Preventing HIV Transmission: Successes and Challenges

Thomas J. Coates PhD
Michael and Sue Steinberg Professor of Global AIDS Research
Director, UCLA Program in Global Health
Division of Infectious Diseases, Department of Medicine
David Geffen School of Medicine USA
University of California, Los Angeles
First Key Point: No One Thought That HIV Prevention Would Be This Difficult

<table>
<thead>
<tr>
<th>Population</th>
<th>HIV Infections</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.5 billion</td>
<td>33.2 million</td>
</tr>
<tr>
<td>896.7 million</td>
<td>22.5 million</td>
</tr>
<tr>
<td>46.8 million</td>
<td>5.7 million</td>
</tr>
</tbody>
</table>

~2.5 million new infections per year

UNAIDS 2007 data
First Key Point
No One Thought That HIV Prevention Would Be This Difficult
Sesame Street
ACT UP, FIGHT AIDS!
Say it: Muppets get AIDS
Trash Bush in 2004
KAMI TICKLES ME
SILENCE EQUALS DEATH
DRUGS INTO BODIES KAMI INTO USA
COOKIE MONSTERS FOR KAMI
Second Key Point
We Can Point To Success Stories

- Not simple
- Not simplistic
- No magic bullet
- But change has happened
- We have an idea of what made it happen
- We know what to do to develop the scientific base
- We know how to document our effectiveness
Second Key Point
We Can Point To Success Stories

- Gay communities in major urban centers in the US, Australia, Canada, Europe early in the epidemic
- Uganda, Thailand, Tanzania, Namibia
- China—Harm Reduction Programs, Outreach to Men Who Have Sex with Men, Sex Workers
- Botswana—Success with treatment and prevention of mother-to-child transmission
- United States, Europe, Australia—Injection drug users
The 10 Best Things in HIV Prevention

1. Demonstrations that HIV prevention is possible and requires radical, not subtle, behavioral change
2. Prevention marketing
3. The male and female condom
4. Behavioral options—abstinence, delay, reduction in partner number, condom use, reduction in sharing of injection equipment
5. The HIV test—given to individuals, couples, families, communities—precursor to positive prevention
7. Access to clean needles and syringes for drug users; drug treatment; substitution therapy for drug use
8. Male circumcision
9. Treatment for HIV (we think)
10. Pre-exposure prophylaxis (we hope)
Third Key Point
HIV Prevention Requires Radical Not Subtle Social and Behavioral Change

- Political support and institutional participation
- Inspirational leaders and community-grown strategies
- Community activism: Human rights framework
- Planning, surveillance, and laboratory support
- Voluntary counseling and testing
- Information, Education, and Communication Campaigns
- Behavioral options—delay intercourse, reduce partner number, use condoms, reduce needle and syringe sharing
- Access to technological advances: male circumcision, PMTCT, treatment
- Support for persons with HIV
Fourth Key Point:
It’s Been Difficult To Get The Simple Things Right
Money Flows

Funding by Donor
- PEPFAR: 22%
- Bilateral: 21%
- Global Fund: 28%
- World Bank/UNAIDS: 21%
- Private: 8%

Total Annual Resources Available for HIV/AIDS

- Signing of Declaration of Commitment on HIV/AIDS, UNGASS
- World Bank MAP launch
- Gates Foundation
- PEPFAR
- Global Fund

$ Millions

- 1986
- 1988
- 1990
- 1992
- 1994
- 1996
- 1998
- 2000
- 2002
- 2004
- 2006
Universal voluntary HIV testing with immediate antiretroviral therapy as a strategy for elimination of HIV transmission: a mathematical model

Reuben M Granich, Charles F Gilks, Christopher Dye, Kevin M De Cock, Brian G Williams

- 3 m people receiving ART by end of 2007
- 6.7m people need treatment and are in danger of losing their lives
- 2.5m became infected in 2007
- Only 1m placed on ART in 2007
It’s Been Difficult to Get the Simple Things Right

Access to HIV Prevention for Individuals at Risk (2007)

- Harm reduction for injection users: 8%
- Condom access: 9%
- Behavior-change programs for MSM: 9%
- Adults with access to HIV testing in Africa: 10%–12%
- Prevention of mother-to-child transmission: 11%
- Behavior-change programs for sex workers: 20%
It’s Been Difficult to Get the Simple Things Right

Prevention Disconnect*

- Prevention expenditure on MSM
- AIDS cases among MSM

70%

Argentina, Bolivia, Brazil, Chile, Costa Rica, Dominican Rep., El Salvador, Guatemala, Mexico, Panama, Paraguay, Peru, Uruguay
"You don't know how many coffins I've bought," says Dr. Smangaiso Hlengwa, who treats patients with H.I.V. in Hlabisa, South Africa. Coffins, large and small, are lined up for sale at a local funeral parlor.
Fifth Key Point: Motivation and Maintenance
HIV and CVD Converge
III. Reduction among

**Warren V. James A. W...**

**FIGURE 1**—HIV Seropositivity in the SFMHS and City Clinic Cohorts, 1978–86
### TABLE 2—HIV Seroconverters and Seroconversion Rates (per Year) by Time Period, SFMHS, July 1982–June 1986

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Seronegatives Observed through Time Periods</th>
<th>Mean Number of Days between Cycles</th>
<th>Seroconversions</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/82–12/84</td>
<td>615</td>
<td>NA</td>
<td>205</td>
<td>18.4*</td>
<td></td>
</tr>
<tr>
<td>7/84–12/84 to 1/85–6/85</td>
<td>352</td>
<td>212</td>
<td>11</td>
<td>5.4†</td>
<td></td>
</tr>
<tr>
<td>1/85–6/85 to 7/85–12/85</td>
<td>312</td>
<td>188</td>
<td>5</td>
<td>3.1†</td>
<td></td>
</tr>
<tr>
<td>7/85–12/85 to 1/86–6/86</td>
<td>317</td>
<td>191</td>
<td>7</td>
<td>4.2†</td>
<td></td>
</tr>
</tbody>
</table>

NA = Not applicable.
*Estimated as described in text.
†Number of seroconversions/number seronegative at beginning of interval × fraction of year observed × 100.
**Estimated Number of New HIV Infections Among Adults/Adolescents, USA, 1977-2006**

Washington, D.C.: 7 of 8 wards with 1.7-2.8% prevalence

City-wide by race/ethnicity and sex

WF  0.2%
HF  0.7%
BF  2.6%
WM  2.6%
HM  3.0%
BM  6.5%

Population Prevalence
Rate per 100,000

- 0.0 - 0.6
- 0.7 - 1.2
- 1.3 - 1.8
- 1.9 - 2.4
- 2.5 - 3.0

No. of cases

- Male-to-male sexual contact
- High-risk heterosexual contact*
- Injection drug use
- Male-to-male sexual contact & injection drug use
- Other

Year of diagnosis

Note. Data statistically adjusted for reporting delays and redistribution of cases in persons initially reported without an identified risk

*Heterosexual contact with a person known to have, or to be at high risk for, HIV infection.
Going the distance

Remember to ask your doctor about CRIXIVAN.

www.crixivan.com
Who’s telling the truth about HIV?

HIV: Still no cure
Sixth Key Point: Vigorous Prevention Science

- Vaccine – Merck Adeno x2
  - STEP/Phambili
- Female Barrier Diaphragm
- Male Circumcision – Susceptibility
  - Oral PrEP – West Africa
- Microbicides – Carraguard
- Microbicides – CS-1
  - HSV-2 Treatment – Infectiousness
  - Male Circumcision – Infectiousness
  - HSV-2 Treatment – Susceptibility
  - Oral PrEP – MSM Safety
  - HVTN 505
  - Thai Prime/Boost
- Microbicides – BG/Pro2000
  - Pro2000
- Microbicides – TDF/PMPA
  - CAPRISA
- Microbicides – Heterosexual
  - FemPrEP
- Oral PrEP – IDU/Thai
- Oral PrEP – Heterosexual (FemPrEP)
- Oral PrEP – Serodisc (Partners)
- Oral PrEP – MSM (iPrEx)
- Vaginal & Oral PrEP (VOICE)
- Index Partner Treatment (HPTN 052)
Reduction of Maternal-Infant Transmission of Human Immunodeficiency Virus Type 1 with Zidovudine Treatment. Pediatric AIDS Clinical Trials Group Protocol 076 Study Group
Edward M. Conner, et al.

Intrapartum and Neonatal Single-Dose Nevirapine Compared with Zidovudine for Prevention of Mother-to-Child Transmission of HIV-1 in Kampala, Uganda: HIVNET 012 Randomised Trial
Laura A. Guay et al.
Estimated Numbers of AIDS Cases in Children <13 Years of Age, by Year of Diagnosis, 1992-2005, 50 States and the District of Columbia
Adult Male Circumcision Significantly Reduces Risk of Acquiring HIV

Reduction in relative risk of HIV infection associated with male circumcision (intent-to-treat analysis):

Kenya (n=2,784): 53%
Uganda (n=4,996): 51%

Male Circumcision for HIV Prevention in Young Men in Kisumu, Kenya: a Randomised Controlled Trial
RC Bailey et al.

Male Circumcision for HIV Prevention in Men in Rakai, Uganda: a Randomised Trial
RH Gray et al.
Highly Active HIV Prevention

- ART to Reduce VL and protect Partners HPTN 052
- Effective IDU Treatment w/ Bupren/Nalox HPTN 058
- Improve education and access to care for all HPTN 043
- Restore mucosal Integrity MSM & Women HPTN 039
- Adolescent Risk Reduction PrEP and Behavior HPTN 060
- Reduce Risk for Vulnerable Women In progress
- MSM: Reduce Risks for A-A and for Stimulant-Users In progress
Seventh Key Point: Combination Prevention

- Behavioural change
- Treatment/antiretroviral/STI/antiviral
- Biomedical strategies
- Social justice and human rights

Figure 1: Highly active HIV prevention
This term was coined by Prof K Holmes, University of Washington School of Medicine, Seattle, WA, USA. STI = sexually transmitted infections.

Coates et al. Lancet, 2008
Onto The Future!