HIV Prevention Cascades: Identifying Gaps in the Delivery of HIV Prevention Interventions

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Abstract.

Background. Cascades have provided an influential heuristic to explore the delivery of Prevention of Mother to Child Transmission (PMTCT) and HIV treatment. Recent attempts have been made to promote an HIV prevention, treatment and care cascade, but whether such a comprehensive perspective can be used to guide programs remains questionable. Here we show how HIV prevention cascades focusing on specific prevention approaches could help inform programs.

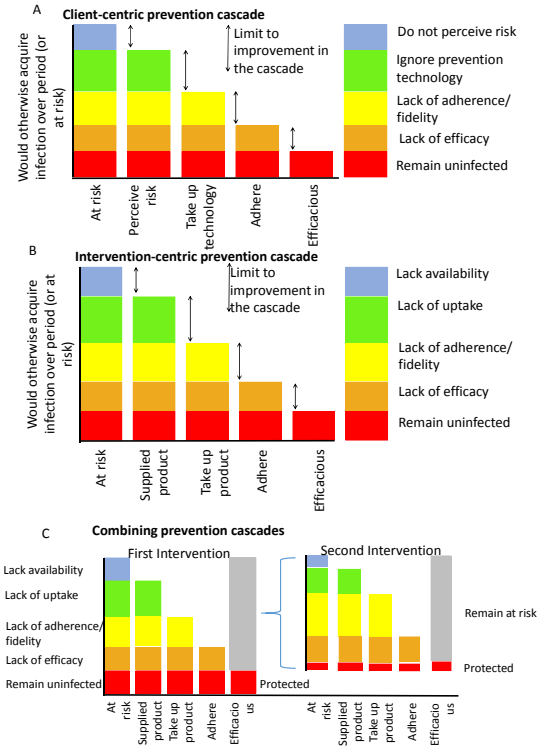
Methods. Data from two rounds (2009-11 and 2012-13) of a population based cohort study of HIV risk and incidence in 12 sites in Manicaland in rural Eastern Zimbabwe were analyzed to populate HIV prevention cascades. These cascades were used as the basis of mathematical models of HIV transmission dynamics to show how improved delivery of HIV prevention interventions can impact the epidemic.

Results: Cascades need to start with those at risk of acquiring HIV and can either focus on their adoption of protective approaches or the supply of and demand for prevention approaches. HIV prevention cascades for voluntary medical male circumcision (VMMC) and condom use promoted by HIV testing and counselling show the steps that would be required to improve the impact of HIV prevention targeted at those currently HIV negative. The results from Manicaland show the lack of implementation of HIV prevention programs for these populations to date. For example, by 2012-13 60% of men still did not have access to VMMC services within 20 miles of their homes. Furthermore, reducing demand, 85% of men did not perceive themselves at risk of HIV, and of those that did only 4% accessed circumcision between 2009-11 and 2012-13. The impact of Testing and counselling is limited by few of those tested reducing their sexual partner numbers or their condom use.

Conclusions: Reviewing the supply and demand for HIV prevention services through creating HIV prevention cascades provides useful insights into how HIV prevention can be improved.

Figure 1. Prevention cascade concepts.

- A prevention cascade for primary HIV prevention should show whether risk of HIV acquisition is reduced.
- The cascade could look from the client or intervention perspective. In the former the individuals choices are emphasized in the later the availability of services is more of a focus.
- More than one prevention approach is possible and their delivery can be combined, but to reduce HIV risk some direct mechanism needs to be used.
- The denominator population can be those with any risk or those with a particularly high risk.
- The time interval over which the cascade is explored could vary with one year or a lifetime being natural timescales..



Conclusions:

Prevention cascades can be used to evaluate whether primary prevention interventions are performing well in reducing HIV risk.

The cascades can identify how HIV prevention should be improved.

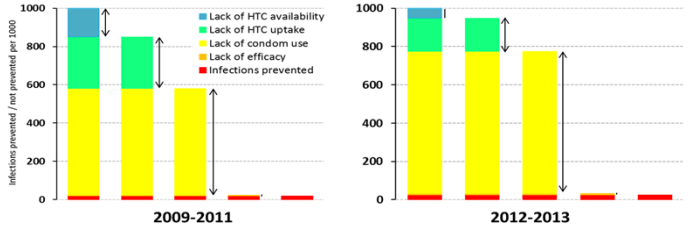
The cascade concepts could be developed further to explore how to use it for monitoring programs.

Figure 1 and 2 published in: Garnett GP, Hallett TB, Takaruza A, Hargreaves J, Rhead R, Warren M, Nyamukapa C, Gregson S. Providing a conceptual framework for HIV prevention cascades and assessing feasibility of empirical measurement with data from east Zimbabwe: a case study. Lancet HIV. 2016 Jul;3(7):e297-306.

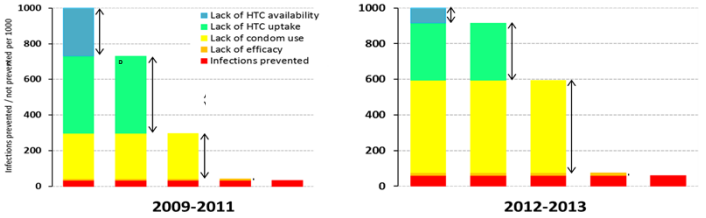
HIV prevention cascades from Manicaland

- Data from a population cohort in rural Zimbabwe was retrospectively analysed to explore the potential to populate prevention cascades.
- A large fraction of HIV prevention spending is on HIV testing, but if that is to influence the susceptibles risk (in addition to treatment as prevention amongst partners) then protective behavior is required.
- Voluntary medical Male circumcision as a one time procedure has no drop off for 'adherence'.

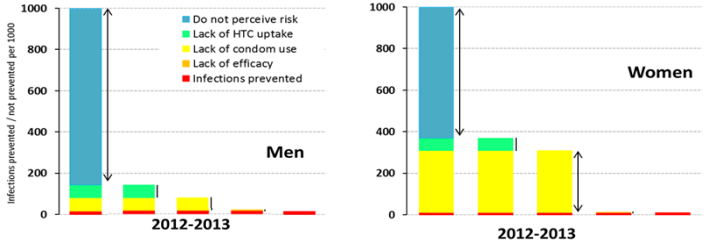
Program centric cascade exploring the impact of testing on condom use for men



Program centric cascade exploring the impact of testing on condom use for men



Client centric cascade exploring the impact of testing on condom use in 2012 to 2013



VMMC cascade from a program perspective showing an increase in service provision.

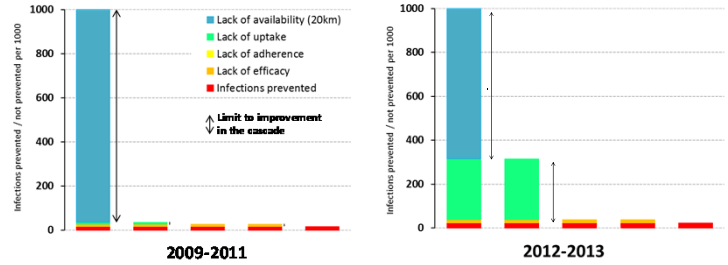


Figure 3.

- The impact of improvements in cascades can me modelled

