

# The Spectrum of ARVs: What are Women Taking and How Well are they Doing?

## Findings from the Canadian HIV Women's Sexual and Reproductive Health Cohort Study (CHIWOS)

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**We would like to acknowledge that we gather on the traditional territory of the Anishinaabeg, Cree, Oji-Cree, Dakota, and Dene peoples, and on the homeland of the Métis Nation.**



# Conflicts of Interest: Disclosure

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No conflicts of interest to declare.

# Who We Are...

- **Dr. Mona Loutfy:** *ON CHIWOS Researcher and Principal Investigator (PI)*
- **Ms. Allison Carlson:** *ON CHIWOS Research Coordinator*
- **Ms. Stephanie Smith:** *ON CHIWOS Peer-Research Associate (PRA)*
- **Dr. Nadine Kronfli:** *ON CHIWOS Student*



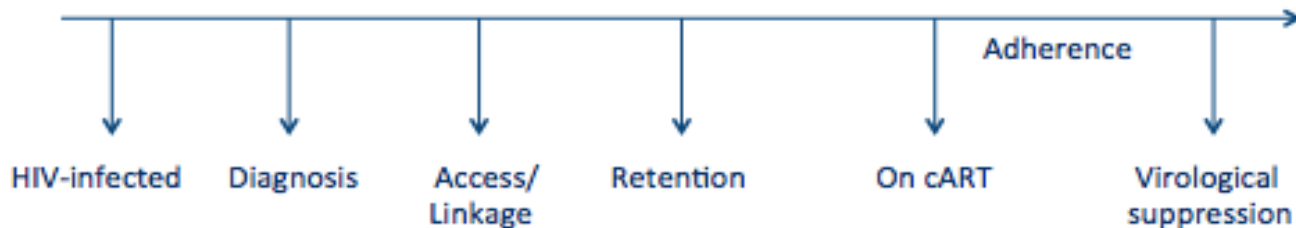
# CHIWOS is a large national Community-Based Research longitudinal study

- Started in 2011 in British Columbia, Ontario and Quebec; is expanding to Saskatchewan and Manitoba
- Aims to increase knowledge on topics deemed to be important to the community – access and quality of care; women’s health, mental health, stigma and more
- Community members have been essential from the beginning – determining the research questions, developing the surveys and are the frontline for conducting the surveys as PRAs
- Many students are involved in CHIWOS and learn the guiding principles of Critical Feminism, Anti-Oppression and Social Justice ... and learn that it takes a diverse Team to conduct research



# Objectives of this Analysis

1. To determine the *proportion* of women living with HIV in our cohort on ART;
2. To outline the specific ARVs used;
3. To identify the socio-demographic, psychosocial and clinical characteristics of women on ART who are not virally-suppressed.



# Peer Research Associates (PRAs)

- PRAs were hired for CHIWOS
  - ❖ BC – 8
  - ❖ ON – 21 + 1 allied interviewer
  - ❖ QC – 10
- A **PRA** is a woman living with HIV trained to be a Research Assistant based on Community-based Research practices
- PRAs are an essential part of CHIWOS
- PRAs are usually the first contact for participants; they do the majority of recruitment\*; they do the consenting and the online survey with the participants; they offer advice and support to the participants

\*Please see Poster #SSP5.18 on Recruitment



# Methods: Study Population and Design

## Longitudinal cohort study:

- Baseline visit (PRA-administered electronic survey)
- q18 month follow-up visits (visits 2 & 3 planned)
- Goal: 1,400 women living with HIV

## Inclusion criteria:

- Self-identified women (trans inclusive)
- Living with HIV (self-report)
- $\geq 16$  years; Living in BC, ON and QC
- For this analysis: Self-reported ART use

## Sampling & Recruitment

- Non-random purposive sampling by health region & harder-to-reach
- From PRAs, ASOs, and/or clinics





# Methods: Outcome of Interest

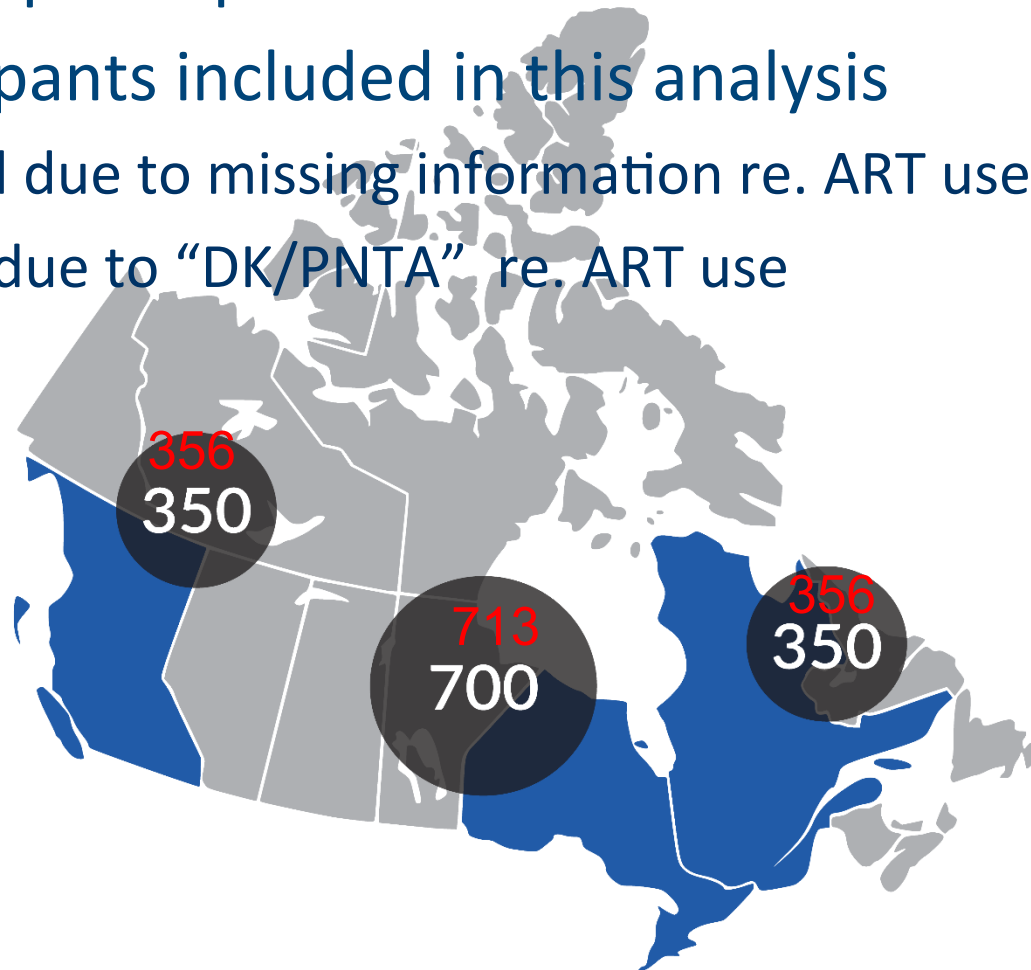
- This analysis includes only the baseline visit (and is therefore, cross-sectional)
- **Primary outcomes:** Self-reported current use of ART (Yes vs. No); for those on ART, viral suppression (Yes vs. No)
- **Correlates of interest:**
  - **Socio-demographic:**
    - Gender identity
    - Sexual orientation
    - Ethnicity
    - Education level; Income
    - Housing stability
    - Food security
    - Incarceration
  - **Psycho-social:**
    - Recreational drug use (RDU)
    - Depression
    - HIV stigma
    - Discrimination: sexism/racism

# Methods: Statistical Analyses

- Summary statistics of socio-demographic, psychosocial and clinical characteristics
  - Medians and IQRs for continuous variables
  - Frequencies and proportions for categorical variables
    - For total population & by province (BC, ON, QC)
    - Chi-square, Fisher's Exact or Wilcoxon's rank sum test for comparisons between provinces
  - Multivariable logistic regression was used to identify correlates of an undetectable viral load (VL) (<50 copies/mL) amongst those on ART

# Results

- 1,425 overall participants
- 1,382 participants included in this analysis
  - 41 excluded due to missing information re. ART use
  - 2 excluded due to “DK/PNTA” re. ART use
- BC: 25%
- ON: 50%
- QC: 25%



# Results: On ART

- **1,178/1,382 (85.2%)** participants in CHIWOS were on ART
- Median duration of ART = 8.6 years (IQR 4.3-14.7 years)
- Of women on ART with self-reported VL data (n=737):
  - 7.3% had a detectable VL ( $\geq 50$  copies/mL) with a median CD4 count of 279 cells/mm<sup>3</sup>
  - 92.7% had an undetectable VL with a median CD4 count of 606 cells/mm<sup>3</sup>

**Table 1: ARV Use Overall and by Province**

Variable: Current ARV Use	Province interview conducted								p-value
	Overall		BC		ON		QC		
	(N=1,382)		(N=351)		(N=678)		(N=353)		
	N	(%)	N	(%)	N	(%)	N	(%)	
Currently on ARVs	1178	(85.2)	318	(90.6)	534	(78.8)	326	(92.4)	<0.001
Previously on ARVs	67	(4.8)	22	(6.3)	30	(4.4)	15	(4.2)	
Never on ARVs	137	(10.0)	11	(3.1)	114	(16.8)	12	(3.4)	



# Results: Participant Characteristics

	On ART		Not on ART		p-value
	N (=1,178)	row(%)	N (=204)	row(%)	
<b>Age</b> (median, (IQR))	44 (37,51)		36 (32,44)		<0.001
<b>Gender Identity</b>					0.089
Woman	1,134	(85.6)	190	(14.4)	
Trans	38	(74.5)	13	(25.5)	
<b>Sexual Orientation</b>					0.002
Heterosexual	1,041	(86.3)	165	(13.7)	
LGBTBQ	132	(77.2)	39	(22.8)	
<b>Ethnicity</b>					<0.001
Caucasian	479	(83.4)	95	(16.6)	
African/Caribbean/Black	376	(91.9)	33	(8.1)	
Indigenous	232	(78.4)	64	(21.6)	
Other	91	(88.3)	12	(11.7)	
<b>Education:</b>					0.960
Secondary or less	690	(85.3)	119	(14.7)	
Post-Secondary	485	(85.4)	83	(14.6)	
<b>Personal Gross Yearly Income</b>					0.256
< \$20,000	827	(85.4)	141	(14.6)	
>\$40,000	114	(80.9)	27	(19.1)	
<b>Housing Status</b>					<0.001
Rent	849	(86.7)	130	(13.3)	
Own	139	(89.7)	16	(10.3)	
<b>History of Incarceration</b>					0.556
Ever	362	(85.6)	61	(14.4)	
Never	744	(85.4)	127	(14.6)	
<b>History of Recreational Drug Use</b>					<0.001
Current	199	(80.2)	49	(19.8)	
Never	601	(83.2)	121	(16.8)	

# Results: Spectrum of ARVs

ARV	Overall (N=1178)		BC (N=318)		ON (N=534)		QC (N=326)	
	N	(%)	N	(%)	N	(%)	N	(%)
<b>NRTI Backbone</b>								
Truvada	664	(56.4)	154	(48.4)	316	(59.2)	194	(59.5)
Kivexa	273	(23.2)	95	(29.9)	104	(19.5)	74	(22.7)
Combivir	35	(3.0)	10	(3.1)	19	(3.6)	6	(1.8)
No NRTIs	60	(5.1)	13	(4.1)	31	(5.8)	16	(4.9)
<b>3<sup>rd</sup> Agent Class</b>								
NNRTI	391	(33.2)	77	(24.2)	215	(40.3)	99	(30.4)
Boosted PI	339	(28.8)	143	(45.0)	110	(20.6)	86	(26.4)
Integrase Inh	185	(15.7)	36	(11.3)	75	(14.0)	74	(22.7)
<b>3<sup>rd</sup> Agent</b>								
<u>Atripla</u>	164	(13.9)	47	(14.8)	85	(15.9)	32	(9.8)
<u>Complera</u>	97	(8.2)	8	(2.5)	61	(11.4)	28	(8.6)
<u>Stribild</u>	42	(3.6)	12	(3.8)	25	(4.7)	5	(1.5)
NNRTI - EFV	33	(2.8)	4	(1.3)	18	(3.4)	11	(3.4)
NNRTI - NVP	54	(4.6)	11	(3.5)	24	(4.5)	19	(5.8)
NNRTI - ETR	39	(3.3)	7	(2.2)	25	(4.7)	7	(2.2)
PI+R - ATZ	169	(14.4)	92	(28.9)	41	(7.7)	36	(11.0)
PI+R - DRV	90	(7.6)	29	(9.1)	36	(6.7)	25	(7.7)
PI+R - LOP	79	(6.7)	22	(6.9)	33	(6.2)	24	(7.4)
II - RAL	127	(10.8)	19	(6.0)	48	(9.0)	60	(18.4)
II - DOL	16	(1.4)	5	(1.6)	2	(0.4)	9	(2.8)

# Results: Women on ART

	With UNDET VL		With DET VL		p-value
	N (=1,028)	row(%)	N (=102)	row(%)	
<b>Age</b> (median, IQR)	45 (37,51)		41 (33,48)		0.005
<b>Gender Identity</b>					0.426
Woman	990	(91.1)	97	(8.9)	
Trans	33	(89.2)	4	(10.8)	
<b>Sexual Orientation</b>					0.027
Heterosexual	917	(91.7)	83	(8.3)	
LGBTBQ	108	(85.7)	18	(14.3)	
<b>Ethnicity</b>					<0.001
Caucasian	418	(90.5)	44	(9.5)	
African/Caribbean/Black	351	(95.9)	15	(4.1)	
Indigenous	182	(84.7)	33	(15.3)	
Other	77	(88.5)	10	(11.5)	
<b>Education:</b>					<0.001
Secondary	409	(89.7)	47	(10.3)	
Post-Secondary	459	(95.8)	20	(4.2)	
<b>Personal Gross Yearly Income</b>					<0.001
< \$20,000	705	(89.1)	87	(10.9)	
> \$40,000	111	(98.2)	2	(1.8)	
<b>Housing Status</b>					<0.001
Rent	751	(91.5)	70	(8.5)	
Own	132	(98.5)	2	(1.5)	
<b>History of Incarceration</b>					<0.001
Ever	298	(86.6)	46	(13.4)	
Never	683	(94.3)	41	(5.7)	
<b>History of Recreational Drug Use</b>					<0.001
Current	140	(80.0)	35	(20.0)	
Never	556	(94.9)	30	(5.1)	

# Results: Adjusted Logistic Regression

Outcome → On ART with UNDETECTABLE VL

	Adjusted OR (95% CI)	p-value
<b>Age</b> < 30	0.49 (0.23, 0.97)	0.041
<b>Education Level</b> Secondary Post-secondary	1.49 (0.87, 2.56) 2.50 (1.31, 4.78)	0.021
<b>History of Incarceration</b> Ever Last year	0.58 (0.35, 0.97) 0.26 (0.13, 0.54)	0.001
<b>Home Ownership</b> House/Apt/Condo Non-Owner	0.23 (0.06, 0.97)	0.045
<b>Resilience Scale</b> Resiliency Score	1.04 (1.02, 1.07)	0.002



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# Study Limitations

- Sampling bias
  - Participants who were not engaged in care were intentionally sought for recruitment, particularly in ON.
    - This explains higher rates of no ART use in ON
- Cross-sectional analysis
  - Causation cannot be assumed

# Conclusions

1. A large proportion (85.2%) of CHIWOS women are on ART and are virally-suppressed (93.7%). This is a likely underestimation from the general population of women living with HIV given our recruitment bias from ASOs and HIV clinics.
2. The identification of correlates associated with a lack of viral suppression despite ART use is **extremely valuable** in order to improve engagement in care.

**WHO:** High-risk women (< 30 years, history of incarceration)

**WHAT:** Type of interventions/services (i.e., education, housing)



# Acknowledgements

## We would like to thank...

- All the women living with HIV who participate in CHIWOS;
- The national team of Peer Research Associates, Co-investigators and Collaborators;
- The Steering Committee, Community Advisory Boards, and Aboriginal Advisory Board;
- The BC Centre for Excellence in HIV/AIDS for data support and analysis;
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- Our affiliated studies: CANOC, REACH, OSC;
- And all our partnering organizations who support study recruitment and operations.

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In **BC**: AIDS Vancouver Island, BC Centre for Excellence in HIV/AIDS, Cool Aid Community Health Centre, Downtown Community Health Clinic, Keys Housing and Health Solutions (Positive Haven), Living Positive Resource Centre, Oak Tree Clinic, Positive Living Fraser Valley, Positive Women's Network, Positive Living North, and Vancouver Island Persons with AIDS Society.

In **ON**: 2-Spirited People of the 1<sup>st</sup> Nations; 519 Community Centre; ACCKWA; Africans in Partnership Against AIDS (APAA); AIDS Committee of Durham Region; AIDS Committee of Guelph and Wellington County; AIDS Committee of Simcoe County; AIDS Network Hamilton; Alliance for South Asian AIDS Prevention; Black Coalition for AIDS Prevention; Bruce House; Casey House; Centre Francophone; Elevate NOW; Fife House; Hemophilia Ontario; HIV/AIDS Regional Services (HARS); Maggie's: Toronto Sex Worker's Action Project; Peel HIV Network; Positive Living Niagara; Prisoners with AIDS Support Action Network; Réseau Access Network; Toronto PWA Foundation; Women's Health in Women's Hands; Children's Hospital of Eastern Ontario; Kingston Hotel Dieu Hospital; Health Sciences North, Sudbury Regional Hospital, HAVEN Program; Lakeridge Health; Maple Leaf Medical Clinic; McMaster Family Practice; Ottawa General Hospital; Riverside Family Health Team; SIS Clinic, Hamilton Health Sciences; St. Joseph's Healthcare London; St. Michael's Hospital; Sunnybrook Health Sciences Centre; Toronto East General Hospital; Toronto General Hospital; William Osler Health System; Windsor Regional Hospital, HIV Care Program.

In **QC**: ACCM; L'ARCHE de l'Estrie; ASTT(e)Q; BLITS; BRAS-Outaouais; CACTUS; CASM; Centre Sida Amitié; Corporation Félix Hubert d'Hérelle; COCQ\_SIDA; Fondation d'Aide Directe-SIDA Montréal; GAP-VIES; GEIPSI; M.A.I.N.S-Bas St-Laurent; Maison Plein Coeur; Maison Dominic; Maison du Parc; Maison Re-Né; MIELS-Québec; Le MIENS Chicoutimi; Portail VIH/sida du Québec; Sidaction Mauricie; Sida-Vie Laval; Stella, l'amie de Maimie.



# References

1. Gardner EM et al. **The spectrum of engagement in HIV care and its relevance to test-and-treat strategies for prevention of HIV infection.** *Clin Infect Dis.* 2011;52(6):793-800.
2. Druyts E et al. **Male sex and the risk of mortality among individuals enrolled in antiretroviral therapy programs in Africa: a systematic review and meta-analysis.** *AIDS.* 2013;27(3):417-25.
3. Fox MP and Rosen S. **Patient retention in antiretroviral therapy programs up to three years on treatment in sub-Saharan Africa, 2007-2009: systematic review.** *Trop Med Int Health.* 2010;15 Suppl 1:1-15.
4. Hall HI et al. **Differences in Human Immunodeficiency Virus Care and Treatment Among Subpopulations in the United States.** *JAMA Internal Medicine.* **2013;173: 1337–1344.**
5. Tapp C et al. **Female gender predicts lower access and adherence to antiretroviral therapy in a setting of free healthcare.** *BMC infectious diseases.* 2011;11:86.
6. Puskas CM et al. **Women and vulnerability to HAART non-adherence: a literature review of treatment adherence by gender from 2000 to 2011.** *Current HIV/AIDS reports.* 2011;8:277–287.
7. Lourenco L et al. **High levels of heterogeneity in the HIV cascade of care across different population subgroups in British Columbia, Canada.** *PLoS One.* 2014 Dec 26;9(12).
8. Olatosi BA et al. **Patterns of engagement in care by HIV-infected adults: South Carolina, 2004-2006.** *AIDS.* 2009;23(6):725-30.
9. Perkins D et al. **Assessing HIV care and unmet need: eight data bases and a bit of perseverance.** *AIDS Care.* 2008;20:318–26.
10. Blank AE et al. **Factors associated with retention and viral suppression among a cohort of HIV+ women of color.** *AIDS Patient Care STDS.* 2015;29 Suppl 1:S27-35.
11. Zhang N et al. **The spectrum of engagement in HIV care: how is it in Shandong Province, China?** *Clin Infect Dis.* 2015;60(8):1292.

# Thank you!

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