Human Immunodeficiency Virus (HIV)
Infection in the Netherlands

HIV Monitoring

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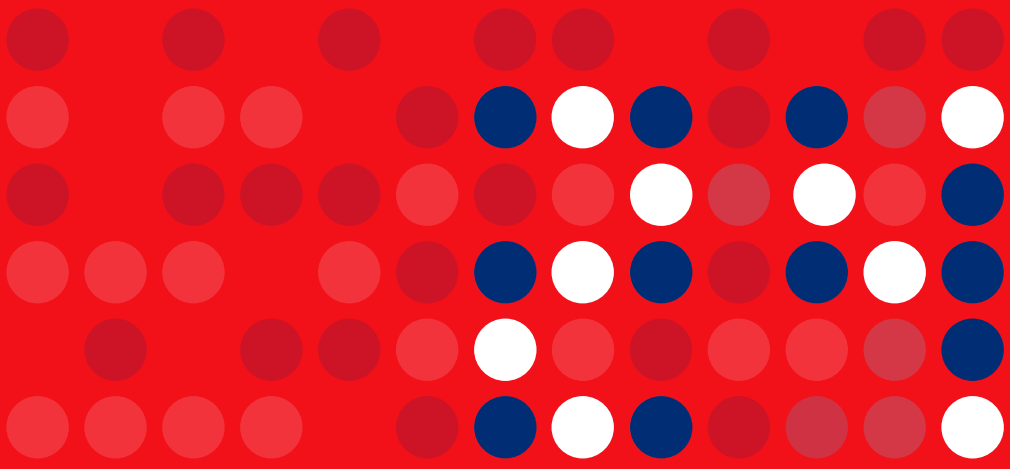
Chapter 3: Identifying gaps in HIV care in the Netherlands using data from Statistics Netherlands



3. Identifying gaps in HIV care in the Netherlands using data from Statistics Netherlands

Vita Jongen, Anders Boyd, Nina Schat, Rosan van Zoest, Ard van Sighem, Marc van der Valk

Summary

To continue the path towards zero new HIV infections we need more focused insight into why certain people do not successfully progress through the steps of the HIV care continuum and as a result, could still have a detectable HIV-1-RNA. The results from this chapter are based on calculations by SHM using non-public microdata from Statistics Netherlands (CBS). CBS is an independent organisation that collects, processes and publishes reliable statistical data on residents of the Netherlands.

We combined all data from individuals with HIV registered by SHM and data from CBS within a secure SHM-CBS environment. The data were combined using date of birth, gender and the four numbers of an individual's postcode. We used all data between 2011 and 2022.

We were able to successfully combine the SHM/CBS data of 28,294 individuals. (92% of all individuals ever linked to care in the SHM database in 2022). 5,736 individuals had migrated or died by 2022, according to CBS or SHM and were subsequently excluded from the dataset. Additionally, we excluded individuals <18 years of age (n=648), with HIV-2 (n=164), who had not been in care for over 10 years (n=23), and who had no data in 2022 (n=5,568). Thus, 21,880 individuals were included in the analyses.

Compared to the general population in the Netherlands, individuals ever linked to HIV care:

- were more often male;
- were less often <25 years of age;
- had more often a first generation migration background;
- lived more often in a single-person household;
- had more often an income <120% of the social minimum;
- more often received social welfare; and
- more often received specialist mental health care.

Having an adequately suppressed HIV-1 RNA was largely correlated with income and age among MSM, women and other men. Viral suppression among individuals with an income <120% of the social minimum was always less than 95%. Lower income and younger age were also related to increased disengagement from care and being diagnosed with late stage HIV among MSM, women and other men.

Box 3.1: Definitions used in this chapter

Term	Definition
Disengagement from care	Individuals ever linked to care who did not attend an HIV clinical visit in the 2022 calendar year (but did attend visits prior to 2022).
Late-stage HIV diagnosis	Defined as a CD4 count <350 cells/mm3 or an AIDS-defining event regardless of CD4 count at the moment of diagnosis, and no evidence of having acquired HIV in the 12 months before diagnosis.
Linked to care	All individuals with at least one HIV clinical visit between 2011 and 2022 and who did not pass away or move abroad.
On ART	All individuals who started ART before or in 2022.
Recent HIV infection	Defined as evidence of having acquired HIV in the 12 months before diagnosis, based on a negative or indeterminate western blot at the time of diagnosis, or a reported last negative HIV test at most 12 months before diagnosis.
Retention in care	All individuals with a clinical visit or a CD4/viral load measurement in 2022.
Viral suppression	Defined as an HIV-1 RNA <200 copies/mL.

Aim

The Netherlands is on track to achieve the UNAIDS 95-95-95 targets before 2025 (see Chapter 1). In 2023, an estimated 25,240 individuals (95% CI 25,075-25,390) were living with HIV. Of these, 21,753 individuals (86%) had a most recent HIV-1 RNA measurement <200 copies/mL. While this proportion is high, it nonetheless means that approximately 3,487 (14%) individuals with HIV in the Netherlands (including individuals unaware of their HIV status) are likely to have a detectable HIV-1 viral load. To continue on the path towards zero new HIV infections, we need more focused insight into why certain people have suboptimal progression through the HIV care continuum and/or disengage from care. Moreover, data on how the HIV epidemic is shaped by socio-demographic and -economic differences are lacking in the Netherlands and could aid in more targeted prevention strategies in populations disproportionally burdened by HIV.

Data from SHM provide information relating to socio-demographic (e.g., date of birth, gender at birth) and health-related factors of the population with HIV. However, SHM lacks information on other societal factors that could indicate social disparity and delayed progression through the HIV care continuum, such as an individual's socio-economic status or level of education. Moreover, SHM cannot provide information on the socio-demographic characteristics of people who disengage from HIV care in the Netherlands. If these data were combined with external data from Statistics Netherlands, the resulting information could more precisely identify specific gaps in care.

Methods

The results from this chapter are based on calculations done by SHM using non-public microdata from Statistics Netherlands (CBS) and Vektis C.V.. CBS is an independent organization that collects, processes and publishes reliable statistical data on residents in the Netherlands. We combined all data from individuals with HIV registered by SHM and data from CBS within a secure SHM-CBS environment. The data were combined using date of birth, gender and the four numbers of an individual's postcode. Combining of the data is done by CBS and researchers have no access to postal codes. As data registration at CBS takes longer to complete than at SHM, we used data for all individuals who were diagnosed with HIV up until 31 December 2022 (i.e. the most recent data available at CBS).

The following variables from the CBS database were included:

Box 3.2: Description of variables included from Statistics Netherlands

Variable	Description
Education level	Classified as: 1. Primary: defined as completed pre-vocational secondary education ('VMBO) and/or first three years of senior general secondary education ('HAVO') or pre-university level ('VWO') 2. Secondary: Completed secondary vocational education (MBO), senior general secondary education ('HAVO') or pre-university level ('VWO') 3. College/University: completed higher vocational education (HBO) or university
Migration background	Based on the country of birth of the parents and the individual. Migration background was categorized as follows: • Dutch: the individual and both parents were born in the Netherlands or both parents were born in the Netherlands, but the individual was not. • First generation migration background: The individual and at least one parent was born abroad. • Second generation migration background: An individual born in the Netherlands who has at least one parent born abroad.
Employment status	Defined as the primary source of income within households: wages, business income, social welfare, retirement or benefits (including disability and unemployment)
Gender	Defined as the gender registered in the administration of the local municipality.
Household composition	Categorized as: single person household, living together with or without children, single parent households or other (e.g., institutionalized, other multi-person households)

Household income	Defined as income according to the social minimum (the minimal amount of financial resources required to achieve a minimally acceptable lifestyle). The social minimum is determined and adjusted bi-annually by the Ministry of Social Affairs and Employment (https://www.uwv.nl/nl/toeslag/sociaal-minimum).
Long term care act (WLZ)	Defined as declared costs (>0 euro) as part of the long term care act. This entails care with stay and care at home, elderly care, psychiatric care, care during chronic illness, and care for individuals with a disability.
Mental health care (basic)	Defined as declared costs (>0 euro) for basic mental health care
Mental health care (specialized)	Defined as declared cost (>0 euro) for specialized mental health care
Social welfare	Defined as receiving social welfare within a year
Use of antipsychotics	Use of medication for psychosis (ATC code N05A)
Use of anti-depressants	Use of medication for depression (ATC code N06A)

We used annual data concerning socio-demographic and socio-economic information for our analyses. Information from a given year (e.g. 2022) was based on data registered at the end of the previous calendar year (e.g. registered by 31 December 2021). Individuals who had migrated or passed away were excluded from the study population in the calendar year following migration or death.

To minimise the risk of personal data inadvertently leading to the identification of an individual, data involving fewer than ten people were not reported. When the number of individuals between steps in the HIV care continuum (i.e. between retention in care and having ART been prescribed) amounted to fewer than five people, a range of values that included the minimum and maximum number of possible people was reported instead.

Description of the population sample

In 2022, there were 30,730 individuals ever registered in the SHM database. We were able to successfully combine the data of 28,294 (92%) individuals with data from CBS. 5,736 individuals had migrated or died by 2022, according to CBS or SHM and were subsequently excluded from the dataset. Additionally, we excluded individuals <18 years of age (n=648), with HIV-2 (n=164), who had not been in care for over 10 years (n=23), and who had no data in 2022 (n=5,568). Thus, 21,880 individuals were included in the following analyses.

Social inequalities in living with HIV in the Netherlands

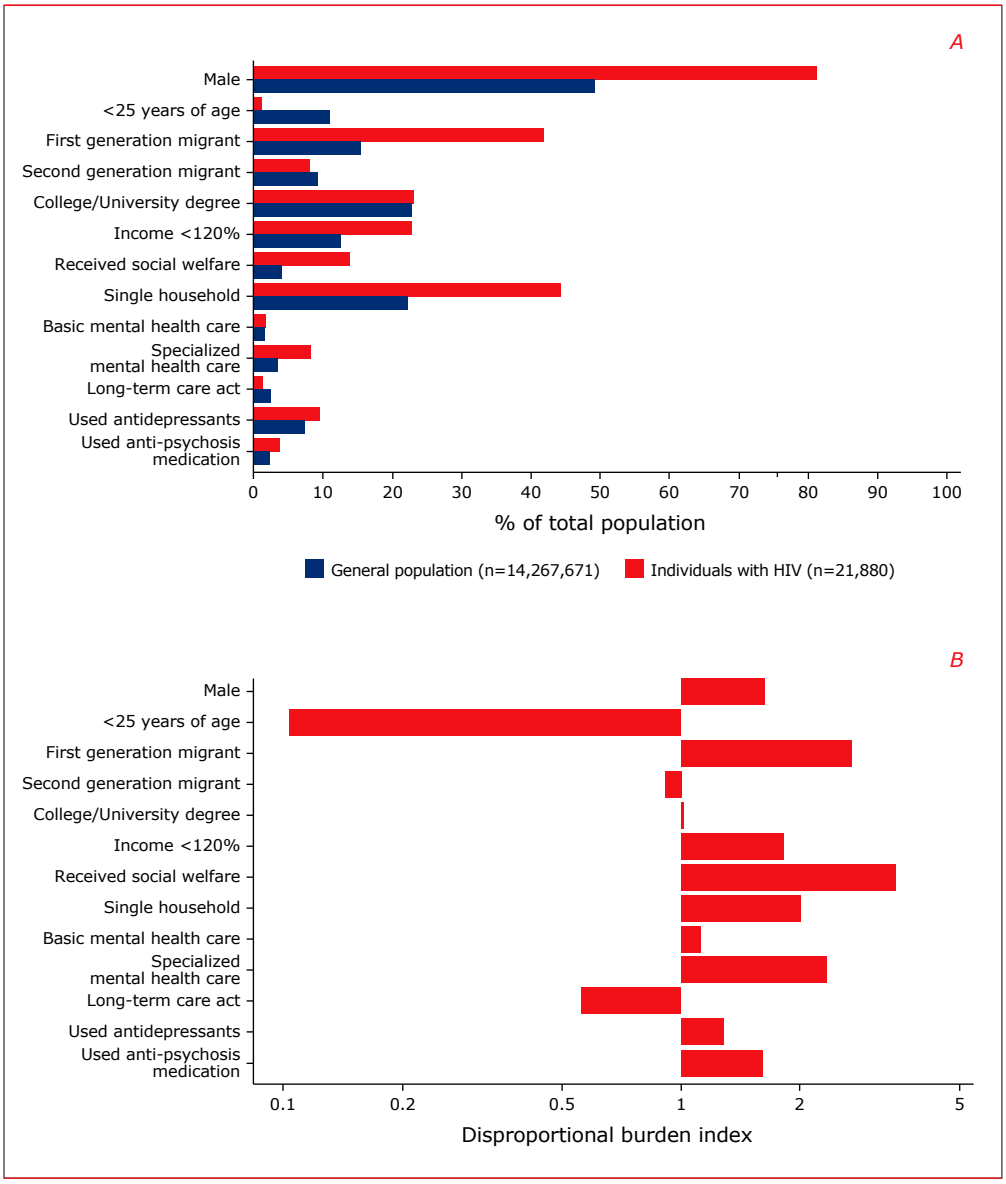
All individuals for whom demographic information was available were compared to the general population in the Netherlands aged 18 years or older (Figure 3.1).

Compared to the general population in the Netherlands, individuals ever linked to HIV care:

- were more often male;
- were less often <25 years of age;
- had more often a first generation migration background;
- lived more often in a single-person household;
- had more often an income <120% of the social minimum;
- more often received social welfare; and
- more often received specialist mental health care.

To quantify the disproportional burden of socio-demographic, -economic and health-related determinants between people with HIV and the general population, we divided the percent with a given determinant among those with HIV by the percent with the same determinant in the general population (defined herein as the “disproportional burden index”). An index of 1 indicates no disproportional burden; <1 a lower observed proportion compared to general population, and >1 a higher observed proportion.

Figure 3.1: *Socio-demographic and socio-economical description of the general population aged 18 years or older and individuals with HIV in care in the Netherlands*

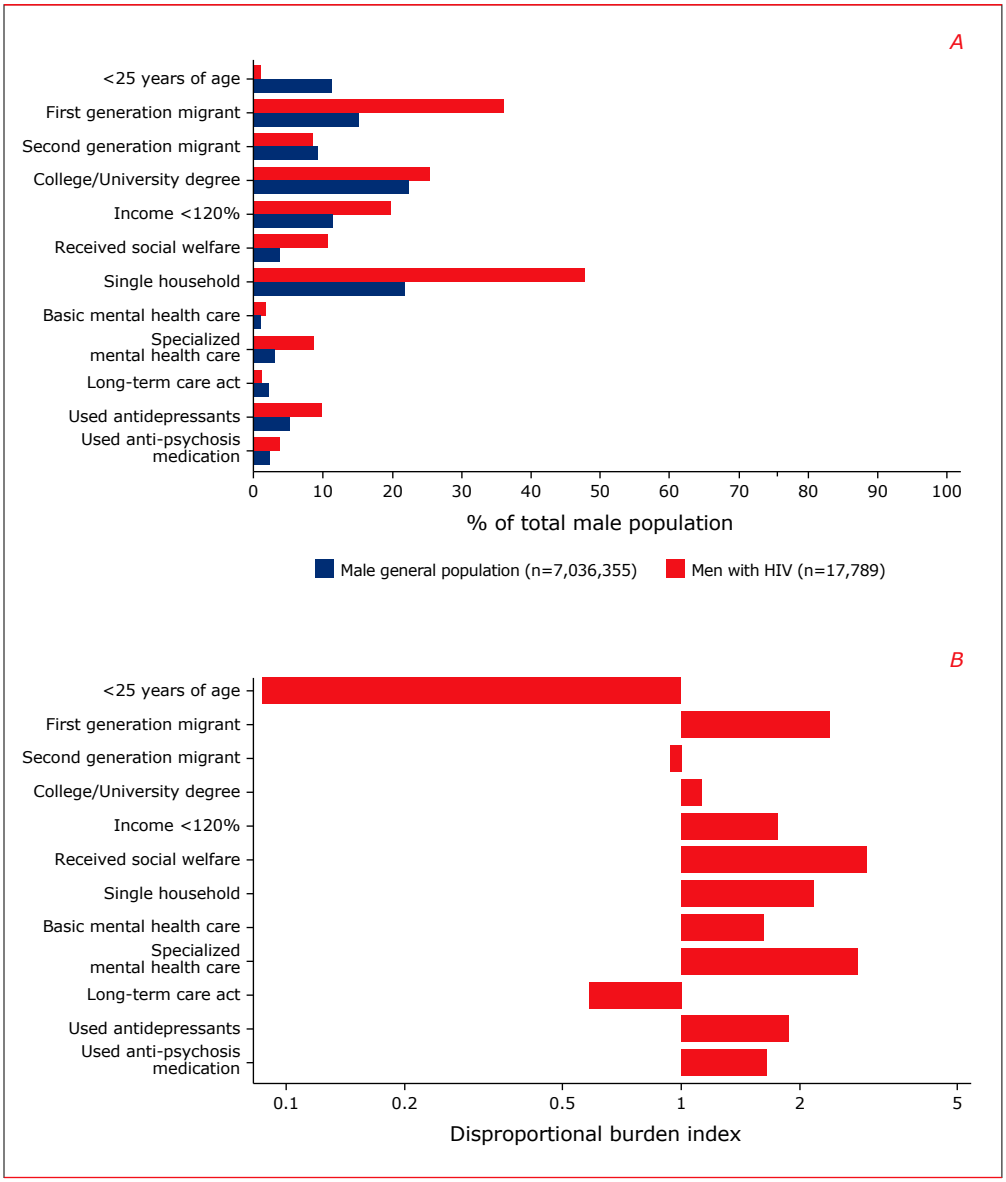


To assess the effect of gender on social disparities, we stratified the analyses by gender. As sexual preference is not available for the general population within the CBS environment, MSM and other men were combined in this analysis.

For men, differences between determinants were similar to the total population (Figure 3.2A). The disproportional burden for men with HIV was most evident for the following socio-demographic, -economic and health related determinants (Figure 3.2B): being <25 years of age (index=0.09), having a first generation migration background (index=2.4), receiving social welfare (index=3.0), living in a single-person household (index=2.2), and having used specialized mental health care (index=2.8).

Figure 3.2A: *Socio-demographic and socio-economical description among men of the general population and men with HIV in care in the Netherlands*

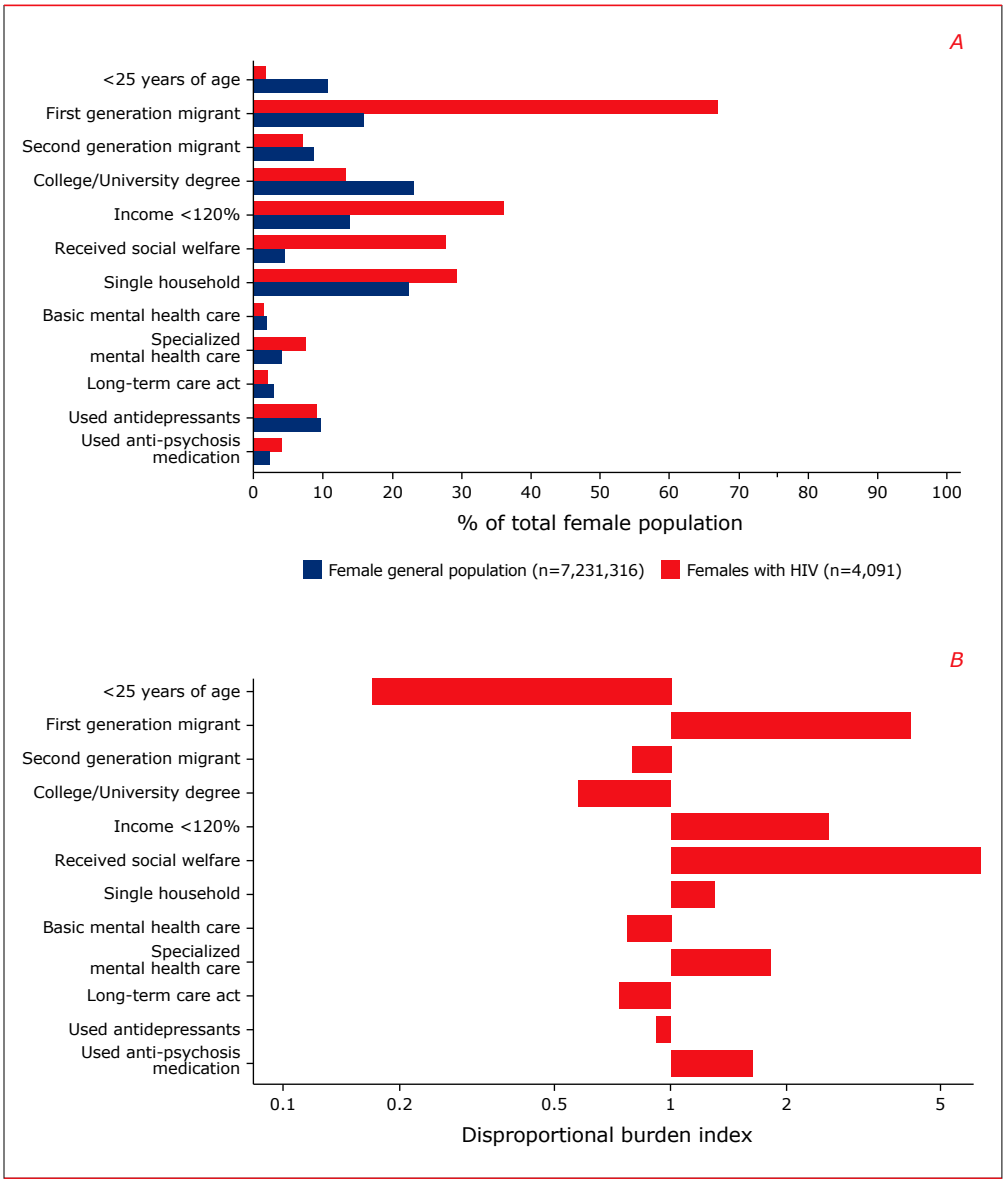
Figure 3.2B: *Disproportional burden index among men*



For women, the differences between the general population and women with HIV were even more distinct: having a first generation migration background (index=4.2), an income <120% of the social minimum (index=2.6), and receiving social welfare (index=6.3) (Figure 3.3Aa and 3.3B).

Figure 3.3A: *Socio-demographic and socio-economical description among women of the general population and women with HIV in care in the Netherlands*

Figure 3.3B: *Disproportional burden index among women*



New HIV diagnoses and late presentation from 2015 onwards

Between 2015 and 2022, 4,652 individuals with a new HIV diagnosis were registered with SHM and combined with data from CBS. Of these, 2,000 individuals had a late stage HIV diagnosis (i.e., CD4 <350/mm3 and/or an AIDS defining event at time of HIV diagnosis): 971 MSM, 380 women, 619 other men, and 30 transgender persons. Using multivariable Bayesian logistic regression we assessed the impact of socio-demographic, -economic and health related determinants on late presentation. As gender and sexual preference largely impacted the outcome, analyses were stratified for MSM, women, and other men. Transgender persons were excluded due to small numbers. To assess whether the contribution of determinants that were associated with a late diagnosis changed over time, we visualized them from 2015 onwards. For visualization purposes, women and other men were combined to reduce the risk of identifying individuals.

Older MSM, those in a two-person household with or without kids, and those with an income <120% of the social minimum had higher odds of being diagnosed with late stage HIV. The distribution of these determinants remained similar over time among MSM diagnosed with late stage HIV (Figure 3.4A). Similarly, older women and other men, and women and other men with an income <300% of the social minimum had higher odds of being diagnosed with late stage HIV. Type of household had no effect. Over time, the proportion of women and other men diagnosed with late stage HIV with an income <120% seemed to increase slightly (Figure 3.4B).

Figure 3.4: *Impact of socio-demographic and socio-economic determinants on being diagnosed with late stage HIV*

Figure 3.4A: *Men who have sex with men*

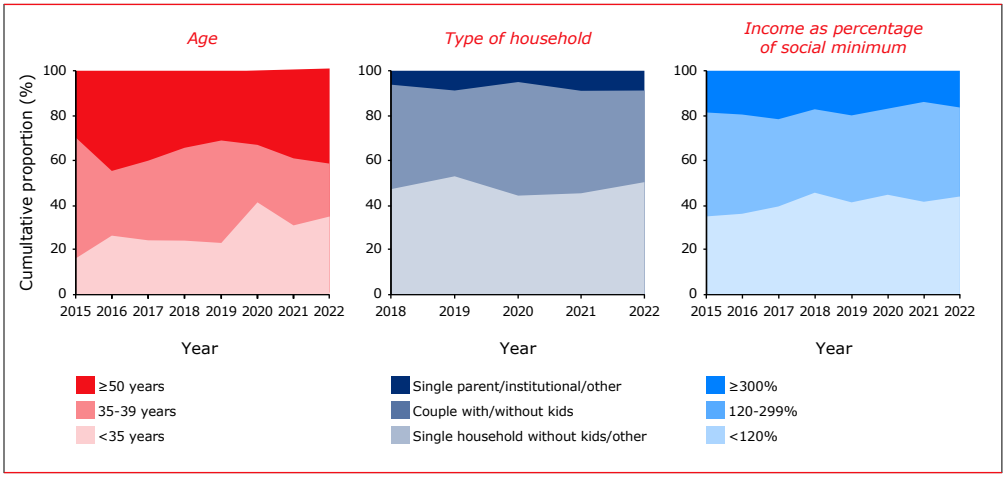
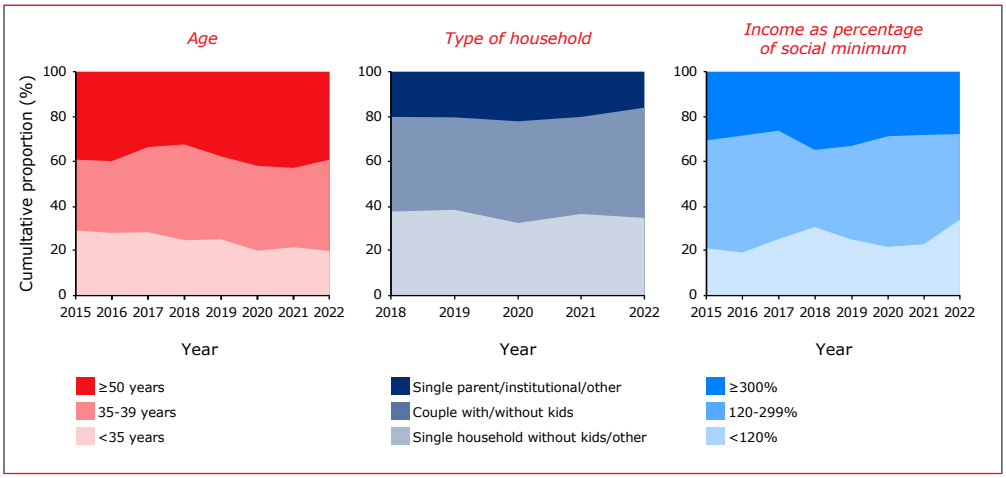


Figure 3.4B: *Women and other men*



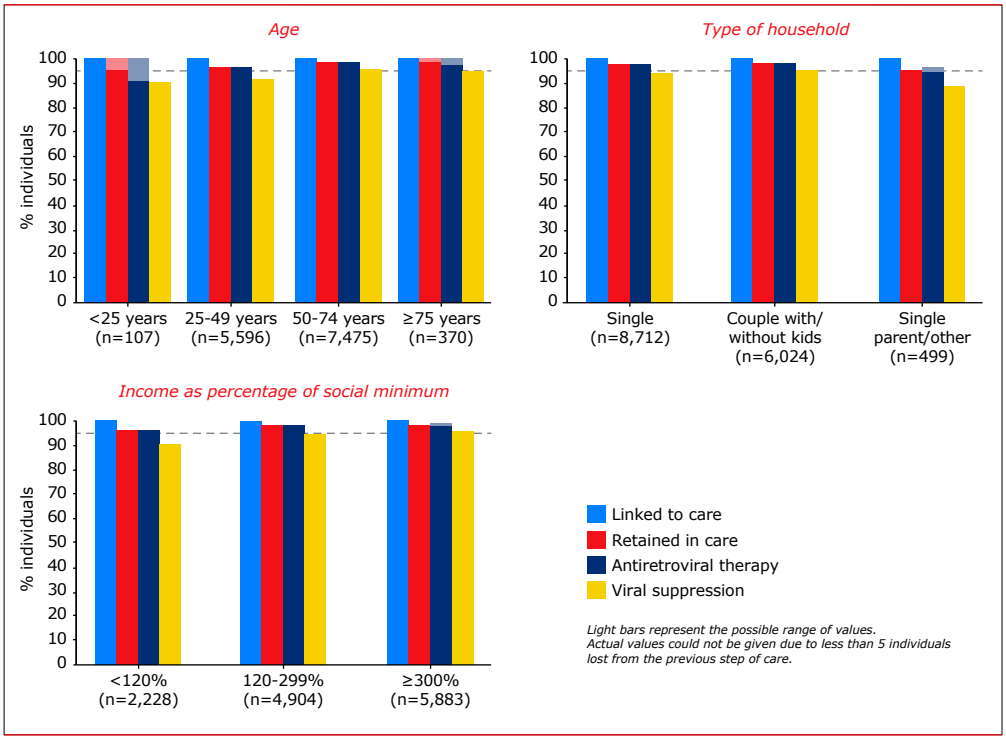
HIV Care Continuum

Using multivariable Bayesian logistic regression we assessed socio-demographic, -economic, and health related determinants for having a detectable viral load (i.e., a HIV RNA >200 cells/mL). As gender and sexual preference largely impacted the outcome, analyses were stratified for MSM, women and other men. We generated HIV care continuums for those determinants that were significantly associated with having a detectable viral load.

Men who have sex with men

Viral suppression was less than 95% among MSM <50 years of age, living in a single or single parent/other (e.g., institutionalized) household and those with an income <120% of the social minimum. Figure 3.5 shows the HIV care continua among MSM, stratified by age, type of household, and income as a percentage of the social minimum.

Figure 3.5: HIV care continuum in 2022 among MSM

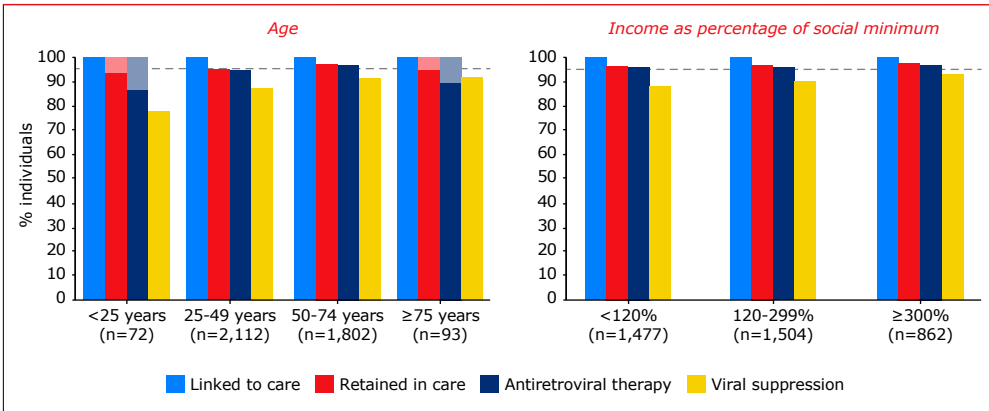


The red dashed line represents 95%.

Women

The effect of lower age and lower income on viral suppression was even stronger among women compared to MSM. While older women and women with an income ≥300% of the social minimum were more often virally suppressed, viral suppression was below 95% across all categories of income. In contrast to MSM, household type did not affect viral suppression among women. Figure 3.6 shows the HIV care continua among women, stratified by age and income.

Figure 3.6: HIV care continuum in 2022 among women

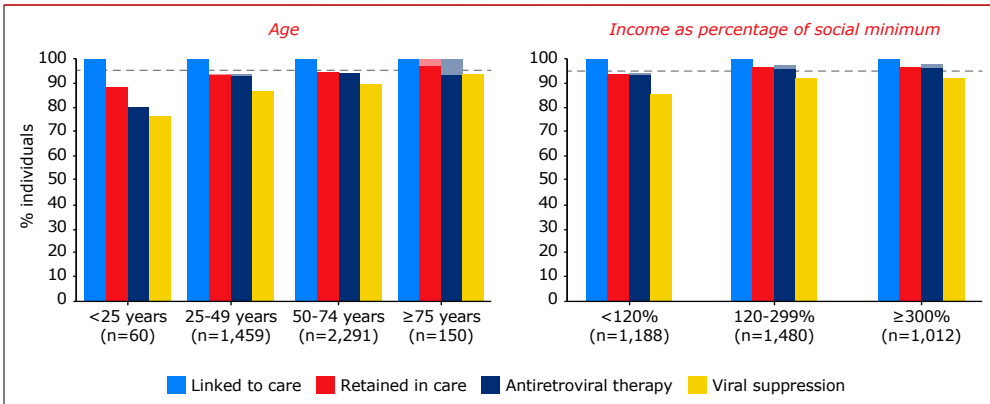


The red dashed line represents 95%.

Other men

The effect of lower age and lower income on viral suppression was also strong among other men. Similar to what was observed among women, viral suppression was below 95% across all categories of age and income. Household type also did not affect viral suppression among other men. Figure 3.7 shows the HIV care continua among other men, stratified by age and income.

Figure 3.7: HIV care continuum in 2022 among other men



The red dashed line represents 95%.

Disengagement from care

In total, 299 MSM and 394 women and other men disengaged from care until 2022. We again assessed the effect of socio-demographic, -economic, and health related determinants on disengagement from care using multivariable Bayesian logistic regression, stratified for MSM, women and other men. Women and other men were taken together due to small numbers. Determinants that were significantly associated with disengagement from care were visualized using bar graphs.

Younger MSM, those living in a single parent or other (e.g., institutionalized) household and those with an income <120% of the social minimum were more likely to disengage from care before 2022 (Figure 3.8).
Similarly, younger women and other men and those with an income <120% of the social minimum were more likely to disengage from care. Additionally, women and other men who had a detectable viral load at their last viral load measurement were more likely to disengage from care (Figure 3.9).

Figure 3.8: Determinants of disengagement from care among MSM

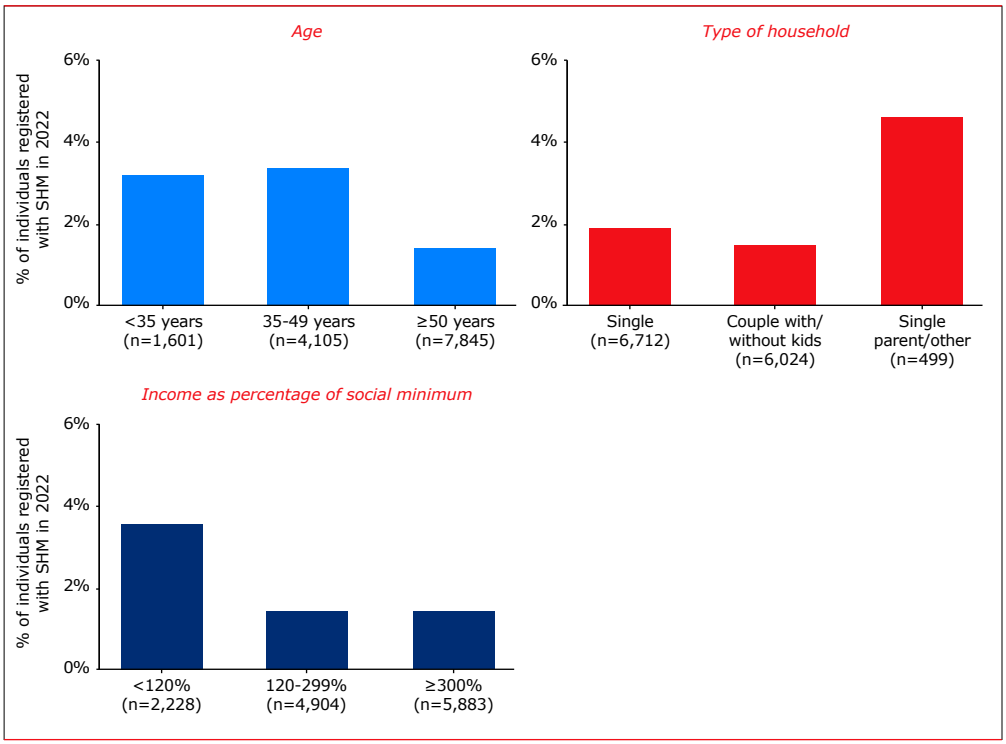
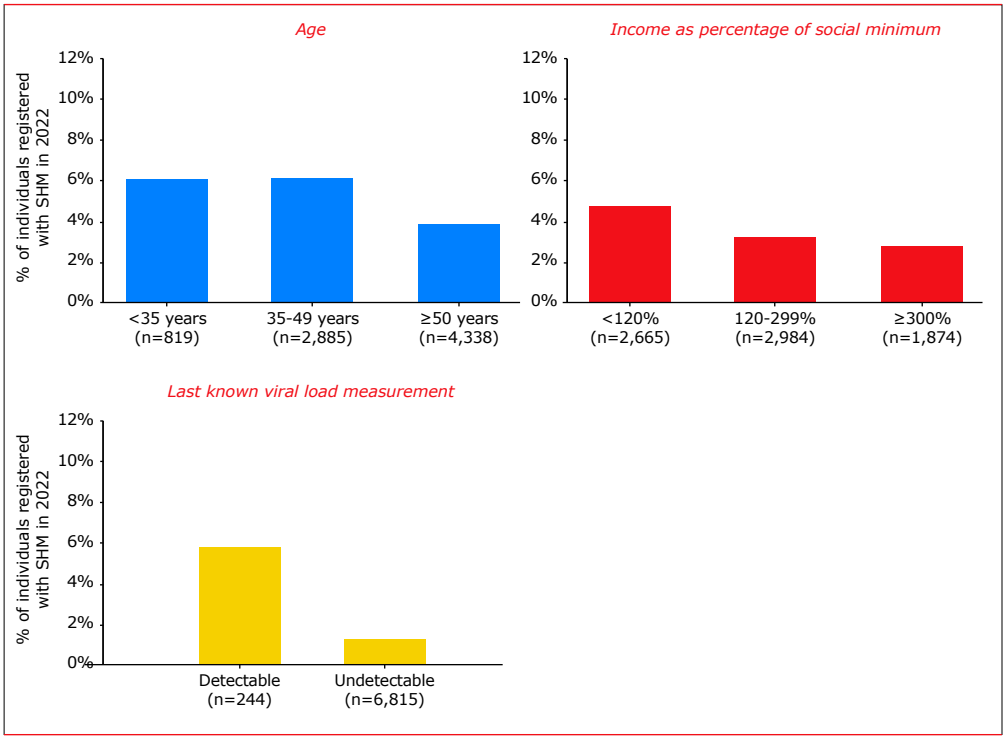


Figure 3.9: Determinants of disengagement from care among women and other men



Conclusions

In 2022, there was strong evidence for a disproportional burden of HIV infection among men and women when comparing socio-demographic, ecnonomic, and health-related data from individuals diagnosed with HIV and the general population in the Netherlands. Additionally, while the HIV care continuum mentioned in Chapter 1 almost reaches the 95-95-95 UNAIDS targets, the HIV care continuum is suboptimal among those with lower incomes. Income, age and household size seem to largely impact progression through the HIV care continuum, as well as engagement in care and stage of HIV diagnosis.

Box 3.3: an interactive tool to guide HIV prevention and care in the Netherlands

The Netherlands aims to end HIV transmission within the country by 2027. Although significant progress has been made, new innovative approaches are needed to reach this goal. We are working on an online, interactive tool that is developed using an existing research platform and allows a low threshold, workable interface for use in HIV prevention and care. The dashboard could hopefully support regions in the Netherlands in evaluating existing and developing new strategies aimed at optimizing HIV prevention and care.

The online dashboard is built using data from SHM and Statistics Netherlands (CBS). The dashboard is updated yearly with statistics on the number of new HIV diagnoses, disease stage and the number of people at each step of the HIV care continuum using UNAIDS definitions, as well as information about PrEP use. All statistics can be stratified by region and key population (i.e., women, men who have sex with men, other men, and transgender people), and viewed over time from 2010 to 2023.

For professionals who work with the community we have developed a more in-depth version of the dashboard which, among other things, includes information on health care consumption prior to HIV diagnosis. A password is needed to access this part of the dashboard which can be requested individually.

The dashboard was developed in collaboration with the Amsterdam Health & Technology Institute using R shiny. Version 3 of the dashboard is currently available online at: https://dashboard.hiv-monitoring.nl/nl