

**The sexual behaviour and sexual health of
heterosexual-identifying men who have
sex with men: understanding an
understudied population to inform public
health policy and practice**

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Declaration of authorship

I, Tyrone Joel Curtis, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Signed _____

Date: 20/12/2021

Dedication

This thesis is dedicated to the memory of my Nana, Dawn Miles (1937-2021), an inspirational woman who never stopped learning and is truly missed every day.

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Abstract

Introduction: Sexual behaviour and identity do not always align. A small but significant proportion of men who have sex with men identify as heterosexual (H-MSM). H-MSM are a challenging population to research, and while their sexual health needs may be complex, these are currently poorly understood. This has important potential consequences for these men, their sexual partners, and the wider population. In this thesis, I use complementary methods to investigate the sexual behaviour and sexual health of H-MSM in high-income countries and consider the implications for public health policy and practice.

Methods: I systematically reviewed 43 quantitative and 21 qualitative studies of H-MSM published 2008-2018 to summarise previous research. I harmonised data for 196,426 MSM from cross-sectional surveys conducted 2010-2017 in Australia, Canada, New Zealand and 14 Western European countries, and performed individual participant data meta-analysis to produce robust statistical estimates and associations giving insight into sexual behaviours and sexual health outcomes related to STI/HIV transmission and testing. I conducted 15 semi-structured interviews with H-MSM resident in England, to explore H-MSM's decision-making regarding STI/HIV prevention and accessing sexual healthcare.

Results: H-MSM were less likely than gay-identifying MSM, and in some cases bisexual-identifying MSM, to report sexual behaviours associated with STI/HIV transmission, or to test for STI/HIV - even among H-MSM reporting greater testing need. Qualitative evidence suggested that H-MSM considered their own health and that of their female partners when making STI/HIV prevention and testing decisions, while lack of information and privacy concerns limited their access to sexual healthcare and STI/HIV prevention.

Conclusions: H-MSM are vulnerable to poor sexual health and face specific challenges in accessing sexual healthcare. My work informs novel approaches that might improve engagement between this population and health services to provide effective and holistic healthcare that generates both individual and public health benefits.

Impact statement

There has long been a strong public health focus on the sexual health and sexual behaviour of men who have sex with men (MSM), as a population heavily impacted by HIV and other sexually transmitted infections (STIs). However, the term MSM is often used synonymously with gay and bisexual identity. We know less about MSM who identify as heterosexual (H-MSM), despite British population data suggesting that H-MSM account for around 1 in 5 men reporting recent (i.e., past 12 months) sex with other men. Their desire for discretion and detachment from LGBTQ+ communities means that H-MSM are potentially less likely to access sexual health services, and from a research perspective, harder to recruit for sexual behaviour or sexual health studies. As such, we know little about the sex they have, where they get sexual health information, or how often they test for HIV or STIs. If H-MSM are at risk of poor sexual health, this has implications for the health of their sexual partners (of any gender) and hence the wider population. There is, therefore, public health benefit to understanding more about this population.

This thesis shows that while H-MSM as a population may be at lower behavioural risk of poor sexual health (including STI/HIV exposure) than gay and, to lesser extent, bisexual MSM, a significant proportion are still at high risk of poor sexual health. Low levels of STI/HIV testing suggest unmet sexual health need among this population. These findings suggest a need to reach H-MSM with relevant sexual health information, including accurate information on the STI/HIV transmission risks of the sex they have, HIV prevention measures such as PrEP, and STI/HIV testing options.

This thesis offers suggestions to help sexual health services to better engage H-MSM. It shows that H-MSM are unlikely to connect with information or interventions aimed solely at gay men, and that outreach efforts that incorporate their social identities or priorities (e.g. masculinity, concern for the health of female partners) might be more successful.

This thesis also suggests ways to improve STI/HIV testing among H-MSM. It shows the need for sexual health services to provide multiple ways of testing, to suit the lifestyles and privacy requirements of H-MSM in a variety of circumstances. In finding that H-MSM may not disclose their sex with men to healthcare providers

voluntarily, it demonstrates the need for healthcare providers not to rely on sexual identity as a proxy for sexual behaviour, but to specifically ask about the sex of sexual partners and activities engaged in. It also emphasises the importance of confidentiality and non-judgement in encouraging H-MSM to disclose to healthcare providers.

Finally, this thesis makes several methodological contributions to sexual health research. First, it demonstrates the importance of considering sexual identity alongside sexual behaviour in sexual health research. It demonstrates the feasibility of using individual participant data meta-analysis to study populations underrepresented in behavioural surveys. It also makes recommendations for improving behavioural surveys of MSM. Lastly, it offers suggestions of how H-MSM may be reached for recruiting to future studies.

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Glossary of abbreviations

Term	Definition
(A)CASI	(audio) computer-assisted self-interview
AD-MA	aggregate data meta-analysis
AI	anal intercourse
B-MSM	bisexual-identifying men who have sex with men
B-MSMW	bisexual-identifying men who have sex with men and women
BS21	Behavioural Surveillance for HIV and Sexual Health in Gay Men and other MSM in the 21st Century
CAI	condomless anal intercourse
CAPI	computer-assisted personal interview
CDC	US Centers for Disease Control and Prevention
COM-B	Capability, Opportunity and Motivation Model of Behaviour
CVAI	condomless vaginal or anal intercourse
DSH	UCL's Data Safe Haven
EMIS	European Men's Internet Survey
FWB(s)	friend(s) with benefits
GAPSS	Gay Auckland Periodic Sex Survey
GCPS	Gay Community Periodic Surveys
GHB/GBL	gamma-hydroxybutyrate / gamma-butyrolactone
G-MSM	gay-identifying men who have sex with men
G-MSMW	gay-identifying men who have sex with men and women
GOSS	Gay men's Online Sex Survey
GP	general practitioner (primary
HCP	healthcare providers
H-MSEW	heterosexual-identifying men who have sex exclusively with women
H-MSM	heterosexual-identifying men who have sex with men
H-MSMW	heterosexual-identifying men who have sex with men and women
HIV	human immunodeficiency virus
HPV	human papillomavirus
IDU	injecting drug user
IPD	individual participant data
IPD-MA	individual participant data meta-analysis
LGBTQ+	lesbian, gay, bisexual, transgender, queer, and associated communities
MFM	male-female-male (sexual activity involving two men and a woman)
MSEW	men who have sex exclusively with women
MSM	men who have sex with men
MSMO	men who have sex with men only
MSMW	men who have sex with men and women
MSW	men who have sex with women
Natsal	National Survey of Sexual Attitudes and Lifestyles

NHBS	National HIV Behavioral Surveillance System
OR / aOR	odds ratio / adjusted odds ratio
PEP	HIV post-exposure prophylaxis
PIS	participant information sheet
PR / aPR	prevalence ratio / adjusted prevalence ratios
PrEP	HIV pre-exposure prophylaxis
RDS	respondent-driven sampling
SHC	sexual health clinic
SN11/15	Sex Now 2011 / Sex Now 2015
SOP	sex-on-premises
STI	sexually transmitted infection(s)
TLS	time-location sampling
VAI	vaginal or anal intercourse
WHO	World Health Organisation

1. Introduction

1.1 Overview

There has long been a strong public health focus on the sexual behaviour and sexual health of men who have sex with men (MSM), as a population heavily impacted by HIV and other STIs. However, the term “MSM” has come to be synonymous with gay- and (to a lesser extent) bisexual-identifying MSM (G-MSM and B-MSM respectively),¹ with relatively little attention given to other MSM, including those identifying as heterosexual (H-MSM). Data from Britain’s Natsal-3 study estimate that H-MSM make up as much as 70% of MSM based on lifetime sexual behaviour, and 22% of MSM based on sexual behaviour in the past year. Estimates from population studies from other countries suggest similar.²⁻⁵ However, recruitment challenges mean that H-MSM typically constitute as little as 1% of participants of studies of MSM sexual health. As a result, we know relatively little about the sexual behaviour and sexual health of H-MSM.

However, there is reason to believe that H-MSM may be at a particular risk of poor sexual health. As a sexual minority population, they may suffer from unique social stressors linked to poor sexual health.⁶⁻¹⁰ Simultaneously, they may lack the support from community and others to alleviate this stress.^{11 12} These men may be less exposed to the sexual health norms of the gay community,¹³ as well as sexual health promotion that takes place in that community.^{14 15} They may also be less likely to disclose their sexual behaviour to healthcare providers (HCPs),^{16 17} and so may be less likely to be offered relevant sexual healthcare.¹⁸⁻²⁰ All of these may contribute to an increased likelihood of poor sexual health compared to the general population.

Poor sexual health among H-MSM can also have an impact more widely, affecting both their male and female sexual partners. In particular, H-MSM may be less inclined to disclose their sex with men to female partners,^{21 22} meaning those partners are less informed about their own potential exposure to HIV or STIs. As a result, there is interest in H-MSM (along with other men who have sex with men and women (MSMW)) as a population that may facilitate transmission of HIV and STIs between MSM and heterosexual (men who have sex with women (MSW) and women) sexual networks.²³ H-MSM may therefore experience a disproportionate

public health burden due to unaddressed sexual health needs that put them and their sexual partners at risk of poor sexual health.

It is therefore important that we develop a better understanding of this population, so that health services can provide effective and holistic healthcare that benefits H-MSM and the wider population. In this thesis, I aim to close the gaps in our understanding of the sexual behaviour and sexual health of H-MSM. To do this, I have adopted a mixed methods approach using complementary research methods that take into account the methodological challenges of studying this population. I also consider the implications of my findings for public health policy and practice.

1.2 Research focus

This thesis focuses on heterosexual-identifying MSM, a population defined by the intersection of the two dimensions of sexual orientation most relevant to sexual behaviour and sexual health research: sexual behaviour and sexual identity.²⁴

1.2.1 Definition of H-MSM

In this thesis, the term “H-MSM” is used to refer to MSM identifying as either heterosexual or straight (terms which are often used interchangeably). Similarly, “G-MSM” refers to MSM identifying as gay or homosexual, while “B-MSM” refers to MSM identifying as bisexual. Importantly, “H-MSM” is not used to refer to men identifying as down low. Though this term gained prominence through mainstream media use referring to African American MSM identifying as heterosexual, there is evidence to suggest that down low is its own sexual identity,^{25 26} and one which indicates a greater level of acceptance of same-sex sexuality than heterosexual identification.²⁷

1.2.2 Geographic focus

The meaning and acceptability of gay or bisexual identification varies culturally.^{1 28} Therefore, to ensure comparability whilst broadening my geographical focus to maximise the available literature and data for this relatively understudied population, this thesis concentrates on H-MSM in high-income countries, specifically those in Western Europe, Australasia, and North America. These are relatively progressive countries, the majority now with same-sex marriage and other measures of LGBTQ+

equality and less (though still present) discrimination and homophobia, thus, posing fewer reasons for MSM not to openly identify as gay or bisexual.²⁸

1.3 Thesis aims

The overarching hypothesis of my thesis is that H-MSM exhibit different sexual behaviour and sexual healthcare-seeking behaviour when compared with G-MSM and B-MSM. As a result, they have unmet sexual health needs that put both them and their sexual partners at risk of poor sexual health outcomes. Reasons for this may be a lack of exposure to the behavioural norms of, and sexual health campaigns promoted within, the LGBTQ+ community, but also as a result of distinct attractions and motivations related to their sexual identity.

My thesis aims to improve understanding of the sexual behaviour and sexual health of H-MSM. Specifically, the aims of this thesis are to:

1. Describe and characterise H-MSM in high-income countries in Western Europe, Australasia, and North America, in terms of their sociodemographic characteristics, sexual behaviour, sexual health, and use of sexual health services.
2. Compare the sexual behaviour, sexual health, and use of sexual health services of H-MSM with those of G-MSM and B-MSM.
3. Understand H-MSM's perception of HIV and STI transmission risk with respect to the sex they have; and how this influences their approach to HIV and STI prevention and risk reduction with their sexual partners.
4. Understand H-MSM's attitudes towards sexual health and sexual healthcare, including accessing sexual healthcare services and STI/HIV testing behaviour in relation to guidelines.
5. Consider the implications of these findings for public health policy and practice.

1.4 Thesis structure

This thesis is comprised of eight chapters.

Chapter 2: I provide the background for this research. After first discussing the three main components of sexual orientation as seen in research, I then provide estimates of the prevalence of H-MSM in the general population, and discuss motivations for

MSM to identify as heterosexual. I then discuss motivations for and challenges of studying H-MSM, before explaining why we might suspect H-MSM are at risk of poor sexual health.

Chapter 3: I describe the methodology used for each component of this thesis, including statistical and qualitative analysis techniques. I also describe the sources of data used.

Chapter 4: I present the findings of my systematic review of literature about the sexual behaviour and sexual health of this population published between 2008 and 2018.

Chapter 5: The previous chapter demonstrates the lack of robust quantitative evidence available on the behaviour and health of H-MSM. Here, I present the findings from a meta-analysis of individual participant data from 13 surveys from four studies in Europe, Australia, New Zealand, and Canada.

Chapter 6: I explore how H-MSM perceive STI/HIV transmission and acquisition risk of the sex they have, and STI/HIV prevention and risk reduction strategies they utilise, using qualitative data from one-to-one semi-structured interviews I conducted with 15 H-MSM resident in England.

Chapter 7: The analysis presented in Chapter 5 shows that H-MSM are less likely than G-MSM, and in some cases B-MSM, to test for HIV and STIs. In this chapter, I present more findings from my one-to-one interviews with H-MSM, in this case, exploring the barriers and facilitators to accessing sexual healthcare, including HIV and STI testing.

Chapter 8: I summarise and integrate the findings from this thesis, and summarise the strengths and limitations of this research. I also discuss the implications of this research for sexual health promotion, sexual healthcare policy and practice, and implications for future research.

1.5 Role of the candidate

The idea for this thesis came from a discussion at a meeting of the BS21* Network in August 2017, at which H-MSM were identified as an under-researched population that could potentially experience a disproportionate public health burden. Following this, my supervisors and I developed a PhD proposal to focus on this population.

For the systematic review presented in Chapter 4, I wrote the review protocol and submitted it to PROSPERO.²⁹ I devised the search strategy, screened all search results, and carried out all data extraction and synthesis. Secondary screening and extraction of 10% of search results and included articles was carried out by Kirsty Bennett (UCL). My supervisors provided advice and feedback for all components of the review.

The idea for the analysis presented in Chapter 5 came from the August 2017 meeting of the BS21 Network, where members discussed how best to bring together their pre-existing survey data to study populations underrepresented therein, including H-MSM. It was my idea to combine these datasets and use IPD-MA techniques to analyse these data, having learnt about and applied IPD-MA for another paper that analysed pre-existing data from multiple health surveys in the UK to examine associations between sexual orientation identity and unhealthy weight.³⁰ All survey design, fieldwork and data cleaning were carried out by the respective project teams. I designed the meta-analysis study and analysis plans and applied to survey teams directly to request access to their data. I carried out all harmonisation of included datasets, as well as all statistical programming and interpretation. My supervisors provided input and feedback throughout all study components.

For the qualitative study presented in Chapters 6 and 7, I wrote the ethics application that was submitted to the UCL Ethics Committee, with support and guidance from Lorraine McDonagh and Cath Mercer. I led development of the topic guide, with input from my supervisors as well as from consultations I conducted with external advisors and an acquaintance who identifies as H-MSM. I devised and implemented the recruitment strategy and conducted all interviews. Interview transcription was

* Behavioural Surveillance for HIV and Sexual Health in Gay Men and other MSM in the 21st Century Network. See Appendix 1 for more information.

carried out by Transcript Divas. I carried out all analysis of interview data and interpreted the findings with guidance from my supervisors.

1.6 Research dissemination

The research presented in this thesis has been presented at a number of conferences and meetings. Below is a summary of these presentations.

Curtis T, Bennett K, McDonagh L K, et al. The sexual behaviour and health of heterosexual-identifying men who have sex with men (MSM): a systematic review. Oral presentation at: The British Psychological Society, Psychologies of Sexualities Section Annual Conference; 4-5 Jul 2019; London, UK. Awarded the Lightning Talk Prize.

Curtis, TJ. Meta-analysis of behavioural surveillance surveys: lessons learned. Oral presentation at: BS21 Network meeting; 13 July 2019; Vancouver, Canada.

Curtis TJ. Individual participant data meta-analysis (IPD-MA) as a technique for studying neglected populations. Invited oral presentation at: STI & HIV World Congress Pre-Congress Symposium panel titled “BS21 Network: Behavioural surveillance for HIV and STIs in the 21st Century”; 14 July 2019; Vancouver, Canada.

Curtis T, Bennett K, McDonagh L K, et al. The sexual behaviour and health of heterosexual-identifying men who have sex with men (MSM): a systematic review. Poster at: STI & HIV World Congress (Joint Meeting of the 23rd ISSTD and 20th IUSTI); 14-17 Jul 2019; Vancouver, Canada.

Curtis TJ, Field N, McDonagh LK, et al. Sexual behaviour and STI/HIV testing among heterosexual-identifying MSM in high-income countries: an individual participant data meta-analysis. Poster at: BASHH Annual Conference; 19-21 Oct 2020; virtual.

Curtis TJ, Mercer CH, Field N, et al. “If they ask, I will tell them”: Attitudes towards accessing sexual healthcare among heterosexual-identifying MSM in England. Oral presentation at: 5th Joint Conference of BHIVA and BASHH; 19-21 April 2021; virtual. Awarded the Chloe Orkin Social Sciences Award.

Curtis T, Field N, McDonagh L, et al. O14.1 Behaviour or Identity? Differences in HIV testing by sexual identity among MSM in high-income countries: an individual participant data meta-analysis. Oral presentation at: STI & HIV World Congress. 14-17 Jul 2021; virtual.

Curtis TJ, Mercer CH, Field N, et al. O15.6 “If they ask, I will tell them”: Attitudes towards accessing sexual healthcare among heterosexual-identifying MSM in England. Oral presentation at: STI & HIV World Congress. 14-17 Jul 2021; virtual.

Panellist for live talk show entitled “Access to HIV testing/care for diverse communities” at STI & HIV World Congress. 14-17 Jul 2021; virtual.

2. Background

In this chapter, I provide a brief background to H-MSM. I first discuss the three most commonly measured dimensions of sexual orientation and demonstrate that for many individuals these do not align. I then focus specifically on H-MSM, explaining why they are of public health interest, and why we believe that they may have unaddressed sexual health needs.

Throughout this thesis, I refer to both sexual and romantic partners. The term “sexual partner” refers to a person with whom someone has sex, regardless of the presence of any emotional or social relationship. The term “romantic partner” refers to a person with whom someone is in a romantic relationship, and who is usually (but not always) also a sexual partner. Where “partner(s)” is used without a description, it should be assumed that this refers specifically to *sexual* partner(s).

2.1 Sexual orientation

Sexual orientation may be defined as “an enduring pattern of or disposition to experience sexual or romantic desires for, and relationships with, people of one’s same sex, the other sex, or both sexes.”³¹ While it may be measured in multiple ways,^{32 33} the dimensions of sexual orientation typically measured are sexual attraction, sexual identity, and sexual behaviour.³⁴

2.1.1 Sexual attraction

Sexual attraction may be defined as attraction toward, or the desire to have, sexual relations with one or multiple sexes.³⁵ Sexual attraction has been argued to be the primary indicator of an individual’s innate sexual orientation,³² and is typically used to measure sexual orientation in psychological and developmental studies, as well as studies of younger populations not yet sexually active.³⁶

Survey instruments assessing attraction range from tools that capture only the presence or absence of attraction to each sex (e.g. attraction to men, to women, to both), or that explore the relative magnitude of attraction to each sex (e.g. only to males; mostly to males, equally attracted to males and females etc.).³⁶ More recent

studies have also recognised the need to consider attraction to those of non-binary gender, asking participants also about attraction to trans men, trans women and genderqueer.³⁷

2.1.2 Sexual identity

Sexual identity has been defined as the “personally selected [...] labels attached to the perceptions and meanings individuals have about their sexuality.”³⁵ An individual’s sexual identity may be chosen based not only on their own perception of their sexual behaviour and/or attraction, but also on their sense of social or collective identity, i.e., their feeling of being part of a wider community based on shared sexual orientation.³¹ The formation of one’s sexual identity, especially if in a sexual minority (i.e., different from the surrounding majority), is therefore a complex process of self-categorisation and social comparison, which can also be influenced by other identities an individual holds, such as those related to ethnicity, religion, nationality and class.³⁸ Sexual identity, like other identities, is important because it implies not only identification with, but also socialisation and interaction within, a community, resulting in exposure to, and potential influence under, that community’s behavioural norms.

Sexual identity is often measured alongside outcomes resulting from social interactions e.g. homophobia, discrimination, victimisation, disadvantage.^{32 39 40} It is also considered the least socially sensitive indicator of sexual orientation, and so is more likely to be included in household or governmental surveys as well as in psychological or social studies.⁴⁰ However, it may sometimes be labelled using the umbrella term of ‘sexual orientation’ despite sexual identity being just one component as described here.⁴¹

Common practice when measuring sexual identity is to ask participants to select which one sexual identity of a number (e.g. *heterosexual/straight, bisexual, or gay/lesbian*) they “think” or “consider” themselves to be.^{31 36 39} Measuring sexual identity in this way fails to recognise that many identify somewhere “between” the sexual identity labels offered, or that they may simultaneously hold multiple sexual identities,⁴²⁻⁴⁴ and instead forces individuals to choose one (and only one) identity that may not accurately reflect their identity,⁴¹ or choose a non-specific option such as *other*.¹⁴ As an individual’s identity or identities can influence others’ perceptions of

them, with implications for their actions towards them,⁴⁵ an individual's *public* sexual identity (i.e. how they identify to others) may also differ from their *private* sexual identity.^{38 44} This can further complicate measurement of sexual identity, as the mode of data collection can affect individuals' perceptions of privacy, thus influencing their willingness to accurately report self-identification.³⁶

2.1.3 Sexual behaviour

Sexual behaviour may be defined as “mutually voluntary activity with another person that involves genital contact and sexual excitement or arousal.”³⁴ Behavioural categorisation of sexual orientation is typically temporal, based on participants' responses to one or more questions about their lifetime or more recent (e.g. previous year) sexual behaviour. Typical questions asked include the gender of sexual partners (where what constitutes a sexual partner is predefined to avoid confusion), the number of sexual partners of each sex, as well as whether they engaged in specific sexual acts (e.g. oral intercourse, anal intercourse (AI)) with partners of each sex.³⁶ The latter questions may enable more accurate categorisation, particularly when there is confusion among participants about whether certain acts constitute sex.^{34 46 47} Exact categorisation will depend on the objective of the study.

Men participating in sexual behaviour studies are typically classified as either men who have sex exclusively with women (MSEW) or MSM, the latter category often including men who have sex with men and women (MSMW), though this group is sometimes referred to separately. Of the three sexual orientation dimensions, sexual behaviour is the most commonly used measure of sexual orientation in public health studies, having the most direct link to STI/HIV transmission, and avoiding the stigmatisation that can result from classification based on sexual identity.¹ However, classification based on sexual behaviour has some criticisms. One such criticism is that it undermines sexual minorities' own self-determined sexual identities, reducing them to their behaviour and removing any element of community.^{1 48} Additionally, behavioural categorisation, especially that based on short-term sexual behaviour, is particularly problematic with regards to bisexuality, as it correlates poorly to bisexual identification and produces unreliable associations between bisexuality and sexual risk factors due to the definitional link between behavioural bisexuality and number of sexual partners (individuals classified as behaviourally bisexual must, by definition,

have reported at least two sexual partners in the specified time period, compared to only one partner for individuals in other categories).⁴⁹

2.2 Discordance between dimensions of sexual orientation

For most people, the three main dimensions of sexual orientation align. However, evidence suggests this is not true for a small but significant proportion of the population.

2.2.1 Evidence for discordance of sexual orientation

The US National Health and Social Life Survey (1992) was one of the first nationally-representative studies to measure multiple dimensions of sexuality, finding substantial differences in the proportions of men reporting any single component of same-sex sexual orientation.³⁴ Recently, the US National Survey of Sexual Health and Behavior (2015) found 8.0% of men reported sexual attraction to men, 5.7% reported sex with another man in the past year, and 6.2% reported gay or bisexual identity.³⁷ Using data from Britain's third National Survey of Sexual Attitudes and Lifestyles (Natsal-3), collected in 2010-2012, Geary et al. also found these differences, with 6.5% of men reporting some same-sex attraction and 5.5% reporting ever having any same-sex sex (same-sex experience with genital contact), but only 2.5% of men reporting gay or bisexual identity.⁵⁰ Similar discordance between sexual identity, attraction, and behaviour have been reported for Australia,² ⁵¹ France,³ New Zealand,⁵² and Canada.⁵³ In all cases, the proportion of men *identifying* as gay or bisexual underestimates the size of the MSM population. Further complexity is observed in cohort studies, which have shown that all three dimensions of sexual identity may change over time for some individuals, further increasing potential for discordance.⁵⁴

2.2.2 Implications of sexual orientation discordance for research

Studies that define their population of interest by a single measure of sexual orientation therefore make an assumption that this measure reflects all three domains, which may lead to invalid inferences. Of relevance to this thesis, studies reporting on the sexual behaviour or sexual health of MSM that do not take sexual identity into account fail to consider that differences in risk or healthcare-seeking behaviours may exist between MSM of different sexual identities, just as differences

exist by other sociodemographic factors such as ethnicity, age and education status.^{1 48 55}

2.3 Heterosexual-identifying MSM – definition and prevalence estimates

As discussed in section 1.2, the population of interest for this thesis is heterosexual-identifying MSM (H-MSM). This is a population defined by the intersection of the two dimensions of sexual orientation most relevant to sexual behaviour and sexual behaviour research: sexual behaviour and sexual identity.²⁴ To ensure the comparability of populations while broadening the geographic scope of this thesis, focus is limited to H-MSM in relatively progressive high-income countries in Western Europe, Australasia, and North America.*

Estimating the size of the H-MSM population is challenging as few large population studies measure *both* sexual identity and sexual behaviour. Among those that do, different target populations and/or different definitions of same-sex behaviour⁵⁷ complicate direct comparisons between countries.

National population studies suggest that H-MSM (based on reporting some form of same-sex sexual activity in some particular timeframe) make up between 1-6% of the male population (Table 1). Viewed at a population level, H-MSM may not seem to represent a significant population. However, these population studies suggest that H-MSM make up between 25%-70% of all men reporting some same-sex experience. Focusing on the past decade, data from Britain's Natsal-3 (2010-12) suggest that H-MSM make up 21.7% (95%CI 14.4-31.4%) of men reporting same-sex sexual partners in the past year. Similarly, US population data suggest that 7.5% (95%CI 4.3-12.7%) of men reporting one or more same-sex partners in the past year identify as heterosexual.⁵ Therefore, while H-MSM may represent only a small proportion of the population as a whole, they make up a sizeable proportion of men reporting same-sex sexual behaviour.

*Specifically, the 23 countries in the *West of the WHO European region* (Andorra, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Spain, Sweden, Switzerland, United Kingdom)⁵⁶, Australia, New Zealand, Canada and the USA.

Table 1: Estimated prevalence of heterosexual-identifying men reporting lifetime same-sex sexual behaviour

Country	Name of study	Year	Age range of sample	Definition of same-sex (MSM) behaviour	Male population who reported MSM behaviour	MSM who identify as heterosexual	Male population classified as H-MSM
USA	National Health and Nutrition Examination Survey (NHANES)	1999-2014	18-59	Any same-sex sexual contact, lifetime	5.5% (4.8-6.1)	36.9% (30.3-44.1)	2.0% ⁵
France	Contexte de la Sexualité en France	2006	18-69	Any same-sex partners after the age of 18.	3.5%	50.3%	1.8% ³
Great Britain	National Survey of Sexual Attitudes and Lifestyles (Natsal-3)	2010-2012	16-74	Any same-sex experience, lifetime.	8.0% (7.2-8.8)	68.9% (63.8-73.6)	5.5% (4.8-6.2)
				Any same-sex genital contact, lifetime	5.5% (4.9-6.2)	59.5% (53.3-65.4)	3.3% (2.8-3.9) [§]
Australia	Australian Survey of Health and Relationships (ASHR2)	2012-2013	16-69	Any homosexual experience (including kissing, touching, intercourse or any other form of sex).	6.4%	56.3%	3.6% ²
Germany	German Male Sex-Study	2014-2016	All aged 45 years	Any sexual experience with a man, lifetime	6.1%	24.9%	1.5% ⁴

[§]Natsal-3 figures are from my own calculations.

2.4 Reasons for heterosexual-identification among MSM

In this section, I will briefly discuss why men may identify as heterosexual despite reporting sexual activity with other men.

2.4.1 Genuine identification as heterosexual

Some H-MSM see no incompatibility between heterosexual identity and same-sex sexuality, do not relate to gay culture, or see same-sex activity as a small and private part of their lives, not important enough to form a significant component of their social identity.^{38 44 58 59} They may feel that their sexual encounters with men are too infrequent, are just a form of male bonding,^{60 61} occur only under certain circumstances (e.g. under the influence of alcohol or drugs^{62 63}), are simply recreational or experimental (sometimes with female partners^{59 64}), or are out of “necessity” (e.g. due to reduced sexual activity with their wife or girlfriend^{58 61}), and lack the emotional connection they may experience with female partners.^{11 59 65} Their attraction to men, if it exists at all, may be only occasional, and insufficient (in their minds) for bisexual identification.^{64 66} Some of these men might identify as bi-curious or mostly heterosexual⁶⁶ (itself sometimes argued to be a distinct sexual identity⁶⁷), though if forced to choose on a survey between identification as *heterosexual* or *bisexual*, may feel more closely aligned with the former,⁴³ or that the latter is

indistinguishable from gay identity.²⁷ In a society in which male heterosexuality is valued above other gender and sexual identities,^{68 69} these men may see no benefit to losing the privilege afforded them by their heterosexual identity.^{64 66} Some authors have suggested that younger generations may have less rigid definitions of heterosexuality, such that same-sex behaviours pose less of a challenge to their sexual identity.^{65 70}

2.4.2 Protection from stigmatisation

Sexual minority identification by MSM may vary as a result of stigmatisation of MSM at multiple levels of society, including within religious and ethnic communities,^{71 72} workplaces,^{44 73} and even at a state⁷⁴ or national level.^{28 75} Additionally, stigmatisation directed specifically at bisexuals exists within both the heterosexual and gay communities⁴⁰ and is usually directed at bisexual men more than women,³⁹ and so may discourage bisexual identification among H-MSMW. Stigma towards bisexual men manifests in a variety of ways, including the belief that bisexual men are actually gay,^{76 77} less inclined to monogamy,⁷⁸ and at higher risk of HIV and STIs.⁷⁹

2.4.3 Irreconcilability of identities

Individuals hold multiple identities related to their sexual behaviour, ethnicity, religion, nationality, profession, family situation and numerous other factors. Men may struggle to adopt non-heterosexual identities when these conflict with their other identities.^{38 61 62 72 80} Gay identification may be seen as incompatible with masculine identities,^{62 64} and men belonging to societies/subcultures with rigid masculine ideals may be less likely to identify as gay or bisexual,^{81 82} particularly if they do not engage in activities seen as specific threats to masculinity such as receptive AI.^{59 83}

2.4.4 Situational homosexuality

There are other contexts in which heterosexual-identifying men may engage in same-sex sexual activity. These are situations characterised by coercive pressures such as financial incentives (e.g. male sex workers^{84 85} and men working in gay pornography^{86 87}), lack of opportunities for sex with women (such as in prisons^{88 89}) or peer pressure (such as hazing rituals in colleges or the armed forces⁶⁰). The focus of this thesis is solely on H-MSM in the general population engaging in consensual

sexual behaviour with men, free from coercive pressures such as violence, isolation from women or explicit financial incentive, and so these situations will not be explicitly studied in this thesis.

2.5 Why study this population?

H-MSM have been identified as an under-researched population that could potentially experience a disproportionate public health burden (BS21, meeting 2017). In addition to potential sexual health problems of their own (see section 2.7.2) there is also interest in their potential to facilitate transmission of HIV and other STIs between MSM and heterosexual sexual networks (so-called “bridging”, though this term should be avoided when referring to this population due to its potential for stigmatisation).⁹⁰⁻⁹² US surveillance data suggest that more HIV infections in heterosexual women originate in MSM than in MSEW,⁹³ and phylogenetic analysis of UK HIV transmission networks has suggested that female sexual partners of H-MSM may be at higher risk of HIV infection than sexual partners of MSEW.²³ MSMW are more likely than MSEW to report insertive condomless AI (CAI), the sexual act with the greatest probability of transmission of HIV,⁹⁴ with female partners,⁹² and case studies suggest that H-MSM may be unaware of the risks of their behaviours to themselves or their (often-female) sexual partners.⁹⁵ These men may not be inclined to disclose their sex with men to female partners, reducing those partners’ awareness of the need to take their own preventative measures.^{21 22 96} Finally, public health campaigns aiming to reduce STI/HIV transmission among MSM that target only gay and bisexual men potentially leave H-MSM with unaddressed health needs.⁹⁷

By developing a better understanding of the sexual behaviour and health of H-MSM, we can understand their sexual health needs and identify gaps between these needs and service provision,⁹⁸ as well as develop more effective ways to reach H-MSM with sexual health information and interventions. This might reduce risks for both them as individuals and their sexual partners, and have an influence at a population level.

2.6 Challenges of studying H-MSM

H-MSM may be considered a “hard-to-identify” population, with the primary methodological challenges facing researchers studying H-MSM being identification

and subsequent recruitment of participants.⁹⁹ Strategies used to identify and recruit MSM such as convenience sampling or time-location sampling (TLS) at gay venues or events¹⁰⁰ typically recruit relatively few H-MSM, who are unlikely to attend these venues.^{101 102} Online surveys promoted by gay websites or geosocial networking mobile applications (apps) such as *Grindr* may be more likely to reach H-MSM who do not visit gay social venues,¹⁰¹⁻¹⁰³ especially those living in smaller cities or rural areas, however, this may still rely on some component of gay or bisexual identification in participants. Lacking a large sample of H-MSM to analyse, many studies group H-MSM with B-MSM or men identifying as “other” or disregard them altogether. Additionally, many large studies of MSM disregard the sexual identity of participants altogether.¹⁰⁴ Therefore, there are few quantitative studies that explicitly report on the sexual health and behaviour of H-MSM. There are, however, qualitative studies focusing on H-MSM, which are possible due to smaller sample size requirements. These studies play an important role in understanding the motivations behind and the meaning H-MSM give to the sex they have with men.^{11 59 61 64 65 81 82 105 106}

2.7 Correlates of and evidence for poor sexual health in H-MSM

There are reasons to theorise that the sexual health of H-MSM may differ from those of G-MSM and B-MSM. In this section, I discuss potential correlates of poor sexual health in this population, and then discuss evidence supporting this theory.

2.7.1 Potential correlates of poor sexual health in H-MSM

2.7.1.1 Minority stress

Minority stress, the additive stress experienced by members of stigmatised groups,¹⁰⁷ is theorised to be the result of stigma, concealment, incidences of discrimination or violence, and for sexual minorities, internalised homophobia.¹⁰⁸

These minority stressors are associated with poorer mental, physical and sexual health in sexual minorities,⁶ as well as higher risk sexual behaviour, poorer sexual health knowledge, and infrequent or reduced likelihood of STI/HIV testing.⁷⁻¹⁰

Although H-MSM may experience less discrimination or violence than openly gay or bisexual men, they are more likely to conceal their same-sex behaviour from

others.¹⁰⁹ Concealment in MSM is also linked to higher levels of internalised homophobia, stress, depression and anxiety.^{10 109-111}

To alleviate these minority stressors and manage guilt or shame,¹¹ individuals may adopt coping strategies¹¹² such as sexual sensation seeking and substance use,¹¹³⁻¹¹⁵ particularly during sex with men,¹¹⁶ risking further poor sexual health outcomes.¹¹⁷

2.7.1.2 Lack of disclosure to healthcare providers

Studies suggest that H-MSM are less likely than G-MSM or B-MSM to disclose their same-sex attraction or behaviour to HCPs.^{16 17} Consequently, H-MSM risk not receiving appropriate STI/HIV testing and treatment, or relevant information about preventative measures such as pre-exposure prophylaxis (PrEP) and vaccinations.¹⁸⁻²⁰

2.7.1.3 Lack of community and social support

In not identifying as gay or bisexual, H-MSM may lack strong connections to the LGBTQ+ community that G-MSM or B-MSM have.¹¹ Connection to the LGBTQ+ community and socialisation with others of similar sexual minority status can alleviate some of the minority stressors discussed above,^{10 107} and is associated with a higher likelihood of testing for HIV.^{118 119} H-MSM may also have less social support from friends and family,¹² which has been linked in MSM to depression,¹¹¹ more frequent sex with men and sex with higher STI/HIV transmission risks,^{9 120 121} and undiagnosed HIV infection.¹²¹

2.7.1.4 Lack of exposure to sexual health campaigns targeting MSM

Since the start of the HIV/AIDS epidemic, the LGBTQ+ community has been proactive at disseminating sexual health information, and sexual health campaigns and interventions are actively promoted. Without a strong connection to this community, perhaps even actively avoiding gay-identified venues, events, or publications,^{11 122} H-MSM may not be exposed to relevant sexual health information or campaigns. Evidence suggests that non-gay-identifying MSM are less likely than G-MSM to receive relevant sexual health information^{14 15} and have reduced sexual health knowledge.^{123 124} They may also feel less comfortable accessing support resources in the community or responding to sexual health campaigns which are typically designed with gay men in mind.¹²⁵

2.7.1.5 Lack of exposure to social norms of the LGBTQ+ community

Finally, lacking exposure to the LGBTQ+ community, H-MSM are less likely to be exposed to the norms of that community, which are associated with gay men's health behaviour.¹³ This could have dual effects on the health of H-MSM. While they may not be exposed to some of the norms associated with more risky sexual behaviour in the MSM community (e.g. substance abuse and chemsex),^{111 120 126} they may also not be exposed to more beneficial norms (e.g. the normalisation of STI/HIV testing¹¹⁹ and condom use). H-MSM may also be more exposed to the norms around condom use in the heterosexual community, which centre around prevention of pregnancy rather than HIV transmission.¹²⁷

2.7.2 Evidence of poor sexual health outcomes for H-MSM

While studies focusing specifically on H-MSM are rare, studies of MSM and MSMW suggest that H-MSM may experience a range of poor sexual health outcomes.

2.7.2.1 Sexual health and behaviour of MSM

MSM remain the group most at risk of HIV infection in high income countries¹²⁸ despite declines in HIV incidence among this population in recent years,¹²⁹⁻¹³² while diagnoses of STIs such as chlamydia, gonorrhoea and syphilis are increasing in MSM.^{130 133-135} British population data suggest that MSM are more likely than MSEW to report sexual behaviours associated with STI/HIV acquisition, and more likely to report poorer sexual function (including reporting sexual function problems and sexual dissatisfaction, though they are also more likely to report sexual health clinic (SHC) attendance and testing for HIV.¹³⁶ Inequalities are not limited to the sexual health domain; MSM are also more likely to report poorer physical and mental health.¹³⁶ Intersectional stigma (that is, discrimination experienced as a result of multiple intersecting stigmatised identities an individual may hold, such as sexual orientation, gender, ethnicity, disability or class)¹³⁷ means that these inequalities are often worse among MSM of minority groups.¹³⁸

2.7.2.2 Sexual health and behaviour of MSMW

MSMW are less likely than men who have sex with men only (MSMO) to have HIV⁹² or have a recent STI diagnosis,¹³⁹ though they are also less likely to have ever tested for HIV in the first place^{140 141} and more likely to be unaware of their HIV

infection if present.¹⁴² They are also more likely to be HIV-positive than MSEW.⁹² Behaviourally, they are less likely than MSMO to have had CAI with male partners,¹³⁹ particularly receptive CAI,⁹² the sexual act considered to have the greatest risk of HIV transmission.⁹⁴ Methodological concerns mean that comparisons between MSMW and either MSEW or MSMO in reported number of sexual partners in the past year are unreliable,⁴⁹ however more reliable comparisons based on longer term (five years or more) sexual behaviour suggest that MSMW report more sexual partners than MSEW^{141 143} and fewer than MSMO.¹⁴¹ There is also evidence to suggest that MSMW are at higher risk of mental health problems, particularly mood and anxiety disorders, than MSEW.¹⁴⁴

2.7.2.3 Other health problems of H-MSM

There is some direct evidence that H-MSM are at higher risk than heterosexual MSEW for a range of health problems beyond those related to sexual health, including drug and alcohol abuse,^{3 145} physical health problems including heart and liver disease,¹⁴⁶ and psychological problems such as anxiety and depression.^{3 145 147} However, they may be at less risk of substance abuse and mental health problems than G-MSM.¹⁴⁷

2.8 Conclusion

In this chapter, I have shown why H-MSM might be at risk of poor sexual health individually, how this might impact the sexual health of their partners, and therefore why they are of interest from a public health perspective. I have also detailed the methodological challenges associated with researching this population. In the next chapter I describe the research methodology I employed to conduct the research detailed in this thesis.

3. Methodology and data sources

In this chapter, I describe my overall approach to methodology, and then provide details of the specific methods used for each component of my research.

3.1 Choice of mixed methods approach

Social science research is typically guided by two main philosophical positions relating to the nature of reality and of knowledge. The (post-)positivist approach to research posits that reality is objective and exists independent of the human mind, and can be known exactly (or approximately, in the case of post-positivism).^{148 149} Knowledge about reality is generated through methods used in the natural sciences, through observations and testing of hypotheses. Social research from a positivist approach is carried out using quantitative research methods such as surveys and experiments. In contrast, the interpretivist or constructionist approach posits that social reality is constructed, at least in part, by the meanings and interpretations of those within it.^{148 149} Knowledge about this reality is produced by exploring and understanding the social world that people inhabit, and that knowledge is also influenced by the researchers (as people also within that world). As such, there is no one single reality that can be known exactly, rather multiple socially constructed realities. Social research from an interpretivist approach is typically carried out using qualitative research methods such as interviews and focus groups.

Health research has typically been dominated by quantitative research. Quantitative research can provide disease prevalence and incidence estimates, compare different groups to identify populations at higher risk of poor health, and allow us to determine predictors of poor health. However, quantitative research can produce knowledge that is too abstract and general for direct application.¹⁵⁰ Qualitative approaches to health research allow researchers to access some knowledge about the world that quantitative research cannot, including the lived experience of people, their decision-making around health decisions, and feelings about accessing healthcare. This knowledge is particularly helpful for understanding people's motivations for engaging in various behaviours, which can lead to the development of interventions to promote or change those behaviours that improve (or conversely worsen) people's health.

There is increasing understanding of the value of using both quantitative and qualitative methods in public health research.¹⁵¹ This mixed methods approach to research arose out of a pragmatist philosophy, which values practical and achievable actions over philosophical purity.¹⁵² The pragmatic approach to research argues for the adoption of the philosophical beliefs, and therefore methodology, that will best answer the particular research question(s) in mind, rather than being bound to a particular methodology by the researcher's philosophical stance.¹⁵⁰ A mixed methods approach can provide the strengths of both quantitative and qualitative methods, and when these are combined effectively in a single study, can produce complementary findings that provide a more complete understanding of the phenomena or population of interest.^{150 153}

Consequently, for this thesis I adopted a mixed methods approach. While my background prior to this PhD was primarily quantitative, I believed that a purely quantitative approach would provide a limited understanding of the health and behaviour of H-MSM. The first two aims of this PhD were about quantifying the sexual behaviour, sexual health, and sexual healthcare-seeking behaviour of H-MSM, and comparing them to those of G-MSM and B-MSM; aims that naturally lent themselves to a quantitative approach. However, the third and fourth aims of this PhD were centred around exploring and understanding how and why H-MSM make the decisions they do with respect to STI/HIV prevention and testing, and therefore, lent themselves to a qualitative approach.

To summarise the existing knowledge related to all four aims, I first conducted a systematic review of literature published between 2008 and 2018. This review included both quantitative and qualitative studies, findings from which have been integrated in a narrative synthesis to highlight complementarity or discordance between findings. Methods for this review are described in section 3.2, and results are presented in Chapter 4. To provide more robust quantitative evidence about H-MSM's sexual behaviour and sexual health, and thus address the first two aims of this thesis, I conducted an individual participant data meta-analysis (IPD-MA) of multiple behavioural surveys of MSM from the regions of interest. Methods for this study are described in section 3.3, and results are presented in Chapter 5. Finally, to address the third and fourth aims of this thesis, I conducted a qualitative study involving semi-structured one-to-one interviews of H-MSM in England. Methods for

this study are described in section 3.4, and results are presented in Chapters 6 and 7. These three studies were largely conducted concurrently, though findings from both the systematic review (Chapter 4) and qualitative study (Chapters 6 and 7) informed some further analyses conducted in the quantitative study (Chapter 5, specifically section 5.5).

Finally, the findings from all of these studies were then integrated in the interpretation stage, which forms the discussion presented in Chapter 8. This involved collating and tabulating findings addressing each thesis aim from all chapters of the thesis, considering the methodological strengths and weaknesses of their respective studies, and synthesising these findings to produce a cohesive narrative addressing the thesis aims.¹⁵⁴ I also considered the implications of these findings for sexual healthcare practice and policy, sexual health promotion, and sexual health research.

3.2 Systematic review

In this section, I describe the methods used to conduct a systematic review of scientific literature published between 2008 and 2018 on the sexual behaviour and sexual health of H-MSM in high-income countries in Western Europe, North America, and Australasia.

The aims of the systematic review were to:

1. Describe the sexual behaviour and sexual health of H-MSM, including STI/HIV testing behaviour.
2. Compare these characteristics with those of G-MSM and B-MSM.
3. Understand H-MSM's perception of risk and attitudes towards sexual health, including accessing sexual healthcare services and STI/HIV preventative strategies such as condoms and PrEP.

3.2.1 Conduct and protocol

This review was conducted in accordance with PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines.¹⁵⁵ The protocol was published on the International Prospective Register of Systematic Reviews (PROSPERO) in advance (CRD42018089124).²⁹

3.2.2 Search strategy including databases searched

Six databases were searched: Medline, PsycINFO, Embase, Web of Science, SCOPUS, and PubMed Central. The search terms used are shown in Table 2, and the full search used for MedLine, PsycInfo and Embase is provided in Appendix 2. Records were extracted into EndNote for duplicate checking and then imported into Covidence systematic review software¹⁵⁶ for screening. I carried out title and abstract screening for all results, followed by full text screening of those articles included at the first stage. A second independent reviewer (Kirsty Bennett) screened 10% of articles at each stage. Disagreements between the two reviewers were resolved by discussion. Articles included after full text screening were “forwards and backwards” searched for additional eligible articles.

Table 2: Database search terms

Category	Subject heading	Keywords
Population	Male	“male” or “males” or “men”
Population: Identity	Heterosexuality	“heterosexual” or “heterosexually identified” or “straight” or “mostly straight” or “straight identif*” or “heterosexual identi*” or “down low” [§]
Population: Behaviour	Homosexuality	“sex with men” or “sex with another male” or “sex with another man” or “sex with other men” or “sex with other male*” or “intercourse with men” or “intercourse with other men” or “intercourse with other male*” or “same-sex sex*” or “gay sex” or “homosexual sex*” or “homosexual behavior*” or “homosexual behaviour” or “same-sex desire” or “same-sex attract*” or “attracted to men” or “attracted to other men” or “behavioural* homosexual*” or “behavioral* homosexual*”
	Bisexuality	“sex with women and men” or “behavioural* bisexual*” or “bisexual* behaviour” or “bisexual* behavior*” or “behavioral* bisexual*”
Outcome: Sexual health	Sexually Transmitted Diseases	“sexually transmitted infection*” or “sexually transmitted disease*” or “STI” or “STIs” or “STDs” or “syphilis” or “gonorrhoea” or “gonorrhea” or “chlamydia” or “c trachomatis” or “hepatitis” or “HPV” or “human papillomavirus” or
	HIV Infections	“HIV”
Outcome: Testing/screening	no subject heading	“test” or “testing” or “tests” or “screen*” or “diagnos*”
Outcome: Sexual behaviour	Sexual Behaviour	“sexual behaviour” or “sexual behavior” or “sexual risk” or “risky sex*” or “condom” or “unprotected” or “condomless” or “unprotected anal” or “CLS” or “UAI” or “anal intercourse” or “vaginal intercourse” or “oral intercourse” or “anal sex*” or “vaginal sex” or “oral sex” or “risk behaviour*” or “risk behavior*”
	Sexual Partners	“sexual partner*”

§The term “Down Low” was included in the search strategy even though it is not an identity I was explicitly interested in, because it is a term often used to refer to H-MSM.¹⁵⁷

3.2.3 Inclusion and exclusion criteria

Article inclusion and exclusion criteria were defined using the PICOS (Population, Intervention, Comparison, Outcomes and Study design) search tool (Table 3).

Articles were included if they were published in English in the 10 years between 1 January 2008 and 23 January 2018, when the initial searches were run.

Table 3: Systematic review inclusion and exclusion criteria

PICOS category	Inclusion criteria	Exclusion criteria
Population	Men aged 18+ who identify as heterosexual or similar (e.g. straight, mostly straight, mostly heterosexual, heteroflexible, etc.) and who report sex with other men.	MSM identifying as gay, bisexual, queer or similar labels that signify acceptance of non-heterosexual identity (except when used as a comparison group to men identifying as any of the labels listed in the inclusion criteria).
Comparison groups	Gay- or bisexual-identifying MSM.	
Geographical context	Studies conducted in the 23 countries in the <i>West of the WHO European region</i> (Andorra, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Spain, Sweden, Switzerland, United Kingdom) ⁵⁶ , as well as the USA, Canada, Australia and New Zealand.	Studies conducted in countries other than those mentioned in inclusion criteria.
Outcomes	Measures and descriptors of sexual behaviour: type of sex with male and female partners, number of male and female partners, risk behaviours (e.g. condom usage) and how these vary with gender and type of partner, how they meet partners. Measures of sexual health: HIV and STI testing frequency, diagnoses, HIV and STI prevalence, sexual risk perception	Outcomes not in inclusion criteria.
Study design	Quantitative, qualitative, and mixed methods studies.	Commentary, review, or opinion publications that do not present new data, and in the case of qualitative studies, articles that only collected data from third parties (e.g. HCPs, partners).
Language	Articles published in English.	Articles published in languages other than English.
Participants (in the case of qualitative studies)	Studies in which H-MSM were directly interviewed.	Studies that only collected data from third parties (e.g. HCPs, partners).

3.2.4 Data extraction

I extracted article characteristics including study aims, recruitment methods, data collection and analysis methodology, and participant characteristics to a bespoke Access database form that I created.

For quantitative articles, I extracted relevant outcome data to the same Access database form. For qualitative articles, I extracted text and quotes relevant to study aims and objectives using QSR International's NVivo software (version 12).¹⁵⁸

3.2.5 Quality appraisal

I assessed the quality of quantitative and qualitative articles using the quality assessment tools and processes described in Table 4. Quality assessments were discussed in detail with my supervisors and the second reviewer (KB). Quality assessments were used to provide context for the interpretation and gauge the level of credibility appropriate for a given study.

Table 4: Quality assessment process

	Quantitative articles	Qualitative articles
Quality assessment tool	AXIS Critical Appraisal Tool ¹⁵⁹	Critical Appraisal Skills Programme qualitative checklist ¹⁶⁰
Description of assessment process	20 questions regarding study aims, methods, analysis, and reporting. Assessment process used to rank articles based on risk of bias, quality of reporting, and statistical analysis.	10 detailed questions regarding study aims, methods (including appropriateness of qualitative methodology for the specific study aims), analysis and reporting. Assessment process used to rank articles based on methodology, analysis, and reporting.
Criteria for high quality articles	Low risk of bias; and No/minor reporting or statistical concerns	No methodological or reporting concerns.
Criteria for medium quality articles	Low to medium risk of bias; and/or Minor reporting or statistical concerns	Minor methodological or reporting concerns
Criteria for low quality articles	Major risk of bias; and/or Major reporting or statistical concerns	Major methodological or reporting concerns

3.2.6 Synthesis

The substantial heterogeneity across included articles in study populations, eligibility criteria, and recall periods for behaviour and outcome reporting meant that a meta-analysis was deemed inappropriate. Instead, I conducted a narrative synthesis, which involved synthesising and summarising the findings of included articles to produce a narrative that addressed the review's aims.¹⁶¹

For quantitative articles, I first tabulated outcome data relevant to the review aims, and then identified patterns (such as consistent differences by sexual identity in reported outcomes) across articles. To assist comparison across articles, I used chi-squared or Fisher's exact tests to test for differences in reporting outcomes between

H-MSM and G/B-MSM when these were not explicitly reported in the original studies. I explored relationships both within and between articles to explain any variability in findings, taking into account differences in outcomes, study populations and settings, and study design. I grouped data from included qualitative articles according to outcomes of interest relevant to the review aims. For each outcome of interest, I explored similarities and contrasts in findings across articles, to identify themes of relevance to study aims.

Findings from both quantitative and qualitative articles were then integrated using a weaving approach to narrative synthesis.¹⁶² This involved writing combined summaries of both the quantitative and qualitative findings for each outcome of interest, highlighting confirmation, complementarity, and discordance between the two sources of data where appropriate. I used quality rankings to decide how much influence to give findings from individual articles in the synthesis, giving more weight to articles considered of medium to high quality.

3.2.7 Challenges of conducting a systematic review for this population

A major challenge arose from the use of the term “heterosexual” to define both behaviour and identity with many articles referencing “heterosexual men” actually referring to behaviourally heterosexual men, i.e. MSEW. Thus, at the screening stage, abstracts which compared MSM to heterosexual men were assumed not to report specifically on H-MSM, unless the rest of the abstract suggested otherwise. When it was not clear from the abstract if H-MSM were reported on, the full text was consulted to guide the decision to include or exclude an article.

A major challenge of reviewing qualitative research was in determining which of an article’s findings applied to H-MSM, as some articles also included men identifying as bisexual or other identities within their samples. When it was not clear that an article’s finding related at least in part to the H-MSM in their sample, I excluded that finding. This was particularly challenging in articles that did not report the sexuality of quoted participants. Another major challenge was the variety of sexual identity terms that are used by men who do not identify as gay or bisexual, including “down low” or “discreet”. As my thesis is focused specifically on men choosing to identify as heterosexual or straight, I only included data and findings that explicitly related to

men reporting same sex partners and identifying as heterosexual or straight in some way, including “mostly straight”, “straight with a pinch of bi” or similar.

The results from the systematic review are presented in Chapter 4.

3.3 Meta-analysis of individual participant data from behavioural surveys of MSM

In this section, I describe the methods used for my meta-analysis of individual participant data from behavioural surveys of MSM, presented in Chapter 5. The aims of this study were to:

1. Describe the sexual behaviour and sexual health of H-MSM, including STI/HIV testing behaviour.
2. Compare these characteristics with those of G-MSM and B-MSM.

This study involved first the collation and harmonisation of data from four different behavioural studies of MSM in 41 high-income countries. These quantitative data were then analysed using IPD-MA techniques to provide prevalence estimates and conduct statistical comparisons between H-MSM, B-MSM, and G-MSM in the reporting of sexual behaviour and sexual health outcomes and characteristics.

3.3.1 Survey selection process

The BS21 collaboration consists of representatives from research groups conducting some of the leading behavioural survey studies in high-income countries, including in Western Europe, North America, Australia, and New Zealand. I worked with datasets available through this collaboration and synthesised these data using established statistical methods. To determine which studies were most appropriate for harmonisation and meta-analysis, I first assessed the number of H-MSM in each study dataset, taking into account the time it would take to harmonise the datasets and the number of H-MSM gained. Where study datasets included more than 50 H-MSM, I obtained questionnaires from research groups and catalogued the questions asked in each survey according to the characteristics, behaviours, or outcomes they assessed to determine their relevance to my research questions. Finally, I contacted the research groups associated with each study that I considered appropriate for harmonisation, providing details of the planned analysis and

dissemination of results, and requested data for the specific variables in their surveys.

I identified four studies as being appropriate for harmonisation, corresponding to a total of 256,728 participants surveyed between 2010 and 2017 in: 38 European countries (the 2010 European MSM Internet Survey, hereon EMIS-2010), Canada (the 2015 Sex Now survey, SN15), Australia (the 2010-2017 Gay Community Periodic Surveys, GCPS), and New Zealand (the 2008, 2011, and 2014 Gay Auckland Periodic Sex Survey (GAPSS) and Gay men's Online Sex Survey (GOSS)). Characteristics of selected studies are presented in Table 5.

I was also provided access to data from Canada's Sex Now 2011 (SN11) and Australia's GCPS 2008-2009, however, after thorough examination decided not to include these datasets. In the case of SN11, the survey collected data on too few outcomes of interest to warrant inclusion. The GCPS 2008-2009 surveys and datasets were considerably different to those of GCPS 2010-2017, and so I declined to use them out of a desire for within-study consistency and concerns about the feasibility of harmonisation.

Table 5: Summary of characteristics of studies included in IPD-MA

Name of study	Geographic focus	Years included in analysis	Number of participants in dataset	Mode of delivery	Recruitment strategy	Eligibility criteria	Topics covered
European Men's Internet Survey 2010 (EMIS-2010) ¹⁶³	51 European countries	2010	180,000+ across 38 European countries. (13 countries did not yield samples of 100+ participants and so were not included in available datasets.)	Internet survey of 278 questions, with routing to skip irrelevant questions and minimise completion time. Available in 25 languages. Median completion time approximately 26 minutes.	Convenience sampling via promotional banners on at least 10 international websites and 200+ national websites for MSM, and instant messages to members of five pan-European social or sexual networking websites for MSM.	Men who were: - living in Europe; - at or over the age of homosexual consent in their resident country; - sexually attracted to men and/or have sex with men.	<ul style="list-style-type: none"> - Sexual behaviour with men over lifetime and previous 12 months - Condom use and access - Sexual health - HIV and STI testing in previous 12 months - HIV health care - Sexual health knowledge - Drug use - Wider measures related to sexual health such as discrimination, loneliness, and sexual happiness - Sociodemographic characteristics
Gay Auckland Periodic Sex Survey (GAPSS) Gay men's Online Sex Survey (GOSS) ¹⁶⁴	GAPSS: Auckland, New Zealand GOSS: New Zealand	2008, 2011, 2014	GAPSS: 1,300-1,500 per year. GOSS: 1,400-2,000 per year.	GAPSS: Three-page self-administered pen-and-paper survey of 60-70 questions. GOSS: Internet survey, identical to GAPSS. Surveys took around 5-12 minutes to complete and were highly comparable across years.	GAPSS: The majority of each year's participants were recruited at Auckland's Big Gay Out fair, as well as gay bars and sex-on-premises venues in Auckland. GOSS: Online recruitment via online dating websites and mobile geospatial networking applications (apps). Recruitment for GOSS took place after each year's GAPSS recruitment ended.	Men who were aged 16 or over and had had sex (defined as "any physical contact you felt was sexual") with a man in the previous 5 years.	<ul style="list-style-type: none"> - Sociodemographic characteristics - Social engagement with the gay community - Sexual partnerships in previous 6 months - Sexual behaviour in previous 6 months (with a focus on anal intercourse) - Condom use - HIV and STI testing in previous 12 months - Sexual health knowledge - Exposure to sexual health promotion - Other topical questions
Gay Community Periodic Surveys (GCPS) ¹⁶⁵	Australia; capital cities and other large urban gay areas. Annually in Sydney, Melbourne, and Queensland (Brisbane, Cairns, Gold Coast, Toowoomba & Townsville). Biennially in Adelaide, Canberra, Perth, and Tasmania (since 2014).	2010-2017	2-3,000 per year in larger cities. 200-1,000 in smaller cities.	Four-page self-administered pen-and-paper survey of 60-70 questions, taking approximately 10 minutes to complete. Additionally, via internet survey since 2014. Surveys are highly comparable across years, and across locations.	Time-location sampling at gay social venues, gay sex-on-premises venues, sexual health clinics, gay social events such as Pride fairs. Online recruitment since 2014 via Facebook ads targeting gay and bisexual men in the sampling regions.	Men who had had sex with a man in the last 5 years.	<ul style="list-style-type: none"> - Sociodemographic characteristics - Social engagement with the gay community - Sexual partnerships in previous 6 months - Sexual practices in previous 6 months - Condom use - HIV testing, knowledge, and disclosure of serostatus - Sexual health testing - Illicit drug use - Other topical questions
Sex Now 2015 (SN15) ¹⁶⁶	Canada	2014/15	~8,000 participants	Internet survey available in both English and French.	Dating/sex-seeking websites, gay/bisexual community-based organisations, word-of-mouth.	Self-selection based on taking part in a survey advertised as being about "sex between men".	<ul style="list-style-type: none"> - Sexual partnerships in previous 12 months - Social engagement with the gay community - Sexual practices in previous 12 months - HIV testing, knowledge, and disclosure of serostatus - Sexual health testing - Sexual health knowledge - Illicit drug and alcohol use - Wider measures related to sexual and mental health - Other topical questions - Sociodemographic characteristics

3.3.2 Data harmonisation

The first stage of data harmonisation involved carrying out discrepancy checks on datasets, to minimise contradictions in individual participants' responses to different questions. The EMIS-2010 codebook included standard discrepancy checks which defined participants' responses as discrepant based on a number of criteria, e.g. reporting never having had AI and also giving a recency for last AI with a man. I applied these same discrepancy checks to the EMIS-2010 dataset, removing those participants with discrepant answers. I then applied these same discrepancy checks as similarly as possible to the other included datasets.

I then carried out harmonisation of the datasets to allow them to be analysed together. As the selected surveys were not designed to be comparable, I conducted *ex-post* harmonisation, in which harmonised variables are created from pre-existing data.¹⁶⁷ I first examined comparable question and answer options for variables across surveys. For each variable of interest, I then defined harmonised variables to which all of the original variables could be mapped. Not all outcomes that I considered important were collected across all surveys. For example, data on oral sex were only available in GCPS 2010-2013 and EMIS-2010, and then only for oral sex with casual partners. Where this is the case, data are presented and analysis conducted only for those surveys and years in which data for the outcome were collected.

I now describe the harmonisation of key variables, including challenges I encountered in the harmonisation process.

3.3.2.1 Sociodemographic characteristics

Although age was collected as a continuous variable in each survey, for the purposes of analysis, I created an age categorisation with five levels: 18-24, 25-34, 35-44, 45-54, and 55+. This allows for a non-linear association between age and outcome variables to be identified, while avoiding the need to specify a nonlinear model, which can cause problems with model convergence in multilevel modelling. Data on participants' education level were harmonised by mapping the options provided by each survey to the levels of the 2011 International Standard Classification of Education (ISCED).¹⁶⁸ For the purposes of analysis, I then defined an education variable with four levels: "less than high school education" (ISCED

levels 0-2), “high school or upper secondary” (ISCED level 3), “post-secondary, less than Bachelor’s degree” (ISCED levels 4 & 5), and “Bachelor’s degree of higher” (ISCED levels 6-8). HIV status was measured by participants’ responses to questions about their last HIV test result (positive, negative, or unknown/never tested).

Some sociodemographic variables could not be fully harmonised as they were not collected by all studies. For example, ethnicity and other questions related to minority status (e.g. religion) were not asked of EMIS-2010 participants, as collection of these data is illegal in some EMIS-2010 countries.¹⁶³ Similarly, information on participants’ migrant status was not collected in GAPSS/GOSS. This means that these variables could not be included as predictors in analyses, as this would result in cross-study incomparability of outcome estimates. However, these data are presented in participant summary tables where available.

3.3.2.2 Sexual identity

In all surveys, participants were asked to indicate their sexual identity. All surveys gave participants three standard options - *gay/homosexual*, *bisexual* and *straight/heterosexual* – as well as the opportunity to indicate that they use a different identity. Some surveys provided alternative identities such as queer or country-specific alternative options (e.g. *takataapui* or *fa-afafine* in New Zealand, *two-spirit* in Canada), or allowed participants to write-in their sexual identity. For the purposes of this analysis, I coded anyone indicating a sexual identity other than gay/homosexual, bisexual or straight/heterosexual as *other*.

In all but one of the included surveys, participants were allowed to choose only one option for sexual identity. However, SN15 allowed participants to choose multiple options if they desired, meaning it was possible for participants to indicate that they identified as heterosexual AND other sexual identities. To manage this, I implemented a restrictive categorisation, coding as *heterosexual* those who selected only heterosexual and no other options (Table 6). Participants who selected bisexual were coded as *bisexual*, no matter what other options they selected, as this indicated some acceptance of sexual attraction or openness to sexual experience with both men and women. This more restrictive categorisation meant that out of 263 SN15 participants who reported their identity as heterosexual (with some additionally

selecting other sexual identities), 134 were ultimately coded as *bisexual*, with a further five categorised as *gay* and three categorised as *other*. While it is impossible to know what participants would have chosen if they had been limited to only one choice, with this categorisation, the distribution of sexual identity for SN15 more closely matched that of SN11, which allowed participants to choose only one sexual identity option.

Table 6: Coding of sexual identity for SN15 participants

Participant's reporting of sexual identity	Coding under restrictive categorisation
"bisexual" (+ "heterosexual" or "gay" or "two-spirit" or "queer" or "other")	<i>bisexual</i>
"gay" (+ "heterosexual" or "two-spirit" or "queer" or "other", but not "bisexual")	<i>gay</i>
"two-spirit" or "queer" or "other" (+ "heterosexual", but not "gay" or "bisexual")	<i>other</i>
"heterosexual"	<i>heterosexual</i>

3.3.2.3 Recall period

The recall period for questions regarding sexual behaviour outcomes differed across surveys. GCPS and GAPSS/GOSS asked participants about sexual activity in the previous six months, while SN15 asked about sexual activity in the previous 12 months. The question format for the majority of EMIS-2010 questions about behaviour differed from other surveys, in that instead of asking if participants had engaged in a behaviour in the previous x months, they asked participants to indicate the recency of when they had last engaged in that behaviour, allowing participants to report the behaviour as occurring in the last: 24 hours; seven days; four weeks; six months; 12 months; five years; or never. However, for some outcomes, EMIS-2010 still only asked if participants had engaged in that behaviour in the previous 12 months. For consistency, I therefore decided to focus on behaviour in the previous 12 months for EMIS-2010 participants.

Using the four survey datasets, I created harmonised variables for each behaviour of interest measuring "recent" activity, where "recent" indicates "in the previous six months" for GCPS and GAPSS/GOSS participants, and "in the previous 12 months" for EMIS-2010 and SN15 participants. This decision was based on two assumptions. The first assumption was that the behaviours in question are sufficiently regular such

that the proportion at a sample level reporting within the previous six months and previous 12 months would be relatively similar, i.e. that men who reported engaging in a behaviour in the previous 12 months also probably engaged in that behaviour in the previous six months. The second assumption was that even if a behaviour occurs less regularly (i.e. a proportion engage in that behaviour less frequently than once every six months), then any change in prevalence would be similar across all sexual identities, so that prevalence ratios (PRs) are comparable. However, this second assumption might not always be true. For example, H-MSM may have AI less frequently than G-MSM if they have fewer sexual partners, such that 6-month and 12-month reporting of AI differs between these groups. Bias can be minimised by careful choice of denominators, such as limiting analysis to men reporting sexual partners in the timeframe of interest. Overall, less variation would be expected between sexual identities in reporting of specific acts provided men have a relatively standard sexual repertoire with sexual partners. I test these assumptions in sensitivity analyses in Chapter 5 (section 5.6.1).

Henceforth, “recent” sexual activity (e.g. AI/CAI) refers to activity in the previous six months for GCPS and GAPSS/GOSS participants, and previous 12 months for EMIS-2010 and SN15 participants. The recall period for sexual health variables such as STI and HIV testing was 12 months across all surveys.

3.3.2.4 Definition of MSM

A key task in the harmonisation process was developing a common definition of “MSM”. My population of interest in this project was *current* MSM i.e., men who have had sex with other men in the recent past and may do so in the near future.

Therefore, for the purposes of these analyses, participants were defined as “MSM” if they identified as men *and* reported having *recent* sex with men (where “recent” is defined as in section 3.3.2.3). When classifying participants in the combined dataset as MSM or not, this latter criteria was assessed based on their responses to survey questions asking one of the following (with the specific question used depending on the survey): *if* the participant had had sex with a man in recall period (GAPSS/GOSS and SN15); *when* the participant last had sex with a man (EMIS-2010); or *how many* men they had had sex with in the recent past (GCPS). Participants who reported that they had had recent sex with a man (or at least one man, for GCPS) were classified

as MSM. Participants were similarly classified as MSMW if they reported recent sex with both male and female partners.

However, there were differences in how surveys defined sex. EMIS-2010 defined sex as “physical contact to orgasm (or close to orgasm) for one or both partners”, GAPSS/GOSS defined sex as “any physical contact you felt was sexual”, and SN15 and GCPS did not offer definitions of sex. Thus there may have been some heterogeneity between (and within) studies in participant understanding of what constituted sex with another man. Hill et al found that while only half of UK and US MSM surveyed included forms of mutual masturbation in the definition of having “had sex”, more than 60% included oral-anal stimulation in this definition, more than 70% included oral-genital stimulation, and 95% included penile-anal intercourse.¹⁶⁹ I assumed therefore that despite the differences in study definitions of sex, the majority of study participants engaging in the behaviours of most interest from an STI/HIV epidemiological standpoint would have reported that they had recently had sex with a man/men, and would thus have been correctly classified as MSM.

3.3.2.5 Partner type

A major difference between surveys was the way in which they distinguished between different types of sexual partners (Table 7), reflecting the subjectivity surrounding this key driver of STI epidemiology.¹⁷⁰⁻¹⁷² The definition of a steady partner used by EMIS-2010 was based on the existence of a steady (or committed) relationship between participants and individual sexual partners. From 2010-2015, GCPS’s definition of a regular partner could be considered to be the same as that of EMIS-2010, depending on how participants defined “lover”. However, in 2016-2017 this definition changed to include fuckbuddies, and so more clearly defined regular partners to also include non-steady regular sexual partners. The GAPSS/GOSS definition of a regular partner was the simplest, based solely on the number of instances of sex with individual partners in the previous six months. By distinguishing between regular and casual partners in this way, this definition assumes that men in steady relationships and those with friends with benefits (FWB) or fuckbuddies have frequent sex with these partners. However, this does raise the possibility of participants defining a boyfriend or husband as a casual partner if they only had sex three or fewer times in the previous six months. SN15 distinguished between three different groups of partners: those with whom participants are in steady relationships;

regular non-steady sexual partners such as fuckbuddies; and one-off partners such as hook-ups or anonymous partners. However, some of these questions did not specify that partners had to be male, and there was evidence that some participants could have interpreted “primary partner” or “partner” to include female partners. Additional validation, involving cross-checking with other questions that specifically related to behaviours with male partners, was therefore needed to ensure that participants were indeed referring to male primary partners.

Table 7: Mapping of partner definitions across included studies to harmonised coding

Study	Harmonised dataset coding	
	<i>Regular</i>	<i>Casual</i>
GCPS	Regular partners (2010-2015): Boyfriend / lover Regular partners (2016-2017): Boyfriend / fuck buddy	Casual partners: No definition given, except in contrast to the definition given for Regular partners.
GAPSS/GOSS	Regular sex partners: Men that the participant had sex with four or more times in the previous six months	Casual sex partners: Men that the participant had sex with once, twice or three times in the previous 6 months.
SN15	Primary partners (boyfriend, partner, husband)	Friends with benefits, fuck buddies. Hook-ups, casual, anonymous partners
EMIS-2010	Steady partners: Boyfriend or husband that means the participant is not single, but not partners who are simply sex buddies.	Non-steady partners: Men that participants had sex with once only, and men that participants had sex with more than once but who they do not think of as a steady partner (including one-night stands, anonymous and casual partners, regular sex buddies).

These differences presented challenges in creating harmonised partner type variables. While both steady partners and one-off/hook-up/anonymous partners were categorised similarly across studies, there was variation in how regular non-steady sexual partners such as fuckbuddies were categorised, with GCPS categorising them as regular partners, EMIS-2010 categorising them as non-steady partners, and GAPSS/GOSS categorising them as regular or casual depending on the frequency of sex. The ideal coding would be similar to that used by SN15, which recognised that MSM may behave differently with fuckbuddies than they do with one-off partners, and that this may also be different to what they do with steady partners.¹⁷²⁻
¹⁷⁴ However, as most surveys used dichotomous partner-type coding, this was not possible. For the purposes of these analyses, I therefore defined steady (for EMIS-

2010) and regular (for GCPS and GAPSS/GOSS) partners as *regular*, and non-steady (for EMIS-2010) and casual (for GCPS and GAPSS/GOSS) partners as *casual* (Table 8). As SN15 distinguished between three different types of partners, it would have been possible to code these data in the same way as EMIS-2010 or GCPS. However, as both SN15 and EMIS-2010 have a 12-month recall period, I decided to use the same mappings for SN15 as for EMIS-2010 to provide consistency. This means that across the surveys, there is a difference in how fuckbuddies (and therefore participants' behaviours with these partners), are categorised in the harmonised dataset (Table 8).

Table 8: Categorisation in harmonised dataset of sexual partner type, by survey

Study	Partner type		
	Steady partners (boyfriend, husband, partner)	Regular non-steady sexual partners (fuckbuddies/FWBs)	One-off, hook-up, anonymous partners
GCPS	<i>Regular</i>	<i>Regular</i> Potentially <i>Casual</i> for 2010-2015	<i>Casual</i>
GAPSS/GOSS	<i>Regular†</i>	<i>Regular†</i>	<i>Casual</i>
SN15	<i>Regular</i>	<i>Casual</i>	<i>Casual</i>
EMIS-2010	<i>Regular</i>	<i>Casual</i>	<i>Casual</i>

†This coding assumes that participants had sex with steady partners and fuckbuddies/FWBs at least four times in the previous six months.

3.3.2.6 Social engagement with gay communities

All four surveys asked questions relating to participants' social engagement with gay men or other MSM. GCPS, GAPSS/GOSS and SN15 asked participants how much of their free time was spent with gay or bisexual men. EMIS-2010 and GCPS asked participants what proportion of their male friends are attracted to men or are gay. I combined these variables to form a measure of social engagement with gay communities. This social engagement variable codes men as having low, medium, or high engagement with gay communities, based on their response to the engagement question that was asked in a given survey. GCPS participants were asked both questions, and so they were coded based on the response to either question which indicated the highest level of engagement with gay or bisexual men. This coding is illustrated in Table 9. I used this variable to assess the association between social engagement with gay communities and reporting of HIV and STI testing, and to test the hypothesis that any differences in testing between H-MSM, B-MSM and G-MSM

are explained in part by differences in social engagement with gay communities.¹¹⁸

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Table 9: Coding of “social engagement with gay communities” variable based on harmonisation of survey variables measuring participants' social engagement with gay, bisexual, or other men attracted to men

		Proportion of free time spent with gay or bisexual men		
		GCPS & GAPSS/GOSS <i>None / A little</i> SN15 <i>Little</i>	GCPS & GAPSS/GOSS <i>Some</i> SN15 <i>25% / 50%</i>	GCPS & GAPSS/GOSS <i>A lot</i> SN15 <i>75% / Most</i>
Proportion of male friends who are attracted to men or are gay	GCPS <i>None / A few</i> EMIS-2010 <i>No male friends / Almost none of them</i>	<i>Low</i>	<i>Medium</i>	<i>High</i>
	GCPS <i>Some</i> EMIS-2010 <i>Less than half / Approximately half</i>	<i>Medium</i>	<i>Medium</i>	<i>High</i>
	GCPS <i>Most / All</i> EMIS-2010 <i>More than half / Almost all</i>	<i>High</i>	<i>High</i>	<i>High</i>

3.3.2.7 Behaviours associated with higher STI/HIV transmission risk

In their 2016 national guidelines on the sexual health care of MSM in the UK, the British Association of Sexual Health and HIV (BASHH) recommended three-monthly STI and HIV testing for men reporting one or more behaviours associated with higher STI/HIV transmission risk.¹⁷⁵ Data on four of these behaviours were available in study datasets: reporting more than 10 sexual partners in the previous 12 months; reporting CAI with a new partner since last test; CAI with a serodifferent partner (defined as a partner of unknown or opposite HIV status) in the previous 12 months; and reporting use of methamphetamine, GHB/GBL, ketamine, inhaled nitrites (poppers) or other novel psychoactive substances during sex in the previous 6 months.

3.3.2.7.1 Higher number of male sexual partners

Surveys from all four studies asked participants about the number of male sexual partners they had had recently, however, the available response options varied

across surveys. GCPS and GAPSS/GOSS provided categorical responses for number of partners in the previous six months, while SN15 allowed a continuous response for number of partners in the previous 12 months. EMIS-2010 asked about steady and non-steady partners separately, and in both cases allowed continuous responses up to 10 partners and then provided categorical responses beyond that. These differences meant that it was not possible to create a continuous variable for number of partners. Instead, I created a binary variable to indicate whether a participant had more than 10 male sexual partners in the previous 12 months (or more than five in the previous six months), in alignment with the threshold specified in the UK national guidelines (described above).¹⁷⁵

3.3.2.7.2 CAI with a new partner since last test

I used reporting of CAI with a casual partner as a proxy measure of CAI with a new partner, as previous research has found casual sexual partnerships to be associated with shorter relationship duration (typically less than one month)¹⁷¹ and fewer instances of sex.^{171 176} Data for this measure were available for all four study datasets.

3.3.2.7.3 CAI with a serodifferent partner

Data on the HIV status of all participants' male sexual partners in the recall period were available only for SN15 and EMIS-2010 participants. For participants in these studies, I used these data to create a binary variable indicating whether they had reported CAI with a serodifferent partner, defined as a partner of unknown or opposite HIV status to the participant.

3.3.2.7.4 Drug use during sex

Surveys from three studies (EMIS-2010, SN15 and GCPS) asked participants about their recent use of recreational drugs, however, they did not specify if these substances were used during sex. In my analysis, I have used participants' reported use of poppers or any of the four common chemsex drugs (crystal methamphetamine, GHB/GBL, mephedrone, and ketamine)¹²⁶ as a proxy for their use during sex, as previous research has found the majority of MSM who use these drugs do so in the context of chemsex.¹⁷⁷ I included poppers in this list due to their inclusion in BASHH's criteria for sexualised drug use.¹⁷⁵ I created a binary variable

for sexualised drug use indicating whether a participant reported use of one or more of the drugs listed above in the previous six or 12 months.

3.3.2.7.5 Combined measure of recent higher STI/HIV transmission risk behaviour

To estimate the proportion of MSM more vulnerable to STI/HIV acquisition, I created a variable indicating whether a participant reported one or more recent behaviours associated with higher STI/HIV transmission risk. To enable consistency across countries and studies, I looked only at the reporting of the two behaviours (a higher number of male partners or recent CAI with a casual partner) for which data were available across all four of the included studies. While this indicator underestimates the prevalence of men for whom more frequent testing is recommended, this decision meant that estimates across studies are comparable.

3.3.2.8 Survey recruitment

MSM recruited online for behavioural and health surveys have been shown to report different behaviours compared to men recruited in person, including different partnering and condom use patterns as well as lower prevalences of HIV testing.¹⁰¹ EMIS-2010 and SN15 recruited participants entirely online. Until 2013, recruitment for GCPS took place entirely in person at gay Pride fairs, as well as gay social venues such as bars and clubs, sex-on-premises (SOP) venues and SHCs. Since 2014, GCPS has also recruited some participants online through *Facebook* with advertisements targeting gay and bisexual men, though the majority of participants are still recruited in person. GAPSS recruited participants in person at a large LGBTQ+ community event in Auckland, as well as at gay social venues and SOP venues, while GOSS recruited men from throughout New Zealand through online dating websites and apps. I created a harmonised recruitment location variable, with recruitment location categorised as “LGBTQ+ fair”, “gay social venue”, “SOP venue”, “sexual health clinic”, and “online”. A simplification of this was also created to record survey mode as “online” or “in-person”.

It is possible that some participants of GAPSS/GOSS and GCPS may be represented more than once in the dataset, due to participation in multiple years. Unfortunately the individual datasets did not include variables to allow for identification of repeat participants, meaning it was not possible to confirm complete

independence of the data. However, as the number of repeat participants is likely to be very small, any bias in analysis due to non-independent data would be negligible.

3.3.3 Final dataset

In the final dataset, I retained data for participants classified as MSM, as described in section 3.3.2.4. A minimum age of 18 years was chosen to provide consistency across datasets, as 18 was the highest minimum age of participant eligibility across the studies. EMIS-2010 was the only survey to have an upper age limit (of 89 years), thus this maximum age limit was applied across all datasets. From the EMIS-2010 dataset, I retained only those participants indicating a country of residence in the *West of the WHO European region*.⁵⁶ I removed from the dataset participants from four countries with fewer than 10 H-MSM in the sample (Malta (0 H-MSM), Luxembourg (5), Norway (4) and Finland (7)) due to concerns about the reliability of country-level prevalence estimates for H-MSM in these countries. Thus, the countries represented in this analysis are:

- EMIS-2010: Austria, Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, Switzerland, United Kingdom
- GCPS 2010-2017: Australia
- GAPSS/GOSS 2008, 2011, 2014: New Zealand
- SN15: Canada

3.3.4 Analysis of harmonised survey data

I calculated descriptive statistics for the sociodemographic characteristics of MSM, stratifying first by country of residence, and then by sexual identity. I then calculated prevalence estimates for sexual behaviour and sexual healthcare outcomes of interest. Finally, I carried out multilevel regression modelling to compare H-MSM with both G-MSM and B-MSM in their reporting of these outcomes. As men grouped into the “other” sexual identity category are not of specific interest in this thesis, prevalence estimates and comparisons with H-MSM for these men are not shown in results. Data for these men were, however, retained in the analysis dataset to provide greater statistical power in analyses.

All analyses were conducted using IPD-MA to account for clustering within the datasets. Typically, when undertaking IPD-MA that uses data from multiple studies,

clustering of data is accounted for at study-level. However, for my analyses, I instead accounted for clustering at country-level as this still essentially accounts for clustering at study-level (as no country was included in more than one study), but also recognises that clustering is likely due to country-level differences in:

- societal acceptance of sexual minorities;⁷
- sexual healthcare policy and practice;^{178 179}
- sexual behavioural norms in MSM communities; and
- recruitment strategies and locations for EMIS-2010 participants.¹⁶³

A detailed description of statistical methods used in these analyses is presented in Appendix 3 and a summary now follows.

3.3.4.1 Two-stage IPD-MA calculation of pooled reporting prevalence estimates

For each outcome of interest, I calculated the proportion of men reporting each outcome, stratifying by country and sexual identity. I then pooled country-level prevalence data via a two-stage IPD-MA process to calculate average prevalence estimates and 95% confidence intervals. As data for H-MSM in some countries were sparse, which also resulted in some country-level reporting prevalences of 0% or 100%, I used the score method with the Freeman-Tukey double arcsine transformation to ensure that pooled estimates and confidence intervals were valid.^{180 181}

3.3.4.2 One-stage IPD-MA calculation of prevalence ratio estimates

Due to the small size of some country-level H-MSM samples, as well as the occurrence of 0% country-level reporting prevalences for some outcomes among H-MSM, two-stage IPD-MA was not suitable for multivariate analysis. Instead, I used one-stage IPD-MA methods to calculate adjusted prevalence ratios (aPRs) comparing H-MSM with B-MSM and G-MSM. PRs were calculated using multilevel modified Poisson regression, with country-level random terms for intercepts and coefficients for the sexual identity variable. I specified an unstructured covariance for the random effects, and specified country-level clustering of residuals, to allow for the residual variance to differ between countries. Models included adjustment for variables suspected of being associated with sexual behaviour and sexual health

outcomes, and for which data were available in all datasets, namely age group, education, and year of survey. In analysis of reported condomless sex (with partners of either gender) I additionally adjusted for HIV status (diagnosed positive or not diagnosed positive). In analysis of reported STI testing in the previous 12 months, models also adjusted for positive HIV status, to account for the fact that men with diagnosed HIV are more likely to test regularly for STIs due to regular HCP visits. Survey mode was not included in analyses involving all four of the included studies, as it was highly correlated with both year and country. However, when GCPS or GAPSS/GOSS data are analysed separately, recruitment mode (“online” vs “in-person”) was included as a variable in the analysis model.

3.3.4.3 Further analyses

I conducted further analyses investigating the role of important mediators or confounders on key sexual behaviour and sexual health outcomes among MSM. I first examined associations between MSM’s relationship status with women and their sexual behaviour with both male and female partners, by calculating adjusted prevalence ratios for selected outcomes comparing men in relationships with women at the time of survey participation with those not in relationships with women. Next, I explored how reporting of risk behaviours differed by recruitment mode (online or in-person), and for in-person recruitment, how reporting of these behaviours differed by recruitment location. Finally, I examined whether associations between sexual identity and reporting of recent HIV and STI testing were mediated by two key behavioural and social factors, specifically, reporting of recent higher STI/HIV transmission risk behaviours and level of social engagement with gay communities.

3.3.4.4 Sensitivity analyses

I conducted sensitivity analyses to explore how results were affected by differences in variable definitions between studies. I first examined data from EMIS-2010 to test the assumption that data from surveys with 6-month and 12-month recall periods were comparable. I then examined how differences in partner type definitions affected prevalence estimates and differences by sexual identity in the reporting of key sexual behaviours. Finally, I calculated adjusted PRs for key outcomes using two-stage IPD-MA, to verify results obtained using the one-stage method.

3.3.4.5 Statistical software and commands used

All analyses were carried out using Stata v15.1.¹⁸² Pooled average prevalence estimates and 95% confidence intervals were calculated using the *metaprop_one* function.¹⁸³ Poisson multilevel regression was carried out using the *mepoisson* Stata command, including random terms for intercepts and coefficients for sexual identity. When regression analysis was conducted using data from a single country, this was done using the *poisson* command, using the *vce(robust)* option to specify the use of the robust standard error estimator. Two-stage IPD-MA Poisson regression was conducted using the *ipdmetan* function, with country-level Poisson regression models specified using the *poisson* command.

Results from this analysis are presented in Chapter 5.

3.4 Qualitative study of H-MSM in England

In this section I describe the methods used for my qualitative study of H-MSM in England, the results of which are presented in Chapters 6 and 7. The aims of this study were to:

1. Understand H-MSM's perception of HIV and STI transmission risk with respect to the sex they have; and how this influences their approach to HIV and STI prevention and risk reduction with their sexual partners, including engagement with HIV prevention strategies such as PrEP.
2. Understand H-MSM's attitudes towards sexual health, including accessing sexual healthcare services and STI/HIV testing behaviour in relation to guidelines.

With the focus on exploring and understanding the reasons for H-MSM's behaviour, a qualitative research design was considered most appropriate for addressing these aims.

3.4.1 Study design

To address the study aims, I designed the study to answer the following specific research questions:

1. How do H-MSM perceive HIV and STI risk with sexual partners?

2. How does their perception of risk influence their decision-making regarding HIV and STI prevention measures with partners?
3. What factors encourage and discourage H-MSM from testing for HIV and STIs?

The two most common methods of data collection in qualitative research are interviews and focus groups.¹⁸⁴ Interviews are one-to-one conversations led by the interviewer and with the aim of getting the research participant to talk about their personal experiences, feelings and perspectives. In contrast, focus groups are guided discussions among small groups of participants about a particular topic, with the discussion guided by a moderator. While focus groups can empower participants to disclose sensitive information in a way they may not during one-to-one interviews, the format of discussion means they do not allow in-depth discussion and follow-up of individual participants' experiences or views.¹⁸⁴ In addition, they may not be suitable for stigmatised populations for whom discretion is important.¹⁸⁵ Given this, as well as the focus on understanding individuals' experiences, I decided to conduct one-to-one interviews for this study.

Interviews in qualitative research differ from those used in quantitative studies. The structured interviews used to collect data in quantitative research comprise a series of standardised, closed questions. In contrast, interviews in qualitative research consist of open-ended questions designed to encourage in-depth and detailed responses from the participant. The two most common forms of interview used in qualitative research are semi-structured and in-depth (or unstructured).¹⁸⁴ In semi-structured interviews, the interviewer uses a pre-prepared list of questions (known as a topic guide) to guide the conversation, whilst allowing some flexibility for discussion of topics raised by the participant. In-depth interviews are more loosely structured, centred around a few topics, and are generally participant-led. I chose to conduct semi-structured interviews due to the range of topics I needed to cover to address the research aims.

3.4.2 Topic guide development

The topic guide was designed to answer the research questions listed above. Development began in August 2019. Initial development was informed by my literature review as well as my systematic review, in particular its identification of

gaps in the understanding of H-MSM's use of sexual healthcare. I also received input from my supervisors, who are researchers in sexual behaviour and health at UCL with a mix of qualitative and quantitative research experience.

3.4.2.1 Stakeholder engagement and public and participant involvement (PPI)

Early in the development of the topic guide, I also consulted with third-party consultants, including:

- Jo Gibbs, Senior Clinical Research Associate, Institute for Global Health, UCL
- Hamish Mohammed, Principal Scientist for STI Epidemiology, Public Health England
- Alissa Ferry, formerly HIV Prevention and Testing Team Leader, Positive East
- Marc Thompson, Co-founder of PrEPster and BlackOut UK, formerly of Terrence Higgins Trust
- Phillip Wragg, Gay men's HIV Prevention and Testing Coordinator, GMI Partnership

These stakeholders provided feedback on the topic guide (including additional questions they would like asked) and recruitment strategy.

I also conducted some PPI work, reviewing and discussing the topic guide, demographics form, and the study more generally (including recruitment options) with an acquaintance who identified as H-MSM and who wished to remain anonymous. He was given a £50 Love2Shop voucher in recognition of his time and input.

3.4.2.2 Piloting and refinement

The pilot guide went through 10 iterations before the study launched. The topic guide was piloted on the first participant, and changes made based on my observations about this interview. Examples of these changes include the use of less formal language (e.g. "women" instead of "female partners"), the shortening of some sections felt to be too long, and the removal of questions which the participant found confusing (e.g. "What do you define as sex with men/women?"). The topic guide was then continually refined throughout the recruitment period. For example, a question was added probing participants' feelings about attending an SHC that primarily

targeted the gay community. The final version of the topic guide is provided in [Appendix 4](#).

3.4.2.3 Topic guide structure

The first section of the topic guide involved questions about participants' backgrounds. This included how they defined their sexual identity, both to themselves (self-identity) and to others in their lives (public identity). The next section focused on participants' sexual history with both men and women, including how they met sexual partners, the types of sex they engaged in with these partners, and any HIV and STI prevention measures they used. The final section of the interview focused on participants' sexual health, including their previous HIV and STI testing history, reasons for testing in the past and what would encourage them to test in the future, their opinions about different forms of testing, and how they thought testing could be encouraged among H-MSM.

3.4.3 Demographics questionnaire

A short questionnaire was designed to systematically capture the demographics of participants (Appendix 5). Information collected included participants' age, gender (including if participants identified as trans or gender diverse), highest level of education, ethnicity, relationship status, area of residence, HIV status, sexual identity, sexual attraction, and romantic attraction.

For sexual identity, the questionnaire asked participants to indicate which label best described their current understanding of their sexual identity, from a nine-point scale previously used by other researchers investigating male sexuality.^{186 187} Questions about sexual and romantic attraction were based on questions previously used in Natsal-3, asking participants to indicate using a 5-point scale the extent to which they had ever felt sexual/romantic attraction towards women and men.^{188 189} Sexual attraction was defined as "your desire to have sex with someone". Romantic attraction was defined as "your desire to be in a relationship with someone".

3.4.4 Ethical considerations

The sensitive nature of interviews meant that there were numerous important ethical considerations.

3.4.4.1 Privacy and data security

While the confidentiality and anonymity of participants in a study such as this is always a primary concern, this was especially the case given the hidden nature of this population and their desire for discretion. This meant considering how to keep participants' data secure from the time they first registered their interest in the study and throughout the interview, analysis, and dissemination. Participants were assigned an ID number and this ID number was kept separate from any personal information kept about participants. Paper consent forms were kept in a locked filing cabinet in the Institute for Global Health, UCL. I used UCL's Data Safe Haven (DSH), a secure online environment for the storage and processing of sensitive and confidential data, to store all electronic participant data, such as contact information provided at the time of registration, data collected as part of the interview process (including demographic information), and audio recordings of interviews. Participants' contact details were deleted once they were no longer required, unless they indicated that they wished to be sent copies of output from the study, in which case their contact details were stored on the DSH, separately from their ID number. Interview recordings were sent to the transcription service (Transcript Divas) using UCL's secure File Transfer Portal, which sends documents held in the DSH securely to recipients. Upon completion, Transcript Divas uploaded anonymised transcripts directly to the DSH using the File Transfer Portal. Audio recordings of interviews were securely deleted once anonymised transcripts had been produced and checked for accuracy. Anonymised transcripts were stored on the DSH as well as a password-protected and encrypted laptop and UCL's secure network. Anonymisation of transcripts meant that names of individuals (participants or other), as well as any other information which could be used to identify participants (such as specific professions or locations) were changed or removed.

3.4.4.2 Safeguarding of participants

A second consideration was safeguarding of participants. It was possible that during the interviews, participants may have found some of the topics of discussion to be upsetting. Participants were assured that they could stop the interviews at any time or could skip any questions they did not wish to answer. Additionally, I ensured that the Participant Information Sheet (PIS) (Appendix 7) contained the contact details of support and sexual health services that might be helpful to participants. If, during

interviews, I thought of specific services that individual participants might find helpful, I discussed these with the participants at the end of the interview.

Many of the participants commented on how much they had enjoyed the interview. In some cases, I was the first person with whom they had discussed many of the topics raised during the conversation. As such, this had allowed them to reflect on these things more than they had previously; one participant contacted me afterwards to tell me it had felt like therapy. While I was happy to hear how helpful he had found the interview, I also made sure to give him the contact details of an LGBTQ+ support service, who were more qualified to provide support.

3.4.4.3 My safety

As I was the sole fieldworker for this study, I also carefully considered my own personal safety during the recruitment process by following procedures detailed in the UCL Lone Working Agreement. I ensured that all face-to-face interviews took place on UCL property. I informed my supervisors of the time and location of these interviews, and also informed them when interviews were finished. I purchased a separate phone for use during the study, to ensure that participants did not have access to my personal number. My supervisors were also available to discuss any distressing topics that arose during interviews.

3.4.4.4 Ethics approval

The study was approved by the UCL Research Ethics Committee on 27 November 2019 (study ID: 16181/001).

3.4.5 Recruitment

3.4.5.1 Eligibility

Initially, participation in the study was open to men living in the UK who were aged 18 years or over, who described themselves as heterosexual or straight, and who had had 'some form of sexual contact with men in the past'. The sexual behaviour criterion was kept broad as it was not clear how challenging it would be to recruit participants to the study. However, early recruitment was more successful than expected. After one participant reported not having been sexually active for a number of years due to health problems, I limited eligibility to men who had had

some form of sexual contact with men *in the past year* rather than at any time in the past, to focus on the experiences of current H-MSM and ensure that findings were relevant to informing current sexual health policy and practice. I also changed the wording of the identity criterion from “describe yourself as heterosexual or straight” to “consider yourself to be heterosexual or straight”, to emphasise the focus on self-identification rather than public identity.

3.4.5.2 Recruitment locations

The study was initially advertised on the study recruitment website *Call for Participants*. This website allows researchers affiliated with a research organisation, to advertise their study to members of the website, and also helps with promotion of the study on social media and elsewhere. This listing was initially planned as a “landing page” to which participants could be directed. However, it received a very strong response, with the first enquiry made within the first 24 hours, and five received within the first week. The study was advertised as being about “men who describe themselves as straight or heterosexual, and who sometimes have sex or sexual contact with other men”, with more specific eligibility criteria listed later. Screenshots of this and other promotion for the study can be found in Appendix 6.

In addition to the listing on *Call for Participants*, I created a study profile on *Grindr*, a geosocial networking app for men seeking sex with other men. This profile did not include a photo and explicitly stated that I was a researcher looking to talk to “straight or hetero” men for a study, and not seeking sexual partners. I activated this profile when I was travelling around or outside of London, so that it would appear on the feeds of men using *Grindr* in the area. I also created a similar profile on the MSM sexual networking website *FabGuys.com*, on the recommendation of an acquaintance of a friend who would previously have been classified as H-MSM (but now identified as gay). This website allows you to change your location of interest, which allowed me to recruit men outside of London more easily. On both *Grindr* and *FabGuys.com*, I directly contacted men I thought may be eligible for the study based on details on their profiles (such as describing themselves as “straight” or use of the word “discreet”). It was also possible for men to contact me directly. The majority of men I contacted on these platforms either did not respond or indicated that they were not eligible as they did not meet the eligibility criteria (e.g. they identified as bisexual or gay).

I also promoted the study via posts in two subreddits (forums) on the social news website *Reddit*. Information about the study was posted in *r/GBr4r* and *r/Londonr4r*, which are subreddits intended for localised personal listings of *Reddit* users wanting to meet others. In the posts I indicated that I was looking to interview “men in the UK who identify as straight or heterosexual (or similar) and who sometimes have some form of sex with men”. In both cases, I sought and received permission from the moderators of these forums before posting about the study.

I also attempted to do physical outreach to recruit for the study. I printed posters that I distributed at some adult stores in London. As part of this planned outreach, I did some volunteer work with Positive East, a HIV and sexual health charity based in East London. This involved helping Positive East outreach workers at monthly testing sessions at locations they suggested were more likely to be attended by H-MSM, including at Abney Park Cemetery and locations in Ilford. To assist with recruitment at these outreach sessions, I printed business cards advertising the study, to be given out to potential participants I met in person. As these cards were designed to be taken away by men with whom I had (in theory) already spoken about the study, they avoided any mention of sex, merely describing the study as being about men’s health, but linking to the *Call for Participants* page through a shortened website address. The Abney Park outreach sessions were not fruitful in terms of recruitment, in part due to the cold weather at the time. While I did meet one H-MSM at an outreach session in Redbridge, it was not possible to do an interview at the time, and he ultimately did not contact me to arrange an interview. Finally, with the onset of the COVID-19 pandemic, Positive East ceased all physical outreach sessions in early March 2020.

3.4.5.3 Recruitment process

Men interested in participating were directed to a secure *Opinio* webform providing information about the study, where they were asked to provide contact details. Upon receiving this information, I directly contacted applicants to provide the PIS and arrange an interview. Once an interview was arranged, participants were also sent the study consent form (Appendix 8) to read, and a link to the pre-interview demographics questionnaire (also hosted securely on *Opinio*). Contact details of applicants were stored in a password-protected spreadsheet stored on the UCL DSH. This information was deleted after a participant’s interview was conducted or

after multiple attempts at contact were not responded to, in which case it was assumed the applicant was no longer interested in taking part in the study.

The study launched with the *Call for Participants* page on 15 January 2020. The first interview was conducted on 23 January 2020, and recruitment continued through February and March. On 13 March 2020 I self-isolated with suspected COVID-19 infection and was too unwell to conduct interviews for 10 days. On 23 March 2020, the UK entered the first national COVID-19 lockdown. It was expected that this would make recruitment more challenging in future due to potential difficulties ensuring participants had sufficient privacy to conduct interviews. In particular, this would mean that those of most interest from a public health perspective – those living with partners or family – would be less likely to be able to participate. It was also felt that the interviews conducted to that point had provided a sufficient level of data saturation for the purposes of this thesis. Consequently, recruitment was ended after the fifteenth interview on 25 March 2020.

Of the 15 study participants, 10 were recruited through the study's listing on the *Call for Participants* website, while two other participants discovered the study through posts on *Reddit*. Two participants were recruited through geosocial sexual networking apps or websites, in this case *Grindr* and *Fabguys.com*. In both cases, these participants contacted me directly in response to profiles promoting the study that I had set up on these platforms. Finally, one participant was notified about the study by his friend, who was a personal acquaintance of mine. A further 20 individuals submitted contact information through the *Opinio* webform. Based on their sign-up dates I believe the majority of these were recruited from *Call for Participants* or *Reddit*, however, as I was not able to interview them it was not possible to confirm exactly how they discovered the study. Although I had varying amounts of email contact with these individuals, these did not ultimately convert to interviews.

3.4.6 Procedure

3.4.6.1 Interview mode

I offered the option of a face-to-face interview or a telephone interview to allow for the recruitment of participants from a wider area than Greater London. I also

understood that, due to the stigmatised nature of this population and the sensitive nature of the topics covered in interviews, some participants might prefer a telephone interview. Five interviews were conducted face-to-face, while 10 were conducted via telephone. Face-to-face interviews were conducted in closed UCL offices of Mortimer Market Centre in Central London, which is also home to a large SHC. I conducted phone interviews alone and in closed offices to ensure participant privacy.

Some researchers have expressed concern about the quality of data from telephone interviews, feeling that the absence of visual cues during interviews and contextual information about participants (such as the participants' surroundings at the time of interview) can inhibit the development of rapport between researcher and participant, and thus negatively affect data quality.^{190 191} While I did find it easier to develop a rapport with participants interviewed face-to-face, I felt I was also ultimately successful in developing a rapport with the majority of telephone interview participants. There were two telephone interviews that I felt would have been more successful conducted as face-to-face interviews. In one case this was because of problems with sound quality, making conversation difficult. In another I felt that the participant was distracted or felt unable to speak freely while taking the interview at a public outdoor location, despite the PIS recommending that participants were somewhere private for their telephone interview.

Concerns have also been raised that telephone interviews may be shorter than face-to-face interviews, with participants less comfortable with silences than in face-to-face interviews and providing shorter answers, with the interviewer occupying a greater proportion of interview time.^{192 193} The average length of face-to-face interviews in this study was 82.4 minutes, compared to 70.6 minutes for telephone interviews; however, when one lengthy face-to-face interview (140 minutes) was removed there was no difference in average interview lengths. I did feel that in a minority (n=3) of my telephone interviews, participants provided shorter responses to questions, and in response, I spent a greater proportion of the interview speaking. This was usually a result of asking more questions or probing to encourage more detailed responses. Similarly, one face-to-face interview participant also provided short responses to questions. However, for the remaining participants, I felt there

was little difference in richness and detail of responses between telephone and face-to-face interviews.

Finally, I felt that participants interviewed face-to-face were slightly more reserved initially when discussing their sexual activity than participants interviewed by telephone. This may be similar to the findings of other researchers that when researching sensitive or distressing topics, telephone interviews can help to create an emotional distance between the researcher and participant, providing the participant a space free of judgement¹⁹⁴ and enhancing feelings of anonymity and privacy.¹⁹⁵⁻¹⁹⁸ While direct methodological comparisons are beyond the scope of this thesis, I do not feel that the quality of face-to-face interviews were significantly affected as a result.

3.4.6.2 Consent and demographics

Prior to each interview, all participants were sent copies of the PIS and the study consent form, to ensure they had time to read them before the interview. At the start of each interview, I briefly discussed the PIS, and answered any questions participants had about the study. For face-to-face interviews, I then asked the participant to complete the consent form. For telephone interviews, I read through the consent form and asked the participant to give their verbal consent. This was recorded separately from the interview, and this recording was stored securely on the UCL DSH. Participants were also asked to complete the demographics form, either on paper (for face-to-face interviews) or via a secure *Opinio* webform (for telephone interviews).

3.4.6.3 Post-interview and incentives

After each interview, I thanked the participant for their time, and also directed them to any specific services from which I thought they would benefit based on the interview content. Participants were also offered a £20 Love2Shop voucher; one participant interviewed over the phone declined to have his voucher sent to him but did not give a reason for this.

3.4.6.4 Recording and transcription

I recorded all interviews using a voice recorder, with an earpiece microphone used for interviews conducted via telephone. The voice recorder was encrypted and

locked with a PIN to ensure that recordings were secure. I uploaded recordings to the UCL DSH immediately after each interview and deleted them from the voice recorder.

Interviews were transcribed by the transcription company Transcript Divas. Upon receipt of the anonymised transcripts, I checked these against the original audio recordings for accuracy.

3.4.6.5 Field notes

Before and after each interview, I wrote field notes. These included: my feelings before and after the interview; observations about the participant and the context of the interview itself (e.g. location, my own observations and thoughts about the participant, background noises (for interviews conducted over the phone)); descriptions and thoughts about any notable responses from the participant; and my general thoughts about how the interview went, including questions that did or did not work well, potential avenues of enquiry in future interviews, and other thoughts on how future interviews could be improved.

3.4.7 Analysis

I analysed data using an inductive thematic analysis approach.^{184 199} This was carried out in six stages, using an iterative and recursive process, involving moving back and forth these phases as analysis progressed. Analysis occurred concurrently with data collection, with analysis of earlier transcripts informing the ongoing development of the topic guide. Throughout all six stages, I also discussed my analysis with supervisors.

3.4.7.1 Stage 1: Data familiarisation

To familiarise myself with the data, I first listened to the audio recordings of interviews whilst checking the transcripts for accuracy. I then read and re-read the anonymised transcripts. I also read the field notes for each interview, to reacquaint myself with the contextual circumstances of the interview and observations about the participant, as well as any significant thoughts I had during the interview. Throughout this process I also made notes about possible codes for the next stage of analysis.

3.4.7.2 Stage 2: Generating initial codes

The second stage involved coding the interviews. This involved assigning codes (key words or phrases describing the concept or idea contained within the text) to sections of the text, where there was relevance to the research questions. Where sections of the text were of interest for multiple reasons, multiple codes were used to code those sections. Transcripts were coded sequentially, however, transcripts were revisited after the initial coding process to code for items missed on previous passes. Coding was carried out using NVivo software (version 12).¹⁵⁸ As an example of how a code was applied to a selection of the text, the following excerpt was coded “discussion of risk with clinics”:

Interviewer: So have you ever heard of PrEP, or Pre-exposure prophylaxis?

P01: Yeah I've heard about that, but when I went to that clinic they did recommend that to me to go, what is it, PrEP and also PEP, but I said to them “I'm not, this is not my identity”, and they asked me “you don't have to identify, like you don't have to have these type of sex to be on it”, and I said “what do you mean”, and they gave me a bit of information to read and they said “you can buy it online and then it can limit the risk of disease”.

3.4.7.3 Stage 3: Searching for themes

After all interviews had been coded, I sorted through the list of generated codes to identify patterns in the data. Where groupings of codes were felt to amass around some unifying concept of relevance and meaning to the research question, these became candidate themes (or subthemes), and I collated relevant codes within these themes. If a particular concept was mentioned by only one or two participants but thought to be particularly relevant to a segment of the H-MSM population, it was still considered a candidate theme or subtheme. I kept codes that did not immediately fit into any candidate themes or subthemes in case they were of use at a later stage of analysis. I used concept maps to help visualise and structure themes and subthemes. I also held a data clinic with my supervisors, at which we discussed transcripts from two interviews and my initial thoughts on themes.

3.4.7.4 Stage 4: Reviewing themes

Once a set of candidate themes and subthemes was identified, these were reviewed to assess their suitability and refined if necessary. I first read all of the extracts coded within each theme, to ensure that the theme represented the data and that data within a theme were coherent and consistent. Where a potential theme was not supported by sufficient data, it was collapsed or where possible, merged with a similar theme. I then re-read all transcripts to explore the validity of the candidate themes in relation to the research questions across the entire dataset.

3.4.7.5 Stage 5: Defining and naming themes

After finalising my set of themes and subthemes, I then wrote brief analytical descriptions of each theme and subtheme. These descriptions defined the meaning of each theme and their specific place in answering the research questions. This process helped me ensure that themes were sufficiently focused, and also to ensure that there was no significant overlap between themes. It also helped me to give sufficiently descriptive and focused names to each theme. One of my supervisors (LMD) also read and provided feedback on written descriptions.

3.4.7.6 Stage 6: Writing the report

Finally, I used these descriptions to write the full analyses. I wrote a narrative to illustrate each theme's relevance and importance in answering the research question in the context of the data. Illustrative quotes from the data were selected to provide context for arguments within themes.

3.4.8 Application of the COM-B model in analysis

The third research question of this study focused on identifying factors that encourage or discourage H-MSM from testing for HIV and STIs, with the intention that this analysis could identify ways in which testing could be increased among this population. I used the Capability, Opportunity and Motivation Model of Behaviour (or COM-B)²⁰⁰ (discussed below) as a theoretical framework on which to organise my analysis for this research question. To do this, I first conducted an inductive thematic analysis of interview data to identify barriers and facilitators to testing and accessing healthcare that were raised by participants. I then categorised these according to where they fit within the COM-B model. To ensure the validity and rigor of my

findings, I discussed these with my supervisors (LMD and CM), and also compared these findings to similar studies in other populations.^{201 202}

3.4.8.1 The Capability, Opportunity, and Motivation Model of Behaviour

The COM-B model (Figure 1) states that to engage in a certain behaviour, an individual must have both the capability and opportunity to engage in that behaviour and must also be motivated to engage in that behaviour. Capability, defined as an individual's capacity to engage in the behaviour of interest, is split into physical capability (e.g. skills) and psychological capability (the mental capacity to engage in the behaviour, e.g. knowledge). Opportunity is defined as factors in the environment surrounding the individual that influence that individual's ability to engage in the behaviour and is split into physical opportunity (components of the environment, e.g. physical resources or time) and social opportunity (involving other people or organisations, e.g. social norms, culture). Motivation is defined as the mental processes that energise and direct behaviour, and is categorised as automatic (habitual, instinctual, or emotional impulses, e.g. fear, embarrassment) or reflective (processes involving conscious thought, e.g. evaluation of past events). Both capability and opportunity can influence motivation, and all three are required for a particular behaviour to occur. Furthermore, the behaviour itself can influence aspects of each of these components.

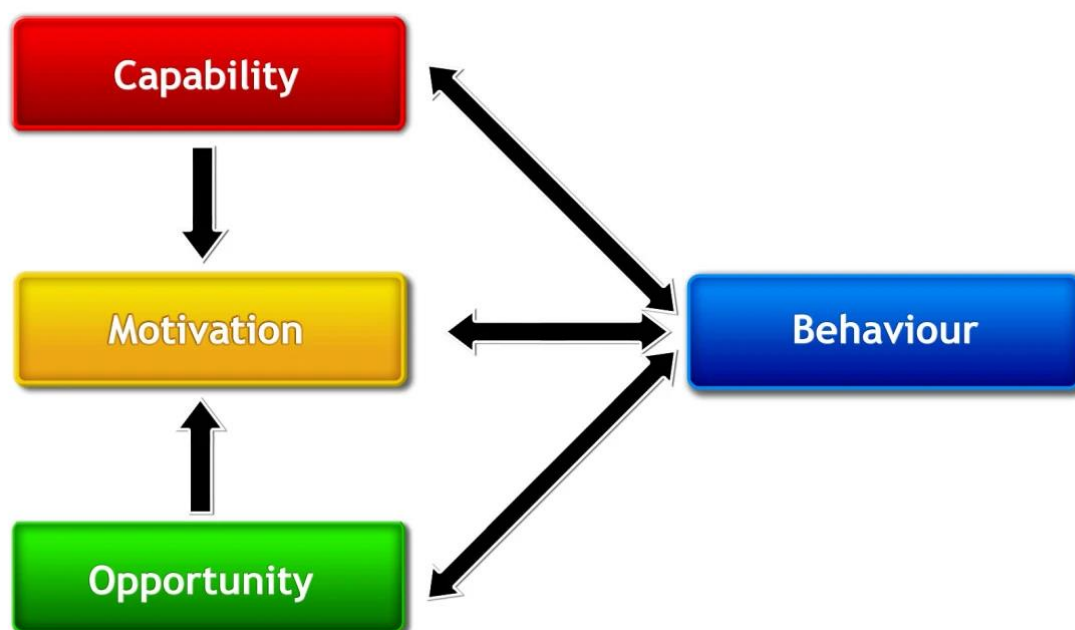


Figure 1: The COM-B model of behaviour, from Michie et al. (2011)²⁰⁰

The COM-B model forms the first tier of the Behaviour Change Wheel (BCW), a behaviour change theory and tool for developing behaviour change interventions (Figure 2).²⁰⁰ The second and third tiers help identify which types of interventions are appropriate to implement and which types of policy may be helpful in implementing these interventions, based on the barriers and facilitators identified in the first tier. Categorising these barriers and facilitators according to the COM-B framework thus aids in developing interventions to improve testing among this population in future. The COM-B model of behaviour has previously been applied in a similar way to sexual healthcare-seeking behaviour in young people.²⁰¹⁻²⁰³

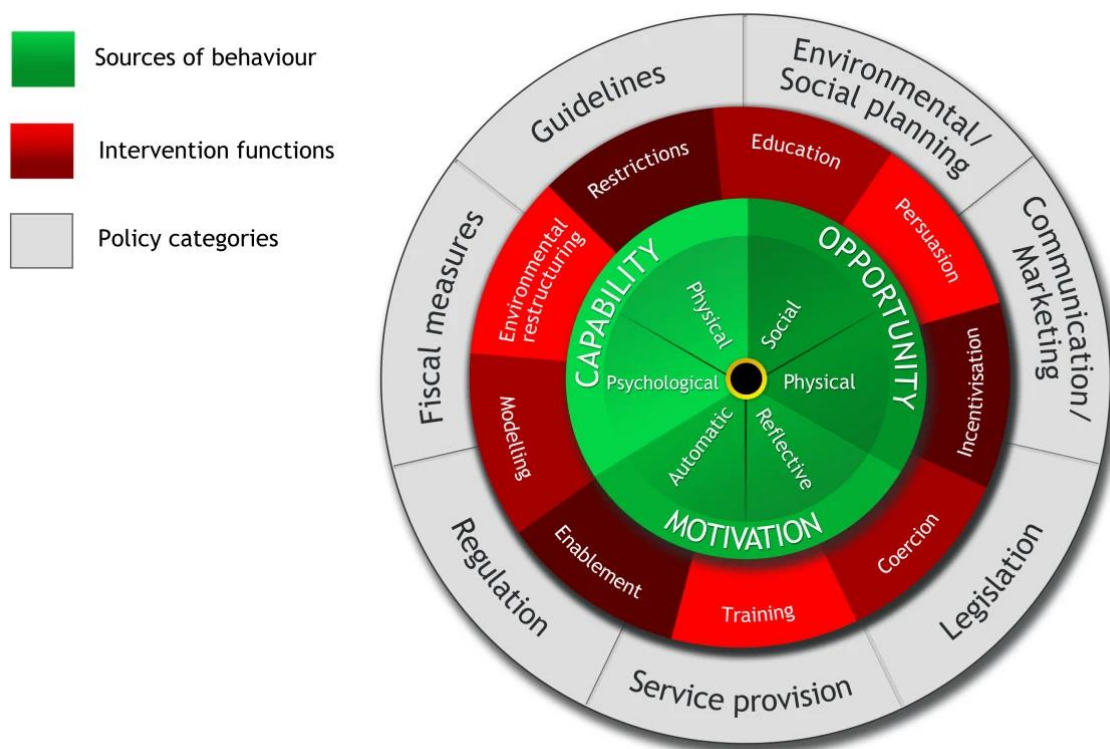


Figure 2: The Behaviour Change Wheel, from Michie et al (2011)²⁰⁰

3.5 Reflexivity

In this section I discuss how my role as researcher as well as my identities, experiences and attitudes may have influenced the research, through both study participants' perceptions of me and my own approach to conducting the research, including interpretation of findings.

3.5.1 My position as a researcher and its impact on the interview process

Throughout the interviews I conducted for my qualitative study, I typically introduced myself to participants as a sexual health researcher. However, face-to-face interviews for this study were conducted in the same building as an SHC, and so participants may have assumed I was also a sexual health clinician. Some participants did in fact make comments in or around their interviews that suggested they held this perception of me, though I corrected them when this occurred. Many participants discussed their trust of HCPs, and in particular, sexual health clinicians. As a result of this trust, participants described feeling comfortable openly discussing sensitive issues with their HCPs. It is possible then that participants' perception of me may have allowed participants to be more open in interviews.

However, participants' perception of me as a sexual health researcher may also have deterred them from expressing themselves naturally during interviews. The label "sexual health researcher" indicates some level of expertise and authority, resulting in a power differential between the participant and me as the researcher. This may have resulted in some participants feeling that they needed to answer some questions, particularly those related to STI/HIV prevention practices, in ways they believed would be "more acceptable" to me. There were also signs in interviews that some participants were not necessarily comfortable using more informal language, despite assurances from me that they could use any language they preferred. As an example, one participant used the word "anilingus" when describing the sex he had with men, indicating perhaps that he expected me to be more comfortable with that word than the more informal "rimming". For all interviews, I attempted to minimise any perception of power differentials between myself and participants by mirroring participants' language as much as possible; trying to minimise use of formal language; and for face-to-face interviews, set up the interview room (including interviewer and participant chairs) in a relaxed and informal way. However, the power imbalance inherent in the interviewer-interviewee dynamic means that some power differential likely remained.

3.5.2 My own sexual identity and its role in the research

As a man who has sex with other men, I share some of the experiences of my interview participants, not just their sexual activity with other men, but also more broadly, for example, their experiences as a sexual minority, their concerns about disclosure to others, and their experiences of sexual healthcare. However, I identify as gay and so there are parts of my participants' lived experiences that I do not share, including their experiences of romantic and sexual relationships with women, and more generally, their lives as heterosexual-identifying men. Therefore, I occupied both an insider and outsider position.

Insider status can provide both benefits and shortcomings to research. For example, insider status can lend legitimacy to a researcher, allow more rapid acceptance by participants, and enable more natural interactions between researcher and research participant.²⁰⁴⁻²⁰⁶ In the interviews I conducted for this study, my position as an insider meant that I understood sexual slang associated with sex between men, and more importantly, understood some of their experiences. It is also possible that a perception of me as a gay man helped participants feel more at ease discussing the sex they had with men than if they were talking with an interviewer they perceived as straight. While I did not explicitly disclose my identity as a gay man to interview participants, it is possible that participants perceived me as such in interviews, using cues such as voice, mannerisms, or my familiarity with terms or concepts discussed during interviews. There is some evidence that this occurred, with one face-to-face interview participant gesturing to me when saying that he would not want to use language that was offensive to gay people. However, this may have been harder for participants to detect in phone interviews.

However, insider status can mean that participants make assumptions about researchers' understanding of the subject of research, and so fail to fully explain their experiences.²⁰⁵ Insider status can further influence the data collection process if the researchers themselves have difficulty separating their personal experiences from the discussion. This can mean they do not probe as deeply into their participants' experiences as they would if discussing a subject they were unfamiliar with.²⁰⁶ I felt that this did affect some of my early interviews, and so tried to be aware of this for later interviews, probing participants' answers even when I thought I understood their reasons for those answers. Insider researchers' closeness to the subject of research

can also threaten the objectivity of the research, with insider researchers more sympathetic to their participants' experiences.²⁰⁴ In this case, I do not feel that my insider status affected my objectivity in a significant way, however, I have discussed below how my desire to avoid further stigmatising my research population had the potential to reduce my objectivity throughout this study.

At the same time, I was also an outsider when conducting this research. My own identity as a gay man means that I do not have access to the lived experiences of my participants as heterosexual-identifying men, both in terms of their romantic and sexual relationships with women, but also their experiences more broadly as heterosexual men. I was concerned about my ability to develop a rapport with my interview participants if they perceived me as gay. I grew up in extremely heteronormative suburban Queensland, Australia in the 1990s and early 2000s, in which implicit (and sometimes explicit) homophobia was the norm. As a young man realising his own identity, I was often exposed to this homophobia, and this usually came from straight male peers at school or adults. As a result, I've always been sensitive to how straight men may perceive me and the potential for feelings of discomfort on both sides. As discussed, I did not explicitly disclose my sexual identity to participants, so it is not clear how many participants perceived me as gay. However, participants of two early phone interviews made comments about avoiding or not wishing to be friends with gay men, suggesting that if they did perceive me to be gay, it did not affect how they responded to questions. Finally, three of my participants described coming from conservative South Asian communities which were not accepting of homosexuality. For these participants, my outsider status (as a White man) may have made them more open during interviews than if I had been from the same community, as two of these participants specifically mentioned concerns about discussing their sex with men with HCPs from their own community or others with similar views about homosexuality.

3.5.3 My responsibility towards my research subjects

Throughout my qualitative study, I was conscious of the ethical responsibilities I had as a social scientist towards my participants. I was aware that these participants were sharing a very private and personal part of their lives, and indeed, some participants described their interview as being the first time they had spoken to

another person about their experiences. Some even described their interview as therapeutic. As a result there were moments in the interviews at which I had to resist the urge to counsel participants, for example, when they made disparaging remarks about their behaviour or themselves.

There was, however, one occasion in which I did not probe into a participant's experiences as much as I could have. This participant revealed early in the interview that he had been sexually assaulted as a teenager, and that this was closely linked to the sex he had with men as an adult. I was conscious of my discomfort discussing this incident, however, I also felt that I may not have the skills to navigate any discussion of the incident in a way that would not cause harm to the participant. Ultimately, I also felt that, despite not knowing the specifics of the incident, I understood enough about its relevance to his experiences as an adult. I therefore refrained from probing further into an experience that may have been traumatic to recount, allowing the participant to bring it up himself where he felt it relevant. At the end of the interview I directed him to relevant services that I thought might provide support, should he wish to pursue these.

Throughout this study, I have also understood my ethical responsibilities towards H-MSM more generally, as my research population.²⁰⁷ H-MSM are a stigmatised population, and a primary consideration throughout the writing and dissemination of my research has been a desire to avoid exacerbating stigma. I was aware of the potential for this to lead to a loss of objectivity, particularly when an outcome estimate (in the case of quantitative research) or an emerging narrative (in qualitative research) has the potential to portray the research population in a negative light. For example, in the quantitative analysis presented in Chapter 5, I was initially reluctant to carry out an analysis of the reporting of recent condomless sex with both men and women, as I was aware that this could potentially feed into stigmatising narratives of H-MSM putting their heterosexual female partners at risk. I also felt that the measure was too imprecise, given my reliance on cross-sectional survey data with a long recall period, such that chronology could not be established. However, the interviews I conducted raised important contextual information regarding the sexual behaviour of H-MSM who also have female partners, and so I felt it was important to carry out this quantitative analysis to complement the emerging qualitative analysis. In thinking about my approach to this analysis, I realised that my true responsibility to my

participants, and to this population more broadly, is to report my results accurately and honestly, and to provide explanatory context where possible to avoid further stigmatisation.^{207 208}

4. Systematic review of literature

4.1 Introduction

The hidden nature of the H-MSM population makes them a challenging population to study (Chapter 2). Studies that do report sexual behaviour or health outcomes for H-MSM tend to focus on MSM more broadly, giving little attention to H-MSM. This chapter presents the results of my systematic review of quantitative and qualitative studies examining the sexual behaviour and sexual health of H-MSM. In general, I have integrated findings from quantitative and qualitative studies to complement each other.

The aims of the systematic review were to:

4. Describe the sexual behaviour and sexual health of H-MSM, including STI/HIV testing behaviour.
5. Compare these characteristics with those of G-MSM and B-MSM.
6. Understand H-MSM's perception of risk and attitudes towards sexual health, including accessing sexual healthcare services and STI/HIV preventative strategies such as condoms and PrEP.

A note on terminology: throughout this chapter, “record” refers to the individual items in the search databases, “article” refers to the journal articles containing the research findings, and “study” refers to the specific research process that produced the research findings contained within an article. This distinction is made because some individual studies produced multiple articles that were included in the review.

4.2 Characteristics of included studies

4.2.1 Screening

Of 8,320 records identified, 3,132 unique records were identified and screened (Figure 3). Altogether, 2,839 records (90.6%) were judged not to be relevant, and 293 full-texts were assessed for eligibility. To meet my review inclusion criteria, it was necessary for authors to report not only the sexual behaviour and sexual identity of study participants, but also outcome data specifically for H-MSM. Qualitative studies were required to have been conducted with H-MSM themselves, and not with

partners or other third parties. I excluded 229 articles at the full-text screening stage; 40% of excluded articles (n=91) did not report either sexual identity (n=65) or sexual behaviour (n=26). Other common reasons for exclusion were that samples did not contain H-MSM (n=29), or H-MSM were included but outcomes for them were not reported (n=47). This left 43 quantitative articles from 34 studies (Table 68, Appendix 9) and 21 qualitative articles from 16 studies (Table 69, Appendix 10) that were included.

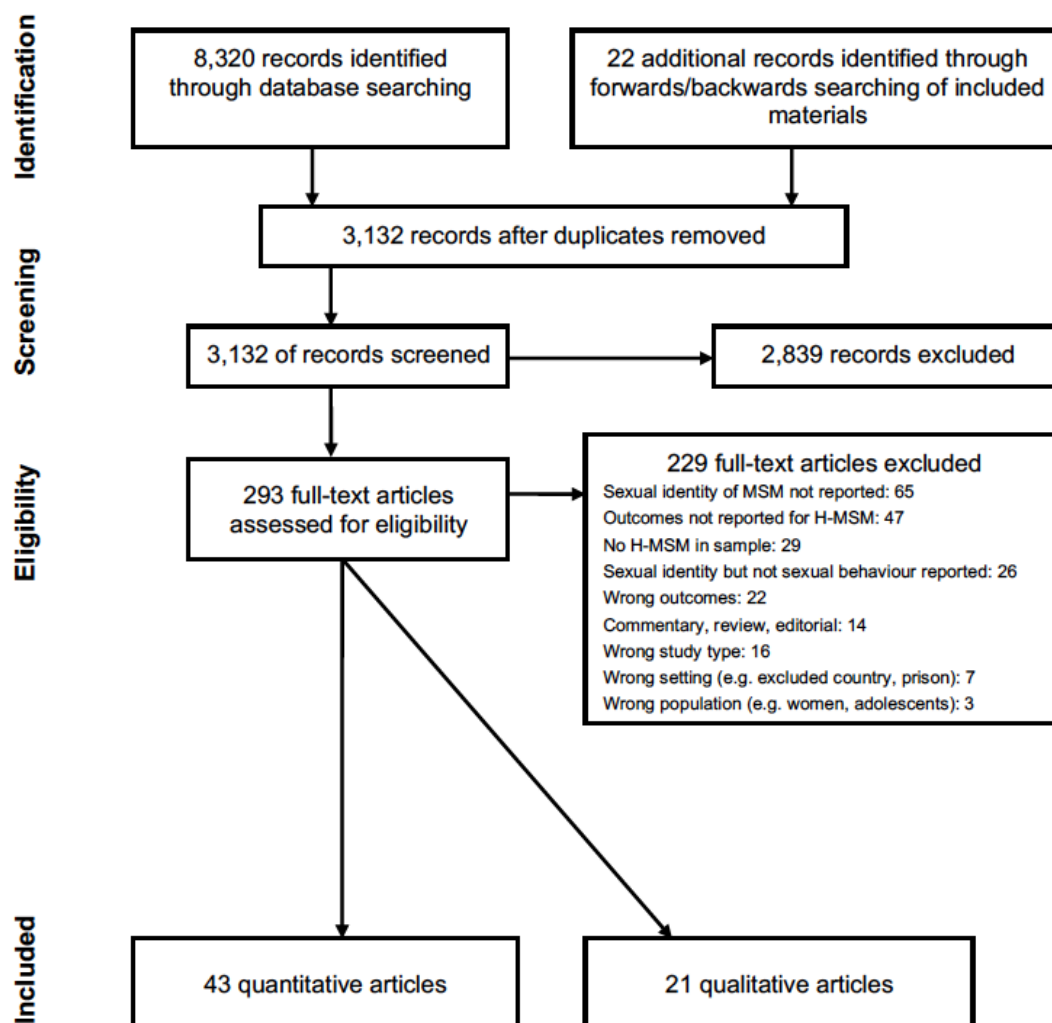


Figure 3: PRISMA diagram showing the screening and selection process for systematic review.

4.2.2 Quality appraisal

Of the quantitative articles, nineteen of 43 were rated as high quality,^{3 20 25 26 118 120 139 209-220} a further 21 articles were rated as medium quality,^{12 71 110 143 221-237} generally because of minor reporting issues or concerns about the representativeness of the

sample, and three articles were rated as low quality,²³⁸⁻²⁴⁰ because of concerns about the quality of statistical analysis conducted. Detailed quality appraisals of all quantitative articles are provided in Appendix 11.

Twelve of the 21 qualitative articles were considered to be of high quality.^{21 27 59 62-65 105 106 241-243} Six articles were considered to be of medium quality, generally because of minor reporting issues such as unclear descriptions of recruitment or analysis.^{11 61 66 81 244 245} Three articles were assessed to be of low quality, primarily because of concerns with data collection or analysis methodology (for example, analysis of translated interview summaries instead of transcripts of the full interviews) or reporting.²⁴⁶⁻²⁴⁸ Only four qualitative articles included discussions on reflexivity.^{27 59 65 241} This is an important component of qualitative articles, helping readers to understand the positions of the researchers involved with the studies, and how these may have influenced the data collection, analysis and writing up of the research. Similarly, 11 qualitative articles did not report the data collection period for their study, meaning some contextual information was missing.^{27 59 61 64-66 81 243 244 247 248} Detailed quality appraisals of all qualitative articles are provided in Appendix 12.

4.2.3 Study characteristics

4.2.3.1 Sample populations

Of the quantitative articles, six were from studies recruited from the general population,^{3 12 118 143 211 218} three from studies that recruited specifically MSMW,^{120 222 236} while the rest recruited only MSM.^{20 25 26 71 110 139 209 210 212-217 219-221 223-228 230-235 237 239 240} Thirteen articles were from studies that defined men as MSM based on lifetime (or similar, e.g. after age 18) sexual behaviour with other men,^{12 20 71 110 118 143 209 211 214 219 227 238 239} with the rest defining MSM based on more recent sexual activity, ranging from previous three months to previous 12 months.^{25 26 120 139 210 212 213 215-218 220 222-226 228-237 240} The majority of these studies (representing 38 out of 43 articles) were based in the USA; five studies reported on samples in France,³ Spain,¹¹⁸ Israel¹² or Canada.^{219 230} Of articles from studies based in the USA, 12 were focused specifically on Black or African American men,^{25 120 217 220 222-224 226 232 234 235 240} with two focusing on Hispanic or Latino men,^{237 238} and the remainder having no racial or ethnic focus. Five articles focused on drug or alcohol users.^{26 110 215 220 225}

The qualitative studies were more focused in their recruitment strategies and inclusion criteria. Seven of the 16 studies recruited specifically MSMW,^{21 27 62 242 244 245 247 248} six studies recruited MSM more broadly,^{11 61 63 64 66 81 105 106 241 246} while three studies did not require participants to have had any sexual experience with men.^{59 65} ²⁴³ In terms of sexual identity, four studies recruited non-gay identifying men,^{21 63 242 244 245} two studies recruited men who identified as neither gay nor bisexual,^{27 62} while seven studies recruited men who self-identified specifically as heterosexual.^{11 59 61 64-66 81 105 106 246 247} Nearly all (15/16) studies took place in the USA. The majority (9/16) of studies recruited participants in large city or urban environments,^{11 21 27 62 63 105 106 241 242 244 245 248} however, one study specifically recruited men living in rural areas of the USA,^{61 81} while another study involved students in a small university town in England, UK.⁶⁵ Six studies specifically recruited Black or African American men,^{27 62 63 241 244 248} one study recruited Latino men,²⁴⁷ with the remaining studies had no specific ethnic focus, though four of these studies had predominantly (>75%) or entirely White men.^{59 61 64-66 81} Two studies focused specifically on young men at university,^{59 65} one study focused on swingers or people involved in “the lifestyle”,²⁴³ and three studies focused on current or previous drug users.^{244 246 248}

4.2.3.2 Recruitment strategies

All but one¹¹⁸ of the quantitative studies that recruited from the general population used some form of probability sampling*, and so these studies are considered more representative of the populations from which they were sampled. Reflecting difficulties in identifying sampling frames and recruiting for MSM, quantitative and qualitative studies specifically targeting MSM frequently used a mixture of time-location sampling† (TLS),^{20 139 210 212 213 216 221 227 233} respondent-driven sampling‡ (RDS),^{26 110 120 217 220 222-226 232 235} snowball sampling§,^{25 27 59 62} quota sampling**,^{21 209}

* Probability sampling: a sampling method in which participants are selected randomly from the population, and their data weighted during analysis based on the probability of being selected.²⁴⁹

† Time-location sampling: sampling in which recruitment takes place at locations randomly selected from a sampling frame of candidate locations at which the target population is known to visit.²⁵⁰

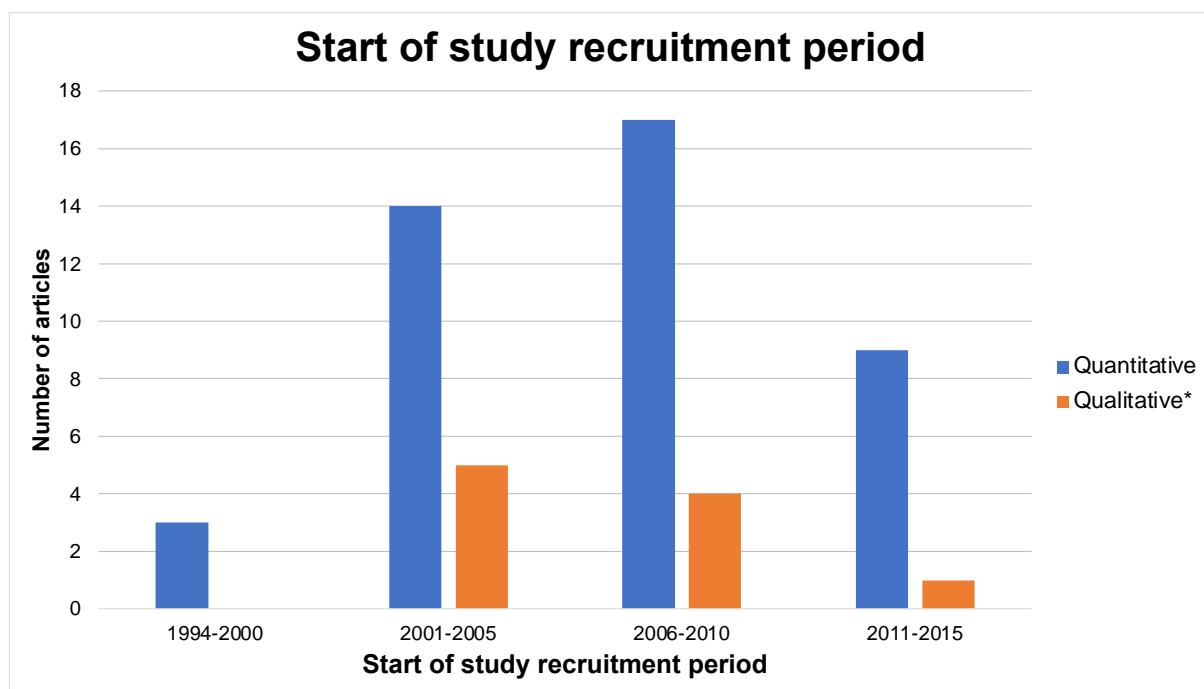
‡ Respondent-driven sampling: sampling in which an initial set of participants from within the target population is recruited, who then recruit a first wave formed of those eligible from within their contacts. This wave then recruits the second wave from within their contacts etc.²⁵¹

§ Snowball sampling: sampling in which one or more initial participants are recruited, and then further participants are approached from within those initial participants' contacts.²⁵²

** Quota sampling: sampling in which participants are selected so that the distribution of a selected characteristic in the final sample is similar to that thought to exist in the population under investigation.²⁵³

236 238 242 245 targeted sampling^{*}, 21 236 242 245 and convenience sampling[†]. 11 25 61-64 66 71 81
105 106 120 214 215 217 219 220 228-232 234 235 237 240 241 244 245 248 Studies that recruited MSM in person recruited from a range of locations, including community-based organisations, SHCs or HIV testing sites, public sex sites such as cruising areas, and gay social venues such as bars or clubs. Studies that recruited online typically recruited from social and/or sexual networking websites, as well as listing websites such as *Craigslist*. Two qualitative studies recruited from within smaller defined populations: Scoats' study recruited from within a previous undergraduate class of the study lead,⁶⁵ while Senreich's study collected data from a population of clients within a substance abuse program.²³⁶

For the majority of included articles, study recruitment and data collection started between 2001 and 2010, with only 10 articles reporting on studies that commenced after 2010 (Figure 4). Eleven qualitative articles did not specify their recruitment periods.



*11 qualitative articles did not specify when data collection took place.

Figure 4: Start of study recruitment period for included articles, by study type

^{*} Targeted sampling: a sampling method for researching "hidden" populations in which primary and secondary research methods are used to identify specific areas and locations in which a target population is likely to be, for inclusion in a sampling frame.²⁵⁴

[†] Convenience sampling: a nonprobabilistic form of sampling in which the sample is selected from participants accessible to the researcher.²⁵⁵

4.2.3.3 Mode of data collection

In the majority of quantitative studies (33/43), data were collected in person via face-to-face interview, (audio) computer-assisted self-interview ((A)CASI), or computer-assisted personal interview (CAPI). Eight studies were conducted via internet survey^{12 71 214 218 228-231} (including one quota panel¹²) and two via telephone interview.^{3 239}

Included qualitative studies used a range of qualitative data collection techniques. Ten studies conducted semi-structured interviews with participants,^{11 21 59 61 62 64-66 81 105 106 242 244 245 247} while a further two studies conducted in-depth interviews.^{27 241}

Three studies conducted focus groups.^{11 63 105 106 248} One study collected data through written responses to surveys and face-to-face follow-up responses if participants wished to provide additional information.²⁴⁶ In two studies the researchers conducted ethnographies to collect data.^{59 243}

4.2.3.4 Method of data analysis

Quantitative studies used a variety of analysis techniques, including descriptive analysis, latent class analysis, and linear, logistic and Poisson regression. For qualitative studies, the majority of interview studies used thematic analysis to analyse data.^{11 21 27 61 62 64-66 81 105 106 241 242 244 245 247 248} Other analysis methods used included phenomenological analysis,²⁴⁶ and a constant-comparative approach.⁶³ Frank's ethnographic study²⁴³ of swingers involved textual analysis of "lifestyle" forums and other materials such as guides and documentaries, and descriptive analysis of her own fieldnotes, and so primary data from participants were limited. Anderson's study⁵⁹ of heterosexual male cheerleaders is not clear about the analysis techniques used, but suggests a combination of ethnographic methods (analysis of fieldnotes) and thematic analysis of interview transcripts.

4.2.4 Potential sources of bias

As in all studies of sexual behaviour or sexual health, underreporting or overreporting (depending on the outcome) due to social desirability is a major source of potential bias, though many of the included quantitative studies employed modes of data collection shown to reduce reporting bias, such as (A)CASI or internet survey.²⁵⁶⁻²⁵⁸ Samples recruited via semi- or non-probabilistic sampling methods such as TLS or convenience sampling at gay-associated venues are unlikely to be

representative of the MSM population, and H-MSM in these samples may be even less representative of H-MSM in general. RDS may have helped some studies recruit men who would not be recruited at gay-associated venues, though again these men may only represent certain sub-populations of MSM. Recall bias is likely to vary across studies reflecting differences in the recall period employed, with some studies measuring outcomes in the past year while others measured outcomes more recently or with last partner. However, it is plausible that recall bias may vary by sexual identity, as self-report may be more accurate for MSM for whom sexual activity with men is less frequent (e.g. some H-MSM).²⁵⁹

4.2.5 Proportion of H-MSM in study samples

Proportions of H-MSM recruited varied depending on the target population, recruitment strategies, and the timeframe defining MSM activity, with studies with longer reference periods reporting higher H-MSM prevalence. In a representative sample of the US general population, 35.3% of all men with lifetime same-sex experience identified as heterosexual (representing 1.8% of the male population).²¹¹ In samples recruited predominantly from MSM communities, H-MSM made up a smaller proportion (<10%) of samples based on lifetime experience.^{20 71 110 209 214 219 227 239}

In studies of current MSM (men reporting sex with other men in the past year or more recently), the proportion of H-MSM ranged from 0.1%²²⁸ to 42%.²³⁷ All studies with less than 1% H-MSM were internet studies recruited from social or sexual networking websites for MSM.^{214 228 231} Studies with the greatest proportions of H-MSM focused on either African American^{220 234} or migrant MSM.²³⁷ Studies reporting on cycles of the US National HIV Behavioral Surveillance System (NHBS), a largescale study of MSM, contained an estimated 1.1-1.7% H-MSM.^{20 210 212 213}

Heterosexual-identifying men made up greater proportions of samples of MSMW, ranging from 3.2% in an internet survey²²⁹ to 19.5% in a RDS-recruited study of MSM, illicit drug users and their sexual partners.²⁶ Studies reporting on higher risk groups tended to have the greatest proportion of H-MSMW, ranging from 7%-20%.^{26 217 222 223 225}

As a result of their more specific focus, qualitative studies which purposefully targeted men with experience of sex with other men tended to have much higher

proportions of H-MSM, ranging from around 20% of the sample to 100% for some studies.^{11 27 61 105 106 246}

4.3 Sexual behaviour

Extracted sexual behaviour data for H-MSM, G-MSM and B-MSM are in Table 72 (Appendix 13). Relevant themes and illustrative quotes from qualitative articles can be found in Table 74 (Appendix 14).

4.3.1 Number and regularity of partners

4.3.1.1 Number of partners of either sex

Multiple large population studies found that H-MSM (based on lifetime behaviour) reported a similar number of lifetime partners (of any sex) as G-MSM or B-MSM, or had a similar likelihood of reporting larger numbers of lifetime partners (considered as 10+ in many studies).^{12 143 211} Regarding recent sexual partners, fewer H-MSM (based on lifetime behaviour) than G-MSM or B-MSM reported having two or more partners in the past year.²¹¹ One study of recent MSM found no difference by sexual identity in reporting 5+ new partners in the previous 6 months, though participants in this sample were at higher STI/HIV risk generally and so were likely not representative of the wider MSM population.²³⁵

4.3.1.2 Number of female partners

H-MSM were more likely to have reported sex with women than G-MSM, and across all timeframes whether in the previous year^{3 139 212 216 218} or more recently.^{110 215 223 238} Three large national studies found H-MSM also more likely than B-MSM to have reported recent female partners,^{3 139 212} though differences in reporting between these groups was smaller, and smaller studies did not find differences between these groups.^{110 215 218 223 238}

Nationally-representative studies from the USA and France found that H-MSM (based on lifetime sexual experience) reported a median of 15 lifetime female partners. This was more than that reported by G-MSM, while comparisons with B-MSM were less clear.^{3 211} H-MSM were also more likely than G-MSM to have reported more than one female partner in the past year, though no difference was found when compared with B-MSM.²¹¹

4.3.1.3 Number of male partners

H-MSM in large general population surveys in the USA and France reported fewer lifetime male partners compared to both G-MSM and B-MSM.^{3 211} High quality national US studies also found that H-MSM (defined based on both lifetime²¹¹ and more recent sexual behaviour²¹³) reported significantly fewer *recent* male partners in the past year than both G-MSM and G-MSM.

Qualitative studies found that for some H-MSM, the relative infrequency of their sex with men actually served as justification for maintaining their identity as heterosexual.^{11 27}

Donald: If you're having sex with women and an occasional guy, but mainly women, I would still consider them straight.²⁷

4.3.1.4 Regularity of male partners

Where explicitly addressed, the majority of H-MSM's same-sex episodes in the qualitative literature were described as one-off, anonymous, or casual. For some, this related to the context in which these same-sex sexual episodes happened, e.g. spontaneous and unplanned events with men they had only just met⁶² or in group sex situations also involving women (discussed below).^{59 65} Other H-MSM specifically sought male partners in locations which facilitated anonymous sex (discussed below).^{27 62 106 241 245} Some H-MSM explicitly expressed not wanting emotional connection with their male partners, in some cases to prevent feelings developing which could complicate their lives when they perceived themselves as straight.^{27 62} Similarly, feelings of shame and guilt led to some H-MSM distancing themselves from male sexual partners once sex had ended.^{11 106} Engaging in one-off or anonymous episodes of same-sex sex therefore helped H-MSM to compartmentalise their same-sex behaviour from the rest of their lives.

Tony: When it's over, I don't want to look at them no more. Get out of my house; you got to go. It was a nice experience, [but] I got things to do. I don't know what you've got planned, but you've got to get out of here.¹¹

Even though H-MSM were in general not looking for romantic relationships with men,^{11 27 62 81} this did not discount the possibility of regular sexual partnerships

developing. In a number of studies, regular or semi-regular sex was described between H-MSM, and though these relationships lacked any romantic element, they were described as having strong elements of friendship or companionship.^{59 81 105} Participants in Silva's study of rural White H-MSM in America reported that by maintaining regular sexual relationships with other men, they avoided having to continually seek new male partners, a process which in rural areas carried an increased risk of discovery by others.⁸¹ However, as H-MSM typically also had female partners, their relationships with other men were generally kept separate from the rest of their lives.^{81 105}

Paul: So, I keep my girlfriend at a level. And I keep my friends at a level. And then I have my male relationship at a level to where it won't intervene with my girlfriend, or with this male over here because he has this female.¹⁰⁵

The preference of H-MSM for casual male partners was supported by the limited quantitative data on male partner type. Two cycles of the high quality NHBS study reported on AI with male partners by partner type, finding that a minority of H-MSM (16% in 2011) reported AI with a main partner (described as a male sexual partner to whom the participant felt most committed, such as a boyfriend, spouse or significant other), less than was reported by both G-MSM (63%) and B-MSM (46%).^{212 216} In contrast, reporting of AI with *casual* male partners was higher (42%), and closer to that of G-MSM (61%) and B-MSM (65%). As these data do not take into account non-AI partners, they may underestimate true partner type prevalence data.

4.3.2 Meeting sexual partners

Only one high quality quantitative study reported on how participants met their male sexual partners. A study of African American MSM in Philadelphia in 2008-2011 found that fewer H-MSM reported seeking sexual partners at gay bars or bathhouses in the past 90 days than G-MSM.²⁵ However, similar proportions of MSM of all identities reported seeking partners at other locations such as cruising venues, sex parties, or online or via chatlines.

4.3.2.1 Avoidance of venues associated with the gay community

The reduced likelihood of H-MSM meeting sexual partners at venues with explicit connections to the gay community was supported by views reported in qualitative studies. Some H-MSM reported feeling uncomfortable around gay men.^{11 81} Others expressed a clear desire to be perceived as heterosexual,^{27 64 66 247} and not as a bisexual or gay man.^{11 27 61 64 66 244} Related to this, men also described secrecy and discretion as being important factors for them in determining how they met partners, wishing to avoid others finding out about their same-sex behaviour.^{106 245} The combination of these two factors led some men to describe specifically avoiding gay venues like bars, clubs or bathhouses and even public cruising areas where they may be mistaken for being gay.¹¹ As a result of their explicit disconnection from the gay community, some men reported being unaware of the existence of locations for gay sex such as bathhouses/saunas or gay public sex areas.^{11 245}

Jim: I feel as though if you go to [gay] clubs that you're gay. And I don't even want to be associated or even acknowledged being gay. So I don't go there. Because gay clubs, if you go in there, you've admitted openly, "Hey, I'm gay. I'm a fucking faggot, I'm a sissy."¹¹

It should be noted, however, that not all H-MSM avoided these locations, with the more liberal university students in Anderson's study feeling comfortable attending gay bars or clubs and even dancing with or kissing other men there.⁵⁹

4.3.2.2 Sexual venues and the internet allow anonymity, privacy, and convenience

Qualitative studies also gave insight as to why other methods of meeting male partners might be more popular with H-MSM. Some H-MSM preferred meeting men at public cruising spots such as parks,^{27 62 241 245} and commercial venues such as adult bookstores,^{62 106} bathhouses/saunas, and sex clubs,^{11 106} because these venues allowed men to have sex that was anonymous and depersonalised, and facilitated compartmentalisation and discretion. The internet allowed men to explore same-sex sex privately and anonymously, by first chatting to other men on dating and hook-up websites, and then eventually meeting with them in person, which could then lead to sex.^{64 245} The internet also offered convenience, facilitating the

arrangement of spontaneous sex with other men through hook-up websites,^{62 245} or to contact male sex workers.²⁴¹

Unattributed: You have an ad, it's posted, you know, someone is talking 'bout, 'Come over. You wanna have fun?' Okay, good. It's just straight up sex, okay, and we already know that going in so it's straight. It's equal. Bam! I don't have to, you know, I don't have to take you out to dinner, you ain't gotta take me out to dinner.⁶²

It is important to note that hook-up apps such as *Grindr* were not discussed in any of the studies, which is likely to be because recruitment for the studies generally took place before these apps became popular. As a result, there was little information in included studies on how H-MSM use hook-up apps.

4.3.2.3 Meeting partners at non-sexual locations

The internet and venues associated with gay sex still raised fears of discovery in some men. Some H-MSM therefore described meeting male sexual partners at locations not typically considered sexual or associated with gay sex, such as mixed-sex nightclubs,^{62 245 247} social gatherings,^{59 62 65} gyms,¹⁰⁵ SHCs,¹⁰⁵ or in other public locations (e.g. in the street).⁶² Due to their non-sexual nature, their presence at these locations was easier to explain for the men involved.²⁴⁵ These episodes tended to be spontaneous,^{59 62} and were usually with men they had only just met.^{62 245}

*Unattributed: I happened to meet him walking down [name of street].
And he looked and I looked and I was like, I turned around and I asked him his name, he asked me my name, and one thing led to another and he told me he was just in town for a day and he was a flight attendant and would I come back to his hotel room with him?
And I said sure. And it was down and dirty.⁶²*

4.3.2.4 Sex between men arising from group sex

Qualitative studies also explored same-sex sexual episodes resulting from group sex situations that also involved women. These occurred in multiple contexts, including planned male-female-male (MFM) threesomes (including swinging) with men and their long-term female partners,^{64 65 243} and more spontaneous group sex situations that took place among young university students and their friends.^{59 65} Examples of

the latter include MFM threesomes,⁶⁵ “switches” (in which multiple male-female couples have sex in the same room and switch partners),⁵⁹ and “trains” (in which multiple men line up to have sex with a single woman).⁵⁹ In the case of MFM threesomes, these usually occurred at the request of the woman involved, for example, to satisfy a sexual fantasy.^{64 65 243} While there was usually little interaction between the men involved, at least initially,^{64 65 243} these experiences sometimes served as an initial exploration of same-sex sex for the straight men involved, which could lead to further sexual experimentation and exploration of their sexual identity.⁵⁹

64 65

*...for Peter, his same-sex sexual explorations were prompted by a series of events that he described as a kind of slippery slope. His female partner wanted them to participate in threesomes involving a second man. ‘After the third or fourth time, the guy went down on me. A couple of times after that, he asked me to do the same for him, and she encouraged it’.*⁶⁴

For the young university students who engaged in MFM threesomes with their friends, these incidents served as a form of bonding: shared experiences with friends that they could talk or joke about later.^{59 65} In fact, some men described only wanting to engage in threesomes if the other male was a close friend, because of the comfort they felt with those friends.⁶⁵ It should be emphasised that in the MFM threesome situations described by these young men, sexual activity usually took place only with the female member of the threesome and not between the two men,⁶⁵ though varying levels of sexual interaction could still occur.⁵⁹

*Matt: It was quite fun, because it was one of my best mates as well, and it was a good way to bond with him in that sort of way. It was just a new experience.*⁶⁵

4.3.3 Sexual behaviour with men

Quantitative studies included in the review reported only on AI between men (discussed below), and so there is little quantitative evidence on other sexual acts. However, evidence from the qualitative studies suggests that, for some H-MSM,

certain sexual acts with men are easier to align with a heterosexual or masculine identity than others, influencing their likelihood of engaging in these acts.

4.3.3.1 Sexual acts requiring little engagement with partners: receiving oral sex, being masturbated

Across many qualitative studies, activities in which H-MSM played more passive roles, such as receiving oral sex or being masturbated, were mentioned as the earliest same-sex activities H-MSM engaged in, suggesting these acts were easiest to align with straight identity.^{11 59 61 63-66 81 105} In narratives of early same-sex sexual exploration, H-MSM frequently mentioned their first same-sex act being receiving oral sex.^{59 61 63 64} Some H-MSM specifically mentioned seeking oral sex from men when their female partners were unavailable⁶⁶ or when sexual activity with their long-term female partners had ceased.⁶¹ Perhaps because receiving oral sex was often part of heterosexual men's sexual repertoire with female partners, tactics like closing their eyes could help H-MSM distance themselves from the fact it was another man giving it to them: *"I just closed my eyes and said [to myself], "My penis doesn't really know, my penis doesn't really know."*¹¹ Oral sex was also described as something that happened *to* H-MSM, something they "let" another man give to them, rather than with their active participation.^{59 105} Framing these acts as means of receiving necessary sexual release that they were unable to get elsewhere, and as activities in which they were passive participants, may explain why some H-MSM reportedly found them easier to align with their straight identity. Indeed, some H-MSM felt no conflict at all between receiving oral sex or masturbation from men and their identity as straight men.^{59 65 81}

Rob: "Yeah, I let a guy give me a blow job once and I don't think that makes me gay."⁵⁹

4.3.3.2 Sexual acts requiring more active engagement with partners: kissing, mutual masturbation, giving oral sex

Activities such as kissing, mutual masturbation and giving oral sex, which required more active engagement with (the bodies of) male partners, were mentioned less frequently as behaviours H-MSM engaged in. In some studies, they were described as the "next step" in same-sex sexual exploration beyond receiving oral sex.^{59 64} H-MSM in multiple studies also provided justification for engaging in these

behaviours. For example, young college H-MSM described kissing, masturbating, or even potentially giving oral sex to male friends when it was requested by a potential female sexual partner as a condition of her involvement in an MMF threesome, acts which they justified as “*a good cause*”.⁵⁹ The rural straight White H-MSM in Silva’s study characterised giving oral sex to each other as a form of mutual sexual relief, or “*helping a buddy out*”: providing sexual release for a friend who, like them, was in an (often sexually unsatisfying) relationship with a woman, and who would provide similar release to them.^{61 81} Some H-MSM also avoided kissing or hugging male sexual partners, which helped to maintain emotional distance from these partners.¹¹¹⁰⁶ These cases suggest these acts are more challenging, though not impossible, to align with a straight identity.

Mike: In your mind you’re thinking you’re not gay, you’re just helping somebody out. This poor guy, he’s married, his wife won’t do it [give him a blowjob] ... But basically it was, if your wife won’t do it, come, I’ll do it, or my wife won’t do it, then we’ll get together and just do it together. And so, I guess in my mind, I wasn’t thinking this is a gay thing, this is just, I’m just helping my friend out.⁶¹

4.3.3.3 Anal intercourse

Qualitative evidence suggested that AI with men may be the most challenging sexual act to align with a heterosexual identity, with some studies suggesting that AI, and receptive AI in particular, is the dividing line between “straight” behaviour and “gay” behaviour for some H-MSM. For instance, H-MSM in some studies explicitly limited their same-sex repertoire to activities such as mutual masturbation, kissing or oral sex.^{59 64 66}

This was supported by the quantitative evidence, which generally showed that H-MSM were less likely than G-MSM and B-MSM to engage in AI with male sexual partners. The 2011 cycle of the NHBS found H-MSM less likely to have reported AI with a male partner in the past year than G-MSM (52% vs 90%, respectively) or B-MSM (85%). In a smaller study of mostly African American MSM, fewer H-MSM reported AI with men in the past year when compared with G-MSM, however, there was no difference when compared with B-MSM.²²⁶ Finally, a nationally-representative study of young Americans found fewer H-MSM (based on lifetime

sexual experience) reported having ever had AI with someone (of any sex) than either G-MSM or B-MSM.¹⁴³

4.3.3.4 Position during AI

Though most quantitative studies reported on position during AI in the context of CAI, all found H-MSM less likely than G-MSM or B-MSM to report recent receptive AI, and all but one study²²⁸ (which had a very small sample of H-MSM) found no difference by sexual identity reporting of insertive AI.^{25 223 224 238}

This pattern was supported by data from qualitative studies, which found evidence to suggest that H-MSM for whom masculinity and heterosexuality are major components of their identity may be less likely to engage in receptive AI. H-MSM who did engage in AI with men often considered this acceptable because they were the insertive partner, a role deemed to be masculine based on gender stereotypes.²⁷ ²⁴⁷ In contrast, receptive AI was considered by some H-MSM as “*feminine*”,²⁴⁷ or crossing “*that line of being considered gay*”.^{27 64 66}

*Frank: Well, what I'm saying (laughs) I never have, but in the past I was asked, but I never was the receiver. I just felt uncomfortable in that like that could be the last of my manlihood or whatever, I just felt uncomfortable with that because I've always been the giver. I think that was because I didn't want to cross that line of being considered gay.*²⁷

Ideas of masculinity and heterosexuality still influenced some H-MSM who wished to engage in receptive AI. For example, some H-MSM who wanted to have receptive AI refused to let women penetrate them out of fear their sexuality would be questioned by their female partners, and so paradoxically sought male sexual partners for this purpose.²⁴² Other H-MSM who had receptive AI with male partners dehumanised their male partners when discussing them, describing them (and their penises in particular) as merely superior alternatives to sexual toys, as “*living and breathing dildos*”.^{64 66} However, some H-MSM rejected the notion of receptive AI as feminine.⁸¹ For others, engaging in submissive sexual acts with men served as relief from the pressures of masculinity experienced in their domestic and professional lives.^{64 66} Engaging in receptive AI could even provide beneficial insight into the experiences of female sexual partners.²⁴² Thus, while some H-MSM were less inclined to engage in

AI, and receptive AI in particular, due to a perception of these acts as less masculine or heterosexual, others were less affected by these beliefs, and instead driven by other motivations.

4.3.4 HIV and STI prevention

This section explores studies' reporting of HIV and STI prevention strategies used by H-MSM, including their motivations for using (or not using) them.

4.3.4.1 Condom use with women

4.3.4.1.1 Prevalence of condom use (or non-use) with women

Numerous studies found that H-MSMW were more likely report condomless vaginal or anal sex with women than both G-MSMW^{25 212 215 216 225} and B-MSMW,^{212 216 225 238} with only one article finding no difference between H-MSMW and B-MSM in reporting of CAI with women.²⁵ Another study of African American MSMW found no difference between H-MSMW and both G-MSMW and B-MSMW in the number of recent *episodes* of condomless sex reported with women.¹²⁰

4.3.4.1.2 Factors influencing condom use with women

These quantitative results may be understood in light of how H-MSM in qualitative studies discussed their decision making around condom use.

4.3.4.1.2.1 Trust

H-MSM reported not using condoms with long-term female partners, basing this decision on their feelings of trust towards these partners, meaning they were unconcerned about STI acquisition.^{62 241 247} In contrast, some of these H-MSM reported condom use with less trusted partners such as sex workers.²⁴⁷

Unattributed: If you involved in a relationship, and you really been knowing a person, it just comes down to a matter of trust. Can you trust this person, and if you can really trust them, then I don't think a condom is necessary.⁶²

4.3.4.1.2.2 Protection of their partners

However, some H-MSM also reported being *more* likely to use condoms with female sexual partners, out of concern for those partners' sexual health.^{62 106} This was

particularly the case for H-MSM with diagnosed HIV, who reported using condoms with their long-term female partners out of a desire to avoid transmitting HIV or STIs to these partners.¹⁰⁶

Q: How often do you use condoms with your wife?

*Keith (Asian Pacific Islander, HIV infected): All the time... . I don't want her to get infected.*¹⁰⁶

4.3.4.2 Condom use with men

4.3.4.2.1 Prevalence of condom use (or non-use) with men

Among H-MSM reporting AI with men, reporting of CAI varied across studies and depended somewhat on partner type and sexual position. Even in high quality national studies, denominators for prevalence estimates of CAI with *regular* male partners were small, and so estimates were inconsistent across studies.^{212 216}

Among MSM reporting AI with *casual* male partners in these studies, there was no difference by sexual identity in reporting CAI with casual partners with prevalence ranging from 42-52%.^{212 216} Two studies reported no difference by sexual identity in reporting CAI with their last partner⁷¹ or number of recent CAI acts.²³⁴ A notable exception was a study of African American MSM which found H-MSM were more likely to report CAI than G-MSM,²³² though this likely related to differences in recruitment between these groups. Limiting to MSMW, there was no difference by sexual identity in prevalence of CAI among MSMW who reported AI with male partners, ranging from 49%-65%.²¹² African American H-MSMW in another study reported fewer *episodes* of condomless sex with male partners than G-MSMW and B-MSMW.¹²⁰

Looking at reporting of CAI by position during AI, fewer H-MSM reported receptive CAI than G-MSM,^{25 223 224} though this is likely to be a result of H-MSM engaging in less receptive AI in the first place. There was no difference in reporting insertive CAI between H-MSM and G-MSM.^{25 223 224 228} No difference was found for reporting of CAI by position between H-MSM and B-MSM.^{25 223 224 228}

4.3.4.2.2 Factors influencing condom use with men

Evidence from qualitative studies was similarly mixed, with numerous factors influencing condom use by H-MSM.

4.3.4.2.2.1 Feelings towards male partners

For some H-MSM the decision to use or not use condoms with men they had sex with was based on their feelings towards those partners. Some H-MSM based this decision on trust, meaning they felt no need to use condoms with male partners they felt they could trust, while using condoms with casual partners or male sex workers.²⁴⁷ For other H-MSM, concern (or lack thereof) for the health of their sexual partners influenced this choice. In contrast to the concern for their female partners' sexual health, as discussed above, the one-off or anonymous nature of their same-sex sexual encounters contributed to these same H-MSM feeling less responsibility for the health of their male partners, and so less obligation to use condoms with these partners.^{62 106} In one study, H-MSM with HIV specifically chose male or trans women partners, who they assumed to already have HIV, in order to allow them to continue to have condomless sex without putting their cis female main partners at risk.¹⁰⁶

Unattributed: I don't know why I'm real careful when I have sex with her, but I have sex with men it's kinda—I don't know why. It's different to me... 'Cause the mens, it's just gone be a fly-by-night thing. Okay, we gone do this and I say, 'Alright, man. I'll see you later.' I'm not gone have no relationship with your ass.⁶²

4.3.4.2.2.2 Circumstances of sex with men

The circumstances in which H-MSM had sex with men was also an influencing factor in condom use with these partners. The often-spontaneous or impulsive nature of sex with men meant that H-MSM often did not have condoms with them (as this would imply planning), or were simply too caught up in the moment to consider condom use.^{62 106} Drug and alcohol use (discussed in section 4.3.6) also contributed to a reduced likelihood of correct condom use during sex with men, because of either reduced capacity or disinhibition.^{106 244}

Derrick: Condom, I don't know. I think I've used condoms [with a woman] every time except maybe once or twice. The same as with a guy, you just get caught up. You just get so turned on you just don't have time to put one on.¹⁰⁶

Charlie: You know, sometimes you don't want to put on a condom and sometimes you might be too high to put on a condom and sometimes you put on [the] condom wrong.²⁴⁴

4.3.4.2.2.3 Identity and invulnerability

Finally, some H-MSM reported a feeling of *invulnerability* based on the fact that they did not identify as gay or only assumed the insertive role during AI with men, and so perceived themselves as not being at risk.^{62 241} This association between gay identity and risk meant that for these H-MSM, who explicitly did not identify as gay, condom use was considered unnecessary or disparaged.

Unattributed: Most of the guys I know, including myself, I don't really use protection. Basically pretty much think that, you know, we're like superman. And sometimes people look down on it.⁶²

4.3.4.3 Condom use with partners of either gender

Studies suggested that H-MSM were more similar to B-MSM in terms of reporting condomless sex with partners of any gender,^{12 120 232 235} while evidence regarding differences with G-MSM was mixed, with two studies of African American MSM suggesting H-MSM engaged in more condomless sex than G-MSM,^{232 235} and others finding no difference.^{12 120}

4.3.4.4 PrEP use and awareness

The relatively recent advent of PrEP²⁶⁰ means that few studies included in the review reported outcomes related to its use. A study of Black MSM in New York City from 2012-2015 found H-MSM were less likely than G-MSM to be aware of PrEP (13% vs 30%), with no difference found when compared to B-MSM (14%).²²⁰ Awareness was no guarantee that men would want to take PrEP, however, with none of the Black or African American H-MSM interviewed in one qualitative study feeling PrEP would be suitable for them.²⁴¹ Reasons for this included fear of being labelled as gay if someone found their pills; their own feelings about the association between HIV and

being gay; or because taking medication could be seen as a sign of weakness.²⁴¹ One man described a feeling among H-MSM like him that, because they personally did not identify as gay, they were not at risk of HIV, and so PrEP would not be necessary.²⁴¹

Unattributed: 'Cause I'm not gay, that nigga's gay – he's suckin' my dick', or 'I don't do that', but you don't know what your partner's doing, and I think that a lot of people are just in denial about their existence. And if you're in denial about your existence, why would you wanna seek any help? [HIV infection] is not gonna happen to me, or anybody I know'.²⁴¹

There was no difference by sexual identity in interest in taking PrEP in MSM surveyed in 2012/13 in Montreal (52-56%).²¹⁹

4.3.5 Disclosure of sex with men to female partners

Two quantitative studies found H-MSMW less likely than G-MSMW or B-MSMW to disclose to female partners that they have sex with men.^{225 229}

Insights into these results was given by some of the narratives in qualitative studies around disclosure. H-MSM across numerous studies justified the non-disclosure of their same-sex activity to female partners because of fears their partners would react with disgust at their same-sex behaviour, and that this would ultimately end the relationship, as some had already experienced.^{21 105 244} As a way of avoiding this rejection, some H-MSM gave partial disclosures when directly questioned by female partners, framing their same-sex behaviour as something that occurred in the past.¹⁰⁵ Others justified their non-disclosure on the grounds of privacy, stating that it was none of their partners' business.²¹

Red Bull: If I don't tell, my rationalization is that I'm protecting her from herself because she cannot handle the truth... I think she would be hurt. I think she would be devastated. I think she would be like "Oh! You gotta leave!" and she won't be the same.²⁴⁴

Some H-MSM did, however, hint at possible future disclosure to their female partners, if they felt the relationship was serious enough.^{21 244} To control who knew about their same-sex activity, H-MSM discussed practising compartmentalisation,

sometimes going to great lengths to maintain separation of their sex with men from the rest of their lives.^{21 27 62 105 241} While for some H-MSM, the secrecy of their sexual activity with men was part of its appeal,⁶⁶ others reported that this secrecy and the constant vigilance required to maintain this compartmentalisation was a source of guilt and stress.^{27 62 105} Even those who did disclose to female partners relied on this compartmentalisation to maintain their primary relationship.¹⁰⁵

*Jason: The worst I've ever felt emotionally about it was when I thought about the possibility of my wife finding out and what she would think of me.*¹⁰⁵

*Paul: So, I keep my girlfriend at a level. And I keep my friends at a level. And then I have my male relationship at a level to where it won't intervene with my girlfriend, or with this male over here because he has this female. But my girl knows. And she's comfortable with the way I live because she knows the way I am and what type of person I am.*¹⁰⁵

4.3.6 Sexualised substance use

Quantitative evidence regarding H-MSM and substance use was limited. A study of Latino men in San Diego found that more H-MSMW reported alcohol use during sex (with any partners) than B-MSMW and H-MSEW, while there was no difference when compared with gay men.²³⁸ They also found that more H-MSMW reported drug use during sex than G-MSM and H-MSEW, though there was no difference when compared with bisexual men. However, this study was insufficiently powered to detect small differences (n=30).

Many qualitative studies discussed associations between H-MSM's use of drugs or alcohol and their same-sex activity.^{11 59 62 63 106 241 244 246-248} The substances typically described in association with same-sex sexual activity among H-MSM were alcohol,^{59 61 106 244} (crack) cocaine^{62 106 244 246} and methamphetamine.¹⁰⁶ As discussed in the section on HIV and STI prevention (section 4.3.4), substance use was linked with a reduced capacity to use condoms appropriately.^{106 244} Drugs or alcohol also featured as drivers of the sex H-MSM had with other men, both due to the effects of

the substances used, and because sex was often exchanged for money to buy these substances or directly for the substances themselves.

4.3.6.1 Effects of substance use

4.3.6.1.1 Altered or heightened sexual desire

H-MSM described drug use heightening and changing their sexual desire, resulting in them being more likely to choose male sexual partners, especially if they were unable to find female sexual partners.^{106 244} A participant in one study talked of cocaine and other drugs making him “*real promiscuous*”,¹⁰⁶ while another said being high “*builds my sex drive up ... if I don't see a female I want to be with, I'll tap a man.*”²⁴⁴ Another discussed the change he felt while on methamphetamine: “*When I discovered meth I was like, wow. It automatically put another face on me, another personality ...more oriented towards homosexual sex...*”¹⁰⁶

4.3.6.1.2 Disinhibitory nature of drugs and alcohol

The disinhibitory nature of alcohol and drugs also caused or allowed H-MSM to engage in sexual acts they would not do when sober.^{59 62 63 81 106 241 244 246} Some H-MSM explicitly stated they only had sex with men while intoxicated.^{62 106 241 244 246} In some cases, these substances were framed as facilitators, enabling positive experiences men would not necessarily pursue while sober.^{59 61 241 244} However, the reduced inhibitions sometimes resulted in H-MSM engaging in behaviour while intoxicated that they later expressed regret or shame about.^{106 246} In the case of exchange sex (discussed below), this disinhibition also left H-MSM open to exploitation, with men across multiple studies reporting being pressured to perform sexual acts they later regretted.^{62 106 244 246} These narratives of regret and exploitation were generally related to crack cocaine and methamphetamine use.

*Gio: The drugs and the alcohol led me to the situations to where I was being compensated for having sex with people I didn't want to have sex with, so I could get more of whatever I was doing.*¹⁰⁶

4.3.6.2 Substance use as a driver for exchange sex

In nearly all cases in which H-MSM discussed exchange sex in qualitative studies, the sex they had with men was in exchange for drugs or for money that was later used to purchase drugs.^{62 63 106 244 246 248} In the majority of the narratives regarding

sex work and drugs, the two were coupled, with drug use taking place at the same time as sex.^{62 63 106 244 246} However, one study of African American injecting drug user (IDU) MSMW found that for most men in their study who engaged in sex work to buy drugs, their sex work and drug consumption were separated, with sex work taking place during the day while they were sober, and drug purchasing and consumption occurring later in the evening.²⁴⁸

Exchange sex was reported on in only one quantitative study of African American MSM in Philadelphia in 2008-2011, which found that just over a quarter of H-MSM reported having exchanged sex for money or drugs in the past 90 days, similar to the proportion of B-MSM and nearly double that of G-MSM.²⁵

4.4 Sexual health

Extracted quantitative sexual health data for H-MSM, G-MSM and B-MSM can be found in Table 73 (Appendix 13). Illustrative quotes from qualitative articles can be found in Table 74 (Appendix 14).

4.4.1 HIV testing

4.4.1.1 Prevalence of HIV testing

Fewer H-MSM reported having tested for HIV than G-MSM, regardless of timeframe (ever or in previous 12 months), in articles using both lifetime and recent definitions of MSM activity, and focusing on various sub-groups, including men in Spain,¹¹⁸ African Americans,^{222 232 240} as well as the general MSM population in Canada and USA.^{71 212 214 216 233} The majority of these studies also found fewer H-MSM reported testing than B-MSM, though some found no difference between these groups in reporting ever testing.^{118 214 216} Prevalence of ever testing among H-MSM in high quality national studies ranged from 70%-80%,^{212 216} while prevalence of testing in the previous 12 months ranged from 40-50%,^{212 216 233} though prevalence among H-MSM in smaller studies varied outside of these ranges. While the majority of these studies recruited men reporting oral and/or anal sex with a male partner, one study that limited recruitment to men reporting recent AI with casual male partners found no difference by sexual orientation in reporting testing in the past six months (63-73%).²⁵ This suggests that differences in testing found in other studies may be due to differences in sexual behaviour. Other studies also found no difference in HIV

testing but were methodologically weaker in terms of smaller samples²³⁸ or conflating sexual orientation groups.¹²

4.4.1.2 Methods of accessing HIV testing and prevention programmes

There were no differences by sexual identity in MSM's use of HIV prevention services or programmes in a large national study of MSM in the US in 2008 (17-18%),²¹² however, the 2011 cycle of the same study found that fewer H-MSM had used these services (13% vs 22% among B-MSM and G-MSM).²¹⁶ H-MSM were found to be more likely to be recruited for HIV testing via social or sexual contacts than via clinic walk-in or through outreach testing at non-clinic, MSM-related venues.²³² They were also less likely than G-MSM to intend to use Internet-based STI/HIV testing in future.²³⁰

4.4.2 STI testing

Two cycles of the US NHBS found that fewer H-MSM (19% in 2011) reported testing for STIs in the previous 12 months than G-MSM (37%) and B-MSM (33%),^{212 216} with another large US study based on lifetime sexual behaviour finding similar disparities.¹⁴³

4.4.3 Barriers and facilitators to accessing sexual healthcare

Sexual health service use and STI/HIV testing were discussed in only two qualitative articles, both with low numbers of H-MSM participants.^{241 247} In addition, both of these studies focused on disenfranchised populations in the USA, which may limit transferability of these findings to countries with more universal access to healthcare. Barriers to STI/HIV testing among H-MSM identified in these studies included HIV-related stigma,²⁴⁷ and a perception of routine health checks as feminine or a sign of weakness,²⁴¹ which clashed with H-MSM's desire to be seen as masculine and heterosexual. This meant that while H-MSM generally avoided routine sexual health screenings, they did seek HIV or STI testing in cases they considered to be emergencies such as after recent risk behaviour or when showing symptoms of STI infection.^{241 247} Some H-MSM also found the inclusion of HIV and STI testing as part of a more general health screening more appealing, avoiding the stigma of purely HIV-focused testing.²⁴⁷

4.4.4 HIV prevalence

HIV prevalence was lower for H-MSM than for G-MSM and B-MSM in all studies reporting this measure, though it is worth noting that the relatively small numbers of H-MSM in the majority of these studies meant the number of HIV-positive men was often very small. Prevalence among H-MSM who had ever tested for HIV ranged from 0% (reported in a population study that included 78 H-MSM²¹¹) to 11% (in a study focusing on African American MSM that included 45 H-MSM²⁵), compared to HIV prevalence estimates of 4%-30% for B-MSM and 17%-44% for G-MSM.^{25 209-211 222 227 233} CDC's large, nationwide NHBS in 2008²¹⁰ estimated a prevalence of 8% for H-MSM, compared to 18% for B-MSM and 19% for G-MSM. This study also reported that, of those with HIV, 63% (5/8) of H-MSM were previously unaware of their infection, the same proportion as B-MSM (63%, 173/273), and more than that for G-MSM (39%, 501/1,279), though this difference was not significant.

4.4.5 Disclosure of HIV status to sexual partners

Disclosure of positive HIV status was studied in only one quantitative article, which found no difference by sexual orientation in disclosure to sexual partners (of either gender) before sex.²³⁶ However, this sample included only eight H-MSMW with a combined total of 21 sexual partners in the previous five years, and so the study was not powered to find a difference by sexual orientation.

Two qualitative articles found that reasons for disclosure (or non-disclosure) of a positive HIV status varied by partner type. While some H-MSM justified non-disclosure to female partners on the grounds that their female partner had not explicitly disclosed their HIV status to them, others did not disclose out of concerns of rejection by that partner.¹⁰⁵

Unattributed: [E]very woman that I've told that I was HIV[-positive], it's just like the door slams. Because they're scared that the rubber's going to break or whatever. A lot of people are not educated on the disease, so that's what really scares them; they think they're going to die if they get it.¹⁰⁵

This also meant that when H-MSM *did* disclose a positive HIV status, this disclosure was often phrased in language that obscured any same-sex behaviour that

contributed to that infection, by minimising it, representing it as a behaviour they used to but no longer engaged in, or in some cases attributing their infection to other risk behaviours such as intravenous drug use.¹⁰⁵

*Unattributed: I lied . . . I told them it was intravenous drug use. I never used intravenous drugs in my life. That's what I tell them, that I shot the needle.*¹⁰⁵

The one-off and impersonal nature of some H-MSM's sex with other men contributed to them feeling a lack of responsibility for the health of their male partners, meaning there was no need to disclose a positive HIV status.^{105 106} Some also assumed that male partners already had HIV, and so disclosure was not necessary.¹⁰⁶

*Ken: I didn't tell them nothing because I figured it was really none of their business.... I ain't told a guy yet.*¹⁰⁵

4.4.6 STI prevalence

Five studies including data on STI prevalence; the majority focused on self-reported STI diagnosis ever^{143 238} or in the past 12 months,^{216 237} with one also reporting test-verified prevalence of herpes simplex virus.²¹¹ All but one lower quality study²³⁸ found no difference in STI prevalence by sexual identity, with the 2011 NHBS reporting previous year STI prevalences of 6% for H-MSM, 9% for G-MSM and 9% for B-MSM.²¹⁶

4.4.7 Vaccination against sexually transmitted viruses

The 2008 and 2011 cycles of the US NHBS found that only around 30% of H-MSM had received hepatitis A and hepatitis B vaccinations, fewer than G-MSM, while comparisons with B-MSM were mixed.^{212 216} In the 2011 cycle of the NHBS, none of the young H-MSM sampled had received a vaccination for HPV, compared to 5% of G-MSM and 5% of B-MSM, though this study was conducted before the implementation of recommendations regarding the routine offering of the vaccine to MSM.²⁰

4.5 Discussion

4.5.1 Summary of findings

In this systematic review, I aimed to provide a synthesis of recent scientific literature reporting on the sexual behaviour and sexual health of H-MSM, focusing on reporting of relevant sexual behaviour and sexual health outcomes by H-MSM and how this compares to that of G-MSM and B-MSM, and also reporting on H-MSM's attitudes towards STI/HIV risk and prevention and accessing sexual healthcare. The findings of this review suggest that, when compared with G-MSM and B-MSM, H-MSM were less likely to engage in behaviours with higher risk of STI/HIV transmission,^{94 175 261} including reporting fewer male partners, and being less likely to report AI and especially receptive AI with those partners. However, H-MSM who did report these behaviours were at similar risk of poor sexual health as G-MSM and B-MSM, as they reported similar levels of condomless sex and primarily reported casual male partners. Engagement with sexual health services (including STI/HIV testing and vaccination) among H-MSM was lower than for G-MSM and B-MSM, suggesting that this group, or at least some H-MSM within this group, is not being sufficiently reached by current sexual health promotion efforts, and may have unmet sexual healthcare needs. While H-MSM were less likely than G-MSM and B-MSM to disclose the sex they had with men to their female partners, and more likely to report condomless sex with these female partners, narratives from qualitative studies suggest that some H-MSM (particularly those diagnosed with HIV) show concern for their female partners' health by taking steps to minimise risk of onward transmission – at least to the women they have sex with.

Masculinity, and the need to maintain a heterosexual image, was a driving factor in many of the behaviours reported by H-MSM, influencing where and how they met male partners, the specific acts they engaged in with partners, attitudes towards HIV prevention measures such as condom use and PrEP, their decision to disclose the sex they had with men to female partners, and engagement with sexual healthcare, including testing for HIV and STIs. Drug use was also a driver of HIV and STI risk, acting as the reason some H-MSM gave for having sex with other men in the first place (especially in the case of exchange sex), but also leading men to engage in sex that placed them at higher risk of STI/HIV transmission.

4.5.2 Strengths and limitations

A major strength of my review is that, to my knowledge, it is the first to have reviewed and integrated sexual behaviour and sexual health data for H-MSM and considered these relative to other MSM. My review is also strengthened by its synthesis of evidence from quantitative *and* qualitative studies, meaning it summarises H-MSM's sexual and sexual healthcare-seeking behaviour, and provides evidence about their motivations for these behaviours. This helps us understand both the extent of the sexual health needs of H-MSM and important contextual information that will help health services aiming to meet these needs. Finally, in its explicit examination of how the outcomes in this review varied by sexual identity, this review clearly shows the important role that sexual identity plays in MSM's sexual behaviour and sexual health.

There are potential weaknesses to this study. Methodologically, it is possible some articles were not identified in my initial database searches and that during the title and abstract screening stage, I did not identify some articles that should have been included. Inclusion in this review required an article to identify both the sexual behaviour and sexual identity of participants, and so it is highly likely that articles relevant to this population, but not reporting both dimensions of sexual orientation, were not included. As such, the results presented here may not represent the full body of research on this population. The majority of results presented here were based on bivariate analyses I conducted on the statistics presented in published studies, which do not take into account potential confounders such as age and education. In addition, inclusion criteria, study population definitions and outcomes varied across the published literature, making comparisons across studies challenging and limiting the generalisability of results. Most of the included studies recruited their samples before 2010. In the intervening time, there have been several important changes for MSM's sexual behaviour and health. HIV testing has increased while HIV incidence among MSM has declined in many of the countries included in this review.^{129-132 262} Simultaneously, steady increases in STI diagnoses among MSM have been observed.^{130 134 135} The increasing popularity of geospatial sexual networking applications, such as *Grindr*, facilitating the opportunity to find male partners,^{103 263} the confirmation that effective treatment for HIV eliminates transmission risk (U=U),²⁶⁴ and the widespread availability of HIV-PrEP have all had

enormous impacts on how MSM meet partners and their approach to HIV prevention, however, the literature included in this review provides little insight into H-MSM's experiences and perceptions of them.

There are also potential weaknesses related to generalisability and transferability. First, nearly all studies report on populations in the USA, which may limit generalisability and transferability to other geographical settings. This is particularly true for findings related to sexual healthcare, given that major differences exist between the USA and other high-income countries in healthcare systems and inequalities in access to these. Additionally, many of the articles focused exclusively on African American men, reflective of a prevailing discourse which has simultaneously problematised H-MSM among African American men (especially the focus on the "down low") while ignoring or excusing similar behaviours among White men.¹⁵⁷ By taking an ethnically specific approach, these studies are able to more closely examine and understand social, cultural and other contextual factors driving H-MSM's behaviour, which can lead to more effective intervention development.²⁶⁵ However, this approach limits the generalisability of findings from some US-focused studies in terms of their applicability to H-MSM in other countries.

Most quantitative studies recruited at MSM-associated venues such as bars and clubs, and so findings from these studies are unlikely to be representative of all H-MSM. Similarly, data for MSM based on lifetime sexual behaviour are unlikely to be representative for current MSM. Of particular note, 62% of H-MSM in one population study reported only ever having had one male partner, perhaps indicating that for many men it may be something they try only once.²¹¹ Another study found that 92% of H-MSM reported last sex with a man more than 12 months ago.³ These men may be of less concern to public health than current H-MSM, though the long-term effects of HIV and some STIs mean they are still relevant. Similarly, while the majority of the men in qualitative studies were not open about the sex they had with men to others in their lives, by definition, the narratives in these studies were those of men who were comfortable talking to researchers about their sexual behaviour and health. Therefore, these findings may not be transferable to men who are less comfortable discussing these topics at all; men who may be of particular interest for this very reason as it suggests that they may also be less likely to discuss their sexual activity with men with HCPs.

4.5.3 Implications for rest of thesis

In this chapter I showed that the majority of evidence (both quantitative and qualitative) relating to H-MSM derived from studies conducted on US-based samples. Similarly, very few qualitative studies examined H-MSM's experiences accessing sexual healthcare, or their attitudes towards PrEP. The research presented in Chapters 5, 6 and 7 of this thesis seeks to address some of these limitations.

Chapter 5 presents quantitative data on sexual behaviour and sexual health outcomes for H-MSM in high income countries outside of the US, who are underrepresented in this review. The methodology employed allows potential confounders to be controlled for in the analysis, providing more robust comparisons between H-MSM and G-MSM and B-MSM. Chapter 6 presents qualitative research exploring the experiences of and attitudes towards STI/HIV risk and prevention (including PrEP) of H-MSM in the UK, who are underrepresented in the existing qualitative literature. Finally, Chapter 7 explores H-MSM's experiences with and attitudes towards sexual healthcare, for which very little evidence is presented in this review.

5. Meta-analysis of individual participant data from behavioural surveys of MSM

5.1 Introduction

As discussed in Chapter 2, samples of most quantitative studies of MSM contain too few H-MSM to enable analysis as a subgroup. This was also observed in the studies included in the systematic review presented in Chapter 4. However, by combining individual participant data from multiple studies, a sufficiently large sample of H-MSM might be established to allow meaningful statistical analysis to be undertaken. That said, it is not simply a matter of combining the data from studies into one dataset and analysing them as if they were part of a single study because studies may vary by recruitment strategy, mode of data collection, or have been conducted in different countries with different societal contexts. All of these conditions can result in between-study heterogeneity in participants, which might introduce bias if not taken into account through more sophisticated analysis methodology. A potential solution to this problem is IPD-MA.

In this chapter, I present the results of analysis I conducted applying IPD-MA techniques to the data from multiple surveys of MSM from high-income countries and comparing MSM according to sexual identity in their reporting of key sexual behaviour and sexual health outcomes. Specifically, the aims of this analysis were to:

1. Describe and characterise H-MSM, in terms of their sociodemographic characteristics, sexual behaviour, sexual health, and use of sexual health services.
2. Compare the sexual behaviour, sexual health, and use of sexual health services of H-MSM with those of G-MSM and B-MSM.

I first present a descriptive summary of the harmonised dataset, discussing differences in samples by study and country, as well as by sexual identity. I then present data on sexual behaviours and outcomes of interest. Sexual behaviours selected for analysis were chosen because of evidence for their potential for HIV and STI transmission.^{94 175} Estimates of behavioural outcomes are first presented

according to sexual partner type (regular or casual male partners, and female partners), before behaviours with higher likelihoods of STI/HIV transmission are examined. Finally, estimates for sexual health behaviours such as HIV and STI testing, as well as sexual health outcomes are presented. For each behaviour or outcome of interest, prevalence estimates are presented at country level, with pooled averages calculated using a two-stage IPD-MA process. At the end of each section, I present measures of the differences in prevalence between H-MSM and both B-MSM and G-MSM, in the form of aPRs estimated using a one-stage IPD-MA process (multilevel modified Poisson regression).

At the end of the chapter, I present additional analyses examining key factors that affect MSM's sexual behaviour and sexual healthcare engagement. I also present the results of sensitivity analyses, validating assumptions made about the data during data harmonisation and analysis.

5.1.1 Terminology

As in previous chapters, the term “partner(s)” should be assumed to refer to *sexual* partner(s) throughout this chapter, unless otherwise specified. “Recent” behaviour refers to behaviour in the previous six months for GCPS (Australia) and GAPSS/GOSS (New Zealand) participants, and in the previous 12 months for SN15 (Canadian) and EMIS-2010 (European) participants (section 3.3.2.3). Within this chapter, the term “MSM” specifically refers to men who reported *recent* sex with men, by the above definition. Therefore, references to “All MSM” should be understood to mean all men within the pooled dataset who reported male sexual partners within the previous six or 12 months, depending on to which survey dataset they belonged.

5.2 Description of study samples

In this section, I provide a description of the combined sample stratified by study and country, and then stratified by sexual identity.

5.2.1 Stratification by study and country of residence

Descriptive statistics for 196,426 men reporting recent sex with men in the available datasets are shown in Table 10, stratified by country. Sample sizes for EMIS-2010 countries ranged from 1,513 from Denmark to over 46,000 from Germany. Just over

54,000 MSM were included from GCPS (an average of 6,785 per year of the study), while over 8,000 MSM were included from New Zealand's GAPSS/GOSS surveys (2,785 per survey year). 6,782 participants from Canada's SN15 survey were eligible for inclusion.

The age distributions of participants from Australia, New Zealand and most European countries were similar, with median ages ranging from 31 to 37. Participants from the Netherlands and Canada were older, with median ages in the 40s. Participants were largely well-educated with at least 60% of participants from most countries reporting some post-secondary education. Nearly three-quarters of participants were in some form of employment.

There were major differences in the distribution of sexual identity both between studies and between countries. The majority of participants from each country identified as gay, ranging from 68% in Greece, to over 90% in the combined Australian surveys. Identification as bisexual ranged from 6% in Australia to over 25% in Canada, and between 10-20% in New Zealand and most EMIS-2010 countries. The proportion of MSM identifying as heterosexual ranged from 0.2%-1.8%, though less than 1% in most countries sampled were H-MSM.

Related to these differences, as well as the differences in recruitment across the included studies, are differences in the measure of social engagement with a wider gay community, based on the reporting of proportion of friends who are gay men or the amount of free time spent with gay men. Among GCPS participants, who were primarily recruited in person at gay bars, clubs, events, or sex on premises venues, over 50% reported a high level of social engagement with gay men. In contrast, reporting of high levels of social engagement with gay men among participants from EMIS-2010 countries, who were recruited entirely online, was between 30-40%. SN15 participants reported the lowest social engagement with gay men, with 48% reporting low social engagement and only 18% reporting high social engagement.

Table 10: Demographics of men reporting recent sex with men in included datasets, by country

Survey	GAPSS/GOSS			EMIS														Total
	GPCS	GAPSS/GOSS	Sex Now	Austria	Belgium	Denmark	France	Germany	Greece	Ireland	Italy	The Netherlands	Portugal	Spain	Sweden	Switzerland	UK	
Country	Australia	New Zealand	Canada	Austria	Belgium	Denmark	France	Germany	Greece	Ireland	Italy	The Netherlands	Portugal	Spain	Sweden	Switzerland	UK	
Year	2010-2017	2008, 2011, 2014	2015	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	
N	54,283	8,262	6,782	3,545	3,549	1,513	9,840	46,732	2,602	1,949	14,369	3,441	4,502	11,868	2,643	4,451	16,001	196,426
Sexual identity																		
Heterosexual (H-MSM) (%)	0.4	0.7	1.8	0.4	0.3	0.7	0.2	0.7	0.6	0.8	0.3	0.3	1.0	0.4	0.9	0.8	0.3	0.5
Bisexual (B-MSM) (%)	5.8	17.5	25.6	15.8	8.7	12.8	8.5	15.0	14.3	12.8	14.0	7.9	19.8	11.4	13.5	15.9	10.8	11.8
Gay (G-MSM) (%)	91.8	79.0	70.9	77.0	86.1	80.0	84.7	78.7	68.2	80.1	75.1	88.3	72.1	81.1	79.6	78.2	84.4	82.7
Other (%)	2.0	2.8	1.7	6.7	4.9	6.5	6.6	5.6	16.8	6.3	10.6	3.5	7.1	7.1	6.1	5.1	4.4	4.9
Number of H-MSM (n)	196	58	121	15	10	10	15	307	16	16	46	10	47	43	24	36	54	1036
Age																		
18-24 (%)	16.3	22.8	11	24.3	18.8	19.9	21.2	21.0	23.1	23.1	21.2	11.2	25.6	21.5	15.9	15.0	15.7	18.8
25-34 (%)	34.8	28.7	22.6	35.4	33.2	30.0	29.8	31.8	41.6	37.7	33.2	23.5	36.5	37.6	31.1	28.3	29.8	32.5
35-44 (%)	24.6	21.2	17.7	23.3	25.4	25.4	28.0	26.5	25.3	23.3	28.9	28.1	23.1	26.5	25.6	28.9	26.4	25.5
45-54 (%)	15.8	16.7	26.2	12.0	16.1	15.9	14.9	15.4	8.0	12.3	13.2	25.1	11.5	11.3	17.7	18.4	18.7	15.8
55+ (%)	8.6	10.6	22.6	5.0	6.6	8.8	6.1	5.3	2.0	3.6	3.5	12.1	3.3	3.0	9.6	9.4	9.4	7.3
Median (IQR)	34 (27-44)	34 (25-46)	44 (30-53)	31 (25-41)	34 (26-44)	35 (27-44)	34 (26-43)	33 (26-43)	30 (25-38)	31 (25-40)	33 (25-41)	40 (30-48)	31 (24-39)	32 (25-40)	35 (28-45)	37 (28-45)	36 (27-46)	34 (26-44)
Education (highest level completed)																		
Less than high school (%)	7.5	6.0	2.5	5.0	4.7	8.9	9.0	9.2	2.8	8.8	6.3	4.0	7.7	8.6	4.3	6.7	9.7	7.6
High school/ upper secondary (%)	18.6	28.1	10.2	32.4	15.6	17.3	7.7	30.8	16.3	4.9	6.2	22.8	22.4	15.4	27.7	26.5	9.0	19.7
Post-secondary, less than university degree (%)	21.6	21.7	41.7	41.2	43.3	47.5	39.9	37.9	59.8	39.7	75.6	42.6	50.9	57.6	60.7	41.1	33.4	37.8
Bachelor's degree or higher (%)	51.8	43.0	45.6	20.8	35.9	26.0	43.0	21.4	20.9	45.9	11.5	30.2	18.1	18.1	7.0	25.2	47.4	34.3
Current employment																		
Employed or self-employed (%)	79.9	79.2	71.1	73.9	72.8	69.3	69.7	74.4	70.7	72.6	69.6	78.1	70.1	66.9	75.5	80.4	76.3	75.1
Student (%)	7.5	9.5	12	15.0	14.6	16.6	16.0	12.1	16.4	14.5	19.5	9.0	17.5	16.7	12.0	9.8	8.9	11.7
Not employed or in education (%)	3.4	4.4	3.6	4.1	5.4	6.1	7.1	5.2	9.2	8.8	5.8	4.0	6.8	10.8	5.4	3.3	5.6	5.2
Other incl. retired or benefits (%)	8.9	5.3	12.4	6.5	6.9	7.9	6.9	7.8	3.4	4.0	4.6	8.4	4.8	5.2	6.6	6.2	8.8	7.6
Ethnicity																		
Asian (%)	8.7	9.3	4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.3
European/Caucasian (%)	78.4	72.6	82.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	78.1
Indigenous Australian (%)	2.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3
First Nation, Inuit or Metis (%)	-	-	3.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3
Maori (%)	-	9.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1
Pacific Islander (%)	0.8	2.9	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0
Other (%)	5.9	4.9	9.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.2
Migrant in country of residence																		
Yes (%)	29.6	-	16.6	17.0	22.8	14.1	13.2	8.4	12.0	22.6	6.7	23.0	17.6	21.8	18.0	25.8	27.6	16.9
Attraction																		
Only to men (%)	-	-	61.1	72.7	79.9	75.5	79.1	74.4	64.0	74.8	70.9	81.1	64.7	75.7	73.7	72.1	77.2	73.8
Mostly to men (%)	-	-	21.2	17.7	15.8	15.7	16.3	15.4	25.1	17.5	22.2	14.6	26.1	18.9	17.6	16.9	16.5	17.7
To men and women equally (%)	-	-	10.1	5.3	2.8	4.7	3.4	5.3	8.0	4.7	4.7	2.4	5.9	3.6	4.3	5.6	3.6	4.9
Mostly to women (%)	-	-	7.0	3.9	1.3	3.6	0.9	4.6	2.3	2.7	1.8	1.6	3.1	1.5	3.9	5.0	2.4	3.3
Only to women (%)	-	-	0.5	0.1	0.1	0.2	0.0	0.1	0.2	0.1	0.1	0.0	0.0	0.1	0.2	0.1	0.1	0.1
Engagement with gay friends or community																		
Low (%)	11.9	35.7	47.8	30.5	19.2	30.8	24.1	27.4	31.5	34.9	29.6	19.6	31.1	25.8	23.8	26.3	23.6	23.7
Medium (%)	34.6	30.3	34.2	38.3	42.3	33.6	43.1	36.7	41.7	35.5	36.9	36.8	42.3	35.4	40.6	42.3	36.5	36.5
High (%)	53.5	30.6	18.0	31.0	38.3	35.4	32.7	35.7	26.6	29.3	33.2	43.2	26.2	38.6	35.5	31.1	39.7	39.5
In a relationship with a man																		
Yes (%)	58.1	30.8	32.5	42.1	47.6	37.9	49.2	44.9	37.2	30.6	37.7	48.4	39.3	33.2	42.9	43.9	38.3	45.5
In a relationship with a woman																		
Yes (%)	-	-	7.2	7.2	4.0	5.9	3.2	7.4	5.4	6.4	5.1	4.1	6.5	3.4	5.6	8.4	5.3	6.4
HIV status at last test																		
Positive (%)	8.7	4.3	8.7	5.8	8.8	9.1	10.9	8.6	8.3	6.1	7.0	16.0	8.1	9.1	5.3	9.4	10.6	8.7
Negative (%)	80.5	69.1	77.7	72.0	74.7	69.1	74.9	64.0	57.5	59.6	65.6	65.7	66.6	66.1	73.9	72.3	63.1	70.6
Unknown/Never tested (%)	7.7	24.2	13.6	21.7	15.9	21.5	13.8	26.9	34.0	34.0	26.3	18.0	24.5	24.4	20.7	17.8	25.8	19.4
Mode of survey completion																		
Online (%)	8.4	55.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	72.8
In person (%)	91.6	44.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.2

Column percentages may not add to 100% due to missing values. Data for ethnicity available only for GPCS, SN15 and GAPSS/GOSS. Data for migration status available only for EMIS-2010, GPCS and SN15. Data for attraction and relationship status with women available only for EMIS-2010 and SN15.

5.2.2 Stratification by reported sexual identity

Table 11 shows the demographic characteristics of MSM in included datasets by reported sexual identity. Men across all sexual identities were similar in terms of their age and employment status. A third of men identifying as either bisexual or heterosexual reported having at most high school education, compared to approximately a quarter of men identifying as gay or categorised as “other”. There were no major differences by sexual identity in either ethnicity or migrant status, at least in studies for which these were recorded.

Differences were observed in reported relationship status, with 50% of G-MSM reporting being in relationships with men, compared to only 20% of B-MSM and 14% of H-MSM. In contrast, 53% of H-MSM reported being in a relationship with a woman, compared to 35% of B-MSM and 0.7% of G-MSM. Differences in sexual attraction and social engagement with gay communities are discussed in sections 5.2.4 and 5.2.5 respectively.

Table 11: Demographics of men reporting recent sex with men in included datasets, by sexual identity

Sexual identity	Heterosexual (N=1,024)	Bisexual (N=23,207)	Gay (N=162,417)	Other (N=9,684)	Total (N=196,332)
Age	%	%	%	%	%
18-24	23.5	22.1	18.0	24.5	18.8
25-34	31.6	27.0	33.2	34.0	32.5
35-44	21.4	21.7	26.3	23.3	25.5
45-54	14.3	17.8	15.7	13.0	15.8
55+	9.2	11.4	6.9	5.2	7.3
Median (IQR)	32 (25-44)	35 (25-46)	34 (27-43)	31 (25-41)	34 (26-44)
Education (highest level completed)					
Less than high school	10.6	9.4	7.4	7.5	7.6
High school / upper secondary	22.5	23.0	19.3	17.6	19.7
Post-secondary, less than a university degree	37.8	40.2	36.9	46.8	37.8
Bachelor's degree or higher	27.5	26.6	35.9	27.4	34.3
Current employment					
Employed or self-employed	74.5	72.6	75.9	66.7	75.1
Student	11.2	13.0	11.2	17.5	11.7
Not employed or in education	5.4	5.3	5.1	6.7	5.2
Other incl. retired or benefits	7.8	8.5	7.4	8.5	7.6
Ethnicity[†]					
Asian	4.3	7.7	8.5	5.4	8.3
European/Caucasian	77.1	76.3	78.4	70.7	78.1
Indigenous Australian	4.8	2.0	2.3	3.3	2.3
First Nation, Inuit or Metis	0.3	0.8	0.3	0.8	0.3
Maori	1.6	2.3	0.9	6.0	1.1
Pacific Islander	0.5	1.6	0.9	2.2	1.0
Other	8.5	8.0	5.9	8.6	6.2
Migrant in country of residence[‡]					
Yes	16.1	14.7	18.9	16.8	18.3
Attraction[§]					
Only to men	11.6	2.6	89.2	42.3	73.8
Mostly to men	7.5	48.4	10.5	41.5	17.7
To men and women equally	12.2	30.7	0.05	8.1	4.9
Mostly to women	60.9	17.7	0.01	7.6	3.3
Only to women	7.8	0.2	0.01	0.3	0.1
Social engagement with gay communities					
Low	70.8	56.9	17.7	38.9	23.7
Medium	16.6	31.4	37.3	37.4	36.5
High	11.5	11.0	44.8	23.2	39.5
In a relationship with a man					
Yes	13.7	20.0	50.1	34.6	45.6
In a relationship with a woman[§]					
Yes	53.2	35.3	0.7	9.3	6.4
Mode of survey completion					
Online	80.3	85.3	70.0	88.1	72.8
In person	19.7	14.7	30.0	11.9	27.2

Column percentages may not add to 100% due to missing values. [†]Data for Ethnicity available only for GCPS, SN15 and GAPSS/GOSS. [‡]Data for Migration status available only for EMIS-2010, GCPS and SN15. [§]Data for attraction and relationship status with women available only for EMIS-2010 and SN15.

5.2.3 Recruitment locations

SN15 and EMIS-2010 recruited their participants entirely online, through dating and hook-up websites for MSM as well as through gay community websites (Table 12).

More than half of New Zealand's GAPSS/GOSS participants, including 85% of H-MSM and 76% of B-MSM, were recruited online (GOSS) through dating and hook-up websites and apps. Australia's GCPS on the other hand recruited almost entirely in person through time-location sampling at gay bars and clubs, SOP venues, SHCs and LGBTQ+ fairs. These recruitment locations were also primarily based in cities and other large urban gay areas. Since 2014 GCPS has also recruited online through *Facebook* advertising targeting gay and bisexual men, however, the vast majority of GCPS participants in the dataset were recruited in person.

Table 12: Recruitment locations of MSM, by sexual identity and study

Recruitment location	H-MSM		B-MSM		G-MSM	
	%	n	%	n	%	n
GCPS 2010-2017	N=196		N=3,134		N=49,630	
Online (2014-2017 only)	1.5	3	2.8	88	8.6	4,283
LGBTQ+ fairs	29.6	58	31.1	975	47.6	23,616
Gay social venues	40.8	80	30.6	959	28.7	14,224
SOP venues	21.9	43	30.5	955	10.0	4,939
SHCs	6.1	12	5.0	157	5.2	2,568
GAPSS/GOSS 2008, 2011, 2014	N=58		N=1,446		N=6,523	
Online	84.5	49	75.7	1,094	50.6	3,300
LGBTQ+ fairs	8.6	5	10.9	157	37.8	2,464
Gay social venues	0.0	0	2.4	35	4.7	305
SOP venues	6.9	4	11.1	160	7	454
SN15	N=121		N=1,738		N=4,809	
Online	100.0	121	100.0	1,738	100.0	4,809
EMIS-2010	N=649		N=16,876		N=101,237	
Online	100.0	649	100.0	16,876	100.0	101,237

5.2.4 Sexual attraction

Two variables which demonstrate important differences between MSM of different sexual identities are sexual attraction and social engagement with gay men. Sexual attraction was only asked in the SN15 and EMIS-2010 surveys, and so the following data applies only to participants of those studies. Among G-MSM, over 99% of participants reported being only or mostly attracted to men (Table 11 and Figure 5). Among B-MSM, 97% reported some attraction to both men and women, with only 3% reporting exclusive attraction to *either* men or women. This was skewed towards attraction to men, though this might be expected among participants of sexual health studies for MSM. Among H-MSM, 69% reported being mostly or only attracted to

women. However, nearly 20% of H-MSM reported being mostly or only attracted to men.

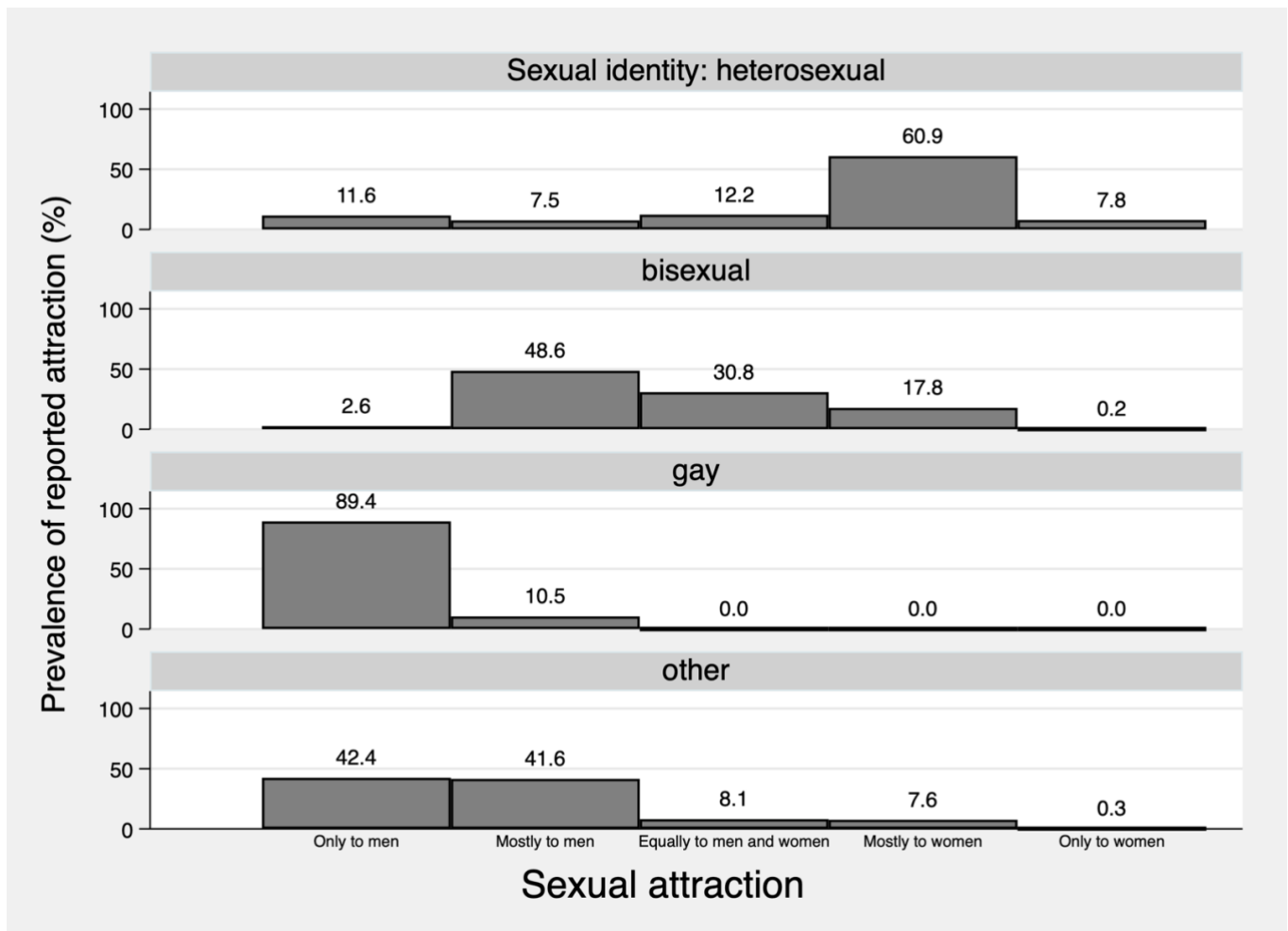


Figure 5: Reported sexual attraction by sexual identity of MSM, among EMIS-2010 and SN15 participants only.

5.2.5 Social engagement with gay communities

Similarly, distinct differences by sexual identity were observed in the data on social engagement with gay communities, as measured by either the proportion of free time spent with gay men, or the proportion of friends who are gay men (Table 11 and Figure 6). Among G-MSM, 45% reported a high level of social engagement with gay communities. While both B-MSM and H-MSM had a similar prevalence of high social engagement with gay communities, these two groups differed in terms of the proportion with low social engagement; 72% of H-MSM reported having few gay male friends or spending little time with gay men compared to 57% of B-MSM.

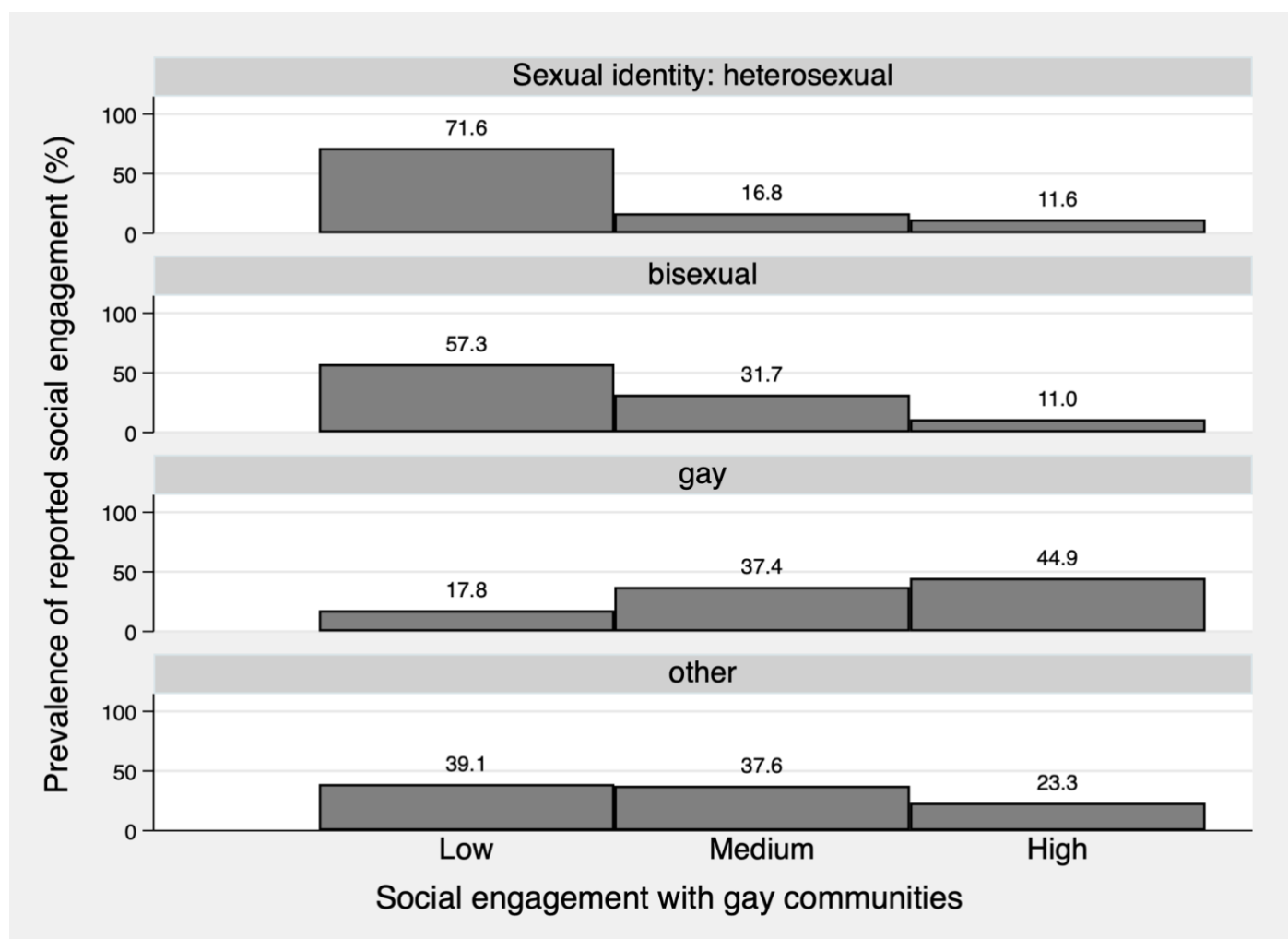


Figure 6: Reported social engagement with gay communities by sexual identity of MSM, among participants from all studies.

5.2.6 A note on men grouped into the “Other” category:

While men grouped into the “Other” category are not of specific interest in this thesis, there is evidence that these men are also distinctly different from the men of other sexual identities (Table 11). These men, while still being primarily attracted to men, also report more attraction to women, with 57% reporting some attraction to either men or women (Table 11 and Figure 5). Similarly, they indicate lower social engagement with gay men than G-MSM, but higher social engagement than B-MSM and H-MSM (Table 11 and Figure 6). Only a third of these men report being in relationships with men, while nearly 10% report being in relationships with women. It is plausible that many of those choosing labels other than “heterosexual/straight”, “bisexual” or “gay” may be doing so out of a desire to move towards a more fluid understanding of sexuality. MSM grouped into the “other” category may use a range of sexual identity terms, and so it is unclear how homogeneous these men are.

However, the data shown here suggest that at a population level at least, the MSM choosing not to identify as heterosexual, bisexual, or gay report characteristics somewhere on the identity spectrum between bisexual and gay in terms of their social engagement with gay men and sexual attraction.

As discussed in section 3.3.4, prevalence estimates and comparisons with H-MSM for MSM grouped into the “other” sexual identity are not shown in the results that follow. For brevity, references to “all sexual identities” hereon will refer to MSM identifying as heterosexual/straight, bisexual, or gay.

5.3 Sexual behaviour

In this section, I examine reporting of MSM’s sexual behaviour. I first look at reporting of sex with regular and casual male sexual partners. I then look at reporting of sex with female sexual partners. Finally, I present data on reporting of exchange sex and behaviours with higher STI/HIV transmission risk.

5.3.1 Sex with regular male sexual partners

In this section, I explore the reporting of behaviour with regular male partners according to sexual identity.

5.3.1.1 Regular male sexual partners

Pooling data from all studies, the average prevalence among H-MSM of reporting recent regular/steady male partner(s) was 35% compared to 45% of B-MSM and 62% of G-MSM (Table 13). However, there was considerable range across studies and countries. In particular, reporting of regular partners was generally higher across all sexual identities among GCPS and GAPSS/GOSS participants than among those of SN15 and EMIS-2010.

Table 13: Recent regular male sexual partners among MSM, by sexual identity

Sexual identity:		Reported recent regular male sexual partner(s)					
		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2017	Australia	69.9	(137/196)	65.8	(2,070/3,147)	76.8	(38,262/49,848)
GAPSS/GOSS 2008, 2011, 2014	New Zealand	51.9	(28/54)	69.7	(975/1,398)	82.0	(5,188/6,329)
SN15	Canada	38.0	(46/121)	34.8	(604/1,738)	45.7	(2,197/4,809)
EMIS-2010	Austria	33.3	(5/15)	40.7	(224/550)	61.5	(1,662/2,701)
	Belgium	30.0	(3/10)	44.5	(138/310)	66.8	(2,034/3,046)
	Denmark	20.0	(2/10)	28.0	(54/193)	61.9	(747/1,206)
	France	33.3	(5/15)	55.3	(462/835)	70.3	(5,849/8,321)
	Germany	40.7	(124/305)	43.3	(3,014/6,956)	60.2	(21,938/36,418)
	Greece	37.5	(6/16)	51.5	(192/373)	57.9	(1,027/1,774)
	Ireland	12.5	(2/16)	35.3	(88/249)	57.1	(890/1,560)
	Italy	28.3	(13/46)	43.4	(867/1,998)	55.2	(5,940/10,768)
	The Netherlands	30.0	(3/10)	34.1	(93/273)	58.9	(1,787/3,032)
	Portugal	59.6	(28/47)	59.8	(531/888)	66.1	(2,141/3,239)
	Spain	25.6	(11/43)	37.1	(503/1,354)	53.9	(5,173/9,603)
	Sweden	16.7	(4/24)	40.2	(143/356)	61.4	(1,288/2,098)
	Switzerland	36.1	(13/36)	39.7	(278/700)	60.0	(2,068/3,445)
UK	20.4	(11/54)	35.0	(606/1,732)	57.8	(7,792/13,477)	
Pooled average % (95% CI)		35.4 (26.6-44.6)		44.7 (38.7-50.7)		62.2 (56.9-67.4)	

Denominator: All MSM.

5.3.1.2 Anal intercourse with regular male partners

Among MSM reporting recent regular male partners, recent AI with such a partner was reported by similar proportions regardless of sexual identity; averages of 80% of H-MSM, 86% of B-MSM, and 91% of G-MSM (Table 14).

Table 14: Recent AI with regular male partners among MSM reporting regular male partners, by sexual identity

Sexual identity:		Reported recent AI with regular male partner(s)					
		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2017	Australia	66.4	(91/137)	76.9	(1,592/2,070)	79.0	(30,225/38,262)
GAPSS/GOSS† 2008, 2011, 2014	New Zealand	78.6	(11/14)	85.8	(459/535)	86.0	(2,901/3,372)
SN15	Canada	84.8	(39/46)	82.8	(500/604)	92.7	(2,037/2,197)
EMIS-2010	Austria	40.0	(2/5)	78.2	(172/220)	90.8	(1,502/1,655)
	Belgium	100.0	(3/3)	85.5	(118/138)	89.1	(1,808/2,029)
	Denmark	100.0	(2/2)	92.5	(49/53)	93.6	(698/746)
	France	100.0	(5/5)	91.5	(420/459)	93.5	(5,444/5,825)
	Germany	49.6	(59/119)	77.5	(2,275/2,937)	88.6	(19,373/21,857)
	Greece	100.0	(6/6)	82.2	(157/191)	94.2	(966/1,026)
	Ireland	50.0	(1/2)	85.1	(74/87)	90.4	(803/888)
	Italy	76.9	(10/13)	92.0	(796/865)	93.0	(5,507/5,922)
	The Netherlands	100.0	(3/3)	84.9	(79/93)	88.1	(1,571/1,784)
	Portugal	70.4	(19/27)	86.4	(456/528)	96.5	(2,063/2,138)
	Spain	100.0	(11/11)	95.0	(476/501)	94.0	(4,850/5,160)
	Sweden	75.0	(3/4)	89.4	(127/142)	86.5	(1,113/1,287)
	Switzerland	66.7	(8/12)	79.8	(217/272)	88.2	(1,819/2,062)
UK	81.8	(9/11)	86.4	(522/604)	88.1	(6,853/7,780)	
Combined average % (95% CI)		80.3 (69.5-89.7)		85.7 (82.3-88.8)		90.5 (87.6-93.0)	

Denominator: MSM reporting recent regular male sexual partners. †Denominator for GAPSS/GOSS participants is men reporting *current* regular partners, as men who reported regular partners in the previous 6 months but did not have a regular partner at the time of survey were not asked about sex with those regular partners.

5.3.1.3 Condomless anal intercourse with regular male partners

Among MSM reporting AI with a regular or steady male partner, CAI was commonly reported by men of all sexual identities, with average prevalences of 67% for H-MSM, 68% for B-MSM, and 76% for G-MSM (Table 15).

Table 15: Recent condomless AI with regular partners among MSM reporting AI with regular male partners, by sexual identity

		Reported recent condomless AI with regular AI partner(s)					
Sexual identity:		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2017	Australia	64.8	(59/91)	63.2	(1,006/1,592)	72.7	(21,972/30,225)
GAPSS/GOSS† 2008, 2011, 2014	New Zealand	82.1	(32/39)	84.0	(420/500)	86.4	(1,759/2,037)
SN15	Canada	72.7	(8/11)	55.3	(254/459)	69.6	(2,018/2,901)
EMIS-2010	Austria	50.0	(1/2)	68.5	(113/165)	76.7	(1,138/1,484)
	Belgium	66.7	(2/3)	61.1	(69/113)	73.1	(1,304/1,785)
	Denmark	100.0	(2/2)	54.2	(26/48)	73.3	(505/689)
	France	80.0	(4/5)	61.0	(253/415)	71.8	(3,847/5,358)
	Germany	58.6	(34/58)	61.7	(1,381/2,238)	76.1	(14,586/19,166)
	Greece	83.3	(5/6)	79.9	(123/154)	75.9	(720/948)
	Ireland	100.0	(1/1)	70.3	(52/74)	75.0	(595/793)
	Italy	20.0	(2/10)	72.0	(561/779)	75.5	(4,100/5,433)
	The Netherlands	0.0	(0/3)	73.4	(58/79)	76.9	(1,192/1,551)
	Portugal	63.2	(12/19)	68.8	(309/449)	75.2	(1,534/2,039)
	Spain	81.8	(9/11)	75.2	(351/467)	74.6	(3,583/4,803)
	Sweden	100.0	(3/3)	73.0	(92/126)	84.0	(926/1,102)
	Switzerland	37.5	(3/8)	52.8	(112/212)	71.4	(1,275/1,785)
UK	66.7	(6/9)	69.4	(360/519)	73.9	(5,003/6,773)	
Combined average % (95% CI)		67.3 (56.0-77.8)		67.7 (63.7-71.7)		75.5 (73.9-77.0)	

Denominator: MSM reporting recent AI with regular male sexual partners. †Denominator for GAPSS/GOSS participants is men reporting AI with *current* regular partners, as men who reported regular partners in the previous 6 months but did not have a regular partner at the time of survey were not asked about sex with those regular partners.

5.3.1.4 Multivariate analysis of sexual behaviour outcomes with regular partners

Among all MSM, H-MSM were on average 14% less likely than B-MSM (aPR=0.86) and nearly 40% less likely than G-MSM (aPR=0.62) to have reported recent regular male sexual partners (Table 16), after adjusting for age, education, and year of survey. Among MSM with recent regular male partners, reporting of AI with these partners was also lower among H-MSM compared with B-MSM (aPR=0.80) and G-MSM (aPR=0.76). While there was no difference between H-MSM and B-MSM who reported regular AI partners in reporting of recent condomless sex with these partners, H-MSM were on average 14% less likely to have reported recent condomless AI with their regular male AI partners than G-MSM (aPR=0.86).

Table 16: Adjusted prevalence ratios comparing H-MSM to B-MSM and G-MSM in reporting of recent sex with regular male sexual partners

Behaviour	Population	H-MSM vs B-MSM (ref) aPR (95% CI)	H-MSM vs G-MSM (ref) aPR (95% CI)
Regular male sexual partner(s) (recent)	All MSM	0.86 (0.75-0.99)*	0.62 (0.52-0.73)***
AI with regular partner(s) (recent)	Men reporting recent regular male partner(s)	0.80 (0.68-0.94)**	0.76 (0.64-0.90)**
CAI with regular partner(s) (recent)	Men reporting recent AI with regular partner(s)	0.97 (0.88-1.07)	0.86 (0.78-0.95)**

Adjusted for age group, education, and year of survey. CAI analysis additionally adjusted for HIV status. ^p<0.10. *p<0.05. **p<0.01. ***p<0.001.

5.3.2 Sex with casual male sexual partners

In this section, I explore the reporting of sexual behaviour with casual male sexual partners according to sexual identity.

5.3.2.1 Casual male sexual partners

The majority of MSM of all sexual identities in all countries surveyed reported recent casual male sexual partner(s) (Table 17). As a result, there was little variation in pooled average prevalences across sexual identities.

Table 17: Recent casual male sexual partner(s) among MSM, by sexual identity

Sexual identity:		Reported recent casual male sexual partner(s)					
		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2017	Australia	74.0	(145/196)	79.8	(2,511/3,147)	68.1	(33,928/49,848)
GAPSS/GOSS 2008, 2011, 2014	New Zealand	91.1	(51/56)	89.5	(1,277/1,427)	79.0	(5,079/6,428)
SN15	Canada	95.0	(115/121)	93.1	(1,618/1,738)	83.3	(4,007/4,809)
EMIS-2010	Austria	73.3	(11/15)	78.0	(430/551)	74.0	(2,003/2,707)
	Belgium	100.0	(10/10)	83.9	(260/310)	79.0	(2,392/3,029)
	Denmark	70.0	(7/10)	84.7	(160/189)	80.5	(961/1,194)
	France	86.7	(13/15)	81.1	(676/834)	78.0	(6,475/8,300)
	Germany	69.2	(204/295)	75.6	(5,227/6,918)	73.4	(26,708/36,396)
	Greece	75.0	(12/16)	79.1	(292/369)	78.0	(1,372/1,759)
	Ireland	78.6	(11/14)	79.9	(195/244)	79.3	(1,219/1,537)
	Italy	73.9	(34/46)	77.9	(1,538/1,975)	74.9	(7,951/10,616)
	The Netherlands	80.0	(8/10)	84.3	(226/268)	83.3	(2,511/3,015)
	Portugal	68.1	(32/47)	74.3	(652/877)	72.8	(2,340/3,216)
	Spain	79.1	(34/43)	75.6	(1,012/1,339)	76.4	(7,281/9,524)
	Sweden	65.2	(15/23)	82.2	(290/353)	76.2	(1,593/2,091)
	Switzerland	82.9	(29/35)	82.9	(571/689)	79.7	(2,752/3,452)
UK	76.9	(40/52)	82.4	(1,399/1,698)	81.0	(10,810/13,341)	
Pooled average % (95% CI)		79.9 (73.5-85.6)		81.7 (78.6-84.6)		77.6 (75.1-80.0)	

Denominator: All MSM.

5.3.2.2 Received oral sex from casual male partners

The majority of MSM with recent casual male partners reported receiving oral sex from one of these partners, with an average prevalence greater than 90% of MSM of each sexual identity (Table 18). Reported prevalences were around 10 percentage points lower among GCPS participants.

Table 18: Received oral sex from recent casual male partners, among MSM reporting casual male sexual partners, by sexual identity (GCPS and EMIS-2010 only)

		Received oral sex from recent casual male partner(s)					
<i>Sexual identity:</i>		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2013	Australia	79.8	(75/94)	86.7	(998/1,151)	89.1	(13,060/14,655)
EMIS-2010	Austria	90.9	(10/11)	96.5	(410/425)	97.2	(1,935/1,991)
	Belgium	100.0	(10/10)	95.7	(247/258)	97.1	(2,304/2,374)
	Denmark	100.0	(7/7)	91.7	(144/157)	97.1	(927/955)
	France	92.3	(12/13)	95.7	(642/671)	96.9	(6,234/6,433)
	Germany	91.1	(184/202)	95.7	(4,964/5,188)	96.9	(25,672/26,481)
	Greece	100.0	(12/12)	96.6	(280/290)	96.1	(1,312/1,365)
	Ireland	100.0	(10/10)	97.9	(186/190)	98.4	(1,194/1,213)
	Italy	91.2	(31/34)	96.4	(1,474/1,529)	96.2	(7,591/7,889)
	The Netherlands	87.5	(7/8)	96.9	(218/225)	98.1	(2,445/2,492)
	Portugal	90.6	(29/32)	98.3	(635/646)	97.0	(2,254/2,324)
	Spain	91.2	(31/34)	97.9	(985/1,006)	98.3	(7,114/7,240)
	Sweden	93.3	(14/15)	95.1	(273/287)	96.3	(1,528/1,587)
	Switzerland	86.2	(25/29)	95.6	(544/569)	97.2	(2,649/2,725)
	UK	92.5	(37/40)	97.3	(1,347/1,385)	98.1	(10,522/10,729)
Pooled average % (95% CI)		91.6 (88.8-94.1)		95.9 (94.5-97.1)		96.9 (95.5-98.0)	

Denominator: MSM reporting recent casual male sexual partners.

5.3.2.3 Gave oral sex to recent casual male partners

On average, 84% of H-MSM, 94% of B-MSM and 97% of G-MSM reported giving oral sex to a recent casual partner (Table 19). As with reporting of receiving oral sex, reporting was again around 10 percentage points lower among GCPS participants than among EMIS-2010 participants. While the reported prevalence of giving oral sex was lower than that of receiving oral sex for H-MSM, there was no such difference for B-MSM and G-MSM.

Table 19: Gave oral sex to recent casual male partners among MSM reporting casual male sexual partners, by sexual identity (GCPS and EMIS-2010 only)

Sexual identity:		Gave oral sex to recent casual male partner(s)					
		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2013	Australia	72.2	(70/97)	82.1	(951/1,158)	89.5	(13,152/14,689)
EMIS-2010	Austria	72.7	(8/11)	95.6	(409/428)	97.0	(1,934/1,994)
	Belgium	90.0	(9/10)	95.0	(247/260)	97.0	(2,315/2,386)
	Denmark	100.0	(7/7)	94.3	(149/158)	96.8	(923/954)
	France	92.3	(12/13)	93.3	(627/672)	97.3	(6,268/6,439)
	Germany	85.7	(174/203)	94.2	(4,904/5,208)	96.4	(25,661/26,609)
	Greece	66.7	(8/12)	89.7	(260/290)	97.5	(1,331/1,365)
	Ireland	90.0	(9/10)	94.8	(184/194)	98.3	(1,187/1,208)
	Italy	64.7	(22/34)	92.8	(1,421/1,531)	96.3	(7,617/7,907)
	The Netherlands	75.0	(6/8)	95.5	(212/222)	97.5	(2,438/2,501)
	Portugal	93.8	(30/32)	95.8	(619/646)	96.9	(2,258/2,330)
	Spain	85.3	(29/34)	95.7	(968/1,011)	98.1	(7,111/7,251)
	Sweden	93.3	(14/15)	92.4	(268/290)	96.2	(1,525/1,586)
	Switzerland	75.9	(22/29)	93.0	(530/570)	97.1	(2,664/2,744)
UK	87.5	(35/40)	96.0	(1,337/1,392)	98.0	(10,543/10,754)	
Pooled average % (95% CI)		83.6 (78.0-88.6)		93.6 (91.8-95.2)		96.8 (95.5-97.9)	

Denominator: MSM reporting sex with casual partners.

5.3.2.4 Anal intercourse with casual male partners

Anal intercourse was common among MSM reporting recent casual male partners, reported by more than three-quarters of MSM of each sexual identity (Table 20).

Reporting was lowest among H-MSM, especially relative to G-MSM, with the pooled average around 10 percentage points lower.

Table 20: Recent AI with casual male partners among MSM reporting casual male sexual partners, by sexual identity

		Reported recent AI with casual male partner(s)					
Sexual identity:		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2017	Australia	76.6	(111/145)	79.5	(1,995/2,511)	81.3	(27,570/33,928)
GAPSS/GOSS 2008, 2011, 2014	New Zealand	68.6	(35/51)	79.6	(990/1,243)	81.9	(4,076/4,976)
SN15	Canada	83.5	(96/115)	87.8	(1,421/1,618)	89.2	(3,575/4,007)
EMIS-2010	Austria	81.8	(9/11)	78.4	(334/426)	83.6	(1,669/1,997)
	Belgium	50.0	(5/10)	79.6	(207/260)	82.8	(1,970/2,380)
	Denmark	57.1	(4/7)	83.8	(134/160)	87.6	(841/960)
	France	92.3	(12/13)	84.1	(566/673)	88.0	(5,678/6,451)
	Germany	71.4	(145/203)	76.0	(3,954/5,200)	81.2	(21,604/26,594)
	Greece	83.3	(10/12)	90.3	(262/290)	89.9	(1,229/1,367)
	Ireland	90.9	(10/11)	76.8	(149/194)	82.1	(998/1,215)
	Italy	70.6	(24/34)	85.7	(1,312/1,531)	87.4	(6,912/7,908)
	The Netherlands	50.0	(4/8)	79.2	(179/226)	82.6	(2,064/2,498)
	Portugal	83.9	(26/31)	88.5	(576/651)	89.4	(2,080/2,327)
	Spain	67.6	(23/34)	87.7	(883/1,007)	88.9	(6,452/7,257)
	Sweden	46.7	(7/15)	72.6	(209/288)	81.0	(1,289/1,591)
	Switzerland	75.9	(22/29)	80.5	(459/570)	83.3	(2,283/2,740)
UK	80.0	(32/40)	79.5	(1,111/1,397)	83.4	(8,983/10,776)	
Pooled average % (95% CI)		75.5 (70.6-80.1)		82.1 (79.6-84.6)		85.1 (83.4-86.6)	

Denominator: MSM reporting sex with casual partners.

5.3.2.5 Insertive anal intercourse with casual male partners

Among MSM reporting recent AI with casual male partners there were similar levels of reporting recent insertive AI across all sexual identities, with average prevalences of 78% for H-MSM, 84% for B-MSM and 83% for G-MSM (Table 21).

Table 21: Recent insertive AI with casual male partners among MSM reporting AI with casual male partners, by sexual identity (GCPS, GAPSS/GOSS and EMIS-2010 only)

Sexual identity:		Reported recent insertive AI with casual male partner(s)					
		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2017	Australia	89.1	(98/110)	91.1	(1,784/1,958)	87.4	(23,804/27,251)
GAPSS/GOSS 2008, 2011, 2014	New Zealand	88.2	(30/34)	81.0	(791/976)	79.0	(3,166/4,010)
EMIS-2010	Austria	88.9	(8/9)	81.2	(263/324)	83.7	(1,379/1,647)
	Belgium	60.0	(3/5)	82.3	(167/203)	84.8	(1,652/1,947)
	Denmark	100.0	(4/4)	76.9	(103/134)	80.0	(665/831)
	France	75.0	(9/12)	88.4	(494/559)	83.7	(4,704/5,620)
	Germany	72.7	(104/143)	82.9	(3,214/3,878)	84.2	(17,817/21,148)
	Greece	80.0	(8/10)	84.5	(218/258)	76.3	(927/1,215)
	Ireland	75.0	(6/8)	85.9	(128/149)	83.1	(819/985)
	Italy	83.3	(20/24)	84.2	(1,088/1,292)	79.7	(5,418/6,796)
	The Netherlands	50.0	(2/4)	82.4	(145/176)	84.8	(1,729/2,039)
	Portugal	80.0	(20/25)	85.9	(482/561)	85.8	(1,743/2,031)
	Spain	65.2	(15/23)	89.0	(776/872)	85.4	(5,435/6,366)
	Sweden	42.9	(3/7)	79.3	(165/208)	80.8	(1,032/1,278)
	Switzerland	66.7	(14/21)	86.1	(391/454)	85.3	(1,924/2,256)
UK	68.8	(22/32)	78.5	(860/1,096)	83.0	(7,388/8,903)	
Pooled average % (95% CI)		78.4 (71.5-84.7)		84.1 (81.8-86.3)		83.1 (81.6-84.5)	

Denominator: MSM reporting AI with casual partners

5.3.2.6 Receptive anal intercourse with casual male partners

In contrast to the reporting of insertive AI, significant differences by sexual identity were observed in the reporting of recent *receptive* AI with casual partners (Table 22). The prevalence among G-MSM was similar to the proportion who reported insertive AI at 83%. In contrast, reporting of receptive AI among H-MSM and B-MSM was around 10% lower than was observed for insertive AI.

Table 22: Recent receptive AI with casual male partners among MSM reporting AI with casual male partners, by sexual identity (GCPS, GAPSS/GOSS and EMIS-2010 only)

Sexual identity:		Reported recent receptive AI with casual male partner(s)					
		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2017	Australia	80.2	(85/106)	72.6	(1,421/1,958)	78.2	(21,244/27,161)
GAPSS/GOSS 2008, 2011, 2014	New Zealand	50.0	(17/34)	72.1	(704/976)	76.4	(3,063/4,010)
EMIS-2010	Austria	66.7	(6/9)	84.1	(281/334)	83.9	(1,382/1,647)
	Belgium	80.0	(4/5)	75.7	(156/206)	81.3	(1,594/1,960)
	Denmark	50.0	(2/4)	78.0	(103/132)	84.8	(708/835)
	France	75.0	(9/12)	73.8	(413/560)	85.5	(4,825/5,641)
	Germany	76.4	(110/144)	77.4	(3,015/3,894)	82.1	(17,467/21,268)
	Greece	30.0	(3/10)	63.8	(166/260)	85.2	(1,037/1,217)
	Ireland	77.8	(7/9)	75.0	(111/148)	86.8	(857/987)
	Italy	47.8	(11/23)	69.0	(894/1,295)	82.4	(5,648/6,851)
	The Netherlands	75.0	(3/4)	76.1	(134/176)	81.2	(1,668/2,054)
	Portugal	69.2	(18/26)	75.0	(425/567)	85.6	(1,748/2,042)
	Spain	65.2	(15/23)	70.3	(616/876)	83.5	(5,355/6,413)
	Sweden	85.7	(6/7)	72.1	(150/208)	79.4	(1,015/1,279)
	Switzerland	77.3	(17/22)	79.9	(362/453)	84.1	(1,900/2,259)
UK	77.4	(24/31)	79.0	(871/1,103)	82.1	(7,326/8,927)	
Pooled average % (95% CI)		70.0 (62.5-77.1)		74.7 (72.5-76.8)		82.7 (81.3-84.0)	

Denominator: MSM reporting AI with casual partners

5.3.2.7 Condomless anal intercourse with casual male partners

Among MSM reporting recent AI with casual male partners, average reporting of recent CAI ranged from 39% among H-MSM to 47% among G-MSM (Table 23).

Table 23: Recent condomless anal intercourse with casual male partners among MSM reporting AI with casual male partners, by sexual identity

Sexual identity:		Reported recent CAI with casual male AI partner(s)					
		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2017	Australia	59.5	(66/111)	44.2	(881/1,995)	48.2	(13,289/27,570)
GAPSS/GOSS 2008, 2011, 2014	New Zealand	48.6	(17/35)	43.1	(427/990)	47.0	(1,915/4,076)
SN15	Canada	58.3	(56/96)	65.4	(930/1,421)	65.5	(2,340/3,575)
EMIS-2010	Austria	33.3	(3/9)	44.6	(146/327)	42.2	(691/1,637)
	Belgium	40.0	(2/5)	38.2	(78/204)	41.9	(812/1,938)
	Denmark	50.0	(2/4)	41.4	(53/128)	48.1	(395/822)
	France	41.7	(5/12)	32.1	(177/551)	38.2	(2,129/5,573)
	Germany	30.8	(44/143)	43.0	(1,664/3,867)	48.0	(10,202/21,262)
	Greece	10.0	(1/10)	33.3	(85/255)	41.6	(501/1,204)
	Ireland	30.0	(3/10)	39.3	(57/145)	51.5	(510/990)
	Italy	29.2	(7/24)	46.7	(601/1,288)	46.0	(3,114/6,767)
	The Netherlands	50.0	(2/4)	51.4	(92/179)	49.8	(1,009/2,025)
	Portugal	19.2	(5/26)	38.9	(220/566)	43.0	(878/2,043)
	Spain	36.4	(8/22)	43.3	(374/864)	46.7	(2,942/6,304)
	Sweden	57.1	(4/7)	50.0	(104/208)	54.4	(693/1,273)
	Switzerland	27.3	(6/22)	35.3	(160/453)	41.3	(926/2,243)
UK	50.0	(16/32)	46.3	(504/1,089)	50.7	(4,496/8,874)	
Pooled average % (95% CI)		39.3 (30.7-48.2)		43.3 (39.4-47.4)		47.3 (44.8-49.7)	

Denominator: MSM reporting AI with casual partners

5.3.2.8 How they met casual male partners

Among EMIS-2010 and SN15 participants reporting a casual male partner in the previous 12 months, men across all sexual identities were most likely to have met their last casual partner online or through apps (Table 24). Reporting this was highest among H-MSM (pooled average 70%) and B-MSM (65%) though still high among G-MSM (57%). There was little difference by sexual identity in meeting partners at SOP such as saunas or sex clubs, with average reporting prevalence 16% for H-MSM, 20% for B-MSM and 22% for G-MSM. Very few H-MSM (pooled average 0.6%) or B-MSM (4%) reported meeting their last casual partner at gay venues, though this was reported by an average of 10% of G-MSM.

Table 24: How MSM met their last casual partner, among MSM reporting casual partners in the previous 12 months (EMIS-2010 and SN15 only)

How men met their last casual partner	H-MSM % (95% CI)	B-MSM % (95% CI)	G-MSM % (95% CI)
Online or apps	69.5 (62.0-76.6)	64.5 (61.5-67.5)	57.1 (55.1-59.1)
SOP venues	16.2 (12.1-20.7)	19.5 (17.6-21.4)	21.6 (19.8-23.4)
Gay social venues	0.6 (0.0-2.1)	4.4 (3.4-5.7)	10.0 (8.6-11.6)
Other	7.3 (4.3-10.8)	10.9 (9.8-12.1)	10.9 (10.3-11.4)

Column proportions do not add to 100% as they are pooled from weighted country-level proportions.

5.3.2.9 Multivariate analysis of sexual behaviour outcomes with casual partners

Among all MSM, H-MSM were equally as likely to have reported recent sex with a casual male partner as B-MSM and G-MSM (Table 25). Among MSM reporting recent sex with casual male partners, H-MSM were slightly less likely to have received oral sex from these partners than B-MSM and G-MSM, though given more than 90% (on average) of MSM of all sexual identities reported this outcome, this difference may not mean much in practice. There were slightly larger differences in reporting of *giving* oral sex to casual partners, with reporting of this by H-MSM 12% lower than by B-MSM, and 15% lower than by G-MSM.

On average, H-MSM were around 10% less likely than both B-MSM (aPR=0.91) and G-MSM (aPR=0.88) to have reported AI with their casual partners. Among MSM reporting AI with casual partners, H-MSM were less likely than B-MSM to have reported insertive AI (aPR=0.91) but there was no difference when compared to G-MSM. There was no difference in reporting of receptive AI between H-MSM and B-MSM, while H-MSM were on average 14% less likely to have reported this than G-MSM. Combined data from all studies suggest that there is no difference in reporting of condomless AI with casual partners between the three groups of MSM.

After adjustment for age group and education, H-MSM were 75% less likely than G-MSM to have met their last casual partner at a gay social venue like a bar or club (aPR=0.25), but 22% *more* likely to have met them through a website or app. There was some evidence that H-MSM were less likely than B-MSM to have met their last casual partner at a gay social venue, and more likely to have met them online, however, neither of these reached statistical significance.

Table 25: Adjusted prevalence ratios comparing H-MSM to B-MSM and G-MSM in reporting of recent sexual behaviour with casual male partners

Outcome	Population	H-MSM vs B-MSM (ref) aPR (95% CI)	H-MSM vs G-MSM (ref) aPR (95% CI)
SEXUAL BEHAVIOUR			
Casual male sexual partner(s) (recent)	All MSM	0.96 (0.91-1.01) [^]	1.00 (0.94-1.07)
Received oral sex from casual male partner(s) (recent)	Men reporting recent casual male partner(s) [†]	0.94 (0.92-0.96) ^{***}	0.93 (0.91-0.96) ^{***}
Gave oral sex to casual male partner(s) (recent)	Men reporting recent casual male partner(s) [†]	0.88 (0.85-0.92) ^{***}	0.85 (0.81-0.90) ^{***}
AI with casual male partner(s) (recent)	Men reporting recent casual male partner(s)	0.91 (0.87-0.95) ^{***}	0.88 (0.84-0.92) ^{***}
Insertive AI with casual male partner(s) (recent)	Men reporting recent AI with casual male partner(s)	0.92 (0.85-0.99) [*]	0.94 (0.86-1.03)
Receptive AI with casual male partner(s) (recent)	Men reporting recent AI with casual male partner(s)	0.95 (0.87-1.03)	0.86 (0.78-0.95) ^{**}
CAI with casual male partner(s) (recent)	Men reporting recent AI with casual male partner(s)	0.93 (0.78-1.10)	0.89 (0.74-1.06)
HOW THEY MET THEIR LAST CASUAL PARTNER			
Online or apps	MSM reporting recent casual male partner(s) [‡]	1.06 (0.99-1.13) [^]	1.22 (1.14-1.30) ^{***}
SOP venues	MSM reporting recent casual male partner(s) [‡]	0.98 (0.80-1.19)	0.86 (0.71-1.05)
Gay social venues	MSM reporting recent casual male partner(s) [‡]	0.57 (0.32-1.02) [^]	0.25 (0.14-0.47) ^{***}
Other	MSM reporting recent casual male partner(s) [‡]	0.81 (0.64-1.03) [^]	0.80 (0.59-1.07)

Adjusted for age group, education, and year of survey. CAI analysis additionally adjusted for HIV status. [†]GCPS and EMIS-2010 only. [‡]SN15 and EMIS-2010 only. [^]p<0.1. ^{*}p<0.05. ^{**}p<0.01. ^{***}p<0.001.

5.3.3 Sex with women

In this section, I examine how the reporting of sex with women varies among MSM according to their sexual identity. I first look at reporting of recent female sexual partners among MSM, who by definition will have also had recent male partners. Among MSMW (i.e., those MSM who also reported recent female partners), I then look at reporting of vaginal or anal intercourse (VAI) with those partners. Next, I look at reporting of condomless VAI (CVAI) among MSMW reporting recent VAI with female partners. Finally, I estimate the prevalence among all MSM, and then just among MSMW, of reporting condomless sex with both male and female partners, as measures of the potential for STI/HIV transmission between MSM and heterosexual sexual networks.

5.3.3.1 Recent sex with men and women

There were clear differences across sexual identities in reporting both recent male and female sexual partners, with an average of 72% of H-MSM, 55% of B-MSM, and only 2.6% of G-MSM reporting recent female sexual partners as well as male partners (Table 26).

Table 26: Recent male and female sexual partners among all MSM, by sexual identity (GAPSS/GOSS, SN15 and EMIS-2010 only)

Sexual identity:		Reported recent male and female sexual partners					
		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GAPSS/GOSS 2008, 2011, 2014	New Zealand	65.5	(38/58)	52.5	(757/1,441)	2.4	(154/6,473)
SN15	Canada	78.5	(95/121)	59.3	(1,031/1,738)	1.3	(63/4,809)
EMIS-2010	Austria	80.0	(12/15)	58.6	(327/558)	2.4	(64/2,715)
	Belgium	60.0	(6/10)	52.3	(162/310)	2.3	(69/3,036)
	Denmark	70.0	(7/10)	61.5	(118/192)	2.5	(30/1,208)
	France	53.3	(8/15)	53.7	(447/832)	2.6	(214/8,284)
	Germany	77.9	(236/303)	58.9	(4,113/6,981)	2.0	(725/36,593)
	Greece	66.7	(10/15)	56.4	(207/367)	4.8	(84/1,759)
	Ireland	81.2	(13/16)	58.7	(145/247)	3.6	(55/1,548)
	Italy	80.4	(37/46)	51.1	(1,023/2,000)	3.1	(337/10,730)
	The Netherlands	60.0	(6/10)	57.6	(155/269)	2.8	(84/3,026)
	Portugal	48.9	(23/47)	49.6	(438/883)	3.6	(117/3,215)
	Spain	72.1	(31/43)	49.7	(670/1,348)	2.6	(247/9,546)
	Sweden	75.0	(18/24)	48.4	(171/353)	2.5	(52/2,097)
	Switzerland	80.6	(29/36)	62.5	(437/699)	2.8	(98/3,455)
UK	66.7	(36/54)	56.0	(968/1,729)	2.4	(328/13,420)	
Pooled average % (95% CI)		72.0 (66.7-77.0)		55.3 (53.1-57.5)		2.6 (2.3-3.0)	

Denominator: All MSM.

5.3.3.2 Vaginal or anal intercourse with female partners

Among MSM who reported recent sex with female partners, recent VAI with a female partner with was reported by nearly all H-MSMW (pooled average 98%) and B-MSMW (94%) (Table 27). However, among G-MSMW reporting female partners this average was considerably lower at 80%.

Table 27: Recent vaginal or anal intercourse with female partner(s) among MSMW, by sexual identity (EMIS-2010 only)

Sexual identity:		Reported recent VAI with female partner(s)					
		H-MSMW		B-MSMW		G-MSMW	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
EMIS-2010	Austria	100.0	(12/12)	92.9	(299/322)	88.7	(55/62)
	Belgium	100.0	(6/6)	96.3	(156/162)	80.9	(55/68)
	Denmark	100.0	(7/7)	100.0	(117/117)	86.7	(26/30)
	France	100.0	(8/8)	96.4	(430/446)	86.3	(183/212)
	Germany	96.6	(228/236)	91.3	(3,740/4,097)	85.4	(615/720)
	Greece	100.0	(10/10)	90.3	(186/206)	74.7	(62/83)
	Ireland	92.3	(12/13)	94.5	(137/145)	80.0	(44/55)
	Italy	94.6	(35/37)	89.6	(911/1,017)	72.1	(240/333)
	The Netherlands	83.3	(5/6)	95.5	(148/155)	82.1	(69/84)
	Portugal	91.3	(21/23)	92.2	(400/434)	86.2	(100/116)
	Spain	96.8	(30/31)	93.4	(626/670)	72.1	(178/247)
	Sweden	100.0	(18/18)	98.8	(169/171)	76.5	(39/51)
	Switzerland	93.1	(27/29)	92.3	(398/431)	80.6	(75/93)
UK	94.4	(34/36)	95.2	(921/967)	72.9	(237/325)	
Pooled average % (95% CI)		98.1 (96.1-99.5)		94.4 (92.8-95.8)		80.3 (76.4-83.9)	

Denominator: MSMW.

5.3.3.3 Condomless vaginal or anal intercourse with women

Among MSMW reporting recent VAI with women, three quarters (77%) of H-MSMW reported not using condoms during VAI on at least one occasion (Table 28). This was higher than for both B-MSMW (66%) and G-MSMW (46%).

Table 28: Recent condomless vaginal or anal intercourse with female partners among MSMW reporting recent VAI with female partners, by sexual identity (EMIS-2010 only)

Sexual identity:		Reported recent CVAI with female VAI partner(s)					
		H-MSMW		B-MSMW		G-MSMW	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
EMIS-2010	Austria	91.7	(11/12)	66.4	(198/298)	49.1	(27/55)
	Belgium	33.3	(2/6)	71.2	(111/156)	54.5	(30/55)
	Denmark	100.0	(7/7)	73.5	(86/117)	46.2	(12/26)
	France	87.5	(7/8)	59.1	(254/430)	37.0	(67/181)
	Germany	76.2	(173/227)	68.3	(2,548/3,730)	50.1	(308/615)
	Greece	40.0	(4/10)	48.1	(89/185)	35.5	(22/62)
	Ireland	50.0	(6/12)	67.2	(92/137)	52.3	(23/44)
	Italy	74.3	(26/35)	63.1	(572/906)	46.9	(112/239)
	The Netherlands	80.0	(4/5)	70.1	(103/147)	58.0	(40/69)
	Portugal	71.4	(15/21)	58.2	(231/397)	39.4	(39/99)
	Spain	70.0	(21/30)	53.7	(335/624)	35.4	(63/178)
	Sweden	94.4	(17/18)	84.6	(143/169)	48.7	(19/39)
	Switzerland	81.5	(22/27)	63.8	(254/398)	51.4	(38/74)
	UK	79.4	(27/34)	71.1	(653/918)	52.5	(124/236)
Pooled average % (95% CI)		76.9 (69.4-83.8)		65.6 (61.7-69.3)		46.4 (42.4-50.4)	

Denominator: MSMW who reported recent VAI with a female partner.

5.3.3.4 Condomless sex with both men and women

Among all MSM, a minority of men of all sexual identities reported both recent CAI with a male partner and recent CVAI with a female partner (Table 29). Prevalence was similar for both H-MSM (12%) and B-MSM (14%), while less than 1% of G-MSM reported both behaviours.

Table 29: Recent condomless sex with both male and female partners among MSM, by sexual identity (EMIS-2010 only)

<i>Sexual identity:</i>		Reported recent CAI with male partner(s) AND recent CVAI with female partner(s)					
		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
EMIS-2010	Austria	6.7	(1/15)	13.5	(73/542)	0.6	(16/2,717)
	Belgium	10.0	(1/10)	13.4	(41/307)	0.7	(22/3,037)
	Denmark	10.0	(1/10)	18.6	(35/188)	0.7	(8/1,207)
	France	20.0	(3/15)	12.4	(103/828)	0.5	(42/8,300)
	Germany	11.5	(34/296)	13.5	(926/6,864)	0.6	(209/36,654)
	Greece	6.7	(1/15)	12.6	(46/365)	0.9	(15/1,763)
	Ireland	12.5	(2/16)	14.2	(34/239)	1.2	(18/1,553)
	Italy	10.9	(5/46)	14.4	(284/1,972)	0.7	(75/10,748)
	The Netherlands	10.0	(1/10)	16.9	(45/266)	0.9	(26/3,029)
	Portugal	8.7	(4/46)	12.8	(112/872)	0.8	(27/3,215)
	Spain	14.3	(6/42)	10.5	(141/1,338)	0.4	(40/9,572)
	Sweden	21.7	(5/23)	16.9	(59/349)	0.7	(15/2,099)
	Switzerland	16.7	(6/36)	11.0	(76/691)	0.6	(22/3,457)
	UK	23.1	(12/52)	16.5	(280/1,702)	0.6	(86/13,442)
Pooled average % (95% CI)		11.7 (9.1-14.6)		13.7 (12.6-14.8)		0.6 (0.6-0.7)	

Denominator: All MSM.

However, a more meaningful comparison is achieved by limiting analysis to MSMW, i.e., MSM who also reported recent female sexual partners (Table 30). Condomless sex with recent male and recent female partners was reported by an average of 16% of H-MSMW, 26% of B-MSMW, and 25% of G-MSM.

Table 30: Recent condomless sex with both male and female partners among MSMW, by sexual identity (EMIS-2010 only)

Sexual identity:		Reported recent CAI with male partner(s) AND recent CVAI with female partner(s)					
		H-MSMW		B-MSMW		G-MSMW	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
EMIS-2010	Austria	8.3	(1/12)	23.5	(73/310)	26.2	(16/61)
	Belgium	16.7	(1/6)	25.8	(41/159)	32.8	(22/67)
	Denmark	14.3	(1/7)	30.7	(35/114)	27.6	(8/29)
	France	37.5	(3/8)	23.4	(103/440)	20.1	(42/209)
	Germany	15.0	(34/227)	23.3	(926/3,977)	29.1	(209/717)
	Greece	10.0	(1/10)	22.8	(46/202)	18.1	(15/83)
	Ireland	15.4	(2/13)	24.8	(34/137)	32.7	(18/55)
	Italy	13.5	(5/37)	28.7	(284/990)	22.7	(75/330)
	The Netherlands	16.7	(1/6)	29.8	(45/151)	31.3	(26/83)
	Portugal	18.2	(4/22)	26.3	(112/426)	24.1	(27/112)
	Spain	20.0	(6/30)	21.5	(141/655)	16.5	(40/242)
	Sweden	29.4	(5/17)	35.5	(59/166)	29.4	(15/51)
	Switzerland	20.7	(6/29)	17.9	(76/424)	23.9	(22/92)
	UK	35.3	(12/34)	29.9	(280/938)	26.5	(86/325)
	Pooled average % (95% CI)		16.1 (12.5-20.0)		25.5 (23.3-27.7)		24.8 (21.9-27.8)

Denominator: MSM who reported recent female sexual partners.

5.3.3.5 Multivariate analysis of sexual behaviour outcomes with women

H-MSM were slightly more likely than B-MSM to have also reported recent sex with a female partner (aPR=1.30), but more than 27 times more likely than G-MSM (aPR=27.8) (Table 31). Among MSMW, reporting of VAI with female partners was slightly higher among H-MSMW than B-MSMW (though reporting prevalence was greater than 94% in both groups) and around 20% higher among H-MSMW than G-MSMW. Among MSMW reporting recent VAI with female partners, H-MSMW were more likely than both B-MSMW (aPR=1.22) and G-MSMW (aPR=1.59) to have reported not using a condom on at least one occasion. Among all MSM, there was no difference between H-MSM and B-MSM in reporting of recent condomless sex with both male and female sexual partners, while H-MSM were unsurprisingly more likely than G-MSM (aPR=19.9) to have reported this. However, when analysis was limited to MSMW, H-MSMW were around 25% less likely than both B-MSMW and G-MSMW to have reported recent condomless sex with both male and female sexual partners.

Table 31: Adjusted prevalence ratios comparing H-MSM to B-MSM and G-MSM in reporting of sexual behaviour with female partners

Outcome	Population	H-MSM vs B-MSM (ref) aPR (95% CI)	H-MSM vs G-MSM (ref) aPR (95% CI)
Sex with female partner(s) (recent)	All MSM [†]	1.30 (1.22-1.39) ^{***}	27.8 (23.0-33.6) ^{***}
VAI with female partner(s) (recent)	MSMW only [‡]	1.03 (1.01-1.05) ^{**}	1.20 (1.13-1.27) ^{***}
CVAI with female partner(s) (recent)	MSMW reporting VAI with recent female partner(s) [‡]	1.22 (1.16-1.28) ^{***}	1.59 (1.45-1.73) ^{***}
CAI with male partner(s) AND CVAI with female partner(s) (recent)	All MSM [†]	0.98 (0.80-1.20)	19.9 (15.7-25.1) ^{***}
	MSMW only [‡]	0.74 (0.59-0.94) [*]	0.74 (0.55-0.99) [*]

Adjusted for age group, education, and year of survey. CAI and CVAI analyses additionally adjusted for HIV status.

[†]GAPSS/GOSS, SN15 and EMIS-2010 only. [‡]EMIS-2010 only. [^]p<0.10. ^{*}p<0.05. ^{**}p<0.01. ^{***}p<0.001.

5.3.4 Exchange sex

In this section, I present prevalence estimates relating to buying and selling sex with men and how these varied by sexual identity.

5.3.4.1 Selling sex to men

Reporting of having received payment to have sex with another man in the previous 12 months was low among MSM of all sexual identities, though it was slightly higher among H-MSM and B-MSM (both pooled averages 6.6%) than G-MSM (4.1%) (Table 32).

Table 32: Received payment for sex with a man in the previous 12 months, among all MSM, by sexual identity (EMIS-2010 only)

Sexual identity:		Reported receiving payment for sex with a man in the previous 12 months					
		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
EMIS-2010	Austria	13.3	(2/15)	6.5	(36/555)	3.5	(94/2,712)
	Belgium	0.0	(0/10)	7.8	(24/308)	3.6	(110/3,046)
	Denmark	0.0	(0/10)	7.9	(15/191)	4.3	(51/1,193)
	France	6.7	(1/15)	8.4	(70/832)	6.4	(527/8,279)
	Germany	7.0	(21/302)	6.2	(432/6,975)	4.1	(1,488/36,622)
	Greece	12.5	(2/16)	6.2	(23/373)	4.1	(73/1,769)
	Ireland	18.8	(3/16)	5.7	(14/247)	3.6	(55/1,546)
	Italy	8.7	(4/46)	9.4	(187/1,990)	6.8	(733/10,711)
	The Netherlands	20.0	(2/10)	5.5	(15/273)	3.1	(94/3,022)
	Portugal	10.6	(5/47)	5.2	(46/884)	3.3	(108/3,226)
	Spain	9.3	(4/43)	7.7	(104/1,353)	4.4	(425/9,552)
	Sweden	12.5	(3/24)	5.4	(19/353)	2.6	(55/2,090)
	Switzerland	8.3	(3/36)	5.1	(36/701)	3.8	(133/3,466)
	UK	3.7	(2/54)	5.8	(100/1,733)	4.3	(573/13,445)
Pooled average % (95% CI)		6.6 (4.5-8.9)		6.6 (5.8-7.4)		4.1 (3.5-4.7)	

Denominator: All MSM.

5.3.4.2 Buying sex with men

A similar proportion of men of all three sexual identities reported paying another man to have sex with them in the previous 12 months (Table 33). Average prevalence estimates from 7.0% of H-MSM, 7.5% of G-MSM, to 9.5% for B-MSM.

Table 33: Paid for sex with a man in the previous 12 months, among all MSM, by sexual identity (EMIS-2010 only)

Sexual identity:		Paid for sex with a man in the previous 12 months					
		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
EMIS-2010	Austria	13.3	(2/15)	9.6	(53/554)	8.6	(232/2,708)
	Belgium	0.0	(0/10)	16.8	(52/309)	9.6	(291/3,044)
	Denmark	10.0	(1/10)	8.9	(17/191)	6.1	(73/1,193)
	France	13.3	(2/15)	10.8	(90/832)	8.8	(727/8,269)
	Germany	5.3	(16/304)	9.3	(650/6,981)	7.2	(2,620/36,607)
	Greece	25.0	(4/16)	9.1	(34/373)	9.8	(173/1,769)
	Ireland	25.0	(4/16)	5.3	(13/246)	4.8	(74/1,543)
	Italy	6.5	(3/46)	10.9	(217/1,989)	8.8	(941/10,708)
	The Netherlands	0.0	(0/10)	12.8	(35/273)	7.4	(223/3,016)
	Portugal	12.8	(6/47)	8.5	(75/884)	6.1	(197/3,225)
	Spain	4.7	(2/43)	10.2	(138/1,349)	7.4	(710/9,553)
	Sweden	0.0	(0/24)	2.5	(9/353)	3.2	(67/2,087)
	Switzerland	13.9	(5/36)	16.5	(116/701)	12.7	(439/3,463)
	UK	5.6	(3/54)	6.5	(113/1,730)	6.3	(848/13,426)
Pooled average % (95% CI)		7.0 (3.8-10.9)		9.5 (8.1-11.1)		7.5 (6.6-8.4)	

Denominator: All MSM.

5.3.4.3 Multivariate analysis of reporting of exchange sex

After adjusting for age and education there was no difference by sexual identity in the reporting of paying for sex with a man in the previous year (Table 34). However, while H-MSM and B-MSM were equally likely to have been paid for sex by a man in the previous year, H-MSM were 71% more likely than G-MSM to report this (aPR=1.71).

Table 34: Adjusted prevalence ratios comparing H-MSM to B-MSM and G-MSM in reporting of exchange sex

Outcome	Population	H-MSM vs B-MSM (ref) aPR (95% CI)	H-MSM vs G-MSM (ref) aPR (95% CI)
Was paid for sex by a male partner in previous 12 months	All MSM [†]	1.09 (0.84-1.41)	1.71 (1.29-2.28) ^{***}
Paid for sex with a male partner in previous 12 months	All MSM [†]	1.00 (0.66-1.50)	1.19 (0.84-1.70)

Adjusted for age group and education. [†]EMIS-2010 only. [^]p<0.10. *p<0.05. **p<0.01. ***p<0.001.

5.3.5 Behaviours with higher STI/HIV transmission risk

In this section, I focus on four behaviours identified in the literature as having higher STI/HIV transmission risk.¹⁷⁵ Estimates for each behaviour are first presented individually, initially at a country-level, before presenting estimates for a composite variable I created (section 3.3.2.7.5) corresponding to a recommendation for more

frequent STI/HIV testing based on reporting the *two* behaviours for which data were available across all four included studies. I then present multivariate comparisons by sexual identity in the reporting of these variables.

5.3.5.1 Reporting a higher number of male partners

Table 35 shows the prevalence of reporting more than five male partners in the previous six months (GCPS and GAPSS/GOSS) or reporting more than 10 male partners in the previous 12 months (SN15 and EMIS-2010). Prevalence was lower among H-MSM (pooled average 17%) and B-MSM (25%) than among G-MSM (34%) though there was heterogeneity across studies, with prevalence among GCPS participants greater than those of EMIS-2010/SN15 participants.

Table 35: Reported a higher number of recent male partners among all MSM, by sexual identity

		Reported a higher number of recent male partners [†]					
Sexual identity:		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2017	Australia	54.7	(81/148)	44.6	(1,308/2,933)	41.8	(19,162/45,878)
GAPSS/GOSS 2008, 2011, 2014	New Zealand	24.1	(14/58)	31.0	(437/1,408)	38.7	(2,453/6,343)
SN15	Canada	12.4	(15/121)	20.2	(351/1,738)	32.1	(1,545/4,808)
EMIS-2010	Austria	16.7	(2/12)	16.9	(86/510)	29.3	(763/2,605)
	Belgium	30.0	(3/10)	30.6	(91/297)	36.6	(1,082/2,953)
	Denmark	28.6	(2/7)	23.1	(40/173)	32.4	(374/1,156)
	France	50.0	(7/14)	36.9	(292/792)	41.9	(3,373/8,057)
	Germany	11.5	(29/253)	17.8	(1,126/6,337)	28.1	(9,851/35,049)
	Greece	35.7	(5/14)	20.9	(72/345)	32.2	(534/1,659)
	Ireland	0.0	(0/12)	17.8	(39/219)	28.3	(416/1,469)
	Italy	15.4	(6/39)	28.0	(509/1,815)	34.5	(3,423/9,921)
	The Netherlands	0.0	(0/10)	31.9	(80/251)	40.4	(1,184/2,933)
	Portugal	14.6	(6/41)	18.8	(157/834)	22.9	(713/3,114)
	Spain	17.1	(6/35)	27.1	(310/1,143)	37.1	(3,217/8,672)
	Sweden	5.6	(1/18)	14.6	(49/336)	24.2	(494/2,038)
	Switzerland	2.9	(1/34)	28.2	(183/648)	36.8	(1,224/3,327)
UK	16.7	(7/42)	23.9	(374/1,562)	35.2	(4,504/12,779)	
Pooled average % (95% CI)		17.2 (9.4-26.5)		25.1 (20.7-29.9)		33.6 (30.6-36.7)	

Denominator: All MSM. †Defined as reporting more than 10 male partners in the previous 12 months, or more than five male partners in the previous six months.

5.3.5.2 Condomless anal intercourse with casual partners

Among all MSM, recent CAI with a casual partner was reported by an average of 22% of H-MSM, 29% of B-MSM and 31% of G-MSM (Table 36).

Table 36: Recent CAI with casual partner(s) among all MSM, by sexual identity

Sexual identity:		Reported recent CAI with casual partner(s)					
		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2017	Australia	33.7	(66/196)	28.0	(881/3,147)	26.7	(13,289/49,848)
GAPSS/GOSS 2008, 2011, 2014	New Zealand	30.4	(17/56)	30.7	(427/1,393)	30.3	(1,915/6,325)
SN15	Canada	46.3	(56/121)	53.5	(930/1,738)	48.7	(2,340/4,809)
EMIS-2010	Austria	20.0	(3/15)	27.0	(146/540)	25.9	(691/2,669)
	Belgium	20.0	(2/10)	25.4	(78/307)	27.2	(812/2,985)
	Denmark	20.0	(2/10)	29.0	(53/183)	33.6	(395/1,174)
	France	33.3	(5/15)	21.7	(177/816)	26.1	(2,129/8,171)
	Germany	15.1	(44/292)	24.5	(1,664/6,804)	28.4	(10,202/35,941)
	Greece	6.2	(1/16)	23.6	(85/360)	29.0	(501/1,729)
	Ireland	21.4	(3/14)	23.8	(57/239)	33.4	(510/1,525)
	Italy	15.2	(7/46)	30.9	(601/1,944)	29.9	(3,114/10,428)
	The Netherlands	20.0	(2/10)	34.3	(92/268)	34.1	(1,009/2,963)
	Portugal	10.9	(5/46)	25.4	(220/866)	27.7	(878/3,166)
	Spain	19.0	(8/42)	28.4	(374/1,315)	31.5	(2,942/9,352)
	Sweden	17.4	(4/23)	29.7	(104/350)	33.4	(693/2,073)
	Switzerland	17.1	(6/35)	23.5	(160/682)	27.2	(926/3,400)
UK	30.8	(16/52)	30.1	(504/1,674)	34.1	(4,496/13,198)	
Pooled average % (95% CI)		22.2 (16.1-28.8)		28.7 (25.0-32.5)		30.9 (28.7-33.1)	

Denominator: All MSM.

5.3.5.3 Condomless anal intercourse with a partner of discordant HIV status

On average, 14% of H-MSM participants of EMIS-2010 and SN15 reported at least one instance of CAI with a serodifferent male partner (i.e., partner with an opposite or unknown HIV status) in the previous 12 months, a smaller proportion than both B-MSM (23%) and G-MSM (29%) (Table 37). There was relative consistency across countries in reporting prevalence for both B-MSM and G-MSM, with country-level prevalences falling within a range of 10 percentage points within each group and narrow confidence intervals for the pooled averages.

Table 37: Recent CAI with a serodifferent male partner among all MSM, by sexual identity (SN15 and EMIS-2010 only)

Sexual identity:		Reported CAI with a serodifferent male partner in previous 12 months					
		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
SN15	Canada	12.7	(14/110)	21.1	(346/1,642)	32.6	(1,471/4,506)
EMIS-2010	Austria	20.0	(3/15)	20.8	(112/539)	24.4	(651/2,668)
	Belgium	20.0	(2/10)	24.4	(75/307)	25.6	(769/3,005)
	Denmark	10.0	(1/10)	24.5	(46/188)	32.0	(379/1,185)
	France	26.7	(4/15)	20.8	(170/818)	24.8	(2,038/8,225)
	Germany	15.3	(44/287)	20.1	(1,357/6,751)	27.2	(9,762/35,854)
	Greece	18.8	(3/16)	19.1	(70/366)	28.1	(491/1,749)
	Ireland	7.1	(1/14)	29.8	(72/242)	34.2	(524/1,530)
	Italy	10.9	(5/46)	27.4	(537/1,959)	30.4	(3,195/10,526)
	The Netherlands	20.0	(2/10)	27.7	(73/264)	29.9	(897/2,996)
	Portugal	8.7	(4/46)	25.1	(219/873)	31.9	(1,017/3,191)
	Spain	21.4	(9/42)	24.2	(322/1,328)	31.3	(2,960/9,466)
	Sweden	17.4	(4/23)	25.1	(88/351)	31.4	(652/2,075)
	Switzerland	14.3	(5/35)	19.1	(129/675)	23.0	(784/3,402)
	UK	21.2	(11/52)	25.7	(432/1,684)	32.6	(4,328/13,263)
Pooled average % (95% CI)		14.2 (11.5-17.0)		23.4 (21.6-25.1)		29.2 (27.6-30.9)	

Denominator: All MSM.

5.3.5.4 Recent sexualised drug use

Use of one or more of the substances of interest (crystal methamphetamine, GHB/GBL, mephedrone, ketamine, or poppers) was, on average, reported by 22% of H-MSM, 26% of B-MSM, and 40% of G-MSM (Table 38). However, there was high variation in reporting prevalence by country as reflected in the wide confidence intervals, with participants in some countries such as Australia, Ireland, the Netherlands, and the UK reporting much higher than average use of these substances.

Table 38: Recent sexualised drug use, among all MSM (GCPS, SN15 and EMIS-2010 only)

		Reported recent sexualised drug use					
Sexual identity:		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2017	Australia	45.3	(67/148)	42.9	(1,195/2,788)	48.7	(22,476/46,169)
SN15	Canada	18.2	(22/121)	25.7	(447/1,738)	35.9	(1,727/4,809)
EMIS-2010	Austria	26.7	(4/15)	31.7	(173/546)	46.9	(1,265/2,697)
	Belgium	20.0	(2/10)	33.0	(101/306)	47.7	(1,441/3,021)
	Denmark	30.0	(3/10)	18.5	(35/189)	35.3	(423/1,198)
	France	13.3	(2/15)	28.5	(235/825)	45.4	(3,727/8,217)
	Germany	18.9	(56/296)	26.0	(1,785/6,858)	41.1	(14,883/36,245)
	Greece	13.3	(2/15)	8.2	(30/364)	22.0	(384/1,748)
	Ireland	26.7	(4/15)	38.1	(94/247)	52.4	(809/1,543)
	Italy	10.9	(5/46)	11.4	(225/1,969)	20.4	(2,159/10,585)
	The Netherlands	40.0	(4/10)	41.6	(112/269)	55.0	(1,647/2,996)
	Portugal	12.8	(6/47)	16.3	(141/865)	25.1	(794/3,165)
	Spain	14.6	(6/41)	21.3	(284/1,334)	34.9	(3,292/9,437)
	Sweden	4.3	(1/23)	17.6	(61/347)	30.1	(629/2,087)
	Switzerland	25.7	(9/35)	33.0	(230/697)	46.0	(1,577/3,429)
UK	42.6	(23/54)	40.4	(692/1,712)	55.9	(7,466/13,358)	
Pooled average % (95% CI)		21.5 (15.0-28.7)		26.4 (21.3-31.8)		39.9 (34.7-45.1)	

Denominator: All MSM.

5.3.5.5 Composite measure of higher STI/HIV transmission risk

Among all MSM, an average of 37% of H-MSM reported higher STI/HIV transmission risk behaviour, defined as reporting at least one of the two behaviours included in the composite measure of higher STI/HIV transmission risk: reporting a higher number of recent male partners and/or recent CAI with a casual male partner (Table 39). This compared to 44% of B-MSM and 49% of G-MSM.

Table 39: Reported one or more recent higher STI/HIV transmission risk behaviours, among all MSM

		Reported one or more recent higher STI/HIV transmission risk behaviours [†]					
Sexual identity:		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2017	Australia	69.2	(108/156)	56.4	(1,666/2,955)	50.7	(23,364/46,074)
GAPSS/GOSS 2008, 2011, 2014	New Zealand	40.4	(23/57)	48.1	(668/1,388)	50.7	(3,198/6,309)
SN15	Canada	49.6	(60/121)	59.9	(1,041/1,738)	58.1	(2,793/4,808)
EMIS-2010	Austria	25.0	(3/12)	38.9	(196/504)	42.5	(1,101/2,588)
	Belgium	50.0	(5/10)	42.4	(126/297)	47.5	(1,395/2,937)
	Denmark	42.9	(3/7)	43.8	(74/169)	48.7	(559/1,149)
	France	64.3	(9/14)	46.7	(365/782)	50.9	(4,074/8,008)
	Germany	23.5	(59/251)	35.9	(2,249/6,261)	43.0	(14,994/34,830)
	Greece	42.9	(6/14)	39.3	(134/341)	46.7	(769/1,647)
	Ireland	25.0	(3/12)	34.4	(74/215)	47.3	(691/1,462)
	Italy	30.8	(12/39)	47.4	(854/1,802)	49.0	(4,824/9,847)
	The Netherlands	20.0	(2/10)	48.4	(122/252)	54.1	(1,577/2,916)
	Portugal	25.0	(10/40)	36.8	(305/829)	39.6	(1,222/3,086)
	Spain	32.4	(11/34)	47.1	(531/1,127)	51.9	(4,461/8,591)
	Sweden	22.2	(4/18)	36.9	(123/333)	43.9	(890/2,028)
	Switzerland	20.6	(7/34)	42.4	(272/641)	48.5	(1,604/3,304)
UK	42.9	(18/42)	44.0	(679/1,543)	51.4	(6,536/12,724)	
Pooled average % (95% CI)		36.7 (27.0-46.8)		44.1 (39.8-48.5)		48.5 (46.4-50.6)	

Denominator: All MSM. †Reported a higher number of recent male partners and/or recent CAI with a casual male partner.

5.3.5.6 Multivariate analysis of STI/HIV transmission risk behaviours

H-MSM were less likely than G-MSM to report three of the four higher transmission risk behaviours individually (higher number of male partners, CAI with serodifferent partners, sexualised drug use), however differences in reporting CAI with casual partners did not reach statistical significance (Table 40). They were less likely than B-MSM to have reported recent CAI with a serodifferent male partner (aPR=0.64), however, no other differences between H-MSM and B-MSM achieved statistical significance. While there were differences observed for the individual higher transmission risk behaviours, differences by sexual identity in the composite measure of transmission risk did not reach statistical significance but were in the direction that suggests H-MSM were less likely to report these than other MSM.

Table 40: Adjusted prevalence ratios comparing H-MSM to B-MSM and G-MSM in reporting of higher STI/HIV transmission risk behaviours

Outcome	Population	H-MSM vs B-MSM (ref) aPR (95% CI)	H-MSM vs G-MSM (ref) aPR (95% CI)
Higher number of male partners (recent)	All MSM	0.75 (0.56-1.02) [^]	0.56 (0.40-0.79) ^{**}
CAI with casual partner(s) (recent)	All MSM	0.81 (0.66-1.00) [^]	0.81 (0.64-1.02) [^]
CAI with a partner of serodifferent HIV status (recent)	All MSM [†]	0.65 (0.56-0.76) ^{***}	0.55 (0.47-0.65) ^{***}
Sexualised drug use (recent)	All MSM [‡]	0.85 (0.71-1.02) [^]	0.56 (0.46-0.69) ^{***}
Composite measure of higher STI/HIV transmission risk [§]	All MSM	0.85 (0.68-1.06)	0.81 (0.63-1.03) [^]

Adjusted for age group, education, and year of survey. CAI and composite measure analyses also adjusted for HIV status. [†]SN and EMIS-2010 only. [‡]GCPS, SN and EMIS-2010 only. [§]Reported a higher number of recent male partners and/or recent CAI with a casual male partner. [^]p<0.10. ^{*}p<0.05. ^{**}p<0.01. ^{***}p<0.001.

5.4 Sexual health

In this section, I examine reporting of sexual health service use behaviours (HIV and STI testing) and outcomes (HIV and STI prevalence).

5.4.1 HIV and STI testing

This section explores reporting of sexual health service use behaviours. I first look at reporting of ever testing for HIV, among all MSM. I then present data on testing for HIV in the previous 12 months, among MSM not previously diagnosed with HIV. I then look at reporting of testing for STIs in the previous 12 months, among all MSM. Finally, I present estimates of differences in testing by sexual identity.

5.4.1.1 Ever tested for HIV

Among all MSM, reporting of ever testing for HIV was lower among H-MSM (pooled average 54%) and B-MSM (63%) than among G-MSM (82%) (Table 41).

Table 41: Ever tested for HIV among all MSM, by sexual identity

Sexual identity:		Reported ever testing for HIV					
		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2017	Australia	77.5	(131/169)	84.4	(2,512/2,975)	94.2	(45,416/48,194)
GAPSS/GOSS 2008, 2011, 2014	New Zealand	47.4	(27/57)	57.9	(835/1,441)	80.6	(5,228/6,486)
SN15	Canada	64.5	(78/121)	75.0	(1,303/1,738)	91.2	(4,387/4,809)
EMIS-2010	Austria	50.0	(7/14)	65.0	(362/557)	82.2	(2,234/2,719)
	Belgium	30.0	(3/10)	65.7	(203/309)	86.0	(2,613/3,037)
	Denmark	20.0	(2/10)	53.9	(103/191)	83.9	(1,013/1,208)
	France	80.0	(12/15)	74.7	(620/830)	87.6	(7,285/8,312)
	Germany	55.1	(168/305)	57.1	(3,981/6,977)	76.7	(28,090/36,623)
	Greece	31.2	(5/16)	47.5	(177/373)	72.0	(1,275/1,771)
	Ireland	43.8	(7/16)	43.0	(107/249)	70.3	(1,093/1,554)
	Italy	50.0	(23/46)	61.7	(1,223/1,982)	76.5	(8,174/10,683)
	The Netherlands	80.0	(8/10)	64.3	(175/272)	83.8	(2,537/3,027)
	Portugal	63.8	(30/47)	66.2	(583/880)	78.4	(2,530/3,226)
	Spain	47.6	(20/42)	62.8	(849/1,351)	78.0	(7,475/9,580)
	Sweden	41.7	(10/24)	60.3	(214/355)	83.6	(1,755/2,099)
	Switzerland	61.1	(22/36)	66.9	(471/704)	86.0	(2,979/3,464)
UK	40.7	(22/54)	53.7	(926/1,724)	77.3	(10,386/13,440)	
Pooled average % (95% CI)		54.0 (46.3-61.5)		62.8 (57.1-68.3)		82.2 (77.3-86.5)	

Denominator: All MSM.

5.4.1.2 HIV test in the previous 12 months

Among MSM reporting no previous HIV diagnosis, country-level reporting of HIV testing in the previous 12 months was consistently lower among H-MSM and B-MSM than among G-MSM across all countries included in analysis (Table 42). Differences between H-MSM and B-MSM were less consistent, though fewer H-MSM reported testing than B-MSM in 14 out of the 17 countries analysed. These differences were evident in the average reporting prevalences, with averages of 52% of G-MSM not previously diagnosed with HIV testing in the previous 12 months compared to 30% of H-MSM and 39% of B-MSM.

Table 42: Testing for HIV in the previous 12 months among MSM not previously diagnosed with HIV, by sexual identity

Sexual identity:		Reported testing for HIV in previous 12 months					
		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2017	Australia	56.1	(87/155)	65.9	(1,886/2,864)	69.6	(30,571/43,946)
GAPSS/GOSS 2008, 2011, 2014	New Zealand	24.6	(14/57)	37.4	(529/1,415)	50.4	(3,123/6,201)
SN15	Canada	36.2	(42/116)	51.4	(855/1,665)	66.4	(2,983/4,492)
EMIS-2010	Austria	18.2	(2/11)	39.4	(189/480)	53.5	(1,190/2,226)
	Belgium	11.1	(1/9)	43.8	(113/258)	59.1	(1,388/2,348)
	Denmark	20.0	(2/10)	25.3	(43/170)	47.8	(452/945)
	France	53.8	(7/13)	47.5	(327/688)	58.4	(3,744/6,407)
	Germany	24.9	(68/273)	33.0	(1,995/6,048)	43.4	(12,592/28,983)
	Greece	20.0	(3/15)	27.4	(87/317)	45.1	(605/1,342)
	Ireland	28.6	(4/14)	20.7	(45/217)	42.4	(550/1,298)
	Italy	29.5	(13/44)	39.7	(680/1,713)	50.6	(4,405/8,708)
	The Netherlands	30.0	(3/10)	36.2	(77/213)	51.6	(1,063/2,062)
	Portugal	41.5	(17/41)	46.9	(375/800)	54.5	(1,493/2,738)
	Spain	30.6	(11/36)	44.4	(518/1,166)	53.4	(4,098/7,668)
	Sweden	10.0	(2/20)	27.6	(81/294)	45.2	(703/1,555)
	Switzerland	40.0	(12/30)	36.1	(215/596)	52.5	(1,392/2,651)
UK	17.4	(8/46)	32.4	(488/1,505)	46.4	(4,795/10,326)	
Pooled average % (95% CI)		29.6 (22.5-37.1)		38.5 (32.5-44.6)		52.4 (46.7-58.2)	

Denominator: MSM not previously diagnosed with HIV.

5.4.1.3 STI testing in the previous 12 months

A similar pattern to that seen for HIV testing was seen in reporting STI testing in the previous 12 months, with testing prevalence generally lower among H-MSM than among G-MSM (Table 43). There was less consistency in differences between H-MSM and B-MSM. Average prevalence was 28% among H-MSM, 32% among B-MSM, and 44% among G-MSM.

Table 43: STI testing in the previous 12 months among all MSM, by sexual identity

Sexual identity:		Reported testing for STIs in the previous 12 months					
		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2017	Australia	51.5	(101/196)	67.3	(2,119/3,147)	71.7	(35,728/49,848)
GAPSS/GOSS 2008, 2011, 2014	New Zealand	47.4	(27/57)	44.0	(625/1,419)	52.8	(3,381/6,407)
SN15	Canada	39.7	(48/121)	53.0	(922/1,738)	65.7	(3,161/4,809)
EMIS-2010	Austria	27.3	(3/11)	21.0	(105/501)	34.1	(866/2,543)
	Belgium	30.0	(3/10)	30.9	(90/291)	45.5	(1,319/2,898)
	Denmark	20.0	(2/10)	28.2	(53/188)	39.7	(471/1,187)
	France	46.7	(7/15)	31.4	(252/802)	43.0	(3,474/8,075)
	Germany	16.5	(45/273)	19.3	(1,224/6,333)	31.8	(10,887/34,240)
	Greece	12.5	(2/16)	25.1	(90/359)	34.6	(594/1,719)
	Ireland	26.7	(4/15)	24.8	(60/242)	43.7	(669/1,531)
	Italy	8.7	(4/46)	22.5	(427/1,899)	32.9	(3,421/10,401)
	The Netherlands	30.0	(3/10)	39.1	(100/256)	56.4	(1,673/2,966)
	Portugal	35.6	(16/45)	24.5	(201/819)	30.2	(912/3,016)
	Spain	36.1	(13/36)	30.0	(381/1,271)	39.6	(3,624/9,144)
	Sweden	16.7	(4/24)	31.5	(109/346)	42.4	(876/2,067)
	Switzerland	12.9	(4/31)	22.5	(144/639)	36.6	(1,206/3,291)
UK	23.1	(12/52)	33.1	(563/1,702)	48.3	(6,414/13,281)	
Pooled average % (95% CI)		27.7 (19.6-36.7)		31.9 (23.7-40.7)		44.0 (35.3-52.9)	

Denominator: All MSM.

5.4.1.4 Multivariate analysis of HIV and STI testing

After adjusting for age, education, year of survey and recruitment location, H-MSM were less likely than both B-MSM and G-MSM to report ever testing for HIV (Table 44). This difference was most pronounced when compared with G-MSM, with H-MSM 30% less likely to report ever testing for HIV (aPR=0.70). Among MSM not previously diagnosed with HIV, H-MSM were on average 19% less likely than B-MSM and 40% less likely than G-MSM to have tested for HIV in the previous year. H-MSM were also 30% less likely than G-MSM to have tested for STIs in the previous year.

Table 44: Adjusted prevalence ratios comparing H-MSM to B-MSM and G-MSM in reporting of HIV and STI testing

Outcome	Population	H-MSM vs B-MSM (ref) aPR (95% CI)	H-MSM vs G-MSM (ref) aPR (95% CI)
HIV test, ever	All MSM	0.90 (0.84-0.97)**	0.70 (0.64-0.77)***
HIV test in previous 12 months	MSM not previously diagnosed with HIV	0.81 (0.70-0.93)**	0.60 (0.51-0.71)***
STI test in previous 12 months†	All MSM	0.91 (0.77-1.08)	0.70 (0.59-0.84)***

Adjusted for age group, education, and year of survey. †Additionally adjusted for positive HIV status. ^p<0.10. *p<0.05. **p<0.01. ***p<0.001.

5.4.2 HIV and STI prevalence

In this section, I investigate reporting of HIV and STI prevalence. I first look at prevalence of HIV among all MSM. I then present data on STI diagnoses in the previous 12 months, first among all MSM, and then among MSM who tested for STIs in the previous 12 months. Finally, I present estimates of differences in outcomes by sexual identity. Denominators for HIV and STI prevalence estimates were very small for H-MSM for some countries, as they were based on the numbers reporting testing. Therefore, HIV and STI prevalence estimates and aPRs should be interpreted with caution.

5.4.2.1 HIV prevalence

HIV prevalence (as measured by reporting of a HIV diagnosis) ranged from 0.0%-11% of H-MSM, 0.5%-6.2% of B-MSM, and 5.2%-17% of G-MSM (Table 45).

Pooling country-level prevalences, HIV diagnosis was reported by an average of 1.0% of H-MSM, 2.4% of B-MSM, and 9.7% of G-MSM.

Table 45: Diagnosed with HIV among all MSM, by sexual identity

		Reported diagnosis with HIV					
<i>Sexual identity:</i>		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2017	Australia	8.2	(14/170)	3.8	(113/2,997)	9.3	(4,506/48,417)
GAPSS/GOSS 2008, 2011, 2014	New Zealand	0.0	(0/57)	1.1	(16/1,422)	5.2	(329/6,364)
SN15	Canada	0.0	(0/121)	2.3	(40/1,738)	11.2	(537/4,809)
EMIS-2010	Austria	0.0	(0/14)	2.0	(11/557)	6.9	(187/2,719)
	Belgium	0.0	(0/10)	2.3	(7/309)	9.8	(299/3,037)
	Denmark	0.0	(0/10)	0.5	(1/191)	11.1	(134/1,208)
	France	0.0	(0/15)	4.0	(33/830)	11.9	(987/8,312)
	Germany	1.0	(3/305)	2.4	(170/6,977)	10.2	(3,725/36,623)
	Greece	0.0	(0/16)	1.6	(6/373)	11.1	(196/1,771)
	Ireland	6.2	(1/16)	0.8	(2/249)	7.0	(109/1,554)
	Italy	0.0	(0/46)	3.1	(61/1,982)	8.2	(874/10,683)
	The Netherlands	0.0	(0/10)	6.2	(17/272)	17.2	(522/3,027)
	Portugal	10.6	(5/47)	3.2	(28/880)	9.5	(307/3,226)
	Spain	2.4	(1/42)	3.6	(49/1,351)	10.2	(974/9,580)
	Sweden	0.0	(0/24)	0.3	(1/355)	6.3	(132/2,099)
	Switzerland	2.8	(1/36)	2.8	(20/704)	11.2	(387/3,464)
	UK	3.7	(2/54)	2.5	(43/1,724)	11.9	(1,597/13,440)
Pooled average % (95% CI)		1.0 (0.0-2.9)		2.4 (1.9-3.0)		9.7 (8.8-10.7)	

Denominator: All MSM.

5.4.2.2 STI diagnosis in the previous 12 months

Among all MSM, an average of 5.7% of H-MSM reported diagnosis with an STI in the previous 12 months, compared to 7.6% of B-MSM and 12% of G-MSM (Table 46).

Table 46: Diagnosed with an STI in the previous 12 months among all MSM, by sexual identity

Sexual identity:		Reported an STI diagnosis/diagnoses in the previous 12 months					
		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2017	Australia	23.1	(40/173)	18.8	(564/2,993)	19.4	(9,303/48,008)
GAPSS/GOSS 2008, 2011, 2014	New Zealand	12.5	(7/56)	8.5	(121/1,421)	11.3	(719/6,350)
SN15	Canada	7.4	(9/121)	9.6	(167/1,738)	17.6	(848/4,809)
EMIS-2010	Austria	0.0	(0/12)	6.4	(33/519)	8.9	(231/2,610)
	Belgium	0.0	(0/10)	7.2	(20/279)	12.6	(369/2,919)
	Denmark	10.0	(1/10)	7.0	(13/186)	12.7	(150/1,183)
	France	7.1	(1/14)	7.7	(59/771)	12.5	(990/7,903)
	Germany	4.6	(13/284)	4.7	(308/6,532)	9.4	(3,300/35,105)
	Greece	7.1	(1/14)	5.3	(19/356)	9.9	(166/1,674)
	Ireland	6.2	(1/16)	4.7	(11/232)	11.3	(170/1,498)
	Italy	6.8	(3/44)	7.2	(134/1,867)	9.7	(997/10,316)
	The Netherlands	0.0	(0/9)	7.8	(20/257)	16.5	(483/2,935)
	Portugal	4.5	(2/44)	6.9	(56/815)	10.0	(309/3,080)
	Spain	9.5	(4/42)	10.8	(139/1,290)	12.8	(1,181/9,208)
	Sweden	0.0	(0/23)	4.2	(14/335)	7.3	(149/2,041)
	Switzerland	3.0	(1/33)	7.4	(48/647)	10.8	(358/3,322)
UK	3.7	(2/54)	7.6	(127/1,669)	12.3	(1,613/13,096)	
Combined average % (95% CI)		5.7 (2.7-9.5)		7.6 (5.7-9.8)		11.9 (9.9-14.1)	

Denominator: All MSM.

Limiting analysis to men who reported STI testing in the previous 12 months, diagnosis with an STI in the previous 12 months was reported by an average of 12% of H-MSM, 19% of B-MSM, and 24% of G-MSM (Table 47).

Table 47: Diagnosed with an STI in the previous 12 months among MSM who tested for STIs in the previous 12m, by sexual identity

Sexual identity:		Reported an STI diagnosis/diagnoses in the previous 12 months					
		H-MSM		B-MSM		G-MSM	
Survey	Country	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2017	Australia	33.0	(32/97)	23.1	(476/2,061)	24.3	(8,493/34,938)
GAPSS/GOSS 2008, 2011, 2014	New Zealand	15.4	(4/26)	16.0	(99/617)	18.4	(611/3,316)
SN15	Canada	12.5	(6/48)	12.5	(115/922)	23.2	(734/3,161)
EMIS-2010	Austria	0.0	(0/3)	24.8	(25/101)	22.7	(189/834)
	Belgium	0.0	(0/3)	20.0	(17/85)	25.0	(320/1,280)
	Denmark	50.0	(1/2)	23.1	(12/52)	29.9	(140/468)
	France	14.3	(1/7)	21.2	(50/236)	24.7	(828/3,349)
	Germany	19.5	(8/41)	17.9	(208/1,160)	25.5	(2,699/10,595)
	Greece	0.0	(0/2)	18.0	(16/89)	19.9	(113/568)
	Ireland	0.0	(0/4)	13.8	(8/58)	24.5	(159/648)
	Italy	25.0	(1/4)	21.0	(85/404)	21.7	(723/3,334)
	The Netherlands	0.0	(0/3)	18.8	(18/96)	28.2	(462/1,640)
	Portugal	0.0	(0/14)	19.7	(38/193)	23.7	(210/885)
	Spain	23.1	(3/13)	26.2	(97/370)	27.2	(959/3,522)
	Sweden	0.0	(0/4)	10.5	(11/105)	16.5	(140/850)
	Switzerland	25.0	(1/4)	25.2	(34/135)	25.5	(300/1,175)
UK	16.7	(2/12)	21.3	(117/549)	24.4	(1,535/6,298)	
Combined average % (95% CI)		12.2 (6.0-19.7)		19.4 (17.1-21.8)		23.8 (22.6-24.9)	

Denominator: MSM who reported testing for STIs in the previous 12 months.

5.4.2.3 Multivariate analysis of sexual health outcomes

Prevalence of diagnosed HIV among H-MSM was around a quarter of that among G-MSM (aPR=0.26), while there was no difference between H-MSM and B-MSM (Table 48). Among all MSM, H-MSM were less likely than G-MSM to report having been diagnosed with an STI in the previous year, however, when limiting to men who tested for STIs, there was no difference by sexual identity in STI prevalence.

Table 48: Adjusted prevalence ratios comparing H-MSM to B-MSM and G-MSM in reporting of HIV and STI prevalence

Outcome	Population	H-MSM vs B-MSM (ref) aPR (95% CI)	H-MSM vs G-MSM (ref) aPR (95% CI)
Diagnosed with HIV	All MSM	1.06 (0.50-2.27)	0.26 (0.12-0.59)**
STI diagnosis in previous 12 months	All MSM	0.97 (0.75-1.25)	0.63 (0.46-0.86)**
	MSM who tested for STIs in the previous 12 months	0.99 (0.70-1.40)	0.83 (0.56-1.23)

Adjusted for age group, education, and year of survey. ^p<0.10. *p<0.05. **p<0.01. ***p<0.001.

5.5 Further analyses

In this section, I provide additional analyses investigating the role of important mediators or confounders on key sexual behaviour and sexual health outcomes among MSM. I first examine associations between MSM's relationship status with women and their sexual behaviour with both male and female partners. I then investigate how reporting of higher STI/HIV transmission risk behaviours by MSM vary by recruitment mode and recruitment location. Finally, I examine associations between recent HIV and/or STI testing and both behavioural and social factors, specifically, reporting of recent higher STI/HIV transmission risk behaviours and social engagement with gay communities.

5.5.1 Relationship status with women and its influence on sexual behaviour

This section examines how the sexual behaviour of MSM differs based on their relationship status with women. I first examine the association between relationship status and condom use during VAI with female partners. I then investigate associations between MSM's relationship status with women and reporting of AI and CAI with their male partners.

5.5.1.1 How does relationship status influence condom use during VAI with female partners?

Data provided in the survey datasets allowed me to examine participants' sexual behaviour with both regular and casual male sexual partners (sections 5.3.1 and 5.3.2 respectively). EMIS-2010 was the only survey to collect more detailed data on sex with female partners, however that survey did not differentiate between different types of female partners. Thus while I found differences by sexual identity in condom use with female partners (section 5.3.3.5), it was not possible to examine whether participants' behaviour differed by types of female partners. However, EMIS-2010 collected data on participants' relationship status at the time of survey participation, including if they were in a relationship with a woman. If we assume that participants' relationship status was constant in the previous 12 months, and that relationship status with women was a proxy measure of the type of female partner(s) with whom participants had sex during that time (i.e., men in relationships with women had sex only with steady female partners, and men not in relationships had sex only with

casual female partners), then stratifying data on participants' condom use with female partners by relationship status may provide an approximate measure of how condom use with female partners was influenced by partner type. In this section I examine associations between relationship status with women and reporting of CVAI among MSM who reported recent VAI with female partners, to estimate how female partner type informed MSM's approach to condom use with these partners, and how this differed by sexual identity.

Table 49 shows the reporting prevalence of recent CVAI with female partners among MSMW who reported recent VAI with female partners, stratified by relationship status with women at the time of survey participation and sexual identity. Among MSMW in relationships with women, reporting of condomless sex with female partners was high regardless of sexual identity, ranging from 83% to 91%. However, among MSMW *not* in relationships with women there was greater variation in reporting of recent CVAI, with 58% of H-MSMW reporting recent CVAI compared to 47% of B-MSMW and 42% of G-MSMW with similar relationship status. This meant that while MSM in relationships with women were generally more likely to have reported condomless sex with their female partners than men not in relationships with women, the strength of this association varied, with the weakest association found for H-MSMW (aPR=1.43) and the strongest association found for G-MSMW (aPR=1.91).

Table 49: Reporting prevalence of recent CVAI and adjusted prevalence ratios measuring associations between reporting of recent CVAI and relationship status with women among MSMW reporting recent VAI with female partners, by sexual identity (EMIS-2010 only)

Relationship status at time of survey participation	Reported recent CVAI with female VAI partner(s)					
	H-MSMW		B-MSMW		G-MSMW	
	%	aPR (95% CI)	%	aPR (95% CI)	%	aPR (95% CI)
Not in a relationship with a woman	57.7	1.00 (ref)	46.6	1.00 (ref)	42.0	1.00 (ref)
In a relationship with a woman	90.5	1.43 (1.24-1.65)***	83.0	1.73 (1.65-1.81)***	85.6	1.91 (1.68-2.17)***

Among MSMW reporting recent VAI with female partner(s) (EMIS-2010 only). Adjusted for age group, education and HIV status. ^p<0.10. *p<0.05. **p<0.01. ***p<0.001.

Table 50 shows differences by sexual identity in reporting of recent condomless sex with female VAI partners, stratified by relationship status with women. Among MSMW not in a relationship with a woman at the time of survey participation and reporting recent VAI with female partners, H-MSMW were more likely than both B-MSMW (aPR=1.26) and G-MSMW (aPR=1.37) to have reported CVAI in the

previous year. H-MSMW who were in relationships with women at the time of survey participation were also more likely than B-MSMW and G-MSMW with similar relationship status to have reported condomless sex with their VAI partners in the past year, however the differences in prevalence were much smaller. The stratified aPRs are smaller than the unstratified aPRs shown in Table 31, suggesting that relationship status with women, and presumably therefore female partner type, explains a substantial part of the differences in condom use with female partners observed between H-MSMW and both B-MSMW and G-MSMW. However, these results also suggest that while MSMW of all sexual identities are similarly likely to engage in condomless sex with steady female partners (i.e., women with whom they are in relationships), H-MSMW are still more likely than both B-MSMW and G-MSMW to engage in condomless sex with *non-steady* female partners.

Table 50: Adjusted prevalence ratios comparing H-MSMW to B-MSMW and G-MSMW in reporting of CVAI with female partners in the previous 12 months among MSMW reporting VAI with female partners, stratified by relationship status with women (EMIS-2010 only)

Relationship status at time of survey participation	Reported CVAI with female VAI partner(s)	
	H-MSMW vs B-MSMW (ref) aPR (95% CI)	H-MSMW vs G-MSMW (ref) aPR (95% CI)
Not in a relationship with a woman	1.26 (1.07-1.48)**	1.33 (1.13-1.56)***
In a relationship with a woman	1.04 (1.00-1.09)^	1.06 (1.01-1.11)**

Among MSMW reporting recent VAI with a female partner (EMIS-2010 only). Adjusted for age group, education and HIV status. ^p<0.10. *p<0.05. **p<0.01. ***p<0.001.

5.5.1.2 Are MSM in relationships with women less likely to engage in AI and CAI with male partners?

In my analysis of qualitative interviews I conducted with H-MSM in England (Chapter 6), I found that some H-MSM in relationships with women limited the sex they have with men to sexual acts with lower STI/HIV transmission risk, to minimise the possibility of onward transmission to their female partners (section 6.4). This meant that they chose not to engage in AI with male sexual partners, or if they did, they ensured the use of condoms. In this section, I test the hypothesis that MSM's relationship status with women is associated with lower reporting of recent AI with male partners and examine how this association differs by sexual identity. I also test whether relationship status with women is associated with reporting of CAI with male partners, among those men reporting AI with male partners. Results are shown only

for participants of surveys which collected information about relationship status with women, namely EMIS-2010 and SN15.

A majority of MSM reported recent AI with a male, regardless of their relationship status with women (Table 51). However, reporting of AI was slightly less common among MSM in relationships with women compared to MSM who were not. This difference was significant for H-MSM and B-MSM, with those in relationships with women less likely (by 11% and 6% respectively) than those not in relationships with women to have reported recent AI with a male partner.

Table 51: Prevalence of reported recent AI and CAI with male partners and adjusted prevalence ratios showing comparisons by sexual identity among MSM, stratified by relationship status with women (SN15 and EMIS-2010 only)

Relationship status at time of survey participation	H-MSM		B-MSM		G-MSM	
	%	aPR (95% CI)	%	aPR (95% CI)	%	aPR (95% CI)
Recent AI with male partner(s)[†]						
Not in a relationship with a woman	70.8	1.00 (ref)	81.7	1.00 (ref)	88.6	1.00 (ref)
In a relationship with a woman	64.8	0.89 (0.79-0.99)*	78.4	0.94 (0.92-0.97)***	84.9	0.99 (0.97-1.00)
Recent CAI with male AI partner(s)[‡]						
Not in a relationship with a woman	53.7	1.00 (ref)	60.8	1.00 (ref)	69.5	1.00 (ref)
In a relationship with a woman	42.8	0.77 (0.61-0.96)*	50.6	0.83 (0.77-0.90)***	64.5	0.98 (0.90-1.06)

Adjusted for age group, education, and year. CAI analyses additionally adjusted for HIV status. [†]Among all MSM. [‡]Among MSM reporting recent AI with a male partner. [^]p<0.10. *p<0.05. **p<0.01. ***p<0.001.

Similarly, among MSM who reported recent AI with a male partner, reporting of CAI with a male partner was less common among MSM in relationships with women. This effect was most pronounced among H-MSM, with reporting of recent CAI with male partners 23% lower among H-MSM in relationships with women compared with H-MSM not in relationships (43% vs 54%). A smaller but significant association was also observed for B-MSM, with those in relationships with women 17% less likely than those not in relationships to have reported recent CAI with a male AI partner (aPR=0.83).

5.5.2 Differences in MSM behaviour by recruitment mode and location

Data included in these analyses come from studies which differed by recruitment mode, with GOSS, SN and EMIS-2010 participants recruited online, and GAPSS and (most) GCPS participants recruited in person from a variety of venues. Differences in behaviour have been found to exist for MSM depending on how they were recruited

for individual studies, with men recruited online more likely than men recruited in person to engage in behaviours with higher likelihoods of STI/HIV transmission.¹⁰¹ The results from the analyses of higher STI/HIV transmission risk behaviours (section 5.3.5.6) may therefore obscure some differences between studies in comparisons between H-MSM and other MSM. In this section I examine how reporting of higher STI/HIV transmission risk behaviours differs by recruitment mode, and for those recruited in person, by type of recruitment location.

5.5.2.1 How do MSM differ in behaviour by recruitment mode?

Table 52 shows the reported prevalence of higher STI/HIV transmission risk behaviours by sexual identity, as well as aPRs comparing H-MSM and other MSM, stratified by recruitment mode. In general, reporting of each risk behaviour was higher among MSM recruited in person than among those recruited online, and this was true for all sexual identities. However, comparisons by sexual identity differed by recruitment mode. Among MSM recruited in person for GCPS and GAPSS, behaviours with higher transmission risk were more likely to be reported by H-MSM than G-MSM, with the exception of sexualised drug use. H-MSM recruited in person were also more likely to have reported CAI with a casual partner than B-MSM. However, among MSM recruited online for GOSS, SN and EMIS-2010, H-MSM were less likely than both B-MSM and G-MSM to report each of the individual behaviours and were less likely to have reported either of the behaviours included in the composite measure of higher STI/HIV transmission risk. Differences were greater when comparing H-MSM to G-MSM.

Table 52: Prevalence of STI/HIV transmission risk behaviours and adjusted prevalence ratios comparing H-MSM to B-MSM and G-MSM, stratified by study recruitment mode

Outcome	Prevalence (%)			aPR (95% CI)	
	H-MSM	B-MSM	G-MSM	H-MSM vs B-MSM (ref)	H-MSM vs G-MSM (ref)
In-person recruitment (GCPS and GAPSS)					
Higher number of recent male partners	53.4	43.7	42.1	1.21 (1.04-1.42)*	1.29 (1.11-1.50)**
CAI with casual partner(s) (recent)	31.9	26.9	25.8	1.18 (0.95-1.48)	1.33 (1.07-1.65)**
Sexualised drug use (recent) [†]	45.9	42.7	49.6	1.08 (0.90-1.30)	0.96 (0.80-1.14)
Composite measure of recent higher STI/HIV transmission risk [‡]	68.8	55.3	50.6	1.18 (1.04-1.33)*	1.34 (1.18-1.51)***
Online recruitment (GOSS, SN15 and EMIS-2010)					
Higher number of recent male partners	14.1	23.9	33.4	0.63 (0.50-0.80)***	0.46 (0.36-0.59)***
CAI with casual partner(s) (recent)	21.3	28.9	31.8	0.77 (0.61-0.97)*	0.75 (0.59-0.96)*
Sexualised drug use (recent) [§]	19.0	25.3	39.3	0.80 (0.67-0.96)*	0.52 (0.44-0.62)***
Composite measure of recent higher STI/HIV transmission risk [‡]	33.8	43.4	48.9	0.76 (0.65-0.89)**	0.71 (0.59-0.84)***

Denominator: All MSM. Adjusted for age group, education, and year of survey. [†]GCPS only. [‡]Reported a higher number of recent male partners and/or recent CAI with a casual male partner. [§]SN and EMIS-2010 only. [^]p<0.10. *p<0.05. **p<0.01. ***p<0.001.

5.5.2.2 How do MSM recruited in person vary by recruitment location?

The analysis in section 5.5.2.1 suggests that H-MSM recruited in person for GCPS and GAPSS are more likely than both B-MSM and G-MSM to report behaviours with higher STI/HIV transmission likelihood. However, in-person recruitment for these studies took place at multiple types of locations, including LGBTQ+ fairs, gay social venues such as bars and clubs, SHCs and SOP venues. Venue type has previously been found to be associated among MSM with both sexual identity²⁵ and engagement in behaviours with higher likelihood of STI/HIV transmission.²⁶⁶ In this section I explore differences in recruitment location by sexual identity among MSM recruited in person for GCPS and GAPSS, and then explore whether differences in behaviour by sexual identity are common across recruitment locations.

Among MSM recruited in person for GCPS, only around 30% of H-MSM and B-MSM were recruited at LGBTQ+ fairs, compared to 52% of G-MSM (Table 53). In contrast, 22% of H-MSM and 31% of B-MSM were recruited at SOP venues compared to only 11% of G-MSM. Similar patterns can be seen in the recruitment location of MSM recruited for GAPSS, albeit that the number of H-MSM is very small here. These results show that, when compared with G-MSM, a much higher proportion of H-MSM and B-MSM recruited in person for these studies are recruited at SOP venues.

Table 53: Location of in-person recruitment of MSM by study and sexual identity (GCPS and GAPSS only)

Recruitment location	H-MSM		B-MSM		G-MSM	
	%	(n/N)	%	(n/N)	%	(n/N)
GCPS 2010-2017						
LGBTQ+ fairs	30.1	(58/193)	32.0	(975/3,046)	52.1	(23,616/45,347)
Gay social venues	41.5	(80/193)	31.5	(959/3,046)	31.4	(14,224/45,347)
SHCs	6.2	(12/193)	5.2	(157/3,046)	5.7	(2,568/45,347)
SOP venues	22.3	(43/193)	31.4	(955/3,046)	10.9	(4,939/45,347)
GAPSS 2008, 2011, 2014						
LGBTQ+ fairs	55.6	(5/9)	44.6	(157/352)	76.5	(2,464/3,223)
Gay social venues	0.0	0	9.9	(35/352)	9.5	(305/3,223)
SOP venues	44.4	(4/9)	45.5	(160/352)	14.1	(454/3,223)

Table 54 shows the reporting prevalence of higher STI/HIV transmission risk behaviours among all MSM by recruitment location, and aPRs showing comparisons by recruitment location. Compared to MSM recruited at LGBTQ+ fairs, MSM recruited at social venues such as bars or clubs were 15% more likely (aPR=1.15) to report recent CAI with a casual partner and/or a higher number of recent partners. Higher likelihoods of reporting these behaviours were also found for MSM recruited at SHCs (aPR=1.19) and MSM recruited from SOP venues (aPR=1.61). The higher likelihood of reporting STI/HIV transmission risk behaviours seen for H-MSM recruited in person may therefore be a consequence of where these men were recruited.

Table 54: Reporting prevalences of recent higher STI/HIV transmission risk behaviours and associations with recruitment location among MSM recruited in person (GCPS and GAPSS only)

Recruitment location	Reported recent higher STI/HIV transmission risk behaviours [†]		
	%	(n/N)	aPR [‡] (95% CI)
LGBTQ+ fairs	44.4	(11,185/25,230)	1.00 (ref)
Gay social venues	51.8	(7,416/14,329)	1.15 (1.13-1.18)
SHCs	58.1	(1,474/2,538)	1.19 (1.14-1.23)
SOP venues	72.8	(4,589/6,308)	1.61 (1.58-1.65)

Denominator is men reporting recent sex with men. [†]Defined as reporting recent CAI with a casual partner and/or more than five partners in the previous six months. [‡]Adjusted for age group, education, year of survey, study and HIV status.

Stratification of this analysis by sexual identity reveals, however, that the associations between recruitment location and STI/HIV transmission risk behaviours are not identical across sexual identities (Table 55). Reporting prevalences and

associations with recruitment were relatively similar for B-MSM and G-MSM, with prevalence lowest (at around 44%) for those B-MSM and G-MSM recruited at LGBTQ+ fairs. Reporting of these behaviours was more likely among B-MSM and G-MSM recruited at all other locations, and most likely among B-MSM (67%; aPR=1.48) and G-MSM (74%; aPR=1.63) recruited from SOP venues. However, among H-MSM, reporting of recent higher STI/HIV risk behaviours was relatively high across all recruitment locations, and highest among H-MSM recruited at LGBTQ+ fairs (69%) and gay social venues (79%). The associations observed among B-MSM and G-MSM between recruitment location and STI/HIV transmission risk behaviours are not observed for H-MSM, with no differences in likelihood of reporting recent risk behaviour found between venues.

Table 55: Reporting prevalences of STI/HIV transmission risk behaviours and associations with recruitment location among MSM recruited in person, stratified by sexual identity (GCPs and GAPSS only)

Recruitment location	Reported recent higher STI/HIV transmission risk behaviours [†]								
	H-MSM			B-MSM			G-MSM		
	%	(n/N)	aPR [‡] (95% CI)	%	(n/N)	aPR [‡] (95% CI)	%	(n/N)	aPR [‡] (95% CI)
LGBTQ+ fairs	68.6	(35/51)	1.00 (ref)	44.5	(472/1,061)	1.00 (ref)	44.3	(10,678/24,118)	1.00 (ref)
Gay social venues	79.0	(45/57)	1.23 (0.94-1.60)	54.3	(497/915)	1.21 (1.10-1.33)***	51.5	(6,874/13,357)	1.15 (1.12-1.17)***
SHCs	36.4	(4/11)	0.61 (0.28-1.34)	56.8	(84/148)	1.21 (1.03-1.42)*	58.3	(1,386/2,379)	1.19 (1.14-1.23)***
SOP venues	59.5	(25/42)	0.96 (0.67-1.36)	66.7	(709/1,065)	1.48 (1.36-1.62)***	74.1	(3,855/5,201)	1.63 (1.59-1.67)***

Denominator is men reporting recent sex with men. [†]Defined as reporting recent CAI with a casual partner and/or more than five partners in the previous six months. [‡]Adjusted for age group, education, year of survey, study and HIV status. [^]p<0.10. *p<0.05. **p<0.01. ***p<0.001.

Consequently, any risk behaviour analysis aiming to account for recruitment location would require interaction terms between recruitment location and sexual identity to allow for differences in associations by sexual identity. An alternative to this is to stratify the analysis by recruitment location. This provides a comparison by sexual identity of the MSM recruited at each individual type of recruitment location. Results of this analysis are shown in Table 56. Among MSM recruited from LGBTQ+ fairs, H-MSM were more than 40% more likely than both B-MSM and G-MSM to have reported recent higher STI/HIV transmission risk behaviours. Similar results were found for MSM recruited from gay social venues. Among MSM recruited from SHCs and SOP venues, there was no difference in reporting of risk behaviours between H-MSM and both B-MSM and G-MSM.

Table 56: Reporting prevalences of STI/HIV transmission risk behaviours and adjusted prevalence ratios comparing H-MSM to B-MSM and G-MSM, stratified by recruitment location (GCPS and GAPSS only)

Recruitment location	Reported recent higher STI/HIV transmission risk behaviours [†]				
	Prevalence (%)			aPR (95% CI)	
	H-MSM	B-MSM	G-MSM	H-MSM vs B-MSM (ref)	H-MSM vs G-MSM (ref)
LGBTQ+ fairs	68.6	44.5	44.3	1.42 (1.11-1.81)**	1.48 (1.17-1.88)**
Gay social venues	79.0	54.3	51.5	1.41 (1.20-1.66)***	1.55 (1.33-1.81)***
SHCs	36.4	56.8	58.3	0.69 (0.32-1.53)	0.71 (0.33-1.54)
SOP venues	59.5	66.7	74.1	0.88 (0.69-1.14)	0.82 (0.64-1.05)

Denominator is men reporting recent sex with men. Adjusted for age group, education, year of survey, study and HIV status.

[†]Defined as reporting recent CAI with a casual partner and/or more than five partners in the previous six months. [^]p<0.10.

*p<0.05. **p<0.01. ***p<0.001.

5.5.3 Behavioural and social influences on HIV and STI testing

This section explores associations between recent HIV and/or STI testing and both behavioural and social factors. I first examine whether differences by sexual identity in HIV and STI testing found in section 5.4.1.4 can be explained by differences in reporting of recent higher STI/HIV transmission risk behaviours. I then examine how MSM's social engagement with gay communities is associated with recent HIV and STI testing, the extent to which this differs by sexual identity, and how controlling for this affects differences in testing between H-MSM and other MSM.

5.5.3.1 Is recent higher STI/HIV transmission risk behaviour associated with HIV and STI testing?

Current UK¹⁷⁵ and other international guidelines²⁶⁷⁻²⁷¹ recommend all MSM test at least annually for STI/HIV, and that MSM engaging in behaviours associated with STI/HIV transmission (such as those discussed in section 5.3.5) test more frequently. It is conceivable that the discrepancies in reported testing observed in section 5.4.1.4 reflect differences in recent behaviour. In this section I examine whether differences in HIV and STI testing by sexual identity can be explained by differences in recent higher STI/HIV transmission risk behaviour (specifically: reporting a higher number of recent male partners and/or recent CAI with a casual partner). I first examine the association between recent sexual behaviour and testing in the past year among MSM in this sample, stratifying by sexual identity. I then examine how differences in likelihood of testing between H-MSM and MSM of other sexual identities vary when stratified by recent behaviour.

Table 57 shows the reporting prevalence of HIV and STI testing in the previous 12 months by reporting of recent higher STI/HIV transmission risk behaviours, stratified by sexual identity. It also shows associations between reporting these behaviours and recent testing. For MSM of all sexual identities, reporting of recent risk behaviours was associated with an increased likelihood of recent testing for both HIV and STIs, however there was little variation in these associations by sexual identity. Recent higher STI/HIV transmission risk behaviour was associated with an increased likelihood of HIV testing of 27%-35%, and an increased likelihood of STI testing of 41-55%. However, even amongst those H-MSM reporting these behaviours, testing prevalence was low at 36% and 34% for HIV testing and STI testing respectively, with similarly low figures (45% and 39% respectively) for B-MSM reporting recent risk behaviours. In comparison, a majority of G-MSM who reported recent higher STI/HIV transmission risk behaviours tested for either HIV (62%) and STIs (54%) in the past year.

Table 57: Prevalence of HIV and STI testing in the previous 12 months and adjusted prevalence ratios measuring the association between recent STI/HIV risk behaviours and HIV and STI testing among MSM, stratified by sexual identity

Reporting of recent higher STI/HIV transmission risk behaviours [†]	H-MSM		B-MSM		G-MSM	
	%	aPR (95% CI)	%	aPR (95% CI)	%	aPR (95% CI)
HIV test in previous 12 months[‡]						
Did not report recent higher STI/HIV transmission risk behaviours	26.4	1.00 (ref)	35.2	1.00 (ref)	45.5	1.00 (ref)
Reported recent higher STI/HIV transmission risk behaviours	35.9	1.32 (1.09-1.60)**	44.9	1.27 (1.20-1.35)***	61.7	1.35 (1.29-1.42)***
STI test in previous 12 months[§]						
Did not report recent higher STI/HIV transmission risk behaviours	22.9	1.00 (ref)	27.6	1.00 (ref)	34.9	1.00 (ref)
Reported recent higher STI/HIV transmission risk behaviours	33.7	1.42 (0.96-2.12)^	38.8	1.41 (1.31-1.52)***	54.3	1.55 (1.46-1.65)***

Adjusted for age group, education, and year of survey. †Reported a higher number of recent male partners and/or recent CAI with a casual male partner. ‡Among MSM not previously diagnosed with HIV. §Additionally adjusted for HIV status. ^p<0.10. *p<0.05. **p<0.01. ***p<0.001.

Table 58 shows differences between H-MSM and other MSM in recent HIV and STI testing, now stratified by recent engagement in higher STI/HIV risk behaviours. Compared with unstratified estimates in Table 48, stratified aPRs show decreases in the difference between H-MSM and other MSM in likelihood of testing. However, changes were small, and significant differences by sexual identity in likelihood of testing remained. Among MSM who did not report higher STI/HIV risk behaviours, H-MSM were less likely than both B-MSM and G-MSM to report HIV testing, and less likely than G-MGM to report STI testing. Among MSM who reported higher STI/HIV

risk behaviours, H-MSM were less likely than G-MSM to report both HIV and STI testing, with no differences found when comparing H-MSM and B-MSM.

Table 58: Adjusted prevalence ratios comparing H-MSM to B-MSM and G-MSM in reporting of HIV and STI testing in the previous 12 months, stratified by reporting of recent higher STI/HIV transmission risk behaviour

Outcome	Population	H-MSM vs B-MSM (ref) aPR (95% CI)	H-MSM vs G-MSM (ref) aPR (95% CI)
HIV test in previous 12 months [‡]	Did not report recent higher STI/HIV transmission risk behaviours	0.82 (0.68-0.98)*	0.65 (0.53-0.79)**
	Reported recent higher STI/HIV transmission risk behaviours	0.86 (0.73-1.02)^	0.66 (0.56-0.78)***
STI test in previous 12 months [§]	Did not report recent higher STI/HIV transmission risk behaviours	0.93 (0.73-1.20)	0.77 (0.59-1.00)*
	Reported recent higher STI/HIV transmission risk behaviours	0.98 (0.83-1.17)	0.76 (0.64-0.89)**

Adjusted for age group, education, and year of survey. †Reported a higher number of recent male partners and/or recent CAI with a casual male partner. ‡Among MSM not previously diagnosed with HIV. §Among all MSM. Additionally adjusted for HIV status. ^p<0.10. *p<0.05. **p<0.01. ***p<0.001.

Finally, Figure 7 allows us to see the unmet testing need among H-MSM more clearly, showing not only the proportion of H-MSM in each risk behaviour category who tested, but also the proportion who did not test. As annual testing for HIV and STIs is recommended for all MSM, the proportion of H-MSM in each behaviour category who did not report testing in the previous 12 months may be defined as having unmet testing need. However, this is especially the case for those who reported recent higher transmission risk behaviours, with testing guidelines recommending more frequent testing for these men. This figure suggests a high level of unmet testing need among H-MSM, including around two-thirds of those engaging in higher STI/HIV transmission risk behaviour.

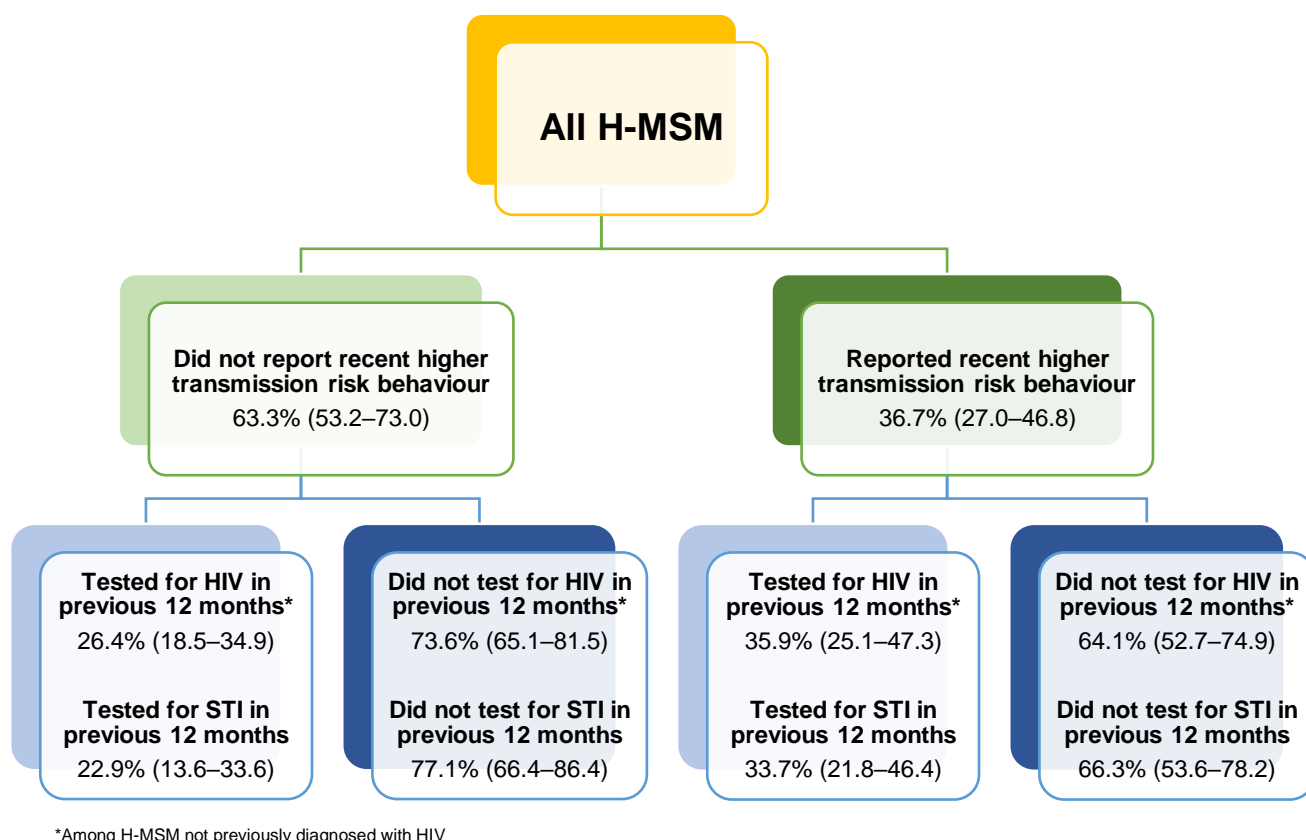


Figure 7: Testing for HIV and STI and unmet testing need among H-MSM according to risk behaviour in the previous year

5.5.3.2 Is social engagement with gay communities associated with HIV and STI testing?

The previous section showed that differences in annual STI/HIV testing exist between H-MSM and G-MSM, and in some cases B-MSM, and that in general these differences were not fully explained by differences in higher STI/HIV transmission risk behaviour. MSM in this sample differed substantially by sexual identity in their social engagement with gay communities, as measured by the proportion of free time spent with gay men (section 5.2.5). In this section, I examine the association between social engagement with gay communities and reporting of STI/HIV testing. I first show the associations between increased social engagement and likelihood of testing for each sexual identity group individually, controlling for demographic variables and reported recent engagement in higher STI/HIV transmission risk behaviours. I then assess the effect that controlling for social engagement has on differences between H-MSM and other MSM in reporting of HIV and STI testing, stratifying by reporting of behaviours with higher STI/HIV transmission risk.

Among MSM of all sexual identities, both HIV and STI testing prevalences increased with greater social engagement (Table 59). However, the association between social engagement and testing differed by sexual identity. Compared to H-MSM who reported low social engagement with gay communities, H-MSM reporting high social engagement were on average twice as likely to report HIV testing in the previous 12 months (aPR=2.04). High social engagement had less of an effect on likelihood of testing among B-MSM (aPR=1.57) and G-MSM (aPR=1.39). Similar results were observed when looking at reported testing for STIs in the previous 12 months.

Table 59: Prevalence of HIV and STI testing and adjusted prevalence ratios measuring the association between social engagement with gay communities and reporting of HIV and STI testing among MSM, stratified by sexual identity

Social engagement with gay communities	H-MSM		B-MSM		G-MSM	
	%	aPR (95% CI)	%	aPR (95% CI)	%	aPR (95% CI)
HIV test in previous 12 months[†]						
Low	26.2	1.00 (ref)	32.8	1.00 (ref)	40.6	1.00 (ref)
Medium	37.6	1.34 (1.14-1.56)***	47.2	1.40 (1.31-1.50)***	52.9	1.27 (1.22-1.31)***
High	56.6	2.04 (1.77-2.36)***	52.4	1.57 (1.42-1.73)***	59.2	1.39 (1.32-1.46)***
STI test in previous 12 months[‡]						
Low	22.6	1.00 (ref)	26.1	1.00 (ref)	32.1	1.00 (ref)
Medium	28.7	1.37 (1.10-1.70)**	39.0	1.44 (1.36-1.53)***	42.9	1.30 (1.24-1.36)***
High	58.7	2.08 (1.74-2.48)***	46.1	1.65 (1.53-1.79)***	51.2	1.47 (1.38-1.57)***

Adjusted for age group, education, year of survey and reported recent engagement in higher STI/HIV transmission risk behaviours. [†]Among MSM not previously diagnosed with HIV. [‡]Among all MSM. Additionally adjusted for positive HIV status. [^]p<0.10. *p<0.05. **p<0.01. ***p<0.001.

Table 60 shows aPRs comparing H-MSM with B-MSM and G-MSM in reporting HIV and STI testing in the previous 12 months, stratified by reported engagement in behaviours with higher STI/HIV transmission risk and now controlling for social engagement with gay communities. Comparisons with the corresponding aPRs in Table 58 suggest that additionally controlling for social engagement reduces differences between H-MSM and other MSM in likelihood of testing but does not completely explain these differences. Controlling for both behaviour and social engagement with gay communities, H-MSM were less likely than G-MSM to report testing for HIV (regardless of whether or not they engaged in behaviours with higher STI/HIV transmission risk) and STIs (specifically among MSM reporting risk behaviours). There is also evidence that some H-MSM were less likely than B-MSM to report HIV testing, though there was no difference in reporting of STI testing between H-MSM and B-MSM.

Table 60: Adjusted prevalence ratios comparing H-MSM to B-MSM and G-MSM in reporting HIV and STI testing in the previous 12 months, stratified by reporting of behaviours with higher STI/HIV transmission risk

Outcome	Population	H-MSM vs B-MSM (ref) aPR (95% CI)	H-MSM vs G-MSM (ref) aPR (95% CI)
HIV test in previous 12 months [‡]	Did not report recent higher STI/HIV transmission risk behaviours	0.84 (0.71-0.99)**	0.75 (0.65-0.88)***
	Reported recent higher STI/HIV transmission risk behaviours	0.88 (0.76-1.00)^	0.74 (0.65-0.83)***
STI test in previous 12 months [§]	Did not report recent higher STI/HIV transmission risk behaviours	0.97 (0.78-1.22)	0.90 (0.73-1.11)
	Reported recent higher STI/HIV transmission risk behaviours	0.99 (0.84-1.16)	0.84 (0.73-0.97)*

Adjusted for age group, education, year of survey and social engagement with gay communities. †Reported a higher number of recent male partners and/or recent CAI with a casual male partner. ‡Among MSM not previously diagnosed with HIV. §Among all MSM. Additionally adjusted for positive HIV status. ^p<0.10. *p<0.05. **p<0.01. ***p<0.001.

5.6 Sensitivity analyses

In this section, I provide the results of sensitivity analyses. I first explore the validity of assumptions made in the harmonisation and analyses of data, specifically the comparability of recall periods and partner definitions across studies. I then compare estimates produced using one-stage and two-stage IPD-MA methods.

5.6.1 Assessing the comparability of recall periods across studies

The key assumptions on which the analyses in this chapter are based are:

1. behaviours of interest are sufficiently regular that reporting prevalences based on a 6-month recall period are comparable to those based on a 12-month recall period; and
2. where this is not the case, differences between 6-month and 12-month reporting prevalences are similar across sexual identities, so that PRs comparing sexual identities across studies with different recall periods are roughly comparable.

As discussed in section 3.3.2.3, for some behaviours of interest, EMIS-2010 asked men to indicate when they last engaged in behaviours via a recency scale, giving them a choice of options including “in the last six months” and “in the last 12 months”. It was therefore possible to test these assumptions by comparing prevalences and prevalence ratios for 6-month and 12-month recall periods for behaviours for which participant responses were reported using these recency scales. However, to do these analyses, I required both the behaviour of interest and the denominator behaviour (defining the group for which prevalence is of interest) to

have 6-month and 12-month data. Thus, this analysis is limited to the few key behaviours for which this was possible, namely: reporting AI with male partners (regardless of partner type); reporting CAI with male partners (regardless of partner type); and reporting sex with women.

Table 61 shows reported prevalence estimates for these three behaviours, based on both 6-month and 12-month recall periods, and also shows the change in prevalence from 6-month to 12-month recall. Table 62 shows aPRs comparing H-MSM to B-MSM and G-MSM for each recall period. For each outcome of interest, the outcome defining the denominator is also based on a similar recall period (e.g. AI with male partners in the previous six months is measured among MSM reporting male partners in the previous six months). The reported prevalence of AI with male partners reporting sex with men increased by 4-6% for men of each sexual identity. Given the nature of PRs, similar increases in prevalence from six months to 12 months should result in similar PRs. Indeed, the aPRs comparing H-MSM to B-MSM or G-MSM changed very little when changing the recall period from 6-months to 12-months.

Table 61: The reporting prevalence of key sexual behaviours among MSM by sexual identity, stratified by recall period (EMIS-2010 only)

Outcome	Recall period	H-MSM		B-MSM		G-MSM	
		%	(n/N)	%	n/N	%	n/N
AI with men (among all MSM)	Previous 6 months	65.8	(356/541)	77.8	(11,986/15,415)	86.0	(82,951/96,509)
	Previous 12 months	68.6	(436/636)	82.2	(13,603/16,554)	90.1	(89,783/99,638)
	Increase in prevalence (%)	4.2	-	5.7	-	4.8	-
CAI with men (among MSM reporting AI with male partners)	Previous 6 months	42.2	(152/360)	52.3	(6,244/11,940)	63.4	(52,412/82,697)
	Previous 12 months	47.5	(206/434)	56.5	(7,630/13,512)	68.4	(61,171/89,412)
	Increase in prevalence (%)	12.6	-	8.0	-	7.9	-
Female sexual partners (among all MSM)	Previous 6 months	65.9	(362/549)	44.3	(6,913/15,622)	1.4	(1,324/97,464)
	Previous 12 months	73.3	(472/644)	56.0	(9,381/16,768)	2.5	(2,504/100,632)
	Increase in prevalence (%)	11.2	-	26.4	-	78.6	-

Table 62: Adjusted prevalence ratios comparing H-MSM to B-MSM and G-MSM in reporting of key sexual behaviours, stratified by recall period (EMIS-2010 only)

Outcome	Recall period	H-MSM vs B-MSM (ref) aPR [†] (95% CI)	H-MSM vs G-MSM (ref) aPR [†] (95% CI)
AI with men (among all MSM)	Previous 6 months	0.83 (0.76-0.90)	0.76 (0.69-0.84)
	Previous 12 months	0.82 (0.76-0.87)	0.76 (0.70-0.82)
CAI with men (among MSM reporting AI with male partners)	Previous 6 months	0.79 (0.71-0.89)	0.65 (0.58-0.73)
	Previous 12 months	0.82 (0.75-0.90)	0.68 (0.61-0.75)
Female sexual partners (among all MSM)	Previous 6 months	1.49 (1.34-1.65)	43.8 (35.3-54.4)
	Previous 12 months	1.30 (1.20-1.40)	26.2 (21.7-31.6)

†Adjusted for by age group and education.

Prevalence of CAI reporting AI increased by 12% for H-MSM and 8% for both B-MSM and G-MSM, and while there were slight differences between 6-month and 12-month aPRs, these differences were still minor. However, changes in reporting of recent female sexual partners varied dramatically between sexual identities.

Prevalence among H-MSM only increased by 11%, compared to increases of 26% for B-MSM and 79% for G-MSM, indicating that a large proportion of G-MSM who also have sex with women do so infrequently. This disparity had a large impact on aPRs between H-MSM and G-MSM, with the aPR nearly halving between the 6-month and 12-month recall period data.

These analyses suggest that while pooling of PRs based on 6-month and 12-month behaviour is acceptable for AI and CAI with men, it may not be acceptable for analyses of outcomes for which there might not be relatively similar changes in prevalence across sexual identities, such as reporting of recent female sexual partners. For outcomes for which this is the case, it may be better to report 6-month and 12-month PRs separately. Table 63 shows the analysis for the outcome “recent female sexual partners”, previously shown in section 5.3.3.5, now stratified by recall period. Results are similar for each recall period, suggesting that in this case, there is little bias resulting from differences in recall period across studies.

Table 63: Adjusted prevalence ratios comparing H-MSM to B-MSM and G-MSM in the reporting of recent female sexual partners (GAPSS/GOSS, EMIS2010 and SN15 only), stratified by recall period

Outcome	Population	H-MSM vs B-MSM (ref) aPR (95% CI)	H-MSM vs G-MSM (ref) aPR (95% CI)
Female sexual partner in the previous 6 months	All MSM (GAPSS/GOSS only)	1.22 (1.00-1.49)	25.7 (19.9-33.1)
Female sexual partner in the previous 12 months	All MSM (SN15/EMIS-2010 only)	1.30 (1.21-1.39)	27.5 (22.6-33.3)

Adjusted for by age group and education.

5.6.2 Assessing the comparability of partner type definitions across studies

Section 3.3.2.5 described how the precise definitions of regular and casual partner types varied across studies based on how individual studies dichotomised participants' sexual partners. GAPSS/GOSS defined partners based solely on the number of times participants had sex with individual partners in the previous six months, with regular partners those the participants had sex with four or more times, and casual partners those participants had sex with once, twice, or three times. However, the other three studies defined sexual partners based on participants' relationship with those partners. For participants of all three studies, regular partners were defined to include steady partners (such as boyfriends, husbands, or "partners"), and casual partners were defined to include hook-ups, anonymous or one-off partners. However, the key difference was in the classification of regular non-steady sexual partners such as fuckbuddies, with these partners treated as regular partners for GCPS participants, and as casual partners for EMIS-2010 and SN15 participants. In this section, I explore how comparable these partner type definitions are. I first examine differences in reporting of key sexual behaviours by partner type, and how these varied by partner type definition. I then examine how these variations in partner type definition affected aPRs measuring differences between H-MSM and other MSM in reporting of these outcomes.

Table 64 shows the reporting of recent sexual partners of each type and reporting of AI and CAI with those partners, and also shows how reporting of these behaviours varied depending on the partner type definition. After adjusting for age group, education, year and sexual identity, there were substantial differences by partner type definition in reporting of sex with regular male sexual partners. Compared EMIS-2010/SN15 participants, reporting of recent regular male sexual partners was higher among participants of both GCPS and GAPSS/GOSS, for whom regular partners were defined more inclusively. However, reporting of recent AI with regular partners was lower among GCPS participants compared to EMIS-2010/SN15 participants. Similarly, reporting of CAI with regular AI partners was lower for both GCPS and GAPSS/GOSS participants compared to EMIS-2010/SN15 participants.

Table 64: Reporting of key behaviours by sexual identity and partner type definitions, and comparisons between partner type definitions

Survey	Definition of partner type	Prevalence (%)			Difference in reporting prevalence aPR (95% CI)
		H-MSM	B-MSM	G-MSM	
REGULAR PARTNERS					
Regular male sexual partner(s), among all MSM (recent)					
GCPS	Steady partners + fuckbuddies ^α	69.9	65.8	76.8	1.35 (1.34, 1.36)***
GAPSS/GOSS	4+ times in 6 months ^β	51.9	69.7	82.0	1.43 (1.42, 1.45)***
EMIS-2010/SN15	Steady partners only ^γ	31.9	41.6	59.7	1.00 (ref)
AI with regular partner(s), among MSM reporting sex with regular male partner(s) (recent)					
GCPS	Steady partners + fuckbuddies ^α	66.4	76.9	79.0	0.89 (0.88, 0.90)***
GAPSS/GOSS	4+ times in 6 months ^β	78.6	85.8	86.0	0.97 (0.96, 0.99)***
EMIS-2010/SN15	Steady partners only ^γ	82.9	86.3	91.4	1.00 (ref)
CAI with regular partner(s), among MSM reporting AI with a regular male partner(s) (recent)					
GCPS	Steady partners + fuckbuddies ^α	64.8	63.2	72.7	0.89 (0.88, 0.90)***
GAPSS/GOSS	4+ times in 6 months ^β	82.1	84.0	86.4	0.90 (0.88, 0.92)***
EMIS-2010/SN15	Steady partners only ^γ	66.5	68.9	76.1	1.00 (ref)
CASUAL PARTNERS					
Casual male sexual partner(s), among all MSM (recent)					
GCPS	Anon, hook-ups, one-off ^δ	74.0	79.8	68.1	0.87 (0.87, 0.88)***
GAPSS/GOSS	1-3 times in 6 months ^ε	91.1	89.5	79.0	1.05 (1.03, 1.06)***
EMIS-2010/SN15	Anon, hook-ups, one-off + fuckbuddies ^φ	79.3	81.2	78.1	1.00 (ref)
AI with casual partner(s), among MSM reporting sex with casual male partner(s) (recent)					
GCPS	Anon, hook-ups, one-off ^δ	76.6	79.5	81.3	0.94 (0.93, 0.94)***
GAPSS/GOSS	1-3 times in 6 months ^ε	68.6	79.6	81.9	0.97 (0.96, 0.98)***
EMIS-2010/SN15	Anon, hook-ups, one-off + fuckbuddies ^φ	75.7	82.4	85.5	1.00 (ref)
CAI with casual partner(s), among MSM reporting AI with casual male partner(s) (recent)					
GCPS	Anon, hook-ups, one-off ^δ	59.5	44.2	48.2	0.84 (0.82, 0.86)***
GAPSS/GOSS	1-3 times in 6 months ^ε	48.6	43.1	47.0	0.97 (0.94, 1.00)*
EMIS-2010/SN15	Anon, hook-ups, one-off + fuckbuddies ^φ	36.0	43.3	47.3	1.00 (ref)

Adjusted for age group, education, sexual identity and year of participation. CAI analysis also adjusted for HIV status.

^αBoyfriends, lovers, or fuckbuddies. ^βPartners with whom the participant had sex with four or more times in the previous six months. ^γBoyfriends, partners, or husband. ^δNot boyfriends, lovers, or fuckbuddies. ^εPartners with whom the participant had sex with once, twice, or three times in the previous six months. ^φHook-ups, one-off partners, anonymous partners, as well as FWBs, fuckbuddies or regular sex buddies. [^]p<0.10. *p<0.05. **p<0.01. ***p<0.001.

In contrast, compared to EMIS-2010/SN15 participants (for whom non-steady partners were defined most inclusively), reporting of recent casual male partners was lower among GCPS participants (which did not include fuckbuddies), and slightly higher among GAPSS/GOSS participants. Among those with casual partners, reporting of recent AI was slightly lower among GCPS and GAPSS/GOSS participants, and reporting of CAI was similarly lower. It should be noted that for most of these outcomes, differences in reporting prevalences between partner type definitions were at most around 10-15%. The exception to this was reporting of

regular male partners, with the use of more inclusive definitions of regular partners resulting in increases of 35-43% over that when regular partners are defined only as steady partners.

These results suggest that the exact definitions used to define MSM's partner types influence the reporting of sex with those partners. Unsurprisingly, reporting of recent regular partners is lowest when these partners are defined only as steady partners, and higher when these partners are defined more inclusively to also includes fuckbuddies or any other partners the participant had sex with multiple times. However, these more inclusive definitions result in lower reporting of AI and especially CAI with these partners, suggesting that MSM are less likely to engage in AI with fuckbuddies than they are with relationship partners, and if they do, are more likely to use condoms. Similarly, reporting of casual male partners is lowest when they are defined only as anonymous or hook-up/one-off partners, and higher when fuckbuddies are also included. Reporting of AI with casual partners is also higher when the more inclusive definition is applied, as is reporting of condomless sex with AI partners, suggesting that MSM are *more* likely to engage in AI with fuckbuddies than they are with other casual partners, and that when they do, they're *less* likely to use condoms with their fuckbuddies.

With regards to the analyses in this chapter, a key interest is not just how this variation in partner type definition affects reporting of these outcomes for *all* MSM, but also how comparable differences between H-MSM and other MSM in reporting of these outcomes are for each partner type definition. Table 65 shows aPRs measuring differences in outcome reporting between H-MSM and both B-MSM and G-MSM, stratified by partner type definition. The effect of variation in partner type definition was most evident in comparisons by sexual identity in reporting of recent regular partners. Among GCPS participants, there was no difference between H-MSM and other MSM in reporting of recent regular partners. However, among EMIS-2010/SN15 participants, H-MSM were less likely than both B-MSM (aPR=0.82) and G-MSM (aPR=0.58) to have reported recent regular partners, suggesting that H-MSM are less likely than other MSM to form steady relationships with male sexual partners. GAPSS/GOSS data also suggest that H-MSM are less likely than both B-MSM and G-MSM to have partners with whom they had sex on multiple (four or more) occasions. Despite these results, aPRs comparing H-MSM to other MSM in

reporting of AI and CAI with regular partners were roughly comparable across partner type definitions. This suggest that differences between H-MSM and other MSM in these behaviours are relatively similar regardless of whether regular partners are limited to steady partners or defined more inclusively to include fuckbuddies.

Table 65: Adjusted prevalence ratios measuring differences between H-MSM and other MSM in reporting of key sexual behaviours, stratified by partner type definition

Survey	Partner type definition	H-MSM vs B-MSM (ref) aPR (95% CI)	H-MSM vs G-MSM (ref) aPR (95% CI)
REGULAR PARTNERS			
Regular male sexual partner(s), among all MSM (recent)			
GPCS	Steady partners + fuckbuddies ^α	1.04 (0.95-1.15)	0.94 (0.86-1.03)
GAPSS/GOSS	4+ times in 6 months ^β	0.74 (0.57-0.96)*	0.64 (0.50-0.83)**
EMIS-2010/SN15	Steady partners only ^χ	0.82 (0.70-0.95)**	0.58 (0.48-0.69)***
AI with regular male partner(s), among MSM reporting recent regular male sexual partner(s)			
GPCS	Steady partners + fuckbuddies ^α	0.86 (0.75-0.97)*	0.84 (0.74-0.95)**
GAPSS/GOSS	4+ times in 6 months ^β	0.91 (0.70-1.18)	0.90 (0.69-1.17)
EMIS-2010/SN15	Steady partners only ^χ	0.79 (0.63-0.99)*	0.74 (0.57-0.96)*
CAI with regular male partner(s), among MSM reporting AI with recent regular male sexual partner(s)			
GPCS	Steady partners + fuckbuddies ^α	1.07 (0.91-1.26)	0.98 (0.84-1.14)
GAPSS/GOSS	4+ times in 6 months ^β	1.23 (0.80-1.89)	1.01 (0.66-1.54)
EMIS-2010/SN15	Steady partners only ^χ	0.95 (0.82-1.09)	0.85 (0.73-1.01) [^]
CASUAL PARTNERS			
Casual male sexual partner(s), among all MSM (recent)			
GPCS	Anon, hook-ups, one-off ^δ	0.95 (0.87-1.03)	1.03 (0.94-1.11)
GAPSS/GOSS	1-3 times in 6 months ^ε	1.03 (0.95-1.11)	1.07 (0.99-1.16) [^]
EMIS-2010/SN15	Anon, hook-ups, one-off + fuckbuddies ^φ	0.96 (0.90-1.03)	0.99 (0.91-1.08)
AI with casual male partner(s), among MSM reporting recent casual male sexual partner(s)			
GPCS	Anon, hook-ups, one-off ^δ	0.96 (0.87-1.05)	0.94 (0.85-1.03)
GAPSS/GOSS	1-3 times in 6 months ^ε	0.85 (0.71-1.02) [^]	0.82 (0.68-0.98)*
EMIS-2010/SN15	Anon, hook-ups, one-off + fuckbuddies ^φ	0.91 (0.86-0.96)**	0.88 (0.83-0.94)***
CAI with casual partner(s), among MSM reporting AI with recent casual male partner(s)			
GPCS	Anon, hook-ups, one-off ^δ	1.32 (1.10-1.58)**	1.28 (1.08-1.52)**
GAPSS/GOSS	1-3 times in 6 months ^ε	1.06 (0.73-1.53)	0.95 (0.66-1.36)
EMIS-2010/SN15	Anon, hook-ups, one-off + fuckbuddies ^φ	0.87 (0.72-1.06)	0.83 (0.68-1.02) [^]

Adjusted for age group, education, and year of participation. CAI analysis additionally adjusted for HIV status. GPCS and GAPSS/GOSS additionally adjusted for recruitment location. ^αBoyfriends, lovers, or fuckbuddies. ^βPartners with whom the participant had sex with four or more times in the previous six months. ^χBoyfriends, partners, or husband. ^δNot boyfriends, lovers, or fuckbuddies. ^εPartners with whom the participant had sex with once, twice, or three times in the previous six months. ^φHook-ups, one-off partners, anonymous partners, as well as FWBs, fuckbuddies or regular sex buddies. [^]p<0.10. *p<0.05. **p<0.01. ***p<0.001.

The exact definition of casual partners had little effect on comparisons by sexual identity in reporting of recent casual partners and reporting of AI with those partners,

with aPRs across definitions roughly comparable. There was some evidence to suggest that the definition of casual partners was meaningful in the case of CAI with casual partners, with H-MSM recruited for GCPS more likely than B-MSM and G-MSM to report CAI with their casual AI partners. However, analysis in section 5.5.2.2 suggests that this result may be a consequence of recruitment, rather than how casual partners were defined.

The implication of the analysis in this section is that prevalence and aPR estimates for sexual behaviour with regular and casual partners calculated earlier (sections 5.3.1 and 5.3.2 respectively) fall somewhere in the middle of the estimates for inclusive and exclusive definitions. However, EMIS-2010/SN15 participants comprise 68% of the pooled dataset, and while the IPD-MA models used to calculate prevalence estimates and aPRs do not weight data proportionally, they are more heavily influenced by these participants' data than by the data of GCPS or GAPSS/GOSS participants (28% and 4% of the dataset respectively). As such, the prevalence and aPR estimates are closer to estimates for the EMIS-2010/SN15 partner type definitions. However, the results of this section suggest that for most outcomes of interest, these estimates are relatively similar to the estimates for the partner type definitions used by the other surveys. The exception to this is reporting of recent regular sexual partners. The prevalence estimates produced from the pooled data underestimate the proportion of MSM who report regular partners as defined by GCPS and GAPSS/GOSS, and aPRs produced for this outcome overestimate the differences between H-MSM and other MSM in reporting of regular partners as defined by GCPS.

5.6.3 Comparison of estimates from one-stage and two-stage IPD-MA methods

As discussed in Appendix 3, IPD-MA can also be carried out in two-stages, with the first stage involving the calculation of study-level (or, in this case, country-level) effects, and then pooling these country-level effects to produce an average effect in the second stage. In this section, I examine how the results of one-stage IPD-MA compare with those calculated through two-stage IPD-MA.

In general, aPRs estimated through two-stage IPD-MA were similar to those estimated through one-stage IPD-MA (Table 66). However, two-stage IPD-MA had

difficulty producing estimates for outcomes for which country-level reporting prevalence for a group under consideration was either 0% or 100%. In the case of the former, two-stage IPD-MA underestimates PRs. This was the case for the estimates for CAI with a regular partner, and dramatically so for HIV and STI prevalence, due to the many countries for which reporting prevalence for H-MSM was zero. When the country-level reporting prevalence for a group was 100%, this led to overestimates of the PR, as demonstrated by the aPR estimates for AI with a regular partner.

Table 66: Comparison of prevalence ratios comparing sexual identities estimated via one-stage and two-stage IPD-MA

Outcome	Population	H-MSM vs B-MSM (ref) aPR (95% CI)		H-MSM vs G-MSM (ref) aPR (95% CI)	
		one-stage	two-stage	one-stage	two-stage
SEXUAL BEHAVIOUR					
Regular male sexual partner (recent)	All MSM	0.86 (0.75-0.99)	0.88 (0.79-0.97)	0.62 (0.52-0.73)	0.62 (0.53-0.74)
AI with regular male partner(s) (recent)	MSM reporting recent regular partner(s)	0.80 (0.68-0.94)	0.98 (0.89-1.07)	0.76 (0.64-0.90)	0.93 (0.84-1.03)
CAI with regular male partner(s) (recent)	MSM reporting recent AI with a regular partner	0.97 (0.88-1.07)	0.31 (0.03-3.08)	0.86 (0.78-0.95)	0.27 (0.03-2.69)
Casual male sexual partner(s) (recent)	All MSM	0.96 (0.91-1.01)	1.00 (0.95-1.05)	1.00 (0.94-1.07)	1.05 (0.99-1.11)
AI with casual partner(s) (recent)	MSM reporting recent casual partner(s)	0.91 (0.87-0.95)	0.94 (0.89-0.99)	0.88 (0.84-0.92)	0.91 (0.86-0.96)
CAI with casual partner(s) (recent)	MSM reporting recent AI with casual partner(s)	0.93 (0.78-1.10)	0.96 (0.84-1.09)	0.89 (0.74-1.06)	0.92 (0.80-1.05)
Female sexual partners (recent)	All MSM	1.30 (1.22-1.39)	1.33 (1.28-1.39)	27.8 (23.0-33.6)	26.9 (22.6-32.1)
SEXUAL HEALTH					
HIV test, ever	All MSM	0.90 (0.84-0.97)	0.92 (0.87-0.97)	0.70 (0.64-0.77)	0.72 (0.65-0.79)
HIV test in previous 12 months	MSM not previously diagnosed with HIV	0.81 (0.70-0.93)	0.80 (0.73-0.88)	0.60 (0.51-0.71)	0.64 (0.57-0.73)
STI test in previous 12 months	All MSM	0.91 (0.77-1.08)	0.91 (0.78-1.05)	0.70 (0.59-0.84)	0.74 (0.62-0.88)
HIV positive	All MSM	1.06 (0.50-2.27)	0.001 (0.00-0.02)	0.26 (0.12-0.59)	<0.001 (0.00-0.01)
STI diagnosis in previous 12 months	MSM who tested for STI in previous 12 months	0.99 (0.70-1.40)	0.004 (0.00-0.10)	0.83 (0.56-1.23)	0.003 (0.00-0.08)

Shaded cells represent two-stage IPD-MA estimates which differed substantially from one-stage estimates.

5.7 Discussion

5.7.1 Summary of findings

I analysed data from 196,426 MSM across 13 surveys from four studies conducted in Western Europe, Australia, New Zealand, and Canada, and found differences between H-MSM and both B-MSM and G-MSM in sociodemographic characteristics, reporting of sexual behaviour, sexual health-seeking behaviour, and sexual health outcomes.

Among men reporting recent sex with other men, there were clear differences by sexual identity in reported sexual attraction, with around two-thirds of H-MSM reported being primarily or exclusively attracted to women, compared to almost all B-MSM reporting attraction to both men and women and likewise, almost all G-MSM reporting exclusive or primary attraction to men. Despite this, there were a minority - one in eight - H-MSM who reported exclusive attraction to men. Relatedly, just over half of H-MSM reported being in relationships with women at the time of survey participation with only one in ten reporting being in relationships with men. MSM who did not identify as gay, and especially H-MSM, also reported low levels of social engagement with gay communities.

At a population level, H-MSM were highly likely to report having casual male sexual partners, with four in five H-MSM having done so in the past six or 12 months. In comparison, only a third of H-MSM reported recent *regular* male partners, and H-MSM were generally less likely than G-MSM to report regular male partners, no matter whether these were strictly defined as romantic partners such as boyfriends or husbands (for which the difference was greater) or defined more inclusively to include fuckbuddies. There was some evidence that this was also true when compared to B-MSM, though this difference was less clear. There was no difference by sexual identity in reporting of casual male partners, regardless of how these partners were defined. Unsurprisingly, H-MSM were more likely than both B-MSM and G-MSM to have reported recent female sexual partners, with over 70% doing so.

In terms of sexual practices with male sexual partners, the most common practice among MSM of all sexual identities was receiving oral sex. This was reported by more than 90% of H-MSM, around 10% more than the proportion who reported

giving oral sex. AI was also common, reported by more than 75% of all H-MSM. At a population level, there was some evidence of a positioning preference among H-MSM and B-MSM who engaged in AI, with reporting of recent insertive AI around 10% more than receptive AI for both of these groups. This was in contrast to G-MSM, for which no population-level tendency was observed. Receptive AI was still common among H-MSM, however, with 70% of those who engaged in AI taking the receptive role at least once in the recent past. In comparison with B-MSM and G-MSM, H-MSM were less likely to have reported sexual acts with men that are typically seen as feminine or associated with a gay identity, including giving oral sex, AI (regardless of partner type), and among those engaging in AI, receptive AI (compared with G-MSM only). While there were limited data on specific sexual acts with women, nearly all H-MSMW and B-MSMW reported recent VAI with female partners, while one in five G-MSMW did *not* report recent VAI with their female partners.

Among MSM reporting AI with male partners there was no strong evidence of differences by sexual identity in condom use with AI partners, regardless of how these partners were defined. However, consistent condom use was associated with partner type, with reporting of condomless AI with regular AI partners higher than that with casual partners. Similarly, relationship status was strongly associated with condom use during VAI with female partners for MSMW of all sexual identities, with the majority of MSMW in relationships with women reporting condomless VAI in the past year. However, a majority of H-MSMW *not* in relationships with women also reported recent condomless VAI, suggesting that condomless sex is more common for H-MSMW regardless of their relationship with female partners. Associations were also found between relationship status with women and sexual behaviour with men, with H-MSM and B-MSM in relationships with women less likely to report AI with male partners, and those who did report AI were less likely to report condomless sex. These associations between relationship status with women and condom use with male and female partners, as well as the higher proportion of H-MSM in relationships with women, likely contribute to the finding that less than one in five H-MSMW reported recent condomless sex with both male *and* female partners, 25% less than both B-MSMW and G-MSMW.

Among MSM from all included studies, reporting of individual behaviours with higher STI/HIV transmission risk was 25-50% lower among H-MSM than among G-MSM, with each behaviour of interest reported by around one in five H-MSM. There was some evidence that reporting of these behaviours differed by study recruitment mode, with reporting of these behaviours generally higher for MSM recruited in person than for those recruited online, regardless of sexual identity. However, while H-MSM recruited online were less likely than both B-MSM and G-MSM recruited online to report these behaviours, H-MSM recruited in person at LGBTQ+ fairs and social venues were *more* likely than B-MSM and G-MSM recruited at these locations to do so, suggesting that H-MSM attending these venues or events have a greater need for sexual healthcare.

Focusing on sexual health service use and intervention uptake, just over half of H-MSM reported ever testing for HIV. While this was lower than that observed for both B-MSM and G-MSM, it was higher than is typically seen among men in the general population.²⁷² Testing in the past year was sub-optimal for men of all sexual identities, with only around one-third of H-MSM and B-MSM and around half of G-MSM testing for HIV in the past year, as recommended by the UK's HIV and STI testing guidelines.¹⁷⁵ Testing prevalences were higher than for MSEW.¹³⁶ While recent HIV and STI testing was higher among MSM who reported higher STI/HIV transmission risk behaviours, around two-thirds of H-MSM who reported these behaviours did *not* report recent testing, indicating substantial unmet need among this group. The reduced likelihood of H-MSM to engage in higher transmission risk behaviour accounted for little of the differences by sexual identity in testing. Adjusting for social engagement with gay communities was found to have a greater impact in reducing differences in testing likelihood, with higher social engagement with gay communities increasing likelihood of testing twofold among H-MSM.

5.7.2 Comparison with previous studies

My quantitative analyses show that the majority of H-MSM reported recent casual male partners rather than regular male partners. This aligns with the narrative from qualitative studies described in Chapter 4 in which H-MSM predominantly discussed one-off, anonymous or casual partners, and did not seek romantic relationships with men.^{11 27 62 81} My analysis also corroborates studies showing H-MSM reporting fewer

recent male partners than both B-MSM and G-MSM.²¹³ Previous research shows that some H-MSM avoid social venues associated with the gay community, such as gay bars,¹¹ explaining why H-MSM as a population may be less likely to meet their sexual partners at such locations. My analysis supported this, and also found a clear preference among H-MSM for meeting partners online.

The analysis presented in this chapter also supports the findings in the systematic review regarding the willingness of H-MSM to engage in specific sexual acts. I found that among all MSM, the proportion reporting recent AI with male partners was lower than that reporting oral sex, but especially among H-MSM, which aligns with findings from both quantitative^{212 216} and qualitative studies.^{59 64 66} Additionally, my data show differences in sexual positioning among H-MSM, with fewer H-MSM reporting giving oral sex to a male partner than reporting receiving oral sex, and among H-MSM reporting AI with male partners, receptive AI was reported by fewer men than insertive AI. This has also been found in studies of MSMW.²⁷³ This analysis also supports the findings of the systematic review that although H-MSM are less likely to report AI with male partners than other MSM, among those who do there is little difference by sexual identity in reporting CAI.^{212 216} The findings of this study with regards to sex with women were also similar to other studies, which found, unsurprisingly, greater reporting of recent female sexual partners among H-MSM,^{3 110 139 212 215 216 218 223} and also greater reporting of recent CVAI with female sexual partners than G-MSM^{25 212 215 216 225} but also B-MSM.^{212 216 225 238} My finding that relationship status with women is associated with lower reporting of CAI with male partners among H-MSM supports similar findings among MSMW.²⁷⁴

Regarding sexual health, these findings are consistent with previous studies showing H-MSM less likely to report HIV testing (ever and more recently) than both G-MSM and B-MSM.^{212 216 233 240 275} However, average prevalence estimates of HIV testing (ever or recently) are lower for men of all sexual identities than in previous studies. This may be related to recruitment venue, with testing prevalence estimates for GCPS participants, who were recruited in person at gay venues, more similar to those men recruited at similar venues in the USA for the NHBS^{212 216}. While previous studies also found H-MSM to be less likely than both G-MSM and B-MSM to report recent STI testing,^{143 216} my analysis found this to be true only when compared to G-MSM. Previous studies have also found links among MSM between greater

engagement with gay communities and increased likelihood of testing for HIV^{118 119} and STI.²⁷⁶ Studies of HIV prevalence typically limited analysis to men who had previously tested, however, they generally found the prevalence to be lower among H-MSM than other MSM, as in this study.^{25 210 222 232 233} Similarly, the lower STI prevalence among H-MSM when compared to other MSM in this study is similar to results of other studies, though these estimates may be unreliable due to low testing among these men.^{216 237} In the case of both HIV and STI prevalence, the greater statistical power afforded by the combined dataset analysed in this chapter allowed the detection of significant differences by sexual identity, which was not always possible in previous studies with smaller samples.

5.7.3 Strengths and limitations

This study provides wide-ranging insight into the sexual behaviour and health of H-MSM. By analysing harmonised individual participant data from 13 surveys across 17 countries, including over 1,000 H-MSM, this study was able to detect differences by sexual identity in reporting of key sexual behaviours and sexual health-seeking behaviours that previous studies were not sufficiently powered to detect. The datasets included in this study were collected from well-respected sexual health and behavioural surveys, with many years of expertise behind each one. The data and methods used in these analyses allow for robust conclusions to be drawn about this population where there is consistency across studies, and also allow for identifying and investigating more setting- and country-specific conclusions where there is heterogeneity.

This study does have some limitations. The process of harmonising data from surveys that were not originally designed to be harmonised inevitably results in a dilution, and in some cases, a loss of information. An example of this from these analyses is the number of recent partners. Differences existed in how surveys allowed participants to report the number of recent sexual partners, with some allowing continuous responses and others allowing only categorical responses, meaning that it was not possible to develop a harmonised continuous measure of number of recent partners, and instead, a dichotomous indicator of partner numbers had to be created. This ultimately limited the analysis that could be carried out.

Similarly, the lack of harmonised ethnicity variable meant that variation in reporting of outcomes by ethnicity could not be taken into account. However, behavioural differences or health inequities are typically driven by inequalities within the societies in which people live, and as such, it is unclear how comparable the experiences of men of the same ethnicity are across the wide range of countries included in analysis. Additionally, the lack of common data across included study datasets on drivers of social inequality would by default have produced an analysis that did not take these factors into account (a “colour blind” approach²⁶⁵), meaning results could be interpreted as being solely due to cultural differences, risking the perpetuation of harmful stereotypes. Finally, small changes in ethnicity classification methods have been shown to produce inconsistencies in results.²⁷⁷ Therefore, it may not have been appropriate to include ethnicity as a controlling variable in a meta-analysis as geographically-broad as this.

The outcome prevalence estimates and differences reported here are averages across 17 different countries. As a result, they may be too general for direct application to specific locations or populations.¹⁵⁰ Similarly, sexual behaviour outcomes were based on reporting of each behaviour at least once in the previous six or 12 months and were not dyad-specific. Therefore, outcomes like CAI with casual partners may not reflect participants’ behaviour with all casual partners. Analysis of associations between recent behaviour and testing assumed that testing followed risk behaviour, and so can only provide an approximation of unmet testing need as some participants may have tested prior to engaging in higher STI/HIV transmission risk behaviours, while others may not have had sufficient time to test between engaging in those behaviours and completing their survey. Similarly, the analyses investigating associations between participants’ relationship status with women and their sexual behaviour in the last year (with male and female partners) assumes that that relationship status was constant over the previous 12 months, and so can only approximate these associations. In particular, the analysis of condom use with female partners assumes that sex in the previous 12 months was only with female partners corresponding to their relationship status. This may have resulted in overestimates of differences observed by sexual identity among MSMW who were not in relationships with women at the time of survey participation, as some of these men (more likely H-MSMW (Table 11)), may have been in relationships sometime

during the previous 12 months. Finally, the conclusions drawn about H-MSM in this study are, by definition, limited to those men who would participate in studies like those included here, and may not reflect the experiences or behaviour of H-MSM who do not visit the sites at which recruitment for these studies took place.

5.7.4 Implications for survey design and analysis

The analyses and results presented in this chapter have methodological implications for both future efforts to study populations underrepresented in study samples, and for future behavioural surveys of MSM. In this section I briefly discuss these implications.

5.7.4.1 IPD-MA as a technique for studying populations underrepresented in study samples

First, I have shown in this chapter that IPD-MA is a viable technique for carrying out quantitative analysis on populations or groups who are underrepresented in typical study samples. My analysis also concurred with other studies that found that one- and two-stage IPD-MA methods generally produce similar estimates for binary outcome data, and so two-stage IPD-MA (which requires less statistical expertise) may be suitable when working with similar data.²⁷⁸ However, my analysis also showed that two-stage IPD-MA is unstable when the outcome is rare or very common (i.e. prevalence is close to 0% or 100%) for any of the sub-groups under comparison.²⁷⁹

While I have shown that pooling and IPD-MA of data from multiple datasets is possible, the limitations of IPD-MA should also be recognised. Assessing study datasets for suitability and then harmonising suitable study datasets involves a significant amount of work, especially if the surveys from which the datasets resulted were not explicitly designed to be harmonised. Pooling data from studies carried out in multiple countries also results in a loss of specificity of findings to a particular population, i.e. estimates relate to the pooled dataset and are not specific to any one population subgroup within that dataset. This specificity is less important for behavioural studies such as this than it is for other IPD-MA studies (e.g. reviews of clinical effectiveness of medicines).

It is also important to consider the individual characteristics of the included datasets. Study datasets often differ in the populations from which they sampled, the ways in which participants were recruited, and in numerous other aspects related to study methodology. Care should therefore be taken to investigate how this heterogeneity affects analysis. Consistency in estimates across individual datasets indicates that differences in samples do not influence the outcome of interest, and so estimates obtained from analysis of the pooled dataset provide a relatively good description of the population of interest. Substantial heterogeneity in estimates is a sign that the samples under investigation differ in ways that influence the outcome of interest. In this case, study samples should be explored to determine the cause of this heterogeneity, and it may be better to interpret and discuss individual estimates separately.

5.7.4.2 Survey recall periods

Surveys considered for inclusion in this analysis varied in their outcome recall period, ranging from three to 12 months. The sensitivity analysis in section 5.6.1 suggests that comparisons of prevalence data from surveys with different recall periods is acceptable when the behaviours in question are relatively common and the recall periods sufficiently large. However, comparison of prevalence data across different recall periods may be less reliable for less frequent behaviours. The example given in this study was sex with female partners, which was unsurprisingly uncommon among G-MSM. Another example for surveys with shorter recall periods is use of illicit substances, some of which may be used very infrequently.²⁸⁰

Multiple studies have suggested that a three-month recall period may be most reliable for self-report sexual behaviour data (especially frequency of behaviours), though longer recall periods (e.g. 12 months) may be better for less frequent behaviours.^{259 281 282} A solution to the problem of inconsistency across surveys may be that offered by the EMIS questionnaires, which moved from asking if participants' engaged in behaviours of interest in a fixed recall period (Fixed Time Format), to asking *when* participants last engaged in behaviours of interest, with participants responding using a recency scale ranging from "in the last 24 hours" to "more than 5 years ago" (the Recency Scale Format (RSF)).²⁸⁰ Asking about behaviour using the RSF offers flexibility in analysis, by allowing prevalence calculations within specific recall periods (as it allows these to be calculated for all of the options given to

participants). It also allows for the creation of recency curves which show at a *population level* how frequently these behaviours are engaged in. These have been used to great effect in examining differences in usage of illicit drugs, including chemsex drugs.^{280 283} The large number of response options necessitated by use of RSF means that it may not be suitable for paper surveys, however their use should be explored for behavioural surveys delivered online or via computers or handheld devices.

5.7.4.3 Partner type definitions

The results in this chapter suggest that standardisation of partner type definitions in MSM sexual health research is needed, with all four studies defining partner types in different ways. In particular, studies differed in how they classified regular non-steady sexual partners such as fuckbuddies, with some grouping them with steady partners, some with hook-up/one-off/anonymous partners, and some keeping them separate. This resulted in large differences across studies in reporting of recent regular partners, with smaller differences observed in prevalence estimates of sexual behaviour with those partners. The lack of consensus in the research community regarding whether the classification of fuckbuddies reflects that among MSM themselves.¹⁷² The evidence in my thesis supports calls for recognition in both sexual health research and practice of fuckbuddies as a third partner type, separate from both steady partners and hook-up/one-off/anonymous partners.^{170 172-174 284}

MSM's relationships with steady partners, fuckbuddies, and more casual partners vary in their levels of trust, familiarity and previous histories of sex, all of which are associated with STI/HIV risk factors such as condom use during AI and knowledge of partners' HIV status.¹⁷⁶ As a result, there are important differences in MSM's behaviour with these partners, with implications for STI/HIV prevention. My results suggest that condom use during AI is more likely with fuckbuddies than with steady partners, and less likely than with hook-up/one-off/anonymous partners, supporting similar findings from others.^{170 173 285} Men with fuckbuddies also have more CAI partners than men with steady partners,¹⁷⁴ but are less likely to know their sexual partners' HIV status.¹⁷⁰ Finally, the Australian Seroconversion Study found that of MSM recently diagnosed with HIV, two-thirds of those who believed they acquired it from a regular male partner reported that partner to be a fuckbuddy as opposed to a steady partner (22% vs 11% of new infections, with 66% believed to have been

acquired from casual partners).²⁸⁶ Grouping fuckbuddies with either steady or more casual partners risks obscuring important differences in MSM's behaviour, limiting the effectiveness of STI/HIV prevention strategies and education.^{170 174}

5.7.4.4 Recruitment in studies of MSM

Finally, my study has implications for recruitment in studies of MSM sexual health and behaviour. Previous comparisons of sexual health studies have shown that samples of MSM differ in sociodemographic characteristics, sexual behaviour and sexual health depending on whether they are recruited online, in person, or as part of national probability surveys.²⁸⁷⁻²⁸⁹ MSM recruited in person are also known to differ based on the type of venue at which they were recruited,^{290 291} and so studies of MSM conducted in-person usually recruit from multiple different venue types to recruit a broader and more representative cross section of MSM. However, my research suggests that associations between recruitment venue types and behaviour may not apply in the same way to MSM of all sexual identities. I found that recruitment venue is strongly associated with HIV/STI transmission risk behaviour among B-MSM and G-MSM (with likelihood of reporting these behaviours lowest among those recruited at LGBTQ+ fairs and highest among those recruited at SOP venues). However, no association was found between recruitment venue and behaviour for H-MSM, with high reporting of recent STI/HIV transmission risk behaviour observed among H-MSM across all venue types. This suggests that samples of H-MSM recruited in-person are much less representative than samples of G-MSM and B-MSM and highlights the importance of interpreting with caution findings drawn from these samples.

5.7.5 Implications for the remaining chapters

In this chapter, I have illustrated that there are some differences in sexual behaviour and sexual health between H-MSM and other MSM. While reporting of higher STI/HIV risk behaviours by some H-MSM (particularly those recruited online) is lower than that reported by G-MSM, there is still a sizable proportion of this population whose behaviour puts them at greater risk of STI/HIV transmission. I also found that H-MSM's relationships with female partners was associated with their likelihood of engaging in AI and (especially) CAI with their male partners. Finally, I found that HIV and STI testing among H-MSM is significantly lower than for other MSM, even taking

account of H-MSM's reduced likelihood of engaging in STI/HIV risk behaviours, suggesting unmet need for sexual healthcare among this population.

In the next two chapters, I present results from my qualitative study of H-MSM in England, in an attempt to understand how H-MSM approach STI/HIV risk with regards to the sex they have, and why engagement with sexual healthcare is lower among this population. In Chapter 6, I present analyses investigating how H-MSM conceptualise STI/HIV transmission and acquisition risk with their (male and female) sexual partners, including STI/HIV prevention strategies they adopt. In particular, this chapter explores how H-MSM's relationships with their female partners (and in some cases, their male partners) influence their approaches to STI/HIV prevention. In Chapter 7, I present findings from the same sample exploring barriers and facilitators to accessing sexual healthcare (including STI/HIV testing) for H-MSM, to understand potential reasons for the lower levels of testing observed among the H-MSM participants in this chapter, and to explore ways of increasing testing among this population.

6. STI/HIV risk perception and approach to STI/HIV prevention and risk reduction of H-MSM in England

6.1 Introduction

In the previous chapter I used advanced statistical analysis techniques to quantify H-MSM's behaviour with their sexual partners (including levels of STI/HIV transmission risk behaviours), their sexual health, and their engagement with sexual healthcare (specifically HIV and STI testing). However, quantitative analysis, particularly that of data from surveys not designed specifically with H-MSM in mind, is ill-equipped to provide understanding of *why* H-MSM engage in the behaviour they do, including how they make decisions about STI/HIV prevention and reasons for seeking (or not seeking) sexual healthcare. While qualitative studies in the systematic review in Chapter 4 explored H-MSM's behavioural motivations, most of these studies were conducted in the USA, providing little understanding of how H-MSM in the UK approach STI/HIV risk, prevention, and testing. Finally, the majority of studies in both the systematic review and IPD-MA were conducted in the first half of the 2010s or earlier, meaning little information was available on H-MSM's attitudes towards newer prevention strategies such as PrEP.

In this and the next chapter, I present the results of my qualitative study of H-MSM in England, in an attempt to address the limitations described above. This chapter presents my analysis exploring H-MSM's perception of and approach to STI/HIV risk and prevention. Specifically, the aims of this analysis were to:

1. Explore how H-MSM in the UK perceive STI/HIV acquisition and transmission risks with their sexual partners of any gender.
2. Understand how this influences their decision-making regarding use of STI/HIV prevention and risk reduction strategies with partners.

To address these aims, I analysed data from one-to-one semi-structured interviews I conducted with H-MSM resident in England. In this chapter, I first describe the study sample, starting with demographics, sexual health and testing history, before

discussing their sexual identity (both private and public) and the context of their sex with men. I then present the results of my thematic analysis addressing the two aims above. Illustrative quotes are provided throughout this chapter to support the results and are also presented in Appendix 15. All names and other identifying information have been changed to preserve participants' anonymity. Strengths and limitations of this study are presented at the end of Chapter 7.

6.2 Sample description

A total of 15 participants were recruited to the study between January and March 2020. This section provides a description of participant demographics and other relevant information.

6.2.1 Demographics

Participants ranged in age from 22-69 years (Table 67). The majority of participants were White (n=9), had some level of university education (n=11), and lived in the Greater London area (n=10). All participants resided in England at the time of interview. Seven of the 15 participants reported being single at the time of their interview, while the remaining participants were married to or in relationships with women, including one who was also in a (separate) relationship with a man.

6.2.2 Sexual identity

When asked pre-interview to indicate their sexual identity from a pre-specified list on the demographics form, 13 of the 15 participants selected labels that included "straight" in some way. Two participants selected "mostly gay", though indicated in interviews that they had previously identified as straight while also engaging in regular sex with men.

6.2.2.1 Private sexual identity

When asked during interviews to describe using their own words how they personally thought of their sexual identity, some participants were happy with the term "straight", including one who described himself as "definitely straight". Others used a combination of identities to describe themselves, including: "90% straight, 10% gay", "80% straight, 20% gay", "in between gay and straight", "fluid straight" and "bisexual, not completely straight". Some participants avoided specific sexual identity labels, instead describing themselves as "inquisitive" or "a bit curious".

Table 67: Demographic characteristics of study participants (N=15)

Demographic characteristic	n	%
Age		
18-24	3	20.0
25-34	6	40.0
35-44	3	20.0
45-69	3	20.0
Ethnicity		
White British	7	46.7
British South Asian	4	26.7
Black British	1	6.7
South Asian	1	6.7
White South African	1	6.7
White Hispanic American	1	6.7
Education level (highest level completed)		
GCSE or equivalent	1	6.7
A-levels or equivalent	1	6.7
Post-secondary qualification, below degree level	2	13.3
Undergraduate degree or higher	11	73.3
Relationship status		
Single	7	46.7
Married or in a relationship with a woman	7	46.7
In (separate) relationships with a woman and a man	1	6.7
Sexual orientation[†]		
Exclusively straight	1	6.7
Straight	4	26.7
Mostly straight	7	46.7
Bisexual-leaning straight	2	13.3
Mostly gay	2	13.3
Sexual attraction		
Only ever to women, never to men	2	13.3
More often to women, at least once to a man	6	40.0
About equally often to women and men	5	33.3
More often to men, at least once to a woman	2	13.3
Romantic attraction		
Only ever to women, never to men	7	46.7
More often to women, at least once to a man	4	26.7
About equally often to women and men	1	6.7
More often to men, at least once to a woman	2	13.3
Prefer not to say	1	6.7

[†]One participant identified as both “mostly straight” and “bisexual-leaning straight”.

6.2.2.2 Public sexual identity

In terms of how they described their sexual identity to others, most participants identified publicly as “straight”. However, for some participants, their public identity differed depending on with whom they were socialising. One participant explained that while he identified to close friends as “100% straight”, he was still open about his sexual experiences with men with these friends. One man explained how he would tell his family he was “normal”, but to friends or sexual partners he would identify as

“bisexual-leaning straight”, while another explained that he described his identity to male sexual partners as “straight curious”. This difference in public and private identities was described most vividly by one of the participants who selected “mostly gay” on the demographics form.

P09 (43, mostly gay): So with my wife and kids, I've got one persona, with my parents I've got another persona, with my gay friends I'm a different person. So, I don't know how I'd say I identify myself. Inside I would probably say I'm gay, but to the outside world and people I don't know, I'm straight. [...] So, when I'm with my family, with my mum and dad, that's not a true reflection of who I am. [...] When I'm with my [gay] friends and I've had a few drinks or whatever I feel a bit more relaxed, I might come across as camp a little bit, I'm a little bit more myself.

6.2.3 Attraction

Of the 13 participants who indicated they identified as “straight” or similar on the pre-interview demographics form, two described themselves as having only been sexually attracted to women, with six describing their sexual attraction as more often to women but at least once to a man, and five describing an equal sexual attraction to men and women. However, this pattern was reversed when it came to romantic attraction, with only one participant reporting an equal romantic attraction to men and women, and seven reporting being romantically attracted only to women. The two participants who identified as “mostly gay” reported being both romantically and sexually attracted more often to men.

6.2.4 Acceptance of and involvement with LGBTQ+ communities

The majority of participants expressed positive views towards gay men and LGBTQ+ communities more broadly. Twelve out of the 15 participants reported having at least one gay male friend, with most of these reporting more than one as well as friends or colleagues of other sexual minorities. Some of these reported ways in which these friendships had helped them understand and explore their sexuality through conversations or modelled behaviour, and in the case of two participants, had actually served as these participants' first same-sex sexual partners. For the majority of these men, however, their connection to LGBTQ+ communities did not extend

beyond these friendships, with only two participants reporting occasionally going to gay bars or pubs currently, and those aged 45 or older reporting previously going to these venues but not having done so since between 10 to 40 years ago.

P11 (24, mostly straight): My best friend at home is gay and so he's actually the first person I experimented with [...] But so a lot of my ideas or a lot of my conversations about the gay experience probably comes through him. For a while, when I was kind of exploring this, let's say [sexual] identity balance, we were listening to a podcast about these two gay guys in New York and they're sort of talking about the gay experience and it just really helped me think about it more in a sense, because it's so easy being this heterosexual person who maybe experimented, to just want to be heterosexual, but I was sort of "forced", you know, to kind of consider certain ideas.

In contrast, two participants stated that they had previously or would in future avoid friendships with gay men, with one expressing concern at being labelled gay by association, and the other not able to clearly identify his discomfort, but putting it down to being "a bit old fashioned" (P02, 35, mostly straight/bisexual-leaning straight). Both of these participants also expressed negative stereotypical views about gay men more broadly, in both cases related to perceptions of promiscuity among this population.

P02 (35, mostly straight/bisexual-leaning straight): Yeah, I just wouldn't feel comfortable being around gay guys... I don't know what it is but I just, they're maybe too flamboyant sometimes or just knowing that they're gay would just not ... it's not that I've got anything against gay people, if my child turned to me one day and said they were gay, I'm like "Good for you, you know, you do you". But, as far as friends go, I just wouldn't pursue a friendship with a gay guy.

6.2.5 Sexual history with women

All participants reported some sexual experience with women, with the exception of one participant who identified as “mostly gay”. At the time of interview, seven participants reported being in sexual relationships with steady female partners (e.g. wives, girlfriends) and four participants reported having previously been in sexual relationships with women but were not currently, including one who remained in a now non-sexual relationship with his wife. Three participants described having previously only had casual female sexual partners.

Of the 11 participants who reported current or previous sexual relationships with women, four reported exclusivity within these relationships. Of the other seven participants who reported some extra-relational sex during previous sexual relationships, four reported this only with men, two only with women (including one only with trans women), and one with both men and women.

6.2.6 Sexual history with men

6.2.6.1 Sexual experience with men

All but two participants reported some sexual experience with men, with nine participants reporting current regular or semi-regular sex with men. Four participants did not currently engage in sex with men but had done so in the past, with three of these participants open to doing so again in future and one no longer sexually active due to medical reasons.

Of the 13 participants reporting some sexual experience with men, three reported only oral sex and mutual masturbation with male partners, while 10 reported engaging in both AI and oral sex. This included one participant who had had AI and oral sex with men when he was younger, but since marrying his wife 40 years ago had only engaged in mutual masturbation with male partners. Of the 10 participants who reported previous AI with male partners, three reported insertive AI only, three reported receptive AI only, and four reported both insertive and receptive AI.

One participant had not yet engaged in sex with men but was considering doing so to fulfil a specific sexual fantasy. Therefore, his inclusion was considered representative of an H-MSM at the earliest stage of their sexual exploration.

Finally, one participant had never had sex with a man, but had occasional sex with trans women, and specifically, trans women with penises. He reported oral sex (giving and receiving) and insertive AI with these partners. I was unsure about including the participant in the study. However, by putting himself forward for the study he indicated he had found the label “men who have sex with men” to be relevant to himself. He made this point himself within the interview, both in terms of the perceived relevance of sexual health material intended for MSM, and in the way he situated his trans women sexual partners within the gay male population. Moreover, many of the issues he raised in his interview were similar to those discussed by other participants in the context of STI/HIV prevention. Therefore, I retained his data in the analysis dataset. However, to avoid conflating the experiences of H-MSM with those of men who have sex with trans women, I have only used his data in analysis when it aligned with experiences of other participants.

Interviewer: If you saw something described as being relevant for men who have sex with men, would you think that’s relevant to you?

P02 (35, mostly straight/bisexual-leaning straight): Yes, I would say so, because at the end of the day it’s still the same thing, the same thing is going into the same holes, you know, so yeah.

6.2.6.2 Context of sex with men

Eight participants described the sex they had with men as casual or recreational: primarily for enjoyment, occurring with varying levels of regularity and not usually involving any emotional connection. While these participants did report some sexual attraction to men, for the most part they reported lacking any *romantic* attraction to men, which also served to explain their straight identity.

P12 (35, mostly straight): People always say you can think of it by numbers, I would say I’m probably 90% straight, maybe 10% gay, but having said that, I’ve never had a romantic relationship with a man, only ever with women. So that’s why, I think, I’d lean more heavily – quite heavily – on a heterosexual side rather than a gay side or a bisexual side.

In contrast, four participants described their sex with men as also having some romantic element (though not necessarily with every partner). This included the two participants who described themselves as mostly gay (though both had at one stage identified as straight) and one participant who, prior to marrying his wife 40 years ago, had described himself as bisexual and had male romantic partners, though since then his sex with men had not involved any romantic or emotional element. It also included one participant whose relationship with his male partner was described as akin to a fuckbuddy-style relationship but with a strong emotional component.

P09 (43, mostly gay): I'm kind of a caring person, so I want – so I haven't got anybody that I'm in love with, so I want to kind of give my love to people if you know what I mean. I know it sounds really cringey, but ... so if I date these guys, and we get on really well, and we have fun, I kind of start caring for them.

For two other participants, their sexual encounters with men were described as forms of sexual experimentation. They had had a few sexual experiences with men that had allowed them to explore their feelings of sexual attraction but did not have firm plans to do so again in future given their primary interest in women (though both allowed for this possibility).

P15 (27, mostly straight): I literally just thought, you know, I might die tomorrow, so, you know, why not go with, you know, what my body is wanting to do. So, I really plucked the courage up by drinking, so I'd been out, and I think that just reduced the barrier I guess, and that, you know, fear, and I just went for it really.

One participant described the sex that he had with men as a form of self-harm. He reported having been sexually assaulted by a man as a teenager, which had negatively influenced his early understanding of his sexual identity. This resulted in him seeking sex with men despite not being sexually attracted to men. He typically sought sex with men only when feeling depressed, and this sex was purposefully similar to his experience when sexually assaulted, involving a loss of control and power (he reported only receptive AI and giving oral sex to male partners), no romantic or intimate elements (e.g. no kissing), and resulting in him feeling “empty”. This directly contrasted with the sex he had with women, in which he was typically in

control as part of consensual erotic roleplay, involved intimacy and was mutually enjoyable. For this participant, the sex he had with men served as an outlet for his negative feelings about himself.

P14 (27, straight): I sat down and realised that it stemmed from being sexually assaulted when I was 14, and then from then on I struggled with my sexual identity from being 14 through to about 22, 23, to come to the realisation that actually I am straight, and that the entire reason that I was seeking out sexual activity with men wasn't because I had any interest in it, but that it was forced on me at a young age and then that formed a key part of my identity for a long time. To be able to be okay with what had happened I made it into a part of my identity.

Finally, one participant's sexual interest in men was primarily as part of a sexual fantasy in which a woman was also present. He had only ever had female sexual partners but had recently become interested in a form of MFM threesome in which he, as the "*beta male*", would be ordered by a dominant female to engage in humiliating sexual acts with both her and the "*alpha male*", also known as the "*bull*". Although he had not yet pursued this interest, it was something he was actively considering doing in future.

Interviewer: What do you think appeals to you about that?

P08 (31, straight): Maybe the bisexual tendency isn't it? That's why I said to you, you know, I'm a heterosexual person who recently developed bisexual tendencies. What appeals to me, maybe it's a case of domination because, like I said to you, I'm into the whole domination fetish thing.

6.2.6.3 Meeting male partners

The majority of participants aged younger than 45 years (10 out of 12) reported meeting male partners through hook-up apps such as *Grindr* or *Tinder* or, less commonly, hook-up websites. These services provided participants with convenience, anonymity, and the ability to select partners based on information provided on their profiles (discussed more in section 6.3.2.1.4). One participant

described using both *Grindr* and a separate hook-up website depending on his need for discretion.

P12 (35, mostly straight): Well, Grindr shows guys that are near to where you are at that present time, so I didn't really want to meet anyone from like the next street because it would just be awkward if I go to the off licence and they're there. If you use FabGuys it gives like a little bit of a wider net, so maybe like someone two or three miles away. So still within travelling distance, but it's less likely you'll bump into them in your day-to-day life. [...] But if I was out and about in town, for example, I'd think Grindr was fine because it's a city centre, nightclubs and so on, it didn't really matter then because you want someone who's nearby.

No participants reported currently meeting male partners at gay social venues such as bars or clubs, though all three participants aged 45 or older reported having previously done so. Two of these participants also reported previously or currently meeting male partners at cruising locations.

6.2.7 HIV status and previous testing history

All participants reported that they were HIV-negative at the time of the interview. Participants varied in their previous testing experience. Four participants had never had an HIV or STI test, while a further four tested infrequently, such as after risk incidents or due to symptoms. Seven participants reported annual or more frequent testing, including two who reported very frequent testing (every 4-6 weeks).

6.3 Perception of STI/HIV transmission risk during sex

Participants primarily considered the risk of STI/HIV transmission during sex (with partners of any gender) in two ways (Figure 8). They considered the *impact* of STI/HIV acquisition and transmission, both on themselves and on their female partners. They also considered the likelihood of STI/HIV acquisition and transmission based on characteristics of their sexual partnerships, including the sexual health of themselves and their partners, and the specific sexual acts engaged in.

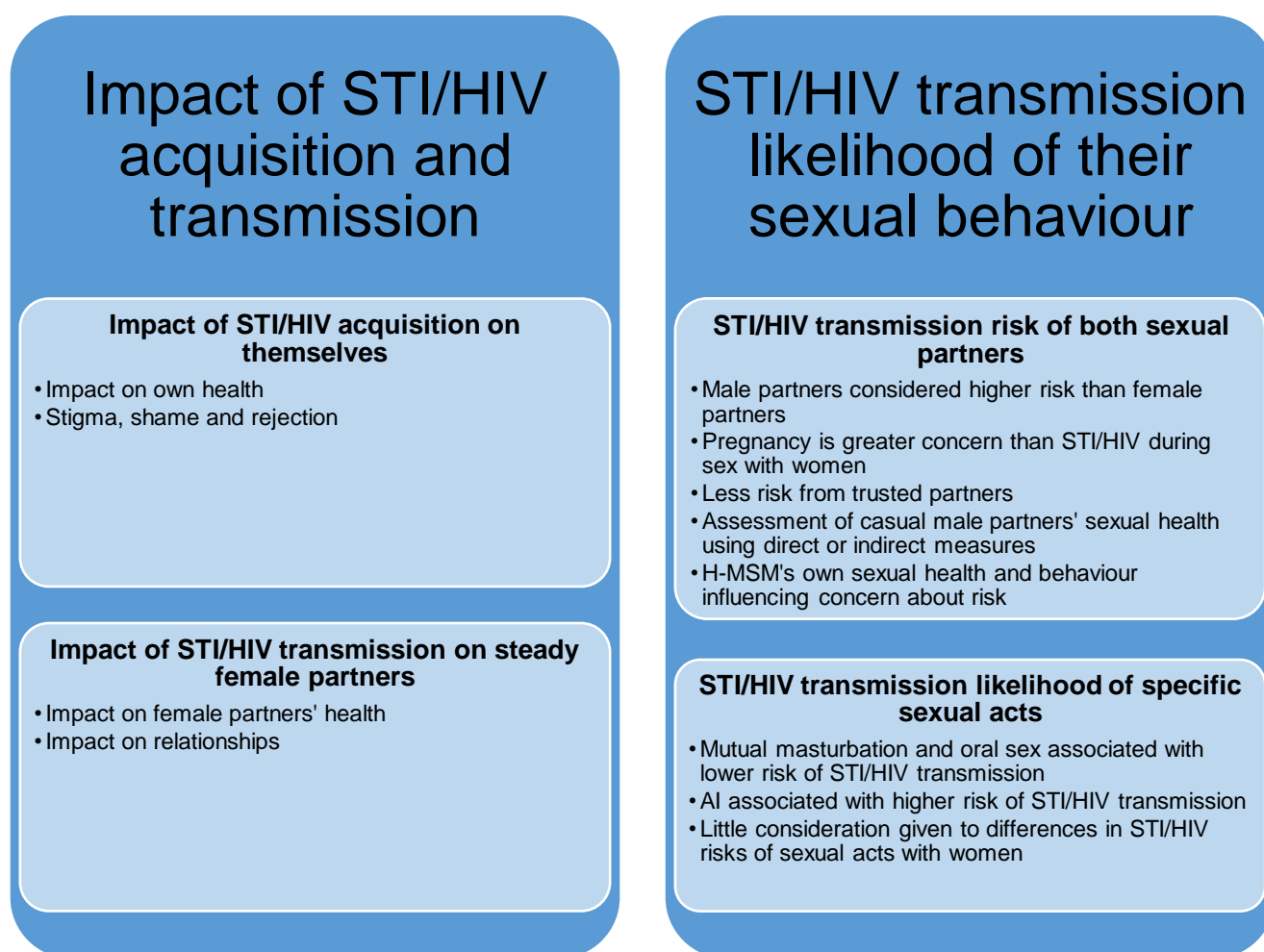


Figure 8: Thematic map of H-MSM's perception of STI/HIV risk during sex with partners of any gender.

6.3.1 Impact of STI/HIV acquisition and transmission

Participants considered the impact of STI/HIV acquisition and transmission both in terms of the impact to themselves, as well as in relation to their long-term or steady female partners.

6.3.1.1 Impact of STI/HIV acquisition to themselves

The impacts of STI/HIV acquisition that participants discussed included that on their own health, as well as the stigma, shame and rejection that might result from positive diagnosis.

6.3.1.1.1 Health impact of STI/HIV acquisition

The majority of participants expressed some concern about the impact of HIV and STIs on their own health. Most concern regarded HIV, with some participants using terms such as “*life changing*” to describe the potential impact on their lives if they

acquired it. Older participants, who were in their 20s and 30s during the height of the AIDS epidemic, recalled seeing gay men (including friends and colleagues) die of AIDS, and the impact that had had on them.

P03 (69, mostly straight): Well, it has, because in my work and seeing colleagues, I was only too aware of how serious – well, they didn't call it HIV then – AIDS was, yes. Because one or two colleagues died and also in my work I was treating people with HIV.

For other younger participants who were children during this time, their perception of HIV had been influenced by parents, friends, teachers, and popular culture. Despite growing up after the advent of effective treatment, HIV was still a source of some anxiety with regards to sex.

P12 (35, mostly straight): I went to school in the 90's where the AIDS epidemic was just starting to die down, but our parents – or my parents, sorry – it had been drummed into them how important it is and they had passed it on to ourselves. Like secondary school teachers were explaining “some of these things are so bad, you can't get rid of them” and that was always like a real fear for myself.

Some participants reported similar concern about STIs. For some, this perception was shaped by previous unpleasant experiences of STIs. This, in turn, influenced their desire to prevent future infections.

P02 (35, mostly straight/bisexual-leaning straight): I picked up an STD from a girl a couple of years back, a T-Girl, sorry, and it was my own fault because we were just going at it without any condoms. I only saw her a couple of times but I got a severe infection and my balls were swollen, I think it was chlamydia, it was one of the ones, I had to get injections and all sorts of shit. So I kind of learnt the hard way.

However, for other participants, STIs were of less concern. This was related to both the relative ease of treatment of some STIs compared to HIV, as well as a feeling that they had less impact on health than HIV, with one participant describing them as

a “*minor inconvenience*” (P12, 35, mostly straight). This resulted in a difference in the seriousness with which HIV and STIs were perceived.

P05 (30, mostly straight): [The] HIV [test] is always the one that I ask about. If I had any of the others it wouldn't bother me because I know that they're treatable. I've had like the HPV vaccine, and obviously they are very unsightly and you can't have sex for what can be a long time, but yeah, the HIV is always my main concern. So they're always going “Yeah, you're free of chlamydia,” and I was like yeah, what is the blood sample like? I want to know the big one.

6.3.1.1.2 Stigma, shame and rejection resulting from STI/HIV diagnoses

Participants' concern about STI/HIV transmission did not just focus on the impact on their health, but also on the stigma they might face if they were diagnosed with HIV or an STI. Societal perceptions of these conditions influenced some participants' feelings of shame. One participant recalling growing up at a time when HIV and AIDS were used “*almost like a curse word, like a swear word, [...] you became like a social pariah*” (P12, 35, mostly straight), while another described his anxiety around telling his girlfriend about a syphilis diagnosis, “*because chlamydia is chlamydia, but syphilis [...] makes me look like a Victorian prostitute*” (P05, 30, mostly straight). This meant that participants worried about the impact of others' perceptions of them should they be diagnosed with HIV or an STI.

P15 (27, mostly straight): So, yeah, it's a big fear of having – if I had the condition then the disease and people's reactions, perceptions, how it would affect my work and my life, and what that means, and trying to educate my ignorance and naivety, I think.

Stigma and shame could also come directly from sexual partners at the time of partner notification. Some participants described negative reactions, including blame, from previous sexual partners (of any gender) upon notifying them of STI diagnoses.

P11 (24, mostly straight): I did have to tell, I was talking to a girl/dating this girl for like a month in, I had to tell her [about his gonorrhoea diagnosis], God she did not take it well, we ended up

breaking up, sort of for other reasons but it was, it happened right at the time.

An STI/HIV diagnosis acquired as a result of their sex with men also posed a threat to other relationships, as it would mean disclosing their sex with men to people in their lives who were otherwise unaware of it and possibly not accepting of it. Some participants voiced fears of rejection or disapproval from families they typically described as conservative, traditional, or religious. In the quote below, a South Asian participant describes how his family's opposition to homosexuality, which would inform their reaction if he disclosed any STI/HIV infection, played a role in his perception of STI/HIV risk.

P01 (30, straight): I'm from a community what's very religious and very community orientated [...] so I could never tell my parents, because they're very traditional, about what was going on or what the case was. They would see it as a western concept that's against the laws [...] I think that's what plays with my mind as well, sometimes that imagine if the family found out, I'd be offending people.

Evidently, beyond just the impact on their physical health, diagnosis with HIV or STIs was also a potential source of stigma, shame, and rejection.

6.3.1.2 Impact of STI/HIV transmission on female partners and relationships

When thinking about the potential impact of STI/HIV transmission as a result of their sexual behaviour, participants also considered how transmission would affect their female partners and their relationships with those partners.

6.3.1.2.1 Impact on their female partners' health

Some participants discussed STI/HIV transmission by considering the health of their female partners. These men understood how any sex they had outside of these relationships could impact the health of their female partners and were worried about inadvertent onward transmission of STIs to their female partners.

P05 (30, mostly straight): Oh yeah, like partly also the reason why we don't have sex is because I'm always worried about giving her stuff.

One participant, who had sex with both men and women outside of his marriage, discussed this concern in terms of a sense of responsibility.

P01 (30, straight): At the end of the day, you don't want to mess up someone else's life when you're married to an individual and you're committed to her, so why should you bother? This is just like enjoyment, fun for a little bit. But your wife is different, like you're married to.

The health of their female partners, therefore, figured strongly in STI/HIV prevention decision-making, with participants employing a variety of strategies to minimise risk of onward transmission to their partners. These strategies are discussed in section 6.4.

6.3.1.2.2 Impact on steady relationships

STI/HIV acquisition or onward transmission to partners also threatened participants' relationships with steady female partners. Most participants in this study felt their female partners would not judge them based on their sex with men (or trans women, as in the case of the participant below). However, informing those partners of an STI diagnosis would constitute a revelation of sex outside of that relationship, which participants felt would pose a major threat to the health of their relationship.

P02 (35, mostly straight/bisexual-leaning straight): And also I wouldn't want to pick up something and then pass it on to my girlfriend and then that would really screw things up [...] I don't think she would judge me too much on the fact that it's a T-Girl, she has a brother who is gay, so she is quite open and she's pretty open to all these kinds of things. I think it would just be the fact that I cheated on her.

Participants acknowledged the responsibility to inform their sexual partners if they were diagnosed in future, with some having done so (with both female and male partners) in the past.

Interviewer: And can you think of a situation in which you would tell a female partner about your experiences with guys?

P15 (27, mostly straight): I think I would, I would absolutely tell them if I had an STI check and that came back with something. Whether that was [HIV] or an STI I would absolutely tell them. [...] It would obviously just take a lot of balls to tell that girl, but I would if that happened.

However, the threat that disclosure of an STI/HIV diagnosis posed to their relationship meant that most participants engaging in sex with others outside of their relationship took steps to avoid this happening. This is discussed in section 6.4.

6.3.2 STI/HIV transmission likelihood of their sexual behaviour

In assessing the STI/HIV transmission risk of the sex they had, participants also considered the likelihood of transmission resulting from that behaviour. Participants assessed this using direct and indirect measures of theirs and their partners' sexual health, as well as the transmission likelihood of the specific acts they engaged in.

6.3.2.1 Transmission risk posed by their sexual partners and themselves

Participants assessed their own risk of STI/HIV acquisition based on their partners' sexual health, the sex of their partners (with male partners considered to represent a greater risk of acquisition than female partners), and other proxy measures of risk such as drug use or location. Participants also assessed the risk of STI/HIV transmission *to* their partners, based on their own sexual health or recent behaviour.

6.3.2.1.1 Men considered higher risk than women

Participants generally considered sex with men to represent a higher likelihood of STI/HIV acquisition than sex with women. Two participants referred to common stereotypes about gay men, such as their supposed promiscuity, to support this perception. Both participants who made these statements described not being comfortable with gay men in social situations. As such, their only interactions with gay men were generally through the apps they used to meet male sexual partners, which likely influenced their perception of other MSM.

P02 (30, mostly straight/bisexual-leaning straight): I know that obviously in the gay fraternity, you know, disease is quite rife and

people are constantly fucking everybody so I am a lot more wary when I'm with a T-Girl about picking something up.

However, others supported this view with more factual claims such as the higher prevalence of HIV and STIs among MSM, or pointed to the ban on blood donation from MSM in the UK.²⁹² This meant that STI/HIV prevention was generally taken more seriously with male partners than with female partners.

P05 (30, mostly straight): Well I suppose the point is, is that men who have sex with men are at far greater risk of getting HIV and STIs, fact.

Participants also considered the potential for STI or HIV acquisition during sex with women, though this was not as common. Participants acknowledged that condomless sex with women was also a possible source of infection, with younger participants in particular considering men and women similarly in terms of risk perception.

P10 (27, bisexual-leaning straight): Just like protection is important for men, it's also important for women as well to sort of prevent the spread of or the acquiring of these transmitted diseases.

6.3.2.1.2 Pregnancy is greater concern than STI/HIV transmission during sex with women

For many participants who also had sex with women, the primary concern for some during sex with female partners was pregnancy. This meant participants' focus with female partners was usually on pregnancy prevention, with less thought given to STI (and especially HIV) prevention measures. As a result, STI/HIV prevention measures were neglected if participants were assured there was no risk of pregnancy.

P15 (27, mostly straight): I think the time I've actually used condoms and actually finished in wearing a condom, I think it's where I haven't trusted the girl in saying that they've taken the pill, so I've put a condom on for that reason because I didn't want them to get pregnant.

6.3.2.1.3 Less risk from trusted partners

Participants described trusting certain sexual partners to give them honest and accurate information about their sexual health (and, in the case of female partners, use of contraception), and to do so unprompted if necessary. As a result, participants considered these partners to pose less of a risk of STI/HIV transmission. Participants most often described this with female partners with whom they were in steady relationships, and this was often linked to agreed exclusivity (section 6.4.1). However, it was also discussed in the context of both male and female partners with whom participants had another form of established (but not necessarily exclusive) relationship, such as romantic, a regular sexual relationship (e.g. fuckbuddy), or friendship.

P04 (61, mostly straight): I am aware that my female partner in the UK is not having sex with anybody else and that's fine. My male partner, um, I've got understanding with, because they're a friend rather than just a sexual partner, who they will tell me and they will expect me to tell them if there is any suggestion of anything being wrong or even a slight risk of something going to be wrong, you know, "Oh I met somebody the other night and we, you know".

However, the experiences of one participant illustrated how this trust could also develop relatively quickly with new casual partners. This participant, who identified privately as mostly gay, described how he could develop feelings of trust and connection with some men he met through hook-up apps, he such that he would feel comfortable engaging in sex with higher risk of STI/HIV transmission than he normally would with other men, including receptive AI or CAI.

P09 (43, mostly gay): I'm talking to this guy at the moment on Grindr, and I want to get to know him first before I do anything with him because he seems quite nice. I think that he's quite sweet in how he's talking to me. I'd rather get to know him first before I do anything with him [...] so if it happens with this guy and he didn't want to use [a condom], and he told me he was negative, then I wouldn't use one. I know you should really, but if we've discussed it

and then he's saying he's all right then I would take his word for it usually.

6.3.2.1.4 Assessment of casual male partners' sexual health using direct or indirect measures

Participants used measures of casual male partners' sexual health, such as HIV status, testing history or use of preventative measures to assess their risk of STI/HIV acquisition. This information was often determined via these partners' profiles (if meeting on a sexual networking app or website) as well as conversations prior to meeting. For example, participants described asking potential partners their HIV status, with a positive HIV status seen by some as representing higher risk in a partner. This was sometimes the case even when the participant understood that men with an undetectable viral load were unable to transmit the virus to partners.

P12 (35, mostly straight): It sounds dreadful, but I think if someone openly stated on their profile that they were either HIV positive or had an STD, that would be a complete no for me. Even though I'm fully aware with modern HIV drugs and retrovirals, there can be no viral load, [...] they can't pass it on any more than anyone else could. I would always be concerned, and I think that sort of fear and that concern would ruin any sort of enjoyment I would have.

However, other participants described previously meeting for sex men who had HIV. In these cases, their reported use of treatment or undetectable viral load provided reassurance that the risk of transmission was low. Similarly, PrEP use by potential partners provided reassurance for some participants, indicating to them that their partner presumably did not have HIV.

P14 (27, straight): You know, it is a conversation that I have had with the guys that I've slept with and gone like "are you on PrEP, is it something that you take?" "Do you take anything else for your HIV?" And they either say yeah or no, and I ask them, you know, like the whys and wherefores, you know.

Participants also described assessing potential male partners based on their testing history, perceiving infrequent testing to indicate higher likelihood of poorer sexual

health in a partner. This information then influenced whether they would meet these men and what sexual activities they would do with them, though some participants acknowledged that this information was not always reliable. In the quote below, one participant described how he would directly ask potential partners about their sexual health and testing history, and how the rest of the conversation with these partners informed his assessment of them:

P14 (27, straight): The app doesn't make it particularly easy to see [partners' testing history and sexual health], so typically I will just ask them straight up, like have you been checked, did you get checked recently, you know, regularly, when was your last, what were the results. And, again, depending on their responses on that, which to be honest with you I'm pretty sure most of them lie and just say yeah even if they don't, but at the same time it's the best argument I've got. [...] You know, judging off the rest of the conversation with them is how I will work out whether or not they've been entirely honest.

Finally, some participants used other characteristics of potential sexual partners as proxy measures of their health, such as intoxication with drugs, and residence in cities with large gay male populations. These characteristics represented an increased likelihood of a partner either having an STI/HIV, or that that partner would want to engage in sex with an increased risk of transmission. One participant discussed feeling comfortable having condomless sex with men from his local area, but that he would feel the need to use condoms if meeting men in Manchester, a city with a large gay community .

P05 (30, mostly straight): I think it's because of my area, I think like if I went to Manchester I'd probably be so shit scared that I'd probably like [use condoms], but yeah.

6.3.2.1.5 H-MSM's own health and behaviour influencing risk perception

Multiple participants also described how measures of their own sexual health influenced their behaviour. This was primarily discussed in terms of the sex they had with their female partners, including use of condoms, and was framed in terms of avoiding onward transmission to those partners. In some cases, participants described situations in which they considered themselves posing a high risk of

onward transmission to their partners, such as after diagnosis with an STI, or when they engaged in concurrent sex with men while in a steady relationship with their female partner.

P15 (27, mostly straight): I would tell them [about an STI diagnosis] before sleeping with them, because I'm not going to be one of those dickheads that goes and has sex with them knowing that I had that disease.

Other participants described situations in which they had no strong reason to believe they might pose a transmission risk to their partners but wanted the assurance of a sexual health screening to be certain, such as before ceasing condom use with a new steady partner.

P12 (35, mostly straight): We did use condoms at the start and then we both went for a screening at the local GUM [...] after that came back that no one is carrying any nasties – more me rather than her – we thought ‘well OK, as long as you take the pill, that should be fine’.

Participants used their assessments of the risk of STI/HIV transmission posed by their partners and well as themselves to decide which STI/HIV prevention strategies they would use during sex, as discussed in section 6.4.

6.3.2.2 Likelihood of STI/HIV transmission of specific sexual acts

As discussed earlier, participants were more vigilant about STI/HIV transmission with regards to the sex they had with men than with women. This meant that they were more likely to assess the transmission risk of particular sexual acts with men, in a way that was rarely discussed in the context of sex with women. This then influenced what sexual acts participants were prepared to engage in with their male sexual partners.

6.3.2.2.1 Mutual masturbation and oral sex associated with low likelihood of STI/HIV transmission

Mutual masturbation and the use of sexual toys were believed to represent minimal risk of STI/HIV transmission to or from male sexual partners. This meant that they were considered a safer option for participants who were particularly anxious about the possibility of STI/HIV acquisition.

P03 (69, mostly straight): My understanding is that the sort of things like mutual masturbation and kissing is a minimal risk really of HIV and pretty minimal risk of syphilis or anything else really.

Some participants did acknowledge that there was some risk of STI transmission during oral sex. However, the relative ease with which STIs could be treated, as well as the minimal risk of HIV transmission during oral sex, meant that it was generally seen by most participants to be a safer activity.

P14 (27, straight): [A]s far as I'm aware there's a very, very low risk of STI or STD transmission through oral sex, and secondly because it's a lot more readily treatable from what I understand, you know, HIV doesn't typically transmit through oral sex, as long as you don't have sores, as long as you don't have any injuries in your mouth, so it's safer, you know.

6.3.2.2.2 AI associated with higher likelihood of STI/HIV transmission

Participants generally considered AI to be associated with a higher likelihood of STI/HIV transmission. Some participants understood that, although AI was associated with a higher possibility of STI/HIV transmission, this risk could be mitigated by condom use.

P12 (35, mostly straight): There will always be a greater risk just because, biologically speaking, I was having sex with other men – like having anal sex with other men – it does have a higher risk, just because the way – it's very vascular, tears are easier to create. There just is that increased risk as far as I'm aware. But I do think I did my best to mitigate those risks. [...] with anal sex, full anal sex, I always wore a condom.

For other participants, however, AI was considered to pose too high a risk of STI/HIV acquisition, regardless of condom use or position. This was reflected in one participant's explanation of why he was not interested in AI with men.

Interviewer: So, could you see yourself ever getting to a point where you wanted to do that [AI with a male partner] in the future?

P15 (27, mostly straight): I would say for now it's absolutely not, because I just wouldn't feel safe. And the whole thing about them obviously not wearing protection, it scares me 100 percent. So, yeah, that's a no-no.

6.3.2.2.3 Little consideration given to differences in STI/HIV risks of sexual acts with women

In line with the finding that participants' primary concern with female partners was the avoidance of pregnancy, less consideration was given to differences in STI/HIV risk of specific sexual acts with female partners. One participant did acknowledge that giving oral sex or digital stimulation to his fiancé presented a lower likelihood of inadvertent onward transmission of STI/HIV than vaginal sex. This is discussed in greater detail in section 6.4.3.2. However, with this exception, STI/HIV transmission was generally only discussed in the context of vaginal sex.

6.4 Prevention of STI/HIV acquisition and transmission

Participants discussed using a range of strategies to prevent or reduce the risk of STI/HIV acquisition and onward transmission. These strategies included: exclusivity with long-term steady partners; selection of sexual partners based on assessments of their sexual health; limiting their sexual repertoire with partners; use of condoms; biomedical interventions such as HIV post-exposure prophylaxis (PEP) and PrEP; and STI/HIV testing (Figure 9).

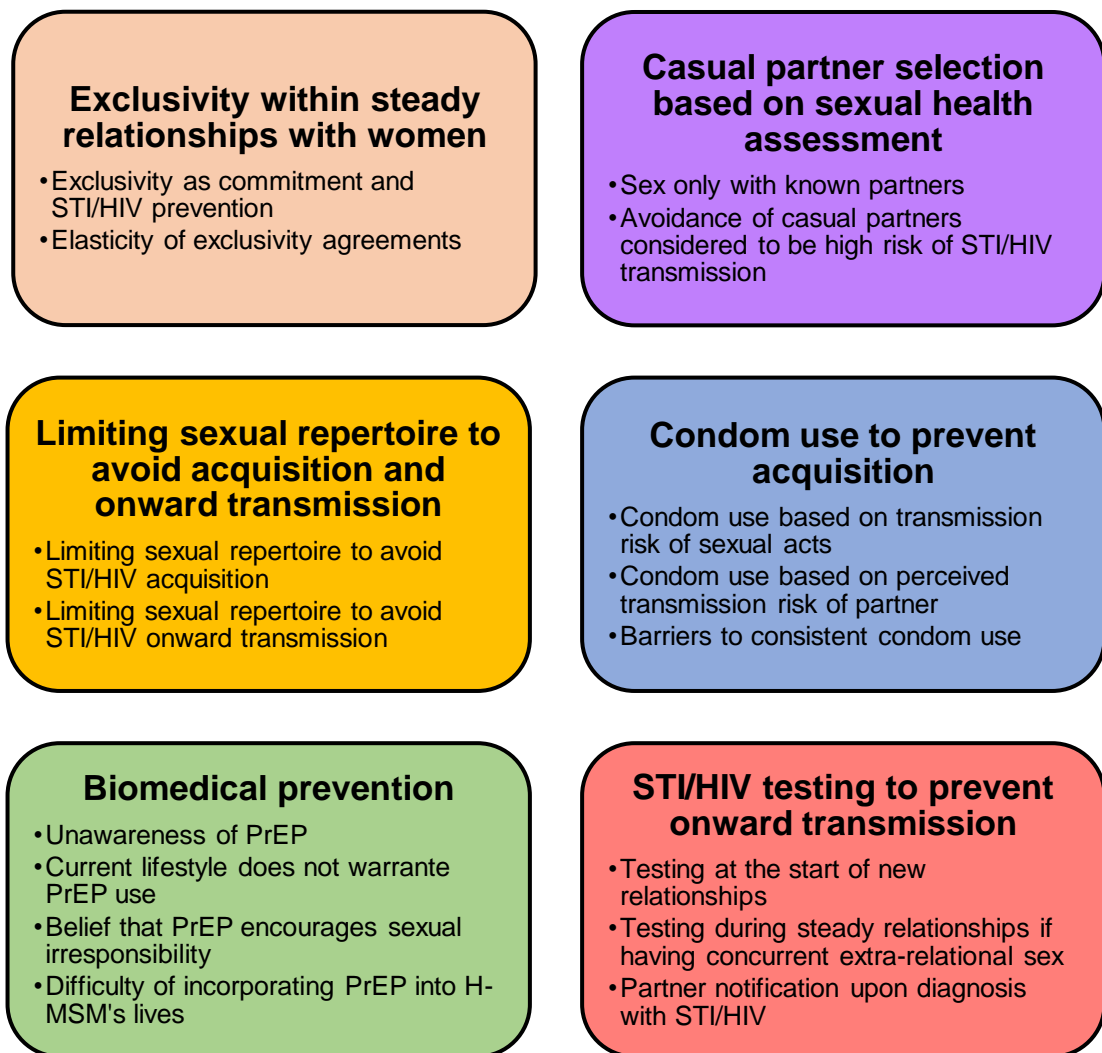


Figure 9: STI/HIV transmission prevention and risk reduction strategies discussed by H-MSM.

6.4.1 Exclusivity within steady relationships with women

With one exception, participants who were currently or had previously been in steady relationships with women described these relationships as being sexually exclusive, in theory, if not necessarily in practice. Though often framed as a demonstration of commitment to their steady partners, exclusivity could also serve to limit transmission risk within those relationships if adhered to. In some cases, however, participants in these relationships found ways of excusing sex with men within the bounds of agreed exclusivity, limiting the effectiveness of this as a strategy.

6.4.1.1 Exclusivity as commitment and STI/HIV prevention

Some participants in long-term relationships with women described being sexually exclusive within these relationships. In most cases, abstaining from sex with others

(men and women) was framed as a demonstration of their commitment, with sex outside of these relationships described as “*cheating*”.

Interviewer: And when you were in these relationships were you also still occasionally meeting up with guys?

P14 (27, mostly straight): Not meeting up, but online, you know, online conversations were happening. [...] I always drew the line at actually physically meeting up when I was in relationships, you know, partly because it's cheating, to be honest, and I've been typically monogamous. So, it wasn't an option, it wasn't on the table to do that.

However, one participant explicitly described this also as a way of reducing the risk of STI/HIV transmission once he and his girlfriend stopped using condoms. He described exclusivity as a compromise that was necessary if they were no longer to use condoms. Sexual exclusivity was therefore understood as a way of preventing STI/HIV transmission within their relationship.

P12 (35, mostly straight): I was a little bit more open-minded about the whole affair, but she was dead set on it would be 100% exclusive. Which I agreed to, I wouldn't say I was 100% happy about it, but that's part of being in a relationship, you have to do things that might go against your nature, as it were. But it was alright, if we want to not use condoms, then we have to be exclusive. [...] I don't think we could open it without damaging our relationship, which I obviously don't want to do.

6.4.1.2 Elasticity of exclusivity agreements

Some participants who were in steady (and supposedly exclusive) relationships with women found ways of excusing their sex with men outside of these relationships. Although they acknowledged they were being unfaithful to their romantic partners, they did not see the sex they had with other men as a major transgression of any implied agreements of exclusivity between them and their female partners. One participant had been married for 40 years and described never feeling “*the need or the desire*” to have sex with other women, saying “*I think I get an adequate*

heterosexual activity with my wife really that satisfies me" (P03, 69, mostly straight). He did, however, regularly engage in mutual masturbation with men he met at cruising spots. For participants like him, the sex they had with men was, in some way, fundamentally different to the sex they had with their female partners.

Other participants explicitly defined cheating exclusively as sex with other women. As these participants were not interested in romantic relationships with men, any sex they had with men did not represent a threat to their primary relationship. In contrast, sex with women would represent "*being unfaithful and untrustworthy*" (P08, 31, straight). This meant that they were able to accommodate sex with men in their agreements of exclusivity.

P05 (30, mostly straight): "I don't see me and guys as cheating, but me and girls cheating would be bad. I think because she knows that I'd never like be in a relationship with a guy, whereas I mean a girl would be like a worry to her. That's how I think anyway."

Participants in steady relationships with women typically no longer used condoms with their romantic partners because of the assumed exclusivity of the relationship. However, they were also concerned for their romantic partner's health, as well as preserving their relationship. Reintroduction of condoms would likely lead to suspicion, meaning they employed other strategies (discussed below) to reduce the risk of inadvertent onward transmission of STI/HIV to these partners as a result of their sex with men.

6.4.2 Casual partner selection based on assessment of risk

Participants who engaged in sex with casual male partners (whether they were in relationships or not) described carefully selecting partners to reduce risk of STI/HIV acquisition. As described in section 6.3.2.1.3, participants used both direct and indirect measures to assess casual partners' transmission risk. One use of these assessments was in deciding whether to have sex with a potential partner. The amount of information required, and the extent to which participants trusted this information, varied across participants.

6.4.2.1 Sex only with known partners

One participant's concern about STIs was such that he did not feel comfortable with any partners he did not already know. As such, he never sought to meet casual sexual partners online or at bars or cruising venues, and only had sex with partners he already knew well, such as friends.

P06 (24, exclusively straight): I'm literally petrified of sexual transmitted diseases. I'm really, you know, very petrified. I don't really get in touch with people who are anonymous. I don't really meet people because I don't really trust them hygienically, and then I never know, like what diseases or what things they hold [...] unless I trust them so completely, I don't really meet them, no, not even kiss.

Interviewer: So when you've met partners in the past, have they tended to be people who you already know?

P06: Yeah, who I already knew.

6.4.2.2 Avoidance of casual partners considered to be high risk of STI/HIV transmission

Other participants felt more comfortable meeting casual partners, but their assessment of their partners did influence their decision to meet with them. As previously discussed, this assessment depended on their partners' HIV status, testing history and other indirect measures such as substance use. When not comfortable with the transmission risk a potential partner posed, they refused to meet with them.

P09 (43, mostly gay): Some people on Grindr when you see when they last tested it's more than 12 months ago, and they're not updated, so you don't know how many sexual partners they've had in that time. But then I would stay clear of them, and also, I wouldn't go with people who don't have their status on their profile as well, because I sometimes think they might be hiding something.

This was one way in which participants' assessment of partners influenced their behaviour. These assessments also influenced what they did with partners they did meet, as discussed in sections 6.4.3 and 6.4.4.

6.4.3 Limiting sexual repertoire to avoid STI/HIV acquisition or onward transmission

Some participants described limiting their sexual repertoire with both male and female partners as a way of reducing STI/HIV transmission risk. This was most often (though not exclusively) reported by participants in steady relationships with female partners, framed as a way of both reducing the risk of acquiring STI/HIV from their male sexual partners, and, when practiced with female partners, of reducing the risk of onward transmission to those partners.

6.4.3.1 Limiting sexual repertoire to avoid STI/HIV acquisition

Participants' assessment of the transmission risk of specific sexual acts (section 6.3.2.2) influenced their intention to engage in those acts with partners. As a result, some participants considered some sexual acts to be too high risk, and therefore, did not engage in those acts with any partners.

One participant described previously enjoying AI (including receptive AI) with men as a young man in the late 1970s. However, since his marriage and the start of the AIDS epidemic in the 1980s, he had only engaged in kissing and mutual masturbation with men. He typically met anonymous men at cruising areas, and so had no information about the health of these partners. Limiting the sex he had to these acts therefore meant he felt there was minimal risk of STI/HIV transmission.

Interviewer: Do you think much about HIV or STIs with these partners?

P03 (69 years, mostly straight): Well, I do, that's why I try and only do mutual masturbation and don't get involved in oral or anal sex.[...] Since HIV, I have not had any sort of penetrative gay sex at all.

Other participants were prepared to accept the small possibility of transmission resulting from oral sex. However, for these participants, the potential for STI/HIV

transmission resulting from AI was too high, regardless of whether condoms were involved. They therefore did not engage in AI with any male partners. In the following quote, one participant described how this assessment of risk, informed by a discussion with a sexual health clinician, had influenced his decision to avoid AI and limit his sexual activity with men to only oral sex:

P01 (30, straight): I did speak to a specialist about this [...] And he said to me that “the risk of you transmitting disease or an infection is very low through oral than through anal”, so I thought to myself, why am I going to risk the activity when it’s more exposure, so I think it’s a release where you’re having a bit of fun, and that’s it mainly.

The participants discussed above generally described having sex with one-off and sometimes anonymous male partners, and so limiting the type of sex they had with these partners may allow these participants to feel safe during these encounters.

6.4.3.2 Limiting sexual repertoire to avoid STI/HIV transmission to steady female partners

Men who were in steady sexual relationships with women, and who had sex concurrently with men, also described limiting their sexual repertoire in ways which reduced the possibility for inadvertent STI/HIV transmission to their female partners. For some, this meant limiting the sex they had with their male partners. The two participants (P01 and P03) quoted in the previous section also partially attributed their limited sexual repertoire with men to a desire to prevent transmission to their wives. These participants continued to use condoms during sex with their wives (for reasons of cleanliness or to prevent pregnancy), and so the risk of transmission to their partners was relatively small. Limiting their transmission risk with male partners enabled these participants to reduce this risk even further.

Interviewer: If someone suggested doing something a bit more [than mutual masturbation], would that ever interest you?

P03 (69, mostly straight): Well, it might interest me but I have been careful to avoid any oral or anal sex since I’ve been married.

Some participants limited the type of sex they had with their steady female partners to minimise the risk of onward transmission. One participant, who reported frequent

condomless sex with men, described rarely having vaginal or oral sex with his fiancé, so as to reduce the risk of transmission to her. He instead used sexual aids (toys) or digital stimulation (fingering) unless he had tested recently and was certain there was no risk of transmission.

P05 (30, mostly straight): Oh yeah, yeah, like partly also the reason why we don't have sex is because I'm always worried about giving her stuff. So I will try and not meet guys and then get tested and make sure that I'm perfectly clean before we do anything, or I will just try and please her, so like finger her or like play toys and stuff like that, like safe ways of doing stuff.

One participant used both of these approaches at different stages of his marriage. After some years of sexual exclusivity with his wife, he started seeking sex with men. However, while sexually active with his wife, he limited the sex he had with men to oral sex only. He then gradually ended the sexual relationship with his wife, which allowed him to feel more comfortable engaging in AI with male partners. In this quote, he describes adopting this strategy as a way of both avoiding inadvertent transmission, as well as the forced disclosure of his sex with men this would have resulted in:

P09 (43, mostly gay): So, when I was meeting the guys, I wasn't having sex with them, I was just getting blown. Yeah, so when I was sleeping with her still, I wasn't having sex with them. Just blowjobs. Because I kind of thought it was easier and then there's less risk and stuff. But it's only when I started having sex with guys that I [...] stopped having sex with her because I didn't know what was going to happen or anything, and then it would be obvious I'd been sleeping around if something happened to her.

The narratives of these participants show that while some H-MSM engage in concurrent sex with both steady female partners and male partners, some will limit their behaviour out of concern for the health of their steady partners, as well as the health of their relationship.

6.4.4 Condom use

Condom use was mostly discussed by most participants as a way of preventing STI/HIV acquisition, with two also discussing it in relation to preventing onward transmission. Participants described assessing the need to use condoms in individual sexual encounters based on both the characteristics of their partners (section 6.3.2.1), and the specific sexual acts (section 6.3.2.2).

6.4.4.1 Condom use based on transmission risk of sexual acts

Participants' assessment of the transmission risk of specific sexual acts guided their intention to use condoms. The perception of oral sex as a relatively low risk act (section 6.3.2.2) meant that no participants reported using condoms for oral sex, feeling this to be unnecessary. In contrast, AI was perceived as an act with higher risk of STI/HIV transmission, and so most participants who engaged in AI with male partners reported intending to use condoms.

P01 (30 years, straight): No I don't [use condoms for oral sex] to be honest with you, because I think to myself, what is the risk [of condomless oral sex] or what could actually happen? What is the exposure? There is no risk with that ideally. In terms of like if it's anal then it's different, because then it's risky.

Participants who practiced both insertive and receptive AI typically did not distinguish between these acts when discussing condom use. However, one participant acknowledged the higher STI/HIV transmission likelihood associated with receptive AI when compared to insertive AI. This difference in risk perception had meant that, despite reporting inconsistent condom use for insertive AI, he had consistently used condoms for receptive AI.

P09 (43, mostly gay): I've used a condom [when bottoming], yeah. Yeah, because I always read up stuff, and I think that – oh my god, this is going to sound awful, I know it's this risk of both sides, but you're more at risk if you bottom continuously, so I've kind of been reckless. Well I've not been reckless bottoming, no, I haven't, no.

Condom use for women was discussed only in the context of vaginal or anal sex. However, no distinction was made between these acts when discussing condom use.

6.4.4.2 Condom use based on perceived transmission risk of partners

Some participants decided on condom use based on the perceived transmission risk of their sexual partners. This resulted in participants typically using condoms for casual or new partners, and not using condoms for trusted partners.

6.4.4.2.1 Non-use for trusted partners

As discussed in section 6.4.2.1.3, participants trusted certain sexual partners to be honest with them about any sexual health concerns that would impact them. This trust meant that participants felt to engage in condomless sex with these partners without risk of STI/HIV acquisition.

Interviewer: When you're with your friend, do you guys use condoms or anything similar?

P04 (61, mostly straight): Not for all that because we're not sort of, ah, we are aware of our friendship and what we're doing and we're quite honest with each other, so anal sex doesn't really need condoms unless you're spreading it around too much and then you need to consider that.

6.4.4.2.2 Consistent condom use with casual partners

In contrast, some participants described a policy of consistent condom use with casual partners. Participants described this with both male and female partners. This was primarily out of concern for STI/HIV transmission but also, in the case of female partners, as a contraceptive measure. Although participants also described discussing sexual health and contraception with their partners before sex, consistent condom use with casual partners was a more reliable way of ensuring minimal risk of STI/HIV transmission or pregnancy.

P11 (24, mostly straight): I always use protection. Even if someone were to tell me they're on the Pill or this or that, I would still use a condom just because I don't want to put my trust in someone else

[...] even like when they're on the Pill, right, that doesn't protect you from everything, right, so I can still get an STI, so what's the point, right, so I would always opt for using a condom.

Participants who practiced consistent condom use felt comfortable expressing this preference with partners. For these participants, condom use was “*just a part of having sex with somebody*” (P14, 27, straight). Condom use was typically negotiated before meeting partners or just before sex, and these participants were prepared to reject a partner if they did not respect this preference.

P14 (27, straight): You know, it's not something I shy away from. I don't go 'oh, well ...' it's 'this is going to happen or else this isn't going to happen.' I need to know that essentially, I'm not going to catch anything from you, and if you're not prepared to put those barriers in place then I'm not prepared to be a willing sexual partner.

6.4.4.2.3 Condom use for extra-relational partners

Condom use was particularly important for two participants who reported sex outside of their primary relationships with women. They understood how inadvertent STI transmission to their partner as a result of their extra-relational sex would damage their relationship and so practiced consistent condom use with their extra-relational partners (of any gender) to avoid this happening. Describing why he tried to consistently use condoms with his trans women partners, one participant said, “*I wouldn't want to pick up something and then pass it on to my girlfriend and then that would really screw things up, so I try and be safe that way.*” (P02, 35, mostly straight/bisexual-leaning straight). Using condoms consistently for any extra-relational sex therefore prevent this from happening.

6.4.4.2.4 Condom use only when concerned about partners

Two participants described rarely using condoms with their sexual partners. These participants did, however, discuss choosing to use condoms when particular partners gave them some reason for concern. One participant described rarely using condoms with men in his area, instead leaving it to his partners to decide. He did, however, discuss how he would probably use condoms with partners from Manchester. This implied he considered his area to have low STI/HIV prevalence, while Manchester, a city with a large gay population, represented an area with higher

prevalence. He assessed therefore that sexual partners from Manchester represented a higher transmission risk, and so condoms would be necessary.

Interviewer: When you're with a guy, how do you make that decision of whether or not to use a condom?

P05 (30, mostly straight): He will ask. I do take them with me, I've got a bag that I take everything with, but generally they don't want it so [...] I think it's because of my area, I think like if I went to Manchester I'd probably be so shit scared that I'd probably like do it, but yeah.

Another participant similarly described rarely using condoms with his previous female partners. However, he did choose to when he was unsure of their contraception practices or if he believed they represented a transmission risk. Using condoms with these partners allowed him to mitigate any potential transmission or pregnancy risks.

P15 (27, mostly straight): I'm not anti-condoms, it's just more that it's been a last measure to prevent pregnancy because of my anxiety [...] To be honest, the only time I really [thought about STI/HIV] was when I found out that the girl that I was cheating on my girlfriend with was having sex with [another] man – that absolutely horrified me. So, in the last couple of times of sex I did use a condom and she did question why, but I couldn't tell her because I thought she was a slag because she was having sex with another bloke that was really dirty and slept around.

Though these participants typically did not use condoms with their partners, they chose to when they were concerned about specific partners.

6.4.4.3 Barriers to consistent condom use

Inconsistent use of condoms with partners was attributed to multiple reasons.

6.4.4.3.1 “Caught in the moment”

Some participants described simply being “caught in the moment” or not having condoms at the time. This was more often described as occurring with female

partners than with male partners, illustrating a more relaxed stance towards condom use with female partners due to a difference in their perception of the risk of sex with male and female partners. One participant, who reported consistent use of condoms with his previous male partners, described previous incidents of non-use with female partners:

P12 (35, mostly straight): I can't even say, if I'm perfectly honest, even when I've had like one-night stands, but with past female partners, I've been really good with condom use. Because sometimes you think 'well, haven't got any, there's none here', but you're past the point of no return.

6.4.4.3.2 Substance use

Others described intoxication due to alcohol use as being associated with non-use of condoms during sex, though again this was more commonly described with female partners. This contributed to the feeling of being “caught in the moment” described above.

Interviewer: And you mentioned that you usually would try to always use condoms. If you didn't then what would usually be the cause of that?

P11 (24, mostly straight): If I didn't, it would almost be, well it's a terrible answer, maybe we like ran out... or just being too fucked up, right.

6.4.4.3.3 Mental health contributing to risk behaviour

Mental health was only mentioned by one participant in relation to condom use and risk taking, but the circumstances of his situation are important with respect to this population. This participant self-identified as gay but identified publicly as straight. He was in an arranged marriage, had young children, and came from a community that was not accepting of homosexuality. Despite accepting his identity as a gay man, he felt unable to leave this marriage due to social pressure from his family and community. As a result, he frequently felt frustration at not being able to live the life he wanted to live. This had recently led to him engaging in uncharacteristic behaviours, including regular use of cocaine, use of GHB and crystal

methamphetamine with one male partner, and engaging in receptive AI and condomless insertive AI with male partners, activities he described as “reckless”.

P09 (43, mostly gay): I've been reckless in the fact that I've been doing coke now and again. I never used to do stuff like this because I've got two kids and a family, I've got a good job, but inside I'm kind of feeling a little bit like I don't care, so I don't care, so I'm doing it kind of thing. [...] So, when I did that time with T [crystal methamphetamine] and G [GHB] with this guy, I kind of knew him beforehand but I wasn't sure what his status was, so I did have unprotected sex with him. But like I said previously, at that moment in time I didn't care, if you know what I mean, I was like 'fuck it, I can't be arsed, fuck it, just do whatever you want to do.'

This illustrates the toll that minority stressors, linked to concealment, can take on the mental health of H-MSM, and how this can lead to increased STI/HIV risk.

6.4.5 Biomedical prevention of HIV infection (PEP and PrEP)

Use of PrEP or PEP was limited among participants, with only one participant having previously used PEP and currently using PrEP, another having discontinued PrEP, and a third having been offered PrEP but declined. Awareness of PrEP among participants was low, and while most participants were not interested in taking PrEP currently, there was some openness to taking it in future should their needs change. However, some barriers to PrEP uptake among H-MSM were identified, including a belief that PrEP encourages sexual irresponsibility, and difficulties incorporating PrEP use into their lives.

6.4.5.1 Unawareness of PrEP

As mentioned above, awareness of PrEP among participants was low, with half of participants having no or only partial awareness of PrEP. Even those who had heard of PrEP were generally unaware of how effective it was at preventing HIV, as illustrated by the following quote from one participant:

P12 (35, mostly straight): I'd have to guess, it's new so let's say [it reduces risk of infection by] more than 50% - I'm not going to say it's like 80% or 90%, because that would be like a miracle drug. But it

must be worthwhile doing it or else people wouldn't do it, if it was like 20%, I'd think there's no point.

In fact, trials have shown PrEP to have an effectiveness among MSM of 86%, and up to 100% when used correctly.^{293 294} This suggests that a primary barrier to uptake of PrEP among H-MSM is lack of awareness.

6.4.5.2 Current lifestyle does not warrant PrEP use

Once informed about PrEP, more than half of participants indicated that, while they were generally positive about PrEP, they would not take it themselves. The most common reason for this was that their current behaviour did not warrant usage. These participants consistently used condoms, had sex only with trusted partners, or simply did not engage in AI. They were comfortable with their current HIV risk-mitigation and felt they would not benefit from PrEP.

P14 (27, straight): For me it's too irregular. There's not really much point in regularly taking something for a risk that's so minor.

However, some participants also indicated that they would be open to taking it at some point in future when it met their needs, for example, if their behaviour changed. Some participants specifically described the extra security and confidence they would feel as a result of taking PrEP. One participant, who consistently used condoms for sex with both men and women, felt that this extra peace of mind, at least in terms of HIV, would both inspire trust in others and give him greater sexual freedom.

P10 (27 years, bisexual-leaning straight): I think it would sort of give me sort of a sense of confidence. I can be sort of more flexible with the kind of things I do with men and women and make me feel that I am more healthy as well, and that other people would also feel confident in engaging with me.

PrEP could therefore allow H-MSM the freedom to explore their sexuality in a way that is safe to them and their partners, at least in terms of HIV.

6.4.5.3 Belief that PrEP encourages sexual irresponsibility

One barrier identified to PrEP uptake among H-MSM who would benefit from it was a perception that PrEP encourages sexual irresponsibility, or was only suitable for the “*very promiscuous*”. This perception was held by a number of participants, including both of those with some experience of using it. One participant associated his commencement of PrEP with his recent “reckless” behaviour. For another participant, his negative feelings regarding PrEP use had resulted in him discontinuing use despite regularly engaging in CAI with men:

P05 (30, mostly straight): [I] took it on and off. But when I spoke to the doctor, the GUM Clinic Doctor, I said I felt really slutty taking it [...] which is stupid, I mean it's useful I've got it but it is stupid. It just made me feel like “oh if I take it, I can do whatever I want”, and I didn't want that feeling, because I felt I was being really reckless by taking it.

This attitude is reflective of the stigma around PrEP use in the wider MSM population^{295 296} as well as some HCPs,²⁹⁷ and suggests that this stigma may also play a role in discouraging PrEP use among H-MSM.

6.4.5.4 Difficulty of incorporating PrEP into H-MSM's lives

Finally, one participant's experience suggested that regular PrEP adherence may be challenging to incorporate into the lives of some H-MSM. This participant's wife was unaware of his regular sex with men, and he feared that her discovery of his PrEP medication could ultimately lead to disclosure of this. He therefore exercised additional discretion in managing his PrEP routine, to avoid this occurring.

P09 (43, mostly gay): So, basically I leave it in the car, so there's a hidden compartment in the car, and sometimes I have to go back in the – so I normally take it between seven and eight in the evening, so I'm going to have to change my hours because sometimes I forget to bring it out of the car so I have to go back down to the car to get it, so I have to say I've left my work stuff in the car to bring it back up and stuff like that. And then I'm scared that she might find it in the car.

Interviewer: What would happen if she did find it?

P09: She probably just would ask me what it was, she probably wouldn't read what it is, and I'd probably just say 'oh, it's to do with high blood pressure,' something like that, I don't know. But another lie, yeah.

This suggests that even those H-MSM who would benefit from and are willing to take PrEP may have difficulty incorporating it into their lives, particularly if living with partners or family unaware of their sex with men.

6.4.6 Testing to prevent onward transmission

Testing for HIV and STIs was sometimes discussed as a strategy for minimising risk of transmission to sexual partners. Participants described doing this at the start of new steady relationships, as well as during ongoing steady relationships in which they were engaging concurrently in extra-relational sex.

6.4.6.1 Testing at the start of new steady relationships

Some participants described testing for STI/HIV at the start of a new relationship, or before ceasing condom use with regular female partners. For some, this involved testing at the same time as their female partners. This served as a way of building trust between partners as well as reassurance.

P12 (35, mostly straight): We went at the same time, yeah. I'd been before because I thought it was just sensible. She hadn't been for many years so she was a bit nervous, and I said, "Well, there's nothing to be nervous about, but OK, why don't we both go together, have that done and then go for a nice lunch?" So it's not so awful."

6.4.6.2 Testing during steady relationships if having concurrent extra-relational sex

For participants in steady sexual relationships with women and also engaging in concurrent sex with men, testing was an additional method of reducing risk to their female partners. One participant, who had regular (often condomless) sex with men, described how he would have penetrative sex with his fiancé only after first abstaining from sex with men for an unspecified period of time and then getting

tested. By doing this he reduced the risk of inadvertent STI/HIV transmission to his fiancé.

P05 (30, mostly straight): I will try and not meet guys and then get tested and make sure that I'm perfectly clean before we do anything.

Participants' broader motivations for testing will be discussed in greater detail in Chapter 7.

6.4.6.3 Partner notification upon diagnosis with STI/HIV

A number of participants discussed how they would approach partner notification in the event of diagnosis with an STI or HIV. Most participants who discussed what they would do in the event of a positive diagnosis acknowledged that while notifying their partners would be difficult, it was important for them to do so. These participants felt they had a responsibility to their partners to inform them of any diagnosis that might affect them.

P15 (27, mostly straight): I think I would, I would absolutely tell [my female partners] if I had an STI check and that came back with something. Whether that was [HIV] or an STI I would absolutely tell them. I'm an honest person, so, yeah, no, I wouldn't hold that back. It would obviously just take a lot of balls to tell that girl, but I would if that happened.

One participant described his previous experiences of notifying (on separate occasions) casual male partners of syphilis and chlamydia diagnoses, with some reacting positively but others reacting very negatively. He acknowledged, however, that partner notification in the event of diagnosis with HIV would be much more difficult. He also noted that anonymous partner notification systems, which are intended to make partner notification easier by sending anonymous text messages to partners, could not be used by men like him who primarily spoke to casual partners through hook-up apps.

P05 (30, mostly straight): But if I was to contract like HIV tomorrow it would be awful because I'd have to tell people, and it would just be devastating. And I know there are like processes where I can give

the phone numbers and whatever, but I don't have the phone numbers of the people that I chat to, so it's difficult.

In the case of participants with steady female partners, partner notification would also involve a disclosure of sex outside of their relationship, including possibly their sex with other men, which participants believed could damage their relationships. Indeed, one participant indicated that rather than disclose to his female partner in the event of a positive STI diagnosis, he would instead find ways to avoid this, including avoiding sex with this partner until after any treatment was finished. His reference to the hypothetical STI being “*cleared up*” suggests that this would be solely in the context of a treatable STI. As such, it is not clear what his actions would be in the event of diagnosis with a more serious STI or HIV.

P02 (35, mostly straight / bisexual-leaning straight): That would be something again to hide because that will be, you know, “Where did you get this STI from?” So that, I'll have to do some James Bond shit then to hide all that. [...] I'd have to just hide it and maybe not see her for a couple of weeks or until it's cleared up or, you know, make some excuse for not having sex, but there's no way she could find out about that.

6.5 Discussion

6.5.1 Summary of findings

I interviewed 15 H-MSM resident in England about the sex they had (with partners of any gender), their perception of STI/HIV risk during sex, and how this informed their approach to preventing or reducing the risk of STI/HIV transmission during sex. These interviews suggest that, in assessing STI/HIV risk, H-MSM consider the potential impact of STI/HIV acquisition or transmission to themselves and also to their partners, especially steady female partners such as girlfriends or wives. They also consider how likely STI/HIV transmission is based on the sex acts themselves, and the perceived risk of their sexual partners and themselves. Based on these assessments, they practice several STI/HIV prevention or risk reduction strategies, though these vary in known effectiveness.

When considering the impact of STI/HIV acquisition, participants considered both the impact on their health, as well as the impact on their wider lives. They expressed concern about the immediate and long-term impact on their health as a result of STI/HIV acquisition. They also considered the potential for stigma and rejection from others as a result of any diagnosis, particularly those from families or communities that were not accepting of homosexuality. As observed for other MSM, HIV was considered to have greater potential impact than other STIs and was thus taken more seriously by some.^{298 299}

Sex with men was considered to represent higher risk of STI/HIV acquisition than sex with women, meaning participants considered risk more thoroughly with male sexual partners. Trusted male partners such as friends or fuckbuddies were considered lower risk than more casual partners (e.g. those met on hook-up apps or websites). Participants' assessments of the latter were informed by direct or proxy measures of their sexual health typically ascertained before meeting or before sex. When considering the transmission risk of specific sexual acts with men, participants believed that some acts (such as mutual masturbation or receiving oral sex) were associated with zero or low likelihood of STI/HIV transmission, and that others (such as AI) carried higher risk of transmission.

Based on these considerations, participants described a number of strategies to avoid acquiring STIs/HIV from their male partners. These include partner selection to avoid men they consider high risk, avoidance of sexual acts they considered high risk, and condom use during AI. These strategies were often used in combination, e.g. the specific acts they engaged in or their use of condoms for AI might depend on whether they considered their partner high or low risk. As participants' perceptions of risk differed, so too did their application of these strategies, with some considering all sex with casual male partners to be high risk, and some making more nuanced assessments. Use of biomedical HIV prevention strategies such as PrEP was low, reflecting a lack of awareness and a perception that PrEP use encouraged sexually irresponsible behaviour.

In contrast, when having sex with women, participants were less concerned about their risk of acquiring STIs or (especially) HIV *from* these partners, though some did report condom use with casual female partners for this reason. Instead, their main

concerns tended to be avoidance of pregnancy, and importantly, preventing inadvertent STI/HIV transmission to these partners from themselves. Participants cared especially for their steady female partners, understood how their own sexual health could negatively impact that of these partners, and so took measures to avoid this happening. For some, this meant use of condoms at the start of new sexual relationships with women (though this was more often described as a contraceptive measure), testing for STIs/HIV before discontinuing condom use with these partners, and mutual agreements of sexual exclusivity within steady relationships, with some not seeking male sexual partners while in relationships with women.

Some participants, however, did have concurrent male sexual partners while in supposedly exclusive relationships with women. Beyond their concern for their female partners' health, these participants were also concerned about the damage that STI/HIV acquisition or transmission to partners would cause to their relationship, and incorporated these concerns into their consideration of risk during sex, not only with their steady partners but also with extra-relational sexual partners.

Consequently, with male partners they were even more likely to practice the risk reduction strategies described earlier, including condom use during AI or avoidance of sexual acts they considered high risk. Some also limited the sex they had with their *female* partners to acts with low transmission risk, or avoided sex with these partners altogether. As this strategy was likely to raise suspicion from their partners, it was practiced only when participants had reason to believe they may have posed a genuine transmission risk to their partners. Importantly, of the 11 participants who reported current or previous steady relationships with women, only one reported concurrent condomless sex with both male and female partners, both of whom were steady or regular partners.

The approaches described above suggest that H-MSM have some understanding of their risk of STI/HIV acquisition, and take measures to reduce this. However, these strategies are not equally effective, especially in relation to STI transmission, meaning that these men may still be at some risk of infection. Though a number of participants did express concern about STIs, their prioritisation of HIV in risk considerations meant that measures to prevent other STIs were sometimes neglected if the risk of HIV was considered low, suggesting a disconnect between STI risk perception and STI prevention behaviour.³⁰⁰ For example, some participants

avoided AI with male partners as they considered it to be high risk, but also had condomless oral sex. Consequently, these men may not be at risk of HIV infection but are still at some risk of acquiring syphilis, gonorrhoea and chlamydia.^{301 302} While some participants practiced consistent condom use during AI with male partners, others' use of condoms was influenced by substance use or their risk assessments of partners. These assessments, however, depend on having accurate information about their partners' sexual health, meaning this strategy may not always be effective at reducing risk.³⁰³ Finally, participants' knowledge of PrEP, arguably the most effective HIV prevention strategy currently available, was low, suggesting these men may not be being receiving sexual health information intended for MSM. More concerning is the role that stigmatic preconceptions about PrEP users may play in limiting PrEP adoption in H-MSM who engage in higher HIV risk behaviour.²⁹⁶ There was also some indication that H-MSM living with female partners or other family may struggle to incorporate daily oral PrEP into their lives due to privacy concerns.

These results also have implications for H-MSM's potential role in facilitating STI/HIV transmission between MSM and heterosexual sexual networks. They suggest that some H-MSM are aware of how their behaviour and health could impact the health of their female partners and consequently adopt strategies to prevent this. However, as described above, some of the strategies adopted by participants to prevent STI/HIV acquisition have limited effectiveness. Assumptions or explicit agreements of sexual exclusivity in relationships also mean that men are less likely to use condoms during sex with steady female partners. As exclusivity is an effective risk reduction strategy only if adhered to by both partners, these results suggest that the female partners of some H-MSM may believe themselves to be at lower risk of STI/HIV acquisition than they are in reality.

6.5.2 Comparison with previous literature

Previous research among MSW has shown the main driver of condom use during sex with women to be risk of pregnancy,^{127 304-306} with STI risk perception not linked to condom use^{307 308} with female partners and some considering HIV to not be a risk during heterosexual sex at all.^{127 304} Men in these studies tended not to use condoms with their female partners when pregnancy was not a concern (e.g. if their partners were using other forms of contraception), and this was generally true of participants

in my study as well, though two participants also explicitly listed STI prevention as a reason for consistent condom use with their casual female partners. In common with other MSM, participants considered HIV to be more of a health risk than other STIs during sex with men.^{298 305} They also expressed concern about the impact of HIV on their wider lives as a result of stigma or rejection from those they love, echoing the narratives in previous studies of H-MSM living with HIV.¹⁰⁵ Previous research suggests that non-gay-identifying MSM living with HIV may experience worse physical and mental health outcomes and stigma than gay men living with HIV, due to having fewer connections to support communities and other people living with HIV.³⁰⁹

I found that the gap between the perceived impact of acquiring HIV and other STIs to be smallest among participants in steady relationships with women who also had concurrent male sexual partners. This is in part because, similar to other studies of H-MSM, participants in steady relationships with women were concerned about their extra-relational sex being discovered by their partners.^{21 22 105 244} However, importantly, these participants also expressed care and concern for their steady partners' health, and did not want to risk their partners' health. This has been observed in previous studies of H-MSMW^{62 106} and also noted by their HCPs,⁵⁸ and is in contrast to the commonly held view of H-MSMW as selfish or indifferent to their female partners.¹⁵⁷ Participants' adoption of strategies to avoid inadvertent STI/HIV transmission to steady partners has also been observed in qualitative studies of H-MSM,^{62 106} and is supported by quantitative studies (Chapter 5 and elsewhere²⁷⁴) showing that MSMW in relationships with women are less likely to report AI and CAI with male partners. Despite this, all but one of these men also reported condomless oral sex with their male partners, though studies show condom use for oral sex is low for both MSM³⁰¹ and heterosexuals.³¹⁰

In common with other studies of H-MSM, participants in my study reported not using condoms with trusted partners.^{62 241 247} These were typically steady female partners, which is unsurprising given the links between sexual trust and emotional intimacy.³¹¹ My participants typically did not seek emotional connection with their male partners, in common with H-MSM in previous studies,^{11 27 59 62 65 81} and so few reported having trusted male sexual partners such as those seen in studies of G-MSM and (to lesser extent) B-MSM.^{306 312 313} Most H-MSM in mine and other studies^{27 59 62 65 106 241 245}

also predominantly reported having one-off male partners. This meant that few men had fuckbuddy-style relationships such as those described in other studies of H-MSM.^{59 81 105} Only two participants in my study reported current or previous fuckbuddy-style relationships, and while these relationships may similarly build trust between partners,¹⁷² only one described his partner as a trusted partner in the context of condomless sex.

Other studies have reported on MSM's use of hook-up apps or websites to screen casual male partners based on sexual health indicators,³¹⁴⁻³¹⁷ most commonly HIV status but also, more recently, PrEP use or undetectable viral load.³¹⁸ These studies describe how discussions facilitated by these services about users' sexual health and sexual history allowed some MSM to develop feelings of trust and connection with partners that led to them engaging in sex with higher STI/HIV risk than they would with less trusted partners.^{316 317} In common with other strategies discussed by my participants, these discussions tend to focus on HIV status and not necessarily other STIs, which may explain why MSM who use hook-up apps are more likely than those who do not be diagnosed with chlamydia, gonorrhoea and syphilis, but not HIV.³¹⁹ However, while several participants in my study screened casual partners by HIV status, only one, who privately identified as gay, reported that his feelings of trust and connection with these partners influenced him to engage in higher STI/HIV risk sex. This suggests that this may also be less common for H-MSM who are not seeking emotional connection with their male partners.

In previous studies of H-MSM^{62 106} and MSMW,^{90 305} some men reported condomless sex with male partners due to lacking condoms or being "caught out". This was typically related to the fact these sexual encounters were unplanned. In contrast, the participants in my study generally met their casual male partners through hook-up apps and subsequently arranged meetings. This meant their sex with men was rarely unplanned, and so no participants provided this as an explanation for condomless sex with men, though several reported it with women. Previous studies have also found that for some H-MSM, their sex with men is explicitly associated with drug and alcohol use,^{62 106 241 244 246} and that this can lead to some engaging in sex they would not have while sober, including condomless sex.^{62 106 244 246} In many cases, this was linked to feelings of internalised homophobia, which led to men later regretting their behaviour. In contrast, most participants in my study were relatively at ease with their

same-sex activity. As such, while several reported using alcohol to facilitate their sex with men (especially early sexual experiences), only one participant, who described engaging in sex with men as a form of self-harm, reported consistently feeling regret after these experiences. Similarly, while three participants reported some sexualised use of drugs, only one participant reported engaging in CAI that he would not have had while sober, and this was explicitly linked to his frustration at having to conceal his true identity as a gay man. Finally, previous studies have identified masculinity as negatively influencing condom use among H-MSM^{62 241} and MSM³²⁰ more broadly, however I did not identify this as a factor in condom use or risk behaviour among participants in this study. The majority of men in this sample were relatively young, and most reported having multiple gay friends, suggesting they may be less influenced by normative standards of masculinity than men in other samples.

Most participants in my study were unaware of PrEP. Previous studies have reported low awareness among H-MSM²²⁰, B-MSM,³²¹ non-disclosing MSM,³²² MSM with regular female partners,³²³ and other MSMW.³²⁴ In contrast, regular HIV testing is associated with higher awareness³²³ and acceptability³²⁵ of PrEP among MSM in the UK. While participants in my study who tested regularly were more aware of PrEP than others, acceptability was low, even among these men. This was due to concerns about PrEP adoption similar to those voiced by MSM in other studies in the UK,³²⁶⁻³²⁸ including concerns about effectiveness, a desire not to take medication, and, in particular, concerns that adoption of PrEP would encourage behaviour change in them. This is related to stigmatising perceptions of PrEP adopters as sexually irresponsible, and is known to impact PrEP adoption more widely.²⁹⁶ Cost has been identified as a barrier to PrEP adoption in the USA³²⁹ and elsewhere,³³⁰ however this was not a concern for participants in my study, as at the time of interviews the NHS in the UK was expected to announce the rollout of its free PrEP programme imminently. Importantly, the difficulty one participant in my study discussed regarding concealment of his supply of daily PrEP from his family has been linked to inconsistent PrEP use resulting in subsequent HIV infection among H-MSMW.³³¹

7. Barriers and facilitators to STI/HIV testing and engagement with sexual healthcare for H-MSM in England

7.1 Introduction

Most national guidelines for STI and HIV testing recommend MSM test (at least) annually, with those engaging in sex with higher transmission risks encouraged to test more frequently.^{175 267-271} Despite this, analysis in Chapter 5 showed that only 54% of H-MSM in the included datasets reported *ever* testing for HIV, and less than a third reported testing for either HIV or STIs in the previous 12 months, up to 40% lower than reporting among G-MSM. While reporting of testing was higher among H-MSM reporting recent higher STI/HIV risk behaviour, it was still low at 36%, indicating a significant proportion of this population with unmet sexual healthcare needs that puts them at risk of poor sexual health. In this chapter, I therefore aimed to determine why uptake of testing specifically, and engagement with sexual healthcare more broadly, are low among this population, and how these could be improved. Specifically, the aim of this chapter was to:

1. Explore barriers and facilitators to STI/HIV testing and engagement with sexual healthcare for H-MSM.

To do this, I analysed data from qualitative interviews conducted with 15 H-MSM resident in England. I conducted an inductive thematic analysis to identify barriers and facilitators to testing and engagement with sexual healthcare and mapped these to components of the COM-B model.²⁰⁰ In the sections below, I present first the barriers and then the facilitators to STI/HIV testing and engagement with sexual healthcare among H-MSM in England. Illustrative quotes are presented to support findings and are also summarised in Appendix 16.

7.2 Barriers to STI/HIV testing and engagement with sexual healthcare for H-MSM

I identified multiple barriers to STI/HIV testing and engagement with sexual healthcare. These are summarised in Figure 10 in terms of the COM-B model,²⁰⁰ and discussed in detail below.

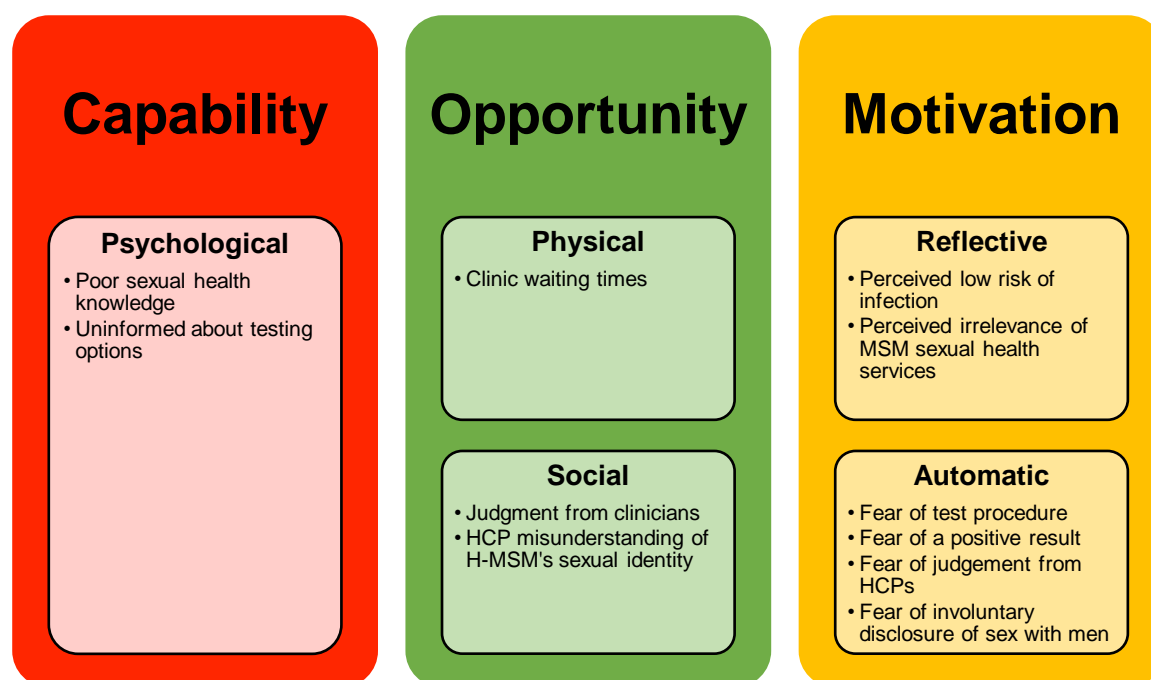


Figure 10: Barriers to STI/HIV testing and engagement with sexual healthcare identified from interviews with H-MSM in England.

7.2.1 Psychological capability

Barriers to STI/HIV testing and sexual healthcare engagement identified as relating to psychological capability are those associated with participants' mental capacity. I identified two psychological capability barriers, both associated with participants' awareness of sexual health and sexual healthcare. These concerned participants' lack of awareness of key sexual health information and of testing options.

7.2.1.1 Poor sexual health knowledge

Poor or low sexual health knowledge presented barriers to testing for some participants. Some participants seemed unaware of the possibility of asymptomatic infections. These participants attributed their infrequent testing to a lack of symptoms, which meant they felt no need to test, despite reporting sexual behaviour that warranted testing.

Interviewer: And why do you think that you haven't tested before?

P10 (27, bisexual-leaning straight): Because I've always been quite confident that I'm quite healthy and I've never ever actually had any symptoms of those transmitted diseases and I don't think there is that much of a need to.

Some participants gave statements indicating that they were poorly informed regarding the window period for STI/HIV testing. For example, some said that they had previously, or would in future, test immediately or very shortly after a sexual encounter they believed to be higher risk. Testing that shortly after exposure would be ineffective, though would allow participants to access emergency prevention options such as HIV-PEP.

P08 (31, straight): If it did come to that situation where I was involved in role play, you know, for the purposes of sexual gratification, then yes, afterwards, the morning after, I would sort of go and get checks done for STD and stuff like that.

Other participants relayed similar narratives regarding poor understanding of sexual health information relevant to MSM. For example, two participants described how, at their first same-sex sexual experience, they were not aware of the need to use lubricant during AI, having not previously used lubricant during vaginal sex with their female partners. This has also been observed in other studies of heterosexual MSEW.³³² H-MSM's limited sexual health awareness therefore has an impact beyond their engagement with sexual healthcare.

7.2.1.2 Uninformed about testing options

Lack of awareness of testing options may act as a barrier to testing among some H-MSM. Some participants were uninformed about the availability of remote testing options such as HIV self-testing and STI or HIV self-sampling kits. Along with the relative lack of awareness of PrEP among participants (section 6.4.5.1), this suggests that some H-MSM are not being reached with information about new testing and prevention options. One participant described how he had only recently seen an article on social media about HIV self-testing kits and was unaware of STI self-sampling kits, despite these having been available for a number of years:

P04 (61, mostly straight): ... for some reason yesterday I saw a little article on my Facebook about [home testing]. It was not at the time when I could manage to click on it and read it, it just really reiterated the fact that it exists, and I was going to check it out a bit more. [...] But whether or not they really want us to know about it is another thing because I've not heard of the all-in-one testing kit. I've heard of the HIV testing and I've not really even heard a lot about that.

Additionally, one participant from a conservative British South Asian community felt that other men in his situation would not be aware of where to go for STI/HIV testing. H-MSM in more conservative communities, which may not typically promote sexual health services, may therefore lack information on testing options, making such men even further removed from testing options.

P09 (43, mostly gay): I do feel that there's a lot of people in my situation that they probably wouldn't know where to go, or bury their head in the sand kind of thing.

7.2.2 Physical opportunity

Barriers categorised as physical opportunity are physical resources or temporal factors that participants described as hampering their ability to test or engage with sexual healthcare. Only one physical opportunity barrier was identified, relating to long waiting times for SHC consultations.

7.2.2.1 Clinic waiting times

Several participants discussed long waiting times to be seen by a HCP as a deterrent to testing at SHCs. They mentioned the inconvenience of having to set aside many hours to visit a clinic. Clinic waiting times therefore act as barriers to testing for those whose schedules are unable to accommodate long waiting times.

P11 (24, mostly straight): It was actually kind of frustrating, it was like, while they said it was a walk-in, you really should just make an appointment. And so I think I spent my first day, literally sitting in there for hours, like you know, they never like called me back. The second day, even when I had an appointment, it still took like hours, right, yeah. [...] I know that if I do want to get tested I would not go to

another sexual health clinic because that took two days. While they were great, it just wasn't fast.

7.2.3 Social opportunity

Social opportunity barriers are factors involving other people or social organisations that participants described as hampering their ability to test or engage with sexual healthcare. Two social opportunity barriers were identified, relating to participants' experiences of judgement and misunderstanding from HCPs.

7.2.3.1 Judgement from healthcare providers

Two participants reported previous instances of judgement from HCPs related to their heterosexual identity and their sexual activity with men. Both of these participants acknowledged that the majority of HCPs they had seen had been non-judgemental. However, they each described single instances in which HCPs had made comments the participants perceived as judgemental. In one case, the HCP had asked very intrusive, and in his view, inappropriate questions about the participant's marriage. While both of these participants continued to test frequently, these incidents had made them feel uncomfortable at the time.

P09 (43, mostly gay): The one time there was a lady who I saw, and I think she was relatively new, and she was really judgmental, proper asking me personal questions, 'and so how does your wife feel?' and things like that, and I felt really – not annoyed, uncomfortable. So, next time I asked to see a guy, and it took about an hour and a half for me to see a guy clinician. [...] so that's why I normally see a guy and I go during [MSM-focused clinic hours].

7.2.3.2 Healthcare provider misunderstanding of H-MSM's sexual identity

Some participants reported instances in which they had felt misunderstood by their HCPs, due to their HCPs' perception of a discordance between the participants' identities as heterosexual and their sexual activity with men. In these cases, the HCPs had implied that because the participant had sex with men, they should have identified as gay or bisexual, despite the participants explaining that they identified as straight. One participant described how this misunderstanding had resulted in him losing confidence in the HCP. This participant described his sexual behaviour with

men as a form of self-harm, and he felt that in dismissing his straight identity, the HCP was then unable to understand the context of his situation.

P14 (27, straight): I was going to get tested after having sex with a guy and realising I was at risk, and I sat down and I explained why I was there, and, you know, I said 'hey I'm straight and I'm doing this, and I'm not really okay with it,' and they responded with 'well, you know, it's okay to be bisexual, a lot of guys are actually bi and don't realise it,' and I had to stop the conversation and I was like 'no, I'm not bi, I've analysed this part of my personality quite a lot, it's to do with self-destruction, it's to do with self-harm,' and that's where, I said earlier, where it wasn't the responses I was looking for, I don't think they were educated in the idea that you can be having sex as a form of self-harm.

While these participants believed these HCPs were not imparting judgement with these assumptions, they did express some frustration, feeling that their clearly-expressed identities and needs were misunderstood.

7.2.4 Reflective motivation

Barriers categorised as relating to reflective motivation are processes involving conscious thought that led to reduced motivation to test or engage with sexual healthcare among participants. Reflective motivation barriers identified among participants included a perception that their sexual behaviour had a low risk of STI/HIV acquisition, and a perception that sexual health services targeting MSM were not relevant to H-MSM.

7.2.4.1 Perceived low risk of infection

Some participants justified their lack of testing on their perception that they were at a low risk of STI/HIV acquisition, although this judgement was often subjective. For some, this self-perceived low risk resulted from only engaging in same-sex sexual acts with lower risk of STI/HIV transmission (section 6.4.3.1). For one participant, this meant only engaging in activities such as kissing or mutual masturbation. Another participant who did engage in AI with partners felt that his consistent use of condoms justified his previous lack of testing. These participants believed their

behaviour presented few opportunities for STI/HIV transmission to occur, and so testing was unnecessary.

Interviewer: Okay, great. Given the sex that you have, do you think you're at much risk of HIV or STIs?

P10 (27, bisexual-leaning straight): No [...] because I use protection such as keeping myself clean, condoms, and sort of ensuring that I am engaging with people that are trusted and experienced.

For other participants, this perception of low risk came from having sex only with trusted regular partners (male or female), even if condoms were not used with these partners. One participant had condomless sex with both his live-in female partner and his regular male partner. Although he acknowledged that his male partner sometimes had other sexual partners, he felt that their mutual trust meant that they would be honest with each other in case of any possible exposure necessitating testing. In the absence of this, he felt no need to test.

P04 (61, mostly straight): There is a risk, not much. I am aware that the female partner in the UK is not having sex with anybody else and that's fine. My male partner, um, I've got understanding with, because they're a friend rather than just a sexual partner, who they will tell me and they will expect me to tell them if there is any suggestion of anything being wrong or even a slight risk of something going to be wrong, you know, sort of "Oh I met somebody the other night and we, you know". [...] I don't feel the need right now to be tested for anything.

Some participants did, therefore, feel that their risk mitigation or avoidance negated the need to test regularly. This judgement did not, however, always correlate with actual low risk, relying on participants having accurate sexual health information (such as the transmission risk associated with specific sexual acts), which some may be lacking (see section 7.2.1.1), as well as accurate information on the sexual behaviour and health of their partners (see section 6.3.2.1).

7.2.4.2 Perceived irrelevance of MSM sexual health services

The ways in which services and/or information for MSM were targeted influenced how relevant participants felt they were to them as H-MSM. For some participants, services or information targeting “gay or bisexual men” were felt to be irrelevant to them as men who identified as heterosexual, with some finding these labels exclusionary and irrelevant to them. While the label “men who have sex with men” was generally felt to be more relevant to these participants, there was a feeling from some that the term was too clinical or academic. This discomfort with specific sexuality labels attached to services meant that the majority of participants generally felt more comfortable attending services intended for the general population rather than MSM-focused services.

P12 (35, mostly straight): If it was specifically for gay men, I don't think I'd want to go in because I'm not gay, but then again, they would all be trained about that. I'd prefer to go like how they have it in the Royal Hospital in Liverpool where it's gents to the left, ladies to the right. So you don't know anyone's history, you don't know why anybody is there, you can't make any assumptions about anybody, you're all just there, together. So for me, personally, I wouldn't be opposed to going to one, but it wouldn't be my first choice. I would rather just go to one where it's generic for everybody.

However, despite not necessarily feeling comfortable with those labels, some participants understood that they were used as proxies for “men who have sex with men”. They would therefore use those services if they felt they would benefit from them.

P05 (30, mostly straight): The point is that I have sex with men, so it's just about - like I know there are a lot of people that don't like terms to identify people, like some people will say “Oh I don't really like being called gay” Or “I don't really like being called bisexual, I quite like queer or I don't really give a term to it”. I can completely understand why guys do want, you know, like to be called gay or bisexual - I personally don't, but that's just the way I am, but I completely understand why guys do. So if I saw something which

promoted for gay and bisexual men, I'm clever enough to know that like I could probably access that, you know [...] I would just hope that they would be, you know, very discreet and confidential, but yeah.

Two participants expressed a preference for MSM-focused services. They felt that HCPs at these services had more specialised knowledge about their healthcare needs. They also described greater comfort discussing their recent sexual activity with these HCPs, feeling they were more accepting and non-judgemental. One participant described why he preferred testing at an SHC situated within London's primary LGBTQ+ centre:

P04 (61, mostly straight): Well I mean I've said to you that personally I prefer that particular place in Dean Street because the relaxed atmosphere, pretty open. And it would be relevant to me in a way because first of all gay, bisexual or whatever, [...] they have a better understanding of what sex is and what diseases are and how to cure them.

Service promotion based on sexual identity, therefore, had the potential to deter or encourage testing among participants, depending on their comfort with those labels.

7.2.5 Automatic motivation

Barriers identified as relating to automatic motivation are instinctual or emotional impulses that reduced participants' motivation to test or engage with sexual healthcare. Automatic motivation barriers to testing and engagement with sexual healthcare reported by participants were fear and embarrassment. Participants expressed a range of fears related to testing and accessing sexual healthcare including: fear of the testing procedure; fear of a positive result; a fear of judgement from HCPs; and a fear that testing would lead to involuntary disclosure of their sex with men.

7.2.5.1 Fear of the test procedure

Fear of how samples were collected for STI/HIV testing deterred some participants from testing. While sample collection involving swabs or collection of urine was generally accepted, some participants described a fear of needles and blood as

preventing them from collecting their own blood samples for self-testing and self-sampling. These participants therefore preferred to test in-clinic where HCPs could take these samples.

P12 (35, mostly straight): I'm quite squeamish – I know that sounds really stupid, but if I had to draw my own blood or even prick my own finger, it would be a hard no for me. But if I had to just to swab my throat, swab my penis, like pee in a little tube – yeah, I'd do that.

Finally, one participant indicated that his previous lack of testing was related to his fear of the urethral swabs for STI testing. However, this was based on an outdated understanding of the testing process, and when informed of current test procedures, he was more inclined to test. For some H-MSM, this fear may therefore be based on misinformation.

P15 (27, mostly straight): I genuinely thought that you would have to go in with like a four-centimetre stick and shove it down and then put it in a test tube. [...] So, that's why I've never done one, is the truth, yeah.

7.2.5.2 Fear of a positive result

For some participants, the possibility of receiving a positive result was a deterrent to testing. Fear of a positive result was related to the potential stigma from others, negative feelings about oneself as a result of a diagnosis, and the potential impact on participants' lives as a result of a positive diagnosis. This was especially so in the case of HIV.

P15 (27, mostly straight): So, yeah, it's a big fear of having – if I had the condition then the disease and people's reactions, perceptions, how it would affect my work and my life, and what that means, and trying to educate my ignorance and naivety, I think.

Some participants were concerned about how they would react in the event of using an HIV self-testing kit and receiving a positive result. These participants were concerned that, without a HCP to provide support, this would be too psychologically damaging, and was a reason for not using a self-testing kit.

P12 (35, mostly straight): Also, it would be a no for me as well because if it said I was positive, like my heart would fall out through my arsehole. And potentially being there on my own – I don't want that and I would think the test isn't real and stuff like that. [...] it would worry me, because people, when they get bad news, they can do very unpleasant things to themselves.

Participants therefore considered the impact diagnosis with HIV or an STI could have on their health and other aspects of their lives, and this influenced their decision to test and how they would do so.

7.2.5.3 Fear of judgement from healthcare providers

Two participants described feeling concerned that they would face judgement from HCPs for their sexual behaviour, and that this influenced their feelings about disclosing their sex with men. Both participants, who were themselves of British South Asian ethnicity, referred to the ethnicity and culture of their HCPs as factors that influenced their concerns. They felt that HCPs from communities or cultures less accepting of homosexuality (including their own) were more likely to be judgemental than those from communities more accepting of homosexuality, basing this feeling on their lived experience as men within the British South Asian community as well as previous experiences with HCPs.

P01 (30, straight): I have spoken to my GP, I've been brave enough, and do you know my GP, my practitioner, at first I thought to myself he would act very negatively and respond very badly, but then he's from a south Asian community and made assumptions on that basis.

However, most participants generally expected HCPs to be open-minded and non-judgemental. Accordingly, this may be of particular concern for H-MSM from more conservative communities.

7.2.5.4 Fear of involuntary disclosure of sex with men to partners or family

The majority of participants had not previously disclosed their sex with men to others in their lives. For these participants, testing at SHCs potentially exposed them to discovery by others, and this therefore acted as a deterrent from testing. This was a

problem particularly for men living in small towns or from religious or ethnic communities in which same-sex sexual behaviour is stigmatised. One participant described the potential problems faced by other South Asian men like himself:

P08 (31, straight): So for instance you know, for [South Asian] men, there's probably a lot of them that are, you know, gay or bisexual, but if you have the clinic in East London where there's a high Bengali population and the likelihood of other people that they know seeing them come out of the centre, you know, so that is problematic isn't it?

Some participants also described feeling uncomfortable disclosing their sexual behaviour to their primary healthcare providers (GPs) or allowing GPs access to their sexual healthcare records. In contrast to the impersonal nature of SHCs, participants felt they had more intimate relationships with their GPs, describing them as “*too close to home*”. These participants feared that any information they disclosed could ultimately be relayed to their wives or other family members, particularly if their family also attended the same GP. As a result, these participants were reluctant to seek STI/HIV testing or other sexual health treatment from their GP.

Interviewer: So, how would you feel asking your GP for a sexual health screening?

P14 (27, straight): I wouldn't. And that's mostly because it's a family doctors, and as much as I trust them to be confidential and follow, you know, they'd follow the law, also most of my family goes to that doctor so there's just something in my head that says, 'hey,' you know, 'like maybe, maybe they'll tell your parents' or 'maybe they'll tell somebody,' you know, and it will eventually get its way about to my mum and dad, and that's not something I particularly want.

Finally, testing using self-testing or self-sampling kits also carried the possibility of discovery. This was particularly of concern for participants living with partners or other family members. These participants were concerned that their families would open their mail, or felt they lacked the necessary privacy to perform self-testing or

self-sampling at home. As such, they considered self-testing or self-sampling kits to be unsuitable and preferred to test at an SHC.

P09 (43, mostly gay): So, I can't have [a self-testing kit] delivered to the house because the kids will open it. Or the wife will say 'what is that.' And then I never normally have free time at home to be able to test myself, so, yeah. [...] If I was living on my own I would probably self-test, but with the kids and the wife around I wouldn't do it.

Involuntary disclosure of their sex with men to female partners would have real consequences to the lives of these participants. It was therefore something they took very seriously when considering testing options.

7.3 Facilitators to STI/HIV testing and engagement with sexual healthcare for H-MSM

I identified multiple facilitators to STI/HIV testing and engagement with sexual healthcare. These are summarised in Figure 11 in terms of the COM-B model²⁰⁰ and discussed in further detail below.

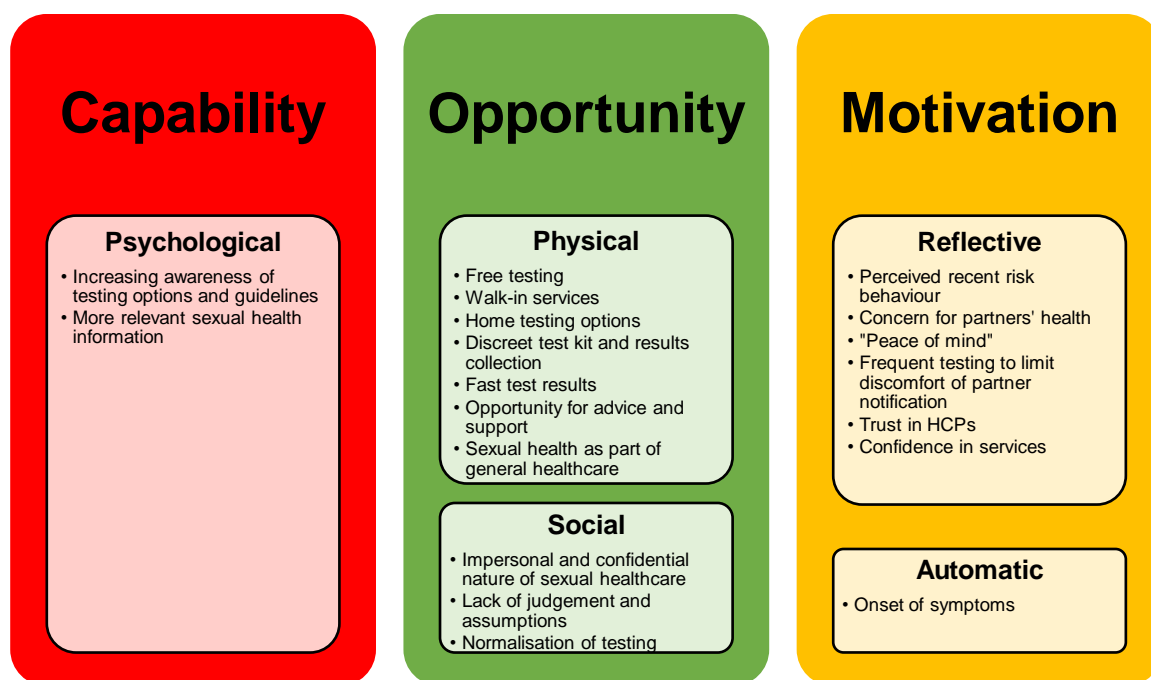


Figure 11: Facilitators to STI/HIV testing and engagement with sexual healthcare identified from interviews with H-MSM in England.

7.3.1 Psychological capability

Psychological capability facilitators were factors related to participants' mental capacity which enabled participants to test or engage with sexual healthcare. Identified psychological capability facilitators related to participants' knowledge and awareness of testing options and guidelines, and the provision of sexual health information relevant to H-MSM.

7.3.1.1 Increasing awareness of testing options and guidelines

Informing participants about testing options and guidelines was identified as a facilitator for testing. Participants who tested irregularly and were unaware of testing guidelines said they would test more regularly upon being informed of current testing frequency recommendations. These participants were also more inclined to test once informed of the availability of self-testing and self-sampling kits.

Interviewer: And how often do you think you would test now that you know about this?

P15 (27, mostly straight): To be honest I would annually probably, whether that's the right thing or not, if I'm not using condoms then that's – or if the recommendation is to do it twice a year, I'd do it twice a year. But whatever's recommended I would do it, no problem, knowing that it's just a spit in a test tube and get blood out of my finger won't be a problem.

Informing H-MSM about test procedures (including sample collection methods) may also correct any misinformation they have about testing, thus removing any concerns deterring these men from testing. This was the case for one participant, who had not previously tested out of a belief that sample collection was overly intrusive (see section 7.2.5.1).

Participants mentioned a range of locations from which they sought (or would seek) sexual health information. Some described trusting more clinical websites like that of the NHS, others mentioned sexual health outreach organisations like Terrence Higgins Trust. Others preferred to speak directly to a HCP (section 7.3.2.6). In terms of outreach to H-MSM, some suggested advertising on hook-up apps such as *Grindr* (section 7.3.1.2), or social media. Some also suggested broader outreach efforts

targeting the general population would be useful. For example, this participant felt that by not advertising STI/HIV testing and prevention options to a wider audience than just MSM, people who would benefit from these options within the general population (including men like him) were missing out.

P04 (61, mostly straight): But for this kind of thing [PrEP], I know there is something, taboo subjects about sex and everything, it's not something which the whole of the population is being told about. You don't get the advert just before Coronation Street saying "Here's the new tablets" and all this and we're not really told about it as such. And for me, that makes me feel that I'm missing out on something. [...] It also really is saying "Well HIV isn't that serious anymore because it can be prevented. A long way since "You've got HIV, you're going to die, you're going to get AIDS and die"

7.3.1.2 Sexual health information relevant to H-MSM

Some participants suggested that H-MSM could be encouraged to test more regularly by presenting them with sexual health information that was more relevant and specific to their experience and identity. These participants did not necessarily identify with information aimed at gay or bisexual men (section 7.2.4.2). They therefore felt that more personalised information would appeal to H-MSM like themselves.

P14 (27, straight): You know, [sexual health information relevant to H-MSM] being on Grindr would be absolutely fucking amazing because I think there's a lot of guys on there who are straight who join the site and get a lot of information aimed at gay and bisexual men but not aimed at themselves, and they don't see any relevance in, you know, accessing information available for gay and bisexual men because they don't identify as such.

7.3.2 Physical opportunity

Physical opportunity facilitators are physical resources or temporal factors that participants described as enabling them to test or engage with sexual healthcare. Participants discussed a range of attributes of sexual health services that would

encourage testing, including free testing options, walk-in services, home testing options, assurances of privacy, time to delivery of test results, opportunities for advice and support, and the inclusion of sexual health testing in general practice.

7.3.2.1 Free testing options

Though only mentioned by one participant, the availability of free testing in the UK was described as facilitating testing. This participant arrived in the UK from the USA around 18 months prior and had tested once in the UK. Although he had found some aspects of his testing experience in the UK frustrating (specifically booking and clinic wait times), the lack of cost meant that he compared it favourably to testing in the USA. Multiple studies of testing in the USA have found the cost of sexual healthcare a barrier to testing,³³³⁻³³⁶ and so it is unsurprising that free testing was raised by this participant.

P11 (24, mostly straight): But you know, I can't really complain, since like in America this shit ain't free anyway. [...] Yeah, so but I'm trying to get tested and I feel very, I enjoy the resources in London, right, but I think that's more just me because the American system is not really accessible.

7.3.2.2 Walk-in services

Walk-in sexual health services were highly valued by participants. These services allowed participants to fit testing into their lives when most convenient for them. This feeling was articulated by one participant when asked about when he would test in future:

P04 (61, mostly straight): Maybe if I'm walking past Dean Street for no reason whatsoever and I've had a pint of lager in the pub thinking "Dear, I shouldn't drink another pint until I've sobered up a bit". Or just because I feel like it. If, I mean I could say "Well hang on a minute, I'm here now, maybe I should go downstairs and get tested". [...] My ideal way is to be able to walk into any NHS establishment that specifically carries out these tests and get it as easily as you can get it in Dean Street.

Walk-in services therefore offered both convenience and spontaneity.

7.3.2.3 Remote testing options

Remote testing options such as home self-testing kits for HIV and self-sampling kits HIV and STIs were viewed very positively by the majority of participants. Only one participant had used them before, however, other participants were generally amenable to testing this way in future. The key benefit of these kits was the convenience they provided, allowing participants to fit sample collection into their schedule, rather than having to fit their schedule around a potentially long visit to a clinic.

Interviewer: Yeah. What appeals to you about [the self-sampling kit service]?

P11 (24, mostly straight): [It] has flexibility, works into my schedule, right. So it's like "Oh I should get tested" and I can say "Oh just mail it to me and I'm going to do it when I have free time", right, like whether that's this weekend or Thursday.

The ability to test in the comfort of their own home was also ideal for those not comfortable in a clinical environment.

Interviewer: How do you feel about [using a self-sampling kit] at home?

P13 (22, straight): Perfectly fine. It can be a lot better, especially to do it in the confines of your own home in comparison to a clinic where you might feel a bit on edge or not 100% sure how to do it. So, I feel like doing it at home is a lot better. And then you can just post it back, so it is easier.

Remote testing options may therefore appeal to H-MSM who do not wish to or are uncomfortable testing at SHCs, although because some H-MSM (particularly those living with their family) may lack the privacy to do self-sampling (section 7.2.5.4), home testing may not be an option for all H-MSM.

7.3.2.4 Discreet test kit and results collection

Some service attributes were suggested to address privacy concerns raised by participants. Concerns related to the privacy of home-delivery of remote testing kits

could be addressed by offering kit collection options, such as collection from clinics or pharmacies. Participants who were not comfortable receiving testing kits at home because of concerns about family or others finding the kits were generally open to collecting these kits from alternative locations, feeling this option provided greater privacy.

P13 (22, straight): I'd much rather go in personally because it avoids that, it's in plain packaging. Whereas maybe if it is delivered, it might reveal what it actually is and you might not want to have everyone know what you're going to do. So I feel it kind of greatly increases privacy if you can go and collect it yourself.

Similarly, offering multiple test result collection options addressed some concerns that participants had about receiving results via text message on their phones. While the majority of participants indicated they were happy to receive results this way, other methods of result collection such as online portals or directly calls to clinics provided additional privacy for participants concerned about others (such as female partners or other family members) intercepting these messages.

P01 (30, straight): I think I have received [results by text message] sometimes, like I said to the clinic staff "can you not send me messages by text" "and we'll call you instead", and I said "yes, calling me would be better. Don't be texting me, because imagine if someone was to read the message or someone was to see the message". So I told them, ring me, don't text me.

Participants were therefore more willing to engage with testing and sexual healthcare services when presented with options meeting their privacy needs.

7.3.2.5 Fast test results

Participants expressed a clear desire to receive their results as quickly as possible, with some discussing the anxiety induced by long waiting periods for results, specifically in the context of HIV testing. A testing service that offered quick delivery of results was therefore seen as highly desirable.

P12 (35, mostly straight): It would appeal to me if it was non-judgemental, that it was confidential and as quick as it could be, like

I don't want to go because then I'll have to wait for two weeks and be terrified.

7.3.2.6 Opportunity for advice and support

For participants who tested in person, one appeal of testing in this way was the opportunity to seek counselling and support from HCPs regarding sexual health or their sexual behaviour. More than half of the participants described previous experiences where they had sought advice from sexual health clinicians or indicated that they would prefer to speak to a HCP if they needed sexual health advice in the future.

Interviewer: Is there a particular reason [you prefer to test in person]?

P14 (27, straight): It gives you the chance to have a conversation with a professional. You can find out a lot more about, you know, is there anything new that you need to be aware of? Is there a higher risk? You know, having been to this clinic before they've turned around and said, you know, 'you want to be a bit more careful, there's a lot of gonorrhoea going around at the minute,' and it just means I can be a bit more aware of the risks with sex and sexuality because, you know, they can turn around and say like, 'hey, we found a few more incidences of X, Y, Z, you need to be aware of that,' and then I can be more aware and take more precaution.

In-person testing was also seen by some as a way of ensuring that participants had support in the case of a positive HIV or STI test. This then helped them to feel at ease in the testing process.

Interviewer: So you actually prefer talking to like a clinician?

P01 (30, straight): Yeah, because I have done tests where I've done it on my own, but I don't know whether it's due to the sex you've had or it's due to your anxiety level is getting high, and I think if you're with a person and a clinician, for them to alleviate the symptoms or they make you feel at ease, but it's just that face-to-face conversation.

Therefore, while home testing options appealed to some participants, in-clinic consultations were highly valued by those with health concerns or needing advice.

7.3.2.7 Sexual health as part of more general healthcare

One way in which participants believed STI/HIV testing could be encouraged among H-MSM was to offer it alongside tests considered part of a standard health check, such as cholesterol and blood pressure checks. It was believed that this would help to normalise testing who might not otherwise think it was necessary or who lacked awareness of their need to test.

P03 (69, mostly straight): If people don't feel they're at risk, they're not going to be bothered to go for a test. But if it's part of what you do at the gym or anywhere else and you have your blood pressure and your HIV test done every year, and your cholesterol or something, then perhaps people would take it onboard. Otherwise, perhaps they might not feel they need it.

Some participants also believed that more information delivered at or by GP surgeries could improve H-MSM's sexual health knowledge. GP surgeries were seen as a less-stigmatised source of health information than SHCs. Promotion of testing at GP surgeries was therefore thought to be more likely to appeal to some H-MSM, though as discussed in section 7.2.5.4, those with concerns about disclosure to partners or other family would be reluctant to engage with this.

Interviewer: And if we wanted to reach more men who are similar to you, where do you think we'd have those messages appear?

P01: I think in health centres mainly, like GP surgeries. I think with the media it's too in your face, like because there's so much taboo and negative association. So I think it would be difficult, but do you know in GP surgeries or health clinics, and also more training provided to GP practitioners around this area, more knowledgeable advice, then you would be more well prepared to do it.

7.3.3 Social opportunity

Facilitators classed as relating to social opportunity are factors involving other people or organisations that participants described as enabling them to test or engage with sexual healthcare. Social opportunity facilitators to testing and engagement with sexual healthcare included the impersonal and confidential nature of SHCs, HCPs' lack of judgement, and the normalisation of testing.

7.3.3.1 Impersonal and confidential nature of sexual health clinics

Participants generally described consultations at SHCs as impersonal. Unlike with their GPs, participants felt it was unlikely they would see the same clinician at an SHC twice. This contributed to participants' feelings of comfort disclosing and discussing their sex with men with sexual health clinicians.

Interviewer: So, how much do you tell [sexual health clinicians] about your situation?

P09 (43, mostly gay): In that situation I'd be honest, because [...] I don't know them and I'm just a number really, so I feel that I – there's nothing to hide.

Similarly, participants appreciated the confidential nature of SHCs. Assurances of confidentiality were described by one participant as essential for encouraging other men who like him, were married and also sexually active with men, to engage with sexual healthcare.

Interviewer: So, now if we wanted to reach men in [the South Asian community], for instance, who are in a similar situation, how do you think we could appeal to them to encourage testing or to promote sexual health prevention?

P09 (43, mostly gay): You just have to kind of say it's confidential, I think. You have to kind of highlight it as confidential, no one knows, you can get tested wherever you want to do it, you can get it privately or... but you need to highlight the fact that it's anonymous, no one's going to know. I think that's what people are scared of.

Where this confidentiality was questioned, as it was in the case for GPs of men with families, participants were unlikely to disclose their sex with men (section 7.2.5.4).

7.3.3.2 Lack of judgement and assumptions by healthcare providers

HCP attitudes during sexual health consultations helped participants feel comfortable discussing their sexual behaviour. Almost universally, participants described non-judgemental attitudes of HCPs as playing a key role in their comfort when testing in the past, and as a necessary component of sexual health services they would attend or use in the future. Lack of judgement was consistently included alongside confidentiality in participants' assumptions about sexual health clinicians, and enabled participants' to trust HCPs.

P14 (27, straight): You know, you can be open, you can go in and say, 'this has happened,' and they go 'okay,' and that's as far as the conversation needs to go. There's no like 'oh, you shouldn't be doing that.' You know, there's no judgment, there's no criticism.

Of particular relevance to this community was the need for clinical staff/healthcare professionals to not assume any particular sexual behaviour of their patients. One participant discussed his appreciation of one SHC's open question regarding his sexual partners, contrasting it to experiences he had had at other clinics which had automatically assumed he only had female sexual partners.

P04 (61, mostly straight): [The clinic staff] just don't care, there's no sort of judgement, there's no anything. They encourage you to tell it as it is. [...] I had one clinic, not just Dean Street, one clinic say, "We don't care if you have sex with monkeys or lions or chimpanzees, you know, just tell us and we'll deal with it". And it's a far cry from: the first visit of the assumption is that you're having sex with women. And then maybe on the second, "Oh have you ever had sex with men?"

One consequence of HCPs' lacking assumptions about their patients' sexual behaviour is that they must explicitly ask patients about the sex they have, and with whom they have it. This is important given my finding that some H-MSM may wait for

their HCPs to ask them directly if they have sex with men before disclosing (section 7.3.4.4).

7.3.3.3 Normalisation of testing

Participants talked about the need to normalise testing. Among those who tested regularly, testing was seen just a part of having sex: “*you’ve kind of just gotta do it*” (P14, 27, straight). Other participants believed that normalising testing would encourage men like them to test in future. One participant referred to a previous public health campaign focusing on testicular cancer as a potential model for how a testing normalisation campaign could work. Others suggested the inclusion of STI/HIV testing in regular health checks through their GP (section 7.3.2.7) as a way of normalising testing. Participants believed that normalisation would remove stigma and help men to see testing as something routinely done.

Interviewer: How do you think we could encourage men who are similar to you to test every year?

P12 (35, mostly straight): Maybe just making sure people know how normal it is, like no one feels embarrassed about going to the dentist or go for any other kind of health check-up. Maybe just try to make it seem like it’s more routine. Like thinking about it, personally, I wouldn’t care if someone saw me in the dentist, for example, but I might be a little bit more coy if someone I knew came into the sexual health clinic [...] which is wrong really, isn’t it? Because most people have sex, it’s nothing to be ashamed of.

Similarly, one participant expressed the desire for men to be more open about testing and sexual health. He stated that although he had never tested before, having male friends encourage testing or testing as a group would have encouraged him to do so. Normalisation of testing could enable men to feel more comfortable discussing testing with their peers, and in turn encourage testing among H-MSM.

P15 (27, mostly straight): What would prompt me [to test in future]? I think looking at my two [female] housemates, one of them persuaded the other to do it, and I think if in my office, you know, the two guys that sit behind me, you know at breaktime are like ‘oh ...’,

you know, ‘... why don’t we just go downstairs and get checked,’ you know, and just casually talked about it like at the pub, I would definitely do it.

7.3.4 Reflective motivation

Reflective motivation facilitators are conscious thought processes that participants reported as increasing their motivation to test or engage with sexual healthcare. Identified reflective motivation facilitators for testing or engagement with sexual healthcare generally fell into five sub-themes: concern for their own health; concern for their female partners’ health; perceived STI/HIV risk of their sexual behaviour; and both trust and confidence in sexual health services.

7.3.4.1 Perceived STI/HIV risk of recent behaviour

For some participants, the decision to test was often made based on an assessment of the STI/HIV acquisition risk of their recent sexual behaviour. A majority of participants indicated that they had previously tested, or would test in future, when they felt they had recently engaged in behaviour they defined as being of higher risk, e.g. condomless AI. For participants who did not test regularly, recent risk activity (as well as symptom onset, discussed below) was described as the primary driver of future testing.

Interviewer: What would prompt you to test in the future for HIV or STIs?

P11 (24, mostly straight): Oh I mean just obviously it’s all circumstance, right, which is a shit answer. So it’s like, if I ever felt like I had unprotected sex, right, I like to always think I’m using condoms but like I think if there are ever a situation that warranted it, then maybe I’m going to go and get tested, right.

For some participants, the sex of their sexual partners also influenced testing regularity. These participants tended to be more sexually active with women, with only occasional male partners. However, they indicated that they would feel the need to test more frequently when sexually active with men than when they only had female partners. Similarly, their motivation to test in the case of specific risk incidents, such as condomless sex, would be stronger if these incidents involved

male sexual partners. For these participants, concern about HIV infection was generally the driver of this more frequent testing, and they perceived male partners to represent a higher risk of transmission than female partners.

Interviewer: Was that something that happened in the past, you had unprotected sex with a guy and then you thought 'I'd better go and get tested'?

P12 (35, mostly straight): No, because I never have, but thinking about it, rhetorically speaking, it would play on my mind more. I think I would wait for like a two-week incubation period and go 'oh shit, I've got to go right now'. Where, if it would be with a woman, I might be like 'I don't feel unwell, I have no symptoms', I'd be less inclined to go 'wait, I have to go today'.

7.3.4.2 Concern for female partner's health

For many participants, a key reason to test was the desire to avoid transmitting infections to their female partners. Participants generally described testing before starting new relationships, or before stopping condom use with female partners. Testing was also described by participants who engaged in concurrent sex with men as a way of preventing potential transmission to their female partners, allowing them to feel confident that they were not risking their partners' health.

P05 (35, mostly straight): Partly also the reason why [me and my fiancé] don't have sex is because I'm always worried about giving her stuff. So I will try and not meet guys and then get tested and make sure that I'm perfectly clean before we do anything...

7.3.4.3 "Peace of mind"

Some participants discussed testing for "peace of mind". These participants perceived themselves to be generally more sexual health conscious and were aware of the potential for asymptomatic infection and STI transmission even with condom use. Testing after a certain period of time or number of partners, rather than after any specific risk behaviours, therefore allayed any minor concerns they had and gave them confidence in their own health.

P11 (24, mostly straight): So after I had my second sexual experience with that guy in college, I actually did realise that I've never really been tested and so I just got a full, you know, STD, STI test done just so I could feel better, you know. Not that it was driven by the gay experience but just like, I should, I need to get tested anyway.

7.3.4.4 Frequent testing to limit discomfort of partner notification

A number of participants discussed the discomfort of notifying partners in the event of previous or hypothetical STI diagnoses (section 6.4.6.3). For one participant, this discomfort actually encouraged him to test more frequently. He regularly engaged in AI with casual male partners, used condoms inconsistently, and had previously had stressful and stigmatising experiences of notifying casual male partners of STI diagnoses. This had therefore influenced him to test very frequently (every four-to-six weeks), as this limited the number of partners he would need to notify in the event of diagnosis with an STI or HIV.

P05 (30, mostly straight): The last two years, a lot of the time I literally go in once a month and, which sounds almost unbelievable, in the sense that they would even accept it, but I was able to like get tested pretty much like, maybe once a month, every six weeks.

Interviewer: And so can you tell me why you go test that often?

P05: I'm just terrified, like the process of like getting a STI and then having to go to tell your previous sexual partners.

7.3.4.5 Trust in healthcare providers

Participants frequently described trusting HCPs and recognised the importance of being honest in consultations. To these participants, the role of HCP (and especially sexual health clinician) implied professionalism, discretion, and non-judgement. They therefore generally trusted HCPs enough to disclose their sex with men.

P11 (24, mostly straight): I guess I would say I think doctors are in a position of trust, right, so I think I come to doctors trusting them and they almost have to then lose that trust, right.

Importantly, however, some participants stated that this disclosure would not necessarily be offered unprompted but would only be made if they were specifically asked. Some spoke of disclosing to their HCPs “*if they ask, if they think it’s an important question*” (P12, 35, mostly straight), highlighting the importance of HCPs explicitly asking patients about the sex of their recent sexual partners.

Interviewer: If a doctor didn’t ask specifically if you have sex with men, but you thought it was relevant to what you were seeing them for, would you feel comfortable bringing that up?

P12 (35, mostly straight): Well, that’s a good question. If I thought like 100% I had to tell them for this thing, then yes. But unless they ask, like no, I wouldn’t tell them I’m allergic to certain types of washing powder, unless they asked because it’s not relevant to this. But honestly, I would take my direction from them, if I’m honest.

Trust in their HCPs therefore allows H-MSM to feel comfortable disclosing their sexual activity with men, which can in turn allow HCPs to offer testing and other relevant sexual healthcare. While this trust in HCPs did, for the most part, also extend to GPs, privacy concerns of some participants with families limited the extent to which these men would disclose to GPs (section 7.2.5.4).

7.3.4.6 Confidence in services

Confidence in sexual health services was a factor in encouraging some participants to engage with sexual healthcare. For some, it was important for them to test in a clinical setting such as a hospital or SHC. These settings inspired confidence in the professionalism and sexual health expertise of specialist staff and the accuracy of the tests. Testing at a clinic also gave participants confidence that they were being tested “for everything”. Therefore, in-clinic testing may be preferable to some H-MSM who lack confidence in home testing options.

Interviewer: And then if you were to decide that you needed to test for some reason, how would you prefer to be tested?

P03 (69, mostly straight): I think I’d probably rather go to a clinic, because you know, that way, you’re being tested for everything, don’t you, really? OK, you can get tests for HIV and chlamydia and

things and do it at home, but I don't know that you can be tested for everything.

Interviewer: Is there any other reason why you'd prefer to go to a clinic?

P03: Well, I perhaps would have more confidence in the technique and the results too, and also the fact that you're having to do this at home when other members of the family are around, it's a bit awkward.

7.3.5 Automatic motivation

Automatic motivation facilitators are instinctual or emotional impulses that motivated participants to test or engage with sexual healthcare. Only one such facilitator was identified, relating to participants' response to the onset of STI symptoms.

7.3.5.1 Onset of STI symptoms

Onset of STI symptoms was a driver for testing and engagement with sexual healthcare. Three participants had previously developed symptoms that they believed to be STI-related, and consequently, sought an STI test. In one case, the participant reported waiting several weeks before seeking care, believing the symptoms would disappear. Participants who rarely or had never tested said symptom onset would be a motivator for testing in future.

Interviewer: What made you go to test that time?

P11 (24, mostly straight): My piss was burning. It was, actually, no, my pee was burning for a few weeks and I was like "This will go away" [laughs]. Actually, I ended up having, what's the right word? Excretion from like you know, ah, out of my urethra, penis hole, yeah. [...] that was basically like "This can't be ignored", you know, right, this isn't, there is by no stretch of the imagination is this okay, so then I was like "I have to go get tested."

7.4 Discussion

7.4.1 Summary of findings

I interviewed 15 H-MSM resident in England and discussed their experiences of and preferences for accessing sexual healthcare. My analysis suggests that barriers to STI/HIV testing and engagement with sexual healthcare for H-MSM are the result of poor sexual health knowledge, concerns about privacy, issues related to their identity, and accessibility of services. However, I also identified a number of facilitators that address or remove these barriers, including the provision of relevant sexual health information, assurances of confidentiality, understanding from HCPs and services of H-MSM's lack of identification with LGBTQ+ communities, and the provision of multiple ways of accessing testing.

Poor sexual health knowledge was identified as a major barrier to testing among H-MSM.¹²⁴ I found that inaccurate understandings of STI/HIV risk and symptoms, as well as unawareness of testing guidelines meant that some participants felt no need to test despite engaging in sex that put them at some risk of STI/HIV acquisition. Others were deterred by fears related to testing, outdated beliefs of the testing process, as well as concerns about the potential impact of a positive HIV or STI test result. However, I found that providing H-MSM with sexual health and testing information relevant to them may address some of the misinformation and concerns listed above and encourage testing among this population. Improving awareness of the range of testing options, as well as testing frequency guidelines for MSM may encourage H-MSM to test more regularly. Updating preconceptions about the testing process and STI/HIV treatment options may also help to make testing less intimidating. Participants valued the opportunities for advice and support that face-to-face consultations with specialist sexual health clinicians provided.

Concerns about privacy were also identified as playing a particularly important role in H-MSM's utilisation of sexual healthcare. This not only influences *where* they feel comfortable testing, but also whether they disclose their sex with men to HCPs, which is integral to HCPs offering relevant advice and services.¹⁸ Participants were generally not comfortable disclosing to GPs, due to fears their sexual activity with men might be disclosed to partners or other family. This may represent a significant barrier to testing for H-MSM in places where sexual healthcare is primarily offered

through primary care.^{337 338} In contrast, the impersonal and anonymous nature of SHCs means participants felt assured of their confidentiality, and therefore comfortable disclosing their sex with men to their HCPs. Importantly, some participants reported they would not disclose unless directly asked by their HCP, underscoring the importance of HCPs asking about their patients' sexual activity and partners if relevant.^{18 97 339 340}

The discordance between H-MSM's heterosexual identities and their sexual activity with men also presented some barriers for participants. Some had experienced incidents of negative judgement or misunderstanding from HCPs specifically related to this perceived discordance, which had resulted in participants losing confidence in their HCPs. I also found that some H-MSM do not utilise or actively avoid sexual health services or information designed for or targeting gay men, feeling these are irrelevant to them as heterosexual-identifying men. HCPs treating H-MSM must be non-judgemental and understanding of their individual circumstances, so that these men feel they can discuss their concerns safely.^{18 339} Efforts to reach H-MSM must recognise their lack of identification with LGBTQ+ communities and acknowledge other identities or priorities these men may have.^{58 247} H-MSM's concern for their female partners (discussed here and in Chapter 6) is one such priority that might be exploited by interventions aiming to increase testing among this population.

Remote testing options such as HIV self-testing or STI/HIV self-sampling kits were an attractive alternative to participants, especially those deterred from testing due to the inconvenience or discomfort of visiting SHCs. HIV self-testing has been identified as increasing testing among non-disclosing MSM³⁴¹ and MSM from stigmatised communities,^{342 343} and so the rapid expansion of remote STI/HIV screening for asymptomatic patients in the wake of the COVID-19 pandemic^{344 345} may be of some benefit to H-MSM. Allowing the collection of test kits from pharmacies or other locations allows these services to be used by H-MSM who, for privacy reasons, may be uncomfortable having them sent to their homes. However, remote testing will not be suitable for all H-MSM, particularly those with low digital literacy or who are not able to collect their own samples. It is important therefore that face-to-face consultations are offered alongside remote testing options, to avoid underserving these men.

The barriers and facilitators to accessing sexual healthcare described in this chapter, while particularly pertinent to H-MSM, are similar to those identified for other populations, including MSM more broadly,³⁴⁶ young people³⁴⁷ and sex workers.³⁴⁸ Therefore, while the recommendations in this discussion are intended to improve sexual healthcare engagement among H-MSM, they are likely to benefit other populations too.

7.4.2 Comparison with the literature

I identified several barriers and facilitators related to H-MSM's comfort discussing their sex with men with their HCPs. Importantly, while previous studies have found non-gay-identifying MSM and MSMW less likely than G-MSM to disclose their same-sex behaviour to any of their HCPs,^{16 17 349} the H-MSM I interviewed were generally happy to disclose to HCPs they trusted. Key to the development of this trust was confidence that the information they provided would remain confidential.

Confidentiality and privacy in sexual healthcare are known to be important to MSM³⁴⁶³⁵⁰ (including MSMW³⁵¹), sexual minorities more broadly,³⁵² young people,³⁴⁷ and the wider population,^{340 353 354} however they are particularly pertinent for H-MSM given their concerns about inadvertent disclosure of their sex with men to female partners or other family.⁵⁸ My study supports previous research suggesting that these concerns mean some H-MSM are especially reluctant to discuss their sex with men with their GPs, who they perceive to be "*too close to home*".³³⁹ In contrast, while only 40% of participants in a study of Scottish gay and bisexual men reported they had disclosed their sexuality to their GPs, a minority of those who had not disclosed reported it was because of confidentiality concerns.³⁵⁵ The vast majority of those who had not disclosed indicated this was because they had not been asked or had not felt it relevant, and 70% of all participants indicated they would feel comfortable raising sexual health issues with their GP or practice nurse.

Still, evidence suggests that MSM in the UK generally prefer not to involve their GPs with sexual healthcare, instead seeking it at SHCs.^{356 357} In particular, some G-MSM and B-MSM prefer testing at SHCs that specialise in MSM sexual health, feeling that these clinics offer a better understanding of their experiences as MSM.³⁵⁸⁻³⁶⁰ In their review of strategies to increase HIV testing among MSM, Campbell et al. showed that the creation of MSM-friendly testing environments such as these may increase

testing rates among MSM.³⁶¹ However, they also questioned whether these represented true increases in testing among MSM, or simply allowed those who would otherwise have tested elsewhere to feel comfortable to disclose as MSM. While this was the case for two participants in my study, my findings suggest that these clinics do not generally appeal to H-MSM, and others have found similar for MSM concerned about being identified by others or misidentified as gay.^{11 351 360 362-364} Several studies have also found that for non-gay-identifying MSM, judgement from HCPs may act as barriers to accessing MSM-targeted testing and prevention options, and highlight the importance of HCPs not making assumptions about patients' sexual identity based on their attendance at MSM-focused SHCs.^{297 362 365}

Finally, I found that remote testing options such as HIV self-testing or STI/HIV self-sampling kits appealed to participants, especially those who had never tested before or who tested irregularly. This supports previous research that found H-MSM more likely than other MSM to prefer HIV self-testing over other testing modes,³⁵⁶ and which identified HIV self-testing as a way of increasing HIV testing particularly among non-disclosing MSM and MSM from communities with high levels of stigma.^{361 366} Other studies of MSM found similar benefits of self-testing to those found in this study, including convenience^{334 335 343 367} and increased privacy.^{334 335 341 343 367} However, my participants raised similar concerns to those raised in other studies, such as difficulties in test administration^{334 343} and a lack of support when receiving a test result at home.^{334 343 367} Importantly, I identified that remote testing options may not be suitable for some H-MSM due to concerns about the privacy of delivery of testing kits to their homes. This has also been identified as a barrier to use of these kits among some G-MSM and B-MSM, particularly those from communities in which sex between men is more stigmatised.^{334 343 361} These concerns are also proposed to explain the lower sample return among bisexual married men in one national US study of home-testing among MSM.³⁶⁸ Other authors have therefore also suggested the need to identify ways of disseminating kits that address these concerns, including over-the-counter collection.^{343 361 368}

The majority of other barriers and facilitators to engagement with sexual healthcare I identified among my participants, including those related to sexual health knowledge, convenience, stigma, fear, and risk perception, have been identified for MSM more broadly,^{346 350} as well as in young people³⁴⁷ and the general population.^{353 354 369}

Notably, however, I did not identify cost as a barrier to HIV/STI testing or sexual healthcare among participants in my study, despite it being identified as a barrier for MSM in multiple studies.^{333-336 350} However, the majority of these studies were conducted in the USA, which has a very different healthcare system to the UK. In contrast, the free provision of healthcare (including sexual healthcare) in the UK meant that cost was not a barrier for the participants in my study.

7.4.3 Strengths and limitations

A strength of this study is that it is one of the first studies to my knowledge to qualitatively explore the sexual behaviour and sexual health of H-MSM in the UK. A previous study explored same-sex encounters as part of MMF threesomes among heterosexual male students in the south of England,⁶⁵ however, this study primarily focused on their descriptions of and feelings about these experiences, with no exploration of any sexual health aspects of these encounters. My study is the first to explore English H-MSM's understanding of sexual health and STI/HIV risk, and their decision-making regarding STI/HIV prevention. It is also the first, to my knowledge, to explore H-MSM's experiences and attitudes of sexual healthcare in the context of the UK healthcare system. My sample includes men in a range of living and relationship situations (including single men, married men, men living with partners or other family, and men living alone), as well as men with varying levels of sexual experience with men (from those still just considering or with minimal previous experiences with men, to those engaging in regular sex with male partners). There is also some ethnic diversity in my sample, with 40% of my sample identifying as minority ethnicities (excluding White minorities). My study therefore captures the views of a H-MSM in a variety of situations.

Limitations include the fact that the UK-specific focus of this study may limit transferability of findings (especially those related to sexual healthcare) to H-MSM in other contexts. There are also ways in which the diversity of this sample is limited. For example, there were few participants of Black African ethnicity, one group of heterosexual men identified as being more likely to be linked to MSM in phylogenetic studies of HIV transmission networks.^{23 370} Similarly, the majority of participants were resident in Greater London or other large cities, and so this study does not capture the experiences of H-MSM in smaller towns or more rural areas, who are likely to

access sexual healthcare in different ways to men living in cities. The majority of participants in this study are younger than 40 years of age. Generational differences in acceptance and comfort with homosexuality and in exposure to the impact of the AIDS epidemic may mean that approaches to STI/HIV prevention and testing differ between younger and older men. Therefore, these findings may not be transferable to H-MSM older than 40, and older heterosexual men have also been identified as more likely to be linked to MSM in HIV transmission network studies.^{23 370} All participants reported having a negative HIV status, meaning this study does not provide any information about the approach to STI/HIV transmission prevention or engagement with sexual healthcare of H-MSM with diagnosed HIV.

Social desirability may have influenced participants' answers to some questions due to their perception of me as a sexual health researcher. For example, participants may have reported more cautious approaches to STI/HIV prevention than they practiced in reality, especially those who engaged in concurrent sex with men while in steady relationships with women. They may also have felt pressure to report testing more regularly than they did in practice. This effect may have been compounded for men interviewed in person, as these interviews took place in offices of a building with a SHC on the ground floor. The latter issue would not have been a problem for interviews conducted over the phone, though the quality of these interviews may have been affected by the additional difficulty of building a rapport with participants when unable to see them (and vice versa). While I believe that this did result in reduced quality interviews in the case of three participants, there was no notable difference between the other telephone interviews and those conducted face-to-face. The sensitive nature of the research topic may also have meant that these participants would not have interviewed at all if they were required to meet in person.

Finally, two-thirds of participants were recruited from the *Call for Participants* website, indicating an interest in research. Indeed, 80% of participants had some form of university education, so these participants are unlikely to be broadly representative of the wider H-MSM population. Though only two participants were recruited from sexual networking apps or websites, the majority of current H-MSM did indicate that they used these, so these men may be somewhat representative of H-MSM who use apps or websites to meet male sexual partners. Additionally, by

participating in this study, participants indicated an interest in sexual health, and so may have a higher awareness of sexual health issues than other H-MSM. While many of the participants indicated in interviews that they had never before spoken to anyone about their sex with men, they were ultimately comfortable discussing their sexual behaviour and sexual health with a researcher. This may indicate that they would be more likely to be comfortable discussing their sex with men with HCPs. These participants may therefore not represent H-MSM who are not comfortable discussing their sex with men with HCPs. In particular, H-MSM who engage in socially undesirable behaviours (e.g. not taking precautions to limit risk to their concurrent female partners) might be less inclined to participate in a study like this, out of fears of judgement. As such, this study does not capture the experiences of these men, who may be of most public health interest.

8. Discussion

8.1 Introduction

This thesis has presented the findings of the three methodologically different approaches that I took to explore and understand the sexual behaviour, sexual health, and sexual healthcare-seeking behaviour of H-MSM. In this chapter, I present a summary of each chapter's findings, and then an integrated synthesis of these findings in relation to the research aims. I also consider the strengths and limitations of this thesis. Finally, I discuss the implications of these findings in terms of sexual healthcare practice and policy, sexual health promotion, the psychosocial implications of my research, and the implications for future research.

8.2 Summary of the purpose and main findings of the thesis

8.2.1 Summary of the purpose and aims of the thesis

The purpose of this thesis was to develop an understanding of the sexual behaviour, sexual health, and sexual healthcare-seeking behaviour of H-MSM. Prior to this study, there was little robust quantitative evidence regarding these characteristics of H-MSM, mainly due to the methodological challenges of recruiting enough H-MSM to adequately power studies. Though there is a good evidence base for the sexual behaviour of MSMW, the extent to which this evidence is applicable to H-MSM was unclear, as most participants in these studies identified as bisexual. Where studies did report outcome data for H-MSM, there was rarely sufficient statistical power to provide robust prevalence estimates or estimates of differences between H-MSM and other MSM. Furthermore, the majority of studies reporting on H-MSM have been conducted in the USA, and so little was known about H-MSM in other high-income countries. The specific aims of this thesis were therefore to:

1. Describe and characterise H-MSM in high-income countries in Western Europe, Australasia, and North America, in terms of their sociodemographic characteristics, sexual behaviour, sexual health, and use of sexual health services.

2. Compare the sexual behaviour, sexual health, and use of sexual health services of H-MSM with those of G-MSM and B-MSM.
3. Understand H-MSM's perception of HIV and STI transmission risk with respect to the sex they have; and how this influences their approach to HIV and STI prevention and risk reduction with their sexual partners.
4. Understand H-MSM's attitudes towards sexual health and sexual healthcare, including accessing sexual healthcare services and STI/HIV testing in relation to guidelines.
5. Consider the implications of these findings for public health practice and policy.

The methodologies I chose to apply in this thesis sought to overcome some of the previously mentioned methodological problems. In the sections below, I summarise each results chapter's aims, design, and main findings. Finally, the mixed methods approach of this thesis allows findings from each study to be integrated to provide a more comprehensive understanding of this population.

8.2.2 Main findings from Chapter 4

In this chapter I summarised the previously conducted quantitative and qualitative research on H-MSM's sexual behaviour, sexual health, and engagement with sexual healthcare. To do so, I conducted a systematic review of peer-reviewed articles on H-MSM published between 2008-2018. The key findings of this chapter were:

- H-MSM reported fewer male partners than G-MSM and B-MSM and were less likely to engage in sexual acts associated with increased risks of STI/HIV acquisition such as AI (and especially receptive AI). However, those that did were at similar risk of poor sexual health as other MSM, reporting similar levels of condomless sex (often driven by drug and alcohol use) and primarily casual partners.
- H-MSM were generally more likely than other MSM to report having female sexual partners, and more likely to report condomless sex with those partners. Though they seldom disclosed the sex they had with men to their female partners, some were aware of the impact their extra-relational sex with men may have on the health of their female partners as well as their relationship, and so took efforts to minimise that risk.

- H-MSM's engagement with sexual healthcare, including STI/HIV testing, was lower than that of G-MSM and B-MSM, suggesting that some H-MSM may have unmet sexual healthcare needs.
- The need to maintain a heterosexual image and adhere to societal ideals of masculinity drove many of the behaviours of H-MSM. This included their lower likelihood of engaging in sexual behaviours seen as "gay", their reluctance to use HIV prevention measures such as condoms and PrEP, and their hesitancy of engaging with sexual healthcare, especially that designed to appeal to sexual minority groups.

8.2.3 Main findings from Chapter 5

In this chapter, I conducted a meta-analysis of IPD from 13 behavioural surveys of MSM conducted in 17 high-income countries to provide robust quantitative estimates of H-MSM's sexual behaviour, sexual health, and engagement with sexual healthcare, as well as comparisons to G-MSM and B-MSM. The main findings from this chapter were:

- A third of H-MSM reported recent regular male sexual partners, while 75% reported recent casual male partners. H-MSM were less likely than G-MSM and B-MSM to report regular partners, but there was no difference in reporting of casual partners. A majority (70%) of H-MSM reported recent female partners (more than both B-MSM and G-MSM).
- Among H-MSM, oral sex and AI with male partners were common, reported by over 90% and 75% of H-MSM respectively. H-MSM were less likely than B-MSM and G-MSM to have reported giving oral sex and AI with male partners, and among those who engaged in AI, H-MSM were less likely than G-MSM to report receptive AI.
- Among H-MSM, reporting of sexual roles in which they were the insertive partner (receiving oral sex from male partners, insertive AI) were around 10% higher respectively than receptive roles (giving oral sex, receptive AI). A similar population tendency towards insertive rather than receptive AI was observed among B-MSM, however there was no evidence of any role preferences among G-MSM.

- Partner type was associated with condom use with male partners, with higher reporting of CAI with regular partners than with casual partners. Still, one-third of H-MSM with casual male AI partners reported condomless sex with these partners.
- Relationship status was also associated with behaviour. H-MSM in relationships with women were less likely to report AI and CAI with male partners, and more likely to have reported condomless sex with female partners. Around 16% of H-MSMW reported recent condomless sex with both male and female partners.
- Among MSM recruited for online studies, H-MSM were less likely than G-MSM and B-MSM to report behaviours associated with higher STI/HIV transmission risk, with a third of H-MSM reporting at least one higher risk behaviour. This relationship was reversed for MSM recruited in person, with over two-thirds of H-MSM recruited in person reporting at least one higher risk behaviour.
- Testing for HIV among H-MSM was low, with around half reporting ever having tested, and less than a third reporting testing in the previous year (less than G-MSM and B-MSM). Recent STI testing among H-MSM was similarly low.
- Reporting of recent HIV and STI testing by H-MSM was higher among those reporting behaviours associated with higher STI/HIV transmission risk, though this was still less than 40%. Differences in recent testing between H-MSM and other MSM remained largely unchanged after controlling for differences in recent risk behaviour. Controlling for social engagement with gay communities had a more substantial effect in reducing differences in testing, with high social engagement with gay communities doubling the likelihood of testing among H-MSM.

8.2.4 Main findings from Chapter 6

In this chapter I explored H-MSM's perception of STI/HIV risk with regards to the sex they have, and the way these influenced the STI/HIV prevention measures they took. To do this, I carried out semi-structured one-to-one interviews with 15 H-MSM in England and performed an inductive thematic analysis on the data from these interviews.

Participants' perceptions of STI/HIV risk during sex were based on:

- the potential impact of STI/HIV acquisition or onward transmission, including the impact on participants' health, the potential for stigma or rejection, the impact on steady partners' health, and the impact on their relationships themselves; and
- the likelihood of STI/HIV acquisition or onward transmission of the sex they had, based on their assessment of the risk of STI/HIV transmission posed by both their potential partners and themselves, and their understanding of the transmission risk of specific sexual acts.

Based on their assessments of STI/HIV transmission risk, participants employed a number of risk reduction strategies. Strategies used to reduce the risk of STI/HIV acquisition included:

- partner selection to avoid casual male partners they considered higher risk;
- limiting their sexual repertoire with male partners to those acts they considered sufficiently low risk;
- condom use during AI with partners (of any gender) they considered higher risk; and
- use of PrEP (though this was limited, and awareness of PrEP was low).

Strategies used to reduce the risk of onward transmission to partners included:

- condom use at the start of relationships;
- testing before ceasing condom use with steady partners;
- exclusivity within steady relationships;
- limiting their sexual repertoire with steady female partners to acts with low transmission risk; and
- frequent STI/HIV testing during relationships.

Participants who engaged in concurrent sex with men while in supposedly exclusive relationships with women also practiced risk reduction strategies to prevent STI/HIV acquisition from male partners, to further reduce the risk of onward transmission to their steady partners. The strategies discussed above varied in effectiveness, with concerns including:

- low reliability of the assessments of potential partners' sexual health;
- inconsistent condom use influenced by substance use and mental health;
- underestimation of the STI transmission risk of oral sex; and
- limits to the suitability of daily oral PrEP for H-MSM living with female partners or family.

8.2.5 Main findings from Chapter 7

In this chapter I performed a thematic analysis on the interview data from my qualitative study of H-MSM in England to identify barriers and facilitators to engagement with sexual healthcare (including STI/HIV testing) for H-MSM. I mapped identified barriers and facilitators to components of the COM-B model of behaviour.

The main barriers to STI/HIV testing and engagement with sexual healthcare identified among H-MSM participants were:

- poor or inaccurate sexual health knowledge;
- fear of the testing procedure as well as fear of positive test results;
- concerns about privacy and accidental disclosure by HCPs, especially their GP/family doctor, of their sex with men to partners and other family; and
- concerns about judgement and misunderstanding from HCPs.

The main facilitators to STI/HIV testing and engagement with sexual healthcare identified were:

- education and information about sexual health, testing guidelines, and testing options;
- more convenient sexual health service attributes, including offering a range of remote and in-clinic testing options;
- assurances of confidentiality during service use, and testing options that meet the privacy needs of H-MSM in a variety of circumstances; and
- establishing trust and confidence in HCPs and services.

8.3 Integrated discussion of H-MSM's sexual behaviour, sexual health, and engagement with sexual healthcare

8.3.1 H-MSM are at lower risk than other MSM of HIV (though not necessarily STI) acquisition, but some may be at elevated risk

The findings presented in this thesis suggest that, at a population level, H-MSM are at lower risk of HIV (and to a lesser extent, STI) acquisition than G-MSM and B-MSM. I found that the sexual behaviour of H-MSM, including the sex they have with male partners, positioning during sex, and their use of STI/HIV prevention or risk reduction strategies, is driven by a range of motivating factors. While some of these are common to MSM of all sexual identities, others are particularly pertinent to this group as H-MSM.

In common with other MSM, concerns about their health are a driver of H-MSM's approach to prevention of STI/HIV transmission, and just as for other MSM, their primary concern with regards to sex with men is HIV, with other STIs considered treatable and therefore of less concern.^{298 299} Similarly, H-MSM also have concerns about the impact to themselves of stigma related to HIV and other STIs, though there is evidence that non-gay-identifying MSM experience this more severely than gay men.³⁰⁹ In addition to these concerns, H-MSM may be motivated to avoid STI/HIV acquisition during sex with male partners because disclosure of these conditions to female partners, family, or others is likely to also require disclosure of their sex with men, which could lead to rejection by those they disclose to (Chapters 4 and 6). This is particularly true for H-MSMW in relationships with women, for whom disclosure may result in relationship breakdown. H-MSMW with steady female partners are also motivated by concerns for these partners' health, and so to avoid inadvertent STI/HIV transmission to these partners, are less likely to engage in AI with their male partners and are more vigilant about condom use when they do (Chapters 5 and 6). Finally, there is evidence that societal standards of masculinity and the associated pressure to maintain an image of heterosexuality also influence the sexual behaviour of some H-MSM, deterring them from engaging in sexual acts seen as feminine or associated with a gay identity, such as giving oral sex to male partners, AI, and especially receptive AI (Chapter 4). While this is experienced by MSM of all sexual identities,³²⁰ H-MSM (particularly those from cultures or communities which place

high importance on qualities seen as masculine) are likely to be more strongly affected by this due to the difficulty of aligning these acts with a heterosexual identity.

The combination of these (and possibly other) factors mean that when compared to other MSM, H-MSM are less likely to report behaviours that are associated with higher risk of HIV (and, to a lesser extent, STI) acquisition.^{94 261} They are less likely than other MSM to give oral sex or engage in AI with these partners, and those that do are less likely to be the receptive partner during AI (Chapters 4 and 5). Some H-MSMW also choose not to seek male partners while in steady relationships with women (Chapter 6), which likely contributes to H-MSM more broadly having fewer male partners (Chapters 4 and 5). Overall, I found H-MSM were 20-44% less likely than G-MSM to report other behaviours indicating higher STI/HIV risk, such as sexualised drug use. Comparisons with B-MSM were less clear, though they also suggest slightly lower engagement in these behaviours among H-MSM.

While H-MSM may be at lower risk of STI/HIV acquisition than other MSM, this thesis does present evidence suggesting that H-MSM are at higher risk of poor sexual health than the general population,^{136 272} and that a significant proportion have a high risk of STI/HIV acquisition. Though H-MSM are less likely to be the receptive partner during AI, receptive AI is still common (Chapters 4 and 5). H-MSM are more likely to have casual and fuckbuddy-type male partners than steady male partners (Chapters 4 and 5), and sex with these partners is associated with higher risk of STI/HIV acquisition.^{174 286} I found that nearly 40% of H-MSM reporting casual AI partners reported condomless sex with those partners, representing over 20% of all H-MSM (Chapter 5). Altogether, I estimated that just over a third of H-MSM reported at least one recent behaviour with higher STI/HIV transmission risk, and my analysis suggests that this may be even higher among H-MSM with more attachment to gay communities.

Other findings also give cause for concern for this population. Though H-MSM are less likely to give oral sex or have receptive AI with male partners, these acts are still common. H-MSM who limit their sex with men to only oral sex may reduce their risk of HIV, but are still at risk of STIs, especially as condoms are rarely used for oral sex.^{301 302} Exchange sex, often linked with drug use (Chapter 4), is relatively high

among H-MSM (Chapter 5) and is associated with high prevalence of HIV.³⁷¹ Finally, this thesis also suggests that sexual health knowledge (such as awareness of asymptomatic infections and PrEP) may be poor for some H-MSM (Chapters 4, 6 and 7), limiting the ability of those at risk to take adequate prevention measures. Privacy concerns related to living situations may further limit PrEP uptake among this population (Chapter 6). At a population-level, therefore, H-MSM may be at a lower risk of HIV (though not necessarily STI) acquisition than G-MSM and B-MSM, however, these results do indicate a subsection of the population with a greater need for sexual healthcare. This is of concern given my findings from Chapter 5 that 70% of H-MSM had not recently engaged with sexual healthcare, including over 60% of those considered as being at higher risk. This is discussed more in section 8.3.3.

8.3.2 The role of H-MSM in facilitating STI/HIV transmission between MSM and heterosexual sexual networks

Much of the research interest in H-MSM as a population has focused on their potential to facilitate transmission of STIs/HIV between MSM and heterosexual sexual networks,⁹⁰⁻⁹² while mass media narratives of H-MSM (and particularly Black or African American H-MSM) have typically portrayed them as secretive and selfish, and as health risks to their female partners.¹⁵⁷ In contrast to these narratives, the findings of this thesis (Chapters 4 and 6) and other studies suggest that H-MSM in steady relationships with women often show concern for the health of these partners and understand how their extra-relational sex can impact on their partners' health as well as their relationships with these partners.^{62 106 339} These men therefore have an added incentive to prevent STI/HIV acquisition and onward transmission, beyond concerns about their own health. As discussed in section 8.3.1, H-MSMW in relationships with women are less likely to engage in AI (and especially CAI) with male partners (Chapters 5),²⁷⁴ and qualitative evidence suggests this is motivated by H-MSMW's desire to prevent transmission to their steady female partners (Chapters 4 and 6). Some H-MSMW also use condoms, or avoid penetrative sex altogether, with their steady female partners when they believe their own health or recent extra-relational sex means they pose a transmission risk to these partners (Chapters 4 and 6). Importantly, results from mine and other studies also suggest that some H-MSMW practice sexual exclusivity with their steady partners and only have male

sexual partners when not in sexual relationships with women, further limiting opportunities for bridging to occur (Chapter 6).^{58 61}

Nevertheless, my finding that just under one in five H-MSMW reported recent condomless sex with both male and female partners (Chapter 5) suggests that a minority of H-MSMW engage in sex that may allow transmission between sexual networks. Admittedly, this measure only indicates that these two incidents - at least one incident of condomless AI with a male partner, and at least one incident of condomless VAI with a female partner – occurred within the previous 12 months and does not provide any information about the relative timing of these events or testing during this period. This may also be an overestimate, as the eligibility criteria for this analysis means H-MSMW who do not engage in concurrent sex with men while in exclusive relationships with women are underrepresented.⁴⁹ However, the lower reporting of STI/HIV testing among H-MSM (Chapters 4 and 5) and the long durations of infectiousness for HIV and some STIs³⁷² means that H-MSMW not reporting concurrent sex with both men and women may still contribute to transmission between sexual networks.³⁷³

There are limits also to the effectiveness of risk reduction strategies employed by H-MSMW to protect steady female partners, as those limiting their sex with men to oral sex to reduce their risk of HIV acquisition are still at risk of STIs (section 8.3.1). Trust-based decision-making means that sex with steady female partners is also likely to be condomless (Chapters 4, 5 and 6), especially if their partners are using other forms of contraception (Chapters 6),^{304 374} meaning onward transmission may still occur. Finally, the reluctance of some H-MSM to disclose their (current or past) sex with men to their female partners^{21 22} also leaves those partners unable to make fully informed decisions regarding STI/HIV prevention.

The results of this thesis therefore suggest that a small but possibly significant minority of H-MSM play some role in facilitating STI/HIV transmission between MSM and heterosexual sexual networks. Phylogenetic studies of HIV transmission networks finding non-disclosed MSM (that is, those not disclosing their sex with men to HCPs) linking MSM and heterosexual women lend credence to this theory.^{23 370} Mathematical modelling exploring the role of MSM in STI transmission in the general population suggests that the impact of MSMW as a population on the spread of STIs

does not outweigh its size,³⁷⁵ and other studies have also found little evidence to support MSMW playing a substantial role in transmission of HIV between sexual networks.^{274 376} The exact contribution of H-MSMW in particular, however, is unclear. These results do, however, highlight the importance of reaching this population with sexual health information and engaging them in sexual healthcare. I discuss potential strategies for doing so in section 8.5.

8.3.3 Sexual healthcare engagement among H-MSM is low and not fully explained by lower risk behaviour

The results presented in this thesis indicate that engagement with sexual healthcare, and specifically testing for HIV and STIs, is low among H-MSM. This is true both at an absolute level, and relative to other MSM (though it is higher than MSEW in the general population²⁷²). It is conceivable that the lower prevalence of testing among H-MSM is because fewer H-MSM engage in activities with higher risk of STI/HIV transmission; indeed this was a reason given for the lack of previous testing by the H-MSM I interviewed (Chapter 7). However, as my analysis in Chapter 5 suggests, recent testing is uncommon even among H-MSM reporting behaviours for which more frequent testing is recommended. Other explanations for H-MSM's lack of engagement with sexual healthcare are therefore required.

A clear narrative that emerged from my systematic review (Chapter 4) is that for some H-MSM, the pressure to achieve an idealised form of masculinity which prizes heterosexuality may deter some H-MSM from engaging with sexual healthcare, as seeking healthcare is seen as feminine and H-MSM may consider HIV testing in particular associated with gay men. I also found that strong associations among H-MSM between social engagement with gay communities and recent testing for HIV and STIs, with high levels of social engagement doubling the likelihood of recent testing among H-MSM (Chapter 5). This could be explained in a number of ways. High social engagement with gay communities may lead to more exposure to norms related to testing within those communities.^{13 119 377} High social engagement may also mean these men are more exposed to sexual health promotion targeting those communities, meaning they are more informed about testing guidelines and options. Finally, it may be that those H-MSM comfortable associating with gay men are less affected by masculine ideals that also deter men from engaging with healthcare,

particularly HIV testing.^{69 320} The exact mechanism behind this is unclear and did not come to light through my qualitative research, however, this warrants further investigation.

My own interviews with H-MSM in England also found that concerns about privacy, confidentiality and judgement deter some H-MSM from testing (Chapter 7). These results suggest that while H-MSM may be comfortable discussing their sex with men with HCPs in specialist sexual health settings, some are less comfortable with GPs, representing a significant barrier to testing for those living in countries in which HIV and STI testing is mainly conducted in primary care.^{337 338} Results from Chapter 7 also suggest that poor or inaccurate sexual health knowledge plays a role,^{124 378} with participants unaware of home-testing options, PrEP, testing guidelines, and the possibility of asymptomatic infection. These barriers are not unique to H-MSM,^{201 346 351 353} however they are of particular significance to this population.

Ultimately, my thesis shows that H-MSM are a population at risk of poor sexual health, with low levels of testing, particularly among those reporting behaviours with a higher likelihood of STI/HIV transmission, indicating a significant proportion of H-MSM with unmet sexual healthcare needs. Engaging these men in sexual healthcare is of importance not just for their own health, but also for that of their sexual partners of any gender. Therefore, while HIV and STI testing is lower among H-MSM, my thesis points to ways that this can be increased. These are discussed in section 8.5.

8.4 Thesis strengths and limitations

A major strength of this thesis is its mixed methods approach. Synthesising both quantitative and qualitative data on this population allowed me to explore not just *what* H-MSM do – for example, estimate the prevalence of outcomes of interest – but also *why* they do what they do. This approach allowed me to produce a more complete understanding of this population than adopting a purely quantitative or qualitative approach, with data from each approach complementing the other. Another strength of my thesis is the involvement throughout of the BS21 Network, and particularly those whose data I included in my IPD-MA analysis (Chapter 5). Discussions at meetings and conferences as well as collaboration on conference abstracts (section 1.6) helped inform decisions made and interpretations during the

research process, such as during the harmonisation of survey data and the selection of outcomes of interest. The input of these researchers (Appendix 1), who are experts in MSM sexual health research, helped ensure that the output from my analysis remained both relevant and responsible to H-MSM as a population.

One limitation of this thesis is its narrow definition of H-MSM's sexual health, focusing solely on HIV and STI transmission behaviours and testing. WHO defines sexual health more broadly, as "a state of physical, emotional, mental and social well-being in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity".³⁷⁹ As such, this thesis could have included other indicators of sexual health such as sexual satisfaction and sexual coercion and therefore considered sexual wellbeing more fully. The inclusion of other health measures associated with MSM's sexual health, such as experienced stigma^{7 138} and mental health more broadly,^{8 111 136} would also have allowed a more holistic understanding of H-MSM's sexual health. However, I was limited in my analysis to the outcomes for which data were available across the studies included in my IPD-MA. This in part reflects the timeframe over which the surveys were undertaken, during which time there has come to be greater recognition of a broader definition of sexual health and its intersectionality with other areas of health. I was also limited by the extent to which these variables were able to be harmonised. Furthermore, it was necessary to limit the scope of the thesis so that it was feasible as a PhD project.

8.4.1 Generalisability and transferability of findings

The methods I used in this thesis range in specificity from low to high. The systematic review primarily included articles about studies conducted in the USA, and so some findings may be specific to H-MSM in that country, and in some cases, within specific communities. In contrast, the IPD-MA (Chapter 5) analysed data from multiple high-income countries outside of the USA. (I considered inclusion of data from the American Men's Internet Survey (AMIS) however the cost of accessing this data meant this was not feasible). While this does broaden the scope of analysis and complements the primarily US-focused results of the systematic review, the nature of the statistical analysis techniques means that estimates calculated are average estimates and are not specific to any particular subpopulation or country within the dataset. In particular, analysis conducted on outcomes related to sex with women

was only possible using data from Western Europe, and so findings related to those outcomes may not be applicable to H-MSM in other populations. Finally, my qualitative study was conducted using data from H-MSM in England. As such it is difficult to quantify how transferable the findings from this study are to H-MSM in other settings, particularly those in countries with vastly different healthcare systems. However, the results from each study largely support or complement the majority of findings from the others.

In addition, all of the data in this thesis related to H-MSM who, by definition, were willing to provide information about their sexual behaviour and sexual health to a third party, either in the form of an online or in-person survey, or a face-to-face interview with a researcher. This generally also meant that they visited a venue or website intended for MSM or identified in some way with advertising targeting H-MSM or MSM more broadly. As such, the findings in this thesis may not apply to H-MSM who are uncomfortable sharing information about the sex they have or who do not visit the locations at which recruitment took place. This may also mean that studies overestimate STI/HIV risk behaviour among H-MSM (due to the associations found between recruitment venue and risk behaviour in section 5.5.2), and STI/HIV testing among H-MSM (due to the associations between engagement with gay communities and recent testing found in section 5.5.3).

Finally, and importantly, associations between country-level structural stigma towards sexual minorities and both sexual orientation (identity and behaviour)²⁸ and sexual health⁷ among MSM mean that the findings of this thesis may not apply to H-MSM outside of the high-income countries specified in section 2.3.

8.4.2 Sources of bias and their influence on research

All of the studies from which data were sourced for this thesis were susceptible to different forms of reporting bias, as they generally relied on participants' self-report of their sexual behaviour and sexual health. Bias may be introduced as a result of differences between H-MSM and other MSM in what constitutes sex, with research suggesting gay men are more likely than heterosexual men to consider manual- and oral-genital contact (particularly if received from another person) as sex.¹⁶⁹ As a result, H-MSM may be less likely than other MSM to consider manual or oral sex-only partners as sexual partners, resulting in under-reporting of sexual partner

numbers by H-MSM. Conversely, this may also lead to overestimates of AI prevalence among H-MSM, as H-MSM who only engage in manual or oral sex are less likely to participate in studies of MSM in the first place. Recall bias may have affected participants across all self-report studies, especially with longer recall periods. However, as discussed in section 4.2.4, self-report of some outcomes may be more accurate for H-MSM than for other MSM, as their sex with men may be less frequent than other MSM and therefore more easily remembered.²⁵⁹ Social desirability bias may also have influenced participants' responses across all studies, leading to under-reporting of outcomes considered "irresponsible" (e.g. CAI or sexualised drug use) and over-reporting of behaviours such as testing. Just as social desirability effects differ by gender,³⁸⁰ it is conceivable that the effects of social desirability among MSM vary according to participants' sexual identity. For example, H-MSM may feel more pressure than other MSM to under-report behaviours that conflict with their heterosexual identity, such as receptive AI. The effect of this bias may have been reduced (in quantitative studies, at least) due to the use of data collection modes such as (A)CAI or internet survey.²⁵⁶⁻²⁵⁸

Studies of H-MSMW, especially qualitative studies in which participants are speaking directly to a researcher, may be particularly susceptible to both social desirability bias and self-selection bias, due to the impact their behaviour can have on the health of female partners. First, it may lead participants to over-report strategies to reduce risk to themselves and their partners. This may have been the case with participants in other studies as well as my own, though I took steps to minimise this in my own interviews (section 3.5.1). It may also mean that MSMW who do not try to reduce risk to their partners choose not to take part in these studies in the first place, for fear of judgement. Quantitative estimates for MSMW in Chapters 4 and 5 are also prone to bias, particularly when classification of participants as MSMW is based on shorter rather than longer recall periods or lifetime behaviour.⁴⁹ Since classification as MSMW requires reporting of both male and female partners in the specified recall period, H-MSMW who have concurrent male and female partners will be overrepresented in analysis datasets. As a result, findings for this group may overestimate prevalence of risk behaviour for the wider H-MSMW population.

8.5 Implications of my findings

In this section, I discuss the implications of my research for sexual healthcare practice and policy, sexual health promotion and awareness, the psychosocial implications for the H-MSM population, and implications for research, including further research needed with this population.

8.5.1 Implications for sexual health outreach and promotion

The results presented in this thesis suggest that sexual health engagement is low among H-MSM. While this in part reflects lower STI/HIV risk behaviour among the H-MSM population, of particular concern are the low levels of engagement among those H-MSM who do report higher STI/HIV transmission risk behaviours, suggesting that these men are not being reached with relevant sexual health information. However, reaching MSM who do not identify as gay has been recognised as a challenge since the start of the AIDS epidemic.^{122 381} My study and others found that these men have little to no connection to gay communities and culture¹²² and may avoid interventions targeted at gay men.^{61 122 351 382} Their desire for discretion also means that there is no well-defined H-MSM community. So the question is how to reproduce the benefits of engagement with gay communities for H-MSM (or other MSM) who do not engage socially with other MSM?

Any health promotion campaign targeting H-MSM must recognise that for these men, unlike many gay (and to a lesser extent, bisexual^{48 382}) men, their sex with men does not constitute a key component of their identity. Indeed, these men do not see their sexual behaviour as distinct from or incompatible with heterosexuality.⁵⁸ Instead, other aspects of their identities, including their ethnicity, religion, social class, family roles, and their heterosexuality, take priority.^{58 106 247} Thus, targeting this population solely based on their sexual behaviour is unlikely to work, and any efforts to reach them must recognise these identities and target these men as parts of those broader communities to which they belong.^{21 62 247 351} Recognition of H-MSM's concern for their steady female partners may also be a pragmatic way of appealing to H-MSM who are reluctant to seek healthcare for themselves, by emphasising testing and STI/HIV prevention measures as means of protecting their partners and their relationships.^{247 339} Sexual health information should be relevant to their sex with both men and women.⁴⁸ Finally, when the health behaviours being encouraged are

stigmatised due to their association with gay identity, these behaviours may need to be embedded within broader health improvement programmes.^{241 247}

An example of such an approach is that used by sexual health researchers to reach heterosexual-identified Latino MSMW in San Diego.²⁴⁷ The *Hombres Sanos* campaign embedded HIV testing and condom promotion within a broader men's health programme. Promotion of the programme used a combination of both broadcasting (reaching the target population as part of the broader community with whom they identify) and narrowcasting (targeting the population of interest as a particular group based on their specific sexual behaviour). Broadcasting components centred around values of importance to the heterosexual Latino population to the which the target population belonged, such as masculinity, strength, and protection of family. Narrowcast components involved more specific messaging aimed at H-MSMW, centred around condom use as a way of keeping their sex with men a secret from others in their lives. This campaign was associated with reduced levels of recent condomless sex with male and female partners among Latino H-MSMW, and also increased awareness of testing locations and HIV risk and increased carrying of condoms among heterosexual men more broadly.³⁸³ In its recognition of the importance of H-MSM's core identities and priorities, and its embedding of stigmatised health behaviours (such as HIV testing) within broader men's health programmes, this campaign offers an example of how H-MSM may be reached.

8.5.2 Implications for sexual healthcare practice and policy

Once H-MSM are aware of the sexual healthcare options available to them, they must feel comfortable and able to utilise them. The findings of this thesis suggest that sexual healthcare engagement by H-MSM may be improved by providing multiple pathways to access that healthcare (including, but importantly not limited to, remote testing options) and facilitating disclosure of their sex with men during face-to-face consultations.

8.5.2.1 Multiple pathways to sexual healthcare

H-MSM have distinct privacy concerns that are of high importance to them, and these can limit their ability to utilise certain sexual health services. For others, their access may simply be limited by the inconvenience of options offered. My findings highlight the importance of providing multiple pathways to sexual healthcare that

meet the privacy and convenience needs of H-MSM regardless of their personal circumstances.

One example of this relates to asymptomatic STI/HIV testing. The gradual integration in recent years of sexual and reproductive health services has seen testing of asymptomatic patients increasingly offered remotely, especially in the wake of the COVID-19 pandemic.^{344 345} Remote testing options such as HIV self-testing and STI/HIV self-sampling kits have been shown to encourage testing among those who've not tested before, by offering greater convenience and privacy than in-person testing options,^{361 384} and therefore may appeal to H-MSM deterred from testing by the inconvenience of visiting a SHC or who have privacy concerns about testing through their GP. H-MSM living with partners or other family may be unable to have these kits delivered to their homes, and so allowing remote testing kits to be collected from clinics, pharmacies or other locations enables these men to also utilise these services.³⁴³

Remote testing is not suitable for all, however, and some H-MSM may prefer to test at an SHC, as this allows them to speak directly with a sexual health clinician. Others may lack the digital literacy to access remote testing. My research and others have shown the vital role that face-to-face consultations with specialist sexual health clinicians play in the provision of sexual health information, advice, and counselling, particularly for those at greater risk of poor sexual health.^{334 356} It is important then that service delivery models include remote testing options to complement, rather than replace, traditional in-clinic testing, so that those uncomfortable with or unable to access remote testing are not underserved.³⁸⁵ Finally, some H-MSM may find that testing with their GP offers more convenience and privacy than testing at an SHC, indicating that primary care also has a role to play in sexual health for H-MSM.

There are other aspects of sexual healthcare in which H-MSM might benefit from the provision of multiple access or usage options. For example, long-acting injectable forms of PrEP, when available, may be more suitable for H-MSM who, for reasons related to privacy, are unable to incorporate daily oral PrEP into their lives.^{331 386 387} Offering sexual healthcare options that accommodate a range of lifestyles and privacy needs removes barriers that may previously have limited uptake of services,

and so the suggestions described above stand to benefit H-MSM as well as other populations for whom similar barriers have been identified.^{202 343 347 384 388}

8.5.2.2 Facilitation of disclosure during face-to-face consultations

For H-MSM to receive the sexual healthcare they need, their HCPs must be aware of their recent sexual behaviour, including their sex with men. Disclosure to HCPs of same-sex sexual activity has been linked among MSM to greater sexual healthcare engagement including HIV and STI testing and vaccinations.^{18 389} My research found that while some H-MSM are happy to disclose their sex with men to HCPs in SHCs (though not necessarily their GPs), they may not do so voluntarily, instead relying on their HCPs to ask for this information if they consider it relevant. This emphasises the need for HCPs in all settings (i.e., not just sexual health) not to rely on sexual identity as a proxy for sexual behaviour in clinical risk assessment, but to specifically ask about the sex of sexual partners and activities engaged in with these partners.⁹⁷

339 340

H-MSM must also feel comfortable to disclose their sex with men to their HCPs when asked. My research and others have shown the importance of discretion and assurances of confidentiality in facilitating disclosure by H-MSM to HCPs.^{58 339} Just as important is understanding and a lack of judgement from HCPs. H-MSM come from a range of cultural backgrounds, and may have sex with men for a variety of reasons, including in exchange for money or drugs or for reasons related to their mental health. When H-MSM feel that their personal circumstances (including their sexual identity) may be judged or misunderstood, they may be deterred from seeking healthcare or disclosing in future. It is important then for HCPs to understand the backgrounds and personal circumstances of their patients,²⁴⁶ and to provide a safe and non-judgemental space in which they feel able to disclose.^{339 351 365}

These requirements of HCPs are not unique to H-MSM,^{346 348 360} suggesting the potential to translate interventions developed for other minority groups. However, they may be particularly salient for this population. Enabling H-MSM to comfortably and confidentially discuss the sex they have enables HCPs to provide H-MSM with sexual health information, services and interventions appropriate to their level of risk and personal circumstances. It also provides opportunities for discussion about other

concerns that may be indirectly related to sexual health, enabling a more holistic assessment of their sexual health.^{97 175}

8.5.2.3 Implications for sexual health education and training

The findings of this thesis point to the need for further education related to gender, sexual health, and sexual identity in medical school and postgraduate medical training. The difficulties of HCPs to discuss sex and sexual health with their patients have been well studied, particularly among GPs, with common concerns affecting HCPs' confidence to have these discussions including a lack of specialist knowledge (particularly for sexual minorities) and lack of sexual health communication skills.³³⁷
³⁴⁰ Although some H-MSM in my study preferred not to discuss their sex with men with their GPs, others indicated they would if they felt it relevant to their health. As GPs may be the only HCPs some H-MSM interact with, it is important that they are able to provide relevant advice and testing services.³⁵⁷ My study showed that even some specialist sexual health clinicians may lack understanding of discordance between patients' sexual identities and behaviour. Improving and broadening medical training on sexual health to include discussions about gender and sexual identity, as well as the skills to have these discussions, will empower HCPs (including GPs) to feel more comfortable discussing sex with their patients (of any gender or identity), meaning they are better positioned to meet their patients' health needs.^{18 201 340}

Finally, the findings of this thesis suggest the need for better sexual health education of the general public, including information of relevance to MSM. Narratives from participants in my study and others^{59 62} suggest that for many H-MSM, their first same-sex sexual encounter is unplanned, meaning they have not given much thought to how to do so safely or enjoyably. Given the difficulties targeting these men, the most likely way in which they would receive this information is through educational campaigns or programmes intended for the general public, such as through school-based sex and relationships education. Particular emphasis should be given to STI prevention with partners of all genders,⁴⁸ so that it is prioritised by men of all sexual identities as much as the prevention of HIV^{299 300} or pregnancy.¹²⁷
³⁰⁴ Providing better and broader sex and relationships education to the general population is likely to benefit H-MSM as a small but particularly important group, but

also the wider population, providing them with the information needed to have sex that is both safe and enjoyable.

8.5.3 Psycho-social implications

This thesis found that a major driver of some H-MSM's behaviour was a strong desire to achieve an idealised form of masculinity aligned with their heterosexuality, influencing their level of engagement with sexual healthcare, their social engagement with gay communities, as well as their desire to engage in sexual acts seen as gay or feminine, such as AI (and in particular, RAI). This hegemonic masculinity is characterised by a number of traits including strength and invulnerability, virility, dominance over others, and aggression. These traits have been linked to behaviours that negatively affect men's health, including increased risk taking (including substance abuse), hypersexuality, a lack of concern for one's health (including mental health), a refusal to engage with or seek health care, and violence.⁶⁹ Among the wider population of MSM, masculinity has been linked to a number of behaviours related to sexual health, many linked to increased risk, including increased numbers of sexual partners, reduced likelihood of condom use, drug use, a preference for the insertive role during AI, and reluctance to test for HIV.^{320 390-392} Multiple studies have established differences by sexual identity in self-identification as masculine, with heterosexual men consistently scoring higher on measures of masculinity than both gay and bisexual men.³⁹³⁻³⁹⁵ My work lends support to the link between perceptions of masculinity and these behaviours, and it follows that any sexual health intervention or programme designed with H-MSM in mind might benefit from taking this into account.

8.5.4 Implications for future research

8.5.4.1 Implications for research and methodology

This thesis shows the importance of considering how sexual identity intersects with sexual behaviour and supports calls to give greater attention to sexual identity as distinct from sexual behaviour in sexual health and other research among MSM.^{1 24 48}
⁹⁷ Men of different sexual identities have different motivations for the sex they have, as well as their approaches to STI/HIV prevention and engagement with sexual healthcare. Zeglin has called for sexual identity to be included not only in the

analysis stage of research, whereby sexual identity is incorporated as both a control and also an interaction term in analysis models, but also that sexual identity is emphasised in the discussion of results, so that differences are made clear.⁹⁷

However, study sample sizes may not always allow for analyses to fully account for sexual identity. The similarities between H-MSM and B-MSM suggest that in some cases it may be appropriate to group H-MSM with B-MSM, such as when investigating engagement with sexual healthcare, for which few differences between these groups were found. In other cases, it is important for researchers to acknowledge that grouping men of different sexual identities may result in some bias in estimates. Grouping of sexual identities may be less of a problem for qualitative research, as qualitative methods allow for deeper exploration of the context of research participants' lives (e.g. identities, relationships, living situation) and how they affect the topic of interest. This does, however, require that researchers are aware of the ways in which B-MSM and H-MSM may differ, and that these are adequately explored both for individual participants and across the sample.

The under-studied nature of H-MSM largely results from their nature as a "hard-to-identify" population,⁹⁹ meaning researchers need to find more innovative ways of reaching them. My research provides insight into ways in which future studies of MSM can better include H-MSM. The results of Chapters 4 and 5 suggest that few H-MSM attend gay social venues such as bars or clubs, at least to meet sexual partners. Studies recruiting from these locations are therefore unlikely to be successful at recruiting H-MSM. In contrast, H-MSM are more likely to look for sexual partners using online methods, the range of which continues to expand. Therefore online recruitment is likely to become an increasingly better way to reach them. However, it is important to recognise that not all online recruitment is the same. Recruitment of gay and bisexual men on social media platforms such as *Facebook* relies on proxies of sexual identity, such as following LGBTQ+ topics or support groups. Due to their detachment from the LGBTQ+ community, as well as their desire to avoid others finding out about their sex with men, H-MSM are therefore unlikely to be captured in these recruitment methods. Similarly, apps such as *Grindr* may present too much of a risk of discovery for some H-MSM, especially those with steady partners, limiting the effectiveness of recruitment through these channels.

In contrast, the most successful recruitment method for my study was via the website *Call for Participants*, which is aimed at a general audience rather than specifically targeting MSM. This method also required little active efforts from me beyond the initial posting of the advert, with participants finding the advert in their own time or being sent the advert by the service itself. Other non-MSM-specific online locations may also be useful for recruiting H-MSM. Classified websites such as *Locanto*³⁹⁶ (and previously, *Craigslist*³⁹⁷) allow users to post personals ads alongside job advertisements and listings for second-hand clothing and furniture. Similarly, *Reddit* offers forums dedicated to gay pornography (including some specifically for heterosexual men³⁹⁸) alongside forums for news and politics, movies, videogames, and almost any other topic of interest. The non-MSM-specific nature of these websites may offer H-MSM safer places to explore their same-sex sexuality than websites or apps aimed at MSM. Future studies wishing to recruit H-MSM and other MSM who do not actively engage with LGBTQ+ communities should consider additional recruitment through similar online locations if feasible.

8.5.4.2 Further research

Further research is needed to identify better ways to appeal to H-MSM with relevant sexual health information and services. This is likely to require focused qualitative research with H-MSM in individual cultural or community groups to ensure that health promotion efforts are sensitive to the specific circumstances of those MSM. Part of this research may also focus on finding an appropriate way to refer to H-MSM, with “heteroflexible” just one suggestion.⁵⁸ It is likely however that no single term will be appropriate for the broad population of H-MSM.

While my research showed that some H-MSM are comfortable accessing sexual healthcare or disclosing their sex with men to HCPs, outbreak cluster studies⁹⁵ and phylogenetic analyses of HIV^{23 370} and gonorrhoea^{399 400} transmission networks show that this is not true for all MSM. Going forward, these studies will continue to play important roles in identifying and understanding specific subpopulations in need of outreach. The use of phylogenetic data in routine clinical practice is still some way off, but could in theory be used to identify non-disclosing MSM (including H-MSM) at the point of care, which might help to provide more relevant and personalised sexual healthcare.⁴⁰¹ However, use of technology in this way has some very serious ethical, legal and clinical implications, including the potential to threaten patients’ trust of

their HCPs.^{401 402} These implications need to be carefully considered, and patient groups consulted, before this is implemented in practice.

Further research is also needed to identify ways to encourage the adoption of PrEP among H-MSM who would benefit from it. While this is likely to only be a minority of this group given my estimate that around one-third of H-MSM engaged in higher STI/HIV risk behaviour, this is not a reason for overlooking H-MSM in terms of the health benefits available through PrEP. Results in Chapters 4 and 6 of my thesis suggest that H-MSM may be ill-informed about PrEP's efficacy, have stigmatising views of those who take it, and are unwilling to take it themselves. This research should focus not just on motivating factors for PrEP use among this population, but also the acceptability and ease of adoption of different forms of PrEP, including long-acting injectables.

Finally, research is needed to identify the reasons for the disparities observed in HIV and STI testing across the MSM population. My research suggests that connection to gay communities plays a significant role in this, however, the mechanisms by which this occurs is not clear. Future research should investigate these mechanisms, and how to reproduce these effects in MSM whose lives do not intersect these communities.

8.6 Conclusion

In this thesis, I used both quantitative and qualitative research methods to study the sexual behaviour, sexual health, and sexual healthcare-seeking behaviour of H-MSM in high-income countries. I found that at a population level, H-MSM may be at lower risk of HIV (though not necessarily STI) acquisition than G-MSM and, to a lesser extent, B-MSM. This may in part be because H-MSM are less likely to engage in behaviours seen as feminine or gay such as AI (and in particular RAI) which are associated with increased likelihood of HIV transmission. However, this may also be because H-MSM in relationships with women understand how their extra-relational sex may affect the health of their steady partners and so take efforts to minimise their risk of STI/HIV acquisition and onward transmission. While the majority of H-MSM also report sex with women, less than one in five H-MSMW report condomless sex with both male and female partners. This suggests that a minority of H-MSM play a role in facilitating HIV or STI transmission between MSM and

heterosexual sexual networks, though infrequent testing among this population and non-disclosure to female partners mean that other H-MSM may also contribute.

Despite their lower risk overall, I found that there is still a significant proportion of H-MSM who engage in sex with a higher risk of STI/HIV acquisition, and who therefore have a greater need to engage regularly with sexual healthcare. However, testing for HIV and STIs is low among H-MSM, regardless of recent behaviour.

Sexual healthcare interventions targeting H-MSM must understand the importance of discretion to this population and should provide options for accessing sexual healthcare that meet the privacy needs of men in a variety of living situations. They must also recognise the importance of other identities H-MSM may hold and integrate them into outreach efforts. High social engagement with gay communities was associated with a twofold increase in recent testing among H-MSM. Future research should determine how these effects can be produced for H-MSM and other non-gay-identifying MSM whose lives do not intersect these communities.

Finally, this research shows the importance of accounting for sexual identity in addition to sexual behaviour in both sexual health practice and research. Sexual identity plays an important role in MSM's motivations for the sex they have, their approach to STI/HIV prevention, and their engagement with sexual healthcare. Recognising this is fundamental to the successful design of research and interventions aimed at improving the sexual health of MSM and their partners.

Appendices

Appendix 1: BS21 Network

A1.1 BS21 Network mission and workshop

The BS21 Network is an informal network of internationally recognised experts in behavioural surveillance research and was created as a way of co-ordinating international research concerning behavioural surveillance for HIV and sexual health in gay men and other MSM in the 21st century. The network's first workshop took place in Glasgow, Scotland in August 2021 in order to explore how behavioural surveillance research could respond to contemporary trends and challenges in the health and social relations of MSM. It also sought to identify novel methods to maintain the responsiveness of behavioural surveillance to new and ongoing public health challenges among MSM.

The majority of network members were associated with one or more behavioural surveillance or population-based surveys in their home country. The workshop involved a number of discussions related to these surveys, including similarities and differences between these surveys, who is and isn't included in them (in particular, identifying understudied populations), and how best to share methods across survey teams. The idea for this thesis originated as a result of these discussions, with H-MSM identified as an understudied population which existing data from across surveys might be used to study.

A1.2 BS21 Network Members

The BS21 members listed below collaborated directly on this project, through contribution of survey data and in the preparation of conference abstract submissions.

European Men's Internet Survey (EMIS-2010)

- Dr Axel J Schmidt, Assistant Professor of Sexual Health and STIs, Faculty of Epidemiology and Population Health, London School of Hygiene and Tropical Medicine, London, UK

Gay Community Periodic Surveys (GCPS)

- Professor Martin Holt, Centre for Social Research in Health, UNSW, Sydney, Australia

- Dr Benjamin Bavinton, Senior Lecturer, Kirby Institute, UNSW, Sydney, Australia

Gay Auckland Periodic Sex Surveys (GAPSS) / Gay men's Online Sex Surveys (GOSS)

- Dr Peter Saxton, Senior Lecturer, School of Population Health, University of Auckland, Auckland, New Zealand

Sex Now 2015 (SN15)

- Dr Nathan Lachowsky, Associate Professor, School of Public Health and Social Policy, University of Victoria, Victoria, BC, Canada

Other members of the BS21 who attended the workshop in August 2017, but who did not directly contribute to this work, are listed below.

- Professor Lisa McDaid, previously MRC/CSO Social & Public Health Sciences Unit, University of Glasgow, Glasgow, Scotland, UK
- Professor Paul Flowers, Glasgow Caledonian University, Glasgow, Scotland, UK
- David Bingham, Terence Higgins Trust, Glasgow, Scotland, UK
- Dr Nicola Boydell, University of Edinburgh, Edinburgh, Scotland, UK
- Associate Professor Richard Bränström, Karolinska Institutet, Stockholm, Sweden
- Associate Professor David Brennan, Factor-Inwentash Faculty of Social Work, University of Toronto, Ontario, Canada
- Dr Jamie Frankis, Glasgow Caledonian University, Glasgow, Scotland, UK
- Dr Cath Mercer, University College London, London, UK
- Jeff Morgan, Community-Based Research Centre for Gay Men's Health, Vancouver, BC, Canada
- Julie Riddell, MRC/CSO Social & Public Health Sciences Unit, University of Glasgow, Glasgow, Scotland, UK
- Dr Patrick Sullivan, Rollins School of Public Health, Emory University, Atlanta, GA, USA
- Lesley Wallace, Health Protection Scotland, Glasgow, Scotland, UK
- Dr Gwenda Hughes, Public Health England, London, UK
- Dr Anthony Nardone, Public Health England, London, UK

Appendix 2: Example search strategy for systematic review

The following is the search used for Ovid databases (MedLine, PsycInfo, Embase),

1. Heterosexuality/
2. heterosexual.tw.
3. straight.tw.
4. mostly straight.tw.
5. heterosexually identif*.tw.
6. straight identif*.tw.
7. heterosexual identi*.tw.
8. down low.tw.
9. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8
10. Homosexuality/
11. Bisexuality/
12. sex with men.tw.
13. "sex with women and men".tw.
14. sex with another male.tw.
15. sex with another man.tw.
16. sex with other men.tw.
17. intercourse with other men.tw.
18. same-sex sex*.tw.
19. intercourse with men.tw.
20. intercourse with other male*.tw.
21. sex with other male*.tw.

22. behavioral* bisexual*.tw.
23. bisexual* behaviour*.tw.
24. gay sex.tw.
25. homosexual sex*.tw.
26. behavioral* homosexual*.tw.
27. homosexual* behavior*.tw.
28. behavioural* homosexual*.tw.
29. behavioural* bisexual*.tw.
30. bisexual* behavior*.tw.
31. homosexual behaviour*.tw.
32. same-sex desire.tw.
33. same-sex attract*.tw.
34. attracted to men.tw.
35. attracted to other men.tw.
36. 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35
37. 9 and 36
38. Sexually Transmitted Diseases/
39. HIV Infections/
40. Sexually Transmitted Diseases/
41. hiv.tw.
42. syphilis.tw.
43. gonorrhoea.tw.
44. gonorrhea.tw.
45. chlamydia.tw.

46. "c trachomatis".tw.
47. sexually transmitted infection*.tw.
48. STI.tw.
49. STIs.tw.
50. hepatitis.tw.
51. hpv.tw.
52. human papillomavirus.tw.
53. sexually transmitted disease*.tw.
54. stds.tw.
55. 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or 52 or 53 or 54
56. test.tw.
57. testing.tw.
58. tests.tw.
59. screen*.tw.
60. diagnos*.tw.
61. 56 or 57 or 58 or 59 or 60
62. 55 and 61
63. Sexual Behavior/
64. Sexual Partners/
65. sexual partner*.tw.
66. sexual behaviour.tw.
67. sexual behavior.tw.
68. sexual risk.tw.
69. risky sex*.tw.

70. condom.tw.
71. unprotected.tw.
72. condomless.tw.
73. UAI.tw.
74. oral sex*.tw.
75. anal sex*.tw.
76. vaginal sex*.tw.
77. condomless.tw.
78. anal intercourse.tw.
79. vaginal intercourse.tw.
80. "oral intercourse".tw.
81. risk behaviour*.tw.
82. unprotected anal.tw.
83. risk behavior*.tw.
84. CLS.tw.
85. 63 or 64 or 65 or 66 or 67 or 68 or 69 or 70 or 71 or 72 or 73 or 74 or 75 or 76 or 77 or 78 or 79 or 80 or 81 or 82 or 83 or 84
86. 55 or 62 or 85
87. 37 and 86
88. 87 and 2008:2018.(sa_year).
89. male/
90. men.tw.
91. males.tw.
92. male.tw.
93. 89 or 90 or 91 or 92

94. 88 and 93

Appendix 3: Summary of statistical methods

In this appendix I describe the statistical methods used in IPD-MA analysis.

A3.1 Measuring differences between groups in cross-sectional data

When carrying out multivariate analysis on cross-sectional data with binary outcomes, logistic regression is often used to produce odds ratios (ORs) as a measure of the difference between groups of interest. This is because logistic regression models the binomial data exactly, and when the probability of an outcome is small (<10%), the OR can approximate the PR between groups. However, when outcomes are common, the OR can overestimate (when PR is greater than 1) or underestimate (when PR is less than 1) the PR.⁴⁰³⁻⁴⁰⁵ Additionally, adjusting for confounding factors leads to inconsistent OR estimates, which are even worse approximations of the PR.⁴⁰⁶ In contrast, PR estimates are more consistent, as adjusting for covariates improves the precision, and does not substantially change the magnitude of the estimates. Finally, due to their more difficult interpretation,⁴⁰⁵⁻⁴⁰⁷ ORs can be misinterpreted as PRs (particularly outside of the scientific community), and so when an outcome is common, this can produce overstated and misleading descriptions of differences between groups.^{405 408 409} It is therefore recommended to produce PRs where possible.^{403 405-407 409-411}

A3.2 Modified Poisson regression for the calculation of prevalence ratios

One method of producing unbiased estimates for data with binary outcomes is modified Poisson regression using the robust sandwich variance estimator.^{408 412}

This models the binary outcome data y as a Poisson variable with mean p and dependent on variable of interest x , with intercept term α and slope β :

$$y \sim \text{Poisson}(p)$$

$$\log(p) = \alpha + \beta x$$

If y is a binary variable indicating whether or not a participant has reported a particular outcome (i.e. $y \in \{0, 1\}$) then $p \in [0, 1]$ is the prevalence of that outcome in the population of interest. Taking the exponential for each side of the equation, gives the following equation:

$$p = e^{\alpha} e^{\beta x}$$

In this formulation, e^{α} is the baseline prevalence of the outcome (i.e. the prevalence in the segment of the population for which $x = 0$), while e^{β} is the PR comparing the prevalence of the outcome in the segment of the population for whom $x = 1$ to the baseline population. Modelling binary data with Poisson regression models therefore enables the calculation of PRs. However, because the binomial variance is bounded (with a maximum value of 0.25 when $p=0.5$), while the Poisson variance (equal to the mean) is unbounded, performing Poisson regression on binomial data overestimates the PR standard error, producing conservative PR confidence intervals.⁴⁰⁵ The modified Poisson regression with robust errors uses the robust sandwich variance estimator to compensate for the overestimation of the standard error.^{408 412} PR estimates produced using robust Poisson regression models have also been found to be unbiased even when the model is misspecified.⁴¹³ It has therefore been recommended as a method of estimating the PR in cross-sectional studies.^{405 408 409}

412

A3.3 Individual participant data meta-analysis (IPD-MA)

Aggregate data meta-analysis (AD-MA) involves the extraction from published reports of studies (typically clinical trials) of aggregate data such as summary statistics of treatment effects (e.g. ORs, PRs) and combining these data to improve confidence estimates around an effect. IPD-MA, rather than using summary data, involves the collation and subsequent analysis of the individual participant data (IPD) from relevant studies. While IPD-MA has typically been used for clinical trials data, it has also been used to analyse population health survey data to measure disparities in health risk between those identifying as heterosexual and sexual minorities.^{30 414}

IPD-MA has a number of benefits over more traditional AD-MA. First, it allows estimates to be calculated for subgroups (e.g. MSM of different sexual identities) for whom data may not be reported for individual studies. It also allows for common inclusion and exclusion criteria to be applied across studies, and for standardised individual-level adjustment for potential confounding factors (e.g. demographic characteristics) rather than adjustment at study-level, thus avoiding ecological bias.⁴¹⁵ Finally, it allows for additional analysis beyond that carried out in initial studies, which may have had more limited scope. However, IPD-MA is a resource-

intensive process, involving sourcing IPD from multiple study teams, and then harmonising the individual datasets into a single large dataset for analysis.

IPD-MA may be carried out in one or two stages.

A3.4 Two-stage methods

In two-stage methods, the individual data from each study are first modelled separately, producing study-specific estimates of effects $\hat{\beta}_j$.²⁷⁹ In the second stage, these study-level effects are pooled using a weighted average method (either fixed or random effects) to produce a single summary statistic $\hat{\beta}$.

A3.4.1 Fixed effects

If studies were conducted in similar populations (e.g. multiple samples from MSM in the same country) and it is assumed that observed differences between study estimates are due only to sampling error, then a fixed effects model can be used to produce the pooled estimate. Fixed effects models assume that there is one true effect β which is identical across all studies, and that study-level estimates are normally distributed about this true effect, i.e.

$$\hat{\beta}_j \sim N(\beta, \text{Var}(\hat{\beta}_j))$$

The estimate for the true effect is then calculated as the weighted average of the study-level estimates

$$\hat{\beta} = \frac{\sum_j \hat{\beta}_j w_j}{\sum_j w_j}$$

with variance

$$\text{var}(\hat{\beta}) = \frac{1}{\sum_j w_j}$$

where the weight for each individual study, w_j , is the inverse of the variance:

$$w_j = \frac{1}{\text{var}(\hat{\beta}_j)}$$

As variance is inversely proportional to study size, this method gives greater weight to larger studies.

A3.4.2 Random effects

When study populations or study methodologies are not identical, fixed effects models are no longer suitable, as observed differences in study estimates may not only be due to sampling error but also the result of differences in study populations or methodology. Random effects models assume that there is sufficient heterogeneity across study populations such that the true treatment effects for individual studies, β_j , are not identical, but are normally distributed about some mean treatment effect β with between-study variance τ^2 .²⁷⁹ Thus the individual study estimates $\hat{\beta}_j$ have distribution

$$\hat{\beta}_j \sim N(\beta_j, \text{Var}(\hat{\beta}_j))$$

where

$$\beta_j \sim N(\beta, \tau^2)$$

In this model, β represents the mean or average of the individual study treatment effects. The estimate of this average, $\hat{\beta}$, is again calculated through a weighted average

$$\hat{\beta} = \frac{\sum_j \hat{\beta}_j w_j}{\sum_j w_j}$$

with variance

$$\text{var}(\hat{\beta}) = \frac{1}{\sum_j w_j}$$

However, the weights for each individual study, w_j , are now adjusted to account for the between-study variance:

$$w_j = \frac{1}{\text{var}(\hat{\beta}_j) + \hat{\tau}^2}$$

As the between-study variance, the estimate of τ^2 provides a measure of the heterogeneity that exists between the studies included in the meta-analysis. The inclusion of this term in the weight calculations means that larger studies contribute less to the mean effect estimate than they do in the fixed effects model.

A3.5 Problems with two-stage method:

For many situations, two-stage IPD-MA is appropriate and provides reasonable pooled estimates. However, there are two situations relevant to this thesis in which standard two-stage IPD-MA is less reliable:

- when producing pooled prevalence estimates of binomial variables; and
- when data for subgroups within studies are sparse, restricting the use of study-level models with explanatory variables.

A3.5.1 Two-stage IPD-MA to produce pooled prevalence estimates for binomial data

When using two-stage IDP-MA on binomial data to produce pooled prevalence estimates, problems may arise in both the first and second stages. Assume that the estimate for the probability p from study j is given by $p_j = \frac{n_j}{N_j}$. In the first stage, problems can arise when calculating confidence intervals for the study-specific estimates p_j . When p_j is close to 0 or 1, the Wald method for calculating confidence intervals, which assumes an approximate normal distribution, can calculate confidence intervals that extend beyond the acceptable range for p , which must remain in the interval $[0, 1]$. Additionally, when p_j is exactly equal to 0 or 1, this method produces zero-width confidence intervals and standard errors equal to zero. While a number of alternative methods of confidence interval calculation have been suggested to avoid these problems, the score method¹⁸⁰ has been recommended for its good coverage and less computationally-intense nature.⁴¹⁶

The second stage of two-stage IPD-MA pools study-level estimates \hat{p}_j assuming that they are approximately normally distributed. This is true when N_j is large or when p_j is not close to 0 or 1. When these conditions are not met, the actual distribution of p_j can be skewed and so pooling can produce nonsensical confidence intervals. A solution to this problem is to transform study-level estimates \hat{p}_j so that they are normally distributed, pool the transformed estimates using standard meta-analysis techniques, and then back-transform the pooled estimate. One such transformation is the Freeman-Tukey double arcsine transformation.¹⁸¹

A3.5.2 Two-stage IPD-MA when study-level data are sparse

A second problem with two-stage IPD-MA arises when study-level data are sparse for subgroups of interest. As the first stage of two-stage IPD-MA involves modelling the data at study-level to produce study-specific estimates of differences between subgroups, when the total number of participants in a subgroup of interest within studies is small, the number of covariates that can be included in the model is limited to avoid overfitting. Also, study-level estimates can be unstable when individual studies have zero cells (i.e. no events for subgroups), due to problems with model convergence.⁴¹⁷ Finally, two-stage IPD-MA is not reliable when the number of studies is small. In these cases, it is better to model the data using one-stage IPD-MA.

A3.6 One-stage methods

One-stage methods model IPD from all studies simultaneously, using multi-level models to account for within-study clustering. They are more complex to implement than two-stage methods, and often provide similar estimates. However, they can provide better estimates when analysing IPD from a small number of studies, or when within-study subgroup data is sparse.⁴¹⁷

To understand how one-stage IPD-MA works, first imagine that all data from all studies were modelled using a simple Poisson regression model:

$$y_{ij} \sim \text{Poisson}(p_{ij})$$

$$\log(p_{ij}) = \alpha + \beta x_{ij} + \varepsilon_{ij}$$

$$\varepsilon_{ij} \sim N(0, \sigma^2)$$

where x_{ij} and ε_{ij} are the measurement for variable x and the residual respectively for the i^{th} participant from the j^{th} study. This model assumes that the intercept α and the slope β are the same for all studies, and so estimates a common intercept $\hat{\alpha}$ and common slope $\hat{\beta}$. It also assumes that the residual variance σ^2 is the same across all studies.

However, it may be reasonable to assume that studies differ in their intercept or slope. In the case of binomial data, this might be the case when you expect the

baseline prevalence (e^α) or the PR (e^β) to differ between studies. We might also expect that the residual variance differs between studies.

Study-level intercepts and effects can be modelled by including random intercept and effect terms in the model. Introducing random intercepts and random effects, and allowing residuals to vary across studies, the model becomes:

$$\log(p_{ij}) = \alpha_j + \beta_j x_{ij} + \varepsilon_{ij}$$

$$\begin{pmatrix} \alpha_j \\ \beta_j \end{pmatrix} \sim MVN \left(\begin{bmatrix} \alpha \\ \beta \end{bmatrix}, \begin{pmatrix} \tau_\alpha^2 & \tau_{\alpha\beta} \\ \tau_{\alpha\beta} & \tau_\beta^2 \end{pmatrix} \right)$$

$$\varepsilon_{ij} \sim N(0, \sigma_j^2)$$

Now each study-level intercept α_j varies about some average α with variance τ_α^2 and each slope β_j varies about some average β with variance τ_β^2 . The model now estimates the average intercept term $\hat{\alpha}$ and average slope term $\hat{\beta}$, as well as variance and covariance elements $\widehat{\tau}_\alpha^2$, $\widehat{\tau}_\beta^2$ and $\widehat{\tau}_{\alpha\beta}$.

Finally, the model can be extended to include other covariates z_k with parameters θ_k . These can be random or fixed. In the case of a multi-level multivariate Poisson regression with random intercepts, random effects on variable x and fixed effects on variables z_k , the regression model is:

$$y_{ij} \sim \text{Poisson}(p_{ij})$$

$$\log(p_{ij}) = \alpha_j + \beta_j x_{ij} + \sum_{k=1}^K \theta_k z_{ijk} + \varepsilon_{ij}$$

$$\begin{pmatrix} \alpha_j \\ \beta_j \end{pmatrix} \sim MVN \left(\begin{bmatrix} \alpha \\ \beta \end{bmatrix}, \begin{pmatrix} \tau_\alpha^2 & \tau_{\alpha\beta} \\ \tau_{\alpha\beta} & \tau_\beta^2 \end{pmatrix} \right)$$

$$\varepsilon_{ij} \sim N(0, \sigma_j^2)$$

Here, the fixed components of the model are estimated in α , β , and the θ_k . The random components are modelled through the estimation of τ_α^2 , τ_β^2 and $\tau_{\alpha\beta}$. Higher

values of the variance and covariance estimates indicate greater heterogeneity in α_j and β_j across studies.

When carrying out one-stage IPD-MA, it is important to specify the structure of the random effects variance-covariance matrix. This is based on the degree of independence expected between random terms. If independence is expected between the random terms, then the off-diagonal terms of the variance-covariance matrix ($\tau_{\alpha\beta}$ in the above example) will be equal to zero. If there is no reason to suspect independence or any other formal relationship between random terms, then an unstructured covariance matrix can be specified. In this case, all elements of the variance-covariance matrix are estimated.

Robust Poisson regression has previously been applied to data with a binary outcome to produce PRs, and while it was found to not perform as well as multilevel logistic regression, this was most pronounced with a higher number of clusters (>30).⁴¹⁸ In my analyses I have prioritised interpretability (i.e. the calculation of PRs instead of ORs) over performance.

Appendix 4: Qualitative study topic guide

INTRODUCTION

Thank you for coming along to talk with me today. My name is Tyrone; I'm a research student at University College London and my project is about understanding more about men who sometimes have sex with other men and who identify as heterosexual or straight or something similar. The aim of the study is really to identify ways in which sexual healthcare for this population can be improved. Today in our interview we'll be exploring three main areas: your thoughts about your identity and sexual orientation, the sex you have (with partners of any gender), and your experiences with and thoughts about different forms of sexual healthcare.

- Go through information sheet.
- Go through consent form. Have they signed?
- Ask them the demographics questions.

Before we start, it is important for you to know that there are no right or wrong answers.

I would invite you to be as open and as honest as you feel comfortable with, I am interested in your personal experiences and opinions, and am not going to judge any of your answers. So if I ask you why you gave a particular answer, it's just because I would like to know more about this. You should also feel free to use whatever terms you feel comfortable using, including explicit language.

Also, anything you tell me in these interviews will be confidential. Although I'm recording this interview, the only people who will hear the recording will be me and the professional transcriber, who has signed a confidentiality agreement. The transcript of this interview will remove any identifying information such as names or locations, so it won't be possible to identify you when reading the transcript, and after the transcript has been produced, the recording will be destroyed.

If you don't feel comfortable answering any questions, you don't have to, and you can ask to stop the interview at any point.

After this interview, if you decide that you don't want to have your data included in the study anymore, you will have a month to tell me, and I will also delete the transcript.

The interview will probably take around an hour. *Do you have any questions before we start?*

[Check ok to record. Turn on recorder]

- 1. Can you start by telling me how you found out about this study?**
 - a. What made you decide to take part?
- 2. Now I'd like to know a bit about you. Can you tell me a bit about yourself?**
 - a. What are the most important aspects of your identity?
- 3. Can you tell me how would you privately describe your sexual orientation?**
 - a. Probe: why do you use this term?
 - b. Has this changed over time?
 - c. How do you describe your sexual orientation to other people?
 - i. Can you explain why you use this label for other people?
- 4. Do you have any friends, acquaintances or relatives who identify as gay or bisexual?**
 - a. Can you tell me more about how you know them?
 - b. Thinking about the community and the people you normally associate with in your day-to-day life, how accepting do you think that community is of gay or bisexual people?
- 5. You mentioned you're in a relationship with _____. Can you tell me more about that relationship?**

SEXUAL EXPERIENCES

We're now going to talk a bit about your sexual experiences.

- 6. Can you tell me, who do you generally have any sort of sex with?**
- 7. What led to you first having sex with men? e.g. porn, etc.**
- 8. What appeals to you about sex with _____?**
- 9. How often would you say that you have sex with these different partners?**
- 10. Can you tell me how you meet _____?**
 - a. Prompt: apps, cruising areas like parks, saunas, clubs, bars

- i. Why do you use this method? Why don't you use other methods? (e.g. apps)
 - b. What are the most important factors to you when choosing your sexual partners?
 - c. Where (physically) do you tend to meet _____?
- 11. What do you normally like to do with these partners?**
 - a. How does sex differ between your partners?
 - b. Is there anything you wouldn't do with some partners? Why?
- 12. When you're having sex with these different partners, do you think much about HIV or STIs before or during?**
 - a. Do you ever discuss HIV or sexual health with your partners?
 - b. Given the sex you have, do you think you're at risk of HIV or STIs? (Why?)
- 13. Do you do anything to avoid HIV or STIs when having sex with these partners?**
 - a. How do you decide what to do with your partners?
 - b. How do you feel discussing condom use with partners?
 - c. How often do you use condoms?
 - d. How do you feel about their health?
- 14. Do you ever have sex while using drugs of any kind or after drinking?**
 - a. What do you use?
 - b. In what circumstances?
 - c. How do you think it influences your behaviour?
- 15. Can you tell me how you normally feel after sex with these different partners?**
 - a. Why do you think you feel this way?
 - b. What do you enjoy about sex with these different partners?
- 16. Can you tell me about how you feel towards about the different partners you have?**
- 17. What do you think you get from sex with men that you don't get from sex with your wife/girlfriend/female partners?**
- 18. Do your female partners know that you have sex with _____?**
 - a. How did that come about?
 - b. How did she react?

- c. What would be her reaction if they knew?
- d. How do you feel about not telling them?**
- e. Can you think of a situation in which you would tell them?

19. Does anyone else in your life know?

- a. Why haven't you told anyone? / If they have: how did they react?
- b. Can you think of a situation in which you might tell anyone?
- c. How would people react?

EXPERIENCE OF SEXUAL HEALTH TESTING

We're now going to talk more specifically about HIV or STI tests you've had in the past.

20. Have you ever told a doctor or nurse or other medical professional that you sometimes have sex with _____?

- a. Who was it?
- b. How did that come up in discussion?
- c. How did you feel talking about it?

21. Have you ever tested for HIV or STIs?

- d. Can you tell me more about that?
- e. What makes you decide to test?
- f. What tests do you normally have?
- g. How often do you test?
- h. How often do you think you should test?
- i. How do you normally decide where to go for a test?
- j. How much do you tell the clinician about the sex you have?

22. If not: Why do you think you haven't been for an HIV or STI test before now?

23. What would your ideal testing scenario be?

- a. In an ideal world, how would you prefer to test?
- b. Why in this particular way?

24. Thinking about some specific HIV and STI testing scenarios now:

- a. How would you feel asking your GP for a sexual health screening?**

- b. **How would you feel going to a specialist STI clinic for screening?
How would you feel going to a clinic that primarily targets the gay community?**
- c. It's now possible to order testing kits online, so a sampling kit is sent to your home in discreet packaging, you collect your samples at home, and then send your samples back through the post, and receive your results a few days later. **How would you feel receiving a sampling kit like that in the post?**
- d. **And how would you prefer to receive your test results?** (e.g. phone call, text message, online) – **Why?**
- e. Finally, you can now test for HIV using a home testing kit, in which you test a drop of your blood, and receive your results within 5 minutes. **How would you feel receiving your test results in this way?**

25. What would prompt you to test for HIV or STIs in future?

So now thinking more generally:

26. Where would you look or who would you speak to if you wanted sexual health information?

27. Have you ever heard of PrEP (pre-exposure prophylaxis)? (Describe if not)

- a. Do you think this is something you would ever be interested in taking?
Why/Why not?
- b. What do you think about it?

28. Many sexual health services will promote their services as being relevant to gay and bisexual men. Would you think these services are relevant to you?

Probe: Why/Why not? Can you elaborate on that a little more?

29. Or if you saw something described as being relevant for “men who have sex with men”, do you think it applies to you/describes you?

Probe: Can you explain why/why not?

30. Where would you like to see health information appear for men who, like you, identify as straight and sometimes have sex with men?

31. How do you think we could encourage men who are similar to you to test regularly (say every year) for HIV and STIs?

- a. Where do you think this message should appear in order to reach men like you?

Prompts: ads on hook-up apps, magazines, saunas

Closing question

That's the end of the questions I have prepared, is there anything else you wanted to mention that we haven't already talked about?

Debriefing at the end:

Thank them for their participation. Discuss services on the information sheet. Give them voucher.

Appendix 5: Qualitative study pre-interview demographics questionnaire

1. What is your age (in years)?
2. How would you describe your gender? _____
3. Do you identify as trans?
 - Yes
 - No
 - Prefer not to say
4. What is the highest level that you have been educated to?

5. How would you describe your ethnicity?

6. How would you describe your relationship status?

7. How would you describe the area you live in?
 - Large city
 - Small city
 - Town
 - Rural village
 - Isolated rural
8. Do you use a smartphone? (e.g. iPhone, Android)
 - Yes
 - No
9. Which of these most accurately reflects your current understanding of your sexual orientation?
 - Exclusively straight
 - Straight
 - Mostly straight
 - Bisexual-leaning straight
 - Bisexual
 - Bisexual-leaning gay

- Mostly gay
- Gay
- Exclusively gay
- Something else _____

The next two questions relate to attraction. The first asks about sexual attraction, i.e. your desire to have sex with someone. The second asks about romantic attraction, i.e. your desire to be in a relationship with someone.

10. I have felt sexually attracted...

- Only to women, never to men
- More often to women, and at least once to a man
- About equally often to women and to men
- More often to men, and at least once to a woman
- Only ever to men, never to women
- I have never felt sexually attracted to anyone at all
- Prefer not to say

11. I have felt romantically attracted...

- Only to women, never to men
- More often to women, and at least once to a man
- About equally often to women and to men
- More often to men, and at least once to a woman
- Only ever to men, never to women
- I have never felt romantically attracted to anyone at all
- Prefer not to say


12. What do you think your current HIV status is?

- Negative (I don't have HIV)
- Positive (I have HIV)
- I don't know
- Prefer not to say

Appendix 6: Screenshots and photos of recruitment methods

A6.1 Call for Participants

The landing page for the *Call for Participants* study page is shown in Figure 12. The study information shown to potential participants prior to signup is shown in Figure 13.



HOME > FIND RESEARCH > STUDY OVERVIEW

MANAGE STUDY ACADEMIC STUDY

Understanding straight-identifying men who sometimes have sex with men

15 January 2020

Researchers at UCL would like to talk to men who describe themselves as straight or heterosexual, and who sometimes have sex or sexual contact with other men. Participation will involve a one-hour confidential interview in-person or over the phone. Our aim is to better understand their sexual behaviour and sexual health (including feelings about testing for HIV and other sexually transmitted infections), so that we can improve the sexual healthcare they're provided.

Requirements

- Males living in the UK.
- Aged 18 years or older.
- Describe yourself as heterosexual or straight.
- Have had some form of sexual contact with another man in the past.

YES, I MEET THESE REQUIREMENTS

TAKE PART IN THIS STUDY

Keywords

University College London Sexual Behaviour sexual health Identity Health Service Use

STUDY ESSENTIALS

- University College London, GB
- 60 min(s) to complete
- £20 Love2Shop voucher
- Interview

ONLINE

Online research

SHARE THIS STUDY

- Facebook
- Twitter
- LinkedIn
- Reddit
- Pinterest
- Email this study
- Print a poster version (PDF)

Figure 12: Landing page for Call for Participants recruitment page.

Take part now:

Participation in this study will involve taking part in a confidential interview of around 1 hour. You'll be asked some questions about yourself, including about the sex you have, and also questions about your experiences and feelings about testing for HIV and STIs. Interviews will take place in a Central London location or over the phone, depending on participant's preference and location.

Your interview will be recorded to enable transcription, however the recording will be deleted once a transcript has been produced. The transcript of your interview will be anonymised, meaning it will not be possible to identify you. It will not be possible to identify any individuals who have participated in the study.

If you would like to be involved in this research, please leave your preferred contact details at the link provided, so that we can arrange an interview. Please ensure that any phone numbers or email addresses you provide can only be accessed by you. All information you provide on this page will remain strictly confidential. If you would prefer to contact the researchers directly, you can register your interest in the study by emailing Tyrone Curtis at tyrone.curtis@ucl.ac.uk.

TAKE PART NOW

What to do next?

SHARE THIS STUDY CONTACT RESEARCHER FIND MORE STUDIES RETURN TO STUDY PAGE

RELATED STUDY RELATED STUDY RELATED STUDY

Figure 13: Study information page shown to men prior to study registration through Call for Participants.

A6.2 Grindr

Figure 14 shows the *Grindr* profile I created to recruit study participants, along with an example of the message I sent to users I thought might potentially be interested in participation. Here LF stands for “looking for”.

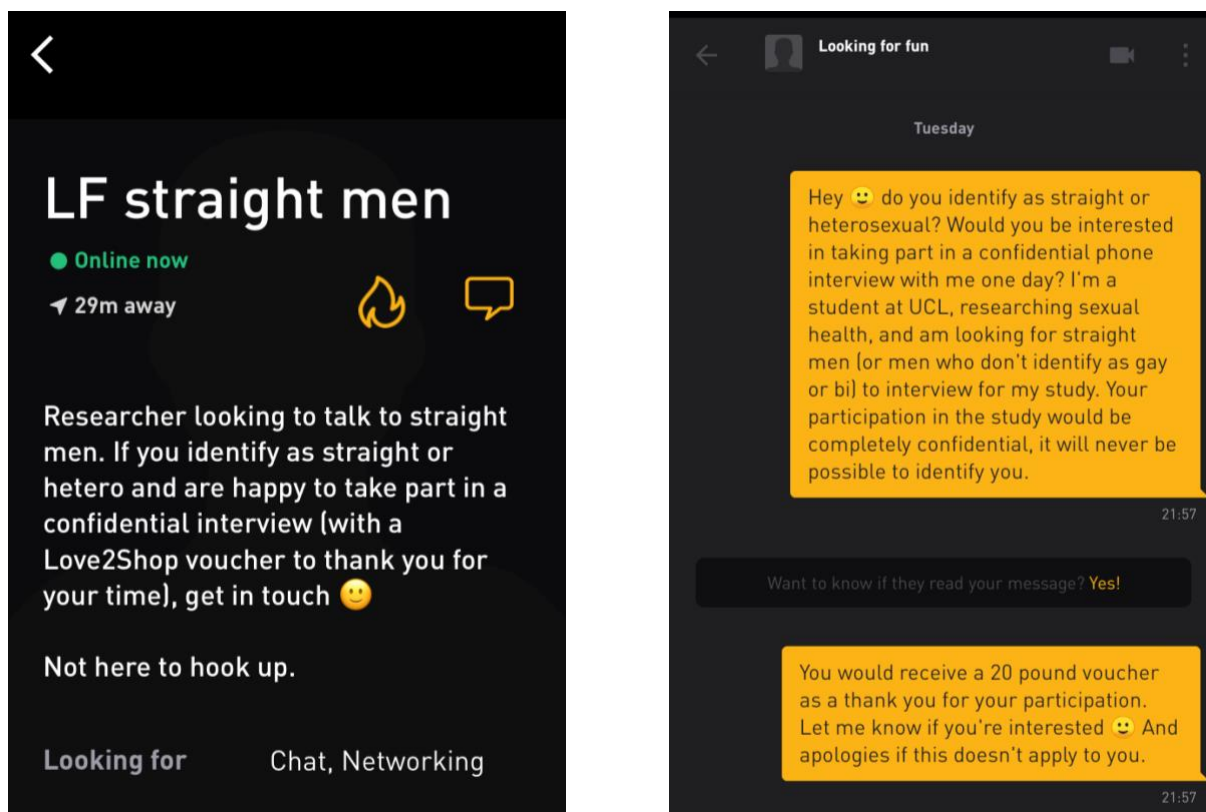


Figure 14: Grindr profile advertising the study, and direct messages sent to users thought to be eligible.

A6.3 Reddit

Figure 15 shows a post promoting the study on the r/londonr4r subreddit. A similar post was made on the r/GBr4r subreddit.

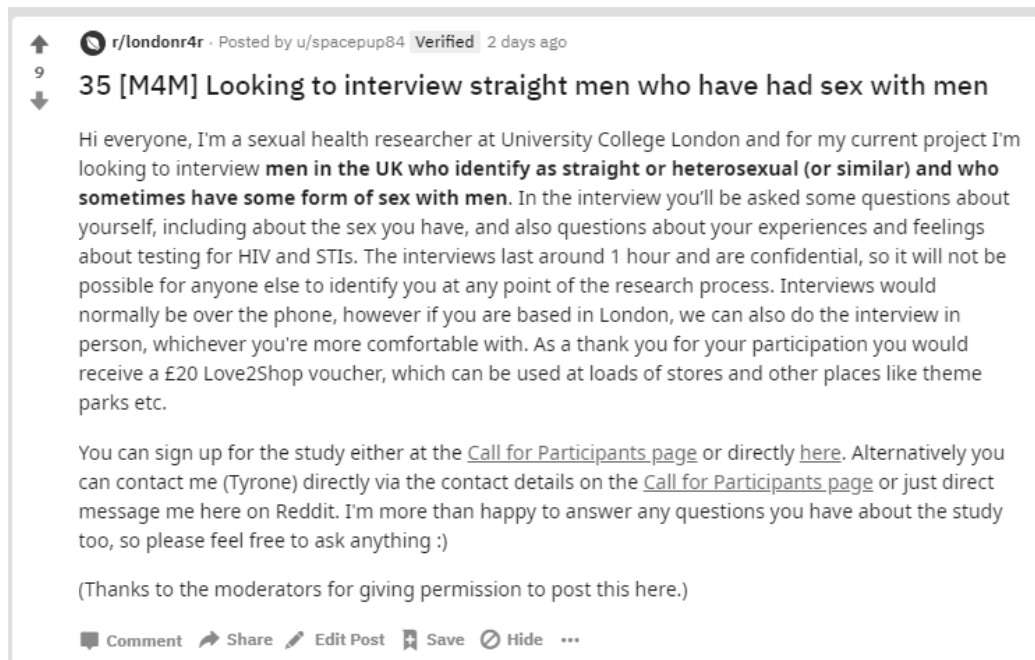


Figure 15: Study promotion post in the r/londonr4r subreddit.

A6.4 Business card promoting the study

Figure 16 shows the business card I printed to distribute to men I met in person (such as through outreach work with Positive East) and who were potentially interested in participating in the study. I designed these cards so that there was no mention of sex on them, in case they were found by other contacts of the men carrying them.

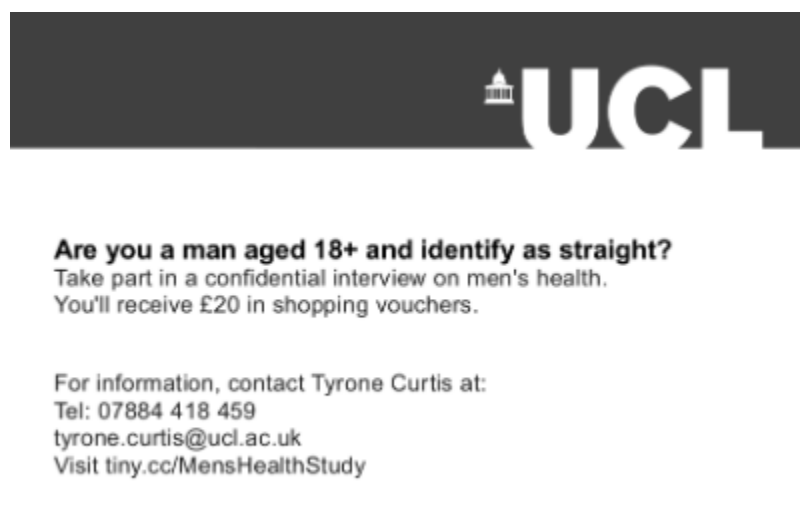


Figure 16: Business card promoting the qualitative study.

A6.5 Poster promoting the study

Figure 17 shows the poster used to promote the study, which was produced from the *Call for Participants* page and distributed at adult stores in Central London.

Call For Participants

Understanding straight-identifying men who sometimes have sex with men

60 min(s) to complete

£20 Love2Shop voucher

Interview

Online

University College London

Researchers at UCL would like to talk to men who describe themselves as straight or heterosexual, and who sometimes have sex or sexual contact with other men. Participation will involve a one-hour confidential interview in-person or over the phone. Our aim is to better understand their sexual behaviour and sexual health (including feelings about testing for HIV and other sexually transmitted infections), so that we can improve the sexual healthcare they're provided.

Find out more online

Poster printed on 21/02/2020 Study expires on 30/06/2020

More info
by scanning the QR code
or visiting the URL

www.cfp.cc/OJUG53

cfp.cc/OJUG53

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Figure 17: Poster promoting the qualitative study.

Appendix 7: Qualitative study Participant Information Sheet

Participant Information Sheet for interviews with heterosexual-identifying men who have sex with men

UCL Research Ethics Committee Approval ID Number: 16181/001

YOU WILL BE GIVEN A COPY OF THIS INFORMATION SHEET

Title of Study: Understanding the sexual behaviour and sexual health of heterosexual-identifying men who have sex with men

Department: Institute for Global Health

Researcher: Tyrone Curtis (PhD student) tyrone.curtis@ucl.ac.uk

Principal Researcher: Professor Cath Mercer c.mercer@ucl.ac.uk

1. Invitation Paragraph

We would like to invite men aged 18 or older who identify as heterosexual or straight and who have had sex with men to take part in a research project. You should only take part if you want to; choosing not to take part will not disadvantage you in any way. Before you decide whether you want to take part, it is important to read the following information carefully and discuss it with others if you want to. Ask us if there is anything that is not clear or if you would like more information.

2. What is the project's purpose?

This project aims to improve our understanding of the sexual behaviour and sexual health of heterosexual-identifying men who have sex with men in the UK. It is hoped that the project will help to improve sexual health service provision for heterosexual-identifying men who have sex with men, and enable sexual health campaigns to better reach these men.

3. Why have I been chosen?

You have contacted us in order to take part in this study, in response to an advert or other invitation. You are eligible to take part in this study if you are aged 18 years or older, identify as male, identify as heterosexual or straight, and have ever had sex with another male. We are aiming to recruit 15-20 participants to this study.

4. Do I have to take part?

No, it is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. You can withdraw at any time without giving a reason and without it affecting any benefits that you are entitled to. If you decide to withdraw you will be asked what you wish to happen to the data you have provided up to that point. You may ask for your data to be withdrawn from the study up to one month after the interview.

5. What will happen to me if I take part?

Participation involves a confidential one-to-one interview with the researcher. This can take place over the phone or in person at a convenient time for you. This should take no more than one hour. During the interview we will discuss a variety of topics, including how you think of your sexual orientation, the sex you've had with women and men in the past and more recently, as well as some questions about sexual health, including your experiences testing for HIV and STIs.

It is up to you whether to take part or not. If you decide to take part you are still able to withdraw at any time during the interview and up to one month after the interview, and without giving a reason. If you decide to take part, you will be given this information sheet to keep and be asked to sign a consent form. As a thank you for your time, you will receive a £20 voucher.

6. Will I be recorded and how will the recorded media be used?

The audio recordings of your interview will be used only for analysis. Anonymised quotes may be used in conference papers, presentations, lectures and a PhD thesis. No other use will be made of them without your written permission. The audio recordings will be anonymised before being professionally transcribed by an external professional transcription service, and will be securely destroyed after they have been transcribed. Identifying information will be removed from the interview transcript. The external professional transcription service who transcribe the interview will be bound by a confidentiality agreement.

With your consent you can be contacted for future research. You may also consent to your anonymised transcript being used by other researchers in future, however you do not have to agree to this to take part in this project.

7. What are the possible disadvantages and risks of taking part?

There are unlikely to be any disadvantages or risks. Because talking about sex and sexual health can be embarrassing, at the end of the interview we will provide all participants with some information where you can seek support if needed.

8. What are the possible benefits of taking part?

Whilst there are no immediate benefits for those participating in the project, it is hoped that this work will help improve sexual health services for men who have sex with men and who identify as heterosexual. Also, you may find discussing sexual health interesting, empowering and enlightening.

9. What if something goes wrong?

If you have any questions regarding this research, require advice, or would like to raise a complaint, please contact the principal investigator: Professor Catherine Mercer: 020 3108 2072 or c.mercer@ucl.ac.uk.

If this individual is not able to address your concerns satisfactorily or you have concerns about the study that you wish to discuss with an independent party, you may contact

the Chair of the UCL Ethics Committee, Academic Services, UCL, Gower Street, London WC1E 6BT, or email ethics@ucl.ac.uk.

10. Will my taking part in this project be kept confidential?

Yes. All the information that we collect about you during the course of the research will be kept strictly confidential. You will not be able to be identified in any ensuing reports or publications. Any contact details you have provided us will be stored on the UCL Data Safe Haven, with access restricted only to those involved with the study. This information will be destroyed as soon as it is no longer necessary. The recording device used to record the interview will be encrypted and password-protected. The audio recording of your interview will be securely destroyed once it has been transcribed. The transcript of your interview will be anonymised, meaning any information that could be used to identify you will be removed. The external professional transcription service who transcribe the interview will be bound by a confidentiality agreement. Your signed consent form will be kept in a locked filing cabinet. Information provided on the pre-interview questionnaire will be entered into a spreadsheet stored in the UCL Data Safe Haven, and then the paper copy securely destroyed.

11. Limits to confidentiality

Please note that confidentiality will be maintained as far as it is possible, unless during your interview the interviewer hears anything which makes them worried that someone might be in danger of harm. In such cases they might have to inform relevant authorities of this.

12. What will happen to the results of the research project?

The anonymized results of this study may be shared with other organizations. With your consent your data may be shared with future ethically approved studies. They will also be presented at conferences, and published in a PhD thesis and academic journal articles. If you wish to have a copy of the study results sent to you, please let the research team know. It will not be possible to identify individuals who have participated in the study. All data will be held on a secure database on a password-protected computer at UCL. The information will be archived at a UCL safe and secure off-site location. Access to stored records is strictly controlled.

13. Local Data Protection Privacy Notice

The controller for this project will be University College London (UCL). The UCL Data Protection Officer provides oversight of UCL activities involving the processing of personal data, and can be contacted at data-protection@ucl.ac.uk.

This 'local' privacy notice sets out the information that applies to this particular study. Further information on how UCL uses participant information can be found in our 'general' privacy notice: For participants in health and care research studies, click [here](#). The information that is required to be provided to participants under data protection legislation (GDPR and DPA 2018) is provided across both the 'local' and 'general' privacy notices.

The categories of personal data used will be as follows:

Name
 Address
 Phone number
 Age
 Sexual orientation
 Relationship status
 Religion
 Ethnicity
 Highest level of education
 HIV Status
 Living situation
 Country of birth

The lawful basis that would be used to process your *personal data* will be performance of a task in the public interest. The lawful basis used to process *special category personal data* will be for scientific and historical research or statistical purposes. *Your personal data will be processed so long as it is required for the research project.* If we are able to anonymise or pseudonymise the personal data you provide we will undertake this, and will endeavour to minimise the processing of personal data wherever possible.

If you are concerned about how your personal data is being processed, or if you would like to contact us about your rights, please contact UCL in the first instance at data-protection@ucl.ac.uk.

14. Who is organising and funding the research?

This study is funded by the Medical Research Council (grant number: MR/N013867/1).

15. Contact for further information

If you require further information, please contact the principal investigator: Professor Catherine Mercer: 020 3108 2072 or c.mercer@ucl.ac.uk

16. Resources for further support

a) SXT Sexual Health Services

- Description: Online service that helps you find your nearest sexual health clinic or services.
- Website: <https://sxt.org.uk/>

b) Test.HIV

- Description: Service offering free self-sampling HIV test kits to residents of many areas in the UK. Test kits are sent in the mail in discreet packaging with no identifying markings or logos. Once you've collected a small blood sample, you then send the sample back in the packaging provided, and receive results a few days later.
- Website: <https://www.test.hiv>

c) Sexual Health London

- Description: Service offering free, discreet at-home sexual health screening for anyone living in eligible areas of London. Test kits are sent in the mail in discreet packaging with no identifying markings or logos. You collect your samples at home and send the samples back in the provided freepost box. You'll then receive your results a few days later via your preferred contact details.
- Website: <https://shl.uk>

d) SH:24

- Description: Service offering free, discreet at-home sexual health screening for anyone living in eligible areas in the UK. Test kits are sent in the mail in discreet packaging with no identifying markings or logos. You collect your samples at home and send the samples back in the provided freepost box. You'll then receive your results a few days later via your preferred contact details.
- Website: <https://sh24.org.uk/>

e) Terrence Higgins Trust

- Description: HIV and sexual health charity which provides services relating to HIV and sexual health.
- General website: <https://www.tht.org.uk>
- Direct helpline: 0808 802 1221, open 10am-8pm Monday to Friday

f) NAZ Project London

- Description: A sexual health charity in London offering culturally-specific sexual health services and programmes for men and women from BAME communities. They offer free and confidential HIV testing, support groups, and counselling for those needing to talk to someone.
- Website: <https://www.naz.org.uk/>
- Helpline: 020 8741 1879

g) LGBT Foundation

- Description: Sexual health and support organisation based in Manchester.
- Website: <https://lgbt.foundation/>

h) Switchboard: LGBT+ Helpline

- Description: Charity which provides a one-stop listening service for LGBT+ people on the phone, by email and through Instant Messaging. They describe themselves as a safe space for anyone to discuss anything, including sexuality, gender identity, sexual health and emotional wellbeing.
- Website: <http://switchboard.lgbt>
- Helpline: 0300 3300 630 open 10am–10pm daily

i) The Survivors Trust

- Description: Charity that provides information, advice or emotional support to survivors of sexual violence.

- Website: <https://www.thesurvivorstrust.org/>
- Helpline: 08088 010818. Monday, Tuesday and Wednesday: 10am-7:30pm. Thursday: 10am-6pm. Friday: 10am-2pm.

j) Survivors Manchester

- Description: Survivor-led/survivor run voluntary organisation that provides support for male survivors of sexual abuse and rape.
- Website: <https://www.survivorsmanchester.org.uk/>
- Helpline: 0808 800 5005.

If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form.

Thank you for reading this information sheet and for considering to take part in this research study.

Appendix 8: Qualitative study consent form

CONSENT FORM FOR INTERVIEWS WITH STUDY PARTICIPANTS

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Title of Study: Understanding the sexual behaviour and sexual health of heterosexual-identifying men who have sex with men

Department: Institute for Global Health

Researcher: Tyrone Curtis (PhD student) tyrone.curtis@ucl.ac.uk

Principal Researcher: Professor Catherine Mercer c.mercer@ucl.ac.uk or 020 3108 2072

UCL Data Protection Officer: data-protection@ucl.ac.uk

This study has been approved by the UCL Research Ethics Committee: Project ID number: 16181/001

Thank you for considering taking part in this research. The person organising the research must explain the project to you before you agree to take part. If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

I confirm that I understand that by ticking each box below I am consenting to this element of the study. I understand that it will be assumed that unticked boxes means that I DO NOT consent to that part of the study. I understand that by not giving consent for any one element that I may be deemed ineligible for the study.

		Tick Box
1.	I confirm that I have read and understood the Information Sheet for the above study. I have had an opportunity to consider the information and what will be expected of me. I have also had the opportunity to ask questions which have been answered to my satisfaction and I would like to take part in an individual interview.	
2.	I understand that I will be able to withdraw my data up to 1 month after the interview.	
3.	I consent to participate in the study. I understand that my personal information will be used for the purposes explained to me. I understand that according to data protection legislation, 'public task' will be the lawful basis for processing.	
4.	I understand that all personal information will remain confidential and that all efforts will be made to ensure I cannot be identified.	
5.	I understand that my data gathered in this study will be stored anonymously and securely. It will not be possible to identify me in any publications.	
6.	I understand that my information may be subject to review by responsible individuals from the University for monitoring and audit purposes.	
7.	I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason. I understand that if I decide to withdraw, any personal data I have provided up to that point will be deleted unless I agree otherwise.	

8.	I understand the potential risks of participating and the support that will be available to me should I become distressed during the course of the research.	
9.	I understand the direct/indirect benefits of participating.	
10.	I understand that the data will not be made available to any commercial organisations but is solely the responsibility of the researcher(s) undertaking this study.	
11.	I understand that I will not benefit financially from this study or from any possible outcome it may result in in the future.	
12.	I understand that I will be compensated for the portion of time spent in the study or fully compensated if I choose to withdraw.	
13.	I agree that my anonymised research data may be used by others for future research or teaching purposes. No one will be able to identify you when this data is shared.	
14.	I understand that the information I have submitted will be published in a PhD thesis and other publications and I wish to receive a copy of them. Yes/No	
15.	I consent to my interview being audio recorded and understand that the recordings will be destroyed following transcription.	
16.	I confirm that I understand the inclusion criteria as detailed in the Information Sheet and explained to me by the researcher.	
17.	I confirm that I understand the exclusion criteria as detailed in the Information Sheet and explained to me by the researcher; and I do not fall under the exclusion criteria.	
18.	I am aware of who I should contact if I wish to lodge a complaint.	
19.	I would be happy for the data I provide to be archived at University College London. I understand that other authenticated researchers will have access to my anonymised and pseudonymised data.	
20.	I voluntarily agree to take part in this study.	

If you would like your contact details to be retained so that you can be contacted in the future by UCL researchers who would like to invite you to participate in follow up studies to this project, or in future studies of a similar nature, please tick the appropriate box below.

Yes, I would be happy to be contacted in this way	
No, I would not like to be contacted	

Name of participant

Date

Signature

Researcher

Date

Signature

Appendix 9: Quantitative studies included in systematic review

Table 68: Summary of quantitative studies included in systematic review

First author (year) and name of parent study	Location and date of data collection	Recruitment strategy & mode of data collection	Current study sample	Behavioural definitions for sample	Behavioural description of men in sample	Description of MSM in sample			Study quality
						Sexual identity	Age	Ethnicity	
Lauby (2008) ²²² Brothers y Hermanos	Philadelphia & New York City, USA 2005-2006	Respondent-driven sampling ACASI	Black MSMW	MSMW: anal sex with a man, vaginal or anal sex with a woman in past 3 months	Total: 212 MSMW: 212	Heterosexual: 31 (14.6%) Homosexual: 17 (8.0%) Bisexual: 153 (72.2%) Other: 11 (5.2%)	18-29: 10% 30-39: 15.5% 40-49: 49.1% 50+: 25.4%	Black: 100%	Medium
Raymond (2008) ²²¹ National HIV Behavioral Surveillance (NHBS)	San Francisco & Los Angeles, USA 2004	Time-location sampling CAPI	MSM not previously diagnosed HIV-positive	MSM: Identifying as gay or bisexual, or had oral or anal sex with a man in past 12 months	Total: 794 MSM: 794	Heterosexual: 6 (0.8%) Homosexual: 661 (83.2%) Bisexual: 27 (14.7%) Other: 10 (1.3%)	18-30: 32.7% 31-40: 29.1% 41-50: 15.2% 51+: 6.0%	African American: 11.8% White: 36.3% Latino: 33.0% Other: 18.3%	Medium
Wheeler (2008) ²²³ Brothers y Hermanos	Philadelphia & New York City, USA 2005-2006	Respondent-driven sampling ACASI	Black MSM	MSM: anal intercourse with a man in past 3 months.	Total: 822 MSM: 822	Heterosexual: 47 (5.7%) Homosexual: 434 (52.8%) Bisexual: 308 (37.4%) Other: 33 (4.0%)	18-29: 15.8% 30-39: 21.8% 40-49: 45.9% 50+: 16.5%	Black: 100%	Medium
Bond (2009) ²²⁴ Brothers y Hermanos	Philadelphia & New York City, USA 2005-2006	Respondent-driven sampling ACASI	Black MSM	MSM: reported oral or anal sex, or mutual masturbation with a man in the past 12 months.	Total: 1,151 MSM: 1,151	Heterosexual: 123 (10.7%) Bisexual: 425 (36.9%) Homosexual: 544 (47.3%) Other: 56 (4.9%)	18-29: 13.8% 30-39: 20.8% 40-49: 46.9% 50+: 18.5%	Black: 100%	Medium
Mimiaga (2009) ²²⁶ Study name not reported	Massachusetts, USA 2008	Modified respondent-driven sampling Face-to-face interview	African American / Black MSM	MSM: oral or anal intercourse with a man in the past 12 months	Total: 197 MSM: 197	Heterosexual: 17 (9%) Bisexual: 86 (44%) Homosexual: 87 (44%) Unknown: 7 (3%)	Mean (SD): 38.7 (11.3)	African American: 87% Haitian, Cape Verdean, Caribbean, Jamaican, and African: 23% Hispanic/Latino: 8%	Medium
Shoptaw (2009) ¹¹⁰ Sexual Acquisition and Transmission of HIV Cooperative Agreement Program (SATHCAP)	Los Angeles, USA 2005-2008	Respondent-driven sampling ACASI	MSM, "hard" illicit drug users, and their sex partners.	MSM: Sex with men, ever	Total: MSM: 722	Heterosexual: 60 (8.3%) Bisexual: 193 (29.7%) Homosexual: 321 (44.5%) Other: 119 (16.5%)	18-29: 11.6% 30-39: 25.1% 40-49: 41.4% 50+: 19.7%	White: 21.1% Black: 43.2% Hispanic: 27.4% Other: 6.1%	Medium

First author (year) and name of parent study	Location and date of data collection	Recruitment strategy & mode of data collection	Current study sample	Behavioural definitions for sample	Behavioural description of men in sample	Description of MSM in sample			Study quality
						Sexual identity	Age	Ethnicity	
Williams (2009) ²⁶ Sexual Acquisition and Transmission of HIV Cooperative Agreement Program (SATHCAP)	Chicago, USA 2005-2008	Respondent-driven sampling CASI	MSM, "hard" illicit drug users, and their sex partners.	MSMO: reported sex only with men in the past 6 months. MSMW: reported sex with men and women in the past 6 months. MSEW: reported sex only with women in the past 6 months.	Total: 2072 MSMO: 138 MSMW: 343 MSEW: 1,591	MSMW Straight/heterosexual: 66 (19.5%) Gay/homosexual: 10 (3.0%) Bisexual: 136 (40.1%) "Down low": 47 (13.9%) Other: 80 (23.7%)	MSMW 18-29: 7.0% 30-39: 18.7% 40-49: 47.5% 50+: 26.8%	MSMW Non-Hispanic White: 5.5% Non-Hispanic Black: 86.9% Hispanic: 6.4% Other: 1.2%	High
Zellner (2009) ²³⁸ Hombres Sanos	San Diego, USA 2006	Random selection and venue-based quota sampling CASI	Latino men at local venues likely to be frequented by MSMW	MSM: identifies as gay or bisexual, or identifies as heterosexual and reports a history of anal intercourse with men.	Total: 674 MSM: 78 MSEW: 596	Heterosexual: 30 (38.5%) Bisexual: 16 (20.5%) Gay: 32 (41.0%)	Mean (SD): 28.4 (9.1) Range: 18-65	Latino: 100%	Low
Zule (2009) ²²⁵ Sexual Acquisition and Transmission of HIV Cooperative Agreement Program (SATHCAP)	North Carolina, USA 2005-2008	Respondent-driven sampling ACASI	MSM, "hard" illicit drug users, and their sex partners	MSMO: sex with men only in past 6 months MSMW: sex with men and women in past 6 months MSEW: report no sex with men in past 6 months	Total: 1044 MSMO: 97 MSMW: 175 MSEW: 772	MSMO: not reported MSMW: Gay or homosexual: 14 (8%) Bisexual: 79 (45%) Heterosexual: 30 (17%) Other: 53 (30%) [Numbers reported are estimates as not reported]	35+: 70.5%	African American: 77.1%	Medium
Barnes (2010) ²⁰⁹ Connect to Protect	15 cities, USA 2005-2006	Venue-based quota sampling ACASI	MSM aged 12-23	MSM: reported ever having had sex with a man.	Total: 611 MSM: 611	Heterosexual: 27 (4.7%) Gay/bisexual: 548 (95.3%)	12-17: 13.7% 18-23: 86.3%	African American: 46.5% Other: 53.5%	High
Barnshaw and Letukas (2010) ²³⁹ Urban Men's Health Study	Chicago, Los Angeles, New York, San Francisco, USA 1996-1997	Disproportionate adaptive probability sample Telephone interview	MSM	MSM: reported same-sex behaviour since age 14.	Total: 2,861 MSM: 2,861	Heterosexual: 96 (3.4%) Homosexual: 2378 (83.2%) Something else: 90 (3.2%)	Not reported	White: 88.4% Non-White: 11.6%	Low
Centers for Disease Control and Prevention (2010) ²¹⁰ National HIV Behavioral Surveillance (NHBS)	21 cities, USA 2008	Time-location sampling CAPI	MSM not previously diagnosed HIV-positive.	MSM: reported at least one male partner (oral or anal sex) in the past 12 months.	Total: 8,153 MSM: 8,153	Heterosexual: 96 (1.2%) Bisexual: 1,485 (18.2%) Homosexual: 6,562 (80.5%)	Median (range): 32 (18-85) 18-29: 41.9% 30-39: 27.4% 40-49: 21.0% 50+: 9.7%	Black, non-Hispanic: 23.2% White, non-Hispanic: 43.9% Hispanic: 25.1% Other: 7.7%	High

First author (year) and name of parent study	Location and date of data collection	Recruitment strategy & mode of data collection	Current study sample	Behavioural definitions for sample	Behavioural description of men in sample	Description of MSM in sample			Study quality
						Sexual identity	Age	Ethnicity	
Sifakis (2010) ²²⁷ Baltimore Young Men's Survey	Baltimore, USA 1996-2000	Time-location sampling Standardised questionnaire	Young MSM aged 15-29.	MSM: reported sexual contact with another male, ever.	Total: 843 MSM: 843	Heterosexual: 22 (2.6%) Bisexual: 161 (19.1%) Homosexual: 615 (73.0%) Transgender: 8 (0.9%)	15-19: 16.0% 20-22: 25.7% 23-25: 30.5% 26-29: 27.8%	Non-Hispanic White: 53.4% Non-Hispanic Black: 33.2% Hispanic: 3.6% Other: 9.5%	Medium
Xu (2010) ²¹¹ National Health & Nutrition Surveys	USA 2001-2006	Complex, stratified, multistage probability sampling ACASI	General population	MSM: Report ever having had same-sex partners.	Total: 4,319 MSM: 206 Non-MSM: 4,113	Heterosexual: 78 (35.3%) Bisexual: 43 (19.2%) Homosexual: 76 (44.5%)	Mean age (95% CI): 40.1 (38.0-42.2)	Non-Hispanic White: 76.2% Non-Hispanic Black: 7.5% Mexican American: 7.2% Other: 9.1%	High
Finlayson (2011) ²¹² National HIV Behavioral Surveillance (NHBS)	21 cities, USA 2008	Time-location sampling CAPI	MSM not previously diagnosed HIV-positive attending MSM-identified venues.	MSM: reported at least one male partner (oral or anal sex) in the past 12 months.	Total: 8,175 MSM: 8,175	Heterosexual: 99 (1.2%) Bisexual: 1,513 (18.5%) Homosexual: 6,553 (80.2%)	18-29: 43.9% 30-39: 27.4% 40-49: 19.6% 50+: 9.1%	Black: 23.7% Hispanic/Latino: 24.7% White: 43.8% Other: 7.7%	High
McKay and Mutchler (2011) ²³⁶ Study name not reported.	Los Angeles, USA. 2002-2004.	Targeted purposive sampling Face-to-face interview	HIV-positive MSMW	MSMW: reported sex with at least one male and at least one female partner in the previous 5 years.	Total: 148 MSMW: 148	Straight/heterosexual: 8 (5.4%) Bisexual: 86 (58.1%) Gay/homosexual: 54 (36.5%)	Mean (SD): 39.8 (7.5)	Black: 33.1% Latino: 33.8% White: 33.1%	Medium
Rosenberg (2011) ²¹³ National HIV Behavioral Surveillance (NHBS)	15 cities, USA 2003-2005	Time-location sampling Face-to-face interview	MSM in participating cities.	MSM: reported at least one main or casual male sex partner in the previous 12 months.	Total: 11,191 MSM: 11,191	Heterosexual: 127 (1.1%) Bisexual: 1,582 (14.1%) Homosexual: 9,388 (83.9%) Other: 94 (0.8%)	18-24: 19% 25-34: 33% 35-44: 32% 45-54: 12% 55+: 4%	White, not Hispanic: 47% Black, not Hispanic: 18% Hispanic: 26% Other: 10%	High
Margolis (2012) ²¹⁴ Study name not reported	USA 2008	Convenience sampling Internet survey	MSM visiting an online sexual networking website for MSM.	MSM: reported oral or anal sex with at least one man, ever.	Total: 8,040 MSM: 8,040	Heterosexual: 66 (0.8%) Bisexual: 1,163 (14.5%) Homosexual: 6,775 (84.3%)	18-24: 14.9% 25+: 85.1%	White: 81.8% Black: 2.6% Hispanic: 8.4% Other: 6.7%	High
Rosenberger (2012) ²²⁸ Study name not reported	USA 2010	Convenience sampling Internet survey	MSM users of web sites for men seeking social or sexual interactions with other men.	MSM: most recent sexual event involved anal sex with another male in the past year	Total: 14,750 MSM: 14,750	Heterosexual: 21 (0.1%) Bisexual: 1,937 (13.1%) Gay/homosexual: 12,571 (85.3%) Unsure/questioning: 114 (0.8%) Other: 98 (0.7%)	18-29: 29.1% 30-39: 22.5% 40-49: 27.4% 50-59: 15.5% 60+: 4.7%	White: 83.2% African American/Black: 3.9% Hispanic/Latino: 7.2% Other: 5.7%	Medium

First author (year) and name of parent study	Location and date of data collection	Recruitment strategy & mode of data collection	Current study sample	Behavioural definitions for sample	Behavioural description of men in sample	Description of MSM in sample			Study quality
						Sexual identity	Age	Ethnicity	
Shearer (2012) ²²⁹ Barriers to Online HIV Prevention Study	USA 2009	Convenience sampling Internet survey	MSMW using MySpace.	MSMW: reported at least one male and one female partner in the previous 12 months.	Total: 666 MSMW: 666	Heterosexual: 21 (3.2%) Bisexual: 532 (79.9%) Homosexual: 73 (10.9%) Other or "Prefer not to answer": 40 (6.0%)	Median (IQR): 21 (19-26)	White, non-Hispanic: 48.8% Black, non-Hispanic: 13.1% Hispanic: 24.0% Other or unknown: 14.1%	Medium
Taylor (2012) ⁷¹ Study name not reported	USA & Canada 2003-2005	Convenience sampling Internet survey	MSM visiting gay-oriented websites facilitating social and sexual networking.	MSM: reported having had sex with a man, ever.	Total: 10,979 MSM: 10,979	Straight/heterosexual: 209 (1.9%) Bisexual: 1,442 (13.1%) Gay/homosexual: 9,219 (84.0%)	18-29: 25.5% 30-39: 29.2% 40+: 44.2%	Non-Hispanic White: 87% Non-Hispanic Black: 5% Hispanic: 8%	Medium
Everett (2013) ¹⁴³ National Longitudinal Study of Adolescent Health (Add-Health), Waves III & IV	USA 2007-2008	Probability sampling CAPI/CASI	Nationally representative sample of 24-32 year olds initially recruited for Add-Health.	MSM: reported ever having had sex with a male partner.	Total: 6,323 MSM: 437 MSEW: 5,886	Can't be calculated due to complex sampling design. Numbers presented instead: 100% heterosexual MSM: 151 Mostly straight/bisexual MSM: 117 Mostly gay/100% gay MSM: 169	Not reported separately. Distribution for entire sample: Range: 24-32 Mean: 28.93	Not reported separately: Distribution for entire sample: Non-Hispanic White: 68.69% Non-Hispanic Black: 14.47% Hispanic: 11.80% Other: 5.04%	Medium
Gilbert (2013) ²³⁰ Sex Now	Canada 2011-2012	Convenience sampling Internet survey	MSM using dating/sex-seeking websites, gay or bisexual community-based organisations, word of mouth.	MSM: identified as MSM	Total: 7,938 MSM: 7,938	Straight/other: 259 (3.1%) Bisexual: 2,719 (32.4%) Gay: 5,410 (64.5%)	Younger than 30: 22.3% 30+: 77.7%	Caucasian: 87.2% Asian: 2.5% Aboriginal: 2.0% Latino: 1.3% Other: 6.9%	Medium
Greene (2013) ²¹⁵ Project MIX	Chicago, Los Angeles, New York City, San Francisco, USA 2005-2006	Convenience sampling ACASI	MSM reporting substance (non-injection drug or alcohol) use before or during sex.	MSM: reported anal sex with male partners in previous 3 months, and condomless anal sex with a male in previous 6 months.	Total: 2,013 MSM: 2,013	Heterosexual: 23 (1.1%) Bisexual: 278 (13.8%) Homosexual: 1,693 (91.1%) Other: 17 (0.8%)	Mean (SD): 36.37 (9.21)	African American: 31% Hispanic/Latino: 19% White: 40% Other: 10%	High
Wall (2013) ²³¹ Barriers to Online HIV Prevention Study	USA 2009	Convenience sampling Internet survey	MSM using MySpace	MSM: reported at least one male sexual partner in previous 12 months.	Total: 5,193 MSM: 5,193	Heterosexual, straight: 21 (0.4%) Bisexual: 1,190 (22.9%) Homosexual, gay: 3,982 (76.7%)	18-29: 82.5% 30-39: 11.6% 40-49: 4.6% 50+: 1.3%	Non-Hispanic Black: 14.2% Non-Hispanic White: 42.8% Hispanic: 31.5% Other/unknown: 11.7%	Medium

First author (year) and name of parent study	Location and date of data collection	Recruitment strategy & mode of data collection	Current study sample	Behavioural definitions for sample	Behavioural description of men in sample	Description of MSM in sample			Study quality
						Sexual identity	Age	Ethnicity	
Baytop (2014) ²³² Study name not reported.	Washington, DC, USA 2008-2010.	Convenience sampling and respondent-driven sampling Intake/risk assessment.	African American MSM attending a gay-identified, community-based organisation for HIV testing.	MSM: reported oral and/or anal sex with a man in the previous 6 months.	Total: 470 MSM: 470	Heterosexual: 88 (18%) Bisexual: 123 (26%) Homosexual: 258 (55%)	18-24: 45% 25-34: 33% 35+: 22% Range: 18-64	African American: 100%	Medium
Centers for Disease Control and Prevention (2014) ²¹⁶ National HIV Behavioral Surveillance (NHBS)	20 cities, USA 2011	Time-location sampling CAPI	MSM not previously diagnosed HIV-positive attending MSM-identified venues.	MSM: reported oral or anal sex with another man in previous 12 months	Total: 8,012 MSM: 8,012	Straight or heterosexual: 99 (1.2%) Bisexual: 1,432 (17.9%) Gay or homosexual: 6,459 (80.6%)	18-29: 47.3% 30-39: 23.4% 40-49: 18.3% 50+: 10.9%	Black/African American: 26% Hispanic/Latino: 27% White: 40% Other: 8%	High
Fernandez-Balbuena (2014) ¹¹⁸ Study name not reported	Multiple cities in Spain 2008-2011	Convenience sampling Paper questionnaire	People using free, street-based rapid HIV testing facilities.	MSM: reported ever having had sex with a man.	Total: 4,885 MSM: 2,559 MSEW: 2,326	Heterosexual: 141 (9.9%) Bisexual: 165 (11.6%) Homosexual: 1,117 (78.5%) (Not asked: 1,057 MSM)	Under 25: 25.3% 25-29: 23.9% 30+: 50.8%	Country of origin: Spain: 69.9% Western Europe, North America and other developed countries: 6.5% Latin America: 21.6% Other developing countries: 2.0%	High
Harawa (2014) ²¹⁷ HIV Prevention Trials Network 061	6 cities, USA 2009-2010	Convenience sampling and respondent-driven sampling ACASI	High-risk Black MSM	MSMW: reported condomless AI with a man and sex with at least one woman in previous 6 months.	Total: 555 MSMW: 555	Participants allowed to choose multiple options. Heterosexual: 40 (7.2%) Straight: 64 (11.5%) Gay: 60 (10.8%) Homosexual: 34 (6.1%) Bisexual: 386 (69.5%) Others sexual identities not reported here.	18-30: 20.9% 31-44: 33.5% 45+: 45.6%	Black, non-Hispanic/Latino: 91.9% Hispanic/Latino Black: 8.1%	High
Lhomond (2014) ³ Contexte de la Sexualité en France	France 2006	Random-digit dialling of landlines and cell phones Telephone interview	Random sample of the French continental population aged 18-69	MSM: reported at least one partner of the same sex after age 18.	Total: 4,400 MSM: 193 MSEW: 4,307	Heterosexual: 93 Bisexual: 40 Gay: 60 *Note: Percentages not presented as these are unweighted numbers.	Not reported	Not reported	High
Meites (2014) ²⁰ National HIV Behavioral Surveillance (NHBS)	20 cities, USA 2011	Time-location sampling CAPI	MSM aged 18-26 years attending MSM-identified venues.	MSM: reported ever having a male sex partner.	Total: 3,221 MSM: 3,221	Heterosexual or straight: 55 (1.7%) Bisexual: 618 (19.2%) Homosexual or gay: 2,537 (78.8%)	Range: 18-26 18-21: 34.0% 22-26: 66.0%	Black or African American: 35.9% White: 25.3% Latino: 30.4% Other: 8.2%	High

First author (year) and name of parent study	Location and date of data collection	Recruitment strategy & mode of data collection	Current study sample	Behavioural definitions for sample	Behavioural description of men in sample	Description of MSM in sample			Study quality
						Sexual identity	Age	Ethnicity	
Oster (2014) ²³³ Young Men's Survey and National HIV Behavioral Surveillance (NHBS)	5 cities, USA 1994-2011	Time-location sampling Face-to-face interview or CAPI	MSM aged 18-29 years attending MSM-identified venues.	MSM: reported a male sex partner in previous 6 months.	Young MSM aged 18-29: 5709	Straight/heterosexual: 95 (1.7%) Bisexual: 1,233 (21.6%) Gay/homosexual: 4,290 (75.1%) Other: 91 (1.6%)	Range: 18-29 18-22: 44.9% 23-29: 55.1%	White: 27.0% Black: 23.4% Hispanic: 35.6% Other: 13.8%	Medium
Dodge (2016) ²¹⁸ National Survey of Sexual Health and Behavior	USA 2012	Population probability sampling Internet survey	General population aged 18+	MSM: reported male sexual partners in the past 12 months. MSEW: reported only male sexual partners in the past 12 months.	Total: 1,833 MSM: 363 MSEW: 1,058 Not sexually active in past year: 412	Heterosexual or straight: 18 Bisexual: 42 Homosexual or gay: 303 (% not reported as gay and bisexual men oversampled.)	Not reported	Not reported	High
Lebouche (2016) ²¹⁹ Actual sur Rue	Montreal, Canada 2012-2013	Convenience sample CAPI and CASI	MSM using a rapid HIV-testing site in Montreal's gay village.	MSM: reported ever having had sex with a man.	Total: 1,179 MSM: 1,179	Heterosexual: 58 (4.9%) Bisexual: 132 (11.2%) Homosexual: 989 (83.9%)	Mean (SD): 37.1 (13.1)	Not reported	High
McCree (2016) ²⁴⁰ Study name not reported	Washington, DC, USA 2008-2010	Convenience sampling Intake/risk assessment	African American MSM attending a gay-identified, community-based organisation for HIV testing.	MSM: reported oral and/or anal sex with a man in the previous 6 months.	Total: 464 MSM: 464	Heterosexual: 88 (19%) Bisexual: 120 (26%) Homosexual or gay: 256 (55%)	18-24: 45% 25-35: 33% 35+: 22%	African American or Black: 100%	Low
Maksut (2016) ²³⁴ Study name not reported.	Atlanta, USA 2012-2014	Convenience sampling ACASI	High-risk Black MSM attending gay-identified social or cruising venues, or using social media or websites for MSM.	MSM: reported condomless anal sex with a man in the previous year.	Total: 450 MSM: 450	Straight/heterosexual: 71 (15.8%) Bisexual: 173 (38.4%) Gay/homosexual/same gender loving: 197 (43.8%)	18-29: 51.1% 30+: 48.9%	Black or African American: 100%	Medium.

First author (year) and name of parent study	Location and date of data collection	Recruitment strategy & mode of data collection	Current study sample	Behavioural definitions for sample	Behavioural description of men in sample	Description of MSM in sample			Study quality
						Sexual identity	Age	Ethnicity	
Mor (2016) ¹² Study name not reported.	Israel 2012	Probability sampling Internet survey	Israeli Jewish members of an online Israeli poll panel, aged 18-44.	Concordant heterosexuals: reporting heterosexual identity and only attracted to and had sex with opposite-sex partners. Discordant heterosexuals: reporting any same-sex attraction or having ever had same-sex intercourse. Gay/bisexuals: report gay or bisexual identification.	Total: 995 Gay, bisexual or discordant heterosexual: 142 Concordant heterosexual: 853	Heterosexual: 60 (42.3%) Gay/bisexual: 82 (57.7%)	Range: 18-44	Israeli Jewish	Medium
Valverde (2016) ²³⁷ Study name not reported.	5 states, USA 2005-2007	Convenience sampling Face-to-face interview	Foreign-born Hispanic migrant and recent immigrant MSM attending community-based organisations, clinical sites and other locations frequented by the target population.	MSM: reported sex with a man in the previous 12 months.	Total: 302 MSM: 302	Heterosexual: 126 (41.7%) Bisexual: 61 (20.2%) Homosexual/gay: 96 (31.8%)	14-25: 38% 26-35: 44% 36-45: 13% 46+: 5%	Hispanic: 100% Country/region of birth: Mexico: 79% Central America: 12% South America: 4%	Medium
Hall (2017) ²³⁵ HIV Prevention Trials Network 061	6 cities, USA 2009-2010	Convenience sampling and respondent-driven sampling ACASI	High-risk Black MSM	MSM: condomless anal sex with a man in the previous 6 months.	Total: 1,449 MSM: 1,449	Heterosexual: 35 (2.4%) Bisexual: 487 (33.6%) Homosexual: 753 (52.0%) Other: 174 (12.0%)	18-30: 33.7% 31-45: 36.1% 46+: 30.2%	Black (African American, Black Caribbean, or multi-ethnic): 100%	Medium
Shadaker (2017) ¹³⁹ National HIV Behavioral Surveillance (NHBS)	20 cities, USA 2011 & 2014	Time-location sampling CAPI	MSM attending MSM-identified venues	MSM: reported at least one male sexual partner in the previous 12 months.	Total: 17,207 MSM: 17,207	Heterosexual: 208 (1.2%) Bisexual: 2,944 (17.2%) Homosexual: 14,003 (81.6%)	Median (IQR): 31 (25-43)	White: 38.6% Black or African American: 26.9% Hispanic/Latino: 26.6% Other: 7.5%	High
Garnett (2018) ²²⁰ Seek, Test, and Retain. Linkages for Black HIV+, Substance-Using MSM (STAR).	New York City, USA 2012-2015	Convenience sampling & respondent-driven sampling Face-to-face interview	Black, substance-using (alcohol or drugs) MSM	MSM: reported anal sex with a man in the past year.	Total: 1,673 MSM: 1,673	Heterosexual: 218 (13.0%) Bisexual: 1,001 (59.9%) Homosexual: 395 (23.6%) Other/don't know: 57 (3.4%)	Median (IQR): 43 (30-50) 18-29: 25.0% 30-39: 17.0% 40-49: 32.5% 50+: 25.5%	Black: 99.9% Hispanic: 26.2%	High

First author (year) and name of parent study	Location and date of data collection	Recruitment strategy & mode of data collection	Current study sample	Behavioural definitions for sample	Behavioural description of men in sample	Description of MSM in sample			Study quality
						Sexual identity	Age	Ethnicity	
Joseph (2018) ¹²⁰ Study name not reported	Philadelphia, Chicago, Los Angeles, USA 2010-2012	Convenience sampling and respondent-driven sampling ACASI	Black/African American MSMW	MSMW: reported oral or anal sex with a man, and oral, vaginal or anal sex with a woman in the previous 12 months.	Total: 584 MSMW: 584	Straight/heterosexual: 40 (6.9%) Bisexual: 439 (75.4%) Gay/homosexual: 61 (10.5%) Other: 42 (7.2%)	Mean (range): 43 (18-70)	Black or African American: 100%	High
Rutledge (2018) ²⁵ Being Responsible for Ourselves (BRO)	Philadelphia, USA 2008-2011	Convenience and snowball sampling ACASI	African American MSM	MSM: reported anal sex with a man (other than a main male partner) in the past 90 days.	Total: 593 MSM: 593	Straight: 45 (7.6%) Down Low: 62 (10.5%) Bisexual: 245 (41.3%) Gay: 241 (40.6%)	Mean (SD): 42 (10.72) Range: 18-69	African American: 100%	High

Appendix 10: Qualitative studies included in systematic review

Table 69: Summary of qualitative studies included in systematic review

First author (year), and location and date of data collection	Article aims	Recruitment strategy	Method of data collection and analysis method	Current study sample	Behavioural definitions for sample	Behavioural description of men in sample	Description of MSM in sample			Study quality
							Sexual identity	Age	Ethnicity	
Anderson (2008) ⁵⁹ Multiple locations, USA Study period not specified	To examine how collegiate male cheerleaders structure differently the requirements for the inclusion of gay men to be perceived as masculine among their heterosexual peers; and to examine how heterosexual collegiate male cheerleaders differently structure the requirements for their own same-sex sex to be compatible with a publicly perceived heterosexual identity.	Initial group of 12 cheerleaders recruited off the member profile search on a US cheerleading website. Snowball and theoretical sampling used to obtain additional participants.	In-depth interviews with participants, participant observation within teams, and observation at cheerleading competitions. Analysis method not reported. Constructivist / interpretivist perspective.	68 self-identified heterosexual men who used to play high school football but became collegiate cheerleaders because they were not selected for their university football teams.	N/A	N/A	Self-identified heterosexual: 68 (100%)	Range: 18-23	White: 80%	High
Frank (2008) ²⁴³ Multiple locations, USA Study period not specified	To explore homophobia and the relative lack of male same-sex activity in heterosexual 'swinging' or 'the lifestyle', especially compared to the ubiquity of female same-sex activity and eroticism.	"Lifestyle" websites and online groups, national and local "lifestyle" publications, "lifestyle"-related leisure events.	Ethnography. Textual analysis of publications, online articles, stories and fieldnotes.	Men and women involved in "the lifestyle" / swingers.	N/A	N/A	N/A	N/A	N/A	High
Operario (2008) ⁶² Oakland, California, USA December 2005 – June 2006	To explore the social and psychological context of sexual behaviour and HIV risk among African American non-gay-identified men who have sex with men.	Referrals from a community-based organisation client base, and referrals from gay men who had non-gay-identifying male partners. Referrals from other study participants.	Semi-structured interviews lasting 60-90 minutes. Thematic analysis.	African American men who had a history of sex with and man and a woman, and who do not identify as either gay or bisexual.	MSM: Reported a history of sex with a man and a woman.	MSM: 21	Not gay or bisexual: 21 (100%)	Not reported	African American: 100%	High

First author (year), and location and date of data collection	Article aims	Recruitment strategy	Method of data collection and analysis method	Current study sample	Behavioural definitions for sample	Behavioural description of men in sample	Description of MSM in sample			Study quality
							Sexual identity	Age	Ethnicity	
Harawa (2008) ⁶³ Los Angeles, USA July 2005 – February 2006	To examine the role of drug use and addiction in same-sex sexuality among non-gay-identifying African American men who have sex with men or with both men and women.	Distribution of fliers with study information at nightclubs, coffee houses, HIV/AIDS clinics, social service agencies, and street or park locations commonly frequented by the target population.	Semi-structured focus groups lasting 90-120 minutes. Constant-comparative approach based in grounded theory.	Non-gay identifying African American MSM or MSMW	MSM: Reported sex with at least one male partner in the previous 12 months. MSMW: Reported sex with at least one male and one female partner in the previous 12 months.	MSM: 41 (89.1%) MSMW: 23 (50%) 6 participants also reported sex with transgender women in the previous 12 months, and 1 participant reported no sex in the previous 12 months.	Bisexual: 17 (37.0%) Heterosexual: 10 (21.7%) Gay: 5 (10.9%) Same-gender loving: 4 (8.7%) Down low or DL: 3 (6.5%) Homosexual: 3 (6.5%) Queer: 1 (2.2%) Other/None of the above: 2 (4.3%) Don't know: 1 (2.2%)	Range: 22-61 Mean: 41.5	African American / Black: 46 (100%)	High
Reback (2010) ¹¹ Los Angeles County, USA August 2002 – March 2003	To better understand the maintenance of a heterosexual identity in the face of discordant sexual behaviours. To better understand the social and sexual meaning of same-sex sexual behaviours for heterosexually-identified men who have occasional sex with other men. To examine how a heterosexual identity is maintained and reaffirmed in light of discrepant sexual experiences.	Convenience sampling via posters and flyers at adult bookstores, sex shops, video stores, parks, restaurants, bars, hotels, laundromats, and community-based organisations. Referrals from community-based organisations.	Focus groups and semi-structured interviews ranging from 1-3 hours. Thematic analysis.	Heterosexually-identified men who had occasional, but not regular (not more than once per month), sex with a man.	MSM: Reported occasional, but not regular, sex with a man in the past year.	MSM: 21 88.2% also reported sex with at least one biological female partner in the previous 6 months.	Heterosexual: 100%	Range: 22-60 Mean (SD): 39.85 (7.9)	African American / Black: 13 (61.9%) Caucasian / White: 6 (28.5%) Latino / Hispanic: 1 (4.8%)	Medium

First author (year), and location and date of data collection	Article aims	Recruitment strategy	Method of data collection and analysis method	Current study sample	Behavioural definitions for sample	Behavioural description of men in sample	Description of MSM in sample			Study quality
							Sexual identity	Age	Ethnicity	
Washington (2010) ²⁴⁸ Baltimore City and surrounding areas, USA Recruitment period not reported	To explore: 1) What kinds of information and materials would be important to include in an HIV prevention program developed for IDU-MSM/W? 2) What issues do IDU-MSM/W perceive to be crucial that need to be addressed in an effort to motivate and increase safer sex practices among them and their male and female sex partners? 3) What is the feasibility of involving recovering IDU-MSM/W as peer-educators to take messages to the street as a means of delivering an HIV education intervention to active IDU-MSM/W?	Convenience sampling via outreach in parks and on inner-city streets known for sex trade.	Focus groups of between 8-10 participants each, lasting 60-95 minutes. Thematic analysis.	African American IDU MSMW	MSM/W: reported sex with both men and women in the past 6 months	MSM/W: 105	Heterosexual: 35 (33.3%) Bisexual: 67 (63.8%) Homosexual: 2 (1.9%)	Mean (SD): 31.6 (8)	African American, not of Hispanic origin: 94 (89.5%) African American, of Hispanic origin: 11 (10.5%)	Low
Benoit (2012) ²⁴⁴ New York City, USA Recruitment period not reported	To explore the perspectives of non-gay-identifying MSMW with female primary partners regarding the role of substance use in their sexual behaviour with other men, as well as men's reasons for disclosing or not disclosing these behaviours to their female partners.	Direct outreach by staff ethnographers at MSM venues, community organisations, websites, and through existing social networks.	Semi-structured interviews with an ethnographer. Thematic analysis.	Black or African American men who report past-year alcohol or illicit drug use, do not identify as gay or homosexual, currently have a female main sexual partner, and engaged in sexual activity with men in the past 12 months.	MSM/W: Currently have a female main sexual partner and engaged in sexual activity with men at least once in the past 12 months.	MSM/W: 33	Heterosexual or bisexual: 84%	Range: 21-60 Mean: 42	African American / Black: 33 (100%)	Medium

First author (year), and location and date of data collection	Article aims	Recruitment strategy	Method of data collection and analysis method	Current study sample	Behavioural definitions for sample	Behavioural description of men in sample	Description of MSM in sample			Study quality
							Sexual identity	Age	Ethnicity	
Fernandez Cerdeno (2012) ²⁴⁷ North San Diego County, California, USA Recruitment period not reported	To describe the development process of a social marketing campaign to promote HIV testing and condom use for heterosexually-identified Latino MSMW.	Recruitment method not reported.	In-depth interviews conducted in participants' preferred language. Thematic analysis.	Heterosexually-identified Latino MSMW.	MSMW: Not specified, but based on the description, assume "current"?	MSMW: 11	Heterosexual: 8 Gay: 2 Confused: 1	Range: 18-52	Latino: 100% Born and raised in Mexico: 8/11 Born in the USA: 3/11	Low
Reback (2013) ¹⁰⁶ Los Angeles County, USA 2002-2003	To better understand the HIV risk behaviours and sexual decision-making processes of heterosexually-identified men who had occasional sex with another male and/or a transwoman.	Convenience sampling via posters and flyers at adult bookstores, sex shops, video stores, parks, restaurants, bars, hotels, laundromats, and community-based organisations. Referrals from community-based organisations.	Focus groups and semi-structured interviews ranging from 1-3 hours. Thematic analysis.	Heterosexually-identified men who had occasional but not regular (not more than once per month) sex with a man and/or a preoperative trans woman.	MSM: Reported occasional, but not regular, sex with a man in the past year. MSTW: Reported occasional, but not regular, sex with a trans woman in the past year. MSMTW: Reported occasional, but not regular, sex with both a man and a trans woman in the past year.	MSM: 15 (48.4%) MSTW: 10 (32.3%) MSMTW: 6 (19.3%) 21 (67.7%) also reported sex with at least one biological female partner in the previous 6 months.	Heterosexual: 100%	Range: 22-60 Mean (SD): 38.9 (8.4)	African American / Black: 19 (61.3%) Caucasian / White: 7 (22.6%) Latino / Hispanic: 2 (6.5%) Asian / Pacific Islander: 2 (6.5%)	High

First author (year), and location and date of data collection	Article aims	Recruitment strategy	Method of data collection and analysis method	Current study sample	Behavioural definitions for sample	Behavioural description of men in sample	Description of MSM in sample			Study quality
							Sexual identity	Age	Ethnicity	
Schrimshaw (2013) ²⁴⁵ New York City, USA July – August 2006	To examine the venues where non-disclosing MSMW meet male sexual partners and the reasons why they prefer some venues over others. To examine the strategies MSMW report using to select which sexual venues they feel comfortable attending to meet their male sexual partners, and strategies they use to reduce the likelihood that they will be discovered by attending these venues.	Targeted sampling at bars and clubs, cruising parks, community-based HIV agencies, websites, newspaper advertisements, friend referrals.	Semi-structured interviews lasting approximately 2 hours. Thematic analysis.	Non-gay identified MSMW who had not disclosed their same-sex behaviour to their female partners.	MSMW: Reported having oral or anal sex with a man in the past year; and reported having vaginal, anal, or oral sex in the past year with a woman to whom they were married or had an ongoing sexual relationship lasting 3 months or longer.	MSMW: 46	Heterosexual or straight: 10 (22%) Bisexual: 29 (63%) Something else*: 7 (15%) *Including “heteroflexible”, “curious”, “sexually free”, “exploring”, and “refusing to label oneself”.	Mean (SD): 39.6 (11.0)	African American / Black: 19 (41%) Hispanic / Latino: 16 (35%) Non-Hispanic White: 10 (22%) Asian: 1 (2%)	Medium
Schrimshaw (2014) ²¹ New York City, USA August 2007 – March 2010	To explore behaviourally-bisexual men's conceptualisations of same-sex behaviour as private and the privacy management rules they used to justify non-disclosure of this information to friends, family members and female partners.	Targeted and quota sampling (to ensure relatively equal distribution of ethnicities) at bars and clubs, cruising parks, community-based HIV agencies, websites, newspaper advertisements, friend referrals.	Semi-structured interviews lasting on average 2hr 14m. Thematic analysis.	Non-gay identified MSMW who had not disclosed their same-sex behaviour to any past-year female sexual partners.	MSMW: Reported having oral or anal sex with a man in the past year; and reported having vaginal, anal, or oral sex in the past year with a woman to whom they were married or had an ongoing sexual relationship lasting 3 months or longer.	MSMW: 203	Heterosexual: 71 (35%) Bisexual: 115 (57%) Other*: 17 (8%) *Including “goes either way”, “between bisexual and heterosexual”, “curious”, “down low”, and “refusing label oneself”.	Mean (SD): 36.9 (11.2)	Black: 68 (33%) Latino: 59 (29%) White: 54 (27%) Asian: 20 (10%) Native American: 2 (1%)	High

First author (year), and location and date of data collection	Article aims	Recruitment strategy	Method of data collection and analysis method	Current study sample	Behavioural definitions for sample	Behavioural description of men in sample	Description of MSM in sample			Study quality
							Sexual identity	Age	Ethnicity	
Reback (2015) ¹⁰⁵ Los Angeles County, USA August 2002 – March 2003 Same sample as Reback (2010)	To understand: 1) How heterosexual identifying MSMW navigate the disclosure decision-making process; 2) what factors serve to determine the their disclosure practices; and 3) how the disclosure decision-making processes and/or related factors differ if the disclosure was regarding male sexual partnering versus HIV serostatus.	Convenience sampling via posters and flyers at adult bookstores, sex shops, video stores, parks, restaurants, bars, hotels, laundromats, and community-based organisations. Referrals from community-based organisations.	Focus groups and semi-structured interviews ranging from 1-3 hours. Thematic analysis.	Heterosexually-identified men who had occasional, but not regular (not more than once per month), sex with a man.	MSM: Reported occasional, but not regular, sex with a man in the past year.	MSM: 21 88.2% also reported sex with at least one biological female partner in the previous 6 months.	Heterosexual: 100%	Range: 22-60 Mean (SD): 39.85 (7.9)	African American / Black: 13 (61.9%) Caucasian / White: 6 (28.5%) Latino / Hispanic: 1 (4.8%)	High
Senreich (2015) ²⁴⁶ A city in Northeastern USA October 2009 – November 2010	Aim for qualitative study: To determine the specific substance-abuse treatment needs of heterosexual clients in substance abuse treatment who have a history of same-gender sexual contact.	Clients in the program for at least 7 days completed a survey, with those indicating a history of same-gender sexual contact asked if they wanted to say anything regarding these experiences.	Survey responses and face-to-face responses to follow-up questions. Phenomenological analysis.	Heterosexual clients in substance abuse treatment with a history of same-gender sexual contact (HSGS).	HSGS: Same-gender contact since age 18	HSGS men: 66	Heterosexual: 100%	For all men and women in the sample: Mean (SD): 44. (7.5)	For all men and women in the sample: Black: 55% Hispanic: 25% White: 16% Mixed / Other: 4%	Low
Carrillo (2016) ⁶⁴ USA (across the country) Recruitment period not reported.	To examine the logics of self-identification among a subset of non-exclusively straight men, and the implications of such identification for future HIV prevention and health promotion work.	Direct messages to men advertising on <i>Craigslist's</i> Men4Men (relationships) and Men4Men (casual encounters) sections.	Semi-structured interviews. Thematic analysis.	Men who have same-sex desires and behaviours and consider themselves to be straight.	MSM: Experienced same-sex desires after the age of 13.	MSM: 100	Public identification: Straight or heterosexual (100%) Private identification: Straight or heterosexual: 50 (50%) Heteroflexible or similar: 23 (23%) Bisexual: 27 (27%)	Range: 18-72	White: 78 (78%) Latino: 11 (11%) African American: 5 (5%) Native American: 3 (3%) Asian American: 2 (2%) Middle Eastern / White: 1 (1%)	High

First author (year), and location and date of data collection	Article aims	Recruitment strategy	Method of data collection and analysis method	Current study sample	Behavioural definitions for sample	Behavioural description of men in sample	Description of MSM in sample			Study quality
							Sexual identity	Age	Ethnicity	
Duffin (2016) ²⁷ Philadelphia, USA Recruitment period not reported	To gain further understanding of why Black men who are behaviourally bisexual choose to reject bisexual identity.	Purposive and snowball sampling, via flyers posted in agencies providing HIV/AIDS services and agencies catering to the LGBT population.	In-depth interviews. Thematic analysis.	African American men MSMW who do not identify as gay or bisexual.	MSM: Reported sex with at least one other man in the past 12 months.	MSM: 33 For the 20 men for whom individual data is presented: Straight: 15/20 DL: 9/20 Trysexual: 2/20 Trysexual defined as "willing to try anything sexual"	Range: 22-53	African American: 100%	High	
Garcia (2016) ²⁴¹ "Your Life, Your Words" New York City, USA June 2013 – May 2014	To 1) identify meaningful categories within the Black MSM (BMSM) category to note the diversity in local organisation of social and sexual experience; 2) problematise local categorisations; 3) describe how recognising diversity and fluidity can shape and inform the use of HIV prevention tools.	Recruitment cards with information about the study left at health centres, community-based organisations, bars, and online.	Three In-depth interview sessions, each roughly 90 minutes. Extended case method and grounded theory.	Black or African American men who have sex with men aged 15 or older.	MSM: Reported anal or oral sex with a man in the past 12 months.	MSM: 31 Gay: 15 (48.4%) Bisexual: 4 (12.9%) Discreet: 4 (12.9%) Straight: 3 (9.7%) Same-gender loving: 3 (9.7%) No sexual identity: 2 (6.5%)	Mean (SD): 29.0 (12.3)	African American / Black: 31 (100%)	High	
Carrillo (2017) ⁶⁶ USA (across the country) Recruitment period not reported. Same sample as Carrillo (2016) ⁶⁴	To examine the logics that allow adult US men to make sense of their same-sex desires and behaviours and make them consistent with a primary self-identification as straight.	Direct messages to men advertising on <i>Craigslist's</i> Men4Men (relationships) and Men4Men (casual encounters) sections.	Semi-structured interviews. Thematic analysis.	Men who have same-sex desires and behaviours and consider themselves to be straight.	MSM: Experienced same-sex desires after the age of 13.	MSM: 100 Public identification: Straight or heterosexual (100%) Private identification: Straight or heterosexual: 50 (50%) Heteroflexible or similar: 23 (23%) Bisexual: 27 (27%)	Range: 18-72	White: 78 (78%) Latino: 11 (11%) African American: 5 (5%) Native American: 3 (3%) Asian American: 2 (2%) Middle Eastern / White: 1 (1%)	Medium	

First author (year), and location and date of data collection	Article aims	Recruitment strategy	Method of data collection and analysis method	Current study sample	Behavioural definitions for sample	Behavioural description of men in sample	Description of MSM in sample			Study quality
							Sexual identity	Age	Ethnicity	
<p>Scoats (2017)⁶⁵</p> <p>A small university in the south of England, UK</p> <p>Recruitment period not reported.</p>	<p>To explore what the experience of threesomes (FFM and MMF) means for heterosexual identity construction to young undergraduate heterosexual men.</p>	<p>Participants were recruited from a previous study as part of undergraduate teaching with one of the authors.</p>	<p>Face-to-face semi-structured interviews of approximately 45 minutes.</p> <p>Thematic analysis, grounded theory.</p>	<p>Undergraduate men who self-identified as heterosexual and gay-friendly.</p>	<p>FFM: female-female-male threesome MMF: male-male-female threesome</p>	<p>Ever engaged in a threesome: 10/30 Engaged in FFM threesome: 7/30 Engaged in MMF threesome: 5/30 Engaged in both FFM and MMF threesome: 2/30</p>	<p>Exclusively straight: 18 (60%) Straight: 11 Mostly straight: 1</p>	<p>Second year of undergraduate university</p>	<p>White: 29 South Asian: 1</p>	<p>High</p>
<p>Silva (2017)⁸¹</p> <p>Missouri, Illinois, Oregon, Washington, or Idaho, USA</p> <p>Recruitment period not reported</p>	<p>To examine how straight, rural MSM understand their own genders and sexualities, and how rurality affects those perceptions.</p>	<p>Advertisements posted in regional Men-for-men Casual Encounters sections of <i>Craigslist</i>, and <i>Grindr</i>.</p>	<p>Phone or face-to-face semi-structured interviews lasting approximately 90 minutes.</p> <p>Thematic analysis.</p>	<p>Rural MSM who identify as straight.</p>		<p>MSM: 19</p>	<p>Public identification Straight: 17 (100%)</p> <p>Private identification Straight: 10 (52.6%) Straight/mostly straight: 1 (5.3%) Straight/mostly straight, with "a percentage towards bi": 1 (5.3%) Straight and bisexual: 3 (15.8%) Straight but bi, but more straight: 1 (5.3%) Straight-leaning bisexual: 1 (5.3%) Bisexual: 1 (5.3%) Gay: 1 (5.3%)</p>	<p>20-29: 1 (5.3%) 30-39: 3 (15.8%) 40-49: 1 (5.3%) 50-59: 6 (31.6%) 60-69: 6 (31.6%) 70-79: 2 (10.5%)</p>	<p>White: 19 (100%)</p>	<p>Medium</p>

First author (year), and location and date of data collection	Article aims	Recruitment strategy	Method of data collection and analysis method	Current study sample	Behavioural definitions for sample	Behavioural description of men in sample	Description of MSM in sample			Study quality
							Sexual identity	Age	Ethnicity	
Siegel and Meuniel (2018) ²⁴² New York City, USA August 2007 – March 2010 Same sample as Schrimshaw (2014) ²¹	To examine how traditional sex and gender stereotypes informed descriptions of men and women as sexual and intimate partners offered by non-gay-identifying MSMW who did not disclose their same-sex activity to female partners.	Targeted and quota sampling (to ensure relatively equal distribution of ethnicities) at bars and clubs, cruising parks, community-based HIV agencies, websites, newspaper advertisements, friend referrals.	Semi-structured interviews lasting on average 2hr 14m. Thematic analysis.	Non-gay identified MSMW who had not disclosed their same-sex behaviour to any past-year female sexual partners.	MSMW: Reported having oral or anal sex with a man in the past year; and reported having vaginal, anal, or oral sex in the past year with a woman to whom they were married or had an ongoing sexual relationship lasting 3 months or longer.	MSMW: 203	Heterosexual: 71 (35%) Bisexual: 115 (57%) Other*: 17 (8%) *Including "goes either way", "between bisexual and heterosexual", "curious", "down low", and "refusing label oneself".	Mean (SD): 36.9 (11.2)	Black: 68 (33%) Latino: 59 (29%) White: 54 (27%) Asian: 20 (10%) Native American: 2 (1%)	High
Silva (2018) ⁶¹ Missouri and Illinois, USA Recruitment period not reported	To understand how straight-identified rural MSM understand their sexual behaviour and identity.	Convenience sampling via an advert placed in the men-for-men casual encounters section of <i>Craigslist</i>	Semi-structured interviews of 1-2 hours. Thematic analysis.	Rural MSM who identify as straight.		MSM: 10	Public identification Straight: 10/10 Private identification: Gay: 1 (10%) Bisexual: 1 (10%) Straight-leaning bisexual: 1 (10%) Straight/mostly straight/leaning bi: 3 (30%) Straight: 5 (50%)	20-29: 1 (10%) 30-39: 1 (10%) 40-49: 1 (10%) 50-59: 3 (30%) 60-69: 3 (30%) 70-79: 1 (10%)	White: 10 (100%)	Medium

Appendix 11: Quality appraisal of quantitative studies included in systematic review

AXIS Quality appraisal questions¹⁵⁹

Introduction

1. Were the aims/objectives of the study clear?

Methods

2. Was the study design appropriate for the stated aim(s)?
3. Was the sample size justified?
4. Was the target/reference population clearly defined?
5. Was the sample frame taken from an appropriate population base so that it closely represented the target/reference population under investigation?
6. Was the selection process likely to select subjects/participants that were representative of the target/reference population under investigation?
7. Were measures undertaken to address and categorise non-responders?
8. Were the risk factor and outcome variables measured appropriate to the aims of the study?
9. Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or published previously?
10. Is it clear what was used to determine statistical significance and/or precision estimates?
11. Were the methods (including statistical methods) sufficiently described to enable them to be repeated?

Results

12. Were the basic data adequately described?
13. Does the response rate raise concerns about non-response bias?
14. If appropriate, was information about non-responders described?
15. Were the results internally consistent?
16. Were the results presented for all the analyses described in the methods?

Discussion

17. Were the authors' discussions and conclusions justified by the results?

18. Were the limitations of the study discussed?

Other

19. Were there any funding sources or conflicts of interest that may affect the authors' interpretation of the results?

20. Was ethical approval or consent of participants attained?

Table 70: Detailed quality appraisal of quantitative studies included in systematic review

Study	AXIS Quality Appraisal Questions																				Comments	Quality rating
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
Lauby (2008) ²²²	Y	Y	N	Y	Y	N	N	Y	Y	Y	Y	Y	§	N	Y	Y	Y	Y	N	Y	Sampling: Sample more representative in terms of sexual identity due to use of RDS, however RDS and offer of monetary incentive may have resulted in unrepresentative sample with higher proportion of lower income participants. Statistical analysis: No concerns. Reporting: No concerns.	Medium
Raymond (2008) ²²¹	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Sampling: Possible nonresponse bias, as HIV testing was not anonymous. Men with undiagnosed HIV infection more likely not to have been tested in past year and most popular reason for not testing was fear of positive result. This potential source of bias not discussed. Very low proportion of H-MSM also raises concerns about how representative the sample is. Statistical analysis: No concerns. Reporting: No concerns	Medium
Wheeler (2008) ²²³	Y	Y	N	Y	Y	N	N	Y	Y	Y	Y	Y	§	N	Y	Y	Y	Y	N	Y	Sampling: RDS may have provided sample that is more representative in terms of sexual identity, but less representative in terms of age (60% aged 40+). Inclusion criteria (AI in past 3 months) also may result in sample less representative of MSM. RDS and monetary incentive may have resulted in unrepresentative sample with higher proportion of lower income participants. Statistical analysis: No concerns Reporting: No concerns.	Medium
Bond (2009) ²²⁴	Y	Y	N	Y	Y	N	N	Y	Y	Y	N	Y	§	N	Y	Y	Y	Y	N	Y	Sampling: RDS may have provided sample that is more representative of target population in terms of sexual identity, but less representative in terms of age (60% aged 40+). RDS and monetary incentive may have resulted in unrepresentative sample with higher proportion of lower income participants. Statistical analysis: Other variables included in multivariate analysis (e.g. traded sex with a male) may have obscured associations between outcomes and sexual identity. Reporting: Basic outcome prevalence data and univariate analysis results not reported.	Medium
Mimiaga (2009) ²²⁶	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	§	N	Y	N	Y	Y	N	Y	Sampling: Use of RDS (particularly small number of seeds and short chain) likely limited representativeness of sample. Data collection: Potential for social desirability bias due to interviewer-administered survey. Statistical analysis: No concerns. Reporting: No concerns.	Medium
Shoptaw (2009) ¹¹⁰	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	§	N	Y	Y	Y	Y	N	Y	Sampling: Appropriate sample for this group (urban, ethnic descent, poor) Statistical analysis: Potentially inappropriate use of Internalised Homonegativity Inventory for straight men – not clear how Gay Affirmation instrument applies to these men. Reporting: "Transgender" included as a sexual identity.	Medium
Williams (2009) ²⁶	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	§	N	Y	Y	Y	Y	N	Y	Sampling: Use of RDS and wider target population beyond MSM for parent study resulted in sample unlikely to be representative of MSM: older, high drug use, very low income, highly ethnic. Data collection: Use of ACASI and local staff limits social desirability bias. Statistical analysis: No concerns. Reporting: No concerns	High

Study	AXIS Quality Appraisal Questions																			Comments	Quality rating	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19			20
Zellner (2009) ²³⁸	Y	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Sampling: Definition of MSM (lifetime history of anal intercourse) means sample may not be representative of current MSM. Very small samples of gay and bisexual men. Very high (90%) proportion of men are recent arrivals to US from Mexico, so unlikely to be representative of wider Latino MSM/MSMW population in USA. Statistical analysis: Potentially over-adjusts in multivariate analysis, given very small size of comparison groups (gay and bisexual MSM). Reporting: Odds ratios interpreted as prevalence ratios throughout.	Low
Zule (2009) ²²⁵	Y	Y	N	Y	N	N	N	Y	Y	Y	Y	Y	§	N	Y	Y	Y	Y	N	Y	Sampling: Use of RDS and wider target population beyond MSM for parent study resulted in sample unlikely to be representative of MSM/MSMW: high drug use, very low income, majority African American. Statistical analysis: Propensity score analysis reporting not clear. Reporting: No other concerns.	Medium
Barnes (2010) ²⁰⁹	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	§	N	Y	Y	Y	N	N	Y	Sampling: Recruited at MSM-associated bars and clubs, so may not be representative of wider MSM population. Statistical analysis: No concerns. Reporting: No concerns	High
Barnshaw (2010) ²³⁹	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	N	N	Y	Y	Y	N	N	Y	Y	Sampling: Sampling conducted in mid-1990s, so limited generalisability when paper was published. Sampling areas of high density of gay men may have resulted in inclusion of more "closeted" men and men who don't attend gay social venues, but may also have resulted in the very low proportion of Other than White men. Data collection: Telephone interviewing likely limited social desirability bias. Statistical analysis: Regression not clearly explained. Reporting: No clear definition given for some measures, including their measures of high risk behaviour. Results presented are unclear and confusing.	Low
Centers for Disease Control and Prevention (2010) ²¹⁰	Y	Y	Y	Y	Y	N	Y	Y	Y	N/A	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Sampling: Recruited at MSM-associated bars, clubs etc., so may not be representative of wider MSM population. Eligibility criteria for inclusion in this analysis was willingness to take non-anonymous HIV test, which may have introduced nonresponse bias. Data collection: Survey administered by interviewer, possibly introducing social desirability bias. Statistical analysis: No concerns. Reporting: No concerns	High
Sifakis (2010) ²²⁷	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Sampling: Not generalizable to MSM older than 29. May not be representative of wider MSM population. Data collection: Requirement to have HIV test may have resulted in selection bias. Statistical analysis: No concerns. Reporting: No concerns.	Medium
Xu (2010) ²¹¹	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Sampling: Sampling method means population is more representative of MSM, though lifetime definition of MSM means unlikely to be representative of current MSM. Data collection: Social desirability bias limited by use of ACASI. Statistical analysis: No concerns. Reporting: No concerns	High
Finlayson (2011) ²¹²	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Sampling: Recruited at MSM-venues, so may not be representative of wider MSM population. Data collection: Survey administered by interviewer, possibly introducing social desirability bias. Statistical analysis: No concerns. Reporting: No concerns	High

Study	AXIS Quality Appraisal Questions																			Comments	Quality rating	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19			20
McKay (2011) ²³⁶	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	§	N	Y	Y	Y	N	N	Y	Sampling: Targeted ethnic sampling strategy results in unrepresentative sample, but allows for more powerful analysis of association with ethnicity. Data collection: Face-to-face interview may have led to overreporting of disclosure due to social desirability, though efforts taken to reduce this. Statistical analysis: Data on position or use of condom during sex are not reported, despite association these may have with disclosure of HIV status. Reporting: No discussion of limitations.	Medium
Rosenberg (2011) ²¹³	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Sampling: Recruited at MSM-venues clubs etc., so may not be representative of wider MSM population. Data collection: Survey administered by interviewer, possibly introducing social desirability bias. Statistical analysis: No concerns. Reporting: No concerns	High
Margolis (2012) ²¹⁴	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Sampling: Recruited from sexual networking websites, so likely to represent higher-risk MSM. Low Other than White sample. Data collection: Social desirability bias reduced through use of internet survey. Short recall period (60 days) limits recall bias. Statistical analysis: No concerns. Reporting: No concerns.	High
Rosenberger (2012) ²²⁸	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Sampling: Recruited from sexual or social networking websites for MSM, so likely to represent higher-risk MSM, who are less likely to be in relationships. Low Other than White sample. Eligibility criteria (most recent sexual event included AI with another male) likely misses many MSMW. Data collection: Online survey likely reduced social desirability bias. Statistical analysis: Regression analyses carried out for H-MSM despite very low sample size. Reporting: Limited discussion of limitations.	Medium
Shearer (2012) ²²⁹	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Sampling: Recruitment location resulted in very young sample, who may not be representative of older MSMW. Potential for self-selection bias. Survey was promoted to MySpace users who listed their sexual identity as gay, bisexual, or "unsure", so likely undersamples non-gay or bisexual-identifying MSMW. Data collection: Internet survey likely reduced social desirability bias. Potential for recall bias due to 12 month recall period, Statistical analysis: Analysis does not account for whether first male sexual encounter occurred after last female sexual encounter, which is possible given the younger age distribution of the sample. Reporting: No concerns.	Medium
Taylor (2012) ⁷¹	Y	Y	N	Y	N	N	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	N	Y	Sampling: Data collected in 2003-2005, when fewer had access to the internet. Limited generalisability to current MSM. Recruited from sexual or social networking websites for MSM, so likely to represent higher-risk MSM. Data collection: Internet survey likely reduced social desirability bias. Statistical analysis: Unclear how denominators for some tables were derived. Not all analysis discussed is presented. Reporting: Study does not report data or analysis for all outcomes discussed in the results section.	Medium

Study	AXIS Quality Appraisal Questions																			Comments	Quality rating		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19			20	
Everett (2013) ¹⁴³	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Sampling: Sampling strategy means sample is more likely to be representative of wider MSM population of this age group, though likely not representative of current MSM due to lifetime definition of MSM. Data collection: Use of CASI for more sensitive questions likely reduced social desirability bias. Statistical analysis: Men identifying as "mostly straight" grouped with bisexual men, perhaps obscuring differences between men identifying as heterosexual and men identifying as gay or bisexual. Condom use not included in statistical models for STI diagnosis, as this was only asked of participants reporting opposite sex partners in past 12 months. Relies on self-reporting of STI diagnoses, which biases those who have tested for STIs. Model adjusts for testing, though only at Wave III. Reporting: No concerns.	Medium	
Gilbert (2013) ²³⁰	Y	Y	Y	N	Y	N	N	Y	Y	Y	Y	Y	?	N	Y	Y	Y	Y	N	Y	Sampling: Vague inclusion criteria – relies on men self-selecting based on the survey identifying as being on "sex between men". Participants already technologically proficient so findings regarding internet testing possibly not generalisable to wider MSM population. Data collection: Reduced social desirability bias due to use of internet survey. Statistical analysis: Combines men identifying as straight and men identifying as "other". Reporting: No concerns.	Medium	
Greene (2013) ²¹⁵	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Sampling: Convenience sample. Excludes injecting drug users, so may not be representative of all substance-using MSM. MSMW in sample may not be representative of all MSM as recruited through a sample of MSM (acknowledged in limitations). Data collection: Limited recall bias due to 3 month recall period. Statistical analysis: No concerns. Reporting: No concerns.	High	
Wall (2013) ²³¹	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Sampling: Recruitment location resulted in very young sample, who may not be representative of older MSMW. Potential for self-selection bias. Survey was promoted to MySpace users who listed their sexual identity as gay, bisexual, or "unsure", so likely undersamples non-gay or bisexual-identifying MSMW. Outcomes based on activity with last sexual partner Data collection: Limited social desirability bias due to use of online survey. Possible nonresponse bias – large dropout rate (42%) who were more likely to be younger, Other than White, less educated, and straight or bisexual-identified. Statistical analysis: Outcome based on activity with last sexual partner only Reporting: Good discussion of limitations. Good reporting of non-responses.	Medium
Baytop (2014) ²³²	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	§	N	Y	Y	Y	Y	N	Y	Sampling: Convenience sample so may not be representative of MSM population. Majority younger than 35 years, though this may represent age group most at risk. Statistical analysis: No multivariate analyses conducted. Reporting: No concerns.	Medium	
Centers for Disease Control and Prevention (2014) ²¹⁶	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Sampling: Recruited at MSM-associated bars, clubs etc., so may not be representative of wider MSM population. Data collection: Survey administered by interviewer, possibly introducing social desirability bias. Statistical analysis: No concerns. Reporting: No concerns	High	

Study	AXIS Quality Appraisal Questions																			Comments	Quality rating	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19			20
Fernandez-Balbuena (2014) ¹¹⁸	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	§	N	Y	Y	Y	Y	N	Y	Sampling: Self-selection bias; the same factors that discourage testing may have discouraged participation (acknowledged by the authors). However broader target population may mean MSM sample is more representative of MSM population in general. Data collection: Anonymous nature of questionnaire may have limited social desirability bias. Statistical analysis: No concerns. Reporting: No concerns.	High
Harawa (2014) ²¹⁷	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Sampling: High-risk sample due to eligibility criteria, so high prevalence of HIV. MSMW recruited as part of larger sample of MSM, so may not be representative of all MSMW. Data collection: ACASI likely limits social desirability. Statistical analysis: No concerns. Reporting: No concerns.	High
Lhomond (2014) ³	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	Sampling: Should be representative of French population, though small sample of sexual minorities as a result. Data collection: Social desirability may be reduced due to telephone interview collection mode. Statistical analysis: No concerns. Reporting: No concerns.	High
Meites (2014) ²⁰	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Sampling: Recruited at MSM-associated venues, so may not be representative of wider MSM population. Data collection: May be prone to recall bias. Study was conducted before HPV vaccine was routinely offered to MSM, so represents baseline data. Statistical analysis: No concerns. Reporting: No concerns.	High
Oster (2014) ²³³	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	§	N	Y	Y	Y	Y	N	Y	Sampling: Men sampled may represent higher risk group, as they are those attending MSM-associated venues. Also may be unrepresentative of MSM in general. Data collection: No concerns. Statistical analysis: No concerns. Reporting: No concerns.	Medium
Dodge (2016) ²¹⁸	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Sampling: Probability-sampled survey so MSM in sample more likely to be representative of MSM in general population. Data collection: Social desirability bias likely reduced through use of internet survey. Statistical analysis: No concerns. Reporting: Measurement of anal intercourse does not specify gender of partners, limiting usefulness.	High
Lebouche (2016) ²¹⁹	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	§	N	Y	Y	Y	Y	N	Y	Sampling: Participants were attending a rapid-HIV test facility, so already have an interest in their sexual health. Testing facility is in the gay neighbourhood of Montreal. Therefore may not be representative of the wider MSM population. Statistical analysis: No concerns Reporting: No concerns.	High
Maksut (2016) ²³⁴	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	§	N	Y	Y	Y	Y	N	Y	Sampling: Good recruitment strategy that recruits from a wide variety of sources. More likely to be representative of MSM. Some selection bias, as all recruited reported CAI in the past 12 months, so already a high risk group. Statistical analysis: Some variables such as education and income not sufficiently explained. Reporting: Reporting of outcomes is not clear.	Medium

Study	AXIS Quality Appraisal Questions																				Comments	Quality rating
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
McCree (2016) ²⁴⁰	Y	Y	N	N	Y	Y	N	Y	Y	N	N	Y	§	N	N	N	Y	Y	N	Y	Sampling: Convenience sample so may not be representative of MSM population. Majority younger than 35 years, though this may represent age group most at risk. Data collection: No concerns. Statistical analysis: Analysis carried out is somewhat confusing and not clearly explained. Reporting: Results table states that AI was eligibility criteria and so 100% of men reported it. However, elsewhere in the paper it states that only 80% of men reported AI, and eligibility criteria allows for oral sex or AI.	Low
Mor (2016) ¹²	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Sampling: Sample is representative of Israeli Jewish population, but may not be generalisable beyond that. Data collection: Condom use limited to last encounter. Statistical analysis: Grouping of men with same-sex attraction and same-sex behaviour likely underestimates differences with concordant heterosexuals. Similarly, grouping of bisexuals and gay MSM likely obscures differences with those groups. Reporting: No concerns.	Medium
Valverde (2016) ²³⁷	Y	Y	N	Y	N	N	N	Y	Y	Y	Y	Y	§	N	Y	Y	Y	Y	N	Y	Sampling: Men were recruited in states that have not been typical settlement destinations of migrants in the US. Data collection occurred in 2005-2007, so may not be representative of current population. Recruited at community-based organisations and clinics, indicating some engagement with health officials or CBOs. Data collection: Potential for recollection bias, as well as reporting/social desirability bias due to self-report at face-to-face interview. Self-report may not be indicative of true STI rate in population that does not regularly attend clinic. Statistical analysis: No concerns. Reporting: No concerns.	Medium
Hall (2017) ²³⁵	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N	Y	Sampling: High risk sample, so may not be representative of wider MSM population. Data collection: 6 month recall period reduces recall bias. Statistical analysis: Did not include some key confounders in analysis. Reporting: Some figures misreported. Does not discuss generalisability.	Medium
Shadaker (2017) ¹³⁹	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Sampling: Study recruited at MSM-associated venues, so MSMW in sample are unlikely to be representative of MSMW in general. Data collection: Potential reporting bias due to staff-administered interviews. Statistical analysis: No concerns. Reporting: No concerns.	High
Garnett (2018) ²²⁰	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	§	N	Y	Y	Y	Y	N	Y	Sampling: Characteristics of the study sample broadly reflect those of Black MSM and TGW in the US. Data collection: Data collected through self-report via face-to-face interviews – subject to social desirability. Very broad definition of “substance-using” – includes “alcohol use to intoxication ever”. Statistical analysis: No concerns. Reporting: No concerns.	High
Joseph (2018) ¹²⁰	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Sampling: High incarceration rate, so may not be representative of wider MSM/MSMW population. Also, recruited as part of a population of MSM, so may not be representative of wider MSMW population. Data collection: Study took place in two states in which it was a felony for someone with HIV to have condomless sex with someone with negative or unknown status. This may have resulted in underreporting of this outcome. Statistical analysis: No concerns. Reporting: No concerns.	High

Study	AXIS Quality Appraisal Questions																				Comments	Quality rating
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
Rutledge (2018) ²⁵	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Sampling: A wide range of sampling strategies used, but may still not be representative of wider MSM population. Statistical analysis: No concerns. Reporting: No concerns.	High

Y=Yes. N=No. § Indicates that there was insufficient information to make this assessment.

Appendix 12: Quality appraisal of qualitative studies included in systematic review

CASP quality appraisal questions¹⁶⁰

1. Was there a clear statement of the aims of the research?
2. Is a qualitative methodology appropriate?
3. Was the research design appropriate to address the aims of the research?
4. Was the recruitment strategy appropriate to the aims of the research?
5. Was the data collected in a way that addressed the research question?
6. Has the relationship between the researcher and participants been adequately considered?
7. Have ethical issues been taken into consideration?
8. Was the data analysis sufficiently rigorous?
9. Is there a clear statement of findings?
10. How valuable is the research?

Table 71: Detailed quality appraisal of qualitative studies included in systematic review

Study	CASP Quality Appraisal Questions										Comments	Quality rating	
	1	2	3	4	5	6	7	8	9	10			
Anderson (2008) ⁵⁹	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Author discusses his findings in relation to other previous studies, and in particular how his findings contrast with other findings.	Sampling: Detailed description of the various recruitment methods used. Ethics: Very detailed discussion of ethics of research method. Analysis: Could be clearer about analysis method. Reflexivity: Good discussion of how the author's sexual identity could have influenced the interviews and the openness of participants.	High
Frank (2008) ²⁴³	Y	Y	Y	Y	Y	Y	§	§	Y	Y	Her main point is that the lack of same-sex sexual activity in the lifestyle isn't as simple as "homophobia" - that is a simplification of the actual situation. Societal homophobia has surely worked its way into the lifestyle, and is manifested in participants' unwillingness to engage in certain behaviours, at least publicly, though they may not actually be homophobic themselves.	Sampling: The author has drawn observations from a number of physical and online sources and events, including personal accounts from participants at events, message board discussions, and literature (flyers etc) in the swinging community. Ethics: Little discussion of ethics. Analysis: Author described both the observational and textual analysis performed for the study. Reflexivity: Author clearly states her previous attendance at events similar to those she conducted field research at, and membership of the community she's researching.	High
Operario (2008) ⁶²	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Thoughtful discussion of results, implications, and suggestions.	Sampling: Recruitment methods clear. Ethics: Great care taken to protect participants' privacy. Analysis: Brief but clear description of analysis. Reflexivity: Paper mentions the ethnicity of the interviewer, indicating awareness of its relevance to participants. But not discussed otherwise.	High
Harawa (2008) ⁶³	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Very clear statement and interpretation of findings, and their implications for the population of interest.	Sampling: Very detailed summary of recruitment process. Ethics: Researchers took participants' privacy and confidentiality very seriously. Analysis: Very thorough data analysis process. Reflexivity: Ethnicity, gender, and professions of facilitators of focus groups mentioned, and previous experience working with these groups. Little reflexivity other than that.	High
Reback (2010) ¹¹	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Provides a useful understanding of H-MSM's compartmentalisation of their sex with men. Also discusses their discounting of their sex with men meaning they do not talk about it and it also does not play a role in their understanding of their sexual identity. It also highlighted the lack of emotional connection made between these men and their male sexual partners.	Sampling: Half of the sample recruited through posters at CBO. Attendees to these are more likely to be low income, and high proportion of the sample have HIV. Ethics: Interviews conducted in non-invasive and non-judgmental manner. Analysis: Paper discusses thematic coding method but does not clearly describe analysis approach. Reflexivity: No real discussion about relationship between researcher and participants.	Medium
Washington (2010) ²⁴⁸	Y	Y	Y	Y	Y	N	§	N	Y	Y	They've stressed the importance of their new findings (e.g. men seeking sex during the day, while not high). Also stressed how important their findings are for the development of services or programmes intended for these men. However, results section was very short, with no real in-depth exploration of results. Some new results presented in discussion.	Sampling: Researchers explained why they felt their recruitment strategy was appropriate given their target population. Ethics: No discussion of ethical approval, no discussion of anonymisation/pseudonymisation. Discussed consent. Analysis: Good discussion of why focus groups were chosen. Good discussion of analysis method. Reflexivity: No discussion of reflexivity.	Low

Study	CASP Quality Appraisal Questions										Comments	Quality rating
	1	2	3	4	5	6	7	8	9	10		
Benoit (2012) ²⁴⁴	Y	Y	Y	Y	Y	N	Y	Y	Y	The researchers discuss how their research may help identify ways of engaging NGI-MSMW in prevention and treatment efforts. Also identify future research pathways.	Sampling: Very brief description of recruitment process. Ethics: Only briefly mentions taking informed consent. No other discussion. Analysis: Paper discusses the analysis procedure in-depth, including that two members of the research staff were involved, coding transcripts separately before comparing their coding and reconciling differences. Reflexivity: No discussion of reflexivity.	Medium
Fernandez Cerdeno (2012) ²⁴⁷	Y	Y	Y	§	N	N	§	N	Y	The qualitative component of this study was only a small part of this paper, and was really to inform the marketing campaign that was the focus of the paper. So there wasn't much space devoted to the qualitative component. Despite this, the researchers give a detailed discussion of the implications of these findings, and how they influenced the campaign.	Sampling: Recruitment method was unclear. Data collection: Interviews were conducted in Spanish, and English summaries of these interviews were produced. These summaries were coded, rather than the interviews themselves. Ethics: No ethical concerns, though no real discussion of ethics. Analysis: Brief description of analysis. However, analysis was performed on translated summaries of interviews, rather than interview transcripts themselves. These findings were then triangulated with other members of the community, so some steps have been taken to ensure the rigour of the analysis. Reflexivity: No discussion of reflexivity.	Low
Reback (2013) ¹⁰⁶	Y	Y	Y	Y	Y	N	Y	Y	Y	Very valuable, particularly in the way they draw out distinctions between how the men treat their female partners and their male/transwomen partners, and the regard they show these different types of partners when it comes to HIV and condoms, as well as the attitudes towards male/transwomen partners (e.g. "they all already have HIV anyway"). Additionally, the role that drug and alcohol play in their sexual behaviour, as well as exchange sex.	Sampling: Clear and detailed discussion of the recruitment process. Very high proportion of participants with HIV, and also high prevalence of previous incarceration, indicating potential lack of transferability. Ethics: Information about oversight provided. No ethical concerns. Analysis: Very clear discussion of analysis approach and methods. Reflexivity: No discussion of reflexivity.	High
Schrimshaw (2013) ¹⁰⁹	Y	Y	Y	Y	Y	N	§	Y	Y	Paper does a good job of linking their findings to other papers on venue selection among MSM, and also linking these to papers linking non-disclosing men to higher risk sex.	Sampling: Good mix of sampling from the general public and targeted sampling from LGBT organisations, venues etc. Very large sample size as part of a larger study. Ethics: No mention of ethical considerations. Analysis: Clear discussion of analysis process given. Reflexivity: No discussion of reflexivity.	Medium
Schrimshaw (2014) ²¹	Y	Y	Y	Y	Y	N	Y	Y	Y	Some excellent synthesis of ideas and how these relate to the design of interventions, and the implications of their findings.	Sampling: Good mix of sampling from the general public and targeted sampling from LGBT organisations, venues etc. Very large sample size as part of a larger study. Ethics: Ethical approval described. No ethical concerns. Analysis: Good discussion of analysis approach and method. Reflexivity: No discussion of reflexivity.	High
Reback (2015) ¹⁰⁵	Y	Y	Y	Y	Y	N	Y	Y	Y	Discussion section details the implications of their research on both partner notification services and also prevention messaging. They also suggest ways in which these difficulties could be overcome. Helpful framing of how important the men's heterosexual identities are to them, and how this shapes their reasoning for disclosure (or lack thereof).	Sampling: Clear and detailed discussion of the recruitment process. As this is the same sample as the other Reback papers, same concerns re: high proportion of participants with HIV, and also high prevalence of previous incarceration, indicating potential lack of transferability. Ethics: Discussion of pseudonymisation process and ethical consent. Analysis: Very clear discussion of analysis approach and methods. Reflexivity: No discussion of reflexivity.	High

Study	CASP Quality Appraisal Questions										Comments	Quality rating	
	1	2	3	4	5	6	7	8	9	10			
Senreich (2015) ²⁴⁶	Y	Y	N	Y	Y	N	Y	N	Y	Y	Researcher is aware of their research's place in the literature, stating that no one else had ever really studied this group before. They've made some good recommendations, and also state clearly that they believe this group to make up a good proportion of people in drug-abuse treatment programmes. However, the research gives a very surface-level understanding of these experiences due to the limitations of the data collection process.	Sampling: Directly recruited participants enrolled in a substance-abuse programme. Ethics: No ethical issues. Analysis: Data were collected initially through a free text field on a self-report from patients in the programme, and then participants were able to provide further information if they wanted face-to-face at a later date. Responses in interviews were written down by the researcher, and not recorded. So the data collection process was not in-depth. However, it did ask participants directly the research question. Reflexivity: No reflexivity statement included.	Low
Carrillo (2016) ⁶⁴	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	The study emphasises that the H-MSM in their study have a clear sense of the sexual identity as straight, and then clearly discusses the implications of this for interventions and health programmes. Emphasises the importance of health educators acknowledging the elastic sexual identities some can have.	Sampling: Recruitment method seems suitable, though sample size is extremely large (100) for a qualitative study. Ethics: Interviews conducted in anonymous internet chat rooms to preserve participants' privacy, though this does limit their ability to know that their participants are who they say they are. Analysis: Thorough analysis process and description. Reflexivity: No reflexivity statement. By conducting interviews in internet chatrooms they've limited the effects of the researcher. They did however consider how the use of internet chat rooms affected the participants themselves.	High
Duffin (2016) ²⁷	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	The researcher makes a very clear point about how their study contributes to our understanding of the Down Low, and of why men don't disclose their sex with men. The first paragraph of the discussion is very powerful, detailing society's role in encouraging these men to hide their sexuality. This aspect of the findings is very important, and they recognise that. It provides a very thorough exploration of men's experiences and beliefs, understandings of labels etc.	Sampling: Author is very clear about the lack of diversity in their sample, and the limitations to generalisability and usefulness of the findings as a result. Ethics: No ethical concerns. Analysis: Very clear and detailed discussion of analysis method. Reflexivity: Very extensive discussion of the researcher's role in the research. They position themselves very clearly with relation to the participants.	High
Garcia (2016) ²⁴¹	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	The researchers understand the importance of their research in showing the heterogeneity that lies within the BMSM community, why that heterogeneity exists, and the implications this has for implementing effective sexual health strategies. It also criticises strategies and research that ignore this heterogeneity.	Sampling: No concerns about sampling method – seems to have provided a relatively diverse sample. Ethics: Very careful approach to ensuring the confidentiality of the research. Analysis: Analysis involved not only triangulation of findings through multiple methods, but also checking with stakeholders and participants. Reflexivity: Paper provides a brief statement of the author's position with respect to the participants, and how this may have influenced the study.	High
Carrillo (2017) ⁶⁶	Y	Y	Y	Y	Y	N	N	Y	Y	Y	A useful study for understanding how H-MSM think about their sexuality, including how the type of sex they have with men influences or interacts with this.	Sampling: Recruitment method seems suitable, though sample size is extremely large (100) for a qualitative study. Ethics: No ethical concerns, care taken to ensure confidentiality and participants' privacy. Analysis: Good description of analysis process, and analysis seems to have been thorough. Reflexivity: No reflexivity statement.	Medium

Study	CASP Quality Appraisal Questions										Comments	Quality rating	
	1	2	3	4	5	6	7	8	9	10			
Scoats (2017) ⁶⁵	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Findings are contrasted well with previous research, noting the difference in context but also the difference in time, and what this suggests about younger people. They've emphasised how under-researched this topic is, and made clear the limits of their research, as well as suggested areas for inquiry in future large-scale surveys.	Sampling: Very clear explanation of the recruitment strategy, and the limitations of the study as a result. Ethics: Expressly states that they followed the ethical procedures of the British Sociological Association. Also discuss the steps taken to ensure the men were comfortable discussing the topics in the interviews, and preventing excessive anxiety. Analysis: Good discussion of the analysis methods used, including inter-code reliability. Reflexivity: The researchers explicitly state that the participants were familiar with the senior author, and so were more easily able to discuss sensitive topics. Not much discussion into how the researcher's role influenced analysis.	High
Silva (2017) ⁸¹	Y	Y	Y	Y	Y	N	§	Y	Y	Y	Researcher discusses the importance of their research in understanding the differences in the way rural HI-MSM understand their sexuality and masculinity, how this differs from how others may think.	Sampling: Sampling method is appropriate to the population. Ethics: No discussion of ethics, though no concerns. Analysis: Interviewer was the only researcher involved in analysis, meaning no oversight or second opinion of codes used. However, analysis process is detailed and clear. Reflexivity: No discussion of reflexivity.	Medium
Siegel (2018) ²⁴²	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Provides an in-depth and fascinating exploration of how non-gay-identifying MSMW think about their male and female partners, and the differences in their interactions with and feelings towards these partners.	Sampling: Good discussions about how representative this data is, particularly because it's a sample of non-disclosing men. Quota sampling performed to ensure good representation. Ethics: No ethical concerns. Analysis: Very detailed explanation of the very thorough analysis process. Reflexivity: No reflectivity statement or even discussion of who the researchers are.	High
Silva (2018) ⁶¹	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Researcher has made clear that he was only able to recruit 10 participants to the study, and so it is merely exploratory, but he has gained a large amount of insight from his study. He also points out areas of research for future researchers.	Sampling: Very small sample, though appropriate sample for the study population. Ethics: No ethical concerns. Study conducted in a way that ensures the privacy and confidentiality of participants. Analysis: Good explanation of the analysis process. Reflexivity: No discussion of researcher's place in the research, but does state that a number of participants indicated they'd not spoken to anyone else about their sexual behaviour.	Medium

Y=Yes. N=No. §Indicates that there was insufficient information to make this assessment.

Appendix 13: Extracted sexual behaviour and sexual health quantitative data included in narrative synthesis

Table 72: Sexual behaviour data extracted from quantitative papers included in systematic review

Reporting timeframe	Outcome	Description of men for whom outcomes are reported	Measure	Sexual identity			Statistically significant difference?		Study
				Heterosexual	Gay	Bisexual	H-MSM vs G-MSM	H-MSM vs B-MSM	
Male partners									
Lifetime	Number of male partners	MSM (lifetime)	median (95% CI)	1.0 (CI not calculated) 62.4% reported only 1 male partner	17.7 (14.4-24.6)	4.2 (3.5-8.9)	↓	↓	Xu (2010) ²¹¹
		MSM (lifetime after age 18)	median (mean)	1 (1.8)	20 (58.6)	2 (18.6)	↓	↓	Lhomond (2014) ³
	10+ male partners	MSM (lifetime)	% (95% CI)	3.2% (0.7-13.1)	76.8% (65.8-85.1)	37.5% (20.3-58.6)	↓	↓	Xu (2010) ²¹¹
Previous 12 months	1+ male partners	MSM (lifetime after age 18)	% (N) [†]	7.8% (N=93)	97.3% (N=60)	42.4% (N=40)	↓	↓	Lhomond (2014) ³
	2+ male partners	MSM (lifetime)	% (95% CI)	1.0% (0.2-4.6)	46.9% (32.7-61.5)	40.6% (24.6-59.0)	↓	↓	Xu (2010) ²¹¹
	Number of casual male partners	MSM (12m)	median (95% CI)	1.2 (0.8-1.7)	3.6 (3.5-3.7)	2.5 (2.3-2.7)	↓	↓	Rosenberg (2011) ²¹³
	Last male sex partner was a casual partner	MSM (12m)	% (n/N)	33.3% (7/21)	36.5% (1,455/3,982)	44.7% (532/1,190)	No	No	Wall (2013) ²³¹
	Reporting higher annualised sex frequency with last male partner	MSM (12m)	AOR (95% CI)	0.5 (0.2-1.0)	1.0 (Ref.)	0.8 (0.7-0.9)	↓	No	Wall (2013) ²³¹
Sex with men									
Lifetime	AI with male partner(s)	MSM (lifetime)	% (n/N)	100% (30/30)	100% (32/32)	87.6% (14/16)	No	No	Zellner (2009) ²³⁸
Previous 12 months	AI with male partner(s)	MSM (12m)	% (n/N)	51.5% (51/99)	89.6% (5,785/6,459)	84.8% (1,215/1,432)	↓	↓	Centers for Disease Control and Prevention (2014) ²¹⁶
			% (n/N)	76.7% (13/17)	89.7% (78/87)	76.7% (66/86)	No	No	Mimiaga (2009) ²²⁶
	AI with main partner(s)	MSM (12m)	% (n/N)	16.2% (16/99)	61.0% (3,999/6,553)	44.4% (672/1,513)	↓	↓	Finlayson (2011) ²¹²
			% (n/N)	16.2% (16/99)	62.6% (4,042/6,459)	46.0% (659/1,432)	↓	↓	Centers for Disease Control and Prevention (2014) ²¹⁶
	AI with casual partner(s)	MSM (12m)	% (n/N)	50.5% (50/99)	55.5% (3,636/6,553)	57.1% (864/1,513)	No	No	Finlayson (2011) ²¹²
			% (n/N)	42.4% (42/99)	60.6% (3,917/6,459)	64.7% (926/1,432)	↓	↓	Centers for Disease Control and Prevention (2014) ²¹⁶
	Insertive AI during last male partnered AI	MSM (12m)	% (n/N)	90.5% (19/21)	57.3% (7,197/12,571)	61.1% (1,184/1,937)	↑	↑	Rosenberger (2012) ²²⁸
Receptive AI during last male partnered AI	MSM (12m)	% (n/N)	33.3% (7/21)	61.3% (7,708/12,571)	56.7% (1,098/1,937)	↓	↓	Rosenberger (2012) ²²⁸	
Previous 60 days	AI with male partner(s)	MSM (lifetime)	% (n/N) AOR (95% CI)	50.0% (15/30) 1.00 (ref)	65.6% (21/32) 3.20 (0.84-11.70)	37.5% (6/16) 0.81 (0.19-3.40)	No	No	Zellner (2009) ²³⁸
	Insertive AI with male partner(s)	MSM (lifetime)	% (n/N)	36.7% (11/30)	31.2% (10/32)	31.2% (5/16)	No	No	Zellner (2009) ²³⁸

Reporting timeframe	Outcome	Description of men for whom outcomes are reported	Measure	Sexual identity			Statistically significant difference?		Study
				Heterosexual	Gay	Bisexual	H-MSM vs G-MSM	H-MSM vs B-MSM	
	Receptive AI with male partner(s)	MSM (lifetime)	% (n/N)	10.0% (3/30)	50.0% (16/32)	31.2% (5/16)	No	No	Zellner (2009) ²³⁸
Condomless sex with men									
Previous 12 months	Condomless AI with male partner(s)	MSM (12m), AI with male partner(s) in previous 12m	% (n/N)	54.9% (28/51)	66.1% (3,825/5,785)	56.5% (686/1,432)	No	No	Centers for Disease Control and Prevention (2014) ²¹⁶
		MSMW (12m), AI with male partner(s) in previous 12m	% (n/N)	46.1% (6/13)	65.4% (51/78)	57.6% (38/66)	No	No	Mimiaga (2009) ²²⁶
	Condomless AI with main partner(s)	MSM (12m), AI with main partner(s) in previous 12m	% (n/N)	37.5% (6/16)	66.3% (2,652/3,999)	59.7% (401/672)	↓	No	Finlayson (2011) ²¹²
			% (n/N)	87.5% (14/16)	69.1% (2,793/4,042)	63.6% (419/659)	No	↑	Centers for Disease Control and Prevention (2014) ²¹⁶
	Condomless AI with casual partner(s)	MSM (12m), AI with casual partner(s) in previous 12m	% (n/N)	52.0% (26/50)	45.8% (1,666/3,636)	43.6% (377/864)	No	No	Finlayson (2011) ²¹²
			% (n/N)	45.2% (19/42)	46.3% (1,813/3,917)	42.2% (391/926)	No	No	Centers for Disease Control and Prevention (2014) ²¹⁶
	Condomless AI during last male partnered AI	MSM (12m), reported AI with last male sexual partner	% (n/N)	38.9% (7/18)	58.3% (6,926/11,886)	50.7% (925/1,823)	No	No	Rosenberger (2012) ²²⁸
	Condomless insertive AI during last male partnered AI	MSM (12m), reported insertive AI during last male partnered AI	% (n/N)	38.9% (7/18)	61.5% (4,164/6,771)	52.0% (571/1,099)	↓	No	Rosenberger (2012) ²²⁸
Condomless receptive AI during last male partnered AI	MSM (12m), reported receptive AI during last male partnered AI	% (n/N)	50.0% (2/4)	64.6% (4,377/6,771)	53.2% (556/1,045)	No	No	Rosenberger (2012) ²²⁸	
Previous 6 months	Condomless AI with male partner	MSM (6m)	OR (95% CI)	2.85 (1.53-5.54)	1.00 (ref)	1.06 (0.66-1.70)	↑	Not reported	Baytop (2014) ²³²
Previous 3 months	Condomless AI during last male sexual encounter	MSM (3m)	No specific measure	Not reported	Not reported	Not reported	No	Not reported	Taylor (2012) ⁷¹
	Condomless insertive AI	MSM (3m), reported AI in previous 3m	%, (n/N)	22.2% (10/45)	26.1% (63/241)	29.0% (71/245)	No	No	Rutledge (2018) ²⁵
		MSM (3m)	AOR (95% CI)	1.00 (ref)	0.97 (0.50-1.90)	1.03 (0.54-1.99)	No	No	Bond (2009) ²²⁴
		MSMO (3m)	OR (95% CI)	0.60 (0.16-2.17)	1.00 (ref)	1.02 (0.36-2.92)	No	No	Wheeler (2008) ²²³
		MSMW (3m)	OR (95% CI)	3.06 (0.90-10.42)	1.00 (ref)	1.29 (0.86-1.93)	No	No	Wheeler (2008) ²²³
	Condomless receptive AI	MSM (3m), reported AI in previous 3m	% (n/N)	2.2% (1/45)	23.7% (54/241)	9.0% (22/245)	↓	No	Rutledge (2018) ²⁵
		MSM (3m)	AOR (95% CI)	1.00 (ref)	7.36 (2.68-20.22)	2.27 (0.83-6.22)	↓	No	Bond (2009) ²²⁴
		MSMO (3m)	OR (95% CI)	0.10 (0.01-0.81)	1.00	0.52 (0.34-0.80)	↓	No	Wheeler (2008) ²²³
MSMW (3m)		OR (95% CI)	0.17 (0.04-0.83)	1.00	0.21 (0.07-0.64)	↓	No	Wheeler (2008) ²²³	
Number of episodes of condomless sex with male	MSMW (12m), 2+ partners (male or female) in past 3 months	Adjusted means ratio (95% CI)	1.00 (ref)	2.09 (1.21-3.61)	2.33 (1.60-3.40)	↓	↓	Joseph (2018) ¹²⁰	

Reporting timeframe	Outcome	Description of men for whom outcomes are reported	Measure	Sexual identity			Statistically significant difference?		Study
				Heterosexual	Gay	Bisexual	H-MSM vs G-MSM	H-MSM vs B-MSM	
	partners in previous 3 months	MSM (12m) aged 18-29	ARR (95% CI)	1.00 (ref)	1.56 (0.88-2.79)	2.02 (1.15-3.54)	No	↓	Maksut (2016) ²³⁴
		MSM (12m) aged 30+	ARR (95% CI)	1.00 (ref)	1.21 (0.80-1.85)	0.91 (0.62-1.34)	No	No	Maksut (2016) ²³⁴
Previous 60 days	Condomless AI	MSM (lifetime), reported AI in previous 60 days	%, (n/N) AOR (95% CI)	73.3% (11/15) 1.00 (ref)	66.7% (4/6) 0.37 (0.05-2.60)	42.9% (9/21) 1.10 (0.09-13.70)	No	No	Zellner (2009) ²³⁸
	Condomless insertive AI	MSM (lifetime), reported insertive AI in previous 60 days	%, (n/N)	54.5% (6/11)	60.0% (6/10)	40.0% (2/5)	No	No	Zellner (2009) ²³⁸
	Condomless receptive AI	MSM (lifetime), reported receptive AI in previous 60 days	%, (n/N)	33.3% (1/3)	37.5% (6/16)	80.0% (4/5)	No	No	Zellner (2009) ²³⁸
Sex with women									
Lifetime	Had female sexual partners	MSM (ever)	%, (n/N)	86.7% (26/30)	15.6% (5/32)	93.8% (15/16)	↑	No	Zellner (2009) ²³⁸
	Number of lifetime female partners	MSM (ever)	median (95% CI)	14.4 (9.2-19.5)	0.2 (0.0-0.9)	6.7 (2.9-17.9)	↑	No	Xu (2010) ²¹¹
		MSM (ever)	mean (median)	24.2 (15)	1.9 (1)	29.5 (10)	↑	§	Lhomond (2014) ³
	10+ lifetime female partners	MSM (ever)	%, (95% CI)	67.0% (51.6-79.4)	1.0% (0.2-4.7)	44.8% (28.4-62.4)	↑	No	Xu (2010) ²¹¹
Previous 12 months	Had female sexual partners	MSM (lifetime after age 18)	%, (N)†	93.8% (N=93)	2.5% (N=60)	79.6% (N=40)	↑	↑	Lhomond (2014) ³
			%, (n/N)	71.7% (71/99)	3.0% (196/6,553)	54.1% (819/1,513)	↑	↑	Finlayson (2011) ²¹²
		MSM (12m)	%, (n/N)	22.2% (4/18)	2.6% (8/303)	64.3% (27/42)	↑	↓	Dodge (2016) ²¹⁸
			%, (n/N)	66.3% (138/208)	2.6% (362/14,003)	51.9% (1,528/2944)	↑	↑	Shadaker (2017) ¹³⁹
	Vaginal or anal intercourse with women	MSM (12m)	%, (n/N)	71.7% (71/99)	3.00% (196/6,553)	52.7% (798/1,513)	↑	↑	Finlayson (2011) ²¹²
			%, (n/N)	69.7% (69/99)	2.6% (169/6459)	48.9% (700/1,432)	↑	↑	Centers for Disease Control and Prevention (2014) ²¹⁶
	2+ female partners	MSM (ever)	%, (95% CI)	21.0% (11.7-34.6)	0.0%	29.9% (15.8-49.4)	↑	No	Xu (2010) ²¹¹
Previous 6 months	Had female sexual partners	MSM (6m)	%, (n/N)	85.7% (60/70)	3.6% (3/83)	71.0% (66/93)	↑	↑	Shoptaw (2009) ¹¹⁰
	Primary female partners in past 6 months, % (n/N)	MSMW (6m)	%, (n/N)	Heterosexual: 70.0% (28/40) Straight: 65.7% (42/64)	Gay: 38.2% (23/60) Homosexual: 50.1% (17/34)	60.4% (233/386)	Heterosexual vs Gay: ↑ Heterosexual vs Homosexual: No Straight vs Gay: ↑ Straight vs Homosexual: No	Heterosexual vs Bisexual: No Straight vs Bisexual: No	Harawa (2014) ²¹⁷
	Self-reported typical distribution of sex partners: reports only or mostly women	MSMW (6m)	%, (n/N)	93.9% (62/66)	30.0% (3/10)	55.1% (75/136)	↑	↑	Williams (2009) ²⁶
Previous 3 months	Vaginal or anal intercourse with women	MSM (3m)	%, (n/N)	65.5% (15/23)	2.1% (36/1693)	49.6% (138/278)	↑	No	Greene (2013) ²¹⁵
			%, (n/N)	70.2% (33/47)	4.6% (20/434)	52.8% (162/307)	↑	↑	Wheeler (2008) ²²³
	Vaginal sex, as average % of all reported sex acts	MSM (3m)	Average % of total sex acts	48.6%	2.4%	33.7%	§	§	Rutledge (2018) ²⁵

Reporting timeframe	Outcome	Description of men for whom outcomes are reported	Measure	Sexual identity			Statistically significant difference?		Study
				Heterosexual	Gay	Bisexual	H-MSM vs G-MSM	H-MSM vs B-MSM	
	Anal intercourse with women, as average % of all reported sex acts	MSM (3m)	Average % of total sex acts	10.3%	1.4%	9.1%	§	§	Rutledge (2018) ²⁵
Previous 60 days	Vaginal or anal intercourse with women in past 60 days	MSM (lifetime)	% (n/N)	76.7% (23/30)	0%	50.0% (8/16)	↑	No	Zellner (2009) ²³⁸
Condomless sex with women									
Previous 12 months	Condomless vaginal or anal intercourse with female partner	MSMW (12m)	% (n/N)	82% (58/71)	54% (106/196)	64% (512/798)	↑	↑	Finlayson (2011) ²¹²
			% (n/N)	80% (55/69)	55% (93/169)	68% (476/700)	↑	↑	Centers for Disease Control and Prevention (2014) ²¹⁶
			% (n/N) AOR (95% CI)	52.9% (9/17) 13.54 (0.99-17.40)	5.7% (5/87) 1.00 (Ref.)	47.7% (41/86) 6.78 (0.99-31.82)	No	No	Mimiaga (2009) ²²⁶
Previous 6 months	Condomless vaginal or anal intercourse with a female partner	MSMW (6m)	AOR (95% CI)	2.62 (1.04-6.59)	1.00 (Ref.)		↑		Zule (2009) ²²⁵
Previous 3 months	Condomless vaginal or anal intercourse with female partners	MSMW (3m)	% (n/N)	86.7% (13/15)	50% (18/36)	68.1% (94/138)	↑	No	Greene (2013) ²¹⁵
	Condomless vaginal intercourse with female partners	MSM (3m)	% (n/N)	48.9% (22/45)	2.1% (5/241)	24.9% (61/245)	↑	↑	Rutledge (2018) ²⁵
	Condomless anal intercourse with female partners	MSM (3m)	% (n/N)	35.6% (16/45)	5.4% (13/241)	35.9% (88/245)	↑	No	Rutledge (2018) ²⁵
	Number of episodes of condomless sex with female partners	MSMW (12m)	means ratio (95% CI)	1.00	0.76 (0.40-1.46)	0.79 (0.59-1.06)	No	No	Joseph (2018) ¹²⁰
Previous 60 days	Condomless sexual intercourse with female partners	MSMW (60d)	% (n/N)	83% (19/23)	(N=0)	25% (2/8)	n/a	↑	Zellner (2009) ²³⁸
Partners of any sex									
Lifetime	Number of partners	MSM (lifetime)	median (95% CI)	15.7 (10.5-21.2)	19 (16.2-26.6)	16.5 (9.5-29.4)	No	No	Xu (2010) ²¹¹
			mean	20.21	Gay MSMO: 37.45 Gay MSMW: 29.47	26.92	No	No	Everett (2013) ¹⁴³
	10+ partners	MSM (lifetime)	% (95% CI)	72.7% (57.1-84.2)	79.0% (68.0-86.9)	69.9% (50.8-83.9)	No	No	Xu (2010) ²¹¹
			% (n/N)	50.8% (31/60)	59.8% (49/82)		No		Mor (2016) ¹²
Previous 12 months	Number of partners	MSM (lifetime)	median (95% CI)	0.6 (0.4-0.8)	0.9 (0.6-2.3)	1.6 (0.7-2.6)	No	No	Xu (2010) ²¹¹
Previous 6 months	2+ partners	MSM (lifetime)	% (95% CI)	25.9% (15.5-39.8)	46.9% (32.7-61.5)	57.7% (39.4-74.1)	↓	↓	Xu (2010) ²¹¹
	5+ partners	MSM (6m)	% (n/N)	41.2% (14/34) AOR: 1.47 (0.61-3.57)	25.6% (189/739) AOR: 1.00	36.9% AOR: 1.10 (0.81-1.49)	No	No	Hall (2017) ²³⁵
Sex with partners of any gender									
Lifetime	Anal intercourse with partners of any gender**	MSM (lifetime)	% (N) [†]	37.39% (151)	92.34-93.82% (169)	79.90% (117)	↓	↓	Everett (2013) ¹⁴³

Reporting timeframe	Outcome	Description of men for whom outcomes are reported	Measure	Sexual identity			Statistically significant difference?		Study
				Heterosexual	Gay	Bisexual	H-MSM vs G-MSM	H-MSM vs B-MSM	
	Condomless vaginal or anal intercourse with a serodifferent or unknown HIV status partner, or partner who was previously diagnosed with an STI/HIV	MSM (lifetime)	% (n/N)	16.7% (10/60)	29.3% (24/82)		No		Mor (2016) ¹²
Previous 6 months	Any condomless sex	MSM (6m)	OR (95% CI)	17.07 (5.37-86.26)	1.00 (ref)	1.51 (0.93-2.49)	↑	No	Baytop (2014) ²³²
	Number of episodes of condomless sex with all partners	MSMW (12m)	means ratio (95% CI)	1.00 (ref)	0.98 (0.61-1.59)	1.06 (0.83-1.35)	No	No	Joseph (2018) ¹²⁰
	6 or more unprotected sex acts	MSM (6m)	% (n/N) AOR (95% CI)	53.1% (17/32) 2.58 (1.09-6.14)	20.9% (152/726) 1.00 (Ref)	50.1% (239/477) 2.51 (1.86-3.38)	↑	No	Hall (2017) ²³⁵
Previous 3 months	Total number of intercourse acts	MSM (3m)	mean (SD)	15.36 (17.01)	11.16 (14.82)	13.67 (18.88)	No	No	Rutledge (2018) ²⁵
	Total number of condomless intercourse acts	MSM (3m)	mean (95% CI)	6.89 (12.66)	2.85 (7.74)	4.07 (13.16)	↑	No	Rutledge (2018) ²⁵
Other sexual behaviour outcomes									
Lifetime	Paid for sex	MSM (lifetime)	% (n/N)	41.7% (25/60)	14.6% (12/82)		↑		Mor (2016) ¹²
	Been coerced to have sex	MSM (lifetime)	% (n/N)	11.7% (7/60)	9.8% (8/82)		No		Mor (2016) ¹²
	Disclosed sex with men to last female partner	MSMW (12m)	% (n/N) AOR (95% CI)	42.9% (9/21) 0.31 (0.12-0.78)	87.7% (64/73) 3.32 (1.57-7.02)	69.9% (372/532) 1.00 (Ref)	↓	↓	Shearer (2012) ²²⁹
Previous 6 months	Did not disclose sex with men to at least one female partner	MSMW (6m)	% (n/N)	24%	9%		↑		Zule (2009) ²²⁵
Previous 3 months	Exchanged sex for drugs/money	MSM (3m)	% (n/N)	26.7% (12/45)	14.1% (34/241)	23.3% (57/245)	↑	No	Rutledge (2018) ²⁵
	Sought sex at gay bar	MSM (3m)	% (n/N)	13.3% (6/45)	34.0% (82/241)	31.4% (77/245)	↓	↓	Rutledge (2018) ²⁵
	Sought sex at bathhouse	MSM (3m)	% (n/N)	8.9% (4/45)	22.0% (53/241)	22.0% (54/245)	↓	↓	Rutledge (2018) ²⁵
	Sought sex at cruising locations	MSM (3m)	% (n/N)	31.1% (14/45)	34.0% (82/241)	40.0% (98/245)	No	No	Rutledge (2018) ²⁵
	Sought sex at sex parties	MSM (3m)	% (n/N)	8.9% (4/45)	10.4% (25/241)	15.5% (38/245)	No	No	Rutledge (2018) ²⁵
	Sought sex via the internet	MSM (3m)	% (n/N)	17.8% (8/45)	28.6% (69/241)	23.3% (57/245)	No	No	Rutledge (2018) ²⁵
	Sought sex via chatline	MSM (3m)	% (n/N)	22.2% (10/45)	37.3% (90/241)	27.4% (67/245)	No	↓	Rutledge (2018) ²⁵

† Indicates that percentages were calculated using sample weightings. Therefore only the percentage and unweighted totals (N) are provided.

§ Indicates that insufficient information was available to make statistical comparison.

AOR=adjusted odds ratio

ARR=adjusted risk ratio

Table 73: Sexual health data extracted from quantitative papers included in systematic review

Timeframe	Outcome	Group for whom outcomes are reported	Measure	Sexual identity			Statistically significant difference?		Study
				Heterosexual	Gay	Bisexual	H-MSM vs G-MSM	H-MSM vs B-MSM	
HIV prevalence									
N/A	HIV prevalence, test verified	MSM (lifetime)	% (95% CI)	0.0	16.5 (8.5-29.6)	4.1 (1.2-13.3)	§	§	Xu (2010) ²¹¹
			% (n/N)	7.8% (2/26)	18.6% (85/542)		No		Baytop (2010) ²³²
		MSM (lifetime), aged 15-29	% (n/N)	4.6% (1/22)	11.2% (69/615)	12.4% (20/161)	No	No	Sifakis (2010) ²²⁷
			AOR (95% CI)	0.1 (0.0-1.1)	1.0 (Ref)	0.7 (0.4-1.3)			
			% (n/N)	8.3% (8/96)	19.5% (1,279/6,562)	18.4% (273/1,485)	↓	↓	Centers for Disease Control and Prevention (2010) ²¹⁰
	MSM (6m), aged 18-29	% (n/N)	6.3% (6/95)	14.4% (618/4,290)	13.9% (172/1,233)	↓	↓	Oster (2014) ²³³	
	HIV prevalence, self-reported	MSM (lifetime), ever tested	% (n/N)	9.5% (2/27)	0% (0/28)	10% (1/10)	No	No	Zellner (2009) ²³⁸
			% (n/N)	11.4% (5/44)	41.9% (101/241)	23.3% (57/245)	↓	No	Rutledge (2018) ²⁵
		MSM (3m), ever tested	% (n/N)	9.5% (2/21)	43.8% (7/16)	29.8% (39/131)	↓	↓	Lauby (2008) ²²²
	HIV-positive, not previously diagnosed	MSM (12m), not previously diagnosed HIV-positive	% (n/N)	0.0% (0/6)	7.3% (48/661)	17.9% (21/117)	No	No	Raymond (2008) ²²¹
Unaware of HIV infection	MSM (12m), HIV-positive	% (n/N)	62.5% (5/8)	39.2% (501/1273)	63.4% (173/273)	No	No	Centers for Disease Control and Prevention (2010) ²¹⁰	
HIV testing									
Lifetime	Ever had an HIV test	MSM (lifetime)	Not provided	Not reported	Not reported	Not reported	↓	n/a	Taylor (2012) ⁷¹
			% (n/N)	47.5% (29/60)	53.8% (43/82)		No		Mor (2016) ¹²
			% (n/N)	70% (21/30)	87.5% (28/32)	62.5% (10/16)	No	No	Zellner (2009) ²³⁸
		MSM (12m)	% (n/N)	71% (70/99)	91% (5,987/6,553)	84% (1,274/1,513)	↓	↓	Finlayson (2011) ²¹²
			% (n/N)	80% (79/99)	93% (5,992/6,459)	86% (1,237/1,432)	↓	No	Centers for Disease Control and Prevention (2014) ²¹⁶
			% (n/N)	67.8% (21/31)	94.1% (16/17)	85.6% (131/153)	↓	↓	Lauby (2008) ²²²
	Never tested for HIV	MSM (lifetime)	% (n/N)	36.9% (52/141)	19.1% (213/1,117)	39.4% (65/165)	↑	No	Fernandez-Balbuena (2014) ¹¹⁸
			OR (95% CI)	2.5 (1.7-3.6)	1.0 (Ref)	2.8 (2.0-3.9)			
		MSM (6m)	% (n/N)	18.2% (12/66)	6.8% (460/6,775)	19.0% (221/1,163)	↑	No	Margolis (2012) ²¹⁴
			OR (95% CI)	3.05 (1.62-5.74)	1.00 (Ref)	3.22 (2.71-3.83)			
	AOR (95% CI)	2.21 (1.03-4.77)	1.00 (Ref)	2.74 (2.19-3.43)					
	% (n/N)	70.5% (62/88)	9.4% (24/256)	39.2% (47/120)	↑	↑	McCree (2016) ²⁴⁰ & Baytop (2014) ²³²		
	OR (95% CI)	23.15 (11.91-45.26)	1.00 (Ref)	5.88 (3.25-10.72)					
Previous 12 months	Tested for HIV	MSM (12m)	% (n/N)	40.4% (40/99)	64.0% (4,195/6,553)	55.6% (841/1,513)	↓	↓	Finlayson (2011) ²¹²
			% (n/N)	49.5% (49/99)	67.6% (4,369/6,459)	62.2% (891/1,432)	↓	↓	Centers for Disease Control and Prevention (2014) ²¹⁶

Timeframe	Outcome	Group for whom outcomes are reported	Measure	Sexual identity			Statistically significant difference?		Study
				Heterosexual	Gay	Bisexual	H-MSM vs G-MSM	H-MSM vs B-MSM	
		MSM (6m), aged 18-29	% (n/N)	46.8% (44/94)	61.7% (2,523/4,088)	57.3% (693/1209)	↓	↓	Oster (2014) ²³³
		MSM (6m)	% (n/N)	15.9% (14/88)	70.7% (181/256)	44.2% (53/120)	↓	↓	McCree (2016) ²⁴⁰
Previous 6 months	Tested for HIV	MSM (3m)	% (n/N)	75.0% (34/45)	69.7% (168/241)	67.4% (165/245)	No	No	Rutledge (2018) ²⁵
Other HIV testing outcomes									
Study recruitment period	Testing recruitment method – recruited for testing through standard clinic-based care, alternative venue testing (AVT), or social networking strategy (SNS)	MSM (6m)	% (n/N)	Standard: 2.3% (2/88) AVT: 10.2% (9/88) SNS: 87.5% (77/88)	Standard: 49.6% (128/258) AVT: 40.7% (105/258) SNS: 9.7% (25/258)	Standard: 17.1% (21/123) AVT: 47.2% (58/123) SNS: 36.6% (45/123)	N/A	N/A	Baytop (2014) ²³²
			OR (95% CI) of testing through AVT compared to standard clinic-based testing	4.11 (0.83-39.58)	0.28 (0.16-0.50)	3.15 (1.75-5.80)	↓	↓	Baytop (2014) ²³²
			OR (95% CI) of testing through SNS compared to standard clinic-based testing	83.14 (20.89-709.18)	0.04 (0.02-0.07)	2.67 (1.44-5.03)	↑	↑	Baytop (2014) ²³²
STI prevalence									
Lifetime	STI diagnosis, self-reported	MSM (lifetime)	% (N) [†]	41.4% (N=151)	G-MSMO: 39.41% (N=94) G-MSMW: 48.9% (N=75)	43.7% (N=117)	No ↓	No	Everett (2013) ¹⁴³
			% (n/N)	36.7% (11/30)	21.9% (7/32)	12.5% (2/16)	No	No	Zellner (2009) ²³⁸
	Herpes Simplex Virus (HSV-2) prevalence, test verified	MSM (lifetime)	% (95% CI)	16.5% (8.9-28.7)	19.3% (10.4-32.8)	18.3% (8.3-35.8)	No	No	Xu (2010) ²¹¹
Previous 12 months	STI diagnosis, self-reported	MSM (12m)	% (n/N)	7.9% (9/96)	9.4% (10/126)	14.8% (9/61)	No	No	Valverde (2016) ²³⁷
			% (n/N)	6.1% (6/99)	8.7% (563/6,459)	8.9% (128/1,432)	No	No	Centers for Disease Control and Prevention (2014) ²¹⁶
	Syphilis diagnosis, self-reported	MSM (12m)	% (n/N)	1.0% (1/99)	2.0% (130/6,459)	2.3% (33/1,432)	No	No	Centers for Disease Control and Prevention (2014) ²¹⁶
	Gonorrhoea diagnosis, self-reported	MSM (12m)	% (n/N)	0.0% (0/99)	4.4% (285/6,459)	4.3% (62/1,432)	↓	↓	Centers for Disease Control and Prevention (2014) ²¹⁶
	Chlamydia diagnosis, self-reported	MSM (12m)	% (n/N)	4.0% (4/99)	3.2% (209/6,459)	3.1% (45/1,432)	No	No	Centers for Disease Control and Prevention (2014) ²¹⁶
	Any other STI diagnosis, self-reported	MSM (12m)	% (n/N)	1.0% (1/99)	1.0% (62/6,459)	0.5% (7/1,432)	No	No	Centers for Disease Control and Prevention (2014) ²¹⁶
STI testing									
Previous 12 months	Tested for any STI	MSM (ever)	% (N) [†]	8.7% (N=151)	MSMO: 28.8% (N=94) MSMW: 32.3 (N=75)	20.0% (N=117)	↓ ↓	↓	Everett (2013) ¹⁴³
		MSM (12m)	% (n/N)	25.3% (25/99)	41.5% (2,682/6,459)	37.5% (537/1,432)	↓	↓	Centers for Disease Control and Prevention (2014) ²¹⁶
	Tested for syphilis	MSM (12m)	% (n/N)	26.3% (26/99)	35.2% (2,308/6,553)	33.5% (507/1,513)	↓	No	Finlayson (2011) ²¹²

Timeframe	Outcome	Group for whom outcomes are reported	Measure	Sexual identity			Statistically significant difference?		Study
				Heterosexual	Gay	Bisexual	H-MSM vs G-MSM	H-MSM vs B-MSM	
			% (n/N)	19.2% (19/99)	37.3% (2,406/6,459)	33.2% (475/1,432)	↓	↓	Centers for Disease Control and Prevention (2014) ²¹⁶
	Tested for gonorrhoea	MSM (12m)	% (n/N)	19.2% (19/99)	36.5% (2,355/6,459)	33.2% (475/1,432)	↓	↓	Centers for Disease Control and Prevention (2014) ²¹⁶
	Tested for chlamydia	MSM (12m)	% (n/N)	20.2% (20/99)	35.7% (2,305/6,459)	32.6% (467/1,432)	↓	↓	Centers for Disease Control and Prevention (2014) ²¹⁶
Other sexual health outcomes									
Lifetime	Received 1+ doses of HPV vaccine	MSM (ever), aged 21-26	% (n/N)	0.0% (0/55)	5.0% (127/2,537)	4.8% (30/618)	↓	↓	Meites (2014) ²⁰
	Received 1+ dose of Hepatitis A vaccine	MSM (12m)	% (n/N)	28.3% (28/99)	44.5% (2,917/6,553)	36.7% (555/1,513)	↓	No	Finlayson (2011) ²¹²
			% (n/N)	29.3% (29/99)	43.4% (2,805/6,459)	34.6% (495/1,432)	↓	No	Centers for Disease Control and Prevention (2014) ²¹⁶
	Received 1+ dose of Hepatitis B vaccine	MSM (12m)	% (n/N)	33.3% (33/99)	49.7% (3,257/6,553)	41.2% (624/1,513)	↓	No	Finlayson (2011) ²¹²
% (n/N)			28.3% (28/99)	48.5% (3,132/6,459)	38.4% (550/1,432)	↓	↓	Centers for Disease Control and Prevention (2014) ²¹⁶	
Previous 12 months	Used individual or group HIV prevention services or programs	MSM (12m)	% (n/N)	17.2% (17/99)	17.6% (1,152/6,553)	17.6% (266/1,513)	No	No	Finlayson (2011) ²¹²
			% (n/N)	13.1% (13/99)	22.2% (1,435/6,459)	21.7% (311/1,432)	↓	↓	Centers for Disease Control and Prevention (2014) ²¹⁶
	Received free condoms	MSM (12m)	% (n/N)	49.5% (49/99)	71.2% (4,599/6,459)	63.1% (904/1,432)	↓	↓	Centers for Disease Control and Prevention (2014) ²¹⁶
N/A	Awareness of PrEP	MSM (12m)	% (n/N) AOR (95% CI)	12.8% (28/218) 1.0 (Ref)	30.4% (120/395) 2.46 (1.42-4.26)	13.8% (138/1,001) 1.12 (0.66-1.90)	↓	No	Garnett (2018) ²²⁰
	Interested in taking PrEP	MSM (ever)	% (n/N) OR (95% CI)	55.2% (32/58) 0.97 (0.57-1.65)	55.9% (553/989) 1.0 (Ref)	51.5% (68/132) 0.84 (0.58-1.21)	No	No	Lebouche (2016) ²¹⁹
	Medium or high perceived risk of HIV infection	MSM (ever)	% (n/N)	40.0% (12/30)	59.4% (19/32)	68.8% (11/16)	No	No	Zellner (2009) ²³⁸
	Intends to use Internet-based STI/HIV testing	MSM (current)	AOR (95% CI)	0.67 (0.50-0.90)	1.00 (Ref)	N/A	↓	N/A	Gilbert (2013) ²³⁰

† Indicates that percentages were calculated using sample weightings. Therefore only the percentage and unweighted totals (N) are provided.

§ Indicates that insufficient information was available to make statistical comparison.

AOR=adjusted odds ratio.

ARR=adjusted risk ratio

Appendix 14: Text extracts from qualitative studies included in systematic review

Table 74: Illustrative quotes from qualitative studies included in systematic review

Category	Subcategory	Theme	Sources	Illustrative quotes
Number of partners		Irregularity of partners as justification for straight identity	11 27	Donald: <i>"Like I said earlier, I think it's just, you know, if you're just having sex strictly with guys, that's what I would, I would consider that to be gay. Just having sex with guys. If you're having sex with women and an occasional guy, but mainly women, I would still consider them straight."</i> ²⁷
Regularity of male partners	One-off, anonymous, or casual partners	Spontaneity of same-sex episodes	59 62 65	Unattributed: <i>"I happened to meet him walking down [name of street]. And he looked and I looked and I was like, I turned around and I asked him his name, he asked me my name, and one thing led to another and he told me he was just in town for a day and he was a flight attendant and would I come back to his hotel room with him? And I said sure. And it was down and dirty."</i> ⁶²
		Anonymous partners more likely at locations in which they meet partners	27 62 106 241 245	Unattributed: <i>"People are straight up and they're like, you know, they just wanna—well, not everyone, um—It's just straight up, you know. You have an ad, it's posted, you know, someone is talking 'bout, 'Come over. You wanna have fun?' Okay, good. It's just straight up sex, okay, and we already know that going in so it's straight. It's equal. Bam! I don't have to, you know, I don't have to take you out to dinner, you ain't gotta take me out to dinner."</i> ⁶²
		Avoidance of emotional connection with male partners	27 62	Unattributed: <i>"Sometimes you know, it's like you meet somebody and you kinda like expect one thing, but before you know it you, it's more than that. It's more like a friendship thing, then the bond starts ...then it becomes more than what it is. More than what it actually started out to be, or more than you actually wanted it to be. Sometimes you can get caught up. And you know, sometimes people grow on you. Sometimes feelings can get involved. That's a touchy thing when, you know, it's a real thing. People have feelings, and that's the only thing about straddling the fence: Sometimes you can get caught up and before you know it your emotions and everything else is involved and that's when it becomes a problem."</i> ⁶²
		Shame and guilt causing distancing from male partners	11 106	Tony: <i>"When it's over, I don't want to look at them no more. Get out of my house; you got to go. It was a nice experience, [but] I got things to do. I don't know what you've got planned, but you've got to get out of here."</i> ¹¹
	Regular partners	Friendship and companionship	59 81 105	<i>"[With] several of his regulars Billy noted, 'I go on road trips, drink beer, go down to the city [to] look at chicks, go out and eat, shoot pool, I got one friend I hike with. It normally leads to sex, but we go out and do activities other than we meet and suck.'"*</i> ⁸¹
		Regular partnerships avoiding need to find partners in future, reducing risk of discovery	81	<i>"While most are open to one-time hook-ups, most also prefer regulars. [...] This is especially important in rural areas, given that each attempt to find a new sexual partner opens the participants to potential discovery in a small pool of acquaintances."</i> ⁸¹

Category	Subcategory	Theme	Sources	Illustrative quotes
		Compartmentalisation	81 105	Paul: <i>"So, I keep my girlfriend at a level. And I keep my friends at a level. And then I have my male relationship at a level to where it won't intervene with my girlfriend, or with this male over here because he has this female."</i> ¹⁰⁵
Meeting male sexual partners	Avoiding venues related to the gay community	Discomfort with gay men	11 81	Marcus: <i>"[And] because I'm not attracted, it's very off-putting when somebody acts gay, and I feel like a lot of gay guys, just kinda put off that gay vibe, I'll call it, I guess, and that's very off-putting to me."</i> ⁸¹
		Desire to be perceived as heterosexual/not gay or bisexual	11 27 61 64 66 244 247	Wayne: <i>"I am straight because, one, I want you to perceive me as how I want to be perceived. I want to be perceived as a man. Gay is weak, gay is vulnerable. I'm none of those things, I am a straight man. I like to appear as a man, act as a man; you treat me like a man."</i> ²⁷
		Importance of secrecy and discretion	106 245	Unattributed: <i>"Too, too risky of a, well, when you trying to be on the DL, as I am, going to those places, you run the risk of being seen or recognized by someone you may or not want to be seen or recognized. If you go to a park or a bathhouse, you never know who might be going by in a vehicle and see you enter one of those places. Someone could see you going into this bar or park."</i> ²⁴⁵
		Specific avoidance of gay bars, clubs etc	11 245	Jim: <i>"I feel as though if you go to [gay] clubs that you're gay. And I don't even want to be associated or even acknowledged being gay. So I don't go there. Because gay clubs, if you go in there, you've admitted openly, "Hey, I'm gay. I'm a fucking faggot, I'm a sissy."</i> ¹¹
		Unaware of venues for sex between men	11	Sam: <i>"I didn't know what bathhouses was until somebody told me. I said, "What is it? A house you're going in to take a bath or something?"</i> ¹¹
	Sexual venues or the internet allowing anonymity, privacy, and convenience	Venues allowing anonymous or depersonalised sex	11 27 62 105 106 241	Patrick: <i>[I]n University City itself there's a park and after the sun goes down it changes.... [In daytime] it's like family and kids and everything. When the sun goes down all the guys come out. All the guys. I mean they come from all over the city, but mostly from University City and West Philly. And most of them come out there to do something.</i> Interviewer: <i>To hook up or something.</i> Patrick: <i>[Yeah to hook up] and most of them are straight. People go out there and have oral sex. I mean I don't see too many people in my neighborhood sashaying at night, you know? In fact, I don't — I mean, there have been but for the most part, most of the guys in my neighborhood act like guys. And they also go to that park. Regardless what they act like, a lot of them go to that park.</i> Interviewer: <i>But they don't see one another, or?</i> Patrick: <i>They see people in that park but that's at night and that's a whole 'nother world. When you go back into the daytime life where you're after the park or before the park-that's, you don't talk about that, do you know what I mean?</i> ²⁷
		Privacy	64 245	<i>"The Internet was the venue most consistently viewed by participants as allowing them to confidentially identify and arrange to meet potential male sexual partners. The fear of discovery in a public setting led many of the men to focus primarily or exclusively on meeting male partners through the Internet."</i> ²⁴⁵

Category	Subcategory	Theme	Sources	Illustrative quotes
		Convenience	62 241 245	"A majority of the men in the study also preferred the Internet because they viewed it as a particularly easy or convenient way to meet other men. This was important for many men who had limited time to find and meet male partners (e.g. before wife gets home, an evening when girlfriend has class, etc.). Some of the non-disclosing MSMW also pointed out that the Internet was a more efficient way to meet someone than traveling to a venue and talking with several individuals in hopes that someone there might be interested in having sex with them." ²⁴⁵
	Non-sexual locations	Easier to explain their presence at these locations	245	"[Many] men reported meeting partners in venues like mixed sexuality dance clubs, the park, or certain Internet sites (e.g. <i>Craigslist</i>), but felt comfortable doing so because if they were observed there, they could offer a nonsexual explanation for their presence." ²⁴⁵
		Spontaneous	59 62 245	Unattributed: " <i>I happened to meet him walking down [name of street]. And he looked and I looked and I was like, I turned around and I asked him his name, he asked me my name, and one thing led to another and he told me he was just in town for a day and he was a flight attendant and would I come back to his hotel room with him? And I said sure. And it was down and dirty.</i> " ⁶²
	Group sex situations also involving women	Participation at request of the woman involved	64 65 243	Jacob: " <i>The [threesome with the] two guys was a girl at a party and she said 'I can't really pick between you two'.</i> " ⁶⁵
		Little interaction between men	64 65 243	"MMF threesomes were not, however, necessarily inclusive of same-sex sex. Instead, we describe the type of interaction that occurs between men in threesomes as semi-sexual: meaning that whilst the men were not intentionally interacting with one another in a sexual manner (although participants did acknowledge that some incidental touching – such as on the shoulder – may have happened), they did engage sexually at the same time with the woman." ⁶⁵
		Starting point for further exploration	59 64 65	"[...] for Peter (40, White) his same-sex sexual explorations were prompted by a series of events that he described as a kind of slippery slope. His female partner wanted them to participate in threesomes involving a second man. ' <i>After the third or fourth time, the guy went down on me. A couple of times after that, he asked me to do the same for him, and she encouraged it.</i> '" ⁶⁴
		MMF threesomes as a form of bonding between friends	59 65	Matt: " <i>It was quite fun, because it was one of my best mates as well, and it was a good way to bond with him in that sort of way. It was just a new experience.</i> " ⁶⁵
		MMF threesomes only with close friends	65	Tony: " <i>I'd prefer it to be someone I knew, definitely someone I knew. I don't know why, I'd just feel a lot more comfortable. I'd struggle to just meet random people and say, 'Fancy a fuck? Cool, let's go'. You never know what the guy's gonna be like. But if I know the guy and I know how open we are, and I know where I stand, it would be more comfortable.</i> " ⁶⁵

Category	Subcategory	Theme	Sources	Illustrative quotes
Activities with men	Passive sexual acts as easier to align with heterosexual identity	Insertive oral sex or receiving masturbation as first same-sex acts	59 61 63 64	<p>“Shaun (30, White) said that he felt <i>‘intrigued’</i> and <i>‘curious’</i> when a specific man proposed to give him oral sex. They first chatted online and by phone, and then they met in person at a bar. Shaun described these interactions as consistently <i>‘flirty’</i>. At the bar they first talked <i>‘like guys’</i> about things like <i>‘sports, cars, [and] drinking’</i>, but the other man eventually made a sexual advance. They went to the man’s house, where this man gave Shaun oral sex. Shaun merely <i>‘played with [the man’s] cock a little through his jeans’</i>⁶⁴</p> <p>Interviewer: <i>Can you remember the first moment that you realized that you were aroused by other guys?</i> Brad: <i>“It was down in [a Southern state], and I had been drinking, and wound up in an arcade, and I got some of the best head I ever had from another, [a] good lookin’ guy. And [that] pretty much sealed it right there for me.”</i>⁶¹</p>
		Seeking oral sex as from men when female partners not available or interested in sex.	61 66	Freddie: <i>“I would say [I’m] straight. I love women. But when they are not available I get head from guys.”</i> ⁶⁶
		Tactics to pretend sexual partner is not another man	11	Talon: <i>[I]t started feeling a little good, and then it felt a little bit better, and so on and so on. And then I screamed, “You can keep the money, just suck it.” I just closed my eyes and said [to myself], “My penis doesn’t really know, my penis doesn’t really know.”</i> ¹¹
		Oral sex as something that happens to men, rather than with their active participation	59 105	“Pete said that he, Sam, and another (now graduated) heterosexual teammate once shared a room with Aaron (an openly gay cheerleader). <i>‘We let Aaron give the three of us a blow job,’</i> ⁵⁹
		Passive acts easier to align with heterosexual identity	59 65 81	Rob: <i>“Yeah, I let a guy give me a blow job once and I don’t think that makes me gay.”</i> ⁵⁹
	Activities requiring more active participation from men, such as mutual masturbation and receptive oral sex	These activities as the “next step”	59 64	<p>“Shaun (30, White) said that he felt <i>‘intrigued’</i> and <i>‘curious’</i> when a specific man proposed to give him oral sex. They first chatted online and by phone, and then they met in person at a bar. Shaun described these interactions as consistently <i>‘flirty’</i>. At the bar they first talked <i>‘like guys’</i> about things like <i>‘sports, cars, [and] drinking’</i>, but the other man eventually made a sexual advance. They went to the man’s house, where this man gave Shaun oral sex. Shaun merely <i>‘played with [the man’s] cock a little through his jeans’</i>. <i>‘I came and that was about it’</i>, said Shaun, adding that after finishing he felt <i>‘odd... it wasn’t the same afterglow that I would have with a woman...the feel good feeling after sex’</i>. Shaun recognised that this male partner made him <i>‘cum harder’</i>, and yet <i>‘afterward it was odd shifting back to guy talk’</i>. Shaun had sex again with this man, and this time they went farther: they kissed, the man rimmed him, and Shaun also performed oral sex.”⁶⁴</p>

Category	Subcategory	Theme	Sources	Illustrative quotes
		Willingness to engage in these acts “for a good cause”	59	“When I asked Patrick what specific interaction would take place with Jeff he said, ‘ <i>Well, for the most part it would be about getting it on with her, but like we might do some stuff together too.</i> ’ Patrick said he would also allow himself to receive oral sex but was not sure if he would give oral sex to Jeff. He then smiled and said, ‘ <i>It depends on what she wants.</i> ’” ⁵⁹
		“Helping a friend out”	61 81	Mike: “ <i>In your mind you’re thinking you’re not gay, you’re just helping somebody out. This poor guy, he’s married, his wife won’t do it [give him a blowjob] ... But basically it was, if your wife won’t do it, come, I’ll do it, or my wife won’t do it, then we’ll get together and just do it together. And so, I guess in my mind, I wasn’t thinking this is a gay thing, this is just, I’m just helping my friend out.</i> ” ⁶¹
		Avoiding kissing and hugging to maintain emotional distance	11 106	“This refusal to express emotion allowed participants to maintain a sense of strength—which they coded as maleness—in the interaction, and helped them maintain sexual identity boundaries. Many refused to kiss, hug, look at, or talk to their sexual partner and ended the encounter immediately following sex.” ¹¹
	Anal sex	Limiting to other activities	59 64 66	“Shaun (30, White) said that he felt ‘ <i>intrigued</i> ’ and ‘ <i>curious</i> ’ when a specific man proposed to give him oral sex. They first chatted online and by phone, and then they met in person at a bar. Shaun described these interactions as consistently ‘ <i>flirty</i> ’. At the bar they first talked ‘ <i>like guys</i> ’ about things like ‘ <i>sports, cars, [and] drinking</i> ’, but the other man eventually made a sexual advance. They went to the man’s house, where this man gave Shaun oral sex. Shaun merely ‘ <i>played with [the man’s] cock a little through his jeans</i> ’. [...] Shaun had sex again with this man, and this time they went farther: they kissed, the man rimmed him, and Shaun also performed oral sex. However, when the man made a move toward anal intercourse, Shaun stopped him.” ⁶⁴
		Insertive AI as acceptable	27 247	“Of the 9 men who identified as heterosexual during the interview, 6 expressed no doubts or questioning about their identity or sexual orientation, as long as they were insertive partners during anal sex with men.” ²⁴⁷
		Receptive anal sex as feminine or “gay”	27 64 66 247	Frank: “ <i>Well, what I’m saying (laughs) I never have, but in the past I was asked, but I never was the receiver. I just felt uncomfortable in that like that could be the last of my manhood or whatever, I just felt uncomfortable with that because I’ve always been the giver. I think that was because I didn’t want to cross that line of being considered gay. I think that’s the most honest, you know, statement I can say. I don’t want to cross that line because once I start to be the receiver then I got to say that I’m gay.</i> ” ²⁷
		Refusal to receive anal sex from female partners	242	“Participants generally said they had to be with a male partner if they wanted to receive anal sex. Although female partners could provide them with anal stimulation, some participants said they would not let a woman do so.” ²⁴²
		Men as alternatives to sexual aids like dildos	64 66	Sam: “ <i>these playmates are only living and breathing dildos</i> ” ⁶⁶

Category	Subcategory	Theme	Sources	Illustrative quotes
		Submissive acts as release from pressures of	64 66	Russell: <i>For most of my sex life I'm in control of things. I'm not a boss at work anymore but I've been in situations where I've managed a hundred people at a time. I take care of my family. I take care of my kids. I'm a good father. I'm a good husband in providing material things for my wife... I'm in charge in a lot of places... There's times when I don't want to be in charge and I want someone to be in charge of me... that's what brings me over [to] the bisexuals... it's kind of submitting to another guy or being used by another guy.</i> ⁶⁶
		Rejection of receptive AI as feminine	81	Mark: <i>"I see it [being penetrated] as a very masculine thing. No one knows how to please a man better than another man."</i> ⁸¹
		Receptive AI providing insight to experiences of female partners	242	Unattributed: <i>"I think I'm a little more well-rounded than I was before because now I can appreciate both experiences. ... I've also learned—being with men who... play the top role and me playing the bottom role—what I like and what I don't like in terms of aggressiveness and approach. And I think that I sometimes feel that I can now connect that with my female partners, my wife specifically, and do things a little differently that I think that I wouldn't like if I was in her shoes. ... I think it's been an experience to benefit me as a person and perhaps, ironically, my relationship with my spouse or with females in general."</i> ²⁴²
STI and HIV prevention: condom use	Condom use with women	Condom use based on feelings of trust	62 241 247	Unattributed: <i>"If you involved in a relationship, and you really been knowing a person, it just comes down to a matter of trust. Can you trust this person, and if you can really trust them, then I don't think a condom is necessary."</i> ⁶²
		Condom use based on concern for female partners' sexual health	62 106	Q: <i>"How often do you use condoms with your wife?"</i> Keith (Asian Pacific Islander, HIV infected): <i>"All the time... I don't want her to get infected."</i> ¹⁰⁶
	Condom use with men	Non-use of condoms out of lack of concern for male partners	62 106	Unattributed: <i>"I don't know why I'm real careful when I have sex with her, but I have sex with men it's kinda—I don't know why. It's different to me . . . 'Cause the mens, it's just gone be a fly-by-night thing. Okay, we gone do this and I say, 'Alright, man. I'll see you later.' I'm not gone have no relationship with your ass. We just fi'tnta do this and I'll see you. You know what I mean? That's just the way it is to me."</i> ⁶²
		Non-condom use resulting from spontaneity or impulsivity	62 106	Derrick (African American=Black, HIV uninfected): <i>"Condom, I don't know. I think I've used condoms [with a woman] every time except maybe once or twice. The same as with a guy, you just get caught up. You just get so turned on you just don't have time to put one on."</i> ¹⁰⁶
		Drug use resulting in non-use of condoms	106 244	Charlie: <i>"You know, sometimes you don't want to put on a condom and sometimes you might be too high to put on a condom and sometimes you put on [the] condom wrong."</i> ²⁴⁴
	Feelings of invulnerability due to identity or position	62 241	Unattributed: <i>"Most of the guys I know, including myself, I don't really use protection. Basically pretty much think that, you know, we're like superman. And sometimes people look down on it. A lot of times trying to get peoples to take protection a lot of time it works more better with females."</i> ⁶²	

Category	Subcategory	Theme	Sources	Illustrative quotes
STI and HIV prevention: PrEP	PrEP not applicable to them	HIV only a threat to gay men	241	Unattributed: <i>“Cause I’m not gay, that nigga’s gay – he’s suckin’ my dick’, or ‘I don’t do that’, but you don’t know what your partner’s doing, and I think that a lot of people are just in denial about their existence. And if you’re in denial about your existence, why would you wanna seek any help? [HIV infection] is not gonna happen to me, or anybody I know.”</i> ²⁴¹
		Taking medication as sign of weakness	241	“In fact, none of these men thought PrEP was a prevention tool that would work for them because of their association of HIV with gay men, taking medication as a sign of weakness and because of fear that if someone found their pills, they would be labelled ‘gay’.” ²⁴¹
		Fear of being labelled gay if others found out they’re taking PrEP	241	“In fact, none of these men thought PrEP was a prevention tool that would work for them because of their association of HIV with gay men, taking medication as a sign of weakness and because of fear that if someone found their pills, they would be labelled ‘gay’.” ²⁴¹
Disclosure of sex with men to female partners	Non-disclosure to female partners	Fear of rejection or ending the relationship	21 105 244	Red Bull: <i>“If I don’t tell, my rationalization is that I’m protecting her from herself because she cannot handle the truth... I think she would be hurt. I think she would be devastated. I think she would be like “Oh! You gotta leave!” and she won’t be the same.”</i> ²⁴⁴ Unattributed: <i>“I was in prison for 12 years and I had sex with men. My wife found out about it. It was part of the reason she left me.”</i> ^{21 246}
		Partial disclosure – framing same-sex behaviour as something in the past	105	Jason: <i>“I told her that I was diagnosed HIV positive in 1994 and she immediately had no problem with it. She said, “Okay, well, we’ll deal with it.” And it wasn’t until maybe a few days later, maybe even a couple weeks later, when she asked me, “How do you think you got it?” And I told her, “Some years ago I had gotten real, real horny, and that a guy sucked me off.” And, she was just kind of like, “Oh, okay. Well, you’re not still doing that, are you?” I said, “No.” And that was it.”</i> ¹⁰⁵
		Privacy	21	Unattributed: <i>“What they don’t know won’t hurt them. And if they say oh, have you ever had sex with guys, I’ll say no, I have not. I’ll lie my ass off.”</i> ²¹
		Possible future disclosure	21 244	Unattributed: <i>“I think to me personally I think the only time you should really, really open up to someone like completely ... for the most part it is if you’re gonna establish a long-term relationship with that person, you know, whether it be sexual or, or marriage-bound or whatever. You know, I mean I knew we were never gonna hit that point, so that’s why, at least right now, I didn’t think she needed to know.”</i> ²¹
		Secrecy as part of the appeal	64 66	“Gerard (57, White) emphasized that none of his friends, including his girlfriend of 14 years, ‘know that I sometimes like to stroke with a guy. I think that’s part of the attraction... that’s it’s a secret’.” ⁶⁴
		Secrecy and compartmentalisation as source of guilt and stress	27 62 105	Jason: <i>“The worst I’ve ever felt emotionally about it was when I thought about the possibility of my wife finding out and what she would think of me.”</i> ¹⁰⁵

Category	Subcategory	Theme	Sources	Illustrative quotes
		Compartmentalisation of same-sex behaviour from heterosexual relationship	105	Paul: "So, I keep my girlfriend at a level. And I keep my friends at a level. And then I have my male relationship at a level to where it won't intervene with my girlfriend, or with this male over here because he has this female. But my girl knows. And she's comfortable with the way I live because she knows the way I am and what type of person I am." ¹⁰⁵
Sexualised drug use	Sexualised drug use as a driver of H-MSM's sex with other men	Altered or heightened sexual desire	106 244	Bernardo: "When I discovered meth I was like, wow. It automatically put another face on me, another personality ...more oriented towards homosexual sex..." ¹⁰⁶
		Sex with men something only done while on drugs or alcohol	62 106 241 244 246	Donnell: "I only had sex with men about five, six times this year. It's something that just happens ... and I'm usually on some alcohol or [methamphetamine]." ¹⁰⁶ Bernardo: "[Sober] I wouldn't even consider a penis anywhere within a couple of inches of my body, touching me, but when I'm high I wish to be penetrated. I'm straight... I'm a hundred percent, that is [without] meth and alcohol." ¹⁰⁶
		Substances as facilitators: allowing men to have sexual experiences they would not choose while sober	59 61 241 244	"All of these men used drugs to overcome dissonance between sexuality and identity. Participant observation in public cruising spots (e.g. parks) indicated heavy drug and alcohol and sex among men engaged in secretive sexual encounters." ²⁴¹ Interviewer: "Can you remember the first moment that you realized that you were aroused by other guys?" Brad: "It was down in [a Southern state], and I had been drinking, and wound up in an arcade, and I got some of the best head I ever had from another, [a] good lookin' guy. And [that] pretty much sealed it right there for me." ⁶¹
		Sex with men while intoxicated as a source of shame	106 246	"It encouraged it [my recovery], as I'd rather avoid those situations going forward. It was directly related to use of mind-altering substances. I've had experiences I don't care to repeat. It helps me not to use. Getting fucked in the ass while using crack is not an experience I care to repeat." ²⁴⁶
		Exploitation of men while on drugs	62 106 244 246	Gio: "The drugs and the alcohol led me to the situations to where I was being compensated for having sex with people I didn't want to have sex with, so I could get more of whatever I was doing." ¹⁰⁶ Unattributed: "When I'm on drugs, I'm vulnerable. You get baited in for drugs, then you gotta do more... I have an ego to protect. It makes you feel 'less than.' I feel like I was suckered. People will give me this much drugs, then say, 'Do this for more.'" ²⁴⁶
Exchange sex	Drug use and exchange sex	Sex with men in direct exchange for drugs	62 63 106 244 246	Unattributed: "Done seen a whole lot of brothers freak with each other, getting high. Some of the mother fuckers you never even think would suck a dick. You know what I mean? "Aw, man suck my dick and I'll give you a hit." You know what I mean? And they'll do it. And then it's, it's mainly that mother fuckin' crack." ⁶²

Category	Subcategory	Theme	Sources	Illustrative quotes
		Sex work and drug use separated	248	"Contrary to what we would have hypothesized, IDU-MSM/W in this study consistently reported that they are active during the daytime hours and not under the influence of drugs. They are seeking sex trade to get money to use drugs in the late evening and/or nighttime." ²⁴⁸
Disclosure of HIV status	Disclosure to female partners	Non-disclosure due to concerns of rejection	105	Unattributed: "[E]very woman that I've told that I was HIV[-positive], it's just like the door slams. Because they're scared that the rubber's going to break or whatever. A lot of people are not educated on the disease, so that's what really scares them; they think they're going to die if they get it." ¹⁰⁵
		Non-disclosure because of lack of disclosure by female partners	105	Jerry: "[A]t first I would say I haven't been tested and I say what about you? And they say, oh, I haven't been tested either. Okay, well, we're both playing that game." ¹⁰⁵
		Non- or partial disclosure of sexual nature of infection	105	Unattributed: "I lied . . . I told them it was intravenous drug use. I never used intravenous drugs in my life. That's what I tell them, that I shot the needle." ¹⁰⁵
	Non-disclosure to male partners	Lack of concern for health of male partners	105 106	Unattributed: "With the girl [I recently dated] I would have used [a condom] ... and I would have had more concern. But these guys who are going around and just doing it with everybody every week, I'm not too concerned about them." ¹⁰⁶ Ken: "I didn't tell them nothing because I figured it was really none of their business.... I ain't told a guy yet." ¹⁰⁵
Sexual health service use	Barriers to testing	HIV stigma	247	"Stigma against HIV was perceived to play a role in low rates of testing" ²⁴⁷
		Routine health checks as feminine or a sign of weakness	241	"Juggling their masculine and heterosexual social appearance with their homosexual behaviour shaped this group's engagement with health services and how these men perceived HIV risk, which in turn translated into their HIV prevention strategies. Seeking health services for routine check-ups was a sign of 'weakness' and femininity..." ²⁴¹
	Facilitators for testing	STI/HIV testing in case of emergencies e.g. recent risk or symptoms	241 247	"adherence to HIV testing was among other 'emergency' reasons for health-seeking (i.e. others included breaking a bone, being shot, and extreme pain)." ²⁴¹ "In general, participants only sought HIV=STI testing after unprotected sex with partners they defined as risky or if they had acute symptoms (e.g. pain and discharge from gonorrhoea)." ²⁴⁷
HIV testing as part of a general health exam		247	"the idea of a general health exam was found to be more appealing and more relevant than standalone STI/HIV testing services." ²⁴⁷	

Appendix 15: Themes and illustrative quotes for Chapter 6

Table 75: Perception of STI/HIV acquisition and transmission risk during sex

Overarching theme	Theme	Sub-theme	Illustrative quotes
Impact of STI/HIV acquisition and transmission	Impact of STI/HIV acquisition on themselves	Impact on own health	<p>Direct exposure to effects of HIV among older participants <i>P03 (69, mostly straight): Well, it has, because in my work and seeing colleagues, I was only too aware of how serious – well, they didn't call it HIV then – AIDS was, yes. Because one or two colleagues died and also in my work I was treating people with HIV.</i></p> <p>Indirect exposure to effects of STI/HIV among younger participants <i>P12 (35, mostly straight): I went to school in the 90's where the AIDS epidemic was just starting to die down, but our parents – or my parents, sorry – it had been drummed into them how important it is and they had passed it on to ourselves. Like secondary school teachers were explaining “some of these things are so bad, you can't get rid of them” and that was always like a real fear for myself.</i></p> <p>Personal experience of STIs in the past <i>P02 (35, mostly straight/bisexual-leaning straight): I picked up an STD from a girl a couple of years back, a T-Girl, sorry, and it was my own fault because we were just going at it without any condoms. I only saw her a couple of times but I got a severe infection and my balls were swollen, I think it was chlamydia, it was one of the ones, I had to get injections and all sorts of shit. So I kind of learnt the hard way.</i></p> <p>STIs less serious than HIV <i>P05 (30, mostly straight): the HIV [test] is always the one that I ask about. If I had any of the others it wouldn't bother me because I know that they're treatable. I've had like the HPV vaccine, and obviously they are very unsightly and you can't have sex for what can be a long time, but yeah, the HIV is always my main concern. So they're always going “Yeah, you're free of chlamydia,” and I was like yeah, what is the blood sample like? I want to know the big one.</i></p>

Overarching theme	Theme	Sub-theme	Illustrative quotes
Impact of STI/HIV transmission on female partners		Stigma and shame	<p>Impact of others' perception on them if diagnosed with STI/HIV <i>P15 (27, mostly straight): So, yeah, it's a big fear of having – if I had the condition then the disease and people's reactions, perceptions, how it would affect my work and my life, and what that means, and trying to educate my ignorance and naivety, I think.</i></p> <p>Negative reactions for sexual partners <i>P11 (24, mostly straight): I did have to tell, I was talking to a girl/dating this girl for like a month in, I had to tell her [about his gonorrhoea diagnosis], God she did not take it well, we ended up breaking up, sort of for other reasons but it was, it happened right at the time.</i></p> <p>STI/HIV acquisition as a result of sex with men resulting in disclosure of sex with men to partners or family unaware of this <i>P01 (30, straight): I'm from a community what's very religious and very community orientated [...] so I could never tell my parents, because they're very traditional, about what was going on or what the case was. They would see it as a western concept that's against the laws [...] I think that's what plays with my mind as well, sometimes that imagine if the family found out, I'd be offending people.</i></p>
		Impact on female partners' health	<p>Concern about inadvertent onward transmission to female partners <i>P05 (30, mostly straight): Oh yeah, like partly also the reason why we don't have sex is because I'm always worried about giving her stuff.</i></p> <p>Responsibility toward primary female partner <i>P01 (30, straight): At the end of the day you don't want to mess up someone else's life when you're married to an individual and you're committed to her, so why should you bother? This is just like enjoyment, fun for a little bit. But your wife is different, like you're married to.</i></p>
		Impact on relationships	<p>STI/HIV acquisition and transmission threatening relationship <i>P02 (35, mostly straight/bisexual-leaning straight): And also I wouldn't want to pick up something and then pass it on to my girlfriend and then that would really screw things up, so I try and be safe that way.</i></p> <p>Responsibility to inform their female partners in the event of an STI/HIV diagnosis <i>Interviewer: And can you think of a situation in which you would tell a female partner about your experiences with guys?</i> <i>P15 (27, mostly straight): I think I would, I would absolutely tell them if I had an STI check and that came back with something. Whether that was [HIV] or an STI I would absolutely tell them. [...] It would obviously just take a lot of balls to tell that girl, but I would if that happened.</i></p>

Overarching theme	Theme	Sub-theme	Illustrative quotes
STI/HIV transmission potential of their sexual behaviour	STI/HIV transmission risk of themselves and their sexual partners	Male partners represent a higher risk of STI/HIV acquisition than female partners	<p><i>P02 (30, mostly straight/bisexual-leaning straight): I know that obviously in the gay fraternity, you know, disease is quite rife and people are constantly fucking everybody so I am a lot more wary when I'm with a T-Girl about picking something up.</i></p> <p><i>P05 (30, mostly straight): Well I suppose the point is, is that men who have sex with men are at far greater risk of getting HIV and STIs, fact.</i></p>
		Pregnancy prevention of greater concern with female partners than STI/HIV prevention	<p><i>P15 (27, mostly straight): I think the time I've actually used condoms and actually finished in wearing a condom, I think it's where I haven't trusted the girl in saying that they've taken the pill, so I've put a condom on for that reason because I didn't want them to get pregnant.</i></p>
		Less risk from trusted partners	<p>Trust with long-term steady or regular partners</p> <p><i>P04 (61, mostly straight): I am aware that the female partner in the UK is not having sex with anybody else and that's fine. My male partner, um, I've got understanding with, because they're a friend rather than just a sexual partner, who they will tell me and they will expect me to tell them if there is any suggestion of anything being wrong or even a slight risk of something going to be wrong, you know, sort of "Oh I met somebody the other night and we, you know".</i></p> <p>Relatively quick development of trust</p> <p><i>P09 (43, mostly gay): I'm talking to this guy at the moment on Grindr, and I want to get to know him first before I do anything with him because he seems quite nice. I think that he's quite sweet in how he's talking to me. I'd rather get to know him first before I do anything with him [...] so if it happens with this guy and he didn't want to use [a condom], and he told me he was negative, then I wouldn't use one. I know you should really, but if we've discussed it and then he's saying he's all right then I would take his word for it usually.</i></p>

Overarching theme	Theme	Sub-theme	Illustrative quotes
		Assessment of casual male partners' sexual health based on direct or indirect measures	<p>Avoidance of HIV-positive sexual partners <i>P12 (35, mostly straight): It sounds dreadful, but I think if someone openly stated on their profile that they were either HIV positive or had an STD, that would be a complete no for me. Even though I'm fully aware with modern HIV drugs and retrovirals, there can be no viral load, [...] they can't pass it on any more than anyone else could. I would always be concerned, and I think that sort of fear and that concern would ruin any sort of enjoyment I would have.</i></p> <p>Undetectable status (among HIV-positive men) or PrEP-use (among HIV-negative men) providing reassurance <i>P14 (27, straight): You know, it is a conversation that I have had with the guys that I've slept with and gone like "are you on PrEP, is it something that you take?" "Do you take anything else for your HIV?" And they either say yeah or no, and I ask them, you know, like the whys and wherefores, you know.</i></p> <p>Acknowledgement that information about partners is not always reliable <i>P14 (27, straight): The app doesn't make it particularly easy to see [partners' testing history and sexual health], so typically I will just ask them straight up, like have you been checked, did you get checked recently, you know, regularly, when was your last, what were the results. And, again, depending on their responses on that, which to be honest with you I'm pretty sure most of them lie and just say yeah even if they don't, but at the same time it's the best argument I've got. [...] You know, judging off the rest of the conversation with them is how I will work out whether or not they've been entirely honest.</i></p> <p>Other characteristics of sexual partners (e.g. location, drug use) as proxy indicators of sexual health <i>P05 (30, mostly straight): I think it's because of my area, I think like if I went to Manchester I'd probably be so shit scared that I'd probably like [use condoms], but yeah.</i></p>
		H-MSM's own health and behaviour influencing risk perception	<p>Specific reasons for believing themselves to present high transmission risk <i>P15 (27, mostly straight): I would tell them [about an STI diagnosis] before sleeping with them, because I'm not going to be one of those dickheads that goes and has sex with them knowing that I had that disease.</i></p> <p>Believe they pose low risk of STI/HIV transmission to partners but wanting assurance of a sexual health screening <i>P12 (35, mostly straight): We did use condoms at the start and then we both went for a screening at the local GUM [...] after that came back that no one is carrying any nasties – more me rather than her – we thought 'well OK, as long as you take the pill, that should be fine'.</i></p>
	Likelihood of STI/HIV transmission of specific sexual acts	Mutual masturbation and use of sexual toys represent minimal risk of STI/HIV transmission	<p><i>P03 (69, mostly straight): My understanding is that the sort of things like mutual masturbation and kissing is a minimal risk really of HIV and pretty minimal risk of syphilis or anything else really.</i></p>

Overarching theme	Theme	Sub-theme	Illustrative quotes
		Oral sex considered a safer sexual activity despite some likelihood of transmission	<i>P14 (27, straight): [A]s far as I'm aware there's a very, very low risk of STI or STD transmission through oral sex, and secondly because it's a lot more readily treatable from what I understand, you know, HIV doesn't typically transmit through oral sex, as long as you don't have sores, as long as you don't have any injuries in your mouth, so it's safer, you know.</i>
		Anal intercourse associated with higher likelihood of STI/HIV transmission	<p>Risk can be mitigated through condom use <i>P12 (35, mostly straight): There will always be a greater risk just because, biologically speaking, I was having sex with other men – like having anal sex with other men – it does have a higher risk, just because the way – it's very vascular, tears are easier to create. There just is that increased risk as far as I'm aware. But I do think I did my best to mitigate those risks. [...] with anal sex, full anal sex, I always wore a condom.</i></p> <p>Risk of transmission during AI is too high to consider doing <i>Interviewer: So, could you see yourself ever getting to a point where you wanted to do that [AI with a male partner] in the future?</i> <i>P15 (27, mostly straight): I would say for now it's absolutely not, because I just wouldn't feel safe. And the whole thing about them obviously not wearing protection, it scares me 100 percent. So, yeah, that's a no-no.</i></p>

Table 76: Strategies for the prevention or risk reduction of STI/HIV acquisition and transmission

Strategy	Theme	Sub-theme	Illustrative quotes
Exclusivity within long-term relationships	Explicit agreements of exclusivity	Exclusivity as show of commitment	<i>Interviewer: And when you were in these relationships were you also still occasionally meeting up with guys?</i> <i>P14 (27, mostly straight): Not meeting up, but online, you know, online conversations were happening. [...] I always drew the line at actually physically meeting up when I was in relationships, you know, partly because it's cheating, to be honest, and I've been typically monogamous. So, it wasn't an option, it wasn't on the table to do that.</i>
		Exclusivity as means of reducing STI/HIV transmission risk	<i>P12 (35, mostly straight): I was a little bit more open-minded about the whole affair, but she was dead set on it would be 100% exclusive. Which I agreed to, I wouldn't say I was 100% happy about it, but that's part of being in a relationship, you have to do things that might go against your nature, as it were. But it was alright, if we want to not use condoms, then we have to be exclusive. [...] I don't think we could open it without damaging our relationship, which I obviously don't want to do.</i>
	Elasticity of exclusivity agreements		<i>P05 (30, mostly straight): "I don't see me and guys as cheating, but me and girls cheating would be bad. I think because she knows that I'd never like be in a relationship with a guy, whereas I mean a girl would be like a worry to her. That's how I think anyway."</i>

Strategy	Theme	Sub-theme	Illustrative quotes
Partner selection based on sexual health assessment	Sex with only known partners		<i>P06 (24, exclusively straight): I'm literally petrified of sexual transmitted diseases and STD. I'm really, you know, very petrified. I don't really get in touch with people who are anonymous. I don't really meet people because I don't really trust them hygienically, and then I never know, like what diseases or what things they hold [...] unless I trust them so completely, I don't really meet them, no, not even kiss. Interviewer: So when you've met partners in the past, have they tended to be people who you already know? P06: Yeah, who I already knew.</i>
	Avoidance of casual partners considered to be high risk of STI/HIV transmission		<i>P09 (43, mostly gay): Some people on Grindr when you see when they last tested it's more than 12 months ago, and they're not updated, so you don't know how many sexual partners they've had in that time. But then I would stay clear of them, and also, I wouldn't go with people who don't have their status on their profile as well, because I sometimes think they might be hiding something.</i>
Limiting sexual repertoire to avoid STI/HIV acquisition and transmission	Limiting sexual repertoire to avoid STI/HIV acquisition	Avoiding all penetrative sex with men	<i>Interviewer: Do you think much about HIV or STIs with these partners? P03 (69 years, mostly straight): Well, I do, that's why I try and only do mutual masturbation and don't get involved in oral or anal sex.[...] Since HIV, I have not had any sort of penetrative gay sex at all.</i>
		Accepting small risk of transmission from oral sex but avoiding AI	<i>P01 (30, straight): I did speak to a specialist about this [...] And he said to me that "the risk of you transmitting disease or an infection is very low through oral than through anal", so I thought to myself, why am I going to risk the activity when it's more exposure, so I think it's a release where you're having a bit of fun, and that's it mainly.</i>
	Limiting sexual repertoire to avoid STI/HIV transmission to steady female partners	Limiting sexual repertoire with male sexual partners to prevent onward transmission to steady female partner	<i>Interviewer: If someone suggested doing something a bit more [than mutual masturbation], would that ever interest you? P03 (69, mostly straight): Well, it might interest me but I have been careful to avoid any oral or anal sex since I've been married.</i>
		Limiting sexual repertoire with female steady partner to prevent possibility of onward transmission as a result of sex with men	<i>P05 (30, mostly straight): Oh yeah, yeah, like partly also the reason why we don't have sex is because I'm always worried about giving her stuff. So I will try and not meet guys and then get tested and make sure that I'm perfectly clean before we do anything, or I will just try and please her, so like finger her or like play toys and stuff like that, like safe ways of doing stuff.</i>

Strategy	Theme	Sub-theme	Illustrative quotes
		Switching between strategies as preference changes	<i>P09 (43, mostly gay): So, when I was meeting the guys, I wasn't having sex with them, I was just getting blown. Yeah, so when I was sleeping with her still, I wasn't having sex with them. Just blowjobs. Because I kind of thought it was easier and then there's less risk and stuff. But it's only when I started having sex with guys that I [...] stopped having sex with her because I didn't know what was going to happen or anything, and then it would be obvious I'd been sleeping around if something happened to her.</i>
Condom use to prevent acquisition	Condom use based on transmission risk of sexual acts	Condom use not necessary for oral sex due to low risk of transmission	<i>P01 (30 years, straight): No I don't [use condoms for oral sex] to be honest with you, because I think to myself, what is the risk [of condomless oral sex] or what could actually happen? What is the exposure? There is no risk with that ideally. In terms of like if it's anal then it's different, because then it's risky.</i>
		Inconsistent condom use for insertive AI but consistent condom use for receptive AI	<i>P09 (43, mostly gay): I've used a condom [when bottoming], yeah. Yeah, because I always read up stuff, and I think that – oh my god, this is going to sound awful, I know it's this risk of both sides, but you're more at risk if you bottom continuously, so I've kind of been reckless. Well I've not been reckless bottoming, no, I haven't, no.</i>
	Condom use based on partner characteristics	Non-use of condoms for trusted sexual partners	<i>Interviewer: When you're with your friend, do you guys use condoms or anything similar?</i> <i>P04 (61, mostly straight): Not for all that because we're not sort of, ah, we are aware of our friendship and what we're doing and we're quite honest with each other, so anal sex doesn't really need condoms unless you're spreading it around too much and then you need to consider that.</i>
		Consistent condom use with casual partners	<i>P11 (24, mostly straight): I always use protection. Even if someone were to tell me they're on the Pill or this or that, I would still use a condom just because I don't want to put my trust in someone else [...] even like when they're on the Pill, right, that doesn't protect you from everything, right, so I can still get an STI, so what's the point, right, so I would always opt for using a condom.</i>
		Negotiation of condom use with casual partners	<i>P14 (27, straight): You know, it's not something I shy away from. I don't go 'oh, well ...' it's 'this is going to happen or else this isn't going to happen.' I need to know that essentially, I'm not going to catch anything from you, and if you're not prepared to put those barriers in place then I'm not prepared to be a willing sexual partner.</i>
Condom use for extra-relational partners	<i>P02 (35, mostly straight/bisexual-leaning straight): I wouldn't want to pick up something and then pass it on to my girlfriend and then that would really screw things up, so I try and be safe that way.</i>		

Strategy	Theme	Sub-theme	Illustrative quotes
		Condom use only with partners causing concern	<p><i>Interviewer: When you're with a guy, how do you make that decision of whether or not to use a condom?</i></p> <p><i>P05 (30, mostly straight): He will ask. I do take them with me, I've got a bag that I take everything with, but generally they don't want it so [...] I think it's because of my area, I think like if I went to Manchester I'd probably be so shit scared that I'd probably like to do it, but yeah.</i></p> <p><i>P15 (27, mostly straight): I'm not anti-condoms, it's just more that it's been a last measure to prevent pregnancy because of my anxiety [...] To be honest, the only time I really [thought about STI/HIV] was when I found out that the girl that I was cheating on my girlfriend with was having sex with [another] man – that absolutely horrified me. So, in the last couple of times of sex I did use a condom and she did question why, but I couldn't tell her because I thought she was a slag because she was having sex with another bloke that was really dirty and slept around.</i></p>
		"Caught in the moment" or unprepared	<i>P12 (35, mostly straight): I can't even say, if I'm perfectly honest, even when I've had like one-night stands, but with past female partners, I've been really good with condom use. Because sometimes you think 'well, I haven't got any, there's none here', but you're past the point of no return.</i>
	Barriers to consistent condom use	Intoxication due to alcohol use	<p><i>Interviewer: And you mentioned that you usually would try to always use condoms. If you didn't then what would usually be the cause of that?</i></p> <p><i>P11 (24, mostly straight): If I didn't, it would almost be, well it's a terrible answer, maybe we like ran out... or just being too fucked up, right</i></p>
		Poor mental health leading to increased risk taking	<i>P09 (43, mostly gay): I've been reckless in the fact that I've been doing coke now and again. I never used to do stuff like this because I've got two kids and a family, I've got a good job, but inside I'm kind of feeling a little bit like I don't care, so I don't care, so I'm doing it kind of thing. [...] So, when I did that time with T [crystal methamphetamine] and G [GHB] with this guy, I kind of knew him beforehand but I wasn't sure what his status was, so I did have unprotected sex with him. But like I said previously, at that moment in time I didn't care, if you know what I mean, I was like 'fuck it, I can't be arsed, fuck it, just do whatever you want to do.'</i>
Biomedical prevention (PrEP)	Lack of awareness of PrEP		<i>P12 (35, mostly straight): I'd have to guess, it's new so let's say [it reduces risk of infection by] more than 50% - I'm not going to say it's like 80% or 90%, because that would be like a miracle drug. But it must be worthwhile doing it or else people wouldn't do it, if it was like 20%, I'd think there's no point.</i>
	Needs-based PrEP use	Current lifestyle doesn't warrant PrEP use	<i>P14 (27, straight): For me it's too irregular. There's not really much point in regularly taking something for a risk that's so minor.</i>
		Openness to PrEP in future if lifestyle changed	<i>P10 (27 years, bisexual-leaning straight): I think it would sort of give me sort of a sense of confidence. I can be sort of more flexible with the kind of things I do with men and women and make me feel that I am more healthy as well, and that other people would also feel confident in engaging with me.</i>

Strategy	Theme	Sub-theme	Illustrative quotes
	Aversion to PrEP due to feeling it encourages sexual irresponsibility		<i>P05 (30, mostly straight): [I] took it on and off. But when I spoke to the doctor, the GUM Clinic Doctor, I said I felt really slutty taking it [...] which is stupid, I mean it's useful I've got it but it is stupid. It just made me feel like "oh if I take it, I can do whatever I want", and I didn't want that feeling, because I felt I was being really reckless by taking it.</i>
	Difficulty incorporating PrEP into lives		<i>P09 (43, mostly gay): So, basically I leave it in the car, so there's a hidden compartment in the car, and sometimes I have to go back in the – so I normally take it between seven and eight in the evening, so I'm going to have to change my hours because sometimes I forget to bring it out of the car so I have to go back down to the car to get it, so I have to say I've left my work stuff in the car to bring it back up and stuff like that. And then I'm scared that she might find it in the car. Interviewer: What would happen if she did find it? P09: She probably just would ask me what it was, she probably wouldn't read what it is, and I'd probably just say 'oh, it's to do with high blood pressure,' something like that, I don't know. But another lie, yeah.</i>
STI/HIV testing to prevent onward transmission	Testing at the start of new steady relationships	Testing with exclusive steady partners before ending condom use	<i>P12 (35, mostly straight): We went at the same time, yeah. I'd been before because I thought it was just sensible. She hadn't been for many years so she was a bit nervous, and I said, "Well, there's nothing to be nervous about, but OK, why don't we both go together, have that done and then go for a nice lunch?" So it's not so awful."</i>
	Testing during steady relationships if having concurrent extra-relational sex	Testing before sex with steady partner to avoid transmission as result of extra-relational sex	<i>P05 (30, mostly straight): I will try and not meet guys and then get tested and make sure that I'm perfectly clean before we do anything.</i>
	Partner notification upon diagnosis with STI/HIV	Acknowledgement of responsibility to notify partners in the event of a diagnosis	<i>P15 (27, mostly straight): I think I would, I would absolutely tell [my female partners] if I had an STI check and that came back with something. Whether that was [HIV] or an STI I would absolutely tell them. I'm an honest person, so, yeah, no, I wouldn't hold that back. It would obviously just take a lot of balls to tell that girl, but I would if that happened.</i>
		Difficulty of notifying casual partners met through hook-up apps	<i>P05 (30, mostly straight): But if I was to contract like HIV tomorrow it would be awful because I'd have to tell people, and it would just be devastating. And I know there are like processes where I can give the phone numbers and whatever, but I don't have the phone numbers of the people that I chat to, so it's difficult.</i>
		Concern about impact on relationship in the event of notification of a positive diagnosis	<i>P02 (35, mostly straight / bisexual-leaning straight): That would be something again to hide because that will be, you know, "Where did you get this STI from?" So that, I'll have to do some James Bond shit then to hide all that. [...] I'd have to just hide it and maybe not see her for a couple of weeks or until it's cleared up or, you know, make some excuse for not having sex, but there's no way she could find out about that.</i>

Appendix 16: Themes and illustrative quotes for Chapter 7

Table 77: Barriers to STI/HIV testing and engagement with sexual healthcare for H-MSM

COM-B component	Barrier	Sub-theme	Illustrative quotes
Psychological capability	Poor sexual health knowledge	Lack of awareness of asymptomatic infection	<i>Interviewer: And why do you think that you haven't tested before?</i> <i>P10 (27, bisexual-leaning straight): Because I've always been quite confident that I'm quite healthy and I've never ever actually had any symptoms of those transmitted diseases and I don't think there is that much of a need to.</i>
		Lack of awareness of testing window periods	<i>P08 (31, straight): If it did come to that situation where I was involved in role play, you know, for the purposes of sexual gratification, than yes, afterwards, the morning after, I would sort of go and get checks done for STD and stuff like that.</i>
	Uninformed about testing options	Lack of awareness of home testing options	<i>P04 (61, mostly straight): ... for some reason yesterday I saw a little article on my Facebook about [home testing]. It was not at the time when I could manage to click on it and read it, it just really reiterated the fact that it exists, and I was going to check it out a bit more. [...] But whether or not they really want us to know about it is another thing because I've not heard of the all-in-one testing kit. I've heard of the HIV testing and I've not really even heard a lot about that.</i>
		Unaware of where to get tested	<i>P09 (43, mostly gay): I do feel that there's a lot of people in my situation that they probably wouldn't know where to go, or bury their head in the sand kind of thing.</i>
Physical opportunity	Clinic waiting times	Long waiting times at clinics acting as deterrent to testing	<i>P11 (24, mostly straight): It was actually kind of frustrating, it was like, while they said it was a walk-in, you really should just make an appointment. And so I think I spent my first day, literally sitting in there for hours, like you know, they never like called me back. The second day, even when I had an appointment, it still took like hours, right, yeah. [...] I know that if I do want to get tested I would not go to another sexual health clinic because that took two days. While they were great, it just wasn't fast.</i>
Social opportunity	Judgement from HCPs	Previous experiences of judgement from HCPs	<i>P09 (43, mostly gay): The one time there was a lady who I saw, and I think she was relatively new, and she was really judgmental, proper asking me personal questions, 'and so how does your wife feel?' and things like that, and I felt really – not annoyed, uncomfortable. So, next time I asked to see a guy, and it took about an hour and a half for me to see a guy clinician. [...] so that's why I normally see a guy and I go during [MSM-focused clinic hours].</i>
	Clinician misunderstanding of H-MSM's sexual identity	Previous experiences of HCPs misunderstanding their identity	<i>P14 (27, straight): I was going to get tested after having sex with a guy and realising I was at risk, and I sat down and I explained why I was there, and, you know, I said 'hey I'm straight and I'm doing this, and I'm not really okay with it,' and they responded with 'well, you know, it's okay to be bisexual, a lot of guys are actually bi and don't realise it,' and I had to stop the conversation and I was like 'no, I'm not bi, I've analysed this part of my personality quite a lot, it's to do with self-destruction, it's to do with self-harm,' and that's where, I said earlier, where it wasn't the responses I was looking for, I don't think they were educated in the idea that you can be having sex as a form of self-harm.</i>

COM-B component	Barrier	Sub-theme	Illustrative quotes
Reflective motivation	Perceived low risk of infection	Belief that their behaviour does not necessitate testing	<i>Interviewer: Okay, great. Given the sex that you have, do you think you're at much risk of HIV or STIs?</i> <i>P10 (27, bisexual-leaning straight): No [...] because I use protection such as keeping myself clean, condoms, and sort of ensuring that I am engaging with people that are trusted and experienced.</i>
		Testing is unnecessary because sex is with trusted regular partners	<i>P04 (61, mostly straight): There is a risk, not much. I am aware that the female partner in the UK is not having sex with anybody else and that's fine. My male partner, um, I've got understanding with, because they're a friend rather than just a sexual partner, who they will tell me and they will expect me to tell them if there is any suggestion of anything being wrong or even a slight risk of something going to be wrong, you know, sort of "Oh I met somebody the other night and we, you know". [...] I don't feel the need right now to be tested for anything.</i>
	Perceived irrelevance of MSM sexual health services	Discomfort with services labelled as for "gay or bisexual men"	<i>P12 (35, mostly straight): If it was specifically for gay men, I don't think I'd want to go in because I'm not gay, but then again, they would all be trained about that. I'd prefer to go like how they have it in the Royal Hospital in Liverpool where it's gents to the left, ladies to the right. So you don't know anyone's history, you don't know why anybody is there, you can't make any assumptions about anybody, you're all just there, together. So for me, personally, I wouldn't be opposed to going to one, but it wouldn't be my first choice. I would rather just go to one where it's generic for everybody.</i>
		Understanding that services identified as for MSM or "gay men" will be of benefit, despite discomfort with labels	<i>P05 (30, mostly straight): The point is that I have sex with men, so it's just about - like I know there are a lot of people that don't like terms to identify people, like some people will say "Oh I don't really like being called gay" Or "I don't really like being called bisexual, I quite like queer or I don't really give a term to it". I can completely understand why guys do want, you know, like to be called gay or bisexual - I personally don't, but that's just the way I am, but I completely understand why guys do. So if I saw something which promoted for gay and bisexual men, I'm clever enough to know that like I could probably access that, you know [...] I would just hope that they would be, you know, very discreet and confidential, but yeah.</i>
		Preference for MSM-focused services	<i>P04 (61, mostly straight): Well I mean I've said to you that personally I prefer that particular place in Dean Street because the relaxed atmosphere, pretty open. And it would be relevant to me in a way because first of all gay, bisexual or whatever, [...] they have a better understanding of what sex is and what diseases are and how to cure them.</i>

COM-B component	Barrier	Sub-theme	Illustrative quotes
Automatic motivation	Fear of test procedure	Fear of needles and blood preventing use of home testing kits	<i>P12 (35, mostly straight): I'm quite squeamish – I know that sounds really stupid, but if I had to draw my own blood or even prick my own finger, it would be a hard no for me. But if I had to just to swab my throat, swab my penis, like pee in a little tube – yeah, I'd do that.</i>
		Fear of testing procedure based on outdated information	<i>P15 (27, mostly straight): I genuinely thought that you would have to go in with like a four-centimetre stick and shove it down and then put it in a test tube. [...] So, that's why I've never done one, is the truth, yeah.</i>
	Fear of a positive test result	Concern about stigma and impact on life of a diagnosis	<i>P15 (27, mostly straight): So, yeah, it's a big fear of having – if I had the condition then the disease and people's reactions, perceptions, how it would affect my work and my life, and what that means, and trying to educate my ignorance and naivety, I think.</i>
		Concern about psychological impact of receiving a positive diagnosis using a self-testing kit	<i>P12 (35, mostly straight): Also, it would be a no for me as well because if it said I was positive, like my heart would fall out through my arsehole. And potentially being there on my own – I don't want that and I would think the test isn't real and stuff like that. [...] it would worry me, because people, when they get bad news, they can do very unpleasant things to themselves.</i>
	Fear of judgement from HCPs	Fear of judgement based on preconceptions of HCPs	<i>P01 (30, straight): I have spoken to my GP, I've been brave enough, and do you know my GP, my practitioner, at first I thought to myself he would act very negatively and respond very badly, but then he's from a south Asian community and made assumptions on that basis.</i>
	Fear of involuntary disclosure of sex with men	Fear of others seeing them attend sexual health clinics	<i>P08 (31, straight): So for instance you know, for [South Asian] men, there's probably a lot of them that are, you know, gay or bisexual, but if you have the clinic in East London where there's a high Bengali population and the likelihood of other people that they know seeing them come out of the centre, you know, so that is problematic isn't it?</i>
		Fear that family attending the same GP clinic will find out about their sex with men Unsuitability of home testing kits for H-MSM living with family	<i>Interviewer: So, how would you feel asking your GP for a sexual health screening?</i> <i>P14 (27, straight): I wouldn't. And that's mostly because it's a family doctors, and as much as I trust them to be confidential and follow, you know, they'd follow the law, also most of my family goes to that doctor so there's just something in my head that says, 'hey,' you know, 'like maybe, maybe they'll tell your parents' or 'maybe they'll tell somebody,' you know, and it will eventually get its way about to my mum and dad, and that's not something I particularly want.</i> <i>P09 (43, mostly gay): So, I can't have [a self-testing kit] delivered to the house because the kids will open it. Or the wife will say 'what is that.' And then I never normally have free time at home to be able to test myself, so, yeah. [...] If I was living on my own I would probably self-test, but with the kids and the wife around I wouldn't do it.</i>

Table 78: Facilitators to STI/HIV testing and engagement with sexual healthcare for H-MSM

COM-B component	Facilitator	Sub-theme	Illustrative quote
Psychological capability	Increasing awareness of testing options and guidelines	Informing H-MSM of testing guidelines and testing options increasing willingness to test	<i>Interviewer: And how often do you think you would test now that you know about this? P15 (27, mostly straight): To be honest I would annually probably, whether that's the right thing or not, if I'm not using condoms then that's – or if the recommendation is to do it twice a year, I'd do it twice a year. But whatever's recommended I would do it, no problem, knowing that it's just a spit in a test tube and get blood out of my finger won't be a problem.</i>
		Broadcasting testing and prevention options to a more general audience benefits the wider population and H-MSM	<i>P04 (61, mostly straight): But for this kind of thing [PrEP], I know there is something, taboo subjects about sex and everything, it's not something which the whole of the population is being told about. You don't get the advert just before Coronation Street saying "Here's the new tablets" and all this and we're not really told about it as such. And for me, that makes me feel that I'm missing out on something. [...] It also really is saying "Well HIV isn't that serious anymore because it can be prevented. A long way since "You've got HIV, you're going to die, you're going to get AIDS and die"</i>
	Sexual health information relevant to H-MSM	Sexual health information specific to the experiences and identity of H-MSM encouraging testing	<i>P14 (27, straight): You know, [sexual health information relevant to H-MSM] being on Grindr would be absolutely fucking amazing because I think there's a lot of guys on there who are straight who join the site and get a lot of information aimed at gay and bisexual men but not aimed at themselves, and they don't see any relevance in, you know, accessing information available for gay and bisexual men because they don't identify as such.</i>
Physical opportunity	Free testing	Free testing options encourage testing	<i>P11 (24, mostly straight): But you know, I can't really complain, since like in America this shit ain't free anyway. [...] Yeah, so but I'm trying to get tested and I feel very, I enjoy the resources in London, right, but I think that's more just me because the American system is not really accessible.</i>
	Walk-in services	Walk-in services offer convenience and allow for spontaneity	<i>P04 (61, mostly straight): Maybe if I'm walking past Dean Street for no reason whatsoever and I've had a pint of lager in the pub thinking "Dear, I shouldn't drink another pint until I've sobered up a bit". Or just because I feel like it. If, I mean I could say "Well hang on a minute, I'm here now, maybe I should go downstairs and get tested". [...] My ideal way is to be able to walk into any NHS establishment that specifically carries out these tests and get it as easily as you can get it in Dean Street.</i>
	Home testing options	Home testing options allow testing to fit into H-MSM's schedule	<i>Interviewer: Yeah. What appeals to you about [the self-sampling kit service]? P11 (24, mostly straight): [It] has flexibility, works into my schedule, right. So it's like "Oh I should get tested" and I can say "Oh just mail it to me and I'm going to do it when I have free time", right, like whether that's this weekend or Thursday.</i>
		Home testing options allow for sample collection in a more comfortable environment	<i>Interviewer: How do you feel about [using a self-sampling kit] at home? P13 (22, straight): Perfectly fine. It can be a lot better, especially to do it in the confines of your own home in comparison to a clinic where you might feel a bit on edge or not 100% sure how to do it. So, I feel like doing it at home is a lot better. And then you can just post it back, so it is easier.</i>

COM-B component	Facilitator	Sub-theme	Illustrative quote
	Ensuring privacy	Allowing both home and in-clinic testing options allow H-MSM to choose the option best meeting their privacy requirements	<i>P13 (22, straight): I'd much rather go in personally because it avoids that, it's in plain packaging. Whereas maybe if it is delivered, it might reveal what it actually is and you might not want to have everyone know what you're going to do. So I feel it kind of greatly increases privacy if you can go and collect it yourself.</i>
		Offering multiple result collection options helps protect H-MSM's privacy	<i>P01 (30, straight): I think I have received [results by text message] sometimes, like I said to the clinic staff "can you not send me messages by text" "and we'll call you instead", and I said "yes, calling me would be better. Don't be texting me, because imagine if someone was to read the message or someone was to see the message". So I told them, ring me, don't text me.</i>
	Fast test results	Quick return of test results reduces the anxiety associated with testing	<i>Interviewer: So how do you think we could encourage men who are similar to you to test every year? P12 (35, mostly straight): It would appeal to me if it was non-judgemental, that it was confidential and as quick as it could be, like I don't want to go because then I'll have to wait for two weeks and be terrified.</i>
	Opportunity for advice and support	In-clinic services can allow H-MSM to seek advice from HCPs	<i>Interviewer: Is there a particular reason [you prefer to test in person]? P14 (27, straight): It gives you the chance to have a conversation with a professional. You can find out a lot more about, you know, is there anything new that you need to be aware of? Is there a higher risk? You know, having been to this clinic before they've turned around and said, you know, 'you want to be a bit more careful, there's a lot of gonorrhoea going around at the minute,' and it just means I can be a bit more aware of the risks with sex and sexuality because, you know, they can turn around and say like, 'hey, we found a few more incidences of X, Y, Z, you need to be aware of that,' and then I can be more aware and take more precaution.</i>
		In-clinic services ensure support is available in the event of a positive diagnosis	<i>Interviewer: So you actually prefer talking to like a clinician? P01 (30, straight): Yeah, because I have done tests where I've done it on my own, but I don't know whether it's due to the sex you've had or it's due to your anxiety level is getting high, and I think if you're with a person and a clinician, for them to alleviate the symptoms or they make you feel at ease, but it's just that face-to-face conversation.</i>
	Sexual healthcare as part of general healthcare	Inclusion of STI/HIV testing as part of a standard health check may normalise testing	<i>P03 (69, mostly straight): If people don't feel they're at risk, they're not going to be bothered to go for a test. But if it's part of what you do at the gym or anywhere else and you have your blood pressure and your HIV test done every year, and your cholesterol or something, then perhaps people would take it onboard. Otherwise, perhaps they might not feel they need it.</i>
Promotion of testing at GP surgeries may appeal to H-MSM who do not attend sexual health clinics		<i>Interviewer: And if we wanted to reach more men who are similar to you, where do you think we'd have those messages appear? P01: I think in health centres mainly, like GP surgeries. I think with the media it's too in your face, like because there's so much taboo and negative association. So I think it would be difficult, but do you know in GP surgeries or health clinics, and also more training provided to GP practitioners around this area, more knowledgeable advice, then you would be more well prepared to do it.</i>	
Social opportunity	Impersonal and confidential nature of sexual healthcare	Impersonal nature of sexual health clinics facilitates disclosure of sexual behaviour	<i>Interviewer: So, how much do you tell [sexual health clinicians] about your situation? P09 (43, mostly gay): In that situation I'd be honest, because [...] I don't know them and I'm just a number really, so I feel that I – there's nothing to hide.</i>

COM-B component	Facilitator	Sub-theme	Illustrative quote
		Emphasising confidential nature of sexual healthcare may help encourage testing among H-MSM concerned about involuntary disclosure of their sexual behaviour	<i>Interviewer: So, now if we wanted to reach men in [the South Asian community], for instance, who are in a similar situation, how do you think we could appeal to them to encourage testing or to promote sexual health prevention?</i> <i>P09 (43, mostly gay): You just have to kind of say it's confidential, I think. You have to kind of highlight it as confidential, no one knows, you can get tested wherever you want to do it, you can get it privately or... but you need to highlight the fact that it's anonymous, no one's going to know. I think that's what people are scared of.</i>
	Lack of judgement and assumptions	Lack of judgement from HCPs facilitates disclosure of sexual behaviour	<i>P14 (27, straight): You know, you can be open, you can go in and say, 'this has happened,' and they go 'okay,' and that's as far as the conversation needs to go. There's no like 'oh, you shouldn't be doing that.' You know, there's no judgment, there's no criticism.</i>
		Lack of assumptions from HCPs about patients' behaviour facilitates disclosure of sexual behaviour	<i>P04 (61, mostly straight): [The clinic staff] just don't care, there's no sort of judgement, there's no anything. They encourage you to tell it as it is. [...] I had one clinic, not just Dean Street, one clinic say, "We don't care if you have sex with monkeys or lions or chimpanzees, you know, just tell us and we'll deal with it". And it's a far cry from: the first visit of the assumption is that you're having sex with women. And then maybe on the second, "Oh have you ever had sex with men?"</i>
	Normalisation of testing	Normalisation of testing in wider society may encourage testing and reduce stigma	<i>Interviewer: How do you think we could encourage men who are similar to you to test every year?</i> <i>P12 (35, mostly straight): Maybe just making sure people know how normal it is, like no one feels embarrassed about going to the dentist or go for any other kind of health check-up. Maybe just try to make it seem like it's more routine. Like thinking about it, personally, I wouldn't care if someone saw me in the dentist, for example, but I might be a little bit more coy if someone I knew came into the sexual health clinic [...] which is wrong really, isn't it? Because most people have sex, it's nothing to be ashamed of.</i>
		Normalisation of testing among men may encourage more openness about testing	<i>P15 (27, mostly straight): What would prompt me [to test in future]? I think looking at my two [female] housemates, one of them persuaded the other to do it, and I think if in my office, you know, the two guys that sit behind me, you know at breaktime are like 'oh ...', you know, '... why don't we just go downstairs and get checked,' you know, and just casually talked about it like at the pub, I would definitely do it.</i>
	Reflective motivation	Perceived STI/HIV risk of recent behaviour	Recent engagement in behaviour with higher risk of STI/HIV transmission
Sex with men a greater driver of testing than sex with women			<i>Interviewer: Was that something that happened in the past, you had unprotected sex with a guy and then you thought 'I'd better go and get tested'?</i> <i>P12 (35, mostly straight): No, because I never have, but thinking about it, rhetorically speaking, it would play on my mind more. I think I would wait for like a two-week incubation period and go 'oh shit, I've got to go right now'. Where, if it would be with a woman, I might be like 'I don't feel unwell, I have no symptoms', I'd be less inclined to go 'wait, I have to go today'.</i>

COM-B component	Facilitator	Sub-theme	Illustrative quote	
	Concern for female partners' health	Testing before sex with regular female partner to prevent inadvertent onward transmission	<i>P05 (35, mostly straight): Partly also the reason why [he and his fiancé] don't have sex is because I'm always worried about giving her stuff. So I will try and not meet guys and then get tested and make sure that I'm perfectly clean before we do anything...</i>	
	"Peace of mind"	Testing after a period of time or number of partners to provide peace of mind	<i>P11 (24, mostly straight): So after I had my second sexual experience with that guy in college, I actually did realise that I've never really been tested and so I just got a full, you know, STD, STI test done just so I could feel better, you know. Not that it was driven by the gay experience but just like, I should, I need to get tested anyway.</i>	
	Discomfort with partner notification	Frequent testing to limit number of partners needing to be notified	<i>P05 (30, mostly straight): The last two years, a lot of the time I literally go in once a month and, which sounds almost unbelievable, in the sense that they would even accept it, but I was able to like get tested pretty much like, maybe once a month, every six weeks. Interviewer: And so can you tell me why you go test that often? P05: I'm just terrified, like the process of like getting a STI and then having to go to tell your previous sexual partners</i>	
	Trust in HCPs	Trust of HCPs inspires comfort disclosing sex with men to those HCPs		<i>P11 (24, mostly straight): I guess I would say I think doctors are in a position of trust, right, so I think I come to doctors trusting them and they almost have to then lose that trust, right.</i>
		Disclosure of sex with men requires prompting from HCPs		<i>Interviewer: If a doctor didn't ask specifically if you have sex with men, but you thought it was relevant to what you were seeing them for, would you feel comfortable bringing that up? P12 (35, mostly straight): Well, that's a good question. If I thought like 100% I had to tell them for this thing, then yes. But unless they ask, like no, I wouldn't tell them I'm allergic to certain types of washing powder, unless they asked because it's not relevant to this. But honestly, I would take my direction from them, if I'm honest.</i>
Confidence in services	Clinical setting inspires confidence in healthcare and testing		<i>Interviewer: And then if you were to decide that you needed to test for some reason, how would you prefer to be tested? P03 (69, mostly straight): I think I'd probably rather go to a clinic, because you know, that way, you're being tested for everything, don't you, really? OK, you can get tests for HIV and chlamydia and things and do it at home, but I don't know that you can be tested for everything. Interviewer: Is there any other reason why you'd prefer to go to a clinic? P03: Well, I perhaps would have more confidence in the technique and the results too, and also the fact that you're having to do this at home when other members of the family are around, it's a bit awkward.</i>	
Automatic motivation	Onset of symptoms	Onset of symptoms prompting testing	<i>Interviewer: What made you go to test that time? P11 (24, mostly straight): My piss was burning. It was, actually, no, my pee was burning for a few weeks and I was like "This will go away" [laughs]. Actually, I ended up having, what's the right word? Excretion from like you know, ah, out of my urethra, penis hole, yeah. [...] that was basically like "This can't be ignored", you know, right, this isn't, there is by no stretch of the imagination is this okay, so then I was like "I have to go get tested."</i>	

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