

Sexualized drug use (chemsex and methamphetamine) and men who have sex with men

? Questions

- What is the impact of sexualized drug use (specifically of chemsex and methamphetamine) on the health of men who have sex with men?
- What are effective interventions and/or services that address chemsex and methamphetamine use among men who have sex with men (including prevention, harm reduction, engagement in care and treatment)?

🔑 Key Take-Home Messages

- Chemsex (1, 2) and methamphetamine use (3, 4) are associated with sexual health-related harms among men who have sex with men.
- Methamphetamine is the most commonly reported drug in sexualized drug use among men who have sex with men (2).
- Several interventions – including motivational interviewing and contingency management – report concurrent, efficacious effects on both methamphetamine use and sexual health-related outcomes among men who have sex with men (5).
- Considering the context of sexualized drug use may lead to a better understanding of how methamphetamine is used as a social and sexual resource among men who have sex with men (6); more qualitative research exploring the social-sexual context is needed (7).

! The Issue and Why it's Important

Sexualized drug use is when recreational drugs are taken in order to facilitate sexual activity (2). Among men who have sex with men, aggregate research has identified a relationship between substance use and sexual risk behaviours (8).

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In the past decade, drug use trends among men who have sex with men have shifted (9–11). ‘Club drugs’, such as cocaine and ecstasy, appear to be less popular than drugs associated with ‘chemsex’, which include methamphetamine, mephedrone, gamma-hydroxybutyrate (GHB), and gamma-butyrolactone (GBL) (9, 12). Chemsex (also known as ‘party and play’) (10) is a specific subset of sexualized drug use, and has been associated with increased sexual risk behaviours and negative health outcomes (1). Use of methamphetamine is of particular concern, as its use is consistently associated with sexual risk behaviours among men who have sex with men (3, 13).

This review: explores the impact of sexualized drug use among men who have sex with men, with a particular focus on chemsex (a *behaviour*) and methamphetamine (a *substance* associated with chemsex); describes effective interventions to address individual harms associated with each; and discusses sex-based sociality, a concept that describes how social life among men who have sex with men may be sexually constructed (7).

What We Found

Sexualized drug use among men who have sex with men

Two systematic reviews, published in 2019, examined sexualized drug use among men who have sex with men (1, 2). Tomkins et al. broadly examined the issue of sexualized drug use on a global scale (2), while Maxwell et al. examined chemsex in high-income countries (1). A scoping review by Edmundson et al. (2018) also investigated the prevalence of sexualized drug use in the UK (9).

The systematic review by Tomkins et al. explored recreational drug use in men who have sex with men and high-risk sexual practices, sexually transmitted infections, and barriers to accessing specialist support (2). Of the 112 studies included in the review, methamphetamines were the most commonly reported drug (44 studies, or 39%). Crystal methamphetamine specifically was reported in 38 studies (34%). The prevalence of chemsex was reported in 38 of the 112 studies (34%), and was associated with condomless sex, group sex, transactional sex, and negative health outcomes such as sexually transmitted infections and mental health issues (2). The Maxwell et al. systematic review on chemsex had similar results, in addition to finding that HIV-positive men who have sex with men are more likely to engage in chemsex behaviours (1). The phenomenon of chemsex is discussed in more detail in the next section.

Similarly, the scoping review by Edmundson et al. distinguished between different forms of substance use: sexualized drug use and chemsex (9). However, a third category was also included: the use of chemsex drugs in an undefined context, which authors

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7. Hopwood M, Cama E, Treloar C. Methamphetamine use among men who have sex with men in Australia: A literature review. 2016. Available from: https://www.unswworks.unsw.edu.au/primo-explore/fulldisplay?vid=UNSWORKS&docid=unsworks_modsunsworks_43428&context=L Accessed April 23, 2019.

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9. Edmundson C, Heinsbroek E, Glass R, Hope V, Mohammed H, White M, et al. Sexualised drug use in the United Kingdom (UK): A review of the literature. *International Journal of Drug Policy*. 2018;55:131–48.

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11. Kurtz SP. Post-circuit blues: Motivations and consequences of crystal meth use among gay men in Miami. *AIDS and Behavior*. 2005;9(1):63–72.

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titled “chemsex drug use”. Studies in this category provided data on chemsex-specific drugs, but lacked event-level data (i.e. data specific to drug use prior to or during sexual activity). Authors also noted that while the use of specific drugs associated with chemsex is not limited to sexual contexts, “chemsex drug use” can be used as a direct proxy for chemsex (9). This review concluded that prevalence estimates varied greatly, and that sexualized drug use and chemsex are poorly understood in the UK (9).

All three reviews found similar challenges when synthesizing evidence on sexualized drug use. The use of heterogeneous sampling techniques produced prevalence estimates that varied considerably (1, 2, 9). Authors also found that studies recruited participants from sexual health or drug treatment services, which likely produced inaccurate estimates of prevalence (1). Two reviews also discussed the difficulty of defining chemsex (1, 9), with one review noting that definitions can vary based on participant preferences, availability of specific drugs, and diverse subcultures (1).

The review by Tomkins et al. found that methamphetamine use was the most frequently reported drug among included studies, and one of the most common drugs used in chemsex (2). Similarly, Maxwell et al. found methamphetamine to be the most commonly injected drug (1). Two other systematic reviews found that sexual risk behaviour is consistently associated with methamphetamine (3, 13); one found that HIV-positive men who have sex with men are more likely to report high-risk sexual behaviours, sexually transmitted infections, and serodiscordant unprotected anal intercourse (3).

In addition to the evidence from academic literature, several books (14), editorials (15, 16), films (17, 18), and theatre productions (19, 20) have explored chemsex and/or use of methamphetamine and associated harms. Most recently, a documentary titled *Crystal City* (2019) examines how crystal methamphetamine addiction has threatened gay communities in New York City (21). Two recent editorials – one featured in *NOW* magazine, the other in *The Globe and Mail* – discuss the rising use of crystal methamphetamine by gay men in Toronto, noting parallels between the current methamphetamine epidemic and the AIDS epidemic of the 1980s (15, 16).

Chemsex

As noted in the previous section, reviews of sexualized drug practices found that studies used different definitions and terminology when describing sexual drug practices of men who have sex with men.

Chemsex is a colloquial term describing a particular subset of sexualized drug use among gay, bisexual, and other men who have sex with men (22–24). Also known as ‘party and play’ in Canada (25), the U.S (9), and Australia (9), chemsex can generally be

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described as intentionally engaging in sexual activity while under the influence of psychoactive drugs (23), which commonly include methamphetamine, mephedrone, and Gamma-hydroxybutyrate (GHB)/Gamma-butyrolactone (GBL) (1, 26). Methamphetamine or mephedrone can also be injected to get a better rush or high (27). Termed 'slamming' or 'slamsex', this is a high-risk practice that can lead to transmission of HIV and hepatitis C through use of shared injecting equipment (28).

Using these particular recreational drugs in a sexual context can facilitate, disinhibit, enhance, or sustain the sexual experience (9). Other drugs can also be involved such as Viagra™, ketamine, cocaine, and amyl/alkyl nitrates (poppers), but these are not considered 'chems' as they do not provide the high and instead are considered casual additions to the high that is associated with mephedrone, GHB/GBL, and methamphetamine (26). However, some studies classify ketamine and cocaine as chemsex drugs (1, 29).

In Canada, drugs commonly associated with party and play include crystal methamphetamine, GHB, and ketamine (25). CATIE has compiled evidence from some Canadian studies and suggests that, while there is no clear estimate of participation, national estimates of gay, bisexual, and other men who partake in party and play range from 5% to 20% (25). A study conducted at World Pride in Toronto in 2014 found that among 1,123 men who have sex with men, 8.0% (n=89) used stimulants (other than prescribed), 4.7% (n=52) used cocaine, 2.0% (n=22) used methamphetamine, 1.8% (n=20) used GHB, 1.7% (n=19) used ketamine, and 1.4% (n=16) used amphetamines in the past 24 hours (30).

Chemsex is not necessarily a traditional sex and drug use issue; rather, chemsex is related to particular cultural features unique to gay men that may complicate their enjoyment of sex (24). These factors can include society's negative attitudes towards homosexuality, the trauma and stigma of the AIDS epidemic, and sexual performance expectations (26). For some men, chemsex allows for "...a different kind of liberation", allowing men to engage in the kind of sex they value while being free from insecurities and anxieties (31). Interviews among drug-using men who have sex with men in Germany (n=75) found that drugs were used to achieve 'cognitive freedom' so that sexuality could be experienced free from care (32).

Chemsex is associated with extended sessions of condomless sex with multiple partners who often are unaware of their serostatus or HIV treatment status (9). One way participants arrange these sessions is through geospatial networking apps, where users can identify local sessions (33). Known as 'chillouts', gatherings are typically hosted at private residences (34), can last for days (34, 35), involve little sleep (35), and several casual sex partners (35). Chemsex has been described by participants as a hedonistic sexual

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experience (35) and an “...extreme fringe of gay sex culture” (36).

The systematic review by Maxwell et al. examined chemsex behaviours in high-income countries (1). Thirty-eight studies were included in the analysis. The review suggests that multiple negative health outcomes are associated with chemsex. Authors found that:

- Men who have sex with men who engage in chemsex are more likely to engage in high-risk sexual behaviours, such as unprotected anal intercourse.
- HIV-positive men who have sex with men are more likely to engage in chemsex.
- Chemsex behaviours are associated with increased risk of acquiring HIV and other sexually transmitted infections.
- The social functioning and mental well-being of men who engage in chemsex may be negatively impacted by this behaviour.

Authors discuss the difficulty of conducting a systematic review on chemsex behaviours. It is challenging to identify and reach representative populations, to classify and measure an uncommon behaviour, and, due to the heterogeneous sampling techniques of included studies, to estimate prevalence (1). While Maxwell et al. conclude that it is likely a minority of men who have sex with men who engage in chemsex (1), Edmundson et al. suggest that the prevalence of chemsex is difficult to determine (9), and Tomkins et al. suggest a wide-ranging prevalence estimate of 10%–94% (2).

The Edmunston et al. review also notes that “...not all SDU [sexualized drug use] or [c]hemsex is problematic and it is possible for participation to be nondetrimental to health and wellbeing if appropriate precautions are made” (9). While no articles in particular are cited alongside this assertion, some editorials found in the grey literature have suggested that chemsex may be manageable (37, 38).

Other research articles suggest that chemsex may have some positive effects among men who have sex with men. For example, one qualitative study explored the motivations and values associated with chemsex in London (31). A total of 30 gay men who had used crystal meth, mephedrone, and/or GHB/GBL with sex in the past 12 months participated in private, semi-structured interviews. After analysis, authors found two major themes that described the benefits of chemsex: it allowed men to have the sex that they wanted (e.g. reduced inhibitions) and it enhanced the qualities valued in sex (e.g. increased intimacy) (31). Another article on the same sample found that, while some men engaged in high-risk sexual behaviours, others had strict, personal rules about protecting their health during chemsex (39). Authors concluded that about one-quarter of study participants demonstrated that drug use during sex was not

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34. Cash P. What’s behind the rise of chemsex? 2015. Available from: https://www.vice.com/en_ca/article/mvxxmv/whats-behind-the-rise-of-chemsex-902 Accessed March 25, 2019.

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inherently problematic (39).

Another qualitative study from London examined how men who have sex with men self-identify a chemsex problem and remain chemsex free (40). All participants (n=6) had attended a chemsex recovery program and detailed their chemsex journeys. A common narrative among the participants was that chemsex evolved from exciting and self-exploratory to an out-of-control, high-risk practice. However, all participants associated chemsex with a positive identity gain, noting that "...chemsex was intimately connected to their identity development and their experiences of living as a gay man, finding spaces to belong within gay communities and relationships" (40).

While these studies outline some favourable outcomes of chemsex, these appear to be limited compared to the numerous harms associated with this behaviour. The literature describing methamphetamine use, which is described below, follows a similar pattern.

Methamphetamine

When compared to other drugs, methamphetamine is set apart by the particular high that users experience (26). In the context of chemsex, when methamphetamine is combined "...with the neurochemical state of male arousal, and with a particular inhibition a person might have about sex, it creates an overwhelming sexual disinhibition and access to desires and fantasies that might previously have been recessed by religious, cultural, or psychological obstacles" (26). This next section provides a brief overview of methamphetamine, and includes a discussion of physiological impacts, propensity for addiction, associated harms, and casual use.

Methamphetamine is an illegal, powerful stimulant (41) that has a significant impact on the body's neurochemical systems (42). Neurons, the fundamental unit of the brain and nervous system, contain chemicals known as neurotransmitters (43). Neurotransmitters, such as dopamine, serotonin, and norepinephrine, are responsible for countless nervous system and bodily functions (44). While methamphetamine can affect serotonin and norepinephrine, it primarily impacts dopamine (45). Dopamine plays an important role in motor function, motivation, and the experience of reward and pleasure (46). Because the molecular structure of methamphetamine and dopamine are similar, methamphetamine can 'trick' neurons into taking up methamphetamine as they would dopamine (45). As a result, increased amounts of dopamine are released and its re-uptake is blocked (45, 46), resulting in a pleasurable, euphoric rush (41). Energy levels increase, as does alertness, confidence, and speech (41). Some users follow a "binge-crash" cycle where the drug is repeatedly taken for days and followed by a "crash", which leaves users vulnerable to health risks (47). With frequent use, the brain's

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natural stores of dopamine are eventually depleted, causing the individual to develop anhedonia, which is the inability to feel pleasure (42).

A synthetic drug, methamphetamine can be manufactured using a variety of starting materials and methods (42), such as inexpensive over-the-counter medications (46). The final product can be purchased as tablets, rock-like chunks (48), or as a powder that can be easily dissolved in water or alcohol (46); hence, it can be administered through oral, nasal, or intravenous routes (47). After smoking or injecting the substance into a vein, the rush is immediate; snorting causes effects in three to five minutes, and swallowing in 15-20 minutes (47). Tolerance to methamphetamine develops when it is taken repeatedly (46), and builds quickly in regular users (47). This means that the drug will need to be taken more frequently and in higher doses to feel the desired effect (46).

Two studies, both conducted in Europe, ranked methamphetamine as the third most harmful drug to individuals after heroin and crack cocaine (49, 50). The first study was based on findings from a day-long workshop conducted with members of the Independent Scientific Community on Drugs in the UK (currently called DrugScience) (49). Twenty of the most popular drugs in the UK were scored out of 100 based on 16 weighted criteria (i.e. multicriteria decision analysis modelling). Nine criteria related to harms produced in the individual including various negative physical, psychological, and social effects. Seven criteria related to harms in others, such as increased health care costs and crime (49). The second study, conducted with 40 delegates from 21 European Union member states who had expertise with licit and/or illicit drugs at the national level (50), used the same methods as the first study; however, delegates were not briefed on the results. Nonetheless, methamphetamine once again ranked as the third most harmful drug to individuals, after heroin and crack cocaine (50). Both studies also assigned a relatively low “harm to others” score for methamphetamine use.

Individual harms were divided into three sub-categories: social, psychological, and physical harms. Social harms were defined by the authors as “loss of tangibles” (e.g. income, housing, job, educational achievements) and “loss of relationships” (e.g. the extent of loss with family and friends) (49, 50). While these authors did not fully explore these issues among methamphetamine users in their analysis, grey and academic literature suggests that methamphetamine use could negatively impact employment and relationships among men who have sex with men (11, 15).

Chronic use of methamphetamine can also produce physiological harms in an individual, such as damage to neurological, cardiovascular, and pulmonary systems (51). Examples of this are detailed in peer-reviewed studies conducted among the general population:

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- One systematic review examining cognitive function among individuals with current and past methamphetamine use found that users performed poorly in several cognitive domains including psychomotor, working memory, attention, cognitive control, and decision making (52).
- Another systematic review found that delusions, auditory and visual hallucinations, hostility, depression, and conceptual disorganization are central to methamphetamine-associated psychosis (4).
- A retrospective review of emergency department patients (n= 113,015) over a two-year period in California found that individuals who tested positive for methamphetamine in their toxicology screen (n=4,407) had a higher prevalence of heart failure compared to the general emergency department population (53).
- Compared to idiopathic pulmonary arterial hypertension (PAH), methamphetamine-associated PAH is severe and progressive, characterized by serious pulmonary vascular disease, lower stroke volume index, and moderate to severe dysfunction in the right ventricle of the heart (54).

Another individual harm associated with methamphetamine is dependence, defined as “[t]he extent to which a drug creates a propensity or urge to continue to use despite adverse consequences” (49). There is no one particular factor that determines whether an individual will develop dependence on a substance; rather, there are several risk and protective factors that will influence an individual’s decision to continue use (55). In the case of methamphetamine, propensity for addiction is likely impacted by the route of administration, as effects can be felt more rapidly when injected or smoked (51).

Authors examining first-time, extra-medical stimulant use of methamphetamine, amphetamine, and methylphenidate among U.S. residents (n=166,737) found that, of those who used stimulants for the first time (n=1,700), 4.9% developed a clinically recognized stimulant dependence syndrome within 24 months (56). Another similar study found that between 5% and 6% of recent-onset cocaine users became dependent (57). Despite these findings, it should be noted that these studies were not conducted specifically among men who have sex with men, and that there may be other risk or protective factors that influence methamphetamine dependence in this population. For example, one study among methamphetamine-using men who have sex with men (n=286) in Los Angeles found that multiple factors contributed to the risk of substance use severity in the sample (58). Another study utilizing data from the 2012-2013 National Epidemiologic Survey on Alcohol and Related Conditions III found that men identifying as gay have greater odds of lifetime substance use compared to heterosexuals in the U.S. (59).

51. Rawson RA. Current research on the epidemiology, medical and psychiatric effects, and treatment of methamphetamine use. *Journal of Food and Drug Analysis*. 2013;21(4):S77–S81.

52. Sabrini S, Grace YW, Joanne CL, IJ K, Louise EC. Methamphetamine use and cognitive function: A systematic review of neuroimaging research. *Drug and Alcohol Dependence*. 2019;194:75–87.

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One systematic review (9) and some anecdotal evidence (34, 35, 55) do mention non-problematic substance use; additionally, we identified a qualitative study, published in 2009, examining methamphetamine use among non-addicted men who have sex with men (60). Several experts were also contacted via email, and asked if they were familiar with other studies exploring this occurrence. While none could provide evidence from peer-reviewed literature, experts suggested that non-problematic substance use is difficult to define and that denial is one aspect of substance dependency, which could bias findings on non-problematic use.

A cohort study of drug use among men who have sex with men in Australia (n=3,017) found little evidence for an association between illicit drug use and poor mental health outcomes (61). Of the 11.5% (n=358) that has used methamphetamine in the past six months, 28% (n=100) were assessed as methamphetamine dependent. Of the 28% who were dependent, less than half showed evidence of depression. Authors concluded that, in this sample, drugs were used by gay and bisexual men to enhance sexual pleasure, and use was not driven by mental health issues (61).

Another Australian study showed that gay and bisexual men engaging in chemsex who concurrently use methamphetamine, Truvada™ (or generic formulations of pre-exposure prophylaxis [PrEP]), and Viagra™ – collectively referred to as “MTV” – strategize ways to protect their sexual health (62). Between January and July of 2017, over 1,800 gay and bisexual men provided details about their use of MTV. PrEP use increased over time – although this was expected, given the recent mass roll out of PrEP among gay and bisexual men in Australia. Use of MTV was associated with being more socially engaged with other gay men; many reported having friends that also used PrEP. Community peer norms and social connections may play a key role in normalising prevention strategies and disseminating information (62).

Interventions addressing methamphetamine use, chemsex, and sexual-health related outcomes

An abstract included in the 23rd Annual Conference of the British HIV Association (BHIVA) in 2017, titled “A systematic review of interventions to decrease the prevalence of ‘chemsex’ among HIV negative and HIV positive men who have sex with men (MSM)” included five interventions, four of which demonstrated a reduction in the prevalence of chemsex (63). No full publication has been authored as of yet. However, the cited interventions were included in a 2019 systematic review by Knight et al., which examined interventions that address substance use and sexual risk among gay, bisexual, and other men who have sex with men who use methamphetamine (5). The researchers searched publications from inception until October 2017, and included 28 studies from high-income countries in the final analysis. Of these,

58. Anderson-Carpenter KD, Fletcher JB, Swendeman D, Reback CJ. Associations between sociodemographic characteristics and substance use disorder severity among methamphetamine-using men who have sex with men. *Substance Use & Misuse*. 2019. [Epub ahead of print].

59. Kerridge BT, Pickering RP, Saha TD, Ruan WJ, Chou SP, Zhang H, et al. Prevalence, sociodemographic correlates and DSM-5 substance use disorders and other psychiatric disorders among sexual minorities in the United States. *Drug and Alcohol Dependence*. 2017;170:82–92.

60. Dew BJ. Toward a better understanding of non-addicted, methamphetamine-using, men who have sex with men (MSM) in Atlanta. *The Open AIDS Journal*. 2010;4:141–7.

61. Prestage G, Hammoud M, Jin F, Degenhardt L, Bourne A, Maher L. Mental health, drug use and sexual risk behavior among gay and bisexual men. *International Journal of Drug Policy*. 2018;55:169–79.

62. Hammoud MA, Vaccher S, Jin F, Bourne A, Haire B, Maher L, et al. The new MTV generation: Using methamphetamine, Truvada, and Viagra to enhance sex and stay safe. *International Journal of Drug Policy*. 2018;55:197–204.

63. Barlow A, Desai M, Hayter M, Lacey C. A systematic review of interventions to decrease the prevalence of ‘chemsex’ among HIV negative and HIV positive men who have sex with men (MSM). *HIV Medicine*. 2017;18(Suppl 1):23.

15 unique interventions reported a concurrent effect on both methamphetamine use and sexual health-related outcomes, such as engaging in condomless anal intercourse or having sex while under the influence of drugs.

Authors grouped the 28 studies into three categories: pharmacological (n=5), psychosocial (n=22), and harm reduction (n=1). A selection of interventions in each of these categories is described below.

Pharmacological

There have been no clinical trials demonstrating that a single medication can specifically counter the effects of methamphetamine (64). However, a growing body of trial data involves the use of dopamine agonists, antagonists, and psychostimulants (5).

A randomized, double-blind, placebo-controlled pilot study in San Francisco among non-dependent methamphetamine and binge-drinking men who have sex with men demonstrated that targeted naltrexone is a feasible, acceptable, and tolerable intervention strategy (65). Participants were eligible if they reported using methamphetamine at least twice per month, weekly binge drinking, and intercourse while under the influence of methamphetamine or alcohol in the past three months. Thirty participants were randomly assigned to receive 50 mg of oral naltrexone (n=15) or placebo (n=15) for eight weeks; one pill was to be taken on days where heavy drinking, methamphetamine use, or when cravings were anticipated. Every two weeks, all participants also received counselling related to substance use and behavioural assessments. Compared to placebo, naltrexone participants had greater reductions in serodiscordant receptive anal intercourse and serodiscordant condomless receptive anal intercourse. Additionally, naltrexone was associated with a reduction in the number of days methamphetamine was used and the number of binge-drinking days (65).

Psychosocial

Most of the interventions included in the systematic review were psychosocial (n=22) and were classified as either **Motivational Interviewing, Contingency Management interventions, or Other Psychosocial Interventions**.

Motivational Interviewing is a method of counselling that focuses on a person's internal motivation to change their behaviour (5). It can be defined as "...a collaborative, person-centered form of guiding to elicit and strengthen motivation for change" (66). Results from an intervention in New York City, the *Young Men's Health Project*, support the utility of motivational interviewing (67). Eligible men were included if they were between the ages of 18 and 29, reported at least five days of recreational drug use (specifically methamphetamine, cocaine, ecstasy, GHB, ketamine, or poppers)

64. Morley KC, Cornish JL, Faingold A, Wood K, Haber PS. Pharmacotherapeutic agents in the treatment of methamphetamine dependence. *Expert Opinion on Investigational Drugs*. 2017;26(5):563-78.

65. Santos G-M, Coffin P, Santos D, Huffaker S, Matheson T, Euren J, et al. Feasibility, acceptability, and tolerability of targeted naltrexone for nondependent methamphetamine-using and binge-drinking men who have sex with men. *Journal of Acquired Immune Deficiency Syndromes*. 2016;72(1):21-30.

66. Miller WR, Rollnick S. Ten things that motivational interviewing is not. *Behavioural and Cognitive Psychotherapy*. 2009;37(2):129-40.

67. Parsons JT, Lelutiu-Weinberger C, Botsko M, Golub SA. A randomized controlled trial utilizing motivational interviewing to reduce HIV risk and drug use in young gay and bisexual men. *Journal of Consulting and Clinical Psychology*. 2014;82(1):9-18.

68. Petry NM. Contingency management: What it is and why psychiatrists should want to use it. *The Psychiatrist*. 2011;35(5):161-3.

69. Higgins ST, Delaney DD, Budney AJ, Bickel WK, Hughes JR, Foerg F, et al. A behavioral approach to achieving initial cocaine abstinence. *American Journal of Psychiatry*. 1991;148(9):1218-24.

70. Nyamathi A, Reback CJ, Shoptaw S, Salem BE, Zhang S, Yadav K. Impact of tailored interventions to reduce drug use and sexual risk behaviors among homeless gay and bisexual men. *American Journal of Men's Health*. 2017;11(2):208-20.

but were not seeking treatment, had a negative or unknown HIV status, and had one instance of unprotected anal intercourse with a high-risk male partner in the last 90 days. In total, 143 men were randomized to two groups: either four sessions of motivational interviewing (n=73) or four educational sessions (n=70) about drug use and HIV sexual risk reduction. While participants in both groups reported significant reductions in unprotected anal intercourse and substance use over time, men receiving motivational interviewing were 18% less likely to use drugs, and 24% less likely to engage in condomless anal intercourse compared to the group that received the education sessions (67).

Contingency Management is an approach to treatment in which individuals are rewarded for evidence of positive behaviour change (68). In the case of substance use, the strategy is to modify an individual's environment so that drug use and abstinence are readily detected (e.g. urinalysis), abstinence is positively reinforced, use of drugs results in a loss of reinforcement, and non-drug reinforcements (e.g. financial incentives) are increased to compete with the drug's effects (69).

A randomized controlled trial conducted in Hollywood with homeless gay and bisexual men assessed the impact of two culturally sensitive intervention programs utilizing contingency management (70). Participants (n=414) were between the ages of 18 to 46, self-reported as being homeless, and had used stimulants (i.e. methamphetamine, amphetamine, and cocaine) within the past three months. Participants were randomly assigned to a Nurse Case Management Plus Contingency Management program (NCM+CM; n=204) or Standard Education Plus Contingency Management (SE+CM; n=210) program. Peers were consulted in the design and implementation of both programs. The NCM+CM program promoted the health of the participants through needs assessments and referrals, led by nurses, and peers delivered education sessions on risk reduction strategies. The SE+CM program involved one risk-reduction session led by a health educator. Both programs had the same contingency management schedule, where the maximum payout participants could earn through negative urinalysis samples totalled USD 444. Regardless of the program, significant and clinically relevant reductions in stimulant use were observed. Over time, both groups demonstrated reductions in methamphetamine and other drugs and in number of partners. Overall knowledge of HIV/AIDS and hepatitis B virus also increased (70).

Other Psychosocial Interventions included in the systematic review were two types of therapy: cognitive and behavioural. Generally, these therapies focus on the influence that psychological factors and social environments have on a particular risk behaviour (5).

The C-TALK intervention was a social-cognitive theory group-based pilot study conducted with men who have sex with men in Chicago who reported using stimulants (methamphetamine or cocaine) in

71. Lyons T, Tilmon S, Fontaine Y-M. Development of a small-group intervention for stimulant-using men who have sex with men. *Journal of Groups in Addiction & Recovery*. 2014;9(1):54–70.

72. Lyons T, Madkins K, Karia P, Garner G. Intimate Strangers? Social networks in HIV-prevention groups for drug users. *Journal of Groups in Addiction & Recovery*. 2013;8(2):129–48.

73. Carrico AW, Flentje A, Gruber VA, Woods WJ, Discepolo MV, Dilworth SE, et al. Community-based harm reduction substance abuse treatment with methamphetamine-using men who have sex with men. *Journal of Urban Health*. 2014;91(3):555–67.

74. HealthLinkBC. Understanding harm reduction: Substance use. 2015. Available from: <https://www.healthlinkbc.ca/healthlinkbc-files/substance-use-harm-reduction> Accessed April 16, 2019.

75. Rawson RA, Shoptaw SJ, Obert JL, McCann MJ, Hasson AL, Marinelli-Casey PJ, et al. An intensive outpatient approach for cocaine abuse treatment: The Matrix Model. *Journal of Substance Abuse Treatment*. 1995;12(2):117–27.

76. National Institute on Drug Abuse. Principles of drug addiction treatment: A research-based guide (Third edition). 2018. Available from: <https://www.drugabuse.gov/node/pdf/675/principles-of-drug-addiction-treatment-a-research-based-guide-third-edition> Accessed May 22, 2019.

77. Reback CJ, Grant DL, Fletcher JB, Branson CM, Shoptaw S, Bowers JR, et al. Text messaging reduces HIV risk behaviors among methamphetamine-using men who have sex with men. *AIDS and Behavior*. 2012;16(7):1993–2002.

the past six months (71). The intervention consisted of ten small group sessions, each 90 minutes in length, that included interactive exercises and group-led discussions on healthy sexuality (72). On the ninth week, each group enjoyed a social outing to encourage positive drug-free social interactions. Group leaders were two peers who were either former stimulant users trained in group process techniques or a drug and alcohol counselor (who was also a peer). Of the 87 men eligible to participate, 70 attended one or more sessions. The majority of participants were African American men. At three-month follow-up, there was a decline in unprotected anal intercourse in the context of stimulant use, and a substantial decline in heavy stimulant use (defined as once or more per week) (71).

Harm reduction

The philosophy of harm reduction is that "...[not] all individuals are ready, willing, and able to pursue abstinence as a treatment goal" (73). The aim is to keep individuals safe while minimizing death, disease, and injury from high-risk behaviours (74).

The *Stonewall Project* model is a year-long community-based drug treatment program (73). In this program, evidence based interventions (such as the Matrix Model) are translated into a clinical setting with a harm reduction focus. The Matrix Model, developed in the 1980s at the Matrix Center in California (75), is a behavioural therapy framework for engaging stimulant users in treatment (76). Therapists foster a positive and encouraging relationship with the patient, promoting self-esteem, dignity, and self-worth (76). Selected substance use management strategies of the *Stonewall Project* include transitioning to less potent modes of methamphetamine administration, promoting self-care strategies while using methamphetamine, and education and promotion of safe injection practices (73). Sexual risk-reduction interventions promoting condom use and seroadaptive behaviours are also delivered. Outpatient treatment includes weekly individual counselling, group counselling, and psychotropic medications (i.e. medication that impacts the mind, emotions, and behaviour) if necessary. A total of 211 methamphetamine-using men who have sex with men were enrolled in two pre-post outcome studies at the *Stonewall Project*. Study 1 (n=123) assessed changes in HIV care indicators, Addiction Severity Index composite scores, and self-reported substance use over a 12-month follow-up period. Participants in Study 1 reported reduced use of cocaine; additionally, among HIV-positive participants (n=75), there was a significant increase in self-reported undetectable HIV viral load (13). Study 2 (n=88) examined changes in sexual risk behaviours, substance use, and HIV care indicators over a 6-month follow-up period. Participants in Study 2 reported a decrease in methamphetamine use, and a reduction in sexual risk behaviours while using methamphetamine (73).

78. Reback CJ, Fletcher JB, Swendeman DA, Metzner M. Theory-based text-messaging to reduce methamphetamine use and HIV sexual risk behaviors among men who have sex with men: Automated unidirectional delivery outperforms bidirectional peer interactive delivery. *AIDS and Behavior*. 2019;23(1):37–47.

79. Reback CJ, Shoptaw S. Development of an evidence-based, gay-specific cognitive behavioral therapy intervention for methamphetamine-abusing gay and bisexual men. *Addictive Behaviors*. 2014;39(8):1286–91.

80. Shoptaw S, Reback CJ, Peck JA, Yang X, Rotheram-Fuller E, Larkins S, et al. Behavioral treatment approaches for methamphetamine dependence and HIV-related sexual risk behaviors among urban gay and bisexual men. *Drug and Alcohol Dependence*. 2005;78(2):125–34.

81. Shoptaw S, Reback CJ, Larkins S, Wang P-C, Rotheram-Fuller E, Dang J, et al. Outcomes using two tailored behavioral treatments for substance abuse in urban gay and bisexual men. *Journal of Substance Abuse Treatment*. 2008;35(3):285–93.

82. Reback CJ, Runger D, Fletcher JB, Swendeman D. Ecological momentary assessments for self-monitoring and counseling to optimize methamphetamine treatment and sexual risk reduction outcomes among gay and bisexual men. *Journal of Substance Abuse Treatment*. 2018;92:17–26.

83. Mimiaga MJ, Reisner SL, Pantalone DW, O'leirigh C, Mayer KH, Safren SA. A pilot trial of integrated behavioral activation and sexual risk reduction counseling for HIV-uninfected men who have sex with men abusing crystal methamphetamine. *AIDS Patient Care and STDs*. 2012;26(11):681–93.

Additional interventions

We identified three other interventions published after the Knight et al. systematic review team concluded its literature search (October 2017). However, earlier versions of these interventions were included in the Knight et al. review. They are discussed below.

Project Tech Support, published in 2012, was a pilot study (77) that tested the feasibility and utility of a text-messaging intervention to reduce methamphetamine use and high-risk sexual behaviours among men who have sex with men. Participants (n=52) received real-time health education text messages and social support for the duration of the intervention (two weeks). At follow-up, frequency of methamphetamine use and frequency of methamphetamine use during unprotected sex both decreased significantly (77).

In 2019, authors published findings from *Project Tech Support2*, a randomized controlled trial based on the pilot study (78). *Project Tech Support2* tested three methods of text-message delivery for reducing methamphetamine use and HIV risk behaviours among men who have sex with men (78). A sample of 286 methamphetamine-using men who have sex with men who predominately represented racial/ethnic minorities were randomized to three groups: 1) interactive text conversations with Peer Health Educators plus five-times-a-day automated messages and weekly self-monitoring assessment (TXT-PHE; n=94), 2) five-times-a-day automated messages and weekly self-monitoring assessment (TXT-auto; n=99), or 3) weekly self-monitoring assessment only (AO; n=93). All three groups demonstrated reductions in methamphetamine use, sex on methamphetamine, and condomless anal intercourse with casual male partners. Participants in TXT-PHE and TEXT-auto reduced condomless anal intercourse with main male partners while participants in TEXT-auto also reduced condomless anal intercourse with anonymous male partners. Authors concluded that automated delivery outperformed peer-delivered messages (78).

Three citations in the Knight et al. systematic review discussed the efficacy of a gay-specific cognitive behavioural therapy (GCBT) intervention for methamphetamine-using gay and bisexual men in California (79-81). Two randomized controlled trials demonstrated the efficacy of GCBT: both significantly reduced methamphetamine use, number of male sex partners, and unprotected anal intercourse (80, 81). A third study, titled *Getting Off*, incorporated contingency management into GCBT. It also reduced methamphetamine use and sexual risk behaviours among men who have sex with men (79, 82). Compared to the original GCBT, the modified intervention demonstrated a greater impact on reducing the number of male sex partners (79).

Recently, authors published results of an augmented version of *Getting Off*, developed to optimize treatment outcomes of the

84. Mimiaga MJ, Pantalone DW, Biello KB, White JM, Hughto JF, O'Cleirigh C, et al. An initial randomized controlled trial of behavioral activation for treatment of concurrent crystal methamphetamine dependence and sexual risk for HIV acquisition among men who have sex with men. *AIDS Care*. 2019. [Epub ahead of print].

85. Aguilar JP, Sen S. The culture of methamphetamine: Reframing gay men's methamphetamine use. *Journal of Human Behavior in the Social Environment*. 2013;23(3):370-82.

86. Marsh W, Copes H, Linnemann T. Creating visual differences: Methamphetamine users perceptions of anti-meth campaigns. *International Journal of Drug Policy*. 2017;39:52-61.

87. Green AI, Halkitis PN. Crystal methamphetamine and sexual sociality in an urban gay subculture: An elective affinity. *Culture, Health & Sexuality*. 2006;8(4):317-33.

88. Power J, Mikolajczak G, Bourne A, Brown G, Leonard W, Lyons A, et al. Sex, drugs and social connectedness: Wellbeing among HIV-positive gay and bisexual men who use party-and-play drugs. *Sexual Health*. 2018;15(2):135-43.

original program (82). Ecological Momentary Assessment (EMA) is a methodology where participants repeatedly collect real-time data on their behaviours. For the duration of the eight-week treatment program, participants received EMA prompts via smartphone to self-monitor their behaviours. These included methamphetamine use, cravings, and sexual risk behaviours. Participants (n=34) were randomized into two conditions: a web-based EMA response visualization dashboard (EMA+Dashboard; n=16) or a condition that included one-on-one counselor support (EMA+Dashboard+Counselor; n=18). Historical controls were used as the reference group. The participants receiving the EMA+Dashboard+Counselor condition demonstrated significant reductions in the number of condomless anal intercourse episodes compared to historical controls (82).

Finally, Knight et al. cites a 2012 pilot trial from Boston that incorporated behavioural activation (a psychosocial treatment for depression) into an intervention for methamphetamine-using men who practice high-risk behaviours (83). Participants reported a decrease in methamphetamine use and condomless anal intercourse. This pilot study was followed by a larger randomized controlled trial published in 2019, *Project IMPACT*, that also used the behavioural activation approach (84). Similar to the initial pilot trial, authors hypothesized that re-learning to engage in non-drug-using aspects of life would facilitate participants' ability to benefit from sexual risk reduction counselling. A total of 41 participants were randomized into the intervention group (n=21) or the control group (n= 20). Authors found that those receiving the *IMPACT* intervention engaged in fewer acts of condomless anal intercourse and had significantly longer periods of continuous abstinence from methamphetamine.

While the review identified interventions demonstrating reductions in sexual health related harms and current methamphetamine use, no intervention explored preventing methamphetamine use among men who have sex with men who do not currently use methamphetamine or those who use it casually. One 2013 study suggests that there is little research exploring the dynamics that inform an

individual's decision to initiate use (85). However, we did find one study from 2009 that discussed the motives, context, and other facilitators and barriers of methamphetamine use among non-addicted men who have sex with men to inform a social marketing campaign (60). This qualitative study concluded that information obtained from the interviews would be useful in developing a culturally appropriate and effective social marketing campaign for methamphetamine-using men who have sex with men. However, upon contacting the author via email, we learned the campaign was not launched due to lack of funding.

Additionally, two U.S. campaigns launched in the early 2000s, *Faces of Meth* and the *Montana Meth Project* addressed methamphetamine use in the general population. Both campaigns used images intended to elicit disgust, fear, and shock in the general public, with the intention of deterring use (86). However, a qualitative study with 47 people who used methamphetamine currently or in the past discussed how the images did not reflect their personal experiences and did not curtail usage (86). Rather, participants actively used the content of the images to construct boundaries between themselves and the individuals depicted. Participants were able to relate to the emotional changes presented in the campaigns, but this was not enough to deter use.

Sex-based sociality

Public health research has demonstrated that chemsex (1, 2) and methamphetamine use (3, 4) are associated with sexual health-related harms among men who have sex with men. However, a critical review from 2018 noted that the literature has prioritized the biomedical aspects of this association, which has resulted in an emphasis on individualized, bio-psychosocial models of gay men's sexualized drug use (6). Authors of a 2006 qualitative study, conducted among gay and bisexual men in Manhattan who use crystal methamphetamine, noted that their analytic focus departed from traditional public health literature (that focuses on the individual) and instead considered the role of social context (87). Current research continues to validate the importance of considering the social perspective

in this population (88).

Sexuality is a unique feature of the gay community and one way that sociality is created among gay men (6). Shifting the focus to how men in gay communities socialize takes into account the role of sexual expression and activity (7). This concept is known as sex-based sociality, and it describes the sexual construction of social life among men who have sex with men (7).

Gay and bisexual men can use methamphetamine and sex as social resources in order to build an identity, participate in the community, establish relationships, and maximize pleasure (6). As discussed in this synthesis, there is evidence that sexualized drug use does produce these desired outcomes (32, 40, 62, 88), but also numerous harms (1, 2). However, emphasizing positive outcomes – such as friendships within networks and a sense of cohesion – is likely a useful place to start when designing harm-reduction interventions or education campaigns (88). For example, a recently published study (already discussed in this review) demonstrated that gay community networks played a strong role in the uptake of PrEP alongside use of methamphetamine and Viagra™ (62).

More qualitative research exploring the social-sexual context is needed (7), as are interventions that account for the social and cultural contexts of sexualized drug use (10).

Factors That May Impact Local Applicability

Chemsex is a behaviour that is socially constructed (1); as a result, there may be a considerable amount of variability among participant preferences, the availability of specific drugs in various geographic locations, and behaviours among subcultures. It is likely for these reasons that there is no ‘official’ definition of chemsex, although some authors have described the complexities of the behaviour in detail (26). Not all research on sexualized drug use classifies substance use before or during sex as ‘chemsex’, even when discussing methamphetamine. A vast amount of academic literature included in this review was from studies produced in the UK and Australia, and findings

may not accurately represent men who have sex with men in Canada who use methamphetamine or engage in party and play.

What We Did

We searched Medline (including Epub Ahead of Print, In-Process & Other Non-Indexed Citations) and PsycInfo using a combination of text terms (men who have sex or MSM or gay*) and (chemsex or chem sex or crystal meth or Methamphetamine* or [Party and play] or PNP or GHB or gamma-hydroxybutyrate or gamma hydroxybutyrate or mephedrone or ketamine or slamming). Searches were conducted on March 13, 2019 and results limited to English articles published since 2010. Reference lists of identified reviews were also searched. In addition, Google searches of various combinations of terms chemsex, crystal meth, gay, party were also conducted. Eight experts were contacted to provide additional information. The search yielded 549 references from which 88 were included. Sample sizes of primary studies ranged from six to 166,737.

Rapid Response: Evidence into Action

The OHTN Rapid Response Service offers quick access to research evidence to help inform decision making, service delivery and advocacy. In response to a question from the field, the Rapid Response Team reviews the scientific and grey literature, consults with experts, and prepares a review summarizing the current evidence and its implications for policy and practice.

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