



LJMU Research Online

Heinsbroek, E, Glass, R, Edmundson, C, Hope, V and Desai, M

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.

<http://researchonline.ljmu.ac.uk/id/eprint/8358/>

Article

Citation (please note it is advisable to refer to the publisher's version if you intend to cite from this work)

**Heinsbroek, E, Glass, R, Edmundson, C, Hope, V and Desai, M (2018)
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. International Journal of Drug Policy. ISSN 0955-3959**

LJMU has developed [LJMU Research Online](#) for users to access the research output of the University more effectively. Copyright © and Moral Rights for the papers on this site are retained by the individual authors and/or other copyright owners. Users may download and/or print one copy of any article(s) in LJMU Research Online to facilitate their private study or for non-commercial research. You may not engage in further distribution of the material or use it for any profit-making activities or any commercial gain.

The version presented here may differ from the published version or from the version of the record. Please see the repository URL above for details on accessing the published version and note that access may require a subscription.

For more information please contact researchonline@ljmu.ac.uk

<http://researchonline.ljmu.ac.uk/>

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

4

5 Ellen Heinsbroek^a, Rachel Glass^a, Claire Edmundson^a, Vivian Hope^{a,b}, Monica Desai^a

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

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

10 ellen.heinsbroek@phe.gov.uk; rachel.glass@phe.gov.uk; claire.edmundson@phe.gov.uk;

11 vivian.hope@phe.gov.uk; monica.desai@phe.gov.uk

12

13 Corresponding author:

14 Dr Ellen Heinsbroek

15 Drug Use & Infections Team, HIV & STI Department

16 National Infection Service, Public Health England

17 61 Colindale Avenue, London, NW9 5EQ, United Kingdom

18 Ellen.Heinsbroek@phe.gov.uk

19 Tel: 020 8327 7311

20

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

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

24 **Abstract**

25 *Background*

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

31 *Methods*

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

38 *Results*

39 There were 299 MSM, 3,215 heterosexual male, 122 WSW and 1,336 heterosexual female
40 participants. MSM were more likely than heterosexual men to use drugs associated with chemsex:
41 injected or non-injected mephedrone (adjusted OR (AOR) 2.22, 95%CI 1.54-3.22; AOR 2.15, 95%CI
42 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-

43 4.15). MSM were also more likely to inject methadone, inhale solvents, take ecstasy, cocaine or
44 speed.

45 WSW were more likely than heterosexual women to use non-injected mephedrone (AOR 2.19,
46 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,
47 95%CI 1.30-7.19). WSW were also more likely to inject methadone, inject cocaine, use non-injected
48 cocaine, crack, benzodiazepines or ecstasy, inhale solvents, or smoke cannabis.

49 *Conclusion*

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

53 **Introduction**

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

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

78 Since 2000, the proportion of all male PWID recruited in the UAM survey who reported sex with men
79 has increased from 4% in 2000/01 to 8% in 2014/15 (Glass, Hope, Tanner, & Desai, 2017). MSM were
80 more often recent initiates to injecting as compared to heterosexual men (13% vs. 8%) (Glass, et al.,
81 2017). These findings indicated that a shift in the injecting population attending drug services is
82 occurring, warranting further investigation of drug use amongst MSM populations.

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

91

92 **Methods**

93 *Study population*

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

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

108 *Definitions*

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

123 *Analysis*

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

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

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

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

142 **Results**

143 *Study population*

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

150 and sex with men was reported by 85 (70%) of the WSW. Male participants were older than female
 151 participants ($p < 0.001$), and heterosexual females were older than WSW ($p = 0.004$), but there was no
 152 difference in age between heterosexual males and MSM ($p = 0.81$). A larger proportion of MSM than
 153 heterosexual men lived in London ($p = 0.002$). A larger proportion of heterosexual men as compared
 154 to MSM had ever been homeless ($p = 0.01$) or imprisoned ($p < 0.001$), whereas for females
 155 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
<i>Demographics</i>				
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%)
<i>HIV status</i>				
HIV status (n, %)	16 (5.4%)	20 (0.62%)	1 (0.82%)	10 (0.75%)
<i>Sexual behaviour in the past year</i>				
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%)

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

161

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

168 *Drugs use in MSM vs. heterosexual men*

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

174 MSM were less likely than heterosexual men to inject heroin (Table 2), particularly those reporting
 175 only male partners (130/161, 81% vs. 120/132, 91%). Among MSM, those reporting male and female
 176 partners when compared to those reporting only male partners, more frequently reported the use of
 177 non-injected heroin (64/121, 53% vs 50/143, 35%), crack (78/121, 65% vs. 63/143, 44%) or cannabis
 178 (63/121, 52% vs. 55/143, 38%), and less frequently injecting speed (30/132, 23% vs. 55/161, 34%).
 179 MSM reporting use of drugs that have been associated with chemsex were attending services across
 180 England and Wales (results not shown).

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

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

190

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
<i>Number of participants</i>				
Total	299	3,215	-	-
Total with information on	292 (98%)	3,133 (97%)	-	-

injected drug use

Total with information on	264 (88%)	2,908 (90%)	-	-
----------------------------------	-----------	-------------	---	---

non-injected drug use***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)

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

193 *Drugs use in WSW vs. heterosexual women*

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

203 WSW who also reported male sexual partners were more likely to report injecting crack (43/85, 51%
204 vs. 8/37, 22%), injecting cocaine (23/85, 28% vs. 4/37, 11%), taking ecstasy (15/83, 18% vs. 0/35,
205 0%), smoking cannabis (53/83, 64% vs. 15/35, 43%) or snorting cocaine (28/83, 34% vs. 3/35, 8.6%).
206 Weak evidence was obtained for injection of ketamine (12/85, 14% vs. 1/37, 2.7%, $p=0.06$), non-
207 injected ketamine use (8/83, 9.6% vs. 0/35, 0%, $p=0.06$) and injection of speed (28/85, 33% vs. 6/37,
208 16%, $p=0.06$).

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

215 Direct sharing of needles and syringes in the last month was reported by more WSW (32/97, 33%)
 216 than heterosexual women (225/978, 23%) (p=0.03), although this difference was no longer
 217 significant when including the sharing of spoons and filters (WSW: 52/97, 54%, heterosexual women:
 218 471/988, 48%, p=0.26). Sharing of needles and syringes was more frequently reported for WSW also
 219 reporting sex with men as compared to those reporting sexual contact with females only (28/68,
 220 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
<i>Number of participants</i>				
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%)	-	-
<i>Drugs associated with chemsex</i>				
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)
<i>Other drugs - injected</i>				
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)
<i>Other drugs – non-injected</i>				
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)

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

223 *Drug use associated with HIV in MSM*

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

229 Sharing of needles and syringes, and the sharing of spoons, filters, needles and/or syringes was
230 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
<i>Number of participants</i>				
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)

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

238

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

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

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

252 Among MSM, the use of non-injected mephedrone was associated with having 10+ sexual partners
253 (AOR 2.23, 1.02-4.88), and the use of injected mephedrone was weakly associated (AOR 2.09, 0.96-
254 4.57). Use of injected and non-injected mephedrone (AOR 1.79, 1.29-2.48; AOR 1.42, 1.00-2.00),
255 injected ketamine (AOR 1.55, 1.09-2.22) and injected cocaine (AOR 1.42, 1.06-1.90) were associated
256 with transactional sex in the past year. Injecting heroin (AOR 0.33, 0.14-0.81), injecting crack (AOR
257 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)

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

260 Among WSW, injecting crack was associated with having 10+ sexual partners (AOR 3.53, 1.17-10.62)
261 and with transactional sex (AOR 1.55, 1.12-2.14). Smoking crack was associated with transactional
262 sex (AOR 1.68, 1.21-2.34). Taking ecstasy was associated with having 10+ sexual partners (AOR 5.73,
263 1.36-24.10). Smoking heroin was associated with having 10+ sexual partners (AOR 4.26, 1.34-13.55)
264 and with transactional sex (AOR 1.45, 1.06-1.98). Because of the strong association between having
265 10+ sexual partners and transactional sex among WSW, it was not possible to add both variables to
266 the same multivariate model.

267 For MSM, there was no evidence for increased sharing of needles and syringes and other injecting
268 paraphernalia for those reporting 10+ sexual partners (10+: 29/64, 45% vs. <10: 85/168, 51%;
269 $p=0.47$), but there was evidence for increased sharing of injecting equipment among those involved
270 in transactional sex in the past year (needle and/or syringe sharing: transactional sex, 16/35, 46% vs.
271 no transactional sex, 35/184, 19%, $p=0.001$; sharing of spoons, filters, needles and/or syringes:
272 transactional sex, 28/36, 78% vs. no transactional sex, 79/186, 42%, $p<0.001$).

273 For WSW, both sharing of needles and syringes and other injecting paraphernalia were higher
274 amongst those reporting 10+ sexual partners (needles and/or syringes: 10+: 13/23, 57% vs. <10:
275 19/74, 26%, $p=0.006$; sharing of spoons, filters, needles and/or syringes: 10+: 18/23, 78% vs. <10:
276 34/74: 46%, $p=0.007$) and amongst those reporting transactional sex (needle and/or syringe sharing:
277 transactional sex, 21/43, 49% vs. no transactional sex, 8/51, 16%, $p=0.001$; sharing of spoons, filters,
278 needles and/or syringes: transactional sex, 28/43, 65% vs. no transactional sex, 21/51, 41% , $p=0.02$).

279

280

281

282 **Discussion**

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

295

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

304

305 The UK Drug Policy Commission's 2010 report identified a lack of information relating to lesbian and
306 bisexual women (Moncrief, 2014). Our study is one of the first studies to highlight differences in
307 drug use in WSW as compared to heterosexual women in the UK (Beddoes, et al., 2010; Moncrief,
308 2014), albeit among a sample of people who injected drugs and attended services. We found that
309 WSW were more likely than heterosexual women to use mephedrone and ketamine, but also
310 various other injected and non-injected drugs. Drug use patterns in WSW were associated with
311 having sex with men, transactional sex and reporting 10+ sexual partners, but it was not possible to
312 disentangle the individual contribution of those factors due to the strong associations between
313 these factors and the small sample size. Sex with men and women and/or identifying as bisexual
314 have been reported in the literature to be associated with higher drug use (Barker, et al., 2012;
315 Buffin, Roy, Williams, & Winter, 2012; Green & Feinstein, 2012; Kerr, Ding, Burke, & Ott-Walter,
316 2015; King & McKeown, 2003).

317

318 Until recently, little information was available on use of drugs associated with sexualised drug use
319 amongst MSM (Beddoes, et al., 2010; Bourne, et al., 2014). In recent years, more evidence has
320 become available on the prevalence, and the drivers of sexualised drug use and chemsex (Ahmed, et
321 al., 2016; Bourne, et al., 2015; Daskalopoulou, et al., 2014; Schmidt, et al., 2016), although limited
322 information remains available on the extent of the injection of drugs associated with chemsex
323 ('slamming'). Our survey addressed both injected and non-injected drug use in people who inject
324 drugs attending services in England, Wales and Northern Ireland. Among MSM overall, we found
325 15% had injected mephedrone in the past year and 15% used mephedrone through other non-
326 injected routes during the past month. However, among those MSM who were HIV-positive 69% had
327 injected mephedrone in the past year and 56% mephedrone used it through other routes. Our
328 estimates fit within the those reported in the wider literature (Edmundson, et al.), when considering
329 that our study population only included those who injected drugs in the past year attending generic

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

333

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

340

341 Apart from sexualised drug use, there are other factors that should be considered to explain the
342 difference in drug use patterns between MSM/WSW and heterosexuals. Poorer mental health,
343 including higher rates of anxiety, depression, self-harm and suicide have been observed among LGBT
344 populations when compared to heterosexual people (Jorm, Korten, Rodgers, Jacomb, & Christensen,
345 2002; King, et al., 2003), with higher rates observed particularly in those identifying as bisexual
346 (Barker, et al., 2012; Jorm, et al., 2002). Among MSM/WSW poorer mental health is often associated
347 with experiencing stigma, violence and verbal assault (Barker, et al., 2012; King, et al., 2003). Mental
348 health is strongly linked to drug use (NIDA, 2014), and could explain differences in the drug patterns
349 observed in this study. Accessible and appropriate mental health services for those MSM/WSW
350 involved in drug use, including sexualised drug use and chemsex, should be provided. Social norms
351 and perceptions of peers' behaviour have also been linked to drug use (NIDA, 2014), and have been
352 described among gay and bisexual men taking 'party drugs' (Ramchand, et al., 2013), including

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

355

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

371

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

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

380

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

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

420

421 **Funding**

422 This work was core funded by Public Health England.

423 **Authors' contributions**

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

428 **Acknowledgements**

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

432 **Conflict of interest**

433 The authors have no conflicts to declare.

434

435 **References**

- 436 Ahmed, A. K., Weatherburn, P., Reid, D., Hickson, F., Torres-Rueda, S., Steinberg, P., & Bourne, A.
437 (2016). Social norms related to combining drugs and sex ("chemsex") among gay men in
438 South London. *International Journal on Drug Policy*, 38, 29-35.
- 439 Barker, M., Richards, C., Jones, R., Bowes-Catton, H., Plowman, T., Yockney, J., & Morgan, M. (2012).
440 The bisexuality report: Bisexual inclusion in LGBT equality and diversity. from
441 <https://bisexualresearch.wordpress.com/reports-guidance/reports/thebisexualityreport/>.
- 442 Beddoes, D., Sheikh, S., Khanna, M., & Francis, R. (2010). The impact of drugs on different minority
443 groups: A review of the UK literature. from [http://www.ukdpc.org.uk/wp-](http://www.ukdpc.org.uk/wp-content/uploads/Evidence%20review%20-%20The%20impact%20of%20drugs%20on%20different%20minority%20groups_%20ethnic%20groups.pdf)
444 [content/uploads/Evidence%20review%20-](http://www.ukdpc.org.uk/wp-content/uploads/Evidence%20review%20-%20The%20impact%20of%20drugs%20on%20different%20minority%20groups_%20ethnic%20groups.pdf)
445 [%20The%20impact%20of%20drugs%20on%20different%20minority%20groups_%20ethnic%](http://www.ukdpc.org.uk/wp-content/uploads/Evidence%20review%20-%20The%20impact%20of%20drugs%20on%20different%20minority%20groups_%20ethnic%20groups.pdf)
446 [20groups.pdf](http://www.ukdpc.org.uk/wp-content/uploads/Evidence%20review%20-%20The%20impact%20of%20drugs%20on%20different%20minority%20groups_%20ethnic%20groups.pdf).
- 447 Bourne, A., Reid, D., Hickson, F., Torres-Rueda, S., Steinberg, P., & Weatherburn, P. (2015).
448 'Chemsex' and harm reduction need among gay men in South London. *International Journal*
449 *of Drug Policy*, 26, 1171-1176.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

496 Mohammed, H., Were, J., King, C., Furegato, M., Nardone, A., & Hughes, G. (2016). Sexualised drug
497 use in people attending sexual health clinics in England. . *Sexually Transmitted Infections*, 92,
498 454.

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

500 NIDA. (2014). Drugs, Brains, and Behavior: The Science of Addiction. from
501 <https://www.drugabuse.gov/publications/drugs-brains-behavior-science-addiction>.
502 Public Health England. (2015). Substance misuse services for men who have sex with men involved in
503 chemsex. from [http://www.nta.nhs.uk/uploads/phe-substance-misuse-services-for-msm-](http://www.nta.nhs.uk/uploads/phe-substance-misuse-services-for-msm-involved-in-chemsex.pdf)
504 [involved-in-chemsex.pdf](http://www.nta.nhs.uk/uploads/phe-substance-misuse-services-for-msm-involved-in-chemsex.pdf).
505 Public Health England, Health Protection Scotland, Public Health Wales, & Public Health Agency
506 Northern Ireland. (2017). Shooting Up: Infections among people who inject drugs in the UK,
507 2016. from [https://www.gov.uk/government/publications/shooting-up-infections-among-](https://www.gov.uk/government/publications/shooting-up-infections-among-people-who-inject-drugs-in-the-uk)
508 [people-who-inject-drugs-in-the-uk](https://www.gov.uk/government/publications/shooting-up-infections-among-people-who-inject-drugs-in-the-uk).
509 Ramchand, R., Fisher, M. P., Griffin, B. A., Becker, K., & Iguchi, M. Y. (2013). Drug use among gay and
510 bisexual men at weekend dance parties: the role of intentions and perceptions of peers'
511 behaviors. *AIDS and Behavior*, *17*, 1540-1549.
512 Schmidt, A. J., Bourne, A., Weatherburn, P., Reid, D., Marcus, U., & Hickson, F. (2016). Illicit drug use
513 among gay and bisexual men in 44 cities: Findings from the European MSM Internet Survey
514 (EMIS). *International Journal of Drug Policy*, *38*, 4-12.
515 Stuart, D. (2013). Sexualised drug use by MSM: background, current status and response. *HIV*
516 *Nursing*, *Spring 2013*, 6-10.

517

518

Table 1: Characteristics of study participants

	MSM	Heterosexual male	WSW	Heterosexual female
Total	299	3,215	122	1,336
<i>Demographics</i>				
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%)
<i>HIV status</i>				
HIV status (n, %)	16 (5.4%)	20 (0.62%)	1 (0.82%)	10 (0.75%)
<i>Sexual behaviour in the past year</i>				
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%)
<i>Injecting risk behaviour in the past month[^]</i>				
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%)

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

525

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
<i>Number of participants</i>				
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%)	-	-
<i>Drugs associated with chemsex</i>				
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)
<i>Other drugs - injected</i>				
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)
<i>Other drugs – non-injected</i>				
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

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
<i>Number of participants</i>				
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%)	-	-
<i>Drugs associated with chemsex</i>				
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)
<i>Other drugs - injected</i>				
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)
<i>Other drugs – non-injected</i>				

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)

531 * Odds ratio for WSW compared to heterosexual women. ** Adjusted for age, region/country of

532 attended service, and ever imprisonment.

533

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
<i>Number of participants</i>				
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.