VIEWPOINT

Where are the positives? HIV testing in sub-Saharan Africa in the era of test and treat

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When the definitive history of AIDS is written, HIV testing will feature not only as a major advance, but also as a metaphor for our uneasy approaches to the epidemic [1]. HIV testing remains suboptimally implemented and widely debated, even as the world has committed to the Sustainable Development Goals and associated calls to end AIDS [2].

1 December 2018 marks the 30th World AIDS Day. Its theme is ‘know your status’; the first time the focus has been on testing, offering opportunity to review how attitudes to testing have changed and policy has evolved since HIV tests were approved for use in 1985. Early on, widespread HIV testing in low and middle-income countries seemed inconceivable. Use of scarce HIV testing resources focused on blood safety, sentinel surveillance and research, and clinical testing of patients who were suspected to have AIDS was initially more available in private than in public facilities. Later, testing scale-up was influenced by experience in high-income countries, with strong protections against mandatory testing; requirement for informed, sometimes written consent; and extensive pre and post-test counselling. Partner notification was not prioritized, as it was for other sexually transmitted infections, and even diagnostic HIV testing of sick patients was not always available [1,3].

Attitudes to HIV testing in low and middle-income countries changed following increased access to treatment and prevention services, especially interventions to prevent mother-to-child transmission. Introduction of point of care rapid tests for HIV further encouraged expansion of testing in many low-resource settings, although some countries have continued to require laboratory-based testing. Voluntary counselling and testing (VCT), viewed as a prevention activity and the gateway to care, was massively expanded, especially in Africa, but maintained strong requirements for pretest counselling [4].

An important shift occurred with the adoption of ‘opt out’ approaches, whereby persons are informed that HIV testing will be performed in the clinical context unless they specifically decline, analogous to practice for most other medical tests. Guidance on provider-initiated HIV testing and counselling (PITC) from the WHO and the Joint United Nations Programme on AIDS (UNAIDS) in 2007 called for testing to be recommended to all persons attending health facilities in generalized epidemic settings, as well as to members of key populations disproportionately affected by HIV [5]. Although recommended, PITC has only been applied consistently in antenatal and tuberculosis clinics and there are still many missed opportunities for testing in clinical settings [6–8]. Accumulating evidence of the benefit of early antiretroviral therapy (ART) highlighted the need to expand HIV testing, motivating UNAIDS to launch its 90:90:90 strategy that calls for 90% of people with HIV to be diagnosed, 90% of the diagnosed to access ART and 90% of the treated to be virally suppressed [9]. Achieving ‘the first 90’ is critical to the whole treatment cascade.

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Population-based HIV surveys in 2015–2016 in Malawi, Zambia and Zimbabwe showed overall awareness of HIV status in 67–74% of all persons aged at least 15 years living with HIV; higher awareness in women than in men; and substantially lower awareness in younger persons aged 15–24 years (50% or less) [10]. Once people were diagnosed, ART uptake and viral suppression were high, and the ‘second and third 90s’ were consistently higher than the first. However, studies among key populations showed a wider range in awareness of HIV-positive status; for example, 18.9% of HIV-positive people who inject drugs in Myanmar [11]; 9.9–30% of MSM with men in Mali, Uganda and India [12–14]; and 64–82% of female sex workers in Zimbabwe and South Africa [15,16]. Overall, UNAIDS estimated that 75% of persons living with HIV globally knew their HIV status by end-2017, indicating that 5.7 million additional persons needed to be diagnosed for global achievement of ‘the first 90’ [17].

Despite these achievements, we face a major testing challenge. Scaling up HIV testing to find the millions unaware of their HIV infection is critical to achieving the 90:90:90 targets. Finding ways to reach people earlier and retest persons with ongoing HIV risk has benefits for reducing HIV morbidity and mortality and preventing HIV transmission. However, resource constraints and potential funding shortages have resulted in demands for increased efficiencies. This has resulted in an emphasis on differentiated approaches to testing with a sharp focus on ‘yield’, meaning the proportion of tests performed that are positive, in an attempt to reduce overall numbers of tests and cost.

There is inherent tension between HIV testing strategies aiming for high yield and those seeking to identify the largest absolute number of individuals with HIV. For example, PEPFAR–supported programmes in Kenya tested more than 13 million people between July 2017 and June 2018, for a yield of only 1.4%. PITC accounted for 77% of all testing performed. The highest yield of new HIV-positives, 9.6%, came from tuberculosis clinics, but their number of new diagnoses was just under 5000. By contrast, over 125 000 newly recognized HIV infections came from the other 10 million tests performed through health facilities, although that represented a yield of only 1.2%.

Self-reported HIV status might appear attractive for targeting HIV testing and, in Kenya, self-reported HIV-positive status showed a high positive predictive value. However, self-reported HIV-negative status did not reliably indicate absence of HIV infection. In Kenya’s 2012 population-based survey, 37% of HIV-positive persons self-reported as HIV-negative and 21% of the latter group had antiretroviral drug metabolites in their blood [18,19]. To minimize unnecessary HIV testing, PITC practice in Kenya has been to recommend repeat testing of HIV-negative persons after a minimum period of a year since the prior test. However, reducing this interval to 3 months, requiring documentation of the negative prior test, and testing persons accompanying patients yielded a substantial increase in numbers of HIV-positive persons identified [20].

Innovations and more focused approaches have been proposed to reconcile ambitious HIV diagnostic targets, low yield and stagnant funding. Suggestions include more selective testing in healthcare settings through use of clinical algorithms identifying persons most likely to be HIV-positive. However, prioritizing specificity over sensitivity through such an approach would likely miss HIV diagnoses among asymptomatic individuals or those with atypical or unrelated symptoms, denying such persons the benefit of ART. A quarter century ago, the Centers for Disease Control and Prevention recommended routine HIV testing in U.S. hospitals with an HIV prevalence of 1% or more or a rate of new AIDS diagnoses of one per 1000 discharges [21]. These thresholds are likely to be met at most health facilities in sub-Saharan Africa.

Other strategies considered include community-based testing, testing family members of HIV-positive index patients, partner notification and self-testing, the latter only now being rolled out. Home-based testing, now that more people are aware of their HIV status, may no longer be efficient. Testing of immediate family members of persons with HIV has given a yield of 3–4% in Kenya. Increased attention is now being given to partner notification, which the WHO has recommended since 2012 but has been rarely implemented.

A review of four randomized trials of partner notification services and six observational studies showed that partner notification for HIV is feasible, effective and results in little social harm [22]. Assisted partner notification was more effective in ensuring testing of contacts than passive referral, and the proportion of partners tested who were HIV-positive in the assisted experiences ranged from 12 to 86%. Network-based methods, analogous to respondent-driven sampling for epidemiologic studies, have also been shown to achieve high positivity rates and can reach people not accessed through current testing services including men and members of key populations [23,24].

A caution is that, although yield may be high, the absolute number of HIV-positive individuals identified through innovative methods such as partner notification will likely be low. Initial experience in Kenya between July 2017 and June 2018 indicated nearly 16 500 new HIV diagnoses from almost 340 000 partner contacts tested, for a yield of 4.9%; these positives accounted for 9.2% of all new diagnoses. It is possible that some persons tested in this early experience were not sex or needle-sharing partners of index clients but other contacts, diluting the risk pool. In England’s 2016 HIV testing experience, partner notification had the highest yield of all modalities, with 3.9% of all partners tested being HIV-positive [25].
Nonetheless, this represented only 1.5% (72/4663) of all new adult HIV diagnoses. To achieve large numbers, partner notification will likely have to be conducted at great scale, an expensive undertaking and the index case persons will still have to be identified by other testing modalities. Partner notification is labour-intensive and costly, although one evaluation concluded it was cost-effective, and affordability could be enhanced by task shifting [26].

Deciding on which HIV testing approach to prioritize exemplifies the common public health conundrum of whether to focus on rates or absolute numbers, and at what cost. Achieving the 90-90-90 targets requires identifying the largest possible number of HIV-positive individuals, and healthcare settings remain the richest source of new diagnoses in most African contexts. Family testing and partner notification still require diagnosis of the initial case of HIV, and this most often occurs in a health facility. For these reasons, as well as the ethical imperative of not letting HIV go undiagnosed and untreated in healthcare settings, we believe it premature to reduce emphasis on PITC in health facilities, which remains the greatest contributor to the ‘first 90’.

The reality is that as more people with HIV are diagnosed and access care, finding persons with undiagnosed HIV becomes progressively more difficult and likely expensive. In the hope for an end-game of eliminating HIV as a pandemic, more rather than less HIV testing will be required. This will include scale-up of all approaches at our disposal and differentiated approaches to testing, tailored to specific contexts. Not only will increased effort be required, but also increased testing, to diagnose and link to ART those populations with low access, including men and adolescents in East and southern Africa, and individuals from key populations in all regions.

Critical evaluation indicators to consider other than yield include absolute numbers of new HIV diagnoses, the cost per HIV-positive person identified and the proportions of HIV-positive individuals linked to ART and who achieve viral suppression. Missing from the 90:90:90 discussions is HIV-associated mortality, the ultimate indicator of overall programme impact. As we approach universal treatment and aspire to control the HIV pandemic, a lower yield for HIV testing but not necessarily a reduced number of tests must be anticipated, and this will constitute one of the prices of success.

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Conflicts of interest
There are no conflicts of interest.

References


