

# Crystal Methamphetamine Initiation Among HIV-Positive and HIV-Negative Men Who Have Sex With Men in Vancouver, Canada: A Longitudinal Analysis

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Vancouver's West End Neighbourhood

## Background

- New HIV diagnoses among gay, bisexual, and other men who have sex with men (GBM) persist in British Columbia (BC) and many other settings globally.
- Treatment as Prevention (TasP) has been policy in Vancouver, BC since 2010, with universal access to anti-retroviral therapy, increased HIV testing programs, and improved linkage to care.
- Crystal methamphetamine use is associated with HIV acquisition among HIV-negative GBM and elevated viremia for GBM living with HIV.
- We used prospective bio-behavioural cohort data to address our three aims regarding recent crystal methamphetamine use: 1) measure temporal trends, 2) identify factors associated with recent use, and 3) identify predictors of initiation.

## Methods

### Study Population & Data Collection:

Data were drawn from the Momentum Health Study, a prospective bio-behavioural cohort of GBM recruited using respondent-driven sampling between Feb 2012 - Feb 2015. Follow-up data were included to Feb 2016. Study visits occurred every six months and included a computer-assisted self-interview and nurse-administered clinical questionnaire with HIV and STI testing.

### Outcomes:

The primary outcome was self-reported crystal methamphetamine use in the past six months. The secondary outcome was first reported use of crystal methamphetamine among participants who had not previously reported any recent use at any previous study visit.

### Explanatory Variables:

For the trend analysis, calendar time was considered in 6-month periods (e.g. Jan-Jun, Jul-Dec). For the regression and survival analysis, HIV treatment optimism as a proxy for attitudinal TasP uptake was assessed using a 12-item scale (Van Den Ven et al., 2000) with higher scores indicating less fear of HIV disease and lower perceived probability of HIV infection. Other explanatory factors considered include demographics, sexual behaviour, substance use, mental health (self-esteem, depression, anxiety), and sexual health.

### Data Analysis:

We used multi-level generalized estimating equations to account for repeated visits within participants and RDS recruitment chain. Logistic regression was used to evaluate temporal trends in crystal methamphetamine use and factors associated with recent use (odds ratio [OR]; 95% confidence intervals [95%CI]). Multivariable models were built using backwards selection and AIC minimization. Univariable survival analysis was used to identify predictors of crystal methamphetamine initiation (hazard ratios [HR]).

## Results

Over the 4-year study period, 698 GBM completed 3,085 study visits (median follow-up of 2.49 years). Overall, **20.1% of GBM reported crystal methamphetamine use** in the six months prior to survey, which was **significantly higher among HIV-positive GBM (44.3%)** than HIV-negative GBM (10.3%,  $p < 0.001$ ).

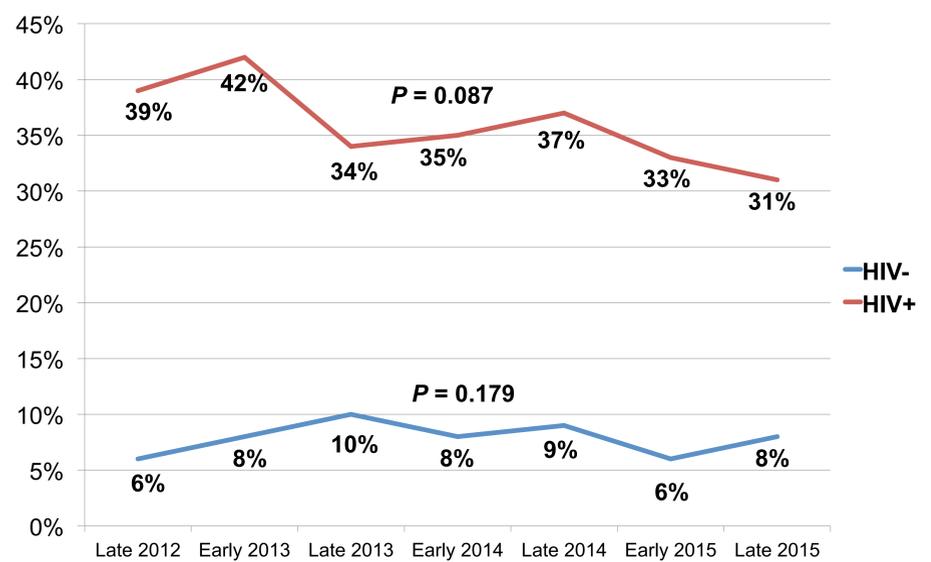


Figure 1. Temporal trends in recent CM use among GBM, 2012-2015

## Results

### Route of use did not differ by HIV status (all $p > 0.05$ ):

- 79.3% smoking,
- 55.0% snorting,
- 27.9% injecting, and
- 26.4% hooping.

### Frequency of use did not differ by HIV status ( $p = 0.237$ ):

- 43.6% used less than monthly,
- 20.7% used monthly, and
- 35.7% used at least weekly

There were no statistically significant temporal trends overall ( $p = 0.069$ ) or for HIV-negative ( $p = 0.179$ ) or HIV-positive ( $p = 0.087$ ) GBM. These trends are shown in **Figure 1**.

During follow-up, 32 HIV-negative GBM (8.5%) and 14 HIV-positive GBM (15.2%) initiated crystal methamphetamine use. The overall incidence rate was 4.40 per 100 person-years (95% CI: 3.30-5.88), which did not differ by HIV status ( $p = 0.10$ ). **Table 1** presents predictors of initiation. Among initiators, 100% of HIV-positive GBM and 78.1% of HIV-negative GBM self-assessed their risk of transmitting or acquiring HIV as "low", respectively.

Table 1. Select predictors of crystal methamphetamine use initiation

	HIV-Negative HR (95%CI)	HIV-Positive HR (95%CI)
Age (in years), continuous	0.99 (0.96-1.02)	0.98 (0.93-1.03)
Non-gay sexual identity (ref: gay)	<b>3.49 (1.71-7.15)*</b>	2.23 (0.49-10.1)
# recent male anal sex partners, P6M	<b>1.01 (1.01-1.02)*</b>	<b>1.02 (1.00-1.05)*</b>
HIV treatment optimism scale	<b>1.07 (1.00-1.15)*</b>	0.98 (0.89-1.09)
Self-esteem scale	<b>1.11 (1.03-1.20)*</b>	1.10 (0.99-1.09)
HADS: Anxiety sub-scale	<b>1.08 (1.00-1.17)*</b>	0.98 (0.87-1.11)
HADS: Depression sub-scale	1.02 (0.93-1.13)	1.05 (0.92-1.19)
Sought sex online $\geq$ monthly (ref: none)	<b>4.66 (2.15-10.11)*</b>	2.91 (0.69-12.25)
Recent escort/sex work (ref: none)	<b>5.05 (1.53-16.68)*</b>	2.97 (0.38-23.62)
Recent group sex (ref: none)	<b>2.72 (1.31-5.65)*</b>	<b>3.51 (1.23-10.03)*</b>
Recent STI diagnosis (ref: none)	<b>3.23 (1.24-8.45)*</b>	1.63 (0.21-12.67)

Bold and \* denotes  $p < 0.05$ ; P6M = past 6 months; HADS = Hospital Anxiety and Depression Scale

## Conclusions

- **Crystal methamphetamine use was prevalent, stable over time, and initiation was common.**
- **Initiators reported more sexual partners and group sex participation, but did not self-perceive this as risky for HIV transmission.**
- **Renewed population-specific interventions and health promotion efforts are desperately needed.**

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