Low levels of chemsex among men who have sex with men, but high levels of risk among men who engage in chemsex: analysis of a cross-sectional online survey across four countries

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Low levels of chemsex amongst men who have sex with men, but high levels of risk amongst men who engage in chemsex: analysis of a cross-sectional online survey across four countries.

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Abstract. Aim: This paper establishes the prevalence of chemsex drug use amongst men who have sex with men (MSM), the extent to which these drugs are used in a sexual context, as well as their associated behaviours and circumstances of use. **Methods**: Data from a cross-sectional, online survey of 2428 MSM recruited via gay sociosexual media in Scotland, Wales, Northern Ireland and the Republic of Ireland were analysed. **Results**: Whilst almost half (48.8%) of participants had ever taken illicit drugs, lifetime chemsex drug use was less common (18.0%) and far fewer reported chemsex drug use in the last year (8.2%) or last 4 weeks (3.0%). One quarter (27.1%) of men who used chemsex drugs in the last year reported no sexualized drug use, but almost three-quarters (72.9%) did. Only 6.1% of the whole sample reported sexualized chemsex drug use in the last year. The odds of reporting chemsex in the last year were significantly higher for men aged 36–45 (AOR = 1.96), single men (AOR = 1.83), men who were HIV positive (AOR = 4.01), men who report high risk sex (AOR = 4.46), being fisted (AOR = 7.77), or sex in exchange for goods other than money (AOR = 4.7) in the last year and men who reported an HIV test in the last 3 months (AOR = 1.53). **Discussion**: Only a small proportion of MSM in these four countries reported chemsex, and, for the first time, we demonstrate that not all chemsex drug use was sexualized. Nevertheless, MSM who engage in chemsex (MWEC) reported substantial sexual risk inequalities. These novel findings highlight several opportunities for intervention, particularly around the multiple vulnerabilities of MWEC, opportunities for early identification of those most vulnerable to chemsex-related harm and the potential to develop a specialised responsive patient pathway.

Introduction

‘Chemsex’, the use of drugs in sexual settings amongst men who have sex with men (MSM), has received sustained attention in the United Kingdom (UK) for the last five years. Chemsex in this geographic context is typically associated with the use of mephedrone, crystal methamphetamine, ketamine and/or gamma-hydroxybutrate (GHB) or the pre-drug gamma-butyrolactone (GBL) (Stuart, 2013; Kirby & Thornber-Dunwell, 2012). Qualitative research from London highlights a range of psychological, social and relational harms associated with chemsex, as well as a propensity for overdose (Bourne *et al*., 2015a). Indeed, data from the coroner of

England & Wales indicates a 119% rise in GHB/GBL overdose related deaths between 2014 and 2015, with an individual dying every 12 days, is potentially linked to chemsex (Hockenhull *et al*., 2016).

Further to this, sexual health harms have been widely examined, with several clinic-based studies indicating an increased likelihood of having been diagnosed with a sexually transmitted infection (STI) within the previous 6 or 12 months among those who had used one or more of the drugs associated with chemsex (Sewell *et al*., 2017; Ottaway *et al*., 2016). Commonly reported effects of these drugs include heightened sexual arousal, increased longevity of sex and, as a consequence, an increased potential for higher number of sexual partners (Bourne *et al*., 2015b). Several studies have found illicit drug use, especially crystal methamphetamine use, to be associated with unprotected anal intercourse at both the individual (Bolding *et al*., 2006) and event levels (Melendez-Torres *et al*., 2016). However, not all studies report this finding and care must be taken in assuming causal pathways (Prestage *et al*., 2007; Melendez-Torres & Bourne, 2016). With a significant proportion of men engaging in chemsex already living with diagnosed HIV, and who largely report anti-retroviral therapy adherence (Hickson *et al*., 2016; Schmidt *et al*., 2016), the potential for HIV transmission within chemsex environments is less certain, but still possible. In addition, the potential for toxic drug interactions to negatively impact HIV clinical outcomes is emerging and multifaceted (Garin *et al*., 2017).

Despite sustained media interest in the topic (Strudwick *et al*., 2016; New Scientist, 2017), there are limited data to inform estimates on the prevalence of chemsex among men who have sex with men anywhere in the British Isles, and little quantitative data to inform understandings of associated sexual behaviours. Such estimates are critically important for planning services (e.g. specialised interventions for harm reduction) and allocating resources where they are needed most (e.g. chemsex intervention *v.* partner notification work). While there have been a variety of papers describing findings from clinical audits or involving clinical samples (Scrivner *et al*., 2013; Daskalopoulou *et al*., 2014; Hegazi *et al*., 2016), these may recruit a disproportionate proportion of men engaging in riskier behaviours and who recognise a need for health care engagement. An exception within the British Isles context comes in the Gay Men's Sex Survey (Hickson *et al*., 2016), which reports overall prevalence of chemsex among MSM living in England (but does not include the other countries within the British Isles) of 6.6%. However, this measure accounts for all contexts in which these drugs are used and does not specifically indicate whether they were used in a sexual context.

This paper aims to establish prevalence of the use of drugs associated with chemsex, and for the first time, the extent to which they are actually used in a sexual context, as well as determine the associated behaviours and circumstances of use. Such data will be of use to those planning service provision, those designing and delivering sexual health promotion and harm reduction interventions in diverse settings. With no data from the last five years focusing on countries or nations of the British Isles other than England, here we focus on gay, bisexual and other MSM living in Scotland, Wales, Northern Ireland (NI) and the Republic of Ireland (RoI).

Methods

Population, sampling and recruitment

The Social Media, MSM and Sexual and Holistic Health (SMMASH2) survey collected anonymous, self-complete questionnaires from men recruited online via gay-specific sociosexual media websites (Gaydar, Recon and Squirt) and smartphone apps (Gaydar, Recon, Grindr, Growlr and Hornet) between April and June 2016. All members of these sociosexual media whose i) profile location, ii) computer IP address or iii) smartphone GPS coordinates were located in Scotland, Wales, NI or RoI, were invited to participate as follows; each profile was sent two message blasts (either as a pop-up message [Gaydar, Recon, Grindr, Growlr and Squirt] or an inbox message [Hornet]) asking them to participate in our survey. In addition, banner advertisements, designed to fit the character of each website/app, were employed to advertise the survey on Gaydar, Recon, Grindr, Growlr, Hornet and Squirt. Clicking on the message blast or banner ad took participants to our survey landing page, which provided full details of the survey, highlighting they were under no obligation to take part and that participation was taken as evidence of consent. No financial incentive was given and participants were asked not to complete the questionnaire if they had already done so, but duplicates were not screened for. Fraudulent and partial entries were screened and deleted. Participants were provided with details of local sexual and mental health services online upon survey completion or exit. Each site/app has a minimum user age of 18, but some men aged 16–17 did participate. In total, 3217 men completed useable questionnaires.

Survey content

Questionnaires surveyed demographics (age, ethnicity, sexual orientation, educational qualifications, relationship status and financial worries), sexual health indicators (HIV testing and status), commercial sex experience and various sexual behaviours in the previous 12 months. A measure of condomless anal intercourse (CAI) with higher risk for HIV infection was derived to

include men who reported CAI with ≥ 2, casual, and/or HIV status unknown/serodiscordant partners in the previous 12 months (compared with men reporting CAI with 0/1, regular and/or HIV status known/seroconcordant partners only). These measures were developed and used previously in the MRC Gay Men's Sexual Health Survey (McDaid *et al*., 2016) and SMMASH study (Frankis *et al*., 2016). Participants were also asked questions about their use of illicit drugs (adapted from EMIS; Schmidt *et al*., 2016), including lifetime experience of illicit drug use (defined here as 'e.g. cannabis, ecstasy, cocaine etc.') and when they last used crystal methamphetamine, mephedrone, GHB/GBL and ketamine respectively, the main 4 chemsex drugs (known colloquially as 'chems'). Men who reported chemsex drug use in the last year, were also asked, 'In the last 12 months, how much of the sex you've had was after taking [drug]' for each of these 4 chemsex drugs, with responses on a 7 point likert scale ranging from 'None of it' to 'All of it'.

Ethical approval was granted by Glasgow Caledonian University School of Health and Life Sciences Ethics Subcommittee (HLS id: HLS/NCH/15/26) and consent assumed by survey participation.

Analyses

Quantitative data were analysed with IBM SPSS 23 for Mac by the first author. Only men who answered questions about their lifetime drug use were included in this analysis (n = 2428), of whom half (51.2%, n = 1193) had never taken illicit drugs and half (48.8%, n = 1135) had. Chi-square tests and univariate logistic regression were used for bivariate comparisons. Variables significant at the bivariate level ($P < 0.05$) were entered into a multivariate logistic regression model to estimate the adjusted odds ratios (AOR) and 95% confidence intervals (CI) for reporting chemsex in the last year. Here we define 'chemsex' as reporting having at least some sex after taking a chemsex drug (crystal methamphetamine, mephedrone, GHB/GBL or ketamine) in the last year.

Results

Sample demographics, sexual behaviours and HIV testing

The characteristics of survey participants are shown in Table 1. Almost half of participants were recruited in Scotland, one quarter in RoI, with fewer in Wales and NI. The mean age of participants was 41 years (range 16–78, sd = 13.5), 97.3% were white and whilst most (81.9%) were gay identified, one in six were bisexual (17.2%) and several identified as straight (0.7%) or 'other' (0.2%). Around 1 in 20 (5.7%) identified as transgender. Almost two-thirds (62.7%) had a

degree or postgraduate level education. Over half (61.1%) were single, but 29.7% had a regular male partner (including same sex marriage and civil partnerships) and 9.2% had a regular female partner (including opposite sex marriage). Just under half (42.4%) said they had financial worries (sometimes, most, or all of the time). Most (82.3%) said they used the commercial gay scene (i.e. gay bars, clubs and saunas) once a month or less, with over half (51.4%) saying they never did. Overall, 92.0% were either HIV negative or untested, and 8.0% said they had tested HIV positive. Just over one third (36.2%) report high risk CAI, 6.7% said they had been fisted and 29.6% had attended a sex party / had group sex in the last year, respectively. A small proportion of men reported sex in return for money (2.4%) or 'anything else' (1.5%) in the last year. Half (50.5%) reported an HIV test in the last year and almost one quarter (22.2%) reported an HIV test in the last 3 months.

Table 1. Survey Sample Demographics, Sexual Behaviours and HIV testing (*n* = 2328)

	n	%
Country of Recruitment		
Scotland	1131	48.6
Wales	389	16.7
NI	176	7.6
RoI	632	27.1
Age		
18 - 25	374	16.1
26 - 35	491	21.2
36 - 45	549	23.7
> = 46	906	39.1
Ethnicity		
White	2260	97.3
Black	4	0.2
Asian	11	0.5
Mixed / Other	47	2.0
Sexual Orientation		
Gay	1890	81.9
Bisexual	398	17.2
Straight	17	.7
Other	4	.2
Gender Identification		
Transgender	131	5.7
Male	2165	94.3
Highest Qualification		
≤ Age 18 or equivalent	854	37.3
University Degree or equivalent	1056	46.2
Postgraduate degree or higher	377	16.5
Relationship Status		
Single	1417	61.1
Regular Male Partner	690	29.7
Regular Female Partner	213	9.2
Do you have any financial worries?		
Occasionally or never	1338	57.6
Sometimes, most or all of the time	984	42.4
Commercial Gay Scene Use		

≥ Twice a month	389	16.8
Once a month or never	1932	83.2
HIV Status		
HIV+	183	8.0
HIV-/Unknown	2104	92.0
Report High Risk CAI		
No	1468	63.8
Yes	833	36.2
Have you been fisted in the last year?		
No	2171	93.3
Yes	155	6.7
Have you been to a sex party / had group sex in the last year?		
No	1634	70.4
Yes	688	29.6
Have you received money in return for sex in the last year?		
No	2243	97.6
Yes	54	2.4
Have you had sex with someone in return for anything else (like cigarettes, drugs, food etc.) in the last year?		
No	2288	98.5
Yes	34	1.5
HIV test in the last year?		
No (includes never tested)	1141	49.5
Yes	1165	50.5
HIV test in the last 3 months?		
No (includes never tested)	1793	77.8
Yes	513	22.2

Illicit Drug use amongst MSM; individual and event level analysis

Participants' illicit drug use is shown in Table 2. Whilst almost half of participants had taken any illicit drugs in their lifetime (e.g. cannabis, ecstasy, cocaine etc.), lifetime chemsex drug use was far less common (crystal methamphetamine 5.1%; mephedrone 9%; GHB/GBL 10%; ketamine 11.5%) and fewer still reported using these drugs within the last year (crystal methamphetamine 2.5%; mephedrone 4.5%; GHB/GBL 4.9%; ketamine 3.8%). Only a small proportion of men (≤ 2% per drug) reported using any of these chemsex drugs in the last 4 weeks. In concert, whilst 18% (n = 435) of participants had used *any* chemsex drugs in their lifetime, only 8.2% (n = 198) had used them in the last year and just 3.0% (n = 72) had used them in the last 4 weeks.

In relation to event based sexualized drug use, we assessed the proportion of sexual events that incorporated the use of chemsex drugs. We asked those men who reported use of each chemsex drug in the last year what proportion of the sex they had had was after taking each drug, respectively. Combining these measures we found that of the 198 men who report any chemsex drug use in the last year, one quarter (27.1%, n = 55) reported no sex on chemsex drugs, almost half (46.2%, n = 91) said less than half of their sex was after taking chemsex drugs and one

quarter (25.9%, *n* = 51) said that half or more of their sex was after taking chemsex drugs. Thus for the whole sample of men in this study, 6.1% reported chemsex and 93.9% reported no chemsex in the last year. Stratifying this further, for the whole sample, most participants reported no chemsex drug use in the last year (91.7%, *n* = 2186), 2.3% (*n* = 55) reported non-sexual chemsex drug use only, 3.8% (*n* = 91) said that less than half of their sex was chemsex and 2.1% (*n* = 51) said that most of their sex was chemsex. Finally, a small proportion of men reported 'slamming' (injecting drugs themselves or by another person) chemsex drugs at sex parties in the last year (*n* = 30, 1.3%); although this represents 21% of those men who reported any chemsex in the last year.

Table 2. Use of Illicit Drugs and Chemsex Drugs

	n	%				
Have you ever taken illicit drugs?						
No	1193	51.2				
Yes	1135	48.8				
Have you taken the following drugs …	**Lifetime**		**In the last year?**		**In the last 4 weeks?**	
Crystal Methamphetamine	**n**	**%**	**n**	**%**	**n**	**%**
No	2270	94.9	2332	97.5	2369	99.0
Yes	122	5.1	60	2.5	23	1.0
Mephedrone						
No	2197	91.0	2306	95.5	2367	98.0
Yes	218	9.0	109	4.5	48	2.0
GHB/GBL						
No	2170	90.0	2293	95.1	2361	98.0
Yes	241	10.0	118	4.9	50	2.0
Ketamine						
No	2138	88.4	2323	96.2	2383	98.6
Yes	278	11.6	93	3.8	33	1.4
Have you taken any Chemsex Drugs?	**n**	**%**				
Never	1977	82.0				
In last Year	198	8.2				
> 1 year ago	237	9.8				
Any Chemsex in the last year?						
No	2186	93.9				
Yes	142	6.1				
What proportion of your sex was after taking Chemsex drugs? (amongst 198 men who report Chemsex drug use)						
None	55	27.1				
Less than half	91	46.2				
More than half	51	25.9				
How recently have you injected drugs, or had someone inject you with them, at a sex party?						
Never	2298	98.7				
In the last year	30	1.3				

Characteristics of men who report chemsex in the last year

We examined the characteristics of men who do and do not report chemsex in the last year (see Table 3). When controlling for the factors significant at the bivariate level in the multivariate regression analysis[1], the adjusted odds of the likelihood of reporting chemsex in the last year were

significantly higher for men aged 36–45 compared to 46+ (AOR = 1.96), single men (AOR = 1.83), men who report high risk CAI (AOR = 4.46), men who said they were fisted in the last year (AOR = 7.77), men who reported sex in exchange for goods other than money (e.g. cigarettes, drugs, food etc.) (AOR = 4.7), men who were HIV positive (AOR = 4.01) and men who reported an HIV test in the last 3 months (AOR = 1.53).

Table 3. Factors associated with reporting Chemsex in the last year.

ns = non-significant, * < 0.05, **P < 0.01, *** < 0.001

	No Chemsex (n = 2186, 93.9%)	Chemsex (n = 142, 6.1%)	Bivariate Regression Analyses		Multivariate Regression Analyses (n = 2210)	
	n (%)	n (%) Chi2 sig value	**OR (95% CI)**		**AOR (95% CI)**	
Country						
Scotland	1065 (94.2)	66 (5.8)^{NS}	1			
Wales	366 (94.1)	23 (5.9)	1.01	(0.62–1.65)		
NI	161 (91.5)	15 (8.5)	1.50	(0.84–2.7)		
RoI	594 (94)	38 (6%)	1.03	(0.68–1.56)		
Age						
18–25	355 (94.9)	19 (5.1)***	1.33	(0.75–2.36)	1.11	(0.57–2.15)
26–35	456 (92.9)	35 (7.1)	1.91	(1.18–3.09)**	1.65	(0.950–2.86)
36–45	496 (90.3)	53 (9.7)	2.66	(1.71–4.13)***	1.96	(1.18–3.26)*
≥ 46	871 (96.1)	35 (3.9)	1		1	
Sexual Orientation						
Gay	1768 (93.5)	122 (6.5)^{NS}	1			
Other MSM	398 (95.9)	17 (4.1)	0.62	(0.37–1.04)		
Gender						
Transgender	120 (91.6)	11 (8.4%) ^{NS}	1			
Male	2035 (94.0)	130 (6.0)	0.7	(0.37–1.33)		
Highest qualifications						
≤ Age 18 or equivalent	807 (94.5)	47 (5.5)^{NS}	1			
University Degree or equivalent	986 (93.4)	70 (6.6)	1.22	(0.83–1.79)		
Postgraduate degree or higher	353 (93.6)	24 (6.4)	1.17	(0.7–1.94)		
Relationship Status						
Single	1314 (92.7)	103 (7.3)**	1.74	(1.19–2.54)**	1.83	(1.18–2.85)**
Regular Partner	864 (95.7)	39 (4.3)	1		1	
Do you have any financial worries?						
Occasionally or never	1268 (94.8)	70 (5.2)*	1		1	
Sometimes, most or all of the time	912 (92.7)	72 (7.3)	1.43	(1.02–2.01)*	1.29	(0.86–1.92)
HIV Status						
HIV+	139 (76)	44 (24)***	6.55	(4.41–9.73)***	4.01	(2.49–6.47)***
HIV-/Unknown	2007 (95.4)	97 (4.6)	1		1	
Report High Risk CAI						
No	1438 (98)	30 (2)***	1		1	
Yes	725 (87)	108 (13)	7.14	(4.72–10.81)***	4.46	(2.85–6.97)***
Have you been fisted in the last year?						
No	2081 (95.9)	90 (4.1)***	1		1	
Yes	103 (66.5)	52 (33.5)	11.67	(7.87–17.32)***	7.77	(4.9–12.38)***
Have you been to a sex party / had group sex in the last year?						

No	1593 (97.5)	41 (2.5)***	1			
Yes	587 (85.3)	101 (14.7)	6.69	(4.59–9.73)***		
Have you received money in return for sex in the last year?						
No	2111 (94.1)	132 (5.9)**	1		1	
Yes	46 (85.2)	8 (14.8)	2.78	(1.29–6.01)**	1.56	(0.6–4.10)
Have you had sex with someone in return for anything else (like cigarettes, drugs, food etc.) in the last year?						
No	2157 (94.3)	131 (5.7)***	1		1	
Yes	23 (67.6)	11 (32.4)	7.88	(3.76–16.5)***	4.7	(1.67–13.21)**
HIV test in the last year?						
No (includes never tested)	1090 (95.5)	51 (4.5)**	1			
Yes	1075 (92.3)	90 (7.7)	1.79	(1.26–2.55)**		
HIV test in the last 3 months?						
No (includes never tested)	1710 (95.4)	83 (4.6)***	1		1	
Yes	455 (88.7)	58 (11.3)	2.63	(1.85–3.73)***	1.53	(1.02–2.3)*

Discussion

This is the first study of chemsex across Scotland, Wales, NI and RoI, and the first therein to distinguish chemsex drug use *per se* from its specific use within sexual contexts. Within this on-line sample of MSM, we have demonstrated the low prevalence of chemsex drug use overall (8.2% within the previous 12 months), in contrast to the relatively high levels of illicit drug use at the individual level. Our study also indicates that not all chemsex drug use occurs within a sexual context, as more than a quarter (27.1%) of those who had used chemsex drugs reported no sex while under their influence. However, a quarter (25.9%) of those who had used chemsex drugs said that the *majority* of their sex occurred after taking them. Our findings clearly demonstrate that the use of drugs associated with chemsex is a minority behaviour across the UK, supporting research in England (Hickson *et al*., 2016), but expands our awareness of the proportion of sex that is had under their influence.

While our findings suggest around one in seventeen (6.1%) MSM have engaged in chemsex within the last year, these men were more likely to be aged 36–45, single, report high risk CAI, report being fisted, report group sex, exchanging sex for non-financial benefits (e.g. cigarettes, drugs, food etc.) and an HIV positive status, providing clear targeting for intervention. It is also essential to acknowledge that while there may be a relatively low population prevalence of chemsex in the British Isles as a whole, it is likely that this behaviour is geographically concentrated in large gay urban centers (e.g. Brighton, Manchester, London; Schmidt *et al*., 2016). These high levels of associated risk taking and inequalities suggest the importance of early identification of those who may be most vulnerable to chemsex-related harm and the need to develop a specialised responsive patient pathway to address the specific needs of those who may benefit most from intervention. Our findings also suggest many of these men were already in

touch with services, because of their HIV care or recent HIV testing history, meaning that existing sexual health services represent a suitable conduit for timely intervention.

With regard to future intervention development, the findings here highlight several opportunities for further focused research. It is important to learn about those salutogenic factors, or assets, that enable most of men who engage with illicit drugs to avoid problematic drug use. Equally, for those who reported lifetime-use of chemsex drugs, understanding how they have maintained and managed episodic or one-off use, rather than continuous or repeated use, may inform interventions for problematic drug use. A thorough consideration of the pathways in and out of illicit drug use and sexualized drug use in particular may benefit the provision of culturally appropriate guidance for the wider MSM population.

Whilst the relationship between chemsex and sexual risk taking is important to consider, we must acknowledge that our study design does not allow us to conclude that this is necessarily a causal relationship. Indeed, a wide variety of additional factors and inter-related health inequalities likely contribute to sexual risk taking and HIV/STI transmission within this context (Melendez-Torres & Bourne, 2016; Bourne & Weatherburn, 2017). Thus, it is probable that other issues of vulnerability observed amongst MWEC herein (e.g. exchanging sex for cigarettes/drugs/food; financial worries), as well as other unrecorded issues, impact synergistically upon their sexual risk taking, necessitating a more holistic intervention than focusing just on sexualized drug taking. That MWEC were over four times more likely to report an HIV positive status suggests one means of targeting such men (e.g. within a clinical consultation) and higher rates of HIV testing suggest that HIV negative MWEC are at least aware of harm reduction in this context. However, as we measured neither PrEP use nor viral load in this study, we are unable to further comment on more sophisticated harm reduction behaviours. In addition, the relationship between chemsex and group sex provides the potential for sexual health and harm reductions to target sex party organisers, whilst the association with fisting raises the importance of promoting hepatitis C awareness amongst the gay community.

A clear limitation of this study is that participants were sampled through gay sociosexual media, where most users are ostensibly seeking new sexual partners. Thus, this may represent a more sexually active sample of MSM in these countries, at least in terms of seeking new sex partners, which may not be representative of men who do not use such sites. While problems of accessibility may exist for small proportions of the target population, recently published modelling indicates that online surveys of MSM in the UK can result in samples that are not significantly divergent from considerably more expensive venue-based sampling (Prah *et al*.,

2016). That said, 83.2% of men in this sample reported using the commercial gay scene once a month or less, suggesting a minimal overlap with a venue-based study. It was not possible to calculate a response rate for these data, given the nature of online surveys and men's use of multiple sites/profiles. However, the demographic profile and sexual behaviours of the sample achieved herein was comparable to other surveys of MSM (e.g. McDaid *et al*., 2016), which supports the wider generalizability of these data. A clear limitation is that our results rely on estimates of self-reported behaviours, spanning the previous year, rather than any objective measure of behaviour. Moreover, we are relying on recall of drug-taking behaviours, which may themselves impact recall accuracy. Nevertheless, such self-report estimates are ubiquitous within online cross-sectional surveys and no methods to provide more objective measures are available. Finally, our analyses and conclusions assume an at least partially causal relationship between chemsex, drug taking, sexual risk taking and demographic characteristics (which are themselves likely to be bidirectional relationships) which given the correlational nature of our cross-sectional study design must be interpreted with caution, though this generic criticism applies to much public health behavioural research.

In observing the relatively small proportion of men who engage in chemsex, it is crucial that those funding, designing and delivering sexual health interventions for gay, bisexual and other MSM also recognise their particularly acute needs (Bourne *et al*., 2015a). Recognising and understanding diverse motivations for engaging in chemsex is central to helping men manage their drug use and reduce the harms to themselves or others (Weatherburn *et al*., 2016). While not all MSM who engage in chemsex will experience difficulties, those that do require tailored harm reduction and psycho-therapeutic interventions. These should be positioned within broader programs that address syndemic health inequalities and support the holistic sexual health of gay, bisexual and other MSM, rather than focusing on singular issues or behaviours (Singer *et al*., 2017).

Conflict of Interest

The authors declare no conflicts of interest.

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[1] The 'sex party' variable was excluded, as chemsex frequently occurs at sex parties so these variables were too similar, and the 'HIV test in the last year' variable was excluded because this was too similar to 'HIV test in the last 3 months', which was stronger predictor at the bivariate level.