Trends of non-HIV chronic comorbidities among HIV-positive individuals on highly active antiretroviral therapy in British Columbia from 2000-2009

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Background

- Since the advent of highly active antiretroviral therapy (HAART) in 1996, successes in reducing HIV and AIDS related morbidity and mortality have led to emerging issues of aging with HIV.
- Due to the complex medical history of HIV positive patients, they are at higher risk for a number of chronic conditions that are typically associated with aging in HIV negative individuals.
- We aim to characterize ten year follow-up of chronic disease incidence among HIV positive BC residents during a period of time within the HAART era.

Table 1: Baseline Cohort Characteristics (n=8620)

Characteristic	Percent	n
Age		8620
≤35	29.4%	
36-50	55.2%	
>50	15.3%	
Sex		8619
Male	83.2%	
Female	16.8%	
Ethnicity		5249
First Nation	20.6%	
Asian	5.3%	
Black	3.6%	
White	75.0%	
Hispanic	3.2%	
HIV Risk Group		
Known MSM	49.1%	6096
Known Hetero Risk	30.0%	6096
Known Blood Risk	4.6%	6096
Known PWID	43.8%	6956
Death during study period	23.6%	
Median CD4 cell count (cells/μL; IQR)	240 (130-370)	8448
Median pVL (copies/mL; IQR)	80000 (20900-110000)	6270
Weighted CCI categories		7259
No morbidity (CCI = 0)	67.4%	
Low morbidity (CCI = 1 to 5)	2.8%	
High morbidity (CCI ≥ 6)	29.8%	

MSM: Men who have sex with men; PWID: People who inject drugs; pVL: plasma HIV-1 RNA viral load; IQR: inter-quartile range; CCI: Charlson Comorbidity Index

Figure 1. Frequency of CCI comorbidities at baseline

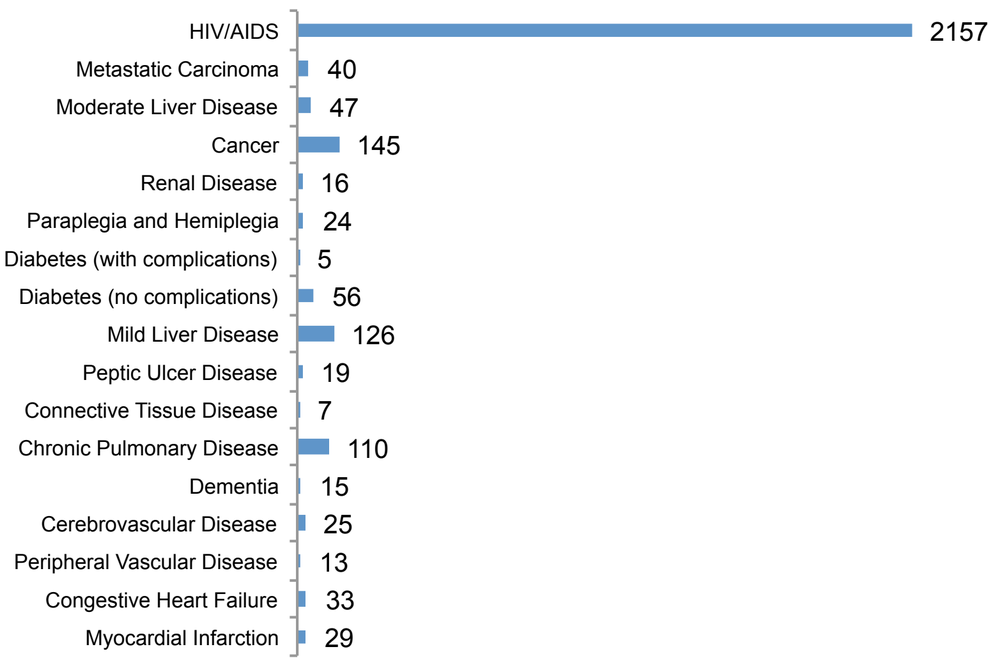
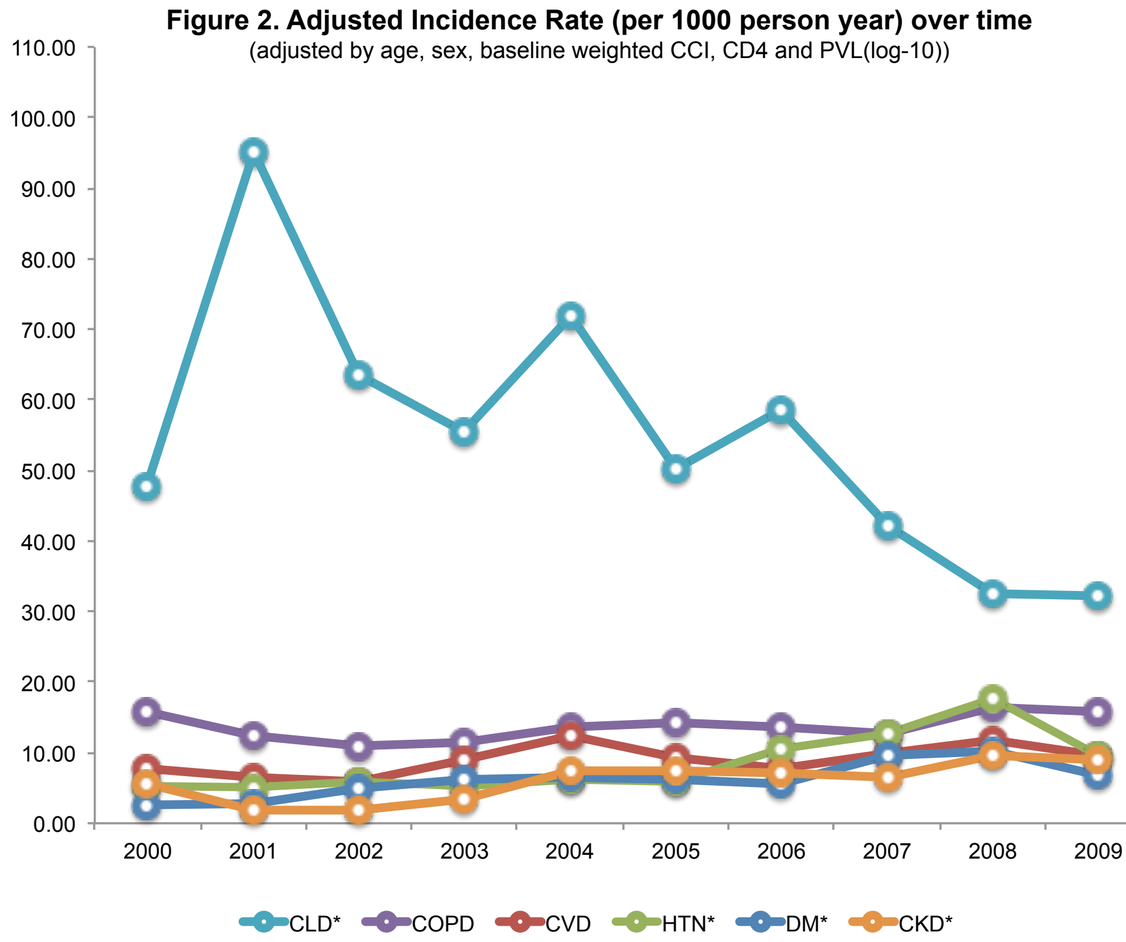


Figure 2. Adjusted Incidence Rate (per 1000 person year) over time
(adjusted by age, sex, baseline weighted CCI, CD4 and PVL(log-10))



DM: diabetes mellitus; HTN: hypertension; CVD: cardiovascular disease; COPD: chronic obstructive pulmonary disease / asthma; CLD: chronic liver disease; CKD: chronic kidney disease
* p<.001

Methods

Study Population

- The individuals included in this analysis were identified as HIV-positive BC residents aged ≥ 19 and initiating HAART between April 1st, 1996 to March 31st, 2010 from the Comparative Outcomes And Service utilization Trends study (COAST) dataset.

Study Design

- We conducted a retrospective population-based cohort study of age-associated chronic disease incidence from HIV positive individuals.
- We assessed incidence rates of six chronic diseases (diabetes mellitus (DM), hypertension (HTN), cardiovascular disease (CVD), chronic obstructive pulmonary disease / asthma (COPD), chronic liver disease (CLD) and chronic kidney disease (CKD)) in the study population; incidence rates were determined for each disease over a period of ten years, from January 1, 2000 to December 31, 2009.
- For each analysis, prevalent cases were identified pre-baseline during a 4-year washout period (April 1st, 1996 to December 31st, 1999) and were excluded from the analyses.

Statistical Analysis

- Poisson's log-linear regression analysis was used to measure trends in incidence rates for each disease-specific analysis.
- Adjusted incidence rates were determined by controlling for variables: age at baseline, sex, baseline weighted Charlson Comorbidity Index (CCI), and baseline CD4 cell count and PVL (log-10).

Results

- The study cohort (n=8620) was predominantly white (75%, based on known ethnicity) male (83%) with a median CD4 cell count of 240 cells/μL and PVL of 80,000 copies/mL at HAART initiation.
- Adjusted incidence rate trends per 1000 person-years of DM, HTN and CKD significantly increased over a 10-year span (p<0.001 for each disease).
- Conversely, adjusted incidence rate trend per 1000 person-years of CLD significantly decreased over a 10-year span (p<0.001). Incidence rates of CLD were also much greater than other chronic diseases at each time point.
- Incidence rate patterns for CVD and COPD/asthma did not significantly change over the study period (Figure 1).

Table 2: Crude and adjusted incidence rates (per 1000 person year) of 6 chronic diseases from 2000-2009 and associated p-value for Poission log-linear regression test for trend

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	p-value
Crude Incidence Rates (per 1000 person year)											
DM	5.86	5.14	6.3	8.13	6.87	6.4	7.1	11.8	11.8	8.69	<0.001
CVD	12.7	9.6	10.4	10.6	13.4	13.7	12.4	12.7	11.2	12.4	0.508
HTN	10.1	5.75	9.3	8.75	9.73	9.9	14.7	15.8	21.6	14.7	<0.001
COPD	12.7	9.01	9.83	8.97	9.18	10.4	10	10.3	11.2	11.6	0.634
CLD	34.7	59.8	46	39.9	52.8	43.3	42	29.1	24.3	22.3	<0.001
CKD	4.68	1.87	2.58	5.21	8.6	8.31	6.46	8.31	8.45	7.47	<0.001
Adjusted Incidence Rates (per 1000 person year) *adjusted for age, sex, baseline weighted CCI, CD4 and PVL(log-10)*											
DM	2.6	2.92	4.84	6.11	6.58	6.34	5.73	9.59	10.2	6.75	<0.001
CVD	7.64	6.62	5.74	9.1	12.3	9.23	7.6	9.77	11.8	9.49	0.055
HTN	5.21	5.11	5.76	5.2	6.11	5.92	10.4	12.6	17.6	9.76	<0.001
COPD	15.7	12.4	11	11.6	13.6	14.2	13.6	12.6	16.5	15.9	0.315
CLD	47.7	95.2	63.4	55.5	71.9	50.4	58.6	42	32.5	32.1	<0.001
CKD	5.6	1.94	1.86	3.5	7.5	7.56	7.23	6.59	9.57	8.93	<0.001

DM: diabetes mellitus; HTN: hypertension; CVD: cardiovascular disease; COPD: chronic obstructive pulmonary disease / asthma; CLD: chronic liver disease; CKD: chronic kidney disease; CCI: Charlson Comorbidity Index; PVL: plasma HIV-1 RNA viral load; 95% CI: 95% confidence intervals

Conclusions

- We observed marked population-level increases in incidence rates for DM, HTN and CKD and no changes for CVD and COPD/asthma among HIV-positive individuals on HAART over the ten-year period.
- Incidence rates of CLD were much greater than the five other chronic diseases at each time point and also had a decreasing trend over the ten-year period.
- Understanding how these chronic conditions affects future disability and death among the aging HIV-positive population is an important area of further research.

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