

US HIV Epidemiology and Risk

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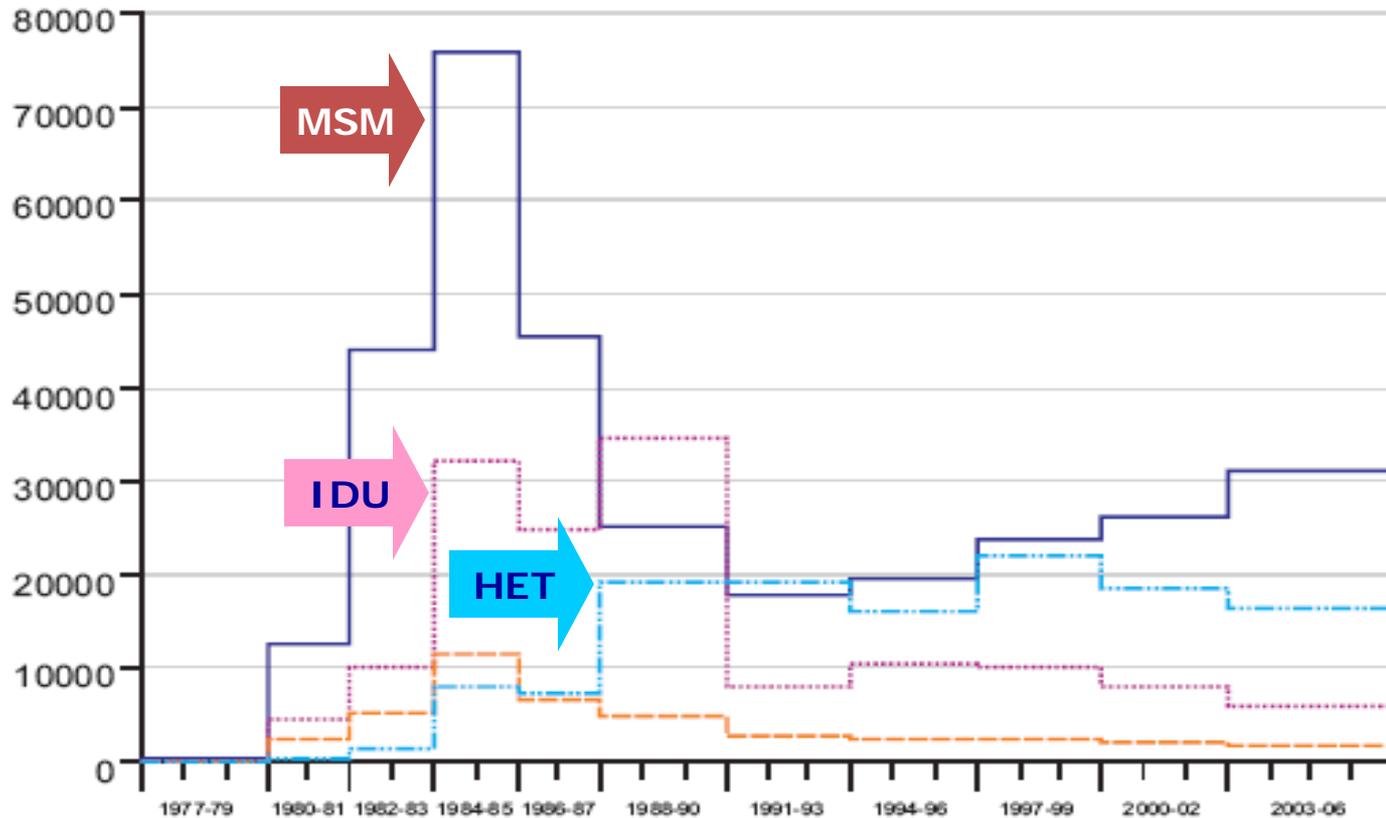
Overview

1. Who is most heavily impacted in the US?
2. What risk behaviors drive HIV infections?
 - Men who have sex with men (MSM)
 - Heterosexuals
3. What do we know about “risk compensation” and effective behavioral interventions?
4. Treatment vs. prevention?

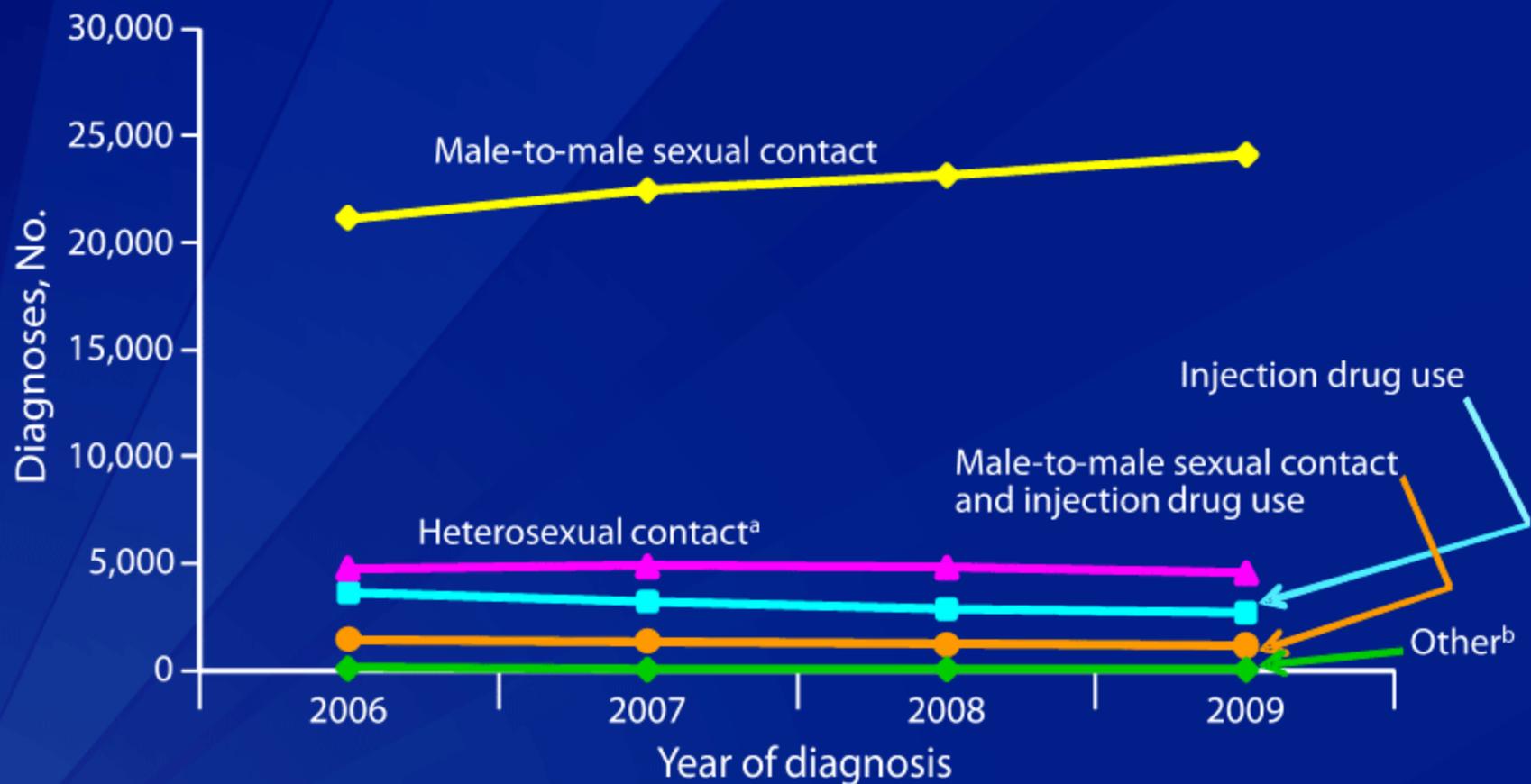
Most heavily impacted populations in the US

Estimated number of new HIV infections U.S. 1977-2006

Hall, JAMA 2008



Diagnoses of HIV Infection among Adult and Adolescent Males, by Transmission Category, 2006–2009—40 States and 5 U.S. Dependent Areas



Note. Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis. All displayed data have been statistically adjusted to account for reporting delays and missing risk-factor information, but not for incomplete reporting.

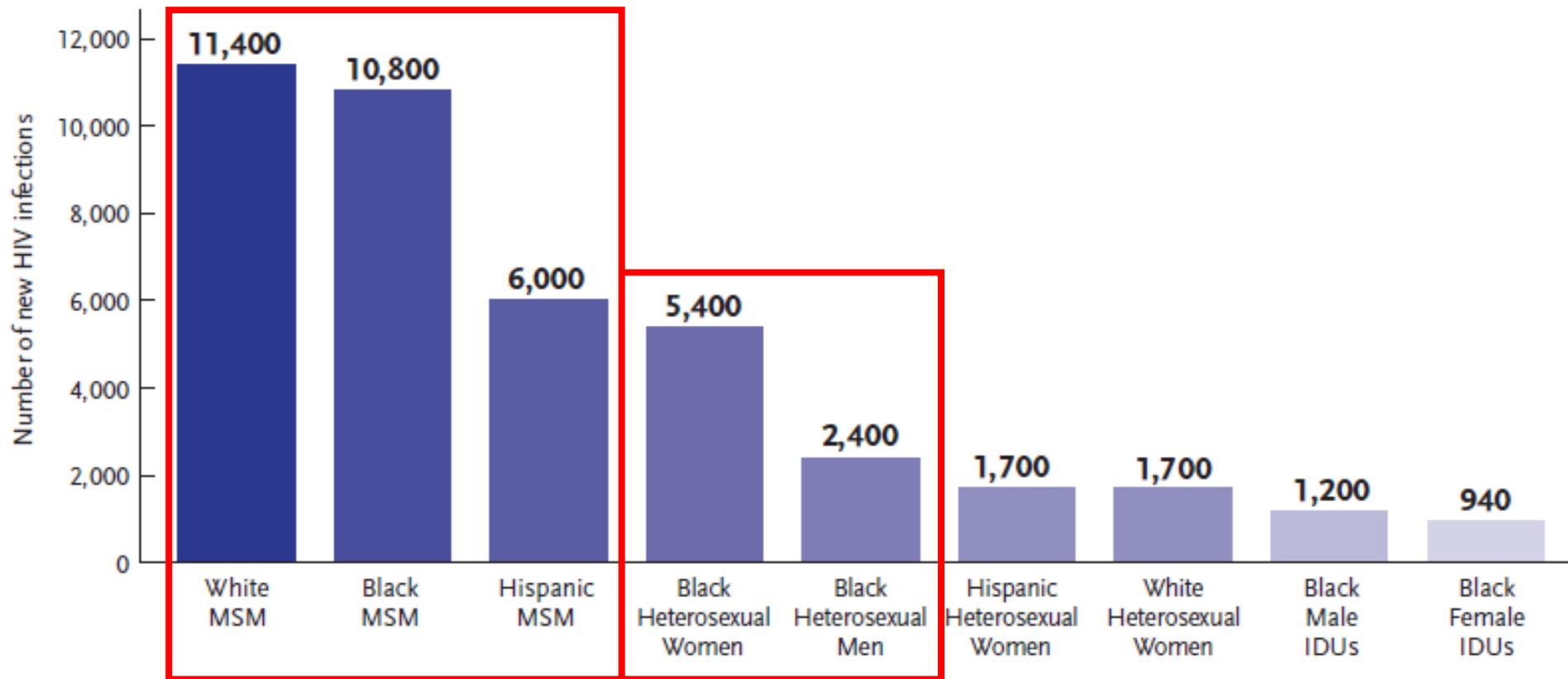
^a Heterosexual contact with a person known to have, or to be at high risk for, HIV infection.

^b Includes hemophilia, blood transfusion, perinatal exposure, and risk-factor not reported or identified.



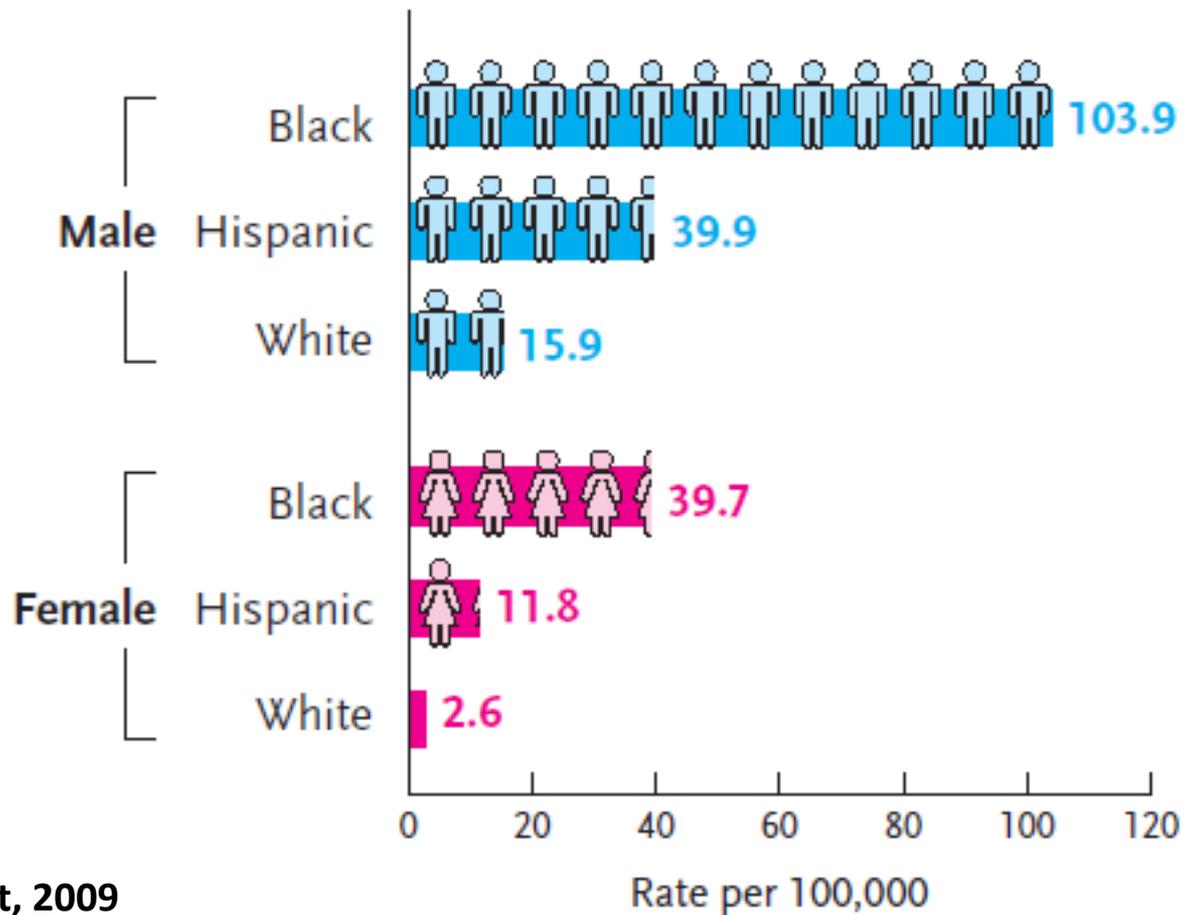
MSM and Black heterosexuals account for most new HIV infections

Figure 1: Estimated New HIV Infections in the U.S., 2009, for the Most-Affected Subpopulations

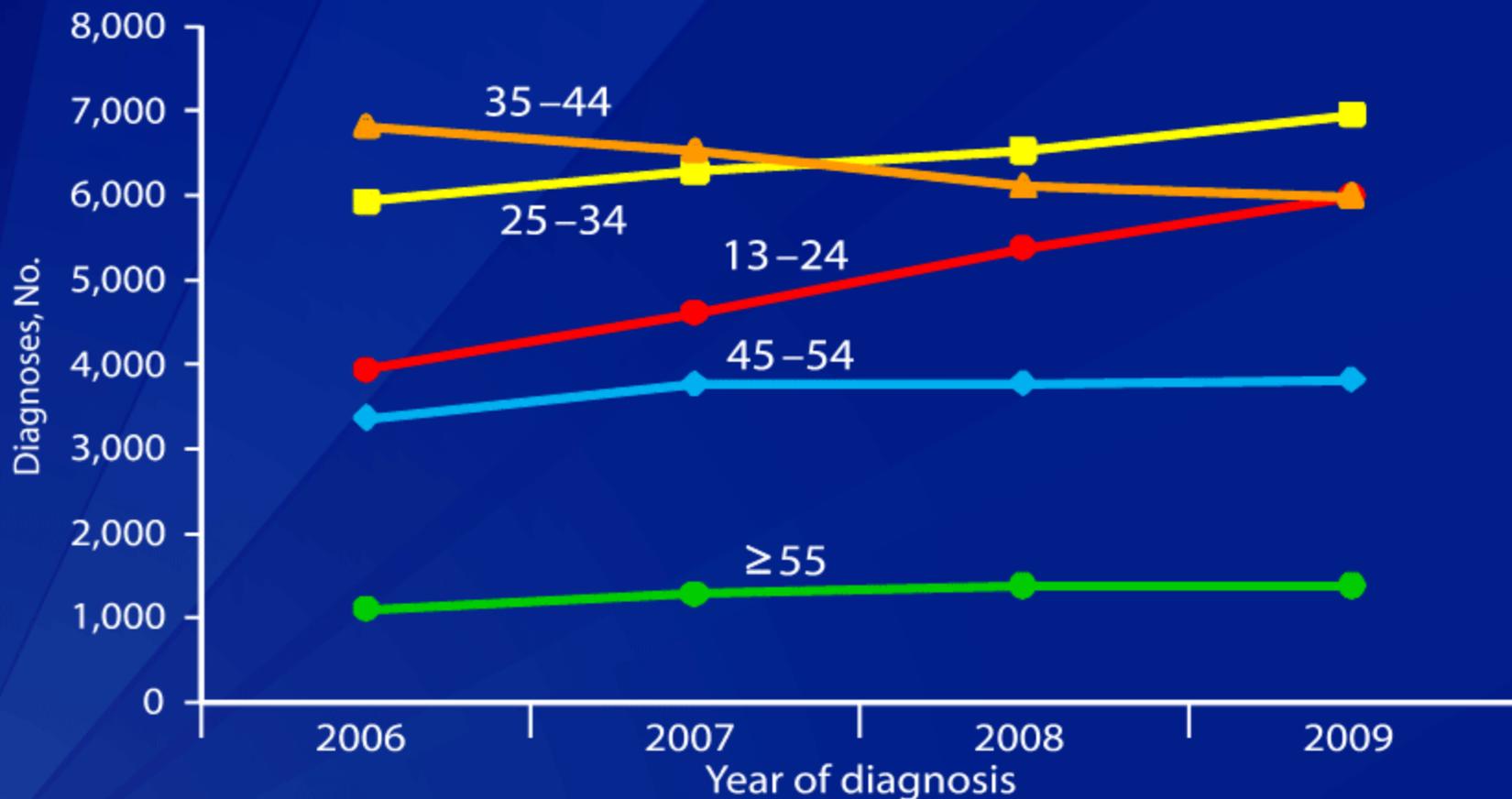


Racial disparities in new HIV infections

Figure 7: Estimated Rate of New HIV Infections, 2009, by Gender and Race/Ethnicity



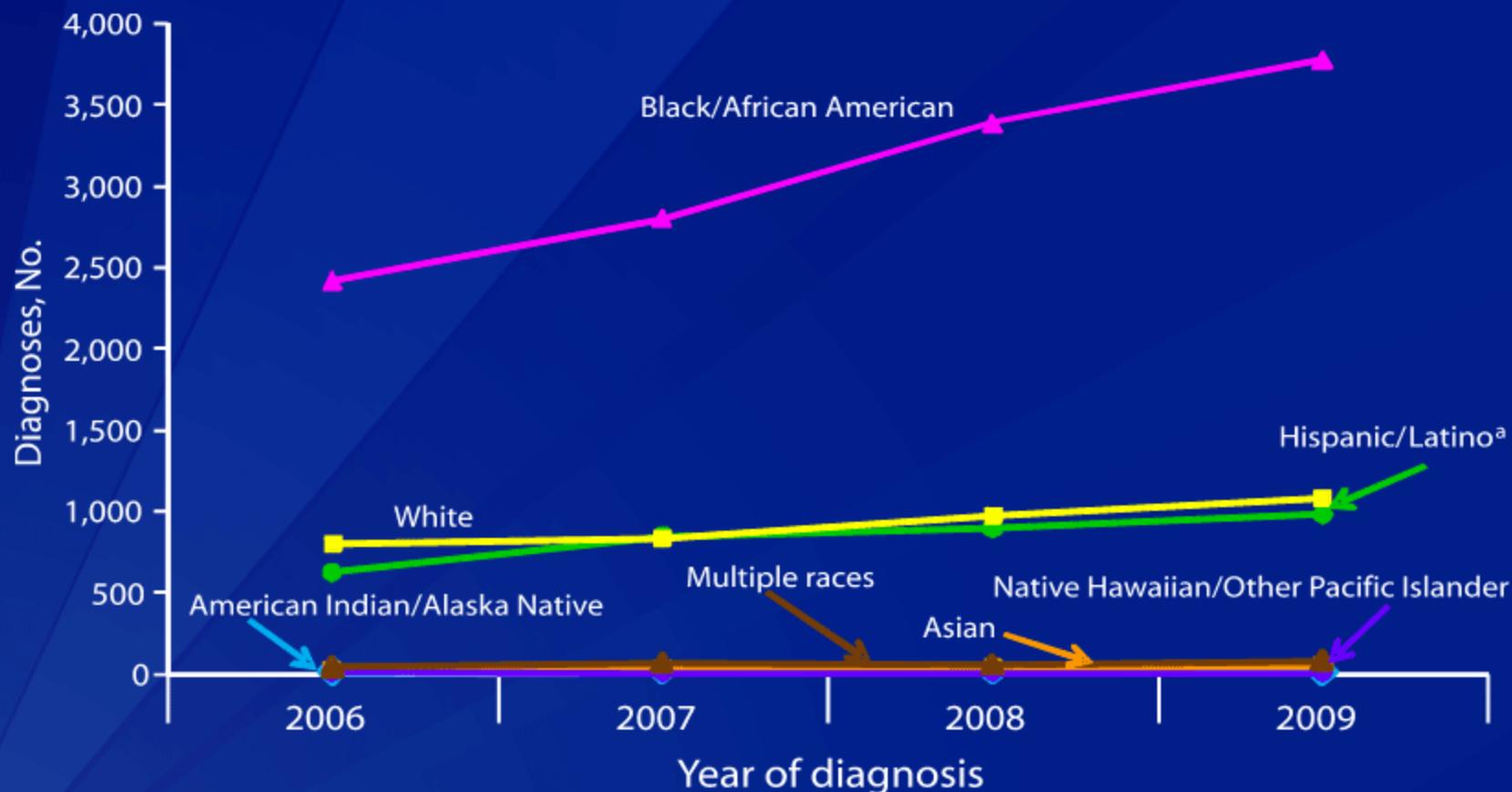
Diagnoses of HIV Infection among Men Who Have Sex with Men, by Age Group, 2006–2009—40 States and 5 U.S. Dependent Areas



Note. Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis. All displayed data have been statistically adjusted to account for reporting delays and missing risk-factor information, but not for incomplete reporting. Data exclude men who reported sexual contact with other men *and* injection drug use.



Diagnoses of HIV Infection among Men Who Have Sex with Men Aged 13–24 Years, by Race/Ethnicity, 2006–2009—40 States and 5 U.S. Dependent Areas



Note. Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis. All displayed data have been statistically adjusted to account for reporting delays and missing risk-factor information, but not for incomplete reporting. Data exclude men who reported sexual contact with other men and injection drug use.

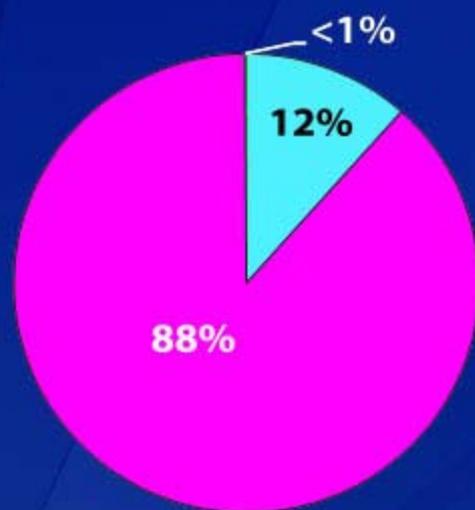
^aHispanics/Latinos can be of any race.



Diagnoses of HIV Infection among Adult and Adolescent Females, by Race/Ethnicity and Transmission Category, 2010—46 States and 5 U.S. Dependent Areas

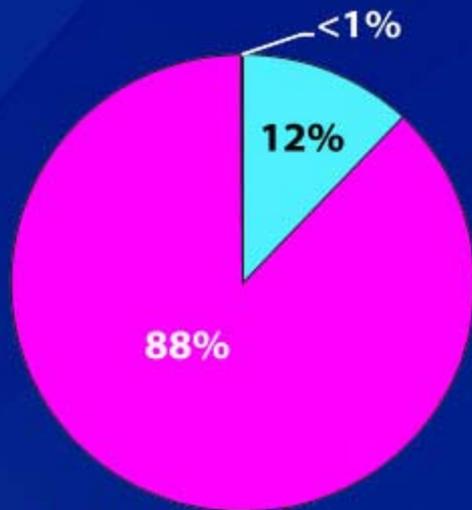
Black/African American

N=6,274



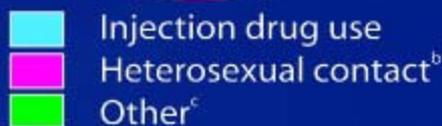
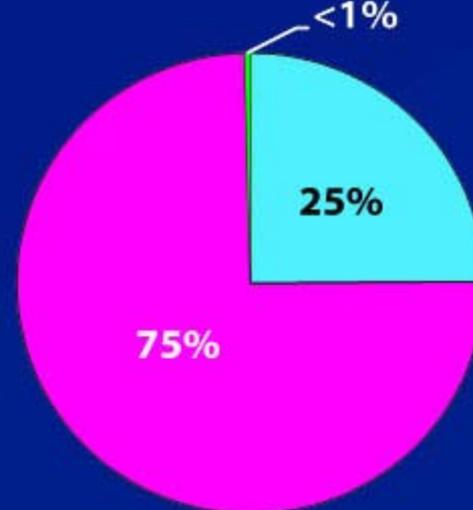
Hispanic/Latino^a

N=1,820



White

N=1,735



Note. Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis. All displayed data have been statistically adjusted to account for reporting delays and missing risk-factor information, but not for incomplete reporting.

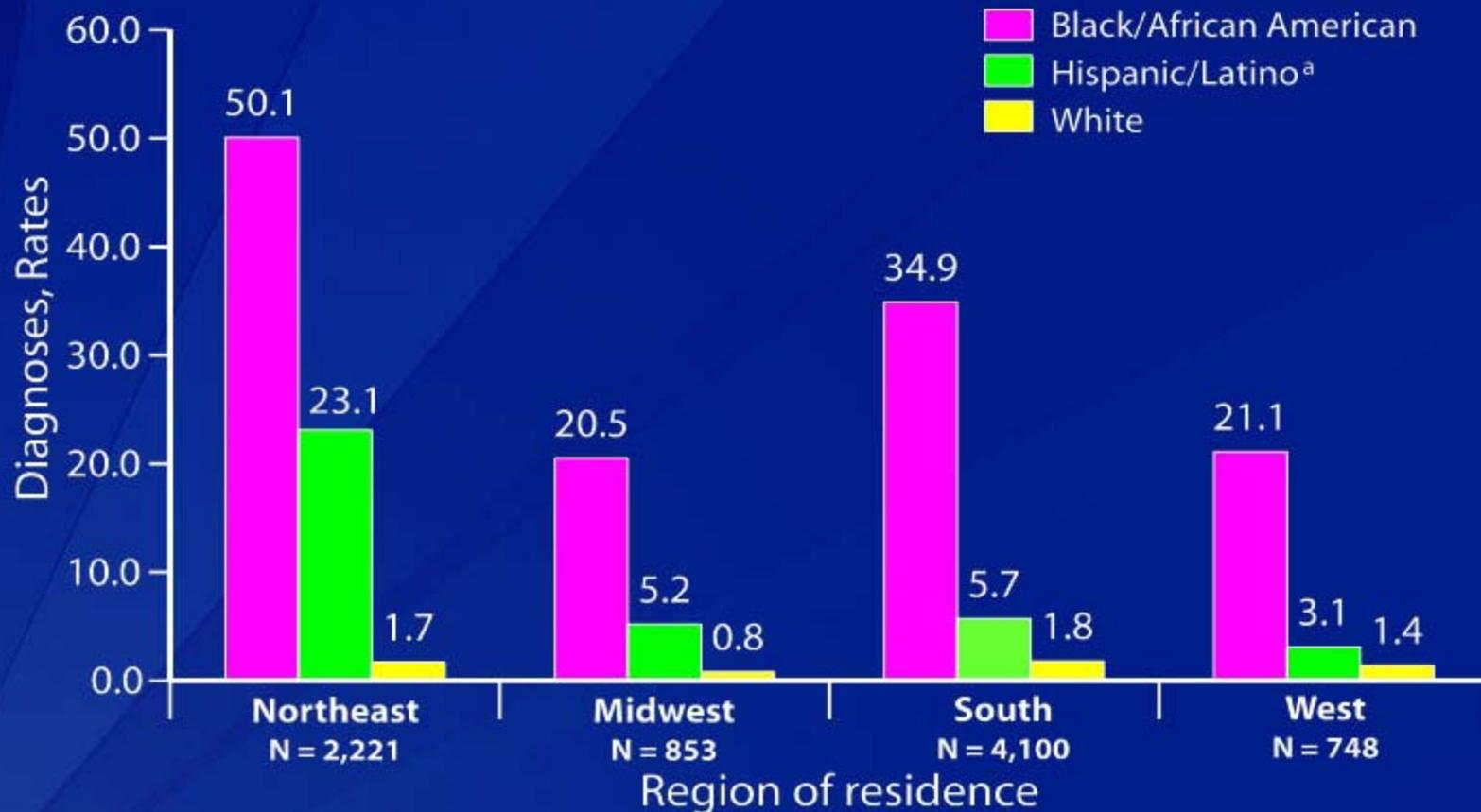
^a Hispanics/Latinos can be of any race.

^b Heterosexual contact with a person known to have, or to be at high risk for, HIV infection.

^c Includes blood transfusion, perinatal exposure, and risk factor not reported or not identified.



AIDS Diagnoses among Adult and Adolescent Females, by Region and Race/Ethnicity, 2010—United States



Note. All displayed data have been statistically adjusted to account for reporting delays, but not for incomplete reporting. Rates are per 100,000 population.

^a Hispanics/Latinos can be of any race.



Risk factors for HIV acquisition

Population Attributable Risk (PAR) in MSM

Explore: 4295 MSM in 6 US cities, 1999-2003

Variable	PAR	OR _{adj}	95% CI
4-9 male sex partners	32.5%	1.6	1.1-2.4
≥ 10 male sex partners		1.8	1.2-2.7
Use of alcohol or drugs before sex	28.5%	1.6	1.1-2.3
Unprot receptive anal sex w/ unknown sero	28.2%	2.8	2.1-3.8
Unprot receptive anal sex w/ HIV negative	21.6%	1.9	1.4-2.7
Unprot receptive anal sex w/ HIV positive	18.2%	3.4	2.2-5.1
Depression	16.7%	1.5	1.1-1.9
Speed	15.9%	1.9	1.4-2.6
Unprot insertive anal sex w/ HIV positive	8.6%	1.6	1.0-2.4
Heavy alcohol use	5.7%	1.9	1.2-2.8
Self-reported gonorrhea	4.3%	2.5	1.5-4.2

What drives infections in heterosexuals?

- Low SES
 - Poverty
 - Less than high school education
 - Unemployment
- Mixing patterns
 - M:F ratios, incarceration associated with more sex partners
 - Concurrency
 - Sexual networks
- Individual-level
 - STDs
 - Drug use

Condom challenges

- Condom failure (breakage/slippage)
 - 1-2% for vaginal sex
 - Higher with anal sex, substance use, inexperience, no/wrong lubricant
- Sexual function
 - 10-30% men report erectile dysfunction with condoms
- Intimacy
 - Many studies suggest lower rates of condom use in main partnerships
- Desire for pregnancy
 - Estimated 140,000 serodiscordant couples in US desire pregnancy
 - Potential exposure when man is HIV+

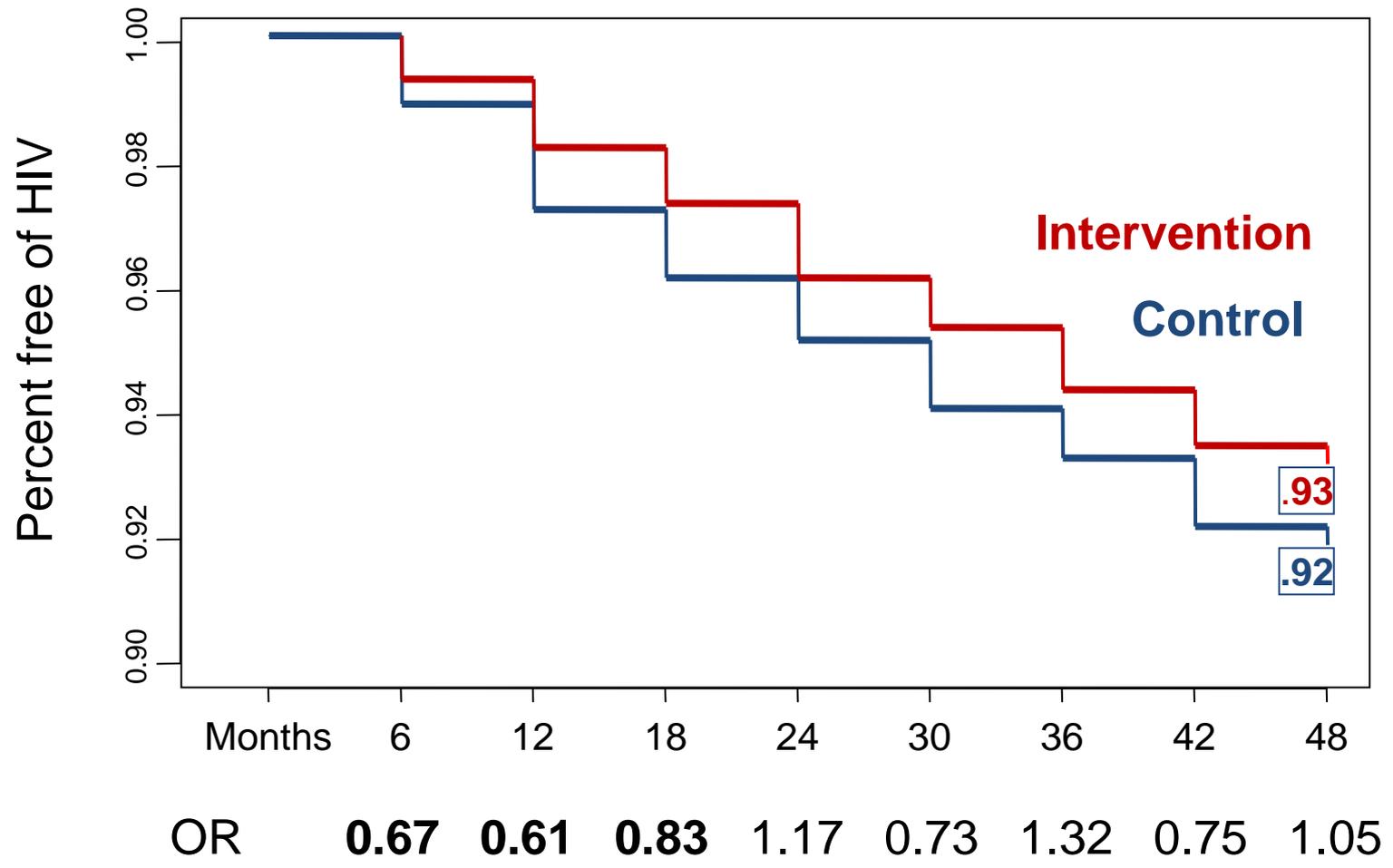
Behavioral interventions and risk compensation

The evolution of testing and counseling?

- **Project RESPECT: 2 vs. 4 counseling sessions [1993-5]**
 - Counseling better than education alone
 - No difference between 2 vs. 4 sessions
- **RESPECT-2: Rapid vs. standard testing [1999-2000]**
 - More people got test results with rapid
 - No difference in STDs or behavior
 - No benefit from a booster counseling session
- **CTN 0032: Rapid testing with vs. without counseling [2009]**
 - No difference in behavior in IDU
 - Project AWARE – STD clinic pts, results available soon

No efficacy of MSM behavioral intervention

EXPLORE: 10 sessions vs. standard counseling



Other behavioral interventions

- No others with an HIV incidence endpoint
- Among individual-level interventions for HIV negatives:
 - Modest reductions in self-reported risk behavior
 - EXPLORE also demonstrated reductions in self-reported risk without impact on HIV incidence
 - Most had short follow-up and/or difficulty with retention
- Couples interventions can increase HIV testing, med adherence

Does “risk compensation” occur?

- Many studies demonstrate risk declines among participants enrolled in prevention studies
 - May be multiple reasons including regression to mean, loss of riskiest participants, other cohort effects
- CDC US MSM PrEP study
 - No difference between men randomized to immediate vs. delayed PrEP
 - But, placebo controlled, not known if efficacious at time of study
- In “real world” setting, mixed results (e.g., male circumcision)
 - Some subpopulations with decreased risk, some with increased risk

Risk compensation unrelated to sexual activity

	iPrEx
Intervention	FTC/TDF daily
Primary outcome	HIV
Population	Men aged 18-67 (N=2499)
Risk factor	MSM behavior
Frequency of outcome in placebo arm	4% per year
Relative risk reduction	44% (95% CI 15-63)

Risk compensation unrelated to sexual activity

	iPrEx	WOSCOPS
Intervention	FTC/TDF daily	Pravastatin daily
Primary outcome	HIV	MI
Population	Men aged 18-67 (N=2499)	Men aged 45-65 (N=6595)
Risk factor	MSM behavior	High cholesterol
Frequency of outcome in placebo arm	4% per year	1.6% per year
Relative risk reduction	44% (95% CI 15-63)	31% (95% CI 17-43)

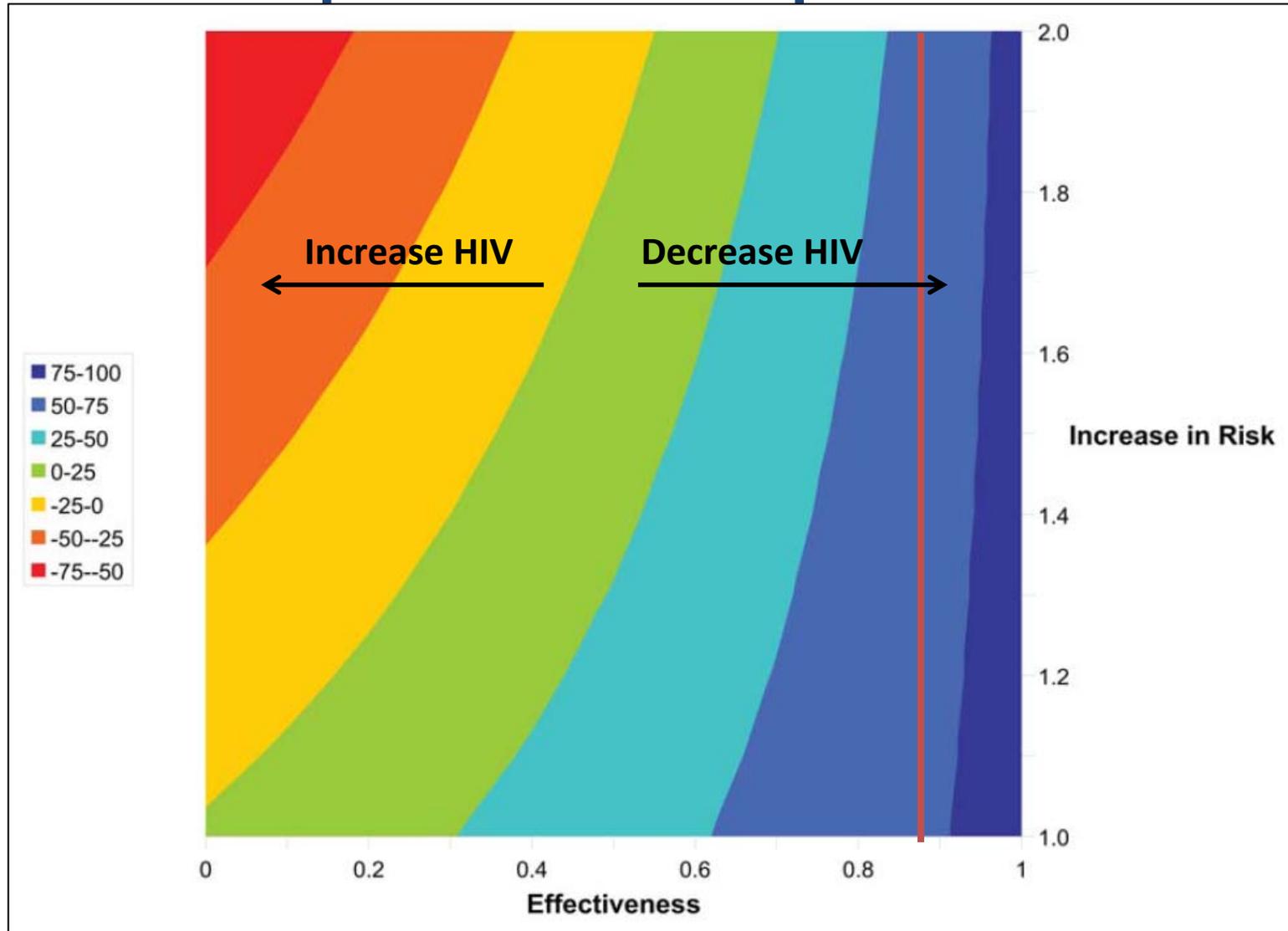
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Frequency of outcome in placebo arm	4% per year	1.6% per year
Relative risk reduction	44% (95% CI 15-63)	31% (95% CI 17-43)
Number of articles on risk compensation	>100	1

iPrEx: Grant, N Engl J Med 2010

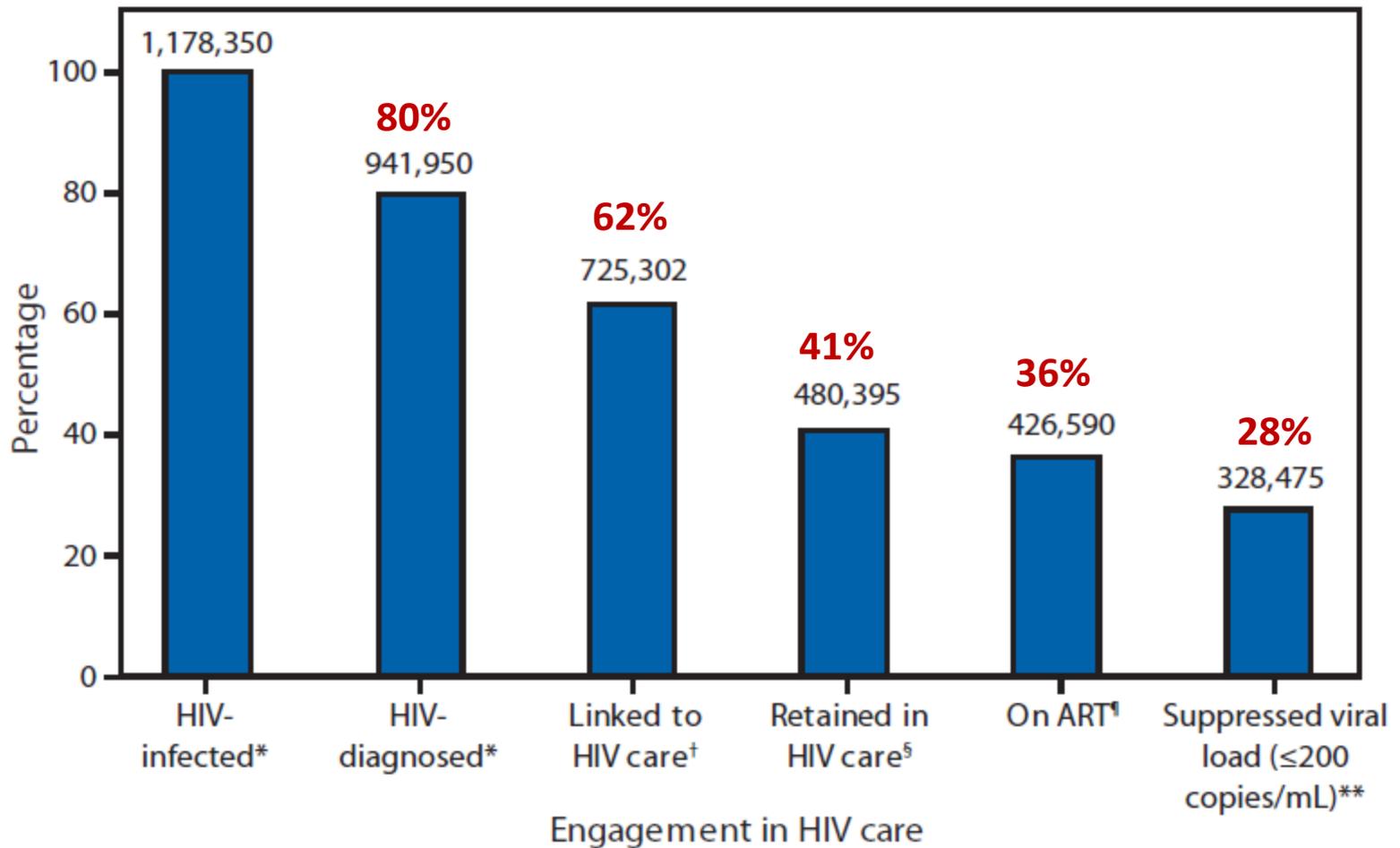
WOSCOPS: Shepherd, N Engl J Med 1995

Degree of effectiveness influences the population impact of risk compensation

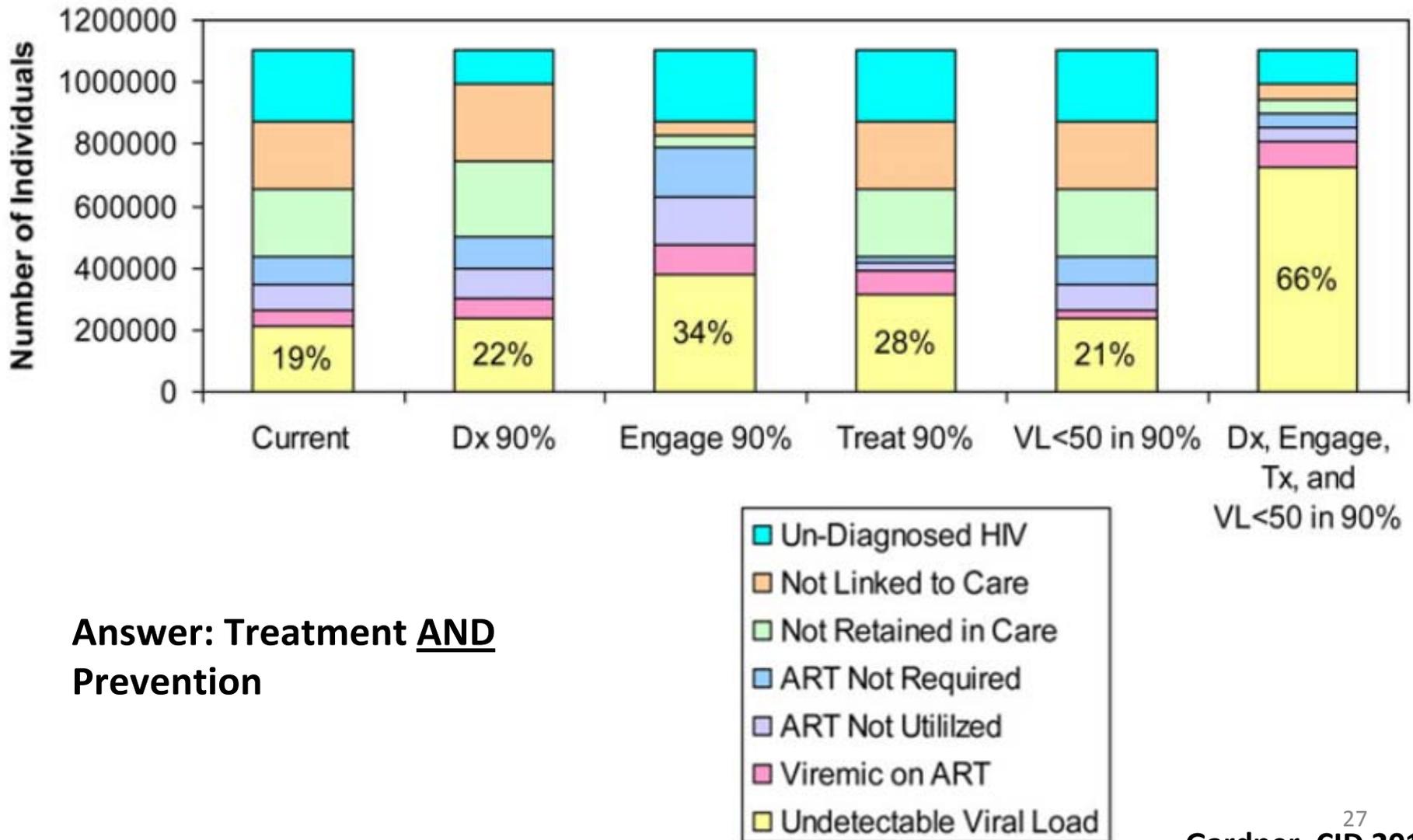


Treatment or Prevention?

HIV Treatment Cascade in US



What will it take to substantially reduce HIV transmission in an entire population?



Answer: Treatment AND Prevention

Conclusions

- In US, populations at greatest risk are MSM (esp young men of color) and low SES heterosexuals (esp Black)
- Risk driven by structural factors, as well as individual behaviors
- Risk compensation may occur in subsets of persons; likely impact of PrEP on behaviors not yet known
- Individual-level behavioral interventions inadequate
- Need treatment and new prevention to have major impact on US epidemic