

# Predictors of non-HIV-related deaths among PWA in New York City, 1999-2003

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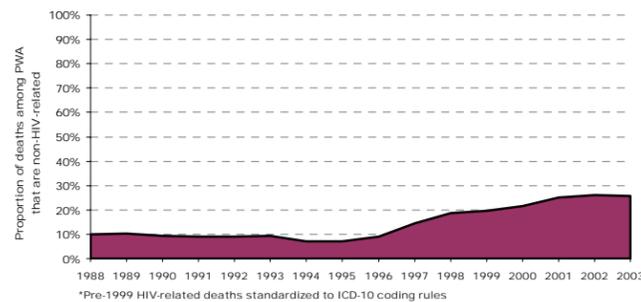
## BACKGROUND

Monitoring mortality from non-HIV-related causes has become an important priority since the survival of persons with AIDS (PWA) has improved due to highly active antiretroviral therapy (HAART). This analysis examines rates for non-HIV-related causes of death in New York City and risk factors for these deaths. The analysis focuses on the period 1999-2003, after HAART was widely adopted.

Why should non-HIV-related causes of death be a concern for PWA and their providers?

- The population of PWA is aging. Between 1993 and 2003, the number of PWA age 50 or older increased almost 6-fold, from 2,904 to 16,900.
- PWA have a very high rate of smoking and substance use, both of which are associated with elevated death rates.
- Complications secondary to HAART may increase CVD mortality.

Non-HIV-related deaths among PWA, NYC, 1988-2003\*



Non-HIV-related causes of death have increased since the widespread use of HAART.

## METHODS

### Population

NYC residents 13+ years old diagnosed with AIDS through 2003; reported to NYC DOHMH as of 9/30/04; and died 1999-2003 according to match with the NYC Vital Statistics Registry or through field surveillance.

### Sources and classification of causes of death

Cause of death information was based on matches with the NYC Vital Statistics Registry (1999-2003) and the National Death Index (1999 only).

Classification of *HIV-related deaths* was based on ICD-10 codes for HIV-related deaths: B20-B24, or CDC-defined opportunistic infection.

Classification of *non-HIV-related deaths* was based on ICD-10 codes for any other known underlying cause of death and categorized into major subgroups (e.g. major CV diseases, non-AIDS-defining malignant neoplasms, substance abuse).

*Substance abuse* category included alcohol abuse and dependence, drug abuse and dependence, aspiration pneumonia, alcoholic and other chronic liver disease, hepatitis C, liver cancer, and septicemia.

*Malignant neoplasms* category excluded liver cancer and AIDS-defining cancers.

Cause of death was unknown for less than 2% of total deaths.

## Analysis

- Average mortality rates per 10,000 PWA (1999-2003), age-standardized to NYC population
- Multinomial logistic regression to determine predictors of death from non-HIV-related causes, compared to living with AIDS

## RESULTS

Demographic characteristics of PLWA, 2003

PLWA 2003, N=53,954	%
Median age (years)	45
Sex	
Male	70.8
Female	29.2
Race	
Black	45.2
Hispanic	33.6
White	19.6
API/Nat. Am./Other	1.6
Borough	
Manhattan	33.3
Brooklyn	27.1
Bronx	22.6
Queens	15.2
Staten Island	1.9
Transmission risk factor	
MSM	25.6
IDU	31.2
Perinatal	0.6
Heterosexual	21.8
Other/Unknown	20.8

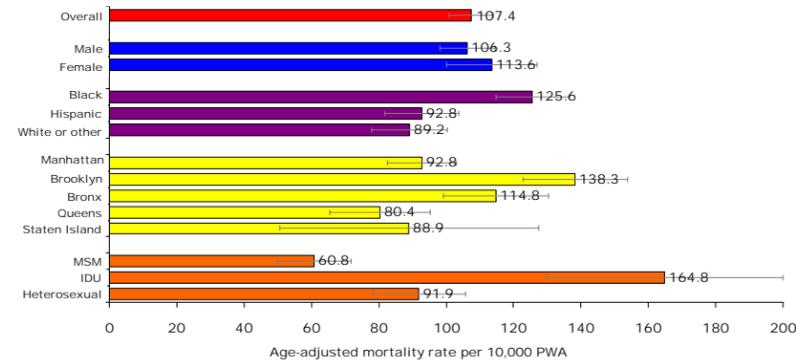
MSM = men who have sex with men  
IDU = injection drug use

Leading causes of non-HIV-related deaths, 1999-2003

Cause of death	N	% of all deaths (N=11,388)	Age-adjusted mortality rate per 10,000 PWA (95% CI)
ALL HIV-RELATED CAUSES	8,543	75.0%	334.3 (321.6, 347.0)
ALL NON-HIV-RELATED CAUSES	2,662	23.4%	107.4 (100.8, 114.1)
Substance abuse	834	7.3%	23.6 (21.2, 26.0)
Major cardiovascular diseases	613	5.4%	30.6 (26.8, 34.4)
Malignant neoplasms	534	4.7%	25.5 (22.1, 28.8)
Accidents	89	0.8%	2.7 (1.9, 3.5)
Chronic lower respiratory diseases	67	0.6%	4.1 (2.5, 5.7)
Diabetes mellitus	63	0.6%	2.7 (1.7, 3.7)
Suicide	63	0.6%	2.4 (1.3, 3.5)
Homicide	52	0.5%	2.0 (1.0, 3.0)
Nephritis, nephrotic syndrome and nephrosis	47	0.4%	1.8 (1.0, 2.6)
All other non-HIV-related causes	271	2.4%	11.3 (8.8, 13.8)

Substance abuse, major cardiovascular diseases, and non-AIDS-defining cancers comprised almost 75% of all non-HIV-related causes of death.

Non-HIV-related mortality rates, 1999-2003



IDUs have the highest mortality rate among all groups (165/10,000 PWA).

Risk factors for non-HIV-related causes of death versus living with AIDS, 1999-2003

	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Age (ref. = 35 to 44 years)		
13 to 24 years	0.23 (0.12, 0.45)	0.55 (0.27, 1.11)
25 to 34 years	0.79 (0.66, 0.95)	0.94 (0.78, 1.13)
45 to 54 years*	1.50 (1.36, 1.65)	1.25 (1.13, 1.38)
55 to 64 years*	1.90 (1.69, 2.14)	1.71 (1.52, 1.93)
65+ years*	3.12 (2.66, 3.66)	3.39 (2.88, 3.99)
Gender (ref. = male)		
Female	0.93 (0.86, 1.02)	0.91 (0.83, 1.00)
Race (ref. = white/other)		
Black	1.28 (1.15, 1.42)	0.99 (0.89, 1.12)
Hispanic*	1.05 (0.94, 1.18)	0.80 (0.71, 0.91)
Borough of residence (ref. = Manhattan)		
Bronx	1.14 (1.03, 1.27)	1.04 (0.92, 1.16)
Brooklyn*	1.28 (1.16, 1.41)	1.22 (1.10, 1.36)
Queens	0.90 (0.79, 1.03)	0.93 (0.81, 1.07)
Staten Island	1.22 (0.92, 1.60)	1.11 (0.84, 1.47)
Poverty level** (ref. = poorer)		
Wealthier	0.77 (0.71, 0.84)	0.90 (0.82, 1.00)
Unknown	1.01 (0.86, 1.20)	1.07 (0.90, 1.27)
Transmission risk (ref. = MSM)		
IDU*	3.43 (3.04, 3.86)	3.37 (2.96, 3.84)
Heterosexual*	1.37 (1.18, 1.58)	1.36 (1.16, 1.60)
Perinatal	0.07 (0.01, 0.51)	0.17 (0.02, 1.34)
Other*	3.27 (2.20, 4.88)	2.90 (1.93, 4.37)
Unknown*	1.43 (1.24, 1.65)	1.41 (1.21, 1.65)
Year of AIDS diagnosis (ref. = 1999-2003)		
Before 1996	1.33 (1.21, 1.46)	1.04 (0.94, 1.15)
1996-1998*	1.58 (1.44, 1.75)	1.38 (1.24, 1.52)

\*Adjusted p<0.001, based on multinomial logistic regression model.  
\*\*Poverty level was an aggregate measure, based on zip code of residence.

IDUs had a three-fold increased risk of a non-HIV-related death versus MSM. Other important risk factors included increasing age and Brooklyn residence.

## CONCLUSIONS

- HIV-related causes continue to dominate mortality among PWA in NYC; however, non-HIV-related causes currently account for one-quarter of all PWA deaths.
- Cardiovascular disease, cancer, and substance abuse accounted for ~75% of non-HIV-related deaths.
- Specific causes of death were generally consistent by race, sex, and transmission risk factor, with some notable exceptions.
- The risk of non-HIV-related causes of death was significantly higher among IDUs, and varied significantly by age, borough, and HIV transmission factor.
- Many major causes of non-HIV-related death are amenable to prevention or intervention, e.g. screening for cancer, support for lifestyle changes such as the nicotine patch and buprenorphine.

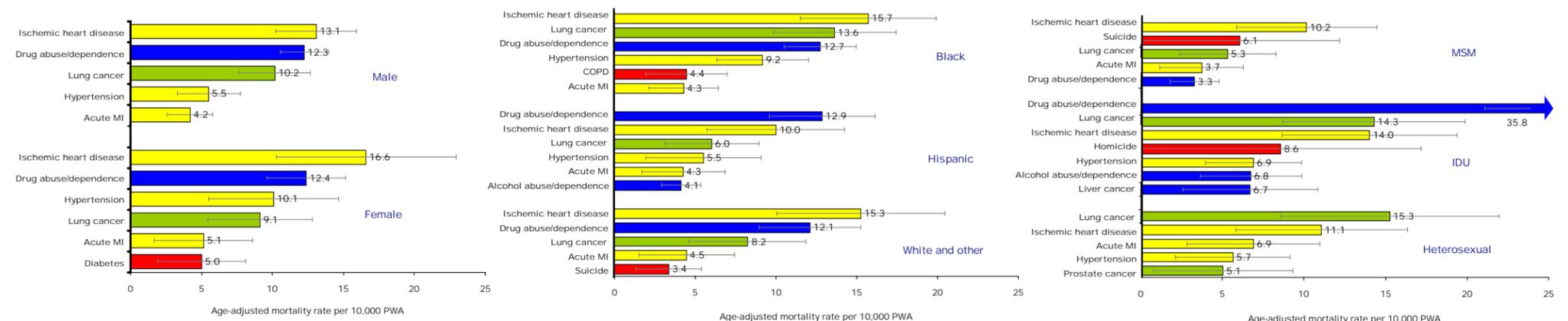
## LIMITATIONS

- Classification of causes of death was not validated by chart review.
- Substance abuse definition may have missed some related deaths.
- Deaths occurring outside NYC (~6%) were not ascertained.
- Some categories had too few deaths for subgroup analyses.
- Regression model did not include laboratory values for CD4 count or viral load before death and could only approximate poverty level.

## ACKNOWLEDGMENTS

- HIV Epidemiology Program, NYC DOHMH (Sonny Ly and Data Support Unit; Surveillance Unit)
- Office of Vital Statistics, NYC DOHMH
- Richard Selik, MD, CDC

Leading specific causes of non-HIV deaths, 1999-2003, by demographic characteristics



Specific causes of death were generally consistent by race, sex, and risk factor, with some notable exceptions. Diabetes was an important non-HIV-related cause of death among women, while suicide was a leading cause among MSM. Substance abuse-related deaths occurred mostly among IDUs.

