

Non-HIV-related causes of death in people with AIDS in New York City, 1999-2003

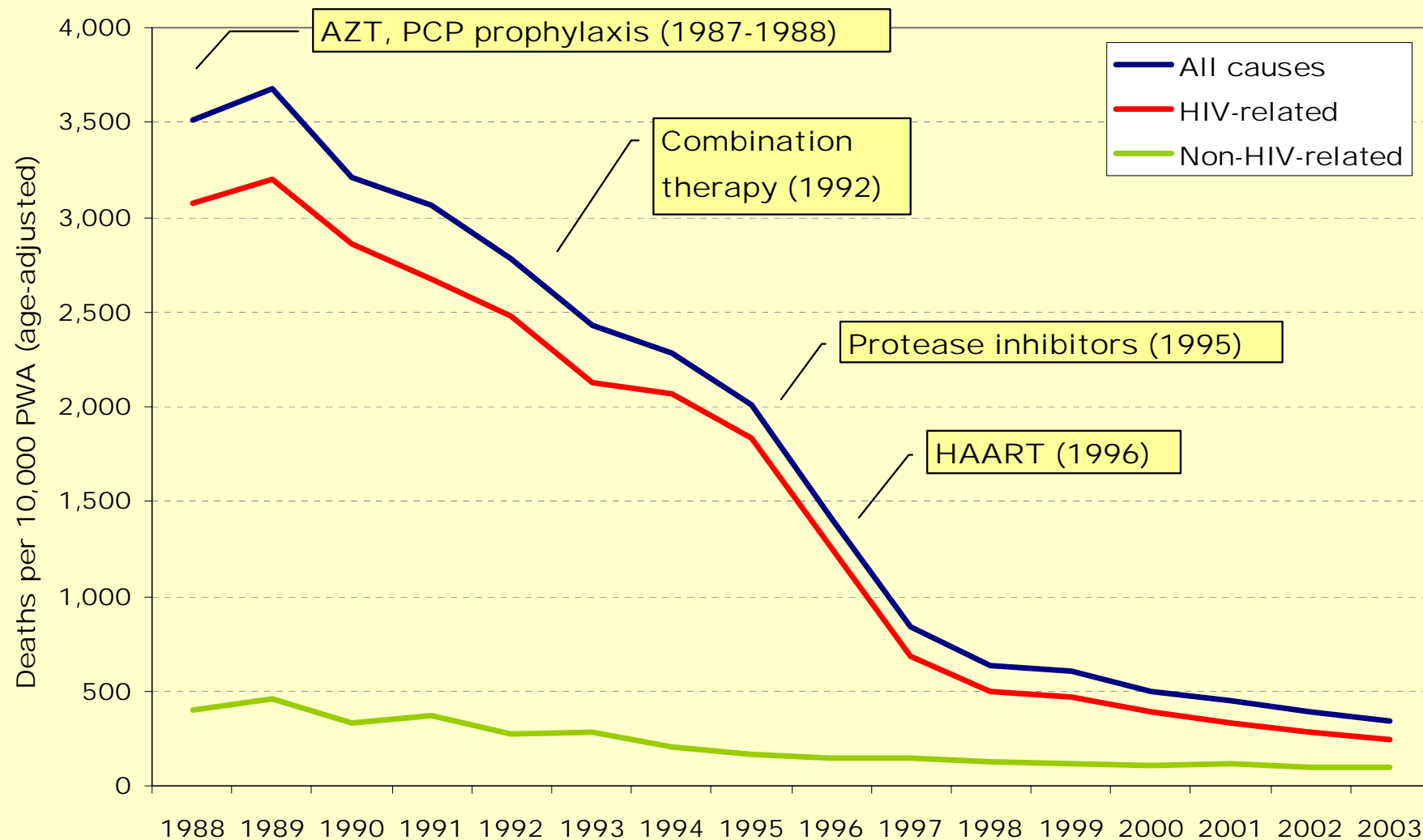
DB Hanna, MR Pfeiffer,
LV Torian, JE Sackoff

HIV Epidemiology Program
NYC Department of Health and Mental Hygiene

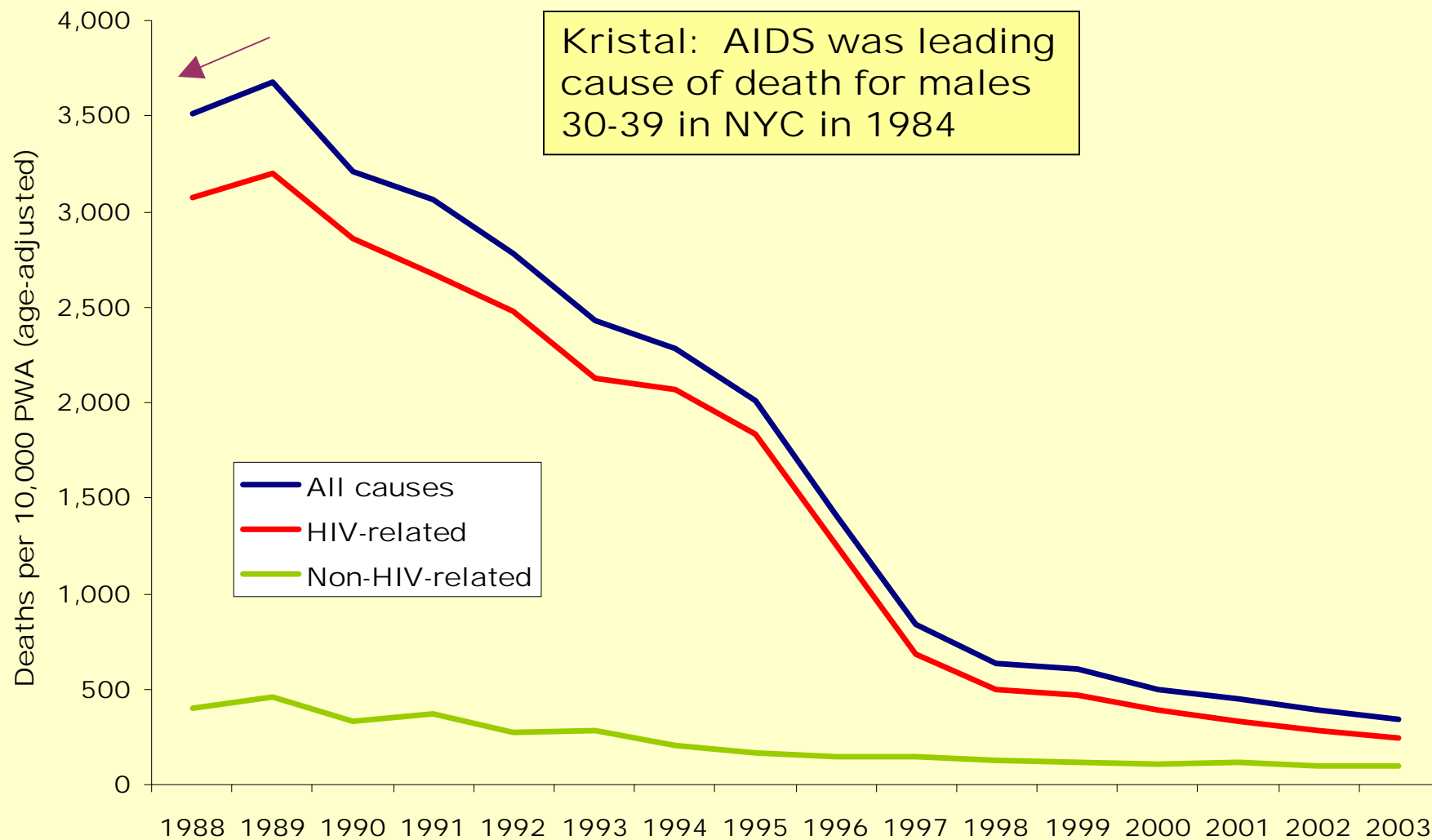
January 27, 2005



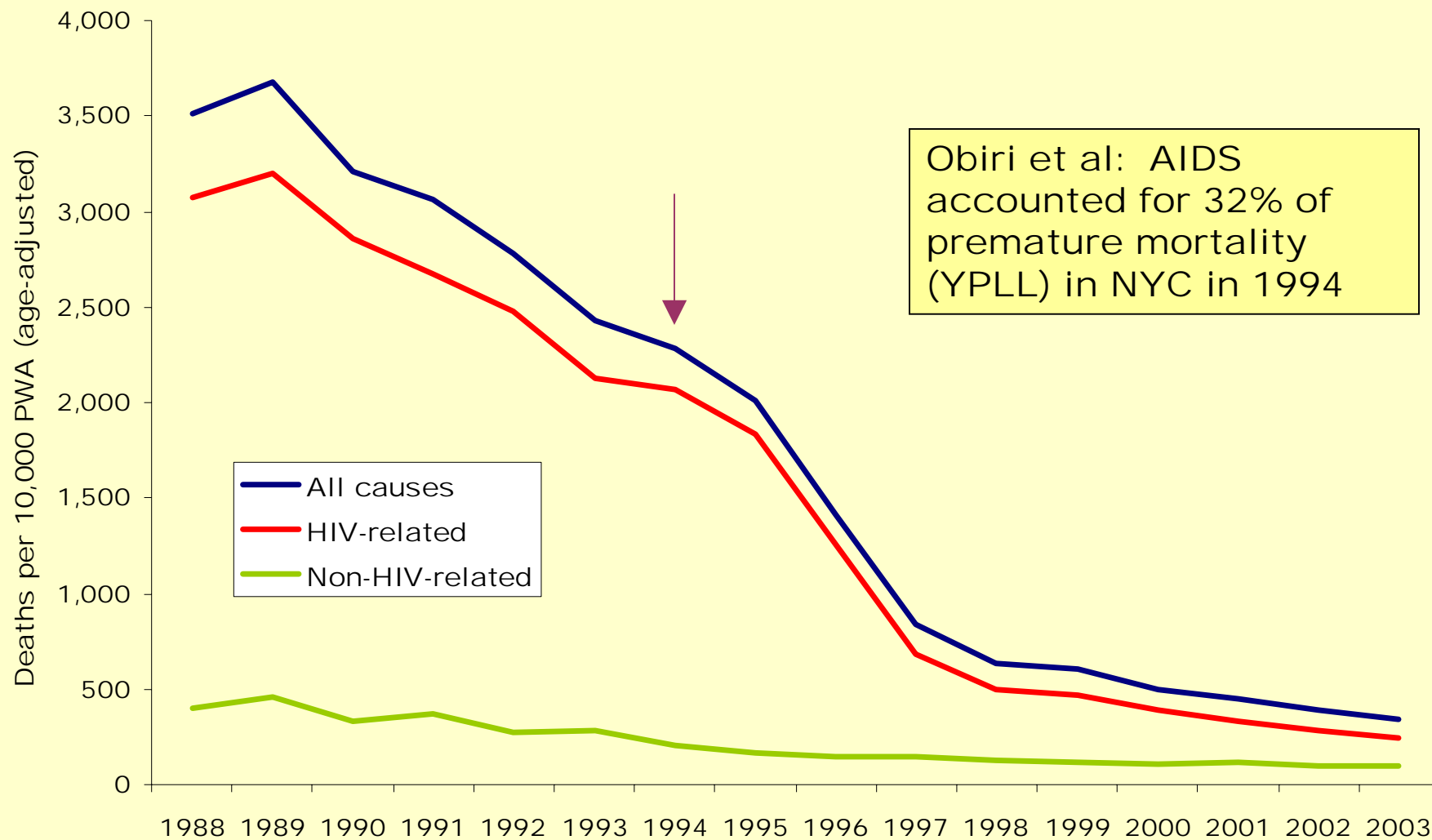
AIDS mortality rate by underlying cause, NYC, 1988-2003



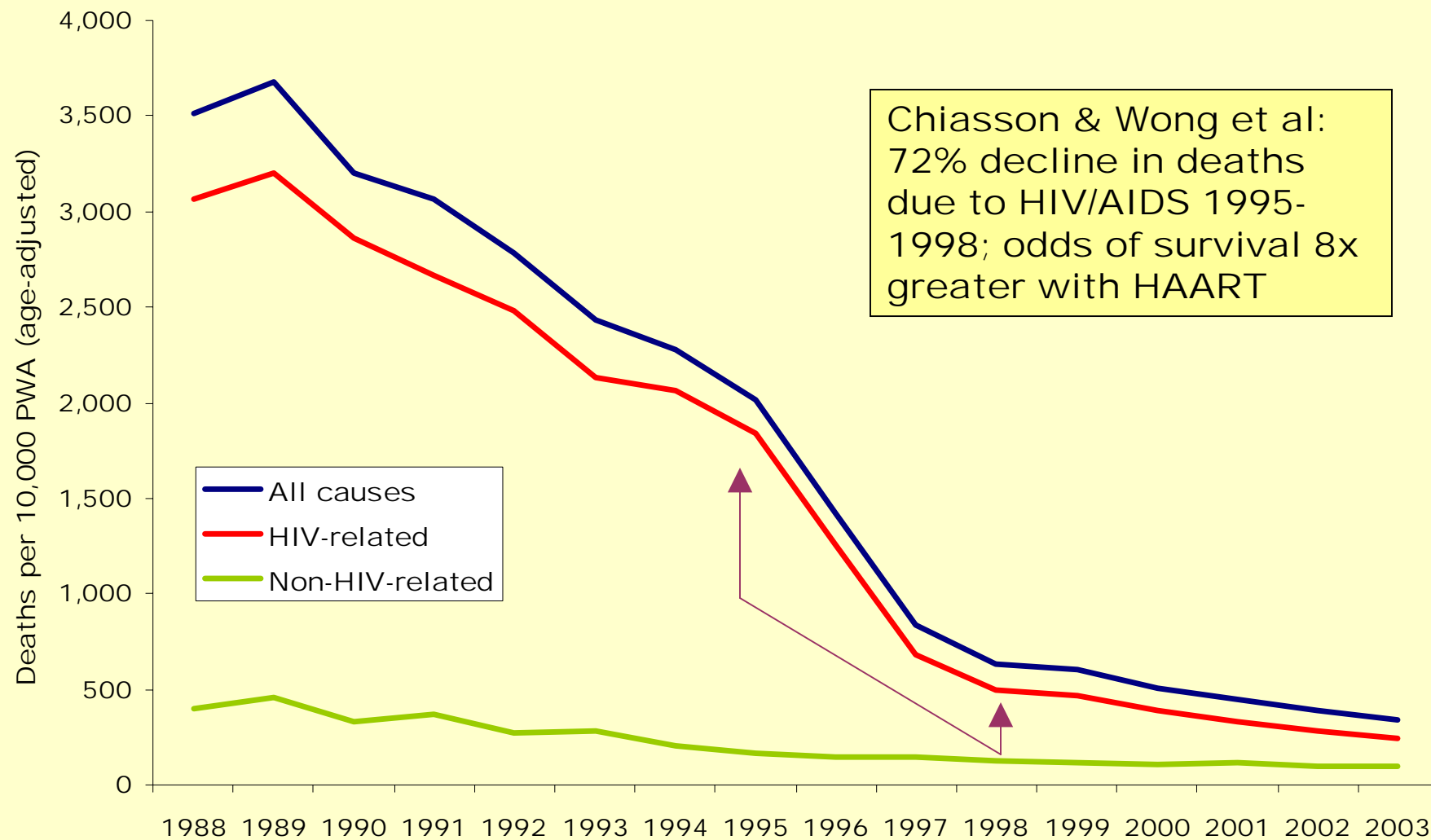
AIDS mortality rate by underlying cause, NYC, 1988-2003



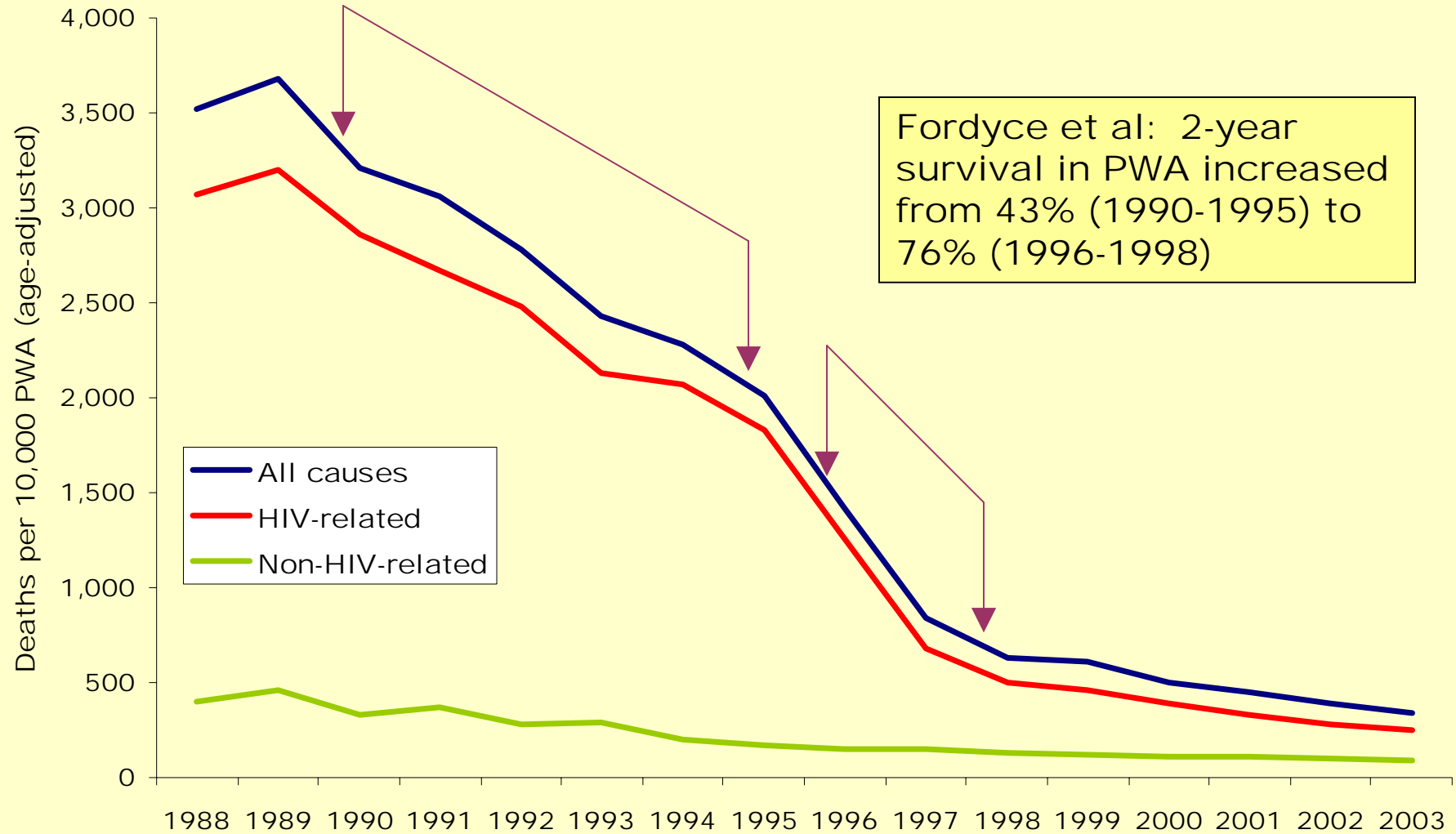
AIDS mortality rate by underlying cause, NYC, 1988-2003



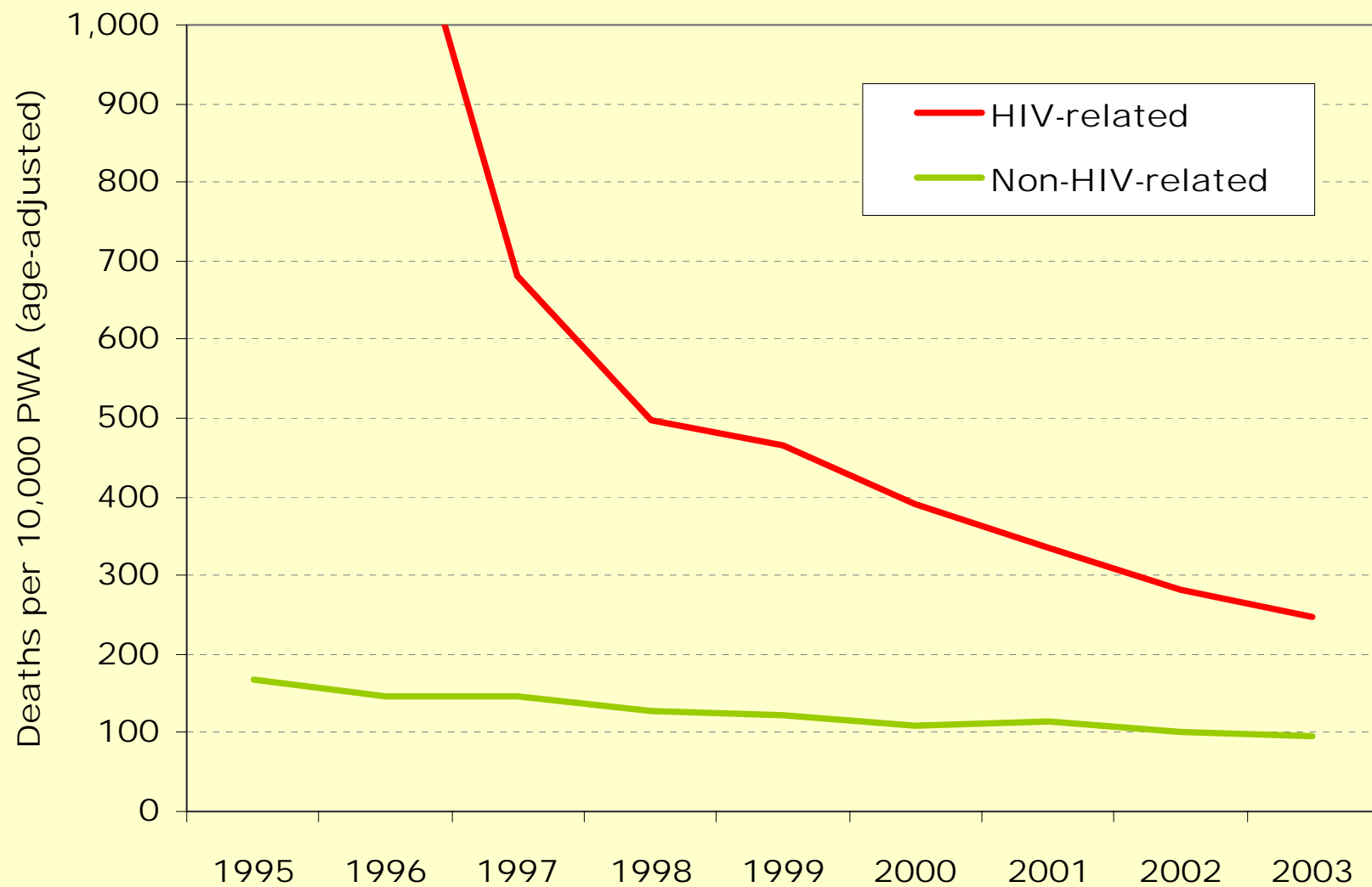
AIDS mortality rate by underlying cause, NYC, 1988-2003



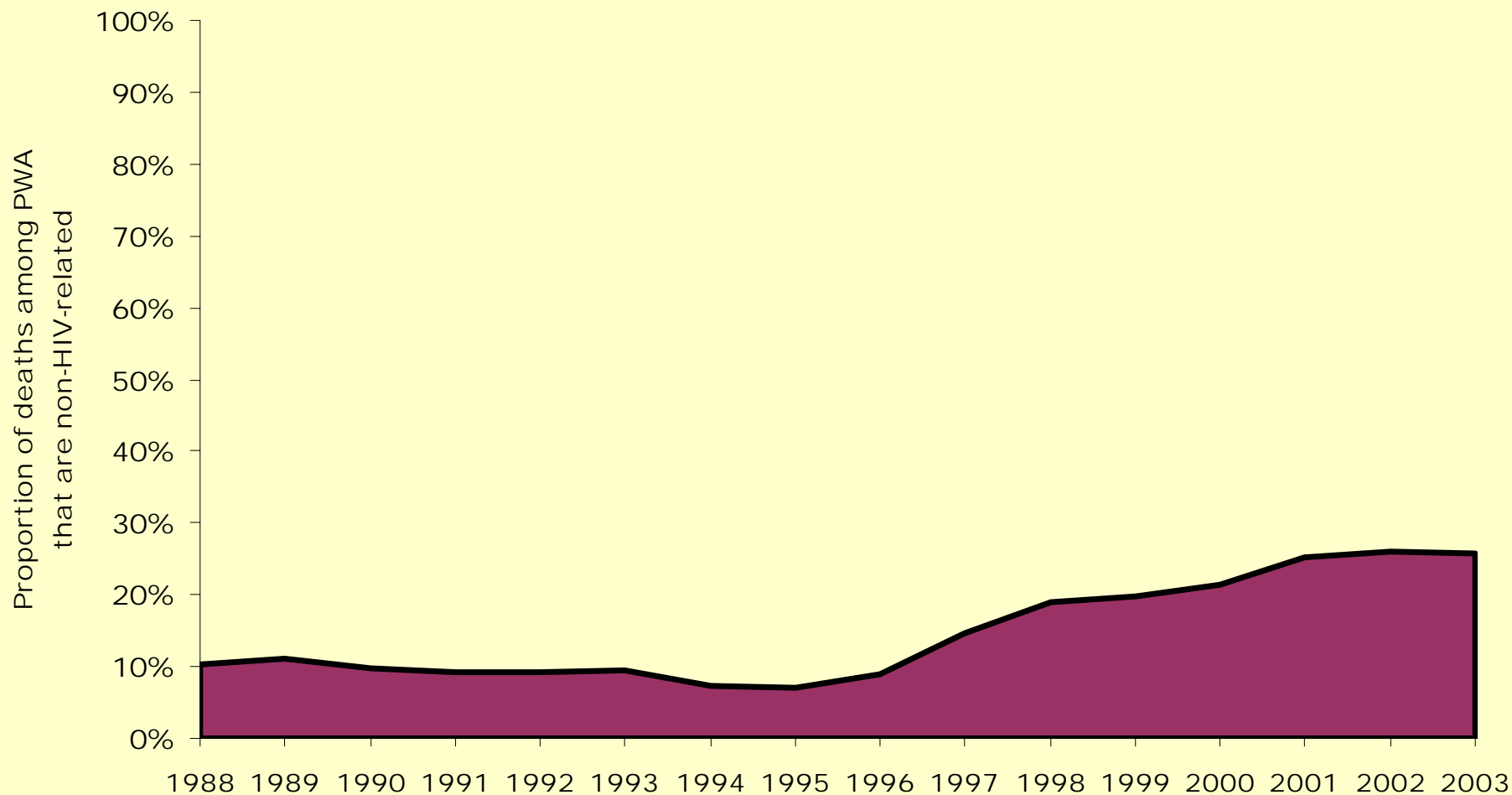
AIDS mortality rate by underlying cause, NYC, 1988-2003



AIDS mortality rate by underlying cause, NYC, 1988-2003



Non-HIV-related deaths among person with AIDS (PWA) NYC, 1988-2003*

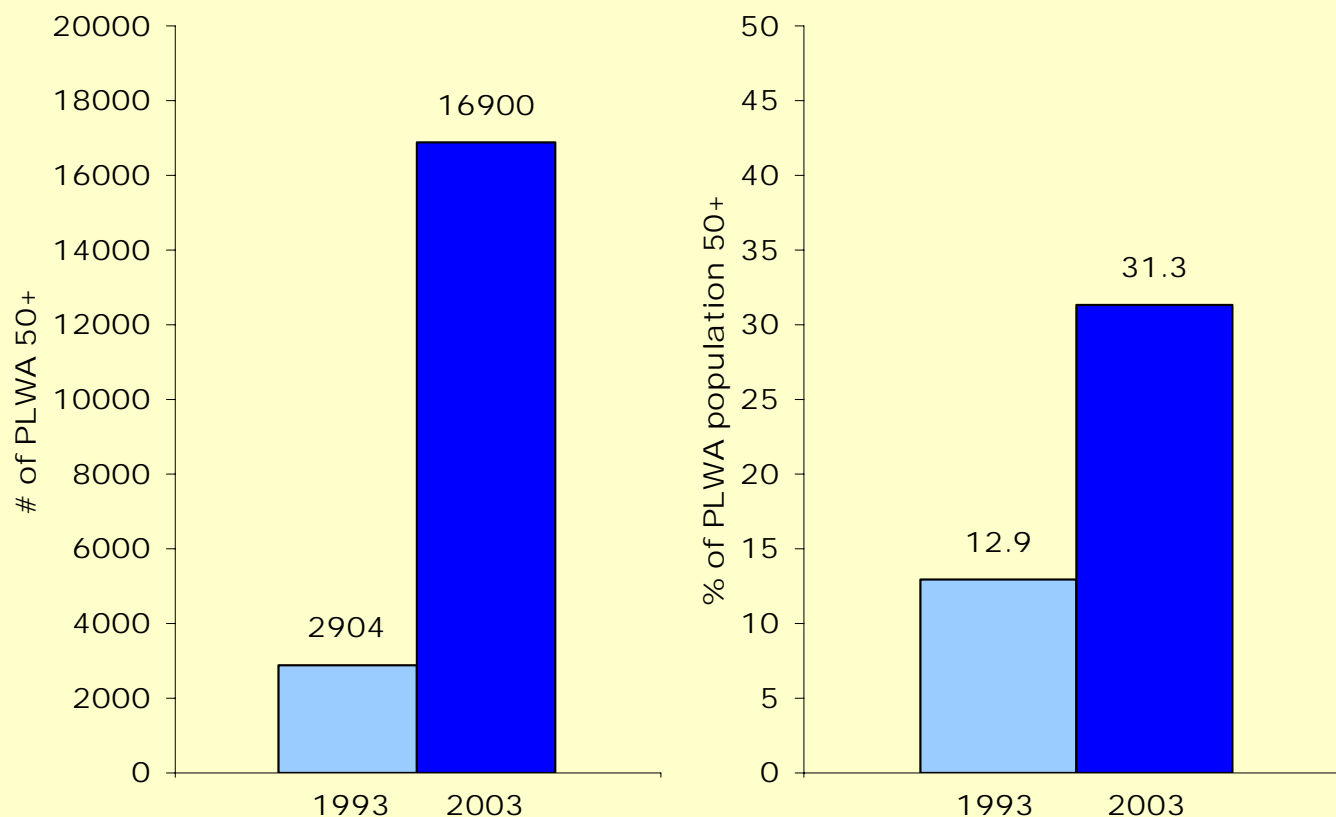


*Pre-1999 HIV-related deaths standardized to ICD-10 coding rules

Non-HIV-related causes of death in PWA: reasons for concern

- Smoking prevalence is higher in PWA than in the general population
- Abuse of alcohol and injection / non-injection drug use is prevalent
- Rates of hepatitis C (a major cause of hepatocellular carcinoma) are ~80% among IDUs
- Concern that complications secondary to HAART increase CVD mortality

The aging PLWA population, NYC, 1993 & 2003



Objectives

- To analyze non-HIV-related mortality rates in the post-HAART period (1999-2003) in NYC:
 - overall, in specific subgroups, and for specific causes
- To identify PWA at greatest risk of a non-HIV-related death
- To identify preventable non-HIV-related illnesses that should be priorities for providers of health-care to PWA

Population

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

Coding cause of death: A primer

- Death certificate may include up to 20 *contributing* or *multiple* causes
- Nosologist assigns ICD code to each contributing cause of death
- All information on the DC used to arrive at an *underlying cause* of death
- Since 1999, ICD-10 scheme used to code cause of death

Source of cause of death

- NYC Vital Statistics Registry, 1999-2003
- Match with the National Death Index (NDI), 1999 only

Classification of HIV-related causes

- ICD-10 codes for HIV-related deaths: *B20-B24*
- Based on ICD-10 rules, some OI deaths are not initially coded as HIV-related, because HIV is not listed on the death certificate
- Selik proposed expanded criteria to include all CDC AIDS-defining conditions, if HIV status is known
 - HIV-related deaths ~4%
 - Our number is greater than what Vital Statistics reports

Classification of non-HIV-related causes

- Criterion:
Any other known
underlying cause of death
- Categorized into major subgroups
- Cause of death unknown for only
183/11,388 total deaths (1.6%)

Codes for major CV diseases

Category	ICD-10
Chronic ischemic heart disease	I20, I25
Acute myocardial infarction	I21-I22
Hypertensive diseases	I10-I13
Cerebrovascular diseases	I60-I69
All other CV disease	All other I00-I78, except I46

Codes for non-AIDS-defining malignant neoplasms

Category	ICD-10
Lip, oral cavity, and pharynx	C00-C14
Stomach	C16
Colon	C18
Rectum and anus	C19-C21
Pancreas	C25
Larynx	C32
Lung, bronchus, and trachea	C33-C34
Breast	C50
Prostate	C61
Leukemia	C91-C95
All other sites	All other C00-C97

Note: Liver cancer included in substance abuse category

Codes for substance abuse

Vital Statistics definition

Category	ICD-10 code(s)
Mental/behavioral disorders due to alcohol	F10
Accidental poisoning by alcohol	X45
Mental/behavioral disorders due to psychoactive substance	F11-F16, F19
Accidental poisoning by psychoactive substance	X40-X42, X44

Codes for substance abuse

"Clinical" definition

Category	ICD-10 code(s)
Mental/behavioral disorders due to alcohol	F10
Accidental poisoning by alcohol	X45
Mental/behavioral disorders due to psychoactive substance	F11-F16, F19
Accidental poisoning by psychoactive substance	X40-X42, X44
Alcoholic liver disease (incl. alcoholic cirrhosis, alcoholic hepatic failure)	K70
Other alcohol-related conditions (incl. alcoholic cardiomyopathy, alcohol-induced chronic pancreatitis)	E24.4, G31.2, G62.1, G72.1, I42.6, K29.2, K86.0
Hepatitis C	B17.1, B18.2
Liver cancer	C22
Other chronic liver disease (incl. unspecific cirrhosis of liver)	K73-K74
Septicemia	A40-A41
Aspiration pneumonia	J69.0

Analysis

- Average mortality rates per 10,000 PWA (1999-2003), age-standardized to NYC population
 - Overall and by sociodemographic factors
 - For non-HIV-related causes overall and specific causes
- Multinomial logistic regression to determine predictors of death from non-HIV-related causes
 - Compared to living with AIDS
 - Independent variables: age, race, sex, transmission risk, borough

Sociodemographic characteristics

PLWA 2003, N=53954	%
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

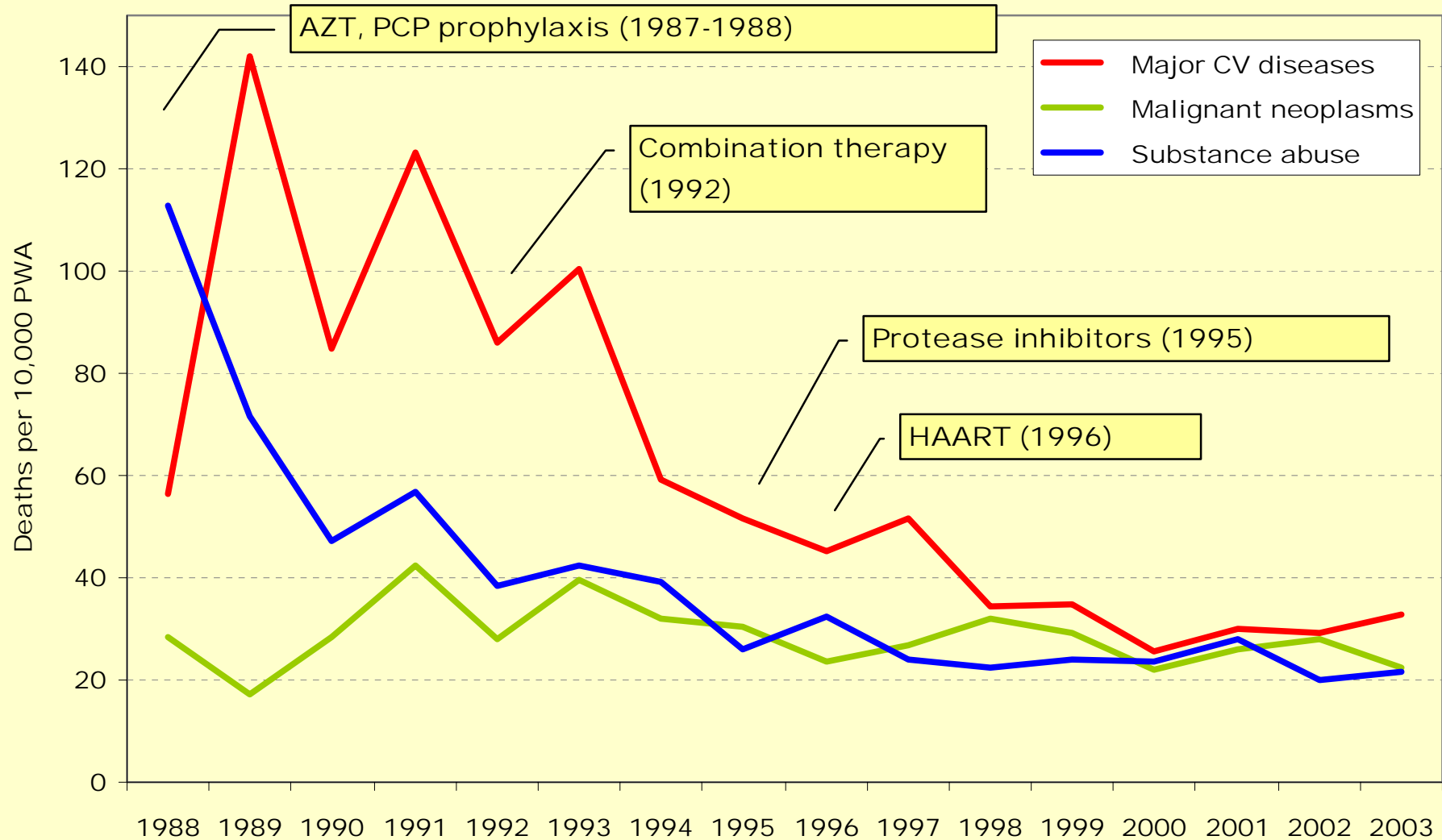
PLWA 2003, N=53954	%
Borough	
Manhattan	33.3
Brooklyn	27.1
Bronx	22.6
Queens	15.2
Staten Island	1.9
Transmission risk	
MSM	25.6
IDU	31.2
Perinatal	0.6
Heterosexual	21.8
Other/Unknown	20.8

Leading causes of non-HIV-related deaths in PWA in NYC, 1999-2003

74.4% of all non-HIV-related deaths

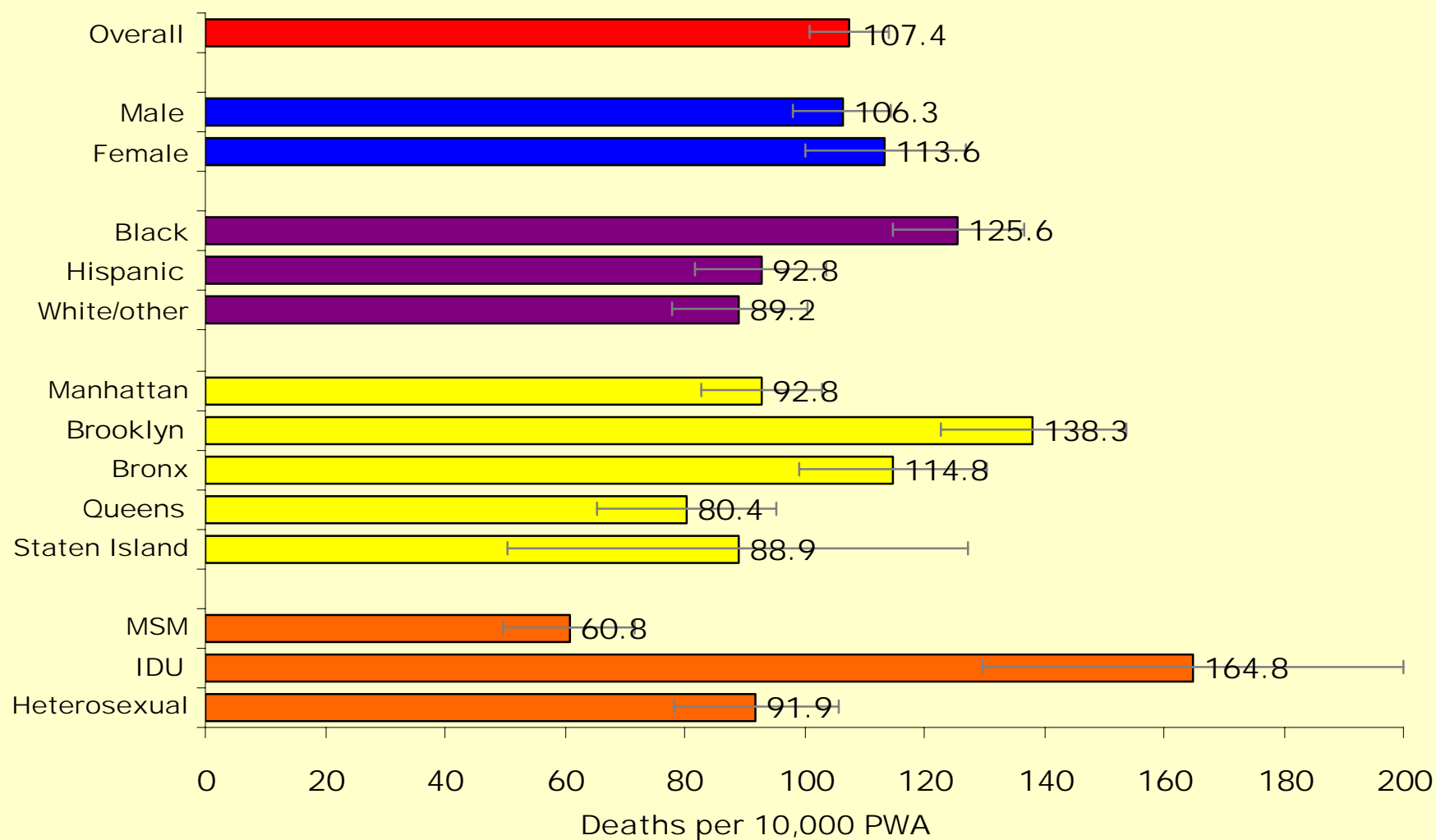
Cause of death	N	% of all deaths (N=11,388)	Age-adjusted death rate per 10,000 PWA (95% CI)
ALL HIV-RELATED CAUSES	8,543	75.0%	334.3 (321.6, 347.0)
ALL NON-HIV-RELATED CAUSES	2,662	23.4%	107.4 (100.8, 114.1)
Substance abuse (alcohol and drug)	834	7.3%	23.6 (21.2, 26.0)
Major cardiovascular diseases	613	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)
Intentional self-harm (suicide)	63	0.6%	2.4 (1.3, 3.5)
Assault (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)

AIDS mortality rate by underlying cause, NYC, 1988-2003

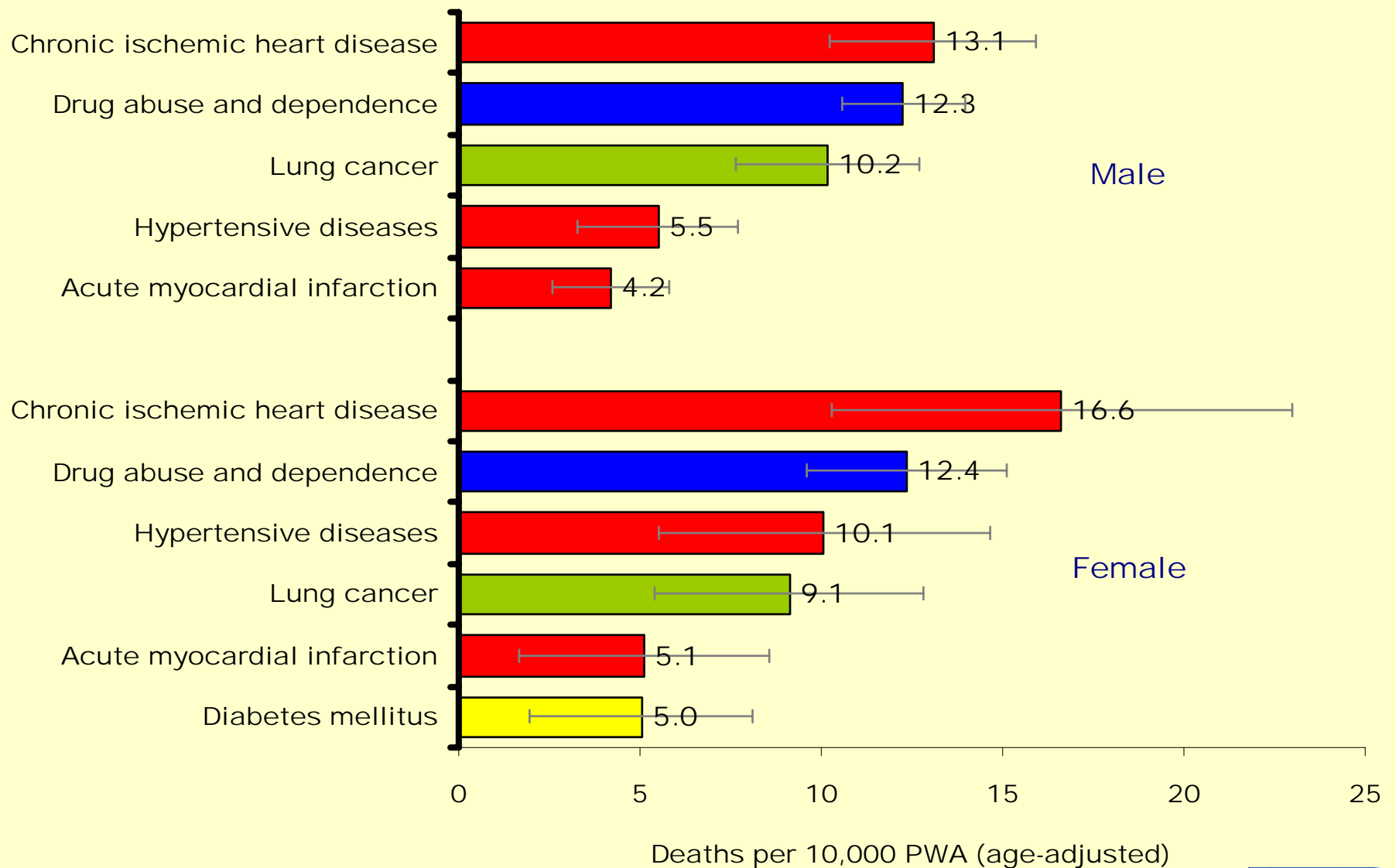


Age-adjusted non-HIV-related mortality rates among PWA in NYC

By demographic characteristics, 1999-2003

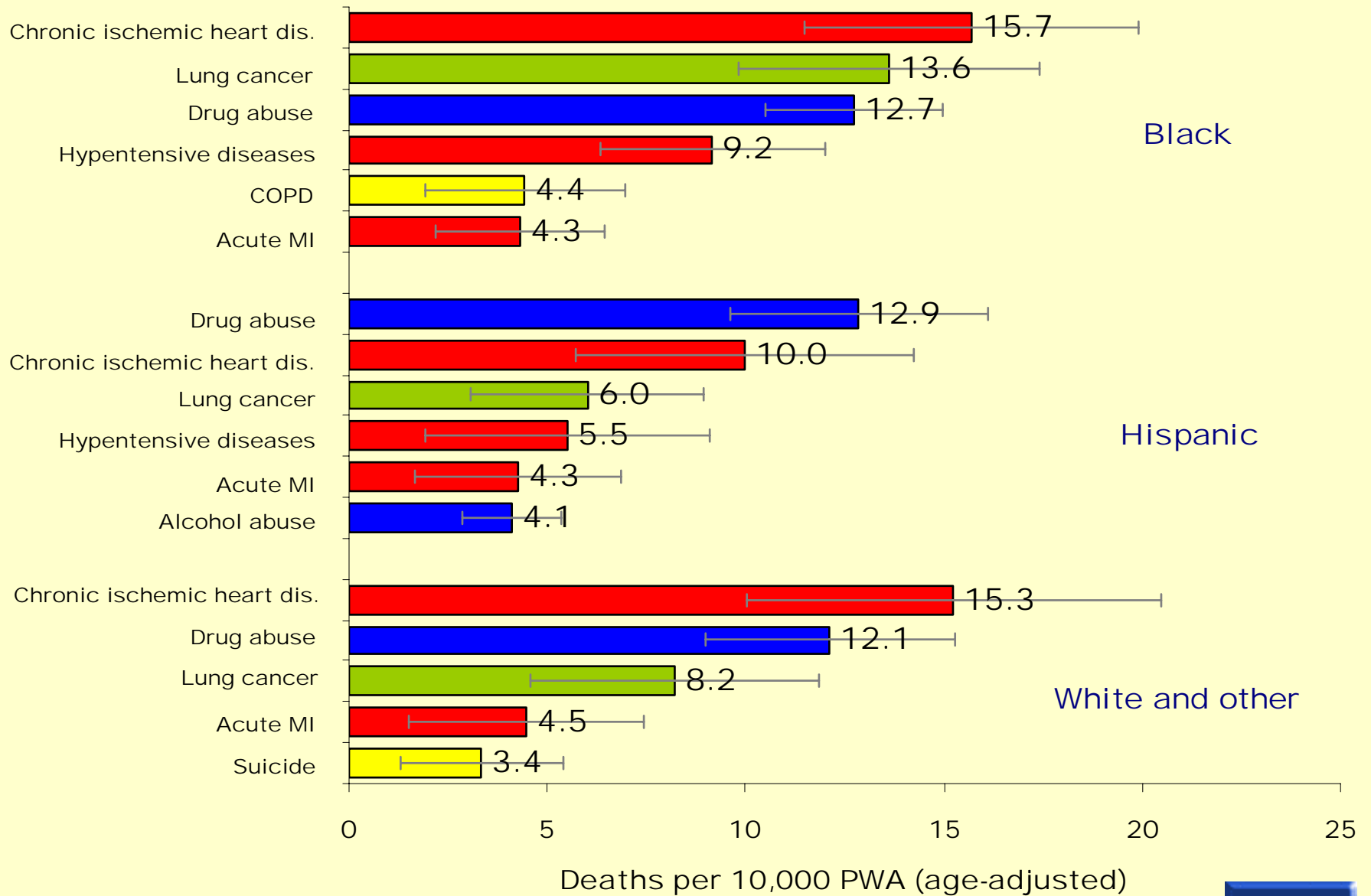


Leading specific causes of non-HIV deaths among PWA, by gender



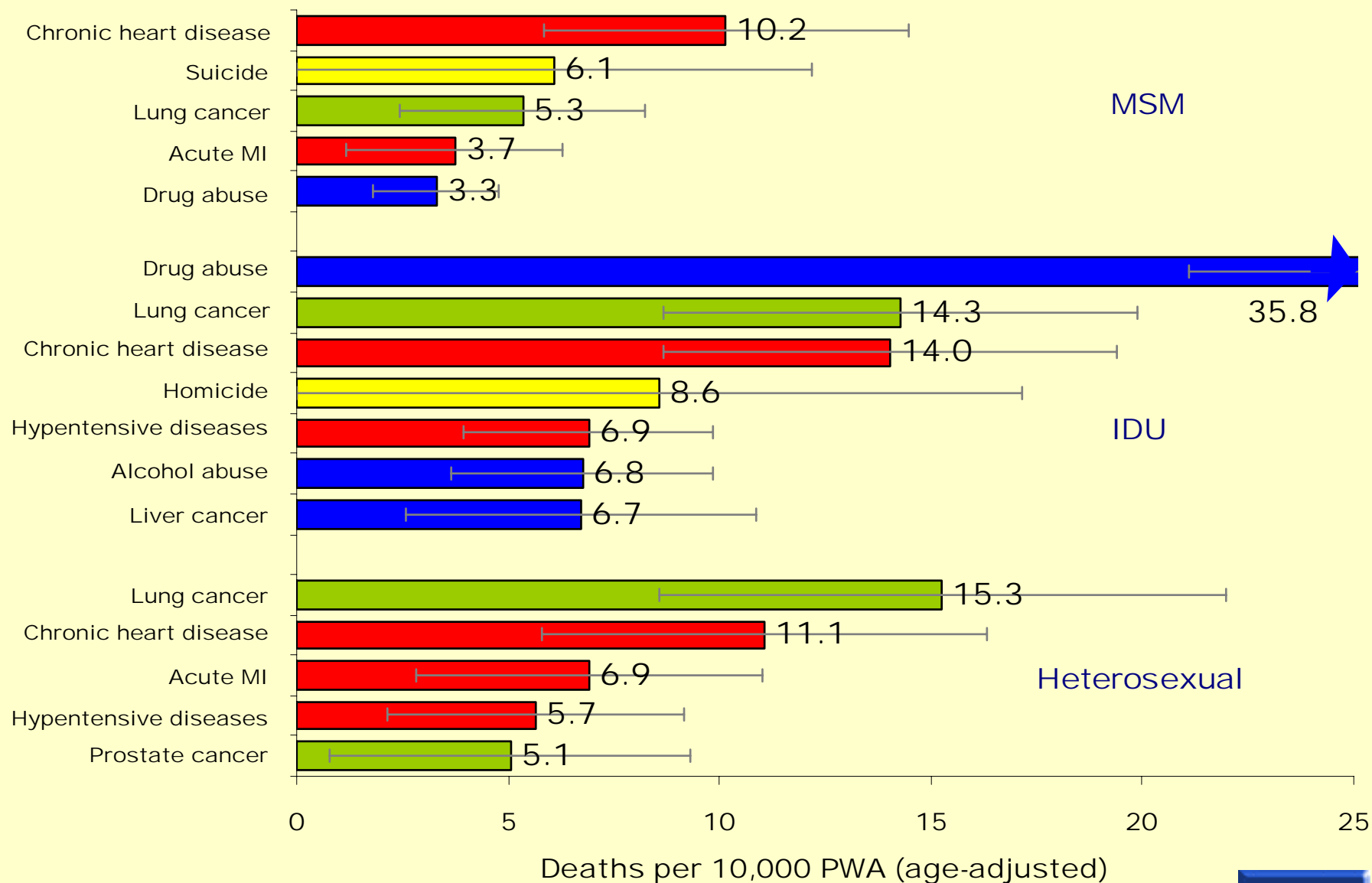
CV Substance abuse Cancer Other

Leading specific causes of non-HIV deaths among PWA, by race



■ CV
 ■ Substance abuse
 ■ Cancer
 ■ Other

Leading specific causes of non-HIV deaths among PWA, by risk



■ CV
 ■ Substance abuse
 ■ Cancer
 ■ Other

Predictors of non-HIV-related deaths

	Crude OR (95% CI)	Adj. OR (95% CI)
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)
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)

Odds ratio compared to PLWA at end of 2003.

Logistic regression model also adjusted for age, poverty level, year of diagnosis.

*Adj. $p < 0.001$



Conclusions

- HIV-related causes continue to dominate mortality among PWA in NYC
- However, the proportion of deaths due to non-HIV-related causes has increased and accounted for 26% of all PWA deaths in 2003
- The risk of non-HIV-related deaths is significantly higher among IDU, and varies significantly by age and borough

Conclusions

- Cardiovascular disease, cancer and substance abuse account for ~75% of non-HIV-related deaths
 - Specific causes generally consistent by race, sex, risk

Recommendations for Health Care Providers to PWA

- Major causes of death are amenable to prevention or intervention
 - Screening for cancers, including prostate, prostate and colon
 - Providing support for lifestyle changes, e.g., nicotine patch, buprenorphine
- Take Care New York priority areas apply equally to PWA

“Health care for people who are HIV-infected should shift from an [exclusive] focus on preventing HIV-related morbidity and mortality to include behaviors and conditions that are increasingly accounting for mortality.”

Primary Care Guidelines for the Management of
Persons Infected with HIV, *Recommendations of
the HIV Medicine Association of the IDSA*, 2004



Limitations

- Classification of cause of death not validated by chart review
- Substance abuse definition may have missed some related deaths
- Deaths occurring outside NYC (~6%) are not ascertained
- Small numbers for subgroup analyses and trends for specific causes
- Regression model did not include laboratory values for CD4 count or viral load

Next Steps

- Further analyses within subgroups defined by geography and risk
- Comparison to causes of death among all NYC residents not known to be HIV+
- Comparable analysis of deaths among people with HIV (not AIDS)
- Analysis of economic impact of non-HIV-related mortality using years of potential life lost (YPLL)

Acknowledgments

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