Oral PrEP in Southern Africa - Ready for PRIME TIME?

For the motion:

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University of Cape Town
Preexposure Chemoprophylaxis for HIV Prevention in Men Who Have Sex with Men


Published online on November 23, 2010
Article and supplement available online

Antiretroviral Prophylaxis for HIV Prevention in Heterosexual Men and Women


Antiretroviral Preexposure Prophylaxis for Heterosexual HIV Transmission in Botswana


FDA approves TRUVADA as PrEP in July 2012

Bangkok IDU study PROUD IPERGAY
PrEP IS ready for Prime Time.....

• 7 minutes
• 7 points
• 14 slides!

CAN A PILL A DAY PREVENT HIV?
FOR INFORMATION ON THIS NEW AND EXCITING HIV PREVENTION STUDY
SMS “INFO” at no cost to 30060 or e-mail MCMHP@hiv-research.org.za
All participants will be compensated for their time and transport.
PrEP works

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BUT it must be taken daily!!!
1. We are NOT winning the war on incidence

Global number of new HIV infections in adults and children: 1990-2013

Source: UNAIDS Global Report 2014
The War on HIV incidence......to effect epidemic control.

- 6000 new infections globally every day
- 2/3 in SSA
- 1/3 in youth 15-24 yrs

- 400 000 infections in 2012
- 36% of women 30-35 yrs
- Adolescent girls 8 x infection of boys
- Females 15-24 yrs 4 x infection of males.
Sub-Saharan Africa’s disproportionate burden in the global HIV epidemic

The HIV burden in sub-Saharan Africa in 2013:
- 25 million living with HIV
- 1.5 million new infections
- 1.1 million deaths

MSM bear disproportionate burden of the HIV epidemic

Global HIV prevalence among adult women sex workers, 2013

2. We won’t treat our way out of the epidemic

"As a result, taxpayers are accumulating an indefinite—and indefinitely growing—responsibility for keeping people alive. Somehow, somebody has to work out how to stop the disease spreading".

*The Economist, 9 August, 2008*
### Top 10 countries: People living with HIV

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>% of people with HIV in the world</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>South Africa</td>
<td>18%</td>
</tr>
<tr>
<td>2</td>
<td>Nigeria</td>
<td>9%</td>
</tr>
<tr>
<td>3</td>
<td>India</td>
<td>6%</td>
</tr>
<tr>
<td>4</td>
<td>Kenya</td>
<td>5%</td>
</tr>
<tr>
<td>5</td>
<td>Mozambique</td>
<td>4%</td>
</tr>
<tr>
<td>6</td>
<td>Uganda</td>
<td>4%</td>
</tr>
<tr>
<td>7</td>
<td>Tanzania</td>
<td>4%</td>
</tr>
<tr>
<td>8</td>
<td>Zimbabwe</td>
<td>4%</td>
</tr>
<tr>
<td>9</td>
<td>USA</td>
<td>4%</td>
</tr>
<tr>
<td>10</td>
<td>Zambia</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>Remaining countries</td>
<td>39%</td>
</tr>
</tbody>
</table>

**Source:** UNAIDS Global Report 2014
2014 UNAIDS GAP report

• 22 million, or 3 of 5 people living with HIV are still NOT accessing ART.
• The proportions of people who do not have access to treatment are:
  • 58% in South Africa,
  • 64% in India
  • 80% in Nigeria.
  – South Africa has announced a BOLD target of providing 4.5 million people with access to antiretroviral therapy.
3. This will need new money but will be cost saving....

- Generic TDF/FTC:
  - Cipla Didivir 200/300mg 30: R314.47

- Generic TDF:
  - Cipla Tenofovir 300mg 30: R103.00
Where to deploy pre-exposure prophylaxis (PrEP) in sub-Saharan Africa?
Verguet S, et al. Sex Transm Infect 2013

• PrEP will have greatest impact and be cost effective in countries with high burden and low MC rates
• Therefore likely to be C-E in SSA
• Also more likely to be C-E if added to other existing strategies.
PrEP can avert as many as 30% of new infections in targeted age groups of women at highest risk of infection.

The cost-effectiveness of PrEP relative to ART decreases rapidly as ART coverage increases beyond 3 times its coverage in 2010, after which the ART program would provide coverage to more than 65% of HIV+ individuals.

“To have a high relative cost-effective impact on reducing infections in generalized epidemics, PrEP must utilize a window of opportunity until ART has been scaled up beyond this level.”
Recent trial data suggest PrEP-based approaches to controlling the HIV epidemic are not only effective, they are cost-effective in South Africa ($4,600/YLS).

Targeting PrEP to high risk populations will further improve this favorable finding.
Conclusions

PrEP could produce more than a dollar in savings for each dollar spent under highly optimistic assumptions, including:

- Targeting PrEP to very high risk populations with an annual incidence $>9\%/yr$,
- AND increasing the efficacy to $>70\%$,
- AND decreasing PrEP costs to $<\$40/yr$.

Today's cost:

- Cipla Didivir 200/300mg (30) (Truvada generic) $\text{R}314.47 : \$31$
- Cipla Tenofovir 300mg (30) (Viread generic) $\text{R}103.00 : \$10$
4. We will have less acquired drug resistance as a result
Program outcomes

• Rates of failure by one year vary from 6% (CT), through 9.9% (Soweto), to 15-25% (Malawi). (1-3)
• 23% failure at Gugs at 6 years. (4)
• The majority of whom will have resistance to at least two of the three drugs in their ART regimen: 84-90% with important mutations. (5-8)
Antiretroviral Therapy and Pre-exposure Prophylaxis: Combined Impact on HIV Transmission and Drug Resistance in South Africa

- **Combined ART + PrEP** is likely to prevent more HIV infections than either strategy alone, but with higher prevalence of drug resistance.
- ART is predicted to contribute more to resistance than is PrEP.
- **Optimizing both** ART and PrEP effectiveness and delivery are the keys to preventing HIV transmission and drug resistance.

5. This will be important for adolescent health and wellbeing.
Global Youth Wellbeing Index Rankings

INDEX DOMAINS
- Citizen Participation
- Economic Opportunity
- Education
- Health
- Information and Communication Technology
- Safety and security

CSIS and IYF, 2014
## Domain Rankings

<table>
<thead>
<tr>
<th>Country</th>
<th>Citizen participation</th>
<th>Economic opportunity</th>
<th>Education</th>
<th>Health</th>
<th>ICT</th>
<th>Safety and security</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>20</td>
<td>1</td>
<td>3</td>
<td>12</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>RSA</td>
<td>2</td>
<td>30</td>
<td>14</td>
<td>26</td>
<td>21</td>
<td>26</td>
</tr>
</tbody>
</table>

*Globally, youth fare better in health than economic indicators*

*85% of youth experienced lower-middle and low well being*
Unacceptable inequality: AIDS deaths rising among adolescents

2nd Leading cause of death...

Deaths in children aged 0 – 4 years

Deaths in young people aged 20 - 24

Deaths in children aged 5 – 9 years

Deaths in adolescents aged 10 - 19

Source: UNAIDS 2012 HIV and AIDS estimates
HIV infections averted per 100 person years of PrEP

Age group targeted

15-19
20-24
25-34
35-49
50+

Females
Males
6. It is an opportunity to enhance testing and SRH services
Youth who have been tested and got results in last 12 months

Source: United Nations Children’s Fund global databases, 2013, based on Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS), and other national surveys, 2007–2012.
Profile of HIV-positive female population in 2012, by age and diagnosis

![Graph showing the profile of HIV-positive female and male populations in 2012, by age and diagnosis.](image)

- **Females**:
  - 15-19: Treated 60%, Diagnosed, untreated 40%
  - 20-24: Treated 80%, Diagnosed, untreated 20%
  - 25-29: Treated 80%, Diagnosed, untreated 20%
  - 30-34: Treated 70%, Diagnosed, untreated 30%
  - 35-39: Treated 60%, Diagnosed, untreated 40%
  - 40-44: Treated 50%, Diagnosed, untreated 50%
  - 45-49: Treated 40%, Diagnosed, untreated 60%
  - 50-54: Treated 30%, Diagnosed, untreated 70%
  - 55-59: Treated 20%, Diagnosed, untreated 80%
  - 60+: Treated 10%, Diagnosed, untreated 90%

- **Males**:
  - 15-19: Treated 80%, Diagnosed, untreated 20%
  - 20-24: Treated 70%, Diagnosed, untreated 30%
  - 25-29: Treated 60%, Diagnosed, untreated 40%
  - 30-34: Treated 50%, Diagnosed, untreated 50%
  - 35-39: Treated 40%, Diagnosed, untreated 60%
  - 40-44: Treated 30%, Diagnosed, untreated 70%
  - 45-49: Treated 20%, Diagnosed, untreated 80%
  - 50-54: Treated 10%, Diagnosed, untreated 90%
  - 55-59: Treated 10%, Diagnosed, untreated 90%
  - 60+: Treated 10%, Diagnosed, untreated 90%

**Legend**:
- Green: Treated
- Yellow: Diagnosed, untreated
- Red: Undiagnosed

Johnson L, 2014
Double Helix Cascade

COUNSELING AND TESTING

UNINFECTED

INFECTED

Prevention

HIV/TB/STI FREE

Treatment

VIRAL SUPPRESSION/TB/STI CURE
Double Helix Cascade

COUNSELING AND TESTING

UNINFECTED

INFECTED

PrEP Uptake

PrEP Persistence

> 4 tabs/week

ART Uptake

ART Persistence

VIRAL SUPPRESSION

Link

Link

Link

Link
7. “Prime time” suggests “tailoring” to prime targets......
4 components for MSM in RSA

Table 3. Contribution of four components of an HIV prevention package to infections prevented.

<table>
<thead>
<tr>
<th>Prevention package component</th>
<th>percent infections prevented due to addition of component (95% CI)(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART (50% coverage of eligible persons)</td>
<td>3.4 (2.2, 4.5)</td>
</tr>
<tr>
<td>PREP (50% coverage of eligible persons)</td>
<td>11.7 (8.4, 15.0)</td>
</tr>
<tr>
<td>UAI (15% reduction)</td>
<td>21.0 (20.0, 22.0)</td>
</tr>
<tr>
<td>HIV testing increase</td>
<td>4.9 (1.8, 7.9)</td>
</tr>
<tr>
<td>% prevented with all 4 components(^2)</td>
<td>33.9 (31.5, 36.3)</td>
</tr>
</tbody>
</table>

Estimated 1 million MSM in RSA.
Combination prevention: RSA case study.

From 2015-2025

150 000 FSWs in RSA

Reduction in new infections (%)

Sex workers
Clients

VM
PrEP
Test and treat
VM and PrEP
VM and PrEP and Test and treat

(Topical PrEP) (Oral PrEP)
Population 600 000: ANC prevalence 30%

- 100 000 young women 16-26 years
- Incidence in the placebo arm of a vaccine trial among women: 7%
- 1 year: 7000 women become HIV +
- Start PrEP for 5-8 years: 60-70% adherent

<table>
<thead>
<tr>
<th>Total % adherence</th>
<th>76</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Detectable “as expected” (all daily, all time driven, and those reporting sex in the last 7 days for event arm): 10; 30 weeks</td>
<td>93.4; 67.9</td>
</tr>
<tr>
<td>% Detectable when reporting sex in last 7 days: 10; 30 weeks</td>
<td>92.5; 79.3</td>
</tr>
<tr>
<td>% ≥ 9.1 fmol/10⁶ cells in PBMC “as expected” (all daily, all time driven, and those reporting sex in the last 7 days for event arm): 10; 30 weeks</td>
<td>81.4; 53.6</td>
</tr>
<tr>
<td>% ≥ 9.1 fmol/10⁶ cells in PBMC when reporting sex in last 7 days: 10; 30 weeks</td>
<td>80.5; 65.5</td>
</tr>
</tbody>
</table>
Cost and health saving

• 4000 infections averted
• 4000 x daily triple therapy for 30-40 years

• Antenatal care
• Family Planning clinics
• STI Clinics
• Sexual and reproductive health services
Herman Biggs
1859-1923

Public health is purchasable. Within a few natural and important limitations any community can determine its own health.
“We need bold initiatives to prevent new infections……”
PrEP: ready, steady, GO!

Is it for me?
Eligibility and Desire

Get started
USE DAILY
Cover for 3 weeks

You are on your way!
USE DAILY
Test 3 monthly

STOP WORRYING

As long as you take a pill a day - the virus will stay away!!!
Force of infection tips the balance

HIV Force of Infection

BENEFIT

INVESTMENT

RISK

Cost Saving
KEEP CALM AND PREP