How program science can help to create effective and efficient HIV responses

Marelize Görgens
The World Bank Global HIV/AIDS Program
Outcomes

Fewer new infections amongst discordant couples

Outputs

At least 80% of discordant discordant couples consistently use condoms

100,000 discordant couples reached with discordant couple program

Activities

As per work plan – how inputs will be used to achieve the outputs defined

Inputs

$4 million for discordant couple programme

Long-term Goal (Impact)

The World of Policy Makers & Programmers
Program Science in the Everyday World of Policy Makers and Program Implementers

**Decide WHAT we want to achieve**

- Know and link your epidemic
- Know and link your evidence
- Know and link your response

**HOW we will achieve it**

- How and where to implement
- Quality standards
- Who will implement it
- Supervision and implementation support arrangements
- Efficiency of implementation

**How do we know whether we’ve been successful**

- Tracking implementation progress
- Tracking efficiency of implementation
- Tracking individual level impact
- Estimating population-level impact
What to achieve?

Measuring whether we’ve been successful

How to achieve it

What to achieve?

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Decide WHAT to achieve

• The science of program prioritisation

• Know and link your epidemic
  – How do we do this? Modeling?
  – Beyond characterisation: who is at risk? Where are they? Which interventions to reach them with?
  – Results-based approaches: start with a theory of change – need to move beyond that to a theory of evidence

• Know and link your evidence
  – Which evidence? Which evidence is ‘good enough’?

• Know and link your response
  – Conundrum of consensus
  – ‘We must do something, this is something, let’s do it’
Conundrums in Program Prioritisation: Experience from Africa
1.2 Focusing on: modes of transmission in sub-Saharan Africa

Source: UNAIDS 2010
MOT’s intent in HIV prevention decision making

• To better understand sources of new infections
• To focus HIV prevention efforts where it will work best
• To AID efforts to better allocate prevention resources where the money is most needed
• To avert more new infections
To do this, the MOT model structure assumes the following potential sources of adult new infections:

- **Sexual contact**
  - Commercial sex
  - Casual sex (more than one partner per year)
  - Marital sex (‘only one partner per year’; ‘low risk heterosexual sex’)
  - Men who have sex with men
- **Injecting drug use**
- **Blood transfusions**
- **Medical injections**
Confusing interpretations about this category

• Persons who have only one partner a year are:
  – **Not** necessarily in a **stable** union
  – **Not** necessarily married
  – **Not** necessarily in a discordant couple partnership

• How is it calculated for modeling purposes?
  – Arithmetically – total percentage has to add up to 100%, so this category is what remains when everything else has been estimated
## Marriage and cohabitation levels in different parts of the world

<table>
<thead>
<tr>
<th>Country</th>
<th>% of men married or cohabitating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benin, 2006</td>
<td>64%</td>
</tr>
<tr>
<td>Congo B, 2005</td>
<td>51%</td>
</tr>
<tr>
<td>Congo DRC</td>
<td>56%</td>
</tr>
<tr>
<td>South Africa</td>
<td>49%</td>
</tr>
<tr>
<td>Swaziland</td>
<td>23%</td>
</tr>
<tr>
<td>Namibia</td>
<td>31%</td>
</tr>
<tr>
<td>Botswana</td>
<td>34%</td>
</tr>
<tr>
<td>India</td>
<td>84%</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>95%</td>
</tr>
</tbody>
</table>

Source: DHSs from different countries
....and recommends the following priority programmes for implementation

### Priority populations and programs

<table>
<thead>
<tr>
<th>Route</th>
<th>Population</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex work</td>
<td>SW and clients</td>
<td>Out-reach, condoms, STI Treatment</td>
</tr>
<tr>
<td>Casual sex</td>
<td>Youth, military, truckers, etc.</td>
<td>Out-reach, condoms, STI</td>
</tr>
<tr>
<td>Low risk</td>
<td>Married couples</td>
<td>Promote testing</td>
</tr>
<tr>
<td>IDU</td>
<td>IDU</td>
<td>Risk elimination, harm reduction</td>
</tr>
<tr>
<td>MSM</td>
<td>MSM</td>
<td>Out-reach, condoms, STI Treatment</td>
</tr>
<tr>
<td>Injection</td>
<td>Patients</td>
<td>Sterile needles</td>
</tr>
<tr>
<td>Blood</td>
<td>Transfusion recipients</td>
<td>Screening</td>
</tr>
<tr>
<td>Mother-to-child</td>
<td>Pregnant women</td>
<td>PMTCT</td>
</tr>
</tbody>
</table>
Has MOT achieved its stated purpose?

Four case studies of HIV prevention program decisions that have been made based on MOT modeling results
1. Allocations of increased amounts of funding to programs that don’t work: Lesotho
2. An important misunderstanding about sources of new infections: Uganda
3. Wastage of resources on non-priority data collection efforts: Swaziland
4. Blind belief in the ‘magic’ of a model; and restating what everyone knew: Zimbabwe
The case of Lesotho
### Lesotho MOT results

#### HIV incidence

<table>
<thead>
<tr>
<th></th>
<th>DHS Multiple partners, default TP</th>
<th>DHS Multiple partners, doubling TP</th>
<th>C IET Multiple partners, default TP</th>
<th>C IET Multiple partners, doubling TP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood transfusions</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Medical injections</td>
<td>0.07</td>
<td>0.04</td>
<td>0.07</td>
<td>0.04</td>
</tr>
<tr>
<td>No risk</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Low-risk heterosexual</td>
<td>60.45</td>
<td>61.80</td>
<td>34.61</td>
<td>35.15</td>
</tr>
<tr>
<td>Partners MP</td>
<td>15.07</td>
<td>15.27</td>
<td>27.37</td>
<td>27.65</td>
</tr>
<tr>
<td>Multiple partnerships (MP)</td>
<td>15.55</td>
<td>16.49</td>
<td>29.43</td>
<td>31.04</td>
</tr>
<tr>
<td>Female partners of MSM</td>
<td>0.50</td>
<td>0.52</td>
<td>0.48</td>
<td>0.50</td>
</tr>
<tr>
<td>MSM</td>
<td>5.56</td>
<td>3.02</td>
<td>5.34</td>
<td>2.89</td>
</tr>
<tr>
<td>Partners of SW clients</td>
<td>1.76</td>
<td>1.75</td>
<td>1.70</td>
<td>1.68</td>
</tr>
<tr>
<td>SW clients</td>
<td>0.57</td>
<td>0.62</td>
<td>0.55</td>
<td>0.59</td>
</tr>
<tr>
<td>Sex workers</td>
<td>0.46</td>
<td>0.49</td>
<td>0.44</td>
<td>0.47</td>
</tr>
<tr>
<td>Partners IDU</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Injecting Drug Use (IDU)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Lesotho NASA in 2007/08

- PMTCT: 41%
- VCT: 17%
- Risk reduction for Vulnerable & accessible: 1%
- Prevention - Youth: 4%
- Prevention in Workplace: 10%
- Community Mobilization: 8%
- BCC: 4%
- STIs: 5%
- Condom Social Marketing: 5%
- Prevention Activities n.e.c: 1%
- Prevention not disaggregated by Intervention: 3%
- Blood Safety: 1%
- Prevention - Youth: 4%
- Prevention in Workplace: 10%
- BCC: 4%
- VCT: 17%
- Risk reduction for Vulnerable & accessible: 1%
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- Prevention in Workplace: 10%
- Community Mobilization: 8%
- BCC: 4%
- STIs: 5%
- Condom Social Marketing: 5%
- Prevention Activities n.e.c: 1%
- Prevention not disaggregated by Intervention: 3%
- Blood Safety: 1%
Lesotho NASA in 2009/10

- Prevention Activities n.e.c: 1%
- Prevention not disaggregated by Intervention: 7%
- Blood Safety: 1%
- Male Circumcision: 2%
- PMTCT: 26%
- Sex worker's programmes: 1%
- Female Condoms: 2%
- BCC: 3%
- Community Mobilization: 2%
- Risk reduction for Vulnerable & accessible: 1%
- Condom Social Marketing: 2%
- Prevention in Workplace: 2%
- Prevention - Youth: 1%
- STIs: 5%
- VCT: 44%
The case of Uganda
Uganda’s MOT results

<table>
<thead>
<tr>
<th>Mode of Transmission</th>
<th>Total number with risk behaviour</th>
<th>as percent of total population</th>
<th>New infections, 2008</th>
<th>% of total incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injecting Drug Users (IDU)</td>
<td>994</td>
<td>0.00%</td>
<td>258</td>
<td>0.28%</td>
</tr>
<tr>
<td>Partners of IDU</td>
<td>252</td>
<td>0.00%</td>
<td>10</td>
<td>0.01%</td>
</tr>
<tr>
<td>Sex workers (SW)</td>
<td>32,652</td>
<td>0.30%</td>
<td>833</td>
<td>0.91%</td>
</tr>
<tr>
<td>Clients</td>
<td>189,381</td>
<td>1.50%</td>
<td>7,172</td>
<td>7.83%</td>
</tr>
<tr>
<td>Partners of Clients</td>
<td>108,676</td>
<td>0.80%</td>
<td>1,660</td>
<td>1.81%</td>
</tr>
<tr>
<td>MSM</td>
<td>3,976</td>
<td>0.00%</td>
<td>559</td>
<td>0.61%</td>
</tr>
<tr>
<td>Female partners of MSM</td>
<td>1,569</td>
<td>0.00%</td>
<td>92</td>
<td>0.1%</td>
</tr>
<tr>
<td>Multiple partnerships (MP)</td>
<td>1,808,919</td>
<td>13.90%</td>
<td>21,722</td>
<td>23.73%</td>
</tr>
<tr>
<td>Partners MP (PMP)</td>
<td>1,417,881</td>
<td>10.90%</td>
<td>19,925</td>
<td>21.76%</td>
</tr>
<tr>
<td>Mutually monogamous heterosexual sex (MM)</td>
<td>6,022,317</td>
<td>46.10%</td>
<td>39,261</td>
<td>42.89%</td>
</tr>
<tr>
<td>No recent risk</td>
<td>3,474,169</td>
<td>26.60%</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Medical injections</td>
<td>13,060,787</td>
<td>100.00%</td>
<td>54</td>
<td>0.06</td>
</tr>
<tr>
<td>Blood transfusions</td>
<td>134,053</td>
<td>1.00%</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Infections in Uganda in 2008: 91 546
Conclusions drawn from the MOT results

1. Who is at risk? *All married adults*

2. The only way that mutually-monogamous couples could get infected with HIV, is if one is already HIV positive when relationship started, therefore:
   - Discordant couples should be a main target population
   - Fuelled by data from couple VCT sessions: 20 – 35% of couples attending *VCT* are discordant

3. Therefore couples VCT as a priority for prevention

4. Key message: "*Marriage is the greatest risk factor for HIV.***"
Yet, other evidence does not support these conclusions

1. Far fewer discordant couples in the general population than what couples VCT data suggest (Uganda AIS 2004/5):
   - **36%** of women and **47%** of men are neither married or in cohabitating relationships
   - Only **5%** of married/cohabitating persons are in discordant couple relationships
   - Therefore, approx 122 000 discordant **couples** in Uganda
   - Rakai data supports this notion of fewer discordant couples

<table>
<thead>
<tr>
<th></th>
<th>% of population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not currently married/in consensual relationship</td>
<td>39%</td>
</tr>
<tr>
<td>Currently married/in consensual relationship</td>
<td>61%</td>
</tr>
<tr>
<td>Concordant HIV-negative couples</td>
<td>39%</td>
</tr>
<tr>
<td>Discordant couples</td>
<td>2%</td>
</tr>
<tr>
<td>Unknown partner status</td>
<td>20%</td>
</tr>
</tbody>
</table>

Source: Gray et al. 2011
Yet, other evidence does not support these conclusions

- **Yet, according to MOT, discordant couples contribute to over 39000 new infections a year**
- **So in 3 years, almost half of new infections (49%) would have disappeared as discordant couple transmission is an epi dead end**

2. Made even more improbable by the reality that not all discordant couples infect each other
   - **27% to 36%** could not be traced to index partner (Donnell et al 2010; Celum et al. 2010)
Proportion of new infections in this sub-population

<table>
<thead>
<tr>
<th>Status</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not currently married/in consensual relationship</td>
<td>43%</td>
</tr>
<tr>
<td>Currently married/in consensual relationship</td>
<td>57%</td>
</tr>
<tr>
<td>Concordant HIV-negative couples</td>
<td>26%</td>
</tr>
<tr>
<td>Discordant couples</td>
<td>14%</td>
</tr>
<tr>
<td>Unknown partner status</td>
<td>17%</td>
</tr>
</tbody>
</table>

Source: Gray et al. 2011

Data from Rakai cohort in Uganda (new infections between 2003/4 to 2007/8) also confirms that discordant couple transmission as a main source of new infections is unlikely.

27% to 36% could not be traced to index partner (Donnell et al 2010; Celum et al. 2010)
Program Science in the Real World of Policy Makers and Program Implementers

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- Know and link your epidemic
- Know and link your evidence
- Know and link your response

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- Quality standards
- Who will implement it
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- Efficiency of implementation

**How do we know whether we’ve been successful**

- Tracking implementation progress
- Tracking efficiency of implementation
- Tracking individual level impact
- Estimating population-level impact
Program efficiency: Implement for lower cost without compromising quality

Source: Marseille et al. (18)
What do we know about implement programme-efficient HIV response in SSA?

- Of all data published on program efficiency:
  - BCC: 38%
  - PMTCT: 14%
  - Treatment: 10%
  - Male circumcision: 2%

- Studies focused on:
  - The general population: 23%
  - Pregnant women: 15%
  - PLHIV: 10%

- Significant data gaps: research evidence of programme efficiency of programmes for MARPs, discordant couples and non-regular partnerships
• The science of program implementation
• Need to design and implement technically-efficient responses:
  • Technical efficient responses are efficient in these areas
    – Service Delivery Efficiency: unit costs, variations and distributions of unit costs, production chain of service delivery, linkages and referrals
    – Institutional Efficiency: Leadership, planning, ownerships
    – Transactional and administrative Efficiency: What volume, how long, through which channels for funding to reach service delivery points
    – Information and Data Efficiency: Data flows, data use
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**How do we know whether we’ve been successful**
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- Estimating population-level impact
Knowing whether we’ve been successful

• The science of performance management, measurement, and evaluation

• In addition to intervention effectiveness and epidemic type.
  .....*Need efficient HIV responses, implemented to scale, for the right populations*
  .....*Measured and adjusted as needed*

• This requires a complementary focus on efficiency and effectiveness
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Fewer new infections amongst discordant couples

Infections
At least 80% of discordant discordant couples consistently use condoms

Outputs
100 000 discordant discordant couples reached with discordant couple program

Activities
As per work plan – how inputs will be used to achieve the outputs defined

Inputs
$4 million for discordant couple programme

Results achievement: EFFECTIVENESS

Implementation monitoring: EFFICIENCY

Thinking as a Policy Maker / Programmer
Outcomes

Fewer new infections amongst discordant couples

At least 80% of discordant discordant couples consistently use condoms

100 000 discordant couple reached with discordant couple program

As per work plan – how inputs will be used to achieve the outputs defined

$4 million for discordant couple programme

Results achievement: EFFECTIVENESS

Implementation monitoring: EFFICIENCY
When to focus on which interventions

Long-term Goal (Impact)

Fewer new infections amongst discordant couples

Results achievement: EFFECTIVENESS

Outcomes

- At least 80% of discordant discordant couples consistently use condoms

Implementation monitoring: EFFICIENCY

Outputs

- 100,000 discordant couples reached with discordant couple program

Activities

- As per work plan – how inputs will be used to achieve the outputs defined

Inputs

- $4 million for discordant couple programme

What have we achieved? Outputs to Impacts
End of Strategic Plan periods

Have we been efficient in using resources? Inputs to outputs
Midterm Reviews of HIV Strategic Plans