The end of AIDS?

Published Online
April 10, 2017
http://dx.doi.org/10.1016/S2468-2667(17)30070-1

This online publication has been corrected. The corrected version first appeared at thelancet.com/public-health on May 12, 2017

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The phrase "ending AIDS" has become popular and means different things to different people. To many, it means eliminating all or almost all clinical disease and death due to HIV infection. The modelling study reported in *The Lancet Public Health* by Brian Williams and colleagues[1] proposes how this might be accomplished in South Africa through the Expanded Treatment and Prevention (ETP) strategy, rather than the Constant Effort (CE) policy that was in place until September, 2016. Combining treatment for all people infected with HIV with other readily available prevention measures would, according to this study, reduce new HIV infections to less than one per 1000 people per year by 2030.[1]

Of course, this strategy would not end HIV infections: most people who are treated successfully with antiretroviral therapy (ART) will live for 30–50 years while still harbouring latent HIV. The elimination of all infectious virus from a chronically infected person—commonly called cure—has never been achieved, with the exception of a single patient who received a bone marrow transplant with rare cells that were naturally resistant to HIV.[2]

However, the ETP model for ending AIDS still deserves careful consideration. This approach would save many lives while also reducing the financial burden, in the case of South Africa, from an estimated US$2·9 billion per annum in 2018 to $0·9 billion by 2050.[1] The savings would be largely due to the impressive benefits of treatment as prevention and the substantial drop in ART costs in the developing world.

The cause of AIDS has been known for more than 30 years, as has the fact that sub-Saharan Africa was experiencing a different (ie, primarily heterosexual) and more widespread epidemic compared with most other regions. In the 1990s, it became clear that the HIV-1 subtype C epidemic of southern Africa was the most severe worldwide. South Africa is the largest country in southern Africa and consequently has the largest number of HIV/AIDS infections in the world, at about 6 million. However, other countries in the region, such as Botswana, Lesotho, and, Swaziland, have similar or even higher infection rates. As pointed out by Williams and colleagues,[1] ending AIDS in the world depends on ending AIDS in South Africa.

In the early days of HIV/AIDS, optimism abounded about various prevention interventions, especially a vaccine. Most people expressed pessimism about the long-term benefits of ART, especially for the developing world. There was little precedent for effective therapy for viral diseases, the first drugs were toxic and prone to the development of resistance, and the highly trained medical personnel thought to be needed were generally not available in sub-Saharan Africa.

Most of these predictions were wrong. Even now, a preventive vaccine is not much closer, but the ETP strategy, as well as other programmes to treat most or all people with HIV infection such as the UNAIDS 90–90–90 plan,[3] seem to be the best way to implement large-scale prevention. An assumption of Williams and colleagues' model is that ART alone might reduce transmission by 99·2%. This level of efficacy is far better than what could be expected with even the best existing viral vaccines.

The first evidence for treatment as prevention was, in retrospect, the use of zidovudine to prevent mother-to-child transmission of HIV.[4] Subsequent combinations of ART for pregnant women provided extremely high efficacy.[5] The value of ART for decreasing HIV incidence in communities of adults was soon recognised[6] and the results of the HPTN 052 study[7] showed very high efficacy for ART given to the HIV-infected partner in serodiscordant-couple relationships. Other obstacles, ranging from drug costs to drug resistance due to incomplete adherence, have proven to be much less daunting than anticipated.[8] Drugs like dolutegravir[9] might make resistance negligible.

In another study, Walensky and colleagues[10] also modelled the effect of expanded treatment on HIV transmission and cost effectiveness in South Africa, in this case using the UNAIDS 90–90–90 design.[3] Although this study uses more conservative assumptions on treatment coverage and rates of viral suppression, it also predicts cost effectiveness and major benefits in the reduction of incidence. The increased rates of coverage and viral suppression used by Williams and colleagues might be justified on the basis of results from Botswana,[11] but the longer period for acute or early high viral load used by Walensky and colleagues seems closer to the frequency of extended early high viral loads seen in Botswana and South Africa[12] compared with the brief 2 week period used by Williams and colleagues.

Although the implementation of ETP should be strongly endorsed, many questions remain. How effective will ART be for the control of tuberculosis? Will the people who are hardest to reach for so-called test and treat ART also be at the highest risk for new HIV infections and equally hard to reach for other prevention interventions, such as pre-exposure prophylaxis (PrEP)? How will immigration and movement of people within South Africa complicate testing and enrolment? What new burdens will the people with long-term HIV infections who are successfully treated with ART place on the health-care system because of their increased risk for other chronic disease outcomes?

For Williams and colleagues' ETP model, many of the assumptions seem optimistic. But optimism might be warranted considering the remarkable progress made during the past 10–15 years in the treatment of the AIDS epidemic in Africa. That progress is largely attributable to the aggressive use of ART for prevention as well as treatment.

Max Essex
Harvard T H Chan School of Public Health AIDS Initiative, Harvard University, Boston, MA 02115, USA
messex@hsph.harvard.edu

I declare no competing interests.

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