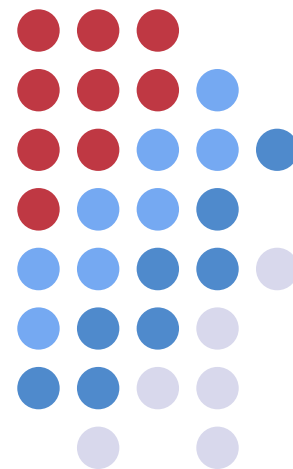


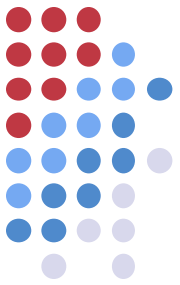
Women with a history of injection drug use at greatest risk for poorer clinical outcomes in a cohort of HIV-positive individuals in Canada

Angela Cescon, Alexis K Palmer, Keith Chan, Shari Margoless, Janet Raboud, Curtis Cooper, Sean Hosein, Marina B Klein, Nima Machouf, Julio S Montaner, Sean B Rourke, Chris Tsoukas, Robert S Hogg, Mona R Loutfy, CANOC Collaboration

1st International Workshop on HIV & Women
January 10, 2011



Overview



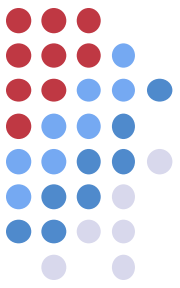
- CANOC is Canada's first nationwide HIV cohort study.
- This emerging team collaboration is an essential first step to evaluating the impact of antiretroviral care on the health and well being of persons living with HIV across various regions of Canada.



Participating cohorts (9):

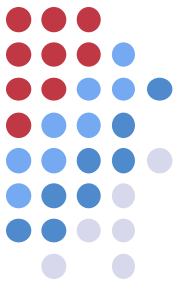
- BC Centre for Excellence in HIV/AIDS
- Clinique Medicale L'Actuel
- Canadian Co-infection Cohort Study
- EARTH
- Maple Leaf Medical Clinic
- Montreal Chest Institute IDS
- Ontario HIV Treatment Network
- Toronto General Hospital
- University of Ottawa





Overview: HIV in Canada

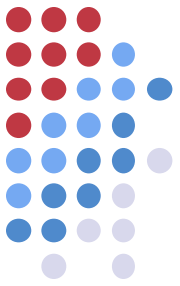
- An estimated 65,000 persons living with HIV in 2008
- Estimated 14,300 women living with HIV, accounting for about 22% of the national total; this compares to 12,200 in 2005
- Women represent one of Canada's fastest growing HIV-positive populations and the greatest proportion of persons unaware of their HIV-positive status in the country are women



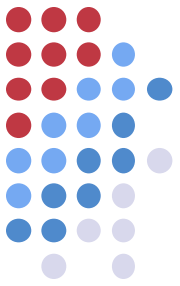
Background

- Women have unique experiences with HIV infection and antiretroviral therapy, yet cohort data examining sex differences in response to therapy and disease progression ***remain inconsistent***, and are likely context-dependent.

Background

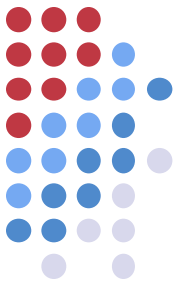


- Importantly, social determinants and gender inequality increase women's vulnerabilities towards HIV infection.
- In Canada, women represent one of the fastest growing HIV-positive populations, and notably, injection drug use (IDU) is becoming an increasingly more prominent risk factor among women.



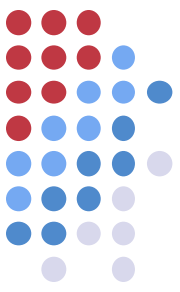
Objectives

- To investigate sex differences in virologic responses to ART and mortality amongst IDU and non-IDU in CANOC.
- Outcomes:
 - Virologic suppression
 - Viral load rebound
 - Mortality (all-cause)



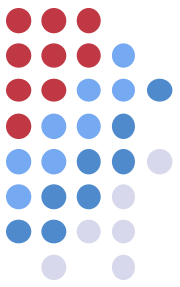
Methods

- Retrospective, observational analysis of CANOC cohort
- Inclusion criteria:
 - First ART therapy date \geq Jan 1st, 2000
 - Available baseline CD4 and viral load within the six months preceding therapy
 - Started ART with at least 3 individual agents
 - *Have at least 1 follow-up VL measurement*
 - *Known IDU history (yes/no)*



Statistical Methods

- Piecewise exponential hazard regression used to evaluate time to VL suppression (two consecutive measures <50 copies/mL)
- Weibull hazard regression used to determine time to VL rebound (>1000 copies/mL after suppression)
- Cox proportional hazard regression used to investigate mortality
 - The primary covariate of interest was sex by IDU status, with the inclusion of four groups: male non-IDU (reference), male IDU, female non-IDU, and female IDU

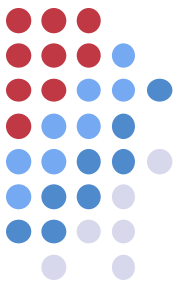


Results

- Demographics (total n=3902)

Characteristic	
Age (median)	40 (IQR 34-46)
Female	818 (21%)
Province	
• British Columbia	1852 (48%)
• Ontario	1045 (27%)
• Quebec	1005 (26%)

Results



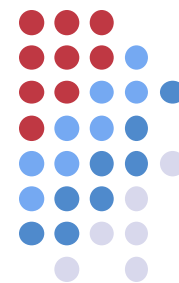
- Baseline Information (total n=3902)

Characteristic	Women	Men	P-value
History of IDU	221 (27%)	508 (17%)	<0.001
AIDS at baseline	90 (11%)	466 (15%)	0.003
Baseline CD4*	199 cells/mL (110-290)	180 cells/mL (90-270)	<0.001
Baseline viral load*	4.7 log ₁₀ copies/mL (4.0- 5.0)	5.0 log ₁₀ copies/mL (4.5- 5.0)	<0.001

*Median (IQR)

Results – VL Suppression

(2 x VL <50 copies/mL)

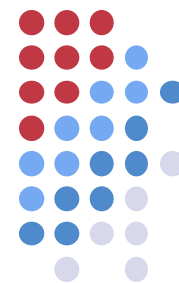


- In multivariate analysis adjusted for age, province, baseline CD4 and viral load, viral load testing rate, year started ART, and third antiretroviral agent, **female IDU** and **male IDU** were less likely to suppress than male non-IDU

	Unadjusted HR	p-value	Adjusted HR	p-value
Sex by IDU status				
Male + non-IDU	1.00		1.00	
Male + IDU	0.64 (0.58,0.72)	<0.001	0.74 (0.66,0.83)	<0.001
Female + non-IDU	0.88 (0.79,0.97)	0.011	0.93 (0.84,1.03)	0.188
Female + IDU	0.40 (0.33,0.48)	<0.001	0.51 (0.42,0.61)	<0.001

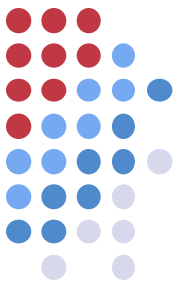
Results – VL Rebound

(>1000 copies/mL after suppression)



- In multivariate analysis adjusted for age, province, baseline CD4 and viral load, viral load testing rate, year started ART, and third antiretroviral agent, **female IDU**, **male IDU**, and **female non-IDU** were more likely to rebound than male non-IDU

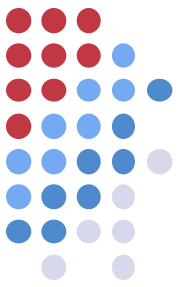
	Unadjusted HR	p-value	Adjusted HR	p-value
Sex by IDU status				
Male + non-IDU	1.00		1.00	
Male + IDU	2.21 (1.72,2.84)	<0.001	1.96 (1.52,2.53)	<0.001
Female + non-IDU	1.70 (1.33,2.18)	<0.001	1.40 (1.08,1.83)	0.013
Female + IDU	3.85 (2.81,5.26)	<0.001	2.96 (2.15,4.08)	<0.001



Results – Mortality

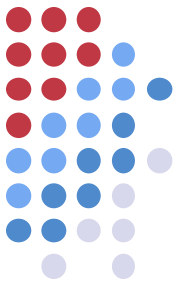
- In time to death analysis adjusted for age, province, baseline CD4, viral load testing rate, year started ART, and third antiretroviral agent, **female IDU** and **male IDU** were at greater risk than male non-IDU

	Unadjusted HR	p-value	Adjusted HR	p-value
Sex by IDU status				
Male + non-IDU	1.00		1.00	
Male + IDU	2.77 (1.86-4.12)	<0.001	1.64 (1.24-2.16)	<0.001
Female + non-IDU	0.73 (0.40-1.35)	0.318	1.23 (0.87-1.75)	0.248
Female + IDU	2.22 (1.11-4.42)	0.024	1.77 (1.22-2.57)	0.003



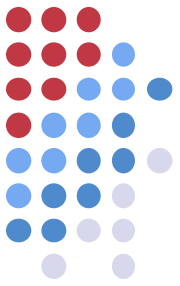
Discussion & Conclusions

- HIV-positive individuals with a history of IDU in CANOC are at heightened risk for poor clinical outcomes.
- Importantly, female IDU were the least likely to virologically suppress, most likely to experience rebound, and had a greater risk of mortality.



Discussion & Conclusions

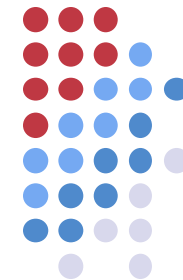
- Further understanding of the intersections between sex and other factors augmenting risk is needed in order to develop approaches to retaining female IDU in care and maximizing the benefits of ART.
- Conducting a similar analysis by province would be useful to see if trends continue at the regional level.



Limitations

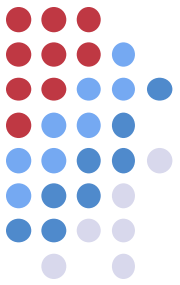
- These data were obtained from only 3 provinces and may not be generalizable to all HIV-positive persons in Canada.
- Of note, BC data represents the entire sample of people on ART in the province, while data from ON and QC are based on a selection of clinics.
- CANOC database does not yet contain information on ART adherence.
- Ethnicity data is not complete in our database so was not included in this analysis.
- Information on pregnancy was not included.

Thank you



The CANOC Collaboration includes: *Community Advisory Committee*: Sean Hosein (Chair), Bruno Lemay, Shari Margolese, Evelyne Ssendogo; *Investigators*: Gloria Aykroyd (Ontario HIV Treatment Network), Louise Balfour (University of Ottawa, Contributes to the Ontario HIV Treatment Network), Ahmed Bayoumi (University of Toronto, Contributes to the Ontario HIV Treatment Network), John Cairney (University of Toronto, Contributes to the Ontario HIV Treatment Network), Liviana Calzavara (University of Toronto, Contributes to the Ontario HIV Treatment Network), Curtis Cooper (University of Ottawa, Contributes to the Ontario HIV Treatment Network), Fred Cruzat (Maple Leaf Medical Clinic), Kevin Gough (University of Toronto, Contributes to the Ontario HIV Treatment Network), Silvia Guillemi (British Columbia Centre for Excellence in HIV/AIDS, University of British Columbia), Richard Harrigan (British Columbia Centre for Excellence in HIV/AIDS, University of British Columbia), Marianne Harris (British Columbia Centre for Excellence in HIV/AIDS), George Hatzakis (McGill University), Robert Hogg (British Columbia Centre for Excellence in HIV/AIDS, Simon Fraser University), Don Kilby (University of Ottawa, Ontario HIV Treatment Network), Marina Klein (Montreal Chest Institute Immunodeficiency Service Cohort, McGill University), Richard Lalonde (The Montreal Chest Institute Immunodeficiency Service Cohort and McGill University), Viviane Lima (British Columbia Centre for Excellence in HIV/AIDS, University of British Columbia), Mona Loutfy (University of Toronto, Maple Leaf Medical Clinic), Nima Machouf (Clinique Medicale l'Actuel, University de Montréal), Ed Mills (British Columbia Centre for Excellence in HIV/AIDS, University of Ottawa), Peggy Millson (University of Toronto, Contributes to the Ontario HIV Treatment Network), Julio Montaner (British Columbia Centre for Excellence in HIV/AIDS, University of British Columbia), David Moore (British Columbia Centre for Excellence in HIV/AIDS, University of British Columbia), Alexis Palmer (British Columbia Centre for Excellence in HIV/AIDS), Janet Raboud (University of Toronto, University Health Network), Anita Rachlis (University of Toronto, Contributes to the Ontario HIV Treatment Network), Stanley Read (University of Toronto, Contributes to the Ontario HIV Treatment Network), Sean Rourke (Ontario HIV Treatment Network, University of Toronto), Marek Smieja (McMaster University, Contributes to the Ontario HIV Treatment Network), Irving Salit (University of Toronto, Contributes to the Ontario HIV Treatment Network), Darien Taylor (Canadian AIDS Treatment Information Exchange Contributes to the Ontario HIV Treatment Network), Benoit Trottier (Clinique Medicale l'Actuel, University de Montréal), Chris Tsoukas (McGill University), Sharon Walmsley (University of Toronto, Contributes to the Ontario HIV Treatment Network), and Wendy Wobeser (Queens University, Contributes to the Ontario HIV Treatment Network).





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