

Sex-specific Patterns in HIV-associated Cardiovascular Mortality in New York City

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BACKGROUND

- We previously identified a more pronounced association between HIV status and cardiovascular disease (CVD) mortality in women than men in New York City through 2012
 - Adjusted mortality rate ratio compared with HIV-negative people: in women: 2.2 (95% CI 2.0-2.4), but in men: 1.2 (95% CI 1.1-1.3)
 - Clinical Infectious Diseases* 2016; 63(8): 1122-1129.
- We extend the analysis through 2017 and include additional control for neighborhood socioeconomic status (SES)
 - In New York City, women with HIV are more likely to live in low SES areas, so SES could confound associations with mortality
- Main question:** Is the greater association of HIV with CVD mortality among women maintained after controlling for SES?

METHODS

SOURCE DATA: NEW YORK CITY HIV SURVEILLANCE REGISTRY

- New York City residents age 13+ reported with HIV to the population-based registry and alive between 2007 and 2017
- Linked with city Vital Statistics Registry and National Death Index to ascertain fact and cause of death
- Residents without HIV enumerated using modified US intercensal estimates after subtracting counts of those with HIV

MAIN STUDY VARIABLES

- Outcome: **Death due to major cardiovascular diseases** (ICD-10 codes I00-I78) as underlying cause of death
- Main exposures: **HIV serostatus** and **sex**
- Covariates: **Neighborhood poverty level** (based on most recently available residential information), age, race/ethnicity

STATISTICAL ANALYSIS

- We accounted for SES in association of HIV status with CVD mortality rates by sex via regression adjustment (log-linear models) and stratification by neighborhood poverty level

RESULTS

PEOPLE WITH HIV IN NEW YORK CITY, 2007-2017

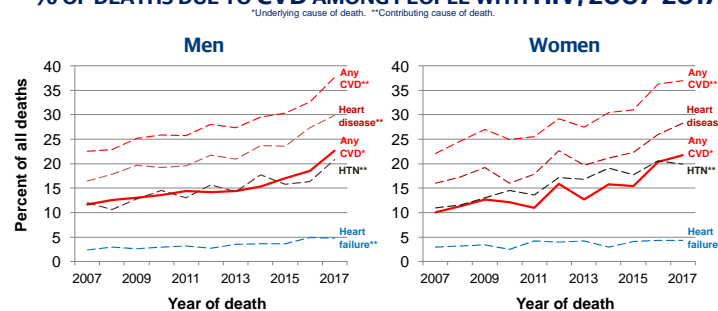
	% unless otherwise noted	
	Men (N=108,083)	Women (N=39,832)
Median age (IQR)	52 (41-59)	52 (44-59)
Race/ethnicity		
Black non-Hispanic	39	58
Hispanic	33	32
White non-Hispanic	24	7
Other/Unknown	3	2
HIV transmission risk		
Men who have sex with men	53	-
Injection drug use history	17	18
Heterosexual or unknown	28	78
Perinatal or other	1	3
Neighborhood poverty level		
Low (<10% below federal poverty level, FPL)	12	6
Medium (10-<20% below FPL)	33	29
High (20-<30% below FPL)	26	28
Very high (≥30% below FPL)	28	38
Median CD4 count*, cells/uL (IQR)	536 (320-761)	559 (298-830)
Suppressed HIV RNA* (<400 copies/mL)	81	78

*At most recent reportable test

CVD MORTALITY AMONG PEOPLE WITH HIV, 2007-2017

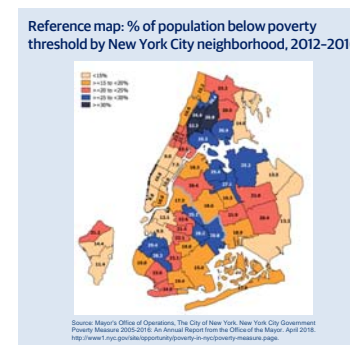
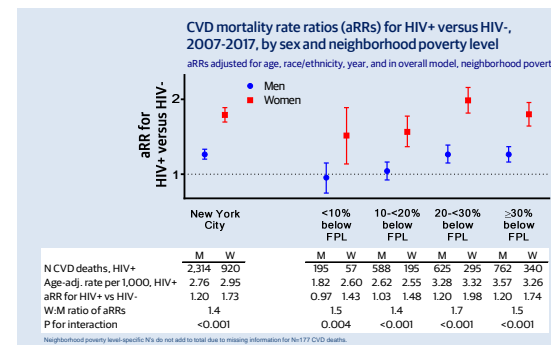
	Men	Women
N deaths, 2007-2017	15,420	6,560
N deaths due to CVD, 2007-2017	2,314 (210/year)	920 (83/year)
% of all deaths attributed to CVD	15	14
Age-adjusted CVD mortality rate per 1,000 person-years (95% CI)	2.76 (2.56-2.96)	2.95 (2.57-3.32)

% OF DEATHS DUE TO CVD AMONG PEOPLE WITH HIV, 2007-2017



ASSOCIATION OF HIV STATUS WITH CVD MORTALITY RATE BY SEX, AFTER ACCOUNTING FOR NEIGHBORHOOD POVERTY LEVEL

- Regression adjustment.** Relative rate of CVD mortality attributed to HIV was attenuated but still elevated in women (RR 1.7, 95% CI 1.6-1.8) compared with men (RR 1.2, 95% CI 1.1-1.3) ($P_{ix \text{ by sex}} < 0.001$)
- Stratification by neighborhood poverty level.** Within each level (<10%, 10-<20%, 20-<30%, ≥30% of neighborhood below FPL), significant differences by sex in the association between HIV and CVD mortality remained ($P_{ix \text{ by sex}} < 0.01$ within all levels)



CONCLUSIONS

- Cardiovascular disease continues to be a major cause of death for people living with HIV in New York City (now 1 in 5 deaths)
 - Providers should continue to emphasize control of viremia and preventive measures: smoking cessation, blood pressure control, lipid management
- Sex differences may reflect biological differences and/or disparate socioeconomic and behavioral profiles between men and women
 - More work is needed to better characterize how socioeconomic, behavioral, and biological factors interact in HIV-associated cardiovascular disease
- Limitations: imperfect categorization of cause of death via death certificates; no information on individual-level SES or hormone levels