CENTER FOR AIDS RESEARCH
JOHNS HOPKINS UNIVERSITY

The Global Epidemics of HIV among Men Who Have Sex with Men: Time for Action

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Outline

- Burden and risk of HIV among MSM
- Stochastic Modeling
- Black MSM: Health Disparities and HIV
- Responses—Prevention and Care
- Sexual Minorities and Human Rights

Burden of HIV among men who have sex with men

Key Themes

- **Expanding globally** in 2012 in high and low income countries
- **Marked by** high HIV burdens among young men, rapid spread and clustering within networks , high frequency of dual and multiple transmitted variants
- **Driven by** high per-act and per-partner HIV transmission probability, sex role versatility, network and structural level risks

Methods

- Comprehensive reviews of HIV among MSM from 2007-2011
- Systematic review of the molecular epidemiology of HIV-1 among MSM
- Modeled dynamics of transmission and prevention impacts using an agent-based stochastic approach

Global HIV prevalence of HIV in MSM compared with regional adult prevalence in 2011

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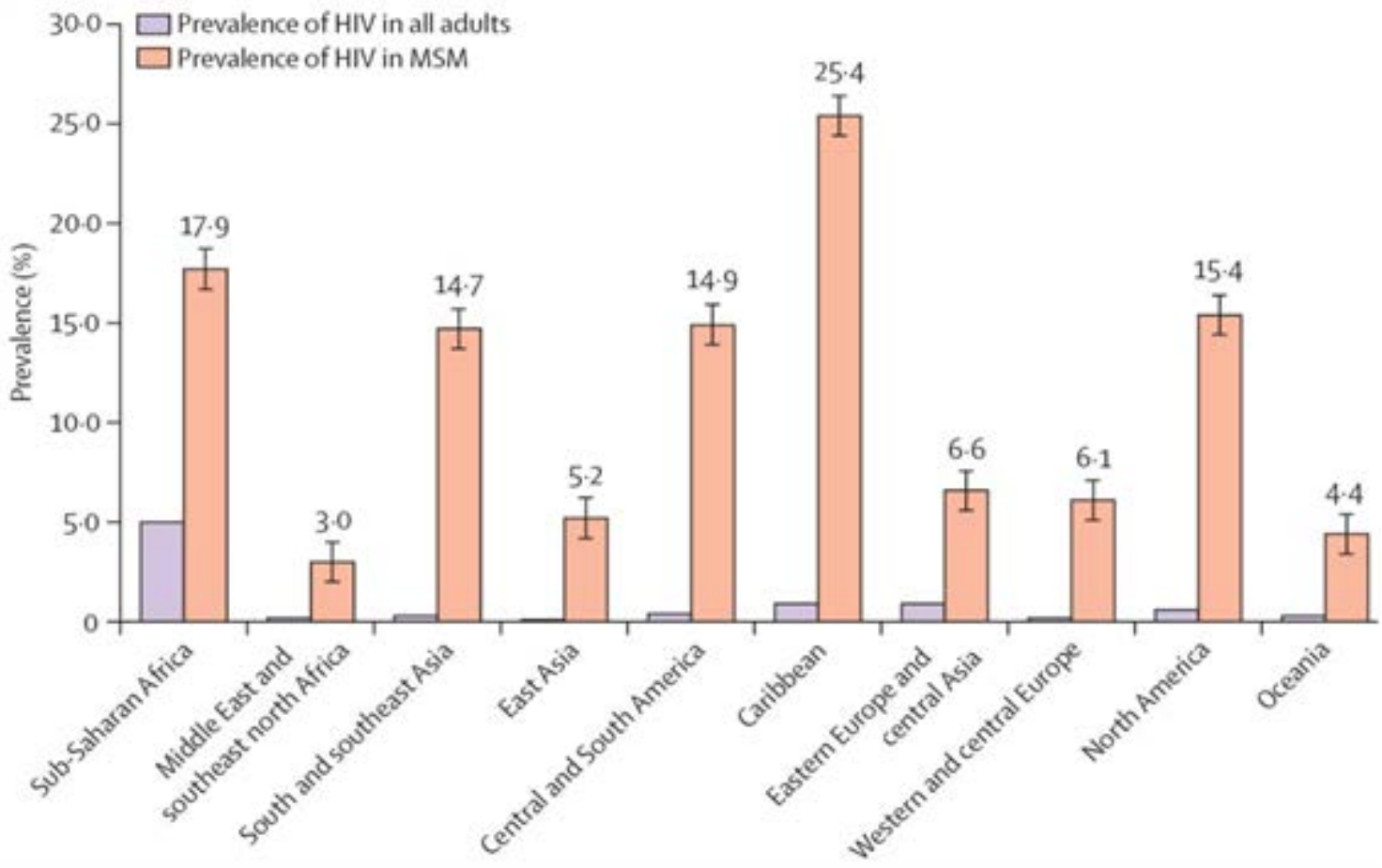

Source: Beyrer, Baral, van Griensven, Goodreau, Chariyalertsak, Wirtz, Brookmeyer, *The Lancet,* 2012

Global HIV prevalence among MSM, 2007-2011

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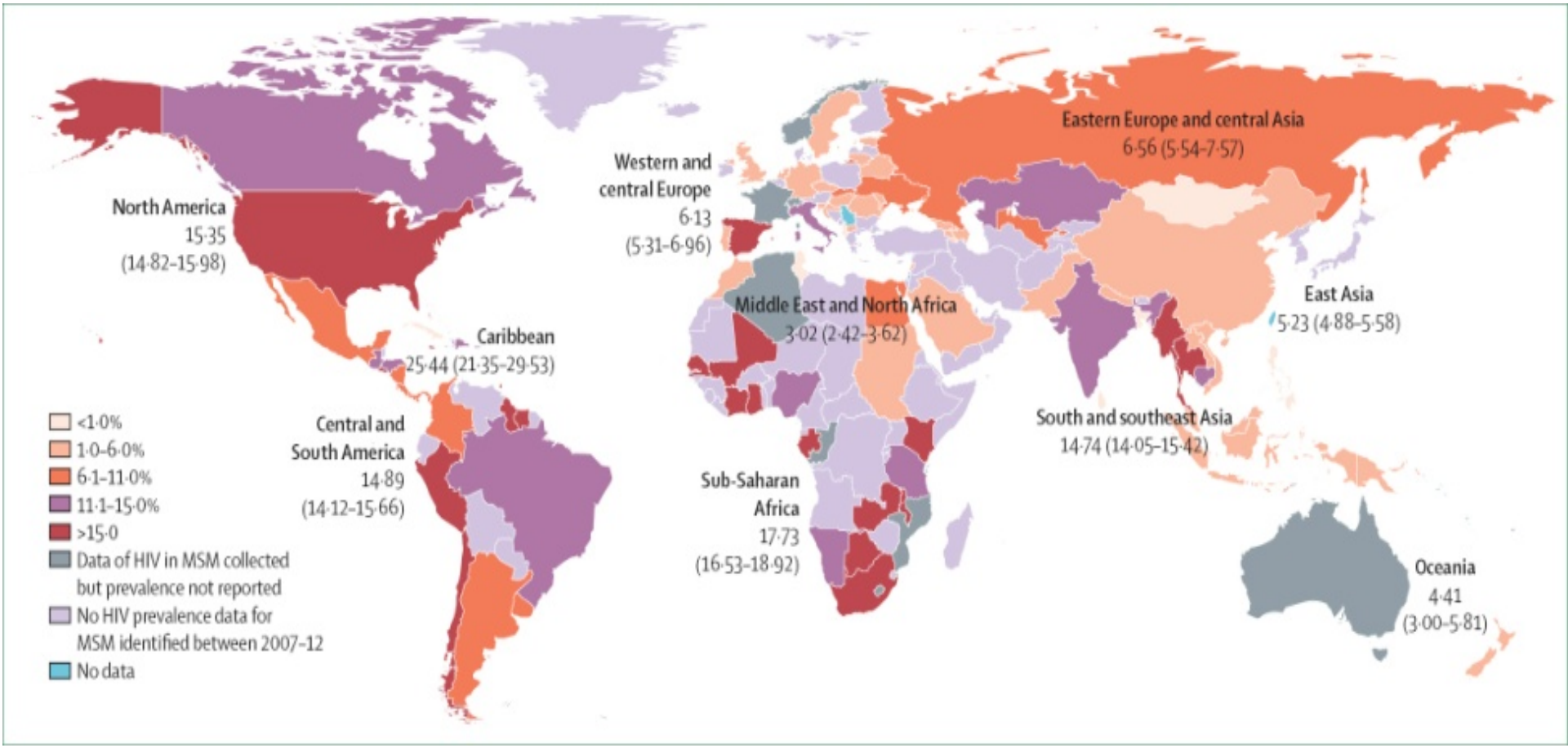

Source: Beyrer, Baral, van Griensven, Goodreau, Chariyalertsak, Wirtz, Brookmeyer, *The Lancet,* 2012

HIV incidence among MSM, 1995-2011

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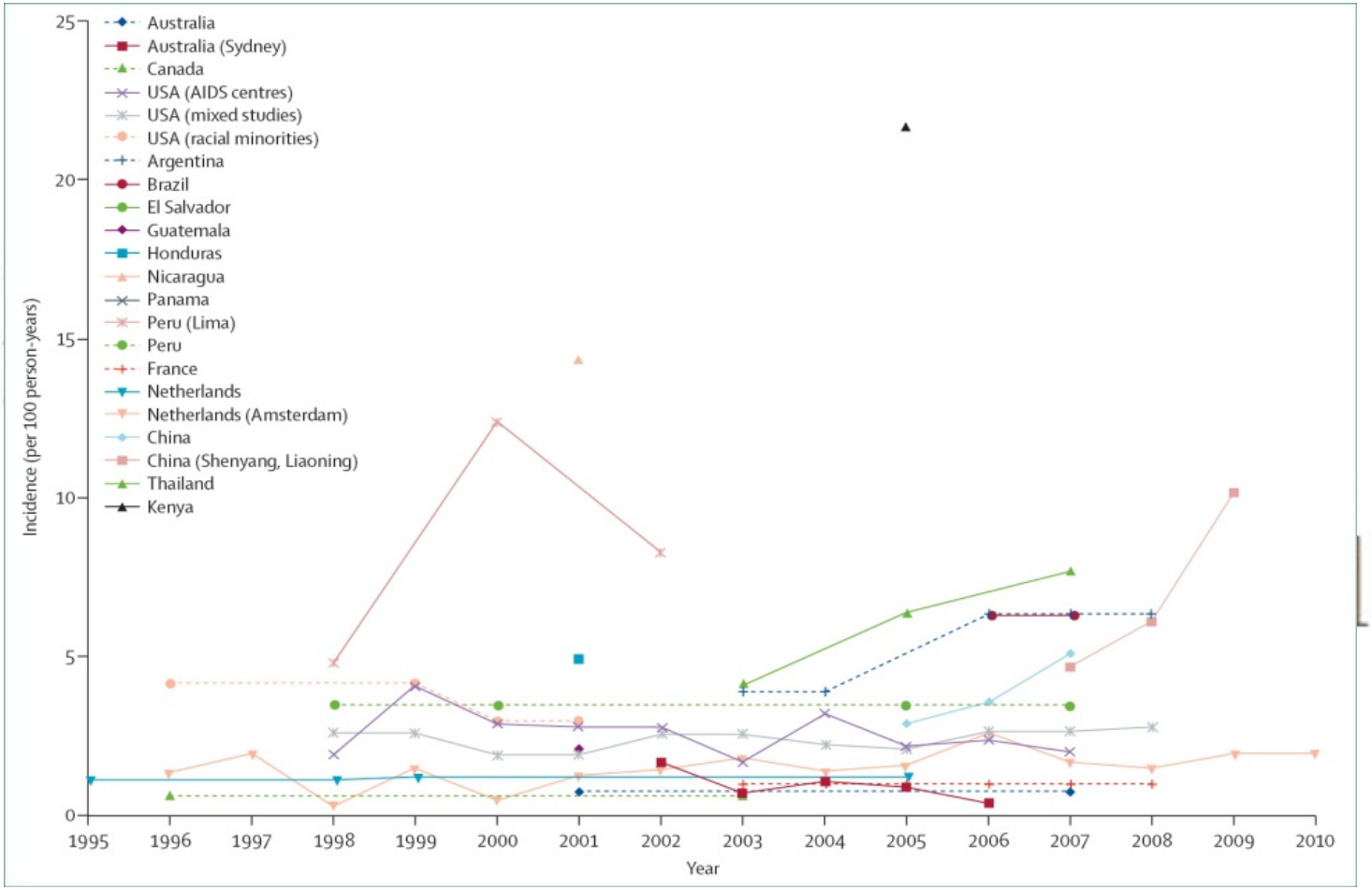

Source: Beyrer, Baral, van Griensven, Goodreau, Chariyalertsak, Wirtz, Brookmeyer, *The Lancet,* 2012

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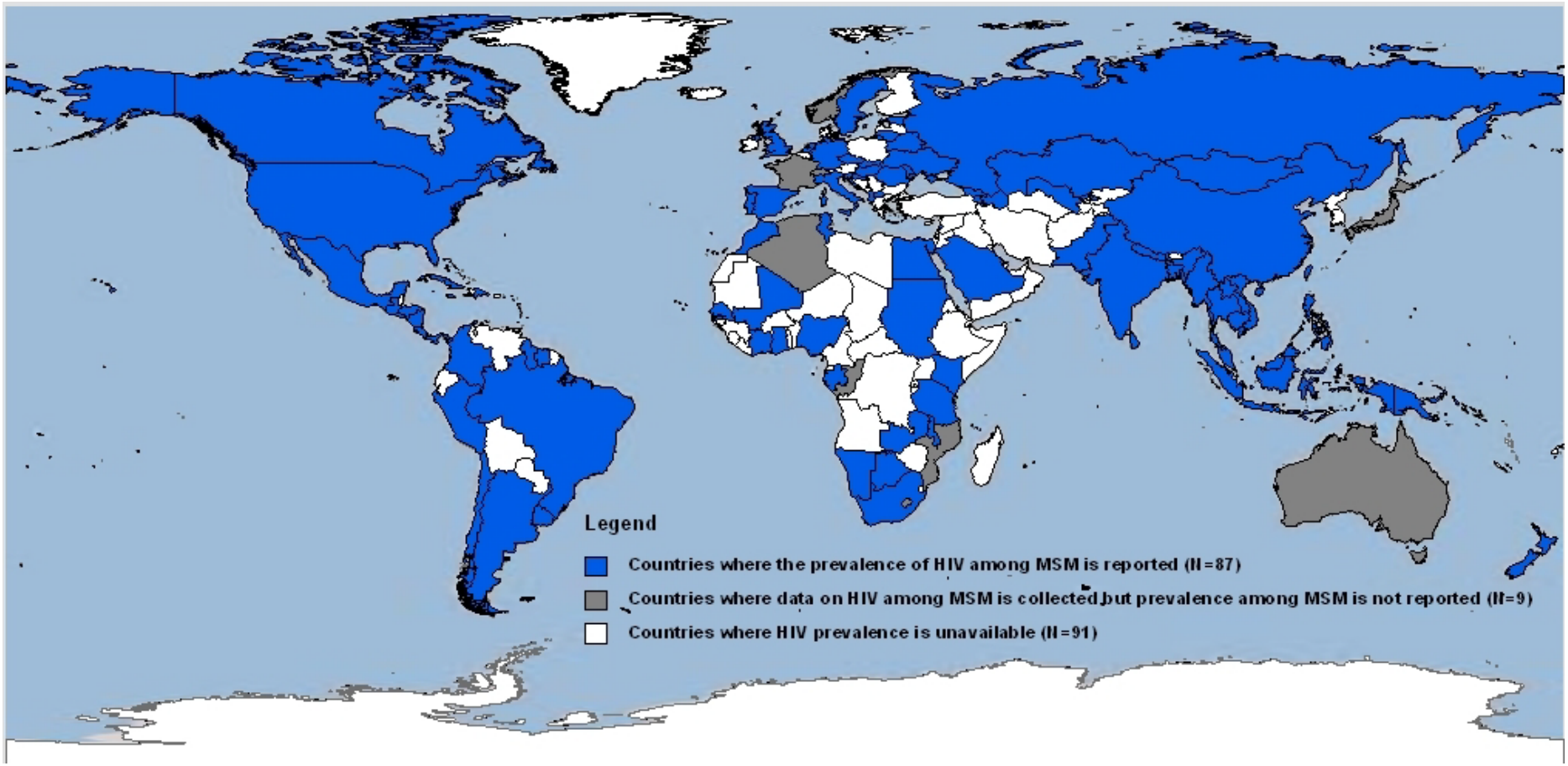
Global surveillance of HIV in MSM, through 2011



Risks for Infection among MSM

- Individual level risks
  - Well described but insufficient to explain epidemics of HIV among MSM
- Network level risks
  - Increased size and lower density networks are associated with HIV in China, Australia, and among racial minority MSM in USA, UK
- Structural risks
  - Emerging data of relationship with HIV for criminalization, stigma, enacted discrimination in health care settings including blackmail with fear of disclosure

Biological Factors driving HIV Transmission

- Per act transmission probability of HIV in anal sex
  - **1·4% per-act (95% CI 0·2–2·5)**
    - 18-fold greater per act probability for HIV in anal sex than in vaginal sex
  - 40·4% per-partner probability (6·0–74·9)
- Sex role versatility with sex between men
  - both insertive and receptive in anal sex increases efficiency of HIV transmission in MSM networks

Modeling Infectivity of HIV among MSM with agent-based stochastic simulation

Modeling Infectivity with agent-based stochastic simulation

- Counterfactual experiment
  - If anal sex were as infectious as vaginal sex, all other things being equal, how much smaller would the HIV epidemic be in specific populations of MSM?

Modeling Infectivity using agent-based stochastic modeling

- Model drivers
  - High per-act transmission rate for anal sex relative to vaginal sex;
  - Unique ability for MSM to be role versatile during sex,
  - Existence of high numbers of partners within a subset of MSM
- Country-specific inputs
  - Demographics, circumcision prevalence , testing frequencies, ARV treatment levels
  - Sexual behaviors within main and casual partnerships
- Assumptions
  - N= 5000 MSM, HIV prevalence at start 15%
  - USA and Peru, 5 years incidence projection

Modeling Results for MSM in the USA and Peru

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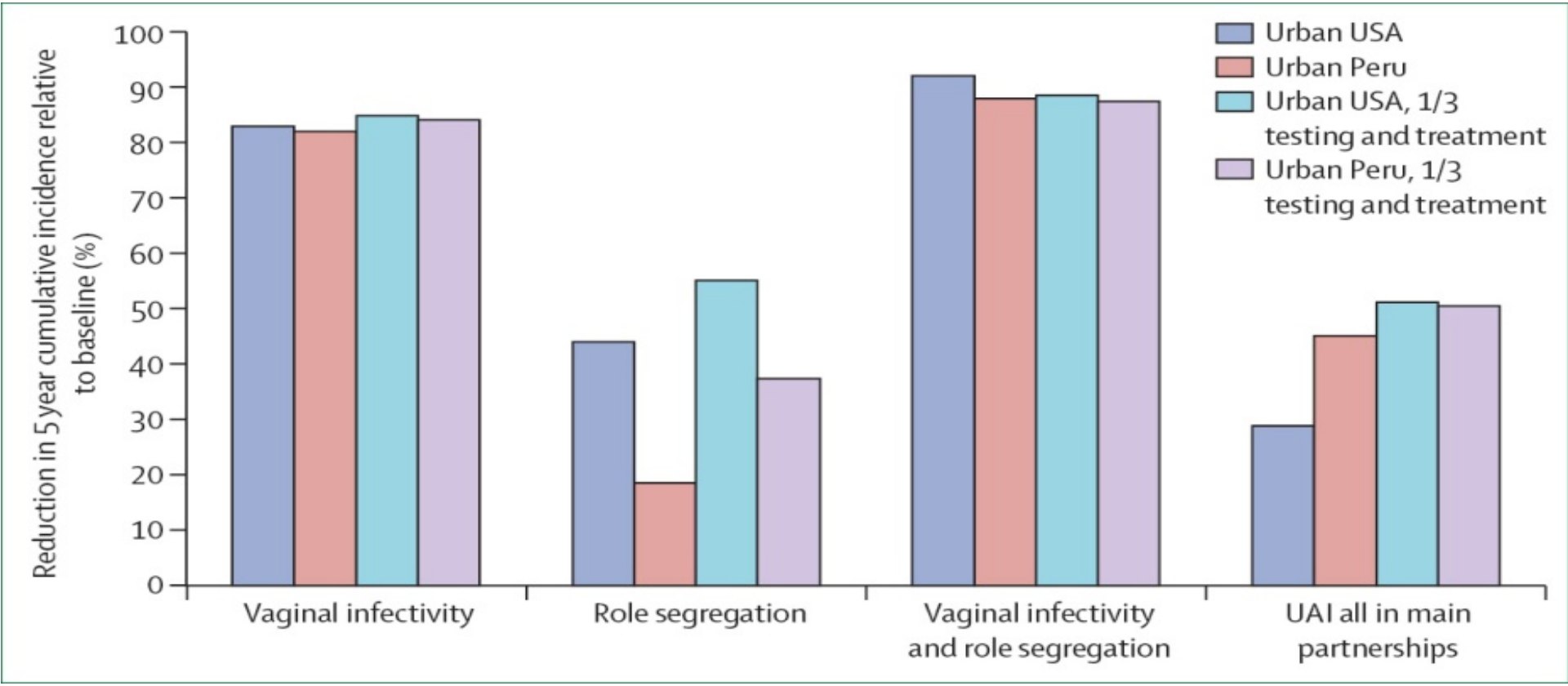

Source: Beyrer, Baral, van Griensven, Goodreau, Chariyalertsak, Wirtz, Brookmeyer, *The Lancet,* 2012

Results of Stochastic Modeling

- Transmission probabilities set to those of vaginal intercourse
  - The greatest reductions with swift reductions in **incidence by greater than 80%,** and in some scenarios by as much as 98%

- Role versatility
  - Predisposes MSM to large epidemics
  - Removing this practice so as to mimic a heterosexual population **reduced incidence by 19–55%**
- Reducing UAI in stable partnerships has impacts but cannot control MSM outbreaks, even with higher levels of treatment coverage

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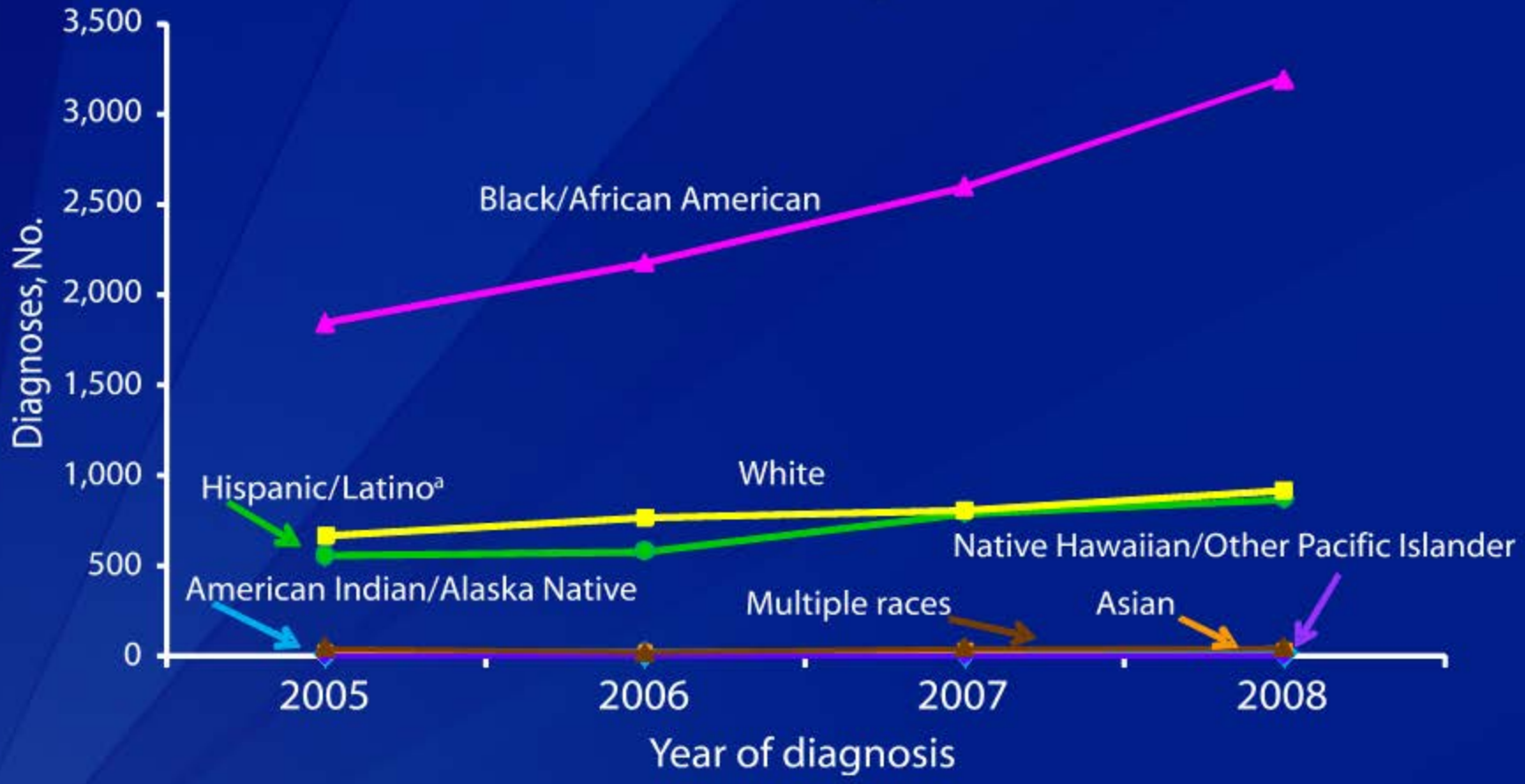
Black MSM and HIV-Related Disparities

Gregorio Millett
Centers for Disease Control and Prevention

Diagnoses of HIV Infection among Men Who Have Sex with Men Aged 13–24, by Race/Ethnicity, 2005–2008— 37 States and 5 U.S. Dependent Areas



Note. Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis. Data from 37 states and 5 U.S. dependent areas with confidential name-based HIV infection reporting since at least January 2005. All displayed data have been estimated. Estimated numbers resulted from statistical adjustment that accounted 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.

[a] Hispanics/Latinos can be of any race.

HIV Risk Behavior & HIV Infection
Black vs. Other MSM, U.S. & U.K.

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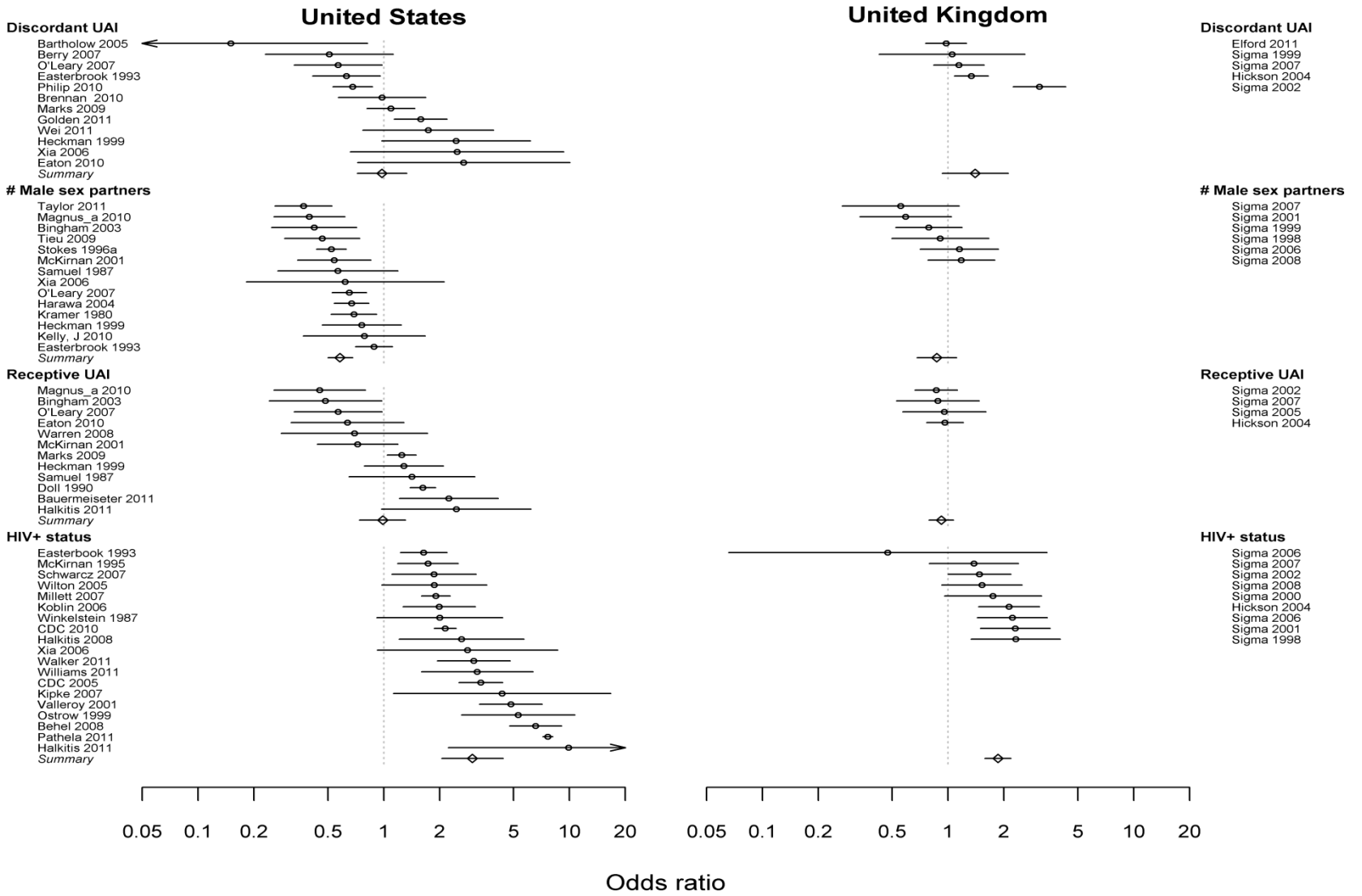

Structural-Level Experiences & Resiliency, U.S. Black MSM vs. Other MSM

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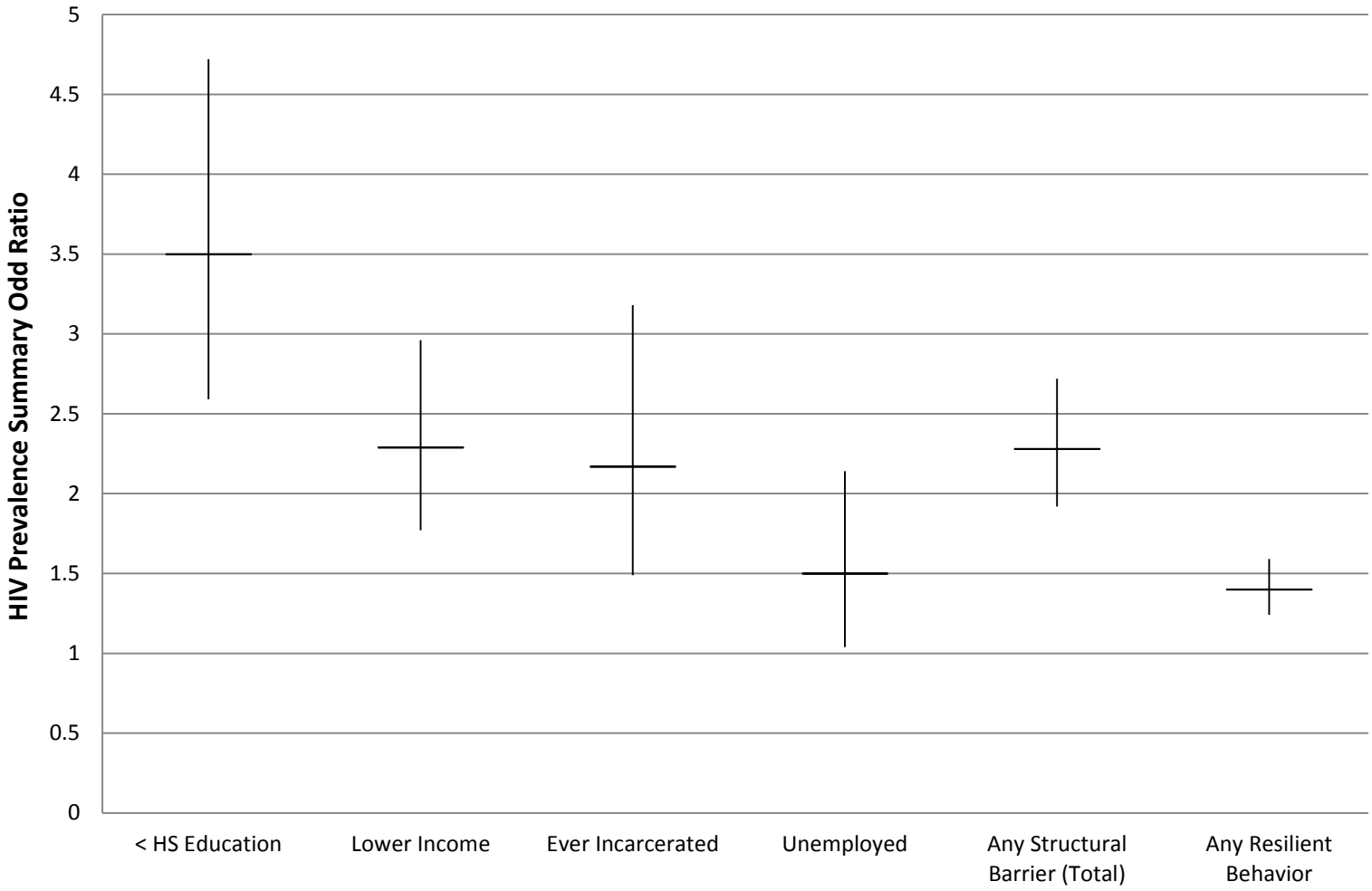
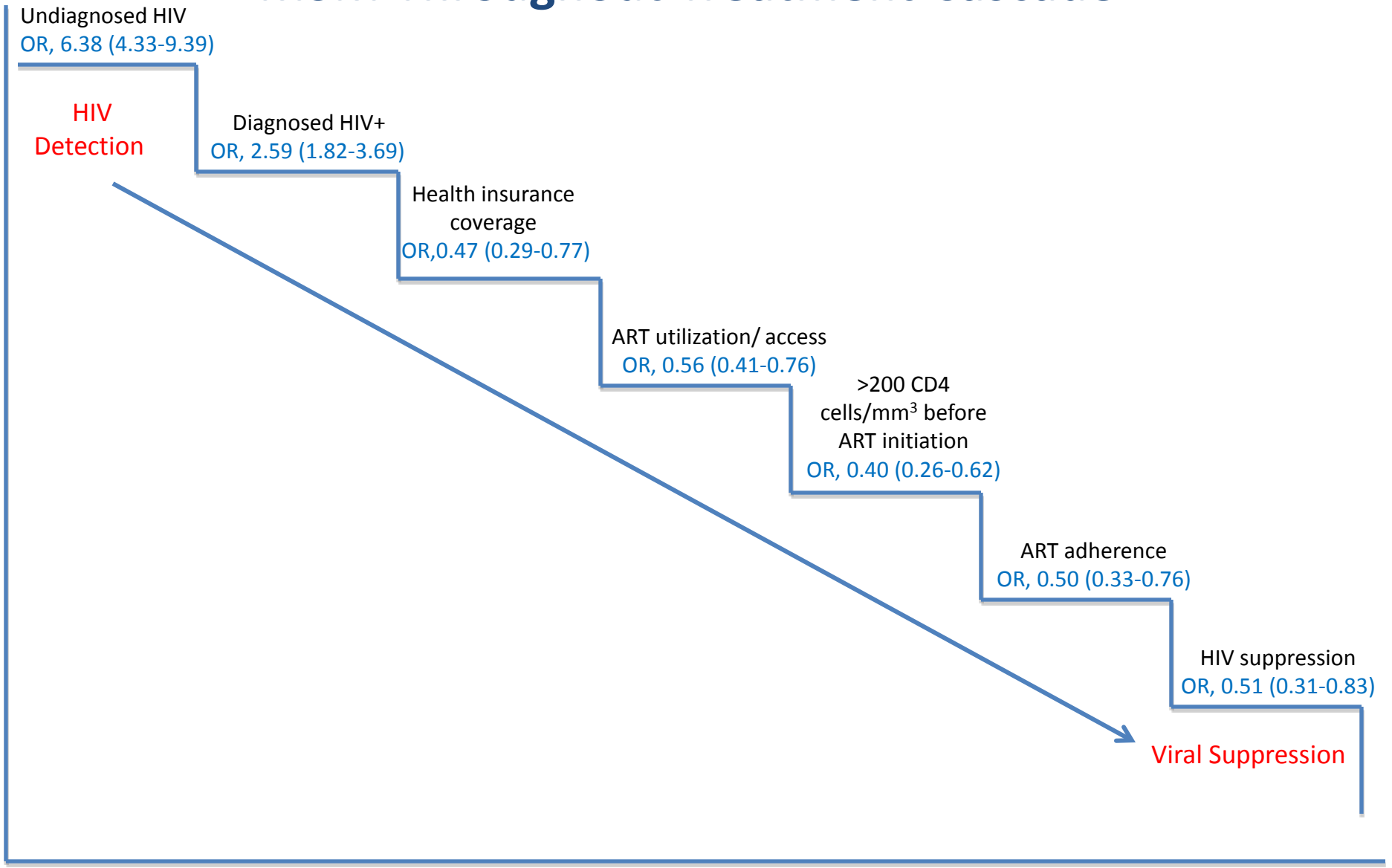
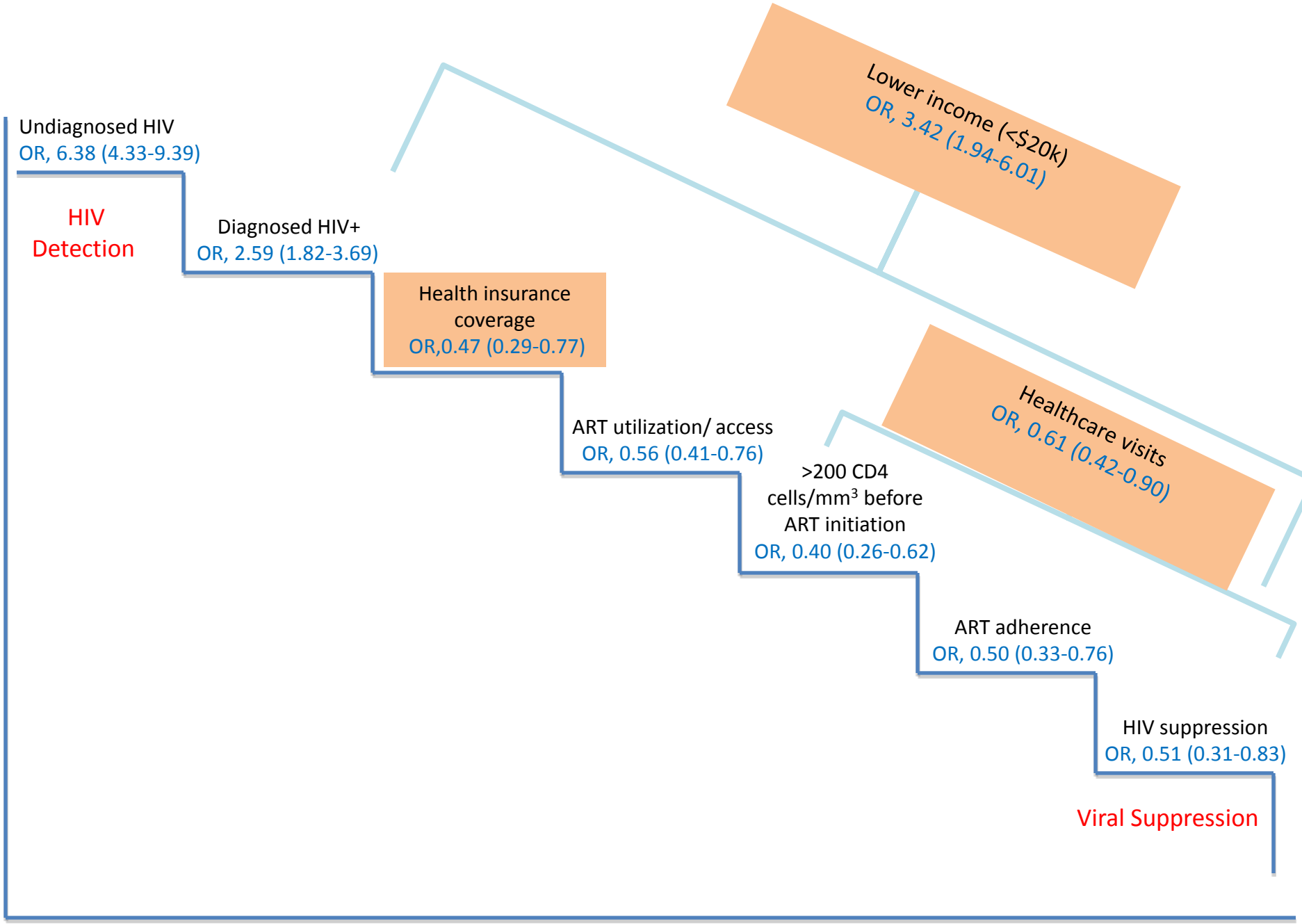


Disparities Persist Between Black and White MSM Throughout Treatment Cascade



(Millett, The Lancet, 2012)



(Millett, The Lancet, 2012)

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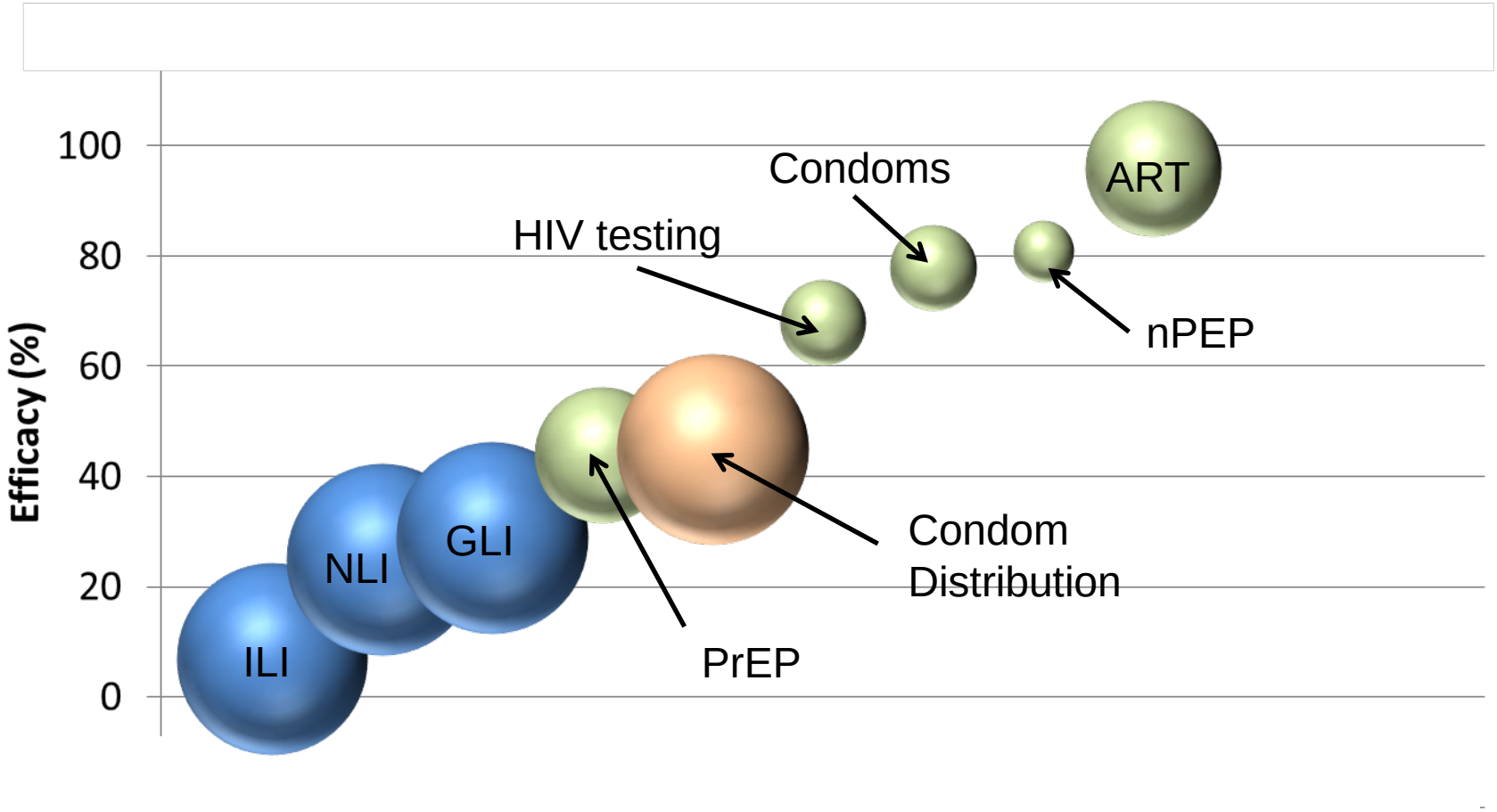
Successes and challenges of HIV prevention in MSM

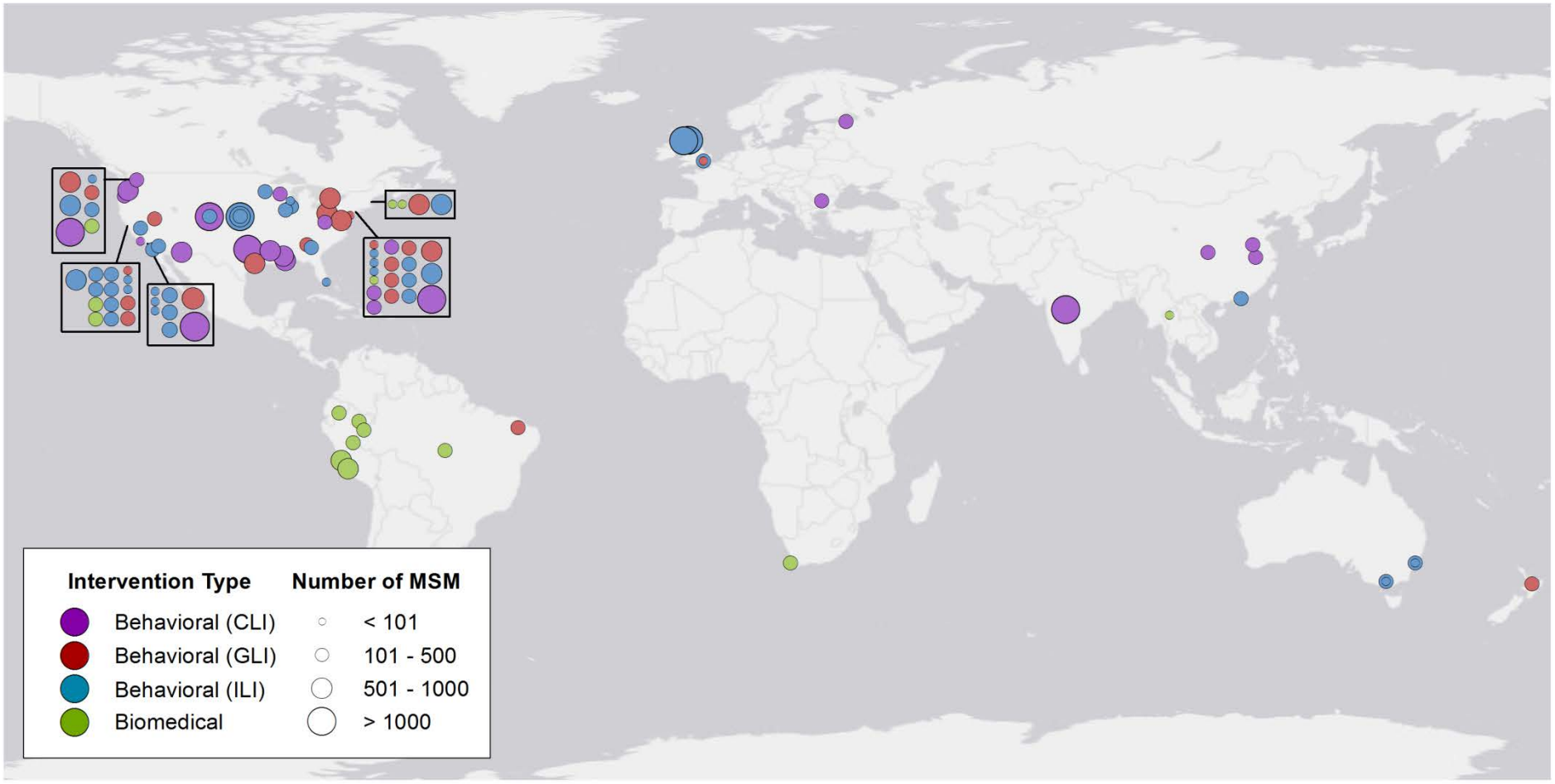
Patrick Sullivan

Interventions, Efficacy, and Evidence



ILI: Individual-level behavior change intervention; NLI: Network-level behavior change Intervention; GLI: Group level Behavior change intervention. Size of bubble is proportional to strength of evidence. Blue: Behavior change; Green: Biomedical; Orange: Structural

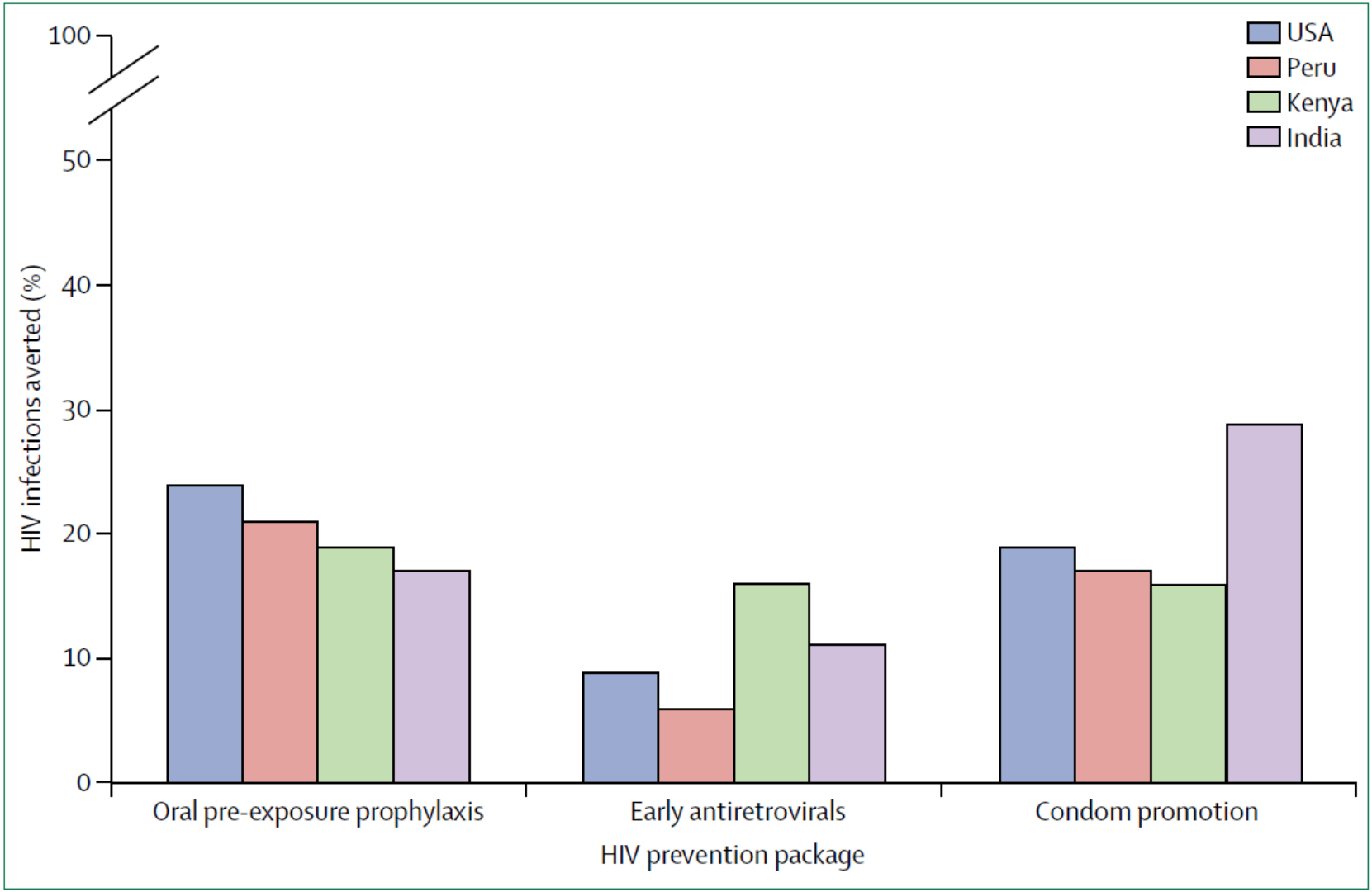
Where we know what we know



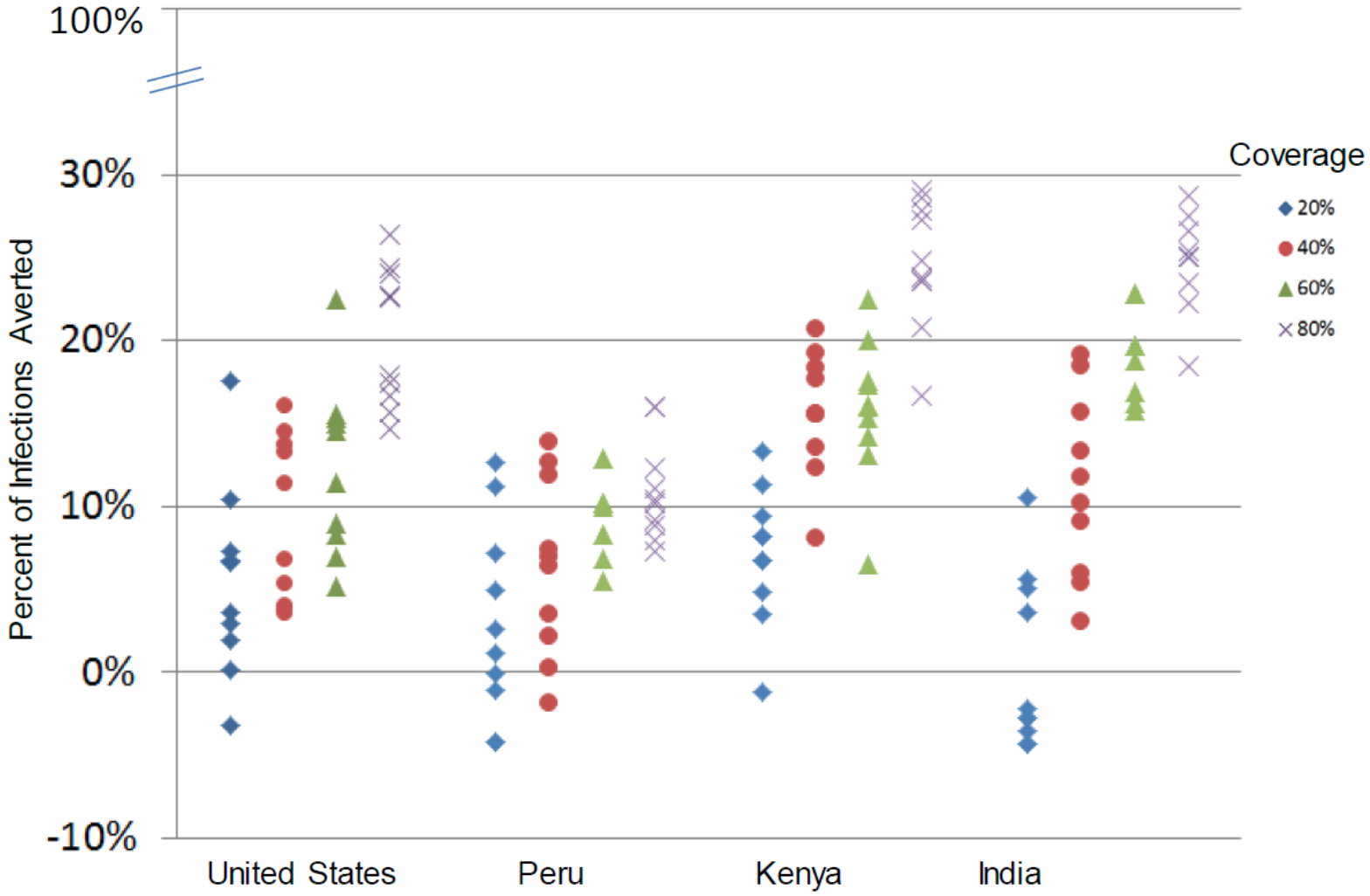
Modeling of Prevention Impact

- Agent-based, stochastic model
- Kenya, USA, Peru, India
- Country-specific parameterization and calibration
- Three prevention approaches/packages:
  - PrEP
  - Treatment of positives
  - Increased condom use
- Outcome: Proportion of infections averted after 10 years

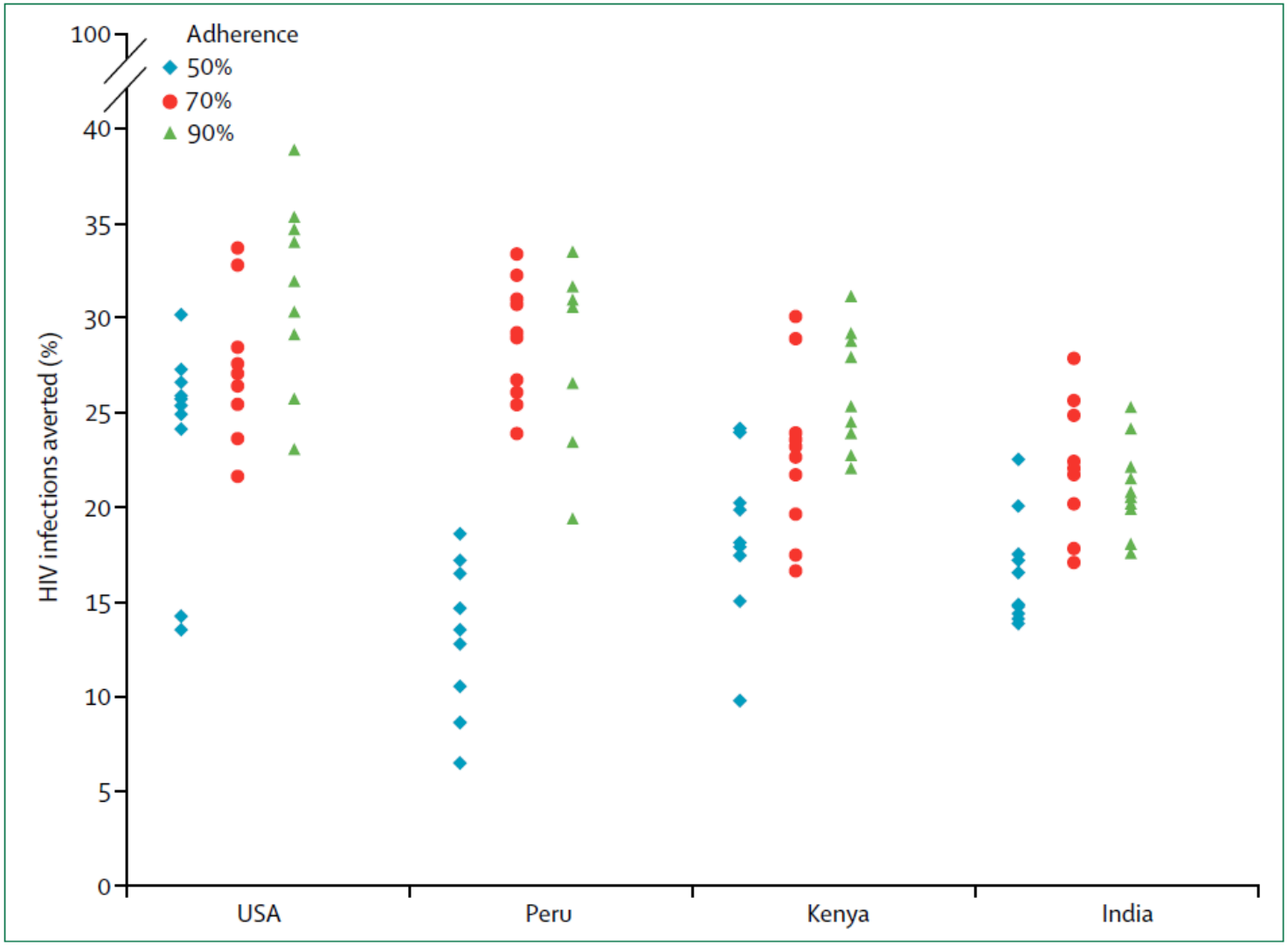
Estimated percent of new HIV infections among MSM prevented by three prevention approaches, four countries



Cumulative proportion of infections among MSM averted by early implementation of antiretroviral therapy for MSM living with HIV infection period at 4 levels of coverage in 4 countries



Estimated percent of new HIV infections among MSM prevented by oral PrEP at varying levels of adherence, four countries



Challenges to Preventing HIV in MSM

- Prejudice, threats and violence against (people thought to be) MSM
- Lack of training for health care workers
- Criminalization of same sex behavior
- Technical challenges to testing prevention packages

Univariate analysis of the associations between fear and experienced discrimination with sexual health and use of services among MSM in Malawi, Botswana, and Namibia.

Variable	Fear of Seeking Health Care OR (95% CI) P=	Denied Health Care Services OR (95% CI) P=	Blackmailed OR (95% CI) P=
Diagnosed with an STI	**2.4 (1.4-4.3)** <.05	**6.9 (3.0-15.6)** <.001	1.5 (0.8-2.7)
Treated for an STI	**2.8 (1.7-4.9)** <.001	**7.3 (3.3-16.2)** <.001	1.5 (0.8-2.6)
Received recommendation for an HIV test	1.9 (1.2-3.0) <.05	2.2 (0.98-4.8)	**1.8 (1.1-2.8)** <.05
Ever tested for HIV	1.1 (0.7-1.7)	1.6 (0.7-3.7)	1.0 (0.7-1.6)
Self-Reported Diagnosis of HIV or AIDS	2.6 (1.1-6.5) <.05	3.3 (0.9-12.1)	**2.7 (1.1-6.6)** <.05
Self-Reported Treatment for HIV	**3.7 (1.6-8.6)** <.05	**46.1 (17.3-122.8)** <.001	**5.4 (2.2-13.2)** <.001
HIV positive	1.7 (0.9-3.2)	1.2 (0.4-3.6)	0.9 (0.5-1.6)
Any interaction with health care	**2.6 (1.6-3.9)** <.001	**6.4 (2.5-16.1)** <.001	**2.1 (1.4-3.2)** <.05

data from three countries are pooled

Fay H, Baral S, Trapence G, Motimedi F, Umar E, et al. Stigma, Health Care Access, and HIV Knowledge Among Men Who Have Sex With Men in Malawi, Namibia, and Botswana. AIDS and Behavior, Dec 2010: 1-10.

Uganda: Structural Violence

Prevention Summary

- Our historical approaches to HIV prevention for MSM have failed
- Using the tools we have today, with appropriate resources, we could prevent at least 25% of new HIV infections among MSM in the next 10 years
- Maximizing effectiveness of prevention requires abandoning false dichotomies, smart prevention packages, structural changes, and going to scale

Sexual Minorities and Human Rights

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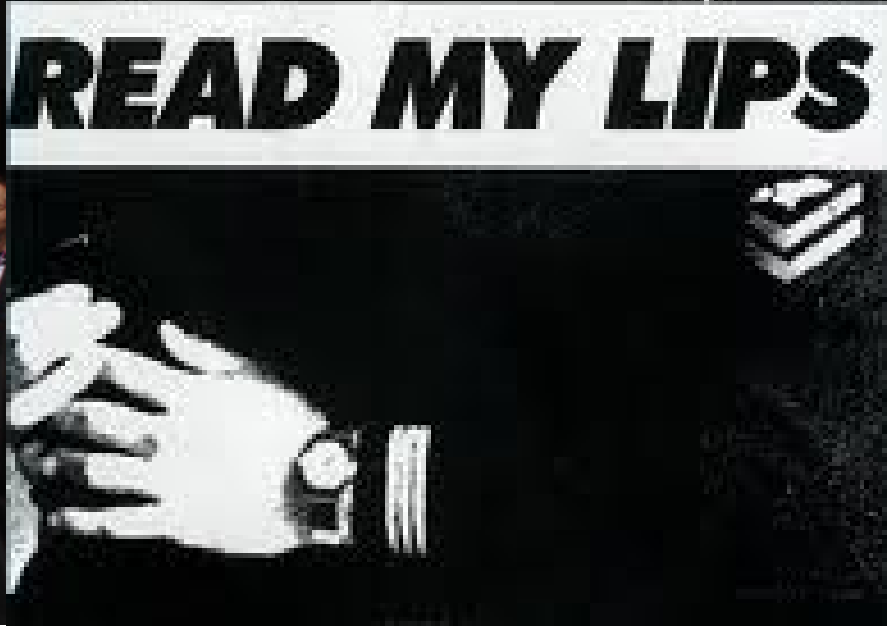
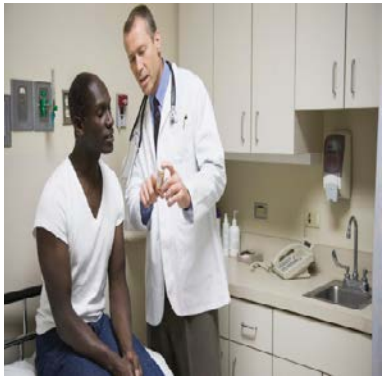


USD $134 million for condoms and lubricant sets a course toward averting 25% of global MSM HIV infections in the next 10 years

Comprehensive Clinical Care

- MSM should be treated as whole people, not just vectors of disease
- Comprehensive care requires:
  - well-trained clinicians who understand the conditions that are more common in MSM
  - knowledge that MSM are whole people with a range of non-HIV/STD health care needs
  - understanding that provider engagement can enable youth and older MSM to develop healthier lifestyles when they come out



“Gay rights are human rights, and human rights are gay rights”

The Yogyakarta Principles

The right to

- the universal enjoyment of human rights
- the highest attainable standard of health
- protection from medical abuses
- found a family

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"…for the LGBT youth out there who are struggling, who are made to feel inferior, let me say this: God loves you as you are. He wants you to live and to thrive. So please take care of yourself, educate yourself about HIV, protect your partners, honor and cherish them. And never let anyone make you feel inferior for being who you are. When you live the life you were meant to live, in freedom and dignity, you put a smile on God's face."

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