

# Social, Socio-Economic and Associated Clinical Benefits of ART Exposure Among HIV-Infected People Who Use Illicit Drugs in Vancouver, Canada

L. Richardson<sup>1,2</sup>, T. Kerr<sup>1,3</sup>, R. Hogg<sup>1,4</sup>, S. Guillemi<sup>1</sup>, J. Montaner<sup>1,3</sup>, E. Wood<sup>1,3</sup>, M.-J. Milloy<sup>1,3</sup>

1. British Columbia Centre for Excellence in HIV/AIDS; 2. Department of Sociology, University of British Columbia;

3. Division of AIDS, Department of Medicine, University of British Columbia; 4. Faculty of Health Sciences, Simon Fraser University

## Background

- Among people living with HIV/AIDS (PHA), there is extensive documentation of the direct HIV-related clinical benefits of engagement and retention in HIV care.
- However, very little is known about whether engagement and retention in HIV care has secondary social, socio-economic and associated clinical benefits.
- It is additionally unclear whether any secondary social, socio-economic or associated clinical benefits of HIV care are more or less relevant at different stages of the HIV continuum of care.
- This is particularly the case for HIV infected people who use illicit injection and non-injection drugs (PWUD), who often contend with complex configurations of social, socio-economic and structural marginalization and face specific challenges related to the management of comorbid substance use disorder.
- We therefore undertook the current study to explore the relationship between the initiation of ART and a range of social, socio-economic and secondary clinical outcomes among a cohort of PWUD living with HIV/AIDS in Vancouver, Canada.

## Methods

- Data were derived from the AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS), a long-running prospective cohort of community-recruited drug users in Vancouver, Canada, a setting of free and universal access to HIV care and other essential health services.
- Longitudinal cohort data were linked to comprehensive HIV clinical monitoring and ART dispensation records from the BC Centre for Excellence in HIV/AIDS.
- First, we examined the study sample characteristics, stratified by whether or not individuals became newly exposed to ART at any point during the study period.
- Second, we developed a series of generalized linear mixed effects models to examine whether initial exposure to ART was associated with a range of social, socio-economic and ancillary clinical benefits.
- Models examined as primary outcomes of interest: (1) relationship initiation; (2) transitioning out of homelessness; (3) entering employment; (4) ceasing involvement in high-risk income generation (e.g., street-based income generation, sex work, drug dealing or other illegal activities); and (5) enrolling in addiction treatment.
- Last, we conducted sensitivity analyses using a lagged ART initiation variable to examine the temporal sequencing ART initiation and our outcomes of interest.

**TABLE 1. Baseline characteristics of 755 HIV-seropositive individuals who use illicit drugs, stratified by becoming newly exposed to ART at any point during the study period, Vancouver, Canada, 2005-2013**

Characteristic	Not newly exposed to ART N = 627 (83.0%)	Newly exposed to ART N = 128 (17.0%)	Odds Ratio (95% CI)	p-value
Age				
Median (IQR)	43.7 (37.6-48.6)	39.1 (32.5-38.8)	0.99 (0.99-0.99)	<0.001
Gender				
Male	430 (68.5)	75 (58.6)		
Female	195 (31.1)	52 (40.6)	1.53 (1.03-2.26)	0.033
Ethnicity				
Non-Caucasian	277 (44.2)	57 (44.5)		
Caucasian	350 (55.8)	71 (55.5)	0.99 (0.67-1.45)	0.942
Homelessness <sup>a</sup>				
No	448 (71.5)	72 (56.3)		
Yes	176 (28.1)	54 (42.2)	0.91 (1.29-2.83)	0.001
Regular Employment <sup>a,b</sup>				
No	517 (82.5)	101 (78.9)		
Yes	110 (17.5)	27 (21.1)	1.265 (0.78-2.01)	0.342
Prohibited/Illegal Income Generation <sup>a,c</sup>				
No	556 (88.7)	93 (72.7)		
Yes	68 (10.8)	33 (25.8)	2.90 (1.81-4.64)	<0.001
High Intensity Drug Use <sup>a,d</sup>				
No	365 (58.2)	48 (37.5)		
Yes	262 (41.8)	80 (62.5)	2.32 (1.57-3.43)	<0.001
High-risk Drug Use <sup>a,e</sup>				
No	83 (13.2)	10 (7.8)		
Yes	544 (86.8)	118 (92.2)	1.80 (0.91-3.57)	0.089
Addiction treatment enrolment <sup>a</sup>				
No	305 (48.6)	70 (54.7)		
Yes	316 (50.4)	54 (42.2)	0.74 (0.50-1.10)	0.136
CD4 T-cell count (per 100 cells)				
Median (IQR)	3.1 (1.9-4.8)	3.7 (2.6-5.0)	1.01 (1.00-1.02)	0.017
PVL (log 10) <sup>a</sup>				
Median (IQR)	2.02 (1.6-4.2)	4.42 (3.9-4.8)	0.10 (0.01-11.54)	<0.001

ART, antiretroviral therapy; CI, confidence interval; PVL, plasma viral load copies per milliliter; IQR, interquartile range

<sup>a</sup> Refers to activities or exposures in the 6 months prior to follow up interview

<sup>b</sup> Includes regular, part time or self-employment

<sup>c</sup> Includes sex work, drug dealing, theft, street-based and other illegal or prohibited sources of income

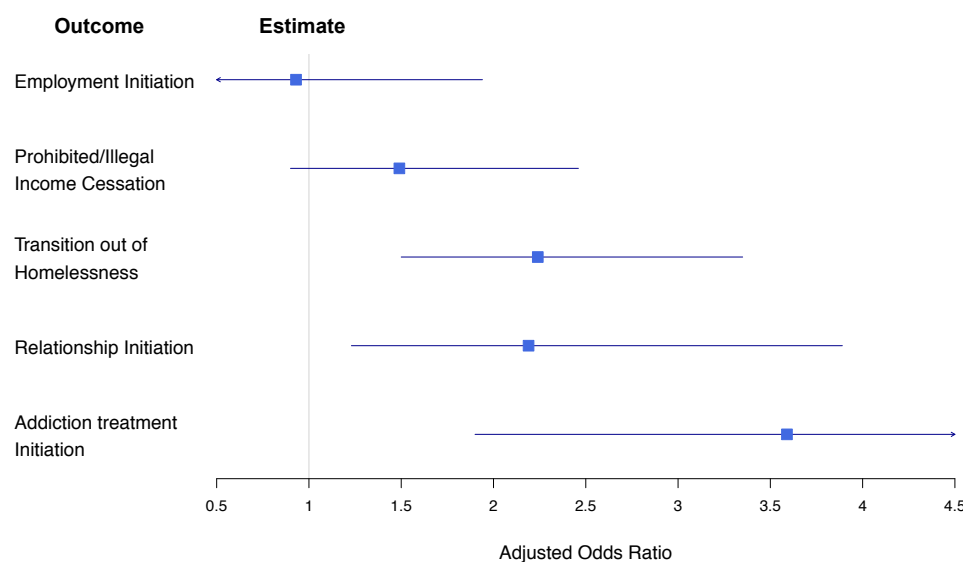
<sup>d</sup> Includes daily or greater heroin injection, cocaine injection, crack-cocaine smoking or methamphetamine use

<sup>e</sup> Includes pipe or syringe sharing, binge drug use, injecting alone, rushed drug use or public drug use

## Results

- Between December 2005 and November 2013, of 755 eligible study participants, 247 (32.7%) self-reported as women and 421 (55.8%) as Caucasian, with 128 (17.0%) initiating ART for the first time during the study.
- Individuals who initiated ART during the study period were more likely at baseline to be younger, female, homeless, engaged in prohibited or illegal income generation, engaged in high-intensity drug use, have a higher baseline CD4 count, and have a lower plasma viral load (Table 1).
- In final multivariate models (Figure 1), initiating ART was positively and significantly associated with transitioning out of homelessness (adjusted odds ratio [AOR]: 2.24; 95% confidence interval [CI]: 1.50-3.35); initiating a romantic relationship (AOR: 2.19, 95% CI: 1.23-3.89) and enrolling in addiction treatment (AOR: 3.59; 95% CI: 1.90-6.75).
- Sensitivity analyses with lagged ART initiation indicators found that none of the outcomes of interest were associated with ART initiation in the previous six-month follow up period.

**FIGURE 1.** Associations between new exposure to ART and social, socio-economic and ancillary clinical outcomes among 755 ART-exposed individuals living with HIV/AIDS who use illicit drugs, Vancouver, Canada, 2005-2013



Notes: 1. Models considered relevant confounding variables of age, gender, ethnicity, education, recent incarceration, high intensity drug use, high-risk drug use, baseline cd4 count, and, where not the outcome of interest, employment, prohibited/illegal income generation, homelessness, and addiction treatment enrollment  
2. \*p<0.05, \*\*p<0.01, \*\*\*p<0.001

## Discussion

- The current study findings demonstrate that initiating ART is associated with other transitions that may produce significant social, socio-economic and clinical benefits.
- Given previous associations between these benefits and improved outcomes among PWH, these benefits could support both the clinical management of HIV and improved quality of life across social, socio-economic and drug use dimensions.
- While it is not possible to establish causal sequencing between ART initiation and our outcomes of interest, the lack of robust relationship in lagged analyses suggests that benefits follow closely after or are precursors to initiation, supporting complementary approaches to promoting engagement in HIV care.
- Readers should be cautious when reviewing our results as the current study may include the potential for unmeasured confounding from factors not considered here; the limited generalizability common to all observational studies; the potential for social desirability or recall bias due to the self-reported nature of non-clinical indicators; and limitations to causal inference for non-controlled research.
- These results point to the potentially critical role that engagement in HIV care can have in clinical and non-clinical domains of the lives of PWH who use illicit drugs and particular benefits of ART initiation for social and socio-economically marginalized individuals.
- These findings provide additional support to previous findings calling for the scale-up of early initiation of ART among this population.

## Acknowledgements

We wish to thank the study participants for their contribution to the research, as well as current and past researchers and staff. The study was supported by the US National Institutes of Health - ACCESS: R01DA021525. We have no conflicts of interest to declare.



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