people diagnosed after arrival, the majority were diagnosed shortly before registration with SHM: 253 (82%) were diagnosed in 2018 or 2019, and 36 (12%) in 2017. In contrast, 70% of the people moving to the Netherlands with a diagnosed HIV infection were diagnosed before 2016. Including those migrants for whom the date of arrival was collected retrospectively, 400 people were known to have been diagnosed before moving to the Netherlands (*Appendix Table 1.1*).

Self-reported geographical region of HIV acquisition

In total, 1,658 (75%) of the individuals diagnosed in 2016 or later reported the most likely country where they acquired their HIV infection (*Figure 1.6*). Among people born in the Netherlands, the majority (90%) reported having acquired their HIV infection in the Netherlands, while among foreign-born individuals, 51% of those diagnosed in 2016 or later reported having acquired their HIV infection in the Netherlands.

Figure 1.6: Proportion of all HIV-1-positive adults diagnosed in 2016 or later per region of origin who reported to have acquired their HIV infection in their own region of origin, in the Netherlands, or elsewhere.



Legend: EUW=western Europe; EUE/C=eastern and central Europe; SAm=South America; Car=Caribbean; SSA=sub-Saharan Africa; SAs=south and south-east Asia; NL=the Netherlands; Other=other regions of origin.

The majority (82%) of MSM diagnosed in 2016 or later acquired their HIV infection in the Netherlands. Among other men and among women with a self-reported region of acquisition, 61% acquired HIV in the Netherlands, while 13% reported having acquired HIV in sub-Saharan Africa. The proportion of Dutch-born people who likely acquired HIV in the Netherlands was 93% for MSM, 79% for other men and 88% for women.

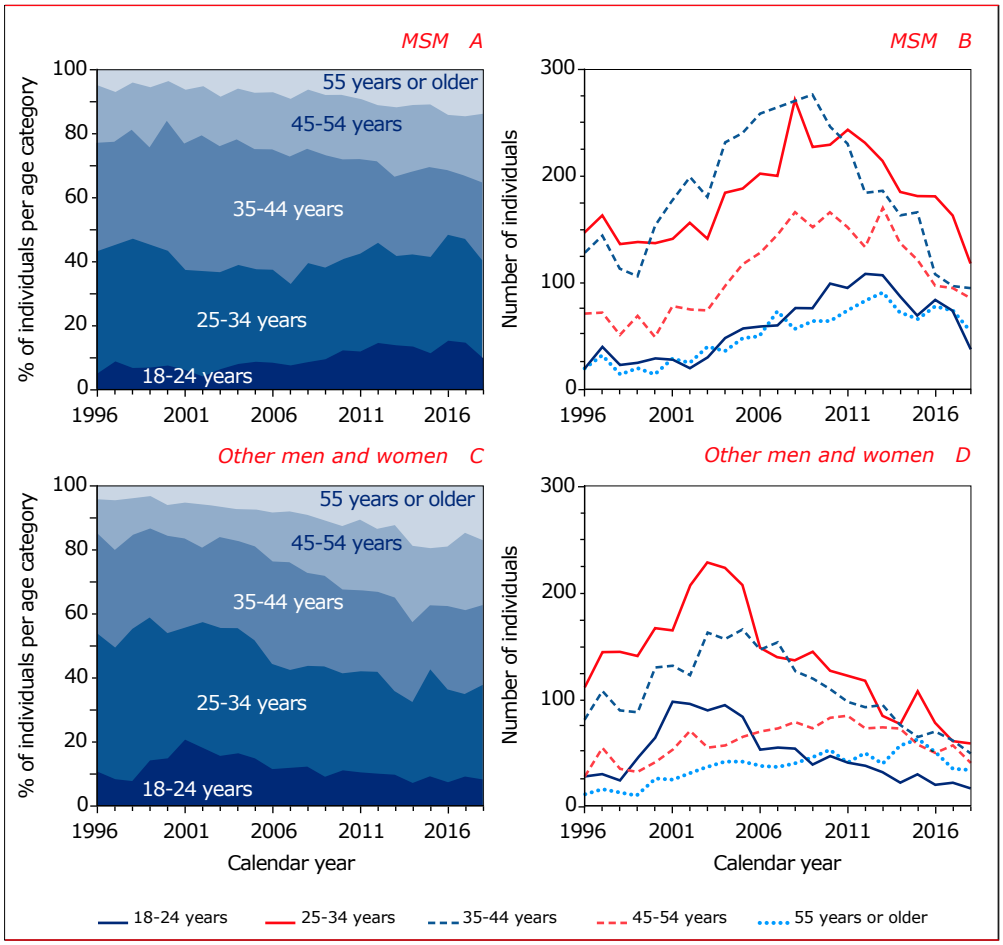
Increasingly older age at time of HIV diagnosis

The age at which individuals are diagnosed with HIV has been slowly increasing over time. In 1996, the median age at the time of diagnosis was 35 (interquartile range (IQR) 30-42) years; in 2018, it was 40 (IQR 30-50) years. Over the entire period from 1996 through 2018, 16% of adults who received an HIV diagnosis were 50 years or older; in 2018, 24% were 50 years or older.

There were considerable age differences between MSM, other men, and women diagnosed in 2016 or later. MSM born in the Netherlands were diagnosed at a median age of 42 (30-53) years, while those of foreign origin were diagnosed at 32 (26-40) years. Among other people of Dutch origin, the median age at the time of diagnosis was 41 (31-53) years for women and 46 (32-55) years for men. Individuals born in sub-Saharan Africa (women: 37 years; men: 42 years) or elsewhere (women: 36 years; men: 39 years) were substantially younger than their Dutch counterparts.

For MSM, the age distribution at the time of diagnosis has gradually changed over time, while for other individuals there were no notable changes up to 2003 (*Figure 1.7*). Thereafter, the age of other individuals at diagnosis started to increase concomitantly with the decreasing number of diagnoses among people from sub-Saharan Africa, who were generally younger than those of Dutch or other origin.

Figure 1.7: *Age distribution at the time of diagnosis among HIV-1-positive (A, B) men who have sex with men (MSM) and (C, D) other men and women. Between 1996 and 2018, the proportion of MSM aged 45 years or older at the time of diagnosis increased from 24% to 36%, while these proportions were 15% and 37% for other individuals. During the same period, the proportion of individuals between 25 and 34 years of age decreased from 38% to 30% for MSM and from 43% to 30% for other individuals.*



Young adults

The annual number of diagnoses among young adults less than 25 years of age who did not acquire their HIV infection via homosexual contact was approximately 90 in the early 2000s and decreased to approximately 17 in 2018, or to 8% of the annual number of diagnoses (*Figure 1.7*). Among MSM, both the number and proportion of diagnoses among young adults increased over time and, in 2012, young adults accounted for 15% (108) of the diagnoses. Thereafter, the proportion of diagnoses among young MSM remained around this level, although the absolute number has decreased.

Entry into care

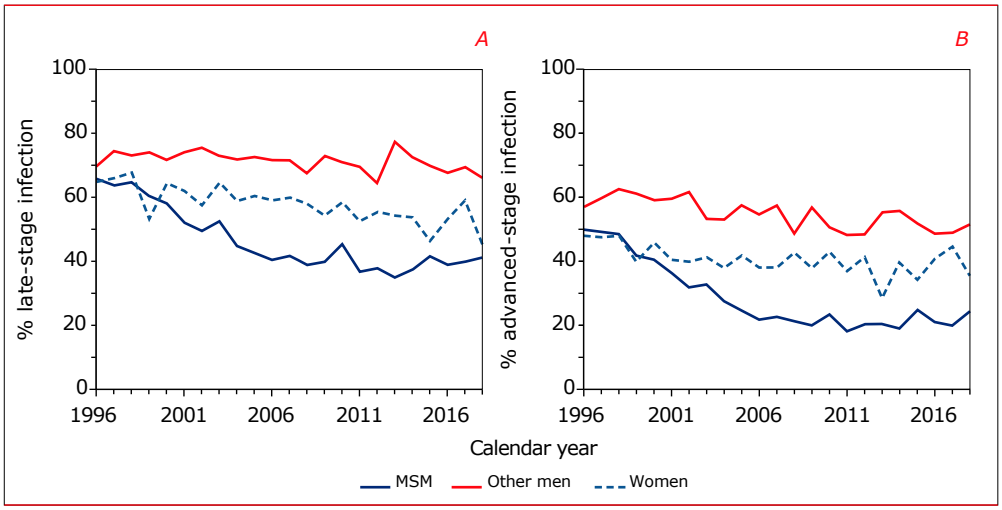
Of all individuals diagnosed with HIV in 2016 or later and for whom the setting in which they first tested HIV-positive was known (excluding those diagnosed abroad), 93% had entered care within 4 weeks of receiving their diagnosis and 96% within 6 weeks. The proportion in care within 6 weeks was 96% for individuals who received their first HIV-positive test at a sexual health centre, and similar for those who tested HIV-positive in a hospital (96%), at a general practice (96%), or at other locations (97%). Overall, the proportion in care within 6 weeks was similar for MSM (96%), other men (95%), and women (97%), and did not differ by age at the time of diagnosis. However, the proportion in care within 6 weeks was larger among individuals born in the Netherlands (98%) than among those born abroad (94%).

Late diagnosis

In total, 30% of the individuals with an HIV diagnosis from 1996 onwards had CD4 counts of 500 cells/mm^3 or higher at diagnosis, 20% had CD4 counts between 350 and 499 cells/mm^3, 20% had CD4 counts between 200 and 349 cells/mm^3, and 31% had CD4 counts below 200 cells/mm^3, while 15% had a concurrent AIDS diagnosis. For people diagnosed in 2016 or later, these proportions had improved somewhat and were 34%, 21%, 19%, and 26%, respectively; 13% had already been diagnosed with AIDS.

Overall, 52% of the individuals were diagnosed with HIV with an already late-stage HIV infection, i.e., with either a CD4 count below 350 cells/mm^3 or an AIDS-defining event regardless of CD4 count[5]. Over time, the proportion of late-stage HIV diagnoses decreased from 67% in 1996 to 47% in 2018 (*Figure 1.8*). In addition, the proportion of individuals diagnosed with advanced HIV disease, i.e., with a CD4 count below 200 cells/mm^3 or AIDS, has likewise decreased over time and was 32% in 2018.

Figure 1.8: Proportion of individuals classified as having (A) late-stage or (B) advanced-stage HIV infection at the time of diagnosis. From 1996 (2016) onwards, 52% (47%) were diagnosed with late-stage HIV infection: men who have sex with men (MSM) 44% (40%), other men 71% (66%), and women 58% (53%). Overall, 34% (29%) were diagnosed with advanced-stage HIV infection: MSM 26% (21%), other men 54% (48%), and women 40% (41%). Late-stage HIV infection: CD4 counts below 350 cells/mm³ or having AIDS, regardless of CD4 count. Advanced-stage HIV infection: CD4 counts below 200 cells/mm³ or having AIDS. As a CD4 count measurement close to the time of diagnosis and before start of treatment was sometimes missing, the stage of the HIV infection could not be determined for all individuals. The proportion with unknown stage of HIV infection decreased from 33% in 1996 to 14% on average in 2016 or later.



Legend: MSM=men who have sex with men.

Late diagnosis by region of origin, age, and setting of diagnosis

Among individuals diagnosed with HIV in 2016 or later, 40% of MSM, 66% of other men, and 53% of women had a late-stage HIV infection. Late-stage HIV infection was most commonly found among people originating from sub-Saharan Africa (63%) or south and south-east Asia (62%), and among people originating from the Netherlands (62%) or from South America (59%) who acquired their HIV infection via other routes than homosexual contact (*Appendix Table 1.3*).

Older age at the time of diagnosis was also associated with a higher likelihood of late-stage HIV infection. Late-stage HIV was seen in 53% of MSM, 76% of other men, and 66% of women diagnosed in 2016 or later at 45 years of age or older, compared with 23% of MSM, 45% of other men, and 29% of women diagnosed at ages younger than 25 years (*Appendix Table 1.3*). Late-stage HIV was also observed

more often in people who received their HIV diagnosis at a hospital (77%) compared with those who were tested at a general practice (45%), a sexual health centre (24%), or another testing location (34%).

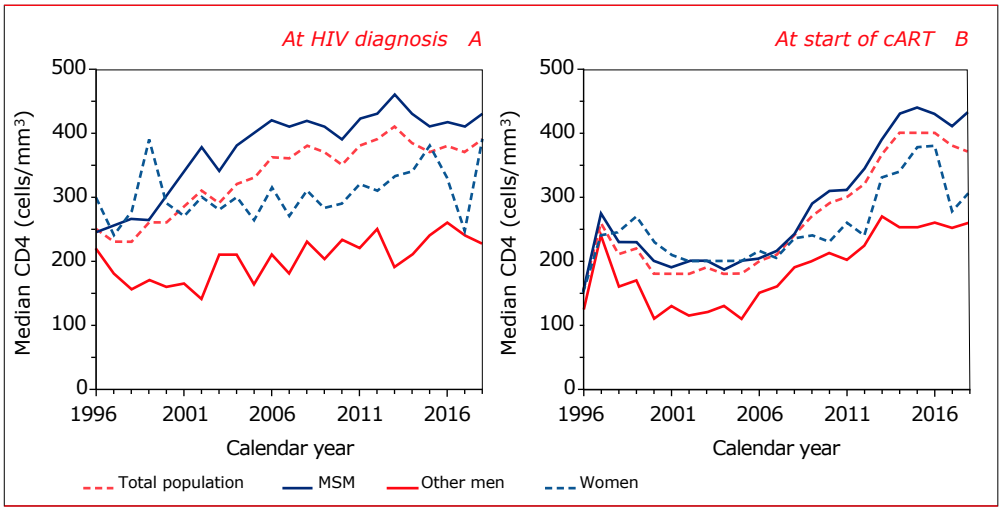
Impact of transient low CD4 cell counts early after infection

During the first few weeks after acquiring HIV, transient low levels of CD4 cell counts are common[6]. As a result, the stage of the infection may inadvertently be classified as late or advanced when individuals are diagnosed with HIV during this early phase of the infection. When people with a known HIV-negative test in the 6 months prior to HIV diagnosis were reclassified as not having a late-stage or advanced-stage HIV infection, the proportion of late-stage HIV infections among individuals diagnosed in 2016 or later changed from 47% to 43%. This decrease was mainly due to a decrease in late-stage HIV among MSM, from 40% to 34%, whereas among other men and among women, the proportion decreased by less than 2 percentage points. The change in the proportion of people diagnosed with advanced-stage HIV infection was more modest: 29% before and 28% after reclassification in people diagnosed in 2016 or later.

Earlier diagnosis

Between 1996 and 2018, median CD4 counts in the total adult population at the time of diagnosis increased from 250 to 390 cells/mm^3 (*Figure 1.9A*). This overall increase was mainly the result of a rise in CD4 counts in MSM, whereas CD4 counts in women and in other men showed more modest increases.

Figure 1.9: Changes over calendar time in median CD4 counts (A) at HIV diagnosis and (B) at the start of combination antiretroviral therapy (cART). (A) Between 1996 and 2018, CD4 counts at the time of diagnosis increased from 250 (interquartile range (IQR) 80–437) to 390 (IQR 150–594) cells/mm³ in the total adult population. The increase was most apparent for men who have sex with men (MSM): 245 (IQR 80–450) cells/mm³ in 1996 and 430 (IQR 218–602) cells/mm³ in 2018. During the same period, CD4 counts in other men and in women were 220 (IQR 40–410) and 300 (IQR 130–450) cells/mm³, respectively, in 1996, and 255 (IQR 59–538) and 390 (IQR 120–600) cells/mm³ in 2018. (B) In the total adult population, CD4 counts at the start of cART rose to 260 (IQR 130–392) cells/mm³ shortly after cART became available, decreased to a plateau of approximately 180 cells/mm³ between 2000 and 2005, and increased thereafter. In 2018, CD4 counts were 380 (IQR 160–602) cells/mm³ in the total population, 435 (IQR 216–658) cells/mm³ in MSM, 280 (IQR 50–490) cells/mm³ in other men, and 308 (IQR 120–545) cells/mm³ in women. The apparent decrease in CD4 counts in women in 2017 is most likely a consequence of the relatively low number of diagnoses in this group.



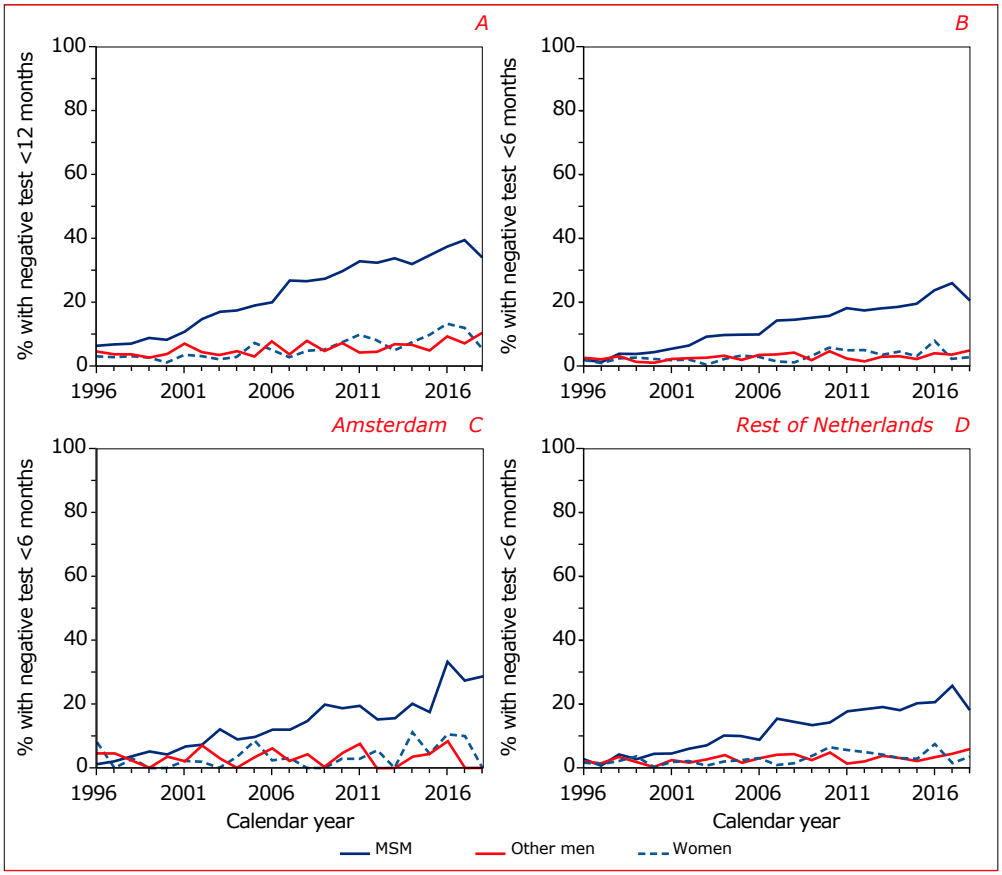
Legend: MSM=men who have sex with men; cART=combination antiretroviral therapy.

Recent infection

The increase in CD4 counts at diagnosis, in conjunction with a decreasing proportion of late presenters, suggests that, on average, people are being diagnosed increasingly earlier in the course of their HIV infection. Another indication of earlier diagnosis is the increase in the proportion of individuals who were diagnosed with strong evidence of a recent infection, based on a known negative HIV test 6 or 12 months, at most, before their first positive test (*Figure 1.10*). Among MSM diagnosed between 2010 and 2015, 32% had a negative test in the 12 months before diagnosis, while 18% had a negative test in the 6 months before diagnosis; by 2018, these proportions had increased to 34% and 21%, respectively. For other

men and for women however, the proportions with a recent infection between 2010 and 2018 were considerably lower: only 7% had a negative test in the 12 months before diagnosis, while 4% had a negative test in the 6 months before diagnosis.

Figure 1.10: *Proportion of people diagnosed and having (A) a last negative test at most 12 months before diagnosis, or (B) a last negative test at most 6 months before diagnosis. Panels C and D show the proportions with a last negative test in the preceding 6 months for (C) Amsterdam and (D) for the rest of the Netherlands. Altogether, 34% of men who have sex with men (MSM), 10% of other men, and 5% of women diagnosed in 2018 had a last negative test at most 12 months before diagnosis, whereas 21% of MSM, 5% of other men, and 3% of women had a last negative test at most 6 months before diagnosis.*



Legend: *MSM=men who have sex with men.*

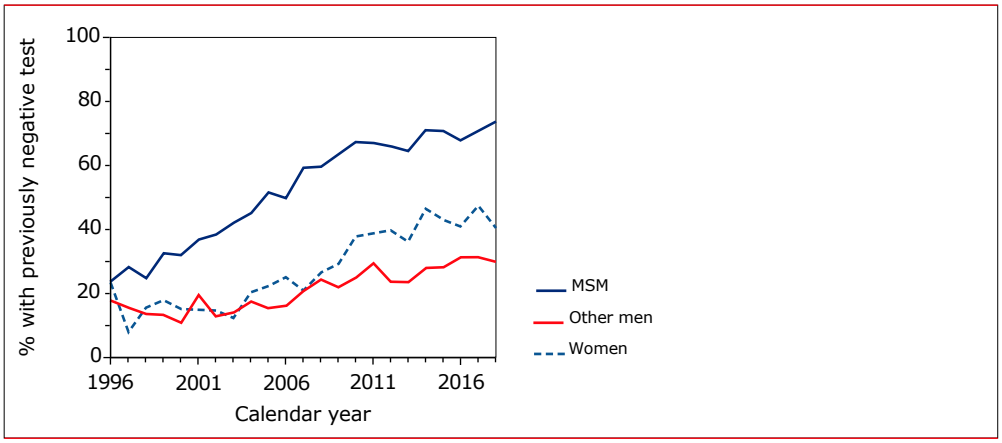
Amsterdam vs. rest of the Netherlands

Among those diagnosed in 2016 or later, the proportion of MSM with a known HIV-negative test in the 6 months before diagnosis was 31% in Amsterdam and 21% (i.e., lower) in the rest of the Netherlands, excluding Amsterdam (*Figure 1.10C; Figure 1.10D*). Among other men and among women, the proportion of recent infections did not differ between Amsterdam and the rest of the country.

Increasing frequency of testing

Since both the proportion of recent infections and CD4 counts at diagnosis have increased among those diagnosed with HIV, testing for HIV has apparently become more common. An additional indication for this is the increasing proportion of people with a known previous negative HIV test (*Figure 1.11*). In 2018, 74% of MSM, 30% of other men, and 41% of women newly diagnosed with HIV had a known previous test with a negative result. The proportion with a known previously negative test was highest among those diagnosed at a sexual health centre (88%), compared with 34% of those diagnosed in a hospital, 59% of those tested at a general practice, and 69% of those diagnosed elsewhere.

Figure 1.11: *Proportion of individuals diagnosed after a previously negative HIV test. Altogether, 74% of men who have sex with men (MSM), 30% of other men, and 41% of women diagnosed in 2018 had a previously negative HIV test.*



Legend: *MSM=men who have sex with men.*

Treated population

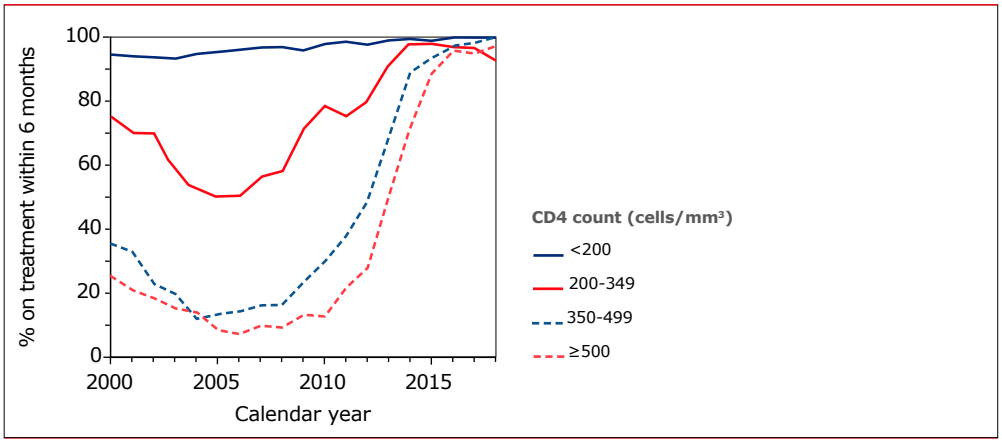
Of the 26,247 adults ever registered with an HIV-1 infection, 25,170 (96%) had started antiretroviral treatment by May 2019. Treatment and treatment outcomes are described in more detail in *Chapter 2*.

Earlier start

In the past few years, cART has been started increasingly earlier in the course of HIV infection, as evidenced by higher CD4 counts at the start of treatment since the mid-2000s (*Figure 1.9B*). In 2018, median CD4 counts at the start of treatment had increased to 380 cells/mm^3. Of those starting cART in 2018, 28% of people started treatment at CD4 counts already below 200 cells/mm^3, 19% started at CD4 counts between 200 and 349 cells/mm^3, 17% started at CD4 counts between 350 and 499 cells/mm^3, and 35% started at CD4 counts of 500 cells/mm^3 or above.

The main reason for starting treatment too late, i.e., at low CD4 counts, appears to be a late diagnosis, because most people who are able to start treatment on time now do so. Those with less than 200 CD4 cells/mm^3 at diagnosis have always started treatment almost immediately, with nearly everyone starting cART within 6 months after diagnosis (*Figure 1.12*). On the other hand, those with higher CD4 counts used to be less likely to start treatment within 6 months of diagnosis, but this likelihood has rapidly increased in recent years, reflecting changes in treatment guidelines towards a universal start of treatment regardless of CD4 count. In 2018, for all CD4 strata, at least 90% of people who were diagnosed with HIV in that year had started treatment within 6 months. The tendency to start treatment earlier after diagnosis is reflected in converging CD4 counts at the time of diagnosis and at start of cART (*Appendix Figure 1.1*).

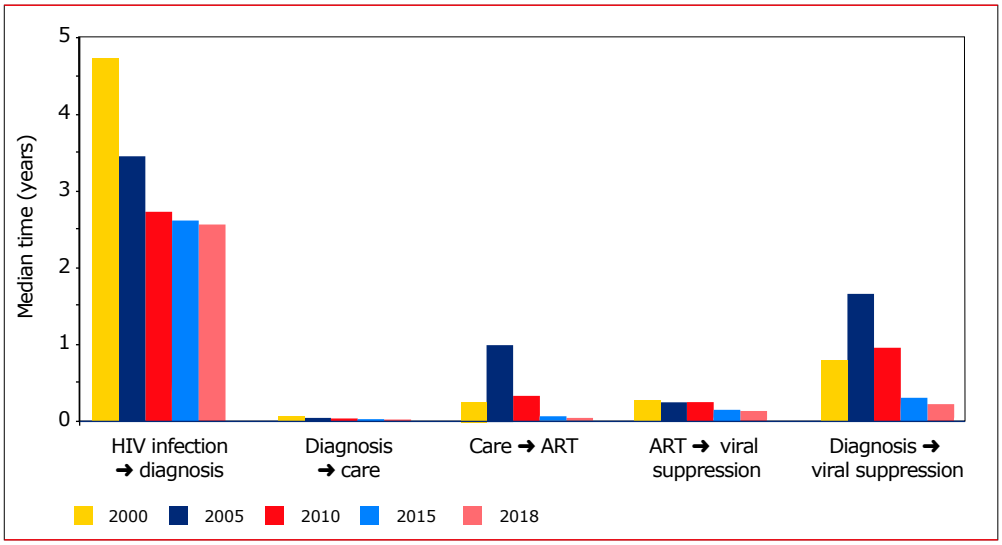
Figure 1.12: Proportion of individuals who started combination antiretroviral treatment (cART) within 6 months after HIV diagnosis by CD4 count at the time of diagnosis. Individuals were considered only if they had more than 6 months of follow up after diagnosis. Of all individuals diagnosed in 2016 or later, 100% of those with CD4 counts below 200 cells/mm³, 97% of those with CD4 counts between 200 and 349 cells/mm³, 98% of those with CD4 counts between 350 and 499 cells/mm³, and 96% of those with CD4 counts of 500 cells/mm³ or above had started cART within 6 months of diagnosis.



Time between HIV infection and viral suppression

People with a fully suppressed viral load do not transmit their virus to uninfected partners (undetectable equals untransmittable or U=U)[7,8,9]. Therefore, it is of paramount importance, not only for people living with HIV, but also from a public health perspective, to minimise the time between the moment a person acquires HIV and the point at which they achieve viral suppression[10]. However, to reach viral suppression, people with HIV must first be diagnosed, then linked to care, and subsequently start treatment. Over time, significant improvements have been realised in these three steps in the HIV care continuum (*Figure 1.13*). Between 2000 and 2018, the median time from infection to diagnosis in the entire HIV-1-positive population was estimated to have decreased from 4.7 (IQR 2.3-8.4) to 2.6 (1.2-4.7) years. During this same period, the median time from diagnosis to viral suppression decreased from 0.80 (IQR 0.40-3.64) years to 0.22 (0.15-0.38) years, mainly as a result of starting treatment earlier after entry into care.

Figure 1.13: Estimated time to reach key stages in the HIV care continuum for HIV-1-positive individuals, including time from infection to diagnosis, from diagnosis to entry into care, from entry into care to starting combination antiretroviral treatment (cART), from starting cART to reaching viral suppression (defined as an RNA measurement below 200 copies/ml), and from diagnosis to viral suppression.



Population – HIV-2

HIV-2-positive individuals

In total, 100 of the 28,375 registered HIV-positive individuals, including 46 men and 54 women, acquired an HIV-2 infection, of whom 21 were diagnosed in 2008 or later. The majority (80, or 80%) of these people acquired their infection via heterosexual contact. HIV-2 is endemic in West-Africa, and 66 people originated from this region, mostly from Ghana (26 people) or Cape Verde (24 people). Only 21 individuals were born in the Netherlands, 15 of whom reported to have acquired their HIV infection in the Netherlands.

For the 84 individuals who were diagnosed in 1996 or later, the median CD4 count at the time of diagnosis was 305 (80-681) cells/mm^3. From 1996 onwards, 53% of the people were diagnosed with a late-stage HIV infection, and 42% were diagnosed with advanced HIV disease[5]. The distribution of CD4 counts at diagnosis appeared to be more bimodal than for HIV-1-positive individuals: 41% had CD4 counts below 200 cells/mm^3, 38% had CD4 counts of 500 cells/mm^3 or higher, while relatively few people (22%) had CD4 counts between 200 and 499 cell/mm^3.

HIV-2-positive people in care

A total of 65 people were still in clinical care, while 17 people had died, 6 had moved abroad, and 12 had no contact with HIV care in 2018. The median age of the people still in care was 61 (IQR 54-64) years; 56 (86%) individuals were 50 years or older. The majority (77%) of those in care had been living with HIV-2 for more than 10 years, while 28% had done so for more than 20 years.

In total, 42 people who were still in care by the end of 2018 had started combination antiretroviral treatment. The majority used a backbone of abacavir/lamivudine (16 individuals) or tenofovir/emtricitabine (12) in combination with dolutegravir (8) or a boosted protease inhibitor (20).

Of the 65 people who were still in care by the end of 2018, 54 had a most recent viral load measurement below 500 copies/ml, 3 had a viral load above 500 copies/ml, and 8 people had no available HIV-2 RNA result in 2018. Of the 23 individuals who were still in care and had not started cART, 18 had a viral load measurement below 500 copies/ml while the other 5 had no RNA result available in 2018. In this group of 23 people, CD4 cell counts were still high, with a median of 760 (570-1060) cells/mm^3.

HIV-1-positive people in care

Population in care

In total, 20,104 (75%) of the 26,976 HIV-1-positive individuals ever registered in the Netherlands, comprising 19,910 adults and 194 minors less than 18 years of age, were known to be in clinical care (*Figure 1.1*; *Table 1.1*; *Appendix Table 1.4*) by the end of 2018. People were considered to be in clinical care if they visited their treating physician in 2018 or had a CD4 count or HIV RNA measurement in that year and were still living in the Netherlands. Of the 6,872 people who, according to this definition, were not in care by the end of 2018, 3,120 (45%) were known to have died, and 1,839 (27%) to have moved abroad, while the remainder were either lost to follow up, only diagnosed with HIV in 2019, or had only moved to the Netherlands in 2019.

Table 1.1: Characteristics of the 20,104 HIV-1-positive individuals in clinical care by the end of 2018. An extended version of this table is available as Appendix Table 1.4.

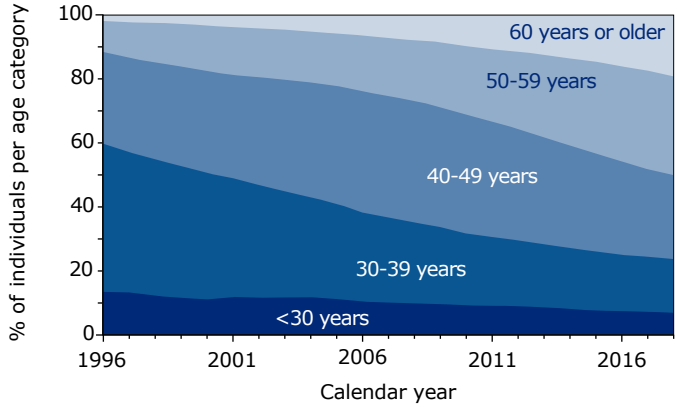
	Men (n=16,422, 82%)		Women (n=3,682, 18%)		Total (n=20,104)	
	n	%	n	%	n	%
Transmission						
MSM	12,697	77	-	-	12,697	63
Heterosexual	2,451	15	3,223	88	5,674	28
IDU	202	1	83	2	285	1
Blood/blood products	165	1	94	3	259	1
Other/unknown	907	6	282	8	1,189	6
Current age [years]						
0-12	61	0	77	2	138	1
13-17	31	0	25	1	56	0
18-24	235	1	84	2	319	2
25-34	1,869	11	447	12	2,316	12
35-44	3,199	19	1,039	28	4,238	21
45-54	5,187	32	1,165	32	6,352	32
55-64	4,025	25	607	16	4,632	23
65-74	1,530	9	178	5	1,708	8
≥75	285	2	60	2	345	2
Region of origin						
The Netherlands	10,836	66	1,129	31	11,965	60
Sub-Saharan Africa	1,084	7	1,484	40	2,568	13
Western Europe	925	6	118	3	1,043	5
South America	1,124	7	333	9	1,457	7
Caribbean	704	4	174	5	878	4
South and south-east Asia	483	3	239	6	722	4
Other	1,204	7	195	5	1,399	7
Unknown	62	0	10	0	72	0
Years aware of HIV infection						
<1	507	3	73	2	580	3
1-2	1,253	8	201	5	1,454	7
3-4	1,443	9	252	7	1,695	8
5-10	4,260	26	728	20	4,988	25
10-20	6,105	37	1,767	48	7,872	39
>20	2,827	17	645	18	3,472	17
Unknown	27	0	16	0	43	0

Legend: MSM=men who have sex with men; IDU=injecting drug use.

Ageing population

The median age of the population in clinical care by the end of 2018 was 50 (interquartile range [IQR] 41-58) and has been increasing since 1996 (*Figure 1.14*). This increase in age is mainly a result of the improved life expectancy of people with HIV after the introduction of cART. In addition, people are being diagnosed at increasingly older ages, as discussed earlier in this chapter. As a result, half of the people currently in care (50%) are 50 years or older, including 53% of men and 37% of women; 19% of the people are 60 years or older (*Appendix Table 1.4*). As the HIV-positive population continues to age, the number of individuals with age-related comorbidities also increases, thereby complicating the management of their HIV infection (see *Chapter 3*).

Figure 1.14: *Increasing age of the HIV-1-positive population in clinical care over calendar time. In 1996, 14% of the individuals in care were younger than 30 years of age, whereas 11% were 50 years or older. In 2018, these proportions were 7% and 50%, respectively, while 19% of individuals in care were 60 years of age or older. The proportion of individuals in clinical care as of 31 December of each calendar year is shown according to age category: <30 years of age, 30 to 39 years, 40 to 49 years, 50 to 59 years, and 60 years or older.*



Duration of infection

People in clinical care by the end of 2018 had been diagnosed with HIV a median of 11.3 (IQR 6.4-17.3) years previously. Thus, a large group (56%) of those in care have been living with HIV for more than 10 years, while 17% have done so for more than 20 years. The median time since diagnosis was 10.5 years for men who have sex with men (MSM), 12.0 years for other men, and 13.4 years for women. The majority of injecting drug users (94%) received their HIV diagnosis more than 10 years ago, which reflects how rare this mode of transmission has become as a result of the rapid and early adoption of harm reduction strategies in the Netherlands.

Antiretroviral treatment

In total, 99% of the individuals in care had started antiretroviral treatment, and 94% of them were currently using a once-daily regimen. Of the 262 (1%) individuals who had not yet started antiretroviral treatment by the end of 2018, 15 (5%) were known to have started treatment in 2019, while 110 (39%) other people were diagnosed with HIV in 2018 and their treatment had most likely not yet been recorded in the SHM database due to a delay in data collection. Antiretroviral treatment is discussed in more detail in *Chapter 2*.

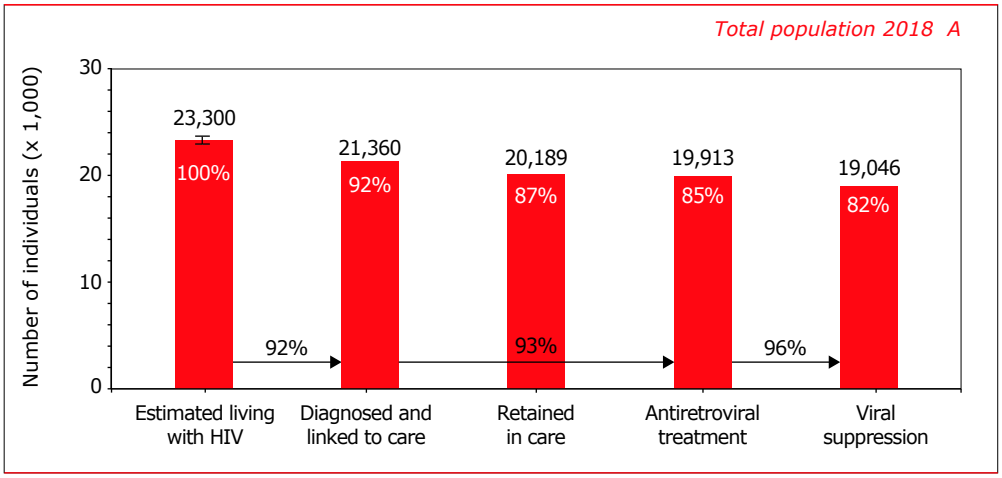
Clinical condition

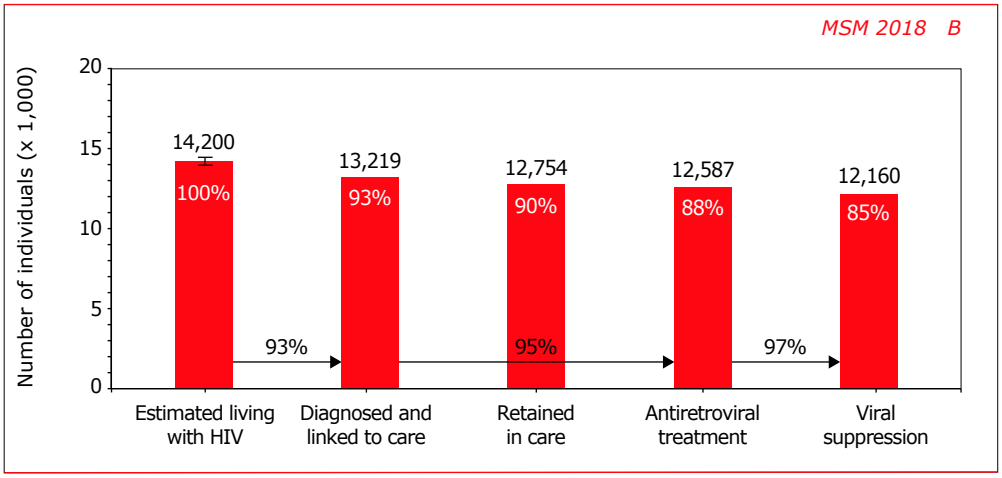
The median latest available CD4 count in 2018 of the people in care was relatively high at 680 (IQR 500-890) cells/mm^3, mainly as a result of treatment but partly also as a result of earlier diagnosis, as reported earlier in this chapter. CD4 counts were similar between MSM and women, being 692 (521-900) and 694 (510-922) cells/mm^3, respectively, but men who acquired HIV via other modes of transmission had lower CD4 counts at a median of 600 (410-820) cells/mm^3 (*Appendix Table 1.4*). For all people in care with a viral load measurement in 2018, 97% had a last measurement in that year below 200 copies/ml. Close to a quarter (23%) of the individuals had ever been diagnosed with an AIDS-defining disease; 57% of these people were diagnosed with AIDS concurrently with their HIV diagnosis.

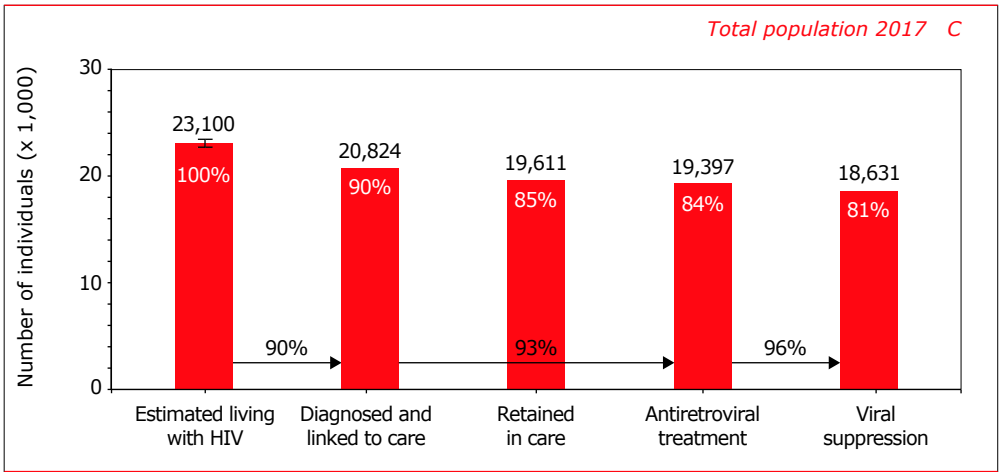
Continuum of HIV care

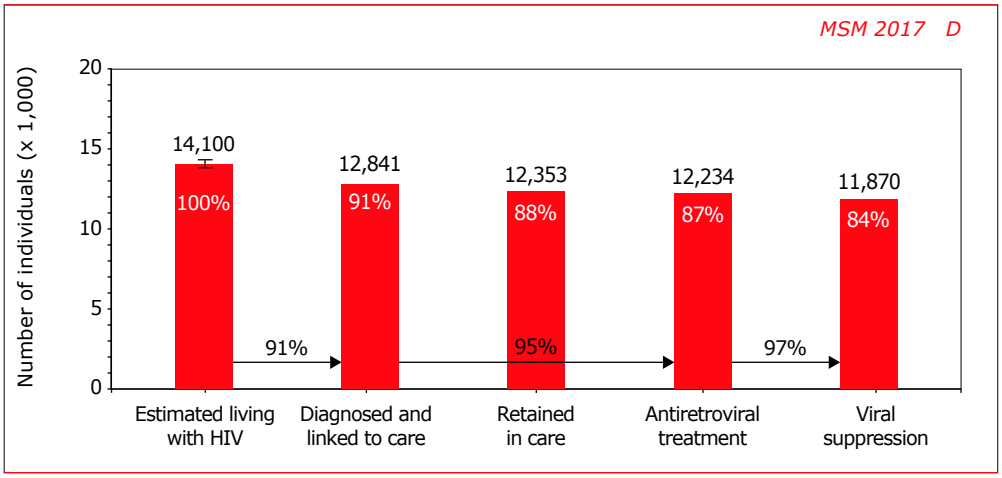
The total number of people living with HIV by the end of 2018 was 23,300 (95% confidence interval (CI) 23,000-23,700), including the estimated 1,900 (1,600-2,300) who were still undiagnosed[1]. Adjusted for registration delay, 21,360 individuals, or 92% of the total number estimated to be living with HIV, had been diagnosed, linked to care, and registered by SHM, of whom 20,189 individuals were considered to be retained in care (i.e., they had had at least one documented HIV RNA or CD4 count measurement or a clinic visit in 2018) (*Figure 1.15A*). The majority of these individuals (19,913, or 93% of those diagnosed and linked to care) had started antiretroviral treatment, and 19,046, or 96% of those treated, had a most recent HIV RNA measurement below 200 copies/ml. Overall, 82% of the total estimated population living with HIV and 89% of those diagnosed and ever linked to care had a suppressed viral load. Hence the Netherlands has reached the Joint United Nations Programme on HIV/AIDS (UNAIDS) 90-90-90 target for 2020 with the current estimate standing at 92-93-96[11]. Of the people still in care by the end of 2018, 14,015 (69%, or 76% of those with a CD4 measurement) had a most recent CD4 count of 500 cells/mm^3 or higher measured at most two years before.

Figure 1.15: Continuum of HIV care for (A, C) the total estimated HIV-1-positive population and for (B, D) men who have sex with men estimated to be living with HIV in the Netherlands by the end of 2018 and by the end of 2017. Percentages at the top of the bars are calculated relative to the number living with HIV, while percentages at the bottom correspond to UNAIDS' 90-90-90 targets. Numbers were adjusted for a backlog in registration of HIV cases (3% in 2017, 11% in 2018).









Viral suppression

In total, 851 individuals (without adjustment for registration delay) had started treatment but did not have a suppressed viral load. On closer inspection, 301 (35%) of these individuals did not have a viral load measurement available in 2018. Of the 550 (65%) people with a viral load measurement and no viral suppression, 143 had only started antiretroviral treatment in 2018 and may not have had sufficient follow-up to achieve a documented suppressed viral load.

Lost to care

In total, 1,793 individuals were lost to care, of whom 654 (36%) before the end of 2008 and 1,139 (64%) after 2008. The 654 individuals who were lost to care in or before 2008 were excluded from the estimated number of people living with HIV and the number of people diagnosed and linked to care. It was assumed to be unlikely that these 654 individuals were still living in the Netherlands by the end of 2018 without needing care or antiretroviral treatment. Of the 1,139 individuals (1,171 with adjustment for registration delay) lost to care after 2008, i.e., the difference between the second (21,360) and third stage (20,189) in the care continuum, 74% were born outside the Netherlands, whereas this proportion was only 40% for those who were still in care by the end of 2018. This suggests that some of those lost to care may actually have moved abroad, in particular back to their country of birth.

MSM

The number of MSM living with HIV at the end of 2018 was estimated to be 14,200 (14,000-14,500), of whom 1,000 (800-1,300) were still undiagnosed. Of these 14,200 MSM, 13,219 (93%) had been diagnosed and linked to care, 12,754 (90%) were still in care, 12,587 (88%) had started antiretroviral treatment, and 12,160 (85%) had a most recent HIV RNA below 200 copies/ml, or 93-95-97 in terms of the UNAIDS 90-90-90 target (*Figure 1.15B*). In total, 9,280 (73%, or 79% of those with a CD4 measurement) of MSM still in care by the end of 2018 had a CD4 count of 500 cells/mm^3 or higher at their last measurement in 2017 or 2018. Among women and other men still in care by the end of 2018, the proportion with viral suppression in 2018 was 92% and 93%, respectively, which was lower than among MSM (95%) (*Appendix Figure 1.2*).

Continuum of care by region of origin, age, and public health service region

Individuals of Dutch origin generally reached higher rates of engagement in the various stages of the care continuum than people originating from abroad (*Appendix Figure 1.3*). In terms of age, the proportion of people who were still in care by the end of 2018 was similar in all age groups. However, the proportion who had started antiretroviral treatment increased from 86% of those diagnosed and linked to care among 18 to 24 year olds to 97% of those aged 65 years or above (*Appendix Figure 1.4*). As a consequence, the proportion of people with viral suppression increased with age and was 74% among those aged 18 to 24 years and 94% in people 65 years of age or older, or 81% and 96%, respectively, of those who were still in care. Finally, engagement in the various stages of the care continuum was very similar between the 25 public health service regions in the Netherlands (*Appendix Table 1.5*).

Continuum of care 2017

We also re-estimated the continuum of HIV care for 2017 and found that, by the end of that year, 23,100 (22,900-23,400) people were living with HIV in the Netherlands, which was similar to the estimated 23,100 (22,700-23,600) reported in last year's Monitoring Report (*Figures 1.15C* and *1.15D*)[12]. While the number diagnosed and the number retained in care were very similar to last year's report, the number of those who started antiretroviral treatment (19,397 compared to 19,289 last year) and the number with viral suppression (18,631 compared to 18,270) were somewhat higher in this year's report. This is due to having cleared the backlog in the collection of data on start of treatment and on viral load measurements in 2017. As a result, the 2017 estimate for the UNAIDS 90-90-90 target has been adjusted and has changed slightly from 90-93-95 in last year's report to 90-93-96 in this year's report. Similarly, when the 2018 HIV continuum of care is recalculated next year, it can be expected to undergo a comparable change compared to that reported in the present report.

Conclusions

Since 2008 there has been a steady decrease in the annual number of new HIV diagnoses to less than 800 new diagnoses in most recent years. This decreasing trend has continued in 2018 with approximately 664 new diagnoses in that year, although there is some uncertainty concerning this figure because, at the time of writing, not all people diagnosed in 2018 have yet been included in the SHM database. The decrease in HIV diagnoses is, in part, a consequence of a decrease in the estimated annual number of newly-acquired HIV infections. More than 40% of the new HIV diagnoses were in people born abroad and approximately half of foreign-born individuals for whom the date of arrival in the Netherlands was known had already been diagnosed before moving to the Netherlands. Hence, the number of HIV infections truly newly-diagnosed in the Netherlands may be considerably lower than reported.

In addition, there were significant decreases in the time from infection to diagnosis and in the time to reaching other stages in the HIV care continuum. This indicates that HIV-positive people are being diagnosed increasingly earlier in the course of their infection. In accordance, a gradually decreasing proportion of individuals are diagnosed with CD4 counts below 350 cells/mm^3. Conversely, the proportion diagnosed with evidence of a recent infection is increasing, although this is more evident among MSM than among other men and among women. In most recent calendar years, however, the downward trend in the proportion of MSM diagnosed with late-stage or advanced HIV infection appears to have halted.

In recent years, testing for HIV appears to have become more frequent, because individuals with a positive test are more likely to have had a previous negative test. Testing rates appear to be highest among people who received a positive test result at a sexual health centre and lowest in those tested in a hospital. In addition, the population that tested positive for HIV in a hospital had the highest proportion of late presenters. These observations illustrate that people tested at sexual health centres are more likely actively seeking testing for HIV on a regular basis than people diagnosed in a hospital, who are more likely to be tested because they have a condition that may be caused by HIV.

People tested early in their infection generally start treatment earlier and with CD4 counts above 350 cells/mm^3. In the most recent years, treatment uptake has also increased in individuals with high CD4 cells such that, in 2018, more than 95% of individuals diagnosed with CD4 cells above 500 cells/mm^3 were on ART within 6 months after HIV diagnosis. As a result of earlier treatment, in combination with increased testing and earlier diagnosis and a decreasing number of newly acquired HIV infections, the Netherlands has continued to both further surpass the UNAIDS 90-90-90 targets for 2020, and close in on achieving the UNAIDS 95-95-95 targets by 2030, with the current figures standing at 92-93-96[13]. In addition, the Netherlands is on course to achieving another UNAIDS' fast-track target for 2020, namely that of a 75% reduction in the annual number of newly-acquired HIV infections since 2010[2,3].

Recommendations

A re-assessment of the continuum of HIV care for 2017 showed that there was a considerable increase in the number of individuals who achieved viral suppression by the end of that year compared to what was reported in last year's report. To even more reliably monitor progress towards achieving UNAIDS' 95-95-95 goals for 2030, a more timely registration of viral load measurements would be needed, which could be markedly improved by further extending the automated import of laboratory measurements (LabLink) in the SHM database to all HIV treatment centres in the Netherlands. At present, LabLink only includes 14 of the 24 HIV treatment centres, although these do cover approximately 72% of all people followed by SHM.

Since 2018, SHM has been recording the date of arrival in the Netherlands for foreign-born individuals. A considerable proportion of these migrants appear to be diagnosed with HIV before arriving in the Netherlands. This will have an impact on the interpretation of the reported annual number of new HIV diagnoses in the Netherlands and, as a consequence, also on estimates of the number of newly-

acquired HIV infections. Not including migrants diagnosed before arrival allows a better estimation of the number of HIV infections newly-acquired *within the Netherlands*, which in turn provides more accurate information on how well the HIV epidemic is being controlled. In addition, at present, the estimate of the population with undiagnosed HIV in the Netherlands includes migrants diagnosed before arrival in the Netherlands, for whom no data of arrival has been recorded. Retrospective collection of the date of arrival is now being undertaken to improve this estimate.

The decrease in the number of new HIV diagnoses may in part be the result of the positive developments mentioned above, i.e., more testing, earlier diagnosis, earlier start of treatment, a larger proportion of people with viral suppression, and a smaller number living with undiagnosed HIV. In the third quarter of 2019, pre-exposure prophylaxis (PrEP) has become available on a national level for those at highest risk of acquiring HIV, thus importantly extending the set of available prevention measures. To fully curb the epidemic and achieve a sustained and steeper reduction in the number of new HIV infections, treatment, prevention, and especially testing need to be scaled up even further. A major step towards achieving this goal would be to reconsider the current restrictions on community-based and home-based HIV testing, as well as increasing awareness of sexual risk behaviour.

Worryingly, there still is a substantial number of individuals who are diagnosed with late-stage or advanced HIV infection. This is even the case among MSM, despite an increasing proportion in this group who have a confirmed diagnosis within a year of infection. Clearly, there remain groups of MSM and other populations who are not reached by existing prevention and testing approaches. Recently, a project called Last Mile was started within the HIV Transmission Elimination Amsterdam (H-TEAM) Initiative to improve our understanding of reasons and motivations for delayed testing in people presenting for care with late-stage HIV. Results of this first phase of the project will provide input for the design and implementation of integrated HIV testing and health check interventions aimed at, and developed together with, key affected populations.

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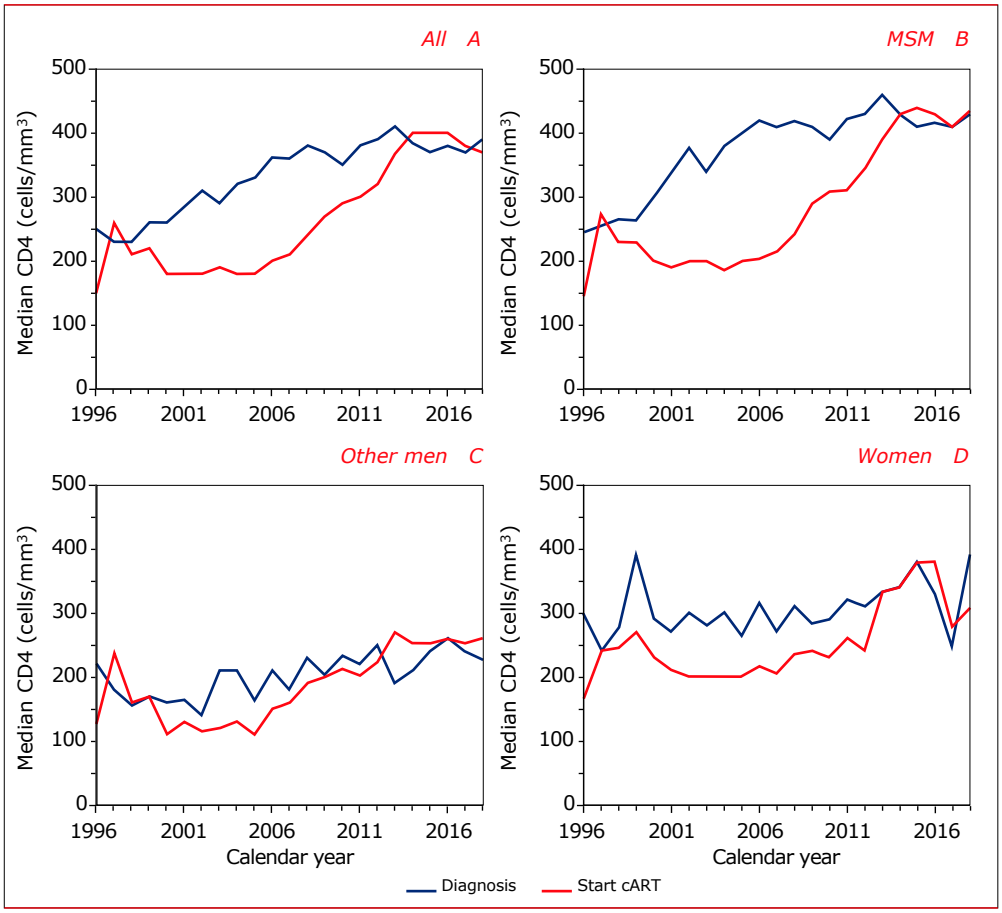
Appendix: supplementary figures and tables

Appendix Figure 1.1: *Changes over calendar time in median CD4 counts at HIV diagnosis and at the start of combination antiretroviral therapy (cART) for (A) all individuals with an HIV-1 diagnosis, and for (B) men who have sex with men, (C) other men, and (D) women. The lines in each panel are a combination of Figures 1.9A and 1.9B.*



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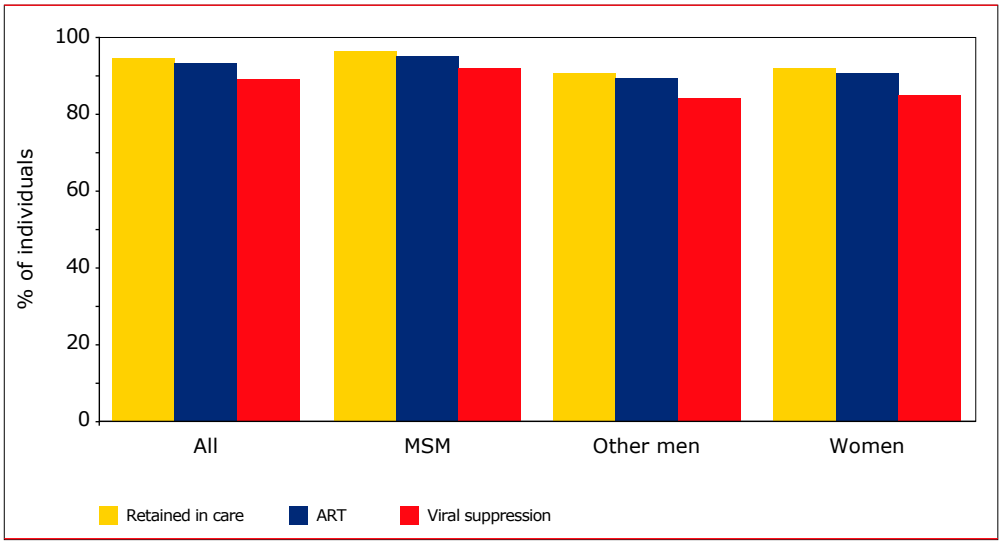
Appendix Figure 1.2: *Continuum of HIV care by transmission risk group. Proportions are given relative to the number of people diagnosed and linked to care.*



Legend: *MSM=men who have sex with men; cART=combination antiretroviral therapy.*

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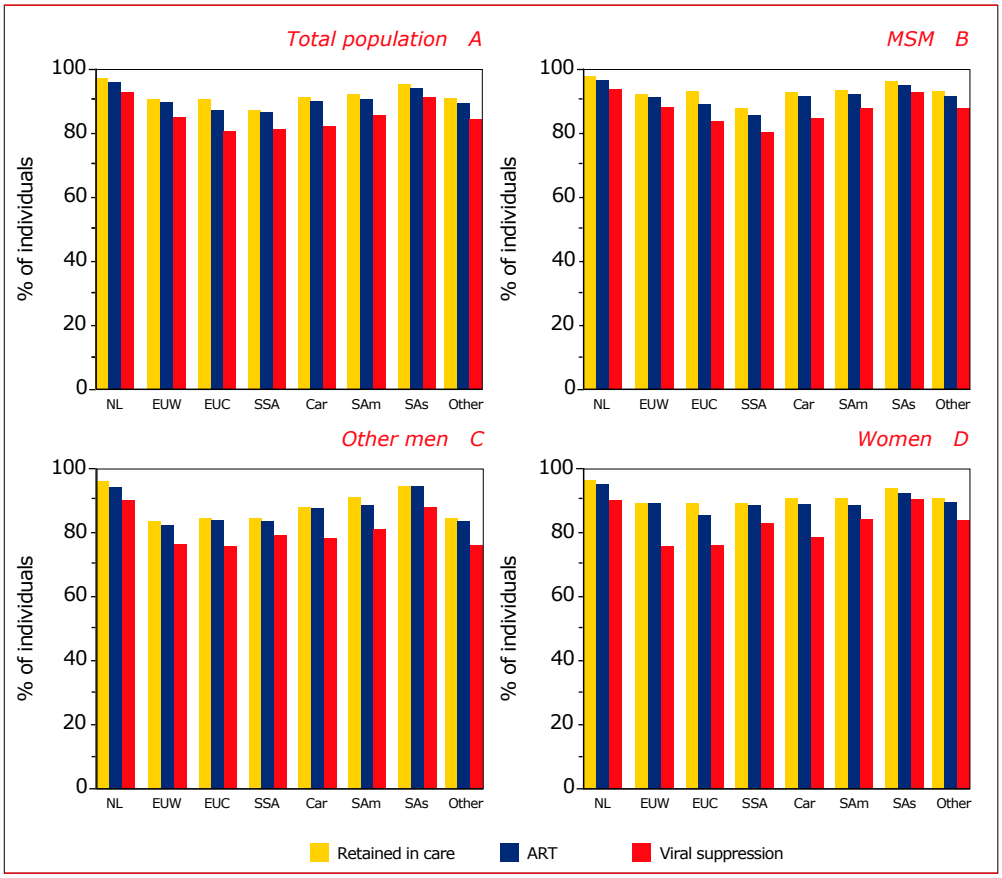
Appendix Figure 1.3: *Continuum of HIV care by region of origin for (A) the total HIV-1-positive population and for (B) men who have sex with men, (C) other men, and (D) women. Proportions are given relative to the number of people diagnosed and linked to care.*



Legend: *NL=the Netherlands; EUW=western Europe; EUC=central Europe; SSA=sub-Saharan Africa; Car=Caribbean; SAm=South America; SAs=south and south-east Asia; Other=other regions of origin; ART=combination antiretroviral therapy.*

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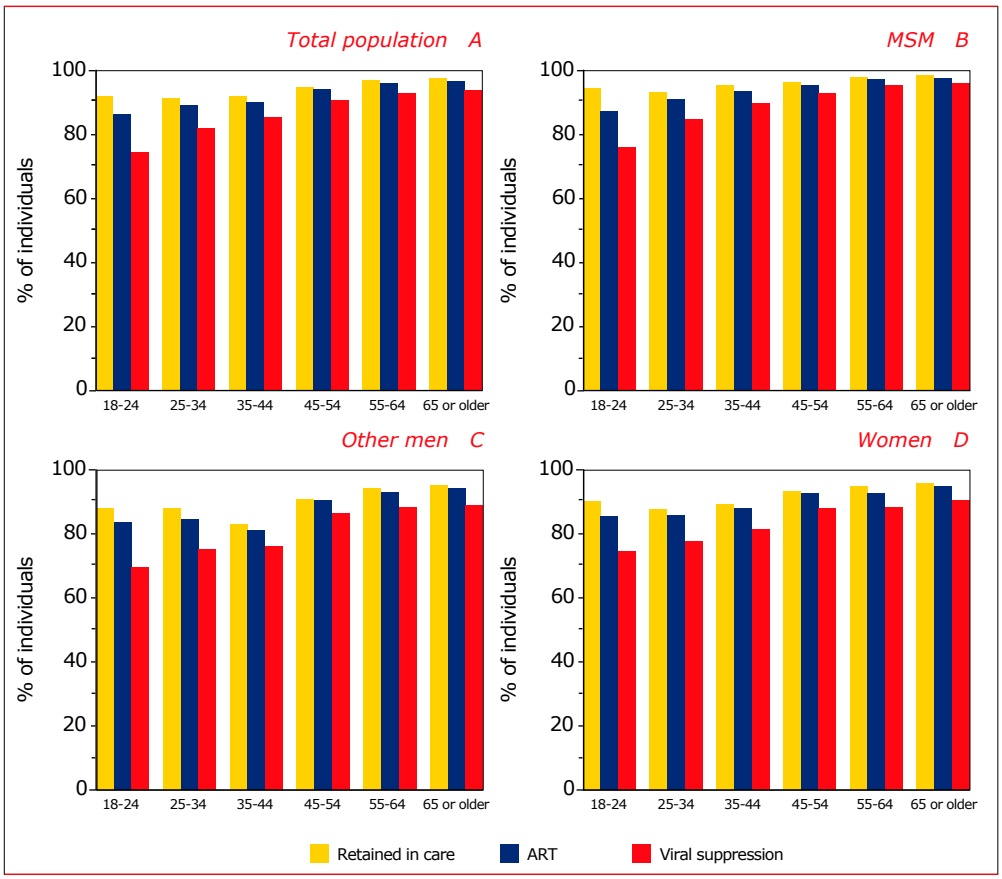
Appendix Figure 1.4: *Continuum of HIV care by age group for (A) the total HIV-1-positive population and for (B) men who have sex with men, (C) other men, and (D) women. Proportions are given relative to the number of people diagnosed and linked to care.*



Legend: *ART=combination antiretroviral therapy.*

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Appendix Table 1.1: *Annual number of HIV-1 diagnoses among children and adults per transmission risk group, including men who have sex with men (MSM) and individuals who acquired their HIV infection via heterosexual contact, injecting drug use (IDU), contact with contaminated blood, or other or unknown modes of transmission. The last column shows the total number of diagnoses excluding migrants who were already diagnosed before moving to the Netherlands. Note: data collection for 2017 and 2018 had not yet been finalised at the time of writing.*

Year of	MSM	Heterosexual		IDU		Blood or blood products	
diagnosis	Men	Men	Women	Men	Women	Men	Women
≤1995	2,287	274	398	285	135	62	22
1996	386	90	83	31	8	3	4
1997	451	115	132	39	10	7	3
1998	337	109	115	25	8	6	6
1999	358	110	139	21	8	9	4
2000	382	163	193	18	5	3	4
2001	453	167	223	16	5	8	7
2002	475	168	255	16	3	15	7
2003	465	179	281	23	5	10	3
2004	596	207	271	11	4	4	4
2005	650	198	267	17	2	3	6
2006	697	164	205	10	5	5	7
2007	787	161	214	12	4	2	6
2008	878	177	183	6	1	5	3
2009	795	161	188	9	0	3	2
2010	804	182	169	6	1	6	2
2011	794	146	153	5	1	9	7
2012	739	152	150	5	1	4	3
2013	768	118	138	2	2	12	2
2014	644	112	122	1	1	7	5
2015	603	130	129	2	0	6	1
2016	548	102	108	1	0	9	3
2017	503	87	86	3	0	6	2
*2017**	*518*	*90*	*89*	*3*	*0*	*6*	*2*
2018	394	66	64	1	1	6	4
*2018**	*437*	*73*	*71*	*1*	*1*	*7*	*4*
2019	35	11	13	0	0	2	1
Total	**15,829**	**3,549**	**4,279**	**565**	**210**	**212**	**118**

**Projected numbers*

Legend: *MSM=men who have sex with men; IDU=injecting drug use.*

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Other/unknown		<18 years of age		Total	Total excluding migrants
Men	Women	Men	Women		
167	46	54	39	3,769	3,753
35	6	14	3	663	662
40	8	8	10	823	819
30	7	8	8	659	649
19	6	11	13	698	692
38	4	16	29	855	852
41	6	15	33	974	973
61	3	18	21	1,042	1,040
60	13	17	21	1,077	1,070
66	8	14	13	1,198	1,189
63	9	11	10	1,236	1,221
58	3	8	12	1,174	1,161
53	7	9	13	1,268	1,260
56	6	13	18	1,346	1,326
51	9	14	15	1,247	1,230
48	6	21	18	1,263	1,243
62	4	14	10	1,205	1,183
47	10	9	13	1,133	1,115
47	5	6	4	1,104	1,071
49	8	6	8	963	926
51	5	7	7	941	907
42	4	7	6	830	785
48	5	4	2	746	706
49	*5*	*4*	*2*	*768*	*727*
54	5	2	2	599	581
60	*6*	*2*	*2*	*664*	*645*
5	1	0	0	68	67
1,291	**194**	**306**	**328**	**26,881**	**26,481**

Appendix Table 1.2: *Region of origin of the 26,247 adult HIV-1-positive individuals with a recorded date of diagnosis stratified according to year of HIV diagnosis.*

	MSM			Other men		
	<2016	≥2016	Total	<2016	≥2016	Total
The Netherlands	9,936	904	10,840	2,277	253	2,530
	69.2%	61.1%	68.4%	44.0%	57.1%	45.0%
Sub-Saharan Africa	210	28	238	1,342	64	1,406
	1.5%	1.9%	1.5%	25.9%	14.4%	25.0%
Western Europe	1,152	75	1,227	295	11	306
	8.0%	5.1%	7.8%	5.7%	2.5%	5.4%
Central Europe	333	85	418	169	20	189
	2.3%	5.7%	2.6%	3.3%	4.5%	3.4%
Eastern Europe	107	21	128	79	2	81
	0.7%	1.5%	0.8%	1.5%	0.5%	1.4%
South America	979	120	1,099	412	38	450
	6.8%	8.1%	6.9%	8.0%	8.6%	8.0%
Caribbean	576	86	662	246	19	265
	4.0%	5.8%	4.2%	4.8%	4.3%	4.7%
South and south-east Asia	423	61	484	130	9	139
	2.9%	4.1%	3.1%	2.5%	2.0%	2.5%
Other/unknown	633	100	733	224	27	251
	4.4%	6.8%	4.6%	4.3%	6.1%	4.5%

Legend: *MSM=men who have sex with men.*

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	Women		
	<2016	≥2016	Total
	1,220	105	1,325
	27.1%	35.4%	27.6%
	1,913	91	2,004
	42.5%	30.6%	41.7%
	230	2	232
	5.1%	0.7%	4.8%
	87	17	104
	1.9%	5.7%	2.2%
	55	7	62
	1.2%	2.4%	1.3%
	407	31	438
	9.0%	10.4%	9.1%
	242	13	255
	5.4%	4.4%	5.3%
	264	20	284
	5.9%	6.7%	5.9%
	86	11	97
	1.9%	3.7%	2.0%

Appendix Table 1.3: *Characteristics of the 894 individuals with a late-stage HIV infection among the 2,220 individuals diagnosed with HIV in 2016 or later. In total, as a result of missing CD4 cell counts at diagnosis, 320 (14%) individuals (223 MSM, 55 other men, and 42 women) could not be classified as having a late-stage HIV infection or not.*

	MSM (n=1,257)		Other men (n=388)		Women (n=255)		Total (n=1,900)	
	n	%	n	%	n	%	n	%
Overall	500	40	258	66	136	53	894	47
Age at entry [years]								
18-24	39	23	10	45	9	29	58	26
25-34	122	31	52	51	36	48	210	37
35-44	109	41	60	71	44	56	213	50
45-54	105	44	74	78	26	63	205	54
55-64	83	61	42	72	18	69	143	65
≥65	42	72	20	74	3	75	65	73
Region of origin								
The Netherlands	335	41	156	68	48	49	539	47
Sub-Saharan Africa	13	57	41	72	42	58	96	63
Western Europe	21	37	6	67	0	0	27	40
Central Europe	20	31	7	41	5	42	32	34
South America	32	36	20	63	14	54	66	45
Caribbean	24	33	9	60	5	42	38	38
South and south-east Asia	25	51	5	100	14	82	44	62
North Africa and Middle East	11	28	7	64	2	100	20	38
Other/unknown	19	39	7	64	6	43	32	43
Location of HIV diagnosis								
Sexual health centre	118	22	9	26	10	48	137	24
Hospital	167	72	172	82	80	77	419	77
General practice	161	45	58	54	26	35	245	45
Other/unknown	54	39	19	53	20	36	93	40

Legend: *MSM=men who have sex with men.*

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Appendix Table 1.4: Characteristics of the 20,104 people living with HIV and in care as of December 2018.

	MSM	Heterosexual		IDU	
	Men	Men	Women	Men	Women
	n=12,697	n=2,451	n=3,223	n=202	n=83
Current age [years]					
0–12	0	0	0	0	0
	0.0%	0.0%	0.0%	0.0%	0.0%
13–17	1	0	2	0	0
	0.0%	0.0%	0.1%	0.0%	0.0%
18–24	170	8	39	1	0
	1.3%	0.3%	1.2%	0.5%	0.0%
25–34	1,526	208	400	5	1
	12.0%	8.5%	12.4%	2.5%	1.2%
35–44	2,554	438	972	30	11
	20.1%	17.9%	30.2%	14.9%	13.3%
45–54	4,013	835	1,076	66	22
	31.6%	34.1%	33.4%	32.7%	26.5%
55–64	3,066	664	514	88	46
	24.1%	27.1%	15.9%	43.6%	55.4%
65–74	1,169	242	165	12	2
	9.2%	9.9%	5.1%	5.9%	2.4%
≥75	198	56	55	0	1
	1.6%	2.3%	1.7%	0.0%	1.2%
Current age 50 years or older					
No	6,046	1,051	2,009	55	19
	47.8%	42.9%	62.3%	27.2%	22.9%
Yes	6,651	1,400	1,214	147	64
	52.4%	57.1%	37.7%	72.8%	77.1%
Current age 60 years or older					
No	10,165	1,885	2,809	157	59
	80.1%	76.9%	87.2%	77.7%	71.1%
Yes	2,532	566	414	45	24
	19.9%	23.1%	12.8%	22.3%	28.9%
Region of origin					
Netherlands	9,029	1,174	964	118	41
	71.1%	47.9%	29.9%	57,4%	49.4%
Sub-Saharan Africa	173	642	1,340	4	0
	1.4%	26.2%	41.6%	2.0%	0.0%

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Blood or blood products		Other / unknown		Total	
Men	Women	Men	Women	Men	Women
n=165	n=94	n=907	n=282	n=16,422	n=3,682
0	0	61	77	61	77
0.0%	0.0%	6.7%	27.3%	0.4%	2.1%
0	0	30	23	31	25
0.0%	0.0%	3.3%	8.2%	0.2%	0.7%
4	2	52	43	235	84
2.4%	2.1%	5.7%	15.2%	1.4%	2.3%
20	9	110	37	1,869	447
12.1%	9.6%	12.1%	13.1%	11.4%	12.1%
27	25	150	31	3,199	1,039
16.4%	26.6%	16.5%	11.0%	19.5%	28.2%
52	29	221	38	5,187	1,165
31.5%	30.9%	24.4%	13.5%	31.6%	31.6%
34	21	173	26	4,025	607
20.6%	22.3%	19.1%	9.2%	24.5%	16.5%
21	6	86	5	1,530	178
12.7%	6.4%	9.5%	1.8%	9.3%	4.8%
7	2	24	2	285	60
4.2%	2.1%	2.6%	0.7%	1.7%	1.6%
78	52	507	227	7,737	2,307
47.3%	55.3%	55.9%	80.5%	47.1%	62.6%
87	42	400	55	8,685	1,375
52.7%	44.7%	44.1%	19.5%	52.9%	37.3%
123	77	723	265	13,053	3,210
74.5%	81.9%	79.7%	94.0%	79.5%	87.2%
42	17	184	17	3,369	472
25.5%	18.1%	20.3%	6.0%	20.5%	12.8%
106	17	409	107	10,836	1,129
64.2%	18.1%	45.1%	37.9%	66.0%	30.7%
29	37	236	107	1,084	1,484
17.6%	39.4%	26.0%	37.9%	6.6%	40.3%

	MSM	Heterosexual		IDU	
	Men	Men	Women	Men	Women
	n=12,697	n=2,451	n=3,223	n=202	n=83
Western Europe	784	80	66	20	25
	6.2%	3.3%	2.0%	9.9%	30.1%
South America	836	219	316	8	1
	6.6%	8.9%	9.8%	4.0%	1.2%
Caribbean	527	124	169	6	1
	4.2%	5.1%	5.2%	3.0%	1.2%
South and south-east Asia	396	37	219	9	1
	3.1%	1.5%	6.8%	4.5%	1.2%
Other	900	168	141	37	14
	7.1%	6.9%	4.4%	18.3%	16.9%
Unknown	52	7	8	0	0
	0.4%	0.3%	0.2%	0.0%	0.0%
Years aware of HIV infection					
<1	387	64	62	1	1
	3.0%	3.0%	1.9%	0.5%	1.2%
1–2	986	171	182	2	0
	7.8%	7.0%	5.6%	1.0%	0.0%
3–4	1,136	202	225	2	1
	8.9%	8.2%	7.%	1.0%	1.2%
5–10	3,428	591	641	6	3
	27.0%	24.1%	19.9%	3.0%	3.6%
10–20	4,576	1,084	1,594	63	20
	36.0%	44.2%	49.5%	31.2%	24.1%
>20	2,178	334	506	128	58
	17.2%	13.6%	15.7%	63.4%	6.9%
Unknown	6	5	13	0	0
	0.0%	0.2%	0.4%	0.0%	0.0%
Current CD4 count [cells/mm^3], median / IQR	698	600	690	586	626
	520–900	410–810	510–918	376–803	370–922
Current CD8 count [cells/mm^3], median / IQR	870	830	770	880	900
	642–1180	590–1140	560–1050	590–1200	690–1100

Blood or blood products		Other / unknown		Total	
Men	Women	Men	Women	Men	Women
n=165	n=94	n=907	n=282	n=16,422	n=3,682
4	3	37	24	925	118
2.4%	3.2%	4.1%	8.5%	5.6%	3.2%
4	10	57	6	1,124	333
2.4%	10.6%	6.3%	2.1%	6.8%	9.0%
3	4	44	0	704	174
1.8%	4.3%	4.9%	0.0%	4.3%	4.7%
10	15	31	4	483	239
6.1%	16.0%	3.4%	1.4%	2.9%	6.5%
9	8	90	32	1,204	195
5.5%	8.5%	9.9%	11.3%	7.3%	5.3%
0	0	3	2	62	10
0.0%	0.0%	0.3%	0.7%	0.4%	0.3%
6	4	49	6	507	73
3.6%	4.3%	5.4%	2.1%	3.1%	2.0%
14	5	80	14	1,253	201
8.5%	5.3%	8.8%	5.0%	7.6%	5.5%
11	5	92	21	1,443	252
6.7%	5.3%	10.1%	7.4%	8.8%	6.8%
26	12	209	72	4,260	728
15.8%	12.8%	23.0%	25.5%	25.9%	19.8%
44	41	338	112	6,105	1,767
26.7%	43.6%	37.3%	39.7%	37.2%	48.0%
61	27	126	54	2,827	645
37.0%	28.7%	13.9%	19.1%	17.2%	17.5%
3	0	13	3	27	16
1.8%	0.0%	1.4%	1.1%	0.2%	0.4%
565	655	594	798	675	690
413-780	510-920	402-810	520-1058	500-880	505-921
722	742	850	770	860	770
540-1114	607-1100	600-1200	570-1070	630-1174	560-1060

	MSM	Heterosexual		IDU	
	Men	Men	Women	Men	Women
	n=12,697	n=2,451	n=3,223	n=202	n=83
Current HIV RNA <200 copies/ml					
Not available	188	43	50	13	5
	1.5%	1.8%	1.6%	6.4%	6.0%
No	326	89	168	10	8
	2.6%	3.6%	5.2%	5.0%	9.6%
Yes	12,183	2,319	3,005	179	70
	96.0%	94.6%	93.2%	88.6%	84.3%
Current HIV RNA <100 copies/ml					
Not available	188	43	50	13	5
	1.5%	1.8%	1.6%	6.4%	6.0%
No	403	114	201	12	10
	3.2%	4.7%	6.2%	5.9%	12.0%
Yes	12,106	2,294	2,972	177	68
	95.3%	93.6%	92.2%	87.6%	81.9%
Ever AIDS	2,369	804	764	79	36
	18.7%	32.8%	23.7%	39.1%	43.4%
AIDS at diagnosis	1,230	558	438	18	7
	9.7%	22.8%	13.6%	8.9%	8.4%
Current treatment					
cART	12,528	2,423	3,172	199	83
	98.7%	98.9%	98.4%	98.5%	100.0%
Non-cART	11	1	3	0	0
	0.1%	0.0%	0.1%	0.0%	0.0%
Not started	158	27	48	3	0
	1.2%	1.1%	1.5%	1.5%	0.0%

Legend: *MSM=men who have sex with men; IDU=injecting drug use; IQR=interquartile range; cART=combination antiretroviral therapy.*

Blood or blood products		Other / unknown		Total	
Men	Women	Men	Women	Men	Women
n=165	n=94	n=907	n=282	n=16,422	n=3,682
5	1	12	6	261	62
3.0%	1.1%	1.3%	2.1%	1.6%	1.7%
4	5	63	16	492	197
2.4%	5.3%	6.9%	5.7%	3.0%	5.4%
156	88	832	260	15,669	3,423
94.5%	93.6%	91.7%	92.2%	95.4%	93.0%
5	1	12	6	261	62
3.0%	1.1%	1.3%	2.1%	1.6%	1.7%
4	7	74	20	607	238
2.4%	7.4%	8.2%	7.1%	3.7%	6.5%
156	86	821	256	15,554	3,382
94.5%	91.5%	90.5%	90.8%	94.7%	91.9%
59	33	330	91	3,641	924
35.8%	35.1%	36.4%	32.3%	22.2%	25.1%
37	20	230	48	2,073	513
22.4%	21.3%	25.4%	17.0%	12.6%	13.9%
160	93	886	281	16,196	3,629
97.0%	98.9%	97.9%	99.6%	98.6%	98.6%
0	1	1	0	13	4
0.0%	1.1%	0.1%	0.0%	0.1%	0.1%
5	0	20	1	213	49
3.0%	0.0%	2.2%	0.4%	1.3%	1.3%

Appendix Table 1.5: *Continuum of HIV care for the total HIV-1-positive population in the Netherlands diagnosed and linked to care stratified by public health service region in which people are living by the end of 2018. Proportions are given relative to the number of people diagnosed and linked to care.*

	Diagnosed and linked to care	Retained in care	
Public health service region	**n**	**n**	**%**
Groningen	576	542	94
Fryslân	340	328	96
Drenthe	269	247	92
IJsselland	333	321	96
Twente	422	410	97
Noord- en Oost-Gelderland	455	443	97
Gelderland Midden	702	680	97
Gelderland-Zuid	402	383	95
Flevoland	562	516	92
Regio Utrecht	1,223	1,152	94
Gooi & Vechtstreek	291	278	96
Hollands Noorden	424	402	95
Zaanstreek-Waterland	357	341	96
Amsterdam	6,169	5,875	95
Kennemerland	575	545	95
Hollands Midden	537	506	94
Haaglanden	1,619	1,536	95
Rotterdam-Rijnmond	2,470	2,301	93
Dienst Gezondheid & Jeugd ZHZ	308	287	93
Zeeland	228	211	93
West-Brabant	561	529	94
Hart voor Brabant	837	788	94
Brabant-Zuidoost	640	605	95
Limburg-Noord	385	361	94
Zuid Limburg	515	489	95
Unknown	159	113	71
Total	**21,360**	**20,189**	**95**

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	Antiretroviral treatment		Viral suppression	
	n	%	n	%
	537	93	514	89
	325	96	315	93
	242	90	235	87
	319	96	314	94
	405	96	386	91
	435	96	416	91
	668	95	643	92
	379	94	363	90
	512	91	489	87
	1,114	91	1,089	89
	270	93	260	89
	397	94	379	89
	337	95	327	92
	5,806	94	5,553	90
	540	94	519	90
	498	93	481	90
	1,522	94	1,471	91
	2,256	91	2,117	86
	280	91	259	84
	205	90	194	85
	522	93	494	88
	787	94	743	89
	600	94	565	88
	359	93	344	89
	486	94	474	92
	111	69	102	64
	19,913	**93**	**19,046**	**89**