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# Reaching 90–90–90 in rural communities in East Africa: lessons from the Sustainable East Africa Research in Community Health Trial

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## Purpose of review

There is an urgent need to understand new population-level approaches that achieve high levels of treatment and viral suppression for persons living with HIV.

## Recent findings

The SEARCH Universal test and treat (UTT) trial conducted in Kenya and Uganda aimed to reduce HIV incidence and improve community health. SEARCH offered HIV and multidisease testing at health fairs followed by home testing for nonparticipants in 32 communities, each with approximately 10 000 persons. In the 16 intervention communities, UNAIDS 90–90–90 targets were achieved within 3 years, reaching '92–95–90' and 79% population-level viral suppression. HIV incidence declined by 32% between year 1 and 3 of follow-up. Key principles of SEARCH's approach included community engagement, integration of HIV with multidisease services, rapid ART start upon HIV diagnosis, and patient-centered, streamlined care. SEARCH's community health approach also reduced HIV mortality, annual TB incidence, and uncontrolled hypertension compared with a country standard of care. Population-level viral suppression increased beyond the UNAIDS 73% target in women and men and reached levels well above recent country estimates across much of sub-Saharan Africa.

## Summary

SEARCH provides one example of how to rapidly surpass UNAIDS 90–90–90 targets while addressing community health on the path to HIV epidemic control.

## Keywords

HIV epidemic control, Kenya, Uganda, Universal HIV Test and Treat

## INTRODUCTION

Antiretroviral treatment (ART) is a key component of global HIV epidemic control and reduces deaths, tuberculosis and new HIV infections. Although great progress has been made in rolling out ART globally, there are still 1.7 million new HIV infections and nearly 1 million deaths annually [1]. We need to accelerate ART coverage through HIV testing, treatment and viral suppression and go beyond the UNAIDS '90–90–90' to reach 2030 UNAIDS targets for epidemic control. In 2018, nearly all countries in Africa were far from reaching the 2020 target of population level viral suppression of 73% [2\*]. For example, recent estimates of population-level viral suppression are 55% in Uganda and 42% in Tanzania. The SEARCH (Sustainable East Africa Research in Community Health) Universal Test and Treat (UTT) Study conducted in rural Uganda and Kenya illustrates one approach to accelerate HIV testing and treatment and improve overall health. Using a

community-based, multidisease model, UNAIDS targets were exceeded ('92–95–90'), and population-level viral suppression increased from 42 to 79% in

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## KEY POINTS

- Rapidly achieving and surpassing UNAIDS 90–90–90 targets in rural Kenya and Uganda, with comprehensive universal HIV testing and treatment, was feasible using a community-health approach and reduced HIV incidence, mortality and tuberculosis and improved hypertension control over a 3-year time frame.
- Community engagement, integration of HIV into multidisease service delivery, rapid ART start upon HIV diagnosis and patient-centered care were the key principles underlying SEARCH’s success in exceeding 90–90–90 targets.
- Proactive efforts to generate demand and reduce barriers for testing and treatment services among men substantially reduced sex disparities in viral suppression at a population-level, with men exceeding 90–90–90 targets in SEARCH intervention communities in 3 years.
- Despite surpassing UNAIDS 90–90–90 targets, gains in viral suppression were not uniform, with persistent disparities seen in youth.
- Lessons learned from SEARCH and other UTT trials can provide critical insights into efforts going forward to achieve the broader goal of HIV epidemic control in sub-Saharan Africa.

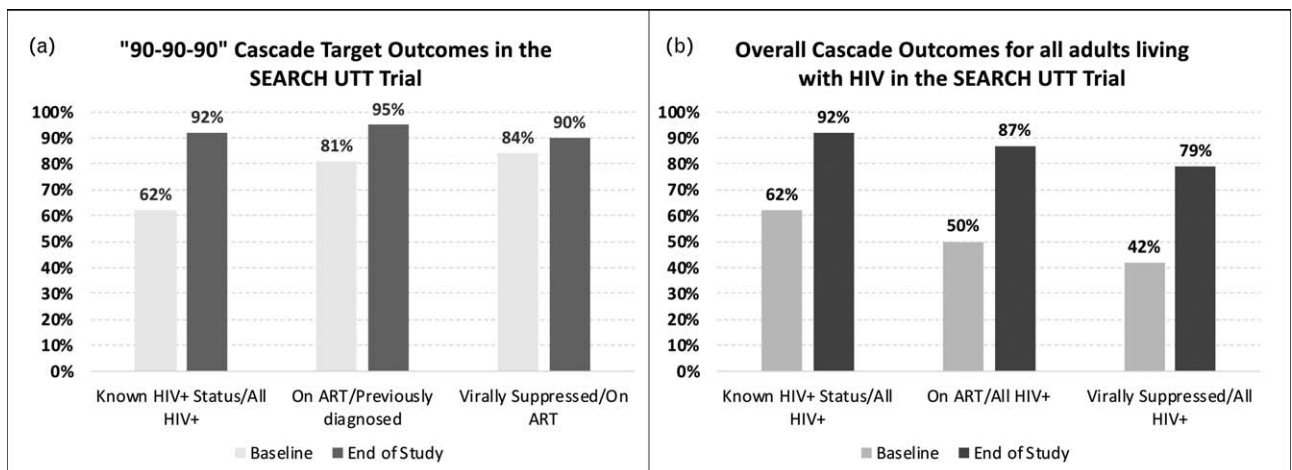
3 years (Fig. 1). Annual HIV incidence declined by 32% in SEARCH intervention communities, and HIV mortality, annual TB incidence and uncontrolled hypertension were each more than 20% lower compared with a country standard of care [3\*].

The SEARCH UTT approach, based on the PRECEDE implementation science framework [4], was rooted in four central principles: community

engagement; community (out-of-health facility) HIV testing via a multidisease approach; rapid ART start offered upon HIV diagnosis; and patient-centered, flexible HIV testing and treatment services with an emphasis on ‘customer service’. Knowing that men were less likely to test and engage in care, we proactively designed interventions to generate demand and reduce barriers for men. Universal testing in SEARCH included community mobilization and a baseline census, followed by 2-week HIV and multidisease health fairs, with home-based testing for nonattendees, annually for 3 years. For universal treatment, rapid ART start was offered upon HIV diagnosis and delivered via health facility-based, patient-centered, streamlined HIV care. Here we describe how SEARCH designed and implemented UTT, and the gaps that resulted from this approach, associated medical outcomes and lessons learned for moving forward with HIV epidemic control.

## UNIVERSAL TESTING

Input from community leaders in health, local government and occupational organizations (e.g. farming and fishing) formed the foundation for the SEARCH UTT approach. The SEARCH team forged partnerships with these leaders and community members and held regular meetings that influenced the design of UTT. Community leaders emphasized that UTT would only be successful if it: was part of a broader investment in overall community health, rather than a stigmatizing, HIV-focused activity; and reduced barriers to testing access – as time spent to both reach and wait at health facilities was high for villagers, particularly in rural areas. SEARCH designed universal testing services in response to



**FIGURE 1.** (a) SEARCH Trial intervention arm outcomes (92%–95%–90%) at end of trial (year 3) for the UNAIDS ‘90–90–90’ targets among all persons living with HIV in SEARCH intervention communities. (b) SEARCH Trial intervention arm outcomes at end of trial (year 3) for the UNAIDS ‘90–90–90’ targets with all adults living with HIV in SEARCH intervention communities as the denominator for each step of the cascade. SEARCH, Sustainable East Africa Research in Community Health.

this community input by offering HIV screening as part of multidisease health fairs, not solely focused on HIV, with out-of-facility testing to minimize barriers and increase access to testing. For residents identified by the study's baseline census but unable to attend the health fair, we offered testing at home or other community locations of their choice [5].

Integrating universal HIV testing into multidisease health fairs demonstrated SEARCH's commitment to community health and provided a means to cope with stigma when accessing HIV testing. Community members are often well aware of clinical sites that provide HIV testing alone, and unfortunately, persons may be wary of accessing these sites out of fear of being seen by their peers. A multidisease testing and screening approach was one way to mitigate these concerns while addressing broader community health needs. Practical challenges to a multidisease testing approach include: funding (which is often disease-specific); and ensuring access to care for medical conditions identified by diagnostic tests offered at fairs (e.g. hypertension). These barriers were overcome by demonstrating that the marginal costs of adding additional services to HIV testing infrastructure, such as hypertension and diabetes screening, are low [6], and explaining the rationale and potential gains of the multidisease approach to and collaborating closely with local and national government HIV and noncommunicable disease programs.

Multidisease service delivery also played a central role in mobilizing SEARCH community members to attend health fairs and engage in testing. SEARCH used posters and radio announcements advertising the breadth of services offered, including screening for hypertension, diabetes, malaria, tuberculosis and HIV, as well as Vitamin A and deworming treatment for young children. On the basis of community feedback, additional services were included over time, including those with the explicit goal of increasing men's attendance at fairs. These included an 'urgent care' station to address acute issues, such as job-related musculoskeletal pain and rashes, and a men's health 'tent' that offered education and group discussion followed by one-on-one counseling for men regarding sexual health concerns, such as erectile dysfunction and sexually transmitted infections, as well as marital and relationship concerns. In addition, other groups (e.g. nongovernmental organizations) requested and were able to offer add-on services at health fair sites, such as on-site cervical cancer screening and family planning. Multidisease health fairs, thus served as a flexible platform responsive to community input and needs over time.

Recognizing that villagers do not wish, or cannot afford, to spend large amounts of time away from

work or daily chores for HIV testing, SEARCH strove to make participation in HIV testing easy and fast (median transit time at health fairs was ~43 min) [5]. Specifically, all screening tests offered were point-of-care, and services were mobile and moved every 1–2 days to a new site, with sites recommended by the community and accessible by foot to villagers. Health fairs incorporated demand-generating strategies based on input from community members to make attendance desirable and to create a festive atmosphere. These included activities, such as live music, games (e.g. soccer matches, debates, cooking contests and a local 'Olympics'), low-cost raffles and tents to offer shade and cover from rain (Fig. 2) [7]. Community leaders (not exclusively health leaders) welcomed villagers as the 'face' of the fairs, and waiting areas not only included health education, but talks by local farming and fishing co-operatives. SEARCH implemented fairs on weekends and during evening hours, to maximize villager, particularly men, access [8]. Home-based testing for fair nonparticipants, a greater proportion of whom were men, also helped to ensure high testing coverage among men [9]. HIV testing costs remained in the range of other mobile testing approaches [6].

At the start of SEARCH, only 62% of persons living with HIV (PLHIV) knew their HIV status. After 3 years of annual campaigns, more than 90% of PLHIV knew their status, and 98% of all baseline census-enumerated adults who remained alive and in community had tested at least once [3<sup>■</sup>]. By incorporating opt-out testing for HIV within multidisease screening, HIV testing uptake among health fair participants exceeded 99%, with less than 1% of participants declining [5]. Staff provided group pretest and one-on-one posttest counseling, with the option of couple's counseling, to all. Among two key subgroups that programs struggle to reach, men and youth (age 15–24 years), the proportion of PLHIV aware of their status was 95 and 87%, respectively, in an open-cohort of residents after 3 years of SEARCH's testing approach [3<sup>■</sup>]. Overall, the SEARCH universal testing approach, which consisted of a census, multidisease health fair and follow-up testing for fair nonparticipants, offers an effective method for rural African communities to rapidly pass the first '90' among both women and men, while addressing broader community health concerns, at a cost comparable with other testing approaches.

## **LINKAGE TO CARE AND ANTIRETROVIRAL THERAPY START**

Linkage to care following an HIV test, particularly when testing is offered outside of health facilities – and therefore, the risk of 'falling out of the cascade'



**FIGURE 2.** Photos of SEARCH Multidisease Community Health Fairs: (a) setting up health fair tents along a hilltop in Southwestern Uganda (photo to the left); and (b) a woman and her two children attending a health fair in Eastern Uganda (photo to the right). SEARCH, Sustainable East Africa Research in Community Health.

during testing to treatment transitions is higher – is critical to the success of UTT. During SEARCH health fairs, a healthcare worker (clinical officer or nurse) from the local government clinic and peer educators (PLHIV who volunteer at clinics) were in attendance, to ensure that each person diagnosed with HIV received an introduction to the clinic staff at the time of testing positive, and to assist with rapid linkage to care and ART initiation [10<sup>¶</sup>]. In keeping with the principle of nts with a positive screen for any condition, whether hypertension, diabetes or HIV, met with a staff member to receive a clinic appointment. At home visits, persons with a new HIV diagnosis talked with a clinic staff member via mobile phone to receive a welcoming introduction to the clinic.

PLHIV who were either newly diagnosed or who had fallen out of care received an appointment within 7 days of HIV testing; pregnant women and persons with CD4<sup>+</sup> less than 200 received appointments within 48 hours [11]. SEARCH offered a 4-week supply of ART on-site at testing fairs. Staff assisted with transport for individuals who wanted to go to the clinic that same day. Transport vouchers to cover travel costs to clinics were provided for the first clinic visit and a mobile phone number was provided that PLHIV could call or text if they had questions. For PLHIV who missed their initial or follow-up appointments, a clinic

tracker would reach out by phone or in person using unmarked vehicles, with flexibility in meeting places, so as to avoid home visits when not wanted by patients [12]. Using this approach, 50% of persons not on ART were linked to care and started ART within 1 week, and 73% linked and started ART within 1 year [10<sup>¶</sup>].

### UNIVERSAL TREATMENT

SEARCH's universal treatment intervention used a patient-centered, streamlined approach to chronic care to overcome barriers to HIV care and optimize health system efficiency. On the basis of community feedback, our own work, and existing literature, it was clear that prior to the start of SEARCH central clinics offering HIV treatment often had long wait times (at times requiring a full day to attend a single out-patient clinic visit) [13], which resulted in time away from work with lost wages or productivity [14]. Furthermore, attending an HIV clinic could fuel rumors, stigmatize PLHIV and create social isolation [15]. In addition, patients had to attend clinic monthly to refill ART [16], and perceptions of judgement, manifesting as 'scolding', from healthcare workers were common [17]. Although these concerns were present for both sexes, men in particular cited these barriers as reasons not to engage in HIV care [18<sup>¶</sup>].

SEARCH's treatment intervention sought to overcome these barriers to care. Our approach included: a 'chronic care' clinic that was 'status neutral' and offered integrated care for HIV, hypertension and diabetes, rather than a solely HIV-focused clinic; less frequent clinic visits for stable patients, with ART refills and clinician appointments every 3 months instead of monthly, to reduce transport costs to the patients; extended clinic hours for patients who could not attend usual daytime hours (e.g. fisherfolk); 24-h phone access to a clinic provider and tiered tracking of patients who fell out of care; and an emphasis on customer service with training of clinic staff on providing a welcoming and friendly environment without judgment or punitive language for patients struggling to engage in care [11]. The costs of this streamlined care approach, inclusive of viral load testing, were similar to or lower than other cost estimates for HIV care delivery in SSA [19<sup>¶</sup>].

With this approach to linkage to care and universal ART eligibility, viral suppression (the third 90) increased from 42 to 71% by 1 year. Overall, after 3 years of SEARCH's UTT intervention, the prevalence of viral suppression among all PLHIV was 79%; well above the '73%' target for viral suppression with '90–90–90' goals [3<sup>¶</sup>]. Among adult men living with HIV, a key group that has consistently 'fallen through the cracks' of the HIV care cascade across SSA, the prevalence of viral suppression was 74% after 3 years of SEARCH's intervention. We attribute this success among men to SEARCH's approach that proactively sought to generate demand for HIV testing and treatment through multidisease integration, lower the 'costs' and time required to access testing and treatment, and offer patient-centered, streamlined care that responded to input from PLHIV and addressed well known barriers to HIV care in SSA.

In contrast to men, HIV-infected adolescents and young adults remained a key sub-group for whom SEARCH's streamlined and multidisease approach to chronic care did not surpass 90–90–90 viral suppression targets, with a prevalence of viral suppression of 55% among 15–24-year-olds in intervention communities after 3 years [3<sup>¶</sup>]. Despite high HIV testing coverage [20], youth linked to care, initiated ART and achieved viral suppression at lower rates than older adults [3<sup>¶</sup>]. Possible explanations for this disparity include: a lack of appeal of integrated noncommunicable disease care, such as hypertension and diabetes – as prevalence of these conditions is low in youth; and competing priorities, such as issues related to social, educational and economic advancement, that outweigh health concerns among youth to a relatively greater extent

than adults, and result in lower care engagement. These gaps must be addressed, and new approaches are under study.

## POPULATION-LEVEL HIV AND HEALTH OUTCOMES

HIV and other health outcomes improved over a very short time with SEARCH UTT and would be expected to increase further over time. HIV incidence decreased by 32% from the first to the third year in the SEARCH intervention arm, in parallel with a near doubling of population-level viral suppression. Notably, in the setting of rapidly changing HIV treatment guidelines, we found no difference in cumulative HIV incidence between the SEARCH intervention and control arms, attributed to the combination of universal baseline HIV testing and rapid expansion of ART eligibility early in the study in the control arm [3<sup>¶</sup>]. Importantly, we did see a more than 20% reduction in HIV-related mortality and HIV-associated tuberculosis (TB) disease in SEARCH intervention versus control communities: reductions that appear to be mediated by greater and more rapid ART start among persons with CD4<sup>+</sup> less than 350, despite ART eligibility for this sub-group in both arms throughout the duration of the trial [21]. Finally, we saw significant improvements in hypertension control among adults with and without HIV at 3 years in intervention versus control communities. At 3 years, hypertension control among adults with prevalent hypertension was 47% in intervention versus 37% in control communities [3<sup>¶</sup>].

## CONCLUSION

Population-based studies, such as SEARCH and other UTT trials [22<sup>¶¶</sup>–24<sup>¶¶</sup>], provide unique and critical insights on how to move towards HIV epidemic control and reduce new infections and HIV-associated mortality. These studies rapidly achieved near-universal testing by working closely with communities and offering HIV testing through health fairs or home testing; rapid linkage and ART start was critical for success. Adding preexposure prophylaxis or other novel prevention approaches to HIV testing and ongoing targeted testing provides opportunity to further enhance impact. SEARCH used a multidisease approach, which increased demand generation for testing, reduced stigma and offered hypertension and diabetes screening for only one additional US dollar/person. Achieving 90–90–90 targets is a first step for HIV epidemic control – efforts now need to be made to go beyond these targets on a population level, including

among subgroups such as youth. In generalized HIV epidemics, UTT approaches that integrate noncommunicable diseases will be critical for overall health outcomes, sustainability and transition to a universal healthcare model.

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## Conflicts of interest

There are no conflicts of interest.

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- of special interest
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