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Increased mortality among people at high risk for HIV in the United States

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BACKGROUND

- Independent of HIV status, people with or at risk for HIV have competing risks of mortality, such as smoking and injection drug use (IDU).
- HIV transmission categories describe those at high risk for HIV: men who have sex with men (MSM), people who inject drugs (PWID), high-risk heterosexuals, and low-risk heterosexuals.

OBJECTIVE

- To estimate excess mortality in people at high risk for HIV in the US compared to low-risk individuals.

METHODS

- *Data Sources and Sample:* We used National Health and Nutrition Examination Survey (NHANES) cycles 2001-2014 and its Linked Mortality File (LMF), updated with mortality data from the National Death Index (NDI) through December 31, 2015. We excluded: people with a positive, indeterminate, or missing HIV test result; "other" cause of death; <18y; or for whom a NDI submission record could not be created.
- *Transmission Categories:* MSM, ever PWID, high-risk heterosexuals, and low-risk heterosexuals. Among heterosexuals, we defined risk based on socioeconomic status (SES), i.e. high-risk (low SES, poverty income ratio [PIR] <1) and low-risk (high SES, PIR ≥1). Participants missing information related to transmission categories were classified as either "Unknown, question not answered" or "Unknown, question not given".
- *Statistical Analysis:* We conducted Lexis expansion to convert one observation per person to one observation for each time interval (1-year of age) per person. We used Cox proportional hazard regression models to assess unadjusted and adjusted association between covariates, exposures, and mortality outcomes.

RESULTS

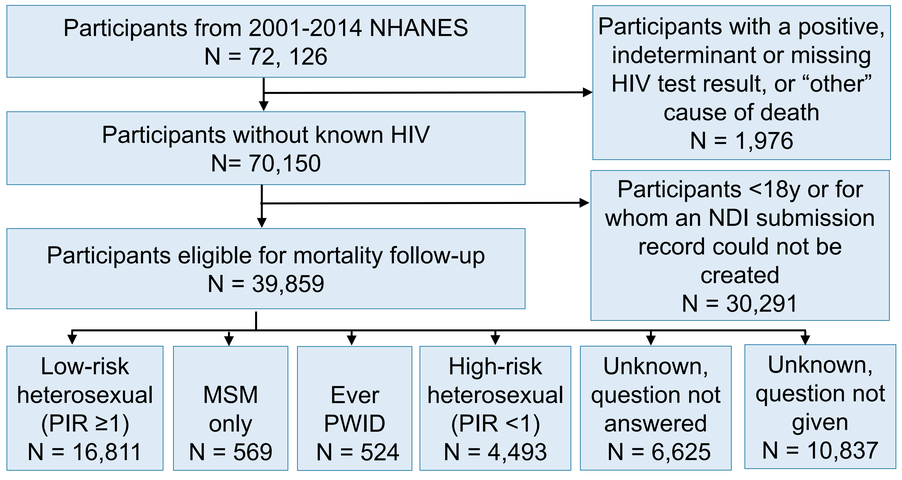

Figure 1. Composition of the sample

RESULTS, CONTINUED

Table 1. Unadjusted association of select covariates with mortality

Exposure	%	Non-HIV mortality rate per 100,000 PY	p-value [a]
Transmission Category			<0.0001
Low-risk heterosexual (PIR ≥1)	42	286	
MSM only	1	628	
Ever PWID	1	920	
High-risk heterosexual (PIR <1)	11	548	
Unknown, question not answered	17	407	
Unknown, question not given	27	2,156	
Covariate			
Age at risk			<0.0001
< 55 years	54	297	
≥ 55 years	46	1,196	
Sex			<0.0001
Female	51	593	
Male	49	820	
Education			<0.0001
Less than high school	42	1,267	
High school	14	755	
More than high school	27	489	
Unknown	17	4,936	
Health Status			<0.0001
Good	50	494	
Fair	11	1,446	
Poor	2	3,043	
Unknown	37	938	
Body Mass Index (BMI)			<0.0001
BMI ≤ 30 kg/m^2	66	614	
BMI > 30 kg/m^2	21	676	
Unknown	13	1,929	
Smoking Status			<0.0001
< 100 lifetime cigarettes	29	497	
≥ 100 lifetime cigarettes	25	977	
Unknown	46	15	
Alcohol Consumption (Binge Drinking)			<0.0001
< 5 drinks/ day for >60 days/yr	31	487	
≥ 5 drinks/ day for >60 days/yr	0	843	
Unknown	69	1,046	
History of Sexually Transmitted Infection (STI)			<0.0001
Yes	6	334	
No	81	331	
Unknown	13	574	

[a] Chi-Square test from Cox proportional hazard regression models.

People from the major HIV transmission categories had a higher risk of non-HIV-associated mortality compared to low-risk heterosexuals.

RESULTS, CONTINUED

Table 2. Unadjusted and adjusted association of HIV transmission category and mortality

Transmission Category	Unadjusted [a] Non-HIV-associated mortality HR (95% CI)	Adjusted [a,b] Non-HIV-associated mortality HR (95% CI)
Low-risk heterosexual [c]	1.0	1.0
MSM only	2.2 (1.4, 3.6)	1.9 (1.2, 3.1)
Ever PWID	3.2 (2.1, 4.9)	2.1 (1.3, 3.3)
High-risk heterosexual	1.9 (1.5, 2.4)	1.6 (1.3, 2.0)
Unknown, question not answered	1.4 (1.1, 1.8)	1.5 (1.1, 2.0)
Unknown, question not given	7.5 (6.5, 8.7)	4.4 (3.3, 5.9)

HR, hazard ratio; **CI**, confidence interval; **MSM**, men who have sex with men; **PWID**, people who inject drugs

[a] Cox proportional hazards regression

[b] Adjusted for age, sex, education, health status, body mass index, smoking status, alcohol consumption, and history of STI

[c] Reference category

- Depending on the transmission category, high-risk individuals had 1.5-4.4 times the rate of non-HIV mortality compared to low-risk heterosexuals.

LIMITATIONS

- Analysis is limited to adults (≥ 18 years).
- Information regarding sexual orientation and drug use was only available at study baseline and was from self-report.
- Information regarding HIV status among some participants was missing.

CONCLUSIONS

- People from the major HIV transmission categories had a higher risk of non-HIV-associated mortality compared to low-risk heterosexuals.
- Interventions for people with HIV should focus on reducing non-HIV-associated causes of death to achieve maximum impact.