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# Is 90-90-90 achievable?

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By 2010, the results of observational studies had suggested that high coverage of antiretroviral therapy (ART) is associated with decreased HIV transmission at a population level.[1] In 2011, the first reports from the randomised controlled trial HPTN 052 were published,[2] which definitively showed that ART reduces the risk of sexually transmitted HIV for serodiscordant couples. Findings from HPTN 052 have been extended,[3] and similarly compelling data have emerged from the TEMPRANO trial.[4] On the basis of these and other data, UNAIDS in 2014,[5] and WHO in 2015,[6] launched aggressive new policies to diagnose and to treat all patients with HIV infection worldwide to achieve plasma viral loads of under 1000 copies per mL in at least 73%. This policy has been framed as the HIV care and treatment cascade, in which 90% of people with HIV infection worldwide are diagnosed, 90% of those diagnosed start ART, and 90% of those taking ART achieve virological suppression.[7] The mathematical models[8] that led to this new policy suggested that this prevalence of suppression will be associated with a fall in the basic reproductive number, $R_0$, to below 1·0 and the gradual extinction of the HIV epidemic as a major public health problem by 2030.

In this issue of *The Lancet HIV*, Noah Haber and colleagues[9] present an analysis of a population-based cohort of patients from KwaZulu-Natal, a province in South Africa that is badly affected by HIV. This cohort, which consisted of patients with HIV who were followed up for 24 031 person-years, was recruited between 2006 and 2011, and was based on a dataset comprising merged data from demographic surveillance and centrally reported clinical and laboratory results. About 16% of the cohort died during follow-up. Although 82% of living patients had been diagnosed with HIV and knew their status, only 45% had been linked to care. Because these data span the period before the South African Government adopted the policy of universal treatment, only 39% were eligible for ART. However, 90% of patients who were eligible started ART, and 94% of those on therapy achieved virological suppression a median of 9 months after treatment initiation. Thus, once they became eligible, therapy followed quickly (within a median of 3 months) and was associated with a high rate of suppression. A second major finding is that these transitions, when examined via longitudinal analysis, have worsened over time. Other data from an observational study[10] in KwaZulu-Natal have shown that ART is associated with decreased HIV acquisition in serodiscordant couples. However, what these new data make clear is that, no matter how effectively ART reduces transmission, therapeutic goals will be difficult to reach.

Data from randomised controlled community-based trials are also emerging. Unfortunately, the first of these trials, ANRS 12249,[11] which was also done in KwaZulu-Natal, did not show differences in the incidence of HIV infection between communities randomly assigned to mass screening and treatment for all and those treated according to the then-current South African standard of care. It has been speculated that low uptake of clinical care after diagnosis in the intervention communities was at the root of the failure to achieve a measurable difference between the groups. In ANRS 12249, 47% of patients sought care (the first step towards receiving ART) after diagnosis—remarkably

close to the 45% who sought care after diagnosis in Haber and colleagues' study.[9] Two other trials, PoPART HPTN 071 and SEARCH, are underway, and will provide additional data in the next few years.

Diagnosing 90% of people with HIV, providing ART to treat 90% of those diagnosed, and sustaining viral suppression in 90% of those on ART is a daunting global goal. However, in the absence of an effective and affordable immunisation for HIV, universal ART remains the best hope for HIV control. Data such as those presented by Haber and colleagues are highly encouraging and suggest that population-level efforts can be a successful core HIV control strategy.

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