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Introduction

CANOC was developed to evaluate the impact of antiretroviral care on the health and well being of individuals living with HIV in Canada.

Frequency of viral load (VL) measurement can indicate quality of care for HIV-infected individuals. This analysis examines if regional and individual characteristics are associated with differential use of VL testing in Canada.

Methods

CANOC cohort participants must have started naive on three or more antiretroviral drugs on/after January 1st, 2000 and have a baseline HIV-1 RNA measure and CD4 cell count within 6 months prior to the start of therapy.

Cohorts contributing data were: BC Centre HIV/AIDS Drug Treatment Program, Ontario Cohort Study, Montreal Chest Institute Immunodeficiency Cohort, The Electronic Anti-retroviral Therapy (EARTH), the IDTC Clinique Médicale l'Actuel, The Canadian HIV/HCV Co-infection Cohort Study, Maple Leaf Medical Clinic, Toronto General Hospital and University of Ottawa.

Data extraction was performed at the participating sites and sent to a central location where a relational database was built and managed.

CANOC participants must have at least 1 year of follow-up to be included in the analysis.

Generalized Estimating Equation regression models were used to examine the relationship between fixed and time-varying covariates, the number of days between VL tests, and the occurrence of an interval of 9 months or more between tests.

Results

3648 individuals from Ontario, Quebec and BC who started HAART after 1/1/2000 with ≥ 1 year of follow-up were included in the analysis.

Median follow-up was 42.9 months (IQR 25.4, 64.4)

Median of 15 VL tests (IQR 9, 22)

Median number of days between tests was 79 (IQR 45-105), and by province was Ontario: 91 (IQR 57, 118), Quebec: 91 (IQR 57, 119), and BC: 64 (IQR 37, 93)

Of 57,308 intervals between VL tests, 6.8% were >6 months and 2.3% were >9 months

Table 1: Rate of Viral Load Testing and Number of 9 month Gaps by Demographic and Clinical Characteristics

Characteristics	N	Annual Testing Rate	p value	# of 9 month Gaps in Testing	p value
Overall	3648	4.3 (3.4-5.5)		0 (0-1)	
Region					
BC	1674	4.9 (3.8-6.3)	<.0001	0 (0-0)	<.0001
ON	1143	3.9 (3.1-4.8)		0 (0-1)	
QC	831	4 (3.2-4.8)		0 (0-1)	
Age					
≤ 40	1942	4.1 (3.2-5.3)	<.0001	0 (0-1)	<.0001
> 40	1706	4.5 (3.6-5.8)		0 (0-0)	
Gender					
Female	723	3.9 (3.1-5)	<.0001	0 (0-1)	<.0001
Male	2925	4.4 (3.5-5.7)		0 (0-0)	
Race					
Non-Caucasian	855	4.4 (3.4-5.7)	0.33	0 (0-1)	0.03
Caucasian	956	4.4 (3.4-5.9)		0 (0-1)	
AIDS Defining Illness					
No	3167	4.2 (3.3-5.5)	<.0001	0 (0-1)	<.0001
Yes	481	4.7 (3.8-5.9)		0 (0-0)	
Initial Therapy					
NNRTI	1586	4.1 (3.2-5)	<.0001	0 (0-1)	<.0001
PI boosted	1433	5 (3.7-6.5)		0 (0-0)	
PI single	384	4 (3.1-4.9)		0 (0-1)	
Other HAART	245	3.9 (3.2-4.7)		0 (0-1)	
Year Starting HAART					
2000	482	3.7 (2.8-4.7)	<.0001	0 (0-1)	<.0001
2001-04	2036	4.2 (3.3-5.3)		0 (0-1)	
>2004	1130	4.9 (3.9-6.4)		0 (0-0)	
CD4 (cells/mm3)					
< 200	1921	4.4 (3.4-5.7)	<.0001	0 (0-0)	<.0001
200 – 350	1175	4.3 (3.4-5.5)		0 (0-0)	
> 350	544	4.1 (3-5.2)		0 (0-1)	
VL (copies/mL)					
≥ 50	3509	4.3 (3.4-5.6)	<.001	0 (0-1)	0.85
< 50	139	3.9 (2.9-4.8)		0 (0-1)	
VL (log ₁₀ copies/mL)					
≥ 5	1664	4.5 (3.6-5.9)	<.0001	0 (0-0)	<.0001
< 5	1984	4.1 (3.2-5.2)		0 (0-1)	
Risk Factor					
MSM	1015	4.3 (3.5-5.5)		0 (0-0)	
IDU	632	4 (3-5.1)		0 (0-1)	
Heterosexual	486	4 (3.1-4.9)		0 (0-1)	
Endemic Country	233	4.1 (3.4-4.8)		0 (0-1)	
Blood	43	4 (3.3-4.9)		0 (0-1)	
Hep C co-infection					
No	1712	4.4 (3.6-5.6)	<.0001	0 (0-0)	<.0001
Yes	736	4.1 (3-5.3)		0 (0-1)	
Positive for HCV antibodies					
No	2117	4.3 (3.5-5.5)	<.0001	0 (0-0)	<.0001
Yes	732	4.1 (3-5.3)		0 (0-1)	

Table 2: Multivariate GEE models of Days Between Viral Load tests and the Probability of a 9 month Gap between Tests

Covariates	Days between successive Viral Load Tests		Probability of an Interval >9 Months	
	Estimate (95% CI)	p value	Odds Ratio (95% CI)	p value
Region				
QC	20.3 (15.5, 25.0)	<.0001	1.72 (1.39, 2.14)	<.0001
ON	18.7 (14.3, 23.0)	<.0001	1.78 (1.37, 2.31)	<.0001
BC (ref.)			1.0	
Age (per 10 years)	-3.8 (-5.4, -2.2)	<.0001	0.77 (0.70, 0.85)	<.0001
Risk factor				
MSM	-9.2 (-13.1, -5.4)	<.0001	0.62 (0.49, 0.78)	<.0001
IDU	16.0 (11.1, 20.9)	<.0001	1.68 (1.38, 2.05)	<.0001
Year of initiating HAART				
>2004	-15.8 (-21.9, -9.7)	<.0001	0.62 (0.46, 0.83)	0.001
2001-2004	-12.4 (-18.2, -6.6)	<.0001	0.70 (0.57, 0.86)	0.0006
2000 (ref.)	0		1.0	
AIDS Defining Illness	-4.9 (-8.5, -1.4)	0.007		
First year of HAART	-24.3 (-26.0, -22.6)	<.0001	0.15 (0.12, 0.20)	<.0001
Boosted PI-based initial HAART	-9.1 (-12.2, -6.0)	<.0001		
Number of drugs in regimen at current visit				
> 0	-27.8 (-31.0, -24.6)	<.0001	0.34 (0.29, 0.40)	<.0001
0 (ref.)	0		1.0	
VL < 50 copies/mL at previous test	8.6 (6.6, 10.7)	<.0001	0.56 (0.48, 0.65)	<.0001

Conclusions

IDU, younger individuals, residents of Ontario or Quebec, individuals who were not taking any ARVs at the current VL test, individuals with at least one year of HAART, individuals having initiated HAART at earlier years, and individuals with detectable viral load at previous test were more likely to have a 9 month gap in VL testing even when VL testing is available at no cost.

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