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# Does migration background differently affect the impact of risk factors associated with HIV infection among men who have sex with men ?

Risk assessment among MSM with different migration backgrounds.

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## Abstract

**Background:** Limited research has examined differences in risk behaviour among men who have sex with men (MSM) with a migration background in the Netherlands and the role of these risk behaviours in HIV infection among MSM with migration background, while research indicated that MSM with a migration background are disproportionately impacted by HIV infection (Beyrer, 2012; CDC, 2011; Wohl et al., 2013).

**Aim:** The aim of this study was to test if migration background differently affect the impact of risk factors associated with HIV infections among MSM.

**Methods:** This research had a cross-sectional design. The data used for this research was retrieved from the online survey 'Men & Sexuality 2018'. Multiple socio-demographic and behavioural risks factors were included. Age, sexual preference, residency, education, number of sexual partners, condom use with steady, casual or one-time partners, alcohol use and drug use were examined among MSM with a migration background, Non-Western ($n$ = 722), Western ($n$ = 448) and Dutch ($n$ = 5035) MSM in the Netherlands.

**Results:** Chi-square test showed that people with different migration groups differed on all variables, except for having casual sexpartners (p=0.061), drugs use (p=0.623) and the prevention method withdrawal before ejaculation (p=0.160). In multiple stratified regression models, the risk factors normally associated with HIV infection were confirmed. However, in contradiction with the hypothesis no association was observed for the interaction effects of migration background. In sum, migration groups differ in socio-demographic characteristics and risk behaviour, thereby their chance of getting HIV infected, although the risk on HIV infection appears to be similar to Dutch MSM.

**Conclusions:** These data underscore the differences in socio-demographic characteristics and behaviour factors among MSM with a migration background and emphasize the need for effective behavioural strategies designed to prevent health disparities among MSM with a migration background. These findings can be used to shape effective risk reduction programs and behavioural counseling taking into account their different socio-demographic characteristics and risk behaviour , especially for Non-western MSM who differ the most in socio-demographic characteristics and risk behaviour from Dutch MSM.


[Keywords: Migration background, MSM, sexual orientation, HIV infection, risk behaviour wordcount: 335]

## Introduction

Human migration has increased globally during the last decade (United Nations, 2013). In the Netherlands for example in 2017, 210.000 people with a migration background came to the Netherlands (CBS, 2019). Since the beginning of the official migration statistics in 1865 these migration numbers have never been so high (CBS, 2019).

Men who have sex with men (MSM) with a migration background have different reasons for migrating to the Netherlands. Social and political factors can force MSM to migrate. For example, one of the reasons of migration is that in parts of the world MSM are persecuted for their sexual orientation (Strömdahl et al., 2017).

A Swedish study of Strömdahl and colleagues (2017) suggest that foreign-born MSM are not only exposed to a high risk of HIV before migration, but also after migration, while living in Sweden. While the Netherlands is open towards sexual orientation, MSM with a migration background might be influenced by the struggle with homophobia and discrimination in their birth county (Sandfort, 2007). This could limit their access to prevention services in the Netherlands, hence increase their vulnerability on HIV.

Furthermore, MSM with a migration background (especially Non-Western MSM) tend to live in communities with restricted freedom regarding sexual orientation were MSM are heavily stigmatized (Wohl et al., 2013; Lewis, 2003; Stall et al., 2003). Because stigma is associated with HIV infection there is reason to believe that MSM with a migration background tend to have higher risk at HIV infection (Wohl et al., 2013; Lewis, 2003; Stall et al., 2003).

This is a problem because this leads to differences in chances of good health (health disparity) between population groups, conflicting with the principles of social justice and public health care striving for equal chances of health (Ruger, 2010).

Because health disparities related to minority groups have been identified as one of the most pronounced gaps in health research (CFDCP, 2011; Wohl et al., 2013), we will investigate whether migration background affects the impact of risk factors associated with HIV infections among men who have sex with men.

### Risk factors among MSM with a migration background

Worldwide MSM are at risk for HIV infection, contributing 42% of estimated new HIV cases in Europe in 2015 (ECDC,2015). In addition, 35% of newly diagnosed HIV infections

were reported among migrants in Europe (ECDC, 2015). This is a serious problem, because untreated HIV infection and acquired immunodeficiency syndrome (AIDS) leads to causes of illness and possible death (Celum et al., 2014).

Although there is a lack of studies including MSM with a migration background in the Netherlands, Beyrer (2012) and colleagues found that among US MSM, a particular concern is the disproportionate burden of HIV infection among non-Caucasian MSM. A meta-analysis across 21 countries containing 174 studies in de US also found greater prevalence of HIV among MSM with different ethnicity (CDC, 2011). While these studies focus on race and ethnicity, they do not take migration in consideration, whilst cross-sectional and longitudinal studies show that MSM and especially MSM with a migration background in the US are at strikingly higher risk of HIV infection (Rosario et al., 2006; Prejean et al., 2011).

Most studies conclude that HIV infection is mostly attributable to sexual risk–taking behaviour (Beyrer, 2010; Rosario at al., 2006; Celum et al., 2014; Mustanski et al., 2011). Recent evidence suggests that racial differences in HIV infection rates among MSM may potentially depend on factors other than behavioural risks (Millett et al., 2007). Where the authors of a qualitative review found that darker skin MSM were no more likely than MSM of other races or ethnicities to engage in sexual risk behaviour (Millett et al., 2007). However, findings of Johnson and colleagues (2008) show that MSM with a migration background do differ in sexual risk taking behaviour. Because of the contradictions in findings, we are interested in whether migration background differently affect sexual risk behaviours associated with HIV infection among MSM in the Netherlands.

Other than sexual-risk behaviour, epidemiological studies demonstrate MSM with a migration background are at increased risk for substance use disorders (Safren et al., 2011; Stueve et al., 2002). Substance use might be a reflection of MSM with a migration background experience at not being able to integrate easily and well (International Centre for Migration & Health (ICMH), 1998, in Carballo et al., 1998). The ICMH (1998) highlighted the extent of drugs use of MSM with a migration background and how difficult it is for them to find culturally acceptable and sensitive help for their drugs problem. In addition, an older study in the Netherlands (Amsterdam) noticed that about a half of a programme for hard drugs users were foreign born (Jong & Reis, 1994 in Carballo et al., 1998). Furthermore, a recent study shows that

Non-Western males in the Netherlands often use drugs in comparison with the Western and Dutch males (Graaf et al., 2010).

Furthermore, in France (Bendahman, 1993, in Carballo et al., 1998), drug use of migrants is seen as a manifestation of social marginalization, and as an expression of anger/frustration at the difficulties of integration. A study of psychological stress and coping among Greek immigrant adolescents in Sweden (Giannopoulou, 1988, in Carballo et al., 1998) tends to confirm this, and similar observations have been reported from Germany (Akbiyik, 1990, in Carballo et al., 1998). In addition, we think that drugs use could be seen as an idiom of distress and need to be considered in socio-political contexts and not just be seen in terms of psychological processes intrinsic to individuals. At the level of symbolic protest, they constitute a language for social suffering (Jong & Reis, 2010).

Because multiple studies suggest that substance use, both drug and alcohol use are associated with a higher prevalence of sexual risk behaviours with higher risk at HIV infection (Marshal et al., 2008; Rosario et al., 2006; Stueve et al., 2002; Koblin et al., 2011), the problem of substance use within the framework of poor post-migration adjustment as well as other health problems deserves greater priority as a looming public health problem with a great impact for foreign born MSM.

**Prevention strategies among MSM with a migration background**

There is growing evidence that for MSM with a migration background health and social services are less accessible (Carballo 1998; Beyrer, 2012). Carballo (1998) claims the problem is the lack of capacity of the immigrant to make appropriate use of these services. Although, a more logic explanation would be the lack of capability of people with a migration background to use these services were capabilities are defined as the alternative combinations of functionings that are feasible for a person to achieve (Sen, 2009). Another explanation is that the stigma and shame that MSM with a migration background experience, limit their access to prevention services (Beyrer, 2012).

Prevention services are of great importance, because effective prevention methods like the use of condoms reduce the sexual risk taking and contributes to lower level of HIV infection and transmission (Beyrer, 2012; Johnson et al., 2008; Mustanski et al., 2011; Strömdahl et al., 2017). In the Netherlands, Soa Aids Nederland advices condom use as a safe prevention method

to reduce HIV transmission (Soa aids, 2014; Ellis et al., 2003). From different prevention approaches, condom use is the most common risk reduction strategy among Dutch MSM. Around 80% of the Dutch MSM follows the sexual behavioural advice of Soa Aids Nederland in relation to condom use (Soa aids, 2014; Ellis et al., 2003).

However, MSM with a migration background use a range of different community-generated prevention approaches (Beyrer, 2012; Strömdahl et al., 2017), including serosorting (i.e., selecting partners on the basis of known or assumed HIV status), strategic positioning (i.e., limiting receptive or insertive roles in anal intercourse on the basis of self or partner known or assumed HIV status), withdrawal before ejaculation, and viral load sorting (only have condomless sex with someone who has HIV if their virus is suppressed due to treatment). Most of these approaches to reduce risk of HIV infection have not been subjected to formal study, some may be ineffective, and some may increase health risks (Johnson et al., 2008).

**The present study**

Prior research regarding risks on HIV infections occurred to a large extent in heterogeneous populations of MSM, without specific focus on migration background (Beyrer, 2012). Limited research has focused on the health disparities among MSM with different migration backgrounds (Beyrer, 2012) and the impact of migration background on risk factors associated with HIV infections (CDC, 2011; Wohl et al., 2013). Hence, we will compare Dutch MSM with MSM with a migration background. This study focusses on factors associated with HIV infection pertinent to MSM from different migration backgrounds (Non-Western and Western MSM).

## Methods

The data used for this research was retrieved from the online survey 'Men & Sexuality 2018 (Den Daas et al., 2018).The survey was available in Dutch, English, French, Farsi, Arabic and Turkish.

### Design and Participants

This research had a cross-sectional design. The recruitment plan of Soa Aids Nederland focused on the target group MSM with extra attention to MSM with a migration background and young MSM (Den Daas et al., 2018). In this study we follow the definition of the CBS were migration background has been based on the individual's country of birth and of the individual's parents' (foreign background when at least one parent was born abroad) (Keij, 2000). First generation migrants are born abroad; second generation migrants are born in the Netherlands, but one or both parent(s) were born abroad. With exception of expatriates and when both parents were born in the Netherlands.

Exclusion criteria were missing age or sexual behaviour, age below 16, women, respondents that only had sex with women and that never had sex and were only attracted to women. Of the 8101 respondents 99% gave informed consent (N=7986). Of these participants 1781 people were excluded and for the final sample size 6205 participants were included in the analysis.

### Procedure

Participants were able to participate through an online link. The survey started after the participant gave informed consent. The survey started with information about the content of the research. Dependent on the personal answers of the participants' questions that were not relevant were automatically skipped. Appendix 2 includes the measurement with the questions relevant to this research.

### Measures

The outcome **HIV status** was assessed with one item for the people that have tested on HIV: "What was the outcome of your last HIV test?" Where HIV positive was designed as 1 and

HIV negative, still waiting for results and I don't know were designated as 0 (category other). Participants never tested for HIV were excluded.

**Number of sexual partners** was measured using one item about the number of sexual partners past six months: "With how many different men have you had anal sex in the last six months? Answers were given from no anal sex partners, one anal sex partner, two to five anal sex partners and more than five anal sex partners.

**Partnership and condom use** was measured using the three items regarding participants' sexual relationships with steady, casual partners and one-time partners. For example: "Have you had anal sex with one or more one-time, casual or steady partner(s) in last six months?" Answers were given from 'No'(1) till 'Yes'(2). Where no partner was designed as 0, having one of more partner(s) using condoms as 1 and having one or more partner(s) without using condoms as 2.

**Prevention methods** were measured using items about different strategies to prevent HIV transmission for the three types of partners; Withdrawal (No ejaculation inside each other) (1), Serosorting (only having sex with someone who has the same HIV status as you) (2) Strategic positioning (someone who is (possibly) HIV positive only take bottom position) (3) Viral load sorting (only have condomless sex with someone who has HIV if their virus is suppressed due to treatment) (4). For analysis average scores were computed, higher average scores indicated greater prevention strategies. Prevention methods measures used a five-point Likert-type scale in which participants that had sex with a steady partner, casual partner or one-time partner were asked to rate how often they used HIV prevention methods "never (5)" to "almost always(1)". One of the preventions methods questions included "How often in the last six months did you do withdrawal, serosorting, strategic positioning or viral load sorting with one-time, casual or steady partners to prevent HIV infection (or transmission)?".

**Drug use** was measured by one item: "Did you use drugs before or during sex in the last six months?". Answers were given from 'Yes'(1) till 'No(2).

**Alcohol use** measures used a five-point Likert-type scale in which participants were asked to rate how often they drank alcohol "never (1)" to "always when I have sex(5)". The alcohol use question included: "Have you drank any alcohol before or during sex in the last six months?". Categories were divided in two groups; Never(0) indicated no alcohol use and higher score (1) indicated alcohol use.

In this study **socio-demographic characteristics**, including **age** in years; <25, 25-39 and 40+, **sexual preference** (Homosexual & Other), Other contains Bisexual, hetero, Asexual or Other. **Educational level** (high, low) where none, primary school, general secondary school and lower vocational secondary school and intermediate vocational education were assigned to low educational level and higher general education or A-level/pre-university secondary education and higher vocational education or university to high educational level, **residency** (High level of urbanization and low level of urbanization) Very strongly and strongly were assigned to high levels of urbanization whether neutral, not or not at all were assigned to low levels of urbanization. The variable **migration background** is divided into five levels; Dutch, Western 1st generation, western 2nd generation, Non-Western 1st generation and Non-Western 2nd generation.

**Data analyses**

Chi square analyses were conducted to analyse if MSM with a migration background differ in socio-demographic characteristics or risk behaviour (including the outcome HIV status). Univariate regression analyses were conducted to examine if migration background differently affect each risk factor associated with HIV infection. Because of low number of HIV infection in Western 2nd generation MSM, MSM with a first- and second-generation migration background were merged for the multivariate analysis. Furthermore to resolve the lack of power, the regularization method Lasso is used to improve the predictive error of the model (Tibshirani, 1996). Lasso provides a form of variable selection, the coefficients that shrunk to 0 are excluded from the model. With this variable selection stratified multivariate logistic regression analyses were conducted examine if migration background differently affect risk factors associated with HIV infection while controlling for all variables in the model.

## Results

Socio-demographic characteristics and risk behaviour of the participants are presented in Table 1. Chi-square test showed that people with different migration groups differed on all variables, except for having casual sexpartners (p=0.061), drugs use (p=0.623) and the prevention method withdrawal before ejaculation (p=0.160). The different migration groups that were compared: Western 1st generation, Western 2nd generation, Non-Western 1st generation, Non-Western 2nd generation and Dutch MSM.

Non-Western first generation MSM differed on, education (p<0.001), residency (p<0.001), number of sexual partners (p=0.002), having one-time partners (p=0.025), serosorting (p<0.001), strategic positioning (p<0.001) and detecting viral load (p=0.040). Non-Western first generation background were often highly educated, were more often living in cities, had often more than five anal sex partners, often had a one-time partner(s) and were mostly not using condoms with a one-time partner, were often serosorting, strategic positioning and detecting viral load compared to the other groups.

Furthermore, Non-Western second generation MSM differed on, age (p<0.001), steady partners (p=0.003) and alcohol use (p=0.016). MSM with a Non-Western second generation background were often under 25 years compared to the other groups and both Non-western groups had less people above 40 years than the other groups. Non-Western second generation background often did not had a steady partner while Dutch and Western first generation were often not using condoms with a steady partner compared to the other groups. MSM with a Non-Western second generation background were often not drinking alcohol while Western first generation drank alcohol more often compared to the other groups. Moreover, Western first generation differed on sexual preference (p=0.006). MSM with a Western first generation background were more often homosexual compared to the other groups.

These findings were in line with the expectations; there are socio-demographic and behavioural differences between de different migration groups.

**Table 1** *Chi squares conducted with socio-demographic characteristics and behavioural factors for Dutch, Western and Non-Western men who have sex with men (MSM), The Netherlands, 2019, (n = 6205)*

| | W1 (n=258) | | W2 (n=194) | | NW1 (n=312) | | NW2 (n=406) | | NL (n=5035) | | Total (n=6205) | | Chi square (χ2) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % | n | % | |
| Age_3gr | | | | | | | | | | | | | **117.959** |
| <25 | 67 | 26,0 | 73 | 37,6 | 87 | 27,9 | 192 | 47,3 | 1729 | 34,4 | 2148 | 34,6 | |
| 25-39 | 82 | 31,8 | 52 | 26,8 | 149 | 47,8 | 105 | 25,9 | 1299 | 25,8 | 1687 | 27,2 | |
| >40 | 109 | 42,2 | 69 | 35,6 | 76 | 24,4 | 109 | 26,8 | 2007 | 39,9 | 2370 | 38,2 | |
| Sexual Preference | | | | | | | | | | | | | **14.584** |
| Homosexual | 225 | 87,2 | 161 | 83,0 | 257 | 82,4 | 321 | 79,1 | 4297 | 85,3 | 5261 | 84,8 | |
| Bisexual/other | 33 | 12,8 | 33 | 17,0 | 55 | 17,6 | 85 | 20,9 | 738 | 14,7 | 944 | 15,2 | |
| Education | | | | | | | | | | | | | **56.661** |
| Low | 58 | 22,6 | 71 | 36,8 | 62 | 20,0 | 139 | 34,2 | 1860 | 37,0 | 2190 | 35,4 | |
| High | 199 | 77,4 | 122 | 63,2 | 248 | 80,0 | 267 | 65,8 | 3168 | 63,0 | 4004 | 64,6 | |
| Residency | | | | | | | | | | | | | **112.423** |
| Low level of urbanization | 35 | 15,8 | 47 | 26,6 | 35 | 12,6 | 72 | 19,4 | 1597 | 34,0 | 1786 | 31,1 | |
| High level of urbanization | 187 | 84,2 | 130 | 73,4 | 243 | 87,4 | 299 | 80,6 | 3103 | 66,0 | 3962 | 68,9 | |
| Number of sexual partners | | | | | | | | | | | | | **31.006** |
| 0 | 38 | 16,0 | 28 | 16,5 | 37 | 13,2 | 67 | 19,4 | 746 | 16,8 | 916 | 16,8 | |
| 1 | 60 | 25,2 | 48 | 28,2 | 64 | 22,8 | 107 | 31,0 | 1459 | 32,9 | 1738 | 31,8 | |
| 2-5 | 82 | 34,5 | 55 | 32,4 | 102 | 36,6 | 103 | 29,9 | 1332 | 30,1 | 1674 | 30,6 | |
| >5 | 58 | 24,4 | 39 | 22,9 | 78 | 27,8 | 68 | 19,7 | 892 | 20,1 | 1135 | 20,8 | |
| Steady partner(s) | | | | | | | | | | | | | **22.968** |
| No | 137 | 57,3 | 117 | 66,5 | 173 | 62,0 | 241 | 68,1 | 2695 | 59,3 | 3363 | 60,1 | |
| Yes +condom | 20 | 8,4 | 7 | 4,0 | 24 | 8,6 | 23 | 6,5 | 274 | 6,0 | 348 | 6,2 | |
| Yes condomless | 82 | 34,3 | 52 | 29,5 | 82 | 29,4 | 90 | 25,4 | 1577 | 34,7 | 1883 | 33,7 | |
| One-time partner(s) | | | | | | | | | | | | | **17.562** |
| No | 103 | 45,8 | 76 | 48,7 | 113 | 43,3 | 165 | 53,2 | 2182 | 53,0 | 2639 | 52,1 | |
| Yes +condom | 50 | 22,2 | 31 | 19,9 | 49 | 18,8 | 54 | 17,4 | 772 | 18,8 | 956 | 18,9 | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Yes condomless | 72 | 32,0 | 49 | 31,4 | 99 | 37,9 | 91 | 29,4 | 1161 | 28,2 | 1472 | 29,1 | |
| Casual partner(s) | | | | | | | | | | | | | 14.896 |
| No | 115 | 53,5 | 76 | 52,1 | 113 | 47,1 | 169 | 59,7 | 2210 | 57,2 | 2683 | 56,5 | |
| Yes +condom | 36 | 16,7 | 20 | 13,7 | 38 | 15,8 | 33 | 11,7 | 483 | 12,5 | 610 | 12,9 | |
| Yes condomless | 64 | 29,8 | 50 | 34,2 | 89 | 37,1 | 81 | 28,6 | 1170 | 30,3 | 1454 | 30,6 | |
| Drug use | | | | | | | | | | | | | 2.572 |
| No | 105 | 64,0 | 85 | 70,2 | 138 | 67,0 | 158 | 68,1 | 2216 | 69,3 | 2702 | 68,9 | |
| Yes | 59 | 36,0 | 36 | 29,8 | 68 | 33,0 | 74 | 31,9 | 982 | 30,7 | 1219 | 31,1 | |
| Alcohol use | | | | | | | | | | | | | **12.197** |
| No | 39 | 23,9 | 33 | 26,8 | 68 | 32,7 | 89 | 38,9 | 972 | 30,3 | 1201 | 30,5 | |
| Yes | 124 | 76,1 | 90 | 73,2 | 140 | 67,3 | 140 | 61,1 | 2238 | 69,7 | 2732 | 69,5 | |
| Withdrawal before ejaculation | | | | | | | | | | | | | 6.578 |
| Non frequent | 116 | 62,7 | 87 | 66,4 | 135 | 64,3 | 168 | 72,4 | 2251 | 55,8 | 2757 | 68,9 | |
| Frequent | 69 | 37,3 | 44 | 33,6 | 75 | 35,7 | 64 | 27,6 | 1023 | 25,0 | 1275 | 31,1 | |
| Serosorting | | | | | | | | | | | | | **31.305** |
| Non frequent | 110 | 59,5 | 86 | 65,6 | 114 | 54,3 | 154 | 66,4 | 2294 | 70,1 | 2758 | 68,4 | |
| Frequent | 75 | 40,5 | 45 | 34,4 | 96 | 45,7 | 78 | 33,6 | 980 | 29,9 | 1274 | 31,6 | |
| Strategic positioning | | | | | | | | | | | | | **29.669** |
| Non frequent | 159 | 85,9 | 121 | 92,4 | 171 | 81,4 | 211 | 90,9 | 2997 | 91,5 | 3659 | 90,7 | |
| Frequent | 26 | 14,1 | 10 | 7,6 | 39 | 18,6 | 21 | 9,1 | 277 | 8,5 | 373 | 9,3 | |
| Viral load sorting | | | | | | | | | | | | | **10.031** |
| Non frequent | 165 | 89,2 | 119 | 90,8 | 178 | 84,8 | 216 | 93,1 | 2965 | 90,6 | 3643 | 90,4 | |
| Frequent | 20 | 10,8 | 12 | 9,2 | 32 | 15,2 | 16 | 6.9 | 309 | 9,4 | 389 | 9,6 | |
| HIV status | | | | | | | | | | | | | **17.464** |
| HIV+ | 23 | 12,4 | 7 | 6,0 | 35 | 16,4 | 15 | 6,7 | 280 | 9,2 | 360 | 9,5 | |
| HIV- | 162 | 87,6 | 109 | 94,0 | 179 | 83,6 | 208 | 93,3 | 2765 | 90,8 | 3423 | 90,5 | |

*Note:* Sexual preference: other contains Hetero, Asexual or Other. Education: none, primary school, general secondary school, lower vocational secondary school and intermediate vocational education were assigned to low educational level and higher general education or A-level/pre-university secondary education and higher vocational education or university to high educational level. Residency: very strongly and strongly were assigned to high levels of urbanization whether neutral, not or not at all were assigned to low levels of urbanization. The number of sexual partners are the number of anal sexpartners in the past six months. One-time, casual and steady were considered as one or multiple anal sex partner(s) in the past six months. The prevention method withdrawal means no ejaculation inside each other. Serosorting means only having sex with someone who has the same HIV status as you. Strategic positioning means someone who is (possibly) HIV positive only take bottom position. Viral load sorting mean only have condomless sex with someone who has HIV if their virus is suppressed due to treatment. Never, Rarely and sometimes are divided to non frequent use of the prevention methods and often and almost always to frequent use of the prevention method.

The association of Socio-demographic characteristics and risk behaviour of the participants on HIV infection is presented in Table 2. Univariate regression analysis showed that all risk factors were indeed associated with HIV infection among the total study population, except for education, having a steady partner with or without using condoms, casual partner using condoms and strategic positioning.

Even though educational level was not significantly associated with HIV infection, there was an interaction between educational level and migration background; education did play a role for people with a non-western migration background. Specifically, highly educated Non-western MSM were at lower risk for HIV infection (p=0.010, OR=0.33 CI95% 0.143-0.765).

Having had one or more one-time partners in the past six months was significantly associated with HIV infection. MSM with a one-time partner and using condoms have lower odds for HIV infection (p=0.010, OR=0.53 CI95% 0.325-0.856) while MSM with a one-time partner not using condoms had higher odds for HIV infection (p<0.001, OR=3.42 CI95% 2.612-4.490). This association did also interact with migration background, only Non-Western second generation not using condoms during sex with a one-time partner were even at lower risk for HIV infection in comparison with Dutch MSM (p=0.017, OR=0.22 CI95% 0.062-0.759).

Having had one or more casual partners without using condoms was significantly associated with HIV infection. MSM with a casual partner without using condoms have higher odds for HIV infection (p<0.001, OR=2.78 CI95% 2.136-3.617) while MSM with a casual partner using condoms had the same odds for HIV infection (p=0.268, OR=0.76 CI95% 0.436-1.239) compared to MSM not having a casual partner. This association did also interact with migration background, only Non-western second generation not using condoms during sex with a one-time partner were at even lower risk for HIV infection in comparison with Dutch MSM (p=0.007, OR=0.16 CI95% 0.042-0.605).

Serosorting was significantly associated with HIV infection. MSM that often used the prevention method serosorting were at lower odds for HIV infection, (p=0.003, OR=0.61 CI95% 0.440-0.842). This association did also interact with migration, Non-western first generation were even at lower risk for HIV infection when serosorting in comparison with Dutch MSM (p=0.025, OR=0.27 CI95% 0.084-0.848).

Viral load sorting was significantly associated with HIV infection. MSM that often used the prevention method viral load detection are at higher odds for HIV infection, (p<0.001,

OR=3.06 CI95% 2.150-4.359). This association did also interact with migration, only Non-Western first generation were even at lower risk for HIV infection when detecting viral load (p=0.011, OR=0.18 CI95% 0.049-0.679).

**Table 2** *Univariate regression models conducted with socio-demographic characteristics and behavioural factors for Dutch, Western and Non-Western men who have sex with men (MSM), The Netherlands, 2019, (n = 6205)*

| | *Main effects* | *Interaction effects* | | | |
|---|---|---|---|---|---|
| | | W1 | W2 | NW1 | NW2 |
| | OR CI(95) | OR CI(95) | OR CI(95) | OR CI(95) | OR CI(95) |
| Age > 25 | 1 | | | | |
| Age 25-39 | 3.277 [1.846-5.816] | 1.009 [0.105-9.654] | NA | 1.665 [0.335-8.259] | 0.847 [0.182-3.929] |
| Age 40+ | 7.776 [4.565-13.245] | 1.332 [0.159-11.138] | NA | 0.933 [0.182-4.780] | 0.369 [0.081-1.687] |
| Sexual Preference Homosexual | 1 | | | | |
| (Bisexual/Other) | 0.502 [0.299-0.843] | 1.619 [0.320-8.183] | NA | 0.892 [0.232-3.437] | NA |
| Residency high level of urbanisation | 1 | | | | |
| Low level of urbanisation | 1.249 [0.937-1.664] | 2.685 [0.334-21.570] | 1.232 [0.135-11.275] | 1.090 [0.295-4.030] | 1.922 [0.237-15.597] |
| Education Low | 1 | | | | |
| Education High | 0.909 [0.702-1.178] | 1.091 [0.367-3.246] | 0.390 [0.081-1.878] | 0.331 [0.143-0.765] | 1.911 [0.508-7.188] |
| Number of sexual partners >5 | 1 | | | | |
| 2-5 | 0.352 [0.259-0.479] | 0.891 [0.271-2.929] | NA | 0.858 [0.314-2.349] | 2.609 [0.539-12.642] |
| 1 | 0.205 [0.142-0.296] | 1.463 [0.335-6.039] | 4.695 [0.834-26.425] | 2.002 [0.683-5.987] | 4.790 [0.975-23.533] |
| 0 | 0.341 [0.231-0.503] | 2.088 [0.600-7.267] | 1.817 [0.167-19.757] | 0.974 [0.246-3.854] | 4.008 [0.805-19.961] |
| No steady partner | 1 | | | | |
| Steady + condom | 0.839 [0.456-1.546] | 0.407 [0.046-3.579] | NA | 0.886 [0.167-4.708] | 3.360 [0.589-19.485] |
| Steady no condom | 1.181 [0.914-1.525] | 0.568 [0.203-1.591] | 2.327 [0.482-11.235] | 1.078 [0.476-2.438] | 0.628 [0.163-2.426] |
| No one-time partner | 1 | | | | |
| One-time + condom | 0.527 [0.325-0.856] | 1.232 [0.285-5.328] | NA | 1.239 [0.298-5.150] | 1.253 [0.240-6.538] |
| One-time no condom | 3.424 [2.612-4.490] | 0.648 [0.237-1.768] | 0.312 [0.064-1.522] | 0.623 [0.264-1.466] | 0.218 [0.062-0.759] |
| No Casual partner | 1 | | | | |
| Casual + condom | 0.757 [0.463-1.239] | 0.378 [0.044-3.263] | NA | 0.505 [0.100-2.549] | 0.407 [0.048-3.468] |
| Casual no condom | 2.779 [2.136-3.617] | 0.747 [0.289-1.928] | 0.357 [0.074-1.733] | 0.670 [0.292-1.535] | 0.159 [0.042-0.605] |
| No drug use | 1 | | | | |
| Drug use | 3.308 [2.533-4.322] | 0.798 [0.275-2.313] | 0.127 [0.013-1.200] | 0.849 [0.371-1.944] | 0.690 [0.197-2.420] |
| No Alcohol use | 1 | | | | |
| Alcohol use | 0.549 [0.420-0.717] | 0.496 [0.165-1.486] | 1.998 [0.208-19.187] | 1.823 [0.770-4.313] | 0.793 [0.226-2.783] |
| Non frequent Withdrawal | 1 | | | | |
| Frequent Withdrawal | 0.478 [0.340-0.670] | 1.201 [0.384-3.754] | 2.443 [0.408-14.612] | 0.652 [0.222-1.920] | 2.775 [0.742-10.382] |
| Non frequent Serosorting | 1 | | | | |
| Frequent Serosorting | 0.609 [0.440-0.842] | 0.941 [0.302-2.931] | 0.727 [0.079-6.674] | 0.267 [0.084-0.848] | 0.270 [0.033-2.218] |
| Non frequent Strategic Positioning | 1 | | | | |
| Frequent Strategic Positioning | 1.191 [0.748-1.896] | 0.358 [0.042-3.028] | NA | 0.215 [0.045-1.024] | NA |
| Non frequent Viral load sorting | 1 | | | | |
| Frequent Viral load sorting | 3.061 [2.150-4.359] | 1.947 [0.529-7.172] | 0.775 [0.077-7.793] | 0.181 [0.049-0.679] | NA |

Note: A explanation of the variables used are noted under table.

In table 3 a multiple stratified regression model is presented for MSM with a migration background to examine the main predictors associated with HIV infection, while controlling for all factors included in the model. Stratified multivariate logistic regression analyses showed that the main effects of risk behaviour were associated with HIV infection, but in contradiction with the hypothesis, no association was observed for the interaction effects of migration background.

Factors that remained significant factors associated with HIV infection for the total study population were age, number of sexual partners, having one or more one-time sex partners regardless their condom use and drug use.

MSM in higher age groups were at higher odds for HIV, 25-39 years (OR=2.58 CI95% 1.407-4.725) and above 40 years (OR=6.07 CI95% 3.453-10.678). MSM using drugs were at higher risk for HIV infection (OR=2.44 CI95% 1.806-3.293). Both MSM having one anal sex partner (OR=0.59 CI95% 0.346-0.994) as well having two to five anal sex partners (OR=0.64 CI95% 0.443-0.913) had lower odds on HIV infection compared to more than five anal sex partners. However, not having an anal sex partner (OR=0.76 CI95% 0.414-1.378) had the same odds for HIV infection in comparison with MSM with more than five anal sex partners.

In line with the expectations, using condoms during sexual intercourse with one-time partners have lower odds on HIV infection (OR=0.41 CI95% 0.228-0.772). While, not using condoms during sexual intercourse with one-time partners was associated with HIV infection (OR=1.79 CI95% 1.150-2.792).

**Table 3** *Multiple stratified regression model conducted with socio-demographic characteristics and behavioural factors for Dutch, Western and Non-Western men who have sex with men (MSM), The Netherlands, 2019, (n = 6205)*

| | *Main effects* | *Interaction effects* | |
|---|---|---|---|
| | | W | NW |
| | Adjusted OR CI(95) | Adjusted OR CI(95) | Adjusted OR CI(95) |
| Age <25 | 1 | | |
| Age 25-39 | **2.58** [1.407-4.725] | NA | 1.68 [0.471-6.003] |
| Age 40+ | **6.07** [3.453-10.678] | NA | 0.62 [0.168-2.257] |
| Number of sexual partners >5 | 1 | | |
| 2-5 | **0.64** [0.443-0.913] | 0.51 [0.114-2.273] | 1.02 [0.383-2.735] |
| 1 | **0.59** [0.346-0.994] | 1.08 [0.135-8.663] | 1.04 [0.248-4.336] |
| 0 | 0.76 [0.414-1.378] | 1.89 [0.251-14.153] | 0.82 [0.161-4.148] |
| No one-time partner | 1 | | |
| One-time + condom | **0.41** [0.228-0.772] | 0.52 [0.047-5.767] | 1.13 [0.257-4.959] |
| One-time no condom | **1.79 [**1.150-2.792] | 0.68 [0.125-3.758] | 0.72 [0.219-2.339] |
| No drug use | 1 | | |
| Drug use | **2.44 [**1.806-3.293] | 0.76 [0.236-2.452] | 0.91 [0.420-1.951] |

*Note:* The number of sexual partners are the number of anal sexpartner(s) in the past six months. One-time partners considered one or multiple anal sex partner(s) in the past six months.

## Discussion

In this study, we focus on MSM with a migration background, because migration is rising in the Netherlands and MSM with a migration background have higher risk at HIV infection. High percentages (35%) of the new cases (42%) of HIV infection among MSM in Europe have a migration background (ECDC, 2015). This is a problem because this leads to differences in chances of good health (health disparity) between population groups, conflicting with the principles of social justice and public health care striving for equal chances of health (Ruger, 2010). Our study is of great importance, because Ruger (2010) mentions that nothing is more important for the world's population than the pursuit of health and social justice.The findings of this study gives the public health services instructions for targeted interventions and contributes to defending the right to health and the imperative of reducing unconscionable health inequalities and thus contribute to a more socially just healthcare system (Ruger, 2010).

If we look at the final model; age, number of sexual partners, having one or more one-time sex partners regardless of their condom use and drug use were still associated with HIV infection. Contrary to our expectations, there is no longer an interaction effect of migration background, which means that migration background does not differently affect the impact of risk behaviour on HIV infection. Although migration groups differ in all socio-demographic characteristics (age, preference, education and residency) and risk behaviour (number of sexual partners, steady partners, one-time partners, different prevention methods and alcohol use) except for drug use, casual partner and the prevention method withdrawal, thereby their chance of getting HIV infected, the risk on HIV infection appears to be similar to Dutch MSM.

Therefore it is interesting to focus on risk reduction programs, for example behavioural counselling including impulse control and consequences of high numbers of sex partners, the importance of condom use or information about the effectivity of different prevention methods to prevent HIV infection and transmission. This approach will be effective in preventing HIV infection and transmission among MSM with a migration background when the program is attracted to and adjusted for MSM with a migration background, especially for Non-western MSM. Because Non-Western MSM differ the most in socio-demographic characteristics and risk behaviour from Dutch MSM.

Selection bias is a possible explanation for migration background not affecting the impact of risk behaviour on HIV infection. MSM with a migration background that were

influenced by the struggle with homophobia and discrimination in their birth county, have experience at not being able to integrate easily and well, have lack of capacity or capability, or experience stigma and shame what limit their access to health- prevention and social services resulting in increased vulnerability on HIV infection, might have lower change to participate in this study. The study population has the ability to read and is reachable for public health services instead of the most vulnerable population. Because of this social exclusion it is expected that the reported differences between MSM with a migration background and Dutch MSM are in fact even greater.

The findings where we did not control for confounding factors show that, being highly educated, frequent serosorting and frequent viral load sorting for Non-Western 1st generation MSM leads to lower risk for HIV infection in comparison with Dutch MSM. For non-Western 2nd generation, not using condoms during sex with a one-time partner and casual partner were even at lower risk for HIV infection in comparison with Dutch MSM.

A possible explanation could be that Non-Western 2nd generation that have less average number of sexual partners and they score lower than average on having a steady, casual or one-time partner. So when they do have a sex partner, sexual intercourse may be less impulsive and they might take into account the partners HIV status to decide whether to use condoms or not.

Non-Western 1st generation were using different prevention strategies than Dutch MSM. Because they use these different prevention strategies more often, they might be executed more consequent. They have less people under 25 years and 80% is highly educated and have more capacity and means to protect themselves against HIV infection. They were drinking less alcohol, less drugs and might be more responsible also in their choice of sexpartner.

**Strengths and limitations**

This is, one of few analyses of a comparison of HIV and sexual behaviour in a relative big sample of MSM with a migration background in a Western setting. This made it possible to draw conclusions about the health risks for Dutch MSM and MSM with a migration background.

When interpreting the findings of the present study, several limitations should be considered. Firstly, conclusions regarding the directions of the reported associations can not be drawn, as collected data is cross sectional and because of the complex and interfering relationships between (sexual) risk behaviour and health issues (Safren et al., 2011). As the

study was not longitudinal, no conclusions can be drawn about the behaviour and HIV infection over time, thereby missing the effect of behavioural changes associated with HIV infection.

In addition, because of the selection bias, more vulnerable MSM with a migration background and limited access to health services or MSM living in restricted communities might be not well-represented in this study population, which may underestimate the effect of migration on the impact risk behaviour associated with HIV infection among MSM. A implication would be a different recruitment method with the focus on MSM, providing the survey in more different languages or use qualitative research methods to reach the most vulnerable MSM with a migration background.

We think, given similar study and literature findings, that the differences in socio-demographic and risk behaviour found in this study do exist. Findings show that Non-western MSM have often higher number of sexual partners, drink less alcohol, use less condoms, but were often serosorting, strategic positioning, viral load sorting and were more often infected with HIV compared to the Dutch and Western MSM. These factors might display more high risk behaviour. There is need for further research to show if these differences are indeed distinctive for Non-Western MSM.

Western MSM are a heterogenous group and a participant with a Non-Western background might not identify as Non-Western. Globalisation made multiculturalism possible, because of connections and interactions with different cultures, norms and values. The traditional dividing line between Western and non-Western not taking into account the differences between the individuals within these allocation, might limit the reliability and external validity. Therefore his selection could have negative impact on the generalizability of the findings.

It was chosen not to impute the missing data, because of the remaining large dataset. It is possible that the missing data could be linked to risk groups relating to migration, because of withdrawal regarding sensitive topics in the survey. Therefore the missing could lead to an underestimated effect of migration background, because the participants with migration background finishing all the sensitive questions, might belong to a lower risk group and therefore be more similar to Dutch MSM.

The effect of low number of HIV infection in 2$^{nd}$ generation migration groups was underpowered parameter estimates. This is solved by emerging the first and second-generation thereby only making differentiation between Non-Western and Western MSM. Furthermore, the

lasso technique is used to enhance the prediction accuracy and interpretability of the produced model and to improve the predictive error of the model by including only the most important factors (Tibshirani, 1996). These factors were compared to findings in the literature to strengthen the use of these variables.

**Implications and future research**

These findings can be used to help shape prevention programs for HIV transmission to focus on risk factors associated with HIV for MSM. Findings show that risk factors were associated with HIV infection, what emphasizes the need for risk reduction programs to prevent HIV infection and transmission.

Moreover, it is important to focus on the role of migration background and to expand access to prevention methods taking into account their sexual risk-behaviour. The different risk behaviours of MSM with a migration background emphasize the need for effective behavioural strategies designed to prevent health disparities among MSM with a migration background although these different risk behaviours do not increase risk on HIV infection. To provide effective treatment to prevent HIV transmission in MSM with migration background small group activities and community based interventions with focus on minority groups with a migration background are needed (Ellis et al., 2003).

Secondly, although among different migration groups risk factors did not differ in direction or strength of their association with HIV, this study shows that MSM with a migration background differ on risk behaviour in comparison with Dutch MSM. MSM with a migration background display high risk behaviour and therefore have higher risk at psychosocial problems and other health concerns (Safren et al., 2011). Because of the complex and interfering relationships between risk behaviour and multiple health issues especially among HIV-infected people (Safren et al., 2011) there is need for studies of co-occurring mental, physical and psychosocial problems, "syndemics", associated with sexual risk taking behaviour in MSM as well as longitudinal studies to draw conclusions regarding the directions of the associations.

This study includes different risk factors. It is of great importance to include various form of risk behaviour, because sexual risk behaviours of MSM must be understood within the context of population specific factors like substance use and other health concerns (Rosario et al., 2006). Because drug use appeared to be one of the most important predictor for HIV

infection it might be interesting to include more external risk factors like for example MSM related stigma and discrimination. Literature shows that migration might differently affect the impact of MSM related stigma and discrimination associated with HIV infection, because MSM related stigma and discrimination are associated with HIV infection and MSM with a migration background have higher risk to be stigmatized and discriminated (Sandfort, 2007; Wohl et al., 2013; Lewis, 2003; Stall et al., 2003).

Taking into account environmental factors will expand knowledge and provide input for different interventions including external risk factors, for example decriminalization of same-sex behaviour , which is a structural intervention for prevention of HIV infection embraced by a nonbinding statement from the United Nations (beyrer,2012). Although MSM related stigma and discrimination have impact on risk behaviour and risk behaviour is included in the study, MSM related stigma and discimination can be a reason for the strinkliny higher risks of MSM with a migration background, even after controlling for individual-level (sexual) risk behaviours.

## Conclusion

Behavioural risk factors for HIV infection do explain elevated HIV rates among MSM. While risk factors did not differ in direction or strength of their association with HIV among different migration groups, migration groups do differ in socio-demographic characteristics and risk behaviour .

Continued emphasis on risk behaviours in interventions will have impact on MSM and on the probably disproportionate burden of HIV infection among MSM with a migration background. Therefore, it is interesting to focus on risk reduction including impulse control and consequences of high numbers of sex partners, the importance of condom use or information about the effectivity of different prevention methods to prevent HIV infection and transmission especially for MSM with migration background.

This approach will be effective in preventing HIV infection and transmission among MSM with a migration background when the program is attracted to and adjusted for on MSM with a migration background, taking into account their different socio-demographic characteristics and risk behaviour , especially for Non-western MSM who differ the most in socio-demographic characteristics and risk behaviour  from Dutch MSM.

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## Appendix 1 tables

The association of socio-demographic characteristics and risk behaviour of the participants on HIV infection is presented in Table 4. Chi squis analyses were used to analyse whether differences in socio-demographic and risk behaviour among migration groups were associated with HIV infection. This table underscores the low numbers of HIV infection resulting in NA "unknown" in the multivariate models where numbers below five were indicated as NA.

**Table 4** *Chi squares conducted of Socio-demographic characteristics and risk behaviour of men who have sex with men (MSM) on HIV infection for Dutch, Western and Non-Western, The Netherlands, 2019, (n = 6205)*

| | | W1 (n=258) | | W2 (n=194) | | NW1 (n=312) | | NW2 (n=406) | | NL (n=5035) | | Total (n=6205) | | Chi square (χ2) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | n | % | n | % | n | % | n | % | n | % | n | % | |
| Age_3gr | | | | | | | | | | | | | | 107.645** |
| <25 | HIV+ | **1** | **2,5** | **0** | **0,0** | **2** | **4,0** | **3** | **3,4** | 15 | 2,1 | 21 | 2,3 | |
| | HIV- | 39 | 97,5 | 34 | 100,0 | 48 | 96,0 | 86 | 96,6 | 208 | 93,3 | 900 | 97,7 | |
| 25-39 | HIV+ | 5 | 7,8 | 5 | 13,5 | 20 | 18,5 | 6 | 8,8 | 61 | 6,6 | 97 | 8,1 | |
| | HIV- | 59 | 29,2 | 32 | 86,5 | 88 | 81,5 | 60 | 90,9 | 860 | 93,4 | 1101 | 91,9 | |
| >40 | HIV+ | 17 | 21,0 | **2** | **4,4** | 13 | 23,2 | 6 | 9,1 | 204 | 14,4 | 242 | 14,5 | |
| | HIV- | 64 | 79,0 | 43 | 95,6 | 43 | 76,8 | 60 | 90,0 | 1212 | 85,6 | 1422 | 85,5 | |
| Sexual preference | | | | | | | | | | | | | | 11.370** |
| Homosexual | HIV+ | 21 | 12,7 | 7 | 7,0 | 32 | 17,8 | 15 | 8,2 | 264 | 9,7 | 339 | 10,1 | |
| | HIV- | 145 | 87,3 | 93 | 93,0 | 148 | 82,8 | 169 | 91,8 | 2467 | 90,3 | 3022 | 89,9 | |
| Bisexual/other | HIV+ | **2** | **10,5** | **0** | **0,0** | **3** | **8,8** | **0** | **0,0** | 16 | 5,1 | 21 | 5,0 | |
| | HIV- | 17 | 89,5 | 16 | 100,0 | 31 | 91,2 | 39 | 100,0 | 298 | 94,9 | 401 | 95,0 | |
| Education | | | | | | | | | | | | | | 1.305 |
| Low | HIV+ | 5 | 12,5 | **4** | **10,3** | 13 | 32,5 | **3** | **4,5** | 97 | 9,7 | 122 | 10,3 | |
| | HIV- | 35 | 87,5 | 35 | 89,7 | 27 | 67,5 | 63 | 95,5 | 902 | 90,3 | 1062 | 89,7 | |
| High | HIV+ | 18 | 12,4 | **3** | **3,9** | 22 | 12,6 | 12 | 7,6 | 182 | 8,9 | 237 | 9,1 | |
| | HIV- | 162 | 87,6 | 74 | 96,1 | 152 | 87,4 | 145 | 92,4 | 1861 | 91,1 | 2359 | 90,9 | |
| Residency | | | | | | | | | | | | | | 4.728* |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Low level of urbanization | HIV+ | **1** | **4,5** | **1** | **4,0** | **3** | **12,5** | **1** | **2,9** | 69 | 7,7 | 75 | 7,5 | |
| | HIV- | 21 | 95,5 | 24 | 96,0 | 21 | 87,5 | 33 | 97,1 | 826 | 93,8 | 925 | 92,5 | |
| High level of urbanization | HIV+ | 19 | 13,8 | 5 | 6,0 | 28 | 16,3 | 12 | 6,8 | 191 | 9,4 | 255 | 9,8 | |
| | HIV- | 119 | 86,2 | 78 | 94,0 | 144 | 83,7 | 165 | 93,2 | 1831 | 90,6 | 3262 | 90,8 | |
| Number of sexual partners | | | | | | | | | | | | | | 114,919** |
| 0 | HIV+ | 5 | 16,1 | **1** | **6,7** | **3** | **10,7** | **4** | **8,9** | 36 | 7,5 | 49 | 8,2 | |
| | HIV- | 26 | 83,9 | 14 | 93,3 | 25 | 89,3 | 41 | 91,1 | 445 | 92,5 | 551 | 91,8 | |
| 1 | HIV+ | **3** | **7,5** | **3** | **10,0** | 6 | 13,0 | **4** | **6,6** | 41 | 4,6 | 57 | 5,4 | |
| | HIV- | 37 | 92,5 | 32 | 90,0 | 40 | 87,0 | 57 | 93,4 | 842 | 95,4 | 1003 | 94,6 | |
| 2-5 | HIV+ | 5 | 7,8 | **0** | **0,0** | 7 | 9,9 | **4** | **6,2** | 71 | 7,7 | 87 | 7,5 | |
| | HIV- | 59 | 92,2 | 37 | 100,0 | 64 | 90,1 | 61 | 93,8 | 850 | 92,3 | 1071 | 92,5 | |
| >5 | HIV+ | 10 | 21,3 | **3** | **10,3** | 17 | 26,6 | **3** | **6,7** | 132 | 19,2 | 165 | 18,9 | |
| | HIV- | 37 | 78,7 | 26 | 89,7 | 47 | 73,4 | 42 | 93,3 | 556 | 80,8 | 708 | 81,1 | |
| Steady partner(s) | | | | | | | | | | | | | | 2.273 |
| No | HIV+ | 16 | 14,7 | **3** | **4,3** | 19 | 15,2 | 10 | 6,6 | 157 | 8,8 | 205 | 9,2 | |
| | HIV- | 93 | 85,3 | 68 | 95,8 | 106 | 84,8 | 141 | 93,4 | 1625 | 91,2 | 2033 | 90,8 | |
| Yes +condom | HIV+ | **1** | **5,6** | **0** | **0,0** | **2** | **11,8** | **2** | **16,7** | 12 | 7,5 | 17 | 8,0 | |
| | HIV- | 17 | 94,4 | 6 | 100,0 | 15 | 88,2 | 10 | 83,3 | 148 | 92,5 | 196 | 92,0 | |
| Yes condomless | HIV+ | 6 | 10,3 | **4** | **10,8** | 13 | 18,6 | **3** | **5,0** | 111 | 10,2 | 137 | 10,5 | |
| | HIV- | 52 | 89,7 | 33 | 89,2 | 57 | 81,4 | 57 | 95,0 | 973 | 89,8 | 1172 | 89,5 | |
| One-time partner(s) | | | | | | | | | | | | | | 135.407** |
| No | HIV+ | 8 | 10,1 | **4** | **7,8** | 11 | 12,2 | 9 | 8,0 | 90 | 6,2 | 122 | 6,9 | |
| | HIV- | 71 | 89,9 | 47 | 92,2 | 79 | 87,8 | 104 | 92,0 | 1355 | 93,8 | 1656 | 93,1 | |
| Yes +condom | HIV+ | **3** | **6,8** | **0** | **0,0** | **3** | **8,3** | **2** | **5,4** | 21 | 3,4 | 29 | 3,8 | |
| | HIV- | 41 | 93,2 | 24 | 100,0 | 33 | 91,7 | 35 | 94,6 | 600 | 96,6 | 733 | 96,2 | |
| Yes condomless | HIV+ | 12 | 20,0 | **3** | **8,3** | 19 | 22,9 | **4** | **6,1** | 169 | 18,5 | 207 | 17,9 | |
| | HIV- | 48 | 80,0 | 33 | 91,7 | 64 | 77,1 | 62 | 93,9 | 7423 | 81,5 | 950 | 82,1 | |
| Casual partner(s) | | | | | | | | | | | | | | 80.549** |
| No | HIV+ | 10 | 10,8 | **4** | **7,5** | 13 | 13,7 | 11 | 9,5 | 101 | 6,4 | 139 | 7,2 | |
| | HIV- | 83 | 89,2 | 49 | 92,5 | 82 | 86,3 | 105 | 90,5 | 1476 | 93,6 | 1795 | 92,8 | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Yes +condom | HIV+ | **1** | **3,3** | **0** | **0,0** | **2** | **5,7** | **1** | **3,1** | 20 | 4,9 | 24 | 4,6 | |
| | HIV- | 29 | 96,7 | 18 | 100,0 | 33 | 94,3 | 31 | 96,9 | 386 | 95,1 | 497 | 95,4 | |
| Yes condomless | HIV+ | 12 | 20,0 | **3** | **7,5** | 18 | 22,8 | **3** | **4,4** | 159 | 16,0 | 195 | 15,7 | |
| | HIV- | 48 | 80,0 | 37 | 92,5 | 61 | 77,2 | 65 | 95,6 | 836 | 84,0 | 1047 | 84,3 | |
| Drug use | | | | | | | | | | | | | | 91.139** |
| No | HIV+ | 7 | 7,6 | **4** | **6,6** | 14 | 11,2 | 5 | 4,1 | 100 | 5,8 | 130 | 6,1 | |
| | HIV- | 85 | 92,4 | 57 | 93,4 | 111 | 88,8 | 116 | 95,9 | 1617 | 94,2 | 1986 | 93,9 | |
| Yes | HIV+ | 10 | 17,9 | **1** | **2,9** | 17 | 26,2 | 6 | 9,0 | 151 | 17,0 | 185 | 16,6 | |
| | HIV- | 46 | 82,1 | 34 | 97,1 | 48 | 73,8 | 61 | 91,0 | 738 | 83,0 | 927 | 83,4 | |
| Alcohol use | | | | | | | | | | | | | | 22.925** |
| No | HIV+ | 8 | 22,2 | **1** | **4,8** | 10 | 16,7 | 6 | 9,1 | 103 | 13,6 | 128 | 13,6 | |
| | HIV- | 28 | 77,8 | 20 | 95,2 | 50 | 83,3 | 60 | 90,9 | 654 | 86,4 | 812 | 86,4 | |
| Yes | HIV+ | 8 | 7,2 | **4** | **5,2** | 22 | 16,7 | 5 | 4,2 | 148 | 8,0 | 187 | 8,1 | |
| | HIV- | 103 | 92,8 | 73 | 94,8 | 110 | 83,3 | 115 | 95,8 | 1713 | 92,0 | 2114 | 91,9 | |
| Withdrawal before ejaculation | | | | | | | | | | | | | | 20.960** |
| Non frequent | HIV+ | 13 | 14,1 | **4** | **6,0** | 22 | 20,6 | 7 | 6,0 | 198 | 11,6 | 244 | 11,6 | |
| | HIV- | 79 | 85,9 | 63 | 94,0 | 85 | 79,4 | 109 | 94,0 | 1515 | 88,4 | 1815 | 88,4 | |
| Frequent | HIV+ | 5 | 8,6 | **2** | **6,9** | 5 | 97,5 | **4** | **7,8** | 44 | 5,9 | 60 | 6,3 | |
| | HIV- | 53 | 91,4 | 27 | 93,1 | 62 | 92,5 | 47 | 92,2 | 705 | 94,1 | 894 | 93,7 | |
| Serosorting | | | | | | | | | | | | | | 18.549** |
| Non frequent | HIV+ | 13 | 14,1 | 5 | 7,5 | 23 | 24,5 | 10 | 9,3 | 192 | 11,0 | 243 | 11,5 | |
| | HIV- | 79 | 85,9 | 62 | 92,5 | 71 | 75,5 | 97 | 90,7 | 1555 | 89,0 | 1864 | 88,5 | |
| Frequent | HIV+ | 5 | 8,6 | **1** | **3,4** | **4** | **5,0** | **1** | **1,7** | 50 | 7,0 | 61 | 6,5 | |
| | HIV- | 53 | 91,4 | 28 | 96,6 | 76 | 95,0 | 59 | 98,3 | 655 | 93,0 | 881 | 93,5 | |
| Strategic positioning | | | | | | | | | | | | | | 0.135 |
| Non frequent | HIV+ | 17 | 12,8 | 6 | 6,7 | 25 | 18,2 | 11 | 7,1 | 220 | 9,7 | 279 | 10,0 | |
| | HIV- | 116 | 87,2 | 83 | 93,3 | 112 | 81,8 | 143 | 92,9 | 2048 | 90,3 | 2502 | 90,0 | |
| Frequent | HIV+ | **1** | **5,9** | **0** | **0,0** | **2** | **5,4** | **0** | **0,0** | 22 | 11,3 | 25 | 9,3 | |
| | HIV- | 16 | 94,1 | 7 | 100,0 | 25 | 94,6 | 13 | 100,0 | 172 | 88,7 | 243 | 90,7 | |
| Viral load sorting | | | | | | | | | | | | | | 38.189** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Non frequent | HIV+ | 13 | 9,5 | 18 | 12,0 | 24 | 16,7 | 11 | 7,1 | 194 | 8,6 | 247 | 8,9 |
| | HIV- | 124 | 90,5 | 132 | 88,0 | 120 | 83,8 | 144 | 92,9 | 2054 | 91,4 | 2525 | 91,1 |
| Frequent | HIV+ | **5** | **38,5** | **1** | **12,5** | **3** | **10,0** | **0** | **0,0** | 48 | 22,4 | 57 | 20,6 |
| | HIV- | 8 | 61,5 | 7 | 87,5 | 27 | 90,0 | 12 | 100,0 | 166 | 77,6 | 220 | 79,4 |

Note: * p<0.05, ** p<0.01

The tables 5,6 and 7 show the same conclusion as table 3. If we look at these effects taking generation into account, again no association was observed for the interaction effects of migration background. However, in table 8, the multivariate regression model with all the predictors while taking generation into account, we find that education was not associated with HIV infection (OR=0.88 CI95% 0.622-1.237), although there was an interaction effect of migration background. Where highly educated Non-western first generation MSM had lower odds on HIV infection (OR=0.19 CI95% 0.045-0.833) in comparison with Dutch MSM.

**Table 5** *Multiple stratified regression model conducted with socio-demographic characteristics and behavioural factors for Dutch, Western and Non-Western men who have sex with men (MSM), The Netherlands, 2019, (n = 6205)*

| | *Main effects* | *Interaction effects* | |
|---|---|---|---|
| | | First | second |
| | EXP(B) CI(95) | EXP(B) CI(95) | EXP(B) CI(95) |
| Age <25 | 1 | | |
| Age 25-39 | **2.87**** [1.368-6.004] | 1.01 [0.161-6.325] | 0.86 [0.112-6.627] |
| Age 40+ | **6.65****[3.285-13.453] | 0.46 [0.073-2.904] | 0.32 [0.044-2.341] |
| Sexual preference | | | |
| Homosexual | 1 | NA | NA |
| Bisexual/Other | 0.61 [0.293-1.256] | 1.30 [0.200-8.400] | NA |
| Residency | | | |
| Low level of urbanization | 1 | | |
| High level of urbanization | 1.34 [0.925-1,925] | 3.60 [0.580-22.350] | 0.89 [0.107-7.480] |
| Education Low | 1 | | |
| Education high | 0.88 [0.622-1.237] | 0.42 [0.138-1.256] | 0.98 [0.213-4.470] |
| Number of sexual partners >5 | 1 | | |
| 0 | 1.10 [0.381-3.169] | NA | 2.44 [0.048-124.758] |
| 1 | 0.68 [0.366-1.274] | 0.33 [0.039-2.844] | 1.13 [0.049-26.058] |
| 2-5 | 0.68 [0.456-1.009] | 0.34 [0.103-1.111] | 2.62 [0.327-20.956] |
| No steady partner | 1 | | |
| Steady + condom | 1.29 [0.625-2.649] | 2.95 [0.376-23.189] | 3.44 [0.247-47.979] |
| Steady no condom | 0.94 [0.668-1.323] | 2.27 [0.832-6.173] | 1.53 [0.238-9.779] |
| No one-time partner | 1 | | |
| One-time + condom | 0.55 [0.291-1.042] | 1.15 [0.161-8.165] | 0.23 [0.013-4.089] |
| One-time no condom | **1.85* [**1.117-3.076] | 0.77 [0.158-3.792] | 0.36 [0.031-4.208] |
| No Casual partner | 1 | | |
| Casual + condom | 0.92 [0.502-1.667] | 0.43 [0.058-3.183] | 0.30 [0.017-5.401] |
| Casual no condom | 1.05 [0.692-1.581] | 1.56 [0.411-5.907] | 0.25 [0.038-1.692] |
| No drug use | 1 | | |
| Drug use | **2.50****[**1.763-3.542] | 0.72 [0.270-1.922] | 0.80 [0.180-3.510] |
| No Alcohol use | 1 | | |
| Alcohol use | **0.68* [**0.479-0.956] | 1.27 [0.423-3.820] | 0.41 [0.078-2.091] |
| Non frequent withdrawal | 1 | | |
| Frequent withdrawal | 0.77 [0.501-1.176] | 1.24 [0.412-3.714] | 3.06 [0.693-13.466] |
| Non frequent serosorting | 1 | | |
| Frequent Serosorting | 0.92 [0.485-1.732] | 0.68 [0.219-2.119] | 0.49 [0.60-4.068] |
| Non frequent Positioning | 1 | | |
| Frequent Positioning | **2.32**** [1.419-3.775] | 0.25 [0.045-1.362] | NA |
| Non frequent viral load | 1 | | |
| Frequent viral load | **2.87**** [1.368-6.004] | 0.62 [0.159-2.429] | 0.96 [0.057-16.301] |

Note: * p<0.05, ** p<0.01

**Table 6** *Multiple stratified regression model conducted with socio-demographic characteristics and behavioural factors for Dutch, Western and Non-Western men who have sex with men (MSM), The Netherlands, 2019, (n = 6205)*

| | *Main effects* | *Interaction effects* | |
|---|---|---|---|
| | | W | NW |
| | EXP(B) CI(95) | EXP(B) CI(95) | EXP(B) CI(95) |
| Age <25 | 1 | | |
| Age 25-39 | **2.87**** [1.368-6.004] | NA | 0.82 [0.189-3.579] |
| Age 40+ | **6.65****[3.285-13.453] | NA | 0.31 [0.067-1.430] |
| Sexual preference | | | |
| Homosexual | 1 | | |
| Bisexual/Other | 0.61 [0.293-1.256] | 5.64 [0.242-131.342] | 0.38 [0.039-3.716] |
| Residency | | | |
| Low level of urbanization | 1 | | |
| High level of urbanization | 1.34 [0.925-1,925] | 4.07 [0.297-55.689] | 1.22 [0.288-5.154] |
| Education Low | 1 | | |
| Education high | 0.88 [0.622-1.237] | 0.46 [0.82-2.594] | 0.66 [0.236-1.854] |
| Number of sexual partners >5 | 1 | | |
| 0 | 1.10 [0.381-3.169] | NA | 2.44 [0.080-73.991] |
| 1 | 0.68 [0.366-1.274] | 0.38 [0.015-9.425] | 0.44 [0.066-2.956] |
| 2-5 | 0.68 [0.456-1.009] | 0.29 [0.035-2.380] | 0.70 [0.210-2.299] |
| No steady partner | 1 | | |
| Steady + condom | 1.29 [0.625-2.649] | NA | 3.24 [0.515-20.310] |
| Steady no condom | 0.94 [0.668-1.323] | 4.12[0.685-24.760] | 1.99 [0.718-5.534] |
| No one-time partner | 1 | | |
| One-time + condom | 0.55 [0.291-1.042] | 0.46 [0.020-10.676] | 0.71 [0.113-4.415] |
| One-time no condom | **1.85* [**1.117-3.076] | 0.60 [0.060-5.905] | 0.61 [0.134-2.815] |
| No Casual partner | 1 | | |
| Casual + condom | 0.92 [0.502-1.667] | NA | 0.48 [0.92-2.523] |
| Casual no condom | 1.05 [0.692-1.581] | 0.70 [0.079-6.158] | 0.95 [0.321-2.814] |
| No drug use | 1 | | |
| Drug use | **2.50****[**1.763-3.542] | 0.77 [0.158-3.736] | 1.02 [0.404-2.569] |
| No Alcohol use | 1 | | |
| Alcohol use | **0.68* [**0.479-0.956] | 1.03 [0.218-4.864] | 1.08 [0.387-3.018] |
| Non frequent withdrawal | 1 | | |
| Frequent withdrawal | 0.92 [0.485-1.732] | 1.24 [0.275-5.591] | 2.21 [0.776-6.266] |
| Non frequent serosorting | 1 | | |
| Frequent Serosorting | **2.32**** [1.419-3.775] | 1.13 [0.196-6.455] | 0.39 [0.111-1.348] |
| Non frequent Positioning | 1 | | |
| Frequent Positioning | **2.87**** [1.368-6.004] | 0.19 [0.016-2.348] | 0.59 [0.081-4.262] |
| Non frequent viral load | 1 | | |
| Frequent viral load | **2.87**** [1.368-6.004] | 1.65 [0.265-10.220] | 0.29 [0.057-1.467] |

Note: * p<0.05, ** p<0.01

**Table 7** *Multiple stratified regression model conducted with socio-demographic characteristics and behavioural factors for Dutch, Western and Non-Western men who have sex with men (MSM), The Netherlands, 2019, (n = 6205)*

| | *Main effects* | *Interaction effects* | | | |
|---|---|---|---|---|---|
| | | W1 | W2 | NW1 | NW2 |
| | EXP(B) CI(95) | EXP(B) CI(95) | EXP(B) CI(95) | EXP(B) CI(95) | EXP(B) CI(95) |
| Age > 25 | 1 | | | | |
| Age 25-39 | **2.58**** [1.407-4.725] | NA | NA | 1.73 [0.324-9.185] | 1.71 [0.281-10.412] |
| Age 40+ | **6.07****[3.453-10.678] | NA | NA | 0.75 [0.132-4.280] | 0.34 [0.048-2.406] |
| Number of sexual partners >5 | 1 | | | | |
| 0 | 0.76 [0.414-1.378] | 3.30 [0.238-45.703] | 0.63 [0.001-298.922] | 0.83 [0.111-6.266] | 2.26 [0.134-37.974] |
| 1 | **0.59*** [0.346-0.994] | NA | 2.06 [0.006-660.936] | 1.02 [0.167-6.236] | 2.80 [0.226-34.741] |
| 2-5 | **0.64**** [0.443-0.913] | 0.609 [0.123-3.004] | NA | 0.66 [0.211-2.087] | 4.15 [0.540-31.905] |
| No one-time partner | 1 | | | | |
| One-time + condom | **0.41**** [0.228-0.722] | 0.88 [0.047-16.291] | NA | 1.50 [0.247-9.121] | 0.73 [0.059-9.064] |
| One-time no condom | **1.79**** [1.150-2.792] | 0.72 [0.076-6.690] | 0.23 [0.01-62.361] | 0.81 [0.189-3.429] | 0.60 [0.088-4.141] |
| No drug use | 1 | | | | |
| Drug use | **2.44**** [1.806-3.293] | 1.60 [0.271-9.387] | 0.20 [0.015-2.797] | 0.93 [0.364-2.392] | 0.89 [0.234-3.392] |

Note: * p<0.05, ** p<0.01

**Table 8** *Multiple stratified regression model conducted with socio-demographic characteristics and behavioural factors for Dutch, Western and Non-Western men who have sex with men (MSM), The Netherlands, 2019, (n = 6205)*

| | *Main effects* | *Interaction effects* | | | |
|---|---|---|---|---|---|
| | | W1 | W2 | NW1 | NW2 |
| | EXP(B) CI(95) | EXP(B) CI(95) | EXP(B) CI(95) | EXP(B) CI(95) | EXP(B) CI(95) |
| Age > 25 | 1 | | | | |
| Age 25-39 | **2.87**** [1.368-6.004] | NA | NA | 1.56 [0.185-13.123] | 0.37 [0.039-3.377] |
| Age 40+ | **6.65****[3.285-13.453] | NA | NA | 0.49 [0.04-10.184] | 0.25 [0.017-3.555] |
| Sexual preference | | | | | |
| Homosexual | 1 | | | | |
| Bisexual/Other | 0.61 [0.293-1.256] | NA | NA | 0.46 [0.034-6.135] | NA |
| Residency | | | | | |
| Low level of urbanization | 1 | | | | |
| High level of urbanization | 1.34 [0.925-1,925] | NA | NA | 1.12 [0.154-8.176] | 1.57 [0.500-48.986] |
| Education Low | 1 | | | | |
| Education high | 0.88 [0.622-1.237] | 0.80 [0.023-28.565] | NA | **0.19*** [0.045-0.833] | 10.49 [0.332-331.017] |
| Number of sexual | | | | | |
| partners >5 | 1 | | | | |
| 0 | 1.10 [0.381-3.169] | NA | NA | NA | NA |
| 1 | 0.68 [0.366-1.274] | NA | NA | 0.50 [0.040-6.346] | 1.58 [0.008-309.497] |
| 2-5 | 0.68 [0.456-1.009] | 0.13 [0.006-2.817] | NA | 0.27 [0.054-1.405] | 12.26 [0.564-266.302] |
| No steady partner | 1 | | | | |
| Steady + condom | 1.29 [0.625-2.649] | NA | NA | 2.83 [0.234-34.349] | 4.89 [0.089-267.092] |
| Steady no condom | 0.94 [0.668-1.323] | NA | NA | 2.33 [0.617-8.778] | 0.80 [0.038-16.553] |
| No one-time partner | 1 | | | | |
| One-time + condom | 0.55 [0.291-1.042] | 0.02 [0.000-11.296] | NA | 1.82 [0.159-20.740] | 0.70 [0.019-25.382] |
| One-time no condom | **1.85* [**1.117-3.076] | 0.85 [0.019-37.963] | NA | 0.74 [0.108-5.084] | 0.56 [0.010-31.652] |
| No Casual partner | 1 | | | | |
| Casual + condom | 0.92 [0.502-1.667] | NA | NA | 0.99 [0.106-9.194] | 0.25 [0.005-12.742] |
| Casual no condom | 1.05 [0.692-1.581] | 0.17 [0.002-15.395] | NA | 2.40 [0.416-13.725] | 0.23 [0.017-3.017] |
| No drug use | 1 | | | | |
| Drug use | **2.50****[**1.763-3.542] | 0.47 [0.028-7.816] | NA | 0.89 [0.255-3.113] | 2.04 [0.202-20.609] |
| No Alcohol use | 1 | | | | |
| Alcohol use | **0.68* [**0.479-0.956] | 1.54 [0.103-23.000] | NA | 1.51 [0.363-6.238] | 0.23 [0.022-2.430] |
| Non frequent withdrawal | 1 | | | | |
| Frequent withdrawal | **0.44**** [0.294-0.664] | 0.46 [0.041-5.270] | NA | 1.44 [0.365-5.678] | 3.76 [0.459-30.839] |
| Non frequent serosorting | 1 | | | | |
| Frequent Serosorting | 0.77 [0.501-1.176] | 0.88 [0.081-9.626] | NA | 0.41 [0.088-1.918] | 0.11 [0.001-13.366] |
| Non frequent Positioning | 1 | | | | |
| Frequent Positioning | 0.92 [0.485-1.732] | 0.07 [0.001-4.650] | NA | 0.31 [0.032-2.942] | NA |
| Non frequent viral load | 1 | | | | |
| Frequent viral load | **2.32**** [1.419-3.775] | 1.43 [0.062-32.789] | NA | 0.28 [0.046-1.739] | NA |

Note: * p<0.05, ** p<0.01

## Appendix 2 'Survey Men & Sexuality 2018'

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Q2 Hartelijk dank dat je wilt meedoen aan het onderzoek 'Survey Mannen & Seksualiteit'.

Deze online vragenlijst gaat over seksueel gedrag en gezondheid van mannen die seks hebben met mannen. Je krijgt onder andere vragen over je ervaring met seks, manieren om hiv en andere soa's te voorkomen, voorlichting over gezonde seks en je houding rondom seks en gezondheid. De nieuwe kennis uit dit onderzoek gaan gezondheidsorganisaties gebruiken om voorlichting over soa's en hiv te verbeteren. Het is nuttig en belangrijk dat je de vragenlijst invult: - Je leert meer over jezelf. - Je helpt mee aan de beste gezondheidsvoorlichting voor zo veel mogelijk mannen. - Je maakt aan het einde kans op één van de 20 waardebonnen ter waarde van 25 euro.
Het onderzoek is helemaal anoniem en duurt ongeveer 20 minuten. Wil je meer weten of een vraag stellen aan de onderzoekers? Bekijk dan de uitgebreide informatie voor deelnemers. [https://www.soaaids.nl/nl/node/11477].

Q2 Thank you for your interest in the study 'Survey Men & Sexuality'.

This online questionnaire about sexual behavior and sexual health of men who have sex with men. Questions will include your experience with sex, ways to prevent HIV and STI, education on healthy sex and your attitudes on sexuality and health.

New insights gained from this research will be used by health organisations to improve education on STI and HIV. It is useful and important that you complete this questionnaire:-You will learn more about yourself.-You help to provide the best health education for as many men as possible.-At the end you could win one of the 20 vouchers worth 25 euros.

The study is completely anonymous and takes about 20 minutes.

Do you want to know more or ask a question to the researchers? Click here for detailed information for participants. [https://www.soaaids.nl/nl/node/11477]
Click if you want to continue to participate in the study.

---

Q3 Toestemmingsverklaring voor deelname aan wetenschappelijk onderzoek

- Ik heb de informatie over het onderzoek gelezen. - Ik weet dat ik via email vragen kan stellen over het onderzoek. - Ik weet dat ik niet verplicht ben om mee te doen en dat ik

tussendoor kan stoppen. - Als ik niet verder wil, hoef ik mijn reden niet op te geven.
Ik stem ermee in om aan dit onderzoek deel te nemen:

- ○ Ja (1)
- ○ Nee (2)

Q3 Informed consent for participation in scientific research

-I have read the written information about this study. -I know I can ask questions about the study via email. -Participation is entirely voluntary and I can stop participating at all times.-If I no longer want to participate I can stop my participation without stating reasons.

I agree to participate in this study:

- ○ Yes (1)
- ○ No (2)

Page Break

Q4 Wat is je leeftijd?
_____ jaar (1)

Q4 What is your age?
_____ years (1)

---

Q5 Ik ben…

- ○ Man (1)
- ○ Vrouw (2)
- ○ Transman (3)
- ○ Transvrouw (4)
- ○ Anders, namelijk (5) _____

Q5 I am...

- ○ A man (1)
- ○ A woman (2)
- ○ A transgender male (3)
- ○ A transgender female (4)
- ○ Other, namely (5) _____

---

Q6 Deze vragenlijst is bedoeld voor mannen, en specifiek voor mannen die seks hebben met mannen, er kunnen vragen volgen die misschien niet volledig aansluiten bij jouw persoonlijke situatie. Dat begrijp ik en ik...

- ○ wil verder gaan met het invullen van de vragenlijst (1)
- ○ stop met het invullen van de vragenlijst (2)

Q6 This questionnaire is meant for men, and specifically for men who have sex with men, there may be questions that may not be fully in line with your personal situation. I understand that and I ...

- ○ want to continue filling out the questionnaire (1)
- ○ want to stop filling out the questionnaire (2)

---

Q7 Wat is je opleidingsniveau?

- ○ Geen (1)
- ○ Basisonderwijs (2)
- ○ Middelbaar algemeen onderwijs (MAVO/MULO) (3)
- ○ Voorbereidend middelbaar beroepsonderwijs (VMBO) (4)
- ○ Hoger algemeen onderwijs (HAVO/VWO/Gymnasium) (5)
- ○ Middelbaar beroepsonderwijs (MBO) (6)
- ○ Hoger onderwijs (HBO, WO, postacademisch) (7)
- ○ Anders, namelijk (9) _____

Q7 What is your education level?

- ○ None (1)
- ○ Primary school (2)
- ○ General secondary education (equivalent to MAVO/MULO) (3)
- ○ Lower vocational secondary education (equivalent to VMBO) (4)
- ○ Higher general education or A-level/pre-university secondary education (equivalent to HAVO/VWO/Gymnasium) (5)
- ○ Intermediate vocational education (equivalent to MBO) (6)
- ○ Higher vocational education or University (equivalent to HBO, undergraduate, postgraduate, PhD) (7)
- ○ Other, namely (9) _____

---

Q8 Wat zijn de vier cijfers van je postcode?

_____

Q8 What are the four numbers of your postal code?

_____

---

Q9 Ben je in Nederland geboren?

- ○ Ja (1)
- ○ Nee (2)

Q9 Where you born in the Netherlands?

- ○ Yes (1)
- ○ No (2)

---

Q10  In welk land ben je geboren?

▼ Andorra (1) ... 251 (251)

Q10  In welk land ben je geboren?

▼ Andorra (1) ...  (251)

---

Q11 In welk land is je moeder geboren?

▼ Nederland (166) ... Zimbabwe (251)

Q11 In which country was your mother born?

▼ The Netherlands (166) ... Zimbabwe (251)

---

Q12 In welk land is je vader geboren?

▼ Nederland (166) ... Zimbabwe (251)

Q12 In which country was your farther born?

▼ The Netherlands (166) ... Zimbabwe (251)

---

Q15 Ik identificeer mij als…

- ○ Gay / homoseksueel  (1)
- ○ Biseksueel  (2)
- ○ Heteroseksueel  (3)
- ○ Aseksueel  (4)
- ○ Anders, namelijk  (5) _____

Q15 I identify as...

- ○ Gay / homosexual (1)
- ○ Bisexual (2)
- ○ Heterosexual (3)
- ○ Asexual (4)
- ○ Other, namely (5) _____

---

Q16 Tot wie voel je je seksueel aangetrokken?

- ○ Alleen tot mannen (1)
- ○ Vooral tot mannen (2)
- ○ Evenveel tot mannen als tot vrouwen (3)
- ○ Vooral tot vrouwen (4)
- ○ Alleen tot vrouwen (5)
- ○ Anders, namelijk (6) _____

Q16 Who do you feel sexually attracted to?

- ○ Only to men (1)
- ○ Mosty to men (2)
- ○ Equally to men and women (3)
- ○ Mostly to women (4)
- ○ Only to women (5)
- ○ Other, namely (6) _____

---

Q17 Met wie heb jij seks?

- ○ Alleen met mannen (1)
- ○ Vooral met mannen (2)
- ○ Evenveel met mannen als met vrouwen (3)
- ○ Vooral met vrouwen (4)
- ○ Alleen met vrouwen (5)
- ○ Ik heb nooit seks gehad (6)
- ○ Anders, namelijk (7) _____

Q17 Who do you have sex with?

- ○ Only with men (1)
- ○ Mostly with men (2)
- ○ Equally with men and women (3)
- ○ Mostly with women (4)
- ○ Only with women (5)
- ○ I have never had sex (6)
- ○ Other, namely (7) _____

Q18 Deze vragenlijst is bedoeld voor mannen die seks hebben met mannen, er kunnen vragen volgen die misschien niet volledig aansluiten bij jouw persoonlijke situatie. Dat begrijp ik en ik...

- ○ wil verder gaan met het invullen van de vragenlijst (1)
- ○ stop met het invullen van de vragenlijst (2)

Q18 This questionnaire is intended for men who have sex with men, there may be questions that may not fully fit your personal situation. I understand that and I ...

- ○ want to continue filling out the questionnaire (1)
- ○ want to stop filling out the questionnaire (2)

---

Q23 Met hoeveel verschillende mannen heb je in de afgelopen 6 maanden anale seks gehad?
[Als je het niet precies weet geef een schatting]
_____ mannen (1)

Q23 With how many different men have you had anal sex in the last 6 months?
[If you do not know exactly give an estimate]
_____ men (1)

---

Q27 Heb je in de afgelopen 6 maanden anale seks gehad met een of meer vaste mannelijke partners?

- ○ Ja (1)
- ○ Nee (2)

Q27 Did you have anal sex with one or more steady partners during the last 6 months?

- ○ Yes (1)
- ○ No (2)

---

Q28 Met hoeveel verschillende vaste partners heb je in de afgelopen 6 maanden anale seks gehad zonder condoom?
_____ vaste partner(s) (1)

Q28 With how many different steady partners did you have condomless anal sex in the last 6 months?
_____ steady partner(s) (1)

---

Q30 Hoe vaak deed je met vaste partners in de afgelopen 6 maanden het volgende om hiv infectie (of transmissie) te voorkomen?

| | Nooit (1) | Zelden (2) | Soms (3) | Vaak (4) | (Bijna) altijd (5) |
|---|---|---|---|---|---|
| Condooms gebruiken (1) | ○ | ○ | ○ | ○ | ○ |
| Niet in elkaar klaarkomen (2) | ○ | ○ | ○ | ○ | ○ |
| Sero-sorteren (alleen seks hebben met iemand die dezelfde hiv status heeft als jij) (3) | ○ | ○ | ○ | ○ | ○ |
| Strategisch positioneren (iemand die (mogelijk) hiv positief is neemt de bottom positie in) (4) | ○ | ○ | ○ | ○ | ○ |
| Virale lading sorteren (alleen zonder condoom neuken met iemand die hiv heeft en bij wie het virus dankzij behandeling onderdrukt is) (7) | ○ | ○ | ○ | ○ | ○ |

Q30 How often in the last 6 months did you do the following things with steady partners to prevent HIV infection (or transmission)?

| | Never (1) | Rarely (2) | Sometimes (3) | Often (4) | (Almost) Always (5) |
|---|---|---|---|---|---|
| Use condoms (1) | ○ | ○ | ○ | ○ | ○ |
| No ejaculation inside each other (2) | ○ | ○ | ○ | ○ | ○ |
| Sero-sortering (only having sex with someone who has the same HIV status as you) (3) | ○ | ○ | ○ | ○ | ○ |
| Strategic positioning (someone who is (possibly) HIV positive only take bottom position) (4) | ○ | ○ | ○ | ○ | ○ |
| Viral load sorting (only have condomless sex with someone who has HIV if their virus is suppressed due to treatment) (7) | ○ | ○ | ○ | ○ | ○ |

Page Break

Q31 Heb je in de afgelopen 6 maanden anale seks gehad met een of meer mannelijke eenmalige partners?

[Hiermee bedoelen we mensen met wie je 1 keer seks hebt gehad en daarna niet meer.]

- ○ Ja (1)
- ○ Nee (2)

Q31 Have you had anal sex with one or more one-time partners in the last 6 months?

[By this we mean people with whom you have had sex once and then no longer.]

- ○ Yes (1)
- ○ No (2)

Q32 Met hoeveel verschillende eenmalige partners heb je in de afgelopen 6 maanden anale seks gehad?
_____ eenmalige partner(s) (1)

Q32 With how many different one-time partners did you have anal sex in the last 6 months?
_____ one-time partner(s) (1)

---

Q33 Met hoeveel verschillende eenmalige partners heb je in de afgelopen 6 maanden anale seks gehad zonder condoom?
_____ eenmalige partner(s) (1)

Q33 With how many different one-time partners did you have condoless anal sex in the last 6 months?
_____ one-time partner(s) (1)

---

Q35 Hoe vaak deed je met eenmalige sekspartners in de afgelopen 6 maanden het volgende om hiv infectie (of transmissie) te voorkomen?

| | Nooit (1) | Zelden (2) | Soms (3) | Vaak (4) | (Bijna) altijd (5) |
|---|---|---|---|---|---|
| Condooms gebruiken (1) | ○ | ○ | ○ | ○ | ○ |
| Niet in elkaar klaarkomen (2) | ○ | ○ | ○ | ○ | ○ |
| Sero-sorteren (alleen seks hebben met iemand die dezelfde hiv status heeft als jij) (3) | ○ | ○ | ○ | ○ | ○ |
| Strategisch positioneren (iemand die (mogelijk) hiv positief is neemt de bottom positie in) (4) | ○ | ○ | ○ | ○ | ○ |
| Virale lading sorteren (alleen zonder condoom neuken met iemand die hiv heeft en bij wie het virus dankzij behandeling onderdrukt is) (7) | ○ | ○ | ○ | ○ | ○ |

Q35 How often in the last 6 months did you do the following things with one-time partners to prevent HIV infection (or transmission)?

| | Never (1) | Rarely (2) | Sometimes (3) | Often (4) | (Almost) Always (5) |
|---|---|---|---|---|---|
| Use condoms (1) | ○ | ○ | ○ | ○ | ○ |
| No ejaculation inside each other (2) | ○ | ○ | ○ | ○ | ○ |
| Sero-sortering (only having sex with someone who has the same HIV status as you) (3) | ○ | ○ | ○ | ○ | ○ |
| Strategic positioning (someone who is (possibly) HIV positive only takes bottom position) (4) | ○ | ○ | ○ | ○ | ○ |
| Viral load sorting (only have condomless sex with someone who has HIV if their virus is suppressed due to treatment) (7) | ○ | ○ | ○ | ○ | ○ |

Page Break

Q36 Heb je in de afgelopen 6 maanden anale seks gehad met een of meer vaste mannelijke seksmaatjes/fuckbuddies?

- ○ Ja (1)
- ○ Nee (2)

Q36 In the last 6 months did you have anal sex with one or more steady male fuckbuddies?

- ○ Yes (1)
- ○ No (2)

Q37 Met hoeveel verschillende vaste seksmaatjes heb je in de afgelopen 6 maanden anale seks gehad?
_____ vaste seksmaatje(s) (1)

Q37 With how many fuckbuddies did you have anal sex in the last 6 months?
_____ fuckbuddies (1)

---

Q38 Met hoeveel verschillende vaste seksmaatjes heb je in de afgelopen 6 maanden anale seks gehad zonder condoom?
_____ vaste seksmaatje(s) (1)

Q38 With how many fuckbuddies did you have condomless anal sex in the last 6 months?
_____ fuckbuddies (1)

---

Q40 Hoe vaak heb je in de afgelopen 6 maanden het volgende gedaan met vaste seksmaatjes om hiv infectie (of transmissie) te voorkomen?

| | Nooit (1) | Zelden (2) | Soms (3) | Vaak (4) | (Bijna) altijd (5) |
|---|---|---|---|---|---|
| Condooms gebruiken (1) | ○ | ○ | ○ | ○ | ○ |
| Niet in elkaar klaarkomen (2) | ○ | ○ | ○ | ○ | ○ |
| Sero-sorteren (alleen seks hebben met iemand die dezelfde hiv status heeft als jij) (3) | ○ | ○ | ○ | ○ | ○ |
| Strategisch positioneren (iemand die (mogelijk) hiv positief is neemt de bottom positie in) (4) | ○ | ○ | ○ | ○ | ○ |
| Virale lading sorteren (alleen zonder condoom neuken met iemand die hiv heeft en bij wie het virus dankzij behandeling onderdrukt is) (7) | ○ | ○ | ○ | ○ | ○ |

Q40 How often in the last 6 months did you do the following things with fuckbuddies to prevent HIV infection (or transmission)?

| | Never (1) | Rarely (2) | Sometimes (3) | Often (4) | (Almost) Always (5) |
|---|---|---|---|---|---|
| Use condoms (1) | ○ | ○ | ○ | ○ | ○ |
| No ejaculation inside each other (2) | ○ | ○ | ○ | ○ | ○ |
| Sero-sorting (only having sex with someone who has the same HIV status as you) (3) | ○ | ○ | ○ | ○ | ○ |
| Strategic positioning (someone who is (possibly) HIV positive only takes bottom position) (4) | ○ | ○ | ○ | ○ | ○ |
| Viral load sorting (only have condomless sex with someone who has HIV if their virus is suppressed due to treatment) (7) | ○ | ○ | ○ | ○ | ○ |

Page Break

Q41 Wanneer ben je voor het laatst op hiv getest?

- 0-3 maanden geleden (1)
- 4-6 maanden geleden (2)
- 6-12 maanden geleden (3)
- Meer dan 12 maanden geleden (4)
- Ik ben nog nooit op hiv getest (5)

Q41 When where you tested for HIV last?

- 0-3 months ago (1)
- 4-6 months ago (2)
- 6-12 months ago (3)
- More than 12 months ago (4)
- I have never tested for HIV (5)

Q43 Wat was de uitslag van je laatste hiv test?

- hiv positief (wel hiv) (1)
- hiv negatief (geen hiv) (2)
- Ik wacht nog op de uitslag (3)
- Weet ik niet (4)

Q43 What was the outcome of your most recent HIV test?

- HIV positive (I have HIV) (1)
- HIV negative (I did not have HIV) (2)
- I am still waiting for the diagnosis (3)
- I do not know (4)

Q114 Heb je in de afgelopen 6 maanden drugs gebruikt voor of tijdens seks?

- ○ Ja (1)
- ○ Nee (2)

Q114 Did you use drugs before or during sex in the last 6 months?

- ○ Yes (1)
- ○ No (2)

Q120 Heb je in de afgelopen 6 maanden alcohol gedronken voor of tijdens seks?

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| | 1 (1) | 2 (2) | 3 (3) | 4 (4) | 5 (5) | |
| Nooit | ○ | ○ | ○ | ○ | ○ | Altijd als ik seks heb |

Q120 Have you drank any alcohol before or during sex in the last 6 months?

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| | 1 (1) | 2 (2) | 3 (3) | 4 (4) | 5 (5) | |
| Never | ○ | ○ | ○ | ○ | ○ | Always when I have sex |

Q156 Mocht je nog vragen opmerking hebben over het onderzoek, neem dan contact op met een van de onderzoekers:
- Chantal den Daas, Rijksinstituut voor Volksgezondheid en Milieu, Centrum Infectieziektebestrijding (chantal.den.daas@rivm.nl) - John de Wit, Universiteit Utrecht, Afdeling Algemene Sociale Wetenschappen (j.dewit@uu.nl) - Wim Zuilhof, Soa Aids Nederland, Programma Manager MSM (wzuilhof@soaaids.nl)

Q156 If you have any questions regarding the study, please contact one of the researchers:
Chantal den Daas, National Institute for Public helath and the Environment, Center for Infectious Disease Control (chantal.den.daas@rivm.nl) John de Wit, Utrecht University , Interdisciplinary Social Sciece (j.dewit@uu.nl) Wim Zuilhof, STI Aids the Netherlands, Program Manager MSM (wzuilhof@soaaids.nl)

## Appendix 3 Syntax

```
* Encoding: UTF-8.

*Werken in kopie.
SAVE OUTFILE='R:\EPI\SOA\9) Soa overig\Gedrag\SMS 2018 _ Anne Konig\Data\Kopie20190205MSM_workfile_eligible.sav'
 /COMPRESSED.

*tabel in welk land ben je geboren.
FREQUENCIES VARIABLES=NL born born_m born_v
  /ORDER=ANALYSIS.
*tabel consent.
FREQUENCIES VARIABLES=consent
  /ORDER=ANALYSIS.
*tabel leeftijd.
FREQUENCIES VARIABLES=age
  /ORDER=ANALYSIS.
*vragenlijst afgemaakt, maar geen exclusie criteria.
FREQUENCIES VARIABLES=Finished
  /ORDER=ANALYSIS.
*indentificatie geslacht en sexuele voorkeur.
FREQUENCIES VARIABLES=pref pref_ov atr atr_ov sexg sexg_ov
  /ORDER=ANALYSIS.


***FILTER. 1e generatie.
Temporary.
Select if (NL = 2).
freq NL.

*vader en moeder ander land crosstabel.
CROSSTABS
/TABLES= born_m BY born_v
```

```
/FORMAT=AVALUE TABLES
/CELLS=COUNT
/COUNT ROUND CELL.

***FILTER. 2e generatie.
Temporary.
Select if (NL = 1).
freq NL.

*vader en moeder ander land crosstabel.
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/FORMAT=AVALUE TABLES
/CELLS=COUNT
/COUNT ROUND CELL.



*vader ander land dan NL (5544-5154=390).
CROSSTABS
/TABLES =NL BY born_v
/FORMAT=AVALUE TABLES
/CELLS=COUNT
/COUNT ROUND CELL.

*moeder ander land dan NL (5544-5160=384).
CROSSTABS
/TABLES =NL BY born_m
/FORMAT=AVALUE TABLES
/CELLS=COUNT
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***FILTER. westerse.
```

Temporary.

Select if (born=1 OR born=13 OR born=14 OR born=17 OR born=18 OR born=19 OR born=20 OR born=26 OR born=36 OR born=53 OR born=57 OR born=55 OR born=68 OR born=73

OR born=82 OR born=88 OR born=99 OR born=101 OR born=108 OR born=109 OR born=113 OR born=128 OR born=133 OR born=152 OR born=137 OR born=165 OR born=170 OR

born=166 OR born=12 OR born=184 OR born=204 OR born=202 OR born=66 OR born=179 OR born=54 OR born=76 OR born=233 OR born=197 OR born=41).

freq born.

*recode born aanmaken variable Born_I 165 = NL=3 1=W 2=NW.

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VARIABLE LABELS Born_I.

EXECUTE.

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(166=3) INTO Born_Moeder.

VARIABLE LABELS Born_Moeder.

EXECUTE.

*recode born_v aanmaken variable Born_Vader 165 = NL=3 1=W 2=NW.

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    (7=2) (9=2) (22=2) (59=2) (61=2) (64=2) (79=2) (84=2) (80=2) (95=2) (101=2)
(115=2) (136=2)
    (155=2) (158=2) (149=2) (154=2) (139=2) (160=2) (172=2) (232=2) (231=2)
(236=2) (176=2) (193=2)
    (235=2) (244=2) (215=2) (3=2) (51=2) (141=2)
    (252=99) (166=3) (SYSMIS=99) INTO Born_Vader.
VARIABLE LABELS Born_Vader.
EXECUTE.

*Compute 1e en 2e generatie NL/NW/W 1=W-1e 2=W-2e 3= NW-1e 4=NW-2e
5=NL.
COMPUTE Migratie_Cat = 99.
IF Born_I=1 AND Born_Moeder=1 AND Born_Vader=1 Migratie_Cat=1.
IF Born_I=1 AND Born_Moeder=2 AND Born_Vader=1 Migratie_Cat=1.
IF Born_I=1 AND Born_Moeder=3 AND Born_Vader=1 Migratie_Cat=1.
IF Born_I=1 AND Born_Moeder=1 AND Born_Vader=2 Migratie_Cat=1.
```

```
IF Born_I=1 AND Born_Moeder=2 AND Born_Vader=2 Migratie_Cat=1.
IF Born_I=1 AND Born_Moeder=3 AND Born_Vader=2 Migratie_Cat=1.
IF Born_I=1 AND Born_Moeder=1 AND Born_Vader=3 Migratie_Cat=1.
IF Born_I=1 AND Born_Moeder=2 AND Born_Vader=3 Migratie_Cat=1.

IF Born_I=1 AND Born_Moeder=3 AND Born_Vader=3 Migratie_Cat=5.

IF Born_I=1 AND Born_Moeder=1 AND Born_Vader=99 Migratie_Cat=1.
IF Born_I=1 AND Born_Moeder=2 AND Born_Vader=99 Migratie_Cat=1.
IF Born_I=1 AND Born_Moeder=3 AND Born_Vader=99 Migratie_Cat=1.
IF Born_I=3 AND Born_Moeder=1 AND Born_Vader=1 Migratie_Cat=2.
IF Born_I=3 AND Born_Moeder=3 AND Born_Vader=1 Migratie_Cat=2.
IF Born_I=3 AND Born_Moeder=1 AND Born_Vader=2 Migratie_Cat=2.
IF Born_I=3 AND Born_Moeder=1 AND Born_Vader=3 Migratie_Cat=2.
IF Born_I=3 AND Born_Moeder=1 AND Born_Vader=99 Migratie_Cat=2.

IF Born_I=2 AND Born_Moeder=1 AND Born_Vader=1 Migratie_Cat=3.
IF Born_I=2 AND Born_Moeder=2 AND Born_Vader=1 Migratie_Cat=3.
IF Born_I=2 AND Born_Moeder=3 AND Born_Vader=1 Migratie_Cat=3.
IF Born_I=2 AND Born_Moeder=1 AND Born_Vader=2 Migratie_Cat=3.
IF Born_I=2 AND Born_Moeder=2 AND Born_Vader=2 Migratie_Cat=3.
IF Born_I=2 AND Born_Moeder=3 AND Born_Vader=2 Migratie_Cat=3.
IF Born_I=2 AND Born_Moeder=1 AND Born_Vader=3 Migratie_Cat=3.
IF Born_I=2 AND Born_Moeder=2 AND Born_Vader=3 Migratie_Cat=3.

IF Born_I=2 AND Born_Moeder=3 AND Born_Vader=3 Migratie_Cat=5.

IF Born_I=2 AND Born_Moeder=1 AND Born_Vader=99 Migratie_Cat=3.
IF Born_I=2 AND Born_Moeder=2 AND Born_Vader=99 Migratie_Cat=3.
IF Born_I=2 AND Born_Moeder=3 AND Born_Vader=99 Migratie_Cat=3.

IF Born_I=3 AND Born_Moeder=2 AND Born_Vader=2 Migratie_Cat=4.
IF Born_I=3 AND Born_Moeder=3 AND Born_Vader=2 Migratie_Cat=4.
```

IF Born_I=3 AND Born_Moeder=2 AND Born_Vader=1 Migratie_Cat=4.
IF Born_I=3 AND Born_Moeder=2 AND Born_Vader=3 Migratie_Cat=4.
IF Born_I=3 AND Born_Moeder=2 AND Born_Vader=99 Migratie_Cat=4.

IF Born_I=3 AND Born_Moeder=3 AND Born_Vader=3 Migratie_Cat=5.
IF Born_I=3 AND Born_Moeder=3 AND Born_Vader=99 Migratie_Cat=5.
If Born_I=99 Migratie_Cat=5.
EXECUTE.

*Compute 1e en 2e generatie NL/NW/W 1=W-1e 2=W-2e 3= NW-1e 4=NW-2e 5=NL verschil twee ouders uit hetzelfde land wordt dat land aangehouden en niet geboorteland.

COMPUTE Migratie_Cat_Y = 99.
IF Born_I=1 AND Born_Moeder=1 AND Born_Vader=1 Migratie_Cat_Y=1.

IF Born_I=1 AND Born_Moeder=2 AND Born_Vader=1 Migratie_Cat_Y=1.
IF Born_I=1 AND Born_Moeder=3 AND Born_Vader=1 Migratie_Cat_Y=1.
IF Born_I=1 AND Born_Moeder=1 AND Born_Vader=2 Migratie_Cat_Y=1.

IF Born_I=1 AND Born_Moeder=2 AND Born_Vader=2 Migratie_Cat_Y=4.

IF Born_I=1 AND Born_Moeder=3 AND Born_Vader=2 Migratie_Cat_Y=1.
IF Born_I=1 AND Born_Moeder=1 AND Born_Vader=3 Migratie_Cat_Y=1.
IF Born_I=1 AND Born_Moeder=2 AND Born_Vader=3 Migratie_Cat_Y=1.

IF Born_I=1 AND Born_Moeder=3 AND Born_Vader=3 Migratie_Cat_Y=5.

IF Born_I=1 AND Born_Moeder=1 AND Born_Vader=99 Migratie_Cat_Y=1.
IF Born_I=1 AND Born_Moeder=2 AND Born_Vader=99 Migratie_Cat_Y=2.
IF Born_I=1 AND Born_Moeder=3 AND Born_Vader=99 Migratie_Cat_Y=3.

IF Born_I=3 AND Born_Moeder=1 AND Born_Vader=1 Migratie_Cat_Y=2.

IF Born_I=3 AND Born_Moeder=3 AND Born_Vader=1 Migratie_Cat_Y=2.
IF Born_I=3 AND Born_Moeder=1 AND Born_Vader=2 Migratie_Cat_Y=2.
IF Born_I=3 AND Born_Moeder=1 AND Born_Vader=3 Migratie_Cat_Y=2.

IF Born_I=3 AND Born_Moeder=1 AND Born_Vader=99 Migratie_Cat_Y=2.

IF Born_I=2 AND Born_Moeder=1 AND Born_Vader=1 Migratie_Cat_Y=2.

IF Born_I=2 AND Born_Moeder=2 AND Born_Vader=1 Migratie_Cat_Y=3.
IF Born_I=2 AND Born_Moeder=3 AND Born_Vader=1 Migratie_Cat_Y=3.
IF Born_I=2 AND Born_Moeder=1 AND Born_Vader=2 Migratie_Cat_Y=3.

IF Born_I=2 AND Born_Moeder=2 AND Born_Vader=2 Migratie_Cat_Y=3.

IF Born_I=2 AND Born_Moeder=3 AND Born_Vader=2 Migratie_Cat_Y=3.
IF Born_I=2 AND Born_Moeder=1 AND Born_Vader=3 Migratie_Cat_Y=3.
IF Born_I=2 AND Born_Moeder=2 AND Born_Vader=3 Migratie_Cat_Y=3.

IF Born_I=2 AND Born_Moeder=3 AND Born_Vader=3 Migratie_Cat_Y=5.

IF Born_I=2 AND Born_Moeder=1 AND Born_Vader=99 Migratie_Cat_Y=1.
IF Born_I=2 AND Born_Moeder=2 AND Born_Vader=99 Migratie_Cat_Y=2.
IF Born_I=2 AND Born_Moeder=3 AND Born_Vader=99 Migratie_Cat_Y=3.

IF Born_I=3 AND Born_Moeder=2 AND Born_Vader=2 Migratie_Cat_Y=4.

IF Born_I=3 AND Born_Moeder=3 AND Born_Vader=2 Migratie_Cat_Y=4.
IF Born_I=3 AND Born_Moeder=2 AND Born_Vader=1 Migratie_Cat_Y=4.
IF Born_I=3 AND Born_Moeder=2 AND Born_Vader=3 Migratie_Cat_Y=4.

IF Born_I=3 AND Born_Moeder=2 AND Born_Vader=99 Migratie_Cat_Y=4.

IF Born_I=3 AND Born_Moeder=3 AND Born_Vader=3 Migratie_Cat_Y=5.

IF Born_I=3 AND Born_Moeder=3 AND Born_Vader=99 Migratie_Cat_Y=5.
If Born_I=99 Migratie_Cat=5.
EXECUTE.

***FILTER. Niet westerse.
Temporary.
Select if (NOT born=1 OR born=13 OR born=14 OR born=17 OR born=18 OR born=19 OR born=20 OR born=26 OR born=36 OR born=53 OR born=57 OR born=55 OR born=68 OR born=73
OR born=82 OR born=88 OR born=99 OR born=101 OR born=108 OR born=109OR born=113 OR born=128 OR born=133 OR born=152 OR born=137 OR born=165 OR born=170 OR
born=166 OR born=12 OR born=184 OR born=204 OR born=202 OR born=66 OR born=179 OR born=54 OR born=76 OR born=233 OR born=197 OR born=41).
freq born.

**Dubble check variabele Migratie_Cat-Y.
Temporary.
Select if (Migratie_Cat_Y eq 2 and NL eq 2).
Freq Born_I.

Temporary.
Select if (Migratie_Cat_Y eq 2 and NL eq 2 and Born_I ne 3).
CROSSTABS
/TABLES = Born_Moeder BY Born_Vader
/FORMAT=AVALUE TABLES
/CELLS=COUNT
/COUNT ROUND CELL.

Temporary.
Select if (Migratie_Cat_Y eq 4 and NL eq 2 ).

```
Freq Born_I .

Temporary.
Select if (Migratie_Cat_Y eq 4 and NL eq 2 and Born_I ne 3).
CROSSTABS
/TABLES = Born_Moeder BY Born_Vader
/FORMAT=AVALUE TABLES
/CELLS=COUNT
/COUNT ROUND CELL.

Temporary.
Select if (Migratie_Cat_Y eq 1).
Freq Born_I.

RECODE Born_I (1=1) (2=2) (SYSMIS=3) (99=0.00) INTO Geboren_Born.
VARIABLE LABELS  Geboren_Born 'Geboren_Born'.
EXECUTE.
```

***1 respondent met extreme waarden volgens plots verwijderd respondent R_1dLIGgNmdm3784q 290 1000 mannen ooit sex en dan 7500 anale seks klopt niet dit moet 750 zijn aangepast..

```
*Dummy varibele Migratie.

RECODE Migratie_Cat_Y (1=1) (ELSE=0) INTO Western1.
EXECUTE.

RECODE Migratie_Cat_Y (2=1) (ELSE=0) INTO Western2.
EXECUTE.

RECODE Migratie_Cat_Y (3=1) (ELSE=0) INTO NonWestern1.
EXECUTE.
```

```
RECODE Migratie_Cat_Y (4=1) (ELSE=0) INTO NonWestern2.
EXECUTE.

RECODE Migratie_Cat_Y (5=1) (ELSE=0) INTO Dutch.
EXECUTE.

***andere verdeling NW/W/NL drie groepen ipv 5 en first and second.

*Recode 1=western 2 = NW 3 = NL.
freq Migratie_Cat_Y.

RECODE Migratie_Cat_Y (1=1) (2=1) (3=2) (4=2) (5=3) INTO Migratie_Cat_X.
EXECUTE.

freq Migratie_Cat_X.
*Dummy variabele voor NW/W/NL NL.

RECODE Migratie_Cat_X (1=1) (ELSE=0) INTO Western.
EXECUTE.

RECODE Migratie_Cat_X (2=1) (ELSE=0) INTO NonWestern.
EXECUTE.

*Recode 1=1e 2 =2e 3 = NL.
freq Migratie_Cat_Y.

RECODE Migratie_Cat_Y (1=1) (2=2) (3=1) (4=2) (5=3) INTO Migratie_Cat_Z.
EXECUTE.

freq Migratie_Cat_Z.
*Dummy variabele voor 1e/2e/ NL.
```

```
RECODE Migratie_Cat_Z (1=1) (ELSE=0) INTO first.
EXECUTE.

RECODE Migratie_Cat_Z (2=1) (ELSE=0) INTO second.
EXECUTE.

**** recode variables aanmaken.
recode Drugs (1=1) (2=0) (SYSMIS=SYSMIS) into Gebruik_drugs.
VARIABLE LABELS Gebruik_drugs.
EXECUTE.

*Alcohol combi seks laatste 6 maanden.
recode alc (1=0) (2=1) (3=1) (4=1) (5=1) into Gebruik_Alcohol.
VARIABLE LABELS Gebruik_Alcohol.
EXECUTE.

*Stedelijk ja (sterk zeer sterk) nee =0 matig weinig niet stedelijk.
RECODE stedelijk (1=1) (2=1) (3=0) (4=0) (5=0) into Stedelijk_2gr.
VARIABLE LABELS Stedelijk_2gr.
EXECUTE.

*Anal sex 6 maanden groepen maken 0,1, 2-5, meer dan 5.
recode ansex_6mn (0=0) (1=1) (2 thru 5=2) (5 thru 400=3) (SYSMIS=SYSMIS) into
ansex_6mn_gr.
VARIABLE LABELS ansex_6mn_gr.
EXECUTE.

*Preventie steady zonder gebruikt 0 nooit zelden soms 1 vaak altijd.
recode steady_prev1 (1=0) (2=0) (3=0) (4=1) (5=1) (999=SYSMIS) into
steady_prev1C.
VARIABLE LABELS steady_prev1C.
EXECUTE.
```

*Preventie steady 0 =geen partner 1 nooit 2zelden soms vaak 3 altijd.

recode steady_prev2 (1=0) (2=0) (3=0) (4=1) (5=1)  (999=SYSMIS) into steady_prev2K.

VARIABLE LABELS  steady_prev2K.

EXECUTE.

*Preventie steady 0 =geen partner 1 nooit 2zelden soms vaak 3 altijd.

recode steady_prev3 (1=0) (2=0) (3=0) (4=1) (5=1)  (999=SYSMIS) into steady_prev3S.

VARIABLE LABELS  steady_prev3S.

EXECUTE.

*Preventie steady 0 =geen partner 1 nooit 2zelden soms vaak 3 altijd.

recode steady_prev4 (1=0) (2=0) (3=0) (4=1) (5=1)  (999=SYSMIS) into steady_prev4P.

VARIABLE LABELS  steady_prev4P.

EXECUTE.

*Preventie steady 0 =geen partner 1 nooit 2zelden soms vaak 3 altijd.

recode steady_prev5 (1=0) (2=0) (3=0) (4=1) (5=1)  (999=SYSMIS) into steady_prev5V.

VARIABLE LABELS  steady_prev5V.

EXECUTE.

*Preventie steady 0 =geen partner 1 nooit 2zelden soms vaak 3 altijd.

recode casual_prev1 (1=0) (2=0) (3=0) (4=1) (5=1)  (999=SYSMIS) into casual_prev1C.

VARIABLE LABELS  casual_prev1C.

EXECUTE.

*Preventie steady 0 =geen partner 1 nooit 2zelden soms vaak 3 altijd.

recode casual_prev2 (1=0) (2=0) (3=0) (4=1) (5=1)  (999=SYSMIS) into casual_prev2K.

```
VARIABLE LABELS  casual_prev2K.
EXECUTE.

*Preventie steady 0 =geen partner 1 nooit 2zelden soms vaak 3 altijd.
recode casual_prev3 (1=0) (2=0) (3=0) (4=1) (5=1)  (999=SYSMIS) into
casual_prev3S.
VARIABLE LABELS casual_prev3S.
EXECUTE.

*Preventie steady 0 =geen partner 1 nooit 2zelden soms vaak 3 altijd.
recode casual_prev4 (1=0) (2=0) (3=0) (4=1) (5=1) (999=SYSMIS) into
casual_prev4P.
VARIABLE LABELS  casual_prev4P.
EXECUTE.

*Preventie steady 0 =geen partner 1 nooit 2zelden soms vaak 3 altijd.
recode casual_prev5 (1=0) (2=0) (3=0) (4=1) (5=1) (999=SYSMIS) into
casual_prev5V.
VARIABLE LABELS  casual_prev5V.
EXECUTE.

*Preventie steady 0 =geen partner 1 nooit 2zelden soms vaak 3 altijd.
recode onen_prev1 (1=0) (2=0) (3=0) (4=1) (5=1) (999=SYSMIS) into onen_prev1C.
VARIABLE LABELS onen_prev1C.
EXECUTE.

*Preventie steady 0 =geen partner 1 nooit 2zelden soms vaak 3 altijd.
recode onen_prev2 (1=0) (2=0) (3=0) (4=1) (5=1) (999=SYSMIS) into onen_prev2K.
VARIABLE LABELS  onen_prev2K.
EXECUTE.

*Preventie steady 0 =geen partner 1 nooit 2zelden soms vaak 3 altijd.
recode onen_prev3 (1=0) (2=0) (3=0) (4=1) (5=1)  (999=SYSMIS) into onen_prev3S.
```

```
VARIABLE LABELS  onen_prev3S.
EXECUTE.

*Preventie steady 0 =geen partner 1 nooit 2zelden soms vaak 3 altijd.
recode onen_prev4 (1=0) (2=0) (3=0) (4=1) (5=1)  (999=SYSMIS) into onen_prev4P.
VARIABLE LABELS  onen_prev4P.
EXECUTE.

*Preventie steady 0 =geen partner 1 nooit 2zelden soms vaak 3 altijd.
recode onen_prev5 (1=0) (2=0) (3=0) (4=1) (5=1) (999=SYSMIS) into onen_prev5V.
VARIABLE LABELS  onen_prev5V.
EXECUTE.

**geen partner verwijderd.

*Gemiddelde berekenen.
COMPUTE MeanCON=MEAN (steady_prev1C, casual_prev1C, onen_prev1C).
EXECUTE.

COMPUTE MeanKlaar= MEAN (steady_prev2K, casual_prev2K, onen_prev2K).
EXECUTE.

COMPUTE MeanSero= MEAN (steady_prev3S, casual_prev3S, onen_prev3S).
EXECUTE.

COMPUTE MeanPositie= MEAN (steady_prev4P, casual_prev4P, onen_prev4P).
EXECUTE.

COMPUTE MeanVirale= MEAN (steady_prev5V, casual_prev5V, onen_prev5V).
EXECUTE.

*Dichotomiseren ja vaak/altijd) (nee soms zelfden nooit).
```

```
recode MeanCON (0,00=0) (0,33=0) (0,50=0) (0,67=1) (1,00=1) (SYSMIS=SYSMIS)
INTO MeanCONR.
EXECUTE.

*Dichotomiseren ja vaak/altijd) (nee soms zelfden nooit).
recode MeanKlaar (0,00=0) (0,33=0) (0,50=0) (0,67=1) (1,00=1)
(SYSMIS=SYSMIS) INTO MeanKlaarR.
EXECUTE.

*Dichotomiseren ja vaak/altijd) (nee soms zelfden nooit).
recode MeanSero (0,00=0) (0,33=0) (0,50=0) (0,67=1) (1,00=1) (SYSMIS=SYSMIS)
INTO MeanSeroR.
EXECUTE.

*Dichotomiseren ja vaak/altijd) (nee soms zelfden nooit).
recode MeanPositie (0,00=0) (0,33=0) (0,50=0) (0,67=1) (1,00=1)
(SYSMIS=SYSMIS) INTO MeanPositieR.
EXECUTE.

*Dichotomiseren ja vaak/altijd) (nee soms zelfden nooit).
recode MeanVirale (0,00=0) (0,33=0) (0,50=0) (0,67=1) (1=1) (SYSMIS=SYSMIS)
INTO MeanViraleR.
EXECUTE.

*cuttofvalue 0.55.
COMPUTE MeanklaarR=MeanKlaar > 0.55.
EXECUTE.

*cuttofvalue 0.55.
COMPUTE MeanSeroR=MeanSero > 0.55.
EXECUTE.

*cuttofvalue 0.55.
```

```
COMPUTE MeanPositieR=MeanPositie > 0.55.
EXECUTE.

*cuttofvalue 0.55.
COMPUTE MeanViraleR=MeanVirale > 0.55.
EXECUTE.



*****Assumpties

* multicollinearity sig sommige boven 0.80.. boven 0.85 niet goed .
CORRELATIONS
  /VARIABLES=Age_3gr pref_2gr opl_grR Stedelijk_2gr ansex_6mn_gr steady2
onen2 casual2
    Gebruik_drugs Gebruik_Alcohol MeanKlaarR MeanSeroR MeanPositieR
MeanViraleR
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.

*niet normaal verdeeld.
EXAMINE VARIABLES=Age_3gr pref_2gr opl_grR Stedelijk_2gr ansex_6mn_gr
steady2 onen2 casual2
    Gebruik_drugs Gebruik_Alcohol MeanKlaarR MeanSeroR MeanPositieR
MeanViraleR
  /PLOT BOXPLOT STEMLEAF HISTOGRAM NPPLOT
  /COMPARE VARIABLES
  /STATISTICS DESCRIPTIVES EXTREME
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.

** maar: residuals normaal verdeeld enVIF dichtbij de 1 dus geen multicollinairty.
REGRESSION
```

```
/MISSING LISTWISE
/STATISTICS COEFF OUTS R ANOVA COLLIN TOL
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT hivstR
/METHOD=ENTER Age_3gr pref_2gr opl_grR Stedelijk_2gr ansex_6mn_gr steady2
onen2 casual2
   Gebruik_drugs Gebruik_Alcohol MeanKlaarR MeanSeroR MeanPositieR
MeanViraleR
/SCATTERPLOT=(*ZRESID ,*ZPRED)
 /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
 /CASEWISE PLOT(ZRESID) OUTLIERS(3).

*Further explore.

*HIV chi square (2 variabelen) 0-other 1=ja.
CROSSTABS
  /TABLES=Migratie_Cat_Y BY hivstR
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ BTAU
  /CELLS=COUNT EXPECTED ROW COLUMN TOTAL
  /COUNT ROUND CELL.

*assumpties ANOVA hoofdvraag.
EXAMINE VARIABLES=hivstR BY Migratie_Cat_Y
  /PLOT BOXPLOT STEMLEAF HISTOGRAM NPPLOT SPREADLEVEL
  /COMPARE VARIABLES
  /STATISTICS DESCRIPTIVES EXTREME
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.

*ANOVA compare.
```

```
UNIANOVA hivstR BY Migratie_Cat_Y
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /PLOT=PROFILE(Migratie_Cat_Y)
  /EMMEANS=TABLES(Migratie_Cat_Y) COMPARE ADJ(LSD)
  /EMMEANS=TABLES(OVERALL)
  /PRINT=ETASQ TEST(LMATRIX) DESCRIPTIVE PARAMETER
HOMOGENEITY OPOWER
  /PLOT=SPREADLEVEL RESIDUALS
  /CRITERIA=ALPHA(.05)
  /DESIGN=Migratie_Cat_Y.
*univeriate stap 1

*Crosstabs incl HIV.
CROSSTABS
  /TABLES=Age_3gr BY hivstR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ RISK CMH(1)
  /CELLS=COUNT ROW
  /COUNT ROUND CELL.


* verschillen MEAN leeftijd Homogeneity of variances was violated dus welch F test,
posthoc:Games Howell, Tukey post hoc test when met the assumption.
ONEWAY Age_3gr BY Migratie_Cat_Y
  /STATISTICS DESCRIPTIVES HOMOGENEITY
  /PLOT MEANS
  /MISSING ANALYSIS.

* chi square.
CROSSTABS
  /TABLES=Age_3gr BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
```

```
  /STATISTICS=CHISQ PHI
  /CELLS=COUNT EXPECTED ROW COLUMN TOTAL
  /COUNT ROUND CELL.

*Crosstabs incl HIV.
CROSSTABS
  /TABLES=Age_3gr BY hivstR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ RISK CMH(1)
  /CELLS=COUNT ROW
  /COUNT ROUND CELL.

*verschillen pref.
ONEWAY pref_2gr BY Migratie_Cat_Y
  /STATISTICS DESCRIPTIVES HOMOGENEITY
  /PLOT MEANS
  /MISSING ANALYSIS.

* chi square.
CROSSTABS
  /TABLES=pref_2gr BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ PHI
  /CELLS=COUNT EXPECTED ROW COLUMN TOTAL
  /COUNT ROUND CELL.

*Crosstabs incl HIV.
CROSSTABS
  /TABLES=pref_2gr BY hivstR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ RISK CMH(1)
  /CELLS=COUNT ROW
  /COUNT ROUND CELL.
```

```
*verschillen opl.
ONEWAY opl_grR BY Migratie_Cat_Y
  /STATISTICS DESCRIPTIVES HOMOGENEITY
  /PLOT MEANS
  /MISSING ANALYSIS.

* chi square.
CROSSTABS
  /TABLES=opl_grR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ PHI
  /CELLS=COUNT EXPECTED ROW COLUMN TOTAL
  /COUNT ROUND CELL.

*Crosstabs incl HIV.
CROSSTABS
  /TABLES=opl_grR BY hivstR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ RISK CMH(1)
  /CELLS=COUNT ROW
  /COUNT ROUND CELL.

*verschillen stedelijk.
ONEWAY Stedelijk_2gr BY Migratie_Cat_Y
  /STATISTICS DESCRIPTIVES HOMOGENEITY
  /PLOT MEANS
  /MISSING ANALYSIS.

* chi square.
CROSSTABS
  /TABLES=Stedelijk_2gr BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
```

```
  /STATISTICS=CHISQ PHI
  /CELLS=COUNT EXPECTED ROW COLUMN TOTAL
  /COUNT ROUND CELL.

*Crosstabs incl HIV.
CROSSTABS
  /TABLES=Stedelijk_2gr BY hivstR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ RISK CMH(1)
  /CELLS=COUNT ROW
  /COUNT ROUND CELL.

*verschillen analsex partners.
ONEWAY ansex_6mn_gr BY Migratie_Cat_Y
  /STATISTICS DESCRIPTIVES HOMOGENEITY
  /PLOT MEANS
  /MISSING ANALYSIS.

* chi square.
CROSSTABS
  /TABLES=ansex_6mn_gr BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ PHI
  /CELLS=COUNT EXPECTED ROW COLUMN TOTAL
  /COUNT ROUND CELL.

*Crosstabs incl HIV.
CROSSTABS
  /TABLES=ansex_6mn_gr BY hivstR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ RISK CMH(1)
  /CELLS=COUNT ROW
  /COUNT ROUND CELL.
```

```
*verschillen steady.
ONEWAY steady2 BY Migratie_Cat_Y
  /STATISTICS DESCRIPTIVES HOMOGENEITY
  /PLOT MEANS
  /MISSING ANALYSIS.

* chi square.
CROSSTABS
  /TABLES=steady2 BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ PHI
  /CELLS=COUNT EXPECTED ROW COLUMN TOTAL
  /COUNT ROUND CELL.

*Crosstabs incl HIV.
CROSSTABS
  /TABLES=steady2 BY hivstR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ RISK CMH(1)
  /CELLS=COUNT ROW
  /COUNT ROUND CELL.

*verschillen onen.
ONEWAY onen2 BY Migratie_Cat_Y
  /STATISTICS DESCRIPTIVES HOMOGENEITY
  /PLOT MEANS
  /MISSING ANALYSIS.

* chi square.
CROSSTABS
  /TABLES=onen2 BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
```

```
  /STATISTICS=CHISQ PHI
  /CELLS=COUNT EXPECTED ROW COLUMN TOTAL
  /COUNT ROUND CELL.

*Crosstabs incl HIV.
CROSSTABS
  /TABLES=onen2 BY hivstR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ RISK CMH(1)
  /CELLS=COUNT ROW
  /COUNT ROUND CELL.

*verschillen casual.
ONEWAY casual2 BY Migratie_Cat_Y
  /STATISTICS DESCRIPTIVES HOMOGENEITY
  /PLOT MEANS
  /MISSING ANALYSIS.

* chi square.
CROSSTABS
  /TABLES=casual2 BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ PHI
  /CELLS=COUNT EXPECTED ROW COLUMN TOTAL
  /COUNT ROUND CELL.

*Crosstabs incl HIV.
CROSSTABS
  /TABLES=casual2 BY hivstR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ RISK CMH(1)
  /CELLS=COUNT ROW
  /COUNT ROUND CELL.
```

```
*verschillen drugs.
ONEWAY Gebruik_drugs BY Migratie_Cat_Y
  /STATISTICS DESCRIPTIVES HOMOGENEITY
  /PLOT MEANS
  /MISSING ANALYSIS.

* chi square.
CROSSTABS
  /TABLES=Gebruik_drugs BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ PHI
  /CELLS=COUNT EXPECTED ROW COLUMN TOTAL
  /COUNT ROUND CELL.

*Crosstabs incl HIV.
CROSSTABS
  /TABLES=Gebruik_drugs BY hivstR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ RISK CMH(1)
  /CELLS=COUNT ROW
  /COUNT ROUND CELL.


*verschillen Alcohol.
ONEWAY Gebruik_Alcohol BY Migratie_Cat_Y
  /STATISTICS DESCRIPTIVES HOMOGENEITY
  /PLOT MEANS
  /MISSING ANALYSIS.

* chi square.
CROSSTABS
```

```
  /TABLES=Gebruik_Alcohol BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ PHI
  /CELLS=COUNT EXPECTED ROW COLUMN TOTAL
  /COUNT ROUND CELL.

*Crosstabs incl HIV.
CROSSTABS
  /TABLES=Gebruik_Alcohol BY hivstR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ RISK CMH(1)
  /CELLS=COUNT ROW
  /COUNT ROUND CELL.

*verschillen condoom gebruik dichtoom.
ONEWAY MeanCONR BY Migratie_Cat_Y
  /STATISTICS DESCRIPTIVES HOMOGENEITY
  /PLOT MEANS
  /MISSING ANALYSIS.

* chi square.
CROSSTABS
  /TABLES=MeanCONR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ PHI
  /CELLS=COUNT EXPECTED ROW COLUMN TOTAL
  /COUNT ROUND CELL.

*Crosstabs incl HIV.
CROSSTABS
  /TABLES=MeanCONR BY hivstR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ RISK CMH(1)
```

```
  /CELLS=COUNT ROW
  /COUNT ROUND CELL.

*verschillen niet klaarkomen dichtoom.
ONEWAY MeanKlaarR BY Migratie_Cat_Y
  /STATISTICS DESCRIPTIVES HOMOGENEITY
  /PLOT MEANS
  /MISSING ANALYSIS.



* chi square.
CROSSTABS
  /TABLES=MeanKlaarR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ PHI
  /CELLS=COUNT EXPECTED ROW COLUMN TOTAL
  /COUNT ROUND CELL.

*Crosstabs incl HIV.
CROSSTABS
  /TABLES=MeanKlaarR BY hivstR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ RISK CMH(1)
  /CELLS=COUNT ROW
  /COUNT ROUND CELL.

*verschillen serosorteren dichtoom.
ONEWAY MeanSeroR BY Migratie_Cat_Y
  /STATISTICS DESCRIPTIVES HOMOGENEITY
  /PLOT MEANS
  /MISSING ANALYSIS.

* chi square.
```

```
CROSSTABS
  /TABLES=MeanSeroR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ PHI
  /CELLS=COUNT EXPECTED ROW COLUMN TOTAL
  /COUNT ROUND CELL.

*Crosstabs incl HIV.
CROSSTABS
  /TABLES=MeanSeroR BY hivstR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ RISK CMH(1)
  /CELLS=COUNT ROW
  /COUNT ROUND CELL.

*verschillen strategisch positioneren dichtoom.
ONEWAY MeanPositieR BY Migratie_Cat_Y
  /STATISTICS DESCRIPTIVES HOMOGENEITY
  /PLOT MEANS
  /MISSING ANALYSIS.

* chi square.
CROSSTABS
  /TABLES=MeanPositieR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ PHI
  /CELLS=COUNT EXPECTED ROW COLUMN TOTAL
  /COUNT ROUND CELL.

*Crosstabs incl HIV.
CROSSTABS
  /TABLES=MeanPositieR BY hivstR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
```

```
  /STATISTICS=CHISQ RISK CMH(1)
  /CELLS=COUNT ROW
  /COUNT ROUND CELL.

*verschillen viral load dichtoom.
ONEWAY MeanViraleR BY Migratie_Cat_Y
  /STATISTICS DESCRIPTIVES HOMOGENEITY
  /PLOT MEANS
  /MISSING ANALYSIS.

* chi square.
CROSSTABS
  /TABLES=MeanViraleR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ PHI
  /CELLS=COUNT EXPECTED ROW COLUMN TOTAL
  /COUNT ROUND CELL.

*Crosstabs incl HIV.
CROSSTABS
  /TABLES=MeanViraleR BY hivstR BY Migratie_Cat_Y
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ RISK CMH(1)
  /CELLS=COUNT ROW
  /COUNT ROUND CELL.

*HIV chi square (2 variabelen) 0-other 1=ja.
CROSSTABS
  /TABLES=Migratie_Cat_Y BY hivstR
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ BTAU
  /CELLS=COUNT EXPECTED ROW COLUMN TOTAL
  /COUNT ROUND CELL.
```

```
*Univariate stap 2

*Binary logistic regression outcome HIV alleen demografie.
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER Age_3gr pref_2gr opl_grR Stedelijk_2gr
  /CONTRAST (Age_3gr)=Indicator(1)
  /CONTRAST (pref_2gr)=Indicator(1)
  /CONTRAST (opl_grR)=Indicator(1)
  /CONTRAST (Stedelijk_2gr)=Indicator(1)
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*Logistic regression alleen seksueel gedrag.
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER ansex_6mn_gr steady2 onen2 casual2
  /CONTRAST (ansex_6mn_gr)=Indicator(4)
  /CONTRAST (steady2)=Indicator(1)
  /CONTRAST (onen2)=Indicator(1)
  /CONTRAST (casual2)=Indicator(1)
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*Logistic regression alleen seksueel gedrag.
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER MeanCONR MeanKlaarR MeanSeroR MeanPositieR
MeanViraleR
  /CONTRAST (MeanCONR)=Indicator(1)
  /CONTRAST (MeanKlaarR)=Indicator(1)
  /CONTRAST (MeanSeroR)=Indicator(1)
  /CONTRAST (MeanPositieR)=Indicator(1)
  /CONTRAST (MeanViraleR)=Indicator(1)
  /PRINT=GOODFIT CI(95)
```

```
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*Logistic regression alleen risico gedrag (niet seksueel).
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER Gebruik_drugs Gebruik_Alcohol
  /CONTRAST (Gebruik_drugs)=Indicator(1)
  /CONTRAST (Gebruik_Alcohol)=Indicator(1)
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*Binary logistic regression outcome HIV alleen age.
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD= ENTER Age_3gr Migratie_Cat_Y Age_3gr*Migratie_Cat_Y
  /CONTRAST (Age_3gr)=Indicator(1)
  /CONTRAST (Migratie_Cat_Y)=Indicator(5)
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

CROSSTABS
  /TABLES=Migratie_Cat_Y BY Age_3gr BY HivstR
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ BTAU
  /CELLS=COUNT EXPECTED ROW COLUMN TOTAL
  /COUNT ROUND CELL.

*Binary logistic regression outcome HIV alleen pref.
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER pref_2gr Migratie_Cat_Y pref_2gr*Migratie_Cat_Y
  /CONTRAST (pref_2gr)=Indicator(1)
  /CONTRAST (Migratie_Cat_Y)=Indicator(5)
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

```
*Binary logistic regression outcome HIV alleen opleiding.
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER opl_grR Migratie_Cat_Y opl_grR*Migratie_Cat_Y
  /CONTRAST (opl_grR)=Indicator(1)
  /CONTRAST (Migratie_Cat_Y)=Indicator(5)
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*Binary logistic regression outcome HIV alleen stedelijk.
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER Stedelijk_2gr Migratie_Cat_Y Stedelijk_2gr*Migratie_Cat_Y
  /CONTRAST (Stedelijk_2gr)=Indicator(1)
  /CONTRAST (Migratie_Cat_Y)=Indicator(5)
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*Logistic regression alleen anelseks partners.
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER ansex_6mn_gr Migratie_Cat_Y
ansex_6mn_gr*Migratie_Cat_Y
  /CONTRAST (ansex_6mn_gr)=Indicator(4)
  /CONTRAST (Migratie_Cat_Y)=Indicator(5)
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*Logistic regression alleen steady.
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER steady2 Migratie_Cat_Y steady2*Migratie_Cat_Y
  /CONTRAST (steady2)=Indicator(1)
  /CONTRAST (Migratie_Cat_Y)=Indicator(5)
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

```
*Logistic regression alleen onen.
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER onen2 Migratie_Cat_Y onen2*Migratie_Cat_Y
  /CONTRAST (onen2)=Indicator(1)
  /CONTRAST (Migratie_Cat_Y)=Indicator(5)
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*Logistic regression alleen casual.
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER casual2 Migratie_Cat_Y casual2*Migratie_Cat_Y
  /CONTRAST (casual2)=Indicator(1)
  /CONTRAST (Migratie_Cat_Y)=Indicator(5)
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*Logistic regression alleen Meancondooms.
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER MeanCONR Migratie_Cat_Y MeanCONR*Migratie_Cat_Y
  /CONTRAST (MeanCONR)=Indicator(1)
  /CONTRAST (Migratie_Cat_Y)=Indicator(5)
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*Logistic regression alleen Mean Klaarkomen.
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER MeanKlaarR Migratie_Cat_Y MeanKlaarR*Migratie_Cat_Y
  /CONTRAST (MeanKlaarR)=Indicator(1)
  /CONTRAST (Migratie_Cat_Y)=Indicator(5)
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*Logistic regression alleen Mean sero.
```

```
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER MeanSeroR Migratie_Cat_Y MeanSeroR*Migratie_Cat_Y
  /CONTRAST (MeanSeroR)=Indicator(1)
  /CONTRAST (Migratie_Cat_Y)=Indicator(5)
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*Logistic regression alleen mean stategisch postitioneren.
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER MeanPositieR Migratie_Cat_Y MeanPositieR*Migratie_Cat_Y
  /CONTRAST (MeanPositieR)=Indicator(1)
  /CONTRAST (Migratie_Cat_Y)=Indicator(5)
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*Logistic regression alleen mean virale lading sorteren.
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER MeanViraleR Migratie_Cat_Y MeanViraleR*Migratie_Cat_Y
  /CONTRAST (MeanViraleR)=Indicator(1)
  /CONTRAST (Migratie_Cat_Y)=Indicator(5)
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*Logistic regression alleen drug.
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER Gebruik_drugs Migratie_Cat_Y
Gebruik_drugs*Migratie_Cat_Y
  /CONTRAST (Gebruik_drugs)=Indicator(1)
  /CONTRAST (Migratie_Cat_Y)=Indicator(5)
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*Logistic regression alleen alcohol.
```

```
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER Gebruik_Alcohol Migratie_Cat_Y
Gebruik_Alcohol*Migratie_Cat_Y
  /CONTRAST (Gebruik_Alcohol)=Indicator(1)
  /CONTRAST (Migratie_Cat_Y)=Indicator(5)
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

****final model: multiple stratified logistic model

*Binary logistic regression outcome HIV + interactie migratie alles finaal model met alleen 1e/2e generatie/NL.

```
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER Age_3gr pref_2gr opl_grR Stedelijk_2gr ansex_6mn_gr
steady2 onen2 casual2
    Gebruik_drugs Gebruik_Alcohol MeanKlaarR MeanSeroR MeanPositieR
MeanViraleR
  first second pref_2gr*first pref_2gr*second Age_3gr*first Age_3gr*second
  opl_grR*first opl_grR*second Stedelijk_2gr*first Stedelijk_2gr*second
    ansex_6mn_gr*first ansex_6mn_gr*second steady2*first  steady2*second
    onen2*first onen2*second casual2*first casual2*second
    Gebruik_Alcohol*first Gebruik_Alcohol*second Gebruik_drugs*first
Gebruik_drugs*second
   MeanKlaarR*first MeanKlaarR*second
    MeanSeroR*first MeanSeroR*second MeanPositieR*first MeanPositieR*second
   MeanViraleR*first MeanViraleR*second
  /CONTRAST (Age_3gr)=Indicator(1)
  /CONTRAST (pref_2gr)=Indicator(1)
  /CONTRAST (opl_grR)=Indicator(1)
  /CONTRAST (Stedelijk_2gr)=Indicator(1)
  /CONTRAST (ansex_6mn_gr)=Indicator(4)
  /CONTRAST (steady2)=Indicator(1)
  /CONTRAST (onen2)=Indicator(1)
```

/CONTRAST (casual2)=Indicator(1)

/CONTRAST (Gebruik_drugs)=Indicator(1)

/CONTRAST (Gebruik_Alcohol)=Indicator(1)

/CONTRAST (MeanKlaarR)=Indicator(1)

/CONTRAST (MeanSeroR)=Indicator(1)

/CONTRAST (MeanPositieR)=Indicator(1)

/CONTRAST (MeanViraleR)=Indicator(1)

/PRINT=GOODFIT CI(95)

/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*Binary logistic regression outcome HIV + interactie migratie alles finaal model met alleen wesstern/nonwestern/NL zonder MeanCONR.

LOGISTIC REGRESSION VARIABLES hivstR

/METHOD=ENTER Age_3gr pref_2gr opl_grR Stedelijk_2gr ansex_6mn_gr steady2 onen2 casual2

Gebruik_drugs Gebruik_Alcohol MeanKlaarR MeanSeroR MeanPositieR MeanViraleR

Western NonWestern pref_2gr*Western pref_2gr*NonWestern Age_3gr*Western Age_3gr*NonWestern

opl_grR*Western opl_grR*NonWestern Stedelijk_2gr*Western Stedelijk_2gr*NonWestern

ansex_6mn_gr*Western ansex_6mn_gr*NonWestern steady2*Western steady2*NonWestern

onen2*Western onen2*NonWestern casual2*Western casual2*NonWestern

Gebruik_Alcohol*Western Gebruik_Alcohol*NonWestern Gebruik_drugs*Western Gebruik_drugs*NonWestern

MeanKlaarR*Western MeanKlaarR*NonWestern

MeanSeroR*Western MeanSeroR*NonWestern MeanPositieR*Western MeanPositieR*NonWestern

MeanViraleR*Western MeanViraleR*NonWestern

/CONTRAST (Age_3gr)=Indicator(1)

/CONTRAST (pref_2gr)=Indicator(1)

/CONTRAST (opl_grR)=Indicator(1)

```
  /CONTRAST (Stedelijk_2gr)=Indicator(1)
  /CONTRAST (ansex_6mn_gr)=Indicator(4)
  /CONTRAST (steady2)=Indicator(1)
  /CONTRAST (onen2)=Indicator(1)
  /CONTRAST (casual2)=Indicator(1)
  /CONTRAST (Gebruik_drugs)=Indicator(1)
  /CONTRAST (Gebruik_Alcohol)=Indicator(1)
  /CONTRAST (MeanKlaarR)=Indicator(1)
  /CONTRAST (MeanSeroR)=Indicator(1)
  /CONTRAST (MeanPositieR)=Indicator(1)
  /CONTRAST (MeanViraleR)=Indicator(1)
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*Binary logistic regression outcome HIV + interactie migratie alles finaal model.
LOGISTIC REGRESSION VARIABLES hivstR
  /METHOD=ENTER Age_3gr pref_2gr opl_grR Stedelijk_2gr ansex_6mn_gr
steady2 onen2 casual2
    Gebruik_drugs Gebruik_Alcohol MeanKlaarR MeanSeroR MeanPositieR
MeanViraleR
  Western1 Western2 NonWestern1 NonWestern2 pref_2gr*Western1
pref_2gr*Western2  pref_2gr*NonWestern1  pref_2gr*NonWestern2
    Age_3gr*Western1 Age_3gr*Western2 Age_3gr*NonWestern1
Age_3gr*NonWestern2
   opl_grR*Western1 opl_grR*Western2 opl_grR*NonWestern1
opl_grR*NonWestern2
  Stedelijk_2gr*Western1 Stedelijk_2gr*Western2 Stedelijk_2gr*NonWestern1
Stedelijk_2gr*NonWestern2
    ansex_6mn_gr*Western1 ansex_6mn_gr*Western2 ansex_6mn_gr*NonWestern1
ansex_6mn_gr*NonWestern2
  steady2*Western1 steady2*Western2 steady2*NonWestern1 steady2*NonWestern2
    onen2*Western1 onen2*Western2 onen2*NonWestern1 onen2*NonWestern2
  casual2*Western1 casual2*Western2 casual2*NonWestern1 casual2*NonWestern2
```

Gebruik_Alcohol*Western1 Gebruik_Alcohol*Western2 Gebruik_Alcohol*NonWestern1 Gebruik_Alcohol*NonWestern2

Gebruik_drugs*Western1 Gebruik_drugs*Western2 Gebruik_drugs*NonWestern1 Gebruik_drugs*NonWestern2

MeanKlaarR*Western1 MeanKlaarR*Western2 MeanKlaarR*NonWestern1 MeanKlaarR*NonWestern2

MeanSeroR*Western1 MeanSeroR*Western2 MeanSeroR*NonWestern1 MeanSeroR*NonWestern2

MeanPositieR*Western1 MeanPositieR*Western2 MeanPositieR*NonWestern1 MeanPositieR*NonWestern2

MeanViraleR*Western1 MeanViraleR*Western2 MeanViraleR*NonWestern1 MeanViraleR*NonWestern2

/CONTRAST (Age_3gr)=Indicator(1)

/CONTRAST (pref_2gr)=Indicator(1)

/CONTRAST (opl_grR)=Indicator(1)

/CONTRAST (Stedelijk_2gr)=Indicator(1)

/CONTRAST (ansex_6mn_gr)=Indicator(4)

/CONTRAST (steady2)=Indicator(1)

/CONTRAST (onen2)=Indicator(1)

/CONTRAST (casual2)=Indicator(1)

/CONTRAST (Gebruik_drugs)=Indicator(1)

/CONTRAST (Gebruik_Alcohol)=Indicator(1)

/CONTRAST (MeanKlaarR)=Indicator(1)

/CONTRAST (MeanSeroR)=Indicator(1)

/CONTRAST (MeanPositieR)=Indicator(1)

/CONTRAST (MeanViraleR)=Indicator(1)

/PRINT=GOODFIT CI(95)

/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*Binary logistic regression outcome HIV + interactie migratie na lasso techniek first/second generation..

LOGISTIC REGRESSION VARIABLES hivstR

```
/METHOD=ENTER Age_3gr ansex_6mn_gr onen2 Gebruik_drugs Western1
Western2 NonWestern1 NonWestern2
  Age_3gr*Western1 Age_3gr*Western2 Age_3gr*NonWestern1
Age_3gr*NonWestern2
  ansex_6mn_gr*Western1 ansex_6mn_gr*Western2 ansex_6mn_gr*NonWestern1
ansex_6mn_gr*NonWestern2
  onen2*Western1 onen2*Western2 onen2*NonWestern1 onen2*NonWestern2
  Gebruik_drugs*Western1 Gebruik_drugs*Western2 Gebruik_drugs*NonWestern1
Gebruik_drugs*NonWestern2
 /CONTRAST (Age_3gr)=Indicator(1)
 /CONTRAST (ansex_6mn_gr)=Indicator(4)
 /CONTRAST (onen2)=Indicator(1)
 /CONTRAST (Gebruik_drugs)=Indicator(1)
 /PRINT=GOODFIT CI(95)
 /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

*Binary logistic regression outcome HIV + interactie migratie na lasso techniek
NW/W final model.
LOGISTIC REGRESSION VARIABLES hivstR
 /METHOD=ENTER Age_3gr ansex_6mn_gr onen2 Gebruik_drugs Western
NonWestern
  Age_3gr*Western  Age_3gr*NonWestern
  ansex_6mn_gr*Western  ansex_6mn_gr*NonWestern
  onen2*Western  onen2*NonWestern
  Gebruik_drugs*Western Gebruik_drugs*NonWestern
 /CONTRAST (Age_3gr)=Indicator(1)
 /CONTRAST (ansex_6mn_gr)=Indicator(4)
 /CONTRAST (onen2)=Indicator(1)
 /CONTRAST (Gebruik_drugs)=Indicator(1)
 /PRINT=GOODFIT CI(95)
 /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

** Voorbereiding *LASSO techniek.
```

```
COMPUTE Age_3gr2=Age_3gr + 1.
EXECUTE.

COMPUTE pref_2gr2=pref_2gr + 1.
EXECUTE.

COMPUTE opl_grR2=opl_grR + 1.
EXECUTE.

COMPUTE Stedelijk_2gr2=Stedelijk_2gr + 1.
EXECUTE.


COMPUTE hivstR2=hivstR + 1.
EXECUTE.

COMPUTE steady22=steady2 + 1.
EXECUTE.

COMPUTE ansex_6mn_gr2=ansex_6mn_gr + 1.
EXECUTE.

COMPUTE onen22=onen2 + 1.
EXECUTE.

COMPUTE casual22=casual2 + 1.
EXECUTE.

COMPUTE Gebruik_drugs2=Gebruik_drugs + 1.
EXECUTE.

COMPUTE Gebruik_Alcohol2=Gebruik_Alcohol + 1.
```

```
EXECUTE.

COMPUTE MeanCONR2=MeanCONR + 1.
EXECUTE.

COMPUTE MeanKlaarR2=MeanKlaarR + 1.
EXECUTE.

COMPUTE MeanSeroR2=MeanSeroR + 1.
EXECUTE.

COMPUTE MeanPositieR2=MeanPositieR + 1.
EXECUTE.

COMPUTE MeanViraleR2=MeanViraleR + 1.
EXECUTE.

COMPUTE western12=western1 + 1.
EXECUTE.

COMPUTE western22=western2 + 1.
EXECUTE.

COMPUTE Nonwestern12=Nonwestern1 + 1.
EXECUTE.

COMPUTE Nonwestern22=Nonwestern2 + 1.
EXECUTE.

*Western/Nonwestern.
COMPUTE Western_L=Western + 1.
EXECUTE.
```

```
COMPUTE NonWestern_L=Nonwestern + 1.
EXECUTE.

*Lasso kijken welke variabele zwaarder weegt.

CATREG VARIABLES=hivstR2 Age_3gr2 pref_2gr2 opl_grR2 Stedelijk_2gr2
ansex_6mn_gr2 steady22 onen22 casual22 Gebruik_drugs2 Gebruik_Alcohol2
MeanKlaarR2 MeanSeroR2 MeanPositieR2 MeanViraleR2 western12 western22
Nonwestern12 Nonwestern22
 /ANALYSIS=hivstR2(LEVEL=NOMI) WITH Age_3gr2(LEVEL=NOMI)
pref_2gr2(LEVEL=NOMI) opl_grR2(LEVEL=NOMI) Stedelijk_2gr2(LEVEL=NOMI)
 ansex_6mn_gr2(LEVEL=ORDI) steady22(LEVEL=NOMI) onen22(LEVEL=NOMI)
casual22(LEVEL=NOMI) Gebruik_drugs2(LEVEL=NOMI)
Gebruik_Alcohol2(LEVEL=NOMI) MeanKlaarR2(LEVEL=NOMI)
MeanSeroR2(LEVEL=NOMI) MeanPositieR2(LEVEL=NOMI)
MeanViraleR2(LEVEL=NOMI) western12(LEVEL=NOMI) western22(LEVEL=NOMI)
Nonwestern12(LEVEL=NOMI) Nonwestern22(LEVEL=NOMI)
 /MISSING=hivstR2(LISTWISE) steady22(LISTWISE) ansex_6mn_gr2(LISTWISE)
onen22(LISTWISE)
  casual22(LISTWISE)
 /MAXITER=100
 /CRITITER=.00001
 /PRINT=R COEFF ANOVA DESCRIP(steady22 ansex_6mn_gr2 onen22 casual22)
QUANT(steady22 ansex_6mn_gr2
  onen22 casual22)
 /INITIAL=NUMERICAL
 /PLOT= REGU
 /REGULARIZATION=LASSO(0.0,1.0,0.02)(DataSet4)
 /RESAMPLE=CROSSVAL(10).

*Binary logistic regression outcome HIV + interactie migratie na lasso techniek.
LOGISTIC REGRESSION VARIABLES hivstR
```

```
        /METHOD=ENTER Age_3gr ansex_6mn_gr onen2 Gebruik_drugs Western1
Western2 NonWestern1 NonWestern2
          Age_3gr*Western1 Age_3gr*Western2 Age_3gr*NonWestern1
Age_3gr*NonWestern2
          ansex_6mn_gr*Western1 ansex_6mn_gr*Western2 ansex_6mn_gr*NonWestern1
ansex_6mn_gr*NonWestern2
          onen2*Western1 onen2*Western2 onen2*NonWestern1 onen2*NonWestern2
          Gebruik_drugs*Western1 Gebruik_drugs*Western2 Gebruik_drugs*NonWestern1
Gebruik_drugs*NonWestern2
        /CONTRAST (Age_3gr)=Indicator(1)
        /CONTRAST (ansex_6mn_gr)=Indicator(4)
        /CONTRAST (onen2)=Indicator(1)
        /CONTRAST (Gebruik_drugs)=Indicator(1)
        /PRINT=GOODFIT CI(95)
        /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

      *****na lasso multiple imputation omnaar de verschillen te kijken.
      *missing values analyse.
      MVA VARIABLES=hivstR Age_3gr ansex_6mn_gr onen2 Gebruik_drugs
MeanCONR
        /MAXCAT=25
        /CATEGORICAL=hivstR Age_3gr ansex_6mn_gr onen2 Gebruik_drugs
MeanCONR
        /MPATTERN
        /TPATTERN PERCENT=1.

      *plus T-tes en EM.
      MVA VARIABLES=hivstR Age_3gr ansex_6mn_gr onen2 Gebruik_drugs
MeanCONR
        /MAXCAT=25
        /CATEGORICAL=hivstR Age_3gr ansex_6mn_gr onen2 Gebruik_drugs
MeanCONR
        /TTEST NOPROB PERCENT=5
```

```
 /MPATTERN
 /TPATTERN PERCENT=1
 /EM(TOLERANCE=0.001 CONVERGENCE=0.0001 ITERATIONS=25).

*Analyze Patterns of Missing Values.
MULTIPLE IMPUTATION  hivstR Age_3gr ansex_6mn_gr onen2 Gebruik_drugs
MeanCONR
 /IMPUTE METHOD=NONE
 /MISSINGSUMMARIES  OVERALL VARIABLES (MAXVARS=25
MINPCTMISSING=10) PATTERNS.

*Random number generators.
SET RNG=MT MTINDEX=20070525.

*Impute Missing Data Values multiple imputation interaction included in model none
migratie STI, age en pref no missing values.
DATASET DECLARE MSMImputed.
MULTIPLE IMPUTATION hivstR Age_3gr ansex_6mn_gr onen2 Gebruik_drugs
MeanCONR
 /IMPUTE METHOD=AUTO NIMPUTATIONS=40 MAXPCTMISSING=NONE
 /CONSTRAINTS Age_3gr( MIN=0)
 /CONSTRAINTS ansex_6mn_gr( MIN=0)
 /CONSTRAINTS onen2( MIN=0)
 /CONSTRAINTS Gebruik_drugs( MIN=0)
 /CONSTRAINTS MeanCONR( MIN=0)
 /MISSINGSUMMARIES NONE
 /IMPUTATIONSUMMARIES MODELS DESCRIPTIVES
 /OUTFILE IMPUTATIONS=MSMImputed.

DATASET ACTIVATE MSMImputed.
LOGISTIC REGRESSION VARIABLES hivstR
 /METHOD=ENTER Age_3gr ansex_6mn_gr onen2 Gebruik_drugs MeanCONR
Western NonWestern
```

```
    Age_3gr*Western Age_3gr*NonWestern onen2*Western  onen2*NonWestern
    Gebruik_drugs*Western Gebruik_drugs*NonWestern MeanCONR*Western
MeanCONR*NonWestern
   ansex_6mn_gr*Western ansex_6mn_gr*NonWestern
    /CONTRAST (Age_3gr)=Indicator(1)
    /CONTRAST (ansex_6mn_gr)=Indicator(4)
    /CONTRAST (onen2)=Indicator(1)
    /CONTRAST (Gebruik_drugs)=Indicator(1)
    /CONTRAST (MeanCONR)=Indicator(1)
    /PRINT=GOODFIT CI(95)
    /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```