



Getting to 90–90–90 targets for children and adolescents HIV in low and concentrated epidemics: bottlenecks, opportunities, and solutions

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Combating HIV has seen some of the greatest achievement in the history of global health, for example, reaching 15 million people with antiretroviral therapy (ART) is one of the greatest achievements, which when the Millennium Development Goals were adopted in 2000, seemed impossible.

In 2014, the Joint United Nations Programme on HIV/AIDS (UNAIDS) and partners have set other seemingly ambitious fast-track targets, that is by 2020 90% of people living with HIV know their HIV status, 90% of people who know their status receive treatment, and 90% of people on treatment have suppressed viral load. This call also applies to children and adolescents, that is, 90% of children and adolescents living with HIV to know their status, 90% of those diagnosed to be on treatment, and 90% of those on treatment to be virally suppressed (90–90–90) [1].

Although the countries of South Asia have low HIV prevalence rate in the general population, and the number of new HIV infections has remained relatively stable in Asia and the Pacific, there has been high and increasing HIV percentage among key populations.

Progress among children and adolescents in South Asia has not reached the desired and planned targets. However, since the 2000 UN Declaration of Commitment there has been a 27% decline in new paediatric HIV infections, which kept in line with global trends. Compared with the period when infections in children were at its highest level (in 2002) Asia Pacific boasts of a 34% decline. Asia Pacific is the second region with largest number of new HIV infections among adolescents, second only to Sub Sahara Africa. Globally, over the period 2001–2013 estimated number of AIDS-related deaths among adolescents (aged 10–19) has been increasing, whereas reducing in other age groups (among children aged 0–9, and among young people aged 20–29). In 2013, two-thirds of the 250 000 (210 000–290 000) new HIV infections among adolescents between the ages of 15 and 19 years were among adolescent girls. Gender-based

inequality, age-disparate sex and intimate partner violence are three potential factors that put girls at increased risk of acquiring HIV. India is one of the six countries, which contribute to 50% of the adolescents HIV transmission, as well being one of the six countries where prevalence of intimate partner violence was higher in the adolescent age group than among adult women aged 20–49 (others are Cameroon, Haiti, Malawi, Namibia, and Zimbabwe) [30]. In many settings, adolescent girls' right to privacy and bodily autonomy is not respected, as many report that their first sexual experience was forced. In Nepal, for example, 47% of women aged 15–49 who had sex before the age of 15 report that their first sexual experience took place against their will [31].

To achieve the ambitious targets set, in low and concentrated epidemics, which accounts for more than 12% of new paediatric HIV infections globally [2], and close to 6% adolescents' infections globally [32], there are myriad of bottlenecks and opportunities that need to be addressed to reach these global targets. Most of the countries with low and concentrated epidemics are in Asia Pacific where HIV epidemic is mostly fuelled by injecting drug use, sex work, and men having sex with men [3]. This study will focus on South Asia region comprising of Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka.

In this region, four countries are in different phases of complex emergencies, two (Afghanistan and Nepal) are low-income economies, two (India and Pakistan) are among UNAIDS Fast-Track priority countries, and one (India) is among the three

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Curr Opin HIV AIDS 2016, 11 (suppl 1):S1–S5

DOI:10.1097/COH.000000000000264

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countries contributing to over 78% of HIV burden in the Asia Pacific region.

Getting to 90–90–90 targets in paediatric HIV and among adolescents in South Asia requires optimal strategies for identifying parents who have been infected with, or at higher risk of HIV infection (key population), HIV exposed and infected children, and adolescent key population. Access to HIV testing and prompt initiation of ART is mandatory, as well as measures to ensure retention in care. It also requires good laboratory capacity for monitoring immunological and virological response. Addressing comorbidities such as tuberculosis (TB) and malnutrition, which tend to affect virological response among children on ART, is also important for actualizing 90–90–90 targets [4,5]. Despite the relatively low numbers of children exposed or living with HIV, and adolescents' key populations in South Asia, identifying optimal strategies to reach the global targets are faced with myriad of demographic, health systems, and structural limitations that need to be addressed. The authors examine these bottlenecks that are likely to curtail progress toward the global targets, and discuss opportunities and necessary transformations needed to accelerate the attainment of the 90–90–90 targets in South Asia.

BOTTLENECKS THAT CURTAIL THE PROGRESS TOWARD 90–90–90

In the past three decades of HIV epidemic, most of the international attention focused on sub-Saharan Africa where there is a bulky of HIV infections. Although there was a strong justification for this prioritization, low and concentrated epidemics, particularly children living with HIV in these settings, were largely overlooked. The 90–90–90 targets, however, have a potential to invigorate attention to all children living with HIV irrespective of epidemic settings.

There are four major categories of bottlenecks that are likely to curtail progress toward the 90–90–90 targets in the region: political, demographic, and socioeconomic factors, which include middle-income status of most countries that limits HIV support; competing priorities with other conditions, such as newborn health, diarrhoeal diseases, malnutrition, and polio; complex emergencies that disrupt effective HIV response; and health systems factors.

Four of the six south Asian countries are middle income, which comes with the cost of diminishing development assistance. For instance, domestic contribution thresholds by eligible middle-income countries for grants from the Global Fund to fight AIDS, Tuberculosis and Malaria is 20–60% – a

significant rise from 5% for developing economies [6].

Demographic and epidemic context of South Asia is another challenge. There are over 60 million children who are under the age of five, and 329.5 million adolescents (State of the world Children report, 2015). With total fertility rate of 2.6 in 2012, the huge number of pregnancies annually puts a stress on health systems, leading to low coverage of essential interventions provided as a part of antenatal package. India alone has estimated 29 million pregnant women annually. Identifying the fewer HIV-infected pregnant women and children in these large populations is like finding a 'needle in a haystack' since it is estimated that India has 40 000–60 000 HIV-positive pregnant women annually, who have to be identified out of the 29 million pregnant women.

Complicating the HIV case finding are the difficulties of reaching children of key populations who are mostly affected by HIV in South Asia. Legal frameworks and stigma have been reported as among the barriers to most key populations for accessing care in the region [7]. As a result, children and adolescents under 15 years of age who are living with HIV are considerably less likely to receive treatment than adults, with less than one in four children between the ages of 0 and 14 [24% (22–26%)] accessing ART in 2013.

In South Asia, every year over one million newborns die before their 28th day of life, stunting among children aged below 5 years stands at 38%, 600 million do not use toilets, and two countries – Afghanistan and Pakistan, still have polio epidemic. Other high-burden diseases such as TB are also common with four of 22 high childhood TB countries in the world being in South Asia [8]. India alone accounts for more than 20% of global burden of childhood TB. Similarly, conflicts, natural disasters and population displacements have been persistent in the past 2 decades affecting sustained health sector response to HIV including early identification and treatment of children.

Health systems factors present the fourth category of bottlenecks that need to be addressed to achieve the 90–90–90 targets in paediatric and adolescent HIV in this region. Children and adolescents under 15 years of age who are living with HIV are considerably less likely to receive treatment than adults, with less than one in four children between the ages of 0 and 14 [24% (22–26%)] accessing ART in 2013. For instance in India, paediatric HIV treatment continues to be initiated at specialized centres of excellence Paediatric Centres of Excellence, mostly situated in urban settings; whereas in Pakistan and Nepal treatment initiation is either

at provincial or district health facilities, which are also fairly limited in numbers. This inadequate decentralization of care limits the access to HIV treatment for children in rural localities. Interrupted procurement and supply of antiretroviral drugs and commodities for early infant diagnosis has also been reported. Inadequate data on paediatric HIV are also evident in most countries limiting the capacity of countries to generate necessary evidence for decision making. In 2015, only five countries in the region reported HIV data in the UNAIDS-led Global AIDS Response Progress Reporting.

Although trends in percentage of estimated HIV-positive pregnant women tested for HIV in Asia Pacific, 2011–2014 indicate an increase in HIV testing as well as treatment coverage among pregnant women and children, both these groups and adolescent key populations requires active case detection and management. Although universal HIV testing for pregnant women have been demonstrated to be cost-effective even in countries with very low HIV prevalence, resource gaps, and lack of demonstrated evidence has meant that most of the countries have opted for targeted HIV testing, geographically targeting provinces, or districts with a relative high burden of HIV. Striving toward elimination would require universal testing. Furthermore, in most countries of South Asia, the practice of men having sex with men, injecting drug use, or commercial sex, and other practises, which puts adolescents at higher risk of HIV are either considered taboo subjects, illegal, or both. Consequently, adolescent key populations face great challenges and barriers in accessing services. Even those who know their HIV status in accessing treatment may face challenges, including stigma and discrimination, problems in disclosure, as well as a lack of support for helping them remain on treatment. Finding optimal antiretroviral regimens and supporting improved clinical and social support and care will be critical to reducing AIDS-related deaths in adolescents. This will require a holistic, life cycle approach.

OPPORTUNITIES

Auspiciously, there are opportunities that could be optimized to maximize HIV case finding, treatment, and retention among children and adolescents living with HIV, and adolescents key populations. Advances in technological innovations in particular information and mobile technologies are one of the great opportunities in South Asia. In India, there are over 911 million wireless mobile phone connections and 92 million internet users [9]. Presence of large generic manufacturers of HIV test kits and antiretroviral drugs in South Asia offers yet another

opportunity to reach the second and third 90s of the global targets. Since 2006, India generic manufacturers have accounted for more than 80% of the donor-funded ARV developing country market [10].

Strong community health systems is another opportunity and is supported by various community health workers (CHWs) cadres, such as Accredited Social Health activists in India, Lady Health Workers in Pakistan, and Female Community Health Volunteers in Nepal.

The presence of civil society organizations and networks of marginalized populations in Nepal, India, and Bangladesh also offers another opportunity for reaching key populations.

The rapidly growing private health sector in South Asia needs to be optimized to bolster access to paediatric HIV services. For instance, private sector accounted for 70% of new hospital beds in India at the end of 2012 [11]. In Nepal, approximately 50% of acute illness patients use private practitioners as the first contact of healthcare. Since 1980s, fee-for-service medical cadres, ‘palli chikitshok’ (village doctors), have been in existence in rural Bangladesh [12].

Unlike other regions, South Asia has shown flexibility and agility in embracing the third gender, modifying their legal frameworks, and decriminalizing laws against homosexuality and transgender, as shown by Nepal and Bangladesh [33].

TRANSFORMATIVE PROPOSITIONS FOR ACHIEVING 90–90–90 TARGETS IN SOUTH ASIA

In South Asia, four transformative propositions could be considered to achieve the 90–90–90 targets: novel service delivery models that are likely to enhance HIV case finding and linkage to care; optimizing opportunities provided by existing technologies, community health systems, and private sector; building resilient health systems; and adapting policies that will promote access to services for hard to reach population and at the lowest level of care.

To reach the first 90 of the global target, effective case-finding strategies that will likely identify more HIV infected children (‘high yield’) and adolescents need to be in place. For children, these strategies include advocating for universal HIV testing in public and private health services where pregnant women seek services, including testing during delivery. This should be coupled with strengthened systems and structures for early infant HIV diagnosis.

Further targeted integration of HIV testing into selected child health service delivery points and Family-Centred Approaches (FCA) that use an adult living with HIV as an index case to identify their

children living with HIV. There is a raft of literature indicating the impact of targeted integration of HIV testing into sick child, TB or malnutrition clinics, and community or home-based programs in identifying more children infected with HIV [13–15]. There are also global initiatives such as ‘Double Dividend’ framework that advocate for targeted integration of HIV into child survival platforms [16]. Good outcomes in paediatric HIV case finding using FCA have also been documented [17]. In concentrated epidemics, efforts should be made in using entry points such as methadone substitution facilities for designing FCA as the feasibility of providing ART and HIV testing in these substitution facilities has already been confirmed [18,19]. The use of point of care diagnostics for HIV virological testing [20] is an evolving territory that can be further optimized to ensure timely diagnosis and linkage to care.

The innovations discussed afore require policies that support provider-initiated testing and counseling, integration, and those that maximize the potential of CHWs in paediatric HIV case findings. In 2014, WHO and United Nations Children’s Fund (UNICEF) launched the HIV/TB-adapted CHW training packages that attempt to use CHWs providing care for newborns, pneumonia, diarrhoea or malaria to also identify, and refer children exposed or infected with HIV or TB [21]. Introducing and adapting these training materials in this region will be an important step toward improving HIV case finding and linkage to treatment.

To reach the first 90 for adolescents’ key populations, there is need to support innovative approaches that improve the reach of services to adolescents. This might include use of innovation in delivery of HIV services to adolescents and combating stigma. India and Bangladesh have innovative methods of reaching adolescents’ key populations through innovative partnerships between public, private, and civil society, while leveraging online technologies.

The second 90 of the global target requires linkage between HIV testing and treatment, and models of care that will ensure optimal delivery of ART, both for children and for adolescents. The use of mobile technologies in reducing turnaround time of infant HIV test results will likely enhance linkage to care [22]. Integration of paediatric ART into Maternal, Newborn and Child Health services will address the verticality and centrality of providing paediatric ART in the region. The internet-based, prompt initiation of paediatric ART services such as telemedicine initiative in India that use video-linked interface to reach rural facilities is an emerging model of decentralization. In most settings, decentralization has been associated with increased access

to paediatric ART [23]. Mobile cash transfers or health workers’ incentives in paediatric HIV also needs further elucidation. The wide availability and less expensiveness of generic ARV medications in the region are essential for provision of paediatric ART. Absence of intellectual property restrictions against generic medications has also resulted in the development of improved paediatric ARV fixed-dose combinations further improving uptake and adherence [10].

For adolescents, innovations to support adolescents living with HIV are needed. ART clinics need to be made friendly to adolescents who have recently been transferred from children, whereas special measures need to be undertaken by children clinics in preparing adolescents to make a transition to adult clinics. Community support and monitoring either through network of adolescents key Population or adolescents living with HIV, and mechanism to extend support as the adolescents move to geographically different places as a requirement for education or work or livelihood is necessary. Adolescence is the period identified to feature relatively poor on ART treatment outcomes in terms of virological response and Lost to Follow up. Thus, interventions are needed to help improve outcomes and retention in care in this unique population [24,25]. Adapting adherence support and service delivery models relevant to adolescents should be a priority to avoid treatment interruptions, development of resistance, and increased morbidity within this age group.

To achieve this, programmes for adolescents need to be developed with meaningful adolescent participation in decision making throughout the full programme cycle. Adolescent need to be mobilized during review of laws that put age restrictions on the access of, or the requirement of parental consent for, sexual and reproductive health and HIV information and services, including harm reduction. Similarly, adolescent’s opinion need to be sought as programmes addressing socioeconomic and policy contexts that increase HIV risk and vulnerability among adolescents are designed, including on reduction of stigma, discrimination, and harmful gender norms.

For children, the third 90 target requires adherence to treatment and management of comorbidities in particular TB and malnutrition, which have been shown to delay viral suppression [4,5]. For instance, the use of sms texts for medical appointments or ARV pick-ups has been shown to improve adherence [26]. Efforts should also be made to explore the use of CHWs or parent-to-parent support groups to adhere to paediatric treatment. The improved availability of point of care diagnostics for viral load measurements in the region will enhance viral load monitoring. For both children

and adolescents, availability of viral load machines within distances, which can be reached, free of costs, or at affordable costs is mandatory. It has become evident that while HIV test and CD4 counts are free, other associated tests are charged. This is a huge barrier to provision of optimum care in HIV management.

There are also cross-cutting factors that are important for reaching the 90–90–90 targets in the region. First is the optimal use of private sector involvement in paediatric HIV as positive outcomes have been reported in programs such as TB in Bangladesh [27]. The Universal Health Coverage – a preponderance theme in world stage at the moment – has also reaffirmed the need for private sector involvement in improving access and financial risk protection for healthcare users [28,29]. Secondly is the need for resilient health systems that respond to the needs of children and adolescents living with HIV in case of manmade or natural disasters. Agencies such as UNICEF are currently developing key considerations for risk-informed programming and resilience mechanisms. Local adaptation of these resilience frameworks will be critical. Lastly is the need for data for children. In a competitive environment, children living with HIV will likely be neglected in the absence of evidence on the burden or inequities in access and outcomes to justify their prioritization. The presence of good information technology infrastructure in South Asia allows for development of electronic health information systems capable of reporting disaggregating data for children and adolescents.

In conclusion, South Asia faces a myriad of bottlenecks but there are opportunities that can be optimized to increase access to paediatric and adolescents HIV services. Innovations and novel service delivery models that foster integrated and family-centred approaches within a broader maternal and child health, adolescents health services, and harm reduction services are critical in attaining the global targets of 90–90–90.

Acknowledgements

None.

Financial support and sponsorship

None.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. UNAIDS. 90–90–90: an ambitious treatment target to help end the AIDS epidemic. Geneva, Switzerland: UNAIDS; 2014.

2. UNAIDS. 2014 Progress report on the Global Plan towards the elimination of new HIV infections among children by 2015 and keeping their mothers alive. In. Geneva: UNAIDS; 2014.
3. UNAIDS. Global Report: UNAIDS report on the AIDS epidemic 2013. In. Geneva: UNAIDS; 2013.
4. Mendoza JA, Paul ME, Schwarzwald H, *et al*. Food insecurity, CD4 counts, and incomplete viral suppression among HIV+ patients from Texas Children's Hospital: a pilot study. *AIDS Behav* 2013; 17:1683–1687.
5. Zandoni BC, Phungula T, Zandoni HM, *et al*. Impact of tuberculosis cotreatment on viral suppression rates among HIV-positive children initiating HAART. *AIDS* 2011; 25:49–55.
6. Fund TG. Resource book for applicants. Geneva, Switzerland: The Global Fund; 2015; 53–60.
7. Grossman CI, Stangl AL. Editorial: global action to reduce HIV stigma and discrimination. *J Int AIDS Soc* 2013; 16:18881.
8. Dodd PJ, Gardiner E, Coghlan R, Seddon JA. Burden of childhood tuberculosis in 22 high-burden countries: a mathematical modelling study. *Lancet Glob Health* 2014; 2:e453–e459.
9. TRAI. Telecom sector in India: a decadal profile. New Delhi, India: Telecom Regulatory Authority of India; 2012; 5–48.
10. Waning B, Diedrichsen E, Moon S. A lifeline to treatment: the role of Indian generic manufacturers in supplying antiretroviral medicines to developing countries. *J Int AIDS Soc* 2010; 13:35.
11. Gudwani A, Mitra P, Puri A. India Healthcare: inspiring possibilities, challenging journey. New York, NY: McKinsey & Company; 2012.
12. Feldman S. The use of private healthcare providers in rural Bangladesh: a response to Cloakin. *Soc Sci Med* 1983; 17:1887–1896.
13. Bahwere P, Piwoz E, Joshua MC, *et al*. Uptake of HIV testing and outcomes within a Community-based Therapeutic Care (CTC) programme to treat severe acute malnutrition in Malawi: a descriptive study. *BMC Infect Dis* 2008; 8:106.
14. Parker LA, Jobanputra K, Rusike L, *et al*. Feasibility and effectiveness of two community-based HIV testing models in rural Swaziland. *Trop Med Int Health* 2015; 20:893–902.
15. Mutanga JN, Raymond J, Towle MS, *et al*. Institutionalizing provider-initiated HIV testing and counselling for children: an observational case study from Zambia. *PLoS One* 2012; 7:e29656.
16. UNICEF. Double dividend. New York, NY: UNICEF, WHO, and EGPAF; 2013.
17. Luyirika E, Towle MS, Achan J, *et al*. Scaling up paediatric HIV care with an integrated, family-centred approach: an observational case study from Uganda. *PLoS One* 2013; 8:e69548.
18. Wang M, Mao W, Zhang L, *et al*. Methadone maintenance therapy and HIV counseling and testing are associated with lower frequency of risky behaviors among injection drug users in China. *Subst Use Misuse* 2015; 50:15–23.
19. Lin C, Cao X, Li L. Integrating antiretroviral therapy in methadone maintenance therapy clinics: service provider perceptions. *Int J Drug Policy* 2014; 25:1066–1070.
20. Ritchie AV, Ushiro-Lumb I, Edemaga D, *et al*. SAMBA HIV semiquantitative test, a new point-of-care viral-load-monitoring assay for resource-limited settings. *J Clin Microbiol* 2014; 52:3377–3383.
21. WHO, UNICEF. Caring for newborns and children in the community, adaptation for high HIV or TB settings. Geneva, Switzerland: World Health Organization; 2014.
22. Seidenberg P, Nicholson S, Schaefer M, *et al*. Early infant diagnosis of HIV infection in Zambia through mobile phone texting of blood test results. *Bull World Health Organ* 2012; 90:348–356.
23. Fayorsey RN, Saito S, Carter RJ, *et al*. Decentralization of pediatric HIV care and treatment in five sub-Saharan African countries. *J Acquir Immune Defic Syndr* 2013; 62:e124–e130.
24. Evans D, Menezes C, Mahomed K, *et al*. Treatment outcomes of HIV-infected adolescents attending public-sector HIV clinics across Gauteng and Mpumalanga, South Africa. *AIDS Res Hum Retroviruses* 2013; 29:892–900.
25. Bygrave H, Mtangirwa J, Ncube K, *et al*. Antiretroviral therapy outcomes among adolescents and youth in rural Zimbabwe. *PLoS One* 2012; 7:e52856.
26. Sabin LL, Bachman DeSilva M, Gill CJ, *et al*. Improving adherence to antiretroviral therapy with triggered real-time text message reminders: the China Adherence Through Technology Study. *J Acquir Immune Defic Syndr* 2015; 69:551–559.
27. Zafar Ullah AN, Huque R, Husain A, *et al*. Effectiveness of involving the private medical sector in the National TB Control Programme in Bangladesh: evidence from mixed methods. *BMJ Open* 2012; 2:e001534.
28. Sachs JD. Achieving universal health coverage in low-income settings. *Lancet* 2012; 380:944–947.
29. Gwatkin DR, Ergo A. Universal health coverage: friend or foe of health equity? *Lancet* 2011; 377:2160–2161.
30. UNICEF HIV and AIDS annual results report 2014.
31. Ministry of Health and Population (MOHP) [Nepal], Nepal Demographic and Health Survey 2011.
32. UNAIDS All In to #EndAdolescentAIDS (2015) http://www.unaids.org/sites/default/files/media_asset/20150217_ALL_IN_brochure.pdf.
33. Supreme Court, Nepal 2014 (Writ No. 917 of the year 2064 BS) http://bds.org.np/wp-content/uploads/2014/06/pdf_supreme_eng.pdf.