Treatment as prevention

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Thanks DoH, WHO, PEPFAR, CHAI, UCT, Joep Lange Institute, Celicia Serenata, Steve Smith, David Allen
Optimising ART Consortia

The USAID-funded OPTIMIZE consortium includes five leading private and public sector partners, and led by Wits RHI. OPTIMIZE leverages efforts by a wide range of donors and key stakeholders (e.g., Unitaid and its implementing partners, WHO and Global Fund).

OPTIMIZE operates under the assumption that aligning the collective power of scientists, regulators, drug companies, donors, programmers and advocates to achieve its singular goal -- accelerating access to simpler, safer and more affordable HIV treatment -- can rapidly advance ART optimization efforts.
HIV-1 levels & HIV-1 infectiousness

- High plasma HIV-1 RNA concentrations are associated with increased HIV-1 transmission risk.

- Plasma and genital HIV-1 levels are correlated (coefficient ~0.5-0.6)
  - But, genital HIV-1 more variable than plasma and tight correlation not found in all individuals.

Quinn et al NEJM 2000

Thanks Connie Cellum
Viral Load and New HIV Cases in San Francisco


n=12,512 unduplicated HIV-positive individuals.
Universal voluntary HIV testing with immediate antiretroviral therapy as a strategy for elimination of HIV transmission: a mathematical model

Simple!!

• Just treat everyone! Epidemic will disappear
High Coverage of ART Associated with Decline in Risk of HIV Acquisition in Rural KwaZulu-Natal, South Africa

Frank Tanser,1,* Till Bärnighausen,1,2 Erofili Grapsa,1 Jaffer Zaidi,1 Marie-Louise Newell1,3
Fact: Sex is now safe? (and childbirth and breastfeeding and sharing needles)

• 052, breastfeeding...
Several things happened in July 2017....

- 90-90-90 success stories (Botswana, Havlir, Sweden)
- But failure to link to care in some RCTs - Swaziland, KZN
- And no impact on new incidence (KZN)
Incidence still remains stubbornly high...

New HIV infections among people aged 15 years and over, by region, 2010–2015

Source: UNAIDS 2016 estimates.
And does not correlate well with ART...

Source: Leigh Johnson, Spotlight, 2016
Troubling....

- Julio Montagner in Vancouver: MSM vs intravenous drug users
Some ideas why: missing men?

• Second 90: probably there for women; not men – and that’s a huge problem
Fact: Transmission is not well understood

• And the ‘solutions’ are often based on common sense mixed with morality and poor science
Or is it something else?

The cycle of infection in South Africa

Young women between 16 and 23 acquire HIV from older men.

Mean: 18

Men between 23 and 35 have a high incidence of HIV.

Mean: 27

Women in their mid-20s infect and are infected by similarly aged men.

Mean: 26
Fact: Sex is now safe
IAS 2018: Sex is now safe

• PrEP/PEP: almost total protection
• As treatment: undetectable=untransmissible
• Partners study (Lancet Aug 2018)
  • Sub-study of gay men
  • Almost 77 000 unprotected anal sex acts – no transmission
• Intermittent PrEP for gay men
  • “on-demand” – 2 tabs 2-24 hours before sex, 1 tab at 24, then 48 hours
  • 1500 (mainly gay men) – no transmissions
Changes to HIV Incidence among those aged two years and older by Sex, South Africa, 2012-2017

- NB. The 2012 results were re-calculated using the 2017 test parameters.
- The overall HIV incidence has significantly dropped by 44%.
- The largest decline (56%) in incidence was among females.
- Among males the incidence declined by 18%.
## ART exposure, South Africa, 2017

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimated number of people on ART (n)</th>
<th>Proportion of people living with HIV on ART (%) 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>4,401,872</td>
<td>62.3 (59.2-65.2)</td>
</tr>
<tr>
<td>Female</td>
<td>2,998,170</td>
<td>65.5 (62.4-68.4)</td>
</tr>
<tr>
<td>Male</td>
<td>1,403,702</td>
<td>56.3 (51.0-61.5)</td>
</tr>
</tbody>
</table>
Similar drops in:

- Rich countries – esp with PrEP
- Botswana
- Swaziland
- Zimbabwe
Conclusion. Data has accumulated to render obsolete estimates of the risk of HIV transmission on cART obtained by extrapolation. Direct estimates are significantly lower and should be used in practice.
90-90-90 Cascade - Total Population
(Jun 2018 - South Africa)

- PLHIV: 7,208,234
- PLHIV who know their status: 6,487,411
- PLHIV On ART: 5,838,670
- Viral loads done: 5,838,670
- Virologically Suppressed: 5,254,803

- Actuals
- 90-90-90 Target (Test and Offer)
- % Progress against previous pillar

- PLHIV: 83%
- PLHIV who know their status: 72%
- PLHIV On ART: 61%
- Viral loads done: 89%
Conclusions

• The decrease in HIV incidence pre-dates ART introduction at scale
• But treatment seems to have had a huge additional impact
• Critical to get to the youth and men
Thank you