Methadone Maintenance Therapy and Viral Suppression Among HIV-infected Opioid Users: The Impacts Of Crack And Injection Cocaine Use

M. Eugenia Socías[1,2], Evan Wood[1,2], Will Small[1,3], Huiru Dong[1], Thomas Kerr[1,2], Julio Montaner[1,2], M-J Milloy[1,2]

1. British Columbia Centre for Excellence in HIV/AIDS, St. Paul's Hospital, Vancouver, Canada;
2. Department of Medicine, University of British Columbia, Vancouver, Canada; 3. Faculty of Health Sciences, Simon Fraser University, Burnaby, BC, Canada

Background

- Enrolment in methadone maintenance therapy (MMT) is associated with improved HIV treatment outcomes among people who use drugs (PWUD).
- The extent to which these benefits are sustained in the context of ongoing cocaine use is unclear.
- We assessed differential impacts of MMT on HIV viral load (VL) suppression among HIV-positive opioid users in relation to discrete patterns of cocaine use.

Methods

- ***Design and setting.*** Data was drawn from the AIDS Care Cohort to Evaluate exposure to Survival Services (ACCESS) study, an ongoing prospective cohort of >800 HIV-positive PWUD in Vancouver, Canada, that started recruitment in 2005.
- ***Study procedures.*** Semi-annual interview, serological testing (e.g., HCV) and linkages with the provincial HIV Drug Treatment program (e.g., CD4, VL, ART dispensation).
- ***Study population.*** HIV-positive ART-exposed opioid users who completed ≥1 study interview between 2005 and 2014.
- ***Measures and analyses.*** Using a procedure recommended by Knol and VanderWeele,[1] we used generalized linear mixed-effects (GLMM) to model the independent effect of MMT on VL suppression (< 50 copies/mL plasma) across strata of frequency (≥daily versus <daily) of cocaine injection (Model 1) and crack cocaine smoking (Model 2), after adjustment for potential confounders.
  - Confounders considered included: age, ethnicity, unstable housing, incarceration, sex work, ≥daily heroin injection, ≥daily crack smoke (for Model 1).

Results

- 397 HIV-positive opioid-users were included.
- 1679.1 person-years of follow up
- At baseline:
  - Age, median (IQR): 41 years (36-47)
  - Male: 234 (59%)
  - Enrolled in a MMT program in the last 6 months: 304 (77%)
  - ≥daily cocaine injection in the last 6 months: 37 (9%)
  - ≥daily crack-cocaine smoking in the last 6 months: 158 (40%)
- Results of the adjusted GLMM analyses of the effect of MMT on VL suppression across strata of cocaine injection and crack-cocaine use are presented in Table 1 and 2, respectively.

Table 1. Adjusted analyses for Model 1

	MMT=No		MMT=Yes		AORs (95% CI) for MMT within strata of frequency of cocaine injection
	Observations with/without viral suppression	AOR (95% CI)	Observations with/without viral suppression	AOR (95% CI)	
≥ Daily cocaine injection	19/32	1.0	134/79	1.37 (0.53-3.49); *P* = 0.516	1.37 (0.53-3.49); *P* = 0.516
< Daily cocaine injection	287/250	0.74 (0.31-1.78); *P* = 0.499	1572/794	1.39 (0.58-3.33); *P* = 0.463	1.88 (1.38-2.56); *P* < 0.001

MMT, methadone maintenance therapy; AOR, adjusted odds ratio; CI, confidence interval
ORs are adjusted for age at baseline, ethnicity, unstable housing, incarceration, sex work, ≥ daily heroin injection, ≥ daily crack smoke.
Measure of effect modification on additive scale: RERI (95% CI) = 0.28 (-0.57 – 1.13); *P* = 0.511.
Measure of effect modification on multiplicative scale: ratio of ORs (95% CI) = 1.37 (0.53 – 3.60); *P* = 0.514.

Table 2. Adjusted analyses for Model 2

	MMT=No		MMT=Yes		AORs (95% CI) for MMT within strata of frequency of crack-cocaine smoking
	Observations with/without viral suppression	AOR (95% CI)	Observations with/without viral suppression	AOR (95% CI)	
≥ daily crack-cocaine smoke	48/117	1.0	449/331	3.11 (1.86-5.21); *P* < 0.001	3.11 (1.86-5.21); *P* < 0.001
< daily crack-cocaine smoke	257/168	4.17 (2.39-7.27); *P* < 0.001	1258/544	6.15 (3.66-10.34); *P = 0.228*	1.48 (1.04-2.09); *P* = 0.028

MMT, methadone maintenance therapy; AOR, adjusted odds ratio; CI, confidence interval
ORs are adjusted for age at baseline, ethnicity, unstable housing, incarceration, sex work, ≥ daily heroin injection
Measure of effect modification on additive scale: RERI (95% CI) = -0.13 (-1.89 – 1.63); *P* = 0.886.
Measure of effect modification on multiplicative scale: ratio of ORs (95% CI) = 0.47 (0.26 – 0.85); *P* = 0.013.

Conclusions

- The effect of MMT on VL suppression differed in relation to distinct patterns of cocaine use:
  - While enrollment in a MMT program was associated with increased odds of VL suppression among <daily cocaine injectors, this beneficial effect of MMT was lost among more frequent cocaine injectors.
  - MMT was associated with increased odds of viral suppression among opioid users regardless of crack-cocaine use.
- Findings from this study support global calls to expand access to low-threshold Opioid Agonist Therapy to improve addiction and HIV outcomes among HIV-positive opioid users.
- Our findings also underscore the urgent need to identify novel and effective pharmacotherapies for the treatment of cocaine use disorders, as well as structural interventions to support engagement in HIV care for this population.

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References:

1. Knol, M.J., VanderWeele, T.J., 2012. Recommendations for presenting analyses of effect modification and interaction. Int J Epidemiol 41, 514-520.

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