

Supplementary Tables

Supplementary Table 1. Overview of categorisation. data source and operationalisation per determinant

Determinant	Categories	Data source	Operationalisation
Individual level			
Sex	Male; Female	Statistics Netherlands, SHC consultation database	
Age (in years)	15-19; 20-24; 25-29; 30-34; 35-39; ≥40	Statistics Netherlands, SHC consultation database	
Migratory background	Native Dutch; Other western; Dutch Antillean; Surinamese; Turkish; Moroccan; Other non-western; Sub-Sahara African (without Cape Verdean); Cape Verdean; Central and Eastern European	Statistics Netherlands, SHC consultation database	Based on a combination of parental country of birth and the person's own country of birth.
Postal code level			
Travel distance to SHC (in kilometres) and travel time (in minutes)	Continuous	ArcGIS and web route planner(s)	Straight-line travel distance between PC centroid and SHC address.
Degree of urbanisation	Very high (≥2500 addresses/km ²) High (1500-2500 addresses/km ²) Moderate (1000-1500 addresses/km ²) Low (500-1000 addresses/km ²) Very low (<500 addresses/km ²)	Statistics Netherlands	
Socioeconomic status	Low (a SES-score less than -1); Average (a score between -1 and +1); High (a score greater than +1)	Netherlands Institute for Social Research	SES was only calculated for four-digit postal with more than 100 households.
Ethnic diversity	In tertiles	Statistics Netherlands	Operationalised as HHI. HHI is based on the percentage of 10 migratory background groups (<i>see migratory background</i>).
Northern or southern part of river Maas	North; South	Statistics Netherlands	

Abbreviations: HHI, Herfindahl-Hirschman Index; km, kilometres; PC, postal code; SES, socioeconomic status; SHC, sexual health centre.

Supplementary Table 2. Univariable multilevel logistic models for SHC utilisation^{a,b}

Determinant	Postal code level variance ^c	PCV (%) ^c	MOR	AUC
Individual level				
Sex	0.69▼	-0.04	2.20	0.534
Age	0.61▼	-11.18	2.10	0.795
Migratory background	0.69▲	+0.86	2.21	0.596
Postal code level				
Degree of urbanisation	0.26▼	-61.88	1.63	0.628
Socioeconomic status	0.54▼	-21.39	2.01	0.564
Ethnic diversity	0.28▼	-59.09	1.66	0.621
Travel distance to SHC in km (continuous)	0.21▼	-70.02	1.54	0.671
Northern or southern part of river Maas	0.56▼	-18.78	1.66	0.567

Abbreviations: AUC, area under the receiver operating characteristics curve; km, kilometre; MOR, median odds ratio; PCV, proportional change in variance; SHC, sexual health centre.

^a SHC utilisation is defined as at least one SHC visit that fulfilled the inclusion criteria (living in the greater Rotterdam area, aged 15 to 45 years, tested for any STI). For each year we only included the first record that met the inclusion criteria during the study period (2015-2017). The model for SHC utilisation includes 1581371 persons.

^b Adjusted for year (2015, 2016, 2017).

^c Null model (Model 0, Table 2) as reference. ▲▼ Postal code level variance higher (▲) or lower (▼) compared to null model.

Supplementary Table 3. Multilevel logistic models for SHC utilisation^a for residents <25 years

Determinant	Model 0 ^b		Model 1		Model 2	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Year						
2015	REF		REF		REF	
2016	0.93	(0.89 - 0.96)	0.93	(0.90 - 0.97)	0.93	(0.90 - 0.97)
2017	0.99	(0.95 - 1.03)	1.00	(0.96 - 1.04)	1.00	(0.96 - 1.04)
Individual level						
Sex						
Male			REF		REF	
Female			1.55	(1.48 - 1.63)	1.55	(1.47 - 1.63)
Age in years						
15-19			0.55	(0.50 - 0.60)	0.55	(0.50 - 0.60)
20-24			REF		REF	
Migratory background						
Native Dutch			REF		REF	
Other western			0.70	(0.55 - 0.91)	0.70	(0.54 - 0.91)
Dutch Antillean			1.55	(1.30 - 1.85)	1.53	(1.29 - 1.83)
Surinamese			1.20	(1.01 - 1.43)	1.20	(1.01 - 1.42)
Turkish			0.27	(0.22 - 0.34)	0.27	(0.22 - 0.33)
Moroccan			0.41	(0.33 - 0.53)	0.41	(0.32 - 0.52)
Other non-western			0.63	(0.51 - 0.78)	0.62	(0.50 - 0.77)
Sub-Sahara African ^c			1.04	(0.84 - 1.28)	1.03	(0.84 - 1.26)
Cape Verdean			1.69	(1.37 - 2.08)	1.67	(1.36 - 2.06)
Central and Eastern European			0.33	(0.25 - 0.42)	0.32	(0.25 - 0.42)
Postal code level						
Degree of urbanisation						
Very high					REF	
High					0.69	(0.59 - 0.81)
Moderately high					0.68	(0.52 - 0.88)
Low					0.70	(0.53 - 0.92)
Very low					0.61	(0.42 - 0.90)
Socioeconomic status						
High					REF	
Average					0.82	(0.68 - 0.98)
Low					0.74	(0.58 - 0.95)
Ethnic diversity						
Low diversity					REF	
Medium diversity					1.34	(1.13 - 1.59)
High diversity					1.80	(1.37 - 2.36)
Travel distance to SHC in km (continuous)			0.92	(0.90 - 0.93)	0.95	(0.94 - 0.96)
Northern or southern part of river Maas						
North					REF	
South					0.90	(0.82 - 0.99)
Additional information						
Measures of variation		P-value		P-value		P-value
Postal code level variance	0.62	<0.001	0.16	<0.001	0.09	<0.001
PCV (%)	REF ^d		74.0%		85.2%	
MOR	2.12		1.47		1.33	
Model performance						
AUC	0.507		0.726		0.733	

Abbreviations: AUC, area under the receiver operating characteristics curve; CI, confidence interval; km, kilometres; MOR, median odds ratio; OR, odds ratio; PCV, proportional change in variance; REF, reference; SHC, sexual health centre.

^a SHC utilisation is defined as at least one SHC visit that fulfilled the inclusion criteria (living in the greater Rotterdam area, aged 15 to 24 years, tested for any STI). For each year we only included the first record that met the inclusion criteria during the study period (2015-2017). The model for SHC utilisation includes 477768 persons <25 years.

^b Model 0 is a null model in which only levels are defined; this model does not contain any individual or postal code level determinants.

^c Sub-Sahara African without Cape Verdean.

^d Reference for Model 1 and Model 2.

Supplementary Table 4. Multilevel logistic models for SHC utilisation^a for residents with a non-Western migratory background

Determinant	Model 0 ^b		Model 1		Model 2	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Year						
2015	REF		REF		REF	
2016	0.96	(0.92 - 1.00)	0.99	(0.97 - 1.01)	0.99	(0.97 - 1.01)
2017	0.94	(0.89 - 0.99)	0.99	(0.97 - 1.01)	0.99	(0.97 - 1.01)
Individual level						
Sex						
Male			REF		REF	
Female			0.99	(0.97 - 1.01)	0.99	(0.97 - 1.01)
Age in years						
15-19			0.77	(0.74 - 0.80)	0.77	(0.74 - 0.80)
20-24			REF		REF	
25-29			0.74	(0.71 - 0.77)	0.74	(0.71 - 0.77)
30-34			0.64	(0.62 - 0.67)	0.64	(0.62 - 0.67)
35-39			0.61	(0.58 - 0.63)	0.61	(0.59 - 0.63)
≥40			0.58	(0.56 - 0.60)	0.58	(0.56 - 0.61)
Migratory background						
Other western			REF		REF	
Dutch Antillean			1.31	(1.25 - 1.37)	1.31	(1.25 - 1.38)
Surinamese			1.14	(1.09 - 1.20)	1.15	(1.09 - 1.20)
Turkish			0.88	(0.84 - 0.92)	0.88	(0.84 - 0.93)
Moroccan			0.93	(0.89 - 0.98)	0.93	(0.89 - 0.98)
Other non-western			0.98	(0.94 - 1.02)	0.98	(0.94 - 1.03)
Sub-Sahara African ^c			1.08	(1.02 - 1.13)	1.08	(1.02 - 1.14)
Cape Verdean			1.37	(1.27 - 1.47)	1.37	(1.27 - 1.47)
Central and Eastern European			0.89	(0.85 - 0.93)	0.89	(0.84 - 0.93)
Postal code level						
Degree of urbanisation						
Very high					REF	
High					0.97	(0.93 - 1.01)
Moderately high					0.95	(0.87 - 1.04)
Low					0.96	(0.88 - 1.06)
Very low					1.02	(0.90 - 1.14)
Socioeconomic status						
High					REF	
Average					0.98	(0.88 - 1.09)
Low					0.95	(0.83 - 1.08)
Ethnic diversity						
Low diversity					REF	
Medium diversity					1.02	(0.97 - 1.07)
High diversity					1.07	(0.99 - 1.15)
Travel distance to SHC in km (continuous)			0.99	(0.99 - 0.99)	0.99	(0.99 - 1.00)
Northern or southern part of river Maas						
North					REF	
South					0.98	(0.97 - 1.01)
Additional information						
Measures of variation		P-value	P-value		P-value	
Postal code level variance	0.21	<0.001	0.00	<0.001	0.00	<0.001
PCV (%)	REF ^d		100.0%		100.0%	
MOR	1.55		1.00		1.00	
Model performance						
AUC	0.508		0.774		0.775	

Abbreviations: AUC, area under the receiver operating characteristics curve; CI, confidence interval; km, kilometres; MOR, median odds ratio; OR, odds ratio; PCV, proportional change in variance; REF, reference; SHC, sexual health centre.

^a SHC utilisation is defined as at least one SHC visit that fulfilled the inclusion criteria (living in the greater Rotterdam area, aged 15 to 45 years, tested for any STI). For each year we only included the first record that met the inclusion criteria during the study period (2015-2017). The model for SHC utilisation includes 603357 persons.

^b Model 0 is a null model in which only levels are defined; this model does not contain any individual or postal code level determinants.

^c Sub-Saharan African without Cape Verdean.

^d Reference for Model 1 and Model 2.