

Thesis for doctoral degree (Ph.D.)  
2018

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# Relating to risk

Sexual behaviour and HIV risk perception among  
men who have sex with men

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# RELATING TO RISK: SEXUAL BEHAVIOUR AND HIV RISK PERCEPTION AMONG MEN WHO HAVE SEX WITH MEN

THESIS FOR DOCTORAL DEGREE (Ph.D.)

By

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*För att göra en bok så behöver man en början. Och den kan vara "det var en gång" eller "en gång".*

*Och så behöver man ett problem. Och sen behöver man en lösning på problemet.*

*Sen behöver man ett slut. Och slutet kan vara "snipp snapp slut" eller "så levde de lyckliga i alla sina dar".*

My daughter Edith Einarsson 6 years old, November  
2017



# ABSTRACT

**Background:** Men who have sex with men (MSM) are a key population for HIV worldwide. Overall HIV incidence is declining but over the past years the proportion of HIV diagnoses attributed to sex between men has remained high in Europe. MSM account for 40% of the reported HIV diagnoses in Europe (2016) and more than 47% in Sweden (cases reported transmitted in Sweden, 2017) despite the notion that HIV is preventable through treatment and effective public health measures. A matrix of social, legal, biological, epidemiological and behavioural causes contribute to the disproportionate vulnerability for HIV infection among MSM in general and to greater extent among certain sub-groups of MSM.

**Aim:** The overall aim of this thesis is to explore and analyse risk factors and risk behaviour for HIV transmission among MSM.

**Methods:** This research project employed quantitative (I-III) and qualitative (V) methods. Studies I-III were undertaken in Sweden and based on data collected with stratified sampling among men in a web community for LGBT persons. The cross-sectional survey, MSM2013, reached 2 751 MSM residing in Sweden. Study IV was based on semi-structured in-depth interviews with 15 MSM recruited through respondent driven sampling and analysed with content analysis.

**Results:** In study I, a weighted Latent Class Analysis with covariates and distal outcomes was conducted to identify four sub-groups of MSM sharing similar sexual practice characteristics: experimentals, bottoms, risk-reducers and clubbers. Experimentals clearly stood out from the other classes with its broad sexual repertoire and high self-rated HIV preventive knowledge.

In study II, we found that many MSM (40%) test for HIV regularly and that outreach and promoting initiatives contribute to testing. Still, factor analysis revealed that fear, anxiety, low risk perception and inaccessible test services remain barriers for testing.

In study III and IV, we concluded that MSM of different HIV status meet in gay-oriented venues both in their home countries and when travelling abroad. We documented that MSM having anal intercourse without condom with casual partners abroad are high sexual risk-takers with broad sexual repertoire. The in-depth interviews in study IV captured a priority target group for HIV prevention: a highly mobile and highly sexually active subgroup of MSM with high HIV and STI risk taking behaviour regardless of context. Berlin provides venues and spaces for sexual liberation greatly appreciated by this subgroup of MSM.

**Conclusions:** This thesis has shown that the diversity among MSM, based on similar sexual practice patterns, should be considered when designing HIV preventive interventions. The finding, that sub-groups of MSM have different sexual practice patterns can provide a base for screening-instruments, medical and behavioural history forms and counselling guides within healthcare and social work, as well as a base for allocation of resources for prevention.

This thesis has also highlighted that preventive interventions focusing solely on increasing knowledge may not be an effective method to reach and decrease HIV risk behaviour among MSM with broad sexual repertoire and high numbers of sex partners. These men may specifically benefit from a HIV and STI testing routine that includes counselling. Healthcare professionals providing care for MSM who test for HIV regularly should remember that this group is reachable and a priority for HIV preventive interventions. Healthcare professionals and prevention workers meeting MSM should have MSM competency and be comfortable and competent to deliver easily accessible test services, including outreach test promotion/testing. Within HIV prevention and HIV test promotion in settings where MSM from different countries and contexts meet there is a need to further prioritise a needs-based approach to risk reduction measures.

**Key words:** HIV, men who have sex with men, HIV prevention, HIV testing, sexual practice, sexual risk behaviour, risk perception, unprotected anal intercourse, condom-less anal intercourse, travel

## LIST OF PUBLICATIONS

- I. **Persson, K. I.**, Tikkanen, R., Bergström, J., Berglund, T., Thorson, A. & Forsberg, B. C. (2016). Experimentals, bottoms, risk-reducers and clubbers: exploring diverse sexual practice in an Internet-active high-risk behaviour group of men who have sex with men in Sweden. *Culture, Health & Sexuality*, 18(6):639-653. doi:10.1080/13691058.2015.1103384
- II. **Persson, K. I.**, Berglund, T., Bergstrom, J., Eriksson, L. E., Tikkanen, R., Thorson, A. & Forsberg, B. C. (2016). Motivators and barriers for HIV testing among men who have sex with men in Sweden. *Journal of Clinical Nursing*, 25(23-24):3605-18. doi:10.1111/jocn.13293
- III. **Persson, K. I.**, Berglund, T., Bergstrom, J., Tikkanen, R., Thorson, A. & Forsberg, B. C. (2018). Place and practice: sexual risk behaviour while travelling abroad among Swedish men who have sex with men. *Travel Medicine and Infectious Disease*. doi:10.1016/j.tmaid.2018.01.009
- IV. Dennermalm, N., **Persson, K. I.**, Thomsen, S. & Forsberg, B. C. Perceptions and Experiences of sex among Swedish Men Who Have Sex With Men in Berlin. (submitted)

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## ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ART	Antiretroviral Therapy
CAI	Condomless Anal Intercourse
CI	Confidence Interval
ECDC	European Centre for Disease Prevention and Control
EMA	European Medicines Agency
EMIS	European MSM Internet Survey
FGD	Focus Group Discussion
HIV	Human Immunodeficiency Virus
IQR	Interquartile Range
LCA	Latent Class Analysis
LGBT	Lesbian, Gay, Bisexual and Transgender
MSM	Men who have Sex with Men
MSM2006, MSM2008, MSM2013	Acronyms for Swedish MSM surveys
OR	Odds Ratio
PCA	Principal Components Analysis
PEP	Post-Exposure Prophylaxis
PrEP	Pre-Exposure Prophylaxis
Qruiser	Scandinavian LGBT Online Community run by QX Publishing (QX Förlag AB)
RDS	Respondent Driven Sampling
SRHR	Sexual and Reproductive Health and Rights
STI	Sexually Transmitted Infection
TLS	Time Location Sampling
UAI	Unprotected Anal Intercourse
UNAIDS	Joint United Nations Programme on HIV/AIDS

## POINTS OF DEPARTURE

When I started my Ph.D. journey, two previous Swedish dissertations focusing on men who have sex with men (MSM) and sexual behaviour in Sweden had been published<sup>1, 2</sup> and one more was ongoing<sup>3</sup>. Both of the two published dissertations were written by gay men in their forties, which I am not. So why should I study this?

The best answer to the question *why?* is often: *why not?* the former Buddhist monk Björn Lindeblad once taught me. I might be an outsider of the gay community. MSM share not only the sexual behaviour, but also a common history of discrimination, repression – and an HIV epidemic. However, as a woman I have similar experience of not always being the norm, having to defend myself, my competence and my opinions in order to have people look beyond my sex, gender and sexuality. In short, I might share a few experiences with many MSM.

*Women's lives (our many lives and different experiences!) can provide the starting point for asking new, critical questions about not only those women's lives but also about men's lives [...]*<sup>4</sup> (p.55).

Still, as an outsider gaining trust and acceptance is a necessary step and this requires cooperation with insiders. Community involvement offers benefits such as a broader representation of marginalised groups and data that is more representative of a community's needs<sup>5</sup>. My belief is that we attained quite a broad representation in the present project.

Many of the participants in the studies included in this thesis are men with strong connections and sense of belonging to the gay scene, men who attend Pride festivals, men who do not think it is a big deal that they have sex with other men. Men who think that courage trumps supportive interventions, as one frustrated MSM2013 survey respondent commented:

*It's just to speak up, right? The only knowledge that you need in this society is courage.*

But there are also many men who do not possess this bravery. Who feel lonely, unsure of their identity, unsure of their HIV status and insecure when meeting others. I am particularly grateful to those men and want to highlight their contributions to this research project. You have shared your stories and experiences when participating in the MSM2013 survey and I wish I could thank each one of you personally. We all should be able to identify ourselves as we wish, and to choose when to be brave, or not. And regardless of courage, everyone has the right to health and well-being. That has been my guiding star while working on this thesis.



# 1 BACKGROUND

## 1.1 HIV AND MSM – A GLOBAL PERSPECTIVE

This thesis aims to explore and analyse risk factors and risk behaviour for transmission of the Human Immunodeficiency Virus (HIV) among men who have sex with men (MSM). Globally and historically, HIV has disproportionately affected gay, homosexual and other MSM since the beginning of the 1980s<sup>6</sup>. While the overall trend is that HIV incidence is declining in many high-income settings, the proportion of new HIV infections attributed to sex between men remained the most common mode of endemic HIV transmission in Europe as well as in Sweden over the last decade<sup>7, 8</sup>. The number of new reported HIV infections continues to decrease while the number of people living with HIV in high-income settings is increasing due to access and adherence to effective antiretroviral therapy (ART)<sup>9</sup>.

A high proportion of new HIV diagnoses in northern and Western Europe and North America are attributed sex between men, while sex between men as route of HIV transmission is reported much more infrequently in other parts of the world<sup>9</sup>. In many settings MSM are a hidden and stigmatised population<sup>9</sup>. Criminalisation of, and negative attitudes towards same-sex behaviour contribute to lack of surveillance epidemiological data among MSM but also likely contribute to MSMs' vulnerability to HIV in these contexts<sup>6</sup>. Immigration to Sweden has increased over the past decades and in 2018 24% of Swedish residents have immigrant background<sup>10</sup>. Several of the most common countries of origin for asylum seekers to Sweden are among the 72 countries where same-sex sexual relations are criminalised<sup>11</sup>. One third (n=23) of these 72 countries can be considered HIV-endemic (HIV prevalence > 1% among the adult population aged 15–49 years old) (UNAIDS data, 2015).

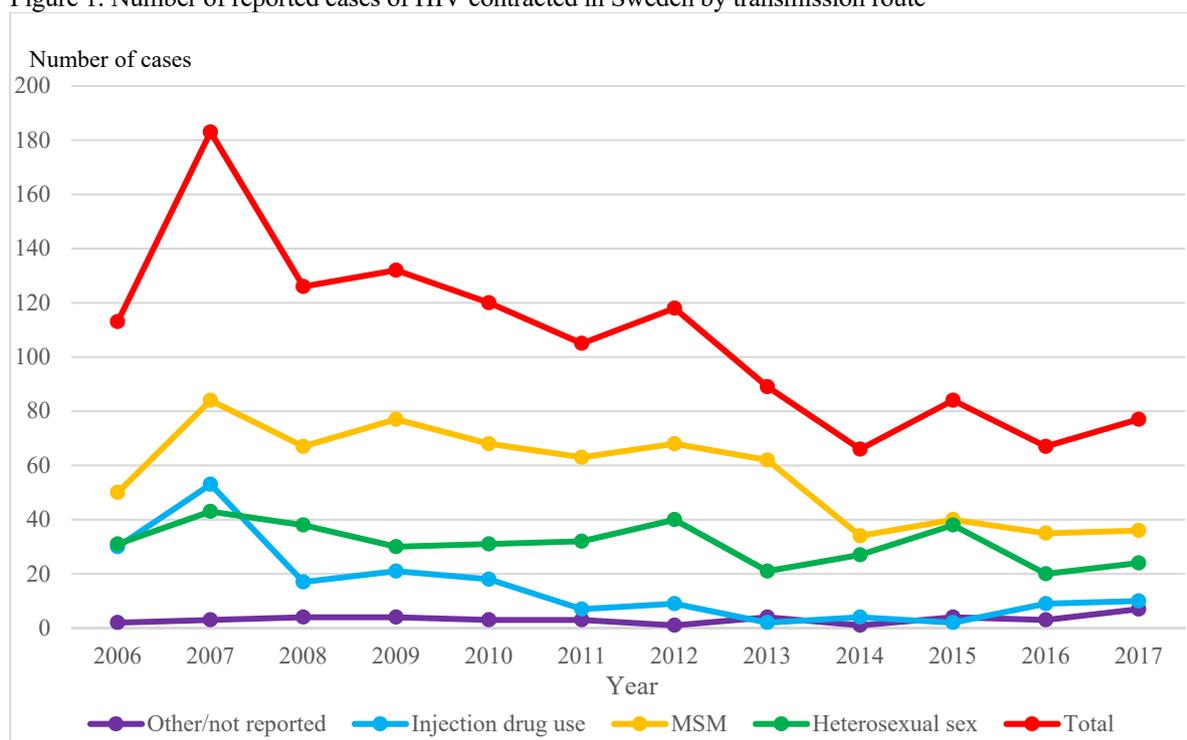
Facilitated travel, such as through the Schengen agreement and deregulation of airfare in Europe (Skoglund, J-M, Transportstyrelsen, personal communication, 2016-10-05), and the development of internet based services such as web communities and smart mobile phone applications have broadened opportunities for MSM to meet over the past decades<sup>12, 13</sup>. HIV prevalence among MSM has been reported as particularly high in urban areas<sup>9, 14</sup> and previous studies have suggested that MSM residing in cities are more exposed to HIV than others due to sexual behaviour as well as city specific characteristics, such as range of venues for meeting sex partners<sup>15, 16</sup>. It is estimated that by 2030, 2 out of 3 people living with HIV globally are expected to live in urban areas<sup>17</sup>.

The European Centre for Disease Prevention and Control (ECDC) conclude that no single intervention is sufficient for preventing HIV or other STIs among MSM<sup>8</sup>. Based on a systematic review of scientific evidence supported by expert opinion, seven key components are suggested for MSM prevention programmes in Europe: vaccinations, condoms, HIV and STI testing, treatment for HIV and STIs including post-exposure prophylaxis (PEP) and pre-exposure prophylaxis (PrEP), health promotion, MSM competent health services and targeted care for MSM living with HIV<sup>18</sup>.

### 1.1.1 HIV and other sexually transmitted infections among MSM in Sweden

The HIV prevalence among MSM in Sweden has been estimated at 2 – 5% in recent studies<sup>19</sup> as opposed to 0.07% in the general population, with higher prevalence in the metropolitan areas compared to the rest of Sweden<sup>20</sup>. One third of the 7 000 people diagnosed and living with HIV in Sweden are reported to have contracted HIV through sex between men and 9 out of 10 among these men are patients at clinics in the metropolitan counties<sup>21</sup>. Public Health Agency of Sweden’s monitoring data shows that sex between men as route of HIV transmission account for a third of the reported HIV cases in these counties compared to less than 10% in other counties.

Figure 1. Number of reported cases of HIV contracted in Sweden by transmission route

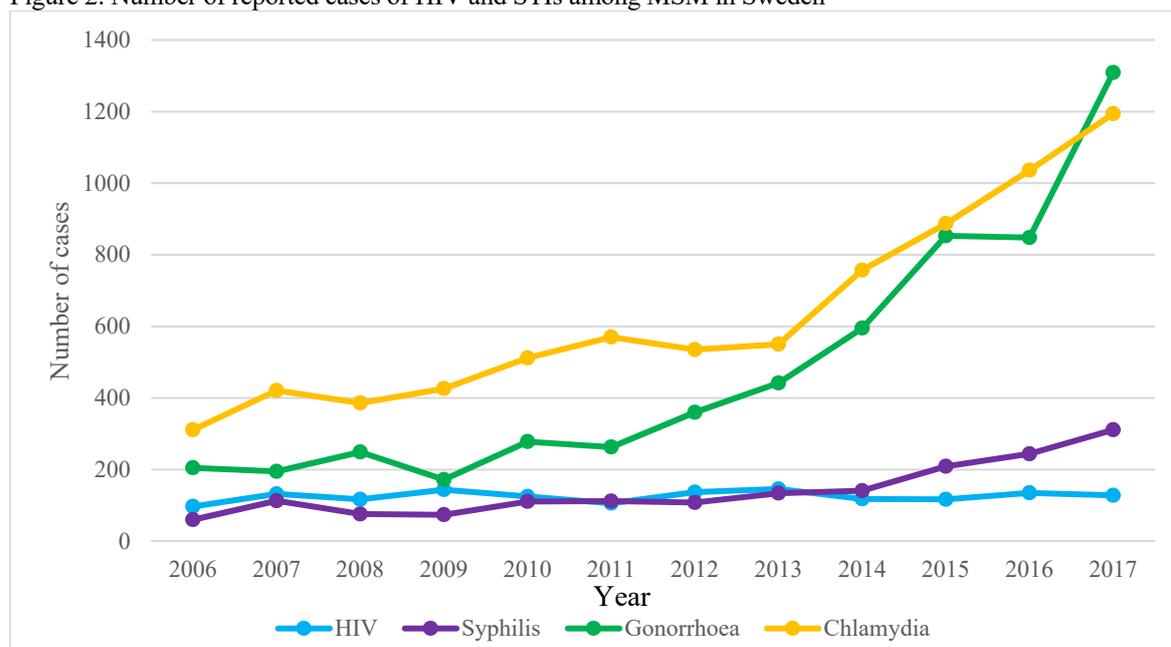


Source: Public Health Agency of Sweden

Over the years, HIV infections among MSM have significantly influenced the epidemiological pattern of HIV in Sweden as MSM have accounted for more than half of the HIV cases reported as contracted in Sweden over the past years, even when the overall HIV incidence trend is decreasing (figure 1). Similarly reported cases of other sexually transmitted infections (STI) among MSM have constantly increased over the past years (figure 2).

During the last two decades, 40% of all HIV infections acquired abroad among Swedish residents have been reported among MSM. As shown in figure 3, the proportion of HIV cases reported with sex between men as transmission route abroad increased from 41% during 2005-2009 to 52% during 2010–2014. In addition, the number of cases of other STIs with a reported transmission route of sex between men abroad has increased over the recent years.

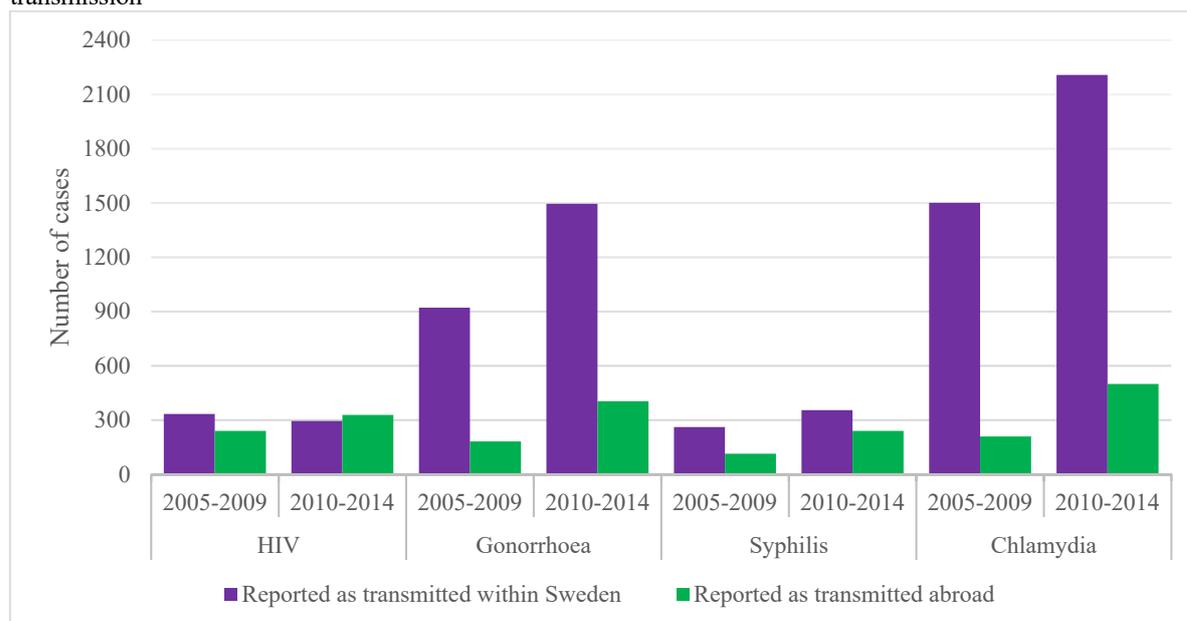
Figure 2. Number of reported cases of HIV and STIs among MSM in Sweden



Source: Public Health Agency of Sweden

A high prevalence of HIV among MSM residents in common destinations for MSM, such as Berlin and London is hypothesised to increase the risk of acquiring HIV or STIs abroad for visitors<sup>22</sup>. Sweden, especially Stockholm, has similarly become a popular destination for MSM travellers from other places. In such a globalised context with contact opportunities in each person’s mobile phone and eased travel, the global community of MSM “is defined less by geographic boundaries and linked more by shared interests and social and sexual networks”<sup>22</sup>.

Figure 3. Number of reported cases of HIV and STIs among MSM in Sweden by reported place of transmission



Source: Public Health Agency of Sweden

## 1.2 STUDYING MSM

### 1.2.1 Estimating the size of the study population

There are no Swedish registers or recurring population surveys of sexual behaviour enabling congruent comparisons over time<sup>i</sup>. Therefore we do not know how common it is to be a man who experiences sex with other men in the entire Swedish population.

Studies from the 1990s and onwards, from the United Kingdom, the United States of America and France, estimate that 3–8% of men have had at least one male sex partner<sup>23-25</sup>. The corresponding estimate for having a male sex partner over the past five years is 1.5–10.7%<sup>23-25</sup>. *Sex in Sweden* conducted in 1996 is the most recent Swedish survey where similar data exists, and 2.6% of the men (18–74 years) answered that they have had sex with another man<sup>26</sup>. That would equal about 80 000 men in that age group.

Later studies of Swedish sexual behaviour have been restricted to subgroups of the population. The youth survey *UngKAB09* estimated that 3.5% of men aged 15–29 had a male sex partner during their most recent sex encounter and the sequel, *UngKAB15* estimated it at 2.7% (Schindele, A-C, Folkhälsomyndigheten, personal communication, 2016-09-27).

The recurring survey *HIV in Sweden* has asked respondents about sexual behaviour and sexual identity in different ways. In the 2011 survey, 4% of the male respondents replied that their current or most recent partner was male<sup>27</sup>. In the 2016 survey questions were asked somewhat differently, and 2% of the male respondents replied that their current or most recent partner was male while 3.5% of the men identified as homo- or bisexual<sup>28</sup>. The recurring national public health survey, *Hälsa på lika villkor*, has included questions on sexual identity in recent years. The 2011–2014 surveys compiled estimate of men identified as homo- or bisexual was 2.45% (95% CI 2.2–2.7)<sup>29</sup> and the 2015-2016 compiled estimate was 2.9% (95% CI 2.5–3.3) (Hashemi, N, Folkhälsomyndigheten, personal communication, 2018-06-18).

Table 1 presents an overview of geographic distribution of Swedish men, male users at the Scandinavian online forum for lesbian, gay, bisexual and transgender (LGBT) persons, *Qruiser* and estimates of the proportion of homo- and bisexually identified men in recent Swedish population surveys. The proportion of men who identify themselves as homo- or bisexual in the surveys usually varies between counties. According to population statistics from Statistics Sweden, more than half of Swedish men live in metropolitan counties. Together these different data sources provide us reason to believe that there are more than 100 000 MSM in Sweden and that they are distributed differently from the general population.

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<sup>i</sup> An overview of different Swedish sexual behaviour cross-sectional surveys referred to in this thesis is presented in appendix V.

Table 1. Geographical distribution of Swedish men, male Qruiser members and homo- and bisexually identified men in recent Swedish surveys

	<b>Distribution of Swedish men &gt; 15 years old<sup>a</sup></b>	<b>Distribution of male Qruiser members &gt; 15 years old resident in Sweden (2012)</b>	<b>Homo- and bi-sexually identified men, (Health on equal terms surveys 2011-2014)</b>	<b>Homo- and bi-sexually identified men, (Health on equal terms surveys 2015-2016)</b>	<b>HIV in Sweden 2016</b>
Estimate (%)	-	-	2.45%	2.9%	3.5%
Number of men	3 968 800	54 633	97 236 <sup>b</sup>	119 123 <sup>b</sup>	143 769 <sup>b</sup>
<i>Stockholm county</i>	22%	41%	4.1%	4.0%	-
<i>Västra Götaland county</i>	17%	16%	2.1%	3.5%	-
<i>Skåne county</i>	13%	13%	1.9%	2.6%	-
<b>Metropolitan counties total share (%)</b>	52%	70%	61.5%	62.6%	-
<b>Other counties total share (%)</b>	48%	30%	38.5%	37.4%	-

<sup>a</sup>Population data from Statistics Sweden, November 2013

<sup>b</sup>Estimates based on population data from Statistics Sweden 2013 and 2016

Sources: Public Health Agency of Sweden, Qruiser membership data, Statistics Sweden population data.

### 1.2.2 Recruiting MSM for quantitative research

Representative sampling of MSM is rarely achievable due to lack of a sampling frame and stigma related to same sex practices<sup>30</sup>. Recent trends show response rates decreasing in traditional population-based postal surveys<sup>31-34</sup>. Researchers must now assess alternative sampling methods<sup>30</sup>. Using the internet for sampling might be an alternative when studying MSM since homosexually identified men are more likely to have met sex partners on the internet than other men<sup>13</sup>. Moreover, MSM tend to underestimate risk when meeting a sex partner on the internet compared with meeting a partner in other contexts indicating that risk-takers might be found on the internet<sup>35</sup>. In addition, general health surveys may not reach many MSM since these men tend to be overrepresented in urban areas<sup>36, 37</sup>.

Internet surveys are useful for sampling MSM regardless of residency and risk behaviour since they potentially overcome geographical barriers and offer anonymity to respondents<sup>37-39</sup>. Internet surveys are known for large variations in nonresponse<sup>13</sup>. At the same time, internet surveys offer a valuable alternative to sampling methods such as Time Location Sampling (TLS)<sup>30, 40</sup>, respondent driven sampling (RDS)<sup>30, 40</sup> and population-based postal surveys<sup>37</sup>. TLS and RDS are well-known for overcoming some of the shortcomings related to selection bias and self-selection. Still these sampling methods have limitations providing representative sample sizes because men who identify themselves as heterosexual even

though they have sex with other men, men who are not part of gay organisations and those who live outside urban areas tend to respond less than other MSM<sup>36, 37, 41</sup>.

In 2006 and 2008 Swedish self-selected nonprobability MSM internet surveys were conducted<sup>42, 43</sup>. The survey in 2006 had 3 202 respondents and the 2008 survey had 4 715 respondents, but these relatively large sample sizes do not necessarily imply representativeness. Current knowledge suggests that when studying sexual behaviour through surveys, a series of three or more surveys are needed to determine if the observed trends are plausible<sup>44</sup>. As described in detail in the methods section, in this project we attempted to improve the data collection method compared to previous Swedish MSM surveys.

### 1.2.3 Recruiting MSM for qualitative research

*People are complex and should be studied by watching them, joining in, talking, and reading what they write*<sup>45 (p.45)</sup>

Studies on sexual risk should consider attitudes and perceptions of the study population<sup>1</sup>. Surveys are generally of limited use when it comes to capturing such nuance, social interaction, conflict and spontaneous elements<sup>45</sup>. Therefore, surveys can be successfully complemented by qualitative studies in order to increase and deepen understanding of sensitive issues<sup>46, 47</sup>. Pope and Mays (1995)<sup>45</sup> suggest three ways in which qualitative methods can complement quantitative ones:

- As formative work when preparing surveys.
- For validation of quantitative studies' results e.g. to achieve in-depth information on private, contradictory or complex phenomena.
- To explore complex phenomena or nexus that cannot be captured with quantitative studies.

Qualitative data collection can be undertaken in several ways with individual interviews, observations and focus group discussions (FGDs) being the most common methods<sup>47</sup>. FGDs are often used for formative and structurally focused studies as well as for evaluation<sup>47, 48</sup>. FGDs have also been used when studying sexual health<sup>49</sup>. However, since confidentiality cannot be assured, FGDs are less suitable when studying individual centred and sensitive issues. Observations derive from anthropology and can be a primary data collection strategy<sup>1</sup>. These are often used for triangulation, e.g. to complement interviews, and can be participatory to varying degree<sup>47, 50, 51</sup>. Aspects such as the researcher's gender and cultural belonging can affect ability to access information via observations and it is often easier for "cultural members [...] to obtain information of a sensitive nature" such as sexuality<sup>50</sup>. Individual interviews provide us information about individuals, but also on what others have observed<sup>51</sup>. They provide opportunities for exploring ambiguity and paradoxes but the degree

of structure and strive for depth varies depending on aims and topics<sup>47</sup>. Interview guides often combine a structured part with a list of nonspecific overarching topics to be touched upon<sup>47</sup>.

Recruiting informants for qualitative studies requires a strategy and obtaining informed consent. Qualitative sampling can be purposeful or convenience sampling. Patton (2015)<sup>48</sup> warns against the latter and lists 40 types of purposeful sampling to choose from including well-known approaches such as snowballing, maximum variation and RDS. The choice of approach should vary based on the research question<sup>51</sup>. While quantitative sampling aims for representativeness, qualitative studies should attain transferability<sup>47, 51</sup>.

### 1.3 RISK AND SEXUAL RISK

*Risk* within the epidemiological field commonly refers to risk of illness<sup>52</sup>, making risk something that rationally should be avoided<sup>53, 54</sup>. Giesecke (2002)<sup>55</sup> (p.29) clarifies that in epidemiology the word *exposure* is used “to denote having met with a risk factor for the disease, which may or may not be the cause” reminding us that risk factors or determinants, “denote anything that could be associated with risk for disease”. Risk can be measured as probability of contracting a disease in a study population, or comparing the probabilities of disease between groups, in relation to exposure of different factors<sup>52</sup>. *HIV risk* can then be defined as probability of HIV transmission. In line with epidemiological standpoints HIV prevention campaigns have historically had an “HIV negative” perspective, namely addressing risk of acquiring HIV rather than risk of onwards transmission<sup>56</sup>. With the development of effective ART, studies and campaigns addressing treatment as prevention<sup>57</sup> and early diagnosis to avoid late presentation and high infectivity<sup>58</sup> have increased. The connotations of HIV risk have therefore changed somewhat to acknowledge that risk can also be handled and even accepted or chosen, not solely avoided by the individual<sup>53</sup>.

Lupton and Tulloch (2002)<sup>53</sup> argue that when viewing risk avoidance as normal, as opposed to risk-taking as irrational, one fails to understand how human sexuality is constructed. Our understanding of risk can deepen with the consideration of sociocultural perspectives<sup>59</sup>. Fox (2000)<sup>60</sup> argues that risk should be seen as neutral, describing probabilities of losses and gains. High risk would mean significant loss and low risk would mean significant reward. Lupton and Tulloch (2002)<sup>53</sup> also connect risk to a westernised discourse of “the ideal of the civilised body”, making the individual the target of control and regulations and reliance on what Foucault described as governmentality: the “‘individuals’ voluntary compliance with the interests and needs of the state”<sup>61</sup> (p.85). This is closely linked to the writings by Michel Foucault on the discipline of the body; where the civilised body listens and acts on reasons. However, Foucault (1990)<sup>62</sup> (p.95) reminds us: “where there is power there is resistance”.

*Risk perception* has been defined as “individual responses to a threat or hazard”<sup>61</sup>. Public and global health ideals and health communication often act according to the idea that information about risk awareness and risk reduction strategies lead to behaviour change among individuals<sup>54</sup>. Such a view expects people to be rational and uniformly act in accordance with

knowledge provided by society and researchers e.g. that individuals should get tested for HIV to benefit public health<sup>56</sup>. Nevertheless, this individualisation of health risks and risk reduction has been shown to fail when tested in practice<sup>54, 63</sup>. Douglas & Calvez (1990)<sup>64</sup> argue that such a view is narrowly based on the majority society's view on risk, neglecting that society consists of many different cultures and subcultures that do not all have the same perception of risk or assessment of different kinds of risk. Scott (2014)<sup>56</sup> shows that certain groups are perceived as "risky" while others are seen as "at risk", implying differentiation in responsibilities in relation to HIV transmission. Structural aspects such as perspectives on power and position related to race, ethnicity, socioeconomic status, age, disability and religion must therefore also be acknowledged when studying and understanding how individuals and groups relate to risk<sup>54, 65, 66</sup>.

Empirical studies have shown that sexual risk-taking can be understood as rational<sup>1, 67</sup>. Lindroth and Löfgren-Mårtensson (2013)<sup>67</sup> suggest that what is often interpreted as risk can be understood as *chance*, the latter implying potential positive and intended consequences of the behaviour. They suggest that we could use the concepts risk-taking and chance-taking instead of risk behaviour or risk-taking behaviour in order to address a person's rational actions rather than viewing people as passive objects. When it comes to sexual situations, chance-taking may be rewarding in terms of possibilities of pleasure, intimacy, relationship-building or even love, and therefore outweigh perceived risk.

Similarly, Lupton and Tulloch (2002)<sup>53</sup> describe that for some risk is associated with positive emotions which intensify the experience of sex or other activities being investigated. Feelings of being closer to danger, belonging to a community, or of breaking rules may all create positive emotions. Lupton (2013)<sup>61</sup> explains that risk-taking in terms of sexual practices such as sadomasochism shares characteristics with activities such as extreme sports or adventure travel since both are associated with injury or disease and considered risky by the majority society. However, sports and travel can be encouraged and seen as self-improvement activities worth understanding and admiration<sup>68</sup> while practices such as barebacking (anal intercourse in which condom use is explicitly and intentionally excluded)<sup>69</sup> or bug chasing (desire to deliberately become HIV infected)<sup>70</sup> are viewed in a negative light<sup>71</sup>.

Lupton (2013)<sup>61</sup> (p.25) concludes that "to call something a 'risk' is to recognise its importance to our subjectivity and well-being" and that such recognition differs between contexts and cultures. Among seven identified risk categories, sexuality and intimate relationships are categorised as *interpersonal risk*. She uses the term *edgework* to comprise "dangerous activities that are undertaken as part of leisure pursuits" with focus on "risk-taking activities [...] exploring boundaries"<sup>61</sup> (p.146). As for illegal drug use or driving fast, the actual knowledge of risk can increase the feelings of pleasure. Lupton (2013)<sup>61</sup> suggests that what many edgework activities have in common is that they require being shared and include trust, thus creating a sense of togetherness. Several studies have also shown that a perceived added value of engaging in certain sexual practices can increase the participants' sense of affinity

in a subculture and/or a common sense of being part of a “resistance movement” in opposition to the majority society’s social norms, power structures and conventional public health promotion<sup>60, 62, 64, 71, 72</sup>.

### 1.3.1 Risk behaviour for HIV and STI among MSM

#### 1.3.1.1 Anal intercourse

Parker (2015)<sup>66</sup> concludes that sexual practice itself is the essential point of departure for sexuality research. Unprotected anal intercourse (UAI) has been known as the foremost determinant for increased risk of HIV infection and other rectal STIs for MSM<sup>6, 63, 73</sup>. However, since the introduction of PrEP for HIV, the connotations of the term ‘unprotected’ have changed. With PrEP as a form of protection, HIV transmission is considered preventable when engaging in anal intercourse without condom<sup>74</sup>. Still much of the recently published MSM research use terms as UAI, but over the past few years, terminology has started to change towards *condomless anal intercourse* (CAI)<sup>ii</sup>. Similarly, in this research project, over time we have adapted to the new terminology. We use UAI when referring to previous studies where this expression was used, and we use CAI in the MSM2013 based articles since the term UAI was used in the survey. However, we switch to CAI in the qualitative study which was conducted most recently.

Five-year follow-up data from Sweden’s largest MSM testing clinic Venhälsan shows that STI risk among MSM is not as closely tied to anal intercourse as for HIV. Only 20% of MSM testing positive for gonorrhoea were positive in more than one of the screened sites (urethra resp. pharynx resp. rectum)<sup>75</sup>. At the same time, the Venhälsan clinic notices an unabating overrepresentation of bacterial STIs among MSM living with HIV<sup>75</sup> (Bratt, G, Venhälsan, personal communication, 2016-10-15). German clinical data point in the same direction<sup>76</sup>. These data altogether reflect the findings of previous research<sup>69</sup> that anal intercourse per se may be highly important and have symbolic meaning to subgroups, but not all, of MSM.

#### 1.3.1.2 Adventurism, sensation seeking and MSM subcultures

It has been hypothesised that practices such as illicit drug use, visiting public sex venues and buying or selling sex are more common among MSM who have anal intercourse with casual partners without condom<sup>63, 77, 78</sup>. This subgroup of MSM has been referred to as “sexually adventurous” or “sensation seeking” denoting a greater number of sexual partners, broader sexual repertoire and stronger risk-seeking disposition than the average MSM<sup>42, 63, 77, 79, 80</sup>. Researchers have also studied the variety of MSM subculture(s) in relation to anal intercourse without condom, HIV and other STIs<sup>81-86</sup>. Certain *places* and contexts (e.g. destinations,

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<sup>ii</sup> In 2017, 27 abstracts were published on PubMed using the term “unprotected anal intercourse” while “condomless anal intercourse” was used in 45 abstracts. Search strings used: ("condomless anal intercourse") AND ("2017"[Date - Publication] : "2017"[Date - Publication]) and ("unprotected anal intercourse") AND ("2017"[Date - Publication] : "2017"[Date - Publication]) (2018-01-10).

theme events and venue types) have also been associated with subcultural expressions associated with anal intercourse without condom, HIV/STI transmission risk and/or adventurism among MSM<sup>87-92</sup>.

Most of the previous research addressing adventurism, sensation seeking and subcultures among MSM has been conducted in Australian and North American contexts (see appendix III). Our review of articles published in this field shows that most studies are quantitative. Attempts to distinguish and estimate the size of subgroups among MSM who share increased risk behaviour have been made<sup>93</sup> but statistical clustering methods have rarely been used for this purpose<sup>36, 40</sup>.

### **1.3.2 Sexual health and sexual practice among Swedish MSM**

The 2010 European MSM survey (EMIS) provided new information on similarities and differences between MSM and their living conditions in 38 European countries<sup>94</sup>. Overall, Sweden was ranked near the European Union median for survey topics such as demographics, sexual satisfaction, HIV and STI prevalence and testing uptake, sexual behaviour and preventive knowledge. Nonetheless, in some other areas Swedes deviate from the other countries. Sweden is notable for high knowledge related to HIV and STI transmission and low share of men who have experience of paying or being paid for sex, but also for high levels of openness, high gay community affiliation and low internalised homonegativity. Studies have confirmed that Swedish liberal attitudes and legislative policies support sexual minorities such as LGBT, suggesting that overall health and wellbeing is enhanced among MSM by living in places with a legal climate positive to LGBT<sup>95-97</sup>.

Swedish MSMs' sexual behaviour have previously been explored in two broad self-selected nonprobability sampling internet surveys<sup>42, 43</sup>. Some key findings from these surveys were:

- Men who had UAI with a partner of unknown HIV status during their most recent sexual encounter had lower knowledge about HIV and safer sex practices.
- 20% of men living in a self-reported committed relation had UAI outside the relationship during the past 12 months.
- 10% of the respondents' most recent sexual encounter happened abroad.

These findings indicated that future research on MSM health should specifically address UAI to improve knowledge on who should be the target of preventive interventions based on differences in HIV risk among subgroups of MSM. At the same time, it should be noted that not all MSM have anal intercourse as part of their sexual repertoire. This was reflected in the results of the European EMIS survey in which 39% of all European MSM respondents did not report anal intercourse during their most recent encounter with a non-steady partner<sup>94</sup>.

As concluded above, previous research has shown that MSM are not a homogenous category and that HIV and STI prevention among MSM may be more effective if it is niched and

targeted towards relevant subgroups of MSM rather than the group as a whole. Further, planning of prevention is preferably made with *proportionate universalism* in mind meaning that “scale and intensity” of interventions is customised to subgroups’ and individuals’ needs<sup>98</sup>. It is therefore necessary to understand more about the diversity of MSM.

### 1.3.3 HIV testing uptake

The previous Swedish MSM surveys<sup>42, 43</sup> have shown that 70–80% of Swedish MSM have been tested for HIV at least once. Other high-income settings present similar estimates<sup>99, 100</sup>.

Getting, as well as not getting tested has been associated with perception of sexual risk-taking in previous studies<sup>101, 102</sup>. Studies conducted before, or contemporary with the introduction of the effective ART show that fear can motivate MSM to get tested but also that fear of the various consequences of an HIV diagnosis is a common reason for not being tested<sup>102</sup>. More studies have focused on barriers than motivators for HIV testing. In recent studies in contexts where ART is readily available barriers have often been addressed in relation to delayed testing and late HIV diagnosis<sup>103-106</sup>. With about a quarter untested in a key population for HIV prevention, there is a need to continue to identify motivators and barriers for HIV testing among MSM and assessing associations with actual HIV testing.

### 1.3.4 Sexual risk taking behaviour while travelling abroad

A recent systematic review of evidence regarding determinants of travel related sexual risk-taking and identification of knowledge gaps and areas for targeted interventions showed a pooled prevalence of casual sex while travelling at 35% and prevalence of noncondom use at 17%<sup>107, iii</sup>. The strongest predictors of casual sex abroad were: expectations of sex before travel, single travelling or travelling together with friends, and having non-regular relationship(s).

Additional studies are needed to understand more about MSMs’ sexual behaviour abroad. That is a conclusion drawn both in the previous Swedish MSM surveys, and with the proportions of Swedish resident MSM infected with HIV and STI abroad in mind. Similarly, international studies have identified the need to study HIV and STI risk factors in MSM associated with mobility and travel patterns<sup>15, 108</sup>. It has been argued that MSM highly enjoy travelling abroad because that broadens their opportunities for visiting social and sexual environments that cater to their interests<sup>22</sup>. Being a sexual minority experiencing varying acceptance in different countries and contexts, travelling abroad is a way for MSM to be able to construct identity, to be openly gay, and to be anonymous<sup>96, 109, 110</sup>. Reasons for travelling can be both push and pull factors, denoting that the place called home has characteristics that make one want to go away (push) while other places can be associated with attractive venues

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<sup>iii</sup> The systematic review was not part of the PhD research project but conducted parallel in cooperation between Lund University and the Public Health Agency of Sweden. Four of the included studies had MSM focus.

and connotations (pull)<sup>111</sup>. Thereby, travelling can function as a *finite province of meaning*; a distinct break from the everyday life where you can be different and act differently than at home<sup>109, 112</sup>.

Our review of recently published articles focusing on MSM and travel/mobility reveals several quantitative attempts to study this topic (see appendix III). Study designs and target populations vary largely as do the results and conclusions drawn. The diverse findings of previous studies addressing sexual risk behaviour while travelling point in at least three different directions:

1. Risk behaviour increases while travelling compared to behaviour at home among MSM, and casual sex while travelling triples the risk of STI infection<sup>108, 113</sup>.
2. MSM engage less in UAI when travelling abroad than when travelling domestically or staying at home<sup>114, 115</sup>.
3. Those engaging in risk behaviour at home also do so while travelling<sup>116-118</sup>.

Some studies found an association between UAI while travelling and illicit drug use<sup>116, 119, 120</sup>. Further, several studies discussed that risk and risk-taking behaviour varies with choice of destination which is tied to reason for travel and subgroup interests<sup>121-123</sup>. A few studies addressed interpersonal communication on HIV status and disclosure<sup>119, 124</sup>.

The meanings of international travel vary depending on region, citizenship and practical matters such as transportation availability and visa requirements. Aside from geographical variations in HIV and STI prevalence, availability and cost of testing for HIV/STI as well as routines for STI testing for MSM, treatment for STI, PEP, PrEP and ART differ between and within different countries<sup>125, 126</sup>. This contributes to geographical differences in the transmission risk of HIV and STIs. Consequently, the ambiguous findings presented above may be due to diverse study contexts.

#### **1.4 CONTRACTING HIV – THEN AND NOW**

In the 1980s and the first half of the 1990s, being diagnosed with HIV was ultimately a death sentence regardless of route of transmission and place of residence. HIV affected already marginalised populations and was socially interpreted and described as punishment, as self-imposed and as nature's corrective<sup>127</sup>. In the middle of the 1990s the effective ART was introduced and many people living with HIV or even with AIDS, unexpectedly found themselves living with a treatable chronic disease. Still when a Swedish national HIV/AIDS strategy was written in 2004 all the effects of ART were not fully understood and the writers cautioned that people living with HIV could be "lulled into a belief that treatment eliminates the risk of transmission"<sup>128 (p.13)</sup>.

Today we know that the new ART was a game changer and that the concerns over widespread drug resistance have diminished. In 2013, the Swedish Institute for Infectious Disease Control and equivalents in many other countries declared that successful ART dramatically reduces infectiousness<sup>129</sup>. By then several studies had demonstrated that people living with HIV who receive ART survive and can live healthy lives, and that the infectiousness is highly reduced so that the risk of further sexual transmission of the virus is minimal given compliance and undetectable viral loads<sup>57</sup>. With this knowledge, the importance of early diagnosis and access to treatment is key in the response to HIV<sup>130</sup>.

At the same time, HIV in 2018 is also considered to be biomedically preventable. Based on the promising findings of studies such as PROUD<sup>131</sup> and Ipergay<sup>132</sup>, antiretroviral medication has been recommended by WHO since 2014 for preventive use as PrEP for MSM, and since 2015 for people at substantial risk of HIV infection<sup>133-135</sup>. The ECDC also encourage countries to offer PrEP for key populations, starting with MSM<sup>136</sup>. PrEP has been implemented in the United States of America, and in August 2016 the antiviral drug Truvada (emtricitabine / tenofovir disoproxil) was also approved by the European Medicines Agency (EMA) for preventive prescription in the European Union<sup>137</sup>. As of December 2017, programmatic PrEP prescription free of charge for the patient was implemented in France, Norway, Belgium and Scotland (Member state representatives discussion, European Union Commission Think Tank meeting, Luxemburg, 2017-12-21). Swedish guidelines and recommendations for prescription were published in August 2017<sup>138, 139</sup> but as of April 2018, only a few county councils had implemented it programmatically.

Modelling research has showed that interventions for MSM should be prioritised when allocating HIV prevention funding<sup>140</sup>. The European recommendations are to prioritise and scale up comprehensive HIV prevention interventions for MSM<sup>8</sup>. Previous Swedish studies have found that MSM were least likely to be diagnosed with HIV late (i.e. be late presenters, defined as a CD4 count <350 cells/ $\mu$ l) or to have AIDS at diagnosis, compared with persons infected through other routes of HIV transmission<sup>141, 142</sup>. A plausible explanation is the general awareness and comparatively high HIV testing frequency among MSM. Nevertheless, the EMIS survey shows that access to testing as well as to treatment and adherence to treatment differs between countries in Europe<sup>94</sup>.

Even in a high-income setting like Sweden, with legal rights and liberal attitudes towards same-sex relations, acquiring HIV is associated with undesirable consequences for the individuals as well as the society. A recent Swedish study demonstrated that most people living with HIV report overall high quality of life, with MSM somewhat higher than other respondents<sup>143</sup>. Living with HIV means living with a chronic disease with life-long treatment, having to adhere to treatments and regular clinic visits. For MSM in Sweden there are clinics specialised in LGBT health and non-governmental organisations offering peer and support groups as well as outreach prevention and testing. Still many MSM living with HIV think that their sex life has been impaired, they worry about being reported by sex partners and

have experienced being sexually rejected<sup>143</sup>. Compared with the other respondents, the MSM respondents also feared stigmatisation of being open about their HIV status and wished that they could be open to a greater extent. In other respects, living with HIV also requires unwanted openness. The Swedish Communicable Diseases Act routinely requires people living with HIV to disclose their HIV status to sex partners, regardless of condom use, something that has been questioned by patient organisations<sup>144, iv</sup>. Moreover, 35 countries still violate human rights with HIV-related travel restrictions ranging from disclosure obligations to deportation<sup>7</sup>.

Major improvements and progress have occurred with regards to HIV treatment, decreased infectiousness and quality of life among people living with HIV. Still, prevalence of an incurable chronic infection and cases of HIV in a society imply commitment and costs related to HIV testing and test promotion, treatment and care. “Epidemics have always engaged societies”<sup>127</sup> and societies have to assure continuous preventive measures and initiatives addressing societal awareness and anti-stigmatisation work. With this background, let us conclude that there are still plenty of reasons to prevent HIV.

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<sup>iv</sup> Since 2013 treating physicians can provide individual exemptions from the obligation for HIV patients fulfilling the criteria for well-treated HIV infection<sup>145</sup>.

## 2 AIMS AND OBJECTIVES

### 2.1 OVERALL AIM

The overall aim of this thesis is to explore and analyse risk factors and risk behaviour for HIV transmission among men who have sex with men (MSM).

Specific objectives:

- To identify characteristics of subgroups at higher risk of HIV infection than others among MSM in Sweden. (study I)
- To assess factors associated with HIV testing and explore motivators and barriers to testing among MSM. (study II)
- To assess differences in sexual practices between MSM having casual sex abroad and MSM having casual sex at home and to explore the factors associated with having casual UAI abroad. (study III)
- To explore the perceptions and experience of sex in Sweden and Berlin among Swedish MSM spending time in Berlin. (study IV)

Table 2. Summarising overview of the studies included in the thesis

Study	Study objective	Data	Analysis	Sample
1	To identify characteristics of subgroups at higher risk of HIV infection than others among MSM in Sweden.	MSM2013, quantitative stratified internet survey, 2013	Latent Class Analysis and multinomial logistic regression analysis	Men who had had UAI with $\geq 1$ casual partner over the past 12 months n=714
2	To explore motivators and barriers to HIV testing and to assess the factors associated with testing among MSM.		Factor Analysis and binary logistic regression analysis	Men ever tested for HIV n=1 602 Men never tested for HIV n=626
3	To 1) assess differences in sexual practices between MSM having casual sex abroad and MSM having casual sex at home and 2) to explore the factors associated with having casual UAI abroad.		Univariable and multivariable logistic regression analyses	Men who had had UAI with $\geq 1$ casual partner <i>abroad</i> over the past 12 months n=102  Men who have had UAI with casual partner but <i>not abroad</i> over the past 12 months n= 656
4	To explore the perceptions and experience of sex in Sweden and Berlin among Swedish MSM spending time in Berlin.	Individual, in-depth, semi-structured interviews with MSM recruited by respondent driven sampling, 2016	Content Analysis	n=15



## 3 MATERIALS AND METHODS

### 3.1 THE MSM2013 SURVEY

The MSM2013 survey, constructed to correspond to the aim and objectives of this thesis (study I–III), was the third Swedish cross-sectional survey recruiting MSM volunteers through the largest Scandinavian web community with LGBT focus, Quiser. At the time of planning the survey, Quiser had more than 50 000 member profiles registered in Sweden as male 15 years or older. 60% of the members visited the community at least once a month (Voss, J, Quiser, personal communication, 2012-10-13). These members were defined as men seeking contact, with focus on sexual contact, with other men on the internet.

Based on the stated user background data, a random selection of 14 514 male Quiser members residing in Sweden were sent a survey invitation to their Quiser inbox. To control for skewed age distribution of Quiser users, the sampling was stratified by county and four age groups. The sample size calculation was based on the estimated percentage of MSM who reported UAI with more than one partner during the last 12 months<sup>43</sup>. We used a level of confidence of 95%, a precision of 0.02 and assumed a nonresponse rate at 75%. We expected 3 600 respondents but 2 751 out of 14 514 men responded to the survey, a crude response rate of 19%. As data on nonrespondents were not available due to the nature of the sample selection, no formal analysis of nonrespondents was performed.

The inbox invitation message contained a link to the questionnaire and information on informed consent and how to contact the researchers. Members using community languages other than Swedish received their invitation message in English. The survey was open for 30 days. Reminders were sent after 10 and 23 days respectively. The web-based questionnaire, comprising 70 questions, was experiential so only questions following the respondent's preceding answers were shown. Most respondents answered about 50 questions.

The questionnaire (see appendix I) was built on previous surveys among MSM in Sweden including EMIS2010<sup>42, 43, 94</sup> and was constructed by a group of researchers and non-governmental organisation representatives experienced in surveys. The questionnaire was pilot tested by 11 MSM and reviewed at a reference group meeting with twenty representatives from healthcare facilities, county councils and non-governmental organisations after which some changes were made. Preparatory work also included collaboration with Swedish gay organisations and media to make sure that the survey was target group needs based and for attaining a high response rate.

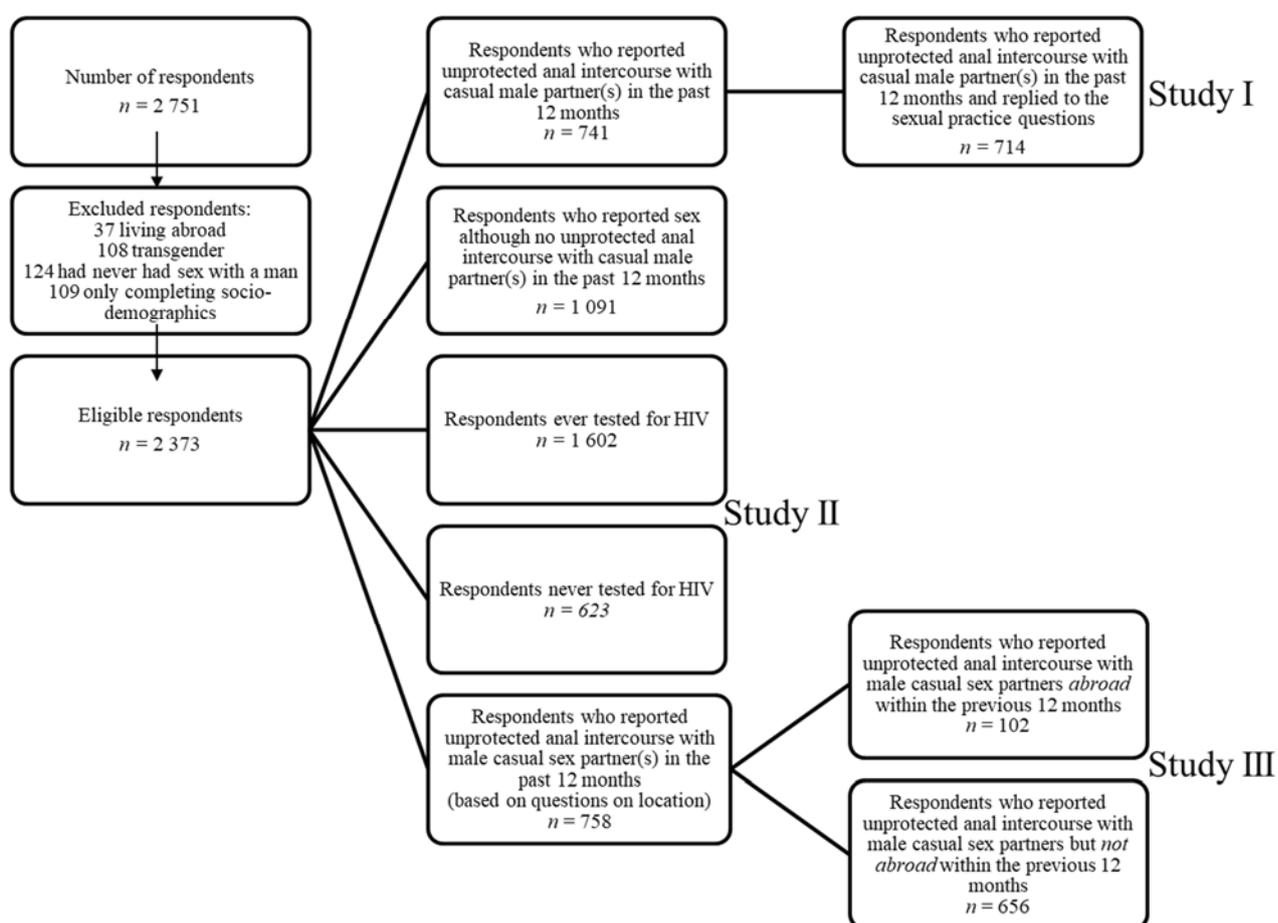
The questionnaire was available in Swedish and English and covered questions on the respondents' sexual practices with men

- in a steady relationship,
- related to UAI with non-steady partners in the past twelve months and
- at the most recent sex encounter.

The questionnaire also included questions on: socio-demographics, HIV and STI testing, preventive interventions in the past twelve months, self-reported HIV knowledge, self-reported preventive needs and experience of visiting gay meeting places.

The MSM2013 team also established a collaboration with an ongoing European TLS project, Sialon II<sup>146</sup> (Swedish partner was Public Health Agency of Sweden) and a respondent driven sampling (RDS) research project (led by Anna Thorson, Karolinska Institutet). The three different data collection methods provided a unique opportunity to compare the validity of Swedish MSM data since similar data were collected using different methods during the same time period. A collaborative comparison study was conducted parallel with the present PhD project<sup>19</sup>.

Figure 4. Summarising overview of inclusion and exclusion of respondents for study I–III



### 3.1.1 Analysis and statistical methods study I–III

Figure 4 presents an overview of the inclusion/exclusion process for studies I–III based on MSM2013 data. The data set used included all the respondents who reported ever having had sex with a man, who were Swedish residents and who replied to more than just the socio-demographic background questions, a total of 2 373 men. Study I focused on the respondents who reported UAI with  $\geq 1$  casual male partner(s) in the past twelve months ( $n=714$ ) i.e. 30%

of all the respondents. In study II, the respondents who did not answer the questions on HIV testing routines were excluded in some analyses. In study III, in-depth analysis of the 758 respondents reporting having had UAI with  $\geq 1$  male casual sex partners within the previous 12 months was conducted. In difference from in study I, in study III we used the survey questions containing location for selection of respondents (see appendix I) thereby enabling comparison based on if the respondents had had sex abroad or not.

Weighting for stratification and nonresponse was done for each strata (age and county of residence) for point estimates in all analyses since probability of inclusion differed between individuals in the study population<sup>147, 148</sup> and nonresponse differed between strata.

### 3.1.1.1 Study I

In study I, Fisher's exact test was used to assess significance. Latent Class Analysis (LCA) was conducted to organise respondents into classes<sup>149</sup>. Covariates were added and multinomial logistic regression analysis was conducted to explore characteristics and outcomes of classes. A stepwise forward selection logistic regression model was applied. The class with overall lowest item response probabilities was used as reference group. Odds ratios (OR) with 95% confidence intervals (CIs) were computed. A value of  $p < 0.05$  was considered statistically significant in the final model. Finally, we estimated and compared distal outcomes, measured as nine items of respondents' self-rated knowledge, for each identified latent class. The Holm-Bonferroni method was used to correct for multiple tests. The study used R version 3.1.2 (R Development Core Team, 2014) and poLCA, an R Package for Polytomous Variable Latent Class Analysis<sup>150</sup>.

### 3.1.1.2 Study II

In study II, an exploratory factor analysis based on polychoric (tetrachoric) correlations between pairs of item responses was conducted for motivators and barriers separately<sup>151</sup>. Oblimin rotation was applied in order to see if factors showed high correlation, but it showed 0.3–0.4 at its highest, indicating low correlation (cf. Watson & Thompson (2006)<sup>152</sup>). Final analyses were therefore performed with varimax rotation. Parallel analysis was used to assess the optimal number of factors accounting for as much variance in the data as possible<sup>151</sup>. A cut-off of 0.30 was applied for item inclusion in interpretable factors (as previously applied by for example Awad et al. (2004)<sup>153</sup>). Items with two or more loadings  $>0.32$  can be considered cross-loading items<sup>154</sup>, and such items were assigned to the single factor with the highest loading. Polychoric correlations between the ordinal questions of knowledge of HIV or STIs were used in a Principal Components Analysis (PCA) to evaluate the explained variance of the data by different principal components<sup>155</sup>. The component which explains the greatest amount of the variance in the data was deemed to be meaningful as a means of data reduction<sup>151</sup>. The component was labelled *HIV/STI and routes of transmission*, and the PCA score for this component was used in the regression analysis.

Binary logistic regression analysis was conducted in order to assess predictors for HIV testing. Multiple imputations were applied using multiple imputation chain equations to account for the nonresponse<sup>156</sup>. Twenty imputed data sets were made with 50 iterations and the results were weighted with Rubin's formula<sup>156</sup>. Subsequently, the full data-set of 2 373 respondents could be included in the regression model. ORs with 95% CIs were computed. A significance level of  $p < 0.1$  was applied when adjusting the backwards selection with regard to the exploratory approach. A value of  $p < 0.05$  was considered statistically significant in the final model. Backwards selection, compared with forward selection, has a tendency to overestimate the number of variables to include when data is scant, but was used because we had a large data set and were taking an exploratory approach.

### 3.1.1.3 Study III

In study III, behavioural differences between UAI with male casual sex partners in Sweden respectively abroad during the previous 12 months were analysed with univariable logistic regression analysis for 21 sexual practice variables ( $n=758$ ). Further, a total of 29 variables were analysed by forward selection multivariable logistic regression to identify factors associated with having had UAI with male casual sex partners abroad within the previous 12 months. One variable, the number of male UAI sex partners within the previous 12 months, was excluded due to collinearity. Variables with a  $p$ -value below 0.05 were included in the final model. Age and county of residence were included regardless of  $p$ -value.

## 3.2 IN-DEPTH INTERVIEWS, STUDY IV

The fourth study was qualitative, based on in-depth semi-structured interviews to deepen understanding of the MSM2013 survey findings. Qualitative RDS was used for recruiting informants for in-depth interviews. RDS, also referred to as network sampling, is a nonprobability sampling method often used to recruit hidden or hard to reach populations within social and health sciences<sup>30, 48</sup>. The principle behind RDS is that the number of informants will increase when interviewees themselves recruits new informants, similar to a chain referral. For each referral away from the initial seed, one more wave is added to the chain<sup>30</sup>. In this study, each *seed* (initial informant) should contribute with a maximum of two referrals to minimise the risk of bias due to the initial seeds being more likely to contact people they know, which might be people similar to themselves. Three initial seeds were chosen but since the third seed did not provide any referrals, a fourth seed was recruited, however the fourth seed was never interviewed due to professional HIV expertise making this person unrepresentative of the community. Wave three was reached in two of the chains (see appendix IV).

The inclusion criteria were:

- Swedish MSM, 18–46 years old.

- Current or former resident of Berlin, or who travel to Berlin at least twice per year.
- Sought for partners and sexual partners during the past three years in both Berlin and Sweden.
- Visits both Berlin and Sweden regularly.

The exclusion criteria were:

- Professional background within HIV/STI prevention, healthcare or equivalent.
- Close relationship with anyone in the research group, risk of social desirability bias and/or ethical issues.

Interviews took place between January and September 2016. The interviews were conducted in Stockholm or Berlin, both face to face and Skype/FaceTime (see table 1). They lasted 46 – 170 minutes. The informants chose the place for the interview and they were reimbursed for their participation with two cinema tickets. No extra reimbursement was given for referral of interviewees. The interviews were recorded and transcribed shortly after the interview by either the interviewer (pilot interviews) or a professional transcriber. The anonymised transcriptions were reviewed by another member of the author team to ensure quality and cultural sensitivity. The quotes were translated from Swedish to English and reviewed to ensure anonymity and correctness.

To achieve high dependability the same interviewer conducted all interviews<sup>157</sup>. The interviewer was a Swedish openly gay identified man, with professional background in the HIV prevention field at a LGBT organisation in Stockholm. He kept a research diary with immediate reflections after each interview and shared it with the author team on a weekly basis, including reflections on method, progress and analysis. The co-authors provided feedback.

The interviewer also made participant observations at gay venues in Berlin, describing the settings and contexts in the diary he shared with the other researchers. The aim of the observations was triangulation, to “observe situations informants have described in interviews, thereby making [researchers] aware of distortions or inaccuracies in description provided by those informants”<sup>50</sup>. Conducting observations at gay clubs in Berlin requires participatory observations by a man and you must be let into the club, dress or undress accordingly and take notes very discreetly due to restrictions defined by the management. Being open with the aim of the study would not be feasible in this setting. The observations were key for understanding the context described by the men interviewed<sup>47, 51</sup>.

A thematic interview guide (see appendix II) was designed based on themes generated from analysis of the MSM2013 survey<sup>29</sup>. The interview guide was piloted with three men who fit the inclusion criteria and thereafter subjected to minor changes. Since no critical changes

were made, the pilot interviews were included in the sample. The following themes were covered: arenas and purposes for meeting other men, sexual practice, testing for HIV/STI, HIV/STI risk, risk reduction, alcohol and drug use, living with HIV. The first three themes were analysed for the study included in this present thesis.

The concept of saturation, when no new information relevant to the research question emerges from interviews<sup>47</sup>, was discussed and the author team reached a consensus that it was achieved after 13 interviews and two additional interviews verified this.

### **3.2.1 Informants' characteristics**

The socio-demographics of the 15 informants are presented in table 3. The informants ranged in age from 25 to 44 years and they either currently lived in Stockholm or used to live in Stockholm prior moving to Berlin. The majority were born and grew up in different places all over Sweden. Two were born abroad. About two-thirds were in a relationship although most of them stated it was "open". One man was a parent. Most had an academic degree. All but two men had a full-time job, mostly in occupations requiring academic education.

Only one informant reported living with HIV, but all except for two had a history of one or more STI diagnoses. Berlin was the predominant travel destination for all informants and although they were not asked about the exact number of lifetime sex partners, it was clear that all men experienced high numbers of sex partners.

Importantly, as a qualitative sample, these men do not constitute a random sample of Swedish travelling men who have sex with men. We believe that the sample to some extent reflects previous research showing that adult gay men are well educated and employed<sup>23</sup>, but also that these MSM are reached by public health research to higher extent than others.

### **3.2.2 Analysis**

Content analysis was applied as described by Graneheim and Lundman (2004)<sup>158</sup> and Graneheim, Lindgren and Lundman (2017)<sup>157</sup> who argue that texts always have multiple meanings and that interpretation is unavoidable. The content analysis was executed as an inductive, iterative process<sup>157</sup>. This enabled the researchers to go back and forth between the raw data, interview guide, analysis and text to gain deeper understanding of the process and meaning. In order to get to know the raw material the researchers listened to the recordings, and took notes in the research diary on reoccurring and new topics and potential themes. The researchers read the transcripts multiple times during the data collection period and afterwards in order to identify patterns<sup>46</sup>. Coding and clustering into subcategories, categories and themes were conducted over time which enabled the researchers to step back and review the data in a new way. NVivo was used for coding and Microsoft Excel to facilitate structure.

Table 3. Socio-demographic data on the 15 informants

Variable		Number of informants
<b>Age</b>	25-29	3
	30-34	6
	35-39	3
	40+	3
<b>Education</b>	High school	1
	Vocational training	3
	Academic	2
	Academic degree	9
<b>Employed</b>	Yes	13
	No	2
<b>Relation to Berlin</b>	Travels regularly to Berlin	9
	Resident	6
<b>Place of interview</b>	Stockholm	5
	Berlin	5
	Skype/FaceTime	5
<b>Relationship status</b>	Single	6
	Monogamous relation	2
	Non-monogamous/open relation	7
<b>Have children</b>	Yes	1
	No	14
<b>Self-reported HIV status</b>	HIV positive	1
	HIV negative	14
<b>STI history</b>	Yes	13
	No	2

### 3.3 ETHICAL CONSIDERATIONS

Ethical considerations are particularly important when studying hidden and stigmatised groups. Historically, health promotion campaigns and preventive measures directed to gay men have sometimes faltered and functioned as “triggers for resistance” when the target group has seen the preventive messages as a way of condemning their way of living, including sexual practice such as anal intercourse without condom, and imposing sexual norms associated with heterosexuality<sup>71, 72</sup>. In addition, the experience from the preparatory, formative work with a previous Swedish MSM survey (self-selected banner/pop-up survey in 2006) was that some web community users criticised the survey, opposing having their sex lives as a research subject. The responsible researcher responded openly and thoroughly to criticisms and the resistance subsided.

#### 3.3.1 Studies I–III

With previous experiences in mind, in the preparatory work with MSM2013, we made sure to:

- Inform and consult Swedish LGBT organisations and LGBT media about the MSM2013 survey.
- Pilot the questionnaire with LGBT organisation members.
- Create a specific Quiser information page on MSM2013.

- Engage three men from an LGBT sports club as frontmen in Quiser advertisement for the MSM2013 survey.
- Create a specific email address for questions about the survey and reply to emails daily.
- Provide a telephone hotline to the researchers three hours a day for questions about the MSM2013 survey.

All respondents were provided information on test and counselling services for questions on sexual risk behaviour and HIV. They were also informed that all published data was going to be displayed in an anonymous manner.

Ethical approval for the MSM2013 survey (study I–III) was obtained from the Regional Ethical Review Board in Stockholm in the spring 2013 (reg no 2013/3:3). Informed consent was obtained from individual respondents. They were given written information about the background and purpose of the project and information on how to contact the researchers.

### **3.3.2 Study IV**

Ethical approval for study IV was obtained from the Regional Ethical Review Board in Stockholm (reg no 2016/5:2). The information to the interviewees included similar information as the MSM2013 survey respondents received but also covered reasons for why the interviews were recorded and specific information on the qualitative methodology. The informants read and signed an information letter and an informed consent document before the interview started to ensure that they understood the conditions of participation. The interviewer ensured that the recruited informants were fully cognisant of the purpose of the study and the conditions of participation, including the fact that they could choose not to answer any question, and were free to back out at any time. Interviewing MSM about sexual risk-taking could potentially spark emotions and processes that may need to be addressed during or after the interview. Therefore clear instructions and contact information to a local counsellor was provided to the informants beforehand. In addition, the interviewer himself was an experienced sex educator, ensuring that any immediate reactions could also be handled if necessary. This included correcting misunderstandings about safer sex that may have come up during the interview after the interview was completed.

The participatory observations at gay venues in Berlin provided extended description of the Berlin club context described by the men interviewed<sup>47, 50</sup>. The observer's approach was discussed thoroughly in the research team. The observations were conducted to get an overall perspective, not for collecting data for analysis. Notes were made after observations to describe context and patterns, not to describe individual visitors. The researcher was not open while conducting the study in the gay venue setting, and could blend in while observing since voyeurism was common among visitors. Pope and Mays (2006)<sup>159</sup> state that "The researcher needs to be accepted by the group but avoid 'going native'". This implied that the observer had to apply a strategy to move to a noninteractive spot when people started to touch him in

order not to “go native” or become a “complete participant”. However, the strategy of not standing too close and not “going native” may have limited the descriptions gained from the observations.

The audio files were coded with numbers and stored with password protection. The transcribers signed a confidentiality agreement before the transcribing started. Person’s names, names of smaller cities and other data that could lead to the identification of the informants were deleted before sharing the transcripts within the author team. The quotes used in this thesis were subjected to a second review to make sure no identification could be made.



## 4 RESULTS AND DISCUSSION

### 4.1 IDENTIFYING SUBGROUPS OF MSM (STUDY I)

*The aim of this analysis was to identify characteristics of subgroups at higher risk of HIV infection than others among MSM in Sweden.*

#### 4.1.1 Key findings and contributions

We hypothesised that among MSM having UAI with casual partners there are subgroups of men clustering risk factors and/or risk-taking behaviours, and that HIV preventive knowledge differs between subgroups. Our assumptions were confirmed in study I where four out of ten MSM2013 survey respondents reported having had UAI with casual partners over the past 12 months. These men differed from other sexually active men with regards to background characteristics such as age, education and health status (see table 4). Moreover, the group of men engaging in UAI with casual partners was diverse. The different characteristics and communication related knowledge of the four latent classes of MSM identified in the study provide valuable knowledge for prevention specialists and healthcare professionals who meet MSM. The qualitative differences between the groups were used to label the classes and remind us that MSM needs are diverse and that MSM could benefit from being offered different types of preventive measures.

The Latent Class Analysis (LCA) generated four distinct unordered classes (visualised in paper I, table 2 and figure 2):

- *Bottoms*, comprising 24% of the sample, were characterised as always being penetrated, while never being insertive, when having UAI. The term bottoms derives from self-labelling used by gay men who prefer receptive anal intercourse<sup>160</sup>. They may self-identify as bottoms compared with tops who prefer having the insertive role and versatiles who report practicing both roles.
- *Risk-reducers*. Among the four classes, this quarter of the men reported least amount of experience with practices such as barebacking, group sex and threesomes. They also had overall limited experience of practices with direct transmission risk of HIV such as receptive UAI. Unlike the bottoms, this class contained men who reported insertive, and to a lesser extent also receptive, UAI.
- *Experimentals*, a third class consisting of 16% of the men and distinguishing itself most clearly from the others. These men reported extensive experience with different sexual practices, as well as binge drinking, drug use, group sex and barebacking.
- *Clubbers* comprising 35% of the men reporting binge drinking, oral sex and insertive anal intercourse equal to, or higher than the experimentals.

Experience of sexual and sex-related practices differed clearly between the classes with experimentals distinguished as adventurous/having a broad sexual repertoire. Interpreting

item response probabilities, we found that for risk-reducers, bottoms and clubbers these were sometimes similar, but more importantly, that they followed the overall same pattern. The experimentals clearly stood out regarding, for example, fisting, urine/faeces, barebacking, use of erectile dysfunction medication and use of poppers.

Table 4. Study sample characteristics

<b>Variable</b>		<b>Men who reported UAI with <math>\geq 1</math> casual male partner(s) &lt;12 months n=714 Percentage (n)</b>	<b>Men who reported sex with <math>\geq 1</math> man &lt;12 months but no UAI with casual partner(s) n=1091 Percentage (n)</b>	<b>P-value</b>
<b>Age</b>	15-25	31.2 (223)	18 (196)	<0.001
	26-35	24.2 (173)	22.8 (249)	0.495
	36-46	21 (150)	26.5 (289)	0.008
	47+	23.5 (168)	32.7 (357)	<0.001
<b>Origin</b>	Born in Sweden	89.1 (632)	87.2 (944)	0.235
	Born abroad	10.9 (77)	12.8 (138)	0.235
<b>County of residence</b>	Stockholm/Göteborg/Malmö	37.7 (269)	35.8 (388)	0.423
	Non metropolitan county	62.3 (445)	64.2 (697)	0.423
<b>Education</b>	University	31.1 (222)	43.5 (474)	<0.001
	Other	68.9 (492)	56.5 (615)	<0.001
<b>Employment status</b>	Employed	68.2 (480)	75.7 (813)	0.001
	Unemployed/long time sick leave	10.9 (77)	6.8 (73)	0.003
	Student	17.9 (126)	13 (140)	0.005
	Retired	3 (21)	4.5 (48)	0.132
<b>Sexual orientation</b>	Homosexual	64.9 (460)	57.6 (624)	0.002
	Other	6.9 (49)	9.3 (101)	0.081
	Bisexual	27.2 (193)	29.8 (323)	0.241
	Heterosexual	1 (7)	3.3 (36)	0.001
<b>Health status</b>	Good/very good	84.7 (603)	90 (977)	0.001
	Bad/very bad	2 (14)	1.3 (14)	0.330
	Neither good or bad	13.3 (95)	8.7 (95)	0.002
<b>Happy with sex life</b>	Happy/very happy	43.3 (309)	47.2 (514)	0.111
	Unhappy/very unhappy	18.2 (130)	17.4 (190)	0.705
	Neither happy or unhappy	38.4 (274)	35.4 (385)	0.194
<b>In a steady relationship</b>	Yes with several people of whom at least one is a man	4.4 (31)	2.3 (25)	0.018
	Yes with a woman	10.5 (75)	20.4 (222)	<0.001
	Yes with a man	20.5 (146)	34.7 (378)	<0.001
	No	64.6 (460)	42.6 (464)	<0.001
<b>HIV status</b>	I have HIV	4.5 (31)	2.2 (23)	0.007
	I do not have HIV	81 (554)	91.3 (961)	<0.001
	Unsure/do not know	14.5 (99)	6.5 (68)	<0.001
<b>HIV test last 12 months</b>	Yes	51.6 (349)	38.4 (397)	<0.001
	No	48.4 (328)	61.6 (638)	<0.001

#### *4.1.1.1 Class membership predicted by age, HIV status and number of sex partners*

Adding covariates to a weighted LCA results in a comparison of the odds of belonging to a specified latent class compared with belonging to a reference class. We conducted a multinomial logistic regression analysis for the four latent class model. The following predictors for class membership were found statistically significant (reference group: risk reducers):

##### *Age*

- Younger age (15–25) was associated with being bottom (OR 0.38, 95%CI: 0.19–0.75 for age 47+).
- Experimentals were often between ages 36–46 (OR 3.42, 95%CI: 1.38–8.50).

##### *HIV status*

- Bottoms (OR 2.51, 95% CI: 1.15–5.49) and clubbers (OR 2.68, 95% CI: 1.25–5.73) were more likely to report being unsure of HIV status than risk-reducers.
- Experimentals (OR 5.39, 95% CI: 1.09–26.77) were more likely than risk-reducers to report having HIV.

##### *Number of sex partners*

- Experimentals and clubbers were associated with a higher number of casual male sex partners over the past 12 months than risk-reducers. Experimentals: OR 7.56, 95% CI: 3.47–16.45 for 2–5 partners; OR 20.93, 95% CI: 5.57–78.65 for 6–10 partners; OR 55.41, 95% CI: 13.38–229.42 for more than 10 partners. Clubbers: OR 2.40, 95% CI: 1.51–3.84 for 2–5 partners; OR 6.34, 95% CI: 2.09–19.24 for 6–10 partners.

No meaningful protective factors were found to differ with statistical significance except that those with university education had lower odds of being a bottom (OR 0.53, 95% CI: 0.32–0.87) than being a risk-reducer.

#### *4.1.1.2 Highest self-rated knowledge among experimentals*

Table 5 presents the results of the distal outcome analysis. The proportion of respondents rating their knowledge as good or very good for each of the nine knowledge variables is presented for the four identified latent classes. The results follow a clear pattern where again, the experimentals stood out from the other classes. Estimates consistently were highest among the experimentals while there was no similar pattern for the lowest estimates. The bottom class showed the lowest estimates for four out of nine knowledge areas and the clubbers had the lowest estimates for three of the remaining four knowledge areas.

Table 5. Distal outcome results

Proportion of respondents rating their preventive knowledge as good or very good.	Class 1 Bottoms	Class 2 Risk-reducers	Class 3 Experimentals	Class 4 Clubbers	P-value
HIV	0.64	0.72	<b>0.82</b>	<i>0.52</i>	3 vs. 1 p=0.016 3 vs. 4 p<0.001 2 vs. 4 p=0.009
STIs other than HIV	0.42	0.52	<b>0.76</b>	<i>0.41</i>	3 vs. 1 p<0.001 3 vs. 2 p=0.002 3 vs. 4 p<0.001 2 vs. 1 p=0.005 2 vs. 4 p=0.004
What it is like living with HIV	<i>0.18</i>	0.28	<b>0.51</b>	0.25	3 vs. 1 p<0.001 3 vs. 2 p=0.006 3 vs. 4 p=0.001
Post-exposure prophylaxis (PEP) against HIV	<i>0.04</i>	0.10	<b>0.23</b>	0.08	3 vs. 1 p=0.001 3 vs. 4 p=0.002
How various STIs are transmitted	<i>0.64</i>	0.70	<b>0.82</b>	0.67	
How to have anal intercourse without tearing the condom	<i>0.49</i>	0.54	<b>0.76</b>	0.63	3 vs. 1 p=0.003 3 vs. 2 p=0.011
How to tell others that I am homosexual/bisexual	0.55	<i>0.52</i>	<b>0.69</b>	0.65	
How I can talk to a sex partner about HIV status	0.43	0.45	<b>0.67</b>	<i>0.39</i>	3 vs. 1 p=0.009 3 vs. 2 p=0.002 3 vs. 4 p=0.001 2 vs. 4 p=0.022
How I get a relationship to work well	0.39	0.54	<b>0.59</b>	<i>0.34</i>	3 vs. 1 p=0.029 3 vs. 4 p=0.001 2 vs. 4 p=0.007

Note: Bold denotes the highest estimate for each distal outcome measured and italics conversely the lowest estimate. P-values indicate significant class difference.

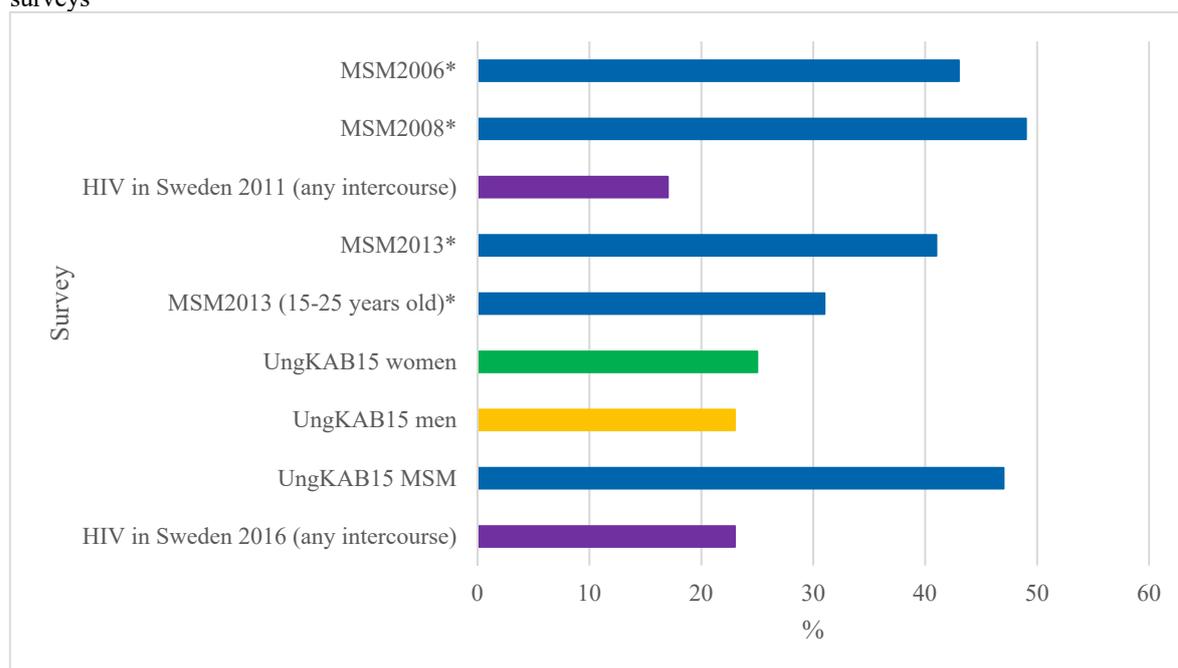
#### 4.1.2 Comparison to previous research studies

We are neither the first nor the last researchers to distinguish and estimate the size of subgroups with regard to risk factors among MSM<sup>93, 160</sup>. However, to our knowledge the present study was among the first ones using LCA for this purpose and we are happy to note that interesting similar grouping attempts have followed<sup>85, 161</sup>.

UAI is the most common transmission route for HIV among MSM, and previous research has concluded that anal intercourse as a sexual practice may be perceived as more important among MSM who contract HIV than others<sup>78</sup>. More than half of the respondents in recent Swedish sexual behaviour surveys, including the MSM2013 survey reported engaging in anal intercourse at their most recent sex encounter<sup>42, 43, 94</sup>. Corresponding estimates among youth in Swedish surveys are under 10%<sup>26, 162, 163</sup>.

Several recent Swedish sexual behaviour surveys have asked about condom use during (anal) intercourse. The comparisons presented in figure 5 indicate that condom use is notably higher among MSM than others, even if there is a difference between young MSM (<26 years) and other MSM.

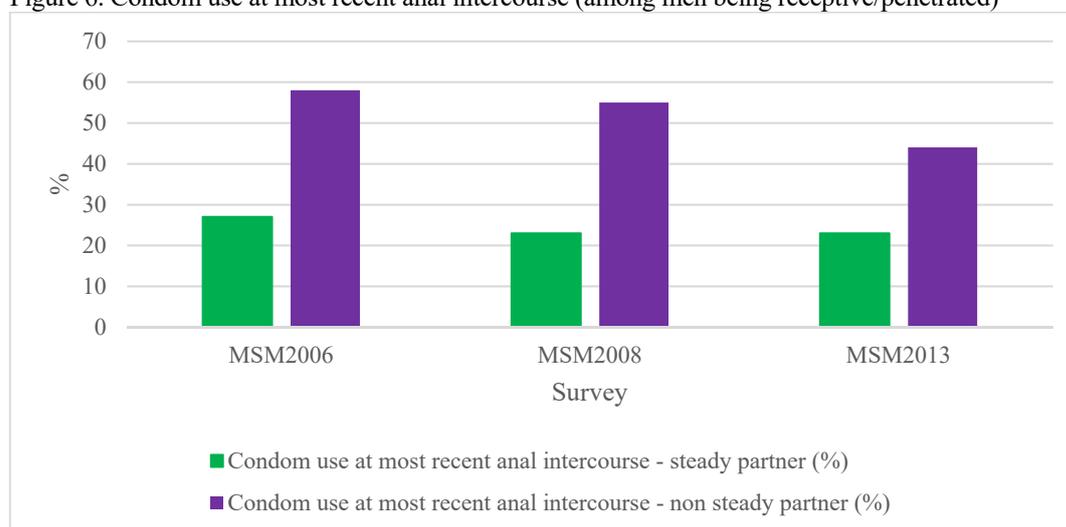
Figure 5. Condom use at most recent (anal) intercourse in Swedish population and MSM sexual behaviour surveys<sup>v</sup>



Note: Purple denotes all genders, blue denotes MSM, yellow denotes men and green denotes women.  
 \* Estimates denotes condom use when being penetrated at most recent anal intercourse

Further, figure 6 shows that MSM condom use with non-steady sex partners is doubled compared to condom usage with steady partners. Altogether, these comparisons strengthen the conclusion that HIV risk, but also HIV risk perception, is relatively high among MSM compared with other groups.

Figure 6. Condom use at most recent anal intercourse (among men being receptive/penetrated)<sup>vi</sup>



In the LCA, experimentals, differed from the other classes with a high prevalence of HIV and high numbers of sex partners. This class had high self-rated knowledge on HIV, STIs,

<sup>v</sup>Sources: MSM2006<sup>42</sup>, MSM2008<sup>43</sup>, HIV in Sweden 2011<sup>27</sup>, MSM2013 (present project data), UngKAB15<sup>163</sup>, HIV in Sweden 2016<sup>28</sup>. See appendix V for details.

<sup>vi</sup>Sources: MSM2006<sup>42</sup>, MSM2008<sup>43</sup>, MSM2013 (present project data). See appendix V for details.

transmission of HIV and STIs and safer sex practice. This finding is in line with previous research that has not found an association between high self-rated knowledge and low risk behaviour<sup>78, 80, 127</sup>.

We also found that UAI was associated with sexual practices and preferences such as group sex, fisting, drug use and high numbers of sex partners. As stated by Kippax (1998)<sup>78</sup> long before the effects of effective ART were fully known, many practices performed by MSM who can be categorised as adventurous or sensation-seeking are not high risk for HIV transmission. Still, studying these practices and their relations to UAI is central for our understanding that risk can be something more multifaceted: exploration of boundaries, self-improvement, possibility of intimacy and relationships and even resistance against authorities<sup>1, 61, 67, 68, 72</sup>.

Besides being specifically interested in anal intercourse, the MSM demonstrating a broad sexual repertoire may share cultural preferences and subcultural expressions that are important to recognise for prevention and healthcare professionals<sup>78, 81, 82, 84, 86, 160</sup>. Also, the association between MSM subculture, seroconversion and drug use require continuous attention. Even though the experimentals in the present study did not demonstrate extreme levels of drug use in relation to UAI, the comparatively high drug use among them compared to the other classes give us reason to relate our results to the previous findings that substance use itself is a predictor for seroconversion<sup>63</sup> and associated with MSM subcultures and hepatitis C<sup>84</sup>. Prevalence of both subcultural sexual preferences and drug use, so called chemsex, was also explored and shown in study IV among highly sexually active MSM (see chapter 4.3).

It is noticeable that the estimated experimentals class size (16%) can be compared to adventurism prevalence estimate attempts in an analysis of online network profile preferences (21%)<sup>93</sup> and another similar recent LCA among MSM (19%)<sup>161</sup>. Also, the latter study found that HIV prevalence and numbers of sex partners are higher among a subgroup of MSM with distinct profiles of sexual practices. MSM who can be categorised as experimental, adventurous, or sensation seeking may be a minority of MSM but our results strengthen previous findings that such a subgroup of MSM regardless of HIV status may account for a disproportionately high proportion of new HIV transmissions<sup>63, 77-79, 164</sup> and should be a priority for HIV prevention.

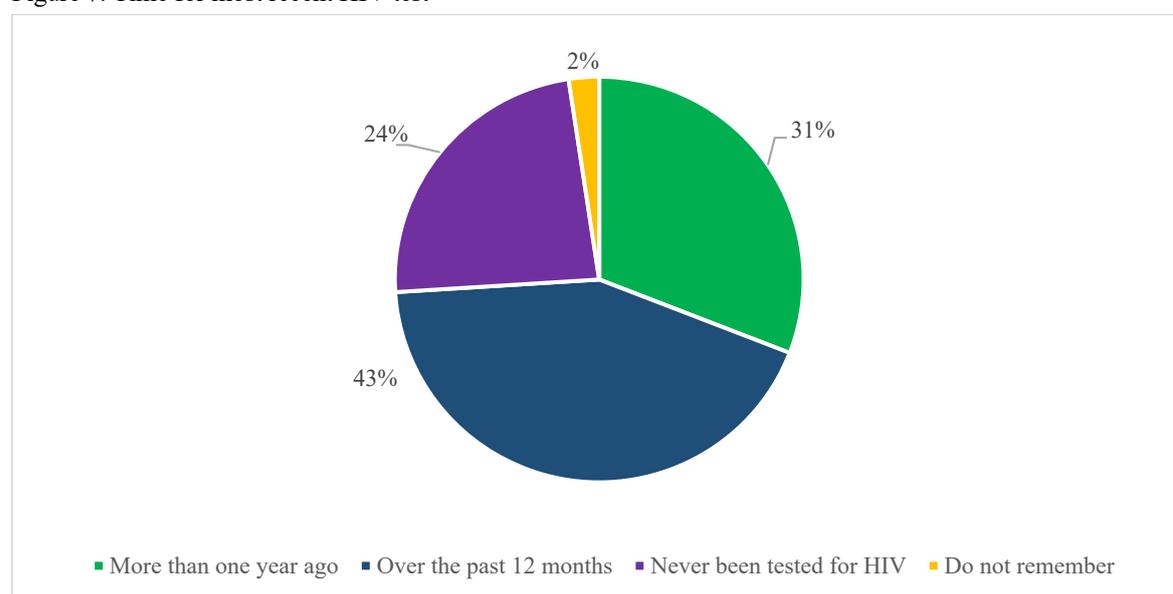
## 4.2 MOTIVATORS AND BARRIERS FOR HIV TESTING (STUDY II)

*The aim of this analysis was to explore motivators and barriers to HIV testing and to assess the factors associated with testing among MSM.*

### 4.2.1 Key findings and contributions

Three quarters (n=1 602) of the MSM2013 survey respondents reported having ever been tested for HIV. The majority provided a single reason for their most recent HIV test (details in paper II, table 1). As presented in figure 7, just under half of the men reported having been tested for HIV within the past 12 months, while almost a third had been most recently tested over one year ago. A quarter reported never having been tested, while a few did not remember when their most recent HIV test was.

Figure 7. Time for most recent HIV test

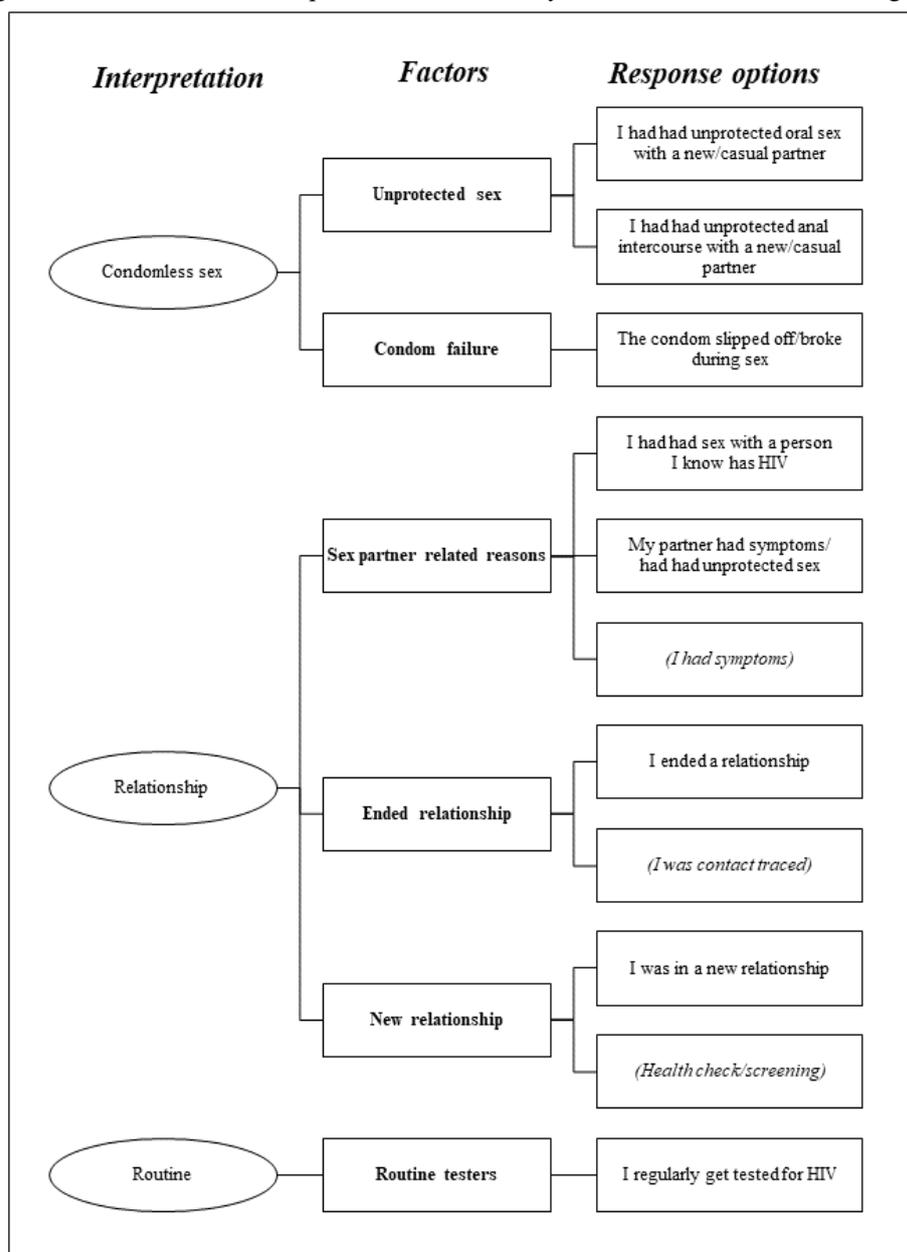


#### 4.2.1.1 Motivators for HIV testing

The chosen study design allowed us to triangulate the results from an explorative factor analysis of respondents' reasons with a regression analysis of correlates of actual testing. The explorative factor analysis on motivators for HIV testing suggested that eleven items should be grouped into six factors (paper II, table 3), the majority of which showed a low correlation between the factors. We labelled the six factors as 1) unprotected sex, 2) condom failure, 3) sex partner related reasons, 4) ended relationship, 5) new relationship and 6) routine testers.

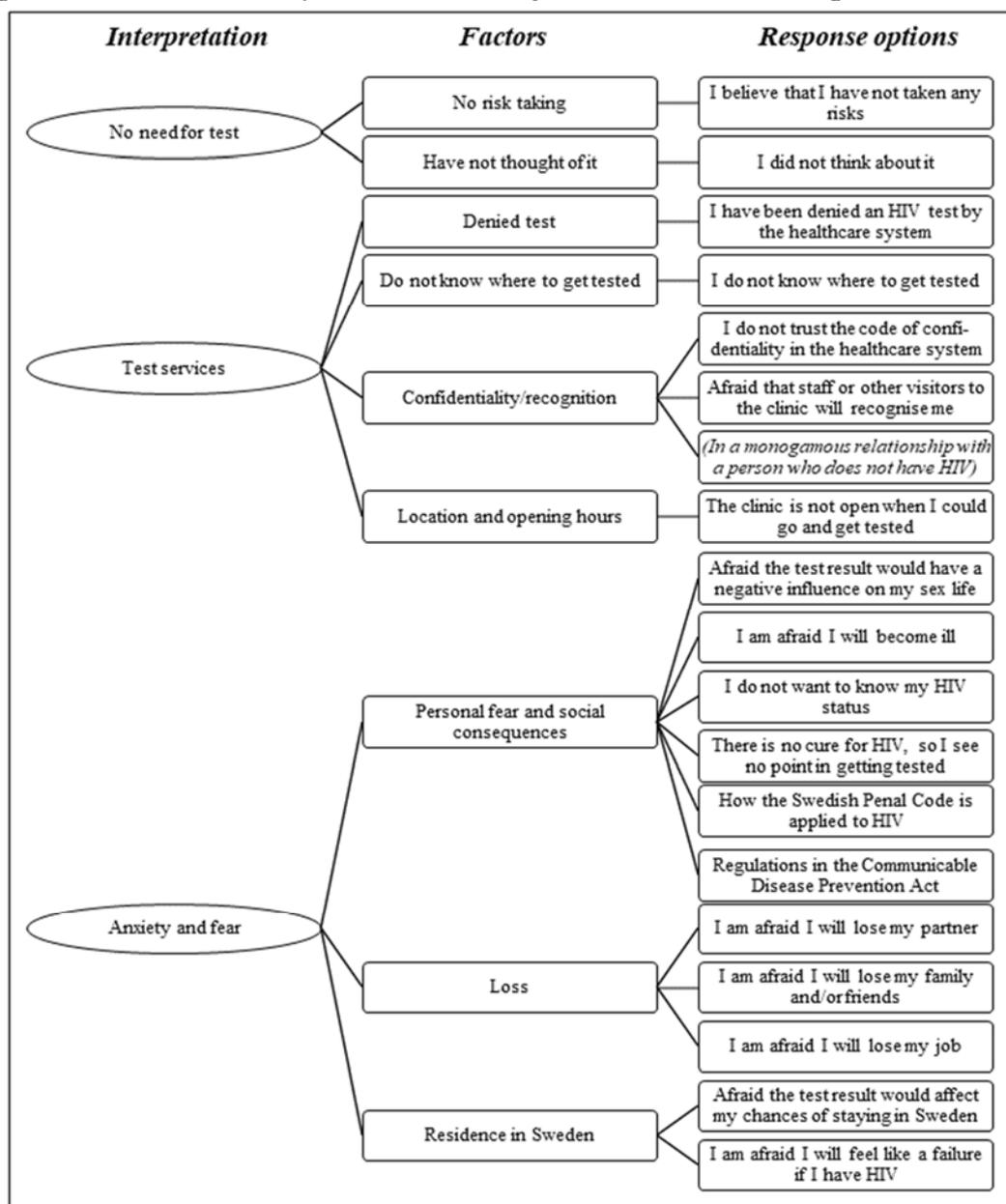
Interpreting the six factor solution, we suggested that factors 1 and 2 can both be understood as condomless sex-related reasons, and factors 3, 4, and 5 could be interpreted as relationship related reasons. Figure 8 visualises the interpretation of factors and the linkage to response options.

Figure 8. Visualisation and interpretation of factor analysis of motivators for HIV testing



Regression analysis results confirmed structural factors as key for predicting HIV testing among MSM. Besides recent experience of UAI with casual partner (OR 1.59, 95% CI: 1.18–2.16 for 1 partner; OR 1.34, 95% CI: 1.04–1.73 for 2+ partners), younger age (15–25 years old compared with 47+ years old, OR 0.51, 95% CI: 0.38–0.69) and university education, (OR 1.24, 95% CI: 1.01–1.52) knowledge on where to take a test (OR 5.35, 95% CI: 4.17–6.85) and experiencing contact with HIV prevention such as condom distribution (OR 1.51, 95% CI: 1.22–1.88) or counsellor (OR 3.45, 95% CI: 2.77–4.30) were associated with having been tested for HIV within the past 12 months (Paper II, Table 5).

Figure 9. Visualisation and interpretation of factor analysis of barriers for HIV testing



#### 4.2.1.2 Barriers for HIV testing

Table 2, paper II, presents the reasons given for never being tested. The main reasons for never having been tested for HIV were related to unawareness or the perception of low risk exposure. The vast majority of the men never tested for HIV indicated reasons related to perception of low risk-taking or unawareness of taking risks. This perception, however, cannot be confirmed as adequate in an overall assessment of their survey response profiles. More than 8 out of 10 of the men never tested for HIV reported having had sex with at least one man over the past 12 months and more than half of them reported having had UAI over the same period of time (unpublished results). This finding strengthens the need for continuous HIV test promotion initiatives targeted at MSM.

The explorative factor analysis suggested that the twenty items should be grouped into nine factors and we noted that factors could be grouped under three umbrellas: 1) no need for a test, 2) availability and structure of test services and 3) anxiety and fear (Paper II, table 4 and figure 9). Figure 9 visualises the interpretation of factors and the linkage to response options.

#### 4.2.1.3 Reasons for not having been tested recently

Three quarters of the MSM2013 survey respondents reported having been tested for HIV. Among these, one out of ten had not been tested over the past five years. It should be noted that 13% of those not tested during the past five years reported living with HIV, indicating that they do not perceive regular viral load measurements as test occasions. Besides that, the responses overall were similar to responses among those who had never been tested (table 6). The main reason specified for not testing was perception of low risk exposure: “I believe that I have not taken any risks” (53.9%). Twice as many of the men who had not been tested within the past five years, compared to those who had never been tested, replied “I am in a monogamous relationship with someone who does not have HIV” as the reason for not being tested recently.

Table 6. Reasons for not having been tested over the past five years

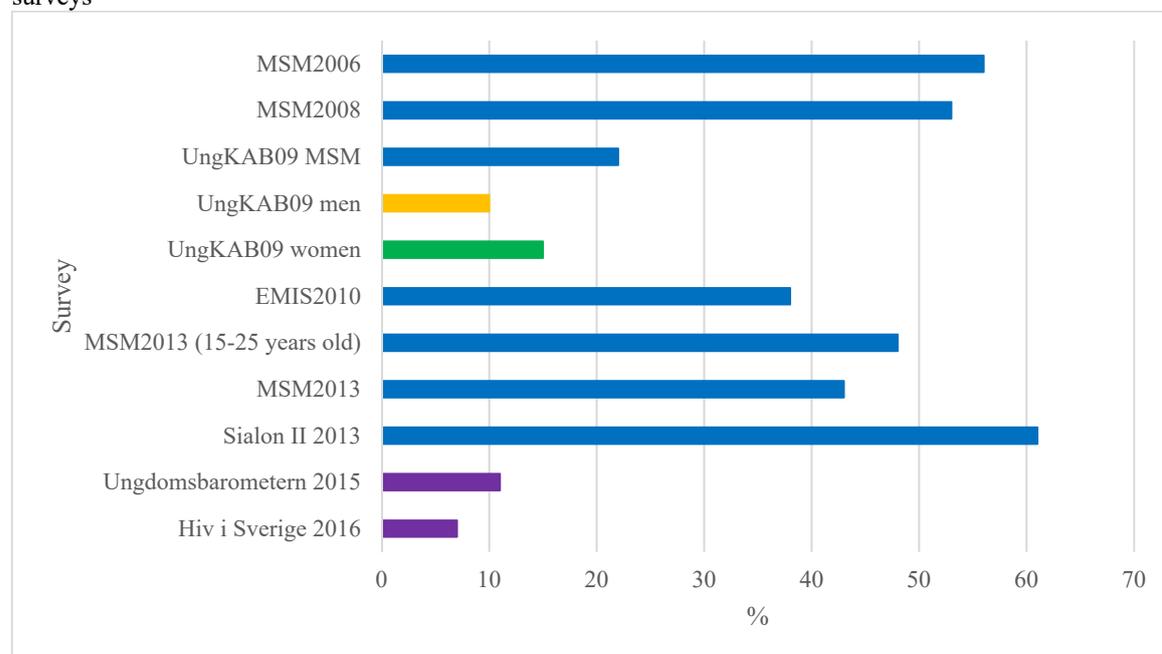
<b>Response item</b>	<b>Number of 'Yes' responses</b>	<b>Per cent of 'Yes' responses</b>
I believe that I have not taken any risks	124	53.9%
I am living in a monogamous relationship with a person who does not have HIV	69	30.0%
I am living with HIV already	32	13.9%
I did not think about it	30	13.0%
I am afraid that staff or other visitors to the clinic will recognise me	18	7.8%
Open-ended 'other' responses	17	7.4%
I do not trust the code of confidentiality in the healthcare system	13	5.7%
I am afraid I will feel like a failure if I have HIV	9	3.9%
I do not want to get tested because of the rules in the Communicable Diseases Act	8	3.5%
I am afraid I will lose my partner	7	3.0%
I am afraid the test result would have a negative influence on my sex life	7	3.0%
I do not know where to get tested	6	2.6%
I am afraid I will become ill	6	2.6%
I do not want to get tested because of how the Swedish Penal Code is applied to HIV	6	2.6%
I am afraid I will lose my family and/or friends	5	2.2%
The clinic is not open when I could go and get tested	4	1.7%
I do not want to know my HIV status	4	1.7%
It is difficult for me to get to a clinic	3	1.3%
I have been denied an HIV test by the healthcare system, even though I have wanted one	2	0.9%
There is no cure for HIV, so I see no point in getting tested	1	0.4%
I am afraid I will lose my job	1	0.4%
I am afraid the test result would affect my chances of staying in Sweden	0	0.0%

## 4.2.2 Comparison to previous studies

Our findings strengthen the knowledge that MSM stand out not only when it comes to condom use (see figures 5 and 6) but also for HIV testing uptake. Swedish MSM surveys and other recent population surveys show that MSM are tested for HIV to greater extent than the general population and the MSM2013 estimates of HIV testing match other recent studies<sup>42, 43, 94, 146, 162, 163</sup>.

A literature review on barriers to HIV testing concludes that many individuals report that they have a regular HIV testing routine<sup>101</sup>. This is also one of the findings of the present study that asked MSM the reasons for their most recent HIV test. Still, we found that there are large variations among MSM regarding their testing habits. As shown in figure 10 Swedish MSM tend to test for HIV more regularly than youth and the general population, indicating that many of them have a high risk perception and/or are being exposed to test promotion initiatives or offered test by healthcare professionals. Also, as shown in table 4, men having had UAI with casual partner recently had also recently taken a HIV test more often than other groups. This is welcomed due to the diverse testing needs of MSM with regards to sexual practices. Still, the MSM2013 estimate of MSM tested over the past 12 months was lower than in other recent Swedish MSM surveys (figure 10), while having ever taken a test among the general population has increased remarkably over the past 20 years<sup>26, 163</sup>. This gives us reason to believe that overall testing uptake among MSM can be improved and that regular testing in subgroups at high risk for HIV can be further encouraged.

Figure 10. Proportions tested for HIV over the past 12 months in Swedish population and MSM behavioural surveys<sup>vii</sup>



Note: Purple denotes all genders, blue denotes MSM, yellow denotes men and green denotes women.

<sup>vii</sup> Sources: MSM2006<sup>42</sup>, MSM2008<sup>43</sup>, UngKAB09<sup>162</sup>, EMIS2010<sup>94</sup>, MSM2013 (present project data), Sialon II 2013<sup>146</sup>, Ungdomsbarometern<sup>165</sup>, HIV in Sweden 2016<sup>28</sup>. See appendix V for details.

About 25% of MSM report *never* having been HIV tested in every Swedish MSM survey over the past twenty years<sup>2, 42, 43, 94, 146</sup>. It has been possible to test for HIV since the mid-1980s<sup>166</sup>, and since the 1990s, studies on barriers to HIV testing have been conducted. Our factor analysis of barriers to HIV testing among MSM confirmed in many ways previous study findings showing that fear and anxiety<sup>101, 167</sup> as well as structural factors specifically for subgroups of MSM<sup>168-170</sup> remain hindrances for testing. Stigma and discrimination of people living with HIV exist and many people living with HIV in Sweden report feelings of hopelessness and experiencing not being able to be open about having HIV<sup>143, 171</sup>. Others who are open face attitudes that HIV is perceived as being caused by lifestyle factors rather than a virus<sup>127</sup>. Comparisons show that MSM, to larger extent than other people living with HIV in Sweden, felt that the HIV diagnosis had affected their sex life negatively and were worried about being reported to the authorities by a sex partner<sup>143</sup>. With this background understanding, never having tested due to fear of loss or negative social consequences can be seen as alarming but knowledge-based barriers for HIV testing. Furthermore, it is worrying that among reasons specified for never having been HIV tested, some barriers based on inaccurate knowledge persist, such as no existence of treatment and not being able to stay in Sweden.

### 4.3 SEXUAL PRACTICE ABROAD AND AT HOME (STUDY III & IV)

*The aims of these analyses were to:*

- *assess differences in sexual practices between men having casual sex abroad and men having it at home (study III),*
- *to explore the factors associated with having UAI with casual partner(s) abroad (study III) and*
- *to explore the perceptions and experience of sex in Sweden and Berlin among Swedish MSM spending time in Berlin (study IV).*

#### 4.3.1 Key findings and contributions

MSM2013 analyses showed that 16.2% (95% CI 11.9-22.0%, 102/758) of the men who had had UAI with casual partner over the past 12 months reported having had it abroad. 90 of the 102 respondents provided information on destination countries. 36 countries were mentioned, half of them (n=19) European, together adding up to three-quarters of the 153 reported UAI events abroad (table 7).

The analyses revealed few statistically significant results, but interesting differences between MSM who had engaged in UAI with a casual partner *abroad* and MSM who have had UAI with casual partner *but not abroad* within the previous 12 months. With few exceptions, most sexual practices were more commonly reported by the men who had engaged in UAI with casual partner abroad than among the others. Three out of the four practices commonly reported among the men who were *not* abroad could be labelled low HIV risk practices:

receptive oral sex, receptive hand sex and rimming. The fourth of these practices, barebacking, is on the other hand considered high HIV risk.

Table 7. Regional distribution of reported UAI events in destination countries and continents

Region	Number of UAI events abroad	%
<b>Europe</b>	113	73.9%
<i>Denmark</i> 25		
<i>Spain</i> 22		
<i>Germany</i> 15		
<i>Norway</i> 11		
<i>United Kingdom</i> 9		
<b>Asia</b>	13	8.5%
<b>Africa</b>	2	1.3%
<b>Middle-East</b>	8	5.2%
<b>South America</b>	3	2.0%
<b>North America</b>	12	7.8%
<b>Oceania</b>	2	1.3%

The statistically significant differences in sexual behaviour found between the two comparison groups were: group sex, paying for sex, poppers use, drug use and erectile dysfunction medication use. All of these were reported more often in the abroad group. Factors associated with UAI with casual partner *abroad* within the previous 12 months were:

- Having visited gay oriented venues such as gay sauna(s) (OR 6.15, 95% CI 3.43–11.06) and café/bar/pub(s) catering to LGBT persons (OR 3.24, 95% CI 1.62–6.48),
- Experience of UAI with a foreign visitor in Sweden (OR 4.80, 95% CI 2.37–9.75),
- Living with HIV (OR 2.73, 95% CI 1.15–6.48),
- Reporting overall poor health (OR 2.24, 95% CI 1.13–4.44),
- Being born outside Sweden (OR 2.21, 95% CI 1.08–4.53) and
- Being vaccinated against hepatitis A and/or hepatitis B (OR 1.92, 95% CI 1.13–3.27).

Three-quarters of the men (77/102, 75.7%, 95% CI 65.2–86.2) met male casual UAI partners who were from the country they visited. One-quarter (29/102, 26.5%, 95% CI 16.3–36.7) had met UAI partner(s) from a country other than Sweden or other than the country being visited while abroad. Finally, one-quarter (24/102, 27.4%, 95% CI 16.4–38.4) had met male casual UAI partners from Sweden while abroad.

A fifth of the survey respondents who experienced UAI with casual partner over the past 12 months also reported having had their most recent sexual encounter abroad and HIV testing uptake among the latter indicated high risk perception (6.5% never tested compared to 29% never tested among all the respondents who had their most recent sex encounter in Sweden)

(unpublished results). Also, the high hepatitis vaccination coverage among the men who had casual sex abroad indicated adequate risk perception.

Quantitative and qualitative methods can complement each other and the in-depth interviews revealed patterns and details not possible to observe through surveys. Although limited in scope, the interviews obtained information from a priority group of MSM for HIV preventive interventions – a highly mobile and highly sexually active subgroup of MSM with high HIV and STI risk-taking behaviour regardless of context, fitting well into the experimental category identified in study I.

Supply and demand of cultural characteristics and factors such as venues, subculture meeting places and potential sex partners sharing the same sexual practice preferences, as well as the sense of being away from home affected their sexual practices. Travelling to Berlin usually meant meeting more sex partners, but many informants reported they would prefer having the same practices in Sweden if the “supply” had been the same.

Among the sexual practices comprised by the MSM2013 survey questionnaire, which were analysed in detail in study I and study III, many of the rarely reported practices in the quantitative studies were mentioned as frequently practiced by the interviewees. The informants described Sweden as “moralistic” and “boring” while Berlin was “sex liberal” and “non-judgmental”. They perceived that Berlin facilitated a specific sex culture with an outgoing and active sexual lifestyle different from Sweden and other European cities. Being away from Sweden, both in the sense of being away from home and away from a perceived sexually closeminded setting, enabled the men to explore their preferred sexual practices as well as new sexual practices:

*I still feel that part of being on vacation is to let go of things and enter some kind of decadence.*

For the men regularly travelling to Berlin it was evident that Sweden was perceived as *home* and that *home* was the place where the men had routines and a reputation to consider. Home was also associated with availability and utilisation of gay friendly HIV and STI testing services. The Stockholm based MSM clinic Venhälsan was often mentioned:

*Five plus. Ten plus. I love Venhälsan. I think it is nice to go there, watch the furnishings, watch the people waiting. I am always well treated [there].*

Most informants in study IV reported getting tested for HIV and STIs every three or six months and all interviewees except for two had a history of one or more STI episodes.

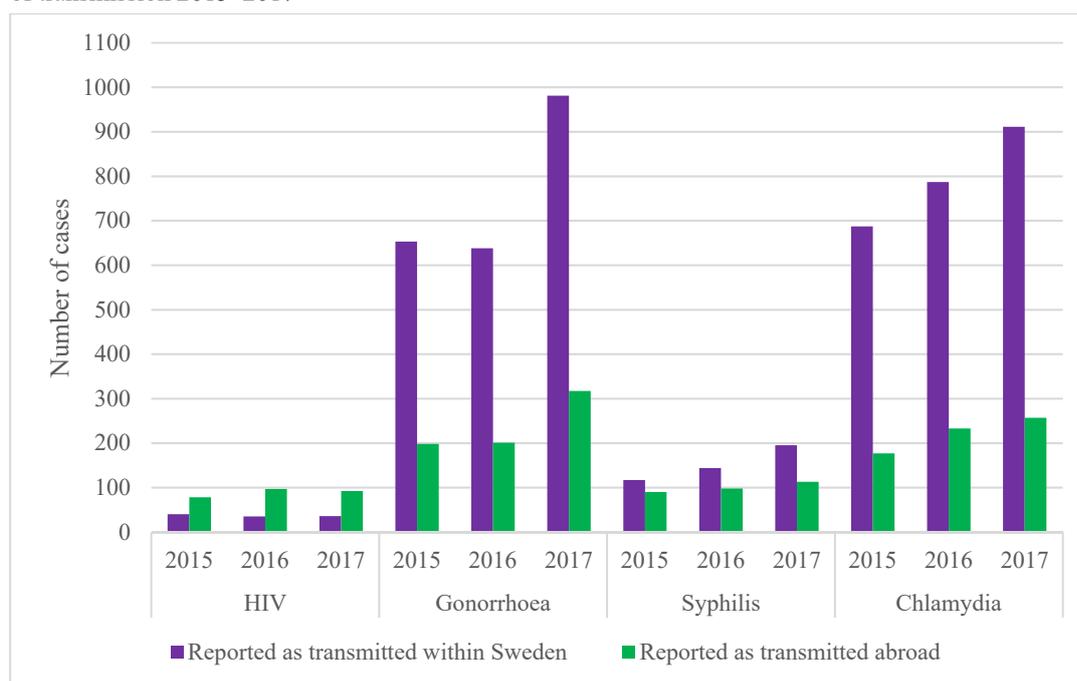
### 4.3.2 Comparison to previous studies

Altogether, our results confirm the hypothesis and findings of some previous studies of different contexts that overall, risk-takers abroad are the ones who are also risk-takers at home both among MSM<sup>116-118</sup> and others<sup>172, 173</sup>. The respondents who experienced UAI with casual partner(s) abroad in study III seemed to be social and outgoing regardless of context. They had visited gay oriented venues such as gay sauna(s) and café/bar/pub(s) catering to LGBT persons and experienced UAI with a foreign visitor(s) in Sweden to higher extent than others. Such an association has also been found among British travellers<sup>174</sup>. The men having UAI abroad seem to seek sexual pleasure and exploration of less common sexual practices<sup>69</sup>. We found no clear evidence for an existence of no risk-taking at home but high risk-taking while travelling as some previous studies have suggested<sup>108, 113</sup>. At the same time, study IV showed that present sexual behaviour at home could be further amplified when travelling to Berlin specifically. Berlin functioned as a “finite province of meaning” for the men, a place with characteristics of their preferences where they could be strangers to a certain extent and forget about the everyday life and reputation associated with home<sup>112</sup>. But Berlin was not only a getaway providing different opportunities than Sweden. As also seen in other studies, travelling to Berlin changed many interviewees in terms of gay identity and preferences as well as their perception of Sweden and Swedish gay culture when returning home and being “homecomers”<sup>110, 112</sup>. This means both that they may implement new practices at home and that they may develop a new relation and attitude towards *risk*<sup>68</sup>.

Our findings reinforce the importance of context and geography in the present research field. While 18% of respondents in an Australian MSM study experienced sex abroad and among these a fifth had UAI<sup>115</sup>, a third of Swedish MSM reported having had sex abroad over the past 12 months and a third of these in turn reported UAI<sup>94</sup>. The Swedish estimates corresponded well to the European Union median in EMIS2010<sup>94</sup>. Also, an American study found behavioural disinhibition in international MSM travellers<sup>114</sup>.

We interpret the present study findings as an outcome of a European context. Connotations of national borders have dissolved in the European Union generally and specifically in regions such as Öresund where two major metropolitan areas in Sweden and Denmark are connected by a bridge that carries more than 70 000 people by car or a 20-minute train ride everyday<sup>175</sup>. The effects on STI epidemiology remain unclear since e.g. the mutant variant of *Chlamydia trachomatis* widespread in Sweden in 2006 among youth and young adults in the general population was rarely found in neighbouring countries<sup>176</sup>. Still our studies III and IV together with the HIV and STI case reporting statistics remind us to not underestimate the mobility related effects on HIV and STI transmission in highly sexually active subgroups such as MSM.

Figure 11. Number of reported cases of HIV and STIs among MSM in Sweden by reported place of transmission 2015–2017



Source: Public Health Agency of Sweden

Figure 11 shows that the reported cases of HIV infection contracted abroad among MSM has increased further over the past years, accounting for 72% (97 out of 132 reported cases) in 2017. A similar increasing trend also applies to gonorrhoea, and to lesser extent to syphilis and chlamydia. It should be noted that Germany is among the top three reported countries of transmission for each of the STIs during the past three years. The significance of pull factors such as certain places with personal, spatial and subcultural meanings should be acknowledged<sup>85, 88, 89, 91, 92, 177</sup>. Our interviews clearly confirmed that Berlin has specific meanings and offers venues not found elsewhere.

In difference from Tanton et al. (2016)<sup>174</sup> we did not find statistically significant associations between high numbers of partners and UAI with casual partner abroad in the multivariable regression analysis in study III. Results were statistically significant in the univariate analysis though and may depend on cut-off limits. The same applies to the regression analysis results that were statistically significant only for experimentals in the univariate but not in the multivariate analysis. In study IV, informants reported exceptionally high number of partners, confirming that a concentrated minority of the highly sexually active men were reached.

It is reasonable and expected that we found associations between UAI with casual partner abroad and hepatitis vaccination coverage and being foreign-born respectively in study III. Vaccination may have taken place in MSM catered settings or general travel medical counselling. Also, it was expected to find that foreign born MSM travelled to a higher extent than others due to probable circular migration and ties to countries of origin<sup>178</sup>. Further

studies are needed to understand more about when and where these individuals' risk-taking behaviour takes place, and if it differs from MSM born in Sweden.

What is potentially worrying is that UAI with a casual partner abroad was associated with living with HIV and reporting overall poor health. Previous research has shown that MSM living with HIV travel to gay resorts more than HIV-negative MSM<sup>179</sup> and that risk-behaviour is high and condom use is low on party-oriented vacations<sup>180</sup>. With the existence of effective ART, which has proven specifically successful among MSM<sup>181</sup>, there is no reason for people living with HIV to abstain from being sexually active. However, at the time of the MSM2013 survey people living with HIV in Sweden, regardless of their viral loads, were obliged to inform a sex partner of their positive HIV status, as required by the Communicable Disease Prevention Act even if they used condoms. Today, the treating physician can provide exemption from this obligation if the patient is on effective ART.

The obligation to inform sex partners is unpopular among people living with HIV. Particularly MSM have shown fear of being reported to the county medical officer or even the police<sup>143</sup>. Previous research shows that MSM living with HIV are more likely to have UAI than HIV-negative MSM<sup>117</sup>. This can be interpreted as simply related to increased pleasure but previous research has also shown that anal intercourse without condom has underlying meanings such as intimacy, exploring boundaries/edgework, sharing a sense of affinity or even acts of resistance against authorities<sup>1, 61, 67, 69, 71, 72</sup>. With a broadened understanding of the symbolic meanings of anal intercourse without condom, it is plausible that some MSM living with HIV prefer going abroad to engage in anal intercourse without condom in order not to be recognised and/or not to risk being reported.



## **5 GENERAL DISCUSSION AND IMPLICATIONS**

### **5.1 ANAL INTERCOURSE AND RISK**

Anal intercourse without condom is a deliberate act with important meanings for many, but not all, MSM<sup>2, 69</sup>. Semen has been a symbol for viability dating back to ancient Greece<sup>127</sup> and is fetishised by MSM subgroups<sup>71</sup>. Overall, as shown in figures 5 and 10, Swedish MSM risk perception and condom use is high compared with the general population and other subpopulations. The findings of the present research project indicate that subgroups of MSM handle and relate to risk in different ways even if they do not deliberately avoid risk<sup>53</sup>. Our studies' results reinforce the notion that MSM are not a homogenous group with regards to sexual practice and we suggest that the prevention of HIV and STIs among MSM may be more effective if it is tailored to, and targeted at different contexts and relevant subgroups of men rather than to the group as a whole<sup>40</sup>. Individuals' preferences and behaviour with regards to anal intercourse may change over time, implying that subgroups are not static<sup>182</sup>. Still, the diversity among MSM should be addressed when designing preventive interventions and when communicating with MSM.

The MSM2013 survey was conducted during the same period of time that the Swedish statement on minimal infectiousness in well treated HIV infection was published<sup>129</sup>. It should be noted that the implications of anal intercourse without condom changed considerably with the dissemination of the scientific evidence that the risk of transmission is minimal with ART, and later with the introduction of PrEP. HIV transmission risk decreases radically in people living with diagnosed HIV taking effective ART and risk of contraction can be significantly reduced among HIV negative MSM using PrEP. This means that the connotations of being risky or at risk change with regard to HIV status<sup>56</sup>. Still, men living with HIV risk being reinfected with drug-resistant HIV virus strains<sup>126</sup>. Further, the risk of STI transmission remains for MSM regardless of HIV status, and the risk of STIs has been shown to be high among sexually adventurous MSM<sup>83</sup> and in networks tied to specific venues among MSM<sup>183</sup>. This complexity alters the prevention landscape and stresses the need for strengthening MSMs' ability to talk about HIV status, ART status/viral loads and PrEP use with sex partners.

### **5.2 HIV TESTING AND COUNSELLING**

Study II showed that 5% or less, of the respondents gave reasons for most recent HIV test such as contact tracing or experiencing symptoms of HIV/STI. This indicates that generous opt out HIV test offerings, test promotion and on-site testing are fruitful for reminding MSM to get tested. In order to decrease delayed HIV diagnosis, it is a priority to reach MSM who have never tested for HIV<sup>141</sup>.

Studies II and IV show that MSM clinics are appreciated and perceived as safe zones for MSM and that a Swedish MSM clinic, Venhälsan, is specifically cherished by the high risk-

takers. Therefore, these men are within reach for preventive interventions such as counselling, condom and lubrication distribution and PrEP prescription. Healthcare professionals meeting these men can be informed that the men experiencing UAI with casual partner abroad were more likely than others to visit gay-oriented venues and to meet foreign visitors for sex while at home. As previous research has concluded, when meeting individuals who report risk-taking behaviour abroad, healthcare professionals may use it as a potential proxy for general risk-taking behaviour and offer counselling and preventive interventions<sup>172</sup>.

Sweden is a small country with regards to population size, but is large in terms of land area. This is not unique, but it creates healthcare challenges. It might not be feasible for each county to have their own MSM clinic. What is feasible is that healthcare professionals meeting MSM should be capable and comfortable discussing sexuality and meeting MSM needs in order to fulfil the Swedish national HIV strategy's statement that "access to testing, treatment and counselling shall be equal and uniform"<sup>184</sup>. Such work should be mandatory for regional health authorities in order to also meet the Swedish national LGBT strategy stating that "LGBT people shall have equal conditions and opportunities as heterosexuals and cis persons to achieve good health"<sup>185</sup> and the WHO declaration stating that "people have the right and duty to participate individually and collectively in the planning and implementation of their health care"<sup>186</sup>.

It should be noted that at the time of the MSM2013 survey, few testing options outside the regular healthcare facilities were available in Sweden and such options have been developed and fill a need among those who do not seek regular healthcare. Community based testing options may be cost-effective and better at target group engagement<sup>187</sup> but currently in Sweden, they rarely offer add-ons such as vaccinations and STI testing. HIV testing at its best is a prevention and health promotion opportunity that can include such add-on offers but also include broader counselling on sexual health. The Swedish healthcare sector therefore needs to systematically improve their sexual health competencies and knowledge about LGBT health in order to increase health services accessibility for MSM. Improvement needs include overcoming the *two-way-taboo* meaning that neither patient nor healthcare professionals address sexual issues out of fear for offending each other<sup>188</sup>.

### **5.2.1 Test promotion and outreach**

This research project shows that outreach work that includes condom and lubrication distribution at venues may be effective for raising awareness and to promote testing. Generous offers of free condoms and lubricants is a cornerstone of MSM prevention<sup>8</sup>. Still, the prevention landscape is constantly changing and condoms are not an alternative for all MSM for reasons ranging from practical to intimacy and as an act of resistance<sup>1, 2, 69, 189</sup>. With recent developments such as mobile phone apps being meeting places for MSM, rapid tests for HIV, effective treatment of HIV, and the implementation of PrEP, preventive interventions and counselling must include more than condom messages. Our findings also

strengthen the continuous need for preventive initiatives that include support and counselling for MSM living with HIV in order to promote condom use regardless of viral load in order to prevent STIs and further transmission of HIV. Outreach workers on venues and online need to have updated knowledge in all these fields. The development of prevention work and MSM proficiency at different destinations where MSM from different countries meet could be suitable for international cooperation between non-governmental organisations.

Outreach interventions in MSM venues need to remember that not only physical venues are of concern<sup>87</sup>. Now that the internet is widely available, smartphone applications such as dating apps are believed to enhance and influence connectivity among MSM globally<sup>12</sup>. The internet should be recognised as an important arena preferred by MSM<sup>190</sup> for information pre-travelling since associations have been found between “Internet use to find sexual partners, travel away from home, and HIV risk behavior”<sup>116</sup>.

### **5.2.2 A note on PrEP**

The efficacy of PrEP for HIV prevention among MSM has been proven through several trials and its use is recommended by WHO<sup>131, 132, 134</sup>. It should be noted that even if the present Swedish guidelines for PrEP prescription do not state certain criteria, almost all of the experimentals identified in study I and all of the interviewees in study IV should have qualified for PrEP in the previous MSM PrEP trials<sup>viii</sup>. PrEP prescriptions for on demand use could also specifically benefit HIV negative MSM as they may engage in risky behaviour while travelling.

The current Swedish PrEP treatment guidelines include a recommendation for mandatory HIV and STI testing every three months<sup>139</sup>. The effects of regular STI testing among PrEP users, such as breaking transmission chains early, have been studied but results are ambiguous and long-term follow-up outside study settings has yet to be completed<sup>191, 192</sup>. We have reason to believe that broader implementation of PrEP in Sweden may increase the HIV and STI testing frequency for MSM in subgroups of importance for the transmission of STIs and HIV.

## **5.3 WISHING A SAFE JOURNEY...**

Regardless of their HIV status, men from all over the world meet other men at gay-oriented venues both in their home cities and when travelling abroad. Many places and venues provide spaces for sexual liberation but can also be symbolically associated with specific characteristics beyond sex. Berlin is such a place for a subgroup of highly sexually active MSM. The expectations on the city as a space for sexual liberation and freedom correlated

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<sup>viii</sup> IPERGAY inclusion criteria: HIV-negative status, 18+ years old, male or transgender, unprotected anal sex with at least two partners during the past 6 months. PROUD inclusion criteria: male at birth, 18+ years old, anal intercourse without a condom in the previous 90 days, likely to have anal intercourse without a condom in the next 90 days<sup>131, 132</sup>.

with the experience of the men interviewed in study IV, creating a sharp contrast to their perception and experience of Sweden as small, boring and moralistic.

Travellers who travel for sexual purposes and are labelled risk-takers by researchers or public health workers can be better understood as edgeworkers striving to “escape the banalities of everyday life”<sup>61 (p.27)</sup> with special interests equivalent to other adventure tourism such as extreme sports<sup>68</sup>. Enjoying a broad sexual repertoire and exploring boundaries could better be compared to climbing mountains. In fact, anal intercourse without condom would then not be considered very risky. While there are 29 deaths for every 100 safe returns among K2 climbers<sup>193</sup>, comparatively few MSM practicing anal intercourse without condom contract HIV, and with effective ART those who get infected can live healthy lives.

#### **5.4 METHODOLOGICAL CONSIDERATIONS**

How do we best collect data among MSM? In a comparison study outside the scope of this thesis we studied which samples four different quantitative data collection methods provided<sup>19</sup>. It was found that different sampling strategies captured different samples of MSM and that all approaches captured men younger than the average Swedish adult male population. These findings suggest that different sampling methods should be considered to fit the aim and desired study population, e.g. TLS for reaching MSM in urban areas, RDS for reaching rural resident MSM and web community sampling among MSM who are not openly gay. None of these sampling strategies are gold standard but they can complement each other when population based data is not feasible.

The MSM2013 survey data collected from the internet community Qruiser started before smartphone apps had impacted contact patterns among MSM<sup>12</sup>. Previously, several researchers had studied the impact of internet on MSM contact patterns<sup>13, 38, 41, 116, 194</sup>. Still, in 2016, Qruiser had more than 50 000 registered Swedish male member profiles with 50% logging in at least once a month (personal communication, Jon Voss 2016-08-25). Qruiser is still used for data collection in LGBT studies, designating it an important base for reaching many LGBT persons. To increase community involvement we also engaged twenty representatives from healthcare facilities, county councils and non-governmental organisations in a reference group, however, we are aware that such an initiative has limitations<sup>5</sup>. Future research will need to carefully analyse the Qruiser member base, changes in the composition of members and assess what subgroups of MSM might be unreachable through the forum. Alternatives or complementary arenas for data collection might be necessary. Discussions are ongoing and the EMIS2017 conclude that 48% of Swedish respondents (cf. 67% of all European respondents) used smartphones to fill-in the survey (Schmidt A J, EMIS project, personal communication, 2018-08-03).

A noteworthy limitation of the MSM2013 survey is its cross-sectional and self-reported character. This excludes causal interpretation and introduces respondent bias, recall bias and social desirability bias<sup>37, 195</sup>. The latter may have been somewhat reduced due to the

anonymous web survey setting. It should be noted that regarding age, the reported age in the survey differed on average one year from the member profile data (see table 8). We believe that the age stated in the survey may be closer to the respondent's actual age due to a hypothesised tendency that web community members want to appear younger.

Table 8. Differences in reported age

	<b>Median (years)</b>	<b>Mean (years)</b>	<b>IQR (years)</b>
<b>Qruiser member profile age</b>	37	38.4	27-48
<b>MSM2013 survey age</b>	38	38.83	27-49

The survey was commissioned by the Swedish Institute for Infectious Disease Control (Smittskyddsinstitutet). We believe this may have affected the willingness to participate in the survey. Firstly, the institute was a government agency associated with disease control. Second, the agency was occasionally confused with the County Medical Officers (*Smittskyddsläkare* in Swedish) known for having the power to force testing for HIV and STIs among unwilling individuals notified through contact tracing. We did not get any open indications of resistance against the commissioning organisation from respondents, nor did we notice any resistance against research on sexual practices among MSM as was the case in the precursor MSM2006 survey.

Compared with e.g. WebRDS and TLS<sup>19, 146</sup>, MSM2013 had the advantage of achieving a sample large enough for subsample analyses presented in the articles in this thesis but also in additional studies<sup>196, 197</sup>. Increased sample size does not improve study design per se but it is known for reducing some of the shortcomings such as reaching a broader sample<sup>37, 41</sup>. We were able to use advanced statistical analyses such as LCA and factor analysis. Another advantage was that stratifying by age and county of residence based on web community membership details allowed us to stratify and weight the statistical analyses<sup>147, 148</sup>.

There are several limitations in approaches for measuring risk-taking and sexual practice generally and specifically when it comes to travelling. Our survey material on the latter was limited and we did not reach as many respondents engaging in sex while travelling as we had expected since the survey was not designed or promoted solely for this purpose. However, compared with several other sampling approaches, a strength of the MSM2013 was sampling outside specific travel related settings. Even if our sample was small in size, it was broad in terms of destinations and sexual practice experiences.

The qualitative method used in study IV has its strengths and weaknesses. With study IV we gathered in-depth knowledge not otherwise observed in the surveys. We had the strength of including interviews and participatory observations from Berlin. We collected rich contextual data from a setting in which the informants are sexually active, made possible by having a male gay-identified interviewer/observer. Efforts were made to include all aspects of trustworthiness including describing the process, having the same person conduct all the interviews, discussing sampling, saturation and other key topics within the research team<sup>157</sup>.

Recruitment of informants was nonetheless challenging. Some persons initially agreed to be interviewed but then delayed the interview or stopped replying to messages. We do not know the individuals' reasons for declining to participate. We hypothesise that unwillingness or opinions/preconceptions about the topics, the commissioning organisation or the interviewer may have contributed.

As also experienced by previous qualitative researchers, the majority of interview subjects were MSM with high education and medium to high socio-economic status<sup>198</sup>. Recent evidence suggests that adult MSM are more likely to have attended university than men in general both in Swedish and other high-income settings<sup>23</sup>. This may imply that they have the economic means to travel to a greater extent than others but also that future research on MSM with lower socio-economic status is of interest.

#### **5.4.1 Generalisability from the Swedish context**

Sweden has long been characterised by a high degree of openness with regards to sexuality and sexual and reproductive health and rights (SRHR)<sup>199</sup>. Examples such as mandatory education about sex and relationships in schools since the mid-1900s, the establishment of more than 200 low-threshold youth clinics (including an internet based one) across the country since the 1970s<sup>199</sup>, and the inclusion of LGBT perspectives in the act prohibiting discrimination of children and students<sup>200</sup> demonstrate this openness. SRHR and LGBT perspectives are present in national public health policies and gender equality policies and also visible in Sweden's foreign policies<sup>201</sup>. Do these characteristics make the findings from a study of Swedish sexuality less generalisable?

Generalisability or external validity can be defined as "the degree to which the results of an observation hold true in other settings"<sup>202</sup>. While such considerations are also made in qualitative research, they are commonly referred to as transferability, defined as whether the findings may be transferred, or relevant, to other settings<sup>46</sup>. It is reasonable to conclude that Swedish MSM differ in character from other settings due to the comparatively supportive Swedish legislation, policies and liberal attitudes to sexual minorities<sup>95-97</sup>. Still we believe that findings such as those of the LCA identifying subgroups of MSM are relevant for other groups and contexts. It is also noteworthy that our results regarding barriers for HIV testing are similar to other findings.

Weighting the previous evidence together with our findings, it is our conclusion that Swedish MSMs' sex related travel experiences may not differ much from experiences in other European settings. For the qualitative study results, we find it reasonable to conclude that interviews with MSM visitors from other countries than Sweden would have provided similar answers regarding their perceptions of Berlin. Still, MSM from other countries and contexts possibly would have provided other perceptions and views on access to HIV testing and preventive interventions.

## 6 CONCLUSIONS

- Subgroups of MSM with high numbers of casual male sexpartners may not be representative for Swedish MSM in general but they should be a priority for HIV and STI preventive and risk reduction measures because of their high risk-taking behaviour.
- Evidence for an association between high self-rated HIV preventive knowledge and less risk-taking behaviour was not documented. Knowledge-intensive interventions may not be the best fit for reducing HIV transmission.
- High perception of sexual risk-taking motivates MSM to get tested for HIV while low risk perception, fear and structural hindrances remain barriers for testing.
- Healthcare professionals and prevention workers offering HIV preventive services, including counselling and information on easily accessible HIV test services, contribute to motivating testing among MSM.
- Risk perception regarding HIV and STI needs to increase when travelling.
- MSM engaging in risk behaviour while travelling also have risk-taking tendencies at home, implying that personality, preferences and behaviour are the decisive factors rather than locations.
- Positive HIV status was associated with being experimental and with experiencing unprotected anal intercourse with casual partner(s) over the past 12 months. MSM living with HIV are a priority for preventive interventions.
- Surveys in MSM web communities can reach valuable samples of MSM especially when the survey is well-prepared, includes target group involvement and is complemented and triangulated for validation.

## 7 IMPLICATIONS FOR POLICY, PRACTICE AND RESEARCH

- The diversity of sexual practices among MSM should be taken into account when designing future HIV prevention interventions. It can provide a base for screening instruments, medical and behavioural history forms and counselling guides within healthcare and social work, as well as evidence for allocation of resources for prevention.
- MSM request healthcare professionals with MSM competency who are comfortable and capable of delivering easily accessible test services, including outreach testing, and can ensure confidentiality.
- MSM with high numbers of sex partners at home and while travelling need a routine for testing for HIV and STI. They may benefit from PrEP in combination with an established routine for testing and needs-based counselling.
- HIV prevention in all settings should prioritise outreach activities, test promotion and availability, and risk-reduction measures for MSM.
- Non-crossectional MSM studies would be valuable for studying topics such as MSM subcultural expressions, sexual practices preferences, and MSM identity and self-labelling in life course perspectives.
- Studying motivators and barriers for HIV testing remains a priority.
- Future MSM studies should be designed to address sexual practice among travelling MSM for further in-depth analysis.
- The perceptions of travelling *abroad* and its implications on risk perception and risk-taking behaviour may differ between groups and contexts. Future research should address this in more detail and multi-setting studies could be of great value.

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## 9 SAMMANFATTNING PÅ SVENSKA

**Bakgrund:** Män som har sex med män (MSM) är riskutsatta för hiv över hela världen. Globalt sjunker hiv-incidensen, men andelen nyrapporterade fall av hivinfektion med smittväg sex mellan män har varit fortsatt oproportionerligt hög i Europa de senaste åren. MSM står för 40 % av de rapporterade hivfallen i Europa (2016) och mer än 47 % i Sverige (infektion överförd i Sverige, 2017). Detta trots att hivöverföring idag i hög grad kan förebyggas genom behandling och effektiva förebyggande folkhälsoinsatser. Sociala, juridiska, biologiska, epidemiologiska och beteendemässiga orsaker bidrar till överrisken för hivinfektion bland MSM i allmänhet och bland vissa undergrupper av MSM i synnerhet.

**Syfte:** Det övergripande syftet med denna avhandling var att utforska och analysera risk- och skyddsfaktorer för hiv bland MSM.

**Metoder:** I detta forskningsprojekt användes kvantitativa (I-III) och kvalitativa (IV) metoder. Studierna I-III genomfördes i Sverige och baserades på data insamlade med en läns- och åldersstratifierad webbenkät bland män i ett webbforum för HBT-personer. Tvärsnittundersökningen MSM2013, nådde 2 751 MSM bosatta i Sverige. Studie IV baserades på semi-strukturerade djupintervjuer med 15 MSM rekryterade med hjälp av respondent driven sampling (RDS) och analyserades med innehållsanalys.

**Resultat:** I studie I identifierade en viktad Latent Class analysis (LCA, inklusive kovariater och distal outcomes) fyra undergrupper av MSM med inbördes liknande sexuell praktik: experimentals, bottoms, risk-reducers och clubbers. Experimentals skiljde sig klart från de övriga klasserna med utpräglad bred sexuell repertoar och hög självskattad kunskap om hiv.

I studie II fann vi att en betydande andel MSM (40 %) testade sig för hiv regelbundet och att uppsökande och hälsofrämjande insatser bidrog till testning. Samtidigt visade faktoranalys att rädsla, ångest, låg riskuppfattning och att testning inte uppfattas som lättillgänglig, fortfarande utgör hinder för testning.

I studierna III och IV kunde vi konstatera att MSM med olika hivstatus möts i olika sammanhang både i sina hemländer och på utlandsresa. Det framgick att MSM som hade analt samlag utan kondom med tillfälliga partners utomlands hade bred sexuell repertoar och sexuellt högriskbeteende för hiv. Med djupintervjuerna i studie IV nåddes en prioriterad målgrupp för hivförebyggande insatser: en mycket mobil och sexuellt aktiv grupp av MSM med högt hiv- och STI-riskbeteende oavsett kontext. Berlin erbjöd mötesplatser och möjligheter till sex som uppskattades av dessa MSM.

**Slutsatser:** Denna avhandling bidrar med kunskap om subgrupper av MSM med olika profiler och mönster gällande sexuell praktik som kan ge underlag för screeninginstrument, anamnesformulär och rådgivningsguider inom hälso- och sjukvård och socialt arbete, liksom för tilldelning av resurser för förebyggande insatser.

Avhandlingen konkluderar också att förebyggande åtgärder som fokuserar på att öka kunskap inte nödvändigtvis är effektiva för att nå, och minska riskbeteende för hiv, bland MSM med bred sexuell repertoar och höga antal sexpartner. Dessa män kan ha särskild nytta av att testa sig för hiv och andra STI samt ta del av individanpassad rådgivning regelbundet. Hälso- och sjukvårdspersonal som möter MSM som testar sig regelbundet bör ha i åtanke att dessa män genom sin testrutin utgör en nåbar och högprioriterad grupp för erbjudanden om hivförebyggande insatser. Vårdpersonal och preventörer som möter MSM behöver ha specifik MSM-kompetens och erbjuda lättillgänglig testning, inklusive testpåminnelse/testning i samband med uppsökande aktiviteter. Det finns också behov av att utveckla och erbjuda behovsbaserade riskreducerande insatser och hivtest i sammanhang där MSM från olika länder och kontexter möts.

**Nyckelord:** hiv, män som har sex med män, hivprevention, hivtestning, sexuell praktik, sexuellt riskbeteende, riskuppfattning, oskyddade anala samlag, analt samlag utan kondom, resa

## 10 REFERENCES

1. Henriksson B. Risk factor love : homosexuality, sexual interaction and HIV prevention. Göteborg: Institutionen för socialt arbete, Göteborgs universitet; 1995.
2. Tikkanen R. Risky business? En sociosexuell studie av män som har sex med män. Göteborg: Institutionen för socialt arbete, Göteborgs universitet; 2003.
3. Strömdahl S. HIV preventive interventions, sampling methods and sexual risk behaviour among men who have sex with men. Stockholm: Karolinska Institutet; 2016.
4. Harding S. Rethinking Standpoint Epistemology: What Is ‘Strong Objectivity’?. In: Alcoff L, Potter E, editors. *Feminist epistemologies*. New York: Routledge; 1993.
5. Guta A, Flicker S, Roche B. Governing through community allegiance: a qualitative examination of peer research in community-based participatory research. *Crit Public Health*. 2013;23(4):432-51.
6. Beyrer C, Baral SD, van Griensven F, Goodreau SM, Chariyalertsak S, Wirtz AL, et al. Global epidemiology of HIV infection in men who have sex with men. *Lancet*. 2012;380(9839):367-77.
7. UNAIDS. *AIDS by the numbers*. Geneva: UNAIDS; 2016.
8. ECDC. *HIV and STI prevention among men who have sex with men*. Stockholm: European Centre for Disease Prevention and Control; 2015.
9. UNAIDS. *Prevention gap report*. Geneva; 2016.
10. Statistics Sweden. *Nya svenska medborgare från drygt 160 länder*: Statistics Sweden; 2018 [accessed 2018 June 13]. Available from: <https://www.scb.se/hitta-statistik/statistik-efter-amne/befolkning/befolkningens-sammansattning/befolkningsstatistik/pong/statistiknyhet/folkmand-och-befolkningsforandringar-2017/> .
11. ILGA. *State Sponsored Homophobia 2017: A world survey of sexual orientation laws: criminalisation, protection and recognition*. Geneva: International Lesbian, Gay, Bisexual, Trans and Intersex Association; 2017.
12. ECDC. *Understanding the impact of smartphone applications on the sexual health of men who have sex with men and HIV prevention in Europe*. Stockholm: European Centre for Disease Prevention and Control; 2015.
13. Daneback K, Mansson SA, Ross MW. Using the Internet to find offline sex partners. *Cyberpsychol Behav*. 2007;10(1):100-7.
14. Macdonald N, Dougan S, McGarrigle CA, Baster K, Rice BD, Evans BG, et al. Recent trends in diagnoses of HIV and other sexually transmitted infections in England and Wales among men who have sex with men. *Sexually transmitted infections*. 2004;80(6):492-7.
15. Egan JE, Frye V, Kurtz SP, Latkin C, Chen M, Tobin K, et al. Migration, neighborhoods, and networks: approaches to understanding how urban environmental conditions affect syndemic adverse health outcomes among gay, bisexual and other men who have sex with men. *Aids Behav*. 2011;15 Suppl 1:S35-50.
16. Frye V, Latka MH, Koblin B, Halkitis PN, Putnam S, Galea S, et al. The urban environment and sexual risk behavior among men who have sex with men. *Journal of urban health : bulletin of the New York Academy of Medicine*. 2006;83(2):308-24.
17. Schwartländer B. What will it take to turn the tide? In: *AIDS 2012*; 2012 July 23; Washington DC.
18. Strömdahl S, Hickson F, Pharris A, Sabido M, Baral S, Thorson A. A systematic review of evidence to inform HIV prevention interventions among men who have sex with men in Europe. *Euro Surveill*. 2015;20(15).
19. Strömdahl S, Persson KI, Forsberg B, Berglund T, Kühlmann-Berenzon S, Tikkanen R, et al. Sampling strategies used in Sweden to study sexual risk behaviour for HIV/STI

- among men who have sex with men: Online banner survey, time location sampling, Web respondent driven sampling and stratified sampling in a Web community. In: Strömdahl S. HIV preventive interventions, sampling methods and sexual risk behaviour among men who have sex with men. Stockholm: Karolinska Institutet; 2016.
20. Folkhälsomyndigheten. Tio år med hivprevention i Sverige 2006-2016. Solna: Folkhälsomyndigheten; 2017.
  21. Nationella kvalitetsregistret InfCareHIV. Årsrapport 2016. InfCareHIV; 2016. [accessed 2018 August 12] Available from: [http://infcare.com/hiv/sv/wp-content/uploads/2017/05/Arsrapport\\_hiv\\_2016.pdf](http://infcare.com/hiv/sv/wp-content/uploads/2017/05/Arsrapport_hiv_2016.pdf)
  22. Fenton KA, Imrie J. Increasing rates of sexually transmitted diseases in homosexual men in Western Europe and the United States: why? *Infect Dis Clin North Am.* 2005;19(2):311-31.
  23. Mercer CH, Tanton C, Prah P, Erens B, Sonnenberg P, Clifton S, et al. Changes in sexual attitudes and lifestyles in Britain through the life course and over time: findings from the National Surveys of Sexual Attitudes and Lifestyles (Natsal). *Lancet.* 2013;382(9907):1781-94.
  24. Purcell DW, Johnson CH, Lansky A, Prejean J, Stein R, Denning P, et al. Estimating the population size of men who have sex with men in the United States to obtain HIV and syphilis rates. *Open AIDS J.* 2012;6:98-107.
  25. Sell RL, Wells JA, Wypij D. The prevalence of homosexual behavior and attraction in the United States, the United Kingdom and France: results of national population-based samples. *Arch Sex Behav.* 1995;24(3):235-48.
  26. Lewin B, Fugl-Meyer K. Sex i Sverige : om sexuallivet i Sverige 1996. Stockholm: Folkhälsoinstitutet; 1998.
  27. Smittskyddsinstitutet. Hiv i Sverige. Kunskaper, attityder och beteenden hos allmänheten 1987–2011. Solna; 2013.
  28. Folkhälsomyndigheten. Hiv i Sverige 2016. En studie om kunskap, attityder och förhållningssätt till hiv i befolkningen. Solna; 2017.
  29. Folkhälsomyndigheten. MSM2013. En studie om sex, hiv och hälsa bland män som har sex med män i Sverige. Solna: Folkhälsomyndigheten; 2015.
  30. Magnani R. Review of sampling hard-to-reach and hidden populations for HIV surveillance. *AIDS.* 2005;19 (suppl 2):67-72.
  31. Daneback K. Webbenkäter som datafångstteknik : en litteraturöversikt. Stockholm: Socialstyrelsen; 2009.
  32. Morton LM, Cahill J, Hartge P. Reporting participation in epidemiologic studies: a survey of practice. *American journal of epidemiology.* 2006;163(3):197-203.
  33. Wallander L, Tikkanen RH, Mannheimer LN, Ostergren PO, Plantin L. The problem of non-response in population surveys on the topic of HIV and sexuality: a comparative study. *European journal of public health.* 2015;25(1):172-7.
  34. Folkhälsomyndigheten. Nationella folkhälsoenkäten – Hälsa på lika villkor? Solna: Folkhälsomyndigheten; 2016. [accessed 2018 June 20] Available from: <https://www.folkhalsomyndigheten.se/contentassets/ae5c19f5eb6d44bd81411de62530a04c/fakta-nationella-folkhalsoenkaten-2016.pdf>
  35. Downing MJ, Jr. Internet advertisements for public sexual encounters among men who have sex with men: are safe behaviors communicated? *American journal of men's health.* 2011;5(5):386-94.
  36. Hughes A, Saxton P. Geographic Micro-Clustering of Homosexual Men: Implications for Research and Social Policy. *Social Policy Journal of New Zealand/Te Puna Whakaaro.* 2006(28):158-78.

37. Ross MW, Mansson SA, Daneback K, Cooper A, Tikkanen R. Biases in internet sexual health samples: comparison of an internet sexuality survey and a national sexual health survey in Sweden. *Social science & medicine*. 2005;61(1):245-52.
38. Bowen A, Williams M, Horvath K. Using the internet to recruit rural MSM for HIV risk assessment: sampling issues. *Aids Behav*. 2004;8(3):311-9.
39. Marcus U, Schmidt AJ, Hamouda O, Bochow M. Estimating the regional distribution of men who have sex with men (MSM) based on Internet surveys. *Bmc Public Health*. 2009;9:180.
40. Mills S, Saidel T, Magnani R, Brown T. Surveillance and modelling of HIV, STI, and risk behaviours in concentrated HIV epidemics. *Sexually transmitted infections*. 2004;80 Suppl 2:ii57-62.
41. Kakietek J, Sullivan PS, Heffelfinger JD. You've Got Male: Internet Use, Rural Residence, and Risky Sex in Men Who Have Sex with Men Recruited in 12 U.S. Cities. *Aids Educ Prev*. 2011;23(2):118-27.
42. Tikkanen R. Person, relation och situation : riskhandlingar, hivtest och preventiva behov bland män som har sex med män. Malmö: Hälsa och samhälle, Malmö högskola; 2008.
43. Tikkanen R. MSM-enkäten : riskhandlingar, hivtest och preventiva behov bland män som har sex med män. Malmö: Hälsa och samhälle, Malmö högskola; 2010.
44. Curtis SL, Sutherland EG. Measuring sexual behaviour in the era of HIV/AIDS: the experience of Demographic and Health Surveys and similar enquiries. *Sexually transmitted infections*. 2004;80 Suppl 2:ii22-7.
45. Pope C, Mays N. Reaching the parts other methods cannot reach: an introduction to qualitative methods in health and health services research. *BMJ*. 1995;311(6996):42-5.
46. Ulin PR, Robinson ET, Tolley EE. *Qualitative methods in public health : a field guide for applied research*. San Francisco: Jossey-Bass; 2005.
47. Malterud K. *Kvalitativa metoder i medicinsk forskning : en introduktion*. Lund: Studentlitteratur; 2014.
48. Patton MQ. *Qualitative research & evaluation methods : integrating theory and practice*. Thousand Oaks, California: SAGE Publications; 2015.
49. Robinson N. The use of focus group methodology - with selected examples from sexual health research. *J Adv Nurs*. 1999;29(4):905-13.
50. Kawulich BB. Participant Observation as a Data Collection Method. 2005. 2005;6(2).
51. Maxwell JA. *Qualitative research design : an interactive approach*. Thousand Oaks: SAGE Publications; 2013.
52. Rothman KJ. *Epidemiology : an introduction*. New York: Oxford University Press; 2002.
53. Lupton D, Tulloch J. 'Life would be pretty dull without risk': voluntary risk-taking and its pleasures. *Health Risk Soc*. 2002;4(2):113-24.
54. Tsisis P, Nirupama N. Vulnerability and risk perception in the management of HIV/AIDS: Public priorities in a global pandemic. *Risk Manag Healthc Policy*. 2008;1:7-14.
55. Giesecke J. *Modern infectious disease epidemiology*. London: Arnold; 2002.
56. Scott JB. *Risky Rhetoric : AIDS and the Cultural Practices of HIV Testing*. 2 ed. Carbondale: Southern Illinois University; 2014.
57. Kalichman SC. *HIV Treatments as Prevention (TasP) : Primer for Behavior-Based Implementation*. New York, NY: Springer New York; 2013.
58. U. K. Collaborative HIV Cohort Steering Committee, Sabin CA, Schwenk A, Johnson MA, Gazzard B, Fisher M, et al. Late diagnosis in the HAART era: proposed common definitions and associations with mortality. *AIDS*. 2010;24(5):723-7.

59. Lupton D. Introduction: risk and sociocultural theory. In: Lupton D, editor. Risk and sociocultural theory : new directions and perspectives. New York: Cambridge University Press; 2000.
60. Fox N, J. Postmodern reflections on 'risk', 'hazards' and life choices. In: Lupton D, editor. Risk and sociocultural theory : new directions and perspectives. New York: Cambridge University Press; 2000.
61. Lupton D. Risk. London: Routledge; 2013. [electronic resource] Available from: <https://dito.se/e-bok/9781135090319/risk>
62. Foucault M. The history of sexuality. Vol. 1, The will to knowledge. Harmondsworth: Penguin; 1990.
63. DiFranceisco W, Ostrow DG, Chmiel JS. Sexual adventurousness, high-risk behavior and human immunodeficiency virus-1 seroconversion among the Chicago MACS-CCS cohort, 1984 to 1992 - A case-control study. *Sex Transm Dis.* 1996;23(6):453-60.
64. Douglas M, Calvez M. The Self as Risk Taker - a Cultural Theory of Contagion in Relation to Aids. *Sociol Rev.* 1990;38(3):445-64.
65. Gant LM. Special issue on: Intersectional contexts of HIV/AIDS: Global examples. *Journal of HIV/AIDS & Social Services.* 2017;16(1):1-3.
66. Parker R. Sexuality, culture and society. Shifting paradigms in sexuality research. . In: Aggleton P, Parker R., Thomas F., editor. Culture, Health and Sexuality: An Introduction. Oxon and New York: Routledge; 2015.
67. Lindroth M, Lofgren-Martensson L. Sexual chance taking: a qualitative study on sexuality among detained youths. *The European journal of contraception & reproductive health care : the official journal of the European Society of Contraception.* 2013;18(5):335-42.
68. Holm MR, Lugosi P, Croes RR, Torres EN. Risk-tourism, risk-taking and subjective well-being: A review and synthesis. *Tourism Management.* 2017;63:115-22.
69. Carballo-Diequez A, Ventuneac A, Dowsett GW, Balan I, Bauermeister J, Remien RH, et al. Sexual Pleasure and Intimacy Among Men Who Engage in "Bareback Sex". *Aids and Behavior.* 2011;15:S57-S65.
70. Moskowitz DA, Roloff ME. The existence of a bug chasing subculture. *Culture Health & Sexuality.* 2007;9(4):347-57.
71. Hammond C, Holmes D, Mercier M. Breeding new forms of life: a critical reflection on extreme variances of bareback sex. *Nurs Inq.* 2016;23(3):267-77.
72. Rofes E. Desires as defiance: gay male sexual subjectivities and resistance to sexual health promotion. *Health Education Journal.* 2002;61(2):125-37.
73. Koblin BA, Husnik MJ, Colfax G, Huang Y, Madison M, Mayer K, et al. Risk factors for HIV infection among men who have sex with men. *AIDS.* 2006;20(5):731-9.
74. Rodger A, Cambiano V, Bruun T, Vernazza P, Collins S, Corbelli GM, et al. Risk of HIV transmission through condomless sex in MSM couples with suppressive ART: The PARTNER2 Study extended results in gay men. In: *AIDS 2018*; 2018 July 23; Amsterdam.
75. Bratt GA, Edlund M, Cullberg M, Hejdeman B, Blaxhult A, Eriksson LE. Sexually transmitted infections (STI) in men who have sex with men (MSM). *Open Infectious Diseases Journal.* 2009;3:118-27.
76. Marcus U, Ort J, Grenz M, Eckstein K, Wirtz K, Wille A. Risk factors for HIV and STI diagnosis in a community-based HIV/STI testing and counselling site for men having sex with men (MSM) in a large German city in 2011-2012. *BMC Infect Dis.* 2015;15:14.
77. Kalichman SC, Johnson JR, Adair V, Rompa D, Multhaupt K, Kelly JA. Sexual sensation seeking: scale development and predicting AIDS-risk behavior among homosexually active men. *J Pers Assess.* 1994;62(3):385-97.

78. Kippax S, Campbell D, Van de Ven P, Crawford J, Prestage G, Knox S, et al. Cultures of sexual adventurism as markers of HIV seroconversion: a case control study in a cohort of Sydney gay men. *Aids Care*. 1998;10(6):677-88.
79. Leobon A, Velter A, Engler K, Drouin MC, Otis J. A relative profile of HIV-negative users of French websites for men seeking men and predictors of their regular risk taking: a comparison with HIV-positive users. *Aids Care*. 2011;23(1):25-34.
80. Prestage G, Brown G, Down IA, Jin FY, Hurley M. "It's Hard to Know What is a Risky or not a Risky Decision": Gay Men's Beliefs About Risk During Sex. *Aids and Behavior*. 2013;17(4):1352-61.
81. Caceres CF, Aggleton P, Galea JT. Sexual diversity, social inclusion and HIV/AIDS. *AIDS*. 2008;22 Suppl 2:S45-55.
82. Lyons A, Hosking W. Health Disparities Among Common Subcultural Identities of Young Gay Men: Physical, Mental, and Sexual Health. *Arch Sex Behav*. 2014;43(8):1621-35.
83. Templeton DJ, Ressler KA, Hope K, Poynten IM. Enhanced surveillance of a lymphogranuloma venereum outbreak in Sydney 2010-2012. *Aust Nz J Publ Heal*. 2016;40(4):368-70.
84. Matser A, Vanhomerig J, Schim van der Loeff MF, Geskus RB, de Vries HJ, Prins JM, et al. HIV-infected men who have sex with men who identify themselves as belonging to subcultures are at increased risk for hepatitis C infection. *PloS one*. 2013;8(3):e57740.
85. Prestage G, Brown G, De Wit J, Bavinton B, Fairley C, Maycock B, et al. Understanding Gay Community Subcultures: Implications for HIV Prevention. *Aids and Behavior*. 2015;19(12):2224-33.
86. Moskowitz DA, Seal DW, Rintamaki L, Rieger G. HIV in the Leather Community: Rates and Risk-Related Behaviors. *Aids and Behavior*. 2011;15(3):557-64.
87. Grov C, Hirshfield S, Remien RH, Humberstone M, Chiasson MA. Exploring the venue's role in risky sexual behavior among gay and bisexual men: an event-level analysis from a national online survey in the U.S. *Arch Sex Behav*. 2013;42(2):291-302.
88. Rosenbrock R. AIDS prevention in Germany - a successful model in crisis. *Bundesgesundheitsbla*. 2007;50(4):432-41.
89. Rawstorne P, Fogarty A, Crawford J, Prestage G, Grierson J, Grulich A, et al. Differences between HIV-positive gay men who 'frequently', 'sometimes' or 'never' engage in unprotected anal intercourse with seronegative casual partners: Positive Health cohort, Australia. *Aids Care*. 2007;19(4):514-22.
90. Prestage G, Down I, Grulich A, Zablotska I. Sex Partying Among Gay Men in Sydney, Melbourne and Brisbane, Australia. *Aids and Behavior*. 2011;15(2):298-304.
91. Callander D, Prestage G, Ellard J, Triffitt K, Brown G, Down I. The Road Less Travelled: Exploring Gay and Bisexual Men's Explanations of 'Uncommon' Routes of HIV Transmission. *Aids and Behavior*. 2016;20(10):2266-74.
92. Hurley M, Prestage G. Intensive sex partying amongst gay men in Sydney. *Culture Health & Sexuality*. 2009;11(6):597-610.
93. White Hughto JM, Hidalgo AP, Bazzi AR, Reisner SL, Mimiaga MJ. Indicators of HIV-risk resilience among men who have sex with men: a content analysis of online profiles. *Sex Health*. 2016;13(5):436-43.
94. The EMIS Network. EMIS 2010: The European Men-Who-Have-Sex-With-Men Internet Survey. Findings from 38 countries. Stockholm: European Centre for Disease Prevention and Control; 2013.
95. Pachankis JE, Hatzenbuehler ML, Hickson F, Weatherburn P, Berg RC, Marcus U, et al. Hidden from health: structural stigma, sexual orientation concealment, and HIV

- across 38 countries in the European MSM Internet Survey. *AIDS*. 2015;29(10):1239-46.
96. van der Star A, Branstrom R. Acceptance of sexual minorities, discrimination, social capital and health and well-being: a cross-European study among members of same-sex and opposite-sex couples. *Bmc Public Health*. 2015;15:812.
  97. Ross MW, Berg RC, Schmidt AJ, Hospers HJ, Breveglieri M, Furegato M, et al. Internalised homonegativity predicts HIV-associated risk behavior in European men who have sex with men in a 38-country cross-sectional study: some public health implications of homophobia. *BMJ Open*. 2013;3(2).
  98. Marmot M. Fair Society, Healthy Lives : the Marmot Review: strategic review of health inequalities in England post-2010. London: Marmot Review: Department for International Development; 2010 Available from: <http://www.parliament.uk/documents/fair-society-healthy-lives-full-report.pdf>
  99. Adam PC, de Wit JB, Bourne CP, Knox D, Purchas J. Promoting regular testing: an examination of HIV and STI testing routines and associated socio-demographic, behavioral and social-cognitive factors among men who have sex with men in New South Wales, Australia. *Aids Behav*. 2014;18(5):921-32.
  100. Marcus U, Hickson F, Weatherburn P, Schmidt AJ, Network E. Prevalence of HIV among MSM in Europe: comparison of self-reported diagnoses from a large scale internet survey and existing national estimates. *Bmc Public Health*. 2012;12:978.
  101. de Wit JB, Adam PC. To test or not to test: psychosocial barriers to HIV testing in high-income countries. *HIV Med*. 2008;9 Suppl 2:20-2.
  102. Flowers P, Church S. To test or not? HIV antibody testing amongst gay men. *Culture Health & Sexuality*. 2002;4(1):43-65.
  103. Berg RC. Predictors of never testing for HIV among a national online sample of men who have sex with men in Norway. *Scandinavian journal of public health*. 2013;41(4):398-404.
  104. Nelson KM, Thiede H, Hawes SE, Golden MR, Hutcheson R, Carey JW, et al. Why the wait? Delayed HIV diagnosis among men who have sex with men. *Journal of urban health : bulletin of the New York Academy of Medicine*. 2010;87(4):642-55.
  105. Schwarcz S, Richards TA, Frank H, Wenzel C, Hsu LC, Chin CS, et al. Identifying barriers to HIV testing: personal and contextual factors associated with late HIV testing. *Aids Care*. 2011;23(7):892-900.
  106. Wiklander M, Brannstrom J, Svedhem V, Eriksson LE. Development and psychometric testing of a barriers to HIV testing scale among individuals with HIV infection in Sweden; The Barriers to HIV testing scale-Karolinska version. *Health Qual Life Outcomes*. 2015;13(1):185.
  107. Svensson P, Sundbeck M, Persson KI, Stafstrom M, Ostergren PO, Mannheimer L, et al. A meta-analysis and systematic literature review of factors associated with sexual risk-taking during international travel. *Travel Med Infect Dis*. 2018.
  108. Vivancos R, Abubakar I, Hunter PR. Foreign travel, casual sex, and sexually transmitted infections: systematic review and meta-analysis. *International journal of infectious diseases : IJID : official publication of the International Society for Infectious Diseases*. 2010;14(10):e842-51.
  109. Hughes H. Holidays and homosexual identity. *Tourism Management*. 1997;18(1):3-7.
  110. Herrera SL, Scott D. "We Gotta Get out of This Place!" Leisure Travel among Gay Men Living in a Small City. *Tourism Review International*. 2005;8(3):249-62.
  111. Weeden C, Lester JA, Jarvis N. Lesbians and Gay Men's Vacation Motivations, Perceptions, and Constraints: A Study of Cruise Vacation Choice. *J Homosex*. 2016;63(8):1068-85.

112. Schütz A, Andersson S, Retzlaff J, Bengtsson J. Den sociala världens fenomenologi. Göteborg: Daidalos; 2002.
113. Rogstad KE. Sex, sun, sea, and STIs: sexually transmitted infections acquired on holiday. *BMJ*. 2004;329(7459):214-7.
114. Truong HM, Fatch R, Grasso M, Robertson T, Tao L, Chen YH, et al. Gay and bisexual men engage in fewer risky sexual behaviors while traveling internationally: a cross-sectional study in San Francisco. *Sexually transmitted infections*. 2015;91(3):220-5.
115. Zablotska IB, Holt M, de Wit J, Mao L, Down I, Prestage G. At home and away: gay men and high risk sexual practices. *Aids Behav*. 2014;18(8):1436-42.
116. Benotsch EG, Martin AM, Espil FM, Nettles CD, Seal DW, Pinkerton SD. Internet use, recreational travel, and HIV risk behaviors in men who have sex with men. *J Community Health*. 2011;36(3):398-405.
117. Fernandez Davila P, Folch C, Ferrer L, Casabona J, Hickson F, Lamut A, et al. Mobile men who have sex with men. An exploration in European residents of sexual risk taking while travelling abroad. In: *AIDS*; 2012; Washington DC.
118. Ramesh S, Mehrotra P, Mahapatra B, Ganju D, Nagarajan K, Saggurti N. The effect of mobility on sexual risk behaviour and HIV infection: a cross-sectional study of men who have sex with men in southern India. *Sexually transmitted infections*. 2014;90(6):491-+.
119. Benotsch EG, Nettles CD, Wong F, Redmann J, Boschini J, Pinkerton SD, et al. Sexual risk behavior in men attending Mardi Gras celebrations in New Orleans, Louisiana. *J Commun Health*. 2007;32(5):343-56.
120. Vanden Berghe W, Nostlinger C, Hospers H, Laga M. International mobility, sexual behaviour and HIV-related characteristics of men who have sex with men residing in Belgium. *Bmc Public Health*. 2013;13.
121. Alcedo S, Kossuth-Cabrejos S, Piscocoya A, Mayta-Tristan P. Factors associated with non-use of condoms in an online community of frequent travellers. *Travel Med Infect Di*. 2014;12(6):750-6.
122. Avery AK, Zenilman JM. Sexually Transmitted Diseases and Travel: From Boudoir to Bordello. *Microbiol Spectr*. 2015;3(5).
123. Clift S, Forrest S. Gay men and tourism: destinations and holiday motivations. *Tourism Management*. 1999;20(5):615-25.
124. Truong HM, Chen YH, Grasso M, Robertson T, Tao L, Fatch R, et al. HIV Serodisclosure and Sexual Behavior During International Travel. *Sex Transm Dis*. 2016;43(7):459-64.
125. Schmidt AJ, Hickson F, Weatherburn P, Marcus U, Network E. Comparison of the performance of STI screening services for gay and bisexual men across 40 European cities: results from the European MSM Internet Survey. *Sexually transmitted infections*. 2013;89(7):575-82.
126. Lee VC, Sullivan PS, Baral SD. Global travel and HIV/STI epidemics among men who have sex with men: what does the future hold? *Sex Health*. 2017;14(1):51-8.
127. Johannisson K. Medicinens öga : sjukdom, medicin och samhälle - historiska erfarenheter. Stockholm: Norstedt; 2013.
128. Samhällets insatser mot hiv/STI. Samhällets insatser mot hiv/STI : att möta förändring : betänkande. Stockholm: Socialdepartementet; 2004.
129. Albert J, Berglund T, Gisslen M, Groon P, Sonnerborg A, Tegnell A, et al. Risk of HIV transmission from patients on antiretroviral therapy: a position statement from the Public Health Agency of Sweden and the Swedish Reference Group for Antiviral Therapy. *Scand J Infect Dis*. 2014;46(10):673-7.

130. Cohen MS, Chen YQ, McCauley M, Gamble T, Hosseinipour MC, Kumarasamy N, et al. Prevention of HIV-1 infection with early antiretroviral therapy. *N Engl J Med.* 2011;365(6):493-505.
131. McCormack S, Dunn DT, Desai M, Dolling DI, Gafos M, Gilson R, et al. Pre-exposure prophylaxis to prevent the acquisition of HIV-1 infection (PROUD): effectiveness results from the pilot phase of a pragmatic open-label randomised trial. *Lancet.* 2016;387(10013):53-60.
132. Molina JM, Capitant C, Spire B, Pialoux G, Cotte L, Charreau I, et al. On-Demand Preexposure Prophylaxis in Men at High Risk for HIV-1 Infection. *N Engl J Med.* 2015;373(23):2237-46.
133. WHO. Prevention and treatment of HIV and other sexually transmitted infections among men who have sex with men and transgender people. Recommendations for a public health approach 2011. Geneva; 2011.
134. WHO. Guidance on oral pre-exposure prophylaxis (PrEP) for serodiscordant couples, men and transgender women who have sex with men at high risk of HIV. Recommendations for use in the context of demonstration projects. Geneva; 2012.
135. WHO. WHO expands recommendation on oral pre-exposure prophylaxis of HIV infection (PrEP). Policy brief. Geneva; 2015.
136. Noori T, Pharris A. Meeting report: Pre-exposure Human Immunodeficiency Virus Prophylaxis in the EU/EEA: Challenges and Opportunities, Stockholm April 2016. *Euro Surveill.* 2016;21(25).
137. EMA. Truvada (emtricitabine / tenofovir disoproxil) : An overview of Truvada and why it is authorised in the EU. EMA/99146/2018 EMEA/H/C/000594. London: EMA; 2016. Available from: [http://www.ema.europa.eu/docs/en\\_GB/document\\_library/EPAR\\_-\\_Summary\\_for\\_the\\_public/human/000594/WC500043715.pdf](http://www.ema.europa.eu/docs/en_GB/document_library/EPAR_-_Summary_for_the_public/human/000594/WC500043715.pdf)
138. Folkhälsomyndigheten. Preexpositionsprofylax för att minska risken för infektion med hiv. En kunskapsöversikt. Solna: Folkhälsomyndigheten; 2017.
139. RAV. HIV preexpositionsprofylax (PrEP) – Rekommendation om praktisk handläggning 2017. Referensgruppen för Antiviral Terapi; 2017.
140. Lasry A, Sansom SL, Hicks KA, Uzunangelov V. Allocating HIV prevention funds in the United States: recommendations from an optimization model. *PloS one.* 2012;7(6):e37545.
141. Widgren K, Skar H, Berglund T, Kling A-M, Tegnell A, Albert J. Delayed HIV diagnosis common in Sweden, 2003–2010. *Scandinavian Journal of Infectious Diseases.* 2014;46(12):862-7.
142. Brannstrom J, Svedhem Johansson V, Marrone G, Wendahl S, Yilmaz A, Blaxhult A, et al. Deficiencies in the health care system contribute to a high rate of late HIV diagnosis in Sweden. *HIV Med.* 2016;17(6):425-35.
143. Folkhälsomyndigheten. Att leva med hiv i Sverige : en studie om livskvalitet hos personer som lever med hiv. Solna: Folkhälsomyndigheten; 2015.
144. Avskaffa hiv-positivas informationsplikt: Expressen; 2015 Available from: <http://www.expressen.se/debatt/avskaffa-hiv-positivas-informationsplikt/>
145. Socialstyrelsen. Den behandlande läkarens och enskilde individens ansvar vid pågående behandling mot hivinfektion. Stockholm: Socialstyrelsen; 2013.
146. Gios L, Mirandola M, Toskin I, Marcus U, Dudareva-Vizule S, Sherriff N, et al. Bio-behavioural HIV and STI surveillance among men who have sex with men in Europe: the Sialon II protocols. *Bmc Public Health.* 2016;16:212.
147. Lohr SL. Sampling : design and analysis. Boston, MA: Cengage Brooks/Cole; 2010.
148. Korn EL, Graubard BI. Examples of Differing Weighted and Unweighted Estimates from a Sample Survey. *Am Stat.* 1995;49(3):291-5.

149. Lanza ST, Tan X, Bray BC. Latent Class Analysis With Distal Outcomes: A Flexible Model-Based Approach. *Structural equation modeling : a multidisciplinary journal*. 2013;20(1):1-26.
150. Linzer DA, Lewis JB. poLCA: An R Package for Polytomous Variable Latent Class Analysis. *Journal of Statistical Software*. 2011;42(10):1-29.
151. Gaskin CJ, Happell B. On exploratory factor analysis: a review of recent evidence, an assessment of current practice, and recommendations for future use. *International journal of nursing studies*. 2014;51(3):511-21.
152. Watson R, Thompson DR. Use of factor analysis in *Journal of Advanced Nursing* : literature review. *J Adv Nurs*. 2006;55(3):330-41.
153. Awad GH, Sagrestano LM, Kittleson MJ, Sarvela PD. Development of a measure of barriers to HIV testing among individuals at high risk. *Aids Educ Prev*. 2004;16(2):115-25.
154. Yong AG, Pearce S. A Beginner's Guide to Factor Analysis: Focusing on Exploratory Factor Analysis. *Tutorials in Quantitative Methods for Psychology*. 2013;9(2):79-94.
155. Holgado-Tello FP, Chacón-Moscoso S, Barbero-García I, Vila-Abad E. Polychoric versus Pearson correlations in exploratory and confirmatory factor analysis of ordinal variables. *Quality & Quantity*. 2008;44(1):153-66.
156. Little RJA, Rubin DB. *Statistical analysis with missing data*. Hoboken, N.J.: Wiley; 2002.
157. Graneheim UH, Lindgren BM, Lundman B. Methodological challenges in qualitative content analysis: A discussion paper. *Nurse Educ Today*. 2017;56:29-34.
158. Graneheim UH, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Educ Today*. 2004;24(2):105-12.
159. Pope C, Mays N. *Qualitative research in health care*. London: BMJ Books; 2006.
160. Moskowitz DA, Rieger G, Roloff ME. Tops, bottoms and versatiles. *Sexual and Relationship Therapy*. 2008;23(3):191-202.
161. Rice CE, Norris Turner A, Lanza ST. Sexual Behavior Latent Classes Among Men Who Have Sex With Men: Associations With Sexually Transmitted Infections. *J Sex Res*. 2017;54(6):776-83.
162. Tikkanen R, Abellson J, Forsberg M. UngKAB09 : kunskap, attityder och sexuella handlingar bland unga. Göteborg: Inst. för socialt arbete, Göteborgs universitet; 2011.
163. Folkhälsomyndigheten. Sexuality and health among young people in Sweden : UngKAB15 - a survey on knowledge, attitudes and behaviour among young people 16-29 years old. Solna: Folkhälsomyndigheten; 2017.
164. Ostrow DG, DiFranceisco W, Kalichman S. Sexual Adventurism, Substance Use, and High-Risk Sexual Behavior: A Structural Modeling Analysis of the Chicago MACS/Coping and Change Cohort. *AIDS and Behavior*. 1997;1(3):191-202.
165. Folkhälsomyndigheten. Ungdomar och sexualitet. Specialrapport från Ungdomsbarometern 2014/2015. Solna: Folkhälsomyndigheten; 2015.
166. Gaines H, Albert J, Axelsson M, Berglund T, Gisslen M, Sonnerborg A, et al. Six-week follow-up after HIV-1 exposure: a position statement from the Public Health Agency of Sweden and the Swedish Reference Group for Antiviral Therapy. *Infect Dis (Lond)*. 2016;48(2):93-8.
167. Lorenc T, Marrero-Guillamon I, Llewellyn A, Aggleton P, Cooper C, Lehmann A, et al. HIV testing among men who have sex with men (MSM): systematic review of qualitative evidence. *Health Educ Res*. 2011;26(5):834-46.
168. Levy ME, Wilton L, Phillips G, 2nd, Glick SN, Kuo I, Brewer RA, et al. Understanding structural barriers to accessing HIV testing and prevention services among black men who have sex with men (BMSM) in the United States. *Aids Behav*. 2014;18(5):972-96.

169. Joseph HA, Belcher L, O'Donnell L, Fernandez MI, Spikes PS, Flores SA. HIV testing among sexually active Hispanic/Latino MSM in Miami-Dade County and New York City: opportunities for increasing acceptance and frequency of testing. *Health Promot Pract.* 2014;15(6):867-80.
170. Behel SK, MacKellar DA, Valleroy LA, Secura GM, Bingham T, Celentano DD, et al. HIV prevention services received at health care and HIV test providers by young men who have sex with men: an examination of racial disparities. *Journal of urban health : bulletin of the New York Academy of Medicine.* 2008;85(5):727-43.
171. Reinius M. HIV-related stigma in the era of efficient treatment : conceptualization, measurement and relations to health-related quality of life. Stockholm: Karolinska Institutet; 2018.
172. Bloor M, Thomas M, Hood K, Abeni D, Goujon C, Hausser D, et al. Differences in sexual risk behaviour between young men and women travelling abroad from the UK. *Lancet.* 1998;352(9141):1664-8.
173. Mercer CH, Fenton KA, Wellings K, Copas AJ, Erens B, Johnson AM. Sex partner acquisition while overseas: results from a British national probability survey. *Sexually transmitted infections.* 2007;83(7):517-22.
174. Tanton C, Johnson AM, Macdowall W, Datta J, Clifton S, Field N, et al. Forming new sex partnerships while overseas: findings from the third British National Survey of Sexual Attitudes & Lifestyles (Natsal-3). *Sexually transmitted infections.* 2016.
175. Lukkerz J, Skarpås, E, Eriksson, N. Sexualiteter i ett Öresundsperspektiv. Malmö: Malmö stad and Region Skåne; 2011.
176. Herrmann B. A new genetic variant of *Chlamydia trachomatis*. *Sexually transmitted infections.* 2007;83(4):253-4.
177. Tulloch J, Lupton D. Risk and everyday life. London: Sage Publications; 2003.
178. Migration, sexuell hälsa och prevention : två kunskapsöversikter med fokus på risktagande och riskutsatthet i samband med migration. Stockholm: Smittskyddsinstitutet; 2012.
179. Kaufman MR, Fuhrel-Forbis AR, Kalichman SC, Eaton LA, Cain D, Cherry C, et al. On holiday: a risk behavior profile for men who have vacationed at gay resorts. *J Homosex.* 2009;56(8):1134-44.
180. Fisher MP, Ramchand R, Bana S, Iguchi MY. Risk behaviors among HIV-positive gay and bisexual men at party-oriented vacations. *J Stud Alcohol Drugs.* 2013;74(1):158-67.
181. Helleberg M, Haggblom A, Sonnerborg A, Obel N. HIV care in the Swedish-Danish HIV cohort 1995-2010, closing the gaps. *PloS one.* 2013;8(8):e72257.
182. Bellis MA, Hughes K, Ashton JR. The promiscuous 10%? *J Epidemiol Community Health.* 2004;58(11):889-90.
183. Bradshaw D, Raghwanji J, Jacka B, Sacks-Davis R, Lamoury F, Down I, et al. Venue-Based Networks May Underpin HCV Transmissions amongst HIV-Infected Gay and Bisexual Men. *PloS one.* 2016;11(9):e0162002.
184. Socialdepartementet. Nationell strategi mot hiv/aids och vissa andra smittsamma sjukdomar. Stockholm: Regeringskansliet; 2017.
185. En strategi för lika rättigheter och möjligheter oavsett sexuell läggning, könsidentitet eller könsuttryck. Stockholm: Arbetsmarknadsdepartementet, Regeringskansliet; 2014.
186. Declaration of Alma Ata : adopted at the International Conference on Primary Health Care, Alma Ata, USSR, 6-12 September 1978. Geneva; WHO; 1978.
187. Qvist T, Cowan SA, Graugaard C, Helleberg M. High linkage to care in a community-based rapid HIV testing and counseling project among men who have sex with men in Copenhagen. *Sex Transm Dis.* 2014;41(3):209-14.

188. Graugaard C, Pedersen, BK., Frisch, M. *Seksualitet og sundhed*. København: Vidensråd for Forebyggelse; 2014.
189. Richters J, Knox S, Crawford J, Kippax S. Condom use and 'withdrawal': exploring gay men's practice of anal intercourse. *Int J Std Aids*. 2000;11(2):96-104.
190. Qvarnstrom A, Oscarsson MG. Experiences of and attitudes towards HIV/STI prevention among holidaymaking men who have sex with men living in Sweden: a cross-sectional Internet survey. *Scandinavian journal of public health*. 2015;43(5):490-6.
191. Jenness SM, Weiss KM, Goodreau SM, Gift T, Chesson H, Hoover KW, et al. Incidence of Gonorrhea and Chlamydia Following Human Immunodeficiency Virus Preexposure Prophylaxis Among Men Who Have Sex With Men: A Modeling Study. *Clinical Infectious Diseases*. 2017;65(5):712-8.
192. Montañó MA, Dombrowski, J.C., Barbee, L.A., Golden, M.R., Khosropour, C.M., editor *Changes in sexual behavior and STI diagnoses among MSM using PrEP in Seattle, WA*. CROI; 2017; Seattle, Washington.
193. Jurgalski E. How deadly are the world's highest mountains? *The Economist*. 2013 May 29th 2013.
194. Villani A, Frigessi A, Liljeros F, Nordvik MK, de Blasio BF. A characterization of internet dating network structures among nordic men who have sex with men. *PloS one*. 2012;7(7):e39717.
195. Fenton KA, Johnson AM, McManus S, Erens B. Measuring sexual behaviour: methodological challenges in survey research. *Sexually transmitted infections*. 2001;77(2):84-92.
196. Johansson K, Persson KI, Deogan C, El-Khatib Z. Factors associated with condom use and HIV testing among young men who have sex with men: a cross-sectional survey in a random online sample in Sweden. *Sexually transmitted infections*. 2018.
197. Strömdahl S, Liljeros F, Thorson AE, Persson KI, Forsberg BC. HIV testing and prevention among foreign-born Men Who have Sex with Men: an online survey from Sweden. *Bmc Public Health*. 2017;17:139.
198. Casey ME. Tourist gay(ze) or transnational sex: Australian gay men's holiday desires. *Leisure Studies*. 2009;28(2):157-72.
199. Forsberg M. *Sexual health in young people : international research summaries and Swedish experiences of preventive work*. Stockholm: Socialstyrelsen; 2008.
200. Lag (2006:67) om förbud mot diskriminering och annan kränkande behandling av barn och elever, 2006:67 (2006).
201. Runeborg A, Anderson C. *Sexual rights for all*. Stockholm: Sida; 2010.
202. Fletcher RH, Fletcher SW, Fletcher GS. *Clinical epidemiology : the essentials*. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2014.



# APPENDICES

## APPENDIX I: MSM2013 SURVEY QUESTIONNAIRE

First we have some questions about your background.

1. I am...

- Male
- Female => survey terminated
- Transgender MtF (male to female)
- Transgender FtM (female to male)
- Other:

1B. Have you received either of the following medical treatments?

- Hormone therapy
- Sex Reassignment Surgery, SRS
- No
- Would rather not say

2. Which year were you born?

[The person can state a year between 1900 and 1998]

3. Where do you live?

- Stockholm region
- Gothenburg region
- Malmö region
- Other Swedish city or large town with more than 10,000 inhabitants
- Small Swedish town (below 10,000 inhabitants) or Swedish rural region
- Norway, Denmark, Finland, Iceland
- Non-Nordic country
- Difficult to specify

4. Which county do you live in? (Scroll bar with the 21 Swedish counties)

Only shown to those who have given one of the following answers to question 3:  Other Swedish city or large town with more than 10,000 inhabitants or  Smaller Swedish town (below 10,000 inhabitants) or Swedish rural region

5. In which country were you born?

(Scroll bar with all countries) If Sweden,

5B. How many years have you lived in Sweden?

.....

5C. Why did you come to Sweden?

- To work
- To study
- To seek asylum
- By adoption
- Through partner/marriage/cohabitant
- Through relatives
- Other reason:

5D. I currently...

choose the statement that corresponds best to your current status in Sweden

- have Swedish citizenship
- have a permanent residence permit
- have a work permit/student visa
- have an on-going asylum application
- Do not know/would rather not answer
- Other:

6. What is the highest level of education you have completed?

- Not completed primary or lower-secondary education
- Primary or lower-secondary education
- Upper-secondary school or equivalent
- Vocational training (e.g. KY)
- University (Bachelor/Masters/selected courses)
- PhD/Doctoral studies
- Other education:

7. Which is your current primary occupation?

- Full-time or part-time work
- Student
- Self-employed
- Seeking employment
- Long-term sick-leave
- On sickness or activity compensation/medically retired
- Retired
- Other:

8. Which of the following options best describe how you think of yourself?

- Gay/homosexual
- Straight/heterosexual
- Bisexual
- I do not place myself in any sexual category
- Do not know/would rather not answer
- Other:

9. How would you describe your general state of health?

- Very good
- Good
- Neither good nor poor
- Poor
- Very poor

10. Are you happy with your sex life?

- Very happy
- Happy
- Neither happy nor unhappy
- Unhappy
- Very unhappy

The following are some questions about sex in a steady relationship

11. Are you currently in a steady relationship with one or more partners (i.e. you are not single)?

- Yes, with a man
- Yes, with a woman
- Yes, with several people of whom at least one is a man
- No

11B. When you have anal intercourse WITHIN that relationship, do you use condoms?

Think back over the last 12 months.

- Yes, always
- Yes, sometimes
- No, never
- We never have anal sex
- Other:

11C. Do you have sexual partners outside of your steady relationship?

You can give multiple answers

- Yes, casual partners
- Yes, recurring casual sex partner(s) or lover(s)
- No

11D. Do you use a condom when you have anal intercourse with sex partners outside of your relationship? Think back over the last 12 months.

- Yes, always
- Yes, sometimes
- No, never
- Do not have anal intercourse outside the relationship

**Here are some questions about your experiences of sex with men over the last 12 months**

12. When did you last have sex with a man? This includes all types of sex, for example anal intercourse, oral sex or masturbation.

- In the last 24 hours
- Within the last week
- Within the last month
- 1-6 months ago
- 7-12 months ago
- More than 12 months ago
- Do not remember/do not know
- Have never had sex with a man

13. When you have had unprotected vaginal/anal intercourse over the last 12 months, was it:

- Always with men
- Most often with men but sometimes with women
- As often with men as with women
- Most often with women but sometimes with men
- Always with women
- Other:.....
- Have not had any sexual contacts within the last 12 months

14. How many men have you had sex with within the last 12 months?

Make an estimation if you are unsure about the exact number

- .....men
- Do not remember/do not know

15. How many new/casual male sex partners have you had unprotected anal intercourse with within the last 12 months?

Make an estimation if you are unsure about the exact number

- \_\_\_\_\_ men
- Do not remember/do not know

15B. For how many of these new/casual sex partners (given in question 15) were you aware of their HIV status (whether they had HIV or not) on the first occasion when you had unprotected anal intercourse?

\_\_\_\_\_ men

15C. Where have you met the new/casual male sex partners that you have had unprotected anal intercourse with within the last 12 months?

You can give multiple answers

*ONLY SHOWN TO THOSE WHO HAVE SPECIFIED AT LEAST 1 TO QUESTION 15:*

- In a metropolitan county (Stockholm, Västra Götaland or Skåne) where I live
- In another metropolitan county (Stockholm, Västra Götaland, Skåne)
- In another Swedish county outside the metropolitan areas
- Abroad
- Do not remember/do not know

15D. Where have you met the new/casual male sex partners that you have had unprotected anal intercourse with within the last 12 months?

You can give multiple answers

*ONLY SHOWN TO THOSE WHO HAVE SPECIFIED AT LEAST 1 TO QUESTION 15:*

Options for those who live in other counties according to question 4:

- In the county where I live
- In a Swedish metropolitan county (Stockholm, Västra Götaland, Skåne)
- In another Swedish county outside the metropolitan areas
- Abroad
- Do not remember/do not know

15E. When you have had unprotected anal intercourse with new/casual male sex partners in Sweden within the last 12 months, who has it been with?

You can give multiple answers

*ONLY SHOWN TO THOSE WHO HAVE GIVEN ANY SWEDISH OPTION TO QUESTION 15C/D*

- Someone who lives in Sweden
- Someone from another country who is visiting Sweden temporarily
- Do not remember/do not know

15F. When having unprotected anal intercourse with new/casual male sex partners in Sweden within the last 12 months, have you done any of the following:

You can give multiple answers

*ONLY SHOWN TO THOSE WHO HAVE ANSWERED SWEDEN TO QUESTION 15C/D*

- Fucked someone (been active)
- Been fucked (been passive)
- Given oral sex
- Received oral sex
- Masturbated to someone else
- Received masturbation from someone else
- Licked anally (rimming)
- Been licked anally (rimming)
- Had alcohol so that I was drunk
- Taken poppers
- Taken drugs (for example recreational drugs or other narcotics)
- Taken Viagra/Levitra/Cialis/Kamagra
- Shared dildos/sex toys with others
- Fisted someone
- Been fisted
- Wet/scat
- Had a threesome
- Had group sex
- Received money or other compensation for sex
- Paid money or given other compensation for sex
- Agreed beforehand to not use a condom (barebacking)
- Other:

15G. When you have had unprotected anal intercourse with new/casual male sex partners abroad within the last 12 months, who has it been with?

You can give multiple answers

*ONLY SHOWN TO THOSE WHO HAVE ANSWERED ABROAD TO QUESTION 15C/D*

- Someone living in Sweden
- Someone living in the country that I visited
- Someone from a country other than Sweden who was also visiting the country
- Do not remember/do not know

15H. In which countries have you had unprotected anal sex with new/casual male sex partners within the last 12 months?

*ONLY SHOWN TO THOSE WHO HAVE ANSWERED ABROAD TO QUESTION 15C/D*  
(Scroll bar with all countries)

15I. When having unprotected anal intercourse with new/casual male sex partners ABROAD within the last 12 months, have you done any of the following:

*ONLY SHOWN TO THOSE WHO HAVE ANSWERED ABROAD TO QUESTION 15C/D*

- Fucked someone (been active)
- Been fucked (been passive)
- Given oral sex
- Received oral sex

- Masturbated to someone else
- Received masturbation from someone else
- Licked anally (rimming)
- Been licked anally (rimming)
- Had alcohol so that I was drunk
- Taken poppers
- Taken drugs (for example recreational drugs or other narcotics)
- Taken Viagra/Levitra/Cialis/Kamagra
- Shared dildos/sex toys with others
- Fisted someone
- Been fisted
- Wet/scat
- Had a threesome
- Had group sex
- Received money or other compensation for sex
- Paid money or given other compensation for sex
- Agreed beforehand to not use a condom (barebacking)
- Other:

16. Have you, within the last 12 months, had unprotected anal intercourse with a man because you have not had access to a condom, even though you had wanted to use one?

- Yes
- No
- Do not remember/do not know

**The following are some questions about the last occasion you had sex with a man**

17. Where did you last have sex with a man?

Options for those who live counties with a large city according to question 4:

- In the county where I live
- In another Swedish metropolitan county (Stockholm, Västra Götaland, Skåne)
- In another Swedish county outside the metropolitan areas
- Abroad
- Do not remember/do not know

18. Where did you last have sex with a man?

Options for those who live in other counties according to question 4:

- In the county where I live
- In Swedish metropolitan county (Stockholm, Västra Götaland, Skåne)
- In another Swedish county outside the metropolitan areas
- Abroad
- Do not remember/do not know

19. In which country did you have sex with a man last time you had sex?

*ONLY SHOWN TO THOSE WHO HAVE ANSWERED ABROAD TO QUESTION 18*

(Scroll bar with all countries)

20. Who did you have sex with that time?  
You can give multiple answers
- Casual sex with partner(s) I had not met before
  - Casual sex with partner(s) I knew from before
  - Partner(s)/boyfriend/spouse
  - Recurring sex partner (regular sex buddy, lover)
  - Other type of partner:

21. When you had sex last time, where did the person you had sex with come from?
- Living in Sweden
  - From another country
  - Do not remember/do not know

22. Where did you first meet your last male sex partner?

NOTSHOWN TO THOSE WHO HAVE SPECIFIED PARTNER/RECURRING TO QUESTION 20

- Internet
- Smartphone app such as Grindr
- Café, bar, pub or nightclub aimed at LGBTQ persons
- Association for LGBTQ persons
- Gay sauna
- Video club/porn cinema
- Pride/LGBTQ festival
- Sex party
- Private party/through friends
- Cruising location (such as a park, beach, toilet or public baths)
- Work place/school
- Other:

23. What did you know/think about your last male sex partner's HIV status?

- I knew that he did not have HIV
- I knew that he had HIV
- I thought that he did not have HIV
- I thought that he had HIV
- I knew he was unsure
- Do not remember
- I did not think about whether he had HIV or not

24. Did you tell the person about your HIV status before you had sex?

- I said that I did not have HIV
- I said that I have HIV
- I said that I am unsure about my HIV status
- I did not say anything about my HIV status
- Do not remember/do not know

25. What did you do when you last had sex with a man?

- You can give multiple answers
- Fucked (was active)
  - Was fucked (was passive)
  - Gave oral sex

- Received oral sex
- Masturbated to someone else
- Received masturbation from someone else
- Licked anally (rimming)
- Was licked anally (rimming)
- Had alcohol so that I was drunk
- Took poppers
- Took drugs (for example recreational drugs or other narcotics)
- Took Viagra/Levitra/Cialis/Kamagra
- Shared dildos/sex toys with others
- Fisted someone
- Was fisted
- Wet/scat
- Had a threesome
- Had group sex
- Received money or other compensation for sex
- Paid money or gave other compensation for sex
- Agreed beforehand to not use a condom (barebacking)
- Other:

26. Did your sex partner(s) use a condom when he fucked you?

*ONLY SHOWN TO THOSE WHO HAVE ANSWERED "RECEIVED ANAL SEX" TO QUESTION 25*

- Yes, during the entire intercourse
- Yes, but not the whole time
- No
- Do not remember/do not know

- 26B. Did your sex partner ejaculate/cum in your rectum (arse) when he fucked you (without a condom)?

*NOT SHOWN TO THOSE WHO ANSWERED "Yes, during the entire time" TO QUESTION 26*

- Yes
- No
- Do not remember/do not know

27. Did you use a condom when you fucked your sex partner(s)?

*ONLY SHOWN TO THOSE WHO HAVE ANSWERED "Fucked" TO QUESTION 25*

- Yes, during the entire intercourse
- Yes, but not the whole time
- No
- Do not remember/do not know

- 27B. Did you ejaculate/cum in your sex partner(s) rectum (arse) when you fucked him (without a condom)? *NOT SHOWN TO THOSE WHO ANSWERED "YES, DURING THE ENTIRE TIME" TO QUESTION 27*

- Yes
- No
- Do not remember/do not know

28. Did you use lubricant (water or silicone based) when you had anal intercourse?

*ONLY SHOWN TO THOSE WHO HAVE ANSWERED "Fucked/was fucked" TO QUESTIONS 26/27*

- Yes
- No
- Do not remember/do not know

29. Did the condom tear/slip off when you had anal intercourse?

*ONLY SHOWN TO THOSE WHO HAVE GIVEN ANY CONDOM ANSWER TO QUESTIONS 26/27*

- Yes
- No
- Do not remember/do not know

30. Did your sex partner ejaculate in your mouth?

*ONLY SHOWN TO THOSE WHO HAVE ANSWERED "GIVEN ORAL SEX" TO QUESTION 25:*

- Yes
- No
- Do not remember/do not know

31. Did you ejaculate in your sex partner's mouth?

*ONLY SHOWN TO THOSE WHO HAVE ANSWERED "RECEIVED ORAL SEX" TO QUESTION 25*

- Yes
- No
- Do not remember/do not know

**Here are some questions about your habits and knowledge of tests for HIV and other sexually transmitted infections (STIs)**

32. What do you know about your HIV status?

- I do not have HIV
- I have HIV
- Unsure/do not know
- Would rather not answer

33. If you want to get tested for HIV, do you know where to get tested at short notice? *NOT SHOWN TO THOSE WHO HAVE ANSWERED "I HAVE HIV" TO QUESTION 32*

- Yes, I am completely sure
- Yes, I am quite sure
- No, I am unsure

34. When was your most recent HIV test result?

- I have never been tested for HIV
- Less than 6 months ago
- 6-12 months ago
- 1 to 5 years ago
- More than 5 years ago
- Do not remember

34B. Why have you never been tested for HIV?

You can give multiple answers

*ONLY SHOWN TO THOSE WHO ANSWERED "I have never been tested for HIV" TO QUESTION 34*

- I believe that I have not taken any risks
- I am living in a monogamous relationship with a person who does not have HIV
- I have been denied an HIV test by the healthcare system, even though I have wanted one
- I do not know where to get tested
- The clinic is not open when I could go and get tested
- It is difficult for me to get to a clinic
- I do not trust the code of confidentiality in the healthcare system
- I am afraid that staff or other visitors to the clinic will recognise me
- I do not want to know my HIV status
- I am afraid I will become ill
- There is no cure for HIV, so I see no point in getting tested
- I do not want to get tested because of the rules in the Communicable Diseases Act
- I do not want to get tested because of how the Swedish Penal Code is applied to HIV
- I am afraid I will lose my job
- I am afraid I will lose my partner
- I am afraid I will lose my family and/or friends
- I am afraid the test result would have a negative influence on my sex life
- I am afraid I will feel like a failure if I have HIV
- I am afraid the test result would affect my chances of staying in Sweden
- Other:

34C. What is your reason for not getting tested for HIV over the last five years?

You can give multiple answers

*ONLY SHOWN TO THOSE WHO HAVE ANSWERED "MORE THAN FIVE YEARS AGO" TO QUESTION 34*

- I believe that I have not taken any risks
- I am living in a monogamous relationship with a person who does not have HIV
- I have been denied an HIV test by the healthcare system, even though I have wanted one
- I do not know where I can get tested
- The clinic is not open when I could go and get tested
- It is difficult for me to get to a clinic
- I do not trust the code of confidentiality in the healthcare system
- I am afraid that staff or other visitors to the clinic will recognise me
- I do not want to know my HIV status
- I am afraid I will become ill
- There is no cure for HIV, so I see no point in getting tested

- I do not want to get tested because of the rules in the Communicable Diseases Act
- I do not want to get tested because of how the Swedish Penal Code is applied to HIV
- I am afraid I will lose my job
- I am afraid I will lose my partner
- I am afraid I will lose my family and/or friends
- I am afraid the test result would have a negative influence on my sex life
- I am afraid I will feel like a failure if I have HIV
- I am afraid the test result would affect my chances of staying in Sweden
- Other:

35. When you were last tested for HIV, what was your reason for getting tested? (you can give multiple answers) *ONLY SHOWN TO THOSE WHO HAVE EXPERIENCE WITH HIV TEST ACCORDING TO QUESTION 34:*

- I was in a new relationship
- I ended a relationship
- I regularly get tested for HIV
- I had had unprotected anal intercourse with a new/casual partner
- I had had unprotected oral sex with a new/casual partner
- The condom slipped off/broke during sex
- I had had sex with a person that I know has HIV
- I had symptoms of HIV or another sexually transmitted infection (STI)
- My partner had symptoms of an STI or had had unprotected sex with someone else
- I was contact traced for HIV or another STI
- Health check/screening
- Do not remember/do not know
- Other:

36. Where did you have your most recent HIV test?

*ONLY SHOWN TO THOSE WHO HAVE EXPERIENCE WITH HIV TEST ACCORDING TO QUESTION 34:*

- At a special clinic for men who have sex with men (for example Venhälsan or Gayhälsan)
- At another clinic for sexually transmitted infections (e.g. sexual health, infection or venereology clinic)
- CheckPoint (RFSL, Malmö)
- Noaks Ark, Stockholm
- Youth clinic
- Abroad
- Self-test/home test
- Health centre
- Other:

37. Did you receive any of the following offers in relation to your last HIV test?

You can give multiple answers

*ONLY SHOWN TO THOSE WHO HAVE EXPERIENCE WITH HIV TEST ACCORDING TO QUESTION 34:*

- Test with results within 30 minutes, known as a rapid test
- Counselling at the test occasion
- Results given at the test occasion/at a follow-up visit to the clinic
- Test for other sexually transmitted infections (STIs)
- Vaccination against hepatitis
- Further counselling offer
- No offer
- Other offer:

38. Which of the following have you been vaccinated against?

- Hepatitis A
- Hepatitis B
- Human papillomavirus (HPV)
- None of the above
- Do not remember/do not know

39. Have you ever been tested or examined for sexually transmitted infections (STIs), such as gonorrhoea, chlamydia, syphilis, genital warts or genital herpes?

- Yes, less than 6 months ago
- Yes, 6-12 months ago
- Yes, more than a year ago
- No
- Do not remember/do not know

40. Where were you last tested for these STIs?

*ONLY SHOWN TO THOSE WHO HAVE EXPERIENCE WITH STI TEST ACCORDING TO QUESTION 39:*

- At a special clinic for men who have sex with men (for example Venhälsan or Gayhälsan)
- At another clinic for sexually transmitted infections (e.g. sexual health, infection or venereology clinic)
- Youth clinic
- Abroad
- Self-test/home test
- Health centre
- Somewhere else:

41. Did you receive any of the following offers in relation to your last STI test?

You can give multiple answers

*ONLY SHOWN TO THOSE WHO HAVE EXPERIENCE WITH STI TEST ACCORDING TO QUESTION 39:*

- Getting tested in the throat and rectum (in addition to urine sample)
- Counselling at the test occasion
- A return visit to receive test results
- Test for HIV and/or other STIs
- Vaccination against hepatitis

- Vaccination against human papillomavirus (HPV)
- Further counselling offer
- No offer
- Other offer:

42. Within the last 12 months, have you found out that you have any of the following sexually transmitted infections (STIs)? (you can give multiple answers)

- Gonorrhoea
- Chlamydia
- Syphilis
- Genital warts/HPV
- Genital herpes
- Hepatitis A
- Hepatitis B
- Hepatitis C
- Lymphogranuloma venereum (LGV)
- Other STI:
- None of the above
- Do not know
- Would rather not answer

**Now, there are only a few questions left.**

Firstly, we would like to know whether you have received any HIV preventive information in the last 12 months. (Yes, several times, Yes, a few times, No, Do not remember)

43A. Have you, within the last 12 months, talked about HIV, STIs or safe sex with anyone who works with HIV, STIs or HIV tests?

43B. Have you received free condoms within the last 12 months? (For example at cruising locations, from condom distributors, when getting tested or sent to your home by mail for free)

43C. Have you read on the internet/mobile phone about HIV, STIs or safe sex within the last 12 months?

43D. Have you read about HIV, STIs or safe sex in pamphlets, newspaper advertisements (for example Kom ut or QX) or any other printed material within the last 12 months?

44. How would you assess your knowledge within the following areas? (Very good, Good, Neither good nor bad, Bad, Very bad)

HIV

STIs other than HIV

What it is like living with HIV

Post-exposure prophylaxis (PEP) against HIV

How various STIs are transmitted

How to have anal intercourse without tearing the condom

How to tell others than I am homosexual/bisexual

How I can talk to a sex partner about HIV status

How I get a relationship to work well

My opportunities if I would like to have a child

Other:

45. Which services would you like access to? (YES, NO, DO NOT KNOW)

Pamphlets about HIV, STIs and safer sex  
Information on the internet/mobile phone about HIV, STIs and safe sex

Chat rooms with online counselling to talk about HIV, STIs and safe sex

Sexual health clinics catering to men who have sex with men

Rapid HIV tests that give results at the test occasion

To test for HIV and STIs outside the healthcare system, such as at gay venues or NGOs (non-governmental organisations).

SMS reminders for HIV tests and other STIs, e.g. every 6 or 12 months.

To remain anonymous when HIV testing

Information from a counsellor about HIV, STIs and safe sex.

Participate together with others in training about HIV, STIs and safe sex

Vaccination against hepatitis A or B

Vaccination against human papillomavirus (HPV)

Get condoms and lubricant sent home by mail

Get condoms and lubricant at venues where men who have sex with men meet.

Talking to a counsellor working in a health care setting about sexuality and health

Support group that deals with issues/problems surrounding sexuality and health

Counselling about having children

Other:

46. When did you last visit any of the following meeting places: (Within the last 24 hours, Within the last week, 1-4 weeks ago, 1-6 months ago, 6-12 months ago, More than 12 months ago, Have never visited any/do not remember)

Café, bar or pub for LGBTQ persons

Festivals, such as Pride or a gay film festival

Internet site/mobile telephone app (except for QX Cruiser) for LGBTQ persons

Nightclub for LGBTQ persons

Gay sauna

Gay cruise vacation

Sex club, sex party or a "dark room" in a bar

Private sex party in someone's home

Video club/porn cinema

Cruising spot where men meet for sex (such as parks, beaches, public baths, public toilets, picnic areas)

Meeting place for those interested in fetishes/S&M/leather

47. Are you or have you been a member of any organisation/association for LGBTQ persons?

I am a member

I have been a member

I have never been a member

48. How often do you log on to Qruiser?

- Every day
- A few times per week
- A few times per month
- More seldom

**The last two questions are about blood-donation. Just like all other questions in this survey, these questions are optional.**

49. If you meet the requirements set out in the rules for blood-donation, would you want to give blood?

*NOT SHOWN TO THOSE WHO HAVE ANSWERED "I HAVE HIV" TO QUESTION 32*

- Yes
- No

Do not know/would rather not answer

50. Have you at any time within the last 12 months given blood in Sweden?

*NOT SHOWN TO THOSE WHO HAVE ANSWERED "I HAVE HIV" TO QUESTION 32*

- Yes
- No
- Do not know/would rather not answer

**Finally, we would like to know:**

51. If you have any comments about what it was like to answer the survey, or if you have anything to add, there is space for that here. You are also welcome to give suggestions about how HIV prevention could be improved.

## APPENDIX II: INTERVIEW GUIDE (STUDY IV)

### INTERVJUN INLEDS MED EN STRUKTURERAD DEL

- Hur gammal är du?
- Bor du i Berlin eller är du här regelbundet?
- Finns det andra städer som du är i regelbundet eller bostad i senaste tre åren?
- Lever du någon form av relation?
- Hur ser den relationen ut?
- Har du barn?
- Vad har du för utbildning?
- Vad har du för sysselsättning?
- Lever du med hiv?

### 1. BERLIN

#### (a)

Hur kommer det sig att du flyttade till Berlin?

*(Utforska i termer av push/pull-faktorer.)*

- När flyttade du hit?
- Hur ofta är du i Sverige?

#### (b)

Hur kommer det sig att du väljer att resa till Berlin?

*(Utforska Berlin i relation till andra resmål.)*

- Hur ofta är du i Berlin?
- När började du åka hit/dit?

Vad hade du för bild av Berlin innan du kom hit första gången?

- Hur väl stämde den bilden med din upplevelse?
- Har/Hur har den bilden förändrats?

Vad är Berlin för dig idag?

*(Utforska stadens betydelse för informanten som person. Utforska även Berlin i relation till hemort)*

### 2. SYFTE MED DEJTING

För vilka syften träffar du killar eller män just nu?

Vad för män går du igång på?

*(Utforska ålder, nationalitet, maskulinitet/femininitet samt fysiska attribut och inre egenskaper.)*

- Är det den typen av man som du brukar ha sex med/dejta?
- Finns det samma man du söker för relation som du söker för mer sexuella träffar?

### 3. ARENOR OCH DEJTING

Hur träffar/träffade du potentiella partners i Berlin?

*(Utforska egenskaper olika arenorna och hur de relaterar till varandra)*

- Kan du beskriva kulturen på den platsen?
- Hur interagerar du med människor där?

### 4. SEX

Hur upplever du dejting- och sexkulturen i Berlin?

*(Utforska likheter och skillnader med hemorten.)*

Vad för typ sex har du?

- Hur tänker du kring termer som top/bottom/vers?
- Vad har du för erfarenhet av trekant eller gruppsex?
- Upplever du att du är delaktig i någon form av subkultur?
- Har du någon gång köpt eller sålt sex?
- Upplever du att det finns en skillnad i ditt sexliv i en relation jämfört med mer casual sex?

Hur mycket sex har du?

*(Utforska likheter och skillnader med hemorten)*

*(Utforska engångshändelser och återkommande icke-stadiga partners.)*

### 5. HIV OCH SÄKRARE SEX

Hur tänker du kring hiv och könssjukdomar?

*(Utforska likheter och skillnader med hemorten.)*

Vad har du för tankar och upplevelse av kondomanvändande?

- Praktiserar du säkrare sex? (*Proba vad personen lägger i begreppet.*)
- Vem introducerar kondomen eller en diskussion om säkrare sex?
- Har ditt kondomanvändande förändrats över tid?
- Finns det sammanhang då du har sex utan kondom?
- Är det skillnad i hur du tänker när du har sex i Sverige jämfört med utomlands?

Vad har du för inställning till riskreducerande strategier som oskyddat samlag med ejakulation utanför kroppen?

Känner du till vad PrEP är?

*(Red ut begreppet vid behov. Utforska PrEP utifrån kondomanvändning och föreställning om hivöverföring och risk)*

- Har du kommit i kontakt med PrEP?
- Hur tänker du kring att själv använda PrEP?
- Hur tänker du kring andras användande av PrEP?

## 6. TESTNING

Har du testat dig för hiv eller en könssjukdom?

*(exkludera hiv om personen kommit ut som hivpositiv eller om personen passat den frågan.)*

Har du testat positivt för någon könssjukdom?

- Hur upplevde du det?
- Fick det någon konsekvens för dig?

Vad var anledningen till ditt senaste test?

- När och var var det?
- När och var testar du dig vanligtvis?

## 7. ALKOHOL OCH DROGER

Hur ser du på drickandet av alkohol i Berlin i en gaykontext?

- Dricker du alkohol?  
*(Proba syfte, kontext och konsekvens.)*  
*(Utforska likheter och skillnader med hemorten.)*

Hur ser du på droganvändningen i Berlin i en gaykontext?

- Använder du droger?  
*(Proba syfte, kontext och konsekvens.)*  
*(Utforska likheter och skillnader med hemorten.)*

Hur tänker du kring poppers i samband med sex?

- Använder du poppers?  
*(Proba syfte, kontext och konsekvens.)*  
*(Utforska likheter och skillnader med hemorten.)*

*Om personen uttrycker att den inte använder droger och/eller alkohol,*

- Hur ser du på andras användande?

## 8. LEVA MED HIV

Hur upplever du situationen för hivpositiva i Berlin?

*(Utforska likheter och skillnader med hemorten.)*

Är hiv något som diskuteras i samband med en dejt?

Hur tänker du på hiv i relation till smittsamhet?

*(Utforska utifrån Treatment as Prevention)*

## 9. ÖVRIGT

Är det något annat du skulle vilja dela med dig av som kan ha relevans för det här projektet?

Känner du någon som skulle passa in och vara intressant för mig att intervjua?

## APPENDIX III: SEARCH STRATEGIES AND ARTICLES IDENTIFIED

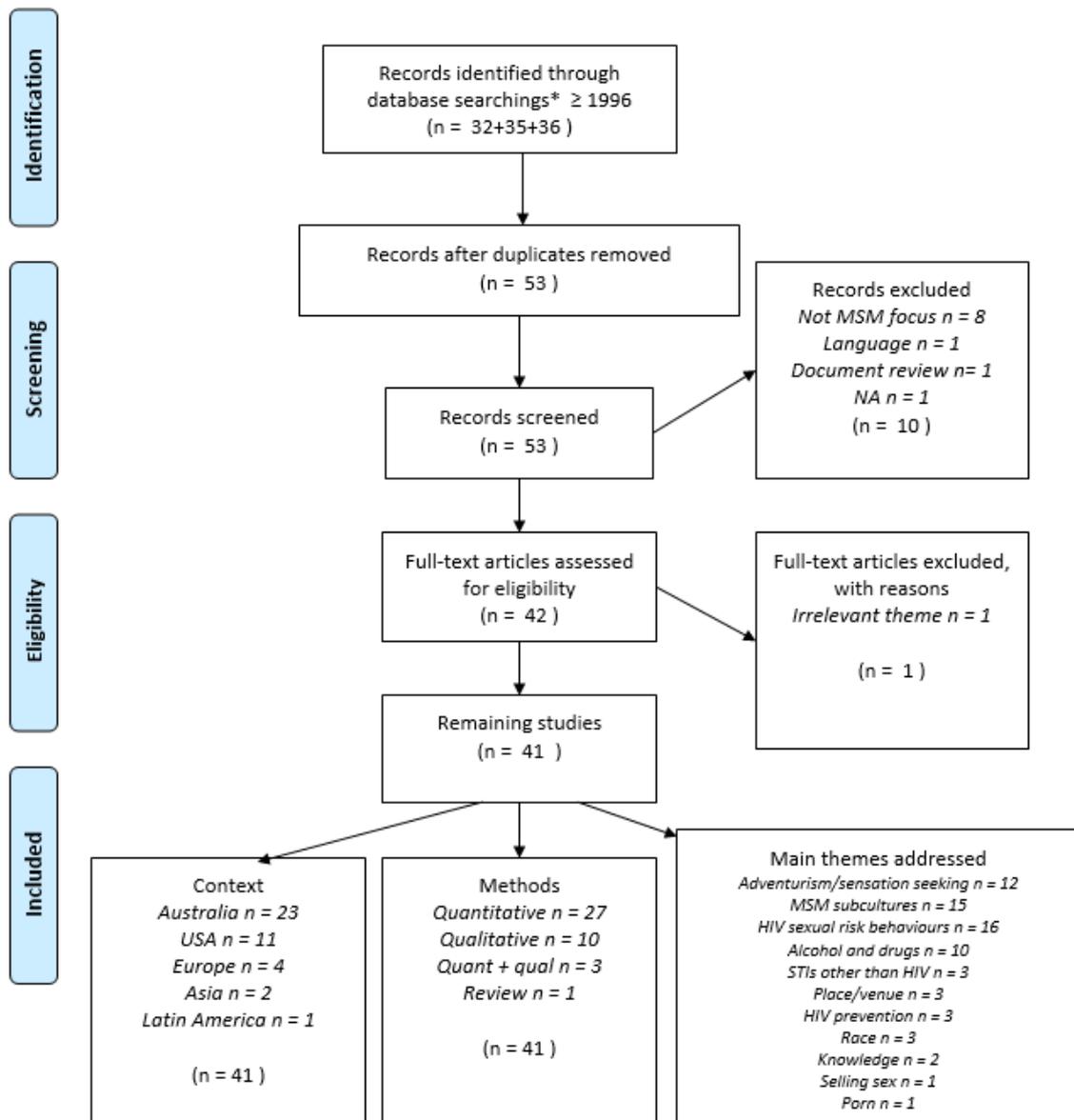
### Search aim: identifying sub-groups with high risk of HIV among MSM

*PubMed (2016-10-04 and 2018-01-10)*

((HIV[MeSH Terms] OR HIV) AND ((homosexual[MeSH Terms] OR msm) AND (adventur\* OR subcult\*)))

*Web of Science (2018-08-10)*

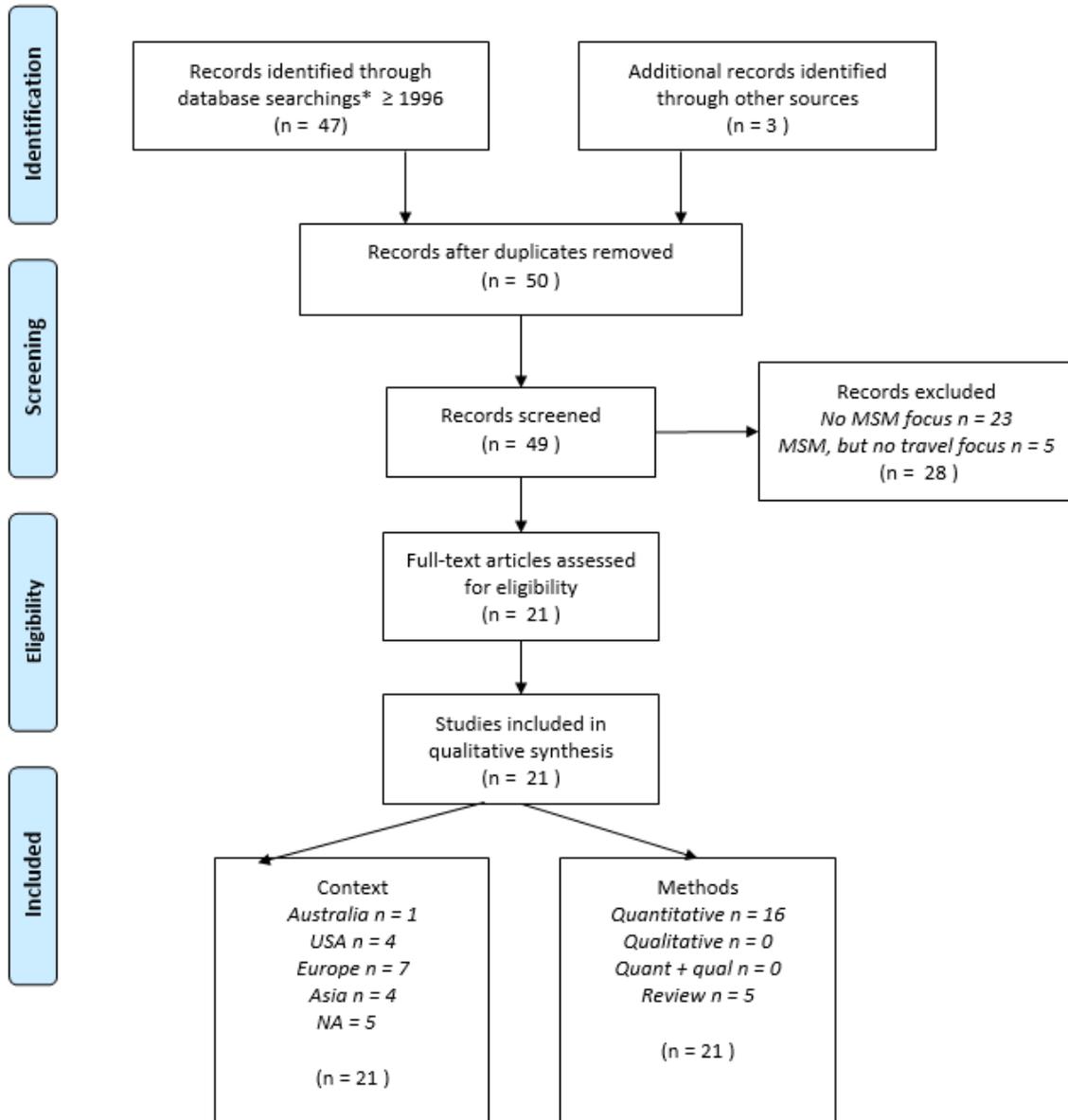
TS=((MSM OR men who have sex with men OR homosexual OR bisexual OR gay)) AND TS=((adventur\* OR "broad sexual repertoire" OR esoteric OR subcult\*)) AND TS=((HIV OR STI OR "sexually transmitted infection" OR STD OR "sexually transmitted disease")) AND TS=(("risk behavi\*") OR ("risk factor") OR ("sexual practic\*"))



**Search aim: Sexual risk behaviour while travelling abroad among MSM**

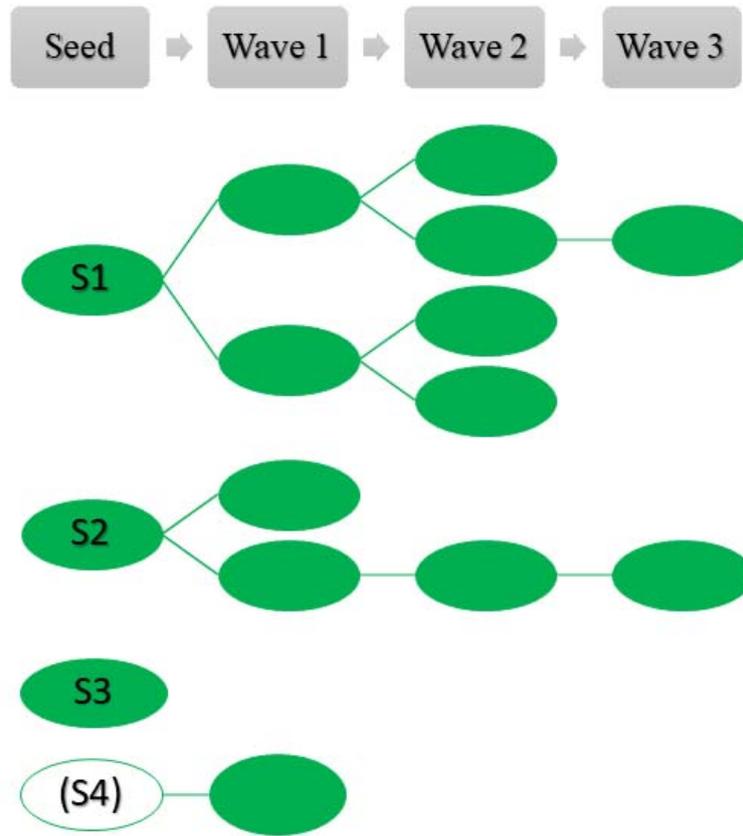
*Web of Science (2016-10-18, 2018-01-10)*

((MSM OR men who have sex with men OR homosexual OR bisexual OR gay))  
 AND TOPIC: ((HIV OR STI OR “sexually transmitted infection” OR STD OR  
 “sexually transmitted disease”)) AND TOPIC: (“risk behavi\*”) OR (“risk factor”)  
 OR (“sexual practic\*”)) AND TOPIC: (travel)



#### APPENDIX IV: RESPONDENT DRIVEN SAMPLING CHAINS

The three original seeds (S1-3), the additional fourth seed (which was not interviewed) and their referrals



## APPENDIX V: OVERVIEW OF SWEDISH SEXUAL BEHAVIOUR SURVEYS

Survey	Year	Age group	Number of respondents/ response rate (%)	Data collection	Target group
<b>Sex in Sweden</b> <sup>26</sup>	1995-1996	18-74	2 810/59%	Interview survey, random selection	General population
<b>MSM1998</b> <sup>2</sup>	1998	14-85	1 401/-	Postal and self-selected internet surveys	MSM
<b>MSM2006</b> <sup>42</sup>	2006	15-76	3 202/-	Self-selected internet survey	MSM
<b>MSM2008</b> <sup>43</sup>	2008	15-77	4 715/-	Self-selected internet survey	MSM
<b>UngKAB09</b> <sup>162</sup>	2009	15-29	15 278/24%*	Postal random selection survey and self-selected internet survey	Youth and young adults
<b>EMIS2010, Swedish sub-sample</b> <sup>94</sup>	2010	15-79	3 269/-	Self-selected internet survey	MSM
<b>HIV in Sweden</b> <sup>27,33</sup>	2011	16-49	1 862/25%/23%	Postal and web-panel surveys	General population
<b>MSM2013</b>	2013	15-108	2 751/19%	Stratified survey in internet community	MSM
<b>Sialon II, Swedish sub-sample</b> <sup>146</sup>	2013	18-81	377/-	Time-Location sampling (TLS)	MSM
<b>MSM RDS survey</b> <sup>3</sup>	2013	19-73	123/-	Respondent driven sampling (RDS)	MSM
<b>Ungdomsbarometern</b> <sup>165</sup>	2014	15-24	5 196/-	Stratified survey combining random- and self-selection	Youth and young adults
<b>UngKAB15</b> <sup>163</sup>	2015	16-29	7 865/26%	Postal random selection survey	Youth and young adults
<b>HIV in Sweden</b> <sup>28</sup>	2016	16-84	11 182/38%	Postal random selection survey	General population
<b>Health on equal terms</b> <sup>34</sup>	2004-2016	16-84	***/47-61%	Postal random selection survey	General population

\*response rate denotes only the postal random selection survey sample

\*\*response rates for postal survey and web panel respectively

\*\*\*Details on number of respondents and response rates for each year are found at

<https://www.folkhalsomyndigheten.se/globalassets/statistik-uppfoljning/enkater-undersokningar/nationella-folkhalsoenkaten/fakta-nationella-folkhalsoenkaten-2016.pdf>

