

# Temporal improvements in clinical outcomes among HIV-positive individuals initiating combination antiretroviral therapy in Canada

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## Background

- As the HIV epidemic evolves in Canada, it is important to characterize the changing demographic and clinical profile of affected populations as well as to examine temporal trends in clinical outcomes
- We aim to describe temporal changes in the demographic and clinical profile of HIV-positive individuals initiating combination antiretroviral therapy (cART) from 2000-2011

## Methods

- Participants of the Canadian Observational Cohort (CANOC) collaboration, a multi-site cohort of HIV-positive individuals aged ≥18 years and initiating cART naively after January 1, 2000 in BC, Ontario, and Quebec, were included
- Participants were grouped by era of cART initiation (2000-2002, 2003-2005, 2006-2008, 2009-2011); participants with <12 months of follow-up were excluded
- Cox proportional hazards models were used to estimate the effect of calendar period of cART initiation on virologic responses to cART, including time to viral load suppression (2 measures <50 copies/mL at least 30 days apart) and rebound (2 measures >200 copies/mL at least 30 days apart, after suppression)

## Results

**Table 1.** Baseline demographic and clinical characteristics of participants by era (n=8006)

Characteristic	Category	Total	2000-2002 (n=1525)	2003-2005 (n=1752)	2006-2008 (n=2329)	2009-2011 (n=2400)	p-value
Sex	Female	1453	309 (20)	346 (20)	402 (17)	396 (17)	0.004
Province	BC	3707	706 (46)	794 (45)	1031 (44)	1176 (49)	0.016
	Quebec	1585	296 (19)	333 (19)	480 (21)	476 (20)	
	Ontario	2714	523 (34)	625 (36)	818 (35)	748 (31)	
Age	-	8006	38 (33-45)	40 (34-46)	41 (34-47)	40 (32-47)	<0.001
IDU history	No	4640	853 (56)	1003 (57)	1395 (60)	1389 (58)	<0.001
	Yes	1772	393 (26)	432 (25)	494 (21)	453 (19)	
	Unknown	1594	279 (18)	317 (18)	440 (19)	558 (23)	
MSM	No	2565	539 (35)	639 (37)	720 (31)	667 (28)	<0.001
	Yes	2988	578 (38)	615 (35)	921 (40)	874 (36)	
	Unknown	2453	408 (27)	498 (28)	688 (30)	859 (36)	
HCV co-infection	No	5598	1005 (66)	1214 (69)	1649 (71)	1730 (72)	<0.001
	Yes	1975	435 (29)	469 (27)	562 (24)	509 (21)	
	Unknown	433	85 (6)	69 (4)	118 (5)	161 (7)	
Aboriginal ancestry	No	3553	806 (53)	883 (50)	1038 (45)	826 (34)	<0.001
	Yes	429	128 (8)	98 (6)	114 (5)	89 (4)	
	Unknown	4024	591 (39)	771 (44)	1177 (51)	1485 (62)	
CD4 count	-	8006	170 (79-280)	172 (90-250)	210 (130-280)	290 (180-390)	<0.001
Viral load (log <sub>10</sub> )	-	8006	4.9 (4.5-5.0)	5.0 (4.6-5.0)	4.9 (4.4-5.0)	4.7 (4.2-5.0)	<0.001
ADI	No	6449	1183 (78)	1341 (77)	1864 (80)	2061 (86)	<0.001
	Yes	1201	268 (18)	323 (18)	332 (14)	278 (12)	
	Unknown	356	74 (5)	88 (5)	133 (6)	61 (3)	
NRTI combination	TDF/FTC	3346	0 (0)	14 (1)	1324 (57)	2008 (84)	<0.001
	AZT/3TC	1698	698 (46)	774 (44)	184 (8)	42 (2)	
	TDF/3TC	568	13 (1)	301 (17)	233 (10)	21 (1)	
	ABC/3TC	1106	67 (4)	221 (13)	505 (22)	313 (13)	
	D4T/3TC	600	416 (27)	164 (9)	19 (1)	1 (0)	
	Other	688	331 (22)	278 (16)	64 (3)	15 (1)	
3 <sup>rd</sup> ARV agent	Nevirapine	809	388 (25)	253 (14)	116 (5)	52 (2)	<0.001
	Efavirenz	2875	394 (26)	469 (27)	826 (36)	1186 (49)	
	Lopinavir	1257	153 (10)	465 (27)	469 (20)	170 (7)	
	Atazanavir	1641	4 (0)	298 (17)	708 (30)	631 (26)	
	Other	1424	586 (38)	267 (15)	210 (9)	361 (15)	
Viral load tests/year	<3	2212	509 (33)	548 (31)	626 (27)	529 (22)	<0.001
	3-4	2296	498 (33)	532 (30)	690 (30)	576 (24)	
	5-6	2718	430 (28)	549 (31)	810 (35)	929 (39)	
	>6	780	88 (6)	123 (7)	203 (9)	366 (15)	

Results are n (%) or median (IQR)  
Note: IDU, injection drug use; HCV, hepatitis C virus; ADI, AIDS-defining illness; ARV, antiretroviral

## Results (cont.)

- Of 8006 participants, 18% were female, 46% lived in BC, 33% in Ontario, and 19% in Quebec
- During follow-up 7378 participants (92%) experienced virologic suppression; of those, 1282 (17%) had subsequent virologic rebound

**Table 2.** Differences in time to viral load suppression and rebound by cART initiation era

Era of cART initiation	Unadjusted HR (95% CI)	p-value	Adjusted* HR (95% CI)	p-value
Virologic suppression				
2000-2002	1.00	<0.001	1.00	<0.001
2003-2005	1.24 (1.15, 1.33)		1.25 (1.16, 1.34)	
2006-2008	1.52 (1.42, 1.63)		1.48 (1.38, 1.59)	
2009-2011	1.59 (1.48, 1.71)		1.46 (1.36, 1.57)	
Virologic rebound				
2000-2002	1.00	<0.001	1.00	<0.001
2003-2005	0.68 (0.60, 0.78)		0.71 (0.62, 0.81)	
2006-2008	0.46 (0.40, 0.53)		0.48 (0.41, 0.56)	
2009-2011	0.33 (0.27, 0.41)		0.33 (0.27, 0.42)	

\*Adjusted for age, sex, province, HIV transmission risks, Aboriginal ancestry, baseline viral load, viral load testing rate

## Conclusions

- Notable temporal changes in the demographic profile and improvements in virologic response to cART are evident among CANOC participants
- Participants initiating cART in the more recent eras were significantly less likely to experience viral rebound and more likely to achieve viral suppression
- Characterizing the demographic and clinical profile of persons living with HIV supports the optimal delivery of clinical care for the evolving Canadian HIV epidemic

## Limitations

- Data were obtained from only three provinces and may not be generalizable to all HIV-positive individuals across Canada
- Data from BC represents the entire sample of CANOC-eligible individuals on antiretroviral therapy in the province, while data from Ontario and Quebec are based on a selection of clinics
- To note, CANOC is currently expanding to include data from Saskatchewan and Newfoundland in effort to broaden our geographic representation

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