

Factors associated with methamphetamine use among men who have sex with men

Question

What are the predictors of methamphetamine use among men who have sex with men?

Key Take-Home Messages

- An abundance of literature details problematic sexualized drug use among men who have sex with men (1–3); additionally, several interventions attempt to address methamphetamine dependence in this population (4, 5).
- Several factors are associated with sexualized drug use among men who have sex with men including earlier age of exposure to sexual networks (6), HIV-positive status (7, 8), more frequent diagnosis of sexually transmitted infections (8), and sociodemographic characteristics such as unstable housing status (9), being unemployed (7), or living in major urban centres (7, 10).
- Some research has found that childhood trauma (11, 12) and homophobic victimization (13) may predict problematic methamphetamine use among men who have sex with men.
- A Canadian study found that initiation of crystal methamphetamine was associated with higher scores on the escape motive scale, recent group sex participation, and exchanging sex for drugs in the past six months (14).

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, the Rapid Response Team reviews the scientific and grey literature, consults with experts if required, and prepares a review summarizing the current evidence and its implications for policy and practice.

While the information in this Rapid Response is considered to be correct at the date of publication, changes in circumstances after the time of publication may impact the accuracy of the information. There are no representations or warranties regarding errors, omissions, completeness, or accuracy of the information provided. This Rapid Response may be reproduced without permission for non-commercial purposes only and provided that appropriate credit is given to the Ontario HIV Treatment Network (OHTN).

Suggested Citation

Rapid Response Service. Factors associated with methamphetamine use among men who have sex with men. Toronto, ON: The Ontario HIV Treatment Network; June 2021.

Prepared by
Danielle Giliauskas

Program Leads / Editors
David Gogolishvili

Contact
rapidresponse@ohtn.on.ca

For more information visit
www.ohtn.on.ca/rapid-response-service

The Ontario HIV Treatment Network
1300 Yonge Street, Suite 600
Toronto ON M4T 1X3
www.ohtn.on.ca

The Issue and Why it's Important

There is a large body of literature detailing the prevalence of sexualized drug use and associated adverse health outcomes among men who have sex with men (1–3). Data from the European Men-who-have-sex-with-men Internet Survey (EMIS-2017) found that among Canadian survey participants (n=5,165), 64.1% indicated substance use and 21.5% reported chemsex (i.e. the use of stimulant drugs to increase the intensity and duration of sex) (15).

A 2019 systematic review examining sexualized drug use among men who have sex with men found that across included studies (n=112), the most commonly reported recreational drug was methamphetamines (n=44), followed by crystal methamphetamine (n=38) (3). Crystal methamphetamine is one of the drugs most commonly associated with chemsex, as it produces a specific “high” that offers disinhibition and desired pleasure during intercourse (16). In addition to the aforementioned literature detailing problematic sexualized drug use among men who have sex with men (1–3), various other sources (e.g. newspaper articles, films) have drawn attention to this issue (17).

Two systematic reviews have described interventions to address methamphetamine use among men who have sex with men (4, 5), with the more recent review of the two (Knight *et al.*, 2019) reporting that some interventions demonstrated a concurrent effect on both methamphetamine use and sexual health related outcomes, with psychosocial interventions holding more promise (4). Knight *et al.* also found that pharmacological interventions had limited efficacy on the treatment of methamphetamine dependence (4). This finding is supported by a 2020 systematic review across 43 randomized controlled trials which found that “[n]o pharmacotherapy reported convincing results” in treating those dependent on methamphetamine/amphetamines (18).

There is an abundance of literature examining the prevalence of methamphetamine use among men who have sex with men, in addition to several interventions that attempt to address methamphetamine dependence. This review explores another key element of understanding methamphetamine use and dependence among men who have sex with men: predictors and other factors associated with initiation and/or dependence on methamphetamine.

What We Found

When considering the relationship between risk factors and the onset of a health-related outcome (such as drug dependence), longitudinal studies are particularly useful (19). This is because longitudinal studies take continuous measurements over an extended period of time in the same cohort of individuals (19). This is in contrast to cross-sectional studies, where the data provided are static: the

References

1. Hibbert MP, Hillis A, Brett CE, Porcellato LA, Hope VD. A narrative systematic review of sexualised drug use and sexual health outcomes among LGBT people. *International Journal of Drug Policy*. 2021;103187.
2. Maxwell S, Shahmanesh M, Gafos M. Chemsex behaviours among men who have sex with men: A systematic review of the literature. *International Journal of Drug Policy*. 2019;63:74–89.
3. Tomkins A, George R, Kliner M. Sexualised drug taking among men who have sex with men: A systematic review. *Perspectives in Public Health*. 2019;139(1):23–33.
4. Knight R, Karamouzian M, Carson A, Edward J, Carrieri P, Shoveller J, et al. Interventions to address substance use and sexual risk among gay, bisexual and other men who have sex with men who use methamphetamine: A systematic review. *Drug & Alcohol Dependence*. 2019;194:410–29.
5. Rajasingham R, Mimiaga MJ, White JM, Pinkston MM, Baden RP, Mitty JA. A systematic review of behavioral and treatment outcome studies among HIV-infected men who have sex with men who abuse crystal methamphetamine. *AIDS Patient Care & STDs*. 2012;26(1):36–52.

outcome and exposure are measured at the same time (20). Because of this, it is difficult to infer causality in cross-sectional studies (20). However, repeated cross-sectional surveys can produce “trend” data – the sampling of different groups of individuals over time – which is useful for identifying population-level features of drug use (21). Nevertheless, cross-sectional studies are considered less valid when examining cause-and-effect relationships (19).

Because of its methodological design, the longitudinal study is able to exhibit how an individual’s drug use develops across the life course (21). Examining drug use across the life course can help understand “...not only how drug taking may start, stop, and restart, but also how changes in frequency or intensity of use and types of drugs used may entail shifts between occasional, ‘recreational’, and more persistent or dependent use” (21, 22). That is to say, longitudinal study designs allow researchers to chart the order of life events and the impact these may have on an individual’s drug use (21). However, longitudinal studies do present some disadvantages due to the element of prolonged time inherent to this study design (19). These include increased temporal and financial demands, greater potential for inaccurate conclusions if individual differences are not accounted for in analyses, and participant attrition, to name a few (19).

The following sections explore both associations and predictors of methamphetamine use (and other substances in general) among men who have sex with men, reporting findings from cross-sectional and longitudinal study designs. Two qualitative studies are included, in addition to a systematic review that presents social and interpersonal factors associated with sexualized drug use, in general, among men who have sex with men.

Methamphetamine use and associated factors

A study conducted in California among men who have sex with men who use methamphetamine found that multiple factors contribute to risks for substance use disorder severity (9). Data for this analysis were taken from a randomized controlled trial to reduce methamphetamine use and HIV sexual risk behaviour among men who have sex with men (n=286) enrolled between 2014 and 2016 (9). Dependent variables in the study were recent substance use (i.e. past 30 days) and current substance use disorder severity; data were also collected on sociodemographic characteristics include age, sexual identity, race/ethnicity, self-reported HIV status, education level, and housing status (9). Of note, approximately 80% of the sample (n=230) was comprised of men who have sex with men of colour (9). Analysis revealed that all measured sociodemographic characteristics, with the exception of gay self-identification, were significantly associated with recent substance use (9). All sociodemographic characteristics were also significantly

6. Tan RKJ, O’Hara CA, Koh WL, Le D, Tan A, Tyler A, et al. Social capital and chemsex initiation in young gay, bisexual, and other men who have sex with men: The Pink Carpet Y Cohort Study. *Substance Abuse Treatment, Prevention, & Policy*. 2021;16(1):18.
7. Melendez-Torres GJ, Bonell C, Hickson F, Bourne A, Reid D, Weatherburn P. Predictors of crystal methamphetamine use in a community-based sample of UK men who have sex with men. *International Journal of Drug Policy*. 2016;36:43–6.
8. Rosinska M, Gios L, Nostlinger C, Vanden Berghe W, Marcus U, Schink S, et al. Prevalence of drug use during sex amongst MSM in Europe: Results from a multi-site bio-behavioural survey. *International Journal of Drug Policy*. 2018;55:231–41.
9. 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;54(11):1763–73.
10. Hussen SA, Camp DM, Jones MD, Patel SA, Crawford ND, Holland DP, et al. Exploring influences on methamphetamine use among Black gay, bisexual and other men who have sex with men in Atlanta: A focus group study. *International Journal of Drug Policy*. 2021;90:103094.

associated with severity of substance use disorder, with the exception of current homelessness (9). Additionally, relative risks for recent methamphetamine use disorder severity were higher among Caucasian/White men who have sex with men relative to non-Caucasian/non-White men who have sex with men (9).

A 2018 cross-sectional study among men who have sex with men in thirteen European cities explored the prevalence and predictors of sexualized drug use (8). From the total sample, 30% of participants (n=1,261) reported any drug use; of these, 3.4% reported the use of chemsex drugs (8). Those who reported any drug use were more frequently diagnosed with HIV (10.5% vs. 3.9%) and other sexually transmitted infections (16.9% vs. 9.2%) compared to those who did not (8). Overall, participants reported attending a gay venue an average of 18.8 times in the past three months; however, among participants who reported drug use during their last sexual encounter, the average rose to 23.7 (8). Authors also noted that the use of party drugs and chemsex drugs was less prevalent in older age groups (8).

Data from a UK-based 2014 survey of men who have sex with men, the Gay Men's Sex Survey (GMSS), was used to characterize demographic and social-sexual risk factors for crystal methamphetamine use (7). The analytical sample consisted of 16,525 individuals: 316 (1.9%) reported use in the past four weeks, 747 (n=4.5%) reported use in the past year, and 1,310 (7.9%) reported ever using the stimulant (7). Univariate analysis revealed that use of crystal methamphetamine in the past year was significantly more likely among those: between the ages of 30 and 49 compared to those aged 20 to 29, living in London, who have received a positive HIV test result compared to those who last tested HIV negative, who had a university degree, and those that had multiple non-steady partners compared to those who had no non-steady partners (7). In multivariate analysis, results were generally similar; however, having a university degree was no longer associated with past year use, and not being employed full-time was associated with past-year use (7).

One study explored longitudinal HIV transmission risk profiles among men who have sex with men living with HIV in the U.S. who were receiving care at HIV specialty clinics (23). Data for this analysis were drawn from the SUN Study (Study to Understand the Natural History of HIV and AIDS in the Era of Effective Therapy) (23). The SUN Study enrolled participants between 2004 and 2006, with follow-up every six months until 2012; of the full sample, 60.5% (n=423) cited "men who have sex with men" as their primary risk factor and were thus included in the analysis (23). Participant data were collected on sociodemographic information, alcohol use, stimulant use, sexual risk behaviours, and sexually transmitted infections (23). Stimulant use (i.e. methamphetamine and cocaine) was defined as self-reported use in the past 30 days (23). At baseline, 11.4% (n=48) of participants reported ever using methamphetamines (23). Participants were subdivided into populations based on their profiles via latent class

11. Chartier M, Vinatieri T, Delonga K, McGlynn LM, Gore-Felton C, Koopman C. A pilot study investigating the effects of trauma, experiential avoidance, and disease management in HIV-positive MSM using methamphetamine. *Journal of the International Association of Physicians in AIDS Care*. 2010;9(2):78–81.
12. Lopez-Patton M, Kumar M, Jones D, Fonseca M, Kumar AM, Nemeroff CB. Childhood trauma and METH abuse among men who have sex with men: Implications for intervention. *Journal of Psychiatric Research*. 2016;72:1–5.
13. Li MJ, Okafor CN, Gorbach PM, Shoptaw S. Intersecting burdens: Homophobic victimization, unstable housing, and methamphetamine use in a cohort of men of color who have sex with men. *Drug & Alcohol Dependence*. 2018;192:179–85.
14. Colyer SP, Moore DM, Cui Z, Zhu J, Armstrong HL, Taylor M, et al. Crystal methamphetamine use and initiation among gay, bisexual, and other men who have sex with men living with HIV in a treatment as prevention environment. *Substance Use & Misuse*. 2020;55(14):2428–37.
15. Brogan N, Paquette DM, Lachowsky NJ, Blais M, Brennan DJ, Hart TA, et al. Canadian results from the European Men-who-have-sex-with-men Internet survey (EMIS-2017). *Canada Communicable Disease Report*. 2019;45(11):271–82.

analysis: Class 1, High Sustained Heavy Drinker (n=139); Class 2, High Mostly Stable Sexual Risk Class (n=72); Class 3, Overall Low Risk Class (n=212) (23). While Class 3 was characterized by consistent low-risk behaviours, Class 1 was defined by a high probability of having five or more drinks consistently in the past 30 days and a decreasing probability of sexual risk (past 60 days) (23). In the first three visits, participants in Class 1 had a probability of using stimulants of <40%, which decreased over time (23). Class 2 was defined by moderate-to-low stimulant use, moderate drinking behaviours, and high sexual risk behaviours (i.e. engaging in condomless anal intercourse) (23). Of note, participants in Class 1 and 2 were significantly younger than those in Class 3 (23). Additionally, compared to Class 1 and 3, participants in Class 2 were less likely to report being a racial/ethnic minority (23). Class 2 also had the highest number of self-reported sexually transmitted infections (23).

Data from the Momentum Health Study by Colyer *et al.* conducted from 2012–2016 in Vancouver were used to examine recent use/initiation of crystal methamphetamine among men who have sex with men living with HIV (14). At enrollment, participants (n=207) completed a survey on sociodemographic, psychosocial, and behavioural factors; this survey included a question about crystal methamphetamine use in the past six months (14). Additionally, a nurse administered a clinical questionnaire related to HIV and other STIs (14). Use of crystal methamphetamine was positively associated with depressive symptomology, escape motivation, increased number of male sex partners, recent diagnosis of a sexually transmitted infection, and use of other drugs (14). Of the individuals who completed at least one follow-up visit (n=172), 92 (53.5%) did not report use of crystal methamphetamine at baseline; of these 92 participants, 14 (15.2%) began using the stimulant for the study's duration (14). Initiation of crystal methamphetamine was associated with higher scores on the escape motive scale, recent group sex participation, and exchanging sex for drugs in the past six months (14). Additionally, the use of crystal methamphetamine was positively associated with depressive symptomology, escape motivation, increased number of male sex partners, recent diagnosis of a sexually transmitted infection, and use of other drugs (14). This longitudinal study also examined predictors of methamphetamine use, and is described in more detail in the next section (14).

Another study by Colyer *et al.* using data from the Momentum Health Study examined the association between HIV treatment optimism and crystal methamphetamine use and initiation (24). However, the analytic sample for this study was among men who have sex with men not living with HIV (n=497) (24). From the sample, 83.1% (n=413) completed at least one follow-up visit; of these, 91.3% (n=377) did not report use of crystal methamphetamine (24). Of those who did not report use of crystal methamphetamine at enrollment and who completed at least one follow-up, 8.5% (n=32) initiated use over the study's duration (24). Authors found that HIV treatment optimism was not associated with recent crystal methamphetamine use or

16. Stuart D. Chemsex: Origins of the word, a history of the phenomenon and a respect to the culture. *Drugs and alcohol today*. 2019;19(1):3-10.
17. The Ontario HIV Treatment Network. Sexualized drug use (chemsex and methamphetamine) and men who have sex with men. 2019. Available from: <https://www.ohtn.on.ca/sexualized-drug-use-chemsex-and-methamphetamine-and-men-who-have-sex-with-men/> Accessed April 28, 2021.
18. Siefried KJ, Acheson LS, Lintzeris N, Ezard N. Pharmacological treatment of methamphetamine/amphetamine dependence: A systematic review. *CNS Drugs*. 2020;34(4):337-65.
19. Caruana EJ, Roman M, Hernández-Sánchez J, Solli P. Longitudinal studies. *Journal of Thoracic Disease*. 2015;7(11):E537.
20. Wang X, Cheng Z. Cross-sectional studies: Strengths, weaknesses, and recommendations. *Chest*. 2020;158(1):S65-S71.
21. Measham F, Williams L, Aldridge J. Marriage, mortgage, motherhood: What longitudinal studies can tell us about gender, drug 'careers' and the normalisation of adult 'recreational' drug use. *International Journal of Drug Policy*. 2011;22(6):420-7.
22. Simpson M. The relationship between drug use and crime: A puzzle inside an enigma. *International Journal of Drug Policy*. 2003;14(4):307-19.

initiation (24). Crystal methamphetamine use was correlated to recent use of ecstasy, recent use of gamma-butyrolactone, and having received and/or given drugs for sex (24).

A small U.S. pilot study from 2010 among 23 HIV-positive men who have sex with men found that participants with greater experiential avoidance – a strategy used to ignore internal private events, such as emotions or memories (25) – reported current symptoms of traumatic stress and methamphetamine use (11). Furthermore, authors found that traumatic stress symptom scores were positively correlated with childhood trauma (11). The findings of this small pilot study are noted in a 2016 U.S. study which further explored the occurrence of childhood trauma and depression among men who have sex with men using methamphetamine (12). Study participants formed three groups: men living with HIV who use methamphetamine (n=77), men not living with HIV who use methamphetamine (n=38), and men not living with HIV who do not use methamphetamine (n=131) (12). Demographic data were collected for all participants; depression was assessed using the Center for Epidemiologic Studies Depression Scale (CES-D), substance use history was assessed using the Structured Clinical Interview for the DSM (SCID), and childhood trauma was assessed using the Childhood Trauma Questionnaire (CTQ) (12). Authors found that depression symptom severity was higher among methamphetamine users compared to non-users, regardless of HIV status (12). Additionally, methamphetamine-using individuals reported higher frequencies of childhood sexual abuse, emotional abuse, emotional neglect, physical abuse, and physical neglect compared to non-users (12). Authors note that because of the cross-sectional study design, causation cannot be inferred; however, the data do suggest that any form of childhood abuse may be a predisposing factor for methamphetamine use in adulthood among men who have sex with men (12).

One study used 24 months of data from an ongoing U.S. longitudinal cohort study among men of colour who have sex with men to determine if the severity of past homophobic victimization (e.g. violence, threats) is associated with an increase in methamphetamine use, and if the relationship can be mediated (i.e. explained) by unstable housing (13). Every six months, participants received a physical examination, laboratory testing, specimen collection, and completed a survey collecting data on sociodemographic, psychosocial, psychological, and behavioural attributes (13). The analytical sample consisted of 1,342 person-visits across 401 individuals (13). Authors found that past homophobic victimization was significantly associated with increased odds of unstable housing and recent methamphetamine use (13). Furthermore, mediation analysis indicated that unstable housing among those who experienced homophobic victimization in the past could partially explain the association between past homophobic victimization and methamphetamine use (13).

23. van den Berg JJ, Zaller ND, Gillani FS, Dunsiger SI, Marshall BDL, Kahler CW, et al. Longitudinal HIV transmission risk profiles among men who have sex with men living with HIV in the SUN study. *American Journal of Men's Health*. 2019;13(1):1-9.
24. Colyer SP, Lachowsky NJ, Cui Z, Zhu J, Armstrong HL, Taylor M, et al. HIV treatment optimism and crystal methamphetamine use and initiation among HIV-negative men who have sex with men in Vancouver, Canada: A longitudinal analysis. *Drug & Alcohol Dependence*. 2018;185:67-74.
25. Hayes SC, Wilson KG, Gifford EV, Follette VM, Strosahl K. Experiential avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of consulting and clinical psychology*. 1996;64(6):1152-68.
26. Rendina HJ, Millar BM, Parsons JT. Situational HIV stigma and stimulant use: A day-level autoregressive cross-lagged path model among HIV-positive gay and bisexual men. *Addictive Behaviors*. 2018;83:109-15.
27. Van Hout MC, Crowley D, O'Dea S, Clarke S. Chasing the rainbow: Pleasure, sex-based sociality and consumerism in navigating and exiting the Irish Chemsex scene. *Culture, Health & Sexuality*. 2019;21(9):1074-86.

An ecological momentary assessment pilot study, day2day, among 52 men who have sex with men living with HIV in New York City explored the association between HIV stigma, drug use, and whether this association was partially mediated by emotion dysregulation (26). Participants (n=52) completed a baseline assessment, and for the next 21 days were sent survey links to measure emotional dysregulation, stigma levels, and daily drug use – a unique link in the afternoon, and a unique link in the evening (26). Drug use was captured in the afternoon survey, and was then linked back to the previous day (26). Authors found that internalized HIV stigma was associated with subsequent increases in emotion dysregulation and also later use of stimulants (26). However, the relationship between internalized HIV stigma and stimulant use could not be explained by emotion dysregulation (26).

Finally, a study from Singapore found that some proxy measures of social capital – such as earlier age of exposure to sexual networks – may predispose young men who have sex with men to greater opportunities for problematic substance use (6). Baseline data from the Pink Carpet Y Cohort Study were used: the study sample included 570 HIV-negative young men who have sex with men between the ages of 18 to 25 (6). Recruitment for this study occurred in 2019 (6). Three classes of participants were identified: those who reported only ever using alcohol during sex (n=348), those who reported mostly using poppers (and some other chemsex-related drugs) during sex (n=140), and those in the chemsex class (n=23) (6). Participants in the chemsex class reported using methamphetamine, gamma-hydroxybutyrate/gamma-butyrolactone, and erectile dysfunction drugs, specifically (6). Multinomial logistic regression was then used to examine the association between these three classes and several proxy measures of social capital, including disclosure of sexual orientation, existence of network ties, community connectedness, and age of sexual debut (6). Participants who reported a later age of sexual debut were less likely to be in the poppers or chemsex class, compared to those in the alcohol class (6).

Qualitative studies

A qualitative study conducted in Ireland explored sexualized drug use pathways among men who have sex with men participating in chemsex (27). The pilot study was small: interviews were conducted with ten individuals (five who were living with HIV, five who were not) experiencing health problems related to chemsex, and were “... seeking service supports to exit the [c]hemsex scene” (27). Several specific details regarding the culture of chemsex were identified in these interviews: initial experiences of sexualized drug use occurred in both one-to-one relationships and in group settings; power dynamics were present in certain instances when drugs were exchanged for sex; some more experienced users “looked after” novice users; and chemsex parties were attended in reaction to life stressors and the lack of emotional connection with sex

28. Lafortune D, Blais M, Miller G, Dion L, Lalonde F, Dargis L. Psychological and interpersonal factors associated with sexualized drug use among men who have sex with men: A mixed-methods systematic review. *Archives of Sexual Behavior*. 2021;50(2):427–60.
29. Tan RKJ, Wong CM, Chen MI, Chan YY, Bin Ibrahim MA, Lim OZ, et al. Chemsex among gay, bisexual, and other men who have sex with men in Singapore and the challenges ahead: A qualitative study. *International Journal of Drug Policy*. 2018;61:31–7.

partners (27). Four main themes emerged from analysis of the interview data: local social and cyber arrangements within the chemsex scene; sexualized drug use, escapism, and compulsive participation; harm reduction; and general experiences of drug dependence (27).

A 2021 qualitative study explored the factors that influence risk for methamphetamine use among Black men who have sex with men living in Atlanta (10). Community-based key informants (n=54) participated in eight focus group discussions, with 6–8 participants in each group; recruitment occurred through community-based or health care organizations (10). Using a semi-structured interview guide, several domains regarding methamphetamine were explored in the focus groups: factors leading to use, consequences of use, perceptions of use, use among peers, description of support services, and recommendations for future work (10). Authors organized findings into two components: first, changes and trends related to use, and second, descriptions of environmental risk factors that interact and thus increase risk (10). Participants noted that methamphetamine use was becoming increasingly prevalent in their communities, especially among younger Black men of lower socioeconomic status (10). Authors also found that methamphetamine was interrelated to stress, mental illness, housing instability, and poverty; additionally, moving to Atlanta was described as a pathway to methamphetamine use, as some individuals were seeking “...freedom of sexual expression in the local Black gay scene” (10). Geosocial networking apps were also noted as facilitating the spread of methamphetamine use in the community (10). Finally, participants described the lack of prevention and harm reduction resources for methamphetamine use as limited, especially in contrast to other concerns (such as the nationwide opioid crisis) (10).

Reasons to engage in chemsex

A systematic review from 2021 by Lafortune *et al.* examined the social and interpersonal factors associated with sexualized drug use among men who have sex with men (28). Authors used a mixed-methods approach for their analysis (i.e. inclusion of both qualitative and quantitative

studies) to allow for an expansive, in-depth understanding of sexualized drug use (28). The synthesis included 35 studies published between 2008 and 2019; qualitative studies (n=18) collected data through interviews and focus groups, while quantitative studies (n=17) primarily utilized data from cross-sectional studies (28). Tables 1 and 2 (below) list the findings (verbatim) from Lafortune *et al.*'s analysis.

Table 1: Mechanisms that promote chemsex

Qualitative studies (n=18)	
1.	As a way of dealing with painful emotions or stressful events
2.	In a context of normalization of sexualized drug use and risk minimization
3.	Under the influence of interpersonal pressure or the desire to belong to a community
4.	As a way to increase intimacy/connectedness
5.	To enhance sexual performance and functioning
6.	To lessen interpersonal and sexual inhibitions

Table 2: Outcome categories associated with chemsex

Quantitative studies (n=17)	
1.	Sexual control and self-efficacy
2.	Sexual functioning
3.	Mental health
4.	Attitudes toward substance use
5.	Life stressors and internalized stressors
6.	Identification with sexual identities or scenes

Authors note that both qualitative and quantitative research converged in several areas, including sexual pleasure and satisfaction, and attitudes and norms that support the practice of chemsex (28). Additionally, authors suggest that further research is necessary in order to explore new hypotheses across several groups of men who have sex with men.

Factors That May Impact Local Applicability

The majority of the studies included in this synthesis were conducted in the U.S. and Canada, though a few studies were conducted in other high-income settings, such as Ireland (27) and the UK (7). It should be noted that one included study was conducted in Singapore (29), a high-income setting where there is criminal legislation directed at sexual minorities and consensual sexual behaviour for men who have sex with men can result in imprisonment (29). Additionally, we found a limited number of studies that used a longitudinal study design when determining predictors of methamphetamine use; while the cross-sectional studies included are useful, they present associations and cannot infer causality. Finally, chemsex is considered a social construct, and is thus subject to participant preference in addition to the popularity and availability of specific drugs (2).

What We Did

We searched Medline (including Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE® Daily and Ovid MEDLINE®) using a combination of terms (gay or men who have sex or MSM) in titles or abstracts AND (MeSH terms Methamphetamine/ or Amphetamine-Related Disorders/ or text term crystal meth* or terms [methamphetamine or chemsex or slamsex or Party and play or PnP] in titles or abstracts). Searches were conducted on April 20, 2021 and results limited to English articles published from 2010 to present. Reference lists of identified articles were also searched. Google (grey literature) searches using different combinations of these terms were also conducted. The searches yielded 504 references from which 29 were included.