STIMULANT USE AND CONDOMLESS SEX WITH MULTIPLE PARTNERS: EFFECT ON PREP ADHERENCE

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BACKGROUND

- In men who have sex with men (MSM), taking at least 4 doses of PrEP (TDF/FTC) per week has shown to be highly effective in reducing HIV acquisition [a,b].
- Tenofovir diphosphate (TFV-DP) concentrations in dried blood spots (DBS) show good correlation with long-term adherence [c].
- Several observational studies have reported an association of increased TFV-DP concentrations among individuals reporting recent condomless anal sex (CAS) or CAS with multiple (≥2) partners (CAS-MP) [d-f].
- Among people living with HIV, there is an association between stimulant use and decreased adherence to antiretroviral therapy [g,h].
- In users of PrEP, datum is limited. One cohort found an association of substance use with adherence levels to PrEP: Heavy substance use had higher odds of adherence [i].

RESEARCH QUESTION

In MSM who are offered PrEP, does stimulant use interact with condomless anal sex with multiple partners (CAS-MP) to have an effect on prevention-effective adherence [j] to TDF/FTC?

HYPOTHESIS

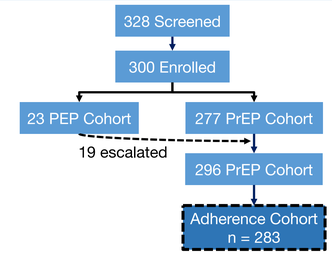
Stimulant users reporting **CAS-MP** will have **decreased** odds of **prevention-effective adherence** to TDF/FTC compared to non-stimulant users reporting CAS-MP, placing them at higher risk for HIV acquisition.

METHODS

Study design	Secondary data analysis Prospective cohort (PATH-PrEP) [k]
Location/Sites	Los Angeles, California; two community-based clinics.
Time period	April 2014 to July 2016.
Inclusion criteria	1) HIV uninfected MSM, 2) Age 18 years or older, 3) Reported receptive anal sex within the last 12 months.
Interventions	-PrEP provision or PEP education arm based on risk behavior. -Escalating behavioral adherence support based on TFV plasma levels in PrEP arm.
PrEP Arm (any of the following at baseline)	1) Condomless anal sex with ≥3 male partners who were HIV+ or unknown status within the last 3 months, or 2) Sexually transmitted infection (STI) within the 12 months prior, or 3) Use of PEP during the preceding 12 months, or 4) ≥1 HIV+ sexual partner for 4 weeks or more.
Study visits	Baseline, week 4, 8, 12, 24, 36, and 48.
Measurements (relevant to this analysis)	-Computer assisted self-interview (CASI) survey. -HIV and STI testing: Gonorrhea (pharynx, rectum, urine), chlamydia (rectum, urine), syphilis. -Adherence assessment (TFV-DP concentration in DBS).
Main predictors (collected at each visit)	**-Stimulant use:** Use of any cocaine, methamphetamine, or ecstasy. **-Condomless anal sex with multiple partners (CAS-MP): 2 or more partners.** **-Interaction.** *All questions at baseline, week 4, 8, and 12 were asked for behavior in the 30-day horizon and questions at week 24, 36, and 48 were asked for behavior in the 90-day horizon.
Outcome (dichotomized)	**TFV-DP concentrations in DBS samples** -Prevention effective adherence: ≥700 fmol/punch (equivalent to 4 or more PrEP doses/week). -Suboptimal adherence: <700 fmol/punch.
Statistical methods	*Analyzed population:* -Included individuals offered PrEP who returned for at least one adherence measurement. *Analysis method:* -Generalized linear mixed model with random intercept/slope on TFV-DP levels by main predictors controlled for age group, race, education, income, enrollment site, and sex work.

RESULTS

Screening, enrollment and included participants

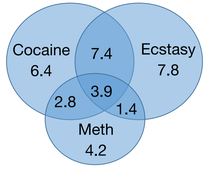


Baseline demographic characteristics of analyzed cohort of MSM prescribed PrEP (n=283)

Age, years, median (IQR)	34 (28-42)
Race/ethnicity	
Non-Hispanic White	51%
Hispanic/Latino	28%
Non-Hispanic Black	10%
Other	10%
Family income >$20,000	70%
At least some college education	89%
No significant differences by main predictors	

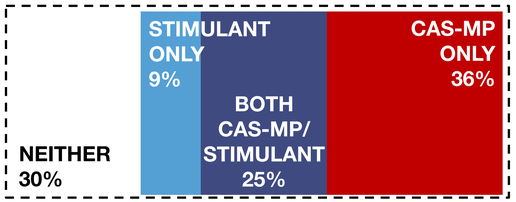
Stimulant and condomless anal sex with multiple partners (CAS-MP) in a cohort of MSM prescribed PrEP

Reported stimulant use (any) in prior 30 days at baseline

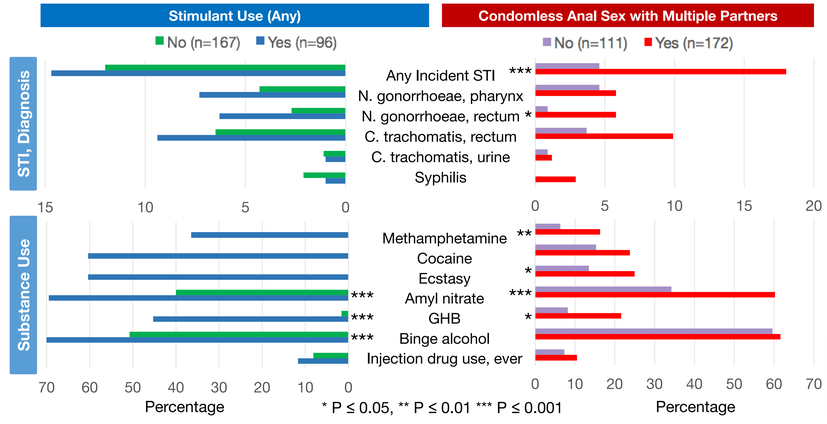


(Percentage of analyzed sample)

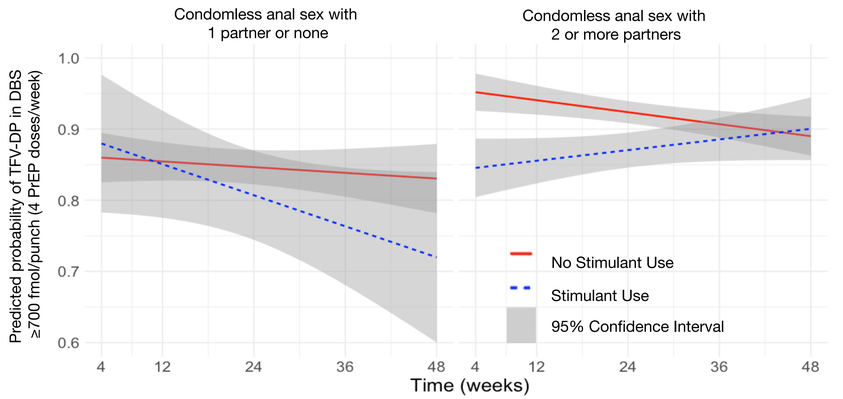
Sub-groups by reported stimulant use and CAS-MP at baseline



Baseline sexually transmitted infections (STI) and substance use in a cohort of MSM prescribed PrEP



Predicted probabilities of prevention-effective adherence (≥700 fmol/punch) by CAS-MP and stimulant use.



Lines denote linear regression of predicted values for each group and shaded areas represent their 95% confidence intervals.

Generalized linear mixed model of stimulant use, CAS-MP and their interaction at week 4 (first measurement of adherence) and over time on prevention-effective adherence (TFV-DP concentration ≥700 fmol/punch) (n=283).

	AOR *	95% Confidence Interval Lower	Upper	P value
Week 4				
No stimulant use or CAS-MP (reference)				
Stimulant use without CAS-MP	1.96	0.65	5.87	0.23
CAS-MP without stimulant use	2.69	1.36	5.31	**<0.01**
Stimulant use and CAS-MP	0.15	0.04	0.57	**0.01**
Over time (per week increase)				
No stimulant use or CAS-MP	1.01	0.99	1.04	0.36
Stimulant use without CAS-MP	0.97	0.93	1.02	0.24
CAS-MP without stimulant use	0.99	0.96	1.02	0.33
Stimulant use and CAS-MP	1.06	1.01	1.12	**0.02**

Abbreviations: CAS-MP, condomless anal sex with multiple partners; AOR, adjusted odds ratio
* Model controlled for age, race/ethnicity, education, income, enrollment site, and sex work

CONCLUSIONS

- At the first adherence visit (week 4), participants reporting stimulant use & CAS-MP had decreased odds of adherence.
- However, contrary to our initial hypothesis, over time, participants reporting **stimulant use & CAS-MP** had **higher** odds of **prevention-effective adherence over time**, achieving levels similar to their non-stimulant using counterparts.
- **Stimulant use should not be a deterrent for providers to prescribe PrEP.**

REFERENCES: [a] Anderson et al, Science Translational Medicine 2012; [b] Grant et al. Lancet Infect Dis 2014; 14: 820–29; [c] Castillo-Mancilla JR et al, AIDS Res Hum Retroviruses 2013; [d] Liu et al. JAMA Intern Med 2016; [e] Hoagland B et al. JIAS 2017; [f] Hosek SG et al JAIDS 2017; [g] Carrico AW et al. Drug Alcohol Depend 2014; [h] Hinkin et al. AIDS Behav 2007; [i] Hoenigl M et al. CROI 2017; [j] Haberer JE et al. AIDS 2015; [k] Landovitz RJ et al. J Acquir Immune Defic Syndr 2017.

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