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

Global HIV prevalence among MSM, 2007-2011

HIV incidence among MSM, 1995-2011

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

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
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. *Hispanics/Latinos can be of any race.
HIV Risk Behavior & HIV Infection
Black vs. Other MSM, U.S. & U.K.

**United States**
- **Discordant UAI**
  - Bartholow 2005
  - Berry 2007
  - O'Leary 2007
  - Easterbrook 1993
  - Philip 2010
  - Brahman 2010
  - Marks 2009
  - Golden 2011
  - Wei 2011
  - Heckman 1999
  - Xie 2006
  - Eaton 2010

- **# Male sex partners**
  - Taylor 2011
  - Magnus 2010
  - Bingham 2003
  - O'Leary 2007
  - Gits 2006
  - McKinnon 2001
  - Sanul 1997
  - Ars 2006
  - O'Leary 2007
  - Hulawa 2004
  - Kirkland 2000
  - Heckman 1999
  - Kelly, J 2010
  - Easterbrook 1993

- **Receptive UAI**
  - Magnus 2010
  - Bingham 2003
  - O'Leary 2007
  - Eaton 2010
  - Warren 2006
  - McKinnon 2001
  - Marks 2009
  - Heckman 1999
  - Samuel 1997
  - Butch 1999
  - Bauermeister 2011
  - Halkitis 2011

- **HIV+ status**
  - Easterbrook 1993
  - McKinnon 1996
  - Schrier 2007
  - Willson 2006
  - Mills 2007
  - Kolpin 2006
  - Wolkstein 1997
  - CDC 2010
  - Halkitis 2008
  - Ars 2006
  - Walker 2011
  - Williams 2011
  - CDG 2005
  - Kipke 2007
  - Valeroy 2001
  - Ostric 1999
  - Benne 2008
  - Palhi 2011
  - Halkitis 2011

**United Kingdom**

- **Discordant UAI**
  - Efird 2011
  - Sigma 1999
  - Sigma 2002

- **# Male sex partners**
  - Sigma 2001
  - Sigma 1999
  - Sigma 1996
  - Sigma 2005

- **Receptive UAI**
  - Sigma 2002
  - Sigma 2001
  - Sigma 2005
  - Hickson 2004

**HIV+ status**

- Sigma 2006
- Sigma 2007
- Sigma 2002
- Sigma 1998
- Sigma 2000
Diagnosed HIV+
OR, 2.59 (1.82-3.69)

Undiagnosed HIV
OR, 6.38 (4.33-9.39)

Health insurance
coverage
OR, 0.47 (0.29-0.77)

>200 CD4
cells/mm³ before
ART initiation
OR, 0.40 (0.26-0.62)

ART adherence
OR, 0.50 (0.33-0.76)

ART utilization/access
OR, 0.56 (0.41-0.76)

HIV suppression
OR, 0.51 (0.31-0.83)

Viral Suppression

Disparities Persist Between Black and White
MSM Throughout Treatment Cascade

(Millett, The Lancet, 2012)
Undiagnosed HIV
OR, 6.38 (4.33-9.39)

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HIV suppression
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Viral Suppression

Lower income (<$20k)
OR, 3.42 (1.94-6.01)

Healthcare visits
OR, 0.61 (0.42-0.90)

(Millett, The Lancet, 2012)
Successes and challenges of HIV prevention in MSM

Patrick Sullivan
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.

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

Data from three countries are pooled.

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
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
“...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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