Mortality among women living with HIV enrolled in CHIWOS: Canada's largest community-based cohort study of women with HIV

Angela Kaida, Valerie Nicholson, Allison Carter, Kath Webster, Rebecca Gormley, Paul Sereda, Clara Wang, Robert S. Hogg, Alexandra de Pokomandy, Mona Loutfy, on behalf of the CHIWOS Research Team

•Faculty of Health Sciences, Simon Fraser University, Burnaby, BC; Canadian Aboriginal AIDS Network; Epidemiology and Population Health, British Columbia Centre for Excellence in HIV/AIDS, Vancouver, BC; Chronic Viral Illness Service, McGill University Health Centre, Montreal, Quebec; Department of Family Medicine, McGill University, Montreal, Quebec; Women's College Research Institute; Women's College Hospital, Toronto, Ontario; Department of Medicine, University of Toronto, Toronto, Ontario.

CONFERENCE CAHR 2018

CAHR 2018, Vancouver, BC, April 27, 2018

CHIWOS
Étude sur la santé sexuelle et reproductive des femmes vivant avec le VIH au Canada
Canadian HIV Women's Sexual and Reproductive Health Cohort Study

No conflicts of interest to disclose

Photo by: V. Nicholson

Acknowledgement of territories

We wish to acknowledge the ancestral, traditional, and unceded territories of the Coast Salish Peoples, and in particular, the Musqueam Nation, Tsleil Waututh Nation, Squamish Nation, on whose territory we are privileged to gather today.

Photo by: V. Nicholson

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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;
- Our affiliated studies: CANOC, REACH, OSC;
- And all our partnering organizations who support study recruitment and operations.
- **Our funders: CIHR Institute of Gender and Health, the CIHR Canadian HIV Trials Network (CTN 262), the OHTN, and the Academic Health Science Centres Alternative Funding Plans Innovation Fund**;

Thank you to the following organizations who have partnered with CHIWOS to provide interview space:

•In **BC**: Oak Tree Clinic at BC Women's Hospital, 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, Positive Living Fraser Valley, Positive Women's Network (closed), Positive Living North, and Vancouver Island Persons with AIDS Society.

•In **ON**: 2-Spirited People of the 1st 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.

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In memoriam – in April 2016

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In memoriam – in April 2018

*We honour and remember the **56 women** living with HIV who participated in CHIWOS from across Canada who have passed away.*

In memory of Marisol Desbiens

CHIWOS PRA, friend, and valued colleague

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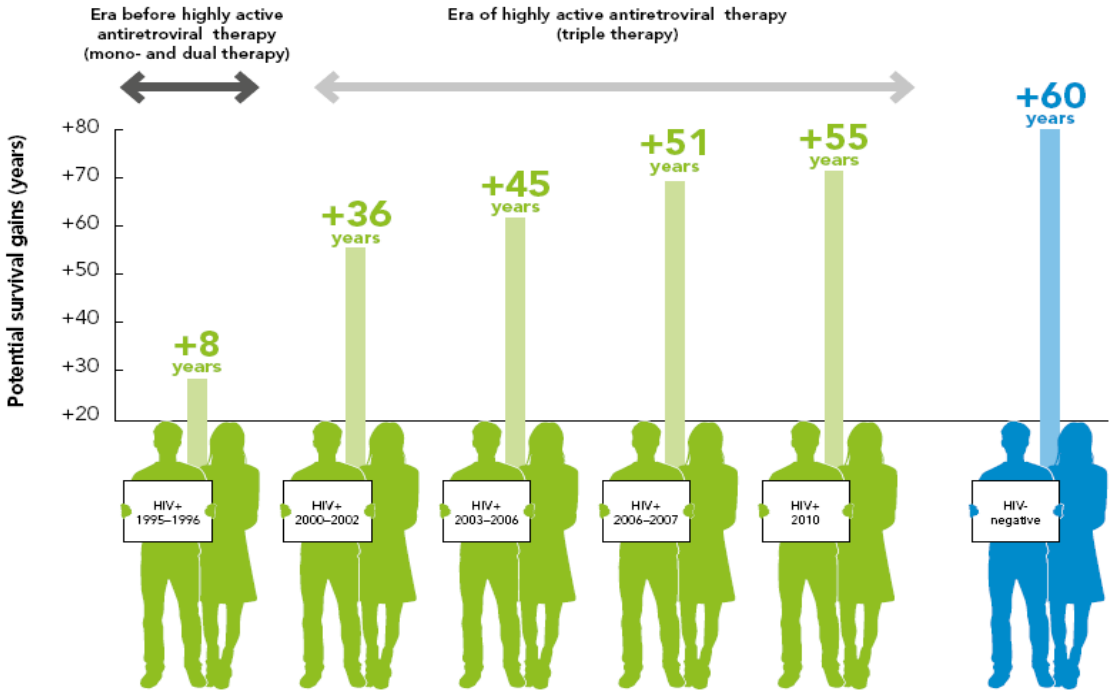
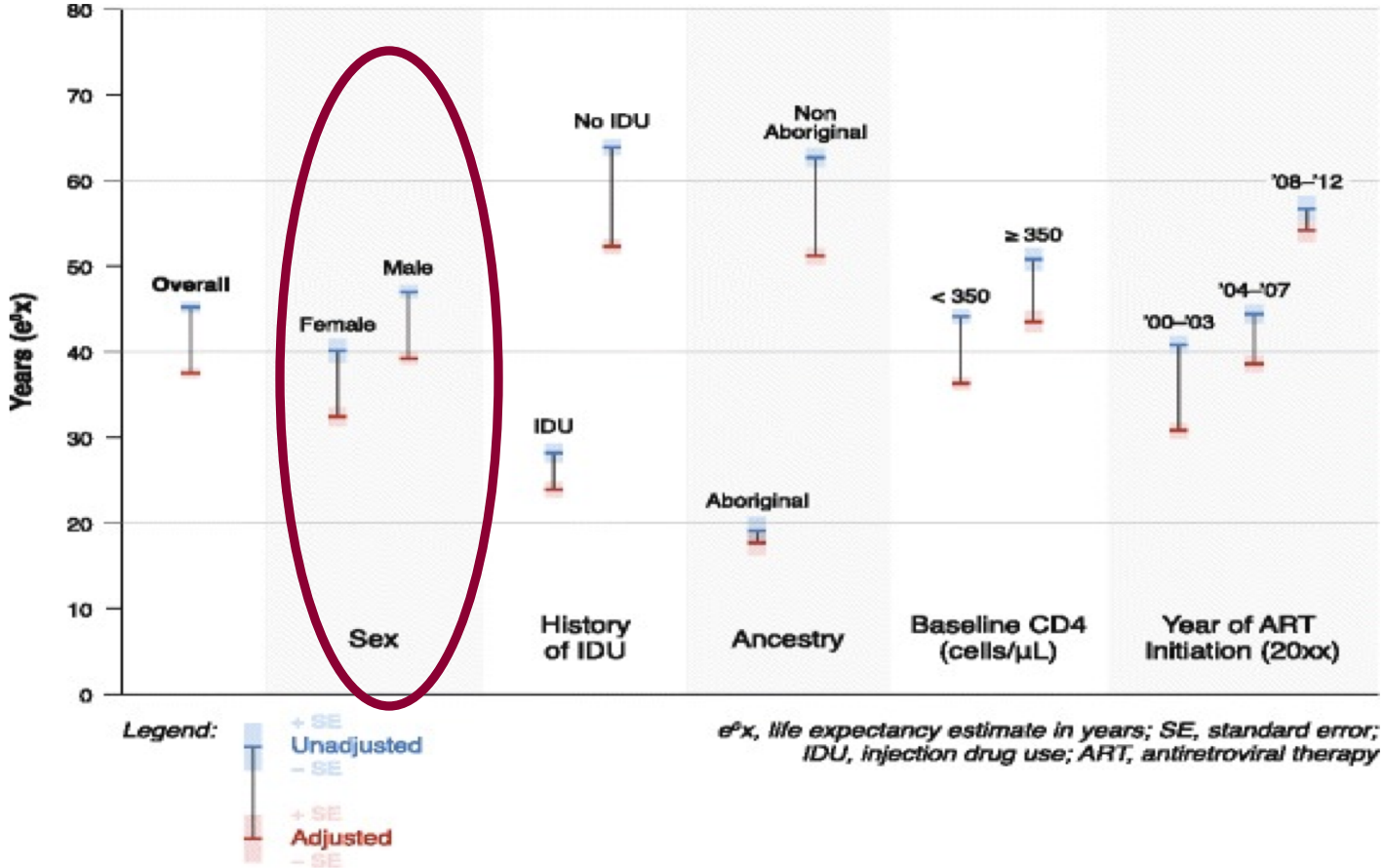
Life expectancy of people living with HIV

Projected impact of highly active antiretroviral therapy on expected survival of a 20-year-old person living with HIV in a high-income country



Samji et al, PLOS ONE 2013; UNAIDS 2014

Inequities in mortality risk



Patterson et al, BMC Infect Dis. 2015

Objectives

Among women living with HIV enrolled in the community-based Canadian HIV Women's Sexual and Reproductive Health cohort study (CHIWOS), the objectives of this study were:

1. To measure all-cause mortality rate from study enrollment (August 2013) until December 1st, 2017;
2. To assess cause of death;
3. To determine socio-structural, HIV-related, and other predictors of mortality.
4. To compare the age-standardized mortality rate of women in CHIWOS with that of the 2011 general female population of Canada.

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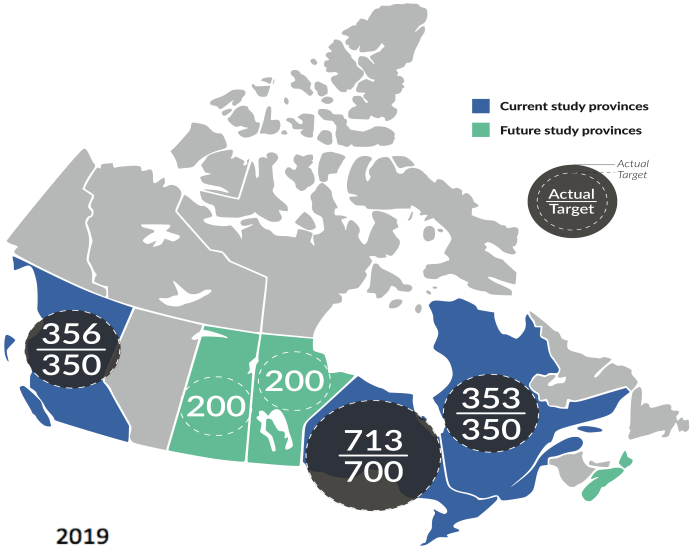
Study Design: CHIWOS

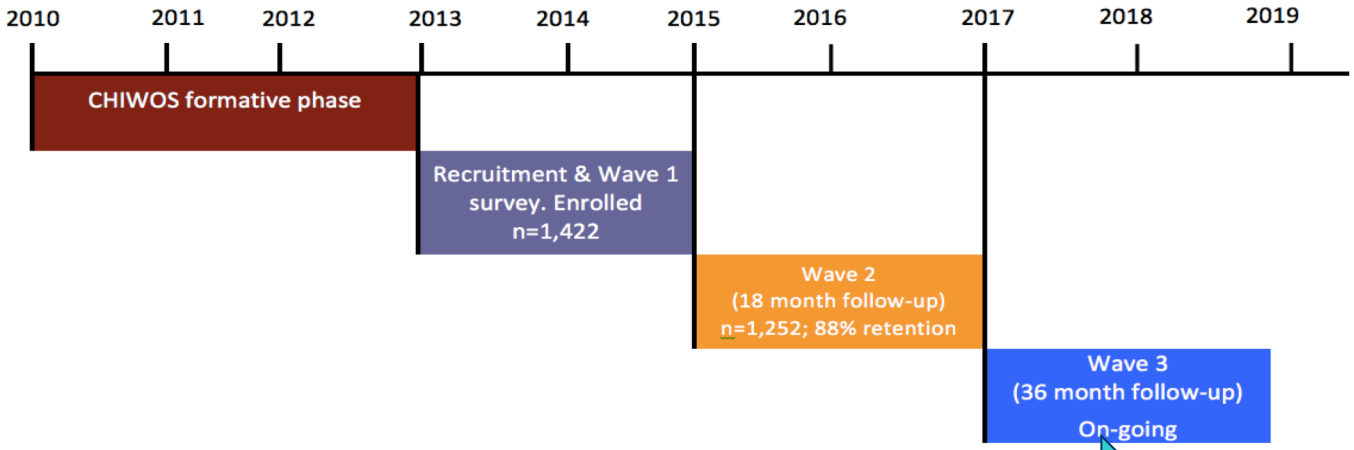
PLOS ONE

RESEARCH ARTICLE

Cohort profile: The Canadian HIV Women's Sexual and Reproductive Health Cohort Study (CHIWOS)

Mona Loutfy[1,2,3]*, Alexandra de Pokomandy[4,5], V. Logan Kennedy[1], Allison Carter[6,7], Nadia O'Brien[4], Karène Proulx-Boucher[5], Erin Ding[7], Johanna Lewis[1,8], Valerie Nicholson[6], Kerrigan Beaver[1], Saara Greene[9], Wangari Tharao[10], Anita Benoit[1,3], Danièle Dubuc[5], Jamie Thomas-Pavanel[1,2], Paul Sereda[7], Shahab Jabbari[7], Jayson H. Shurgold[6,11], Guillaume Colley[7], Robert S. Hogg[6,7], Angela Kaida[6], on behalf of the CHIWOS Research Team¶





Mortality analysis

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Measures: Mortality

- **Primary outcome: Mortality (all-cause)**

- Death and cause of death were determined via study notification procedures (e.g., PRAs, family/friends, providers, research partners, obituaries)

- In British Columbia, deaths were also confirmed via linkage to BC Vital Statistics
  - Sensitivity = 64%
  - Specificity = 99%

- In BC Vital Statistics, cause of death was determined using ICD-9 and ICD-10 codes

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Measures: Time at risk of death

- For each participant, we summed months between CHIWOS start & end dates:
  - **Start date:** Date of the Wave 1 interview (study enrolment)
  - **End date:** Earliest of: date of death, study withdrawal, Wave 3 survey completion, Lost-to-follow-up or Declined for Wave 3, or December 1st, 2017

- Total cohort “Time at risk” was summed across all participants and expressed as “woman years of follow-up”.

Loss-to-follow-up (LTFU)

- We defined LTFU as having no research team contact with a participant for at least 18 months.
- Between Waves 1 and 2, 6.4% (n=91) of participants were considered LTFU and another 1.3% (n=19) declined to complete Wave 2.
- All 110 participants were retained in the study and were considered eligible for Wave 3 and attempts to make contact continue.
- Given that LTFU may be associated with mortality, we used competing risk analyses to retain LTFU participants in the analysis as participants who are “at risk of dying” rather than censoring at the last point of contact [Fine and Gray, 1999].

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Predictors of mortality

- We explored several baseline predictors of mortality, including:
  - Social determinants of health
  - HIV-related characteristics
  - Violence
  - Substance use
  - Mental and physical health

Methods: Statistical Analyses

- ***Descriptive statistics*** were calculated for the outcome measure (all-cause mortality and causes of death) and covariates
- Mortality rate was calculated using **person-time methods** and 95% confidence intervals calculated using the Poisson distribution.
- **Age-standardized mortality ratios** were computed using 2011 Canadian female reference population data from Statistics Canada (age 15+ years).
- **Cumulative incidence function** was used to measure the cumulative probability of death overall and by key covariates
- **Proportional sub-distribution hazards model** (with loss-to-follow-up as a competing risk) identified unadjusted and adjusted predictors of mortality over the follow-up.

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Table 1. Baseline characteristics (n=1,422)

Characteristics	Median or n	[IQR] or (%)
Median **Age**	42.5	[35.0-50.0]
Trans **gender** identity	63	4.4%
Ethnicity		
Indigenous	318	22.4%
African / Caribbean / Black	418	29.4%
White	584	41.1%
Other ethnicities	102	7.2%
Personal yearly income <$20,000	998	70.2%
Drug use (current or previous)	642	45.1%
Received HIV medical care in past year	1330	93.5%
Currently on ART	1175	82.6%
Undetectable viral load (<50 copies/mL)	1097	77.1%

Results: Mortality incidence

- 54 women died of 1,422 enrolled (3.8%)
- Crude mortality rate = 11.8 per 1,000 woman-years; 95% CI: 9.0-15.3.

Fig 1. Age-standardized mortality ratio comparing CHIWOS to the general female Canadian population (2011, age 15+ yrs)

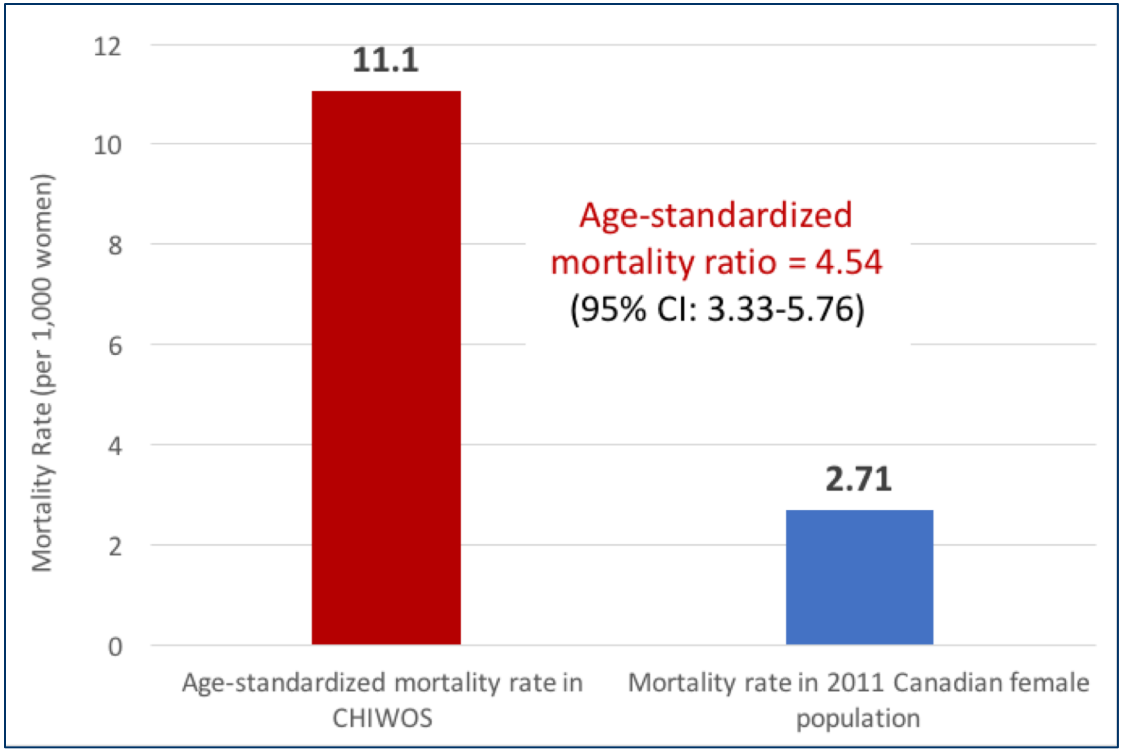
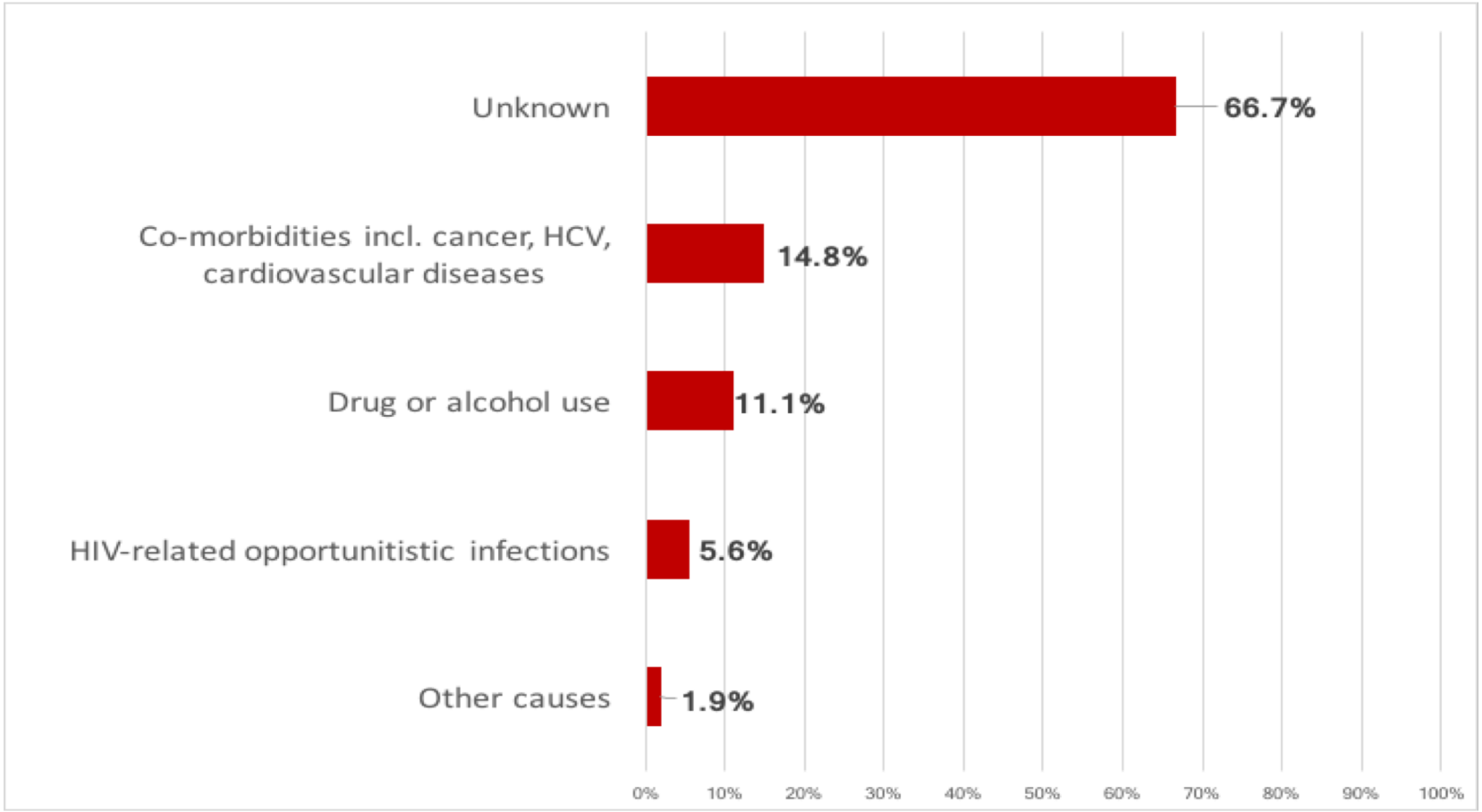


Fig 2. Cause of death among women living with HIV enrolled in CHIWOS with follow-up until December 1st, 2017 (n=54)



Cumulative probability of mortality by probable depression (CES-D score >=10 vs <10)

Table 2. Proportional sub-distribution hazards model of mortality among CHIWOS participants, with LTFU as a competing risk (n=1,422)

Baseline Characteristics		Unadjusted HR (95% CI)
Age at interview (per year increase)		1.05 (1.02, 1.07)
Ethnicity:	White	1.00
	Indigenous	1.35 (0.75-2.41)
	African/Caribbean/Black	0.20 (0.07, 0.57)
	Other ethnicity	0.82 (0.29-2.32)
Personal annual income < $20,000		3.08 (1.32, 7.21)
Current sex work		2.35 (1.05-5.25)
Illicit drug use (past 3 months)		4.54 (2.27, 9.06)
Alcohol use:	Non-binge drinkers	1.00
	Binge drinkers	1.25 (0.60, 2.62)
	Heavy drinkers	4.19 (1.50, 11.7)
Tobacco use:	Never	1.00
	Former	5.71 (1.86, 17.5)
	Current	8.20 (3.22, 20.9)
Incarceration:	Never	1.00
	Ever	4.07 (2.22, 7.44)
	Last year	3.32 (1.27, 8.65)
Depressive symptoms (CESD score ≥10)		2.08 (1.16, 3.73)
Violence as adult (ever)		5.60 (1.36, 23.07)
Physical Health Summary Score (SF-12;/unit increase)		0.97 (0.95, 0.99)

Table 2. Proportional sub-distribution hazards model of mortality among CHIWOS participants, with LTFU as a competing risk (n=1,422)

Baseline Characteristics	Unadjusted HR (95% CI)	Adjusted HR (95% CI)
Age at interview (per year increase)	1.05 (1.02, 1.07)	**1.06 (1.03, 1.09)**
Ethnicity: White Indigenous African/Caribbean/Black Other ethnicity	1.00 1.35 (0.75-2.41) 0.20 (0.07, 0.57) 0.82 (0.29-2.32)	Not selected
Personal annual income < $20,000	3.08 (1.32, 7.21)	2.11 (0.81, 5.54)
Current sex work	2.35 (1.05-5.25)	Not selected
Illicit drug use (past 3 months)	4.54 (2.27, 9.06)	Not selected
Alcohol use: Non-binge drinkers Binge drinkers Heavy drinkers	1.00 1.25 (0.60, 2.62) 4.19 (1.50, 11.7)	1.00 0.95 (0.40, 2.28) **4.62 (1.66, 12.82)**
Tobacco use: Never Former Current	1.00 5.71 (1.86, 17.5) 8.20 (3.22, 20.9)	1.00 3.26 (0.97, 10.94) **3.93 (1.45, 10.65)**
Incarceration: Never Ever Last year	1.00 4.07 (2.22, 7.44) 3.32 (1.27, 8.65)	Not selected
Depressive symptoms (CESD score ≥10)	2.08 (1.16, 3.73)	**1.95 (0.97, 3.92)**
Violence as adult (ever)	5.60 (1.36, 23.07)	Not selected
Physical Health Summary Score (SF-12;/unit increase)	0.97 (0.95, 0.99)	Not selected

Adjusted for province of residence

Discussion

- We found an alarmingly high mortality rate among a community-based cohort of women with HIV in Canada, a majority of whom were engaged in HIV care.

- Sensitivity analyses suggest that reported mortality rates *underestimate* true mortality.
  - An estimated 69 CHIWOS women have likely died; n=15 *more* than reported.
  - Comprehensive assessment of death from BC, but not other provinces may bias the results

- Most causes of death are still unknown.

- No HIV-related clinical factors predicted mortality.

- Findings suggest that co-morbidities, substance use (hazardous alcohol use, tobacco), and socio-structural inequities present greater risks to the survival of women living with HIV.

Ewayo et al, BMC Infect Dis 2017

Implications

- Good HIV clinical care is necessary but not sufficient.
- Women-centred HIV community outreach, social care services, and policies are urgently needed.
  - Address social disparities and mental health needs
  - Integrate harm reduction services, inclusive of tobacco and hazardous alcohol use.
- Prioritize peer support and leadership in these services.

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Symbols were designed by Valerie Nicholson (CHIWOS BC PRA) and drawn by Asha Pieper (a young Canadian artist) with input from the national CHIWOS PRA team

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Thank you!

•For more information about CHIWOS, please contact:

•**Rebecca Gormley (BC)**

•604-558-6686 or 1-855-506-8615 (toll-free), rgormley@cfenet.ubc.ca

•**Jaqueline Anaquod (SK)**

•(306)331-5822, janaquod@hsnri.ca

•**Adina Lakser (MB)**

•(204) 789-3245, Adina.Lakser@umanitoba.ca

•**Mina Kazemi (ON)**

•416-351-3800 x 2784, mina.kazemi@wchospital.ca

•**Karène Proulx-Boucher (QC)**

•514-934-1934 x 32146, chiwos.quebec@gmail.com

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