HIV Prevention Toolbox

March 2016
78 million people infected, 39 million people dead
37 million living with HIV today

2 million people became infected in 2014
An urgent and ongoing crisis:

2,500 infections every day: 1 new infection every 30 seconds

80% of new infections in SSA
AVOIDING AIDS
AS EASY AS...
ABSTAIN
BE FAITHFUL
CONDOMISE
HIV in retreat….

• 15.8 million on ART June 2015
• New HIV infections ↓ by 35% since 2000
• New infections among children ↓ by 50% since 2000
• AIDS related deaths ↓ by 42% since 2004
• TB related deaths ↓ by 32% since 2004
HIV in SSA: the Epidemic Goes On

People living with HIV in sub-Saharan Africa, 2013

Source: UNAIDS 2013 estimates

UNAIDS Gap Report, 2014
## HIV in SSA AMP Countries

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</thead>
<tbody>
<tr>
<td>Botswana</td>
<td>300 000</td>
<td>23.4</td>
<td>160 000</td>
<td>15 000</td>
<td>4 200</td>
</tr>
<tr>
<td>Kenya</td>
<td>1,600 000</td>
<td>6.2</td>
<td>800 000</td>
<td>220 000</td>
<td>62 000</td>
</tr>
<tr>
<td>Malawi</td>
<td>910 000</td>
<td>10.0</td>
<td>430 000</td>
<td>170 000</td>
<td>44 000</td>
</tr>
<tr>
<td>Mozambique</td>
<td>1,400 000</td>
<td>11.3</td>
<td>750 000</td>
<td>200 000</td>
<td>74 000</td>
</tr>
<tr>
<td>SA</td>
<td>5,600 000</td>
<td>17.3</td>
<td>2,900 000</td>
<td>460 000</td>
<td>270 000</td>
</tr>
<tr>
<td>Tanzania</td>
<td>1,800 000</td>
<td>5.6</td>
<td>760 000</td>
<td>230 000</td>
<td>84 000</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>1,200 000</td>
<td>14.9</td>
<td>600 000</td>
<td>200 000</td>
<td>58 000</td>
</tr>
</tbody>
</table>
New HIV Infections in Adolescents (15-19) in 20 Countries with Highest Number of New HIV Infections, 2012

Source: UNAIDS 2012 HIV and AIDS estimates
HIV In SSA: the Epidemic Among Women

• In 2013, of the 24.7 million people HIV infected in SSA >50% were women
• Young women are twice as likely to be infected as young men
• Women have fewer HIV prevention options than men

Source: UNAIDS 2013 estimates

UNAIDS Gap Report, 2014
• 6.4 million live with HIV (12.2%)
• Women 30-34 years – prevalence 36%
• Men 35-39 years – prevalence 29%
• >3 million South Africans on ART
• 400 000 new HIV infections in 2012
Young women and girls.

Women: 15-24 years 4 x higher than male peer
Girls: 10-19 years 8 x higher than male peers
Highest incidence : 20-34 years females
Lower incidence in those married compared with co-habiting or single.
Young and vulnerable

<table>
<thead>
<tr>
<th>Age Group (Years)</th>
<th>KZN HIV Prevalence ANC (N=1029)</th>
<th>CT HIV Prevalence General Female (N=600)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤16</td>
<td>8.4%</td>
<td>12%</td>
</tr>
<tr>
<td>17-18</td>
<td>18.6%</td>
<td>17%</td>
</tr>
<tr>
<td>19-20</td>
<td>25.4%</td>
<td>30%</td>
</tr>
</tbody>
</table>

Incidence KZN (16-35 yo) : 9% and Cape Town (16-20) yo : 8%
HIV+ HIV+ 12-24 years.

Vicious HIV Cycle

HIV+ HIV+ HIV+ 24-40 years

24-35 years.

HIV+ HIV-ve HIV-ve

12-24 years.
Highly active HIV prevention.

A term coined by Prof K Holmes, University of Washington School of Medicine, Seattle, WA, USA.5
We need a biomedical Revolution!!

Why?

Source: UNAIDS 2012 HIV and AIDS estimates
What Do We Have to Address the Epidemic?

- Education and behavior modification
- Condoms, and other barrier methods
- Treatment/prevention of drug/alcohol abuse
- Clean syringes, i.e. needle exchange programs
- Interruption of mother-to-child transmission
- Circumcision for female-to-male transmission
- HIV/STI Testing
- Antiretroviral treatment as prevention
- Post-exposure prophylaxis (PEP)
- Pre-exposure prophylaxis (PrEP)*
- Topical microbicides¹
- Vaccination¹

*Daily Truvada®; alternate regimens still in research
¹Still in research

With thanks to Carl Dieffenbach & Jeff Schouten
Harm Reduction

- Male circumcision
  - Auvert BPloS Med 2005
  - Gray R, Lancet 2007

- Microbicides for women
  - Abdool Karim Q, Science 2010

- Oral pre-exposure prophylaxis
  - Grant R, NEJM 2010 (MSM)
  - Baeten J, NEJM 2012 (Couples)
  - Paxton L, NEJM 2012 (Heterosexuals)
  - Choopanya K, Lancet 2013 (IDU)

- Post Exposure prophylaxis (PEP)
  - Scheckter M, 2002

- Female Condoms

- Treatment of STIs
  - Grosskurth H, Lancet 2000

- Male Condoms +Lube

- HIV Counselling and Testing
  - Coates T, Lancet 2000
  - Sweat M, Lancet 2011

- Treatment for prevention

- Behavioural Intervention
  - Abstinence
  - Be Faithful

- (Un)conditional cash transfers
  - Kohler HP, 2002

- PMTCT
  - Cohen M, NEJM, 2011
  - Donnell D, Lancet 2010
  - Tanser, Science 2013

- HIV CARE and PREVENTION
New technologies

- Depot PrEP (vaginal rings)
- Long Acting Injectable PrEP
- On Demand PrEP - pills, films
- Passive/Active immunisation
- Multifunctional products, eg contraception
What is Missing to Address the Epidemic?

UNEXPOSED

Behavioral, Structural

Circumcision

Condoms

EXPOSED (precoital/coital)

ARV
PrEP

Vaccines
Microbicides

bnAbs

EXPOSED (postcoital)

ARV PEP

Vaccines

bnAbs

INFECTED

Treatment Of HIV Reduced Infectivity

YEARS

HOURS

72h

YEARS

Thanks to Mike Cohen for this slide.
Cohen et al, JCI, 2008; Cohen IAS 2008
HIV Prevention in SSA Women: The Gap

- HIV-1 prevention interventions demonstrated to be effective in reducing HIV-1 risk are inadequate
  - **Condom use, HIV/STI testing** - Require participation/consent of male partner
  - **PrEP** - Achieving high adherence, especially among young SSA women, has been a central challenge (VOICE, Fem-PrEP)
  - **Microbicides** - Data suggest young SSA women wanted a product they could use to reduce their risk, but that microbicides did not fit into the realities of their daily lives (VOICE, FACTS 001)
- Inadequate prevention options for women unable to negotiate safe sex practices
- Developing HIV-1 prevention options that SSA women can use remains a global concern
## Consider an Analogy

<table>
<thead>
<tr>
<th>PREGNANCY PREVENTION</th>
<th>HIV PREVENTION</th>
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<tbody>
<tr>
<td>Education &amp; behavior modification</td>
<td>Education &amp; behavior modification</td>
</tr>
<tr>
<td>Condoms</td>
<td>Condoms</td>
</tr>
<tr>
<td>Birth control pill</td>
<td>PrEP</td>
</tr>
<tr>
<td>“Morning-after pill”</td>
<td>PEP</td>
</tr>
<tr>
<td>Spermicide</td>
<td>Topical microbicides</td>
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<tr>
<td>Implantable birth control</td>
<td>Antibody-mediated Prevention (bnAbs)</td>
</tr>
<tr>
<td>Vasectomy/Tubal Ligation</td>
<td>Vaccination</td>
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</table>
World Modern Contraceptive Prevalence by Method, Latest Year

- Female Sterilization: 223 Million
- IUDs: 169 Million
- Pill: 104 Million
- Condom: 90 Million
- Other Modern Methods: 7 Million
- Male Sterilization: 28 Million
- Injections: 41 Million

Couples Using Any Modern Method: 661 Million

Earth Policy Institute - www.earth-policy.org

Source: EPI from UNPop
“It supports the contention that increased choice is associated with increased uptake and with better health outcomes (such as lower pregnancy rates and fewer STIs), and that women, given a choice, exercise it and continue use of their chosen contraceptives to a greater degree than those denied their choices.”
Seek, Test, Treat and Suppress

Oral PrEP

MMC and Condoms

Universal Testing
Couples Testing
Self Testing
Community testing

PMTCT

Security
Oral PrEP
Vag. Rings
Passive-active vaccination

PMTCT

HIV Prevention Trials Network
The HVTN 703/HPTN 081 AMP Study: Filling the Gap

AMP = Antibody Mediated Prevention

This is the idea of using an antibody made by scientists and giving it to people directly, i.e. using an intravenous (IV) infusion, to prevent HIV infections.
Combination prevention: Hep B

- Universal precautions
- Safer sex
- Vaccinate with Hep B vaccine (active)
- Passive immunization with anti Hep B immunoglobulins
Rabies

- Avoid stray dogs
- Immunize pets
- Wash wound
- Active immunization
- Passive immunization with anti rabies immunoglobulin
TAILORED, Client-Centred Prevention Packages

CSW
IDU
MSM
PMTCT

Young women
The Prevention Revolution

“Scientists have developed an array of effective tools which if implemented could reverse the AIDS epidemic”

• Professor Francoise Barré Sinoussi.
The Prevention Revolution

“Prevention activism is indispensable to overcome the epidemic”

- Archbishop Tutu.
01 December: National AIDS Day
Sex before marriage is a sin

3 Steps to AIDS Free
A
B
C
Abstain
Be faithful
Condomise
HVTN 703/HPTN 081 Protocol Team

- Chairs: Larry Corey & Mike Cohen
- co-Chairs: Sri Edupuganti & Nyaradzo Mgodi
- Protocol Team Leader & Core Medical Monitor: Shelly Karuna
- DAIDS Medical Officers: Marga Gomez & David Burns
- Statisticians: Allan DeCamp, Deborah Donnell, Peter Gilbert, Michal Juraska, Nidhi Kochar
- Laboratory Representatives: John Hural, Sue Eshleman, On Ho, David Montefiori, Vanessa Cummings, Estelle Piwowar-Manning
- VRC Representatives: Julie Ledgerwood, Barney Graham, John Mascola
- Investigator Representatives: Ken Mayer, LaRon Nelson, Manuel Villaran, Sinead Delany-Moretiwe
- Social & Behavioral Scientist: Michele Andrasik
- DAIDS Protocol Pharmacist: Scharla Estep
- Regional Medical Liaison: Simba Takuva
- Clinical Safety Specialist: Maija Anderson
- Protocol Development Manager: Carter Bentley
- FHI360/HPTN LOC Director: Niru Sista
- Senior Research Clinician: Phil Andrew
- Clinical Research Manager: Liz Greene
- Clinical Trials Manager: Carissa Karg
- SDMC Representatives: Lynda Emel, Gina Escamilla, Evangelyn Nkwopara
- Regulatory Affairs Representative: Meg Brandon
- Communications Representatives: Jim Maynard & Eric Miller
- Community Engagement Representatives: Gail Broder, Jonathan Lucas, Jontraye Davis
- Clinic Coordinators: Deb Dunbar, Lilian Saavedra, Elaine Sebastian
- CAB Representatives: Likhapha Faku, Mark Hubbard, Jim Wick
- Community Educators/Recruiters: DaShawn Usher & Luciana Kamel
- Technical Editor: Erik Schwab