

Background

- Chronic diseases, including those associated with cigarette smoking, are increasingly becoming recognized as important causes of premature morbidity and mortality for people living with HIV (PLWH)
- We conducted a cross-sectional analysis to examine the burden of smoking and select chronic diseases and their associations with mortality among PLWH receiving ART in British Columbia (BC)

Methods

- Beginning in 2014, physicians of all medically eligible PLWH enrolled in BC’s provincially-funded ART Drug Treatment Program (DTP) were mailed Clinical Status Report Forms (CSRFs) designed to measure the prevalence of chronic diseases, blood pressure, body mass index, and cigarette smoking on an annual basis
- We analyzed data obtained from CSRFs sent to DTP participants’ physicians from the British Columbia Centre for Excellence in HIV/AIDS between June 17, 2014 and September 30, 2016
- Follow-up for mortality was conducted through data linkages with the provincial vital statistics agency until August 2017
- Univariable logistic regression models and a multivariate logistic regression explanatory model were developed to determine factors associated with mortality

Results

- A total of 3307 DTP participants’ physicians returned at least one CSRF, representing 41.5% of DTP participants; among these patients, the median age was 50.5 years, 79.4% were male, and 85.7% had viral load <200 copies/mL
- DTP participants without any CSRFs returned did not differ significantly in age from DTP participants with 1 or more CSRFs returned, but a greater proportion were male (84.2%), MSM (34.3%), and had viral load <200 copies/mL (88.1%)
- At least one chronic condition was reported for 55.0% of DTP participants
- Among individuals with reported smoking status (n = 2061), 40.8% were current smokers, 20.6% were former smokers, and 38.6% had never smoked (Table 1)
- A total of 172 of the studied DTP participants died, resulting in an overall mortality rate of 5.2%
- Factors associated with mortality included age, IDU, current or unknown smoking status, BMI <18.5 or unknown, CD4 <500 cells/mm³ or unknown, unknown adherence to ART, diabetes, alcohol dependence, and non AIDS-defining cancer (Table 2)

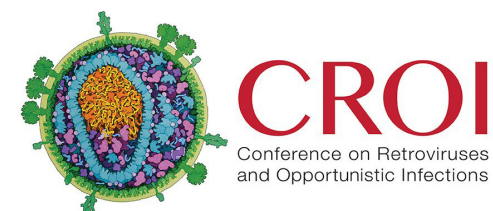


Table 1:

Bivariable analysis of factors associated with mortality among DTP participants whose physicians returned at least one CSRF (n=3307)

	Survival (n=3135)	Death (n=172)	Total (n=3307)	p-value
Median Age at Time Last CSRF Received				
	50.3 years	54.6 years	50.5 years	< 0.001
Gender				
Female	617 (19.7%)	37 (21.5%)	654 (19.8%)	0.585
Male	2492 (79.5%)	133 (77.3%)	2625 (79.4%)	
Transgender	26 (0.8%)	2 (1.2%)	28 (0.8%)	
HIV Risk Exposure				
Blood	90 (2.9%)	4 (2.3%)	94 (2.8%)	< 0.001
Heterosexual	354 (11.3%)	12 (7.0%)	366 (11.1%)	
IDU	894 (28.5%)	94 (54.6%)	988 (29.9%)	
MSM	937 (29.9%)	25 (14.5%)	962 (29.1%)	
MSM/IDU	204 (6.5%)	13 (7.6%)	217 (6.6%)	
Other	24 (0.8%)	0 (0%)	24 (0.7%)	
Unknown	632 (20.1%)	24 (14.0%)	656 (19.8%)	
Smoking Status				
Current	780 (24.9%)	60 (34.9%)	840 (25.4%)	< 0.001
Former	411 (13.1%)	14 (8.1%)	425 (12.8%)	
Never	783 (25.0%)	13 (7.6%)	796 (24.1%)	
Unknown	1161 (37.0%)	85 (49.4%)	1246 (37.7%)	
Hepatitis C Virus Antibody Positive				
Yes	729 (23.3%)	77 (44.8%)	806 (24.4%)	< 0.001
Hepatitis B Surface Antigen Positive				
Yes	86 (2.7%)	6 (3.5%)	92 (2.8%)	0.478
MI or other Ischemic Heart Disease				
Yes	94 (3.0%)	9 (5.2%)	103 (3.1%)	0.111
Stroke or other Cerebrovascular Disease				
Yes	46 (1.5%)	3 (1.7%)	49 (1.5%)	0.740
Diabetes Mellitus				
Yes	154 (4.9%)	15 (8.7%)	169 (5.1%)	0.047
Hypertension				
Yes	238 (7.6%)	15 (8.7%)	253 (7.7%)	0.556
Chronic Renal Disease				
Yes	104 (3.3%)	13 (7.6%)	117 (3.5%)	0.009
Chronic Obstructive Lung Disease				
Yes	184 (5.9%)	29 (16.9%)	213 (6.4%)	< 0.001
Asthma				
Yes	100 (3.2%)	7 (4.1%)	107 (3.2%)	0.503
Alcohol Dependence				
Yes	229 (7.3%)	31 (18.0%)	260 (7.9%)	< 0.001
Dependence on Other Drugs				
Yes	609 (19.4%)	63 (36.6%)	672 (20.3%)	< 0.001
Major Depression, Mania, or Bipolar				
Yes	391 (12.5%)	26 (15.1%)	417 (12.6%)	0.290
Chronic Anxiety or Panic Attacks				
Yes	217 (6.9%)	14 (8.1%)	231 (7.0%)	0.538
Psychotic Disorder				
Yes	132 (4.2%)	12 (7.0%)	144 (4.4%)	0.085
Non AIDS-Defining Cancer				
Yes	52 (1.7%)	11 (6.4%)	63 (1.9%)	< 0.001
Other Chronic Condition				
Yes	502 (16.0%)	41 (23.8%)	543 (16.4%)	0.011

Table 2:

Univariable and multivariable logistic regression modeling the probability of mortality among DTP participants whose physicians returned at least one CSRF (n=3307)

Variable	Odds Ratio (95% Confidence Interval)	
	Univariable Models	Multivariable Model
HIV Risk Exposure (Reference = MSM)		
Blood	1.67 (0.57, 4.89)	1.47 (0.48, 4.46)
Heterosexual	1.27 (0.63, 2.56)	0.80 (0.38, 1.68)
IDU	3.94 (2.51, 6.18)	2.55 (1.49, 4.35)
MSM/IDU	2.39 (1.20, 4.75)	1.82 (0.87, 3.80)
Other/Unknown	1.37 (0.78, 2.42)	1.55 (0.85, 2.83)
Smoking Status (Reference = Never)		
Current	4.63 (2.52, 8.51)	2.73 (1.40, 5.33)
Former	2.05 (0.96, 4.41)	1.20 (0.54, 2.69)
Unknown	4.41 (2.44, 7.96)	2.69 (1.41, 5.15)
Body Mass Index (Reference = 18.5-25)		
Underweight (<18.5)	3.61 (1.65, 7.91)	3.33 (1.45, 7.62)
Overweight (≥25, <30)	0.78 (0.37, 1.62)	0.89 (0.41, 1.92)
Obese (≥30)	0.90 (0.38, 2.13)	0.83 (0.33, 2.08)
Unknown	1.89 (1.19, 3.00)	1.79 (1.06, 3.03)
CD4 Count* (Reference = ≥500 cells/mm³)		
<200 cells/mm³	5.21 (3.26, 8.33)	3.32 (2.00, 5.50)
200-349 cells/mm³	3.38 (2.15, 5.34)	2.25 (1.39, 3.64)
350-499 cells/mm³	2.06 (1.29, 3.27)	1.91 (1.18, 3.08)
Unknown	3.54 (2.16, 5.79)	2.62 (1.56, 4.40)
Adherence to ART* (Reference = ≥95%)		
<95%	1.92 (1.38, 2.68)	1.34 (0.93, 1.92)
Unknown	1.72 (1.07, 2.75)	2.66 (1.47, 4.81)
Diabetes Mellitus (Reference = No or Unknown)		
Yes	1.85 (1.06, 3.22)	1.99 (1.05, 3.77)
Chronic Renal Disease (Reference = No or Unknown)		
Yes	2.38 (1.31, 4.33)	1.80 (0.93, 3.52)
Alcohol Dependence (Reference = No or Unknown)		
Yes	2.79 (1.85, 4.21)	1.65 (1.05, 2.60)
Dependence on Other Drugs (Reference = No or Unknown)		
Yes	2.40 (1.74, 3.31)	1.45 (0.96, 2.17)
Non-AIDS-Defining Cancer (Reference = No or Unknown)		
Yes	4.05 (2.07, 7.91)	3.17 (1.52, 6.59)
Age at Time Last CSRF Received (10 Year Intervals)		
	1.45 (1.27, 1.65)	1.70 (1.43, 2.01)
Class of 3 rd Drug in ART Regimen* (Reference = Protease Inhibitor)		
NNRTI	0.62 (0.41, 0.94)	0.76 (0.49, 1.18)
Integrase inhibitor	0.56 (0.35, 0.91)	0.64 (0.39, 1.06)
Other	0.93 (0.55, 1.57)	0.77 (0.43, 1.35)
Not on Therapy	2.39 (1.35, 4.23)	1.66 (0.84, 3.26)
*Closest reported value within 3 months before or after date CSRF was received by the BC Centre for Excellence in HIV/AIDS		
*Calculated by prescription refill data in year prior to date CSRF was received by the BC Centre for Excellence in HIV/AIDS		
*At date CSRF was received by the BC Centre for Excellence in HIV/AIDS		

Conclusions

- Cigarette smoking and other chronic diseases are highly prevalent among PLWH in BC
- Current cigarette smoking, alcohol dependence, diabetes, and non-AIDS-defining cancers are strongly associated with mortality among PLWH in BC
- Focused attention to smoking cessation, treatment for alcohol use disorder and better diabetes management may further reduce mortality among PLWH



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