



IMPROVING HIV SERVICE DELIVERY FOR INFANTS, CHILDREN AND ADOLESCENTS: A framework for country programming

United Nations Children's Fund
March 2020

Suggested citation: United Nations Children's Fund,
*Improving HIV service delivery for infants, children and
adolescents: A framework for country programming*,
UNICEF, New York, 2020.

Front cover: Halima Mfaume, a 16-year old girl living with
HIV, and her grandmother at their home in Dar es Salaam,
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Until no child has AIDS.



Acknowledgements

The development of this HIV service delivery framework was coordinated by Nande Putta with the support and guidance of Shaffiq Essajee and overall leadership of Chewe Luo (HIV/AIDS Section, UNICEF). This framework is the result of an extensive collaborative process involving many meetings, consultations and working group discussions over several months in 2019. UNICEF and its partners are grateful for the support, enthusiasm and invaluable inputs of the following:

- More than 300 front-line health-care providers who participated in a survey of their practices, preferences and challenges in providing HIV care to infants, children and adolescents.
- Experts representing 24 organizations* who participated in a two-day think-tank consultation as part of the framework development process:

Alasdair Reid (UNAIDS), Alexandra Vrazo (USAID), Alice Armstrong (UNICEF), Andy Carmone (CHAI), Anne Magege (ELMA Philanthropies), Catherine Bilger (UNAIDS), Catherine Langevin-Falcon (UNICEF), Cheick Tidiane Tall (EVA), Chewe Luo (UNICEF), Denis Tindyebwa (ANECCA), Dominic Kempes (Independent consultant), Dorothy Mbori-Ngacha (UNICEF), Elaine J. Abrams (ICAP at Columbia University), Elijah Paintsil (Yale University), Elizabeth Obhimbo (University of Nairobi), Emilia Rivadeneira (CDC), Francesco Merico (WCC-EAA), Hilary Wolf (OGAC), Jennifer Mulik (PACT), Kanchana Suggu (CHAI), Landry Tsague (UNICEF), Lara du Moulin (ELMA Philanthropies), Laura Oyiengo (Kenya MOH), Laurie Gulaid (UNICEF), Lazeena Muna-McQuay (UNICEF), Luann Hatane (PATA), Martina Penazzato (WHO), Martine Weve (Aidsfonds), Mary Mahy (UNAIDS), Maximina Jokonya (Africaid-Zvandiri), Moses Bateganya (FHI 360), Nande Putta (UNICEF), Nandita S. Sugandhi (ICAP at Columbia University), Natella Rakhmanina (EGPAF), Patrick Oyaró Owiti (Health Innovations Kenya), Peter Elyanu (Baylor College of Medicine), Saeed Ahmed (Baylor College of Medicine), Shaffiq Essajee (UNICEF),

Shaun Mellors (Viiv Healthcare), Stuart Kean (Independent consultant), Surbhi V. Modi (CDC) and Theresa Wolters (EGPAF).

- Colleagues from CHAI, EGPAF, PATA and UNICEF who supported the design, administration and analysis of the health-care provider survey: Amanda Williams and Stephanie Dowling (CHAI); Leah Petit and Madison Ethridge (EGPAF); Daniella Mark, Luann Hatane, Lynn Phillips and Tammy Sutherns Burdok (PATA), and Aja Weston, Nande Putta and Shaffiq Essajee (UNICEF).
- Leads and members of the working groups who provided valuable input to the design and development of the framework:

Working group 1: Age group 0–4. Leads: Alex Vrazo (USAID) and Theresa Wolters (EGPAF). Members: Catherine Bilger (UNAIDS), Elijah Paintsil (Yale University), Martina Penazzato (WHO), Natella Rakhmanina (EGPAF), Patrick Oyaró Owiti (Health Innovations Kenya), Ravikiran Bhairavabhotla (CDC) and Stuart Kean (Independent consultant).

Working group 2: Age group 5–9. Leads: Emelia Rivadeneira (CDC) and Laura Oyiengo (MOH Kenya). Members: Catherine Bilger (UNAIDS), Daniella Mark (PATA), Eliane Vrolings (Aidsfonds), Justin Mandala (FHI360), Peter Elyanu (Baylor College of Medicine), Sabrina Ern  (Aidsfonds) and Stuart Kean (Independent consultant).

Working group 3: Age group 10–19. Leads: Luann Hatane (PATA) and Natella Rakhmanina (EGPAF). Members: Audrey Nosenga (ZY+), Cheick Tidiane Tall (EVA), Denis Tindyebwa (ANECCA), Francesca Merico (WCC-EAA), Gloriam Moses (AYARHEP), Hilary Wolf (OGAC), Immaculate Mutisya (CDC), Janet Tatenda Bhila (Y+), Kanchana Suggu (CHAI), Maximina Jokonya (Africaid-Zvandiri), Moses Bateganya (FHI360) and Wole Ameyan (WHO).

* Aidsfonds, Africaid-Zvandiri, African Network for the Care of Children Affected by HIV/AIDS (ANECCA), Baylor College of Medicine, Centers for Disease Control and Prevention (CDC), Clinton Health Access Initiative (CHAI), Elizabeth Glaser Pediatric AIDS Foundation (EGPAF), ELMA Philanthropies, Health Innovations Kenya, FHI 360, ICAP at Columbia University, Joint United Nations Programme on HIV/AIDS (UNAIDS), Kenya Ministry of Health (MoH), Office of the Global AIDS Coordinator (OGAC), PACT, Paediatric-Adolescent Treatment Africa (PATA), Positive Action for Children Fund, Viiv Healthcare (PACF), R seau Enfants et VIH en Afrique (EVA), United Nations Children's Fund (UNICEF), University of Nairobi, United States Agency for International Development (USAID), World Health Organization (WHO), World Council of Churches – Ecumenical Advocacy Alliance (WCC–EAA), Yale University.

Working group 4: Typology. Leads: Andy Carmone (CHAI) and Nandita S. Sugandhi (ICAP at Columbia University). Members: Catherine Bilger (UNAIDS), Cheick Tidiane Tall (EVA), Martina Penazzato (WHO), Peter Elyanu (Baylor College of Medicine), Ravikiran Bhairavabhotla (CDC), Surbhi V. Modi (CDC) and Theresa Wolters (EGPAF).

Working group 5: Communication, advocacy, monitoring and milestone tracking. Leads: Dominic Kemps (Independent consultant) and Immaculate Mutisya (CDC Kenya). Members: Carl Stecker (Catholic Relief Services), Corinna Csaky (Coalition for Children Affected by AIDS), David Ruiz (Aidsfonds), Francesca Merico (WCC-EAA), KaeAnne Parris (CDC), Kelley Lennon (FHI360), Laura Oyiengo (MOH Kenya), Shaun Mellors (Viiv Healthcare) and Stuart Kean (Independent consultant).

- Colleagues from the Yale School of Medicine who supported a critical review and ranking of the evidence base: Elijah Paintsil, Caitlin Hansen, Carlos Oliveira, Melissa Campbell and Shadrack Frimpong.
- Colleagues from CHAI, EGPAF and the Yale School of Medicine who supported the drafting of intervention narratives based on the ranked evidence: Amanda Williams and Stephanie Dowling (CHAI); Adrienne Hayes (EGPAF); Elijah Paintsil, Caitlin Hansen, Carlos Oliveira, Melissa Campbell and Shadrack Frimpong (Yale School of Medicine).
- Consultants: David Sullivan and Dominic Kemps, who contributed to the technical and advocacy processes of the framework development as well as the writing of the document.
- ELMA Philanthropies, UNAIDS and Viiv Healthcare for financial contributions towards several elements through the whole process.
- Colleagues from ministries of health and other national stakeholders as well as representatives of the faith-based community for invaluable insights and

contributions through the framework development process and particularly in its validation:

Ministries of health: Angela Mushavi (Zimbabwe MOH), Bilikisu Jibrin (Nigeria MOH), Djeneba Boro (Côte d'Ivoire MOH), Eleanor Magongo (Uganda MOH), Laura Oyiengo (Kenya MOH) and Mathurin Koudjate (Côte d'Ivoire MOH).

Other national stakeholders: Abiola Davis (Nigeria UNICEF Country Office), Esther Nyamugisa (Uganda UNICEF Country Office), Steve Okokwu (Malawi UNICEF Country Office), Victorine Dilolo (Côte d'Ivoire UNICEF Country Office), Winnie Mutsotso (Zambia UNICEF Country Office) and Yayeh Negash (Ethiopia UNICEF Country Office).

Representatives from faith-based organizations and their funding/implementing partners: Carl Stecker (Catholic Relief Services), Dan Irvine (World Vision International), Elizabeth Lule (Early Childhood Development Action Networks), Gibstar Mukangila (Circle of Hope, Zambia), Joseph Donnelly (Caritas International), Mary Grace Donohoe (Religions for Peace), MaryLynn Qushell (Children of God Relief Institute – Nyumbani), Pedro Agudelo (Reformed Church of America), Richard Bauer (Eastern Deanery AIDS Relief Program), Robert J. Vitillo (Permanent Observer Mission of the Holy See to the United Nations in Geneva), Sarah Greene (American Jewish World Service), Sr. Mary Owens (Children of God Relief Institute – Nyumbani), Susan Hillis (PEPFAR) and Thomas Fenn (Catholic Relief Services/Faster).

Special gratitude is also due to all colleagues in the field who continue to provide services to infants, children and adolescents living with HIV, their families and communities. This framework aims to further support their work, including by highlighting the evidence they have gathered and their experiences in designing and implementing impactful interventions and programmes where they are most urgently needed.

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Acronyms and abbreviations

ACT	Accelerating Children’s HIV/AIDS Treatment
AIDS	acquired immunodeficiency syndrome
ANECCA	African Network for the Care of Children Affected by HIV/AIDS
ART	antiretroviral therapy
ARV	antiretroviral drug
AYARHEP	Ambassadors for Youth and Adolescents Reproductive Health Programme
CDC	Centers for Disease Control and Prevention
CHAI	Clinton Health Access Initiative
EGPAF	Elizabeth Glaser Pediatric AIDS Foundation
EID	early infant diagnosis
EVA	Réseau Enfants et VIH en Afrique
HEI	HIV-exposed infants
HIV	human immunodeficiency virus
MOH	Ministry of Health
MTCT	mother-to-child transmission (of HIV)
NGO	non-governmental organization
OGAC	Office of the Global AIDS Coordinator
PACF	Positive Action for Children Fund
PATA	Paediatric-Adolescent Treatment Africa
PEPFAR	(United States) President’s Emergency Plan for AIDS Relief
PMTCT	prevention of mother-to-child transmission (of HIV)
POC	point of care
SDGs	Sustainable Development Goals
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNICEF	United Nations Children’s Fund
USAID	United States Agency for International Development
WCC-EAA	World Council of Churches-Ecumenical Advocacy Alliance
WHO	World Health Organization
Y+	Global Network of Young People Living with HIV
ZY+	Zimbabwe Young Positives

Executive Summary

Today, HIV is as serious and deadly a threat to infants, children and adolescents as it was a decade ago. Consistent efforts to improve services have had some success, but we are nowhere near the ultimate goal of eliminating AIDS as a public health problem among infants, children and adolescents. It is already evident that the global 'super-fast-track' targets will be missed, including those of providing 1.4 million children (aged 0–14 years) and 1 million adolescents (aged 15–19 years) with lifelong HIV treatment by 2020. Continued failure to make substantial progress will seriously jeopardize the overall goal of ending AIDS by 2030.

Recent trends and current figures show that there has certainly been some progress. Yet, the testing, treatment and retention gaps for infants, children and adolescents remain – and they are not closing fast enough.

Worldwide, about 940,000 children under the age of 15 were receiving antiretroviral therapy (ART) in 2018, more than double the number in 2010. Yet they accounted for only slightly more than half (54 per cent) of all children living with HIV in that age group – in stark contrast to the proportion of pregnant women living with HIV receiving ART (82 per cent).

The poor results in HIV treatment coverage are matched by – and are partly a result of – insufficient progress in diagnosing infections and preventing new ones. In 2018, two in five of all infants exposed to HIV were not tested for HIV by 2 months of age, and the total number of annual new HIV infections among those aged 10–19 years in 2017 was only about 25 per cent lower than it was in 2010.

The world can and must do better. For this reason, UNICEF, in collaboration with partners, has developed this framework to help countries around the world improve service delivery for infants, children and adolescents. The framework focuses on service delivery as one of three pillars of an effective HIV response, along with diagnostics and drugs. It is based on the recognition that commodities alone cannot produce the results we need. Good service delivery is necessary to get the right

diagnostics and drugs to children and provide them with the care and support they will need to survive and thrive over a lifetime of living with HIV.

The framework was developed through a tremendous collaborative effort involving nearly 400 people, including some 320 frontline service providers within the African Network for the Care of Children Affected by HIV/AIDS (ANECCA), Réseau Enfants et VIH en Afrique (EVA) and the Paediatric-Adolescent Treatment Africa (PATA) network who responded to a values and preferences survey; and 40 global experts representing 24 stakeholder organizations that participated in a 'think tank' consultation and working groups to examine the evidence base and design the service delivery framework.

The service delivery framework is action-focused and aims to help generate a dialogue among country stakeholders and programme managers to better define context-specific priority interventions for infants, children and adolescents living with HIV at national and subnational levels.

To help identify the questions most useful to ask and the solutions most likely to have the greatest impact, the framework outlines three basic steps: (1) assessing the situation, including by using assessment tools provided in the framework; (2) identifying, planning for and implementing the optimal interventions using the solution matrix; and (3) tracking and monitoring progress towards improved service delivery with a view to continuous quality improvement of programmes.

The framework also seeks to firmly position HIV responses for infants, children and adolescents within the larger health, social and economic environments that influence HIV programming. Therefore, in addition to the specific interventions defined in the solution matrix to address programming gaps, the framework offers recommendations for several systems-strengthening, cross-cutting elements that need to be in place in all programmes, settings and contexts.

Regardless of the country or context, the framework was not developed to replace the tools and approaches that currently guide HIV programming for infants, children and adolescents. Instead, it is intended to complement and fortify existing initiatives. As countries work to achieve the global targets for ending AIDS in infants, children and adolescents, the framework reinforces, highlights and expands on best practices.

The framework is intended to be used by programme managers and implementers tasked with providing services to infants, children and adolescents living with HIV. Depending on the country and context, this is likely to include relevant government ministries, the faith-based and private sectors, community-based groups and other non-governmental organizations (NGOs), and networks

and support groups run by and directly supporting people living with and affected by HIV.

UNICEF plans to further validate and roll out the service delivery framework in 2020 with the support of international and local partners, including those involved in the consultation process. It is not a coincidence that this framework is being introduced in the same year in which UNAIDS and partners assess progress against the 'super-fast-track' targets, most of which will not be achieved in most countries. More intensified efforts are needed everywhere to advocate for better programming for infants, children and adolescents and to prioritize interventions for them. This new framework is an opportunity to make continuous and faster progress in that direction.

Background and introduction

Despite a decade of consistent efforts to improve services and outcomes for infants, children and adolescents living with HIV, we are failing in our global ambition to eliminate AIDS as a public health problem among them. The challenges facing us are starkly evident in recent data showing that antiretroviral therapy (ART) coverage has slowed globally, with a net increase of only about 3,300 children aged 0–14 years on ART from 2017 to 2018,¹ corresponding to a rise in ART coverage of just 2 percentage points. By comparison, less than a decade ago, from 2010 to 2011,² there was a net increase of 101,000 children aged 0–14 years on ART, a 5 percentage point increase in coverage.

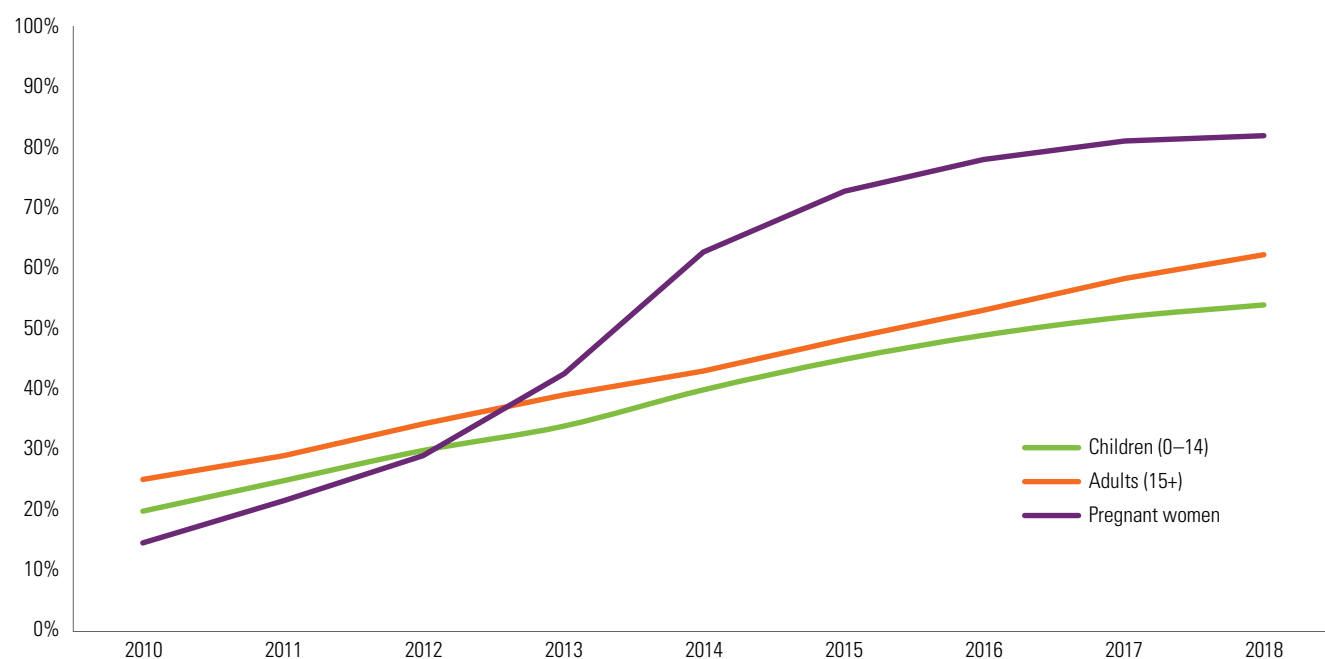
If overall ART coverage among children and adolescents were as high as it is for pregnant and breastfeeding women with HIV, this slowdown might be more understandable, while remaining unacceptable and worrisome. But only about half (54 per cent³) of all children aged 0–14 years living with HIV worldwide in 2018 were receiving the treatment they needed to stay alive.

Global ART coverage among pregnant and breastfeeding women, meanwhile, was 82 per cent in 2018,⁴ and some countries reported coverage over 95 per cent. Global ART coverage among adults was 62 per cent in 2018⁵ (*Figure 1*).

The absence of age-disaggregated data prevents a more complete reflection of the situation. As noted in the 2019 *Start Free Stay Free AIDS Free* report, global estimates of ART coverage were not available for adolescents aged 15–19 years because there is inadequate disaggregation of reported HIV data by age and sex. Among the few countries reporting such data, the picture is mixed, including low coverage (Nigeria and the United Republic of Tanzania) and high coverage (Botswana and Zimbabwe).⁶

A comparison across regions (*Figure 2*) highlights substantial variations, indicating where the challenges are most acute. In Eastern and Southern Africa, coverage of ART in children aged 0–14 years living with HIV in 2018

Figure 1. Comparison of ART coverage among children aged 0–14, adults 15+ years and pregnant women, 2010–2018



Source: UNAIDS 2019 estimates; Global AIDS Monitoring 2019.

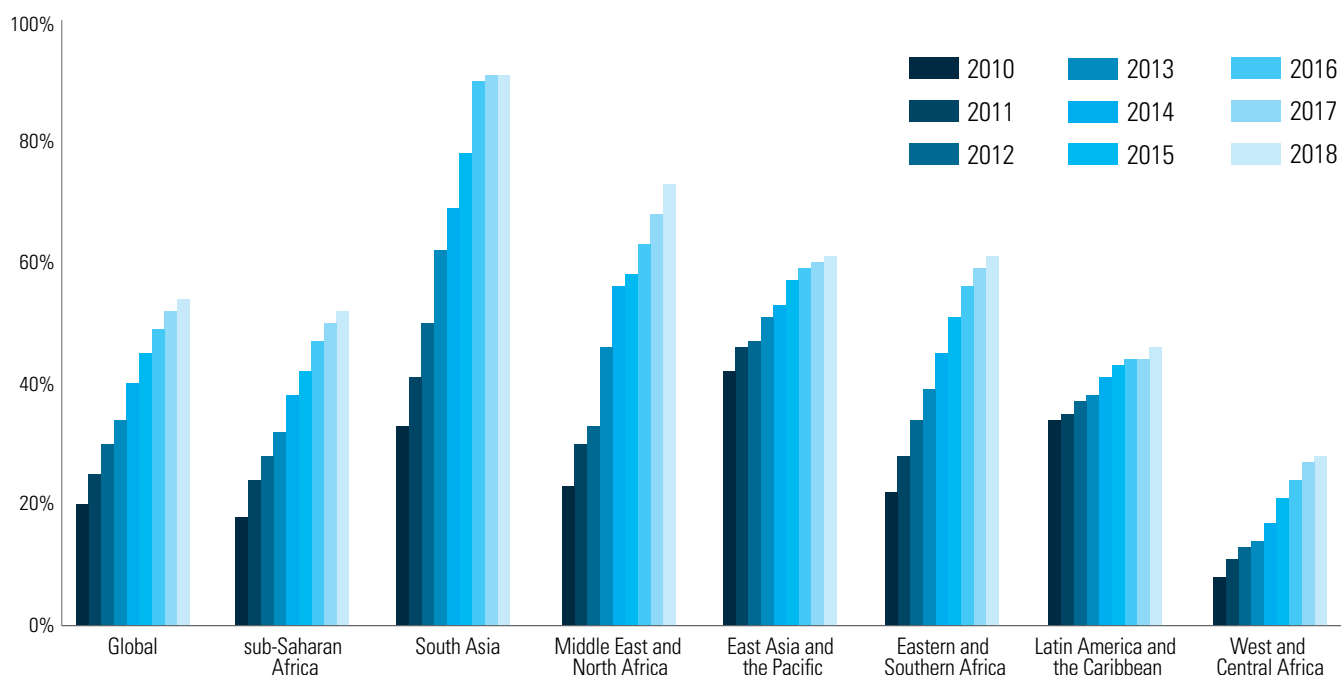
was 61 per cent,⁷ nearly 40 percentage points higher than the coverage level in 2010. In West and Central Africa, however, only about 28 per cent⁸ of children aged 0–14 years living with HIV were receiving ART in 2018, a level only about 20 percentage points above that of 2010 (Figure 2). In both regions, when we compare this to ART coverage for pregnant and breastfeeding women living with HIV (92 per cent in Eastern and Southern Africa and 59 per cent in West and Central Africa), the gap in access is quite large, just over 30 percentage points.⁹

This overall lacklustre performance is due to a combination of factors. For one, the success of prevention of mother-to-child transmission of HIV (PMTCT) programmes in many countries leads to the perception that the problem of HIV among infants, children and adolescents has been solved, resulting in decreased attention and engagement. Another factor is the renewed focus on primary health care in the Sustainable Development Goals (SDG) era, which poses the risk that HIV could become a forgotten problem, particularly if HIV services are not designed to be delivered within an integrated and systems-strengthening approach. In addition, waning donor focus globally has resulted in reduced funding for HIV in general and for paediatric HIV programmes in particular, a situation that has contributed to difficulties in scaling up services and responses in many countries. The alarm has already

been raised on several occasions, as infants, children and adolescents living with HIV have fallen further behind. Notwithstanding the recent successes in mobilizing resources for the Global Fund to Fight AIDS, Tuberculosis and Malaria,¹⁰ it is evident that bold and intensified advocacy efforts continue to be required to redirect the world’s attention to HIV and to the fate of infants, children and adolescents living with HIV.

As it stands now, the problem of HIV among these groups is far from solved. Among the persistent challenges contributing to the lagging ART coverage, for example, are weak systems with missed opportunities for identifying infants, as seen in the 2019 UNAIDS estimates that only 59 per cent¹¹ of HIV-exposed infants received a diagnostic test for HIV within 2 months of age,¹² in spite of successful efforts at identifying HIV-infected pregnant women and starting them on ART, and in spite of high coverage for 6-, 10- and 14-week scheduled immunizations. As well, in many countries, treatment has not been optimized (especially for younger children) by transitioning to the available WHO-recommended regimens, besides the fact that there are limited options overall for younger children. In addition, a fundamental problem has long been a lack of effective services for locating, linking, treating and retaining infants, children and adolescents living with HIV. Children and adolescents do less well in key service delivery indicators

Figure 2. Percentage of children aged 0–14 years living with HIV and receiving ART, by region, 2010–2018



Source: UNAIDS 2019 estimates; Global AIDS Monitoring 2019.

Note: Data are not available for Eastern Europe and Central Asia, North America and Western Europe.

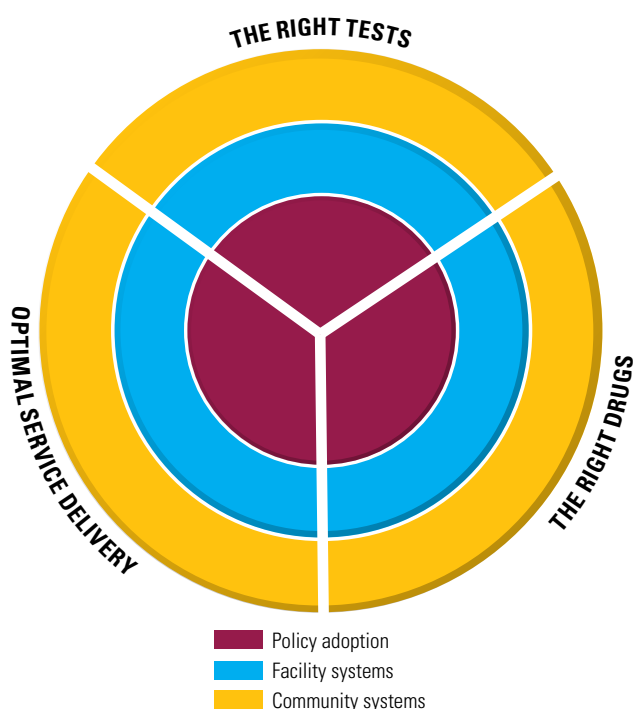
such as viral suppression. When compared with adults on ART, children and adolescents on ART have poorer viral suppression,¹³ indicating that existing programming is not adequately oriented towards retaining children and adolescents in care or supporting their adherence to ART.

Figure 3 illustrates how these three major elements – the best testing methods and technologies, the right treatment options and optimal service delivery mechanisms – are all necessary to ensure robust HIV programmes serving infants, children and adolescents living with HIV. As indicated, within each area there needs to be engagement at policy level, in facilities and with communities. The link with communities is especially critical for service delivery, because they are highly influential in supporting, promoting and monitoring the quality and reach of HIV testing and treatment services.

A FRAMEWORK TO SUPPORT IMPROVED SERVICE DELIVERY

The Joint United Nations Programme for HIV/AIDS (UNAIDS) and the United States President’s Emergency Plan for AIDS Relief (PEPFAR), through the ‘Three Frees’ framework,¹⁴ have provided targets

Figure 3. Successful paediatric treatment requires action across three areas: diagnostics, drugs and service delivery, which in turn are implemented within three domains: policy adoption, facility systems and community systems



and a general direction for how the world will end paediatric and adolescent AIDS in the years to come. The AIDS Free Working Group, co-convened by the World Health Organization (WHO) and the Elizabeth Glaser Pediatric AIDS Foundation (EGPAF), identifies five thematic areas (diagnosis, drug optimization, service delivery, community engagement and monitoring and evaluation) requiring focused action to end paediatric and adolescent AIDS. The Rome Action Plan¹⁵ supports achievements in two of these areas: diagnosis and drug optimization. In the wake of the two-year Accelerating Children’s HIV/AIDS Treatment (ACT) initiative,¹⁶ launched in Africa in 2014, researchers and policy makers turned their attention to determining which interventions were most important for children and adolescents living with HIV. This led to the identification of efforts that should be continued and replicated, especially in settings where limited local resources may threaten the future sustainability of treatment services.¹⁷

Reviewing the ACT experience in the *Journal of Acquired Immune Deficiency Syndromes* in 2018, Penazzato and colleagues¹⁸ discussed four major categories of initiatives and service packages that can help a country programme move towards elimination of paediatric AIDS:

1. The right drugs in the right formulations at any age
 - a. Better, affordable and convenient regimens are an urgent priority for the paediatric HIV community, since many children initiate ART with resistance to the typical first-line regimens because of prior ART exposure through PMTCT programmes and increasing resistance in the HIV community to non-nucleoside reverse transcriptase inhibitors (NNRTIs).
2. Treatment monitoring and timely switching
3. A comprehensive and holistic clinical package of care
 - a. Children often present sick and with advanced immunosuppression at the time of diagnosis, necessitating a holistic approach to their care to keep them alive.
 - b. Clinical services must include prevention and management of specific co-morbidities such as tuberculosis, pneumocystis pneumonia and other infections, as well as provision of routine elements of ‘well-child’ care as recommended by WHO: immunizations, deworming, malaria

prophylaxis, iron and vitamin A supplementation, growth monitoring, nutrition counselling and water safety.*

4. Accelerating innovations to ensure paediatric adherence and viral suppression.

In the same journal issue, Medley and colleagues¹⁹ proposed the following five strategies after their analysis of what had worked during the ACT initiative:

1. Implementing a targeted mix of HIV case finding approaches (e.g., provider-initiated testing and counselling within health facilities, optimization of early infant diagnosis, index family-based testing and integration of HIV testing within key populations, as well as orphans and vulnerable children programmes)
2. Addressing the unique needs of adolescents
3. Collecting and using data for programme improvement
4. Fostering a supportive political and community environment
5. Investing in health system-strengthening activities, including continued advocacy and global investments to eliminate AIDS-related deaths among children and adolescents.

Despite all, however, slow and uneven improvements in recent years make it highly unlikely that the 2020 'super-fast-track' goals²⁰ will be met globally or in most individual countries.²¹ This failure is a call to action for the present and future. In order to make more rapid and consistent progress, thoughtful, in-depth consideration of where programmes and countries are in regard to reaching their treatment goals is needed. Evaluation of the state of implementation of effective solutions and understanding of gaps must be undertaken urgently to bring paediatric and adolescent HIV programming back on track.

The strategies noted above are the underpinnings of this new service delivery framework for infants, children and adolescents living with HIV that aims to get paediatric and adolescent HIV programmes on track towards achieving the 'super-fast-track' targets²² for these subpopulations. The framework is the culmination of close to a year's work during which UNICEF and collaborators consulted with global experts, national programme managers and other key stakeholders including adolescents and young people living with HIV; surveyed front-line health-

care providers; and examined the published evidence concerning which service delivery interventions work best to improve outcomes in infants, children and adolescents living with HIV across the whole continuum of care, from locating (and testing) to linkage, treatment and retention. The framework is intended to complement WHO recommendations and existing policies, strategic frameworks and guidelines related to adolescent and paediatric HIV, such as the Start Free, Stay Free, AIDS Free framework,²³ the AIDS Free Framework,²⁴ the Global Accelerated Action for the Health of Adolescents (AA-HA!) framework²⁵ and the WHO/UNAIDS Global Standards for quality health-care services for adolescents.²⁶

The service delivery framework is organized in such a way as to take a data-informed, differentiated approach to programming, recognizing that different solutions may be needed for different countries, different subnational regions, different subpopulations of children and adolescents and at different points along the continuum of care. For example, services to locate and test more adolescents aged 15–19 years are likely to differ from services needed to locate and test younger children. This notion of moving away from 'one size fits all' interventions to differentiation by context is an essential component of the framework, and to that end, an initial and critical step in using it involves assessment of the 'typology' of a given country from a paediatric and adolescent HIV epidemiology perspective. This is followed by evaluation of the programme and how well it serves children and adolescents of different ages across the continuum of care.

Detailed worksheets are provided within the framework to help users understand *what* the state of their epidemic is and *where* gaps lie in the continuum of care for different age groups of children. Following this assessment, a solutions matrix outlines best practices whose appropriateness will differ depending on a particular country's context. These best practices in turn link to narratives explaining the 'how-to' of implementation based on learning from the evidence base, as well as to tools to support roll-out and help programme managers and stakeholders better understand which interventions to implement for optimal programming and *how* to implement these interventions.

The service delivery framework aims to help programme managers answer questions that regularly guide the

* More recently, following the launch of the nurturing care framework by WHO and UNICEF, responsive parenting and early learning have been recognized as essential to address child development for this vulnerable group of children.

priorities they set and the decisions they are already making or soon will need to consider. Such questions might include, for example: How do we implement point-of-care (POC) testing to maximum benefit? How do we support community testing and linkage to care? How can we do a better job of reaching adolescent girls and young women living with HIV, linking them to and retaining them on treatment? What interventions are needed most urgently in our local context?

To answer such questions in the most effective and relevant ways, evidence is critical. That consideration guided the creation of the framework, which was developed in a collaborative manner with specialists in

the field at local and international levels. A central part of the approach was a review of available resources to offer an evidence-based collection of solutions for use by national and subnational programme managers involved in the re-orientation and refining of HIV programming for infants, children and adolescents living with HIV.

Many effective strategies already exist to locate, link, treat and retain infants, children and adolescents living with HIV, and many are already included in international and national HIV guidelines. The service delivery framework can complement and help to optimize uptake of these approaches and expand their reach.

Intended users and how to use the framework

Intended users of the framework. The service delivery framework is meant to be used by programme managers and implementers tasked with providing services to infants, children and adolescents living with HIV. Depending on the country and context, this is likely to include relevant government ministries, the faith-based and private sectors, community-based groups and other non-governmental organizations, and networks and support groups run by and directly supporting people living with and affected by HIV.

Since most of the evidence that underpins the framework is derived from high HIV burden countries, it is likely to be most useful in countries or regions where there is a generalized HIV epidemic with high rates of HIV among women, children and adolescents. The impact of similar approaches in different epidemic contexts is less clear and should be given careful consideration.

How to use the framework. Overall, the service delivery framework aims to help programme managers more systematically consider the full spectrum of interventions available to improve services for infants, children and adolescents living with HIV along a locate-link-treat-retain continuum and better define context-specific priority interventions at national and subnational levels while supporting systems-strengthening, cross-cutting elements (*Figure 4*). By understanding the typology of an epidemic and applying differentiated solutions, countries can move from a 'one size fits all' approach to a more differentiated approach. The framework helps to create a dialogue around what is needed and how progress should be tracked to create a continuous quality improvement cycle.

To help programme managers and in-country stakeholders identify the most useful questions to ask and the solutions most likely to have the greatest impact, the framework outlines three basic steps: (1) assessing the situation by using the assessment tools provided; (2) identifying, planning for and implementing the optimal interventions using the solutions matrix; and (3) tracking and monitoring progress towards improved

service delivery with a view to quality improvement of programmes. *Figure 5* outlines a continuous quality improvement process in which the three steps – typology and programme assessment, solutions identification and prioritization, and implementation monitoring and milestone tracking – are undertaken, looping back periodically to reassess and reprioritize. The process is spearheaded by the National Paediatric HIV Programme Manager in collaboration and consultation with the Technical Working Group.

For the assessment phase, worksheets are provided to help users understand *what* the state of their epidemic is and *where* gaps lie in the continuum of care for different age groups. Based on the findings of the assessment, the solutions matrix (*Table 5*) then defines *which* evidence-based interventions might be best suited for a particular country's context. These best practices in turn link to narratives and tools (where available) that can help programme managers and stakeholders better understand how to implement interventions. The framework emphasizes consultation and consensus building among stakeholders to ensure that programmes are implemented in a coordinated fashion.

The framework also seeks to firmly position HIV responses for infants, children and adolescents living with HIV within the larger health, social and economic environments that influence HIV programming. Therefore, in addition to the specific interventions defined in the solutions matrix to address programming gaps, the framework offers recommendations for several systems-strengthening, cross-cutting elements that need to be in place in all programmes, settings and contexts. These elements are in essence the enablers that are the bedrock of better health systems in general and for infant, child and adolescent HIV care and treatment services in particular.

Flexibility and adaptability are key features of the framework, which takes a data-informed,

Figure 4. Interventions across the continuum of care and systems-strengthening, cross-cutting elements

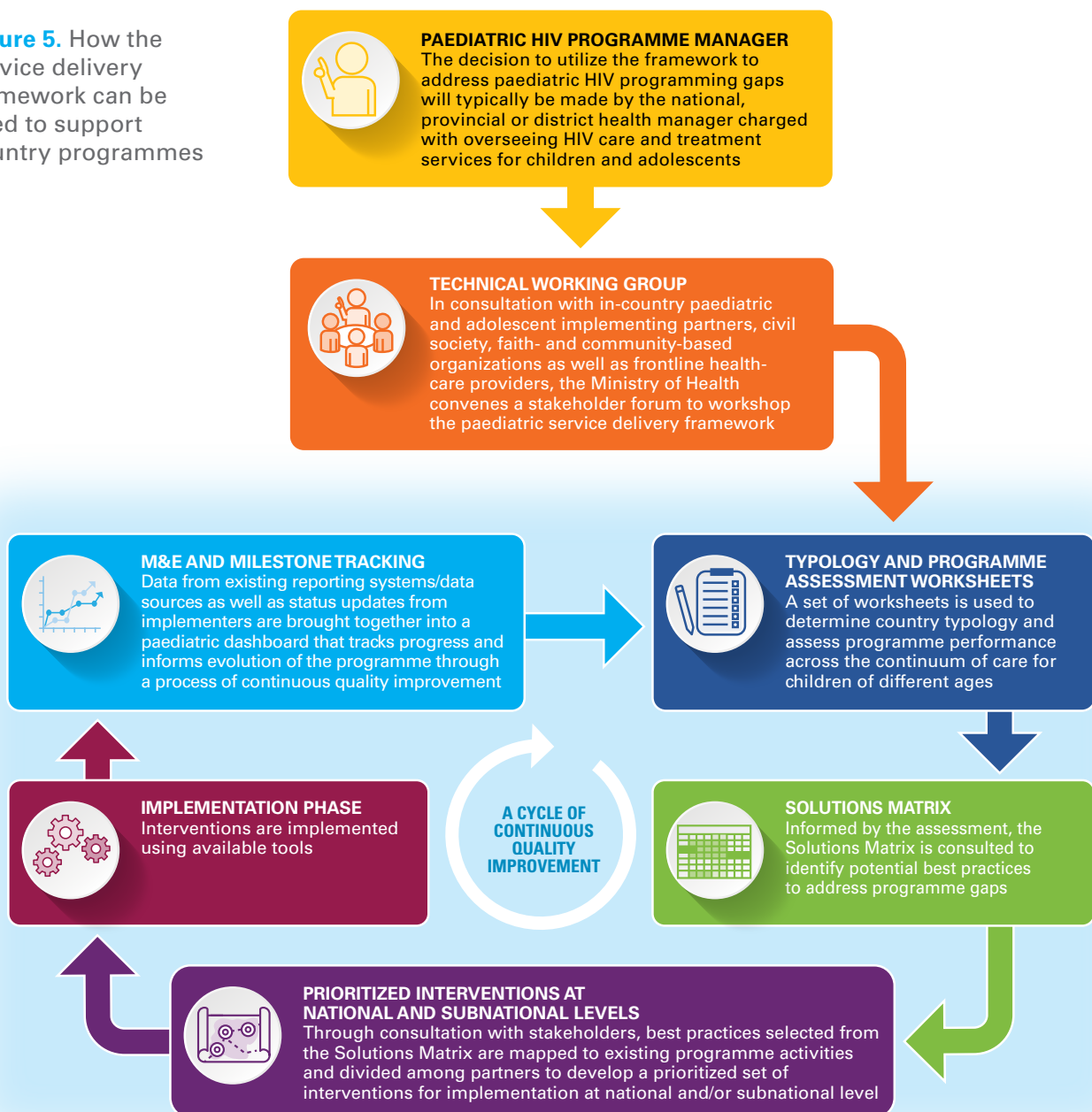


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differentiated approach to programming, recognizing that different solutions may be needed for different countries, different subnational regions and different subpopulations of children and at different points along the continuum of care. For example, services to locate and test adolescents aged 15–19 years differ from services needed to identify younger children living with HIV, so depending on the epidemiological context in a country and the performance of the programme, the national programme may choose to prioritize interventions and investment in a targeted way.

Regardless of the country or context, the framework was not developed to replace the tools and approaches that currently guide HIV programming for infants, children and adolescents living with HIV. Instead, it is intended to complement and add granularity to existing normative guidance. For example, WHO recommendations already call for differentiated service delivery and task shifting for children and adolescents. As countries work to achieve the ‘super-fast-track’ targets for ending AIDS in children and adolescents, the framework reinforces, highlights and expands on best practices.

Figure 5. How the service delivery framework can be used to support country programmes



Assessing the situation

The assessment process guides subsequent deliberations and decision points in the solutions matrix. A thorough assessment that draws from the experience and data of all stakeholders at national and subnational levels will enable the users of the framework to answer important questions such as: *Is there a problem with locating patients? What do our data say about who is being missed? How well are children being retained in care? In what age groups are the gaps most evident?* In order to successfully answer these questions, it is necessary to identify and access all the different sources of data and information available at national and subnational levels for tracking the status of the HIV epidemic in infants, children and adolescents. This includes nationally aggregated data reported into the Global AIDS Monitoring database,²⁷ as well as any available paediatric and adolescent HIV cohort data and datasets from partners that may provide more granular information across the continuum of care. An important principle of the assessment is that wherever possible, data should be age-disaggregated to allow age-differentiated responses. Systems to routinely capture age-disaggregated data going forward are also vital for monitoring progress and should be implemented either nationally or at key sites in order to ensure ongoing quality improvement.

During the assessment, users are encouraged to consider the following:

- What do we see at a *national* level? What useful contrasts and comparisons can you draw with other national programmes, such as the PMTCT or immunization programmes?
- Are there international partners or NGOs with disaggregated data that have not been accessed or fully interrogated? (This can be especially valuable for countries with limited data.)
- Can age-disaggregated data gathering be integrated into national data collection instruments?
- What about subnational data? How can such information be captured?

This framework calls for three distinct types of assessment to be performed: a typology assessment to determine the type of epidemic being addressed; a programme assessment to evaluate specific programme gaps across the continuum of care for different ages of children and adolescents; and a barrier analysis to identify larger systems issues that are not necessarily specific to any age group but that need to be improved upon to ensure optimal performance. Each of these is described in more detail below.

1. TYPOLOGY DETERMINATION

An important starting point to using this framework is identifying the epidemiological context at both the national and subnational levels using the available data. Defining the typology is a two-step process: epidemic classification and programme impact classification.

To determine epidemic classification (*Box 1*), we refer to WHO's definition of epidemic types: (1) generalized, where HIV prevalence among pregnant women is greater than 1 per cent; and (2) concentrated, where HIV prevalence is greater than 5 per cent in any subpopulation at higher risk of infection (such as people who inject drugs, sex workers, and men who have sex with men), but less than 1 per cent among pregnant women.²⁸ Most countries in sub-Saharan Africa, which in 2018 was home to 9 out of 10 infants, children and adolescents living with HIV worldwide,²⁹ have a generalized epidemic. Concentrated epidemics occur mainly in the regions of Asia and the Pacific, the Middle East and North Africa, Eastern Europe and Central Asia, Western and Central Europe, North America, and Latin America and the Caribbean.³⁰

A related phenomenon that is also useful to recognize is that of concentrated epidemics within generalized ones (also known as a mixed epidemic³¹), which may be the case from a national or subnational perspective. Several examples of this have been described in recent studies. Though data are limited, epidemics among people who

inject drugs have been identified in Eastern Africa, with HIV prevalence approximating 40 per cent.³² In West Africa, pooled HIV prevalence estimates for female sex workers are near 35–40 per cent in several countries,³³ and individual studies with men who have sex with men show prevalence ranging from 10 per cent in Gambia³⁴ to 50 per cent in Côte d'Ivoire.³⁵

Further differentiation of generalized epidemics is determined by whether they are of lower or higher prevalence, a distinction that can be important in identifying context-specific interventions. According to WHO, a high prevalence setting is one where the national or subnational prevalence is equal to or greater than 5 per cent in the population to be tested.³⁶ For the purposes of this framework, higher prevalence countries are those with overall HIV prevalence equal to or greater than 5 per cent and lower prevalence countries are those with overall prevalence less than 5 per cent.

Box 1. Typology classification (Step 1)

Epidemic classification

- Identify epidemic as either **generalized** (take note of concentrated epidemics within generalized epidemic settings) or **concentrated**.
- Further classify generalized as **lower prevalence (less than 5 per cent) or higher prevalence (greater than or equal to 5 per cent)**.

Based on these considerations, all countries would fit into one of three epidemic classifications: concentrated, generalized lower prevalence, or generalized higher prevalence. In addition, both lower and higher prevalence countries may have concentrated epidemics within their generalized epidemics and this should be noted.

Once the epidemic type is determined, the next step is to determine programme impact using two impact indicators (Box 2): mother-to-child transmission rate and new infections among adolescents aged 10–19 years. These two impact indicators draw attention to which age-groups need greater focus on case finding in the national response.

Box 2. Typology classification (Step 2)

Programme impact classification

- Assess **mother-to-child transmission (MTCT) rate** as a proxy for incidence among children 0–14 years, using a benchmark of 5% MTCT rate (at the end of breastfeeding) to divide into two categories: high and low incidence.
- Assess **number of new infections annually in adolescents 10–19 years** using a benchmark of 10,000 to divide into high and low categories of adolescent incidence. This can be assessed using national or subnational datasets where available, and by availing either actual data such as population-based HIV impact assessments (PHIAs) or modelled estimates from UNAIDS.

Nine typology types are defined through this two-step process, listed as types A through I (Table 1):

- Generalized higher prevalence with high MTCT rate
- Generalized higher prevalence with high incidence among adolescents
- Generalized higher prevalence with high MTCT rate **and** high incidence among adolescents
- Generalized lower prevalence with high MTCT rate
- Generalized lower prevalence with high incidence among adolescents
- Generalized lower prevalence with high MTCT rate **and** high incidence among adolescents
- Concentrated with high MTCT rate
- Concentrated with high incidence among adolescents
- Concentrated with high MTCT rate **and** high incidence among adolescents

These typology classifications provide context to intervention options within the solutions matrix.

2. PROGRAMME ASSESSMENT

Overall, the coverage of ART for children living with HIV aged 0–14 years (the current Global AIDS Monitoring treatment indicator specific to children and adolescents living with HIV) should indicate whether a country has a very weak (<30 per cent coverage), weak (30–50 per cent), moderate (51–80 per cent) or strong (>80 per cent) HIV treatment programme for the population of

Table 1: Typology classification A–I

TYPOLGY CLASSIFICATION	A	B	C	D	E	F	G	H	I
TYPOLGY DESCRIPTION	GENERALIZED HIGH PREVALENCE mixed picture with high MTCT but fewer than 10,000 adolescent infections per year	GENERALIZED HIGH PREVALENCE mixed picture with low MTCT rate but more than 10,000 adolescent infections per year	GENERALIZED HIGH PREVALENCE with high MTCT rate and more than 10,000 adolescent infections per year	GENERALIZED LOW PREVALENCE mixed picture with high MTCT but fewer than 10,000 adolescent infections per year	GENERALIZED LOW PREVALENCE mixed picture with low MTCT rate but more than 10,000 adolescent infections per year	GENERALIZED LOW PREVALENCE with high MTCT rate and more than 10,000 adolescent infections per year	CONCENTRATED mixed picture with high MTCT but fewer than 10,000 adolescent infections per year	CONCENTRATED mixed picture with low MTCT rate but more than 10,000 adolescent infections per year	CONCENTRATED with high MTCT rate and more than 10,000 adolescent infections per year
KEY FEATURES	High new infections in infants; low adolescent new infections	High new infections in adolescents; low new infections in infants	High new infections in ALL age groups	High new infections in infants; low adolescent new infections	High new infections in adolescents; low new infections in infants	High new infections in ALL age groups	High new infections in infants; low adolescent new infections	High new infections in adolescents; low new infections in infants	High new infections in ALL age groups
COUNTRY EXAMPLES Applying official statistics from UNAIDS 2019 estimates, this is how countries would be located in the different typology groupings.	<ul style="list-style-type: none"> Equatorial Guinea 	<ul style="list-style-type: none"> Botswana Namibia South Africa 	<ul style="list-style-type: none"> Eswatini Kenya Lesotho Malawi Mozambique Uganda United Republic of Tanzania Zambia Zimbabwe 	<ul style="list-style-type: none"> Angola Belize Benin Djibouti Gabon Gambia Guinea-Bissau Jamaica Liberia Mauritius 	<ul style="list-style-type: none"> Thailand 	<ul style="list-style-type: none"> Burundi Chad Ethiopia Haiti 	<ul style="list-style-type: none"> Argentina Bolivia Cambodia Chile Colombia Dominican Rep. Ecuador El Salvador Eritrea Guatemala Honduras Iran Lao People's Dem. Rep. Madagascar Nepal Niger Pakistan Papua New Guinea Paraguay Peru Philippines Senegal Sudan Uzbekistan Viet Nam 	<ul style="list-style-type: none"> NONE 	<ul style="list-style-type: none"> Burkina Faso Dem. Rep. of the Congo Indonesia Myanmar

children and adolescents living with HIV. Comparing the ART coverage in the PMTCT programme with the treatment coverage for children and adolescents indicates how much of an equity gap exists between mothers and their children and reflects the extent of missed opportunities in service delivery for treatment initiation among infants and young children (Figure 6). Similarly, comparing coverage of first-dose diphtheria, pertussis and tetanus vaccine (DPT1) and HIV early infant diagnosis (EID) testing at 6 weeks of age reflects

the extent of missed opportunities for testing among HIV-exposed infants as mothers bring their infants to receive the DPT1 vaccine immunization (Figure 7).

Following this, undertaking a deeper-dive programme performance assessment will help identify where gaps exist in service provision – for different age groups, at different points along the locate-link-treat-retain continuum and/or in different districts or regions. This will help in prioritizing age-specific interventions,

Figure 6. ART access gap between children aged 0–14 living with HIV and pregnant women living with HIV, 19 selected countries, 2018

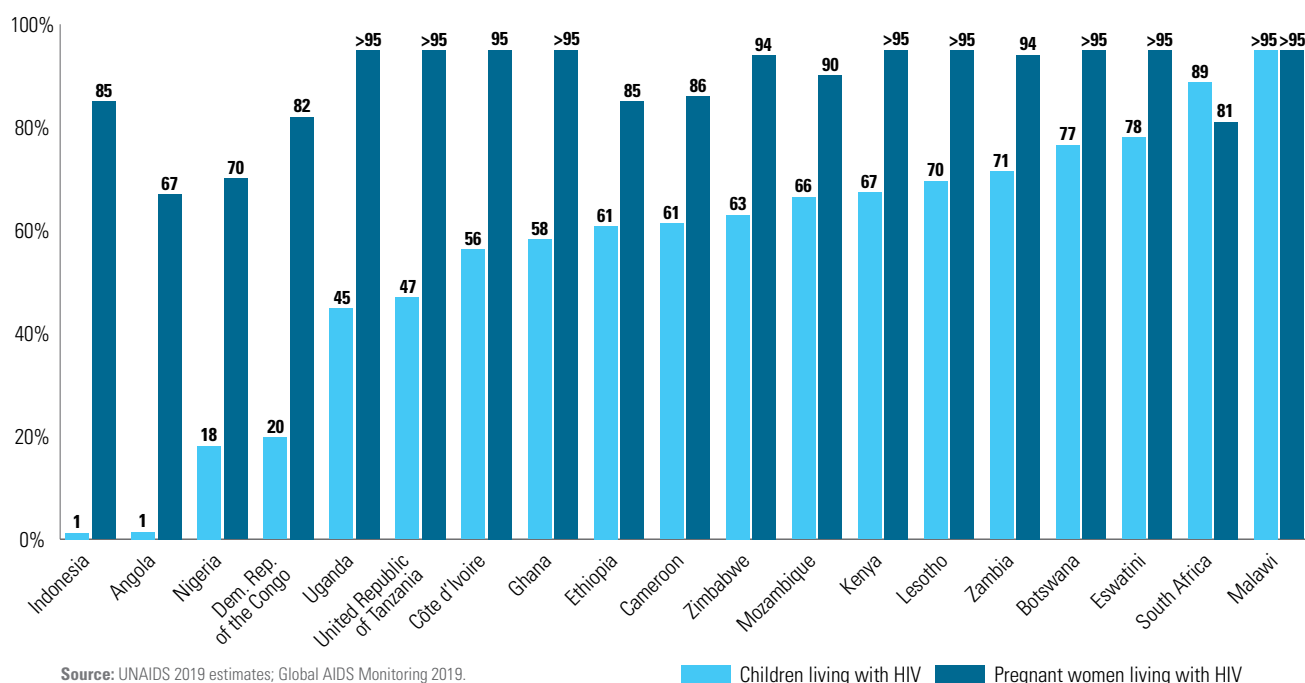
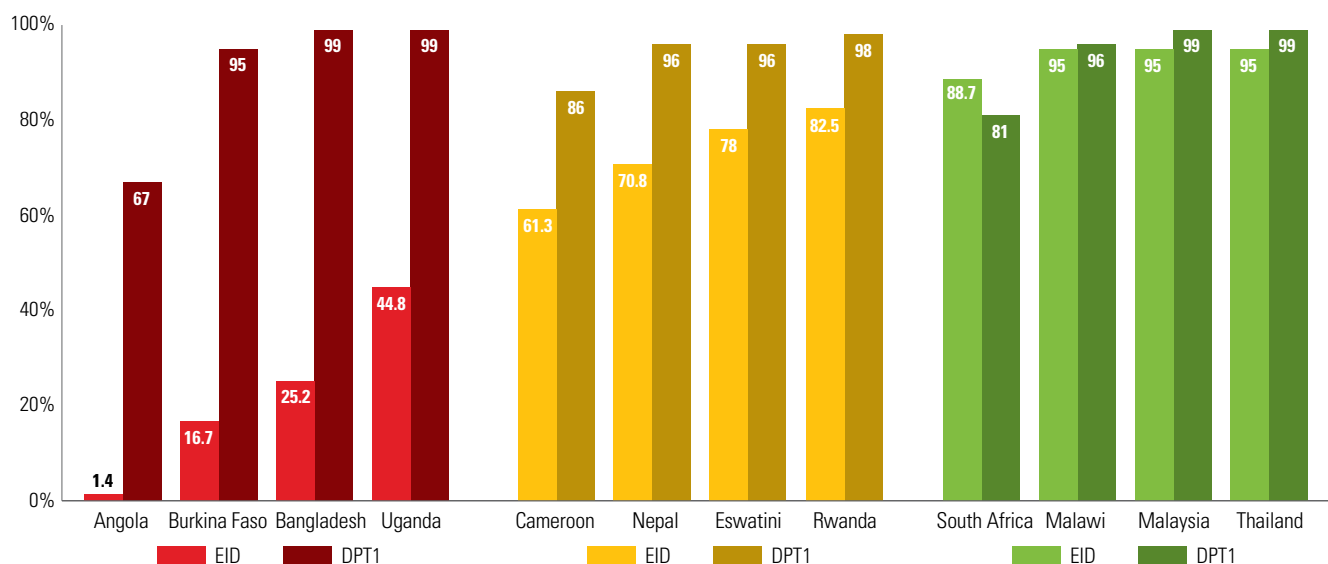


Figure 7. Comparison of coverage of EID HIV testing and DPT1 immunization at 6 weeks of age across 12 countries with large (red), moderate (yellow) and small (green) differences between the two indicators, 2018



care-continuum specific interventions and geographic focus. Approaches to improve efforts will likely vary across the range of programme weaknesses and identified strengths.

KEY PROGRAMME ASSESSMENT QUESTIONS

1. What is the national (or subnational) antiretroviral therapy (ART) coverage for children aged 0–14? If available, what is the national ART coverage for adolescents aged 10–19? Does your coverage reflect a very weak, weak, moderate or strong HIV treatment programme for children and adolescents?
2. What is the national (or subnational) ART coverage for pregnant and breastfeeding women in PMTCT programmes?
3. To visualize the gap between treatment access among pregnant and breastfeeding women living with HIV and that among children and adolescents living with HIV, plot the trend of change over 5–10 years in the treatment gap between women receiving ART in PMTCT programmes and children aged 0–14 receiving ART. Observe whether the trend is reducing, stagnant or increasing. Take note of the factors contributing to this trend.
4. Likewise, to visualize the missed opportunities for testing for HIV among HIV-exposed infants during immunization services, plot the trend of change over 5–10 years in the coverage gaps for 6-week DPT immunization and for HIV-exposed infants receiving early infant diagnosis (EID) within 2 months of age. Observe whether the trend is reducing, stagnant or increasing. Take note of the

factors contributing to this trend.

5. Complete Table 2 using all available data from national health management information systems (HMIS) and implementing partners. These data may exist as aggregate numbers in summary forms; or if summary forms do not provide for age disaggregation they may require some abstraction from registers. Where age disaggregation is absent in both registers and summary forms, consider obtaining data from sites with electronic medical registries to inform this analysis. This exercise can be undertaken at facility, subnational (district or region) or national level. Once Table 2 is completed, identify the weakest link(s) in the care continuum by age. These are the points with the lowest percentages.
6. Similarly, complete Table 3 using all available data from national HMIS and implementing partners. This exercise can be undertaken at subnational (district or region) or national level. If undertaken at national level, it will aid in identifying subnational regions with the highest unmet need. If undertaken at subnational level, it will aid in identifying districts and subdistricts with the highest unmet need. This step is contingent on having subnational estimates (or proxies) of children and adolescents living with HIV. Once Table 3 is completed, identify the regions that contribute the most (70 per cent or more) to the total unmet need; and within all regions, identify which age groups have the highest unmet need. Assessment worksheets with built-in formulas and graphs for countries to input their data can be found [here](#).

Table 2: Performance along the locate-link-treat-retain continuum by age group*

AGE GROUP	LOCATE	LINK	TREAT	RETAIN	
	INDICATOR: Number identified /Estimated number living with HIV**	INDICATOR: Number linked to treatment/ Number identified	INDICATOR: Number on treatment/Estimated number living with HIV	INDICATOR: Number alive on treatment at 12 months/Number of new initiations in the cohort	INDICATOR: Number virally suppressed/ Number on treatment
0–4 years					
5–9 years					
10–14 years					
15–19 years					

* Note that nationally representative data may not be available for all age groups and all points along the continuum of care. For example, access to EID testing for infants and children up to 18 months is generally well captured nationally, whereas data on retention among adolescents may not be as robust or may be specific to a particular programme or facility. When reviewing data from partners, the size of the dataset and the quality of data may limit the ability to generalize findings across the whole national or subnational programme. Where this is the case, expert opinion should be sought to support the consensus decision of the technical working group or stakeholder group as to whether the data should be considered in selecting interventions from the solutions matrix.

** The estimate of number of children living with HIV by age group will be guided by available spectrum estimates at national and subnational level. Alternative methods to determine this in the absence of estimates can be explored and guided by the technical working group and national statisticians and epidemiologists.

Table 3: Which age groups of children and adolescents have the lowest ART access and which subnational administrative regions contribute the most ($\geq 70\%$) to unmet treatment need?

REVIEW THE UNMET TREATMENT NEED BY SUBPOPULATION AND SUBNATIONAL REGION TO RANK THEIR CONTRIBUTION TO NATIONAL UNMET TREATMENT NEED.												
AGE GROUP	INDICATOR	National	Subnational region									
			No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9	No.10
0–4 YEARS	Estimated children aged 0–4 living with HIV (a)											
	Children aged 0–4 living with HIV receiving ART (b)											
	Unmet treatment need for children aged 0–4 living with HIV (a-b = c)											
	Contribution to national unmet treatment need for children aged 0–4 living with HIV (c subnational/c national)											
5–9 YEARS	Estimated children aged 5–9 living with HIV (a)											
	Children aged 5–9 living with HIV receiving ART (b)											
	Unmet treatment need for children aged 5–9 living with HIV (a-b = c)											
	Contribution to national unmet treatment need for children aged 5–9 living with HIV (c subnational/c national)											
10–14 YEARS	Estimated children aged 10–14 living with HIV (a)											
	Children aged 10–14 living with HIV receiving ART (b)											
	Unmet treatment need for children aged 10–14 living with HIV (a-b = c)											
	Contribution to national unmet treatment need for children aged 10–14 living with HIV (c subnational/c national)											
15–19 YEARS	Estimated children aged 15–19 living with HIV (a)											
	Children aged 15–19 living with HIV receiving ART (b)											
	Unmet treatment need for children aged 15–19 living with HIV (a-b = c)											
	Contribution to national unmet treatment need for children aged 15–19 living with HIV (c subnational/c national)											

3. BARRIER ANALYSIS TO IDENTIFY LARGER SYSTEMS ISSUES

A large volume of literature exists to describe the barriers to child and adolescent HIV testing, treatment and retention. In the process of evidence review to determine best practices, 120 reports and reviews were identified that enumerate many of these barriers and define what opportunities exist to address them and scale up coverage as well as improve quality of care.

Most of these are either focused group discussions with health workers or clients, or surveys and other prospective evaluations of cohorts of children, including children being followed as part of larger clinical studies, or retrospective reviews of client records to identify why clients did not access services as expected. Among the barriers identified, there are several recurring themes that can be aggregated at facility, patient and community levels. For provider-initiated testing and counselling among children, a recent review found that although supply chain issues resulting in stock-out of essential commodities was a frequently cited problem, providers felt that it was lack of health worker capacity that was the real challenge to scaling up testing access.³⁷ The review examined the current evidence around health workers' perspectives and identified lack of child-friendly infrastructure at clinics, lack of consensus on age of consent for testing and disclosure, lack of training in the testing guidance and confusion around their role, which most believed was to provide information and clinical services but not testing, counselling and disclosure of status.

A similar survey of evidence around barriers to adolescent testing noted substantial individual, health system and legal barriers to testing access among adolescents, and in particular stigma among health workers themselves.³⁸ A desk review of 28 HIV-specific laws in sub-Saharan Africa showed that in most cases, legal provisions fail to take human rights principles and public health recommendations for facilitating adolescents' access to HIV service into account, and moreover that discrepancies exist between legal and policy documents.³⁹

Male partners play a key role in determining HIV care and treatment outcomes for mothers and children, and involving male partners in PMTCT and EID is associated with improved outcomes. Focus group discussions with male partners of women enrolled in PMTCT programmes in Kenya raised several challenges to greater engagement, including economic

hardship, insufficient social support from providers, peers and bosses, and pervasive HIV-related stigma.⁴⁰ Fragmentation of services from antenatal to post-natal to paediatric care is another important reason why opportunities to enrol children of PMTCT mothers into testing and care services are often missed.

Children and adolescents who test positive face additional hurdles to access and be retained on treatment. In Eswatini, focus group discussions among caregivers of young children who did or did not initiate ART after a positive diagnosis identified denial, guilt, a lack of knowledge and awareness, HIV-related stigma and a lack of money to attend clinic visits especially when clinics are far to travel to, as the key barriers to ART initiation.⁴¹ A similar focus group discussion methodology was applied to adolescents at urban and rural clinic sites in western Kenya, and this showed that for adolescents it is the context of negative societal beliefs about HIV and the secrecy associated with living with HIV that were the main barriers to starting and staying on treatment.⁴²

A more recent systematic review of the evidence around barriers to treatment and retention in children, adolescents and adults identified five cross-cutting patient-level barriers that were relevant to all age groups: the need to address social isolation, lack of confidentiality, feeling of disempowerment, the financial costs of regular clinic visits and the lack of integration of religious beliefs into care. The review also identified inadequate training and compensation for lay health workers as a major underlying barrier to achieving better client outcomes.⁴³

In order to understand challenges to service in the local context, a barrier analysis should be conducted prior to adopting service delivery interventions. Several tools exist to support this at national level; for example, the HIV and social protection assessment tool⁴⁴ developed by UNAIDS to conduct a quick scan of national social and child protection systems can be used to assess how sensitive social protection tools are for people with HIV. The Paediatric HIV Toolkit produced by USAID provides useful instruments for rapid programme assessment especially of facility and human resource constraints.⁴⁵ Global Fund guidance on conducting a situation analysis assessment to support funding applications may also be useful in formulating a rapid evaluation of programme barriers. Table 4 provides a simple format for recording demand and supply side barriers to testing and treatment as discussions are undertaken to brainstorm on key barriers related to the demand-side and supply-side of service delivery.

Table 4: Cross-cutting (demand- and supply-side) barriers relevant to specific age groups or to all ages

DEMAND-SIDE BARRIERS	SUPPLY-SIDE BARRIERS
INFANTS AND YOUNG CHILDREN (0–4 years)	
OLDER CHILDREN (5–9 years)	
ADOLESCENTS (10–19 years)	
ALL AGES	

Solutions matrix

Once typology classification and initial programmatic assessments are completed, framework users will turn to the solutions matrix to select a combination of interventions best suited to a country's epidemic classification and programming gaps for specific age groups along the locate-link-treat-retain continuum. The solutions matrix (*Table 5*) is a concise list of age-specific best practice service delivery interventions for specific points along the continuum. The 'locate' step refers to testing and finding HIV-positive clients by providing testing services through a range of entry points and platforms; the 'link' step refers to ensuring that identified clients living with HIV are introduced to treatment services so as to initiate ART as soon as possible after identification; the 'treat' step refers to the ongoing provision of WHO-recommended optimal treatment regimens to clients, including management of complications and advanced disease; and the 'retain' step refers to keeping clients in care, supporting adherence and monitoring viral load to ensure viral suppression.

The interventions in the solutions matrix are the 'what to do' approaches and innovations that have been implemented in a range of settings to efficiently and effectively locate, link, treat and retain infants, children and adolescents living with HIV, including by recognizing important facilitators and addressing common bottlenecks and barriers. These interventions are categorized as 'should do' and 'could do' based on the strength of the evidence. 'Should do' means that the evidence on the benefit and impact of the interventions is substantial and that country programmes should therefore strongly consider and prioritize them. 'Could do' means that the evidence for these interventions is not as substantial but that countries may wish to implement them if they seem well suited to the particular context and specific programme gaps. Further, in the table, interventions that are implemented across community and facility platforms are highlighted in blue. The 'should do' interventions in the matrix link to a narrative (*Annex B*) that explains how the intervention can be implemented, what its impact has been where implemented and for

which age group and typology classification it is best suited. In addition, where available, links to tools have been provided.

There are some important overarching considerations that should inform the selection of 'solutions' and the way in which these are implemented. Broadly speaking, interventions that are integrated into the maternal child health service are most likely to be sustained. Interventions that target adolescent populations should seek to ensure that service planning involves the active and meaningful participation of adolescents and young people and that services entail specific efforts to be adolescent-friendly.

As mentioned in the methodology, the selection of interventions within the solutions matrix was determined by evidence review and structured assessment of the collected evidence using a series of quality criteria. This ranked evidence was complemented by the results of a front-line health-care provider survey that highlighted numerous barriers to service delivery as well as several interventions those surveyed believed most effective. Finally, the solutions matrix underwent review and validation by partners who further considered the categorization of interventions. Through these various steps and stages, the matrix was refined and adjusted. For example, some interventions were moved from 'should do' to 'could do' to better align with global guidance (such as school-based testing) or better reflect the reality of resource constraints in most low- and middle-income countries (such as economic incentives and social protection). Other interventions were moved from 'could-do' to 'should-do' on the basis of strongly identified programmatic need in spite of less substantial evidence. Examples of this include integrating mental health and substance abuse care for adolescents. In some cases, interventions were broken down to highlight specific components relevant to the point in the locate-link-treat-retain continuum – for example, adolescent-friendly health services is a broad category intervention but has specific components relevant to locate, to link, to treat and to retain adolescents. Finally,

Table 5: Solutions Matrix

 Click on any 'Should Do' to navigate to intervention narratives and tools

CONTINUUM OF CARE					
AGE	STRENGTH OF EVIDENCE	LOCATE	LINK	TREAT	RETAIN
0-4 YEARS	SHOULD DO	<ul style="list-style-type: none"> Index family-based testing (including in adult ART services) Mentor mothers (and other peer support models for mothers) Mobile and electronic tracking platforms (linked to early infant diagnosis [EID] testing) Mother-infant paired services (including mother-infant pair tracking for missed appointments or lost-to-follow-up) Point-of-care (POC) technologies for EID Task shifting for testing and linkage Testing sick children in tuberculosis, nutrition, out- and in-patient services 	<ul style="list-style-type: none"> Mentor mothers (and other peer support models for mothers) Mobile and electronic tracking platforms (linked to EID testing) Mother-infant paired services (including mother-infant pair tracking for missed appointments or lost-to-follow-up) Task shifting for testing and linkage 	<ul style="list-style-type: none"> Case management by mobile phone Decentralized treatment Mentor mothers (and other peer support models for mothers) Task shifting for treatment and retention 	<ul style="list-style-type: none"> Appointment systems (including appointment diaries and appointment tracking through community outreach) Differentiated service delivery (DSD) (including family-based DSD) for stable children Home-based adherence and psychosocial support Mentor mothers (and other peer support models for mothers) Mobile SMS reminders POC technologies for viral load Task shifting for treatment and retention
	COULD DO	<ul style="list-style-type: none"> Campaign-based testing Congregation-based testing Testing in immunization/growth monitoring services Very early EID and treatment 	<ul style="list-style-type: none"> Economic incentives and social protection 	<ul style="list-style-type: none"> Telemedicine Very early EID and treatment 	<ul style="list-style-type: none"> Economic incentives and social protection
5-9 YEARS	SHOULD DO	<ul style="list-style-type: none"> Assisted disclosure Home-based and mobile testing Index family-based testing (including in adult ART services) Risk screening for provider-initiated testing and counselling Task shifting for testing and linkage Testing sick children in tuberculosis, nutrition, out- and in-patient services 	<ul style="list-style-type: none"> Assisted disclosure Task shifting for testing and linkage 	<ul style="list-style-type: none"> Assisted disclosure Case management by mobile phone Decentralized treatment Task shifting for treatment and retention 	<ul style="list-style-type: none"> Appointment systems (including appointment diaries and appointment tracking through community outreach) Assisted disclosure Differentiated service delivery (DSD) (including family based) for stable children Home-based adherence and psychosocial support Mobile SMS reminders POC technologies for viral load Task shifting for treatment and retention
	COULD DO	<ul style="list-style-type: none"> Campaign-based testing Congregation-based testing School-based testing 	<ul style="list-style-type: none"> Economic incentives and social protection 	<ul style="list-style-type: none"> Telemedicine 	<ul style="list-style-type: none"> Economic incentives and social protection
10-19 YEARS	SHOULD DO	<ul style="list-style-type: none"> Adolescent-friendly health services (including a) adolescent designated testing points at the facility, b) integrated HIV testing services at the HIV clinic, family planning clinic, gender-based violence centre, in- and out-patient departments, and c) integrating sexual and reproductive health services) Adolescent peer support (including teen clubs) Assisted disclosure Differentiated service delivery (DSD) for locating adolescents HIV self-testing Home-based and mobile testing Index family-based testing (including in adult ART services) Social network testing (for high-risk subpopulations) Task shifting for testing and linkage 	<ul style="list-style-type: none"> Adolescent-friendly health services (including a) adolescent linkage to care navigators and b) mental health and substance use screening and support) Adolescent peer support (including teen clubs) Assisted disclosure Task shifting for testing and linkage 	<ul style="list-style-type: none"> Adolescent-friendly health services (including a) adolescent-dedicated spaces and days and b) mental health and substance use screening and support) Adolescent peer support (including teen clubs) Assisted disclosure Case management by mobile phone Community-based treatment Decentralized treatment Integrating mental health and substance abuse disorder care Task shifting for treatment and retention 	<ul style="list-style-type: none"> Adolescent-friendly health services (including a) adolescent peer-managed appointments and lost-to-follow-up tracking and b) mental health and substance use screening and support) Adolescent peer support (including teen clubs) Adolescent transition Appointment systems (including appointment diaries and appointment tracking through community outreach) Assisted disclosure Case management by mobile phone Differentiated service delivery (DSD) for stable adolescents (including for adolescent key populations) Home-based adherence and psychosocial support Integrating mental health and substance abuse disorder care Mobile SMS reminders POC technologies for viral load Risk assessment for poor adherence Task shifting for treatment and retention
	COULD DO	<ul style="list-style-type: none"> Campaign-based testing Congregation-based testing Online social network support Risk screening for community testing School-based testing 	<ul style="list-style-type: none"> Economic incentives and social protection Online social network support 	<ul style="list-style-type: none"> Online social network support Telemedicine 	<ul style="list-style-type: none"> Economic incentives and social protection Online social network support

Note: Text in blue indicates interventions implemented in communities or in communities and facilities.

some interventions were added because additional new evidence and recommendations came to light, such as social network testing.

The solutions matrix is intended to be a dynamic resource that will evolve as additional programme data and research come to light. A web-based service delivery hub⁴⁶ developed by WHO and UNICEF and accessible at <www.childrenandaids.org/service_delivery_hub> is an online component of the service delivery framework, a collection of best practices that will expand to include additional solutions as the evidence base expands.

When selecting interventions from the solutions matrix, users are encouraged to consider the following:

1. Are there simple and/or a few ways to address programmatic weaknesses that can have a large impact?
2. Based on the assessment findings (typology classification and programme assessment), which age group(s) and points along the locate-link-treat-retain continuum require most focus?
3. Where in the programme is there some good momentum, such that, with a boost in focus, set targets could be achieved?

Systems-strengthening, cross-cutting elements

In addition to specific interventions that should be prioritized according to country typology and programming gaps, there are systems-strengthening, cross-cutting elements to be addressed directly and forcefully in all programmes, settings and contexts. These elements are in essence the ‘enablers’ that are the bedrock of success and sustainability in HIV programmes in general and among infants, children and adolescents in particular.

To end HIV as a public health threat, it is essential to develop more inclusive, more effective primary health care, with stronger health workforce capacities, greater community engagement, more efficient supply chains, better data, and adequate and sustainable financing. To address concerns about the declining interest in HIV, it might be useful to stress to policymakers that reducing the burden of HIV will free up significant capacity in the health-care system, facilitating achievement of the broader objectives of the 2030 Agenda for Sustainable Development by hastening progress towards Sustainable Development Goal 3.

With these high-level priorities in mind, the following are among the key systems-strengthening, cross-cutting elements that should be considered in the framework. They mirror the themes of the WHO health systems strengthening framework (see *Box 3*) and include:

Box 3. Health system building blocks

Health system building blocks:

- Service delivery
- Health workforce
- Information
- Medical products, vaccines and technologies
- Financing
- Leadership and governance

Source: World Health Organization, *Everybody's Business: Strengthening health systems to improve health outcomes – WHO's framework for action*, WHO, Geneva, 2007.

- A conducive policy environment with guidelines and policies that support locate, link, treat and retain, as well as tools that support the provision of standard of care across various facility levels. For example, lowered age of consent for HIV testing of adolescents; ART guidelines that include the best treatment regimens and dosage forms for infants, children and adolescents and allow for rapid transition to better options when they become available; and training materials and tools adapted to include topics of disclosure, adherence and transition in a comprehensive way.
- Reduction of HIV-related stigma and discrimination, including in the health setting and in the community. Evidence suggests that the prejudices of providers at facilities offering HIV care are a major contributor to poor patient adherence and retention in care.⁴⁷ It is essential that the health facility environment be welcoming and patient-centred – especially for adolescents and young mothers seeking care for themselves or their children.
- Sufficient quantity and quality of human resources. Practices such as task shifting are increasingly being used to alleviate human resource constraints and allow for the expansion of HIV programmes. It is essential, however, to mentor and support staff with regular retraining, ensuring that they maintain their skills and knowledge.⁴⁸ Decision-makers and other programme personnel also should engage with colleagues in finance and treasury ministries to make sure that funds are secured for sustained support of staff as international funding streams decline, giving particular priority to people living with HIV and community health workers. In addition, health-care worker training and refresher training to provide quality care for all subpopulations should be institutionalized.
- A supportive, rights-based legal environment – for example, by addressing laws that criminalize HIV and key populations, which may hamper index-case

partner and family-based testing and provision of outreach services to adolescents and youth from key populations.

- An efficient, accessible and quality-assured testing network, with opportunities for rapid turnaround of HIV testing and treatment monitoring results for infants, children, adolescents, and pregnant and breastfeeding women living with HIV.⁴⁹
- A functional supply chain for drugs and other commodities (e.g., HIV testing kits and viral load testing materials) that can expand to accommodate new sites and deliver integrated services for testing and treatment within primary-health-care systems. This in turn necessitates accurate forecasting and timely procurement of commodities. The Clinton Health Access Initiative maintains an up-to-date forecasting tool that allows for quantification of currently recommended ARVs for children, adolescents and adults.⁵⁰
- Political will and buy-in from governments and stakeholders to commit to ambitious targets, including subnational targets for HIV testing and treatment among infants, children and adolescents.
- Mechanisms that enhance community engagement and collaboration and foster engagement of caregivers and adolescents living with HIV in decisions that impact them. Although health facilities are at the heart of health service delivery, their ability to extend services beyond

their confines may be limited, and their outreach efforts to take services into communities may encounter structural barriers such as stigma and discrimination that they are ill-equipped to handle. Dialogue and collaboration between the health facility and the community is therefore essential to achieving programmatic 'saturation' in any given area, ensuring that all infants, children and adolescents living with HIV, even in the most remote areas, are linked to care. Community health workers, faith communities and organizations, mentor mothers, local networks of people living with HIV and community-based organizations can provide an essential community 'push' effort to connect these subpopulations to services. Such community representatives are trusted locally and in many cases are able to dedicate the time clinic staff cannot, in order to connect the hardest to reach and retain them. Various tools exist to support these processes, including the Clinic-Community Collaboration Toolkit developed by Paediatric-Adolescent Treatment Africa (PATA).⁵¹

- Coordination among donors and other stakeholders, which can make all strategies and interventions more efficient and sustainable. Often this can be most readily achieved through relevant technical working groups.
- Strategic information to capture age-disaggregated data, set targets and track outcomes by various subpopulations.

Monitoring

The Global AIDS Monitoring (GAM)⁵² indicators (Annex D) were designed to help countries assess their progress in achieving national targets in their HIV responses. In addition, they contribute to an improved understanding of the global HIV response as outlined in the 2016 Political Declaration on Ending AIDS, the Sustainable Development Goals,⁵³ and the ‘super-fast-track’ targets of the Start Free, Stay Free, AIDS Free framework (Box 4).

Box 4. AIDS Free ‘super-fast-track’ targets.

AIDS Free ‘super-fast-track’ targets

- Provide 1.6 million children (aged 0–14) and 1.2 million adolescents (aged 15–19) living with HIV with lifelong antiretroviral therapy by 2018. [Reach 95% of all children living with HIV]
- Provide 1.4 million children (aged 0–14) and 1 million adolescents (aged 15–19) with lifelong HIV treatment by 2020. [Reach 95% of all children living with HIV]

The first step in using the service delivery framework is to undertake a critical analysis of gaps along the locate-link-treat-retain continuum for each age group. For many national and subnational teams, this may be limited, because of insufficiently disaggregated data making it difficult to understand where progress in the paediatric and adolescent response has stalled. While the GAM indicators⁵⁴ exist, there is a lack of consistency in what is being reported and in the disaggregation needed for more nuanced programme performance assessment.

The value of the interventions recommended in the solutions matrix can be determined only through rigorous and continuous monitoring. This is the third major component of the service delivery framework, after assessment (classification of the epidemic typology and understanding the programme gaps) and application of the evidence-based solutions proposed in the solutions matrix. Robust monitoring efforts are essential to understand whether the applied solutions are yielding the desired results (*Figure 8*). The use of this framework therefore necessitates an increased focus on data.

There are several bottlenecks preventing the availability and use of high-quality age- and sex-disaggregated data to inform and guide delivery of high-quality services. These include absence of tools that capture the WHO-recommended⁵⁵ five-year-band age- and sex-disaggregation, lack of unique patient identifiers, insufficient human resources, low uptake and scale-up of patient-level information systems, and absent or irregular data quality checks and data reviews.

Five key areas are critical for monitoring the implementation of the service delivery framework to ensure a continuous quality improvement cycle and achievement of set targets.

I. Increasing the availability and use of age- and sex-disaggregated data

While there is a provision for age- and sex-disaggregated data within GAM, most countries do not report these data because primary source summary forms do not have appropriate age- and sex-disaggregated elements. In addition, very few

Figure 8. Data drives implementation of the service delivery framework



countries have nationally representative patient-level information systems. Therefore, the data currently being reported globally do not provide the needed detail to understand progress in care for children and adolescents up to age 19. The framework encourages leadership at national and subnational levels to reinforce the use of the existing GAM indicator framework and recommended sex- and five-year age-disaggregation. This may require a combination of communication, tools modification, capacity-building and systems enhancement. Critically, programme managers are asked to identify where the gaps are in the collection, collation, analysis, use and reporting of age- and sex-disaggregated data, particularly at the local health facility level.

II. Increasing the availability and use of data on the uptake of services along the locate-link-treat-retain continuum

The service delivery framework encourages the use of data specific to each step along the continuum to ensure that programme and health facility managers are able to assess where interventions along the locate-link-treat-retain continuum are working well and where they are not. Doing so provides a deeper level of insight to determine where greater focus is needed along this continuum. For example, as more people are enrolled in care, greater consideration needs to be taken to balance activities promoting new treatment initiations and retaining people already identified. These decisions can only be made locally using the relevant data.

III. Analysing data to identify location focus

To optimize available resources, interventions should be targeted in terms of programmatic and geographic focus. For example, as high-prevalence countries enrol more people in care, programming based on data insights becomes more critical to ensure that resources are invested appropriately based on population and location. A broad 'test all' approach may be cost-effective in a high-prevalence setting where few people have been connected to care, but yields will drop precipitously once the easiest to reach have been enrolled and programmes need to aim at targeting the hardest to reach in the most likely locations.

IV. Maintaining a continuous quality improvement cycle

Continuous quality improvement (CQI) is a process of collecting, analysing and using data to improve the

quality of services or products on an ongoing basis through a series of cyclic steps – plan, do, study, act.⁵⁶

At facility level, the framework aims for clinic managers to use data to continuously improve service delivery and achieve their desired performance. It is understood that local health facility registers already include disaggregated data as well as several other forms of data that exist at facility level. The framework encourages the use of these data alongside CQI methods such as the root cause analysis fishbone tool⁵⁷ to understand existing gaps and address them with the use of the solutions matrix and complementary existing guidelines and tools.

V. Milestone tracking of implementation and scale-up of service delivery interventions

An important feature of monitoring is understanding progress over time. It is expected that countries will capture their baselines for service delivery implementation at adoption of the framework and then record progress against set milestones for scale-up periodically (on a 6- to 12-month cycle).

Examples of milestones that could be set are:

1. To close 30 per cent of the treatment gap from baseline within 6 months, 60 per cent by the end of the first year (12 months) and 80 per cent within 18 months, and to achieve 'super-fast-track' targets (95 per cent) by 24 months (2 years);
2. To scale up index family-based testing to 30 per cent of adult ART sites within 6 months, 50 per cent within 12 months and 100 per cent within 18 months in the subnational regions with the highest burden; and
3. To scale up paired mother-infant services in subnational regions with high MTCT rates to reach 20 per cent of PMTCT sites within 6 months, 35 per cent within 12 months and 50 per cent within 18 months.

It is expected that following launch of the framework, the first six months will be focused on initiating new practices or enhancing current ones, based on the solutions matrix. The subsequent 12-month period is expected to be focused on targeted scaling – scaling those interventions that work but only where data indicate they will drive progress to closing the gap. And the last 18 months focused on consolidating gains and ensuring sustainability.

Conclusion

It is important to recognize, as this framework seeks to do, that the current challenges should also be seen as a consequence of heightened expectations brought about by what would have been seen two or three decades ago as unimaginable improvements in overall HIV responses. These improvements are due to the endeavours of tens of thousands of people, from health centre exam rooms to boardrooms, who have been working for the benefit of millions of people they may never meet. This work continues, and as a result, at this very instant a child somewhere is being diagnosed with HIV and linked to care. If she or he can remain on ART and in contact with health-care providers and community support, the prognosis is excellent. Similarly, nearly every minute a mother is being told that her child has avoided infection with HIV because of her own diligence in adhering to a PMTCT programme and the support of her family, health-care team and community.

These realities underscore the inspiring consequences of the world's response to HIV on a population-wide basis over the past 25 years, due in no small part to multilateral, goal-directed initiatives implemented and supported at global and local levels. Numerous examples exist of impactful international responses to HIV among children and adolescents, such as the Global Plan towards the Elimination of New HIV Infections among Children by 2015 and Keeping Their Mothers Alive (Global Plan),⁵⁸ launched in 2011, the Accelerating Children's HIV/AIDS Treatment (ACT) initiative,⁵⁹ launched in Africa in 2014, and the 2016 Start Free, Stay Free, AIDS Free 'super-fast track' framework for ending AIDS among children, adolescents and young women by 2020.⁶⁰

This overarching success does not mean the battle is near to being won, however. Instead, the progress to date comes with ongoing obligations to vulnerable

and under-served populations such as infants, children and adolescents living with HIV. The service delivery framework is action-oriented and structured to deliver results. Its value stems from its having been developed in a broadly consultative manner with emphasis on high-quality evidence for all recommended interventions. At its centre, the solutions matrix is a concise menu of service delivery interventions that are age-specific best practices for specific points along the locate-link-treat-retain continuum. Having assessed the national or subnational programme, managers and implementers can interrogate the solutions matrix and pull out specific ideas for stakeholders to consider and implement. Such consensus among local and national stakeholders from a wide range of settings and contexts underscores the framework's likely benefits for programmes everywhere – and all the more so if funders and donors collectively align their support for its implementation.

UNICEF and partners plan to further validate and roll out the service delivery framework in 2020 with the support of the partners involved in the consultation process. Continuous shared learning through testing and documenting service delivery models is a critical element to the ongoing refinement of the framework, particularly to better understand and address more complex situations, such as those occurring in mature and advanced programmes and in concentrated epidemics. It is not a coincidence that the framework is being introduced in the same year in which UNAIDS and partners assess progress against the 'super-fast-track' targets, most of which will not be achieved in most countries. More intensified efforts are needed everywhere to advocate for better HIV programming for infants, children and adolescents and to prioritize interventions for them. This new framework is an opportunity to make continuous and faster progress in that direction.

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Annex A: Methodology

Methodology: How the framework was developed.

The framework was developed through four main steps: i) a survey administered to front-line health-care providers in the field to identify challenges, service delivery gaps and innovative best practices; ii) an extensive literature review of more than 360 papers to identify key barriers and enablers as well as interventions along the locate-link-treat-retain continuum; iii) a think-tank consultation to consider the need for and the potential value of a new framework, as well as to set the parameters for what it might look like and how it could be used; and iv) a collaborative co-creation process where five working groups deliberated to design and develop the framework over the course of two months.

I. **Health-care provider survey:** A survey of front-line health-care providers was developed by Paediatric-Adolescent Treatment Africa (PATA) and UNICEF and distributed across several health-care provider networks – the African Network for Care of Children affected by HIV/AIDS (ANECCA), Réseau Enfants et VIH en Afrique (EVA) and PATA – to expand its reach, particularly in West and Central Africa. The 321 respondents highlighted the need for a framework providing an outline of best practices with simple how-to guidance on service delivery for infants, children and adolescents living with HIV. The observations are compelling, and they bolster the recommendations in the solutions matrix (*Table 5*) discussed in this document. The following is a summary of some of the survey findings:

- Multiple challenges were noted in early infant diagnosis (EID), including retaining mothers and infants in care, unduly long turnaround times on testing results, and under-resourced and under-prepared providers.
- Health-care providers sought better community outreach for EID as well as integration of EID within maternal child health and more effective reminders for families to come in for visits.
- Caregiver education and counselling about testing for and treating HIV, as well as assisting caregivers and their families with disclosure support, was also highlighted as a much-needed intervention.
- Health-care providers observed that finding clients (i.e., children and adolescents living with HIV) was

difficult because of limited resources, a lack of time and appropriate places to test patients, and challenges related to obtaining consent for testing in adolescents.¹

- Outreach solutions proposed by health-care providers included enhanced community/clinic collaborations, integration of health services (testing for HIV in facilities and settings not solely dedicated to HIV, for example) and removal of consent barriers.
 - The barriers for treatment and retention included a lack of training, inadequate time to offer services and staff members' reluctance to initiate ART.
 - Proposed solutions to these challenges included better appointment tracking, reduction of stigma, provider training on ART for children and adolescents, and age-friendly services like teen clubs, peer support groups and weekend services.
 - The overall importance of closer collaboration between community and facility was noted by providers.
- II. **Literature review:** This was conducted by UNICEF and the Clinton Health Access Initiative (CHAI) and identified 360 papers reporting on barriers and enablers, as well as service delivery innovations along the locate-link-treat-retain continuum for infants, children and adolescents living with HIV. UNICEF collaborated with a team at the Yale School of Medicine to undertake a critical review of this evidence base and ranked the evidence, scoring each paper for quality using a simple semi-quantitative approach with four criteria: (1) number of clients who received the intervention (<100='0', 100 or >='1'); (2) number of facilities or sites where the intervention was implemented (1='0', >1='1'); (3) whether the study was published in a peer-reviewed, high-impact journal (impact factor <2='0', 2 or >='1'); and (4) whether the study reported significant positive outcomes (no='0', yes='1'). Studies were then clustered by intervention, which resulted in 34 separate interventions, each containing anywhere from 1 to 23 papers. Interventions were divided across the continuum of care (locate, link, treat and retain) and classified into 'should do' (multiple high-scoring papers in support of the intervention, implying that countries should strongly consider it) or 'could do' (few low-scoring

papers, implying that programme managers could consider the intervention, depending on context). This consolidated, ranked evidence base was utilized to propose recommendations in the service delivery framework and incorporated into the solutions matrix. A summary of the ranked and clustered interventions is provided in Annex B.

III. **Think-tank consultation:** UNICEF and partners gathered for a two-day think-tank consultation in New York on 17–18 June 2019 to develop consensus on a framework for priority interventions to enhance service delivery for locating, linking, treating and retaining infants, children and adolescents living with HIV in line with the AIDS Free Framework² and Rome Action Plan³ commitments.

Key agreements were:

1. That it is unacceptable for infants, children and adolescents living with HIV continue to remain undiagnosed, to face stagnating access to treatment and to have poor treatment outcomes.
2. That service delivery must be prioritized alongside drugs and diagnostics within the collaborative work of the AIDS Free Working Group of the 'Three Frees' framework⁴ and Rome Action Plan.⁵
3. That concerted advocacy (in the context of declining interest and funding and to boost political will), including tracking milestones, by all present and their leadership, is urgent.
4. That service delivery remains inadequately addressed and requires urgent collective action, based on lessons learned and promising practices to date, to implement context-specific and effective testing, treatment and care approaches to turn the tide and achieve the 2020 targets.
5. That numerical 95-95-95 target-setting for 2020 at national, subnational and local levels, together with milestone tracking, are critical ingredients for success.
6. That efforts by partners and funders must be aligned across and within countries to optimize investment and impact.
7. That focused work is needed on community-facility platforms and linkages along a locate-link-treat-retain continuum contextualized by setting typology, by age band (infants, children and adolescents) and by state of health (the well child versus the sick child).

At the end of the meeting, participants agreed on a conceptual structure for organizing and presenting the best practices along the continuum of care while also recognizing the cross-cutting, health systems components that are essential enablers for all service delivery interventions.

IV. **Working groups:** Following the June 2019 think-tank consultation, subgroups were formed to undertake focused discussions in one of five areas as follows: working group 1: age group 0–4 years; working group 2: age group 5–9 years; working group 3: age group 10–19 years; working group 4: typology; and working group 5: communication, advocacy, monitoring and milestone tracking. Think-tank partners self-selected into working groups and met weekly over a six-week period to discuss rationale, scope and key considerations as well as review evidence and best practices along the locate-link-treat-retain continuum for inclusion in the framework. To ensure meaningful engagement of adolescents, colleagues from youth and adolescent groups such as Ambassadors for Youth and Adolescents Reproductive Health Programme (AYARHEP), Zimbabwe Young Positives (ZY+) and the Global Network of Young People Living with HIV (Y+) were invited to participate.

V. **Framework validation:** UNICEF and its partners undertook a validation process in which a draft version of the service delivery framework was shared with key stakeholders and potential users in the field (ministry of health officials, implementing partners and health-care providers) with a view to obtaining their input. This was done through a workshop for faith-based organizations convened on 27 September 2019, and in a virtual technical consultation convened on 21 November 2019 with the participation of think-tank partners, representatives of ministries of health, and other national stakeholders. In both cases, the framework's background and development process were explained and guidance on its use was provided. Input was sought on a range of elements, including the typology assessment tool and the interventions in the solutions matrix. Extensive observations were received on how the framework could be kept relevant and useful and on its utility, accessibility and relevance at national, subnational, health facility and community levels. This feedback was incorporated with additional refinements to the framework, particularly the assessment tools, solutions matrix and annexes.

Notes to Annex A

- 1 Mark, D., et al., 'Optimizing HIV Service Delivery for Infants, Children and Adolescents: Data from 324 facilities in 30 countries', 20th International Conference on AIDS and STIs in Africa (ICASA), Kigali, Rwanda, 2–7 December 2019.
- 2 World Health Organization, *AIDS Free Framework to accelerate paediatric and adolescent HIV treatment*, WHO, Geneva, 2018, Licence: CC BY-NC-SA 3.0 IGO. <<https://apps.who.int/iris/bitstream/handle/10665/273150/WHOCDSD-HIV-18.20-eng.pdf?ua=1>>, accessed 11 December 2019.
- 3 Pediatric HIV: Rome Action Plan, <<https://www.paediatrichivactionplan.org>>, accessed 11 December 2019.
- 4 Joint United Nations Programme on HIV/AIDS, *Start Free, Stay Free, AIDS Free: A Super-Fast-Track Framework for ending AIDS among children, adolescents and young women by 2020*, UNAIDS, Geneva, 2016, <www.unaids.org/sites/default/files/media_asset/Stay_free_vision_mission_En.pdf>, accessed 11 December 2019.
- 5 Pediatric HIV: Rome Action Plan.

Annex B: Intervention narratives and tools

Adolescent-friendly health services

AGE GROUP			
0-4 yrs	5-9 yrs	10-18 yrs	

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓		✓	✓		✓			

NARRATIVE	
<p>Youth- or adolescent-friendly services can encompass a variety of features, including adolescent-designated testing points at the facility, integrated HIV testing services at the HIV clinic, family planning clinic, gender-based violence centre, in- and out-patient departments, integrating sexual and reproductive health (SRH) services, adolescent linkage to care navigators, youth-friendly waiting areas or designated clinic spaces, evening or weekend clinic hours, adolescent trained healthcare providers (HCPs), utilization of adolescent-specific tools, adolescent peer-managed appointments and lost-to-follow-up tracking, adolescent and youth support groups and integration with other adolescent health services or needs^{1,3,7,9}. Attendance at adolescent-friendly services has been shown to significantly improve linkage and/or retention for adolescents and youth ranging in age from 10 to 24 years across low- and middle-income countries^{1,3,4,6,10}.</p> <p>Elements that comprise youth- or adolescent-friendly services include physical elements such as youth-friendly spaces, educational materials and hours, along with the right clinical and social environment such as staff specifically trained to work with youth or youth support groups and meetings⁶. Youth-friendly services may extend beyond the basic elements of clinic design and staff training to incorporate specific tools that benefit adolescents, including adolescent risk screening to identify more adolescents and young people</p>	<p>at risk and link them to testing and care, depression screening to address depression which is associated with poor ART adherence, and/or substance use screening which is associated with increased risk of HIV transmission or loss to follow-up^{1,2,7,11}. Incorporating these additional features may further improve linkage and retention rates. Additionally, integrating HIV care with other health services that affect adolescents, such as SRH programmes and substance abuse treatment, can lead to improvements across the cascade^{5,8,11}. Substance use disorders are known risk factors for contracting HIV and other sexually transmitted infections (STIs) in adolescents, and adolescent females are generally under-represented in substance abuse treatment programmes¹¹. HIV/SRH integration can help to address barriers for HIV, STI, and contraception services for key populations, particularly adolescent girls and young women aged 15-24 and young males under 18 years^{5,8}.</p> <p>Although youth-friendly waiting areas and evening clinic hours are shown to facilitate retention in care for adolescents and young people living with HIV³, among all interventions, staff training in particular has been demonstrated to significantly improve outcomes including youth engagement, adherence to treatment and retention in care^{3,4}. Any adolescent-friendly service intervention should at minimum address provider attitudes, training and awareness.</p>

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TOOLS	
<p>Adolescent-friendly health services for adolescents living with HIV: from theory to practice (WHO, 2019)</p> <p>Ready to Care charter and scorecard (Y+ and READY consortium)</p>	<p>Sensitizing health workers to providing responsive care for adolescents and young people living with HIV (PATA)</p> <p>Clinic-community collaboration toolkit: How clinics and communities can work together to improve HIV service delivery for adolescents and young people (PATA)</p>

Adolescent peer support

AGE GROUP			
0-4 yrs	5-9 yrs	10-18 yrs	✓

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓	✓	✓	✓	✓	✓	✓	✓	✓

NARRATIVE	
<p>Peer support models, for example, community adherence clubs among adults with HIV, have been shown to have a positive impact on stable patient experience with HIV care, in particular with time spent waiting for medicines and the feelings of achievement that come with taking good control of one’s chronic illness with peers⁶. This is also a phenomenon that has been noted in PMTCT programming in Uganda; the use of peers, community lay persons, and village health team members improved follow-up of HIV infected mothers and their exposed infants¹.</p> <p>It is therefore not surprising that peer support among teens has also been shown to be an effective way to test, initiate ART, and keep HIV-infected adolescents in care. Peer support was noted by Neary and colleagues in a survey of over 1,000 young people seeking HIV testing at a facility in Kenya to be a positive influence for teens and young people to undergo HIV testing and subsequent linkage to care². Shah and colleagues also found that peer navigators helped to bring street-connected youth (SCY) into care in their study of SCY in Eldoret, Kenya⁴. A “Red Carpet Programme” for HIV-infected teenagers in Homa Bay, Kenya, was noted to boost linkage and early retention in care. This programme involved the establishment of a very important person (VIP) card and express services, which consisted of fast-track access to healthcare facilities (HCF), peer counselling, and psychosocial support services. In addition, HCFs were made adolescent and youth friendly (adolescent and youth-trained staff, adolescent and youth-targeted posters, and adolescent and youth-targeted clinic areas) to welcome newly identified adolescents and youth and guide them through initial registration and follow-up, and flexible hours were set up at HCFs for peer counselling and support services³.</p> <p>Community adolescent treatment supporters (CATS) have been utilized to good effect in Zimbabwe, where Willis and colleagues found in a randomized trial that CATS service recipients had greater linkage to care, psychosocial well-being, and adherence than those receiving standard of care⁹. The Zvandiri program is a multicomponent differentiated service delivery model for children, adolescents, and young people in Zimbabwe that integrates peer-led, community interventions within government health services. Willis and colleagues noted in their review of programme scale-up and programmatic impact that this approach has improved uptake of HIV testing services, adherence, and retention in care, outcomes likely to link with improved survival, health, and psychosocial well-being⁷. Adolescent support groups under the Accelerating Children’s HIV/AIDS Treatment in Africa (ACT) Initiative</p>	<p>were also found to be acceptable to healthcare providers and beneficiaries; this educational support group initiative was held monthly and run by trained healthcare providers (counsellors/health promoters). It followed a defined educational curriculum of six topics, including HIV/AIDS, disclosure, sexual and reproductive health, and mental health⁵.</p> <p>Adolescent peer support throughout the continuum of HIV care represents a wide range of initiatives that help to locate and keep this vulnerable population in care. An example is “Teen Clubs”. This is a targeted psychosocial support intervention that combines strategies including peer counselling and support, clinic accessibility for adolescents living with HIV, youth-friendly services, and addressing barriers with the goal of achieving optimal treatment outcomes for adolescents – all in the context of dedicated youth support group meetings usually held on a Saturday morning. The Teen Club intervention is adapted from the Baylor College of Medicine International Pediatric AIDS Initiative Center for Excellence curriculum. ART clinicians and nurses are trained in the Teen Club curriculum and provide support to the monthly sessions.</p> <p>In order to evaluate the Teen Club package, the intervention was established in an urban tertiary referral HIV clinic in Malawi. It provided teens on ART with dedicated weekend clinic time, sexual and reproductive health education, peer mentorship, and support for positive living, treatment adherence, and disclosure. Participants were recruited from existing ART patients (age 10-19) at the Zomba Central Hospital where the Teen Club was established. Data were pulled from standard MOH ART monitoring tools (paper or electronic medical records) starting in 2004 for participants. Participants were then tracked from the start of the intervention in March 2010 until they were lost to care or through the end of the study in December 2015. A total of 617 participants were included in this evaluation. Teens were considered “exposed” to the Teen Club if they had received ART services through at least two Teen Clubs at the time of enrolment into the evaluation.</p> <p>There were several factors found to be associated with attrition in this evaluation: exposure to Teen Club, age at time of selection, and year of ART initiation. The results indicate that adolescents exposed to Teen Club have 3.7 times lower odds of attrition compared to those with no exposure to Teen Club.</p> <p>One pitfall of this intervention is that adolescents 15-19 still have a higher risk of attrition than those 10-14 years old, highlighting the need for more age-specific programming for this group of adolescents.</p>

Adolescent peer support (continued)

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TOOLS

[Peer network in Zimbabwe \(PEPFAR solutions\)](#)

[Zvandiri Program Website](#)

[Peer support group guide \(EGPAF\)](#)

[Providing peer support for adolescents and young people living with HIV \(PATA\)](#)

[BIPAI Teen Club Life Skills Curricula A life skills curriculum for adolescent HIV psychosocial peer support](#)

[Ariel Adherence Clubs: Increasing Retention in Care and Adherence to Life-Saving Antiretroviral Therapy among Children and Adolescents Living with HIV in Tanzania \(PEPFAR Solutions, 2018\)](#)

[Operation Triple Zero \(PEPFAR Solutions\)](#)

Adolescent transition models

AGE GROUP			
 0-4 yrs	 5-9 yrs	 10-18 yrs	✓

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓	✓	✓	✓	✓	✓	✓	✓	✓

NARRATIVE	
<p>The number of adolescents with perinatally or behaviourally acquired HIV is increasing in low-income countries, especially in sub-Saharan Africa, where HIV prevalence and incidence are the highest. As adolescents survive into adulthood in the era of antiretroviral therapy, there is a pressing need to transition them from paediatric to adult care. It is most often at this time of transition that adolescents may be lost to follow-up or fail to adhere to treatment, resulting in poor clinical outcomes and risk of transmission to partners—and in the case of adolescent girls who are pregnant, to children as well³.</p> <p>A literature review by Dahourou and colleagues noted that few data on transition outcomes for HIV-infected adolescents are available from African settings. Studies mainly from Eastern and Southern Africa reported on the barriers to successful transition, highlighting several gaps, including lack of adequate infrastructure, staff training and communication between paediatric and adult clinicians, as well as fears of being stigmatized in adult care settings. Most countries have no specific national guidelines on when to disclose HIV status or when and how to transition to adult care. Several models of care adapted to the adolescent transition question have been implemented in specific settings. These models include teen clinics as an intermediary step between child and adult care, peer educators and the use of social media to support adolescents who are transitioning. However, regardless of the model, one overarching theme remains the lack of human resources and staff capacity. The authors concluded that staff training, data collection and analysis to report on transition outcomes and systems to screen and identify individuals at higher risk of loss to follow-up for targeted care and peer support are essential to improve the quality of services³.</p>	<p>Yi and colleagues, reporting on adolescents facing transition into adult care in Cambodia, noted that a range of individual, social and health system and service factors may determine successful transition preparedness among adolescents in Cambodia. Strengthening implementation of age-appropriate and individualized case management transition at all sites, while creating supportive family, peer, and healthcare environments for adolescent transition is required¹⁷. The importance of targeted and adolescent-friendly support during the period of transition was also noted in a qualitative study of stakeholders in paediatric care (caregivers, beneficiaries, service providers) in Thailand¹⁶.</p> <p>In a highly resourced setting such as the United States, Tanner and colleagues noted the importance of evidence-based research and a quality improvement framework to inform comprehensive and streamlined transition protocols to help enhance the capacity of adult clinics to collaborate with adolescent clinics and provide coordinated and uninterrupted HIV-related care¹⁵. Tanner noted the utility of close collaboration and a “warm handoff” between adolescent and adult clinics. Righetti and colleagues, reporting on transition outcomes in Italian cohorts of HIV patients transitioning to adult care, echoed these calls for coordination and collaboration, noting the positive impact of a dedicated day for transitions, patient-customized environment, psychological support, and the provision of many health services in one site¹⁴.</p> <p>There are toolkits and some programme experiences to guide the transition of an adolescent HIV patient to an adult HIV service. An increased attention to this fragile moment in the client’s life and also ongoing research and reporting on programme successes will continue to offer more guidance and solutions.</p>

Adolescent transition models *(continued)*

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TOOLS

[HP+ Pediatric Transition Model](#)

[WHO Adolescent Transition](#)

[Toolkit for Transition of Care and Other Services for Adolescents Living with HIV](#)

[Resources to Support Transition of Adolescents from Pediatric to Adult HIV Care \(amfAR\)](#)

[Transitioning HIV-Infected Youth into Adult Health Care \(American Academy of Pediatrics\)](#)

Appointment systems

AGE GROUP			
 0-4 yrs	✓	 5-9 yrs	✓
		 10-18 yrs	✓

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓	✓	✓	✓	✓	✓	✓	✓	✓

NARRATIVE	
<p>Managing a chronic condition such as HIV/AIDS requires a different approach to appointments than acute out-patient care. National health systems have demonstrated better follow-up of HIV clients with longitudinal information and related data collection, though reminding patients and families of scheduled appointments to support their attendance at clinic and ART adherence remains difficult. This situation was made more visible as HIV services were rolled out to non-specialist centres, as was the case with PMTCT services being provided at reproductive and child health centres.</p> <p>One study that addressed this question was the randomized trial by Ross-Degnan et al². The trial tested the impact of implementing paper-based appointment tracking and community outreach systems on the rate of missed appointments and number of days covered by dispensed antiretroviral medications among women previously established on antiretroviral therapy. The team of researchers found that appointment-tracking and community outreach significantly improved appointment-keeping for women on antiretroviral therapy. The facility staff controlled their workload better, identified missing patients rapidly, and worked with existing community organizations.</p>	<p>A package of attendance and adherence interventions at Kenyan rural health facilities was evaluated by Boruett et al¹. This package included: 1) Implementing a clinic appointment diary system for tracking patient attendance; 2) Modifying the national routine patient monitoring form (MoH-257); 3) Conducting targeted training of health service providers drawn from each intervention site; 4) Visiting the facility teams to support their implementation of the intervention. This study demonstrated that a facility-based intervention could strengthen the appointment-tracking and performance-monitoring system and that the use of facility-generated indicators was feasible and built the staff's capacity to help patients improve their clinic attendance.</p> <p>A national programme in any epidemiologic context looking therefore to improve attendance at clinic for HIV patients should consider appointment tracking systems such as diaries and strengthened data collection and utilization at sites. The use of community outreach for those who have not made it to their appointments has also been shown to have a positive impact on the retention of patients.</p>

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TOOLS	
<p>PEPFAR Solutions Website: Tracking and Tracing Patients</p>	<p>Ministry of Health, National AIDS and STI Control Program. Differentiated Care: Operational Guide. (annex 8)</p>

Assisted disclosure

AGE GROUP			
0-4 yrs	5-9 yrs	10-18 yrs	10-18 yrs
		✓	✓

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓	✓	✓	✓	✓	✓	✓	✓	✓

NARRATIVE	
<p>Despite growing evidence of empiric and perceived theoretical benefits of disclosing HIV status to children living with HIV, it is estimated that as many as 75% of children living with HIV in some regions have not been informed that they have HIV.^{1, 2} Timely and supportive disclosure may confer several benefits, including better psychological adjustment, higher self-esteem, improved participation in healthcare decision-making, better adherence to therapy, better clinical outcomes (e.g., higher CD4 count, viral load suppression, low morbidity and mortality), and lowered risk of transmitting HIV when the child becomes sexually active, as well as smooth transition from paediatric care to adult care.³⁻⁹ Barriers to disclosure include caregiver's fear of discrimination, stigma, social isolation of the child, psychological trauma, confrontation or creating enmity with their child, health service-related factors (lack of clear guidelines on disclosure, negative attitude of healthcare providers, lack of supporting services), young age of the child, and lack of disclosure skills of both caregivers and providers.^{8,10}</p> <p>The World Health Organization strongly encourages disclosing HIV infection status to school-age children (6-12 years) and recommends that younger children be informed incrementally according to their cognitive and emotional maturation¹¹. However, there is still ongoing debate on 'the when', 'the how', and 'the what to inform'. Disclosure should be a shared responsibility by parents/caregivers and healthcare workers. To increase the rate of disclosure, several interventions based on an education model (theoretical framework, process-oriented disclosure, and iterative construct) have been used to improve the knowledge and skills of caregivers and healthcare workers on disclosure.⁹ Blasini et al. deployed a five-component intervention in Puerto Rico³. They used audiovisual aids such</p>	<p>as an HIV cartoon book and other educational materials portraying HIV as a chronic illness for the educational and intervention sessions. Thailand has a national paediatric disclosure intervention protocol, a four-step counselling-based model to guide healthcare providers to assist caregivers in the process of disclosing HIV status to infected children (aged 7 years and older). Namibia established a multipronged national paediatric HIV disclosure intervention in 2010.¹² Botswana has also adopted a flipbook developed by Baylor's International Paediatric AIDS Initiative and the Children's Hospital of Philadelphia.⁹ A trial was conducted in Ghana of a patient-centred intervention delivered by a member of the clinical team who is familiar with the socio-cultural norms of the community and trained to address information, motivation and behavioural skills of caregivers in a tailored manner to facilitate their engagement in the process of disclosure (i.e., pre-disclosure, disclosure, and post-disclosure phases) in a manner suitable to the needs of the child.¹³ Preliminary data presented at the 22nd International AIDS Conference (AIDS 2018) showed that children in the treatment group had greater disclosure at each time point (p<0.001) and a higher proportion of them had been disclosed to by 1 year (51.4% vs. 16.2%; p<0.001; unadjusted HR=3.98: 95% CI, 2.63, 6.03) and 3 years (71.3% vs. 34.0%; unadjusted HR=4.21: 95% CI, 3.09, 5.72).</p> <p>Understanding disclosure through multiple stakeholder perspectives can inform the development of the content and optimal practices that balance conflicting considerations for child, caregiver, and provider well-being. Available tools and protocols described above from other countries can be adopted by programmes and countries to improve the rate of paediatric HIV disclosure.</p>

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TOOLS	
<p>Disclosure of HIV Status Toolkit for Pediatric and Adolescent Populations (EGPAF, 2016)</p> <p>Guideline on HIV disclosure counselling for children up to 12 years of age</p>	<p>(WHO, 2011)</p> <p>New Horizons Disclosure Tool Kit (EGPAF)</p> <p>Telling others about my HIV status (READY)</p>

Case management by mobile phone

AGE GROUP			
 0-4 yrs	✓	 5-9 yrs	
		 10-18 yrs	✓

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓	✓	✓	✓	✓	✓	✓	✓	✓

NARRATIVE	
<p>Mobile phone case management, which provides support to recipients of care through the use of texts or short message service (SMS) messages and phone calls, is an effective intervention strategy for retention of mother-infant pairs (MIPs) and adolescents in HIV care.^{1,2,3} For MIPS, studies show that mobile phone case management can also increase uptake of infant HIV testing,^{1,2} and for adolescents, the intervention can improve adherence and reduce viral load.³</p> <p>Compared with mothers living with HIV receiving routine care, studies in Kenya and Zambia show that retention for mothers living with HIV receiving one-on-one counselling phone calls from case managers was consistently higher at delivery, 6 weeks post-partum and 14 weeks post-partum.^{1,2} Additional research is needed to ascertain whether the intervention can be expanded upon to also be effective in improving adherence. The intervention was shown to be easily scalable in terms of human resources, but some limitations include the need for recipients of care to have access</p>	<p>to a mobile phone and some difficulty on the part of the case managers in reaching mothers on the phone.^{1,2}</p> <p>A United States study conducted on adolescents had a greater focus on adherence and more frequent touchpoints than the studies on MIPs. Youth were contacted by “adherence facilitators” once or twice a day (depending on their ART regimen frequency) Monday through Friday by phone call to see if medications had been taken correctly, to provide problem-solving support, and to schedule any relevant referrals.³ Adherence rates increased significantly and viral load decreased compared to the control group, whose adherence actually declined over the 48 weeks of the study.³ Further research is needed as the sample size for this study was small and adherence was self-reported.³ Additional research is also needed to determine whether text message reminders alone are as effective as the reminders in this study, which were embedded into a supportive conversational interaction, and how to target the appropriate intervention to the right patients.</p>

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TOOLS	
<p>Health IT for Improved Chronic Disease Management (Agency for Healthcare Research and Quality, USA)</p> <p>mHealth: New horizons for health through mobile technologies (WHO, 2011)</p>	<p>Mobilizing HIV Identification and Treatment (MHIT) in Lesotho (Vodacom website)</p>

Community-based treatment

AGE GROUP			
0-4 yrs	5-9 yrs	10-18 yrs	✓

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓		✓	✓		✓			

NARRATIVE	
<p>Adolescents account for 40% of those newly diagnosed with HIV in Haiti, with poor outcomes thought to be related to poor adherence to therapies and care based on social isolation, stigma, and long visits reported among adolescents. This study aim was to provide integrated care to adolescents, in cohorts of 10-15 and 16-20 years of age, with additional services such as counselling and social activities in their community in Port-au-Prince. Retention at 12 months was defined as being alive with a visit between 11 and 13 months from enrolment. Viral load suppression was defined as <1,000 copies/ml.</p> <p>The study enrolled 50 adolescents in cohort care in a 10-month period from 2014 to 2015, and the comparison group was made up of adolescents receiving standard care at the Adolescent Clinic between 2009 and 2012. Measures of antiretroviral therapy (ART) eligibility, time to initiation of ART, viral suppression and retention were measured in both models of care.</p>	<p>In cohort care, 100% of patients were assessed for ART eligibility during their initial visit and all eligible were started on ART at the time of first visit, whereas median time to ART initiation in standard care was 20 days. Retention at 12 months from enrolment was significantly increased in cohort care; 86% of adolescents in cohort care were retained compared to 66% and found to be statistically significant. In cohort care, among those with a viral load measurement 6-12 months from ART initiation, 26% achieved viral suppression.</p> <p>Community-based cohort care for adolescents living with HIV in Haiti significantly improved retention by an absolute difference of 20% and decreased time to ART initiation, yet viral suppression remained poor, indicating a need for increased efforts to improve adherence to ART among adolescents. Viral loads were not routinely collected until 2016, which could account for differences between the intervention and comparison groups.</p>

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TOOLS	
<p>UNAIDS & MSF experiences in Community Based ART Delivery (case studies demonstrating innovative, high-impact strategies for community-based service delivery)</p> <p>MSF Adherence club toolkit (includes useful how-to kit to set up community adherence clubs)</p>	<p>Community ART Group Toolkit (MSF, 2017)</p> <p>Clinic Community Collaboration toolkit (models of care linking facility and community)</p>

Decentralized treatment

AGE GROUP			
 0-4 yrs	✓	 5-9 yrs	✓
		 10-18 yrs	✓

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓	✓	✓						

NARRATIVE	
<p>The decentralization of HIV service provision, with its spread to non-specialized facilities, represented a step forward for the continued roll-out of HIV care globally. The 2016 WHO HIV guidelines emphasized the importance of decentralization to reduce wait times to initiation as well as to provide services where patients live. Decentralization helps patients to avoid complicated and sometimes costly trips to central hospitals for every visit. Data are encouraging not only for the roll-out of adult services to primary health facilities but also for paediatric services. Fayorsey and colleagues, in their review of decentralization in five African nations (274 public facilities in Kenya, Lesotho, Mozambique, Rwanda, and the United Republic of Tanzania from January 2008 to March 2010) found that the expansion of paediatric services to primary health facilities resulted in increased numbers of children on ART and that early findings suggested lower rates of loss to follow-up and mortality at primary health facilities⁷.</p> <p>It is important to note that a roll-out of paediatric HIV services to a system that is not ready to accommodate these patients is not good care, and will not result in good outcomes. Such a warning comes from the work conducted by Cissé and colleagues⁴, who conducted a cross-sectional study throughout Senegal between March and June 2015, following all HIV-infected children and adolescents (0–19 years), whether treated with ART or not, and receiving follow-up care in decentralized structures. The authors noted that care in Dakar, the Senegalese capital, is well structured in specialist facilities but that the children who were sent to decentralized facilities saw lower quality care. The study revealed that nearly two-thirds of children treated by ART and receiving care in decentralized sites experienced treatment failure. As a response to this situation the authors proposed overall strengthening of facilities, managing notifications, improvements in children’s social and economic environment such as community involvement, social support for families (food, schooling, etc.), support for adherence, and a system for regular virologic monitoring. Improving care will also require adjusting treatments quickly for children with virologic failure, by introducing protease inhibitors, considering first-line therapies with high genetic barriers, and ensuring the availability of third-line ART. Similar findings of the impact of decentralization in the Democratic Republic of the Congo were noted in a cohort study of 1,482 mother-infant pairs at PMTCT sites by Edmonds et al⁵. They noted that services were delivered less efficiently at antenatal/labour and delivery sites than counselling and testing centres. Although access improved with decentralization, its potential cannot be realized without sufficient and sustained support.</p>	<p>There are programmatic examples of good care being delivered to children away from central hospitals and specialized clinics. Van Dijk and colleagues reported in their cohort study of 111 HIV-infected children in Zambia originally treated at Macha Hospital that HIV care and treatment can be effectively delivered to HIV-infected children at rural health centres through mobile ART teams, removing potential barriers to uptake and retention¹¹. The authors noted that patients treated by the mobile clinic team had similar virologic and clinical responses to treatment, though viral load suppression was not quite as good as in the facility-based group. The authors emphasized the importance of outreach teams being supported to increase access to HIV care in rural areas for children and to keep up the encouraging work being done away from hospital-based clinics. Bock and colleagues reported in their retrospective review of programme data from the provincial monitoring system between April 2004 and April 2006 that viral load suppression rates between 1,741 children treated at levels 2 and 3, level 1, and primary healthcare clinic facilities had no significant differences between them. The study confirmed the feasibility of providing antiretrovirals at all levels of the healthcare service in the Western Cape, South Africa.</p> <p>In a prospective cohort study of children aged 6-15 years conducted from January 2013 to December 2014 in Harare, Zimbabwe, McHugh and colleagues found that despite only 64% of participants achieving virologic suppression, clinical outcomes were good and high rates of retention in care were observed. They add that in an era moving towards differentiated care in addition to implementation of universal treatment, decentralized HIV care for children is achievable. Interventions to improve adherence in this age-group are urgently needed¹⁰. Also in Zimbabwe, Farrand and colleagues found in a randomized control trial that community-based support provided by community health workers to caregivers substantially reduces the risk of virologic failure in HIV-infected children and adolescents⁸. This finding echoes other calls for a well-supported community presence as decentralization is undertaken so as to ensure good adherence and viral load suppression in children and adolescents.</p> <p>Auld and colleagues noted in their retrospective cohort study among children starting ART between 2004 and 2010 in Eswatini that down referral was protective against loss to follow-up and attrition, but not against mortality in that pre-‘treat all’ era. They concluded that decentralization of paediatric ART through down referral and spoke initiation within a hub-and-spoke system should be continued and might improve programme outcomes².</p>

Decentralized treatment (continued)

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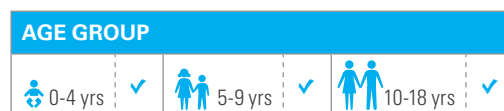
TOOLS

[Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection, WHO 2016.](#) (chapter 6.9)

[One Stop Shop: Improved individual and population health outcomes through integrated tuberculosis and HIV service delivery in Eswatini \(PEPFAR Solutions\)](#)

[Decentralizing Antiretroviral Treatment Services at Primary Health Care Facilities \(AIDStar One, 2010\)](#)

Differentiated service delivery for stable children and adolescents



TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓	✓	✓	✓	✓	✓	✓	✓	✓

NARRATIVE

Differentiated service delivery (DSD) is defined as a client-centred approach that simplifies and adapts HIV services across the cascade, in ways that both serve the needs of people living with HIV better and reduce unnecessary burdens on the health system.

Recognizing and utilizing the central role of families in the care of children, and also acknowledging the special needs of children when they receive HIV care services, have been noted to be impactful in finding infected children as well as keeping these patients on ART³. Tailored services to children and families impacted by HIV have been implemented by integrating HIV testing into maternal and child health clinics as well as immunization clinics. Equally, index family-based testing, home-based testing of absent family members initiated at a clinic visit, and inviting family members to the clinic for testing have all been shown to improve testing uptake³.

Expanding DSD to children and adolescents, for example, in the form of less frequent clinic visits and ones that are timed to coincide with parental visits and school holidays, enhances the efficiency offered by spacing visits for adults since it is these same adults who bring their own children in for refills and check-ups⁹.

Field experiences with DSD for stable paediatric patients⁴⁻⁵ have demonstrated good outcomes for children receiving DSD at child-friendly clinics in terms of adherence, loss to follow-up, and viral load suppression, and adolescent-focused Youth Clubs⁷ were able to offer good clinical and well as psychosocial support to this difficult-to-treat group. Community adherence groups have great potential to bring services where they are most needed and most apt to be received. Zimbabwe has included family DSD in national guidelines⁶ and in Mozambique² community adherence groups also demonstrated this can work well.

DSD for families must be sensitive to the specific needs of the different family members. Services should be provided within an integrated approach with care by the same clinician (who), at the same time (when), and within the same clinic (where).

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- TOOLS**
- [Zimbabwe DSD guidelines](#)
 - [Providing differentiated delivery to children and adolescents \(WHO, 2018\)](#)
 - [WHO Differentiated Care for children, adolescents, and breast-feeding women](#)
 - [IAS Differentiated Care website](#)
 - [Differentiated service delivery for adolescents and young people living with HIV in South Africa \(PATA\)](#)
 - [Differentiated service delivery for adolescents and young people living with HIV \(PATA and SAT\)](#)
 - [Ministry of Health, National AIDS and STI Control Program. Differentiated Care: Operational Guide.](#)

HIV self-testing

AGE GROUP			
0-4 yrs	5-9 yrs	10-18 yrs	✓

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓	✓	✓	✓	✓	✓	✓	✓	✓

NARRATIVE	
<p>Studies have shown that social, economic and structural barriers inhibit the quality of care and uptake of HIV screening. However, HIV self-testing (HIVST) is a highly efficient and accessible intervention that has shown promising uptake in countries with underserved populations. Even with the introduction of new HIV testing methods, current efforts are being taken to improve the accessibility of HIV testing in hard-to-reach communities. Collectively, HIV testing uptake and coverage of antiretroviral therapy is a lot lower in older children and adolescents (ages 10-19). Adolescents are a group that is often overlooked in HIV care, and the numbers of HIV-related deaths of adolescents have risen over the years. This rise in deaths is concerning when numbers of HIV-related deaths in all other age groups have declined. Lack of family or community support, emotional burden of reactive tests and perceptions of low risk of HIV infection have contributed to such an increase in adolescent deaths.³ Current efforts determine different delivery strategies that will further increase HIV testing uptake.</p> <p>In order to combat gaps in HIV response, HIV self-tests were dispersed using different delivery practices that significantly aided in the identification of individuals living with HIV. HIVST kit delivery strategies included community-based distribution, workplace distribution, integration into HIV testing services, and distribution at public health facilities. With the hope of increasing the preventative coverage of HIV services, trained individuals provided recipients with brief information about HIV, information about the test and a demonstration of how to use and interpret the kit.² Other forms of delivery were held at hot spots, such as shopping centres, bus stops, and healthcare facilities.</p>	<p>After presenting the kits, individuals could either conduct a test themselves or accept guidance from a distributor. Results concluded that the highest proportions of first-time testers fell into the adolescent age group.</p> <p>Adolescents are among the groups where HIV testing coverage is the lowest. Low uptake is attributed to the lack of knowledge about youth-friendly health services. A study showed that 95% of adolescents at schools near a local hospital in Mozambique were not aware that these youth-friendly services were offered. Not only do such programmes offer HIV testing, but they also provide sex education and counselling in the event of reactive tests. Other studies analysed the preferences of HIV testing delivery for adolescents. Many adolescents claimed to prefer at-home testing rather than onsite HIV testing not only because it is more convenient to them, but also because it allows them to have sole control of privacy, disclosure and time of testing. Data for delivery preferences were obtained from adolescents through group discussions, in-depth interviews, and discrete choice experiments. Although HIVST kits provide adolescents with increased autonomy over their health, many adolescents found the availability of in-person support for reactive tests to be equally important.</p> <p>Another study explored key drivers of demand for linkage to care following reactive HIVST.⁴ The survey results concluded that adolescents were more willing to seek care than adults, while economic costs and location of health facilities continued to be significant barriers to linkage to care for both adults and adolescents. In order to overcome these barriers, further research is necessary to discover ways to satisfy demands for the dispersion of ART treatment in hard-to-reach communities.</p>

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TOOLS	
<p>WHO Self-testing (WHO website with a variety of resources related to self-testing)</p> <p>WITS RHI Self Testing Job Aid</p> <p>WHO Self Testing Guidelines (2016) and WHO Self Testing Strategic</p>	<p>Framework (2018)</p> <p>Home Based Testing and Counseling Handbook (WHO 2012)</p> <p>Decision Framework for HIV Testing Services (DSD website)</p>

Home-based adherence support and psychosocial support

AGE GROUP			
0-4 yrs	✓	5-9 yrs	✓
		10-18 yrs	✓

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓	✓	✓	✓	✓	✓			

NARRATIVE	
<p>Home- or community-based adherence support as a comprehensive intervention method can be both effective at improving treatment retention and cost-effective when compared to costs associated with patients who fall out of care and become sicker and more likely to die^{1,2,4,5,6}. Incremental cost increase from standard ART care includes the additional costs of human resources, training, management and administration, infrastructure and equipment⁶. Particularly in low-income countries, community-based support (CBS) can be used to increase the health workforce through training of lay health workers while improving ART retention for children^{3,4}. Home-based adherence interventions ranged in focusing on children and their caregivers for children under 2, 0-17, 0-18, and 10-17; each group had promising outcomes as a result of the intervention^{1,2,3,4,5,6}. Multiple studies of CBS and similar models have demonstrated that for participants receiving CBS, loss to-follow-up (LTFU) is less and attrition is reduced, and virologic suppression is greater, when compared to children not receiving CBS or similar models^{4,5,6}. The cost of CBS may be as low as US\$49.50 in addition to the standard ART care cost per patient per year, with an incremental cost per patient-LTFU averted by as much as US\$600 and US\$776 after one and two years, respectively⁵.</p> <p>Primary objectives of home-based care include delivery of medical care, antiretroviral delivery, and psychosocial support². Home-based</p>	<p>care delivery is a common means of providing health services and basic counselling for a range of health issues, including HIV^{1,2,3}. This type of adherence support can be provided by trained nurses, healthcare workers, or patient advocates who are able to provide psychosocial support for caregivers or children and determine other challenges at home that may be preventing a child from adhering to treatment^{2,5,6}. While overall antiretroviral treatment adherence is improved for all ages of children (0-18), home-based adherence support has been shown to improve retention for children under 2 at even higher rates⁶.</p> <p>Some opportunities with this intervention include incorporating other health services with adherence support. For example, a study in Mombasa, Kenya, distributed care packages for malaria and diarrhoea treatment for children along with ARV treatment support¹. This could lessen cost by integrating with other programmes and reduce stigma if home visits to HIV-affected families are conducted by community members. A pitfall to home- and community-based adherence support is that for the programmes to address psychosocial support, they need to incorporate an evidence-based psychological intervention along with traditional home visits in order to improve psychological outcomes for children and caregivers³.</p>

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TOOLS	
<p>Clinic Community Collaboration toolkit (models of care linking facility and community)</p> <p>Service Delivery chapter of WHO HIV Guidelines (2016)</p> <p>Improving Patient Antiretroviral Therapy Retention through Community Adherence Groups in Zambia (PEPFAR Solutions, 2018)</p>	<p>Improving Retention, Viral Suppression, and Facility Congestion through Postes de Distribution Communautaire in the Democratic Republic of the Congo (PEPFAR Solutions, 2018)</p> <p>Handbook on Counselling and Psychosocial Care for Children and Adolescents Living with and Affected by HIV (ANECCA, 2018) See in particular chapters 12 & 13</p> <p>Community ART Group Toolkit (MSF, 2017)</p>

Home-based and mobile testing

AGE GROUP			
0-4 yrs	5-9 yrs	10-18 yrs	10-18 yrs
		✓	✓




TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓	✓	✓	✓	✓	✓			

NARRATIVE	
<p>The progress of recent years in finding new HIV cases has slowed as more and more people are identified and put on ART. In spite of this, the data tell us that only about 50% of HIV-infected children were on life-saving ART in 2018⁷. The statistics indicate that case finding remains an important piece of any effort to reach the 95-95-95 goals for children and adolescents. To this end, much work has been done to find ways to locate those in need of testing. Testing outside of the facility has been studied in adults, and now there is increasing research to boost efforts to locate HIV-infected adolescents and children outside health settings.</p> <p>Testing among orphans and vulnerable children (OVC), in spite of their elevated risk for HIV acquisition, continues to be insufficient. Future Families, a programme of home visits by trained community workers in South Africa, showed promise in increasing HIV counselling and testing (HCT) among OVC and represents a potential way forward for other programmes facing challenges in addressing HIV case finding among children and adolescents⁵. In Zambia and South Africa, as part of the PopART trial, home-based HIV</p>	<p>counselling and testing was noted to be feasible, acceptable and effective at significantly increasing HCT uptake among adolescents aged 15–19⁴.</p> <p>Community-based testing, both mobile testing as well as home-based, in Eswatini was also noted to be an effective and affordable way to get young people to learn their HIV status; the importance of reliable linkage to care after a positive diagnosis was also noted by the authors².</p> <p>HIV programmes wishing to decide between mobile testing and home-based testing will note the article by Labhardt and colleagues, which found that home-based testing was better at reaching children and those who had never been tested before, whereas mobile clinic testing detected more new HIV infections¹.</p> <p>The importance of linkage to care was highlighted by many studies, and work in Uganda demonstrated a positive impact on linkage to care among HIV-positive adults identified by home-based testing³. This is something that should be considered for adolescents, contingent upon local laws governing self-testing favouring such an intervention.</p>

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TOOLS	
<p>CDC HIV Testing in Non-clinical Settings Has many accompanying job aids for testing.</p>	<p>Consolidated WHO Guidelines on HIV Testing Services</p> <p>ICAP Approach to Strategic HIV Testing</p>

Index family-based testing

AGE GROUP			
 0-4 yrs	✓	 5-9 yrs	✓
 10-18 yrs	✓		

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓	✓	✓	✓	✓	✓	✓	✓	✓

NARRATIVE	
<p>Index family-based testing is a high yield and efficient strategy for identifying and initiating the children of HIV-infected adults who are at a higher risk of HIV infection and who may be missed through existing PMTCT, early infant diagnosis and provider-initiated testing and counselling efforts.^{1,2,3,4,5} Studies have demonstrated that almost half of HIV-infected patients enrolled in treatment have family members with an unknown status and two thirds are children.^{2,3,5} Yields from index family-based testing range from 1.4% to 13% and are often higher than those achieved through other testing modalities.^{1,2,3,4,5} Index family-based testing also improves timely linkage to care with initiation rates of 42% to 96% seen across studies.^{1,2,3} This strategy also provides an opportunity for assisted disclosure, which has been shown to increase testing uptake, adherence and retention.³</p> <p>Index family-based testing should be implemented through routine screening of HIV-infected clients, including those who are newly identified and those already in care, in order to determine the HIV status of their sexual partners and family members, including children, and to invite those with an unknown HIV status for testing. Children can also serve as index clients for identification of their siblings and parents who may have an unknown status. Contacts with an unknown HIV status can be invited for testing by the index client or healthcare worker, and testing can be conducted at the facility or through home visits. Those newly identified as HIV-positive and those identified as known HIV-positive and not already in care should be referred to ART and followed up until ART initiation is confirmed.</p>	<p>Implementation of index family-based testing has shown to be feasible to implement without numerous additional resources in facility settings.^{2,4,5} Studies also show client acceptance rates for the strategy to be as high as 93%.² However, challenges to implementation include varying uptake of HIV testing for children, which ranged from 19% to 94% across studies.¹ Reasons include logistical challenges in getting children to facilities (e.g., time, distance), transportation costs, incorrect addresses or clients not being home, refusal to give consent or need to consult with a partner or family member, fear of discrimination, blame or inadvertent disclosure, underestimation of the child’s HIV risk and health care worker attitude.^{1,2,3,5} Opportunities to improve uptake include early screening of newly identified clients and inclusion of family testing messages in post-test counselling, complete recording of index client and contact biodata, phone reminders, repeat home visits, flexible scheduling of HIV testing and support for disclosure and intergenerational communication.^{3,6}</p> <p>Recommendations for comprehensive implementation include development of a systematic approach to screening, referral and linkage to care, standard operating procedures and implementation guidance.¹ Going forward, additional research is needed to determine the most effective manner and location in which to implement index family-based testing and how it can be integrated with existing approaches such as assisted partner notification and self-testing.^{1,4}</p>

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TOOLS	
<p>Consolidated list of index family based testing tools from PEPFAR, WHO and Tingathe</p> <p>Family-based index case testing to identify children with HIV</p>	<p>(WHO & UNICEF, 2018)</p> <p>Index and Partner Notification Testing Toolkit (PEPAR Solutions, 2018)</p>

Integrating mental health and substance abuse disorder care

AGE GROUP			
0-4 yrs	5-9 yrs	10-18 yrs	✓

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓	✓	✓	✓	✓	✓	✓	✓	✓

NARRATIVE	
<p>HIV patients with co-morbid mental health and substance abuse problems have challenges keeping on ART and staying healthy. Differentiated service delivery is addressed in other parts of this Annex, and a further refinement of differentiated services for adolescents and paediatric patients growing up with HIV is offering an integrated model of HIV care with mental health and substance abuse services.</p> <p>Studies across countries have demonstrated that gaps continue in screening for and managing mental health and substance abuse problems in HIV programmes in low- and middle-income countries². Work from Zimbabwe³ has demonstrated that recognizing the risk of depression among adolescents</p>	<p>living with HIV and responding to this can have a positive impact on teen mental health and their HIV management.</p> <p>In South Africa, a family-based mental health pilot programme for adolescents affected by HIV was delivered by lay health workers and noted to improve ART adherence and improvement of HIV knowledge¹. This is particularly interesting given the elevated viral load seen among many adolescents on ART.</p> <p>The studies cited have small patient populations, but their findings echo those of larger adult studies and are compelling enough to encourage programmes to consider mental health and substance abuse when treating HIV in older paediatric patients and adolescents.</p>

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TOOLS	
<p>AIDS Education and Training Center Program (USA) toolkit for mental health and substance use in HIV care</p> <p>Substance Abuse and Mental Health Services Administration (USA) case for mental health screening in HIV care</p>	<p>AIDSFree toolkit for transfer of care and other services for adolescents living with HIV</p>

Mentor mothers

AGE GROUP		
0-4 yrs	✓	5-9 yrs
		10-18 yrs

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
	✓	✓		✓	✓		✓	✓

NARRATIVE	
<p>The use of mentor mothers in low-resource settings has been shown to be a low-cost and effective intervention for improving child health outcomes such as low birthweight, stunted growth, sub-optimal breastfeeding and timely presentation for early infant diagnosis (EID).^{1,2} For low-resource settings with a high burden of HIV and/or other diseases and a shortage of healthcare workers, task shifting to mentor mothers can ease the service delivery burden, reduce service delivery and treatment costs and support the development of community health workers.¹ However, to ensure effectiveness of this strategy, the quality of the intervention is critical.^{1,2}</p> <p>In South Africa, the Philani+ programme demonstrated that mentor mothers had a positive impact on multiple child health outcomes at relatively low cost, and averted costs associated with poor health outcomes. Mentor mothers were selected based on their strong parenting skills, and trained for six weeks in cognitive-behavioural techniques to support mothers in improving their children’s health outcomes through pre- and post-natal home visits. Infants in the programme were 1.35x more likely to have a normal birthweight, 1.69x more likely to achieve normal growth and</p>	<p>3.59x more likely to have been exclusively breastfed compared to those in standard care.¹ These improvements averted costs of US\$2,397 per case of low birthweight, US\$2,454 per case of stunting and US\$1,618 per case of sub-optimal breastfeeding.¹ In addition, using mentor mothers was estimated to be 4x cheaper than using nurses (US\$69,692 vs. US\$286,961).¹</p> <p>While mentor mothers can be effective in improving child health outcomes, additional studies show that outcomes are dependent on the quality of the intervention. For example, the Mother Mentor (MoMent) study in Nigeria demonstrated that mother-infant pairs receiving more structured and supervised support from mentor mothers were 3.7x more likely to present for EID compared to those receiving support from routine peer counsellors under the standard of care.² While mentor mothers and routine peer counsellors had similar workloads and exposure to clients, mentor mothers were also supported by a knowledgeable supervisor and were trained to provide well-informed and specific support to their clients. Ensuring training, structure and supervision are therefore critical aspects of implementing and maximizing the impact of mentor mothers.</p>

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TOOLS	
<p>EGPAF Mentor Mothers program in DRC (2017)</p> <p>Mother Mentor/Mother Support Group Strategy for Expansion of Peer Support for Mothers Living with HIV (MSH & Ethiopia Network for HIV/AIDS Treatment, Care and Support, 2014)</p>	<p>Community Client Tracing Through Mentor Mothers in the Democratic Republic of the Congo (UNICEF, 2018)</p> <p>Kenya Mentor Mother Program (2012 guidelines)</p> <p>Community Focal Mothers (PEPFAR Solutions)</p>

Mobile and electronic tracking platforms

AGE GROUP		
 0-4 yrs	<input checked="" type="checkbox"/>	 5-9 yrs
		 10-18 yrs

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓	✓	✓	✓	✓	✓	✓	✓	✓

NARRATIVE	
<p>The transformative role technology can play in the lives of HIV patients is well known. The point-of-care (POC) machine that tells a mother on the same day as her appointment that her exposed infant is not infected with HIV has a positive impact on that mother-infant pair. Equally powerful is knowing that a child or teenager needs to start second-line ART after a viral load test result is returned promptly. HIV programmes looking to improve their follow-up of patients and communication of results to clients as well as providers and community actors will do well to read about which circumstances and for which populations mobile technology and tracking platforms can be best used. Gous and colleagues offer a good commentary on methods of delivering results using technology, and assert that there is tremendous opportunity to inform better patient care and directly contribute to ‘90–90–90’ progress by developing digital systems for result delivery. Besides infrastructure and technical challenges, systems should address the entire cascade of care from initial diagnosis to monitoring treatment response⁵. Essajee and colleagues discuss four innovative diagnostic approaches to achieve the 90-90-90 targets: these include point-of-care testing, use of short message service (SMS) printers to connect the central laboratory and the health facility through a mobile phone network, expanding paediatric testing to other entry points where children access the health system and testing HIV-exposed infants at birth as a rapid way to identify in utero infection². It is not surprising that technology figures prominently in these four.</p> <p>As an excellent example of the need for impactful application of technology, PMTCT programmes rely on prompt return of test results to providers so they can make the right decisions for their patients. Vojnov and colleagues demonstrated in their systematic review that SMS/general packet radio service (GPRS) printers reduced the overall test turnaround time from specimen collection to results received in the healthcare facility by 17 days. SMS/GPRS printers are fairly easy to use and require minimal skills to operate, while significantly reducing the test turnaround time⁹. These printers can be considered for circumstances in which the traditional paper-based system is hampered by infrastructure difficulties and can be overcome by technology. In a similar vein to the SMS printer studies, text messaging was shown in rural Zambia to improve early infant diagnosis, but the authors noted it requires a reliable mobile phone network and improving mobile phone ownership among beneficiaries⁷. In Lesotho a mobile phone initiative with the MoH and Vodafone has had success in enrolling more HIV- infected pregnant women and infected children in care, evidence that there are methods to overcome some of the barriers described above.</p> <p>Kenya and Rwanda are two country examples of nationwide informatic systems having a positive impact on HIV programming. Kayumba and</p>	<p>colleagues reported in their cohort study of 380 Rwandan infants that the use of mobile technology for communication of HIV PCR results, coupled with well-trained and skilled personnel, can reduce delays in communicating results to providers. Such reductions may improve timely ART initiation in resource-limited settings⁶.</p> <p>In Kenya, Finocchiaro-Kessler and colleagues⁴ drew important conclusions from their study of the HIV Infant Tracking System (HITSsystem) implementation. The HITSsystem is a web-based, automated intervention designed to overcome current EID barriers by providing efficient prospective tracking of HIV-exposed infants. The HITSsystem is accessed online via computer, using mobile broadband modems that respond to cellular signal rather than hardwired internet access, making this system feasible even in remote areas. The HITSsystem triggers electronic action ‘alerts’ for both EID providers and lab technicians when time-sensitive EID interventions are due, facilitating infant tracking and bringing back defaulters into care. A built-in text messaging system sends messages to mothers’ mobile phones when test results are ready or follow-up visits are needed.</p> <p>The technology used to assist adherence and tracking can also take the form of pill counting and monitoring devices, such as the MEMS cap or Wisepill device, which follow if a patient is taking her/his ART by recording when the pill bottle is opened. Campbell and colleagues demonstrated in their qualitative study of how Ugandans perceive electronic adherence monitoring and reminders that monitoring created a sense of pressure to adhere to ART, which some participants described as “forcing” them to adhere. However, even participants who felt that monitoring forced them to take medications perceived using the electronic adherence monitors as conducive to their fundamental goal of high ART adherence¹.</p> <p>A randomized control trial in South Africa involving 345 participants showed that a population of patients less than 30 years old responds well to mobile health interventions that engage patients in HIV care. The intervention arm received the app (along with referral to a treatment site) and the control arm received the standard of care (referral alone)⁸.</p> <p>Mobile and electronic tracking platforms to improve HIV programme results have many components and some high-impact elements have been mentioned here; it will be important for programme managers to consider their local environments and the capacity of the system to incorporate and maintain these initiatives. Some tools, such as a nationwide electronic medical records, may be too costly to set up and maintain but the placement of a few key POC machines with wireless printers may have a large impact on result returns within the national system that operates within national budgetary constraints.</p>

Mobile and electronic tracking platforms *(continued)*

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TOOLS

[HIV Case-Based Surveillance System with Biometric Code and Patient Linkage and Retention Tool](#)

[Mobilizing HIV Identification and Treatment \(MHIT\) in Lesotho \(Vodacom website\)](#)

Mobile SMS reminders

AGE GROUP			
 0-4 yrs		 5-9 yrs	
 10-18 yrs			

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
								

NARRATIVE	
<p>With increasing mobile phone ownership in sub-Saharan Africa and Asia Pacific, text messaging using the short message service (SMS) is a promising strategy to strengthen engagement in HIV care. Text messages are a low-cost, convenient method of delivering information that can overcome stigma associated with HIV by being a more private and confidential way for patients to access and interact with the healthcare system. SMS programmes evaluated in adult populations in clinical trial settings have demonstrated improvement in antiretroviral therapy (ART) adherence, leading to the World Health Organization recommending the use of SMS-based interventions. In the routine clinical care setting, SMS reminder programmes have modestly increased consistent ART prescription coverage among adults⁴. SMS reminder programmes appear to be viewed favourably by participants, with the acceptability of SMS reminders rated as somewhat or very helpful by 93% of participants who received SMS reminders for ART refills in one study⁶.</p> <p>mHealth has significant potential to expand the scale of prevention of mother-to-child transmission of HIV³. To date, mobile SMS reminders have been examined as a tool to decrease loss to follow-up of mother-baby pairs. An individually tailored, theory-based text messaging intervention that enrolled pregnant women living with HIV with access to a mobile phone found significant improvements in post-partum clinic attendance and virologic infant testing as compared to standard care¹. Text messages were based on the Health Belief Model and were tailored based on gestational age, mother's name, infant's name, preferred language and time and date of delivery. Of note, high rates of infant HIV testing were also observed in the control arm of this study, which was thought to be due to both groups receiving antenatal counselling that has been shown to improve infant outcomes. This finding suggested that SMS interventions should be delivered as an adjunct to other core health services, rather than as a stand-alone approach².</p>	<p>Several challenges exist to the implementation of mobile SMS reminder programmes in settings where mobile phone ownership is low, or phone sharing is common. A study to improve retention of mother-infant pairs in rural Malawi, where most mothers do not own mobile phones, used SMS reminders sent by healthcare workers to community-based volunteers, who then identified mothers and infants with missed appointments to encourage them to return to clinic⁵. However, challenges were identified in the implementation of SMS-based tracing that led to reminders being sent 43% of the time, and this model was not shown to improve post-partum retention in care. In addition, concerns were raised about community volunteers' ability to maintain confidentiality when tracing women with missed appointments. Confidentiality concerns have also been raised in the context of mobile phone sharing. The possibility of inadvertent HIV status disclosure was raised as a potential obstacle to the implementation of SMS reminder programmes in a setting where mobile phone sharing is common, though there was little evidence that this actually occurred⁶. Measures to safeguard against the risk of inadvertent HIV status disclosure, such as ensuring that HIV status has been disclosed to the person sharing the phone prior to initiation of SMS reminders, and the use of general, non-HIV-specific language, should be considered as part of SMS reminder programmes to ensure that confidentiality is preserved.</p> <p>An area for additional research is mobile SMS reminders for ART adherence and retention in care among adolescents. In addition, there is considerable heterogeneity in the study designs, settings, content and frequency of text messages, and types of HIV-associated outcomes targeted in the mobile SMS reminder research conducted to date. Collection of process measures in future SMS reminder interventions will be important to assist in identifying which intervention components are effective or ineffective in promoting adherence and retention in care in real-world settings.</p>

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TOOLS	
<p>Intervention text messages (list of messages to consider for SMS reminders)</p>	<p>Mobilizing HIV Identification and Treatment (MHIT) in Lesotho (Vodacom website)</p>

Mother-infant paired services

AGE GROUP		
0-4 yrs	✓	5-9 yrs
		10-18 yrs

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓	✓	✓	✓	✓	✓	✓	✓	✓

NARRATIVE	
<p>The provision of HIV services to HIV-infected pregnant women and mothers has been a vital component in the world's efforts to reduce the number of HIV-infected children, and to promote the health of many HIV-infected women and their families. Retention of pregnant women after the birth of their child, and shepherding the mother-infant pair through the series of healthcare visits and HIV tests until the child is declared HIV-uninfected at the end of breastfeeding is another programmatic challenge that is met with varying degrees of success around the world.</p> <p>Family-focused HIV care, and in particular care focused on the mother-infant pair, has been shown to improve retention in care for the mother and HIV-free survival of the infant, as was seen in a cluster-randomized controlled trial in Nigeria involving 369 women¹. Challenges to PMTCT-ART clinic integration were noted in a study of 372 women in military health facilities in Nigeria³, and are a reminder of the potency of removing barriers such as poor service integration, and clients delivering their babies in facilities separate from where PMTCT services are accessed. Integration of services in a South African randomized control trial showed that integrating ART services into the maternal and child health platform during the post-natal period was a simple and effective intervention for improving maternal and child outcomes in the context of HIV¹⁶.</p> <p>A comprehensive service delivery model in the United Republic of Tanzania involved the creation of the One Stop Clinic of Ifakara: a PMTCT and paediatric unit integrated within the Reproductive and Child Health Clinic as well as the implementation of electronic medical records and of provider-initiated HIV testing and counselling (PITC) in the hospital wards. Early infant HIV diagnosis (EID) testing performed locally in addition to the other components discussed</p>	<p>above resulted in an increased number of mothers and children diagnosed and linked to care, a higher detection of children with AIDS, universal treatment coverage, lower loss to follow-up, and an early mother-to-child transmission rate below the threshold of elimination⁶. The Nigerian and Tanzanian examples cited above offer excellent ideas for improving a PMTCT programme that is faltering in its retention of mothers or infants. In addition to these two country examples, a combined clinic model from Rwanda demonstrated the impact of delivering services to mothers and children at one point as well as the utility of community-based lay treatment partners⁶.</p> <p>Challenges in a staff mentorship project of PMTCT service providers in Malawi included inadequate oversight of staff and scheduling difficulties for the mother-infant pairs. The authors noted the integrated service model needs to be understood by local staff, so their expectations are consistent with those of health managers, and there is a shared belief and commitment to the new approach⁹. Initiatives such as the Partnership for HIV-Free Survival demonstrate the importance of local engagement and sustainable quality improvement projects in improving maternal and child outcomes^{15, 21}.</p> <p>In settings where trained healthcare providers are lacking, lay health workers were noted in a literature review to be beneficial in increasing access to PMTCT services and reducing MTCT of HIV, though their impact on improving adherence to ART remains scanty²⁰.</p> <p>Option B+ results demonstrated the power of taking care of the HIV-infected mother during and after her pregnancy, and programmatic work and research since that time have shown the importance of a well-planned and integrated service delivery platform for the mother-infant pair.</p>

Mother-infant paired services *(continued)*

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TOOLS

[Counselling for Maternal and Newborn Health Care \(WHO\)](#) (see chapter 14)
[Improving mother-baby pair retention in integrated maternal and child health and HIV services in Eswatini \(PEPFAR Solutions\)](#)

[Evidence-based practices for retention in care of mother-infant pairs in the context of eliminating mother-to-child transmission of HIV in Eastern and Southern Africa \(UNICEF\)](#)

[Community Focal Mothers \(PEPFAR Solutions\)](#)

Point-of-care (POC) technology

AGE GROUP		
0-4 yrs	✓	5-9 yrs
		10-18 yrs




TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓	✓	✓		✓	✓			

NARRATIVE	
<p>Reliable and swift diagnosis of HIV infection saves lives, and this is very important particularly when considering HIV-exposed infants. Point-of-care technology has been shown to have a positive impact on returning results quickly to providers and to families and on initiation of ART in infected infants. Observational studies conducted before and after implementation of POC in Cameroon, Côte d'Ivoire, Eswatini, Kenya, Lesotho, Mozambique, Rwanda, and Zimbabwe found that POC early infant diagnosis (EID) improves the speed of return of HIV test results and enables earlier ART initiation¹.</p> <p>Recent research from Malawi found improved ART initiation rates following diagnosis with same-day POC EID testing when compared to traditional lab-based testing⁵. Research from a South African hospital and primary care clinic noted a benefit to POC testing when compared to the standard of care⁶. A recent study from Mozambique equally noted that routine</p>	<p>use of POC EID in primary health clinics was associated with significant improvements across the cascade of care for HIV-exposed infants⁴. There is also a cost benefit to health systems, as Frank and colleagues noted in their <i>Lancet</i> HIV article on POC in Zimbabwe³.</p> <p>Essajee and colleagues² noted in their review of innovating diagnostic approaches which can reduce mortality among HIV-infected infants that POC testing has the potential to provide immediate results but is less cost-effective in settings where test volumes are low. POC must therefore be paired with the appropriate MTCT settings, and the ongoing support of traditional lab-based testing systems is not to be abandoned. Consider strategic placement of POC within the context of the broader laboratory and sample transport system and where gaps exist.</p>

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TOOLS	
<p>UNICEF POC Toolkit</p> <p>Key Considerations for Introducing New HIV Point-of-Care Diagnostic Technologies in National Health Systems</p>	<p>AIDSFREE Viral Load and EID Archive</p> <p>Methods and tools for integrating innovative point-of-care HIV testing into national laboratory networks</p>

Risk assessment tools for retention

AGE GROUP			
 0-4 yrs	 5-9 yrs	 10-18 yrs	✓




TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓	✓	✓	✓	✓	✓	✓	✓	✓

NARRATIVE	
<p>Enrolling in care those patients who are newly diagnosed with HIV and starting their ART as promptly as possible after diagnosis does not guarantee long-term retention in care. Indeed, starting patients quickly without a plan of how to keep them on treatment, and support them in their lifelong therapy, may result in poor retention, despite early and good linkage to care. Retention is defined in many different ways, but formal definitions and measurements have utilized required follow-up at certain intervals to define retention in care; these definitions have typically conceptualized retention in care based on either appointments missed or medical visits attended at regularly defined intervals, such as 90 days from the last healthcare contact.</p> <p>Supporting retention, in a similar vein to efforts to provide individualized care through differentiated service delivery, is most optimally done by identifying who is at the greatest risk for loss to follow-up. Howarth and colleagues conducted a survey of 983 people living with HIV in London as well as of healthcare professionals with the goal of investigating the measurement, prediction and improvement of retention and engagement in out-patient HIV care¹. The study found that a combination of six variables from the REACH survey and clinical data set provided the best</p>	<p>set of predictive variables. These were age at diagnosis, having children, recreational drug use in the past five years, drug/alcohol dependency in the past year, money for basic needs and use of public transport to get to the clinic. An HIV programme, in all epidemic settings, having difficulty with retention of patients in care should thus consider these six variables. A family or a patient demonstrating a high risk for defaulting or being lost to follow-up could, subsequent to risk assessment, benefit from additional support in the community and at the health facility.</p> <p>Johnson and colleagues² validated a 10-question patient-centred screen that helped to identify deficits in patient perceptions of engagement before the development of poor outcomes, including loss to follow-up, treatment nonadherence, virologic failure, and the resulting increased likelihood of HIV-associated morbidity and mortality and onward transmission of HIV. Lower scores on the HIV index were related to higher depression and anxiety symptoms, greater use of alcohol and stimulants, and increased likelihood of reporting internalized HIV stigma. Higher index scores were positively associated with self-reported measures of antiretroviral therapy adherence, corroborative clinic records documenting appointment attendance, and increased likelihood of recent viral load suppression.</p>

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TOOLS	
<p>Retention readiness indicator tool (etr, US based organization advancing health equity)</p> <p>Retention in care (University of Washington [USA]--National HIV curriculum website)</p>	<p>HIV Index, Johnson et al.</p>

Risk screening tools for provider-initiated testing and counselling (PITC)

AGE GROUP		
 0-4 yrs	✓	
 5-9 yrs	✓	
 10-18 yrs	✓	

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓	✓	✓	✓	✓	✓			

NARRATIVE	
<p>By the time a child has reached the health facility with a guardian seeking help for a particular illness, the receiving medical team may already be thinking about testing for HIV, depending on the particular national or subnational HIV epidemic. That said, some providers are too busy, or resources are lacking at health facilities for paediatric HIV testing. There is a need, in settings where paediatric and adolescent HIV ART coverage continues to lag behind that of pregnant women or adults, for a thoughtful testing strategy. Risk screening tools in these situations should be considered.</p> <p>Bandason and colleagues¹, in a study in Zimbabwe among nearly 10,000 children ages 6-15 at primary healthcare facilities, found that a screen involving four questions helped to improve testing specificity and sensitivity. The questions included: Has the child been admitted to hospital before? Does the child have recurring skin problems? Are one or both parents of the child deceased? Has the child had poor health in the last three months? It was demonstrated that simple questions asked by trained lay healthcare workers can help to find the children most in need of testing and conserve resources for these patients as well as provider time.</p> <p>Moucheraud and colleagues found that among the 8,602 participants in a study at 12 hospitals in Malawi, a tool containing six yes/no items used for children (aged 1-15 years) in the in-patient paediatric wards helped target</p>	<p>HIV testing to those most at risk in a low-paediatric-prevalence, resource-constrained setting². The initial tool included six questions and was informed by the Bandason and colleagues' paediatric screening tool: Has this child ever (previously) been admitted to the hospital? Has this child had recurring skin problems? Has one or both of the natural parents died? Is this child sicker more often than other children in the last three months? Does this child have frequent ear discharge? Is this child shorter or smaller than others in the same age group?</p> <p>Yumo et al. found in their review of the impact of different testing strategies (targeted PITC and blanket HIV testing vs. symptom-based HIV testing) at out-patient departments in district hospitals in Cameroon that blanket testing in a low HIV burden setting may not be the most efficient way to find patients. Rather, continued symptom-based testing and targeted PITC could effectively and efficiently accelerate HIV case detection and ART coverage among children and adolescents in Cameroon and similar low-prevalence contexts³.</p> <p>The work of case finding, particularly in younger patients whose prevalence is often lower than adults, is challenging and can be resource intensive. Screening of paediatric patients at health facilities, both in-patient and out-patient, is a good way to ease this burden as well as to find these children sooner, before they present with advanced HIV to the hospital.</p>

REFERENCES	
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TOOLS	
Consolidated guidelines on HIV testing services for a changing epidemic (WHO, 2019)	ICAP Approach to Strategic HIV Testing

Social network testing

AGE GROUP			
0-4 yrs	5-9 yrs	10-18 yrs	✓

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓		✓	✓		✓	✓	✓	✓

NARRATIVE

In spite of years of effort to destigmatize and demystify HIV/AIDS and its continuum of care, the condition remains highly stigmatized. This situation can result in late testing and accessing treatment for those who are ill, and for those who feel well, an under-appreciation and misunderstanding of the importance of knowing one's status. People tend to trust their community around them, and to this end much work has been done with at-risk key populations to get them tested for HIV within their social networks⁹, as these groups represent a trusted and non-stigmatizing community and a source of information.

Indeed, social media in general have been noted to be places where people go for information about HIV in an anonymous manner, and thus can be used to spread messages and knowledge in a non-stigmatizing way⁷. Cao et al. also found in their systematic review and meta-analysis that social media interventions are effective in promoting HIV testing among men who have sex with men (MSM) in many settings. They concluded that social media interventions to improve HIV services beyond HIV testing in low- and middle-income countries and among other key populations need to be considered¹. They also noted that social media interventions that were participatory and peer-led resulted in higher HIV testing rates compared with those that had no social media interventions or had social media interventions that did not include interactive characteristics. Schumann and colleagues in their study of social network testing in a low-prevalence environment in the United States found that it proved to be successful at reaching high-risk individuals who may not otherwise engage in HIV testing⁸.

Given the opportunities presented by social networking and social media, researchers have investigated the potential for social networks to encourage people to get tested, in particular among men who have inadequate rates of HIV testing and also among MSM. These studies were conducted with adults and young adults in low- and middle-income nations (e.g., Kenya, Peru, United Republic of Tanzania) as well as wealthier countries (China, United States). Country programmes in all epidemiologic settings seeking to utilize the community to build and sustain social networks and the technology that binds these communities for HIV testing of young people and teens should consult the tools below as well as read the articles in the references section. Illustrative examples are mentioned below.

McCree and colleagues studied the integration of social network strategies (SNS) into existing HIV counselling, testing, and referral services targeting 18- to 64-year-old black gay, bisexual, and other MSM in nine community-based organizations in seven US cities⁴. Recruiters participated in initial coaching sessions and boosters, led by SNS staff at each of the sites, on how to elicit social contacts for testing. The network associates (NAs) were referred by recruiters to HIV counselling and testing services at a designated site location. NAs and recruiters were linked. Incentives were provided to recruiters for NAs who were tested; NAs received incentives for testing. The authors found several common lessons and that development of the plan, staffing, training, and use of incentives were identified across the sites. Collectively, these lessons indicate use of SNS is resource-intensive, requiring a detailed plan, dedicated staff, and continual input from clients and staff for successful implementation.

Young and colleagues report in their findings from the HOPE social media intervention for HIV prevention in Peru that development of peer-mentored social media communities seemed to be an efficacious method to increase HIV testing among high-risk populations in Peru. Results suggest that the HOPE social media intervention could improve HIV testing rates among MSM in Peru¹⁰. The HOPE Peru study was a cluster randomized trial. Some 49 peer

leaders were recruited with the help of the staff from the Epicentro Gay Men's Community Center in Lima, Peru. Potential peer leaders visited the study website for an online eligibility screening. Participants were randomly assigned to either an HIV intervention or a control condition, and to one of four groups within that condition. During each week of the intervention, peer leaders in the intervention groups attempted to communicate with their assigned participants on Facebook by sending messages, chats, and wall posts. In addition to general conversation, peer leaders were instructed to communicate about HIV prevention and testing. The HOPE social media intervention led to an almost three-fold increase in the odds of getting an HIV test compared with a control group.

Huang et al. found in their study based in the United States that using a mobile phone app called Grindr one can take advantage of social networks to increase HIV testing. An advertisement publicizing free HIV self-tests was placed on Grindr, a smartphone social-networking application, from 17 April to 29 May 2014. Users were linked to <http://freehivselftests.weebly.com/> to choose a self-test delivery method: U.S. mail, a Walgreens voucher, or from a vending machine. Black or Latino MSM aged 18 years and older were invited to take a testing experiences survey. During the campaign, the website received 11,939 unique visitors (average: 284 per day) and 334 self-test requests. Among 57 survey respondents, 55 (97%) reported that using the self-test was easy; two persons reported testing HIV positive and both sought medical care. Social networking application self-testing promotion resulted in a large number of self-test requests and has high potential to reach untested high-risk populations who will link to care if they test positive³.

In their qualitative study of Tanzanian male networks and to inform future self-testing campaigns among this under-tested group, Conserve et al. examined the reasons men encouraged other men in their network to test for HIV, the approaches used for HIV testing encouragement, and the outcomes of HIV testing encouragement, including willingness to self-test for HIV². Findings indicated that men encouraged their peers to test for HIV for a number of reasons, including the awareness of their peers' reputational masculinity behaviour linked to having multiple sexual partners of unknown HIV status. Men also incorporated respectable masculinity ideals related to family planning and safe sex as part of their strategies to encourage their peers to test for HIV. In conclusion, the authors reported that based on the different strategies men used in this study to encourage HIV testing, self-testing educators and promoters will be trained to use formal and informal conversations to engage their peers about the benefits of self-testing and provide instructions on how to self-test.

Tang et al. in their study of crowdsourcing to expand HIV testing among MSM in China found that crowdsourced interventions may be an important tool for the scale-up of HIV testing services among MSM in low- and middle-income countries. The intervention consisted of a multimedia HIV testing campaign, an online HIV testing service, and local testing promotion campaigns tailored for MSM⁶.

In Kenya, where the legal and political environment make it difficult to test MSM for HIV, Njagi and colleagues' study found that building upon the social and sexual networks of MSM may be one promising strategy while discovering critical cases of HIV. The study used four clinical sites to compare a social and sexual network index testing (SSNIT) strategy compared to traditional HIV screening. Clinics using the SSNIT strategy had significantly higher incidence rates of HIV diagnoses than control clinics⁵.

Social network testing (continued)

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TOOLS

- [Social Network Strategy for HIV Testing Recruitment](#) (CDC, 2019)
- [A Community-Based Strategy for Identifying Persons with Undiagnosed HIV Infection](#) (CDC, 2016)
- [Social Networks Testing](#) (Wisconsin Department of Health Services, 2017)
- [ICAP Approach to Strategic HIV Testing](#) (2017)
- [Using Social Marketing as an Outreach Strategy to Reach Youth for HIV Testing](#) (National Youth Advocacy Coalition, USA)
- [CDC Social Media Toolkit--Let's Stop HIV](#) (CDC, USA)
- [Elements of a crowdsourcing intervention to solicit HIV testing](#)

Task shifting for testing and linkage

AGE GROUP

 0-4 yrs ✓
  5-9 yrs ✓
  10-18 yrs ✓

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
✓	✓	✓	✓	✓	✓			

NARRATIVE

Innovation in task shifting has included the creation and testing of various cadres to support HIV testing and counselling (HTC) such as ‘HIV Diagnostic Assistants’¹, and the expansion of roles of community health workers (CHWs) to include HTC for all age-groups within health facility and community settings²; and follow-up of PMTCT mothers to ensure HIV-exposed infants receive early infant diagnosis and linkage to care⁴.

HIV Diagnostic Assistants (HDAs) as a new cadre helped address the often-occurring issue of lay counsellors/community health workers in short supply or overstretched in Malawi by being able to rapidly train and deploy this cadre to focus on HIV testing without any competing clinical demands. Criteria for HDA enrolment included age above 18, high school education and one-year working experience. Training comprised three-week classroom didactic training followed by one-week practicum under the supervision of a laboratory technician. The roles and responsibilities of the HDAs once qualified and deployed included: provision of rapid HIV and syphilis testing, collection of dried blood spot (DBS) samples for early infant diagnosis (EID) and viral load testing, sample tracking, delivery of results, documentation, supply chain monitoring and quality assurance for rapid HIV, syphilis, EID and viral load testing. HDAs were remunerated by MoH within a salary range similar to other government supported lay counsellors and were subject to similar performance monitoring from facility- and district-level supervisors. HDAs were deployed based on a combination of factors including: facility cohort size, gap to reaching facility testing targets, number of clinical service delivery points requiring access to HTC and ensuring a minimum of two HDAs per facility, leading to an ultimate deployment of 2 to 10 HDAs per facility and a total of 1,159 across 60% (457) of Malawi’s facilities, which translated to 6.4 HDAs per 100,000 population. HDA deployment was associated with significant increases in total HIV testing across all ages and sexes as well as antenatal syphilis testing and EID testing. Age groups 15-25 and above 25 were most impacted in comparison with other age groups; and testing through PITC was most impacted compared with testing through family referral or voluntary counselling and testing (VCT).

In the Tingathe-basic (community outreach) and Tingathe-PMTCT programmes², a multipronged approach using CHWs led to dramatic improvements (greater than seven-fold) in the identification of and enrolment in care of HIV-exposed and -infected infants. Health centre-based HTC showed higher prevalence in comparison to home-based HTC, however, the volume of children tested was four times more through home-based HTC, resulting in roughly the same number of children being identified through both strategies. The multipronged approach combined traditional health centre-based testing, home-based testing, testing children of adults on ART, positive linkage for clients with known positive status but not in clinical care and follow-up of mother-infant pairs from PMTCT services. Criteria for recruitment of CHWs were completion of primary schooling, residence in the catchment area, ability to ride a bicycle, ability to read and write in English and being HIV-infected or HIV-affected. The selection process included group interview by programme leadership followed by individual interviews. Recruited CHWs underwent a four-week training in HTC followed by two-week specialized training in paediatric HIV and PMTCT, two-week onsite orientation and quarterly half-day refresher training. Responsibilities included health centre navigation, positive linkage of new and known HIV-positive children and adolescents, health talks and education at the health centre; conducting health centre-based and home-based (referral-based or door-to-door) HTC (including some testing at other venues such as community sensitization events, orphanages and youth service facilities); client follow-up home visits (of assigned HIV-positive children and adolescents or PMTCT clients) and adherence support; and maintenance of a ‘master card’ to document and track clinic appointments, home visits, services utilized, new diagnoses and test results. Testing of children was by indication, mainly children of a positive parent, children at an orphanage, or on request from a parent or guardian. CHWs were supervised weekly by a site supervisor and monthly by a programme coordinator with bi-annual performance evaluations. The site supervisor undertook a confirmation of competency before allowing home visits and conducted unscheduled client visits without the CHW to ensure client satisfaction. Remuneration was US\$50 to US\$100 per month per CHW, bicycle for transportation, mobile phone airtime and bags for supplies and materials.

Horwood et al. found that providing the WHO adapted Community Case Management (CCM) training followed by a Continuous Quality Improvement (CQI) model of mentorship substantially increased the number of antenatal and post-natal visits by CHWs and the proportion of mothers who were able to recall key health promotion messages; and was associated with improved infant feeding practices, disclosure of HIV status and care-seeking behaviours by mothers. The CQI mentoring model involved CHWs collecting a few key data elements (such as testing for HIV and infant feeding practices) that were the basis for review and discussion at bi-monthly mentoring meetings. During these meetings, the data were reviewed, gaps identified, and ideas designed to address these gaps. In addition, quarterly learning sessions were convened where CHW teams presented their progress and this provided opportunities for peer learning across CHW groups.

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TOOLS

[Human Resources for Health Staffing Allocation Tool](#) (PEPFAR Solutions, 2018)
 [Task Shifting: Global Recommendations and Guidelines](#) (WHO & PEPFAR, 2008)

[HIV Diagnostic Assistant Tools](#) (Malawi, 2016) Tingathe program training manual

Task shifting for treatment and retention

AGE GROUP			
 0-4 yrs		 5-9 yrs	
 10-18 yrs			

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
								

NARRATIVE	
<p>M. L. McNairy et al. implemented two models of treatment-related task-sharing with nurses and found that task-sharing of HIV care including antiretroviral therapy (ART) initiation with nurses is feasible in Côte d'Ivoire. The two models were: i) one in which nurses initiated and managed patients on ART at facilities with on-site physicians providing ongoing supervision and mentorship; and ii) one in which nurses worked independently (initiating and managing patients on ART) with the support of visiting physicians who provided supervision and mentorship on a weekly or twice-a-week basis. To enable this, the Ministry of Health expanded the nursing scope of practice allowing nurses to initiate and manage eligible patients on ART. Training topics included general HIV knowledge, ART initiation of first-line regimens, monitoring of drug side effects, referral of cases to physicians at higher-level facilities and use of HIV registers and reporting tools. Physicians also received a one-week training in mentorship techniques and supervision processes. Physicians provided intensive mentorship for the first month of implementation, which included once-a-week on-site mentorship to each nurse focusing on physical examination skills, reviewing laboratory results, selecting appropriate regimens for eligible patients, filing area and treatment data tools, documenting the ART initiation appointment and what side effects to anticipate based on the prescribed ART regimen and how to recognize immune reconstitution syndrome. At the end of the one-month of intense mentoring, the nurses were observed by a physician on their history taking, clinical examination, ART prescribing, and documentation. Nurses who passed this observation were allowed to begin initiating ART independently and those who did not received a second month of mentorship. Nurses were also able to consult physicians by phone. This was implemented across 26 health facilities, the majority (20) being primary health care facilities. Overall, 666 patients were initiated on ART, and retention across all facilities was high at 86%. While the</p>	<p>ART initiations among paediatric patients was very low (46), the study demonstrated the feasibility of task sharing. Burnet et al. similarly demonstrated the effectiveness of combining on-site support with training (as opposed to training on its own) in improving the skills of clinical officers, nurses and midwives with improvement in performance of history taking, physical examination, laboratory investigations and prescribing for antiretroviral therapy.</p> <p>In Mozambique, Marotta et al. implemented task-shifted provision of treatment to children under 5 from clinical officers to maternal and child health nurses. Children were therefore treated together with their mothers by the maternal and child health nurses until they turned 5, after which they were transferred as a pair to the out-patient department integrated HIV health service for continuation of care under a clinical officer. Increases in provision of Isoniazid (INH) prophylaxis and nutritional assessment and a decrease in time from referral to initiation of ART were reported.</p> <p>In the systematic review conducted by Penazzato et al., no important differences were identified in mortality between task-shifting models of care and physician- or specialist-led models of care. A range of task-shifting models are described in this review: i) a decentralized model of care delivery with nurse-led ART initiation and provision of ART at primary health care level, and in settings where TB and HIV activities are fully integrated, the nurses also administered TB medications; ii) home-based care programmes where nurses and community volunteers provided additional care at home for children needing extra adherence, nutritional and educational support; iii) tasks traditionally performed by nurses shifted to administrative staff (data collection and monitoring), laboratory staff (blood collection) or counsellors and community support groups (counselling). The role of physicians was mainly management of complex cases, training/mentoring and supervision.</p>

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TOOLS	
HIV Diagnostic Assistant Tools (Malawi, 2016) Tingathe program training manual	Task Shifting: Global Recommendations and Guidelines (WHO & PEPFAR, 2008)

Testing sick children in tuberculosis, nutrition, out- and in-patient settings

AGE GROUP		
0-4 yrs	✓	5-9 yrs
		✓
		10-18 yrs

TYPOLOGY								
High prev >5%	High prev >5%	High prev >5%	Low prev <5%	Low prev <5%	Low prev <5%	Concentrated	Concentrated	Concentrated
Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence	Mixed (low MTCT, high ado incidence)	Mixed (High MTCT, low ado incidence)	High MTCT, high ado incidence
	✓	✓		✓	✓			

NARRATIVE	
<p>Testing sick children in tuberculosis, nutrition, out- and in-patient settings (herein called universal testing) is a high-yield, efficient, and cost-effective integrated intervention for testing and diagnosing HIV in children in low- and middle-income countries. Particularly, this helps to identify children who remain undiagnosed because of the gaps associated with PMTCT and provider-initiated HIV testing and counselling (PITC). PMTCT has been inefficient due to cases of mother and child pairs who are lost to follow-up, and HIV-infected pregnant or breastfeeding women who never enter the system¹. Also, PITC has so far been poorly implemented, leading to missed opportunities to diagnose and treat children living with HIV.²</p> <p>Universal testing approaches are effective, and they include integrating HIV testing and nutrition service delivery; bedside or in-patient HIV testing; and the comprehensive routine opt-out provider-initiated testing (ROOT). In one study in Uganda, testing sick children in nutrition centres helped to identify 50% of HIV-positive infants compared to the 19.6% who were diagnosed through PMTCT alone³. Another universal testing approach, ROOT, increased the proportion of eligible children offered testing from 76% to 93%, and their test uptake from 71% to 95% compared with a previous period when PITC was done². Beyond identifying and diagnosing HIV-positive children, universal testing interventions have also been found to be cost-effective. For instance, integrating HIV and nutrition programming led to cost-effectiveness of US\$11 to US\$29/DALY in Malawi and US\$16 to US\$59/DALY in Mozambique⁴.</p> <p>Unlike symptom-triggered stand-alone testing approaches such as PMTCT and PITC, universal testing interventions combine HIV testing with essential services such as Community Management of Acute Malnutrition (CMAM), and out-patient and in-patient treatment of any disease presented, regardless of whether it is HIV/AIDS or not. Where implemented, health care workers such as nurses, and counsellors were trained on issues relating to testing children, methods of effectively using diagnostic tools,</p>	<p>and frameworks on consent and guardianship^{1,2,3,4,5,6,7,8}. Crucial logistics such as testing equipment were made readily available, and where appropriate, caregiver and/or child consent was sought before testing was performed^{1,2,3,4,5,6,7,8}. Upon the identification of an HIV-positive child, health workers referred the child for ART treatment and essential HIV care.</p> <p>The integration of HIV testing into non-PITC and non-PMTCT hinges on the assumption that unhealthy children who report to a health facility for medical care, or are identified by their community to be malnourished, may also be potentially susceptible for HIV/AIDS. For instance, it is well-established fact that HIV/AIDS and undernutrition are synergistic co-epidemics with known linkages^{9,10}. Also, universal testing interventions have an advantage of eliminating the barrier of clinicians feeling uncomfortable asking about HIV status/testing as well as the stigma associated with discussing the results in an open ward^{2,5}. Particularly, ROOT helped to decrease testing-related stigma due to its routine and non-symptomatic requisites, and further empowered caregivers to optionally decide to test or not². Community involvement also played an important role in identifying children who were malnourished or sick from other complications and subsequently referred for treatment at health facilities⁶. Together, these benefits associated with the integrated nature of universal testing interventions helped to increase willingness to test, and led to the discovery of many HIV-positive children who had been missed by PITC and PMTCT.</p> <p>While universal testing interventions have significant merits over symptom-triggered testing approaches such as PMTCT and PITC, their successes rely heavily on rigorous training of healthcare workers, investments in testing equipment, and a swift referral to care of children who have been identified as HIV-positive. Going forward, operational research on how to ensure patients identified through universal testing approaches are effectively linked to care and receive ART is needed^{1,5,6}. These joint efforts will help to ensure achievement of the UNAIDS 95-95-95 targets.</p>

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TOOLS	
Outcomes and Cost-Effectiveness of Integrating HIV and Nutrition Service Delivery: Pilots in Malawi and Mozambique (2017)	Decision Framework for HIV Testing Services (DSD website)
Details of the calculations presented in the Results section of the above paper	Paediatric HIV testing strategy decision tool (WHO, 2019)

Annex C: Intervention scoring table

Final Scoring: 'Should do': **3, 3+, 4, 4+**; 'Could do': **1, 1+, 2, 2+** (+ for interventions with three or more papers)

#	INTERVENTIONS	# OF PAPERS	ALL SCORES	FINAL SCORE
1	Adolescent-friendly health services	13	(3,2,1,0,3,3,4,3,3,4,3,2,2)	4+
2	Adolescent peer support	10	(2,4,4,3,3,1,3,2,3,3)	4+
3	Adolescent transition models	17	(2,1,1,1,0,2,1,2,1,4,1,0,2,0,4,3,1)	4+
4	Appointment systems	1	(4)	4
5	Assisted disclosure	10	(3,3,2,3,4,2,2,2,0,0)	4+
6	Campaign-based testing	2	(1)	1
7	Case management by mobile phone	5	(1,1,3)	3+
8	Community-based treatment	2	(1,3)	3
9	Congregation-based testing	1	(2)	2
10	Decentralized treatment	11	(4,3,3,4,4,2,3,4,4,0,4)	4+
11	Differentiated service delivery for stable children and adolescents	9	(3,1,4,1,3,2,1,3,4)	4+
12	Economic incentives and social protection	6	(3,4,3,1,3,4)	4+
13	HIV self-testing	5	(2,2,3,2,4)	4+
14	Home-based adherence and psychosocial support	7	(3,4,3,2,4,3,3)	4+
15	Home-based and mobile testing	8	(3,3,3,1,2,4,3,3)	4+
16	Index family-based testing	7	(1,2,3,4,3,2,2)	4+
17	Integrating mental health and substance abuse disorder care	3	(2,2,1)	2+
18	Mentor mothers	2	(3,4)	4
19	Mobile and electronic tracking platforms	9	(1,2,1,1,1,3,4,1,2)	4+
20	Mobile SMS reminders	6	(4,4,0,3,4,2)	4+
21	Mother-infant paired services	23	(2,3,1,1,0,1,1,1,1,3,3,4,4,2,3,3,3,4,3,2,4,4)	4+
22	Online social network support	2	(0,1)	1
23	Point-of-care (POC) technology	5	(4,4,1,4,1)	4+
24	Risk assessment tools for retention	1	(3)	3
25	Risk screening tools for community testing of adolescents	1	(2)	2
26	Risk screening tools for provider-initiated testing and counselling	3	(3,3,4)	4+
27	School-based testing	4	(2,3,2,4)	4+
28	Social network testing*			
29	Task shifting for testing and linkage	8	(4,4,1,1,2,1,4,3)	4+
30	Task shifting for treatment and retention	10	(2,2,2,4,3,3,4,1,1,1)	4+
31	Telemedicine	1	(1)	1
32	Testing sick children in tuberculosis, nutrition, out- and in-patient services	9	(3,2,2,4,4,4,3,4,3)	4+
33	Testing in immunization/growth monitoring services	2	(2)	2
34	Very early EID and treatment	5	(2,2,1,2,2)	2+

Note: 121 papers on barriers and enablers were also reviewed, in addition to the interventions listed here. Text in blue indicates interventions implemented in communities or in communities and facilities. Interventions with a score of 3, 3+, 4 and 4+ were categorized as 'Should do' interventions, while those scoring 1, 1+, 2 and 2+ were categorized as 'Could do'. The + was assigned to interventions with multiple papers (3 or more). Some interventions were reclassified from "Should-do" or "Could-do" after the validation process (refer page 24 Solutions Matrix Section).

* Social network testing was included as an intervention during the review and validation process.

Annex D: Selected Global AIDS Monitoring (2019) indicators for infants, children and adolescents

INDICATOR REFERENCE	INDICATOR	NUMERATOR/DENOMINATOR	FREQUENCY OF MEASUREMENT	DISAGGREGATION
COMMITMENT 1: Ensure that 30 million people living with HIV have access to treatment through meeting the 90-90-90 targets by 2020				
1.1	People living with HIV who know their HIV status (Percentage of people living with HIV who know their HIV status at the end of the reporting period)	Number of people living with HIV who know their HIV status/Number of people living with HIV	Annually	<ul style="list-style-type: none"> 0–14 years for children and 15 years and older by sex (men and women) for adults. As available: Disaggregation by detailed age and sex: <1 year, 1–4 years, 5–9 years and 10–14 years for children and 15–19 years, 20–24 years, 25–49 years and 50+ years by sex (men and women) for adults; by gender (men, women, other gender) for adults. Cities and other administrative areas of importance.
1.2	People living with HIV on antiretroviral therapy (Percentage and number of adults and children on antiretroviral therapy among all adults and children living with HIV at the end of the reporting period)	Number of people on antiretroviral therapy at the end of the reporting period/Estimated number of people living with HIV (to determine treatment coverage) Number of people among all people living with HIV who know their HIV status (to determine the second 90)	Data should be collected continually at the facility level and aggregated periodically, preferably monthly or quarterly. The most recent monthly or quarterly data with the count of the number of people currently on treatment should be used for annual reporting.	<ul style="list-style-type: none"> 0–14 years for children, and 15 years and older by sex (men and women) for adults. Data reported for unknown age or sex should be allocated to the age- and sex-disaggregated data cells using the same distribution of the data with known age and sex. As available. Disaggregation by detailed age and sex: <1 year, 1–4 years, 5–9 years and 10–14 years for children; and 15–19 years, 20–24 years, 25–49 years and 50+ years by sex (men and women) for adults; by gender (men, women, other gender) for adults. Cities and other administrative areas of importance. Numbers of people newly initiating antiretroviral therapy during the current reporting year (these data should be available from the same sources as the total number of people receiving antiretroviral therapy).
1.3	Retention on antiretroviral therapy at 12 months (Percentage of adults and children living with HIV known to be on antiretroviral therapy 12 months after starting)	Number of adults and children who are still alive and receiving antiretroviral therapy 12 months after initiating treatment/ Total number of adults and children initiating antiretroviral therapy in 2017, within the reporting period, including those who have died since starting antiretroviral therapy, those who have stopped treatment and those recorded as lost to follow-up at month 12	As people start antiretroviral therapy, monthly cohort data should be collected continuously. Data for monthly cohorts completing at least 12 months of treatment should then be aggregated.	<ul style="list-style-type: none"> 0–14 years for children and 15 years and older by sex (men and women) for adults. Breastfeeding status when starting therapy.
1.4	People living with HIV who have suppressed viral loads (Percentage and number of adults and children living with HIV who have suppressed viral loads at the end of the reporting period)	Number of people living with HIV in the reporting period with suppressed viral loads (<1,000 copies/mL)/ Estimated number of people living with HIV (to estimate viral load suppression coverage); OR Estimated number of people living with HIV who are on treatment (to determine progress towards the third 90).	Annually	<ul style="list-style-type: none"> 0–14 years for children and 15 years and older by sex (men and women) for adults; data reported for unknown age or sex should be allocated to the age- and sex-disaggregated data cells using the same distribution of the data with known age and sex. These adjustments should be noted in the box providing additional information. As available. Disaggregation by detailed age and sex: <1 year, 1–4 years, 5–9 years and 10–14 years for children and 15–19 years, 20–24 years, 25–49 years and 50+ years by sex (men and women) for adults; by gender (men, women, other gender) for adults. Cities and other administrative areas of importance.

INDICATOR REFERENCE	INDICATOR	NUMERATOR/DENOMINATOR	FREQUENCY OF MEASUREMENT	DISAGGREGATION
COMMITMENT 1: Ensure that 30 million people living with HIV have access to treatment through meeting the 90-90-90 targets by 2020				
1.5	Late HIV diagnosis (Percentage and number of adults and children newly diagnosed with HIV with an initial CD4 cell count <200 cells/mm ³ and <350 cells/mm ³ during the reporting period)	1. Numbers of people living with HIV with an initial CD4 cell count <200 cells/mm ³ at the time of diagnosis 2. Numbers of people living with HIV with an initial CD4 cell count <350 cells/mm ³ at the time of diagnosis/ Total number of people living with HIV with an initial CD4 cell count during the reporting period	Annually	<ul style="list-style-type: none"> 0–14 years for children and 15 years and older by sex (men and women) for adults.
1.6	Antiretroviral medicine stock-outs (Percentage of treatment sites that had a stock-out of one or more required antiretroviral medicines during a defined period)	Number of health facilities dispensing antiretroviral medicines that experienced a stock-out of one or more required antiretroviral medicines during a defined period/ Total number of health facilities dispensing antiretroviral medicines during the same period	Annually	<ul style="list-style-type: none"> Type of site: for example, general clinic, maternal and child site or tuberculosis site
1.7	AIDS mortality (Total number of people who have died from AIDS-related causes per 100,000 population)	Number of people dying from AIDS-related causes during the calendar year/ Total population regardless of HIV status * Calculation Numerator/denominator times 100,000	Annually	<ul style="list-style-type: none"> Sex. Age (<5, 5–14 and 15+ years).
1.8	HIV testing volume and positivity (The number of HIV tests conducted (testing volume) and the percentage of HIV-positive results returned to people (positivity) in the calendar year)	Number of tests conducted where an HIV- positive result was returned to a person (positivity)/Number of tests performed where results were received by a person (testing volume)	Annually	<ul style="list-style-type: none"> 0–14 years for children and 15 years and older by sex (men and women) for adults. Testing modality. <ul style="list-style-type: none"> Community-level HIV testing services reporting: <ul style="list-style-type: none"> Mobile testing (e.g., through vans or temporary testing facilities); Voluntary counselling and testing (VCT) centres (not within a health facility setting); and Other community-based testing. Facility-level testing: <ul style="list-style-type: none"> Provider-initiated testing in clinics or emergency facilities; Antenatal clinics (including labour and delivery); VCT (within a health facility setting); and Other facility-level testing.
COMMITMENT 2: Eliminate new infections among children by 2020 while ensuring that 1.6 million children have access to HIV treatment by 2018				
2.1	Early infant diagnosis (Percentage of infants born to women living with HIV receiving a virological test for HIV within two months of birth)	Number of infants who received an HIV test within two months of birth during the reporting period. Infants tested should only be counted once. The numerator should not include infants tested after two months./Number of pregnant women living with HIV giving birth in the past 12 months	Annually or more frequently, depending on a country's monitoring needs	The numerator should be disaggregated by the result: positive, negative, indeterminate or rejected for testing.
2.2	Mother-to-child transmission of HIV (Estimated percentage of children newly infected with HIV from mother-to-child transmission among women living with HIV delivering in the past 12 months)	Estimated number of children newly infected with HIV in the previous 12 months from mother-to-child transmission/Estimated number of births to women living with HIV in the previous 12 months	Annually	None

INDICATOR REFERENCE	INDICATOR	NUMERATOR/DENOMINATOR	FREQUENCY OF MEASUREMENT	DISAGGREGATION
COMMITMENT 2: Eliminate new infections among children by 2020 while ensuring that 1.6 million children have access to HIV treatment by 2018				
2.3	Preventing mother-to-child transmission of HIV (Percentage of pregnant women living with HIV who received antiretroviral medicine to reduce the risk of mother-to-child transmission of HIV)	Number of pregnant women living with HIV who delivered during the past 12 months and received antiretroviral medicines to reduce the risk of mother-to-child transmission of HIV. Global reports summarizing the coverage of antiretroviral medicine for preventing mother-to-child transmission will exclude women who received single-dose nevirapine, since it is considered a suboptimal regimen. However, the country should report the number of women who only received single-dose nevirapine. This count should include all women who delivered in the past 12 months, regardless of which year they started on ARVs./ Estimated number of women living with HIV who delivered within the past 12 months	Annually or more frequently, depending on a country's monitoring needs	<ul style="list-style-type: none"> • Cities and other administrative areas of importance. • The numerator should be disaggregated by the categories below. Each woman should only be counted once in one of the cells: <ol style="list-style-type: none"> 1. Newly initiated on antiretroviral therapy during the current pregnancy. 2. Already receiving antiretroviral therapy before the current pregnancy. 3. Other (please specify regimen).
COMMITMENT 3: Ensure access to combination prevention options, including pre-exposure prophylaxis, voluntary medical male circumcision, harm reduction and condoms, to at least 90% of people by 2020, especially young women and adolescent girls in high-prevalence countries and key populations – gay men and other men who have sex with men, transgender people, sex workers and their clients, people who inject drugs and prisoners				
3.1	HIV incidence (Number of people newly infected with HIV in the reporting period per 1,000 uninfected population)	Number of people newly infected during the reporting period/ Total number of uninfected population (or person-years exposed) * Calculation Rate: (Numerator x 1,000)/denominator	Annually	<ul style="list-style-type: none"> • Sex (male and female). • Age (0–14, 15–24, 15–49 and 50+ years). • Cities and other administrative areas of importance.
3.4	HIV testing among key populations (A–D) (Percentage of people of a key population who tested for HIV in the past 12 months, or who know their current HIV status) This indicator is divided into four sub-indicators: A. HIV testing among sex workers B. HIV testing among men who have sex with men C. HIV testing among people who inject drugs D. HIV testing among transgender people	Respondent knows they are living with HIV or Respondent reports having tested for HIV in last 12 months and result was negative/ Number of people in key populations who answered question	Annually	A, C and D: Gender (female, male and transgender). A–D: Age (<25 and 25+ years). A–D: Cities and other administrative areas of importance.
3.5	Antiretroviral therapy coverage among people living with HIV in key populations ((A–E) Percentage of the people living with HIV in a key population receiving antiretroviral therapy in the past 12 months) This indicator is divided into five sub-indicators: A. Antiretroviral therapy coverage among sex workers living with HIV B. Antiretroviral therapy coverage among men who have sex with men living with HIV C. Antiretroviral therapy coverage among people who inject drugs living with HIV D. Antiretroviral therapy coverage among transgender people living with HIV E. Antiretroviral therapy coverage among prisoners living with HIV	Number of respondents living with HIV who report receiving antiretroviral therapy in the past 12 months/ Number of respondents living with HIV	Annually	A, C, D and E: Sex (female, male and transgender). D: Age (<25 and 25+ years). A–E: Cities and other administrative areas of importance.

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© United Nations Children's Fund
Three United Nations Plaza
New York, New York 10017
Attn.: sessajee@unicef.org or nputta@unicef.org

March 2020