TARGETED PATHS TO HIV PREVENTION
WHY AGAIN AND WHY NOW?

Debbi Birx, MD
Director, Division of Global HIV/AIDS
Center for Global Health
Centers for Disease Control and Prevention
Number of New HIV Infections Has Declined

- In past 8 years, number of new HIV infections has decreased
  - 17% overall
  - 18% in sub-Saharan Africa
  - 29% in South and South East Asia

- HIV prevalence among young pregnant women (15–24 years old) has decreased significantly in Botswana, Ivory Coast, Kenya, Malawi, and Zimbabwe

http://www.unaids.org/globalreport/Global_report.htm
Direct Numbers for PEPFAR-Supported Treatment, Care, PMTCT, and OVC, 2004–2010

3,209,900 directly supported on treatment as of September 30, 2010

PEPFAR, President’s Emergency Plan for AIDS Relief
PMTCT, Prevention of mother-to-child transmission
OVC, Orphans and vulnerable children
Summary of Global HIV Epidemic in Numbers in 2009

- **People living with HIV**
  - Total: 33.3 million
  - Women: 15.9 million
  - Children aged <15 years: 2.5 million

- **People newly infected with HIV**
  - Total: 2.6 million
  - More than 7,000 new HIV infections a day
    - 97% are in low- and middle-income countries
    - 1,000 are in children aged >15 years
    - 6,000 are in adults aged 15 years and older
      - ~51% are women
      - ~41% young people aged 15–24 years

http://www.unaids.org/globalreport/Global_report.htm
People Newly Infected with HIV Globally in 2009

Total: 2.6 million (2.3–2.8 million)

UNAIDS: Report on the Global AIDS Epidemic 2010, all numbers are estimates
http://www.unaids.org/globalreport/Global_report.htm
Why the Current Focus on HIV Prevention?

- New interventions have proven efficacious for preventing HIV infection
- CDC and PEPFAR have built major global infrastructures in the health sector
  - Allows for provision of care, treatment, and services for prevention of mother-to-child transmission, HIV testing and counseling, and medical male circumcision
  - Provides a platform for integrating prevention into existing services
<table>
<thead>
<tr>
<th>Intervention</th>
<th>Efficacy Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male circumcision</td>
<td>50-60% efficacy</td>
</tr>
<tr>
<td>Improved interventions for PMTCT</td>
<td>With effective PMTCT programs, HIV transmission can be reduced to 2–4%</td>
</tr>
<tr>
<td>Antiretroviral treatment as prevention</td>
<td>Observational data of sero-discordant couples suggest up to 92% reduction in HIV transmission</td>
</tr>
<tr>
<td>HIV vaccine</td>
<td>31% efficacy</td>
</tr>
<tr>
<td>Vaginal microbicide</td>
<td>39% efficacy; 54% among high adherers</td>
</tr>
<tr>
<td>Pre-exposure prophylaxis</td>
<td>44% efficacy; 74% among high adherers</td>
</tr>
</tbody>
</table>

PMTCT, Prevention of mother-to-child transmission
### Prevention Interventions: Potential Impact vs. Quality of Data

<table>
<thead>
<tr>
<th>Public Health Impact</th>
<th>Quality of Data</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poor</td>
</tr>
<tr>
<td>Large</td>
<td>Treatment as prevention</td>
</tr>
<tr>
<td>Some</td>
<td>Commercial sex workers (all behavioral)</td>
</tr>
<tr>
<td>Potential*</td>
<td>Counseling and testing</td>
</tr>
<tr>
<td>No Evidence of Impact</td>
<td>Mass media</td>
</tr>
</tbody>
</table>

*Right direction, not statistically significant

PMTCT, Prevention of mother-to-child transmission
PwP, Prevention with positives
Pregnant Women Treated
FY2004–FY2010


Number of women tested

Botswana
Rwanda
Kenya
Namibia
So. Africa
Uganda
Guyana
Zambia
Mozambique
Tanzania
Haiti
Cote d'Ivoire
Vietnam
Nigeria
Ethiopia

0 100,000 200,000 300,000 400,000 500,000 600,000

FY 04 FY 05 FY 06 FY 07 FY 08 FY 09 FY10
# Need for More Coverage with Efficacious Interventions

## Intervention Coverage in Sub-Saharan Africa

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Coverage in Sub-Saharan Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV counseling and testing</td>
<td>40% have been tested; 40% of HIV infected know their status</td>
</tr>
<tr>
<td><strong>Antiretroviral treatment</strong>*</td>
<td>37% of people eligible for treatment received life-saving medicines; 50% (21%–95%) in PEPFAR-supported former “focus” countries</td>
</tr>
<tr>
<td>Prevention of mother-to-child transmission</td>
<td>54% (40%–84%) PMTCT coverage</td>
</tr>
</tbody>
</table>

UNAIDS: Report on the Global Epidemic 2010

*Eligible at CD4 count of 200

PMTCT, Prevention of mother-to-child transmission
Using Health-Sector Platforms for Integrated HIV Prevention

**HIV Care and Treatment Sites**
- ART
- Testing partners
- Sero-discordant couples
- PwP
- Risk reduction and condoms
- Safe medical procedures

**HIV Testing and Counseling Sites**
- Testing individuals and partners
- Risk reduction and condoms
- Safe medical procedures

**Male Circumcision Sites**
- Male circumcision
- Testing
- Risk reduction and condoms
- Safe medical procedures

**Antenatal Clinics**
- Testing pregnant women and partners
- Prophylaxis for mothers and infants
- Risk reduction and condoms
- Safe medical procedures
Overview

- HIV in the United States
- National HIV/AIDS strategy
- Prevention in health care settings
  - Persons with HIV
  - Persons with high risk for acquiring HIV
HIV in the United States
Magnitude of the Problem

- 1.1 million people living with HIV
- 56,000 new infections (2006)
- 16,000 deaths (2006)
- Net increase of 40,000 people each year
- People who start ART are now expected to live at least additional 35 years

Hall H et al. JAMA 2008;300(5):20-529;
ART, Antiretroviral treatment
HIV Incidence and Prevalence Estimates
United States, 1977–2006

Hall HI, et al. JAMA 2008;300(5):520-529
AIDS Prevalence in the United States
By State, 2007

50% of persons living with AIDS are in 5 states
90% of persons living with AIDS are in 23 states

HIV/AIDS in the United States
Health Inequity

- 95% of people with AIDS are MSM, African American, Latino, or IDU
  - 53% of all cases are among MSM
- African Americans are 8 times more likely to have HIV than whites
- Latinos are 3 times more likely to have HIV than whites
- MSM are >40 times more likely to have HIV than other men


MSM, Men having sex with men
IDU, Intravenous drug users
Overview

- HIV in the United States
- National HIV/AIDS strategy
- Prevention in health care settings
  - Persons with HIV
  - Persons with high risk for acquiring HIV
National HIV/AIDS Strategy: Major Goals and Associated Targets for 2015

- **Reduce HIV incidence**
  - Lower the annual number of new infections by 25%
  - Reduce the HIV transmission rate by 30%

- **Increase access and quality of care for people with HIV**
  - Increase to 85% the proportion of newly diagnosed patients linked to care within 3 months of diagnosis

- **Reduce HIV-related disparities**
  - Increase by 20% the proportion of HIV-diagnosed persons with undetectable viral load in each of 3 target populations: African Americans, Hispanics/Latinos, and MSM

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http://aids.gov/federal-resources/policies/national-hiv-aids-strategy

MSM, Men having sex with men
Smart Investments Now Yield Savings Later

Comparison of 5 scenarios: Projected HIV Incidence

Reducing transmission rate by 50% in 5 years would save $44–104 billion

Hall HI, et al. JAMA 2008;300(5):520-529
Overview

- HIV in the United States
- National HIV/AIDS strategy
- Prevention in health care settings
  - Persons with HIV
  - Persons with high risk for acquiring HIV
HIV Prevention in Healthcare Settings
Targeting People with HIV

- HIV testing and linkage to care and prevention services
- Antiretroviral therapy
- Retention in care and adherence to interventions
- Partner services
- Risk-reduction interventions and condoms
- STD screening and treatment
- Perinatal transmission interventions
- Substance use, mental health, and social support
21% (230,000) with undiagnosed HIV
Associated with >50% of sexual transmission

79% (870,000) diagnosed
More likely to access prevention and treatment

Routine, opt-out screening in clinical settings costs $2,000–6,000 per person with HIV diagnosed

2006 HIV Testing Recommendations
Evidence of Impact

CDC. MMWR 2010;59(47);1550-1555
Antiretroviral Treatment (ART) Is Effective Care and Prevention

ART associated with
>90% reduction in excess mortality
92% reduction in HIV transmission in cohort of HIV-discordant couples

Donnell D. Lancet 2010; 375: 2092-2098
ART, Antiretroviral treatment .
Population Impact of Antiretroviral Therapy
British Columbia, Canada, 1996–2009

Montaner JS, et al. Lancet, 2010;376(9740);532-539
HAART, Highly active antiretroviral therapy
IDU, Intravenous drug use

Montaner JS, et al. Lancet, 2010;376(9740);532-539
HAART, Highly active antiretroviral therapy
IDU, Intravenous drug use
Medication Adherence and Viral Load Suppression

Mantel-Haenszel test for trend
p = 0.001

<table>
<thead>
<tr>
<th>Adherence</th>
<th>Suppressed VL, % of persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;70%</td>
<td>20%</td>
</tr>
<tr>
<td>70% - &lt;80%</td>
<td>34%</td>
</tr>
<tr>
<td>80% - &lt;90%</td>
<td>58%</td>
</tr>
<tr>
<td>90% - &lt;95%</td>
<td>70%</td>
</tr>
<tr>
<td>95% - 100%</td>
<td>86%</td>
</tr>
</tbody>
</table>

Linkage and Retention in Care and Prevention Services

- **Linkage to care and preventive services**
  - Only 69% persons with HIV attend clinic within 12 months of diagnosis.

- **Cost and effectiveness of services**
  - Case management improves linkage by 32% at a cost of $1,200/person.
  - Interventions focused on adherence reduce viral load at ~$35,000/QALY.
  - Sexual behavior change interventions reduce unprotected sex by 43% and acquisition of sexually transmitted diseases by 80%.

- **Effectiveness depends on coverage during the entire cascade from testing to care**
  - Transmission reductions can vary from 15% to 44%.

References:
- QUALY, Quality-adjusted life year
Partner Services

- **Partner testing and linkage services**
  - Reduce future transmission through earlier identification of undiagnosed infections
  - 20% of partners tested through provider notification had undiagnosed HIV

- **Median cost per new diagnosis is $7,800**

HIV Prevention in Health Care Settings
Targeting People at High Risk for Acquiring HIV

- Behavioral risk-reduction interventions and condoms
- Pre-exposure prophylaxis (PrEP)
- Microbicides
- STD Screening and treatment
- Substance use, mental health, and social support services
- Male circumcision
Goal: Reduce risk behaviors and increase condom use
- More than 50 interventions showed effect in controlled trials
- Many implemented in clinical settings

Impact
- Reduce incident STDs by 17%
- Cost-effective: $15,000 per HIV infection averted

Delivery: Provider or computer-delivered interventions feasible to implement on large scale
- Need for linkage of patients requiring more intensive services to allied health or community-based provider
- Social, economic, mental health, and substance use issues often paramount

CDC. 2009 Compendium of Evidence-Based HIV Prevention Interventions. Available at www.cdc.gov/hiv/topics/research/prs
STDs, Sexually transmitted diseases
Pre-exposure Prophylaxis: Potential Users and Cost-effectiveness

- 44% reduction in acquisition
- Potential users are HIV-uninfected persons at very high risk of infection and unable to consistently use other prevention modalities

**Cost-effectiveness depends on**
- Incidence in target groups using pre-exposure prophylaxis
- Cost of medication and services
- Ability to maintain or increase existing risk reduction behavior
- Adherence to medication
- $34,000-$320,000/QALY saved

QUALY, Quality-adjusted life year
Policy, Systems, and Environmental Change: Integrating Prevention and Health Care

- **Policy development and support**
  - Guidelines and recommendations: testing, prevention with positives, ART, male circumcision
  - Quality measures
  - Reimbursement guidance

- **New programs and models**
  - Expanded Testing Initiative: 30 jurisdictions with >90% of epidemic
  - Enhanced HIV Prevention Planning: 12 urban areas with 44% of epidemic
    - Integrating HIV prevention, care, and treatment
“The United States will become a place where new HIV infections are rare and when they do occur, every person, regardless of age, gender, race/ethnicity, sexual orientation, gender identity or socioeconomic circumstance, will have unfettered access to high quality, life-extending care, free from stigma and discrimination.”

——Vision, National HIV/AIDS Strategy
CHILDHOOD SEXUAL VIOLENCE AND HIV: DATA TO GUIDE PREVENTION

Jim Mercy, PhD
Division of Violence Prevention
National Center for Injury Prevention and Control
Centers for Disease Control and Prevention
Overview

- Childhood sexual violence and HIV/AIDS
- Importance of public health surveillance of childhood sexual violence globally
  - National survey in Swaziland
  - Promising approaches to preventing childhood sexual violence and mitigating its health consequences

Childhood sexual violence is any sexual act perpetrated against the will of or by coercion of a person <18 years old by anyone regardless of their relationship to the victim.
The Magnitude of the Problem

- 150 million girls and 73 million boys experienced sexual violence with physical contact in 2002
- Adolescents make up the fastest growing group of HIV-infected persons worldwide
- Sexual violence increases risk for HIV infection, as well as other mental and physical health problems
Paths Leading From Childhood Sexual Violence to HIV

Childhood Sexual Violence → Direct Transmission → HIV Infection

Childhood Sexual Violence → Compromised Negotiation → HIV Risk Behaviors → HIV Infection
Swaziland

- Landlocked—bordering Mozambique and South Africa (population 1,133,066)
- Among countries with highest adult HIV prevalence: 34.5%
- 2006: CDC/UNICEF/Swaziland formed partnership to conduct a national survey
Purpose of the National Survey
Swaziland, 2007

- Describe magnitude and nature of the problem
- Assess health consequences
- Identify potential risk and protective factors
- Assess utilization of services
- Help guide prevention programs and policies

Females aged 13–24 years participated and reported on their experience with sexual violence as children.
Sexual Violence Prior to Age 18 Among Females 13–24 Years of Age, Swaziland, 2007

Association Between Childhood Sexual Violence and Selected Health Conditions, Females 13–24 Years Old, Swaziland, 2007

Adjusted odds ratio*

*Adjusted for age, community setting, SES, and orphan status


SES, Socioeconomic status

STDs, Sexually transmitted diseases
Key Characteristics of Perpetrators of Childhood Sexual Violence, Swaziland, 2007

- Three most common perpetrators
  - Men/boys from the neighborhood: 32.3%
  - Boyfriends: 26.2%
  - Male relatives (excluding fathers): 14.0%

- Perpetrators tend to be substantially older than their victims (60% 5 or more years older)

The Fataki Campaign

- Reduce acceptance of cross-generational relationships that contribute to unsafe sex
- Morogoro, Tanzania
  Percent of people who said they could do something increased from 64% to 88%

Heath C. Switch: How to change things when change is hard. Broadway Books: New York, pp. 234-239
Low use and awareness of services

- Only 14% of victims of childhood sexual violence received any kind of health, social, or criminal justice service.
- Only 16% of respondents were aware of post-exposure prophylaxis (PEP) services.

Post-exposure Prophylaxis (PEP)

- **PEP for rape victims**
  - Reduces likelihood of HIV seroconversion
  - 28-day course of antiretroviral medications started within 72 hours of rape
    - 80% effective under optimal conditions

- **Cost effective in South Africa**
  - Net cost of $2,000 per life year gained

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Parents protect children

- Having a close relationship with one’s mother cuts the risk of childhood sexual violence by more than 50%

Parents are not a primary source of health information

- 16% learned of HIV/AIDS from their parents
- 34% learned about safe sex from their parents

Families Matter

- Promote positive parenting skills about sexuality and sexual risk reduction
  - Targets parents/caretakers children 9–12 years old
  - Educational intervention in 5 sessions

- Rural, Western Kenya
  - Enhanced communication:
  - Proportion of children asking parents about a sexual topic increased from 14% to 50%

Together for Girls:
A Global Partnership

- Centers for Disease Control and Prevention
- United Nations Children’s Fund
- President’s Emergency Plan for AIDS Relief
- The Joint United Nations Programme on HIV/AIDS
- United Nations Development Fund for Women
- United Nations Population Fund
- Becton, Dickinson and Company
- CDC Foundation
- Nduna Foundation
- Grupo ABC

Generate data to guide action
Support governments in evidence-based prevention and response
Mobilize action through communication strategies
HIV PREVENTION IN NEW YORK CITY

Thomas A. Farley, MD, MPH
Commissioner
New York City Department of Health and Mental Hygiene

Overview

- **HIV epidemic in New York City**
  - Resurgence of transmission in MSM

- **Prevention initiatives**
  - Expanded HIV testing and linkage to care
  - Prevention with positives
  - Condom distribution
  - Risk-reduction messages in mass media
  - Reducing alcohol use
Trends in HIV/AIDS
New York City, 1981–2009

Number of reported PLWHA

Calendar year

New HIV/AIDS diagnoses and deaths

Deaths to persons with AIDS

Reported persons living with HIV (non-AIDS)

Reported persons living with AIDS

PLWHA, Persons living with HIV/AIDS
Data on deaths outside New York City are incomplete
New HIV Diagnoses
New York City, 2001–2009

As reported to the New York City Department of Health and Mental Hygiene by September 30, 2010
Trends in HIV Diagnoses by Risk Group
New York City, 2001–2009

For events reported to the NYC DOHMH by September 30, 2010. Heterosexual risk category expanded to include HEFSP-defined probable heterosexual risk. Perinatal and other risk not included. Source: HIV Epidemiology and Field Services Program, NYC DOHMH.

MSM, Men having sex with men  IDU, Intravenous drug use
HIV/AIDS Diagnoses Among MSM by Age
New York City, 2001–2009

Number of new HIV cases in MSM

Year of HIV/AIDS diagnoses

Age ≥30 years
Age 13-29 years

Reported to NYC DOHMH HIV Epidemiology and Field Services Program as of September 30, 2010.
Generated on December 2, 2010
Transmission Risks of Reported Acute HIV Cases
New York City, 2008–2009

<table>
<thead>
<tr>
<th>Transmission Risk</th>
<th>Cases</th>
<th>Percent</th>
<th>Percent with Known Risk Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSM only</td>
<td>143</td>
<td>74%</td>
<td>86%</td>
</tr>
<tr>
<td>MSM and IDU</td>
<td>6</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>IDU</td>
<td>6</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>Heterosexual</td>
<td>11</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>Unknown/under investigation</td>
<td>27</td>
<td>14%</td>
<td>–</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>193</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on data reported to NYC DOHMH HIV Epidemiology and Field Services Program by September 30, 2010
Number of Male Sex Partners in Past Year Among MSM

MSM Venues, New York City, 2008

- 1 partner: 26%
- 2-3 partners: 35%
- 4-6 partners: 17%
- 7-9 partners: 8%
- 10+ partners: 15%


MSM, Men having sex with man
HIV/AIDS Risks Among MSM
New York City

- Condom use inconsistent
  - Last anal sex unprotected: 35%*
  - Last anal sex with HIV+ or unknown status partner unprotected: 15%*
  - Last anal sex among HIV+ unprotected: 35%*

- Disclosure of status inconsistent
  - Knew HIV status of last partner: 62%
  - Discussed HIV before sex with all past-year partners: 41%

*Among MSM who had anal sex at last sex
National HIV Behavioral Surveillance Study of MSM, New York City, 2008
Where Newly Diagnosed MSM Go to Meet Partners
New York City, 2007–2008

(N=159)

Among MSM naming venues
NYC DOHMH, Bureau of HIV/AIDS Prevention and Control, Field Services Unit Interview Data, MSM, NYC 2007-2008
Overview

- HIV epidemic in New York City
  - Resurgence in MSM

- Prevention initiatives
  - Expanded HIV testing and linkage to care
  - Prevention with positives
  - Condom distribution
  - Risk-reduction messages in mass media
  - Reducing alcohol use
“The Bronx Knows” Testing Campaign
July 2008–June 2010

- Total reported tests: 395,061
- Data reporting partners:
  - 7 hospitals: 1,547 / 179,025, 0.86%
  - 16 community health centers: 1,095 / 177,272, 0.62%
  - 9 community-based organizations: 607 / 38,764, 1.57%
- Total confirmed positive: 3,249 (0.82%)
- Total new diagnoses: 1,237 (0.31%)
  - 67% linked to care

Reporting of new diagnoses is incomplete. Presented numbers are underestimated.
Small Changes in Behavior in HIV+ Prevent More Infections Than Large Changes in HIV-

Mathematical model of 1,000 MSM. Model assumes: 10 partners per year, 50 anal sex encounters per year, per-act transmission probability 0.01, baseline condom use 60%, condom effectiveness 90%
77% of HIV+ men and 57% of HIV+ women in care in NYC remain sexually active*
~Half of sexually-active HIV+ MSM engage in unprotected anal sex*
Only 14% of physicians provide HIV risk-reduction counseling to established HIV+ patients**
Only 39% of sexually-active HIV+ adults in care received one-on-one risk reduction counseling in the last year*

Regular risk-reduction counseling of HIV+ by providers is essential

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Condoms Distributed vs. Condom Use
Louisiana, 1994–2002

- Condoms distributed (million)
- Condom use last sex

Cutback of free distribution

Louisiana Office of Public Health
NYC Condom Availability Highlights

- 41 million free male condoms per year
  - 5 per capita
- >3,000 venues
- 93% of all NYC MSM venues identified
Reaching MSM in NYC with Prevention Messages

- >100,000 MSM in NYC
  - Need to use mass media
- Focus groups of young minority MSM
  - Unconcerned about HIV
  - Have not seen prevention messages
- Developed media message to emphasize continued risk of HIV

(Play video)
Five or More Sex Partners by Alcohol Use Among Men Who Have Sex with Men

Percent of adults with 5 or more partners

- Non-drinkers: 21%
- Alcohol drinkers without binge drinking: 24%
- Binge drinkers: 40%
Alcohol and/or Drugs Before Sex Among High-risk MSM with Two or More Sex Partners

- Neither: 54%
- Alcohol only before sex: 27%
- Alcohol + drugs before sex: 12%
- Drugs only before sex: 7%

Farley T, et al. NYC Vital Signs 2008, 7(6); 1–4
“High” on Alcohol at Last Sex by Number of Sex Partners among High-risk MSM

Percent “High” on alcohol at time of last casual sex

<table>
<thead>
<tr>
<th>Number of sex partners in past year</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-4</td>
<td>30%</td>
</tr>
<tr>
<td>5-9</td>
<td>41%</td>
</tr>
<tr>
<td>10-19</td>
<td>39%</td>
</tr>
<tr>
<td>20+</td>
<td>48%</td>
</tr>
</tbody>
</table>

Farley T, et al. NYC Vital Signs 2008, 7(6); 1–4
Increases in alcohol taxes are followed by reductions in alcohol consumption and reductions in STDs

A 20 cents per pack increase in beer tax associated with 9% reduction in gonorrhea among teens and young adults

STDs, Sexually transmitted diseases
“The harsh mathematics of this epidemic prove that prevention is essential to expanding treatment. Stressing treatment without paying adequate attention to prevention is simply unsustainable.”

—Bill Gates
Co-chair, Bill & Melinda Gates Foundation