

Differences in Time to Virologic Suppression and Rebound Between Aboriginal Peoples and Other Ethnic Groups Among Individuals Initiating Combination Antiretroviral Therapy in a Multisite Cohort of Individuals Living with HIV in Canada

Jaime Younger¹, Anita C. Benoit², Kerrigan Beaver³, Randy Jackson⁴, Michael Keshane³, Laverne Malcolm³, Renée Masching⁵, Tony Nobis⁵, Earl Nowgesic⁷, Doe O'Brien-Teengs⁸, Dwayne Poulette³, Terra Tynes³, Tonie Walsh³, Wanda Whitebird⁶, Art Zoccolo⁹, Mark Hull^{10,11}, Denise Jaworsky¹¹, Elizabeth Benson^{3,12}, Anita Rachlis¹³, Sean Rourke^{7,14}, Ann Burchell^{7,14}, Curtis Cooper¹⁵, Robert Hogg¹⁰, Marina Klein¹⁶, Nima Machouf¹⁷, Julio Montaner¹⁰, Chris Tsoukas¹⁶, Mona Loutfy^{2,15}, Janet Raboud^{1,15}, on behalf of the Building Bridges Team and the Canadian Observational Cohort Collaboration*

¹University Health Network, ²Women's College Research Institute, ³Building Bridges Research Team, ⁴McMaster University, ⁵Canadian Aboriginal AIDS Network, ⁶Ontario Aboriginal HIV/AIDS Strategy, ⁷University of Toronto, ⁸Lakehead University, ⁹Spirited People of the 1st Nations, ¹⁰British Columbia Centre for Excellence in HIV/AIDS, ¹¹University of British Columbia, ¹²Gitsan Nation, ¹³Sunnybrook Research Institute, ¹⁴Ontario HIV Treatment Network, ¹⁵University of Ottawa, ¹⁶McGill University, ¹⁷Clinique Médicale l'Actuel

Building Bridges

Building Bridges was a collaborative community-based research project using Indigenous methodology to conduct epidemiological health research between Aboriginal and allied stakeholders and the Canadian Observational Cohort (CANOC).

Objective

Determine time to virologic suppression (VS) and virologic rebound (VR) between Aboriginal and non-Aboriginal CANOC participants.

Methods

- CANOC is a collaboration of 8 cohorts of treatment-naïve HIV-infected participants initiating combination antiretroviral therapy (cART) after 1/1/2000.
- Fine and Gray models were used to estimate the effect of ethnicity on:
 - time to VS (two consecutive viral loads (VLs) <50 copies/mL at least 30 days apart) after adjusting for the competing risk of death &
 - time until VR (two consecutive VLs >200 copies/mL at least 30 days apart) following VS.
- Models were adjusted for confounders and the competing risk of death.

Results

- VS was achieved in 7800 (84%) participants, and of these 1256 (16%) rebounded.
- 384 participants died before achieving VS, including 72 (14%) Aboriginal Peoples and 312 (4%) other participants.

| N=9300 | Aboriginal Peoples N=498 | ACB N=789 | Caucasian N=2474 | Other N=629 | Unknown N=4910 | P |
|-----------------------------|--------------------------|-----------|------------------|-------------|----------------|--------|
| Demographics | | | | | | |
| Age | 39 | 37 | 41 | 38 | 40 | <.0001 |
| Male | 59% | 47% | 87% | 88% | 86% | <.0001 |
| Province | | | | | | <.0001 |
| BC | 83% | 11% | 47% | 40% | 51% | |
| Ontario | 13% | 59% | 45% | 48% | 22% | |
| Québec | 4% | 31% | 8% | 12% | 27% | |
| Risk Factors | | | | | | |
| MSM | 20% | 8% | 60% | 64% | 28% | <.0001 |
| IDU | 72% | 3% | 29% | 10% | 17% | <.0001 |
| Clinical | | | | | | |
| Year of cART Initiation | 2005 | 2006 | 2006 | 2007 | 2008 | <.0001 |
| Regimen | | | | | | <.01 |
| PI Based | 49% | 48% | 50% | 48% | 48% | |
| NNRTI Based | 47% | 48% | 46% | 49% | 46% | |
| CD4 cells/mm ³ | 160 | 189 | 210 | 204 | 240 | <.0001 |
| VL (log ₁₀ c/mL) | 4.9 | 4.5 | 5.0 | 4.9 | 4.9 | <.0001 |
| ADI | 17% | 15% | 19% | 20% | 11% | <.0001 |
| Hepatitis B | 3% | 9% | 7% | 10% | 8% | <.0001 |
| Hepatitis C | 70% | 6% | 30% | 13% | 21% | <.0001 |

*Investigators

Principal Investigators: Robert Hogg, Ann N. Burchell, Curtis Cooper, Deborah Kelly, Marina Klein, Mona Loutfy, Nima Machouf, Julio Montaner, Janet Raboud, Chris Tsoukas, Stephen Sanche, Alexander Wong, Tony Antoniou, Ahmed Bayoumi, Mark Hull, Bohdan Nosyk
Co-Investigators: Angela Cescon, Michelle Cotterchio, Charlie Goldsmith, Silvia Guilleli, P. Richard Harrigan, Marianne Harris, Sean Hosen, Sharon Johnston, Claire Kendall, Clare Liddy, Viviane Lima, David Moore, Alexis Palmer, Sophie Patterson, Peter Phillips, Anita Rachlis, Sean B. Rourke, Hasina Samji, Marek Smieja, Benoit Trottier, Mark Weinberg, Sharon Walmsley

Figure 1: Cumulative incidence curves for time until suppression.

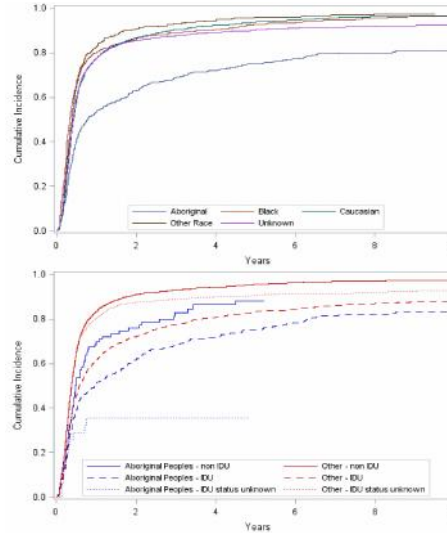
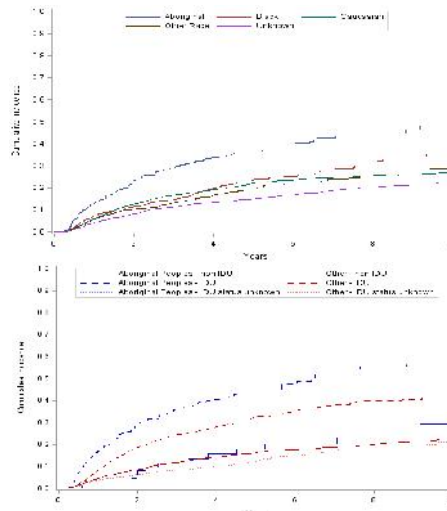


Figure 2: Cumulative incidence curves for time until rebound.



| | Time until suppression | | Time until rebound | |
|---|------------------------|--------|--------------------|--------|
| | HR (95% CI) | p | HR (95% CI) | p |
| Ethnicity (ref = Caucasian) | | | | |
| Aboriginal | 0.71 (0.63,0.81) | <.0001 | 1.17 (0.92,1.47) | 0.19 |
| ACB | 1.10 (0.98,1.22) | 0.10 | 1.21 (0.96,1.53) | 0.11 |
| Other | 1.08 (0.98,1.18) | 0.11 | 0.95 (0.76,1.18) | 0.65 |
| Unknown | 0.93 (0.87,1.00) | 0.04 | 0.93 (0.78,1.10) | 0.38 |
| Age (per 10 years) | 1.02 (0.99,1.04) | 0.22 | 0.74 (0.70,0.79) | <.0001 |
| Gender (ref = Male) | | | | |
| Female | 0.92 (0.85,0.99) | 0.02 | 1.57 (1.35,1.84) | <.0001 |
| IDU | | | | |
| Yes | 0.71 (0.65,0.76) | <.0001 | 1.96 (1.66,2.31) | <.0001 |
| Unknown | 0.92 (0.84,1.00) | 0.05 | 0.80 (0.63,1.02) | 0.07 |
| MSM | | | | |
| Yes | 1.04 (0.96,1.12) | 0.34 | 0.94 (0.78,1.13) | 0.48 |
| Unknown | 1.10 (1.00,1.21) | 0.05 | 1.13 (0.92,1.40) | 0.24 |
| Province (ref = Ontario) | | | | |
| British Columbia | 0.85 (0.80,0.90) | <.0001 | 1.24 (1.05,1.47) | 0.01 |
| Québec | 0.99 (0.91,1.07) | 0.76 | 0.97 (0.78,1.20) | 0.77 |
| cART Regimen (ref = Boosted PI) | | | | |
| II | 1.94 (1.48,2.55) | <.0001 | 0.97 (0.30,3.13) | 0.96 |
| NNRTI | 1.26 (1.20,1.32) | <.0001 | 0.86 (0.75,0.98) | 0.02 |
| PI | 0.88 (0.79,0.98) | 0.02 | 1.29 (1.04,1.59) | 0.02 |
| Other | 1.10 (0.91,1.32) | 0.32 | 1.22 (0.89,1.68) | 0.21 |
| VL Measurement (ref ≤3 times/yr) | | | | |
| 3 – 4 times/yr | 1.67 (1.57,1.79) | <.0001 | 1.12 (0.95,1.31) | 0.17 |
| 4 – 6 times/yr | 1.79 (1.67,1.92) | <.0001 | 1.25 (1.06,1.48) | <.01 |
| > 6 times/yr | 1.29 (1.18,1.41) | <.0001 | 2.44 (1.95,3.05) | <.0001 |
| CD4>200 cells/mm ³ | 1.24 (1.19,1.30) | <.0001 | 1.28 (1.14,1.45) | <.0001 |
| cART initiation year (ref = 2000-2001) | | | | |
| 2002-2003 | 1.08 (0.98,1.19) | 0.11 | 0.69 (0.58,0.82) | <.0001 |
| 2004-2005 | 1.25 (1.14,1.37) | <.0001 | 0.65 (0.54,0.77) | <.0001 |
| 2006-2007 | 1.46 (1.33,1.59) | <.0001 | 0.39 (0.32,0.47) | <.0001 |
| 2008-2009 | 1.51 (1.38,1.65) | <.0001 | 0.28 (0.23,0.35) | <.0001 |
| 2010-2012 | 1.28 (1.17,1.41) | <.0001 | 0.17 (0.12,0.23) | <.0001 |

Conclusions

- Among CANOC participants initiating cART, Aboriginal Peoples were less likely to achieve VS, but had similar rates of VR as other ethnic groups.
- Further research is required to identify socio-demographic, clinical and psychosocial predictors of VS to target interventions, programming and services to improve HIV health outcomes.

Acknowledgements

- Traditional territory of the Mississaugas of the New Credit
- CANOC participants



Funding

CANOC is funded by the Canadian Institutes of Health Research (CIHR) through a Centres for HIV/AIDS Population Health and Health Services Research Grant [CIHR 711314], Operating Grants HIV/AIDS Priority Announcement [CIHR 711310] and Population and Public Health [CIHR 711319], and by the CIHR Canadian HIV Trials Network [CTN 242]. JR is supported through an OHTN Chair in Biostatistics. ANB and TA are supported by CIHR New Investigator Awards. CC is supported through an Applied HIV Research Chair from the OHTN. RH is supported by a University Professorship at Simon Fraser University. MK is supported by a Chercheur-Boursier Clinicien Senior Career Award from the Fonds de recherche en santé du Québec (FRSQ). ML receives salary support from CIHR. JM is supported by an Avant-Garde Award from the National Institute on Drug Abuse, National Institutes of Health.