Developing an “HIV Prevention Cascade”
Current approach and future directions

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Overview

- HIV projections
- The power of the treatment cascade
- The potential for a prevention cascade
- Prevention Continuums
- A working model
  - The Infection Cascade
  - An Interruption and Disruption framework
HIV projections

- Globally, new infections are down by 33% in comparison to 2001
- 2.1 million new infections in 2013
- 35 million PLWH by end of 2013
- 12.9 million PLWH with access to ART (28 million eligible)
- 39 million people have died from HIV-related causes; 1.5 million in 2013
- Every hour, 240 new infections occur

HIV projections

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The Power of the Treatment Cascade

- Published in 2011
- Final metric of “success” focused attention on size of untreated population.
- With HPTN052 and START results, that number is a clear failure in public and personal health
- VERY VERY STICKY
The Power of the Treatment Cascade

Cascade of HIV Care
New York State, 2011

Abbreviated HIV treatment cascade for sub-Saharan Africa, 2012

Source: UNAIDS global report 2013
The Power of the Treatment Cascade

- Very very STICKY
- Over 600 citations in published work
- Unquantifiable citations in unpublished work
- Quantifiable
- Generalizable
- Intuitive
- Broad reach
- Mobilizing- visible measureable gaps
Can be used at the level of individual and community

For every 100 people living with HIV:
- 80 are aware of their infection
- 62 are linked to HIV care
- 41 stay in HIV care
- 36 get antiretroviral therapy
- 28 have a very low amount of virus in their body

1. Get an HIV test
2. If you have HIV, get prevention counseling and medical care
3. Stay in medical care
4. Take and stay on medicine to lower the amount of HIV in the body

Lower amount of virus means:
- Better health
- Longer life
- Fewer new infections
- Helping to stop HIV in the US

http://www.medicalnewstoday.com/articles/238399.php
Limitations
Oversimplification?
Does not identify reasons for or how to address gaps.
Limitations

HIV Negatives?
FORGOTTEN NEGATIVES?

No to treating our way out of the epidemic, say South African experts

Lesley Odendal
Published: 21 October 2014

No, we cannot treat our way out of the HIV epidemic, was the resounding sentiment of a panel of expert clinicians and the audience, at a debate held at the 2014 Southern African HIV Conference in Cape Town, South Africa.

The truth is, with 33 million people living with HIV/AIDS, we cannot treat our way out of the epidemic. Even with a life-saving drug like lamivudine, the new drug is expensive and access to treatment, less than half of those in need get treatment. A lifetime of treatment is required. Without access to treatment, more people become infected.

Forgotten Negatives: The Limits of Treatment as Prevention

The CDC’s High-Impact Prevention strategy takes aim at the stubborn HIV incidence rate in the United States. The only problem: it doesn’t include an ambitious plan for those at risk for the virus.

By Jeremiah Johnson

We cannot treat our way out of the #AIDS epidemic. Ambitious action is needed for a vaccine & a cure #UNAIDSstrategy2021
The potential for a prevention cascade

- STRONG desire…
  - for a figure/heuristic that is as mobilizing as treatment cascade
  - that speaks to policy makers as clearly
  - that offers a metric or ruler for progress, success and failures
  - addresses that cascade of care and prevention are interrelated
HIV Prevention Continuum

Test

Negative

Counseling and Risk Stratification

Provision of Tailored Prevention Services

Retention in Services

Adherence Support

Prevention Toolbox

Ongoing Counseling, Support and Outreach

Support Adherence, Repeat HIV Testing


AS Fauci/NIAID
Tailored Prevention Using HIV Prevention Toolkit

Provision of Tailored Prevention Services

- ARVs for PMTCT, PEP, PrEP
- Blood Supply Screening
- Condoms
- Education/Behavior Modification
- Clean Syringes
- Microbicides
- Treatment/Prevention of Drug/Alcohol Abuse
- STI Treatment
- Medical Male Circumcision
- Treatment as Prevention
- HIV Testing/ Counseling

Combination HIV Prevention

Prevention toolbox
### Treatment Action Group

#### HIV-NEGATIVE

<table>
<thead>
<tr>
<th>Stage</th>
<th>Activities</th>
</tr>
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<tbody>
<tr>
<td><strong>Linkage to primary care</strong></td>
<td>HIV risk screenings, linkage case management for high-risk individuals, ACA navigation</td>
</tr>
<tr>
<td><strong>Screen for risk factors and barriers</strong></td>
<td>Screen for STIs, mental health issues, drug use, domestic violence, trauma</td>
</tr>
<tr>
<td><strong>Retention in care and services</strong></td>
<td>Assess attitudes, beliefs, behaviors, education, and problem-solving skills</td>
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<tr>
<td><strong>Continued risk reduction, PrEP, PEP</strong></td>
<td>Case management and linkage to housing and other ancillary services</td>
</tr>
<tr>
<td><strong>Remain HIV-negative</strong></td>
<td>+ Regular HIV testing and reevaluation of risk factors; adherence support</td>
</tr>
<tr>
<td><strong>Outreach and reengagement</strong></td>
<td></td>
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</tbody>
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- Mental health and drug-use counseling
- Peer support/navigation
- Health literacy and education
Goals for Prevention Cascade...

- Quantifiable
- Generalizable
- Intuitive
- Broad reach
- Mobilizing- visible measurable gaps
- Explicitly links TasP and prevention efforts
- Oversimplified
We wanted to know- How to people stay negative? We asked- How do people get infected?

Given that…
• Not all sex includes exposure to HIV
• Not all exposures lead to viral entry
• Not all entry events lead to an established HIV infection

How do 50,000 infections happen every year in the US?

How does any single infection happen?
Our work focused on trying to identify the most “simple” sequence of events that leads to infection (Infection Cascade).

- Identify strategies that interrupt that progression.
- Identify factors that deter uptake and use of strategies for given groups and communities.
the HIV INFECTION CASCADE

Viral Infection

Viral Entry

Viral Presence

Circulating Virus

~50,000 in US
Strategies to interrupt?

What are the pathways out of that cascade?

~50,000 in US
Interrupting the HIV INFECTION CASCADE

Reduce Virus in community
• High uptake of testing
• High/complete levels of durable viral suppression among PLWH
• Test, link, treat, retain
• Hot-spots

Circulating Virus
Viral Presence
Viral Entry
Viral Infection

http://kff.org/hivaids/fact-sheet/hiv-testing-in-the-united-states/
Interrupting the HIV INFECTION CASCADE

Eliminate Virus in community
- 100% tested
- 100% on effective treatment
- 100% suppressed durably

• Viral Infection
• Viral Entry
• Viral Presence
• Circulating Virus
Interrupting the HIV INFECTION CASCADE

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Interrupting the HIV INFECTION CASCADE

Reduce Proximal Virus
- Couples testing with 4th generation tests
- Status discussions
- Durable viral suppression in HIV positive partner(s)
  - Assist/engage in positive partner(s)’s care
  - Test, link, treat, retain

Circulating Virus
Viral Presence
Viral Entry
Viral Infection
Interrupting the HIV INFECTION CASCADE

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Diagram of HIV Infection Diagnosis

Interrupting the HIV INFECTION CASCADE

Eliminate Proximal Virus
- Instant VL test
- Highly accurate
- Complete uptake

Diagram:
- Circulating Virus
- Viral Presence
- Viral Entry
- Viral Infection
Interrupting the HIV INFECTION CASCADE

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Viral Infection

Viral Entry

Viral Presence

Circulating Virus
Reduce Viral Entry

- Barrier method(s) - male condom/female condom
- Male circumcision
- Choice of alternatives to penetrative sex
- Treatment of STIs
- Minimize abrasive (dry) penetration
- Use new needles
- Use clean needles/equipment
- OST

- Future methods - microbicides

Interrupting the HIV INFECTION CASCADE
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Prevent Viral Entry
- Perfect consistent condom use
- 100% uptake
Interrupting the HIV INFECTION CASCADE

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- OST
- Future methods - microbicides
Interrupting the HIV INFECTION CASCADE

Deter Establishment of Viral Infection
- PEP
- PrEP

- Future methods - other ARV prevention strategies

Viral Infection
Viral Presence
Circulating Virus
Viral Entry
PREVENT Establishment of Viral Infection

- PrEP for all at risk
- High adherence

Interrupting the HIV INFECTION CASCADE
Interrupting the HIV INFECTION CASCADE

Deter Establishment of Viral Infection
- PEP
- PrEP

- Future methods—other ARV prevention strategies

Viral Infection
Viral Presence
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Interrupting
the HIV INFECTION CASCADE

Deter Establishment of Viral Infection
• PEP
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Future methods - other ARV prevention strategies
Interrupting the HIV INFECTION CASCADE

- Viral Infection
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Interrupting the HIV INFECTION CASCADE

- Viral Infection
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Interrupting
the HIV INFECTION CASCADE

**Eliminate Virus in community** High uptake of testing; high/complete levels of durable viral suppression; CVL, test, link, treat, retain

**Eliminate Proximal Virus** Know partner status; couples testing; 4th generation tests; Durable viral suppression in HIV positive partner(s); Status discussions

**Prevent Viral Entry** Barrier method(s)- male condom/female condom; choice of alternatives to penetrative sex; sexual positioning; treatment of STIs; minimize abrasive (dry) penetration

**Prevent Establishment of Viral Infection** PEP, PrEP

- Depression
- Housing
- Hunger
- Violence
- Caring relationships
- Safety
- Stigma
- Intimate Partner Violence
- Discrimination
- Employment
- Access to education
- Substance use
- Poverty
- Gender dynamics
- Trauma
Interrupting the HIV INFECTION CASCADE

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**Social-Political**
- Structural
- Cultural
- Economic Factors

**Factors**
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**Discrimination**

**Violence**

**Employment**

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**Gender dynamics**

**Safety**

**Stigma**

**Intimate Partner Violence**

**Hunger**

Example…
17 yo female
KZN
Interrupting the HIV INFECTION CASCADE

Example…
17 yo female KZN

Viral Infection
Viral Entry
Viral Presence
Circulating Virus

Violence
Discrimination
Safety
Stigma
Intimate Partner Violence
Hunger
Employment
Access to education
Poverty
Gender dynamics

HIV continuum of care
Example…
17 yo female
KZN

(1) Need to **disrupt** the inequities that deter access, uptake and use

(2) Need high interest strategies that work IN CONTEXT Violence

**Interrupting the** HIV INFECTION CASCADE

- Circulating Virus
- Viral Presence
- Viral Entry
- Viral Infection
- Discrimination
- Employment
- Access to education
- Poverty
- Gender dynamics
- Safety
- Stigma
- Intimate Partner Violence
- Hunger
Interrupting and Disrupting the HIV INFECTION CASCADE

Limitations

Oversimplified
• Does not include all possible interruption strategies
• Depicts each transition area as equal

Very hard to move to quantitation
Reduced Viral Infection

Reduced Viral Entry

Reduced Viral Presence

Reduced Circulating Virus

QUANTITIES?

PLANNING:
Dollars allocated per level?

KNOW YOUR EPIDEMIC
% Uptake * % Efficacy * [N]
Conclusions

Models that can mobilize efforts to prevention HIV are needed

Taking a social-ecological perspective could be advantageous

More work remains to be done…
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Questions
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