

Injection drug use & depressive symptoms are associated with food insecurity in HIV-hepatitis C virus co-infected individuals in Canada

Advancing Food Insecurity Research in Canada

November 17, 2016

Authors: McLinden T, Moodie EEM, Hamelin A-M, Wusiman A, Khosrow-Khavar F, Conway B, Hull M, Cooper C, Paradis G, Gill J, Rourke SB, Klein MB, Cox J

Presenter: [Taylor McLinden](#), MSc

PhD Candidate, Epidemiology

taylor.mclinden@mail.mcgill.ca

www.taylormclinden.ca



- **Food insecurity (FI):**
 - **Common** in HIV-positive & **HIV-HCV** co-infected ^[1]
 - FI in HIV-positive (British Columbia): **71%** (2007-2008) ^[2]
 - FI in HIV-HCV co-infected (Canada): **59%** (2012-2014) ^[3]
 - Much higher than general Canadian population (**8%**) ^[4]

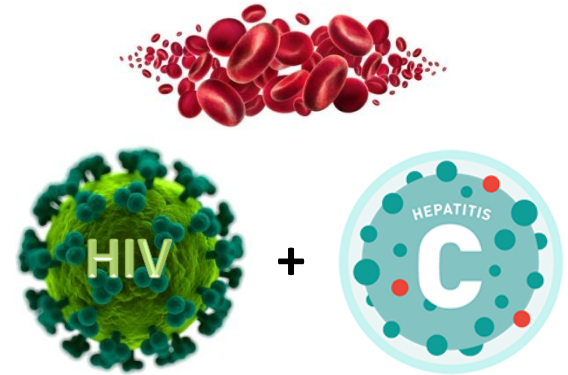
- **FI:** Limited or uncertain -
 - **Availability** of nutritionally adequate & safe foods
 - or
 - **Ability** to acquire acceptable foods in socially acceptable ways ^[5]

- FI is **context-specific**:
 - General population **vs.** sub-groups of population

- **20% of HIV-positive: HIV-HCV co-infected** ^[6]
 - Vulnerable sub-set of HIV-positive ^[7-9]
 - High prevalence of **injection drug use (IDU)**
 - HIV & HCV - bloodborne viruses
 - High prevalence of **depressive symptoms**

- **FI is associated with:**



- Sub-optimal HIV treatment adherence ^[10]
- Incomplete HIV viral load suppression ^[11]
- Lower CD4 cell counts ^[12]
- Higher rates of mortality ^[13]



- **Due to consequences of FI:**

- Identifying risk factors for FI may inform interventions to:
 - Reduce FI & consequences of being food insecure

Objectives

- **Objectives:**
 - Separately examine 2 associations:
 -  (1) **Injection drug use** → food insecurity
 -  (2) **Depressive symptoms** → food insecurity
 - **Population: HIV-HCV co-infected** in Canada
 - Prospective longitudinal cohort data
 - Temporality (exposure precedes outcome)

- **Data sources:**

- **Food Security & HIV-HCV Study:**



- **Canadian Co-infection Cohort (CCC)** ^[14]
 - Multi-centre study of co-infected in care
 - 17 HIV clinics, 6 provinces
 - Questionnaires & blood samples (every 6 months)
- **FI-related:**
 - Integrated in CCC: Nov 2012 - May 2015 ^[3]
 - Additional questionnaire
 - Household Food Security Survey Module (HFSSM)

- **Measurements:**

- **Exposures** (2 analyses):



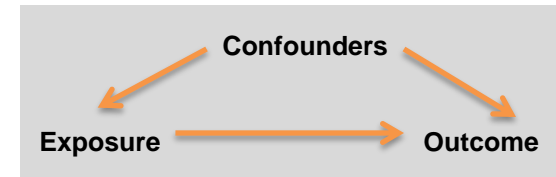
- **(1)** Self-reported **IDU** (*in the past month*)

- none **vs.** occasional IDU (< 1 day / week) **vs.** frequent IDU (\geq 1 day(s) / week)



- **(2)** Self-reported **depressive symptoms** (*in the past week*)

- Center for Epidemiological Studies Depression Scale (CES-D-10)
- CES-D-10 score \geq 10

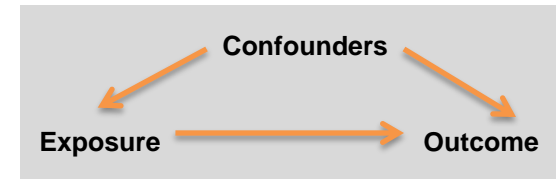


- **Outcome:** food insecurity (*in the past 6 months*)

- 10-item adult scale: Household Food Security Survey Module (**HFSSM**)^[15]
- Binary indicator: food secure **vs.** food insecure (marginal/moderate/severe)
 - **# of affirmative (✓) responses** on Health Canada's HFSSM
 - 0 affirmative responses: food secure
 - \geq 1 affirmative response: **food insecure**

- **Measurements cont'd:**

- **Confounders** (self-report / blood tests):
 - Selected on substantive grounds (*a priori*)



- **(1) IDU analysis:**

- Socioeconomic: **income**, employment, education
- Sociodemographic: age, gender, ethnicity, born in Canada, province, living / housing situation, unstable housing
- Behavioural: IDU in lifetime, use of other illicit substances (via snorting / smoking), alcohol / cigarette use
- Clinical: Long-term / recent depressive symptoms [**exposure in (2)**], self-reported health state



- **(2) Depressive symptoms analysis:**

- Adjusted for all above
- Additional: recent IDU [**exposure in (1)**], use of food assistance / mental health professionals, indicators of health status (AIDS-defining illnesses, long-term depressive symptoms, issues with mobility / self-care, end-stage liver disease), & sexual orientation



- **Data analyses:**
 - **Generalized estimating equations (GEE):**
 - Estimated adjusted **odds ratios (ORs)**
 - 2 multivariate logistic regression models
 - **(1) IDU** (occasional / frequent) → FI
 - Adjusted for confounders
 - **(2) Depressive symptoms** → FI
 - Adjusted for confounders
 - Repeated (correlated) measurements – longitudinal data
 - Temporality: exposure & confounders lagged in time

- N = **725** HIV-HCV co-infected participants

- 17 centres, 6 provinces (2012 - 2015)

- **Baseline** (visit 1):



- **26%** engaged in **IDU** (*in the past month*)
 - Occasional (**12%**) / Frequent (**14%**)



- **52%** experienced **depressive symptoms** (*in the past week*)
 - CES-D-10 ≥ 10

- **64%** experienced **FI** (*in the past 6 months*)
 - ≥ 1 on HFSSM

Results

- After temporal-ordering & adjustment for confounding:
 - 2 multivariate logistic models



- **Occasional IDU → FI:**

- adjusted odds ratio = **1.22** (95% CI = 0.79 - 1.90)

- **Frequent IDU → FI:**

- adjusted odds ratio = **1.93** (95% CI = 1.16 - 3.22) *





- **Depressive symptoms → FI:**


- adjusted odds ratio = **2.01** (95% CI = 1.48 - 2.74) *

($p < 0.05$) *


Discussion

- IDU, depressive symptoms, & FI: common in study sample
 - Frequent IDU (*in the past month*) & depressive symptoms (*in the past week*)
 - Significantly **associated** with FI ($p < 0.05$) *
 - **The odds of FI are:**
 - **1.93** times *higher* for those who engage in **frequent IDU** 
 - **2.01** times *higher* for those who experience **depressive symptoms** 
-

• IDU → FI:

- 
- Directly: disrupt food intake patterns by reducing appetite & metabolism ^[16]
 - Indirectly: drug-using environments creating barriers to food access / availability ^[16]



• Depressive symptoms → FI:

- 
- Potential neuro-vegetative role: loss of interest, appetite change, psycho-motor effects, fatigue ^[17]

Limitations

- Relatively short duration of follow-up
 - Loss of power when **lagging** covariates
- Sample limited to co-infected in HIV care
 - May not be **representative** of entire co-infected population
- Self-report of exposures & confounders
 - Potential **measurement error** / misclassification
- Observational study - residual **confounding**
 - Unmeasured factors / imperfectly measured factors

Conclusions

- **Significant risk factors for FI:**
 - **(1) Frequent IDU & (2) depressive symptoms**
 - Co-infected individuals engaged in IDU or experiencing depressive symptoms may be higher **risk**
 - FI: potential **harm** of IDU & depressive symptoms
 - Existing **interventions** aimed at IDUs or depressive symptoms:
 - Substance abuse treatments
 - Harm reduction programs
 - Mental health services
- 
- 
- These programs & services may:
 - **Reduce FI & consequences of being food insecure**

Acknowledgements

- **Study participants** across Canada
- **My PhD co-supervisors:** Drs. Joseph Cox & Erica Moodie
- **Food Security & HIV-HCV Study PIs:** Drs. Anne-Marie Hamelin & Joseph Cox
 - **Funding:** CIHR & CIHR Canadian HIV Trials Network
 - www.hivnet.ubc.ca/clinical-trials/ctn264
- **Canadian Co-infection Cohort:** Dr. Marina Klein & co-investigators & staff
- **Personal stipend support:** **CANOC Centre Doctoral Scholarship Award**



References



- **[1]** Weiser SD, Young SL, Cohen CR, Kushel MB, Tsai AC, Tien PC, et al. Conceptual framework for understanding the bidirectional links between food insecurity and HIV/AIDS. *Am J Clin Nutr.* 2011; 94(6):1729S-1739S.
- **[2]** Anema A, Weiser SD, Fernandes KA, et al. High prevalence of food insecurity among HIV-infected individuals receiving HAART in a resource-rich setting. *AIDS Care.* 2011;23(2): 221–30.
- **[3]** Cox J, Hamelin A-M, McLinden T, Moodie EMM, Anema A, Rollet-Kurhajec KC, et al. Food Insecurity in HIV-Hepatitis C Virus Co-infected Individuals in Canada: The Importance of Co-morbidities. *AIDS Behav.* 2016.
- **[4]** Roshanafshar SH, Hawkins E. Health at a glance—food insecurity in Canada. Ottawa: Statistics Canada; 2015.
- **[5]** Andersen SA. Core indicators of nutritional state for difficult to sample populations. *J Nutr.* 1990;120(Suppl. 11):1559–600.
- **[6]** Remis RS. Modelling the incidence and prevalence of hepatitis C infection and its sequelae in Canada, 2007. Ottawa: Public Health Agency of Canada; 2007.
- **[7]** Braitstein P, Montessori V, Chan K, et al. Quality of life, depression and fatigue among persons co-infected with HIV and hepatitis C: outcomes from a population-based cohort. *AIDS Care.* 2005;17(4):505–15.
- **[8]** Mrus JM, Sherman KE, Leonard AC, Sherman SN, Mandell KL, Tsevat J. Health values of patients coinfecting with HIV/Hepatitis C: are two viruses worse than one? *Med Care.* 2006;44(4): 158–66.
- **[9]** Rourke SB, Sobota M, Tucker R, et al. Social determinants of health associated with hepatitis C co-infection among people living with HIV: results from the Positive Spaces, Healthy Places study. *Open Med.* 2011;5(3):e120.
- **[10]** Singer AW, Weiser SD, McCoy SI. Does Food Insecurity Undermine Adherence to Antiretroviral Therapy? A Systematic Review. *AIDS Behav.* 2015; 19:1510-1526.
- **[11]** Aibibula W, Cox J, Hamelin AM, McLinden T, Klein MB, Brassard P. Association between food insecurity and HIV viral suppression: a systematic review and meta-analysis (Abstract 009). *Am J Epidemiol.* 2016; 184(1):78-80.
- **[12]** Aibibula W, Cox J, Hamelin AM, Mamiya H, Klein MB, Brassard P. Food insecurity and low CD4 count among HIV-infected people: a systematic review and meta-analysis. *AIDS Care.* 2016; 28(12):1577-1585.
- **[13]** Anema A, Chan K, Chen Y, Weiser SD, Montaner JS, Hogg RS. Relationship between food insecurity and mortality among HIV-positive injection drug users receiving antiretroviral therapy in British Columbia, Canada. *PLoS ONE.* 2013;8(5):e61277.
- **[14]** Klein MB, Saeed S, Yang H, et al. Cohort profile: the Canadian HIV-hepatitis C co-infection cohort study. *Int J Epidemiol.* 2010;39(5):1162–9.
- **[15]** Health Canada. Canadian Community Health Survey, Cycle 2.2, Nutrition (2004): Income-Related Household Food Security in Canada Ottawa 2004. http://www.hc-sc.gc.ca/fn-an/surveill/nutrition/commun/income_food_sec-eng.php. Accessed 25 Oct 2016.
- **[16]** Anema A, Mehra D, Weiser SD, Grede N, Vogenthaler N, Kerr T. Drivers and Consequences of Food Insecurity Among Illicit Drug Users (Chapter 20). New York: Elsevier Publishing Inc; 2015.
- **[17]** Lux V, Kendler KS. Deconstructing major depression: a validation study of the DSM-IV symptomatic criteria. *Psychol Med.* 2010;40(10):1679–90.