The case for Multipurpose Prevention Technologies

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MPTs integrate prevention of HIV/STIs and pregnancy
## Impact of Fertility Decline on income 1965-2000
(for E and SC Asia, L America, and SSA, combined)

<table>
<thead>
<tr>
<th></th>
<th>1965</th>
<th>2000 Without fertility decline</th>
<th>2000 With fertility decline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population size</td>
<td>2.1b</td>
<td>5.7b</td>
<td>4.1b</td>
</tr>
<tr>
<td>Dependency ratio</td>
<td>0.81</td>
<td>0.93</td>
<td>0.60</td>
</tr>
<tr>
<td>Per capita income</td>
<td>$1110</td>
<td>$1685</td>
<td>$2633</td>
</tr>
</tbody>
</table>
Trends in Maternal Mortality Ratios

MM Ratio reduced by 43 deaths per 100,000 for each 10% point rise in contraception due to decline in high risk pregnancies (Cleland et al 2011; see also Jain 2011)
Women's deaths from communicable, maternal, perinatal and nutritional conditions as a percentage of total women's deaths, 2004

Data Source: World Health Organization
Map Production: Public Health Information and Geographic Information Systems (GIS)
World Health Organization

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Under-5 mortality rate (probability of dying by age 5) per 1000 live births, 2009

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Data Source: World Health Organization
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Data Source: World Health Organization
Map Production: Public Health Information and Geographic Information Systems (GIS)
World Health Organization
Unmet Need for Family Planning, 2000 - 2008
Method mix: among all married users, % using specific method

Source: UNPD 2011
Adapted from: KJ Looker, GP Garnett and GP Schmid; An estimate of the global prevalence and incidence of herpes simplex virus type 2 infection; Bulletin of the World Health Organization, 2007, vol 86/10/07
Incidence rates of cervical cancer (age-standardized per 100 000 women, all ages), 2004

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Data Source: World Health Organization
Map Production: Public Health Information and Geographic Information Systems (GIS)
World Health Organization

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2010: A global view of HIV infection

33.3 million people [31.4 – 35.3 million] living with HIV, 2009

Source: UNAIDS

World Health Organization

UNAIDS

To calculate the adult HIV prevalence rate, we divided the estimated number of adults (15-49 years) infected with HIV in 2009 by the 2009 population with HIV.
Number of people receiving antiretroviral therapy in low- and middle-income countries, by region, 2002–2009

UNAIDS 2010
Sub Saharan Africa
Sub-Saharan Africa lags behind: Trends in Contraceptive Prevalence in married women (any method)

Source: UNPD
The overall demand for contraception is increasing.

% of married women aged 15–49

- Latin America & Caribbean
  - 1990-1995: 59, 17
  - 2000-2005: 69, 12

- North Africa & West Asia
  - 1990-1995: 54, 14
  - 2000-2005: 60, 10

- South & Southeast Asia
  - 1990-1995: 41, 18
  - 2000-2005: 59, 11

- Sub-Saharan Africa
  - 1990-1995: 14, 26
  - 2000-2005: 20, 24

Legend:
- Blue: Unmet need
- Red: Met need
Method mix: among currently married (CM) and sexually active not married (NM) women, % using specific method

Country and Survey Year

- CM NM Kenya 2008-09
- CM NM Lesotho 2009
- CM NM Malawi 2010
- CM NM Swaziland 2006
- CM NM Tanzania 2010
- CM NM Zambia 2007

Source: Demographic and Health Surveys 2006-1010
HIV prevalence among 15-49 year-old women
Malawi: CPR and HIV Trends

Contraceptive prevalence rate
- Other
- Condom
- IUD
- Sterilization
- Implant
- Pill
- Injectable

HIV prevalence and incidence: ages 15-49, men and women

Data sources:
- CPR data from Malawi DHS
- HIV data from UNAIDS/WHO

CPR: Married women, modern methods
HIV Incidence and Prevalence: ages 15-49, men and women
STIs in Swaziland:
Comparison between 1980 and 2004

<table>
<thead>
<tr>
<th></th>
<th>1980</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chancroid</td>
<td>44%</td>
<td>1%</td>
</tr>
<tr>
<td>Syphilis</td>
<td>17%</td>
<td>9%</td>
</tr>
<tr>
<td>LGV</td>
<td>13%</td>
<td>12%</td>
</tr>
<tr>
<td>Genital herpes</td>
<td>12%</td>
<td>61%</td>
</tr>
</tbody>
</table>
Age-standardised prevalence of cervical HPV DNA in sexually active women

IARC Multi-centre HPV Prevalence Survey, 1995-2002

<table>
<thead>
<tr>
<th>Country</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nigeria</td>
<td>933</td>
</tr>
<tr>
<td>Argentina</td>
<td>908</td>
</tr>
<tr>
<td>India</td>
<td>1940</td>
</tr>
<tr>
<td>Colombia</td>
<td>1981</td>
</tr>
<tr>
<td>China, Yangcheng</td>
<td>671</td>
</tr>
<tr>
<td>Chile</td>
<td>971</td>
</tr>
<tr>
<td>Mexico</td>
<td>1340</td>
</tr>
<tr>
<td>Vietnam, Ho Chi Minh</td>
<td>918</td>
</tr>
<tr>
<td>Korea</td>
<td>870</td>
</tr>
<tr>
<td>Italy, Turin</td>
<td>1013</td>
</tr>
<tr>
<td>Thailand, Lampang</td>
<td>1024</td>
</tr>
<tr>
<td>Netherlands</td>
<td>3299</td>
</tr>
<tr>
<td>Thailand, Songkla</td>
<td>716</td>
</tr>
<tr>
<td>Spain</td>
<td>908</td>
</tr>
<tr>
<td>Vietnam, Hanoi</td>
<td>1007</td>
</tr>
</tbody>
</table>
Bacterial Vaginosis

- 5110 women in Cape Town followed for 36 months, 86 new HIV seroconverters. Nonseroconverting control subjects (n=324).


- 31% in 300 woman cohort in Johannesburg

  Palanee T, WRHI ongoing Biomarkers study

BV is common and is associated with new HIV infections.
Trichomonas Vaginalis

• Prevalence of *Trichomonas* infection among adolescent girls, pregnant women, and commercial sex workers in Ndola, Zambia.

• 460 schoolgirls, 307 pregnant women, and 197 commercial sex workers.

• The prevalence of vaginal infection with *T. vaginalis* was
  – 24.6% among the adolescents,
  – 32.2% among the pregnant women,
  – 33.2% among the commercial sex workers.

**TV is common in Ndola, Zambia.**

Crucitti, Tania PHD; Sexually Transmitted Diseases: April 2010 - Volume 37 - Issue 4
China
Contraception in China is dominated by IUD and sterilization

- IUD gaining in popularity – low cost and difficult to remove after installation
- Condom usage increased with urbanization and increased income
- OC/Inj. usage decreased due to SE and decreased Govt. purchased
- Implant – local Govt. replaced Implant with IUD
- Limited R&D investment

McKinsey and Co
HIV-1 epidemic in China

Heterosexual Transmission: increased from 40.3% in 2008 to 47.1% in 2009.
MSM: increased from 5.9% in 2008 to 8.6% in 2009.
Changing STI Epidemic Profiles

Characteristics

• **Before middle of 1990s:** Gonorrhea (red) and Genital warts (green) were the major STDs

• **Late 1990s to 2005:** NSU (pink) was the major STD, with Gonorrhea (red), Genital warts (green) and syphilis (yellow) also widely spread;

• **After 2006:** syphilis became the major STD, with Chlamydia, Gonorrhea (red), and Genital warts (green) widely spread.
India
Contraceptive uptake and population concerns

At the current pace, India will double its population in 50 years making sustainable development unattainable.

If unwanted fertility is averted, TFR will reach replacement level.
Unmet need for contraception

Unplanned pregnancy in India: 78%
Unwanted pregnancy: 21%
Induced abortions: 4 million (approx)
Ratio of illegal to legal abortion: 10:1
HIV in India

Estimated HIV infections: 2.39 million
Prevalence rate: 0.31 %
Women infected: 39%
Concentrated & heterogeneous in distribution, with some districts showing high prevalence
Heterosexual transmission - >85%

![Routes of Transmission of HIV, India, 2010-11](image1)

![Trends of HIV in India, 2004-09](image2)
## General Population: STI/RTI Prevalence (%)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Females</th>
<th>Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syphilis</td>
<td>0-4.7</td>
<td>1-10.1</td>
</tr>
<tr>
<td>Gonorrhoea</td>
<td>0-1.9</td>
<td>0-3.9</td>
</tr>
<tr>
<td>Chlamydia</td>
<td>0-1.3</td>
<td>0.1.1</td>
</tr>
<tr>
<td>Trichomonas</td>
<td>1.2-8</td>
<td>1.5-3.6</td>
</tr>
<tr>
<td>Candidiasis</td>
<td>7.2-23.9</td>
<td>-</td>
</tr>
<tr>
<td>Bacterial Vaginosis</td>
<td>17.8-63.7</td>
<td>-</td>
</tr>
<tr>
<td>HSV2 serology (IgG)</td>
<td>8.6-17.9</td>
<td>7-10.6</td>
</tr>
<tr>
<td>HIV</td>
<td>0-0.95</td>
<td>0-1.4</td>
</tr>
</tbody>
</table>

25 studies for female and 15 studies for male general population reviewed

NACP III: report on mid-term review of STI services
From the field: Target Product Profile for MPTs

• Different needs for different countries, and for married and unmarried women
• Different products for women wanting pregnancy and women wanting contraception
  – Contraception and HIV prevention
  – Contraception and STI prevention: HSV2, BV, TV, HPV, GC, CT
  – STI and HIV prevention
• Indication that combination barrier method/vaginal product may be acceptable
• Injectables and pills very acceptable
• Peri-coital and long acting required
Programmatic action that could set the scene

• Increase contraceptive uptake by:
  – Expand method mix
  – Increase contraception uptake by giving greater attention to populations where gap between fertility desires and contraceptive practice is greatest
  – Include counseling and education to clarify health concerns and side effects of methods

• Integrate contraceptive and HIV services:
  – PMTCT for +ve and -ve women
  – ARV services
  – HCT in family planning

• Expand introduction of female condoms
• Demand creation
Historically, health interventions in LMICs have seen slow uptake and low coverage.

Typical US Drug launch (time to peak sales)

1987: Safe Motherhood Initiative

DOTS

Skilled birth attendance

HepB vaccine

ORT

ACTs procured

ARVs

Hib vaccine

Source: Guy Stallworthy, Gates Foundation
Thank You

- John Cleland
- Nomita Chandhiok
- Allen Wu
- Martha Brady
- Melanie Pleaner
- Elizabeth Bukusi
- Charlotte Watts
- Thes Palanee