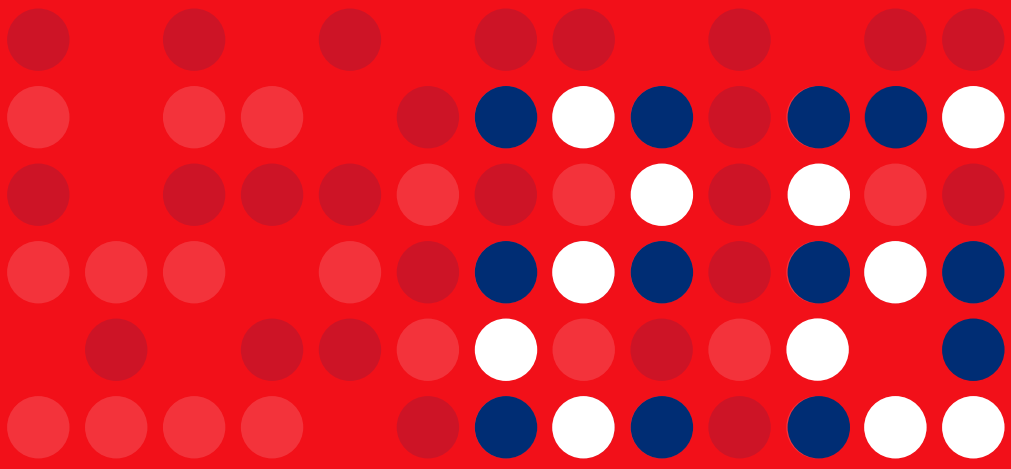
Human Immunodeficiency Virus (HIV)
Infection in the Netherlands

hiv Monitoring

HIV Monitoring Report 2026

Chapter 11: Quality of Care



11. Quality of care

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Introduction

One of the missions of SHM is to contribute to the quality of HIV care in the Netherlands. Via the collection of pseudonymised data from individuals in outpatient care at the 23 dedicated treatment centres, SHM can provide a nationwide overview of the outcome of care for individuals. This unique overview allows SHM to facilitate assessment of the quality of HIV care in the Netherlands.

The Dutch Association of HIV-Treating Physicians (Nederlandse Vereniging van HIV Behandelaren, NVHB) has issued a variety of indicators to reflect the quality of health care provided to individuals with HIV. Given the broad range of indicators, SHM, along with members of the Quality Commission from the NVHB, has decided to focus on only one set of key indicators that will be described in this year's report.

As individuals with HIV have increased their lifespans with the use of effective antiretroviral therapy, age-related comorbidities have increased in prevalence[1]. One of the more concerning comorbidities is cardiovascular disease[2]. As in the reports from the last two years, we focus our indicators on primary and secondary prevention of cardiovascular disease. We evaluate center-specific completeness of information for the following indicators: smoking, lipid profile, and blood pressure measurement.

The SCORE-2 for individuals aged 40-69 years old and the SCORE2-OP for individuals 70 years old or older are often used in clinical care to understand the 10-year risk of developing a cardiovascular disease event for those who have not yet had such an event[3, 4]. We provide information on whether the SCORE2 or SCORE2-OP were able to be calculated for these age groups. Based on data from the REPRIEVE study[5], guidelines from the European AIDS Clinical Society and the Netherlands recommend statin prescription for individuals with HIV who have a high 10-year risk of cardiovascular disease event, that is ≥2.5% for those aged below 50 years, ≥5% for those aged between 50 and 69 years and ≥7.5% for those aged above 70 years[6, 7]. In addition to these recommendations, the updated guidelines from the European society of cardiology (ESC) and the European Atherosclerosis Society (EAS) recommend statin prescription for individuals aged ≥40 years with HIV[8]. For individuals with a high 10-year risk of a cardiovascular disease event (based on current Dutch and international recommendations), we report the percentage who received a prescription for statins (including those who ever used a statin and those with refused statin use) and those with an LDL cholesterol at or below the recommended limits (i.e., target LDL cholesterol)[9].

Finally, we report the percentage of individuals with high blood pressure who received a prescription for antihypertensive medication and, conversely, the percentage of individuals who received an antihypertensive medication and had a blood pressure at or below the recommended limits in Dutch guidelines (i.e., target blood pressure)[9]. The full list of indicators, their definitions and in which populations these indicators were analyzed are provided in *Box 11.1*.

This analysis relates to all individuals who were diagnosed with HIV and who are currently in care at one of the 23 HIV treatment centres in the Netherlands. To facilitate presentation, we have decided to provide mostly figures describing changes over the last 5 years and comparison of indicators between individual centres and the national average. Indicators are reported for the 23 HIV treatment centres individually. Each HIV treatment centre is referenced by a number, which is used consistently across all figures in this chapter. These centre numbers do not correspond with those used in the map with centre overview at page 5 of this report.

Each HIV treatment centre receives its own unblinded data. The NVHB Quality Committee has access to all data and reviews the results during the audits. Where necessary, data may be unblinded to facilitate discussions with the respective centres and to support quality improvement initiatives.
In collaboration with V&VN VCH, the NVHB organizes annual audits with four different HIV treatment centres, during which three auditors discuss aspects of quality of care and the results of the indicator report generated by SHM. These audits also provide an opportunity to discuss challenges in care delivery and share best practices. HIV treatment centres are re-audited every five years. The data presented in this chapter are also available online to HIV treatment centres and are included in the audits. In addition, these data can serve as a valuable benchmark for centres to identify potential areas for improvement. The findings presented in this chapter are discussed annually at the NVHB members' meeting.

Box 11.1: Definitions of specific indicators and focus populations.

Specific indicator	Definition	Focus population
Information on smoking		
	The percentages of individuals who ever gave information on their smoking status. The percentage of individuals who gave information on their smoking status during the calendar year.	40 years old or older
Information needed for cardiovascular disease screening		
Total, HDL or LDL cholesterol	The percentage of individuals who had a total, HDL or LDL cholesterol measurement during the calendar year[1].	40 years old or older
Blood pressure	The percentage of individuals who had at least one blood pressure measurement during the calendar year.	
All cardiovascular parameters	The percentage of individuals who had total, HDL and LDL cholesterol and blood pressure measurement during the calendar year and during the last 5 calendar years.	
Information on cardiovascular event risk		
SCORE2(-OP)	The percentage of individuals who had enough information to have their SCORE2(-OP) cardiovascular risk assessment during the calendar year.	40-69 years old (SCORE2) or 70 year old or older (SCORE2-OP), without a history of CVD.
Statin use		
	The percentage of individuals who received a prescription for statins during the calendar year. The percentage of individuals who received a prescription for statins, including individuals with past and refused statin use in 2025.	40 years old or older with SCORE2 or SCORE2-OP predicted 10-year high risk differentiated by age and without a history of CVD[2].
Target LDL cholesterol		
	The percentage of individuals who had an LDL cholesterol level ≤2.6 mmol/L during the calendar year.	40 years old or older with SCORE2 or SCORE2-OP predicted 10-year high risk, differentiated by age.
Antihypertensive medication use		
	The percentage of individuals who received a prescription for antihypertensive mediation during the calendar year.	• All individuals with high blood pressure[3] • And stratified by hypertension grades[4]
Target blood pressure		
	The percentage of individuals who had a systolic blood pressure <130 mmHg and diastolic blood pressure <80 mmHg (for those 18-64 years old), or a systolic blood pressure <140 mmHg and diastolic blood pressure <80 mmHg (for those 65 years old or older).	All individuals on antihypertensive medication.

Abbreviations: *HDL = high-density lipoprotein; LDL = low-density lipoprotein.*

1 Calendar year is defined as running from 1 January to 31 December.

2 Defined as : ≥2.5% when aged <50; ≥5% aged 50-69 years; ≥7.5% when aged≥70 years and without a history of CVD, details on these scores can be found in the following website: https://u-prevent.com and also references[3, 4, 6, 7].

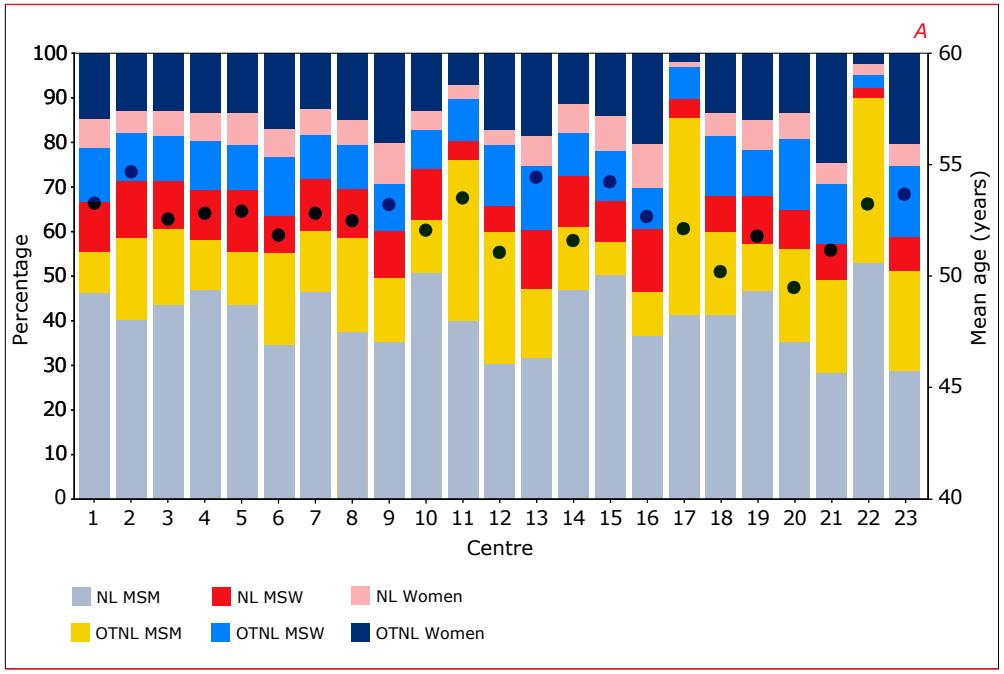
3 Defined as a diastolic blood pressure ≥90 mmHg and systolic blood pressure ≥140 mmHg[7].

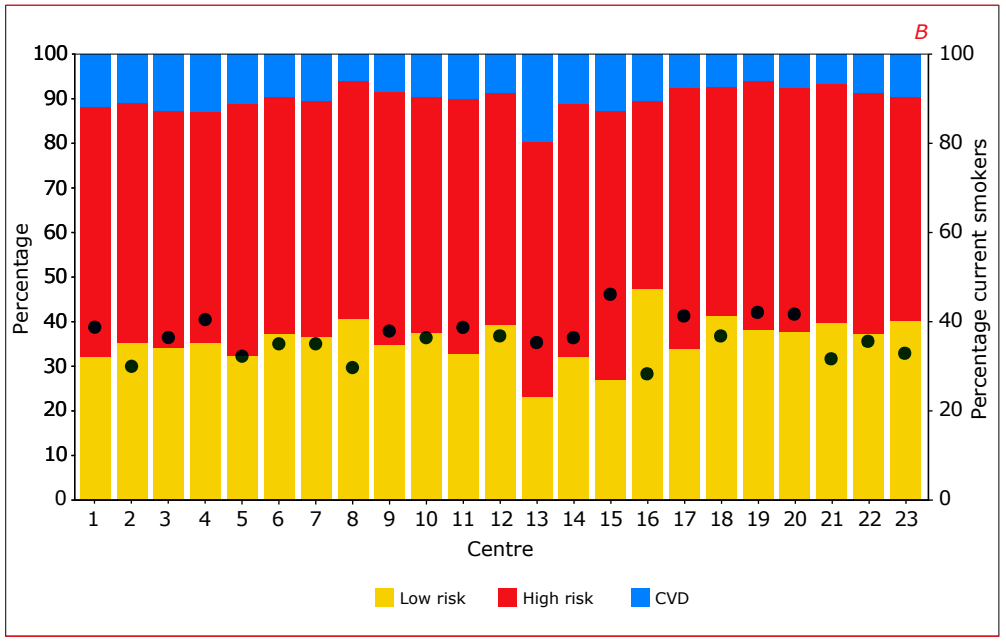
4 Defined as hypertension Grade 1 BP 140-159/90-99 mmHg; Grade 2 Hypertension BP 160-179/100-109 mmHg; Grade 3 Hypertension BP > 180/110 mmHg[7].

Centre overview

To provide an understanding of the patient 'mix' across centres, the distribution of geographical origin/mode of HIV acquisition/gender groups and age have been provided for each centre (*Figure 11.1A*). The distribution of individuals with low and high predicted 10-year risk of cardiovascular disease, according to the current recommendations, for those who have not had a cardiovascular disease event, and the percent with cardiovascular disease are also provided for each treatment centre (*Figure 11.1B*). Predicted 10-year cardiovascular risk was assessed with SCORE2 (i.e., 40-69 year old) or SCORE2-OP (i.e., 70 year old or older). These are presented alongside the percentage of individuals who are currently smoking.

Figure 11.1: *Description of the patient 'mix' for individuals in care (A), and the distribution of cardiovascular disease risk according to the current recommendations and smoking status (B) in 2025 in the Netherlands.*





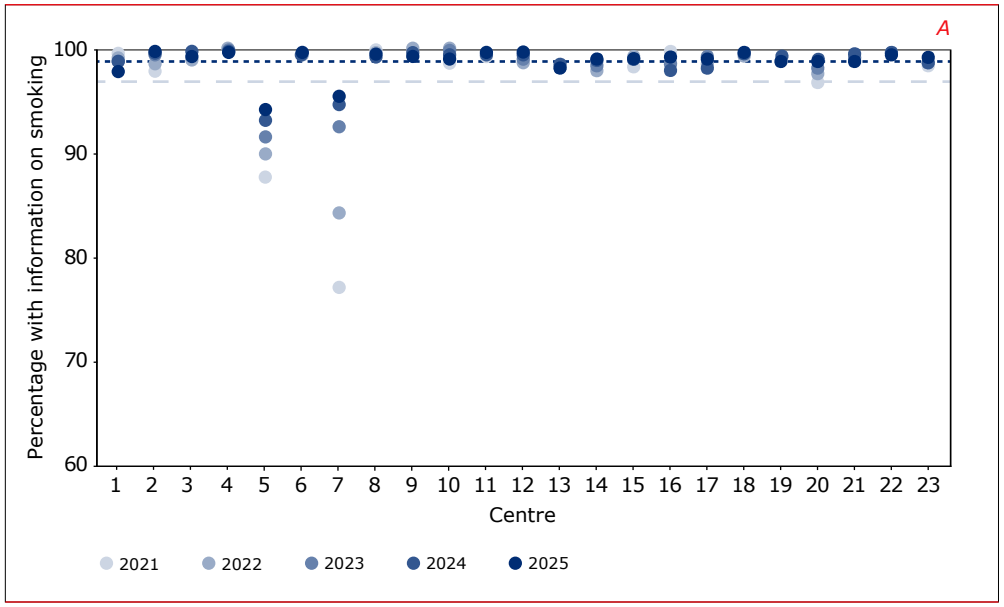
Note: *In A, the bars in this chart show the percentage of individuals per centre according to geographical origin/mode of transmission/gender group. In A, black dots represent the mean age of individuals in care at each centre. In B, black dots represent the percent of current smokers of individuals in care at each centre. This panel distinguishes those who already have cardiovascular disease (CVD) and those who are low or high risk according to the predicted 10-year cardiovascular risk were assessed with SCORE2 (i.e., 40-69 year old) or SCORE2-OP (i.e., 70 year old or older).*

Legend: *CVD=cardiovascular disease; MSM = men who have sex with men; MSW = men who exclusively have sex with women; OTNL = other than Dutch.*

Evolution of indicators over time

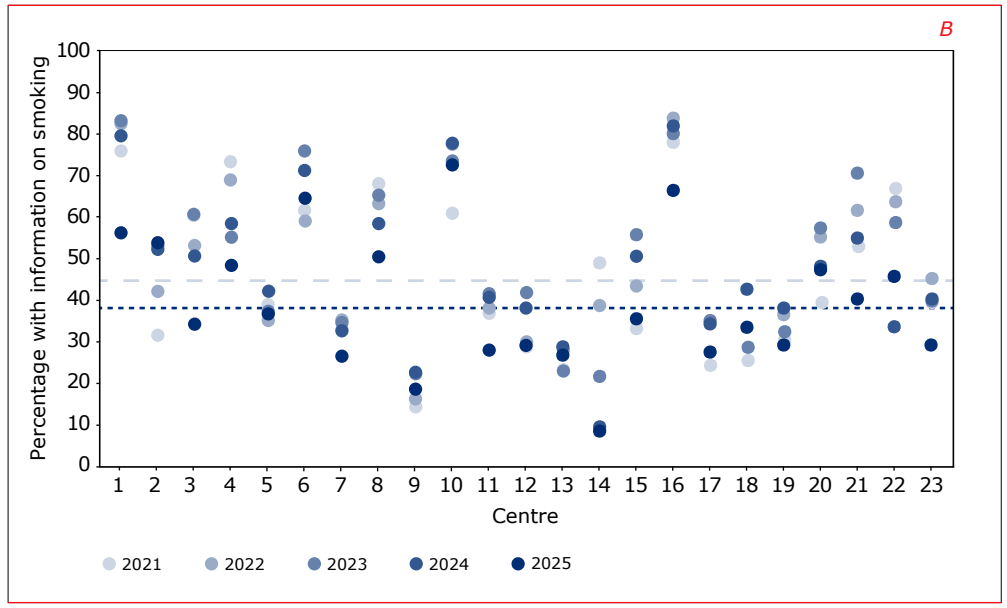
To provide an understanding of how indicators have evolved, each indicator in *Box 11.1* has been reported for its corresponding focus population on an annual basis between 2021 and 2025. For example, the indicator 'information on smoking' has been provided for individuals who were 40 years old or older and were in care in 2021, 2022, 2023, 2024, and 2025.

Figure 11.2A: *Information on smoking; in other words, individuals who ever had information on their smoking status during each year between 2021 and 2025.*



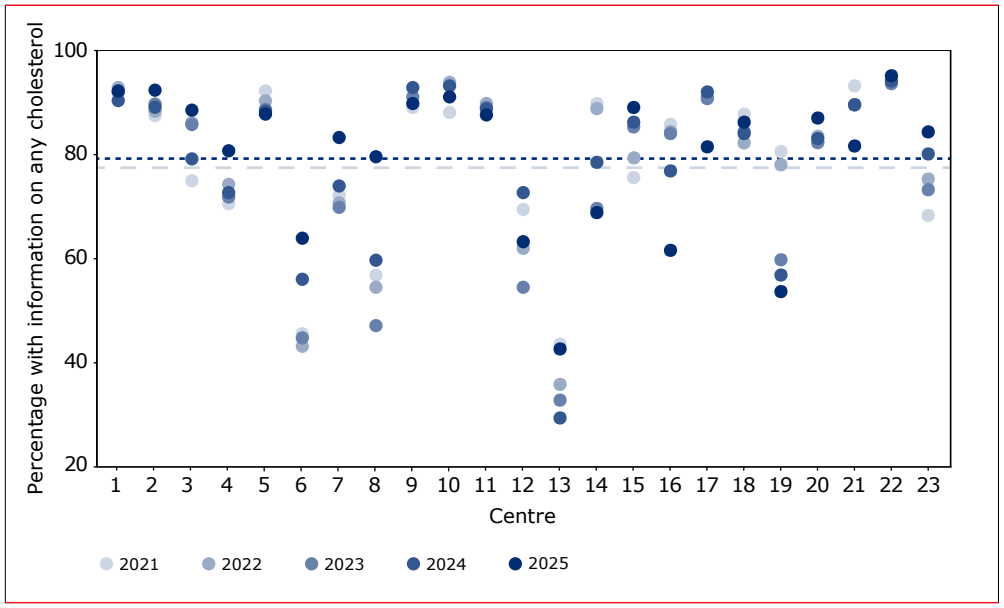
Legend: *Data are provided for individuals 40 years old or older. Data points from multiple years can overlap with one another. The dashed lines represent the national averages for 2021 and 2025. Centre numbers correspond to those used in Figure 11.1.*

Figure 11.2B: *Information on smoking; in other words, individuals who had information on their current smoking status during each year between 2021 and 2025.*



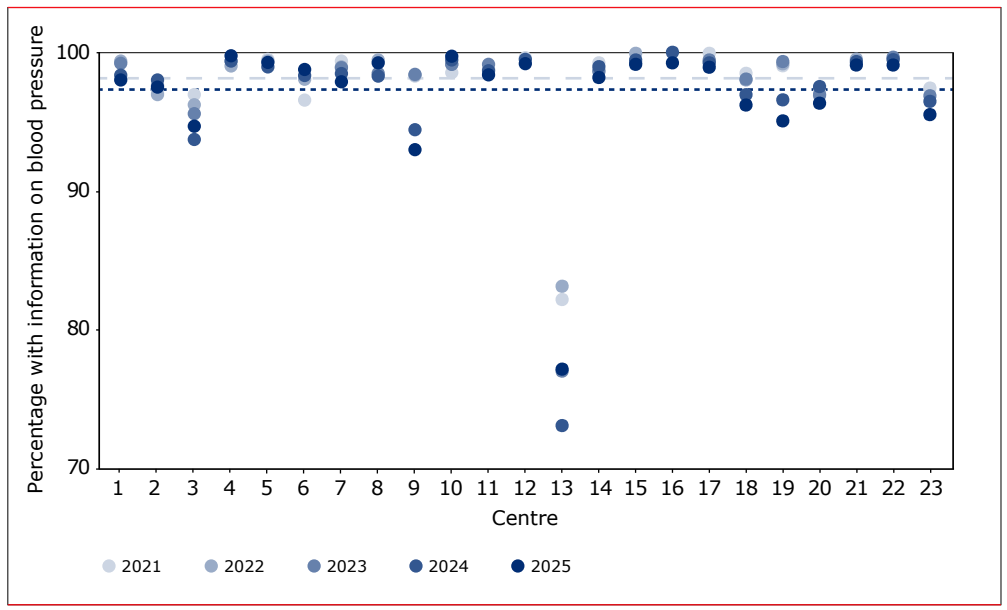
Legend: *Data are provided for individuals 40 years old or older. Data points from multiple years can overlap with one another. The dashed lines represent the national averages for 2021 and 2025. Centre numbers correspond to those used in Figure 11.1.*

Figure 11.3: *Information on total cholesterol; in other words, individuals who had a total, LDL or HDL cholesterol measurement during each year between 2021 and 2025.*



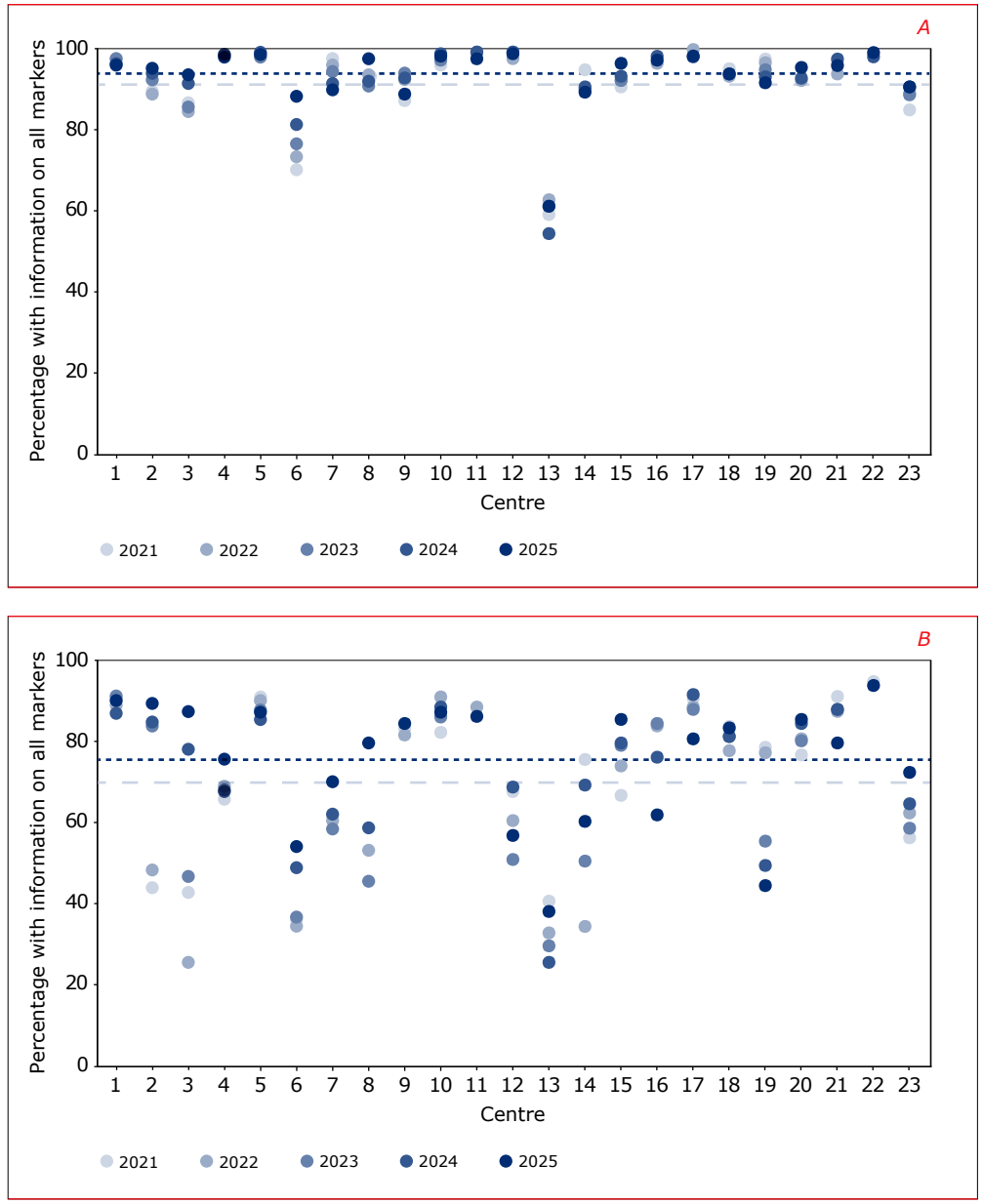
Legend: *Data are provided for individuals 40 years old or older. Data points from multiple years can overlap with one another. The dashed lines represent the national averages for 2021 and 2025. Centre numbers correspond to those used in Figure 11.1.*

Figure 11.4: *Information on blood pressure; in other words, individuals who had a blood pressure measurement during each year between 2021 and 2025.*



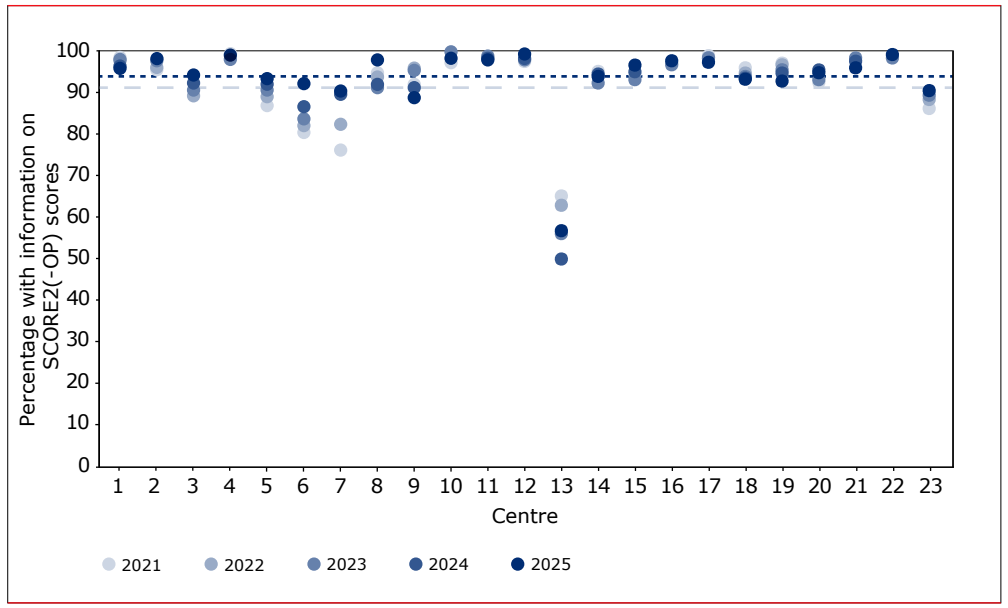
Legend: *Data are provided for individuals 40 years old or older. Data points from multiple years can overlap with one another. The dashed lines represent the national averages for 2021 and 2025. Centre numbers correspond to those used in Figure 11.1.*

Figure 11.5: *Information on all cardiovascular parameters; in other words, individuals who had total, HDL, LDL cholesterol and blood pressure measurement during (A) during the last 5 years and (B) each year between 2021 and 2025.*



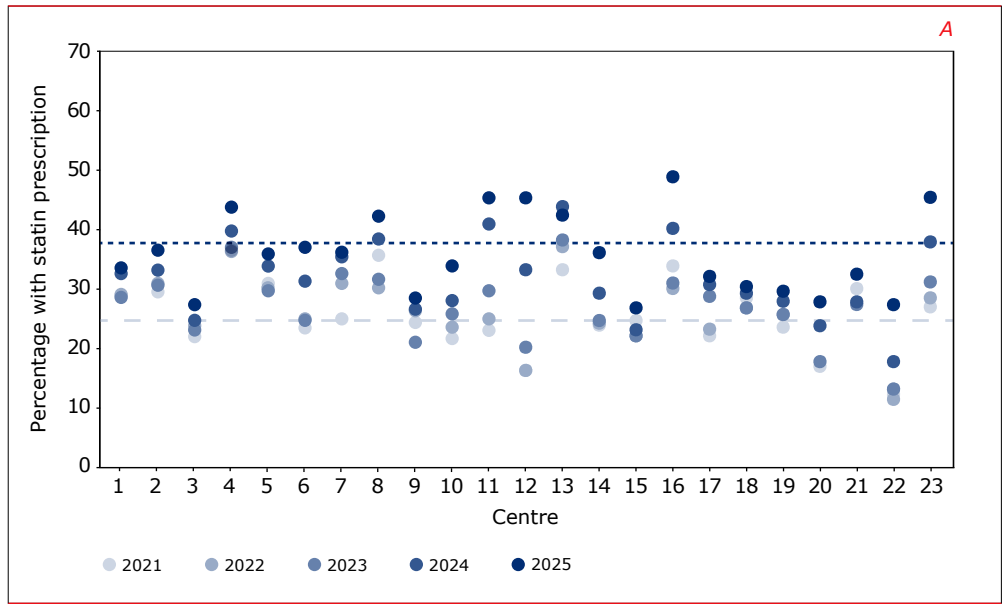
Legend: *Data are provided for individuals 40 years old or older. Data points from multiple years can overlap with one another. The dashed lines represent the national averages for 2021 and 2025. Centre numbers correspond to those used in Figure 11.1.*

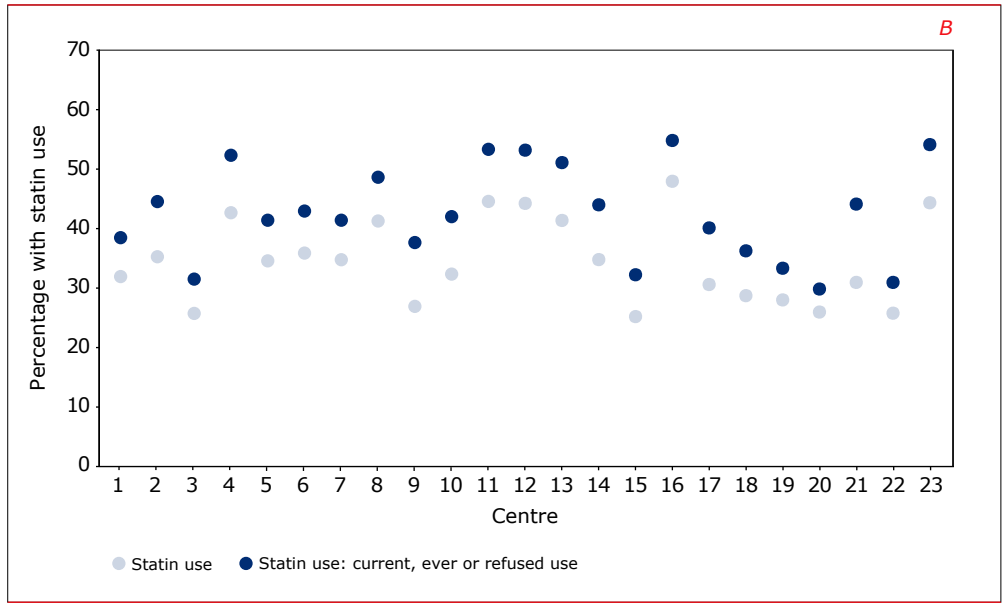
Figure 11.6: *Information on cardiovascular event risk during the last 5 years between 2021 and 2025.*



Legend: *The indicator represents individuals who had enough information to have their cardiovascular disease assessed by the SCORE2 (40–69 year old) or SCORE2-OP (70 year old or older). If data for calculating SCORE2-(OP) were missing, we replaced (i.e., imputed) the missing value with the value from the last observation with data. We only used data within a maximum of five years, except for smoking. The dashed lines represent the national averages for 2021 and 2025. Data points from multiple years can overlap with one another. Centre numbers correspond to those used in Figure 11.1.*

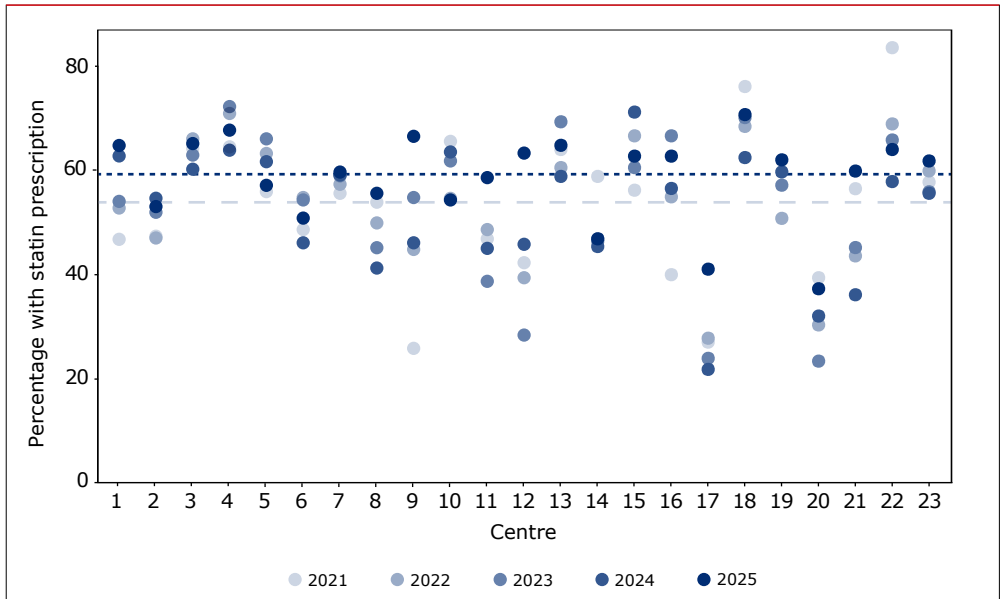
Figure 11.7: *Statin use, in other words, statin use among individuals with a high predicted 10-year cardiovascular event risk score using SCORE2(-OP): (A) Individuals using statins during each year between 2021 and 2025, (B) individuals in care in 2025 who received a statin prescription, stratified by current statin use, refused statin use, and past statin use (i.e., used statins at some point before 2025 but no longer using them).*





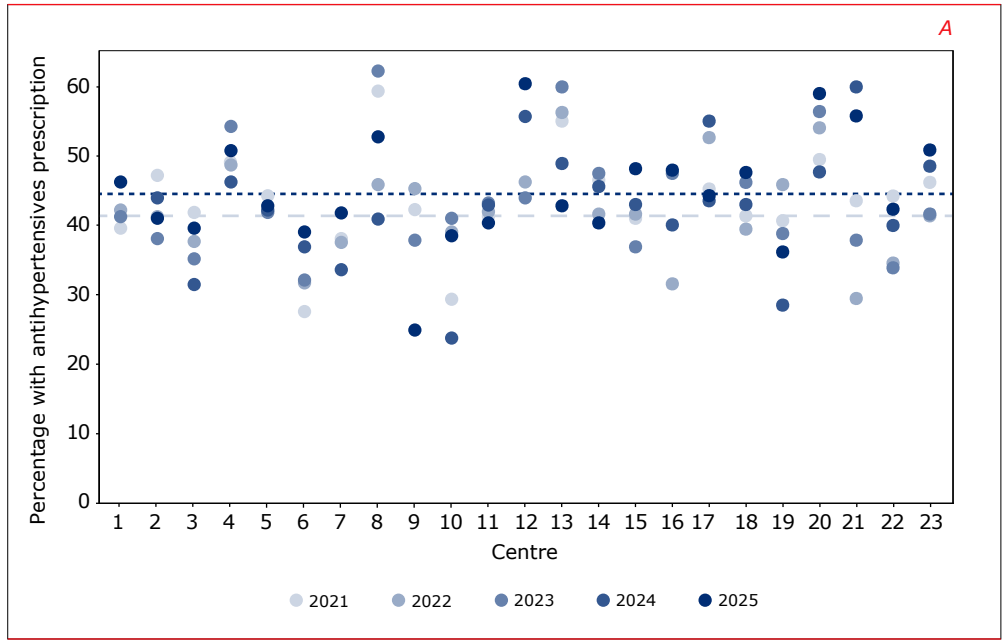
Legend: *Data are provided for those whose predicted 10-year cardiovascular risk were assessed with SCORE2 (i.e., 40-69 year old) or SCORE2-OP (i.e., 70 year old or older). If data for calculating SCORE2-(OP) were missing, we replaced (i.e., imputed) the missing value with the value from the last observation with data. We only used data within a maximum of five years, except for smoking.Data points from multiple years can overlap with one another. The dashed lines in A represent the national averages for 2021 and 2025. Centre numbers correspond to those used in Figure 11.1.*

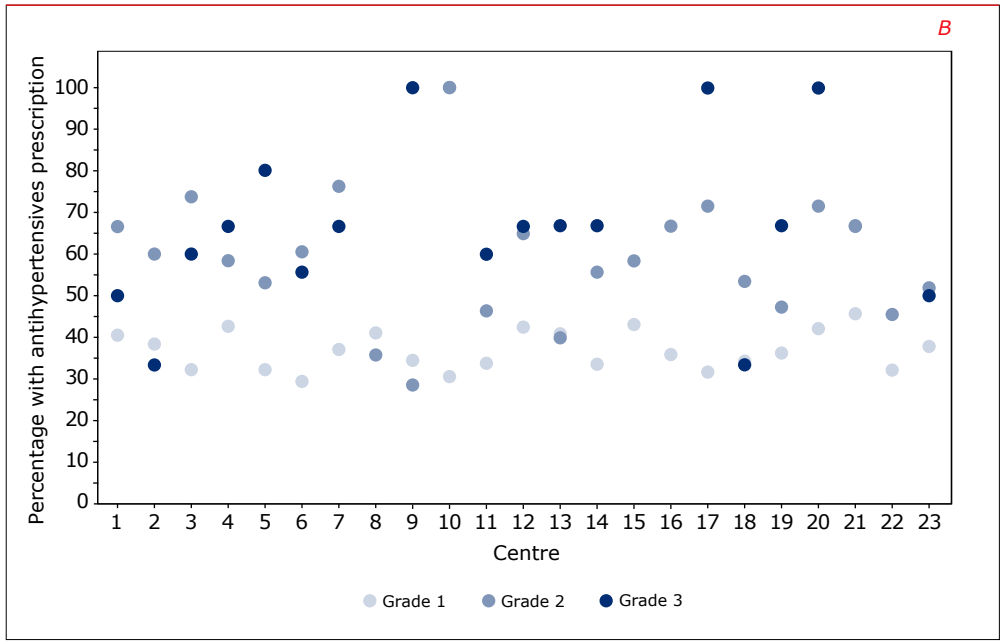
Figure 11.8: *Target LDL cholesterol; in other words, individuals with a high predicted 10-year cardiovascular event risk score using SCORE2(-OP), with a prescription for statins , and had an LDL cholesterol level ≤2.6 mmol/mL during each year between 2021 and 2025.*



Legend: *Data are provided for those whose 10-year cardiovascular risk were assessed with SCORE2 (i.e., 40-69 year old) or SCORE2-OP (i.e., 70 year old or older). If data for calculating SCORE2-(OP) were missing, we replaced (i.e., imputed) the missing value with the value from the last observation with data. We only used data within a maximum of five years, except for smoking. Data points from multiple years can overlap with one another. The dashed lines represent the national averages for 2021 and 2025. Centre numbers correspond to those used in Figure 11.1.*

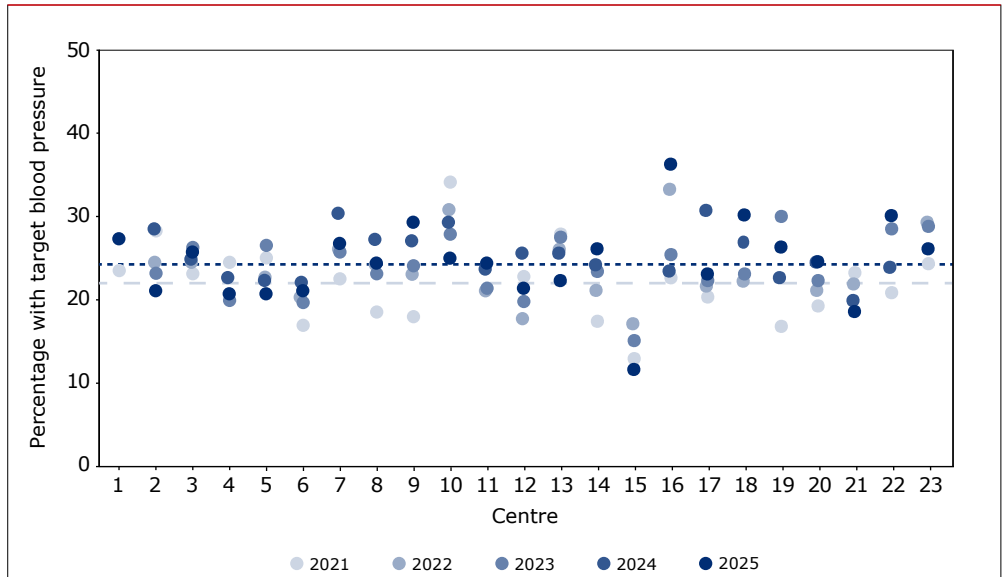
Figure 11.9: *Antihypertensive medication use; in other words, individuals who had high blood pressure and received a prescription for antihypertensive medication during each year between 2021 and 2025. A) high blood pressure defined as a diastolic blood pressure ≥90 mmHg and systolic blood pressure ≥140 mmHg and B) by different grades of hypertension for the year 2025.*





Legend: *(A) Data are provided for those who had high blood pressure, defined as ever having a diastolic blood pressure ≥90 mmHg. (B) Data provided for those with hypertension, defined as grade 1 blood pressure (i.e., 140–159/90–99 mmHg); grade 2 blood pressure (i.e., 160–179/100–109 mmHg); grade 3 blood pressure (i.e., >180/110 mmHg). Data points from multiple years can overlap with one another. The dashed lines in A represent the national averages for 2021 and 2025. Centre numbers correspond to those used in Figure 11.1.*

Figure 11.10: *Target blood pressure; in other words, individuals who were receiving antihypertensive medication and had a blood pressure below age-specific thresholds during each year between 2021 and 2025.*



Legend: *Age-specific thresholds refer to the following: systolic blood pressure <130 mmHg and diastolic blood pressure <80 mmHg (for those 18–64 years old), or a systolic blood pressure <140 mmHg and diastolic blood pressure <80 mmHg (for those 65 years old or older). Data are provided for those on antihypertensive medication. The dashed lines represent the national averages for 2021 and 2025. Data points from multiple years can overlap with one another. Centre numbers correspond to those used in Figure 11.1.*

Key findings and conclusions

The most important findings of this comparison of cardiovascular disease indicators between HIV treatment centres in the Netherlands are as follows:

- In 2025, the national average for data availability in that year was 38% for smoking (45% in 2021), 97% for blood pressure (98% in 2021), and 81% for total-, HDL- or LDL-cholesterol (77% in 2021). Compared with 2021, yearly updated information on smoking decreased, while it remained high for blood pressure and improved somewhat for total-, HDL-, or LDL-cholesterol. However, there was substantial variation in the percentage of individuals with information on total, HDL- or LDL- cholesterol across centres.
- In 2025, the national average for having all the information to predict 10-year risk of a cardiovascular event was 94%, and slightly increased from 91% in 2021
- The national average of receiving statins among individuals with a high predicted 10-year risk of a cardiovascular disease event according to SCORE2(-OP), increased from 23% in 2021 to 37% in 2025. Even when current statin use was combined with past or refused statin use, only 45% of individuals with a high predicted 10-year CVD risk had ever been prescribed statins in 2025. There was substantial variation between centres in the percentage who received a statin prescription. Although most centres showed an increase over the past five years in the percentage of individuals with a high risk receiving statins.
- Among those with a high predicted 10-year risk of a cardiovascular disease event, as determined by the SCORE2(-OP), there was some variation between centres in the percentage with target LDL cholesterol when individuals had a prescription for statins. The national average in 2025 was 59%.
- Overall, 45% of the individuals with high blood pressure in 2025 received an antihypertensive prescription. There was also slight between-centre variation in the percentage of individuals with high blood pressure who received an antihypertensive prescription and some centres have shown decreases in this percentage over the past 5 years. However, antihypertensive prescription increased as the grade of hypertension increased. Overall, 24% of the individuals taking antihypertensive medication had achieved a target blood pressure. There was slight between-centre variation in the percentage of individuals with target blood pressure.

Nevertheless, these conclusions must be considered in light of the data collection methods used by SHM. Much of the data are obtained through electronic medical records, which might contain incomplete information on items, such as smoking status and antihypertensive medication. Furthermore, primary prevention of cardiovascular disease for specific centres is commonly provided by general practitioners or peripheral healthcare centres. There remains a possibility that in some cases information may not have been captured in the data collection. Certain data related to cardiovascular disease may be missing simply because these data are not measured at the HIV treatment centre. We were unable to include individuals lacking the information needed to predict the 10-year risk of a cardiovascular event when analysing the indicators for statin and antihypertensive medication use. Finally, we do not have specific reasons why people are not taking antihypertensive medications, which could be unrelated to the care given at the HIV treatment centre. For statin prescription, SHM recently started collecting information on statin refusal.

Care related to cardiovascular disease does have variation across centres. Nevertheless, there is room for improvement. Certain centres should therefore strive to increase the percentage of individuals with information on cholesterol measurements and risk assessment of cardiovascular disease events. Less than half of the individuals with a predicted high 10-year risk of a cardiovascular event used statins. This analysis provides insight into the provision of cardiovascular diseases care at the different treatment centres.

References

1. Verheij, E., et al., Long-term evolution of comorbidities and their disease burden in individuals with and without HIV as they age: analysis of the prospective AGEhIV cohort study. The lancet. HIV, 2023. **10**(3): p. e164–e174.
2. Ntsekhe, M. and J.V. Baker, Cardiovascular Disease Among Persons Living With HIV: New Insights Into Pathogenesis and Clinical Manifestations in a Global Context. Circulation, 2023. **147**(1): p. 83–100.
3. SCORE2 risk prediction algorithms: new models to estimate 10-year risk of cardiovascular disease in Europe. European heart journal, 2021. **42**(25): p. 2439–2454.
4. SCORE2-OP risk prediction algorithms: estimating incident cardiovascular event risk in older persons in four geographical risk regions. European heart journal, 2021. **42**(25): p. 2455–2467.
5. Grinspoon, S.K., et al., Pitavastatin to Prevent Cardiovascular Disease in HIV Infection. New England Journal of Medicine, 2023. **389**(8): p. 687–699.
6. NVHB. https://nvhb.nl/wp-content/uploads/2025/02/leidraad-CVRM-bij-hiv-jan-2025.pdf. 2025.
7. EACS Guidelines version 12.1, N.p.I.P.o.C.D., https://eacs.sanfordguide.com/eacs-part2/eacs-part2-section2/cardiovascular-disease/eacsprevention-of-cvd
8. Mach, F., et al., 2025 Focused Update of the 2019 ESC/EAS Guidelines for the management of dyslipidaemias. Eur Heart J, 2025. **46**(42): p. 4359–4378.
9. Richtlijn HIV - Nederlandse Vereniging van HIV Behandelaren (NVHB).