

Supplements to

Harnessing registry data to identify socio-demographic and socio-economic gaps in HIV care in the Netherlands

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SI Table 1. Characteristics of individuals with HIV who could and who could not be linked with data from Statistics Netherlands

	Linked (n=28,294)	Not linked (n=2,407)
	<i>n (%)¹</i>	<i>n (%)¹</i>
Age at last HIV care visit, median [IQR] (n=22,641)	52 [42-60]	42 [33-54]
Born in the Netherlands (n=30,536)		
No	12,937 (46.0%)	1,849 (77.5%)
Yes	15,212 (54.0%)	538 (22.5%)
Gender/sexual preference category		
Men who have sex with men	16,756 (59.2%)	1,043 (43.3%)
Cis-gender heterosexual men	5,822 (20.6%)	767 (31.9%)
Cis-gender women	5,380 (19.0%)	555 (23.1%)
Transgender persons	336 (1.2%)	42 (1.7%)
<i>Health related</i>		
Age in years at HIV diagnosis, median [IQR] (n=30,556)	36 [28-45]	32 [27-40]
Year of HIV diagnosis (n=30,556)		
<2015	22,247 (78.9%)	1,758 (74.2%)
≥2015	5,941 (21.1%)	610 (25.8%)
HIV type (n=30,668)		
HIV-1	28,130 (99.5%)	2,381 (99.2%)
HIV-2	89 (0.3%)	<10 ²
HIV-1/2	50 (0.2%)	<10 ²
HIV stage at diagnosis		
Early/recent	4,610 (16.3%)	277 (11.5%)
Chronic	7,231 (25.6%)	411 (17.1%)
Late stage	3,131 (11.1%)	226 (9.4%)
Advanced stage	7,567 (26.7%)	610 (25.3%)
Unknown	5,755 (20.3%)	883 (36.7%)

	Linked (n=28,294)	Not linked (n=2,407)
Nadir CD4 count (cells/μL), median [IQR] (n=12,593)	290 [180-430]	260 [140-407]
Undetectable viral load at last measurement³ (n=21,995)	19,867 (93.7%)	680 (84.7%)
CD4 count (cells/ μL) at last measurement, median [IQR] (n=15,344)	730 [530-957]	660 [420-892]

Abbreviations: HIV, human immunodeficiency virus; IQR, interquartile range

1. Unless otherwise indicated
2. To minimise the risk of personal data inadvertently leading to the identification of an individual, data involving fewer than ten people were not reported
3. Defined as an HIV RNA <200 copies/mL

SI Table 2. Determinants of having a detectable viral load (HIV-1 RNA <200 copies/mL).

		MSM		Cisgender heterosexual men		Women	
		<i>Undetectable viral load (n=12,776)</i>	<i>Detectable viral load (n=892)</i>	<i>Undetectable viral load (n=3,550)</i>	<i>Detectable viral load (n=449)</i>	<i>Undetectable viral load (n=3,679)</i>	<i>Detectable viral load (n=442)</i>
Age							
	<25 years	91 (0.7%)	11 (1.2%)	43 (1.2%)	16 (3.6%)	60 (1.6%)	¹
	25-49 years	5,099 (39.9%)	472 (53.1%)	1,272 (35.8%)	198 (44.2%)	1,823 (49.6%)	257 (58.1%)
	50-74 years	7,197 (56.3%)	382 (43.0%)	2,095 (59.0%)	220 (49.1%)	1,702 (46.3%)	165 (37.3%)
	≥75 years	389 (3.0%)	24 (2.7%)	140 (3.9%)	14 (3.1%)	94 (2.6%)	¹
Education level							
	Primary	1,318 (10.3%)	129 (14.5%)	918 (25.9%)	172 (38.3%)	1,088 (29.6%)	133 (30.1%)
	Secondary	3,026 (23.7%)	252 (28.3%)	864 (24.3%)	107 (23.8%)	976 (26.5%)	123 (27.8%)
	College/university	4,268 (33.4%)	255 (28.6%)	597 (16.8%)	52 (11.6%)	617 (16.8%)	63 (14.3%)
	Missing	4,164 (32.6%)	256 (28.7%)	1,171 (33.0%)	118 (26.3%)	998 (27.1%)	123 (27.8%)
Migration background²							
	None	7,675 (60.1%)	459 (51.5%)	1,510 (42.5%)	155 (34.5%)	969 (26.3%)	88 (19.9%)
	First generation	4,028 (31.5%)	323 (36.2%)	1,774 (50.0%)	248 (55.2%)	2,710 (73.7%)	354 (80.1%)
	Second generation	1,073 (8.4%)	110 (12.3%)	266 (7.5%)	46 (10.2%)	³	³
Type of household							

	Single	6,308 (49.4%)	447 (50.1%)	1,531 (43.1%)	177 (39.4%)	1,112 (30.2%)	130 (29.4%)
	Pair with/without children	5,813 (45.5%)	298 (33.4%)	1,565 (44.1%)	132 (29.4%)	1,453 (39.5%)	137 (31.0%)
	Single parent/institutionalized/other	441 (3.5%)	67 (7.5%)	355 (10.0%)	66 (14.7%)	1,054 (28.6%)	137 (31.0%)
	Missing	214 (1.7%)	80 (9.0%)	99 (2.8%)	74 (16.5%)	60 (1.6%)	38 (8.6%)
Income							
	High	5,805 (45.4%)	268 (30.0%)	996 (28.1%)	80 (17.8%)	857 (23.3%)	75 (17.0%)
	Middle-low	4,518 (35.4%)	321 (36.0%)	1,356 (38.2%)	153 (34.1%)	1,380 (37.5%)	156 (35.3%)
	Below the poverty line ⁴						
		2,127 (16.6%)	238 (26.7%)	1,036 (29.2%)	158 (35.2%)	1,265 (34.4%)	165 (37.3%)
	Missing						
		326 (2.6%)	65 (7.3%)	162 (4.6%)	58 (12.9%)	177 (4.8%)	46 (10.4%)
Received social welfare							
	No	11,864 (92.9%)	794 (89.0%)	2,941 (82.8%)	368 (82.0%)	2,723 (74.0%)	334 (75.6%)
	Yes	912 (7.1%)	98 (11.0%)	609 (17.2%)	81 (18.0%)	956 (26.0%)	108 (24.4%)
Year of HIV diagnosis							
	<2015	9,633 (75.4%)	616 (69.1%)	2,600 (73.2%)	344 (76.6%)	2,928 (79.6%)	350 (79.2%)
	≥2015	3,143 (24.6%)	276 (30.9%)	950 (26.8%)	105 (23.4%)	751 (20.4%)	92 (20.8%)
Stage of HIV diagnosis							
	Early/recent	3,227 (25.3%)	214 (24.0%)	215 (6.1%)	27 (6.0%)	200 (5.4%)	25 (5.7%)
	Late/advanced	4,061 (31.8%)	260 (29.1%)	1,913 (53.9%)	193 (43.0%)	1,585 (43.1%)	167 (37.8%)

Chronic/unknown	Used mental health care ⁵	5,488 (43.0%)	418 (46.9%)	1,422 (40.1%)	229 (51.0%)	1,894 (51.5%)	250 (56.6%)
	No	11,205 (87.7%)	784 (87.9%)	3,218 (90.6%)	409 (91.1%)	3,336 (90.7%)	401 (90.7%)
	Yes	1,571 (12.3%)	108 (12.1%)	332 (9.4%)	40 (8.9%)	343 (9.3%)	41 (9.3%)
Used antidepressants ⁶	No	11,418 (89.4%)	820 (91.9%)	3,321 (93.5%)	431 (96.0%)	3,353 (91.1%)	403 (91.2%)
	Yes	1,358 (10.6%)	72 (8.1%)	229 (6.5%)	18 (4.0%)	326 (8.9%)	39 (8.8%)
Used anti-psychotic medication ⁶	No	12,317 (96.4%)	864 (96.9%)	3,412 (96.1%)	434 (96.7%)	3,534 (96.1%)	424 (95.9%)
	Yes	459 (3.6%)	28 (3.1%)	138 (3.9%)	15 (3.3%)	145 (3.9%)	18 (4.1%)

1. To minimize the risk of personal data inadvertently leading to the identification of an individual, data involving fewer than ten people were not reported.
2. 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.
3. Due to limited number of observations, first and second migration background were combined into one category for women.
4. Income below the poverty line is defined as a household income <120% of 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>).
5. Defined as declared cost (>0 euro) for mental health care
6. Use of medication for depression (ATC code N06A) or psychosis (ATC code N05A)

SI Table 3. Determinants of having a detectable viral load (HIV-1 RNA <200 copies/mL). Results from univariable and multivariable Heckman probit regression.

		MSM (n=892)		Cisgender heterosexual men (n=449)		Women (n=442)	
		<i>Probit coefficient (95%CI)</i>	<i>Adjusted probit coefficient (95%CI)¹</i>	<i>Probit coefficient (95%CI)</i>	<i>Adjusted probit coefficient (95%CI)²</i>	<i>Probit coefficient (95%CI)</i>	<i>Adjusted probit coefficient (95%CI)³</i>
Age							
	<25 years	REF	REF	REF	REF	REF	REF
	25-49 years	-0.04 (-0.35;0.27)	-0.16 (-0.16;0.49)	-0.51 (-0.85;-0.17)	-0.58 (-0.93;-0.23)	-0.22 (-0.55;0.11)	-0.20 (-0.54;0.14)
	50-74 years	-0.28 (-0.59;0.03)	-0.04 (-0.37;0.29)	-0.72 (-1.06;-0.38)	-0.75 (-1.10;-0.40)	-0.39 (-0.73;-0.06)	-0.37 (-0.71;-0.02)
	≥75 years	-0.23 (-0.59;0.13)	0.01 (-0.38;0.39)	-0.74 (-1.17;-0.31)	-0.79 (-1.24;-0.35)	-0.52 (-1.01;-0.03)	-0.52 (-1.02;-0.01)
Education level							
	Primary	REF	REF	REF		REF	
	Secondary	-0.07 (-0.18;0.03)	-0.04 (-0.15;0.08)	-0.21 (-0.35;-0.07)		0.03 (-0.11;0.16)	
	College/university	-0.23 (-0.34;-0.12)	-0.12 (-0.23;-0.002)	-0.38 (-0.55;-0.21)		-0.07 (-0.23;0.09)	
	Missing	-0.23 (0.34;-0.12)	-0.15 (-0.27;-0.04)	-0.32 (-0.45;-0.18)		0.01 (-0.12;0.14)	
Migration background⁴							
	None	REF	REF	REF		REF	
	First generation	0.09 (0.02;0.16)	0.05 (-0.13;0.03)	0.12 (-0.08;0.32)		0.12 (0.0008;0.24)	
	Second generation	0.26 (0.15;0.36)	0.15 (0.03;0.26)	0.27 (0.08;0.47)			

Type of household

Single	REF	REF	REF	REF
Pair with/without children	-0.15 (-0.22;-0.08)	-0.05 (-0.13;0.02)	-0.16 (-0.28;-0.04)	-0.11 (-0.24;0.01)
Single parent/institutionalized/other	0.37 (0.23;0.52)	0.30 (0.15;0.44)	0.25 (0.09;0.42)	0.04 (-0.08;0.17)
Missing	0.84 (0.68;1.00)	0.89 (0.68;1.11)	1.06 (0.84;1.28)	0.91 (0.62;1.19)

Income

High	REF	REF	REF	REF	REF	REF
Middle-low	0.20 (0.12;0.27)	0.16 (0.08;0.25)	0.16 (0.02;0.31)	0.17 (0.03;0.32)	0.12 (-0.02;0.26)	0.13 (-0.01;0.27)
Below the poverty line ⁶	0.41 (0.32;0.50)	0.34 (0.24;0.43)	0.32 (0.18;0.47)	0.34 (0.19;0.49)	0.19 (0.05;0.33)	0.21 (0.06;0.35)
Missing	0.66 (0.50;0.82)	0.07 (-0.16;0.29)	0.80 (0.59;1.02)	0.75 (0.52;0.97)	0.53 (0.32;0.74)	0.52 (0.29;0.74)

Received social welfare

No	REF	REF	REF
Yes	0.22 (0.11;0.33)	0.01 (-0.13;0.13)	-0.05 (-0.17;0.06)

Year of HIV diagnosis

<2015	REF	REF	REF
≥2015	0.14 (0.07;0.21)	-0.08 (-0.19;0.04)	0.01 (-0.11;1.14)

Stage of HIV diagnosis

Early/recent	REF	REF	REF
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Late/advanced	-0.01 (-0.10;0.07)		-0.13 (-0.34;0.09)	-0.11 (-0.33;0.12)
Chronic/unknown	0.06 (-0.02;0.14)		0.11 (-0.11;0.32)	0.01 (-0.21;0.23)
Used mental health care⁷				
No	REF		REF	REF
Yes	-0.01 (-0.11;0.09)		-0.02 (-0.19;0.16)	0.01 (-0.16;0.18)
Used antidepressants⁸				
No	REF	REF	REF	REF
Yes	-0.14 (-0.25;-0.02)	-0.12 (-0.24;-0.008)	-0.24 (-0.47;-0.002)	0.02 (-0.16;0.19)
Used anti-psychotic medication⁸				
No	REF		REF	REF
Yes	-0.06 (-0.24;0.12)		-0.07 (-0.34;0.20)	0.03 (-0.23;0.28)

1. Education level, migration background, type of household, income, receival of social welfare, year of HIV diagnosis, stage at HIV diagnosis, use of antidepressants, and use of anti-psychotic medication were included in the initial multivariable model for MSM. Age was forced into the multivariable model.
2. Education level, migration background, type of household, income, year of HIV diagnosis, and use of antidepressants were included in the initial multivariable model for cisgender heterosexual men. Age was forced into the multivariable model.
3. Migration background, type of household, and income were included in the initial multivariable model for women. Age was forced into the multivariable model.
4. 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.
5. Due to limited number of observations in some cells, first and second migration background were combined and therefore only one coefficient is shown.

6. Income below the poverty line is defined as a household income <120% of 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.uvw.nl/nl/toeslag/sociaal-minimum>).
7. Defined as declared cost (>0 euro) for mental health care
8. Use of medication for depression (ATC code N06A) or psychosis (ATC code N05A)

SI Table 4. Determinants of having a detectable viral load (HIV-1 RNA <1000 copies/mL). Results from univariable and multivariable Heckman probit regression.

		MSM (n=833)		Cisgender heterosexual men (n=413)		Women (n=398)	
		<i>Probit coefficient (95%CI)</i>	<i>Adjusted probit coefficient (95%CI)¹</i>	<i>Probit coefficient (95%CI)</i>	<i>Adjusted probit coefficient (95%CI)²</i>	<i>Probit coefficient (95%CI)</i>	<i>Adjusted probit coefficient (95%CI)³</i>
Age							
	<25 years	REF	REF	REF	REF	REF	REF
	25-49 years	0.04 (-0.29;0.37)	0.24 (-0.10;0.59)	-0.36 (-0.73;-0.001)	-0.30 (-0.67;0.07)	-0.22 (-0.55;0.12)	-0.20 (-0.54;0.15)
	50-74 years	-0.21 (-0.54;0.12)	0.04 (-0.31;0.39)	-0.53 (-0.89;-0.17)	-0.44 (-0.81;-0.07)	-0.43 (-0.77;-0.08)	-0.40 (-0.76;-0.05)
	≥75 years	-0.15 (-0.53;0.23)	0.11 (-0.29;0.51)	-0.57 (-1.01;-0.12)	-0.44 (-0.90;0.03)	-0.47 (-0.96;0.03)	-0.47 (-0.98;0.04)
Education level							
	Primary	REF	REF	REF	REF	REF	
	Secondary	-0.08 (-0.19;0.03)	-0.04 (-0.15;0.08)	-0.21 (-0.35;-0.07)	-0.17 (-0.31;-0.03)	0.01 (-0.12;0.15)	
	College/university	-0.23 (-0.34;-0.12)	-0.12 (-0.23;-0.002)	-0.36 (-0.53;-0.19)	-0.28 (-0.45;-0.10)	-0.05 (-0.21;0.11)	
	Missing	-0.24 (0.35;-0.13)	-0.17 (-0.29;-0.06)	-0.32 (-0.45;-0.18)	-0.36 (-0.50;-0.22)	0.002 (-0.13;0.14)	
Migration background⁴							
	None	REF	REF	REF	REF	REF	
	First generation	0.08 (0.01;0.15)	-0.06 (-0.14;0.02)	0.06 (-0.08;0.20)	-0.13 (-0.25;-0.02)	0.12 (-0.01;0.25)	
	Second generation	0.23 (0.12;0.34)	0.12 (0.0003;0.23)	0.23 (0.04;0.42)	0.11 (-0.09;0.31)	⁵	

Type of household

Single	REF	REF	REF	REF
Pair with/without children	-0.14 (-0.21;-0.07)	-0.04 (-0.12;0.03)	-0.17 (-0.29;-0.05)	-0.05 (-0.18;0.08)
Single parent/institutionalized/other	0.39 (0.25;0.54)	0.32 (0.17;0.47)	0.29 (0.12;0.45)	0.07 (-0.06;0.21)
Missing	0.87 (0.71;1.03)	0.95 (0.73;1.17)	1.08 (0.86;1.30)	0.85 (0.57;1.13)

Income

High	REF	REF	REF	REF	REF	REF
Middle-low	0.19 (0.11;0.26)	0.15 (0.06;0.23)	0.16 (0.01;0.30)	0.11 (-0.03;0.26)	0.10 (-0.05;0.24)	0.10 (-0.04;0.25)
Below the poverty line ⁶	0.40 (0.31;0.49)	0.33 (0.22;0.43)	0.34 (0.19;0.49)	0.25 (0.09;0.40)	0.17 (0.03;0.32)	0.19 (0.04;0.39)
Missing	0.66 (0.50;0.82)	0.04 (-0.20;0.27)	0.83 (0.61;1.05)	0.87 (0.64;1.09)	0.42 (0.20;0.64)	0.39 (0.15;0.63)

Received social welfare

No	REF	REF	REF
Yes	0.18 (0.07;0.29)	0.04 (-0.10;0.17)	-0.05 (-0.16;0.07)

Year of HIV diagnosis

<2015	REF	REF	REF
≥2015	0.10 (0.03;0.17)	-0.10 (-0.22;0.02)	0.001 (-0.13;0.13)

Stage of HIV diagnosis

Early/recent	REF	REF	REF
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Late/advanced	-0.03 (-0.12;0.06)		-0.07 (-0.30;0.15)		-0.10 (-0.34;0.13)
Chronic/unknown	0.05 (-0.03;0.13)		0.15 (-0.08;0.37)		0.03 (-0.20;0.26)
Used mental health care⁷					
No	REF		REF		REF
Yes	-0.01 (-0.11;0.09)		0.004 (-0.17;0.18)		0.05 (-0.13;0.22)
Used antidepressants⁸					
No	REF	REF	REF		REF
Yes	-0.13 (-0.24;-0.01)	-0.11 (-0.23;0.007)	-0.25 (-0.49;-0.007)		0.06 (-0.11;0.24)
Used anti-psychotic medication⁸					
No	REF		REF		REF
Yes	-0.05 (-0.23;0.14)		-0.02 (-0.29;0.25)		0.09 (-0.17;0.34)

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1. Education level, migration background, type of household, income, receival of social welfare, year of HIV diagnosis, stage at HIV diagnosis, and use of antidepressants were included in the initial multivariable model for MSM. Age was forced into the multivariable model.
 2. Education level, migration background, type of household, income, year of HIV diagnosis, and use of antidepressants were included in the initial multivariable model for cisgender heterosexual men. Age was forced into the multivariable model.
 3. Migration background and income were included in the initial multivariable model for women. Age was forced into the multivariable model.
 4. 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.
 5. Due to limited number of observations in some cells, first and second migration background were combined and therefore only one coefficient is shown.
 6. Income below the poverty line is defined as a household income <120% of 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.uvw.nl/nl/toeslag/sociaal-minimum>).

7. Defined as declared cost (>0 euro) for mental health care
8. Use of medication for depression (ATC code N06A) or psychosis (ATC code N05A)

SI Table 5. Socio-demographic and -economic determinants of disengagement from care among men who have sex with men, cis-gender heterosexual men, and women

	MSM		Cisgender heterosexual men		Women	
	Not disengaged (n=13,335)	Disengaged (n=333)	Not disengaged (n=3,784)	Disengaged (n=215)	Not disengaged (n=3,964)	Disengaged (n=157)
Age						
<25 years	101 (0.8%)	¹	54 (1.4%)	¹	70 (1.8%)	¹
25-49 years	5,372 (40.3%)	199 (60.3%)	1,368 (36.2%)	102 (47.7%)	1,980 (49.9%)	100 (63.7%)
50-74 years	7,454 (55.9%)	125 (37.9%)	2,216 (58.6%)	99 (46.3%)	1,815 (45.8%)	52 (33.1%)
≥75 years	408 (3.1%)	¹	146 (3.9%)	¹	99 (2.5%)	¹
Education level						
Primary	1,399 (10.5%)	48 (14.4%)	1,000 (26.4%)	90 (41.9%)	1,173 (29.6%)	48 (30.6%)
Secondary	3,187 (23.9%)	91 (27.3%)	921 (24.3%)	50 (23.3%)	1,057 (26.7%)	42 (26.8%)
College/university	4,426 (33.2%)	97 (29.1%)	623 (16.5%)	26 (12.1%)	661 (16.7%)	19 (12.1%)
Missing	4,323 (32.4%)	97 (29.1%)	1,240 (32.8%)	49 (22.8%)	1,073 (27.1%)	48 (30.6%)
Migration background ²						
None	7,972 (59.8%)	162 (48.6%)	1,598 (42.2%)	67 (31.2%)	1,026 (25.9%)	31 (19.7%)
First generation	4,220 (31.6%)	131 (39.3%)	1,896 (50.1%)	126 (58.6%)	2,938 (74.1%)	126 (80.3%)
Second generation	1,143 (8.6%)	40 (12.0%)	290 (7.7%)	22 (10.2%)	³	³
Type of household						

Single	6,603 (49.5%)	152 (45.6%)	1,639 (43.3%)	69 (31.2%)	1,209 (30.5%)	33 (21.0%)
Pair with/without children	6,016 (45.1%)	95 (28.5%)	1,644 (43.4%)	53 (24.7%)	1,537 (38.8%)	53 (33.8%)
Single parent/institutionalized/other	478 (3.6%)	30 (9.0%)	388 (10.3%)	33 (15.3%)	1,147 (28.9%)	44 (28.0%)
Missing	238 (1.8%)	56 (16.8%)	113 (3.0%)	60 (27.9%)	71 (1.8%)	27 (17.2%)
Income						
High	5,982 (44.9%)	91 (27.3%)	1,045 (27.6%)	31 (14.4%)	903 (22.8%)	29 (18.5%)
Middle-low	4,739 (35.5%)	100 (30.0%)	1,442 (38.1%)	67 (31.2%)	1,489 (37.6%)	47 (29.9%)
Below the poverty line ⁴	2,256 (16.9%)	109 (32.7%)	1,122 (29.7%)	72 (33.5%)	1,373 (34.6%)	57 (36.3%)
Missing	358 (2.7%)	33 (9.9%)	175 (4.6%)	45 (20.9%)	199 (5.0%)	24 (15.3%)
Received social welfare						
No	12,358 (92.7%)	300 (90.1%)	3,127 (82.6%)	182 (84.7%)	2,935 (74.0%)	122 (77.7%)
Yes	977 (7.3%)	33 (9.9%)	657 (17.4%)	33 (15.3%)	1,029 (26.0%)	35 (22.3%)
Year of HIV diagnosis						
<2015	10,000 (75.0%)	249 (74.8%)	2,778 (73.4%)	166 (77.2%)	3,144 (79.3%)	134 (85.4%)
≥2015	3,335 (25.0%)	84 (25.2%)	1,006 (26.6%)	49 (22.8%)	820 (20.7%)	23 (14.6%)
Stage of HIV diagnosis						
Early/recent	3,368 (25.3%)	73 (21.9%)	230 (6.1%)	12 (5.6%)	217 (5.5%)	8 (5.1%)
Late/advanced	4,230 (31.7%)	91 (27.3%)	2,017 (53.3%)	89 (41.4%)	1,695 (42.8%)	57 (36.3%)

Chronic/unknown	5,737 (43.0%)	169 (50.8%)	1,537 (40.6%)	114 (53.0%)	2,052 (51.8%)	92 (58.6%)
Used mental health care⁵						
No	11,686 (87.6%)	303 (91.0%)	3,428 (90.6%)	199 (92.6%)	3,592 (90.6%)	145 (92.4%)
Yes	1,649 (12.4%)	30 (9.0%)	356 (9.4%)	16 (7.4%)	372 (9.4%)	12 (7.6%)
Used antidepressants⁶						
No	11,924 (89.4%)	314 (94.3%)	3,542 (93.6%)	1	3,608 (91.0%)	1
Yes	1,411 (10.6%)	19 (5.7%)	242 (6.4%)	1	356 (9.0%)	1
Used anti-psychotic medication⁶						
No	12,860 (96.4%)	321 (96.4%)	3,635 (96.1%)	1	3,807 (96.0%)	1
Yes	475 (3.6%)	12 (3.6%)	149 (3.9%)	1	157 (4.0%)	1

Abbreviations: CI, confidence interval; HIV, human immunodeficiency virus

1. To minimize the risk of personal data inadvertently leading to the identification of an individual, data involving fewer than ten people were not reported.
2. 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.
3. Due to limited number of observations, first and second migration background were combined into one category for women.
4. 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>).
5. Defined as declared cost (>0 euro) for mental health care
6. Use of medication for depression (ATC code N06A) or psychosis (ATC code N05A)

SI Table 6. Time-updated determinants of disengagement from care. Results from univariable and multivariable piecewise exponential survival model.

	MSM		Cisgender heterosexual men		Women	
	<i>Coefficient (95%CI)</i>	<i>Adjusted coefficient (95%CI)¹</i>	<i>Coefficient (95%CI)</i>	<i>Adjusted coefficient (95%CI)²</i>	<i>Coefficient (95%CI)</i>	<i>Adjusted coefficient (95%CI)³</i>
Years since HIV diagnosis						
0	REF	REF	REF	REF	REF	REF
1	2.03 (1.29;3.18)	2.99 (1.90;4.71)	2.37 (1.69;3.32)	2.96 (2.10;4.16)	2.29 (1.66;3.16)	2.51 (1.82;3.47)
2	2.50 (1.61;3.90)	4.45 (2.84;6.98)	2.12 (1.50;3.00)	2.90 (2.04;4.13)	1.92 (1.38;2.69)	2.29 (1.63;3.23)
3	2.67 (1.71;4.16)	5.51 (3.50;8.66)	2.18 (1.54;3.10)	3.28 (2.29;4.69)	1.93 (1.37;2.71)	2.35 (1.66;3.33)
4	3.43 (2.22;5.31)	8.18 (5.23;12.81)	2.49 (1.76;3.53)	3.96 (2.77;5.66)	1.90 (1.35; 2.69)	2.35 (1.65;3.35)
5	3.41 (2.19;5.30)	9.59 (6.07;15.16)	2.43 (1.70;3.48)	4.30 (2.97;6.23)	2.12 (1.50;3.00)	2.67 (1.87;3.82)
6	3.70 (2.37;5.77)	12.48 (7.80;19.96)	2.67 (1.86;3.83)	5.16 (3.53;7.54)	1.89 (1.31;2.73)	2.44 (1.68;3.55)
7	4.66 (2.99;7.26)	16.81 (10.51;26.88)	2.82 (1.95;4.08)	5.61 (3.80;8.27)	2.41 (1.68;3.46)	3.16 (2.18;4.57)
8	3.94 (2.47;6.26)	14.58 (8.93; 23.78)	3.41 (2.35;4.95)	6.80 (4.60;10.05)	2.21 (1.51;3.24)	2.91 (1.97;4.31)
9	4.33 (2.69;6.98)	16.95 (10.25;28.01)	3.02 (2.00;4.55)	5.87 (3.83;8.98)	2.33 (1.54;3.52)	3.12 (2.05;4.75)
10	3.60 (2.11;6.15)	15.06 (8.62;26.32)	3.42 (2.20;5.30)	6.79 (4.31;10.70)	2.16 (1.34;3.49)	2.90 (1.79;4.71)
11	2.98 (1.47;6.06)	11.88 (5.74;24.59)	3.02 (1.70;5.37)	6.49 (3.60;11.68)	2.46 (1.38;4.40)	3.34 (1.86;6.00)
Age						

	<25 years	REF	REF	REF	REF	REF	REF
	25-49 years	1.04 (0.75;1.43)	0.89 (0.64;1.24)	0.82 (0.5;1.24)	0.78 (0.51;1.17)	0.66 (0.52;0.84)	0.59 (0.46;0.76)
	≥50 years	0.29 (0.20;0.43)	0.28 (0.19;0.42)	0.53 (0.35;0.80)	0.50 (0.33;0.77)	0.42 (0.32;0.56)	0.38 (0.28;0.50)
Education level							
	Primary	REF	REF	REF	REF	REF	
	Secondary	0.78 (0.63;0.96)	0.80 (0.65;1.00)	0.69 (0.58;0.81)	0.74 (0.63;0.88)	1.05 (0.90;1.24)	
	College/university	0.48 (0.38;0.60)	0.57 (0.45;0.72)	0.64 (0.52;0.78)	0.79 (0.64;0.98)	0.82 (0.66;1.00)	
	Missing	0.72 (0.57;0.89)	0.92 (0.73;1.16)	0.70 (0.60;0.83)	0.81 (0.68;0.97)	0.70 (0.58;0.84)	
Migration background⁴							
	None	REF	REF	REF	REF	REF	
	First generation	2.26 (1.94;2.63)	1.60 (1.36;1.89)	1.61 (1.41;1.85)	1.20 (1.04;1.39)	1.18 (1.01;1.37)	
	Second generation	2.67 (2.18;3.28)	1.86 (1.50;2.29)	1.85 (1.50;2.27)	1.58 (1.28;1.95)	1.34 (1.06;1.70)	
Type of household							
	Single	REF	REF	REF	REF	REF	
	Pair with/without children	0.77 (0.63;0.93)	0.96 (0.79;1.17)	0.90 (0.75;1.06)	1.14 (0.95;1.37)	0.81 (0.66;0.99)	
	Single parent/institutionalized/other	2.46 (1.89;3.20)	1.94 (1.48;2.54)	1.35 (1.07;1.70)	1.29 (1.02;1.62)	0.96 (0.78;1.17)	
	Missing	1.29 (1.09;1.52)	2.37 (1.95;2.90)	1.35 (1.15;1.58)	1.86 (1.55;2.23)	1.33 (1.11;1.59)	
Income							
	High	REF	REF	REF	REF	REF	REF
	Middle-low	1.61 (1.34;1.94)	1.40 (1.16;1.69)	1.36 (1.14;1.63)	1.30 (1.08;1.56)	1.09 (0.88;1.35)	1.13 (0.92;1.40)

Below the poverty line ⁵		2.92 (2.43;3.52)	2.41 (1.95;2.99)	2.13 (1.78;2.54)	1.86 (1.53;2.27)	1.44 (1.18;1.76)	1.45 (1.19;1.78)
Missing		7.74 (5.84;10.25)	4.83 (3.49;6.68)	4.48 (3.43;5.85)	4.17 (3.07;5.66)	1.98 (1.42;2.76)	2.48 (1.76;3.51)
Received social welfare							
No		REF		REF		REF	
Yes		1.32 (1.05;1.65)	0.76 (0.59;0.97)	1.27 (1.08;1.49)		1.07 (0.93;1.24)	
Used mental health care⁶							
No		REF		REF		REF	
Yes		1.16 (0.73;1.85)		0.68 (0.34;1.36)		0.78 (0.42;1.45)	
Used antidepressants⁷							
No		REF	REF	REF		REF	
Yes		0.62 (0.45;0.83)	0.65 (0.48;0.88)	0.87 (0.66;1.14)		0.80 (0.63;1.03)	
Used anti-psychotic medication⁷							
No		REF		REF		REF	
Yes		1.25 (0.87;1.80)		0.92 (0.64;1.33)		1.14 (0.83;1.57)	

-
1. Years since HIV diagnosis, age, education level, migration background, type of household, income, receipt of social welfare and use of antidepressants were included in the initial multivariable model for MSM.
 2. Years since HIV diagnosis, age, education level, migration background, type of household, income, and receipt of social welfare were included in the initial multivariable model for cisgender heterosexual men.

3. Years since HIV diagnosis, age, education level, migration background, type of household, income, and use of antidepressants were included in the initial multivariable model for cisgender heterosexual men.
4. 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.
5. Income below the poverty line is defined as a household income <120% of 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.uvw.nl/nl/toeslag/sociaal-minimum>).
6. Defined as declared cost (>0 euro) for mental health care
7. Use of medication for depression (ATC code N06A) or psychosis (ATC code N05A)

SI A. Versions of files used for analyses

- Stapelingsmonitor2023V1
- Stapelingsmonitor2022V2
- Stapelingsmonitor2021V3
- Stapelingsmonitor2020V3
- Stapelingsmonitor2019V4
- Stapelingsmonitor2018V3
- Stapelingsmonitor2017V4
- Stapelingsmonitor2016V2
- Stapelingsmonitor2015V2
- Stapelingsmonitor2014V6
- Stapelingsmonitor2013V4
- Stapelingsmonitor2012V3
- DOODOORZ2023TABV6
- DOODOORZ2022TABV8
- DOODOORZ2021TABV6
- DOODOORZ2020TABV2
- DOODOORZ2019TABV2
- DOODOORZ2018TABV2
- DOODOORZ2017TABV2
- DOODOORZ2016TABV2
- DOODOORZ2015TABV2
- DOODOORZ2014TABV1
- DOODOORZ2013TABV2
- DOODOORZ2012TABV1
- GBAMIGRATIE2023BUSV1
- GBAPERSOON2023TABV1

SI B. Collaborators of the ATHENA observational HIV cohort

Clinical centres

** denotes site coordinating physician*

Amsterdam UMC, Amsterdam:

HIV treating physicians: F.J.B. Nellen*, M.A. van Agtmael, M. Bomers, G.J. de Bree, S.E. Geerlings, A. Goorhuis, V.C. Harris, J.W. Hovius, B. Lemkes, E.J.G. Peters, T. van der Poll, J.M. Prins, K.C.E. Sigaloff, V. Spoorenberg, M. van der Valk, M. van Vugt, W.J. Wiersinga, F.W.M.N. Wit. *HIV nurse consultants:* C. Bruins, J. van Eden, I.J. Hylkema-van den Bout, L.M. Laan, F.J.J. Pijnappel, S.Y. Smalhout, M.E. Spelbrink, A.M. Weijsenfeld. *HIV clinical virologists/chemists:* N.K.T. Back, R. van Houdt, M. Jonges, S. Jurriaans, F. van someren Gréve, M.R.A. Welkers, K.C. Wolthers.

Emma Kinderziekenhuis (Amsterdam UMC), Amsterdam:

HIV treating physicians: M. van der Kuip, D. Pajkrt. *HIV nurse consultants:* F.M. Hessing, A.M. Weijsenfeld.

Admiraal De Ruyter Ziekenhuis, Goes:

HIV treating physicians: M. van den Berge*, A. Stegeman. *HIV nurse consultants:* S. Baas, L. Hage de Looft. *HIV clinical virologists/chemists:* A. van Arkel, J. Stohr, B. Wintermans.

Catharina Ziekenhuis, Eindhoven:

HIV treating physicians: M.J.H. Pronk*, H.S.M. Ammerlaan. *HIV nurse consultants:* E.S. de Munnik, S. Phaf. *HIV clinical virologists/chemists:* B. Deiman, V. Scharnhorst, M.C.A. Wegdam.

DC Klinieken Lairesse - Hiv Focus Centrum, Amsterdam:

HIV treating physicians: J. Nellen*, A. van Eeden, E. Hoornenborg, S de Stoppelaar. *HIV nurse consultants:* H. Berends, L.J.M. Elsenburg, H. Nobel. *HIV clinical virologists/chemists:* F. van Someren Gréve, M. Welkers, K. Wolthers, N. Back, S. Jurriaans

ETZ (Elisabeth-TweeSteden Ziekenhuis), Tilburg:

HIV treating physicians: M.E.E. van Kasteren*, M.A.H. Berrevoets, A.E. Brouwer. *HIV nurse specialist:* A. Adams, B.A.F.M. de Kruijf-van de Wiel. *HIV nurse consultants:* M. Pauwels-van Rijkevoorsel. *HIV data collection:* B.A.F.M. de Kruijf-van de Wiel. *HIV clinical virologists/chemists:* J.L. Murck.

Erasmus MC, Rotterdam:

HIV treating physicians: C. Rokx*, A.A. Anas, H.I. Bax, E.C.M. van Gorp, M. de Mendonça Melo, E. van Nood, J.L. Nouwen, B.J.A. Rijnders, C.A.M. Schurink, L. Slobbe, T.E.M.S. de Vries-Sluijs. *HIV nurse consultants:* N. Bassant, J.E.A. van Beek, M. Vriesde, L.M. van Zonneveld. *HIV data collection:* J. de Groot. *HIV clinical virologists/chemists:* J.J.A. van Kampen, M.P.G. Koopmans.

Erasmus MC Sophia Kinderziekenhuis, Rotterdam:

HIV treating physicians: P.L.A. Fraaij, A.M.C. van Rossum, C.L. Vermont. *HIV nurse consultants:* L.C. van der Knaap.

Flevoziekenhuis, Almere:

HIV treating physicians: J. Branger*, R.A. Douma. *HIV nurse consultant:* A.S. Cents-Bosma, M.A. Mulder.

HagaZiekenhuis, Den Haag:

HIV treating physicians: E.F. Schippers*, C. de Bree, C. van Nieuwkoop. *HIV nurse consultants:* J. Geilings, A. van Overeem. *HIV data collection:* G. van der Hut. *HIV clinical virologists/chemists:* N.D. van Burgel.

HMC (Haaglanden Medisch Centrum), Den Haag:

HIV treating physicians: E.M.S. Leyten*, L.B.S. Gelinck, F. Mollema. *HIV nurse consultants:* M. Langbein, G.S. Wildenbeest. *HIV clinical virologists/chemists:* T. Nguyen.

Isala, Zwolle:

HIV treating physicians: B. Hafkamp*, J.W. Bouwhuis, A.J.J. Lammers. *HIV nurse consultants:* A.G.W. van Hulzen, S. Kraan. *HIV clinical virologists/chemists:* S.B. Debast, G.H.J. Wagenvoort.

Leids Universitair Medisch Centrum, Leiden:

HIV treating physicians:

A.H.E. Roukens*, M.G.J. de Boer, H. Jolink, M.M.C. Lambregts, H. Scheper.

HIV nurse consultants: A. Metselaar, D. van der Sluis. *HIV clinical virologists/chemists:* S.A. Boers, E.C.J. Claas, E. Wessels.

Maasstad Ziekenhuis, Rotterdam:

HIV treating physicians: J.G. den Hollander*, R. El Moussaoui, K. Pogany. *HIV nurse consultants:* C.J. Brouwer, D. Heida-Peters, E. Mulder, J.V. Smit, D. Struik-Kalkman.

HIV data collection: T. van Niekerk. *HIV clinical virologists/chemists:* C. van Tienen.

Maastricht UMC+, Maastricht:

HIV treating physicians: S.H. Lowe*, A.M.L. Oude Lashof, D. Posthouwer, A. Stoop, M.E. van Wolfswinkel. *HIV nurse consultants:* R.P. Ackens, M. Elasri, K. Houben-Pintaric, J. Schippers.

HIV clinical virologists/chemists: T.R.A. Havenith, M. van Loo.

Frisius MC, Leeuwarden:

HIV treating physicians: M.G.A. van Vonderen*, L.M. Kampschreur, S.E. van Roeden. *HIV nurse consultants:* M.C. van Broekhuizen, S. Faber *HIV clinical virologists/chemists:* A. Al Moujahid.

Medisch Spectrum Twente, Enschede:

HIV treating physicians: G.J. Kootstra*, C.E. Delsing. *HIV nurse consultants:* M. van der Burg-van de Plas, L. Scheiberlich.

Noordwest Ziekenhuisgroep, Alkmaar:

HIV treating physicians: W. Kortmann*, G. van Twillert*, R. Renckens, J. Wagenaar.

HIV nurse consultants & HIV data collection: D. Ruiter-Pronk, B. Stander.

HIV clinical virologists/chemists: J.W.T. Cohen Stuart, M. Hoogewerf, W. Rozemeijer, J.C. Sinnige.

OLVG, Amsterdam:

HIV treating physicians: K. Brinkman*, G.E.L. van den Berk, K.D. Lettinga, M. de Regt, W.E.M. Schouten, J.E. Stalenhoef, S.M.E. Vrouwenraets. *HIV nurse consultants:* H. Blaauw, G.F. Geerders, M.J. Kleene, M. Knapen, M. Kok, I.B. van der Meché, A.J.M. Toonen, S. Wijnands, E. Wttewaal. *HIV clinical virologists:* D. Kwa, T.J.W. van de Laar.

Radboudumc, Nijmegen:

HIV treating physicians: R. van Crevel*, K. van Aerde, R.J.W. Arts, S.S.V. Henriët, H.J.M. ter Hofstede, J. Hoogerwerf, O. Richel, K. Stol. *HIV nurse consultants:* M. Albers, K.J.T. Grintjes-Huisman, M. de Haan, M. Marneef. *HIV clinical virologists/chemists:* M. McCall, J. Rahamat-Langendoen, E. Ruizendaal. *HIV clinical pharmacology consultant:* D. Burger.

Rijnstate, Arnhem: *HIV treating physicians:* E.H. Gisolf*, M. Claassen, R.J. Hassing,. *HIV nurse consultants:* G. ter Beest, P.H.M. van Bentum, Y. Neijland, M. Valette. *HIV clinical virologists/chemists:* C.M.A. Swanink, M. Klein Velderman.

Spaarne Gasthuis, Haarlem:

HIV treating physicians: S.F.L. van Lelyveld*, R. Soetekouw. *HIV nurse consultants:* L.M.M. van der Pijlt, J. van der Swaluw. *HIV clinical virologists/chemists:* J.S. Kalpoe, A. Wagemakers, A. Vahidnia.

Medisch Centrum Jan van Goyen, Amsterdam:

HIV treating physicians: F.N. Lauw, D.W.M. Verhagen. *HIV nurse consultants:* M. van Wijk.

Universitair Medisch Centrum Groningen, Groningen:

HIV treating physicians: W.F.W. Bierman*, M. Bakker, J. Kleinnijenhuis, E. Kloeze, A. Middel, D.F. Postma, Y. Stienstra, M. Wouthuyzen-Bakker. *HIV nurse consultants:* A. Boonstra, M.M.M. Maerman, D.A. de Weerd. *HIV clinical virologists/chemists:* M. Knoester, C.C. van Leer-Buter, H.G.M. Niesters, X.W. Zhou.

Beatrix Kinderziekenhuis (Universitair Medisch Centrum Groningen), Groningen:

HIV treating physicians: B.R. Brandsema, A.R. Verhage. *HIV nurse consultants:* N. van der Woude. *HIV clinical virologists/chemists:* M. Knoester, C.C. van Leer-Buter, H.G.M. Niesters, X.W. Zhou.

Universitair Medisch Centrum Utrecht, Utrecht:

HIV treating physicians: T. Mudrikova*, R.E. Barth, A.H.W. Bruns, P.M. Ellerbroek, M.P.M. Hensgens, J.J. Oosterheert, E.M. Schadd, A. Verbon, B.J. van Welzen. *HIV nurse consultants:* B.M.G. Griffioen-van Santen, L. van de Koolwijk, I. de Kroon. *HIV clinical virologists/chemists:* F.M. Verduyn Lunel, A.M.J. Wensing.

Wilhelmina Kinderziekenhuis, UMC Utrecht, Utrecht:

HIV treating physicians: Y.G.T. Loeffen, T.F.W. Wolfs. *HIV nurse consultants:* M. Kok. *HIV clinical virologists/chemists:* F.M. Verduyn Lunel, A.M.J. Wensing.

Curaçao Medical Center, Willemstad (Curaçao): *HIV treating physicians:* E.O.W. Rooijackers, D. van de Wetering. *HIV nurse consultants:* A. Alberto. *Data collection:* I. der Meer.

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HIV data monitoring: D. Bergsma, J.M. Grolleman, L.E. Koster, K.J. Lelivelt, S.T. van Loenen, M.J.C. Schoorl, K.M. Visser.

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