Universal **test** and **treat** not enough to end HIV epidemic

Early models of HIV epidemics calculated that near-universal antiretroviral treatment coverage and medical circumcision could almost eliminate new infections. However, as countries like Eswatini reach their 90-90-90 targets, it's becoming clear that this is not the case. Randomised trials in sub-Saharan Africa confirm the feasibility of universal test-and-treat, but localised data and additional preventative measures are needed to reduce new infections enough to eliminate the HIV epidemic.

By **Andrea Teagle**

South Africa introduced the universal test-and-treat (UTT) approach in September 2016 to manage the HIV epidemic, extending treatment to every person who tested positive, regardless of their CD4 count (a measure of how well the immune system is working).

The UTT approach had twin goals: to enable people living with HIV (PLHIV) to live healthy, long lives and, by getting people onto treatment early, to reduce new infections at a population level.

By 2020, South Africa and other countries aimed to achieve the UNAIDS 90-90-90 target: 90% of PLHIV would know their status, 90% of those diagnosed would be on antiretroviral treatment (ART) and 90% of those on ART would be virally suppressed (meaning that the amount of the virus in the bloodstream is too low for that person to transmit HIV to anyone else). It was expected that achieving these goals, which equates to 72.9% of PLHIV achieving viral suppression, would reduce new infections enough to eliminate HIV epidemics by 2030.

Real-world evidence

According to the fifth national HIV survey, conducted by the HSRC and the Centers for Disease Control and Prevention, South Africa has a way to go to meet the 90-90-90 targets, although we have made significant progress towards the first 90, with 84.8% of PLHIV aware of their status in 2017.

However, as countries now look to reach new, 95-95-95 targets by 2030, there is growing evidence of the effectiveness of UTT and what is needed going forward to eliminate the HIV epidemic.

Five randomised population-level trials in sub-Saharan Africa (Botswana, Zambia, Uganda, Kenya and South Africa) have assessed UTT interventions.

The trials showed that UTT is cost-effective, rapidly and significantly increases the number of people in care, and reduces the number of people who die from HIV-related illness. 'When coupled with robust linkage to HIV care, rapid ART start and patient-centred care, UTT achieved among the highest reported population levels of viral suppression in SSA,' write Professor Diane Havlir from the University of California, San Francisco, and colleagues in the *Journal of the International AIDS Society*. The impact of UTT in these settings must not be understated. However, the reductions in new infections fell far short of what was required to achieve epidemic control, even allowing that the impact on infection might increase over time.

The take-home message is two-fold. Firstly, evidence supports the implementation of UTT as standard policy, particularly in countries with generalised epidemics where most people with HIV are not known. Secondly, measures additional to UTT should be implemented for countries to control their HIV epidemics.

Eswatini and South Africa models

Why has the UTT not reduced new infections as much as early models predicted? Evidence from Eswatini suggests that it is because real-world ART coverage is not equal across different demographic groups that are more or less at risk for transmission, and newly infected individuals are especially infectious. So, if a country's ART programme misses groups that are disproportionate transmitters (young

Ending the HIV epidemic will require expanding preventative measures, such as youth-friendly reproductive and health services.

Photo: Freepik

men, for example), its effectiveness is compromised. In the sub-Saharan Africa trials, although an impressive 87% of participants on treatment were virally suppressed by the end of the studies, this figure was lower among young people.

Eswatini is one of the countries closest to achieving the 90-90-90 goals. However, despite significant health gains, new infections remain too high to eliminate the epidemic, write Adam Akullian and colleagues. Extrapolating from current statistics, their model, which was published in *The Lancet HIV* in 2020, found that even with 100% ART coverage (and annual universal HIV testing) and medical circumcision, HIV incidence in Eswatini would remain above the threshold needed for epidemic control.

Specifically, it would reduce HIV incidence to 7.3 per 1 000 person-years by 2030 and 4.6 per 1 000 person-years by 2050 – still far off the epidemic control target, which is 1 infection per 1 000 person-years. (Person years is a way to measure rates of new infection and is calculated as number of people multiplied by time. For example, if 500 people are followed for two years over a study, then there are 500*2 = 1 000 patient years of follow-up. If 2 of those participants acquire HIV, then the incidence rate would be 2 per 1 000 person-years.)

In South Africa, another model, taking account of different coverage across risk groups, found the same outcome. It found that reductions in new infections were sensitive to differences in risks between demographic groups, and whether ART coverage (and viral suppression) extended to high-risk PLHIV. Co-author Dr Dimitrov Dobromir and colleagues conclude, 'Reaching UNAIDS treatment cascade targets does not equate to the end of the HIV epidemic in South Africa.'

Extending universal test-and-treat gains

In a recent editorial in *The Lancet*, Professor Ruanne Barnabas from the University of Washington and the HSRC's Professor Heidi van Rooyen note that the Bukoba Combination Prevention Evaluation (BCPE) in Tanzania, in response to the mixed results of the other sub-Saharan UTT trials, successfully employed several strategies to extend access to HIV testing and to initiate and keep more people on treatment.

They offered community-based HIV testing to reach men and young people who might not seek care at clinics and offered same-day ART initiation to everyone who tested positive. Peer counsellors helped to link and keep people in care, following up with individuals who did not return to the clinic within 90 days. When these patients did return, they were welcomed with expedited services and extra assistance.

Van Rooyen and Barnabas note that the study more than halved undiagnosed HIV cases and doubled the number of people on ART. 'Critically, their data-driven approach identified gaps for future interventions to reach men, people who use alcohol, and those living in poverty, thus closing the gaps in HIV care,' they write.

Another gap in care that Havlir and colleagues identified in the sub-Saharan trials, and another reason for lower-than-expected reductions in new infections, is the challenge of reaching mobile populations. Implementing UTT over broader geographic regions would increase the reduction in new infections at the population level.

The results of the BCPE trial suggest that bridging demographic gaps in testing and treatment through data-driven targeted interventions valuably extends the benefits of UTT. 'Taking what we have learnt from clinical trials and programme evaluations, incorporating innovations and data-driven adaptations with ongoing monitoring and evaluation, we can maximise health benefits from HIV prevention and treatment programmes …,' Barnabas and van Rooyen write.

Additional preventative strategies that, alongside UTT, could help to reduce new infections to the epidemic control threshold include pre-exposure prophylaxis, youth-friendly sexual and reproductive health services, condom use and syringe service programmes. Dobromir and colleagues argue that more-dynamic models are needed to understand how different high-risk groups contribute to new infections and to identify the most effective combinations of treatment and prevention.

Author: Andrea Teagle, a science writer in the HSRC's Impact Centre
ateagle@hsrc.ac.za

Researcher: Prof Heidi van Rooyen, group executive of the HSRC's Impact Centre
hvanrooyen@hsrc.ac.za