EDITORIAL

Adolescents, young people, and the 90–90–90 goals: a call to improve HIV testing and linkage to treatment

Vincent J. Wong[a], Kate R. Murray[b], B. Ryan Phelps[a], Sten H. Vermund[c] and Donna R. McCarraher[b]

The current low rates of HIV diagnosis and treatment initiation among adolescents and young people ages 15–24 continues to present a significant challenge to the epidemic control of HIV. With a 'business as usual' approach to HIV testing and linkage to treatment, new infections among adolescents and youth will likely increase, with the burden compounded by the increasing number of youth in Africa, expected to reach 293 million by 2025. Recent studies reveal significant gaps in the HIV clinical cascade among young people as the global community pursues the Joint United Nations Programme on HIV and AIDS 90–90–90 targets. This AIDS supplement was commissioned with the goal of informing program planners, researchers, policymakers, and funding agencies about the development and design of effective adolescent and youth programs, policies, and strategies for improving the first two 90s among adolescents and youth: HIV testing and diagnosis and linkage to care and treatment. Emerging evidence should inform efforts to better target the youth and adolescents who are most at risk, aiming for early diagnosis and treatment initiation for those who are HIV positive, while also ensuring appropriate primary prevention so that those identified as HIV negative remain so.

AIDS 2017, **31** (Suppl 3):S191–S194

Keywords: adolescents, HIV, linkage, pediatrics, provider-initiated testing and counseling, testing, voluntary counseling and testing, youth

The good news in global health includes the tremendous gains made in prevention of mother-to-child transmission services, which now reach 80% of pregnant women living with HIV in 21 priority countries, and toward the bold new goal of eliminating HIV among infants [1,2]. However, the troubling news remains the current low rates of HIV diagnosis and treatment initiation among young people ages 15–24 which continue to present a significant challenge to epidemic control. In the United States, 59% of adolescents and young adults ages 13–29 who are living with HIV remain undiagnosed [3]. In Sub-Saharan Africa, where most young people and adolescents living with HIV (ALHIV) reside, only one in five HIV-positive adolescent girls know her HIV status. Moreover, globally an estimated one-third of all new infections occurs in those 15–24 demonstrates the importance of an HIV response targeting these age groups [4]. The prevention of mother-to-child transmission gains that have reduced infant infection rates could be reversed if high rates of HIV transmission persist among adolescents and youth. With a 'business as usual' approach to HIV testing and treatment, new infections among adolescents and youth will likely increase, with the burden compounded by the increasing number of youth

[a]USAID, Office of HIV/AIDS, Arlington, Virginia, [b]FHI 360, Durham, North Carolina, and [c]Yale Schools of Public Health and Medicine, New Haven, Connecticut, USA.

Correspondence to Vincent J. Wong, MSc, USAID, Office of HIV/AIDS, 2100 Crystal Drive. Box 9044, Arlington, VA 22202, USA.
Tel: +1 15713091273; e-mail: vwong@usaid.gov
Received: 3 May 2017; accepted: 3 May 2017.

DOI:10.1097/QAD.0000000000001539

in Africa, expected to reach 293 million by 2025 and 535 million by 2065 [5]. Furthermore, a recent modes of transmission study in South Africa continues to highlight the fact that adolescent girls are primarily infected by older males, putting them at particular risk of earlier infection [6]. In 2015, 250 000 ALHIV were newly infected, and two out of three resided in Sub-Saharan Africa [2]. As we look to the years ahead, constant (or increased) incidence with this growing population, combined with limited access to or uptake of HIV services will inevitably lead to a substantially higher HIV burden.

In a dire complement to these statistics, results from recent studies reveal significant gaps in the HIV clinical cascade among young people in terms of reaching the 90–90–90 targets set by Joint United Nations Programme on HIV and AIDS [7–10]. Combined results from population-based HIV surveys conducted in 2016 to measure HIV incidence in Malawi, Zambia, and Zimbabwe showed that 46% of people ages 15–24 were aware of their HIV status, and of those who were aware, only 82% were on treatment and 79% of these were virally suppressed [11–14]. In these countries, older adults are faring much better with 78% reporting they were aware of their HIV status, 90% of those diagnosed were on treatment, and 90% of those on treatment were virally suppressed [14]. Even when adolescents seek health services for HIV-related illnesses, openings are lost to engage them in care. Health facilities have reported low rates of testing coverage, representing critical missed opportunities to diagnose ALHIV, improve adolescent health and reduce onward transmission. One study from Zimbabwe suggests that primary healthcare providers often do not recognize HIV infection among adolescents, many of whom reported likely infection at birth, but some of whom may have acquired HIV sexually [15].

The evidence on successful efforts to get adolescents and young people into HIV testing and link them to treatment is also insufficient. A recent systematic review of the uptake and positivity rate of HIV testing services among children and adolescents (ages 5–19) reported that approaches evaluated to date have not been tailored to needs of this age group [16]. Rather, they replicate strategies for adults and do not consider the specific barriers that adolescents face [17]. Once diagnosed, multiple factors have been reported as thwarting successful linkage to care; providers lack 'friendliness,' and adolescents' developmental stage makes managing their illness challenging [18]. Another systematic review that described key factors affecting linkage to care for ALHIV found that most work has focused on addressing individual barriers and not adequately addressed other barriers such as structural and health system issues [19]. For both HIV testing and linkage to treatment, most new approaches that have been vetted are based on small studies with methodological constraints; new approaches developed with scale-up in mind are sorely needed to meet the needs of adolescents and young people [19].

Despite the gaps in evidence, the importance of improving HIV testing and linkage to care has been recognized by the global health community. For example, a WHO values and preferences study revealed that key barriers to HIV testing and counseling included unfriendly services and adolescents' concerns about confidentiality [20]. Subsequently, WHO released its 'Guidance for HIV Testing and Counselling and Care for ALHIV' and a complementary online tool (http://apps.who.int/adolescent/hiv-testing-treatment/) [21] in order to guide countries as they modify existing programs and develop new ones. A key policy barrier that many countries must address to improve access and coverage is adolescents' ability to provide legal informed consent for HIV services, including testing and care [17].

This AIDS supplement was commissioned with the goal of providing new evidence and insights to program planners, researchers, policy makers, and funding agencies who are seeking to improve or develop HIV testing, diagnosis, linkage to care and treatment programs, policies, and strategies for adolescents and youth. Seven of the nine articles focus on Sub-Saharan Africa, reflecting the continent's burden of the global HIV epidemic; two articles highlight challenges in the United States in addressing adolescent key populations, who have specific barriers to accessing services. Together, these studies not only identify key gaps in access and acceptability of services, but highlight a range of promising programmatic responses.

With a focus on at-risk adolescents accessing HIV services, the Metropolitan Atlanta community adolescent rapid testing initiative study by Camacho-Gonzalez *et al.* [22] identified an intervention that provided venue-based testing, motivational interviewing and case management to adolescents and youth. Wilson *et al.* [23] highlight that adolescents value caregiver support and positive interactions with healthcare workers, and that they desire making autonomous decisions regarding HIV diagnosis and disclosure. Denison *et al.* [24] detail the process and importance of engaging youth in programs and research designed to meet their needs.

Community-based approaches demonstrate successes in increasing access and uptake: Indravudh *et al.* [25] assessed HIV self-testing in Malawi and Zimbabwe, and Shanaube *et al.* [26] describe the benefits of a combination HIV prevention package in Zambia that included universal HIV testing and linkage to treatment.

Among adolescent MSM in the United States, Marano *et al.* [27] found variable, but overall low, reach by community-based HIV testing services, as well as low rates of linkage to treatment, illustrating the need to

identify barriers to HIV diagnosis, especially among Black and Hispanic adolescent MSM populations. Ruria *et al.* [28] found that active youth engagement, efforts to promote links between facilities and schools, and youth-friendly programming for newly diagnosed adolescents and youth were associated with increased retention in care.

Kaufman *et al.* [29] found that despite the scale-up of voluntary male circumcision programs to prevent HIV transmission, opportunities are being missed to deliver HIV prevention messaging and counseling to both infected and uninfected youth. Finally, Wagner *et al.* [30] assess the use of continuous quality improvement to improve adolescents' satisfaction with HIV testing services, their HIV knowledge, and their intentions to retest in the future.

Several important themes emerge when we consider the existing evidence alongside the research presented in this supplement. The combination of demographic shifts, high-HIV prevalence, and incidence rates, and comparatively low rates of treatment coverage and viral suppression in adolescents and young people highlights a serious programmatic gap that threatens the global gains made against the HIV pandemic. These disconnects require attention in both programs and policies. To reach the first two 90s and attain primary prevention among HIV-uninfected adolescents (including key populations), there are multiple needs to be addressed. Consent policies and laws must be changed to respect the autonomy of adolescents and youth and to take into consideration the crucial support they receive from caregivers and healthcare workers. We need to develop and evaluate new programmatic and policy innovations that are informed by the adolescents and youth they are intended to serve [31,32]. Program data must guide implementation and, along with survey data, may serve to identify 90–90–90 gaps among younger age bands. Finally, our efforts must target those who are most at risk – diagnosing them early and immediately treating those who are HIV positive, and ensuring through appropriate primary prevention efforts that those identified HIV negative are empowered to remain so.

Acknowledgements

Conflicts of interest

There are no conflicts of interest.

References

1. WHO. *Progress Report 2016: Prevent HIV, Test and Treat All.* Geneva, Switzerland: World Health Organization; 2016.
2. United Nations Children's Fund. *For Every Child, End AIDS – Seventh Stocktaking Report.* New York: UNICEF; 2016.
3. Zanoni BC, Mayer KH. **The adolescent and young adult HIV cascade of care in the United States: exaggerated health disparities.** *AIDS Patient Care STDS* 2014; **28**:128–135.
4. United Nations Children's Fund. *Towards an AIDS-free Generation-Children and AIDS: Sixth Stocktaking Report.* New York, NY: UNICEF; 2013.
5. Economic Commission for Africa. *The Demographic Profil of African Countries.*Addis Ababa, Ethiopia; 2016.
6. de Oliveira T, Kharsany A, Graf T, Cawood C, Khanyile D, Grobler A, *et al*. **Transmission networks and risk of HIV infection in KwaZulu-Natal, South Africa: a community-wide phylogenetic study.** *Lancet HIV* 2017; **4**:e41–e50.
7. UNAIDS. *90–90–90: an ambitious treatment target to help end the AIDS epidemic.*UNAIDS; 2014.
8. Philbin MM, Tanner AE, DuVal A, Ellen JM, Xu J, Kapogiannis B, *et al*. **Factors affecting linkage to care and engagement in care for newly diagnosed HIV-positive adolescents within fifteen adolescent medicine clinics in the United States.** *AIDS Behav* 2014; **18**:1501–1510.
9. Fox MP, Rosen S. **Systematic review of retention of pediatric patients on HIV treatment in low and middle-income countries 2008–2013.** *AIDS* 2015; **29**:493–502.
10. Kim SH, Gerver SM, Fidler S, Ward H. **Adherence to antiretroviral therapy in adolescents living with HIV: systematic review and meta-analysis.** *AIDS* 2014; **28**:1945–1956.
11. ICAP. *Summary Sheet: Preliminary Findings: Zimbabwe population-based HIV impact assessment ZIMPHIA 2015–2016.* In; 2016.
12. ICAP. *Summary Sheet: Preliminary Findings: Malawi population-based HIV impact assessment MPHIA 2015–2016.* In; 2016.
13. ICAP. *Summary Sheet: Preliminary Findings: Zambia population-based HIV impact assessment ZAMPHIA 2015–2016.* In; 2016.
14. Justman J. *Real Progress in the HIV epidemic: PHIA findings from Zimbabwe, Malawi, and Zambia.* Seattle, WA: CROI; 2017.
15. Ferrand R, Munaiwa L, Matsekete J, Bandason T, Nathoo K, Ndhlovu C, *et al*. **Undiagnosed HIV infection among adolescents seeking primary healthcare in Zimbabwe.** *Clin Infect Dis* 2010; **51**:844–851.
16. Govindasamy D, Ferrand RA, Wilmore SM, Ford N, Ahmed S, Afnan-Holmes H, *et al*. **Uptake and yield of HIV testing and counselling among children and adolescents in sub-Saharan Africa: a systematic review.** *J Int AIDS Soc* 2015; **18**:20182.
17. Fox K, Ferguson J, Ajose W, Singh J, Marum E, Baggaley R. *HIV and adolescents: guidance for HIV testing and counselling and care for adolescents living with HIV: Annex 15: Adolescent consent to testing: a review of current policies and issues in Sub-Saharan Africa.*World Health Organization; 2013.
18. Philbin MM, Tanner AE, Duval A, Ellen J, Kapogiannis B, Fortenberry JD. **Linking HIV-positive adolescents to care in 15 different clinics across the United States: creating solutions to address structural barriers for linkage to care.** *AIDS Care* 2014; **26**:12–19.
19. MacPherson P, Munthali C, Ferguson J, Armstrong A, Kranzer K, Ferrand RA, *et al*. **Service delivery interventions to improve adolescents' linkage, retention and adherence to antiretroviral therapy and HIV care.** *Trop Med Int Health* 2015; **20**:1015–1032.
20. Armstrong A, Baggaley R, Ferguson J, Van der Kwaak A, Wolmarans L. **The Voices Values and Preference of Adolescents on HIV Testing and Counselling: Consultation for the Development of the World Health Organization HIV Testing and Counselling Guidelines for Adolescents In.** *Edited by WHO* 2013.
21. *HIV and adolescents: guidance for HIV testing and counselling and care for adolescents living with HIV: recommendations for a public health approach and considerations for policy-makers and managers.* Geneva, Switzerland: World Health Organization; 2013.
22. Camacho-Gonzalez AF, Gillespie SE, Thomas-Seaton L, Frieson K, Hussen SA, Murray A, *et al*. **The Metropolitan Atlanta community adolescent rapid testing initiative study: closing the gaps in HIV care among youth in Atlanta, Georgia, USA.** *AIDS* 2017; **31 (Suppl 3)**:S267–S275.
23. Wilson KS, Beima-Sofie KM, Moraa H, Wagner AD, Mugo C, Mutiti PM. **"At our age, we would like to do things the way we want:" a qualitative study of adolescent HIV testing services in Kenya.** *AIDS* 2017; **31 (Suppl 3)**:S213–S220.

24. Denison JA, Pettifor A, Mofenson LM, Kasedde S, Marcus R, Konayuma KJ, *et al*. **Youth engagement in developing an implementation science research agenda on adolescent HIV testing and care linkages in sub-Saharan Africa.** *AIDS* 2017; **31 (Suppl 3)**:S195–S201.
25. Indravudh PP, Sibanda EL, d'Elbée M, Kumwenda MK, Ringwald B, Maringwa G, *et al*. **'I will choose when to test, where I want to test': investigating young people's preferences for HIV self-testing in Malawi and Zimbabwe.** *AIDS* 2017; **31 (Suppl 3)**:S203–S212.
26. Shanaube K, Schaap A, Chaila MJ, Floyd S, Mackworth-Young C, Hoddinott G, *et al*., on behalf of the HPTN 071 (PopART) Study Team. **Community intervention improves knowledge of HIV status of adolescents in Zambia: findings from HPTN 071-PopART for youth study.** *AIDS* 2017; **31 (Suppl 3)**: S221–S232.
27. Marano MR, Stein R, Williams WO, Wang G, Xu S, Uhl G, *et al*. **HIV testing in nonhealthcare facilities among adolescent MSM.** *AIDS* 2017; **31 (Suppl 3)**:S261–S265.
28. Ruria EC, Masaba R, Kose J, Woelk G, Mwangi E, Matu L, *et al*. **Optimizing linkage to care and initiation and retention on treatment of adolescents with newly diagnosed HIV infection.** *AIDS* 2017; **31 (Suppl 3)**:S253–S260.
29. Kaufman MR, Dam KH, Van Lith LM, Hatzold K, Mavhu W, Kahabuka C, *et al*. **Voluntary medical male circumcision among adolescents: a missed opportunity for HIV behavioral interventions.** *AIDS* 2017; **31 (Suppl 3)**: S233–S241.
30. Wagner AD, Mugo C, Bluemer-Miroite S, Mutiti PM, Wamalwa DC, Bukusi D, *et al*. **Continuous quality improvement intervention for adolescent and young adult HIV testing services in Kenya improves HIV knowledge.** *AIDS* 2017; **31 (Suppl 3)**: S243–S252.
31. Villa-Torres L, Svanemyr J. **Ensuring youth's right to participation and promotion of youth leadership in the development of sexual and reproductive health policies and programs.** *J Adolesc Health* 2015; **56 (1 Suppl)**:S51–S57.
32. *Youth in development policy: realizing the demographic opportunity*. Washington, DC: USAID; 2012.