Intermittent injecting drug use and HCV incidence in an observational cohort study of people who inject drugs in Montréal, Canada

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Background

- In Montréal, hepatitis C virus (HCV) infection is highly problematic among people who inject drugs (PWID), with incidence estimates varying between 14 and 24 per 100 person-years between 1997 and 2014 [1, 2].
- Among the few studies describing longitudinal injecting drug use behavioral dynamics, 6-37% of PWID had an injecting drug use trajectory characterized by multiple episodes of injection cessation and relapse (i.e. intermittent injecting drug use) [3-5].
- "Temporary breaks" of injecting drug use were suggested as a way to reduce the likelihood of being exposed to HCV [6], although the evidence is scarce.
- Our previous work (unpublished results) has shown that compared to continuous injecting drug use, intermittent injecting drug use, defined as injecting within 1 or 2 months out of a 3-month period, was associated with:
  - A reduced risk of borrowing previously used injection material;
  - A reduced frequency of injecting drug use.
- Borrowing previously used injection material and frequent injecting drug use are prominent risk factors for HCV infection [6, 7].

Objective

Specific aim:

- To assess the association between HCV infection and intermittent injecting drug use, compared to continuous injecting drug use.

Hypothesis:

- Based on our previous work, intermittent injecting drug use will be associated with a reduced risk of HCV infection, compared to continuous injecting drug use.

Methods

Study design:

- Hepatitis Cohort study (HEPCO): ongoing observational cohort of active PWID based in Montréal, Canada.
- Inclusion criteria: age ≥18 years; injecting drug use in the 6 months prior to enrollment; HCV RNA negative at baseline; assessment between March 2011 and December 2014; and ≥1 follow-up visit.
- Data collection: at baseline and 3-month follow-up visits; HCV testing and interviewer-administered questionnaire eliciting information on sociodemographics, drug use and related behaviors, and treatment utilization.

Variables of interest:

- Injecting drug use within the past 3 months: reported at each visit, and defined on a categorical scale: injecting within 0 (no use), 1 or 2 months (intermittent use), or 3 months (continuous use). *See Figure 1.*
- HCV infection: HCV RNA+ or seroconversion; estimated to occur at the midpoint between a negative and a positive consecutive visit; investigated among HCV Ab– participants (at-risk of primary infection) and HCV Ab+ participants (at-risk of reinfection or recurrence).

Statistical analyses:

- Cox regression analyses with time-dependent covariates: multivariate models adjusted for potential confounders identified a priori, including: age at baseline; gender; and opioid substitution treatment (OST) in the past 3 months. HCV Ab status at baseline assessed for effect modification. Performed using SAS, version 9.3.
- Kaplan–Meier failure curves for multiple-record-per-subject data: stratified by injecting drug use patterns. Performed using Stata/MP, version 14.1.

Did you inject drugs within each of the past 3 months ?		
1st month	2nd month	3rd month
Yes / No	Yes / No	Yes / No

Figure 1. Assessment of injecting drug use within the past 3 months.

Conclusions

- Intermittent injecting drug use was associated with a reduced risk of getting infected with HCV, compared to continuous injecting drug use.
- The effect of intermittent injecting drug use on the risk of HCV infection was similar to the effect of no injecting drug use.
- Findings suggest that intermittent injecting drug use should be encouraged over continuous use by health care providers.
- At the clinical and public health levels, findings bring new perspectives for improving interventions among PWID and preventing the transmission of HCV, and possibly hepatitis B and HIV.
- Further work is needed to contextualize intermittent injecting drug use among injecting drug use trajectories.

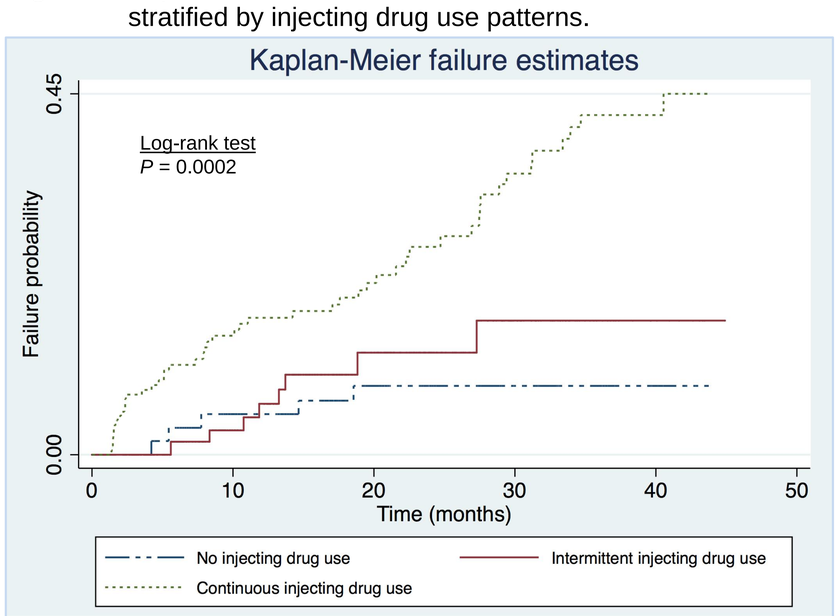
Results

- 311 participants contributed 1,689 visits, resulting in 63 HCV infections (34 primary infections, 29 reinfections/recurrences).
- Baseline characteristics: mean age 40 years; 82% male; 47% HCV Ab+ ; 188 (60%), 79 (25%) and 44 (14%) participants reported continuous, intermittent and no injecting drug use in the past 3 months, respectively.
- HCV incidence: 11.3 per 100 person-years (95%CI 8.8-14.4).

Table 1. Univariate/multivariate Cox models of the association between HCV infection and injecting drug use patterns.

Characteristics	HR (95%CI)	aHR (95%CI)
Injecting drug use in the past 3 months		
Continuous use	1.00	1.00
Intermittent use	**0.36 (0.17-0.77)**	**0.40 (0.19-0.86)**
No use	**0.23 (0.09-0.58)**	**0.30 (0.12-0.77)**
Age at baseline		
Per 5 year increase	**0.81 (0.71-0.92)**	**0.84 (0.73-0.96)**
Gender		
Male	1.00	1.00
Female	1.35 (0.73-2.49)	0.99 (0.52-1.88)
OST in the past 3 months		
No	1.00	1.00
Yes	**0.49 (0.28-0.84)**	**0.50 (0.28-0.87)**
Not eligible for OST	**0.23 (0.11-0.49)**	**0.37 (0.16-0.84)**

Figure 2. Kaplan-Meier failure estimates for HCV infection stratified by injecting drug use patterns.



- No effect modification by anti-HCV status at baseline (primary HCV infection vs. HCV reinfection/recurrence).

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