Patterns of injecting and non-injecting drug use by sexual behaviour in people who inject drugs attending services in England, Wales and Northern Ireland, 2013-2016

Ellen Heinsbroek[a], Rachel Glass[a], Claire Edmundson[a], Vivian Hope[a,b], Monica Desai[a]

a. HIV & STI Department, National Infection Service, Public Health England, 61 Colindale Avenue, London, NW9 5EQ, United Kingdom

b. Public Health Institute, Liverpool John Moores University, 2nd Floor Henry Cotton Campus, 15-21 Webster Street, Liverpool L3 2ET, United Kingdom

ellen.heinsbroek@phe.gov.uk; rachel.glass@phe.gov.uk; claire.edmundson@phe.gov.uk; vivian.hope@phe.gov.uk; monica.desai@phe.gov.uk

Corresponding author:

Dr Ellen Heinsbroek

Drug Use & Infections Team, HIV & STI Department

National Infection Service, Public Health England

61 Colindale Avenue, London, NW9 5EQ, United Kingdom

Ellen.Heinsbroek@phe.gov.uk

Tel: 020 8327 7311

Patterns of injecting and non-injecting drug use by sexual behaviour in people who inject drugs attending services in England, Wales and Northern Ireland, 2013-2016

Keywords: LGBT, homosexuals, sexualised drug use, chemsex, people who inject drugs

Abstract

Background

Higher levels of drug use have been reported in lesbian, gay, bisexual and transgender (LGBT) communities, some of which can be explained by sexualised drug use, including 'chemsex'; the use of drugs before or during planned sexual activity to sustain, enhance, disinhibit or facilitate sex. We explored injecting and non-injecting drug use by sexual behaviour among people who inject drugs (PWID) in England, Wales and Northern Ireland.

Methods

Data were used from an unlinked-anonymous survey of PWID (2013-2016), where participants recruited through services self-completed a questionnaire. We included sexually active participants who had injected in the previous year, and compared injecting and non-injecting drug use between men reporting sex with men (MSM) and heterosexual men, and between women reporting sex with women (WSW) and heterosexual women. The questionnaire did not include GHB/GBL and methamphetamine use.

Results

There were 299 MSM, 3,215 heterosexual male, 122 WSW and 1,336 heterosexual female participants. MSM were more likely than heterosexual men to use drugs associated with chemsex: injected or non-injected mephedrone (adjusted OR (AOR) 2.22, 95%CI 1.54-3.22; AOR 2.15, 95%CI 1.48-3.11) and injected or non-injected ketamine (AOR 1.98, 95%CI 1.29-3.05; AOR 2.57, 95%CI 1.59-

4.15). MSM were also more likely to inject methadone, inhale solvents, take ecstasy, cocaine or speed.

WSW were more likely than heterosexual women to use non-injected mephedrone (AOR 2.19, 95%CI 1.20-3.99) and use injected or non-injected ketamine (AOR 5.58, 95%CI 2.74-11.4; AOR 3.05, 95%CI 1.30-7.19). WSW were also more likely to inject methadone, inject cocaine, use non-injected cocaine, crack, benzodiazepines or ecstasy, inhale solvents, or smoke cannabis.

Conclusion

Injecting and non-injecting drug use differed between MSM/WSW and heterosexual men and women. The use of drugs that have been associated with chemsex and sexualised drug use is more common among both MSM and WSW than heterosexual men and women.

Introduction

Higher levels of drug use have been reported in lesbian, gay, bisexual and transgender (LGBT) as compared to heterosexual communities (Green & Feinstein, 2012; Home Office, 2014). There are likely to be various underlying reasons and motivations for drug use in the LGBT community, including sexual minority stress (including stigma, discrimination and internalised homophobia), social norms and perceived peer pressures (Green & Feinstein, 2012; Ramchand, Fisher, Griffin, Becker, & Iguchi, 2013). Sexualised drug use has been reported to be common among men who have sex with men (MSM) in the UK and elsewhere (Melendez-Torres, Hickson, Reid, Weatherburn, & Bonell, 2017; Mohammed, et al., 2016). Sexualised drug use can take many forms and is not a new phenomenon, however, sex under the influence of previously popular 'club drugs' such as ecstasy and cocaine, was often incidental rather than planned and intentional (Bourne, et al., 2015). The emergence over the last decade or so of 'chemsex' or 'Party and Play (PnP)' where particular drugs are used before or during planned sexual activity to sustain, enhance, disinhibit or facilitate sex among MSM, has caused particular concern (Bourne, et al., 2015; Public Health England, 2015). The drugs used in chemsex/PnP can vary among and within countries (Schmidt, et al., 2016). In the UK, they usually include one or more of mephedrone, GHB/GBL, methamphetamine and less commonly ketamine (Bourne, Reid, Hickson, Torres-Rueda, & Weatherburn, 2014; Schmidt, et al., 2016); with the injecting use in this context often referred to as 'slamming' (Bourne, et al., 2015). Among certain populations chemsex/PnP is associated with increased sexual risk behaviour, and so an elevated risk of blood borne and sexually transmitted infections. In addition, sharing equipment when injecting drugs may put individuals at greater risk of both HIV and Hepatitis C infection (Public Health England, Health Protection Scotland, Public Health Wales, & Public Health Agency Northern Ireland, 2017).

Injecting drug use in England, Wales and Northern Ireland is monitored by the unlinked anonymous monitoring (UAM) survey of people who inject drugs, which samples from a range of generic drug services (including needle and syringe programmes (NSPs) and drug and alcohol treatment services).

Since 2000, the proportion of all male PWID recruited in the UAM survey who reported sex with men has increased from 4% in 2000/01 to 8% in 2014/15 (Glass, Hope, Tanner, & Desai, 2017). MSM were more often recent initiates to injecting as compared to heterosexual men (13% vs. 8%) (Glass, et al., 2017). These findings indicated that a shift in the injecting population attending drug services is occurring, warranting further investigation of drug use amongst MSM populations.

Although drug use amongst MSM is widely reported, limited information is available on the extent of sexualised drug use amongst MSM (Edmundson, et al.). For women who have sex with women (WSW), there is currently very little information available on the extent and nature of any drug use, including sexualised drug use (Beddoes, Sheikh, Khanna, & Francis, 2010; Moncrief, 2014). In the context of the recent emergence of chemsex/PnP, and in particular 'slamming', we explored the types of drugs used by sexual behaviour among men and women who inject drugs in England, Wales and Northern Ireland so as to better understand the current patterns of injecting and non-injecting drug use among MSM and WSW who inject drugs.

Methods

Study population

A repeated, national, voluntary unlinked-anonymous survey of people who inject drugs in the UK (excluding Scotland) has been conducted since 1990. The full methodology of the survey has been previously described (Hope, et al., 2014). Briefly, between 2500-3500 PWID attending a range of services were recruited each year into the survey by around 60 collaborating agencies; these include addiction treatment services, community drug and alcohol teams, and NSPs. Eligible participants included those who had ever injected psychoactive drugs and who had not already participated in the current calendar year. Participants provided a dried-blood spot sample, which was tested for antibodies against HIV, hepatitis B and hepatitis C, and self-completed a questionnaire which

gathered data on: injected drugs in the past year and past month; non-injected drug use in the past month; sharing of needles, syringes and other injecting equipment in the past month; and sexual behaviour including the number of male and female partners in the past year, condom use, and involvement in transactional sex in the past year. First participations during 2013-2016 were included (i.e. those taking part in 2014 to 2016 who reported taking part previously since 2013 were excluded as repeats) with reports of having sex and injecting drugs in the past year.

Definitions

MSM was defined as any male participant who reported sex with at least one male in the past year, regardless of the number of female sexual partners reported. Similarly, WSW was defined as any female participant who reported sex with at least one female in the past year, regardless of the number of male sexual partners reported. We defined injected and non-injected mephedrone and ketamine as drugs associated with chemsex/PnP (the survey questionnaire did not ask about GHB/GBL and methamphetamine use during this period). Direct sharing was defined as the sharing of needles and syringes. Indirect sharing was defined as the sharing of other injecting paraphernalia, such as spoons and filters. Total number of sexual partners was calculated by adding the number of male and female sexual partners, and was categorised as those reporting <10 or 10+ sexual partners. Information on those individuals who reported information on <10 male or female partners only, but left the question blank for the other gender were included in the group with <10 sexual partners. Sexual risk was defined as reporting 10+ sexual partners, and/or not always using a condom (for men and heterosexual women only), and/or being involved in transactional sex. Transactional sex was defined as receiving money, goods or drugs in exchange for sex.

Analysis

Injecting and non-injecting drug use was compared between MSM and heterosexual men, and between WSW and heterosexual women. For injected drugs, use in the past year was used for

analysis to increase the power of the analysis and to capture information on intermittent injectors as well as regular injectors. A sensitivity analysis was performed using injected drug use in the past month. For non-injected drug use only data on use in the past month was available. For MSM and WSW, associations of injected and non-injected drug use were investigated for HIV-status and for reporting opposite sex sexual partners, having 10+ sexual partners, and having transactional sex in the past year.

Direct sharing of needles and syringes, and both direct and indirect sharing including other injecting paraphernalia, was compared between MSM/WSW and heterosexual men and women, between HIV-positive and HIV-negative MSM, between MSM/WSW reporting 10+ vs. <10 sexual partners, and between MSM/WSW reporting transactional sex or not.

Comparisons of categorical data were conducted using Pearson's Chi-squared test and comparisons of numeric data were conducted using the Student's t-test or Mann-Whitney U-test as appropriate. Odds ratios (OR) and 95% confidence intervals (CI) for the types of injected and non-injected drug used were adjusted by logistic regression for age and geography (region/country of attended drug service) *a priori* and for homelessness and imprisonment if found to differ by sexual behaviour on univariate analysis.

Results

Study population

Between 2013 and 2016, there were 7,440 first participations who reported injecting drugs in the past year. Sexual activity in the past year was reported for 4,972 individuals (67%), with those sexually active individuals being younger (mean age 36 for sexually active vs. 41 years for sexually inactive, $p<0.001$) and more likely to be female (29% female for sexually active vs. 17% female for sexually inactive, $p<0.001$). There were 299 MSM, 3,215 heterosexual male, 122 WSW and 1,336 heterosexual female participants (Table 1). Sex with women was reported by 135 (45%) of the MSM,

and sex with men was reported by 85 (70%) of the WSW. Male participants were older than female participants ($p<0.001$), and heterosexual females were older than WSW ($p=0.004$), but there was no difference in age between heterosexual males and MSM ($p=0.81$). A larger proportion of MSM than heterosexual men lived in London ($p=0.002$). A larger proportion of heterosexual men as compared to MSM had ever been homeless ($p=0.01$) or imprisoned ($p<0.001$), whereas for females imprisonment was more common amongst WSW than heterosexuals ($p=0.02$).

Table 1: Characteristics of study participants

	MSM	**Heterosexual male**	**WSW**	**Heterosexual female**
Total	299	3,215	122	1,336
Demographics				
Age in years (mean, sd)*	36 (8.5)	36 (7.9)	32 (7.7)	34 (7.4)
Geography (n,%)				
Living in London	39 (13%)	253 (7.9%)	11 (9.0%)	138 (10%)
Ever homeless (n,%)**	218 (74%)	2,549 (80%)	98 (81%)	1,107 (77%)
Ever in prison* (n,%)**	200 (68%)	2,513 (79%)	74 (62%)	675 (51%)
HIV status				
HIV status (n, %)	16 (5.4%)	20 (0.62%)	1 (0.82%)	10 (0.75%)
Sexual behaviour in the past year				
Sexual activity with individuals of the same sex and of opposite sex	135 (45%)	NA	85 (70%)	NA
Transactional sex[$]	41 (14%)	53 (1.7%)	48 (41%)	255 (19%)
10+ sexual partners[#]	80 (27%)	126 (4.0%)	26 (21%)	106 (8.1%)

Injecting risk behaviour in the past month^				
Injected in the past month	242 (82%)	2,473 (77%)	100 (82%)	1,012 (76%)
Sharing of needles and syringes^	55 (24%)	382 (16%)	32 (33%)	225 (23%)
Sharing of needles, syringes and other injecting equipment^	114 (49%)	924 (38%)	52 (54%)	471 (48%)

* Age missing for 37 participants, ** Homelessness missing for 41 participants, *** Imprisonment missing for 38 participants, $ Receiving money, goods or drugs in exchange for sex; missing for 82 participants, #Number of sexual partners missing for 128 participants, ^Among those who reported injecting drug use in the past month (missing for 28). Sharing of needles and syringes missing for 115 participants; sharing of needles, syringes and other injecting equipment missing for 84 participants.

In total, 4,859 participants (98%) provided information on the type of injected drugs used and 4,495 participants (90%) provided information on the type of non-injected drugs used. Heroin was the most commonly used injected drug, reported by 85% of MSM, 93% of heterosexual men, 93% of WSW and 94% of heterosexual women (Table 2, Table 3). Crack was the most commonly used non-injected drug, reported by 53% MSM, 55% heterosexual men, 66% WSW, and 55% heterosexual women.

Drugs use in MSM vs. heterosexual men

MSM were more likely than heterosexual men to use drugs associated with chemsex: injected or non-injected mephedrone and injected or non-injected ketamine (Table 2). MSM were also more likely to inject methadone, or inhale solvents, take ecstasy, cocaine or speed. Also unspecified 'other' injected drug use was higher among MSM. Results were similar when considering injecting drug use in the last month (Supplementary Table 1).

MSM were less likely than heterosexual men to inject heroin (Table 2), particularly those reporting only male partners (130/161, 81% vs. 120/132, 91%). Among MSM, those reporting male and female partners when compared to those reporting only male partners, more frequently reported the use of non-injected heroin (64/121, 53% vs 50/143, 35%), crack (78/121, 65% vs. 63/143, 44%) or cannabis (63/121, 52% vs. 55/143, 38%), and less frequently injecting speed (30/132, 23% vs. 55/161, 34%). MSM reporting use of drugs that have been associated with chemsex were attending services across England and Wales (results not shown).

The number of different types of injected drugs used in the past year and non-injected drugs used in the past month did not differ between MSM and heterosexual men: both groups reported a median number of two injected (mean 2.2) and two non-injected drugs (mean 2.1) (p= 0.35, p=0.15). Among MSM, a higher number of non-injected drugs was reported among those also reporting sex with women (median 3 vs. median 2, p=0.005).

Direct sharing of needles and syringes in the past month was reported by more MSM than heterosexual men (Table 1, p<0.001). When the sharing of spoons and filters as well as needles and syringes was considered almost half MSM reported sharing and compared to almost two-fifths of the heterosexual men (Table 1, p<0.001).

Table 2: Injected drug use in the last year and non-injected drug use in the last month for MSM and heterosexual men

	MSM n (%)	**Heterosexual men n (%)**	**OR*, 95%CI**	**AOR**, 95%CI**
Number of participants				
Total	299	3,215	-	-
Total with information on	292 (98%)	3,133 (97%)	-	-

injected drug use				
Total with information on non-injected drug use	264 (88%)	2,908 (90%)	-	-
Drugs associated with chemsex				
Mephedrone - injected	45 (15%)	259 (8.3%)	2.02 (1.44-2.85)	2.22 (1.54-3.22)
Mephedrone - non-injected	40 (15%)	246 (8.5%)	1.93 (1.35-2.77)	2.15 (1.48-3.11)
Ketamine - injected	31 (11%)	166 (5.3%)	2.12 (1.42-3.18)	1.98 (1.29-3.05)
Ketamine - non-injected	25 (9.5%)	106 (3.7%)	2.77 (1.75-4.36)	2.57 (1.59-4.15)
Other drugs - injected				
Heroin	250 (85%)	2,919 (93%)	0.46 (0.32-0.65)	0.46 (0.32-0.67)
Methadone	24 (8.2%)	120 (3.8%)	2.25 (1.43-3.55)	2.21 (1.37-3.57)
Crack	148 (51%)	1,604 (51%)	0.98 (0.77-1.25)	0.94 (0.72-1.22)
Cocaine	57 (19%)	528 (17%)	1.19 (0.88-1.62)	1.23 (0.90-1.70)
Amphetamine (speed)	85 (29%)	888 (28%)	1.04 (0.80-1.35)	1.18 (0.88-1.57)
Other	52 (18%)	342 (11%)	1.77 (1.29-2.44)	1.85 (1.33-2.57)
Other drugs – non-injected				
Heroin	114 (43%)	1,391 (48%)	0.83 (0.64-1.07)	0.82 (0.63-1.06)
Crack	141 (53%)	1,593 (55%)	0.95 (0.74-1.22)	0.93 (0.71-1.22)
Cocaine	71 (27%)	526 (18%)	1.67 (1.25-2.22)	1.64 (1.21-2.21)
Amphetamine (speed)	56 (21%)	469 (16%)	1.40 (1.03-1.91)	1.59 (1.14-2.21)
Cannabis	118 (45%)	1,389 (48%)	0.88 (0.69-1.14)	0.88 (0.68-1.15)
Solvents or glue	14 (5.3%)	69 (2.4%)	2.30 (1.28-4.15)	2.56 (1.40-4.69)
Ecstasy/MDMA	37 (14%)	190 (6.5%)	2.33 (1.60-3.40)	2.35 (1.60-3.46)
Benzodiazepines	82 (31%)	1,065 (37%)	0.78 (0.59-1.02)	0.85 (0.64-1.13)
None of the above	31 (12%)	388 (13%)	0.86 (0.59-1.28)	0.82 (0.55-1.24)

* Odds ratio for MSM compared to heterosexual men. ** Odds ratio adjusted for age, region/country of attended service, ever homeless and ever imprisonment.

Drugs use in WSW vs. heterosexual women

WSW were more likely than heterosexual women to use non-injected mephedrone and use injected or non-injected ketamine (Table 3). Weak evidence was found for an association with injected mephedrone. WSW were also more likely to inject methadone, inject cocaine, or inject unspecified 'other' drugs. Similar results were obtained in the sensitivity analysis on injected drug use in the last month, where significant results were also obtained for injected mephedrone, ketamine and crack (Supplementary Table 2). WSW were more likely to use non-injected cocaine or crack or take benzodiazepines or ecstasy, inhale solvents, or smoke cannabis. Weak evidence was found for an association with non-injected speed (Table 3). WSW reporting use of drugs that have been associated with chemsex were attending services across England and Wales (results not shown).

WSW who also reported male sexual partners were more likely to report injecting crack (43/85, 51% vs. 8/37, 22%), injecting cocaine (23/85, 28% vs. 4/37, 11%), taking ecstasy (15/83, 18% vs. 0/35, 0%), smoking cannabis (53/83, 64% vs. 15/35, 43%) or snorting cocaine (28/83, 34% vs. 3/35, 8.6%). Weak evidence was obtained for injection of ketamine (12/85, 14% vs. 1/37, 2.7%, p=0.06), non-injected ketamine use (8/83, 9.6% vs. 0/35, 0%, p=0.06) and injection of speed (28/85, 33% vs. 6/37, 16%, p=0.06).

WSW reported a higher number of different types of injected drugs (median 2, mean 2.2) than heterosexual women (median 2, mean 1.8) (p=0.003). WSW also reported a higher number of non-injected drugs (median 3, mean 3.3) drugs than heterosexual women (median 2, mean 2.2) (p<0.001), and were less likely to indicate that they had used none of the listed non-injected drugs (Table 3). Among WSW, a higher number of injected and non-injected drugs was reported for those also reporting sex with men (median 1 vs. median 2, p=0.005; median 4 vs. median 2, p<0.001).

Direct sharing of needles and syringes in the last month was reported by more WSW (32/97, 33%) than heterosexual women (225/978, 23%) (p=0.03), although this difference was no longer significant when including the sharing of spoons and filters (WSW: 52/97, 54%, heterosexual women: 471/988, 48%, p=0.26). Sharing of needles and syringes was more frequently reported for WSW also reporting sex with men as compared to those reporting sexual contact with females only (28/68, 41% vs. 4/29, 14%, p=0.009).

Table 3: Injected drug use in the last year and non-injected drug use in the last month for WSW and heterosexual women

Drug used	**WSW n (%)**	**Heterosexual women n (%)**	**OR*, 95%CI**	**AOR**, 95%CI**
Number of participants				
Total	122	1,336	-	-
Total with information on injected drug use	122 (100%)	1,312 (98%)	-	-
Total with information on non-injected drug use	118 (97%)	1,205 (90%)	-	-
Drugs associated with chemsex				
Mephedrone - injected	17 (14%)	92 (7.0%)	2.15 (1.23-3.74)	1.81 (0.98-3.34)
Mephedrone - non-injected	17 (14%)	75 (6.2%)	2.54 (1.44-4.46)	2.19 (1.20-3.99)
Ketamine - injected	13 (11%)	35 (2.7%)	4.35 (2.24-8.47)	5.58 (2.74-11.4)
Ketamine - non-injected	8 (6.8%)	25 (2.1%)	3.43 (1.51-7.79)	3.05 (1.30-7.19)
Other drugs - injected				
Heroin	114 (93%)	1,240 (94%)	0.87 (0.41-1.86)	0.74 (0.34-1.63)
Methadone	14 (11%)	48 (3.7%)	3.42 (1.83-6.41)	3.86 (2.00-7.44)
Crack	51 (42%)	530 (40%)	1.07 (0.73-1.55)	1.18 (0.78-1.78)

Cocaine	28 (23%)	137 (10%)	2.56 (1.62-4.05)	3.07 (1.90-4.94)
Amphetamine (speed)	34 (28%)	331 (25%)	1.15 (0.76-1.74)	1.07 (0.68-1.67)
Other	24 (20%)	77 (5.9%)	3.94 (2.38-6.51)	4.73 (2.74-8.14)
Other drugs – non-injected				
Heroin	66 (56%)	606 (50%)	1.25 (0.86-1.84)	1.14 (0.77-1.70)
Crack	78 (66%)	661 (55%)	1.60 (1.08-2.39)	1.61 (1.05-2.45)
Cocaine	31 (26%)	168 (14%)	2.20 (1.41-3.42)	2.22 (1.41-3.50)
Amphetamine (speed)	28 (24%)	177 (15%)	1.81 (1.15-2.84)	1.56 (0.97-2.54)
Cannabis	68 (58%)	488 (41%)	2.00 (1.36-2.93)	1.91 (1.29-2.84)
Solvents or glue	10 (8.5%)	23 (1.9%)	4.76 (2.21-10.26)	3.91 (1.74-8.78)
Ecstasy/MDMA	15 (13%)	54 (4.5%)	3.10 (1.69-5.69)	3.20 (1.69-6.04)
Benzodiazepines	68 (58%)	426 (35%)	2.49 (1.69-3.65)	2.50 (1.67-3.75)
None of the above	5 (4%)	168 (14%)	0.27 (0.11-0.68)	0.31 (0.13-0.79)

* Odds ratio for WSW compared to heterosexual women. ** Adjusted for age, region/country of attended service, and ever imprisonment.

Drug use associated with HIV in MSM

Although numbers are small, there is evidence that HIV-positive MSM were more likely than HIV-negative MSM to have used drugs that have been associated with chemsex: injected and non-injected mephedrone and injected ketamine (Table 4). Also injection of unspecified 'other' drugs was higher amongst HIV-positive MSM (Table 4). Injected and non-injected heroin use was lower amongst HIV-positive MSM (Table 4).

Sharing of needles and syringes, and the sharing of spoons, filters, needles and/or syringes was reported by a lower proportion of HIV-positive MSM than HIV-negative MSM, although statistical

231 significance was only reached for the association of sharing of spoons, filters, needles and/or
232 syringes (HIV-positive MSM: 3/14, 21% vs. HIV-negative MSM: 111/218, 51%, p=0.03).

233 Of the sixteen HIV-positive MSM, thirteen were aware of their status, one reported never being
234 tested, and two did not respond to the question about testing.

Table 4: Injected drug use in the last year and non-injected drug use in the last month for HIV-positive and HIV-negative MSM*

Drug used	HIV-positive n (%)	HIV-negative n (%)	OR*, 95%CI	AOR**, 95%CI
Number of participants				
Total	16	299	-	-
Total with information on injected drug use	16 (100%)	277 (93%)	-	-
Total with information on non-injected drug use	16 (100%)	248 (83%)	-	-
Mephedrone - injected	11 (69%)	34 (12%)	15.66 (5.13-47.82)	15.6 (3.74-65.07)
Mephedrone – non-injected	9 (56%)	31 (13%)	9.00 (3.13-25.90)	13.1 (3.00-56.93)
Ketamine - injected	5 (31%)	26 (9.4%)	4.37 (1.41-13.55)	4.06 (1.04-15.92)
Heroin - injected	6 (38%)	244 (88%)	0.08 (0.03-0.24)	0.17 (0.05 -0.63)
Heroin – non-injected	0 (0%)	114 (46%)	-	-
Other - injected	7 (44%)	45 (16%)	4.00 (1.42-11.32)	3.40 (1.00-11.57)

* Only drugs shown significant on multivariate analysis, * Odds ratio for HIV-positive MSM compared to HIV-negative MSM. ** Odds ratio adjusted for age, region/country of attended service, ever homeless and ever imprisonment.

Drug use associated with 10+ sexual partners and transactional sex in MSM and WSW

Reporting 10+ sexual partners in the past year was more common among MSM and WSW than heterosexual men and women (Table 1, p<0.001). Transactional sex in the last year was more commonly reported among women than men (p<0.001), and more commonly reported among MSM and WSW than heterosexual men and women (Table 1, p<0.001, p<0.001).

For WSW, all of those (100%) who reported 10+ sexual partners reported also having sex with men, and 23 out of 26 (88%) who reported 10+ sexual partners reported transactional sex in the last year. Among MSM, those reporting 10+ sexual partners were no more or less likely to report also having sex with women (39/80, 49% vs. 96/219, 44%, p=0.45), but were more likely to report transactional sex than those with <10 partners (16/76, 21% vs. 25/211, 12%, p=0.05). A minority of those reporting 10+ sexual partners reported always using a condom, with consistent condom use being lower amongst MSM (11%, 7/64) and heterosexual men (15%, 17/112) than among heterosexual women (45%, 32/71) (p<0.001).

Among MSM, the use of non-injected mephedrone was associated with having 10+ sexual partners (AOR 2.23, 1.02-4.88), and the use of injected mephedrone was weakly associated (AOR 2.09, 0.96-4.57). Use of injected and non-injected mephedrone (AOR 1.79, 1.29-2.48; AOR 1.42, 1.00-2.00), injected ketamine (AOR 1.55, 1.09-2.22) and injected cocaine (AOR 1.42, 1.06-1.90) were associated with transactional sex in the past year. Injecting heroin (AOR 0.33, 0.14-0.81), injecting crack (AOR 0.24, 0.12-0.47), smoking crack (AOR 0.53, 0.28-1.01) and injecting cocaine (AOR 0.36, 0.15-0.86)

were less frequent among MSM having 10+ sexual partners than among MSM with <10 sexual partners.

Among WSW, injecting crack was associated with having 10+ sexual partners (AOR 3.53, 1.17-10.62) and with transactional sex (AOR 1.55, 1.12-2.14). Smoking crack was associated with transactional sex (AOR 1.68, 1.21-2.34). Taking ecstasy was associated with having 10+ sexual partners (AOR 5.73, 1.36-24.10). Smoking heroin was associated with having 10+ sexual partners (AOR 4.26, 1.34-13.55) and with transactional sex (AOR 1.45, 1.06-1.98). Because of the strong association between having 10+ sexual partners and transactional sex among WSW, it was not possible to add both variables to the same multivariate model.

For MSM, there was no evidence for increased sharing of needles and syringes and other injecting paraphernalia for those reporting 10+ sexual partners (10+: 29/64, 45% vs. <10: 85/168, 51%; p=0.47), but there was evidence for increased sharing of injecting equipment among those involved in transactional sex in the past year (needle and/or syringe sharing: transactional sex, 16/35, 46% vs. no transactional sex, 35/184, 19%, p=0.001; sharing of spoons, filters, needles and/or syringes: transactional sex, 28/36, 78% vs. no transactional sex, 79/186, 42%, p<0.001).

For WSW, both sharing of needles and syringes and other injecting paraphernalia were higher amongst those reporting 10+ sexual partners (needles and/or syringes: 10+: 13/23, 57% vs. <10: 19/74, 26%, p=0.006; sharing of spoons, filters, needles and/or syringes: 10+: 18/23, 78% vs. <10: 34/74: 46%, p=0.007) and amongst those reporting transactional sex (needle and/or syringe sharing: transactional sex, 21/43, 49% vs. no transactional sex, 8/51, 16%, p=0.001; sharing of spoons, filters, needles and/or syringes: transactional sex, 28/43, 65% vs. no transactional sex, 21/51, 41% ,p=0.02).

Discussion

Injecting and non-injecting drug use differed between MSM and WSW and heterosexual men and women who inject drugs in our study. Mephedrone and ketamine use, drugs associated with chemsex, were found to be higher in MSM and WSW, but there were also differences by sexual behaviour for a number of other drugs, including drugs, such as cocaine, crack, cannabis and amphetamine, that can be used for sexualised drug use. Injected and particularly non-injected drug use was reported to be higher for WSW and MSM also reporting sexual partners of the opposite sex. Mephedrone and ketamine were also associated with a positive HIV-status and with transactional sex among MSM, and mephedrone was associated with having a large number of sexual partners in MSM. We also identified higher injecting and sexual risks among MSM/WSW as compared to heterosexual men and women, with a higher proportion of MSM and WSW reporting sharing of needles and syringes, having 10+ sexual partners, and being involved in transactional sex. Consistent condom use was low amongst both MSM and heterosexual men and women with 10+ partners.

Our findings need to be considered in the context of the study population of the UAM survey; that is people who have ever injected psychoactive drugs recruited through a range of services including addiction treatment services and NSPs. This population will differ from the wider, mostly non-injecting, drug using population of MSM/WSW; for example, our sample had much larger proportion of heroin or crack use compared to other studies, and a high proportion of WSW involved in transactional sex. Despite these caveats, our survey suggests that drug use patterns are different between MSM/WSW and heterosexual individuals who inject drugs, and this may in part be explained by sexualised drug use.

The UK Drug Policy Commission's 2010 report identified a lack of information relating to lesbian and bisexual women (Moncrief, 2014). Our study is one of the first studies to highlight differences in drug use in WSW as compared to heterosexual women in the UK (Beddoes, et al., 2010; Moncrief, 2014), albeit among a sample of people who injected drugs and attended services. We found that WSW were more likely than heterosexual women to use mephedrone and ketamine, but also various other injected and non-injected drugs. Drug use patterns in WSW were associated with having sex with men, transactional sex and reporting 10+ sexual partners, but it was not possible to disentangle the individual contribution of those factors due to the strong associations between these factors and the small sample size. Sex with men and women and/or identifying as bisexual have been reported in the literature to be associated with higher drug use (Barker, et al., 2012; Buffin, Roy, Williams, & Winter, 2012; Green & Feinstein, 2012; Kerr, Ding, Burke, & Ott-Walter, 2015; King & McKeown, 2003).

Until recently, little information was available on use of drugs associated with sexualised drug use amongst MSM (Beddoes, et al., 2010; Bourne, et al., 2014). In recent years, more evidence has become available on the prevalence, and the drivers of sexualised drug use and chemsex (Ahmed, et al., 2016; Bourne, et al., 2015; Daskalopoulou, et al., 2014; Schmidt, et al., 2016), although limited information remains available on the extent of the injection of drugs associated with chemsex ('slamming'). Our survey addressed both injected and non-injected drug use in people who inject drugs attending services in England, Wales and Northern Ireland. Among MSM overall, we found 15% had injected mephedrone in the past year and 15% used mephedrone through other non-injected routes during the past month. However, among those MSM who were HIV-positive 69% had injected mephedrone in the past year and 56% mephedrone used it through other routes. Our estimates fit within the those reported in the wider literature (Edmundson, et al.), when considering that our study population only included those who injected drugs in the past year attending generic

services. Comparisons of the literature on sexualised drug use and chemsex among MSM are difficult due to the range of definitions and recall periods used, lack of event-level data, and differing recruitment strategies and study populations (Edmundson, et al.).

We found broadly similar patterns of drug use in MSM and WSW, with the exception of smoking cannabis and use of non-prescribed benzodiazepines which were more likely to be reported by WSW. There is little published data available on the comparison between drug use in MSM and WSW. A community-based survey of 4,165 LGB people in the UK found that use in the last month of all substances studied, apart from cannabis, was higher for MSM than for WSW (Buffin, et al., 2012). No distinction in the publication was made between injected and non-injected drug use.

Apart from sexualised drug use, there are other factors that should be considered to explain the difference in drug use patterns between MSM/WSW and heterosexuals. Poorer mental health, including higher rates of anxiety, depression, self-harm and suicide have been observed among LGBT populations when compared to heterosexual people (Jorm, Korten, Rodgers, Jacomb, & Christensen, 2002; King, et al., 2003), with higher rates observed particularly in those identifying as bisexual (Barker, et al., 2012; Jorm, et al., 2002). Among MSM/WSW poorer mental health is often associated with experiencing stigma, violence and verbal assault (Barker, et al., 2012; King, et al., 2003). Mental health is strongly linked to drug use (NIDA, 2014), and could explain differences in the drug patterns observed in this study. Accessible and appropriate mental health services for those MSM/WSW involved in drug use, including sexualised drug use and chemsex, should be provided. Social norms and perceptions of peers' behaviour have also been linked to drug use (NIDA, 2014), and have been described among gay and bisexual men taking 'party drugs' (Ramchand, et al., 2013), including

chemsex drugs (Ahmed, et al., 2016). There is a need for health promotion interventions to challenge social norms relating to drug use generally, and chemsex specifically (Ahmed, et al., 2016).

Most evidence available on sexualised drug use in MSM/WSW populations is collected through sexual health clinics. Edmundson *et al.* found that nineteen of twenty-eight studies included in a literature review on sexualised drug use among MSM in the UK were conducted in HIV and/or sexual health clinics, and two in a specialised LGBT drug and alcohol clinic in London. In the specialised London clinic a much higher prevalence of chemsex drugs use was observed than in our survey: 64% attended the clinic for mephedrone (Moncrief, 2014), and 85% for any chemsex drug (Stuart, 2013), which is unsurprising given the LGBT focus of the clinic and its particular interest in chemsex. Our study provides new evidence for injected and non-injected drug use among MSM/WSW attending generic services with the use of drugs associated with chemsex reported across England and Wales. There were notable differences by sexual behaviour for a number of other drugs, including drugs that could be used in other patterns of sexualised drug use such as cocaine, crack, cannabis and amphetamine. Although we cannot conclude from our data whether individuals sought treatment or advice for sexualised drug use when attending the drug services, it does suggest that use of sexualised drugs does occur among individuals attending drug service, and that tailored services need to be available when an individual does seek help.

Sharing of needles and syringes was reported more frequently amongst MSM and WSW as compared to heterosexual men and women in our study. Sharing of needles and syringes was particularly high among WSW with 10+ sexual partners and among MSM and WSW reporting transactional sex, placing them at increased risk of blood borne virus infections, including HIV and hepatitis C. Sharing of needles and syringes was found to be lower amongst HIV-positive MSM than

amongst HIV-negative MSM. Almost all HIV-positive MSM included in the survey were aware of their status; fear of transmitting the virus to others may have been the reason for reduced sharing of injecting equipment.

Several limitations could be identified for our study. We cannot conclude whether differences in drug use between MSM/WSW and heterosexual men and women relate specifically to sexualised drug use, because the questionnaire did not include a question on whether drugs were used during sex. The types of drugs used and the associations with many sexual partners among MSM suggest that sexualised drug use, including 'slamming' does occur. Another limitation of the questionnaire used is that it did not collect data on GHB/GBL and methamphetamine use during this period, both of which are common chemsex drugs. For injecting drug use, an unspecified 'other' category was included in the questionnaire: this was reported more frequently for MSM and WSW as compared to heterosexuals, and reported more frequently among HIV-positive MSM as compared to HIV-negative MSM, possibly capturing some injected methamphetamine or GHB/GBL use. Questions on methamphetamine and GHB/GBL have been added to the questionnaire used in the UAM survey from 2017 onwards. The UAM survey included questions on sexual behaviour, but not on sexual identity, and it is possible that those who were included in the analysis as MSM/WSW would not identify as such (Green & Feinstein, 2012). Other limitations of the survey are its cross-sectional study design, which prohibits inferences on the causal directions of associations, and its reliance on self-reported behaviour. The accuracy of self-reports may be subject to recall bias; however, self-reported risk behaviours among PWID have previously been shown to be reliable (Latkin, Vlahov, & Anthony, 1993). Further, the survey used a self-completed and anonymous questionnaire to reduce disclosure bias, however, concerns about the disclosure of sensitive issues, such as sexual behaviour, might still persist and socially desirable answers could have been given for these.

Our analysis adds to the growing body of evidence that sexualised drug use, including 'slamming' is occurring among MSM accessing generic drug services, and provides new evidence indicating sexualised drug use, including 'slamming', might be occurring among WSW accessing generic services. Our analysis further highlights that injected and non-injected drug use overall are different between MSM/WSW and heterosexual men and women. Though further work is needed, understanding these differences in drug use by sexual behaviour are important to our understanding of current patterns of sexualised drug, including chemsex, and for framing appropriate responses. Although MSM/WSW may be more familiar with attending sexual health services if they require help with sexualised drug use, our data suggest that individuals who use chemsex drugs are also attending generic services for people who use drug across England, Wales and Northern Ireland. Services for people who use drugs have been encouraged to be more inclusive of LGBT communities in recent years (Public Health England, 2015), and this could be an explanation for the increased proportion of MSM recruited in to the survey in recent years, but there is scope for further improvement. Generic services for people who use and inject drug in the UK are mostly set up to address opiate use and may be less familiar with treatments for stimulant drug use, particularly for the drugs associated with sexualised drug use. Although heroin use is still most commonly reported amongst those attending these generic services, including in MSM/WSW, these services may need to be adapted to meet the local needs of MSM/WSW who present and may have problems related to sexualised drug use, including chemsex (Public Health England, 2015).

Funding

This work was core funded by Public Health England.

Authors' contributions

All authors contributed to writing the manuscript. The Unlinked Anonymous Monitoring Survey of People Who Inject Drugs was conducted by Rachel Glass (RG) and Claire Edmundson (CE) and was coordinated by Vivian Hope (VH), Monica Desai (MD) and Ellen Heinsbroek (EH). Analysis was undertaken by EH.

Acknowledgements

We are grateful to all of the people who took part in the surveys and to the fieldworkers that undertook the data collection. We would also like to thank those who undertook the blood borne virus testing on the dried blood spot samples, and those who have assisted with running the surveys.

Conflict of interest

The authors have no conflicts to declare.

References

Ahmed, A. K., Weatherburn, P., Reid, D., Hickson, F., Torres-Rueda, S., Steinberg, P., & Bourne, A. (2016). Social norms related to combining drugs and sex ("chemsex") among gay men in South London. *International Journal on Drug Policy, 38*, 29-35.

Barker, M., Richards, C., Jones, R., Bowes-Catton, H., Plowman, T., Yockney, J., & Morgan, M. (2012). The bisexuality report: Bisexual inclusion in LGBT equality and diversity. from https://bisexualresearch.wordpress.com/reports-guidance/reports/thebisexualityreport/.

Beddoes, D., Sheikh, S., Khanna, M., & Francis, R. (2010). The impact of drugs on different minority groups: A review of the UK literature. from http://www.ukdpc.org.uk/wp-content/uploads/Evidence%20review%20-%20The%20impact%20of%20drugs%20on%20different%20minority%20groups_%20ethnic%20groups.pdf.

Bourne, A., Reid, D., Hickson, F., Torres-Rueda, S., Steinberg, P., & Weatherburn, P. (2015). 'Chemsex' and harm reduction need among gay men in South London. *International Journal of Drug Policy, 26*, 1171-1176.

Bourne, A., Reid, D., Hickson, F., Torres-Rueda, S., & Weatherburn, P. (2014). The Chemsex study: drug use in sexual settings among gay & bisexual men in Lambeth, Southwark & Lewisham. Retrieved 31/08/17 from www.sigmaresearch.org.uk/chemsex.

Buffin, J., Roy, A., Williams, H., & Winter, A. (2012). Part of the Picture: Lesbian, gay and bisexual people's alcohol and drug use in England (2009-2011). from http://www.boltonshealthmatters.org/knowledgehub/part-picture-lesbian-gay-and-bisexual-peoples-alcohol-and-drug-use-england-2009-2011.

Daskalopoulou, M., Rodger, A., Phillips, A. N., Sherr, L., Speakman, A., Collins, S., Elford, J., Johnson, M. A., Gilson, R., Fisher, M., Wilkins, E., Anderson, J., McDonnell, J., Edwards, S., Perry, N., O'Connell, R., Lascar, M., Jones, M., Johnson, A. M., Hart, G., Miners, A., Geretti, A. M., Burman, W. J., & Lampe, F. C. (2014). Recreational drug use, polydrug use, and sexual behaviour in HIV-diagnosed men who have sex with men in the UK: results from the cross-sectional ASTRA study. *Lancet HIV, 1*, e22-31.

Edmundson, C., Glass, R., Heinsbroek, E., Hope, V., White, M., Mohammed, H., & Desai, M. Sexualised drug use in the UK: A review of the literature. *International Journal of Drug Policy, Under Review*.

Glass, R., Hope, V. D., Tanner, C., & Desai, M. (2017). 'Slamming' among men who have sex with men accessing general drug services, in response to Schmidt, AJ et al., 2016, Illicit drug use among gay and bisexual men in 44 cities: Findings from the European MSM Internet Survey (EMIS). *International Journal of Drug Policy, 49*, 24-25.

Green, K. E., & Feinstein, B. A. (2012). Substance use in lesbian, gay, and bisexual populations: an update on empirical research and implications for treatment. *Psychology of Addictive Behaviors, 26*, 265-278.

Home Office. (2014). Drug misuse: Findings from the 2013/14 crime survey for England and Wales. from https://www.gov.uk/government/publications/drug-misuse-findings-from-the-2013-to-2014-csew/drug-misuse-findings-from-the-201314-crime-survey-for-england-and-wales.

Hope, V. D., Harris, R. J., De Angelis, D., Croxford, S., Marongiu, A., Parry, J. V., & Ncube, F. (2014). Two decades of successes and failures in controlling the transmission of HIV through injecting drug use in England and Wales, 1990 to 2011. *Eurosurveillance, 19*.

Jorm, A. F., Korten, A. E., Rodgers, B., Jacomb, P. A., & Christensen, H. (2002). Sexual orientation and mental health: results from a community survey of young and middle-aged adults. *British Journal of Psychiatry, 180*, 423-427.

Kerr, D., Ding, K., Burke, A., & Ott-Walter, K. (2015). An alcohol, tobacco, and other drug use comparison of lesbian, bisexual, and heterosexual undergraduate women. *Substance Use & Misuse, 50*, 340-349.

King, M., & McKeown, E. (2003). Mental health and well-being of gay men, lesbians and bisexuals in England and Wales. . from http://www.mindout.org.uk/wp-content/uploads/2012/06/SummaryfindingsofLGBreport.pdf.

King, M., McKeown, E., Warner, J., Ramsay, A., Johnson, K., Cort, C., Wright, L., Blizard, R., & Davidson, O. (2003). Mental health and quality of life of gay men and lesbians in England and Wales: controlled, cross-sectional study. *Br J Psychiatry, 183*, 552-558.

Latkin, C. A., Vlahov, D., & Anthony, J. C. (1993). Socially desirable responding and self-reported HIV infection risk behaviors among intravenous drug users. *Addiction, 88*, 517-526.

Melendez-Torres, G. J., Hickson, F., Reid, D., Weatherburn, P., & Bonell, C. (2017). Findings from within-subjects comparisons of drug use and sexual risk behaviour in men who have sex with men in England. *International Journal of STD & AIDS, 28*, 250-258.

Mohammed, H., Were, J., King, C., Furegato, M., Nardone, A., & Hughes, G. (2016). Sexualised drug use in people attending sexual health clinics in England. . *Sexually Transmitted Infections, 92*, 454.

Moncrief, M. (2014). Out of your mind. from http://londonfriend.org.uk/outofyourmind/.

NIDA. (2014). Drugs, Brains, and Behavior: The Science of Addiction. from https://www.drugabuse.gov/publications/drugs-brains-behavior-science-addiction.

Public Health England. (2015). Substance misuse services for men who have sex with men involved in chemsex. from http://www.nta.nhs.uk/uploads/phe-substance-misuse-services-for-msm-involved-in-chemsex.pdf.

Public Health England, Health Protection Scotland, Public Health Wales, & Public Health Agency Northern Ireland. (2017). Shooting Up: Infections among people who inject drugs in the UK, 2016. from https://www.gov.uk/government/publications/shooting-up-infections-among-people-who-inject-drugs-in-the-uk.

Ramchand, R., Fisher, M. P., Griffin, B. A., Becker, K., & Iguchi, M. Y. (2013). Drug use among gay and bisexual men at weekend dance parties: the role of intentions and perceptions of peers' behaviors. *AIDS and Behavior, 17*, 1540-1549.

Schmidt, A. J., Bourne, A., Weatherburn, P., Reid, D., Marcus, U., & Hickson, F. (2016). Illicit drug use among gay and bisexual men in 44 cities: Findings from the European MSM Internet Survey (EMIS). *International Journal of Drug Policy, 38*, 4-12.

Stuart, D. (2013). Sexualised drug use by MSM: background, current status and response. *HIV Nursing, Spring 2013*, 6-10.

519

Table 1: Characteristics of study participants

	MSM	Heterosexual male	WSW	Heterosexual female
Total	299	3,215	122	1,336
Demographics				
Age in years (mean, sd)*	36 (8.5)	36 (7.9)	32 (7.7)	34 (7.4)
Geography (n,%)				
Living in London	39 (13%)	253 (7.9%)	11 (9.0%)	138 (10%)
Ever homeless (n,%)**	218 (74%)	2,549 (80%)	98 (81%)	1,107 (77%)
Ever in prison* (n,%)**	200 (68%)	2,513 (79%)	74 (62%)	675 (51%)
HIV status				
HIV status (n, %)	16 (5.4%)	20 (0.62%)	1 (0.82%)	10 (0.75%)
Sexual behaviour in the past year				
Sexual activity with individuals of the same sex and of opposite sex	135 (45%)	NA	85 (70%)	NA
Transactional sex[$]	41 (14%)	53 (1.7%)	48 (41%)	255 (19%)
10+ sexual partners[#]	80 (27%)	126 (4.0%)	26 (21%)	106 (8.1%)
Injecting risk behaviour in the past month[^]				
Injected in the past month	242 (82%)	2,473 (77%)	100 (82%)	1,012 (76%)
Sharing of needles and syringes[^]	55 (24%)	382 (16%)	32 (33%)	225 (23%)
Sharing of needles, syringes and other injecting equipment[^]	114 (49%)	924 (38%)	52 (54%)	471 (48%)

* Age missing for 37 participants, ** Homelessness missing for 41 participants, *** Imprisonment missing for 38 participants, $ Receiving money, goods or drugs in exchange for sex; missing for 82 participants, # Number of sexual partners missing for 128 participants, ^ Among those who reported injecting drug use in the past month (missing for 28). Sharing of needles and syringes missing for 115 participants; sharing of needles, syringes and other injecting equipment missing for 84 participants.

526

Table 2: Injected drug use in the last year and non-injected drug use in the last month for MSM and heterosexual men

	MSM n (%)	Heterosexual men n (%)	OR*, 95%CI	AOR**, 95%CI
Number of participants				
Total	299	3,215	-	-
Total with information on injected drug use	292 (98%)	3,133 (97%)	-	-
Total with information on non-injected drug use	264 (88%)	2,908 (90%)	-	-
Drugs associated with chemsex				
Mephedrone - injected	45 (15%)	259 (8.3%)	2.02 (1.44-2.85)	2.22 (1.54-3.22)
Mephedrone - non-injected	40 (15%)	246 (8.5%)	1.93 (1.35-2.77)	2.15 (1.48-3.11)
Ketamine - injected	31 (11%)	166 (5.3%)	2.12 (1.42-3.18)	1.98 (1.29-3.05)
Ketamine - non-injected	25 (9.5%)	106 (3.7%)	2.77 (1.75-4.36)	2.57 (1.59-4.15)
Other drugs - injected				
Heroin	250 (85%)	2,919 (93%)	0.46 (0.32-0.65)	0.46 (0.32-0.67)
Methadone	24 (8.2%)	120 (3.8%)	2.25 (1.43-3.55)	2.21 (1.37-3.57)
Crack	148 (51%)	1,604 (51%)	0.98 (0.77-1.25)	0.94 (0.72-1.22)
Cocaine	57 (19%)	528 (17%)	1.19 (0.88-1.62)	1.23 (0.90-1.70)
Amphetamine (speed)	85 (29%)	888 (28%)	1.04 (0.80-1.35)	1.18 (0.88-1.57)
Other	52 (18%)	342 (11%)	1.77 (1.29-2.44)	1.85 (1.33-2.57)
Other drugs – non-injected				
Heroin	114 (43%)	1,391 (48%)	0.83 (0.64-1.07)	0.82 (0.63-1.06)

Crack	141 (53%)	1,593 (55%)	0.95 (0.74-1.22)	0.93 (0.71-1.22)
Cocaine	71 (27%)	526 (18%)	1.67 (1.25-2.22)	1.64 (1.21-2.21)
Amphetamine (speed)	56 (21%)	469 (16%)	1.40 (1.03-1.91)	1.59 (1.14-2.21)
Cannabis	118 (45%)	1,389 (48%)	0.88 (0.69-1.14)	0.88 (0.68-1.15)
Solvents or glue	14 (5.3%)	69 (2.4%)	2.30 (1.28-4.15)	2.56 (1.40-4.69)
Ecstasy/MDMA	37 (14%)	190 (6.5%)	2.33 (1.60-3.40)	2.35 (1.60-3.46)
Benzodiazepines	82 (31%)	1,065 (37%)	0.78 (0.59-1.02)	0.85 (0.64-1.13)
None of the above	31 (12%)	388 (13%)	0.86 (0.59-1.28)	0.82 (0.55-1.24)

527 * Odds ratio for MSM compared to heterosexual men. ** Odds ratio adjusted for age, region/country of

528 attended service, ever homeless and ever imprisonment.

529

530

Table 3: Injected drug use in the last year and non-injected drug use in the last month for WSW and heterosexual women

Drug used	WSW n (%)	Heterosexual women n (%)	OR*, 95%CI	AOR**, 95%CI
Number of participants				
Total	122	1,336	-	-
Total with information on injected drug use	122 (100%)	1,312 (98%)	-	-
Total with information on non-injected drug use	118 (97%)	1,205 (90%)	-	-
Drugs associated with chemsex				
Mephedrone - injected	17 (14%)	92 (7.0%)	2.15 (1.23-3.74)	1.81 (0.98-3.34)
Mephedrone - non-injected	17 (14%)	75 (6.2%)	2.54 (1.44-4.46)	2.19 (1.20-3.99)
Ketamine - injected	13 (11%)	35 (2.7%)	4.35 (2.24-8.47)	5.58 (2.74-11.4)
Ketamine - non-injected	8 (6.8%)	25 (2.1%)	3.43 (1.51-7.79)	3.05 (1.30-7.19)
Other drugs - injected				
Heroin	114 (93%)	1,240 (94%)	0.87 (0.41-1.86)	0.74 (0.34-1.63)
Methadone	14 (11%)	48 (3.7%)	3.42 (1.83-6.41)	3.86 (2.00-7.44)
Crack	51 (42%)	530 (40%)	1.07 (0.73-1.55)	1.18 (0.78-1.78)
Cocaine	28 (23%)	137 (10%)	2.56 (1.62-4.05)	3.07 (1.90-4.94)
Amphetamine (speed)	34 (28%)	331 (25%)	1.15 (0.76-1.74)	1.07 (0.68-1.67)
Other	24 (20%)	77 (5.9%)	3.94 (2.38-6.51)	4.73 (2.74-8.14)
Other drugs – non-injected				

Heroin	66 (56%)	606 (50%)	1.25 (0.86-1.84)	1.14 (0.77-1.70)
Crack	78 (66%)	661 (55%)	1.60 (1.08-2.39)	1.61 (1.05-2.45)
Cocaine	31 (26%)	168 (14%)	2.20 (1.41-3.42)	2.22 (1.41-3.50)
Amphetamine (speed)	28 (24%)	177 (15%)	1.81 (1.15-2.84)	1.56 (0.97-2.54)
Cannabis	68 (58%)	488 (41%)	2.00 (1.36-2.93)	1.91 (1.29-2.84)
Solvents or glue	10 (8.5%)	23 (1.9%)	4.76 (2.21-10.26)	3.91 (1.74-8.78)
Ecstasy/MDMA	15 (13%)	54 (4.5%)	3.10 (1.69-5.69)	3.20 (1.69-6.04)
Benzodiazepines	68 (58%)	426 (35%)	2.49 (1.69-3.65)	2.50 (1.67-3.75)
None of the above	5 (4%)	168 (14%)	0.27 (0.11-0.68)	0.31 (0.13-0.79)

* Odds ratio for WSW compared to heterosexual women. ** Adjusted for age, region/country of attended service, and ever imprisonment.

534

Table 4: Injected drug use in the last year and non-injected drug use in the last month for HIV-positive and HIV-negative MSM*

Drug used	HIV-positive n (%)	HIV-negative n (%)	OR*, 95%CI	AOR**, 95%CI
Number of participants				
Total	16	299	-	-
Total with information on injected drug use	16 (100%)	277 (93%)	-	-
Total with information on non-injected drug use	16 (100%)	248 (83%)	-	-
Mephedrone - injected	11 (69%)	34 (12%)	15.66 (5.13-47.82)	15.6 (3.74-65.07)
Mephedrone – non-injected	9 (56%)	31 (13%)	9.00 (3.13-25.90)	13.1 (3.00-56.93)
Ketamine - injected	5 (31%)	26 (9.4%)	4.37 (1.41-13.55)	4.06 (1.04-15.92)
Heroin - injected	6 (38%)	244 (88%)	0.08 (0.03-0.24)	0.17 (0.05 -0.63)
Heroin – non-injected	0 (0%)	114 (46%)	-	-
Other - injected	7 (44%)	45 (16%)	4.00 (1.42-11.32)	3.40 (1.00-11.57)

535 * Only drugs shown significant on multivariate analysis, * Odds ratio for HIV-positive MSM compared to HIV-
536 negative MSM. ** Odds ratio adjusted for age, region/country of attended service, ever homeless and ever
537 imprisonment.