We commend the creativity of Reuben Granich and colleagues in proposing universal voluntary HIV testing and immediate treatment to reduce HIV incidence to less than 0·1% in a generalised epidemic such as South Africa’s. However, in addition to programmatic, clinical, social, behavioural, financial, and ethical obstacles, we are concerned that their model underestimates the role of acute transmission. The proposed yearly testing would miss most acute infections (which cannot be detected by standard antibody tests), and thus would fail to stop potential rapid chains of early transmissions during peak (acute) infectivity. Granich and colleagues assume acute infection to be ten times as infectious as chronic infection, partly on the basis of the Rakai, Uganda, cohort, which provides the best direct evidence (although it was not designed to assess acute infectivity). However, modelling based on Rakai data has indicated relative acute infectivity of 26-fold to 43-fold.

Additionally, Granich and colleagues’ assumption of eight partners per year is strikingly at variance with survey data (even if such data probably significantly underestimate multiple partnerships), such as a 2005 South African survey that found only 16·3% of men and 2·6% of women reported two or more partners in the past year. Nor does an epidemic doubling time of 1·2 years approximate the current epidemic in South Africa.

Finally, the model’s estimated effect is based on optimistic assumptions, including a “full package” of standard interventions reducing transmission by 40% (something rarely, if ever, achieved). According to the model, the other 60% reduction in transmission would be achieved by universal testing and treatment (in a near-perfect scenario), but it would be very sensitive to rates of drop-out, infectivity while on antiretroviral therapy, and especially coverage of testing, making practical concerns about implementation all the more daunting.

We declare that we have no conflict of interest.

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Reuben Granich and colleagues explore a policy of universal voluntary HIV testing with immediate antiretroviral therapy as a strategy for elimination of HIV transmission. I wonder how relevant their findings are, given that the models used do not account for concurrency—ie, overlapping, long-term partnerships—which are likely to account for a substantial amount of HIV transmission in South Africa.

Granich and colleagues do state that their model “allows for a high level of concurrency and for a much higher infectiousness during the acute phase than during the chronic phase.” However, the reference they use to support this statement does not model concurrency, but uses a basic risk-category, deterministic model combined with a factor for changes in viral load. This is not the same thing as modelling concurrency, which is a network effect enhanced by, but independent of, viral load fluctuations. For deterministic models to approximate the observed prevalence of HIV, they must make unreasonable assumptions about African sexual behaviour. The authors of the cited paper, and presumably Granich and colleagues, assume that 1% of people have on average 77 partners per year. Behavioural surveys from Africa have never found such high levels of “promiscuity.” The authors’ assumption is derived not from behavioural data, but from the demands of the model itself. The model would not predict actual prevalence otherwise.

Network models do not require unrealistic assumptions, and are much better able to derive prevalence estimates on the basis of actual behavioural data. Thus, it would seem worth modelling the effect of testing and antiretroviral therapy with a network model that includes concurrent partnerships. At the very least, factoring in concurrency would increase the relative amount of transmission attributable to the “acute” phase—ie, when infection is not even detectable on an HIV test—beyond what is calculated by Abu-Raddad and Longini (and presumably Granich and colleagues). That would reduce the effect of testing and early treatment significantly, I suspect.

I declare that I have no conflict of interest.

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I declare that I have no conflict of interest.
The model would have been stronger had it costed concrete programmes to reduce these barriers and support people’s ability to access services. Without attention to such programmes, the model would not achieve the posited uptake necessary to achieve its goals. If efforts to determine the model’s potential are deemed worthy of study, it is imperative that not only HIV testing and treatment be scaled up, but also programmes to protect and promote human rights of people living with and vulnerable to HIV. Additionally, people living with and affected by HIV should be involved.

We declare that we have no conflict of interest.

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Reuben Granich and colleagues1 suggest universal HIV testing and immediate treatment of those found positive, which is indeed “a bold move away”2 from the current approach of treatment on the basis of clinical need and prevention through behavioural education.

Granich and colleagues’ modelling results depend heavily on the validity of assumptions about future or unrealised events. For example, they assume that, with treatment, infectiousness fell to only 1% of untreated infectiousness. They also assume a yearly dropout rate of 1.5%, which would seem overly optimistic for a long-term “universal” programme. A sensitivity analysis with these model parameters would have allowed us to see how different values might affect the results qualitatively. Scientifically, their results merely indicate some possible future scenarios—if antiretroviral therapy strikingly lowers the infectivity of treated patients, if long-term compliance is sufficiently high, and if this programme does not lead to significantly more risky behaviour by the population owing to a false sense of security.

Furthermore, to remedy the inadequacies of implementing a universal testing programme, one could consider the experience of Cuba, where extensive random testing accompanied by contact tracing of infected individuals has resulted in a high HIV detection rate, estimated by two different methods at around 77%3 and 80%,4 respectively. This has resulted in Cuba having a significantly lower HIV prevalence than its neighbours in the Caribbean Basin.5 Moreover, contact tracing is less costly than universal testing, and hence is an ideal complement to large-scale intervention programmes in developing countries.

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