Cause-specific Hospitalization Trends Among North American Persons With HIV 2005–2015

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Introduction

- Antiretroviral therapy improvements have led to increased viral suppression and CD4 counts among persons living with HIV (PLWH).
- PLWH are aging, with a high burden of comorbidities.
- Recent trends in hospitalization rates are not well-known.
- We examined all-cause and cause-specific hospitalization rates among US and Canadian PLWH between 2005 and 2015.

Methods

Study Population

- Patients ≥18 years old in care in 6 NA-ACCORD clinical cohorts with hospitalization data
- Followed from 1/1/2005 or cohort entry, until death or 12/31/2015
- Censored after 1 year without HIV viral load or CD4 count, but allowed to re-enter analysis

Study Outcomes

- All-cause and cause-specific hospitalizations
- ICD codes for primary discharge diagnoses were categorized with Clinical Classifications Software.

Analysis

- Estimated annual hospitalization rates per 100 person-years
- Poisson regression with GEE to estimate incidence rate ratios for calendar time trends (expressed as annual percentage change)
- Adjusted for NA-ACCORD cohort, gender, race/ethnicity, HIV risk group, and annually-updated age, HIV viral load, and CD4 count.

Results

- 28 057 patients contributed 125 724 person-years of follow-up.
- From 2005 to 2015:
  - Median age increased from 43 to 49 years
  - Median CD4 count increased from 384 to 573 cells/μL
  - Proportion of patients with viral load <400 copies/mL increased from 52% to 83%
- 7503 (27%) patients were hospitalized a median of 2 times (IQR 1, 3), contributing a total of 21 230 hospitalizations.

Table 1. Patient characteristics.

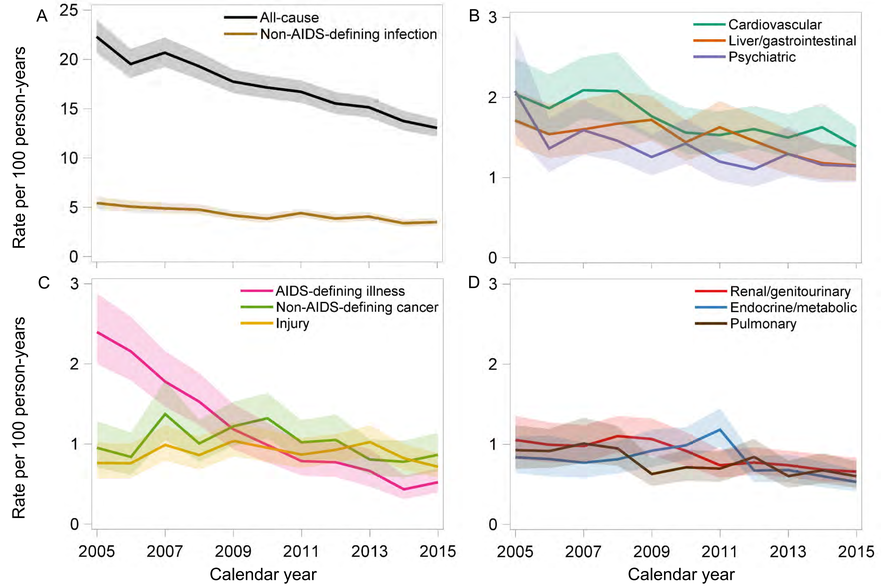
Characteristic		No. (%)
Gender	Cisgender men	22 560 (80%)
	Cisgender women	5339 (19%)
	Transgender	158 (1%)
Race/ethnicity	Black, not Hispanic	8947 (32%)
	White, not Hispanic	11 526 (41%)
	Hispanic	4611 (16%)
	Other/missing	2973 (11%)
HIV risk group	Men who have sex with men	14 622 (52%)
	Injection drug use	3706 (13%)
	Heterosexual/other	9729 (35%)

Table 2. Distribution of 10 most frequent hospital discharge diagnostic categories.

Diagnostic category	No. (%)	Three most frequent discharge diagnoses in category	Annual % Rate Change (95% CI)	
			Unadjusted	Adjusted
All-cause	21 230 (100%)	Not applicable	-4 (-5, -4)	-1 (-2, 0)
Non-AIDS-defining infection	5263 (25%)	Sepsis/bacteremia, bacterial pneumonia, cellulitis/cutaneous abscess	-3 (-5, -2)	1 (0, 2)
Cardiovascular	2134 (10%)	Confirmed coronary events, congestive heart failure, chest pain	-3 (-5, -1)	-4 (-6, -2)
Liver/gastrointestinal	1817 (9%)	Acute or chronic pancreatitis, GI bleed, appendicitis	-3 (-5, -1)	-1 (-3, 1)
Psychiatric	1699 (8%)	Major depressive disorder, bipolar disorder, depressive disorder NEC	-4 (-7, -1)	1 (-3, 4)
AIDS-defining illness	1372 (6%)	PCP, Burkitt lymphoma, recurrent bacterial pneumonia	-15 (-18, -13)	-8 (-10, -5)
Non-AIDS-defining cancer	1271 (6%)	Unspecified non-Hodgkin's lymphoma, leiomyoma of uterus, lung cancer	-2 (-5, 0)	-1 (-3, 2)
Injury/poisoning	1112 (6%)	Complications due to renal dialysis device, poisoning by cocaine/stimulant, closed fracture of femur neck	0 (-2, 2)	1 (-2, 3)
Renal/genitourinary	1076 (5%)	Renal failure, hypertensive chronic renal disease, calculus of kidney/ureter	-4 (-6, -1)	-2 (-4, 1)
Endocrine/metabolic	992 (5%)	Diabetes mellitus (not ketoacidosis/hyperosmolar), hypovolemia, hyperkalemia	-2 (-5, 0)	-1 (-3, 3)
Pulmonary	953 (4%)	COPD exacerbation, asthma exacerbation, acute respiratory failure	-4 (-7, -1)	-2 (-5, 2)

Figure 1. Unadjusted hospitalization rates with 95% confidence bands, 2005–2015.

Shown are all-cause and the 10 most frequent diagnostic categories ordered by frequency.



Conclusions

- In these 6 cohorts of PLWH in the US and Canada, unadjusted hospitalization rates decreased overall and for most diagnostic categories from 2005 to 2015.
- Improvements in viral suppression and CD4 count largely accounted for decreases in unadjusted hospitalization rates.
- Unlike older studies, we did not find rate increases for cardiovascular, renal, and pulmonary hospitalizations.

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