Elizabeth Glaser Pediatric AIDS Foundation
Fighting for an AIDS-free generation

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Triple Elimination of Mother-to-Child Transmission of HIV, Syphilis and Hepatitis B:

Results from a Country-Level Survey in Sub-Saharan Africa

Introduction

The elimination of mother-to-child (or *vertical*) transmission of HIV, syphilis, and hepatitis B (HBV) is a high priority for the health of women and children, given the elevated risk of transmission and the danger the infections pose to the immediate and life-long health of the woman and child. Infants born to mothers living with HIV who are not on antiretroviral therapy (ART) have a 15–30% chance of acquiring HIV during pregnancy or childbirth—with an additional 10–20% risk during prolonged breastfeeding—and those who are infected have an 15–35% chance of dying in the first year of life.[1] Infants born to mothers with syphilis have a high chance of adverse fetal outcomes, including early fetal death, stillbirth, neonatal death, preterm birth, low birthweight, and congenital infection.[2] For HBV, the risk of mother-to-child transmission can reach up to 90% depending on the viral load. Additionally, chronic infection occurs in the majority (90%) of infants infected from their mothers or before five years of age. Those infected after the age of five years are much less likely (<5%) to develop a chronic infection. Chronic HBV infection can result in liver disease, cirrhosis (scarring), and cancer.[3]

Given the overlap in affected populations, their similar transmission pathways, and the potential for integrating interventions via antenatal, delivery, and postnatal services, there is an opportunity to group together efforts to end all three types of transmission. The three also share a high potential for success due to the availability of effective testing and treatment options. States are encouraged to work towards eliminating transmission of all three diseases through mutually reinforcing interventions, otherwise known as "triple elimination." The World Health Organization (WHO) has established guidance on a set of criteria that countries must meet to move along the three stages of the "path to elimination," and eventually be fully validated by a global validation advisory committee.[4] The WHO guidance document also suggests a package of interventions for "integrated management and monitoring of vertical transmission across a wide range of epidemiological and programmatic contexts."[5]

In order to promote progress in highly affected countries, WHO has established "Global health sector strategies on, respectively, HIV, viral hepatitis and sexually transmitted infections," first for 2016 to 2021, and another for the period of 2022 to 2030. These strategies build on the highly effective *Global Plan towards the Elimination of New HIV Infections among Children and Keeping their Mothers Alive* (known as the *Global Plan*) and emphasize the integration of HIV services with testing and treatment for HBV and other sexually transmitted diseases, such as syphilis. Despite such global attention, there has been limited progress on the path to elimination of syphilis and HBV, especially HBV. Progress on HIV transmission has also stalled in recent years with the end of the Global Plan and the less impactful *Start Free Stay Free AIDS Free* framework (Table 1).[6] While the *Global AIDS Monitoring* report does contain a few indicators on syphilis and HBV, these are mostly not reported on and data on HBV is currently unavailable.

Abbreviations

ANC	Antenatal care
ART	Antiretroviral therapy
BPG	Benzathine penicillin G
EMTCT	Elimination of mother to child transmission
FTC	Emtricitabine
HBeAg	Hepatitis B envelope antigen test
HBsAg	Hepatitis B surface antigen test
PrEP	Pre-exposure prophylaxis
Px	Prophylaxis
RDT	Rapid diagnostic test
TDF	Tenofovir disoproxil fumarate
Vx	Vaccine

Methods and Limitations

To understand better the remaining challenges on the path to triple elimination, EGPAF conducted a survey of triple elimination efforts in antenatal care settings in 12 EGPAF-supported countries in 2022: Cameroon, Côte d'Ivoire, Democratic Republic of the Congo, Eswatini, Kenya, Lesotho, Malawi, Mozambique, Nigeria, Tanzania, Uganda, and Zimbabwe. To add supplementary data, the landscape survey was sent to seven additional countries (Botswana, Burkina Faso, Ethiopia, Ghana, Namibia, South Africa, and Zambia) in a survey supported by the WHO in 2021. Ministries of Health and disease programs were consulted to compile the responses.

The focus of the landscape survey was to understand what services, treatments, diagnostics, and vaccines are available for HIV, syphilis, and HBV (as relevant) in the surveyed countries, and their progress in providing integrated services for pregnant women and neonates across the three diseases. It also examined key barriers to the implementation of triple elimination approaches in each country, as well as opportunities for the introduction of concrete interventions that would strengthen country approaches to triple elimination.

Data was gathered through a comprehensive written survey, and country data was validated twice for all EGPAF-supported countries except Zimbabwe. All countries were included in the landscape except for Botswana, which did not respond to the survey. In addition, Ghana only partially responded to the survey and Burkina Faso sent two responses from different departments that needed to be combined. Since the status of the elimination of perinatal HIV transmission is already well documented, the focus of the survey was on the elimination of mother-to-child transmission of syphilis and HBV.

This briefer provides a highlight of the findings from countries EGPAF surveyed in 2022 and additional data collected in 2021 from WHO-supported countries. Additionally, baseline results from the UNAIDS, WHO, and UNICEF Global AIDS Monitoring data collection are provided where indicators on triple elimination of mother-to-child transmission (EMTCT) were reported on and published in 2021.

Table 1: Summary of available data on triple EMTCT indicators published by UNAIDS, WHO, and UNICEF for the year 2021*

Country	HIV testing among pregnant women (%)	Coverage of HIV-positive pregnant women who receive ART for prevention of mother-to-child transmission of HIV (%)	Vertical transmission rate of HIV (%)	Early infant diagnosis (virological test within two months of birth, %)	"National policy on dual HIV/syphilis rapid diagnostic tests: (1) pregnant women and (2) key populations"	"National plan for the elimination of vertical transmission of (1) HIV and (2) syphilis"
Burkina Faso	>98%	>98	10	23	1, 2	1, 2
Cameroon	77	67	17	48	1	1, 2
Côte d'Ivoire	>98	95	6	61	1	1, 2
Democratic Republic of the Congo	41	61	23	12 (2020)	1	unavailable
Eswatini	89	>98	3	45	1, 2	1, 2
Ethiopia	72	78	18	38	unavailable	1
Ghana	96	87	16	25	1, 2	1, 2
Kenya	85	91	9	65	1, 2	1, 2
Lesotho	83	86	8	63	1, 2	1, 2
Malawi	>98	93	8	79	unavailable	1, 2
Mozambique	>98	unavailable	unavailable	83 (2020)	1	1, 2
Namibia	>98	>98	5	>95	1	1, 2
Nigeria	32	34	25	15	1, 2	1, 2
South Africa	93	96	4	94	1, 2	1, 2
Uganda	>98	>98	7	75	1	1, 2
United Republic of Tanzania	>98	80	11	48	1	1, 2
Zambia	90	97	8	32	1, 2	1, 2
Zimbabwe	86	87	9	>98	1	1, 2

*Countries reported limited data on syphilis and none on HBV, despite the listing of a few indicators in the Global AIDS Monitoring Report

Results and Analysis

Testing

WHO recommends testing for HIV, HBV, and syphilis at least once during pregnancy and as early as possible.[7] As shown in Table 2, all the surveyed countries reported that their protocol is to test women for HIV and syphilis at least once during pregnancy. Yet only ten countries also test for HBV. In some of these countries, the testing only happens in what is typically referred to as urban areas. Such testing would generally take place during antenatal care (ANC) appointments. While there is generally a high rate of first ANC attendance uptake overall, one key challenge in the surveyed countries is the late stage that these visits commence. This limits early access to testing and treatment during the first trimester, which is particularly critical for the prevention of mother-to-child transmission of HIV and syphilis, especially in rural areas (Table 2).

Determining a woman's HIV status is best done before she becomes pregnant so that she can start treatment and reduce her viral load before carrying a child. Pregnant women who were not tested prior to pregnancy should be tested as early as possible during pregnancy and, if positive, placed on treatment immediately for her health and to reduce the chance of transmission. Women who test negative should be retested later in pregnancy and while breastfeeding and be offered PrEP. This is because infection with HIV is still possible, and the risk of transmission is highest immediately after any such new infection. As noted in Table 1 (above), HIV testing rates for pregnant women in 2021 were generally high, with eight of the 18 surveyed countries testing over 95% of women and another six countries testing over 80%. Yet, two countries lag far behind with only 41% tested in the DRC and 32% in Nigeria.[8] A review on national HIV retesting guidelines from 2019 across all surveyed countries revealed that retesting is universally recommended during pregnancy and postpartum for all high prevalence settings.[9] A recent example from Kenya revealed that retest coverage is high postpartum but not during pregnancy;[10] however, in general, across countries, data is largely unavailable on how extensively this policy is implemented.

Testing and treatment for HBV and syphilis can take place during pregnancy and still be highly effective for the woman and for preventing transmission to the fetus, though they should also take place as early as possible. Testing for syphilis has been facilitated with the advent of dual diagnostics that cover both HIV and syphilis, which saves people and healthcare workers time and money. The rapid version of this test (rapid diagnostic test or *RDT*) ensures they receive the test results immediately for rapid linkage to treatment. National policies exist on dual HIV/syphilis RDTs for pregnant women in all 16 countries with available information (Table 1), but the dual HIV/syphilis RDT was available in only 12 of the surveyed countries (Table 2). Five other countries offered single RDTs for HIV and syphilis, and one additional country offered only the single HIV RDT. As seen in Table 5, some of the barriers to greater use of the dual RDT is the cost (five countries)—even though dual testing can be cost saving—and inadequate availability of the test or other essential supplies (nine countries). Programs should also offer testing and treatment at the same site.

Women can be tested for HBV with an effective, low-cost surface antigen test (HBsAg). Since treatment needs to start by 28 weeks of pregnancy, this test should be given as early as possible. However, this is only the case in a consistent manner in eight of the surveyed countries (Table 2), with another three countries offering it inconsistently or for a fee. The faster RDT helps ensure people know their status and can be linked to treatment quickly, but the single HBsAg RDT is only available in six of the 18 surveyed countries. In the future, countries can look forward to triple HIV/syphilis/HBsAg RDTs that may be eligible for donor procurement and that can facilitate simplified and integrated screening.

According to WHO recommendations, if a woman tests positive for HBsAg, further tests are required to determine subsequent actions. The test of choice is a viral load test for HBV DNA, but unfortunately this test is not widely available (Table 2). Prices also seem prohibitively expensive (Table 5), though it should be priced at similar levels to HIV or TB molecular tests given they all benefit from preferential or global access pricing agreements. An alternative test is the envelope antigen test (HBeAg), which also shows the level of viremia and thus indicates transmission risk. However, HBeAg is less accurate and may give false negatives in those with high viral loads. Overall, the HBeAg or HBV DNA tests are only available in nine countries, and on a limited basis in four of these. These tests are also more complex than HIV and syphilis RDTs, which is an additional barrier to decentralization, integration, and same site test-and-treat. Another issue may be that no WHO prequalified product exists for the HBeAg RDT, meaning that countries may not be able to procure these tests.

Male partners should also be tested for the three diseases and be linked to treatment and care. For HIV and HBV, the risk from partners is more significant for uninfected women, as they may acquire the infection from their partner during pregnancy or breastfeeding. This subsequently poses a high risk of transmission to the infant. While there is no cure for HIV or chronic HBV infection, women with syphilis may be cured. However, this does not convey immunity and therefore they may become reinfected from a positive spouse during pregnancy. Partner testing and treatment for syphilis is offered in 17 out of 18 surveyed countries, but people must pay for the test in two countries and are treated without a test in another. In general, partner index testing has had a low uptake and requires improvement for all three diseases.

Table 2: Summary of triple EMTCT results from country survey for testing performed during ANC visits

Country	Setting	Number of Recommended ANC visits/contacts	Number of ANC contacts attended	First ANC contact (week)*	>75% Facility-based births	Tested for at least once during pregnancy	RDTs offered	HBsAg test <28w pregnancy	HBeAg and/or HBV viral load**	Syphilis test and treatment offered to partner
Burkina Faso	Urban Peri-urban Rural	4–8	4–6	<12	yes	HIV, syphilis, HBV	single HIV, dual HIV/syphilis	yes	yes (unavailable)	yes
			3–5	<12		HIV, syphilis				
			2–4	14–28		HIV, syphilis				
Cameroon	Urban Peri-urban Rural	4	>4	12–16	yes	HIV, syphilis, HBV	single HIV, single syphilis, single HBsAg	yes (urban)	yes (urban)	yes ($)
			3–4		yes					
			<4		unavailable					
Côte d'Ivoire	Urban Peri-urban Rural	8	5	<12	yes	HIV, syphilis ($), HBV	single HIV	yes ($)	yes	yes ($)
			3–4	<12						
			1–2	>16						
Democratic Republic of the Congo	Urban Peri-urban Rural	4	4	24	yes	HIV, syphilis	single HIV, dual HIV/syphilis	no	no	no
			3	24	yes					
			1–3	24–30	no					
Eswatini	Urban Peri-urban Rural	8	4	20–24	yes	HIV, syphilis, HBV	single HIV, single syphilis, single HBsAg	yes	private sector	yes
Ethiopia	Urban Peri-urban Rural	4(8)	<4	12–16	yes	HIV, syphilis, HBV	single HIV, dual HIV/syphilis	no	no	yes
			2–4	20	no	HIV, syphilis				
			<2	>20	no	HIV				
Ghana	Urban Peri-urban Rural	≥4	3	10–12	yes	HIV, syphilis	single HIV, dual HIV/syphilis	yes	no	yes
Kenya	Urban Peri-urban Rural	4	4	>12	yes	HIV, syphilis	single HIV, single syphilis, dual HIV/syphilis	no	no	yes
			unavailable	>12	unavailable					
			3	>24	no					
Lesotho	Urban Peri-urban Rural	8	>6	12	yes	HIV, syphilis, HBV	single HIV, single syphilis, dual HIV/syphilis, single HBsAg	yes	private sector	yes
			5–6	12–24	yes					
			<5	>24	unavailable					
Malawi	Urban Peri-urban Rural	4	4	>12	yes	HIV, syphilis, HBV	single HIV, single syphilis, single HBsAg	sometimes	no	yes
Mozambique	Urban Peri-urban Rural	4	3	<20	yes	HIV, syphilis	single HIV, single syphilis, dual HIV/syphilis	no	no	treated without being tested
			2	<20						
			2	>20						
Namibia	Urban Peri-urban Rural	8	>3	16–28	yes	HIV, syphilis, HBV	single HIV, single syphilis (lab-based), single HBsAg	yes	yes	yes
Nigeria	Urban Peri-urban Rural	8	4–6	18–21	yes	HIV, syphilis, HBV ($)	single HIV, single syphilis, dual HIV/syphilis, single HBsAg	yes	yes	yes
			4–6	18–21	no					
			3–5	>30	no					
South Africa	Urban Peri-urban Rural	8	4	8	yes	HIV, syphilis	single HIV, single syphilis	yes (not rouitine)	yes (viral load)	yes
			3	<12						
			3	<12						
Uganda	Urban Peri-urban Rural	8	3	12–24	yes	HIV, syphilis, HBV	single HIV, dual HIV/syphilis	yes	yes	yes
				>12	unavailable					
				>12	unavailable					
United Republic of Tanzania	Urban Peri-urban Rural	8	6	12	yes	HIV, syphilis, HBV	single HIV, single syphilis, dual HIV/syphilis	yes	yes	yes
			4							
			4							
Zambia	Urban Peri-urban Rural	8	4–6	<12	yes	HIV, syphilis	single HIV, single syphilis, dual HIV/syphilis	no	no	yes
			3–5	<12	yes					
			3–4	>12	no					
Zimbabwe	Urban Peri-urban Rural	4	4	<12	yes	HIV, syphilis	single HIV, single syphilis, dual HIV/syphilis	no	no	yes
				<16						
				<16						

Complemented with UNICEF/WHO data

* Pregnant women should receive testing for HIV, syphilis, and hepatitis B (HBsAg) at least once during pregnancy, preferably in the first trimester or at latest 12 weeks.
** HBV viral load is the better and standard test, but sometimes only HBeAg is available to measure viraemia and risk of transmission. HBV viral load testing is also more complex than RDTs to perform.

Prophylaxes and Treatment

Prophylaxes or treatments to prevent transmission to the fetus or newborn are available for all three diseases but are not systematically provided. Again, for such preventive treatments to be administered most effectively, early and regular ANC visits are crucial for pregnant women to be tested, receive the results, and be provided with treatment. Providing prophylaxes or treatment to newborns of women with HIV, syphilis, or HBV is more likely to happen when women give birth at health care facilities or otherwise have access to medical care at birth.

If a pregnant woman living with HIV knows her status and is on effective ART before pregnancy, the risk of transmitting the virus to her fetus or infant is very low.[11] According to UNAIDS (Table 1), the rates of women living with HIV who were receiving ART in 2021 ranged from 34% (Nigeria) to over 95% in seven countries. Perinatal HIV transmission rates have dropped significantly since 2011 when the Global Plan was launched but remain above 10% in seven of the surveyed countries. Children born to women living with HIV should receive prophylactic medicine as a further preventive measure. Given high rates of early mortality among HIV-infected infants, they should be tested for HIV via early infant diagnosis (EID) by two months of age and starting at birth, preferably, so they can be linked to treatment as quickly as possible. Yet EID rates remain far too low in most countries, with nine surveyed countries testing under 50% of infants by two months of age and four countries testing 25% or less. Only four countries are reaching over 80% of infants.

Pregnant women with syphilis should be treated with benzathine penicillin G (BPG) once weekly for three consecutive weeks to cure their infection. This also acts as a preventive treatment for the fetus, as the medicine can cross the placenta. As shown in Table 3, in all surveyed countries pregnant and breastfeeding women with early syphilis are treated with BPG or an alternative, though the latter should be avoided because they do not cross the placenta. Newborns born with syphilis should also be treated with BPG soon after delivery, which is given in all but three surveyed countries (Table 3). BPG is generally available, but stockouts do occur in eight of the surveyed countries (Table 5) and additional stockouts can exist on site even if products are available in the country.

In order to prevent HBV transmission to the fetus from an HBV-positive mother, required treatment varies depending on her viral load or HBeAg status (see testing, above). When the viral load is high (above 200,000 IU/ml) or if her HBeAg is positive, women should be treated with tenofovir (TDF) because of the elevated risk of transmission. As seen in Table 3, only ten of the surveyed countries provided tenofovir as a prophylaxis for HBV from 28 weeks pregnancy to the birth of the child. In some cases, provision may have been included in policy but not available in practice.

Women who meet the criteria for HBV prophylaxis and who are HIV negative can either take TDF as a monotherapy or as part of a two-drug oral HIV pre-exposure prophylaxis (PrEP) regimen (tenofovir disoproxil fumarate/emtricitabine) when at high risk of acquiring HIV. The advent of long-acting PrEP (such as the dapivirine vaginal ring and injectable cabotegravir), while sought after in all surveyed countries (Table 5), presents a challenge as it does not include TDF. Therefore, alternatives will need to be available to prevent HBV transmission for those taking long-acting PrEP for HIV. Women living with HIV should be given TDF as part of their three-drug ART regimen (this is already the case with the WHO-recommended first line regimen of TLD (tenofovir disoproxil fumarate/lamivudine/dolutegravir). At the same time, while the first line of ART almost always contains TDF, the second line almost never does. But information on the number of women this affects is sparse (Table 3). Furthermore, TDF as a monotherapy is only available in 11 of the 18 surveyed countries. Moreover, it is not generally covered by HIV-related funding sources as, for HIV PrEP or ART, it is part of fixed dose combinations. HIV-negative women in all but one surveyed country are therefore usually given the two-drug HIV PrEP formula instead, as it is covered by donors for HIV programs and has the double benefit of treating HBV and protecting against HIV acquisition (Table 5).

It is most important that infants born to HBV-positive mothers with a high viral load, or who have a positive HBeAg result, receive the HBV birth dose (HepB-BD) vaccine within 24 hours of birth. The vaccine should be given regardless of a woman's HBV infection status as an extra safeguard against perinatal HBV transmission. Yet only six of the surveyed countries reported providing the birth dose, with one of those providing it only in the private sector (Table 3). Moreover, giving the vaccine within 24 hours of birth is particularly challenging for births outside of health facilities. While all countries report over 75% facility-based births in urban settings (Table 2), solutions must be found for women in rural areas (five countries reported under 75% of births take place in facilities) or for all other women giving birth at home. Options might include administration of the birth dose by community health workers or birth attendants. However, only five of the surveyed countries expressed interest in this option even if cold chain solutions can be found for transport and delivery (Table 5). Thus, it was not considered the chief barrier to implementation from the country perspective. Instead, support for the implementation of the birth dose vaccine was deemed lacking. While the vaccine is considered affordable for domestic procurement, programs still require implementation support.

The low levels of HepB-BD vaccination are surprising given that (i) there is already systematic provision of birth doses of the polio and tuberculosis (BCG) vaccines (although they are not as critical to provide within 24 hours of birth) and (ii) that the vaccine is very affordable. Though finding donors to support HBV programs has proven challenging, the vaccine is well within reach of domestic budgets at only $0.20-$0.25 a shot, as long

as it is prioritized and included in national budgets. Some countries may confuse the requirement for the HepB-BD vaccine with the regular vaccine regimen in which the HBV vaccine is usually provided as part of a 3-dose pentavalent or hexavalent vaccine that starts at four to six weeks of age. This regular vaccine regimen is well-provided in all countries (including via GAVI, the Vaccine Alliance), but is *not* effective against perinatal HIV transmission. GAVI-eligible countries may be waiting for support to set up a vaccination system. GAVI's board approved support for the establishment of platforms to catalyze the introduction of the HepB-BD vaccine beginning in 2021, but implementation has been delayed due to Covid-19 to an unknown date.[12] Either way, GAVI is not planning to provide the HepB-BD vaccine itself. GAVI only plans to provide implementation support because it deems countries can pay for the vaccine themselves, given the low cost. Countries are therefore encouraged to move forward independently and urgently to implement the HepB-BD vaccine as part of their usual childhood vaccination program. This requires stronger political will from countries and implementation support from donors.

Table 3: Summary of triple EMTCT results from country survey for treatment

Country	Treatment for syphilis	Alternatives to BPG available	Newborn treated for syphilis (if needed)	If eligible, TDF prophylaxis (28 weeks–birth)*	HIV-positive [HBsAg+] pregnant women: % on TDF-containing ART**	HepB birth dose vaccine	HepB3 vaccine from six weeks
Burkina Faso	yes	yes	yes	no	unavailable	yes	yes
Cameroon	yes($)	yes	no	yes($)	unavailable	no	yes
Côte d'Ivoire	yes	yes	yes	yes	100%	yes	yes
Democratic Republic of the Congo	yes	yes	yes	no	unavailable	no	yes
Eswatini	yes	yes	yes	yes	unavailable	no	yes
Ethiopia	yes	yes	no	no	91%	no	yes
Ghana	yes	yes	unavailable	no	unavailable	no	yes
Kenya	yes	yes	yes	yes	99% of HIV+ pregnant on ART	private sector	yes
Lesotho	yes	yes	yes	yes	>95% of HIV+ pregnant on ART	no	yes
Malawi	yes	yes	no	yes	>50%	no	yes
Mozambique	yes	yes	yes	no	>50%	no	yes
Namibia	yes	yes	yes	no	unavailable	yes	yes
Nigeria	yes	yes	yes	yes	34% HIV+ pregnant on ART (>90% TDF)	yes	yes
South Africa	yes	yes	yes	yes	unavailable	no	yes
Uganda	yes	yes	yes	yes	50%	yes	yes
United Republic of Tanzania	yes	yes	yes	yes	>95% of HIV+ pregnant on ART	no	yes
Zambia	yes	yes	yes	unavailable	unavailable	no	yes
Zimbabwe	yes	yes	yes	yes	unavailable	no	yes

* In some countries (e.g., Nigeria), lamivudine (3TC) is used, not TDF. TDF/3TC may also be used for PrEP rather than TDF/FTC (e.g., in Malawi and Zimbabwe).

** Women coinfected with HIV and HBV should be receiving TDF-based ART, which will provide prophylaxis to prevent the mother-to-child transmission of HBV. This is in addition to three-dose HBV vaccination for all infants, including timely birth dose. The first line will almost always contain TDF but almost never the second line. If 99% of HIV-positive women are on ART then it can be assumed that most, if not all, are receiving TDF.

Policy, Financing, and Political Will

The path to triple elimination in each country relies on the full commitment and leadership of the national government, backed by reliable and flexible support from donors where needed. Countries demonstrate their political will through the rapid incorporation of WHO guidelines and recommendations into national policies and other improvements to service delivery based on the latest documented good practices. These changes in policy need to be backed by the human, financial, and material resources needed to implement changes quickly.

Overall, political and financial support in the surveyed countries is strongest for ending perinatal HIV transmission of HIV, followed by their commitment to ending transmission of syphilis. On the other hand, political and financial support for eliminating HBV transmission is much weaker from both high-burden countries and donors. Efforts to eliminate all three diseases under a triple elimination plan—integrating services and making use of synergies as appropriate—varies widely across the surveyed countries. In all but one of the surveyed countries, there exists a national plan for eliminating perinatal HIV transmission of HIV and syphilis (Table 1). Working groups on HIV, syphilis, and HBV exist only in six of the countries. Another two countries have working groups on HIV and syphilis, one has a working group on HIV and HBV, and the rest only have working groups on HIV. As shown in Table 5, integration of services across the triple elimination spectrum was only in place in six of the surveyed countries. An additional seven countries are in the process of integrating services, though only for two diseases in two of those countries. The clinical capacity to manage triple elimination exists on a wider basis, with 11 countries reporting they had this capacity in place and a further two reporting some level of capacity. Community awareness about the value of eliminating the three diseases was reported to exist in nine surveyed countries (Table 4). There is room to build on civil society organization involvement across the three diseases, especially concerning syphilis and HBV.

In all surveyed countries, support for triple elimination services and commodities were requested from donors and included in national budgets. Yet people needed to pay potentially prohibitive out-of-pocket costs for some services in six countries and for health products in ten countries. This was particularly true for syphilis testing (4 countries), syphilis treatment (7 countries), HBV testing (8 countries) and HBV monotherapy (4 countries). The U.S. President's Emergency Plan for AIDS Relief (PEPFAR) is the primary donor for perinatal HIV transmission prevention. PEPFAR includes funding for the dual RDT for HIV/syphilis, but not for HBV commodities. The Global Fund now provides funding for an integrated approach to the elimination of perinatal HIV transmission of HIV, syphilis, and HBV as part of their prevention of mother-to-child transmission (PMTCT) funding. Such support may include testing and treatment commodities for all three diseases, improvement of ANC and related services, and education campaigns or other community-based mobilization efforts.[13] Such funding may now be included in the primary application, as opposed to past years when it could only be requested for HBV and syphilis as part of reallocation of grants not fully used.

Table 4: Summary of triple EMTCT results from country survey for policy and financing

Country	Program responsible	EMTCT working group	Organizations active on triple EMTCT*	Service delivery financing**	Purchasing of health products	Product costs***	Civil society organization (CSO), Community-based organization (CBO) engagement
Burkina Faso	MOH: Family Health Directorate	HIV, syphilis, HBV	UNFPA, UNICEF, WHO	MOH with domestic or donor funds Implementing partners	MOH with domestic or donor funds: syphilis RDT, dual HIV/syphilis RDT, HBsAg RDT, HepB-BD Out of pocket expense: syphilis RDT, dual HIV/syphilis RDT, BPG, HBsAg, HBeAg, HBV DNA	Unavailable	CSOs involved in PMTCT
Cameroon	MOH: Sub-Direction for STI/HIV/ Hepatitis and TB	HIV	none	Out of pocket with subsidy in rural areas, costs vary in urban facilities.	Out of pocket: syphilis RDT, BPG, HBsAg RDT, HBeAg RDT, HBV viral load, TDF monotherapy, HepB-BD vaccine No major donor for syphilis and HBV. Small subsidy from government budget.	Syphilis RDT $5 BPG $8.61 HBsAg RDT and HBeAg RDT $15.51 HBV viral load $15.51 TDF monotherapy $3.45 HepB-BD $15.51	HIV only
Côte d'Ivoire	MOH: Joint National Aids Control Programme (NACP) and National Program for Women and Child, Syphilis	HIV	CDC, Global Fund, PEPFAR, with implementing partners; NGO networks of PLHIV, WHO, UNAIDS, UNICEF	MOH with domestic or donor funds, Implementing partners	MOH with donor funds: BPG, HBV DNA test, TDF monotherapy, HepB-BD, dual HIV/syphilis RDT, syphilis RDT	Unavailable	Clinical and community implementing partners
Democratic Republic of the Congo	HIV Program	HIV	Elykya Project, FHI360, Global Fund, ICAP Project, HPP Project, IHAP Project, LISANGA, UNICEF, WHO	MOH with domestic or donor funds Implementing partners Out of pocket Medical insurance Community	MOH with donor funds: syphilis RDT, BPG Implementing partners: HBsAg RDT, HBV viral load Out of pocket and insurance: HepB-BD	Unavailable	RENOAC, Femmes Plus, UCOP+, RENADEF
Eswatini	Sexual and reproductive health	HIV	Only the MOH with implementing partners (EGPAF, GWU)	MOH with domestic or donor funds Medical insurance	MOH with donor funds: syphilis RDT, BPG, HBsAg RDT, TDF monotherapy, HepB-BD	Syphilis RDT, BPG, HBsAg RDT, HepB-BD, TDF monotherapy: free HBV viral load: $20 in private sector	Unavailable
Ethiopia	MOH: MCH Directorate and PMTCT case team	HIV, syphilis, HBV	CDC, EPHI, HAPCO, ICAP, UNAIDS, UNICEF, WHO	MOH with domestic or donor funds implementing partners	MOH with domestic or donor funds: syphilis RDT, dual HIV/syphilis RDT, BPG Implementing partners: syphilis RDT, dual HIV/syphilis RDT, TDF monotherapy Out of pocket expense: BPG	Syphilis RDT, dual HIV/syphilis RDT: free for PMTCT services HBsAg and HBeAg: private sector prices	HAPCO, Network of HIV+ Associations, implementing partners
Ghana	HIV, MNCH, Immunization and Hepatitis Programs	HIV	Unavailable	MOH with domestic or donor funds Out of pocket Medical insurance	MOH with domestic or donor funds: dual HIV/syphilis RDT Out of pocket expense: BPG, HBsAg, HBV DNA, TDF monotherapy, HepB-BD Medical insurance: BPG, HBsAg	Unavailable	NAP+
Kenya	MOH: Division of National AIDS and STI Control Program (NASCOP)	HIV	HIV implementing partners funded by PEPFAR and other donors doing EMTCT work distributed across the various counties	MOH with domestic or donor funds	MOH with donor funds: syphilis RDT, dual HIV/syphilis RDT, BPG, TDF monotherapy Out of pocket: HBsAg RDT, HBeAg RDT, HBV viral load, HepB-BD Medical insurance: HBsAg RDT, HBeAg RDT, HBV viral load, HepB-BD	Syphilis RDT $2 Dual HIV/syphilis RDT $6 BPG $2–5 HBsAg RDT $20 HBV viral load $45–60 TDF monotherapy $65 for 20 day dose HepB-BD $20–30	NEPHAK and CSO's dealing with PMTCT, mothers and their children; HBV awareness is low except among a few CSO's dealing with key populations such as PWID
Lesotho	PMTCT Program	HIV	Baylor, Mothers2mothers	MOH with domestic or donor funds	MOH with domestic and donor funds	BPG 2.4 MU $3.80 HbsAg test reagent (30 tests) $19.50 HBV test strips (100) $3.88	CSOs through NAC, LENEPHWA
Malawi	Department of HIV/AIDS and Viral Hepatitis (HIV Program)	HIV, HBV	CHAI, implementing partners including EGPAF, UNICEF	MOH with domestic or donor funds Medical insurance	MOH with donor funds	Unavailable	Unavailable
Mozambique	HIV Program	HIV, syphilis, HBV	Implementing partners, Organizations of PLHIV, PEPFAR, PLASOC	MOH with domestic or donor funds	MOH with donor funds: syphilis RDT, dual HIV/syphilis RDT, BPG, TDF monotherapy	Unavailable	Unavailable
Namibia	MOH and Social Services, Maternal, Newborn and Child Health, Sexual and Reproductive Health, and HIV Programmes	HIV, syphilis	CDC, DAPP, Intra Health, I-TECH, MOH and Social Services, NANASO, Project Hope, Society for Family Health, UNAIDS, UNFPA, UNICEF, USAID, WHO	MOH with domestic or donor funds Medical insurance	MOH with domestic or donor funds: syphilis (lab), BPG, HBsAg RDT, HBeAg RDT, HBV DNA, TDF monotherapy, HepB-BD Medical insurance: syphilis (lab), BPG, HBsAg RDT, HBeAg RDT, HBV DNA, TDF monotherapy, HepB-BD	Central Medical Stores does keep a list for in-country costs as prices have been fluctuating recently due to the COVID-19 pandemic	MOH and Social Services is working in collaboration with various partners such as Catholic Aids Action, Council of Churches in Namibia, DAPP, Namibia Network of AIDS Service Organization, Namibia Red Cross Society, Positive Vibes, Project Hope, Society for Family Health
Nigeria	MOH: National AIDS and STIs Control Program	HIV, syphilis, HBV	Global Fund, implementing partners, PEPFAR, UNICEF	MOH with domestic or donor funds Medical insurance Out of pocket for HBV	MOH with donor funds: dual HIV/syphilis RDT, HepB-BD Out of pocket: syphilis RDT, BPG, HBsAg RDT, HBeAg RDT, HBV viral load, TDF monotherapy, HepB-BD	Syphilis RDT $6 BPG $12 HBsAg RDT $6 HBeAg RDT $48 HBV viral load $120	Unavailable

Continued on next page

Country	Program responsible	EMTCT working group	Organizations active on triple EMTCT*	Service delivery financing**	Purchasing of health products	Product costs***	Civil society organization (CSO), Community-based organization (CBO) engagement
South Africa	MOH: Programs in HIV, MNCH and Child Health	HIV	CDC, Mothers to Mothers, UNICEF through sub-contracted NGOs	MOH with domestic or donor funds Out of pocket Medical insurance	MOH with domestic or donor funds: syphilis RDT, BPG, HBsAg RDT, HBV DNA, TDF monotherapy Out of pocket expenses: syphilis RDT, BPG, HBsAg RDT, HBV DNA, TDF monotherapy Medical insurance: syphilis RDT, BPG, HBsAg RDT, HBV DNA, TDF monotherapy	Syphilis RDT $7.60 Dual HIV/syphilis RDT $1.25 HBsAg RDT $1.20 HBV DNA $21	Advocacy for prevention of HIV and AIDS (APHA)
Uganda	HIV Program	HIV	Baylor, IDI, IntraHealth Int, JSI, Mild May, MSH	MOH with domestic or donor funds	MOH with donor funds	Unknown (free to clients)	First lady organizations (OFLA), women's advocacy groups, PLHIV networks
United Republic of Tanzania	HIV Program, RCH Section, PMTCT Unit	HIV, syphilis, HBV	Implementing partners, organizations of PLHIV, PEPFAR, UNICEF	MOH with domestic or donor funds	MOH with donor funds: syphilis RDT, dual HIV/syphilis RDT, BPG, TDF monotherapy Out of pocket: HBsAg RDT	Syphilis RDT $0.27 Dual HIV/syphilis RDT $1.5 BPG $0.21/vial HBsAg RDT $0.05 HBV viral load $84 TDF monotherapy $2.4/30 tabs HepB-BD $2.64	Several CSOs supported through TACAIDS, NACOPHA, Implementing partners: Save the Children, Jhpiego
Zambia	MOH: RMNCAH and HIV programme	HIV, syphilis, HBV	CHAI, Jhpiego, PPAZ, UNICEF, USAID, WHO	MOH with domestic or donor funds Out of pocket Medical insurance	MOH with domestic or donor funds and Medical insurance: syphilis RDT, dual HIV/syphilis RDT, BPG, HBsAg RDT, HBeAg RDT, HBV DNA, TDF monotherapy, HepB-BD vaccine Out of pocket expense: BPG	Unavailable	Centre for Reproductive Health, PPAZ
Zimbabwe	PMTCT and National ART Program	HIV, syphilis	BRTI, CHAI, OPHID, ZACH, ZHI, ZIMTECH, ZNNP+	MOH with domestic or donor funds Implementing partners	MOH with donor funds: syphilis RDT, dual HIV syphilis RDT, BPG, TDF monotherapy Implementing partners: syphilis RDT, dual HIV syphilis RDT, BPG	Unavailable	Several CSOs including: Zimbabwe National Network for People Living with HIV, Mavambo Trust

* Implementing organizations may be funded by PEPFAR, UNICEF and/or the WHO.
** Donor funds typically refer to funds coming from PEPFAR or the Global Fund.
*** All local currency converted to US$ (date of currency calculation 1/24/2022); costs are not standardised so cannot be accurately compared across countries.

Table 5: Summary of triple EMTCT results from country survey for barriers and enablers

	Barriers		Enablers						
Country	**Barriers to use of the dual HIV/ syphilis RDT**	**BPG Stockouts**	**HIV-positive pregnant women needing HBV prophylaxis/ Tx: preference for TDF/FTC PrEP to TDF alone**	**If no cold chain needed: prefer community-level HepB-BD Vx**	**Interest in long-acting PrEP or ART**	**TDF monotherapy available**	**Community awareness on triple EMTCT**	**Clinical capacity to manage triple EMTCT**	**Integration across triple EMTCT**
Burkina Faso	Cost Voluntary testing granted by women at ANC for only 1 of 2 Inadequate availability of tests	yes (rare)	yes	yes	yes	yes	yes	yes	yes
Cameroon	Cost Voluntary testing granted by women at ANC for only 1 of 2	no	yes	no	yes	yes ($)	yes	yes	yes
Côte d'Ivoire	Cost Inadequate availability of tests	no	yes	no	yes	yes ($)	some	some	in progress (dual only)
Democratic Republic of the Congo	Stigma Inadequate availability of tests (insufficient supply) Low testing coverage	yes	yes	yes	yes	yes	no	unavailable	in progress (dual only)
Eswatini	Cost HIV status already known Supply chain issues	unavailable	yes	no	yes	no	yes	yes	no
Ethiopia	Cost Inadequate availability of tests Stock-outs	yes	yes	yes	yes	yes	unavailable	yes	no
Ghana	unavailable	unavailable	yes	unavailable	unavailable	yes ($)	yes	no	unavailable
Kenya	HIV status already known Inadequate availability of tests	no	yes	unavailable	yes	yes	no	yes	in progress
Lesotho	HIV status already known	no	yes	no	yes	no	no	yes	yes
Malawi	HIV status already known	sometimes	yes	no	yes	no	no	yes	in progress
Mozambique	HIV status already known	yes	no	unavailable	yes	no	no	in progress	in progress
Namibia	Inadequate availability of tests	no	yes	N/A	yes	no	yes	yes	yes
Nigeria	Slow scale up	no	yes	yes	yes	yes	no	no	yes
South Africa	HIV status is already known Not available (dual tests are not approved for national rollout)	yes (rare)	yes	unavailable	yes	yes	yes	yes	no
Uganda	Inadequate availability of tests	yes	yes	yes	yes	yes	yes	yes	no
United Republic of Tanzania	Inadequate coordination No training Inadequate supplies Expiration of supplies	no	yes	no	yes	no	syphilis: yes HBV: no	in progress	yes (starting)
Zambia	HIV status is already known Inadequate availability of tests	yes	yes	yes	yes	yes	yes	yes	yes (starting)
Zimbabwe	HIV status already known	no	no	unavailable	yes	no	yes	yes	yes

Conclusion

The survey results show that national programs still have progress to make in terms of policies, budgeting, and the availability and use of services and commodities before they will be able to reach the triple elimination goals set out by the WHO. Some general health systems challenges lie in the different level of services obtained by pregnant women, such as early and regular ANC visits and facility deliveries. There is a particularly large discrepancy in access between those living in urban, peri-urban, and rural areas. General strengthening of health care systems over the longer term will be necessary to address such issues, including increased support for community health care workers who can help bridge the gap by facilitating access to testing and linkage to care and treatment. While much progress is still to be made, overall funding for elimination of HIV mother-to-child transmission in sub-Saharan Africa remains significant, perhaps outside of west and central Africa, but syphilis and especially HBV programs remain grossly underfunded.

Programs should also offer testing and treatment at the same site. Syphilis testing is generally more available as it is often paired with HIV testing in a dual RDT. However, governments still need to make an effort to ensure it is universally available and that single tests are given when a woman is already known to be living with HIV. Reducing stockouts of BPG must also be prioritized to ensure it is available for both the pregnant woman as treatment (as BPG is the only syphilis treatment that crosses the placenta), as well as for the newborn, and ensuring that treatment can be administered in sites where pregnant women are tested.

Many shorter-term interventions could vastly improve progress on the pathways to triple elimination if sufficient political will and financing were in place, especially on HBV. There is an urgent need to increase testing of women for the HBV surface antigen and viral load tests, which are both essential to diagnosing women, assessing treatment needs, and ensuring proper follow-up for newborns. All countries should include these tests as part of the standard of care for pregnant women and to ensure access by all women. As such, tests should be done close to or at facilities where women are seen, and the turnaround time of results and follow-up should occur as fast as possible. The inexpensive and effective HBsAg RDT should be much more widely available than is currently the case, and WHO prequalified HBeAg tests are needed. Countries should make the HBV viral load test available for all women testing positive for HBsAg, especially because the test is available at the same preferential rates as for currently used HIV and TB molecular tests. Greater efforts need to be made to ensure women who are eligible for tenofovir are put on treatment by 28 weeks of pregnancy, whether in in the form of fixed dose combinations for HIV PrEP or ART, or monotherapy TDF. Pooled coordination and support are needed with HIV programs on the use of TDF for HIV and HBV to ensure access and get lower prices. All HBV tests and treatment should be offered for free, especially now that the Global Fund is allowing countries to put HBV testing and treatment in their primary grant requests.

Ensuring newborns receive a birth dose of the HBV vaccine should be a simple matter—especially for facility deliveries—given the low cost. Countries should take advantage of the infrastructure already in place to provide existing birth dose vaccines (such as for polio and TB) and implement the HBV birth dose urgently. What seems to be missing are country policy changes, coupled with domestic budgeting and procurement, and donor support for implementation.

Policy and action priorities that must be strengthened

1. Political will, policy change, and financing for triple EMTCT, especially the HBV component
2. Programmatic integration across all three, with combined HIV, syphilis, and HBV technical working groups
3. Clinical capacity and training to ensure delivery of triple EMTCT services
4. Supply chain of essential commodities for testing and treatment, and the HBV birth dose vaccine, including at decentralized facilities where most women are seen
5. Involvement of communities and civil society organizations
6. Free services, without out-of-pocket expenses
7. Financing of triple EMTCT via the Global Fund Grant Cycle 7[14]

With the funding, political will, and resourcing, triple elimination of mother-to-child transmission is imminently possible. We have the tools and policies. Only implementation remains.

Endnotes

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Disclaimer: *This briefer does not represent the official position of the Ministries of Health of the countries included in the landscape.*

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