



## Reaching the 90-90-90 target: lessons from HIV self-testing

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Reaching the UNAIDS goal of viral suppression among at least 73% of people who are living with HIV through lifesaving antiretroviral therapy (ART) hinges on reaching the key goal of identifying 90% of people living with HIV. Community-based HIV testing is successful in increasing the proportion of people living with HIV identified and linked to care, but gaps persist and innovative testing strategies are needed to address them.<sup>1-4</sup> Specifically, men in sub-Saharan Africa are less likely than women to undergo HIV testing and link to care, leading to a gap in life expectancy of up to 10 years between men and women and ongoing HIV transmission from men to women.<sup>5-7</sup>

Community-based testing and linkages to HIV care and prevention are being assessed in HPTN 071/PopART, a cluster-randomised trial in 21 communities in Zambia and South Africa to estimate the effect of a household combination HIV prevention package on population-level HIV incidence. In *The Lancet HIV*, Chama Mulubwa and colleagues<sup>8</sup> report assessment of HIV self-testing compared with standard finger-prick testing in a nested cluster-randomised trial in individuals aged 16 years and older in four Zambian communities participating in PopART. In a 3-month period, community HIV care providers enumerated 13 267 individuals in the HIV self-testing group (a door-to-door offer of the option of oral HIV self-testing alongside the offer of home-based finger-prick rapid HIV testing) and 13 706 in the non-HIV self-testing group (the offer of home-based finger-prick rapid HIV testing alone done by lay counselors at the household). In the intervention arm these lay counselors offered a choice of HIV self-testing, with or without supervision or through secondary distribution. The primary outcome was knowledge of HIV status (defined as self-reporting HIV positive to the community HIV care providers or accepting an offer of HIV testing services).

The intervention led to a 1.30 increased odds in knowledge of HIV status in the HIV self-test group, 68% in the HIV self-test group had knowledge of HIV status compared with 65% in the non-HIV self-test group. The effect of HIV self-testing only occurred in men, among whom there was a 5% increase in knowledge of HIV status. Unsupervised HIV self-testing was twice as likely to be used by men aged 30 years or older as

among men aged 16 to less than 30 years. The number of people tested increased from 21% to 30% with HIV self-testing among those who didn't participate in the first two rounds of household HIV testing in PopART. The self-testing intervention also had a small but significant effect on knowledge of HIV status among younger individuals (aged 16 to 29 years); however, 28% of adolescents were not reached, primarily because males and younger age groups were more often absent during household visits.<sup>8</sup>

Thus, HIV self-testing accessed the hardest to reach individuals, including men, younger people, and individuals previously resident in the community but who did not participate in two rounds of PopART. HIV positivity was similar among those tested by HIV finger-prick, HIV self-tests, and unsupervised HIV self-tests, suggesting that there was no evidence of selection bias by testing strategy in this study, which allowed choice of supervised or unsupervised HIV self-testing in the intervention arm. Importantly, social harms were rare in the HIV self-testing group.

The most meaningful outcome from the perspective of both individual and public health was the linkage of HIV-positive individuals to ART care and viral suppression (ie, the second and third 90s in the UNAIDS 90-90-90 target framework). Although this study was not designed to assess linkage to care and viral suppression, interventions might be needed to facilitate and monitor linkage of HIV self-testing to HIV care to maximise the effect on initiation of ART and viral suppression (the full cascade of 90-90-90).

We commend the investigators for seeing the gap in HIV testing and rigorously assessing HIV self-testing. Looking ahead, what is the role for HIV self-testing and community-based strategies to reach the first 90 target and sustained linkage to treatment and prevention? With increased experience and access to HIV self-testing, people living in medium and high HIV-incidence settings could independently do HIV self-tests, which will further normalise testing and also bring down the costs. To get there, several gaps in evidence need to be addressed. First, men who were absent from their homes might be reached by testing at social venues or in their work place. Second, although no increase among women in knowledge of HIV status with HIV

self-testing was observed, and women more often chose supervised testing, women could also benefit from increased access to HIV self-testing, which is more convenient than HIV finger-prick tests. Third, WHO calls for appropriate supervision to be available, and for young people this might mean peer-guided or App-guided HIV self-testing strategies. Unpacking and meeting the priorities and motivation of men, women, and young people could further increase HIV testing. Lastly, innovation is needed to link persons to prevention or treatment services to reach the ambitious HIV testing, treatment, and prevention targets needed to achieve epidemic control.

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## How do we preserve health among adults living with HIV?

In *The Lancet HIV*, Keri N Althoff and colleagues<sup>1</sup> estimated the contribution of traditional and HIV-related risk factors for non-AIDS defining cancers, type 1 myocardial infarction, end-stage liver disease, and end-stage renal disease in a large, well performed cohort study of HIV-infected patients from the North American AIDS Cohort Collaboration on Research and Design Consortium recruited during 2000–15. This study highlights the importance of intervening upon traditional risk factors to prevent a substantial proportion of these outcomes among HIV-infected adults. The findings are of interest for physicians treating HIV-infected individuals and could be used to guide the prioritisation of interventions. However, it would be reasonable to initiate a general debate about how money should be used and how to prioritise interventions and allocate resources not only for the ageing HIV population, but also for the aging population in general.

During the past 20 years, the life expectancy of the HIV-infected population has improved substantially, with the median age reaching 50 years or more.<sup>2,3</sup> As a result, the main health challenge for most of the

HIV-infected population in high-income countries nowadays is not immunodeficiency, but prevention and management of age-related and lifestyle-associated diseases, multimorbidity, and polypharmacy.

The shift in the main health challenge faced by the HIV-infected population results from the combined effect of natural ageing and the greater relative risk for a number of age-related diseases in this population than in the general population.<sup>3,4</sup> Persistent immune dysfunction, inflammation, chronic immune activation, and toxic effects of treatment have been suggested as the main causes of the risk increase.<sup>5</sup> However, life-style associated and conventional risk factors, some of which are more prevalent among the HIV-infected population than the general population, seem to account for a substantial and potentially preventable part of the burden of age-related diseases.<sup>6,7</sup>

In their study, Althoff and colleagues<sup>1</sup> estimated the fractions of incident non-AIDS-defining cancer, myocardial infarction, end-stage liver disease, and end-stage renal disease that were attributable to specific risk factors at a population level (ie, population attributable fractions; PAFs), to identify the risk



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