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**Predictors of crystal methamphetamine use in a community-based sample of UK men who have sex with men**

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## **Abstract**

**Background.** Crystal methamphetamine ('crystal meth') use by men who have sex with men is an ongoing public health issue in the UK. We conducted a descriptive epidemiological study to characterise demographic and socio-sexual risk factors for crystal meth use in a national sample of UK MSM recruited in late 2014.

**Methods.** We used data from the 2014 Gay Men's Sex Survey (n=16,565), an online community-based survey in the UK. We used logistic regression to relate risk factors to last-year use of crystal meth.

**Results.** In univariate models, crystal meth use was significantly associated with being between the ages of 30 and 49 (30-39, OR 2.24; 40-49, OR 2.21), living in London, having received a positive HIV test result (OR 7.37, 95% CI [6.28, 8.65]), and with higher education qualifications (1.40, [1.13, 1.75]), as well as with having multiple steady (2.15, [1.73, 2.68]) and non-steady (13.83, [10.30, 18.58]) partners with condomless anal intercourse. Relationships were similar in multivariate models, but education was no longer associated with last-year crystal meth use and lack of full-time employment was.

**Conclusions.** This analysis confirms and updates previous findings from the UK. Crystal meth use may now be more concentrated in London since previous surveys. This analysis presents novel findings regarding the association between number and sexual risk with partners and last-year meth use.

**Keywords:** epidemiology; crystal methamphetamine; men who have sex with men

## **Introduction**

Crystal methamphetamine ('crystal meth') use by men who have sex with men (MSM) has been a public health concern in the United States and Australia for almost 20 years (Reback, 1997; Southgate & Hopwood, 1999), with reports of MSM using crystal meth in sexualised contexts because of its sensation-enhancing qualities and for its effects on sexual performance (Digiusto & Rawstorne, 2013).

Despite debate in the UK the mid to late 2000s about the potential impact of crystal meth on the gay community, concern has increased in the last two years with the emergence of 'chemsex' (Bourne, Reid, Hickson, Torres-Rueda, Steinberg, et al., 2015) and the resulting call for chemsex to be seen as a public health priority (McCall, Adams, Mason, & Willis, 2015). Chemsex is the intentional combining of illicit drugs ('chemicals') with sex in order to facilitate or enhance both experiences. The drugs most commonly associated with chemsex in the UK include crystal meth, methylmethcathinone ('mephedrone') and gammahydroxybutrate ('GHB', sometimes taken as gamma-butyrolactone or 'GBL'). These drugs can induce euphoria and disinhibition, enhance sexual arousal and increase sexual performance. 'Chemsex' is also known as 'party and play' in North America and Australia (Mimiaga et al., 2008; Prestage et al., 2009).

As a recent systematic review of observational studies on drug use and MSM (Vosburgh, Mansergh, Sullivan, & Purcell, 2012) concluded, crystal meth use is consistently associated with sexual risk behaviour, such as condomless anal intercourse (CAI, defined as an anal intercourse episode without condom use), at the level of the sexual encounter. This is supported by more recent analyses conducted on samples of UK MSM examining dyadic new partner encounters (Melendez-Torres, Hickson, Reid,

Weatherburn, & Bonell, 2015a) and multi-partner encounters (Melendez-Torres, Hickson, Reid, Weatherburn, & Bonell, 2015b).

Yet individual-level risk factors for crystal meth use in UK MSM remain poorly characterised. Qualitative investigation on chemsex with MSM in South London suggests that crystal meth use specifically facilitates situations in which STI and HIV transmission can occur (Bourne, Reid, Hickson, Torres-Rueda, & Weatherburn, 2015). Past analyses have suggested that crystal meth use is concentrated in London (Bonell, Hickson, Weatherburn, & Reid, 2010), and analyses have suggested prevalence of crystal meth use in community-based samples of MSM ranging from 4.7% in national surveys (Bonell et al., 2010) to one in five for MSM recruited in central London gyms (Bolding, Hart, Sherr, & Elford, 2006).

Understanding which MSM are using crystal meth is important to develop a targeted harm reduction and HIV prevention agenda. The last study to characterise risk factors for crystal meth use in a national sample of UK MSM relied on data from the 2007 round of the Gay Men's Sex Survey (Bonell et al., 2010) and is insufficient to inform current debates on this issue. We present here a descriptive epidemiological study to characterise demographic and socio-sexual risk factors for crystal meth use in a national sample of UK MSM recruited in late 2014 as part of the Gay Men's Sex Survey (GMSS).

## **Methods**

The 2014 GMSS, an open-access, internet-based community-based survey of UK MSM conducted to understand the level and distribution of HIV risk behaviours and prevention needs relevant to health promoters in the UK, recruited through gay dating websites and apps, Facebook, and a variety of community based organisations'

websites in summer 2014. Inclusion criteria were men, living in the UK, aged 16 or over, and who identified as gay, bisexual or some other non-heterosexual identity.

Our dependent variable was any reported crystal meth use in the last year. We chose last-year use because it balanced the aim of investigating recent crystal meth use with the need to develop statistical models that are estimable—a challenge when examining a low level of specific drug use in a survey sample. We selected predictor variables as far as possible for comparison with past UK-based studies of illicit drug use in this population. We first examined frequencies of the dependent and predictor variables in the sample. We then estimated all models as univariate logistic regressions, and then as a multivariate model with all predictor variables.

## **Results**

A total of 16,565 MSM contributed to the analysis sample. Of these, 4.5% (n=747) reported using crystal meth in the last year. Overall, 7.9% (n=1,310) reported ever using crystal meth, and 1.9% (n=316) reported crystal meth use in the last four weeks. Less than one in a hundred respondents (0.97%, n=161) reported crystal meth use in the last week. MSM in the analysis sample were, on average, 35.1 years of age (SD=13.2). Nearly half (48.6%) reported having a university degree. Respondents were roughly equally split between the four regions in England (from 24.1% in London to 21.1% in the Midlands and East of England), though in total 8.8% of respondents came from the devolved nations. More than two-thirds (67.2%) reported that their last HIV test was negative, while 24.0% reported never receiving an HIV test and 8.8% reported being HIV positive. Of the 15.7% of respondents who reported a non-gay sexual identity, 65.6% reported that they identified as bisexual, and 1.3% reported that they identified as straight, and 8.9% reported that they identified as queer. The

remaining 24.1% of respondents either preferred any other term or reported not usually using one.

Frequencies of predictor variables and regressions are presented in Table 1. Several significant associations were present in initial univariate models. Crystal meth use in the last year was most prevalent in MSM aged 30-49, with similar odds ratios in each category (ORs 2.24, 2.21 respectively; both  $p < 0.001$ ). MSM with university degrees were more likely to report having used crystal meth in the last year than MSM with no tertiary qualifications (OR 1.40, 95% CI [1.13, 1.75]). Crystal meth use was still reported most often by respondents from the London region, with prevalence in the south of England a distant second (0.31, [0.25, 0.38]). Compared to MSM who last tested negative for HIV, MSM who tested positive were more likely to have reported crystal meth use (7.37, [6.28, 8.65]), while men who had never tested were least likely (0.20, [0.13, 0.29]). Respondents reporting multiple steady partners (described in the survey as ‘boyfriends or husbands that mean you are not “single”, but not to partners who are simply sex buddies’) had higher odds of CAI than those reporting no steady partners (2.15, [1.73, 2.68]), or one steady partner with or without CAI. Respondents reporting one or more non-steady partners (described in the survey as ‘men you have had sex with once only, and men who have sex with more than once but who you don’t think of as a steady partner), with or without CAI, also reported higher odds of CAI. Finally, MSM who reported their sexual identity as something other than ‘gay’ were less likely to report last-year crystal meth use (0.55, [0.43, 0.70]). Employment was not significantly associated with crystal meth use.

In a multivariate regression, associations with region of residence and HIV testing history remained significant and in the same direction as compared to the

univariate models. Not being in full-time employment was, newly, a significant predictor of increased odds of crystal meth use (OR 1.25, 95% CI [1.03, 1.50]). Highest qualification and sexual identity were no longer significantly associated with last-year crystal meth use (all  $p>0.05$ ). The pattern of associations between age and last-year crystal meth use was similar to the pattern seen in the univariate model, though being under 20 years of age was no longer associated (0.97,  $p>0.05$ ) and being 60 years of age and older was (0.54, [0.30, 0.95]). The strongest association by magnitude of effect was with number and type of non-steady partners, as respondents with two or more non-steady CAI partners in the last year had odds more than eight times greater of reporting last year meth use (8.08, [5.80, 11.25]) and respondents with one non-steady CAI partner had odds about two and a half times greater (2.45, [1.63, 3.66]). In the variable testing associations between steady male partners and last-year crystal meth use, only having multiple steady partners with CAI was associated with increased odds of last-year crystal meth use (1.60, [1.23, 2.09]).

## **Discussion**

This paper confirms earlier quantitative findings (Bonell et al., 2010) that crystal meth use is much more common in London than elsewhere in the UK. Moreover, it appears that although prevalence of self-reported last-year use of crystal meth appears to not have changed (4.5% in this analysis as compared to 4.7% reported in Bonell et al. (2010)), crystal meth use may have become more concentrated in London now.

Similar to Bonell and colleagues' 2010 analysis, we found that last-year crystal meth use was highest in MSM aged 30 to 49. Findings on the relationship between age and crystal meth use match findings from another recent, large-scale study of associations with drug use undertaken with HIV-positive MSM in the UK

(Daskalopoulou et al., 2014). Our findings on crystal meth use by HIV testing status were also similar, again indicating much higher use among men with diagnosed HIV.

Our findings also go beyond previous reports in several important ways. While Bonell and colleagues (2010) examined number of male sex partners, we were able to deconstruct non-steady and steady male partners. These findings update, extend and mirror previous evidence from South Florida, USA on the association between reporting any non-steady sex partners and crystal meth use (Forrest et al., 2010), and demonstrate that these relationships persist even in multivariate models. This relationship is important because pathways to sexual risk may be different by perceived intimacy with partner (Purcell et al., 2014; Zea, Reisen, Poppen, & Bianchi, 2009). We found that while having a steady partner was protective against last-year crystal meth use, having two or more steady partners with CAI increased the odds of reporting last-year crystal meth use. Thus, the rate of switching, or concurrency between, steady sexual partners may increase the risk of STI transmission even in the context of relationships that may be characterised by ‘negotiated safety’ and strategic positioning (e.g. assuming the insertive role in anal intercourse when HIV negative in a serodiscordant encounter), among other tools for management of risk in open relationships (Hickson et al., 1992; Holt, 2014). In contrast, having any non-steady partners, even without CAI, increased odds of last-year crystal meth use, and having two or more non-steady partners with CAI increased odds of last-year crystal meth use more than six times as much as having two or more steady CAI partners. Because HIV is most readily transmissible in its acute stage, frequently before a diagnosis is made, rapid rotation of non-steady partners increases the probability of onward transmission. Crystal meth use is associated at the encounter level with increased sexual risk, particularly in encounters located in sex-on-

premises venues (Melendez-Torres et al., 2015a). Moreover, crystal meth use may lead to sex that may be especially risky, including due to tissue damage (Bourne, Reid, Hickson, Torres-Rueda, & Weatherburn, 2015). Thus, the association between high numbers of non-steady partners with CAI and crystal meth use presents a challenge for HIV prevention, as not only are MSM reporting crystal meth use having more risky sexual encounters, but those encounters themselves may be riskier than would otherwise be the case.

However, in the face of treatment as prevention and pre-exposure prophylaxis (PrEP), these high rates of CAI as associated with crystal meth use may not continue to be as important in understanding HIV transmission as they are in understanding STI transmission more generally. When used as prescribed, antiretroviral treatment—either for HIV positive people, or for those at high risk of acquiring HIV—can reduce the risk of HIV transmission to very low levels (Grant et al., 2010; Hamlyn et al., 2010). While population coverage of these interventions is unlikely to eliminate HIV transmission, these findings do suggest that specific population subgroups should be targeted by PrEP and frequent testing to detect early cases of HIV.

Our analysis is limited in several important ways. In this cross-sectional study, we aimed to describe demographic and socio-sexual characteristics that were associated with last-year crystal meth use, rather than examining causality. Though we were able to recruit a national convenience sample, it is possible that our sample may have been more likely to report risky behaviours and to be open about their sexuality than a true probability sample, as prior research has suggested (Dodds, Mercer, Mercey, Copas, & Johnson, 2006; Evans, Wiggins, Bolding, & Elford, 2008). Further, because this was a convenience sample within the context of a cross-sectional survey, our comparisons to

2007 data are only tentative. The surveys differed in terms of their recruitment methods; the survey analysed here was conducted entirely online, compared to the 2007 survey which incorporated both paper and online versions. Finally, we were unable to analyse Wales, Northern Ireland and Scotland separately because of sparse data on the outcome.

This study provides an updated epidemiological profile of the distribution of crystal meth use in UK MSM. While the proportion of MSM in the UK utilising crystal meth remains small, there is evidence of significant, unmet harm reduction need among this group (Bourne, Reid, Hickson, Torres-Rueda, Steinberg, et al., 2015). Concern has been expressed that existing drug harm reduction services may lack an awareness or understanding of gay sexual contexts in which much crystal meth use occurs (Bourne, Reid, Hickson, Torres-Rueda, Steinberg, et al., 2015; Matheson, Roxburgh, Degenhardt, Howard, & Down, 2010). It is critical these services be resourced to meet the specific needs of MSM and partner with LGBT organisations who have such experience and expertise (London Friend, 2015). From a cultural studies perspective, harm reduction services should be responsive to the specific ways in which contextual factors and drug use trends interact to produce ‘emergent’ harms (Race, 2014). Specific harms may accrue to MSM who use crystal meth as a result of the contexts in which it is used. To be successful, harm reduction services should consider these specific harms carefully. Future research should continue investigating patterns of use, including distinguishing between occasional or episodic use and drug use that may be problematic.

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## **Tables**

**Table 1.** Variable frequencies and model results.