



# Prevention of mother-to-child transmission of HIV



Internal document  
2020 edition

# **Prevention of mother-to-child transmission of HIV**

Internal document  
2020 edition

## **International MSF HIV working Group**

### **Editor**

Elisabeth Le Saout

### **Translation**

Carolyne López Vásquez

### **Design and layout**

Evelyne Laissu

### **Published by**

Médecins Sans Frontières

© Médecins Sans Frontières, 2020

All rights reserved for all countries. No reproduction, translation and adaptation may be done without the prior permission of the Copyright owner.

*Médecins Sans Frontières. Prevention of mother-to-child transmission of HIV - Protocol - 2020 edition.*

Ref. L007AIDM10EFP

## Introduction

Globally, new paediatric HIV infections decreased from 270 000 (230 000-330 000) in 2009 to 160 000 (110 000-260 000) in 2018, with only an 8% decline in the last 2 years. More than 90% of these children were infected through mother-to-child transmission (MTCT). Without intervention, the risk of transmission is 15-30% in non-breastfeeding populations. Breastfeeding by an infected mother increases the risk by 5-20% to an overall transmission rate of 20-45%. In resource-limited settings, without combined triple antiretroviral therapy (ART), 50% of HIV-infected children die before the age of two.

Effective prevention of mother-to-child transmission (PMTCT) has reduced HIV transmission to < 1%. The systematic implementation of these protocols has made paediatric infection an increasingly rare problem in contexts where adequate health care is accessible. Over the last few years significant impact has also been made in resource-limited settings. In the 21 African priority countries in the Global Plan, which account for over 90% of all HIV-infected pregnant women and new infections among children globally, ART coverage in HIV-infected pregnant women increased to 82% (62-95%) in 2018.

Six-week MTCT rates declined globally from an estimated 26% (24-30%) in 2009 to 6.8% (5.4-9.5%) in 2018 with an end of breastfeeding transmission rate of 12.75% (10.6-16%). Despite the significant scale-up in services a lot remains to be done. In western and central African countries, only 59% of HIV-infected pregnant women in 2018 were on antiretrovirals (ARVs)<sup>1</sup> (UNAIDS estimates, 2019).

In resource-limited settings, the current WHO 2016 guidelines<sup>2</sup> recommend initiating lifelong ART in all HIV infected pregnant women regardless of their CD4 count (formerly called option B+). These recommendations make it possible to reduce mother-to-child HIV transmission to < 5%.

This approach provides the basis for:

- Early initiation of ART for all HIV-infected pregnant women, benefiting both the health of the mother and reducing the risk of transmission to her infant during pregnancy and in future pregnancies;
- Provision of ARVs to the mother to reduce the risk of transmission during the breastfeeding period;
- Potentially reducing the risk of sexual transmission if the partner is HIV negative.

There are several challenges however to implementing these recommendations:

- Many women do not attend antenatal care (ANC) services due to various social and economic barriers, even less women attend postnatal care (PNC);
- Most women attending antenatal services are unaware of their HIV status;
- When testing is available, many women find it difficult to disclose their status to their partner or relatives making it more difficult for them to adhere to ARVs;
- Many women attend ANC services only once or twice during their pregnancies and/or do not deliver in health facilities making it difficult to implement the entire PMTCT protocol;

- Despite the relative simplicity of the new PMTCT guidelines, it may still be difficult to implement these recommendations in weak health services. Mother and child health (MCH) services that struggle with a lack of human resources, inadequate infrastructure, poor working conditions for staff etc., may face considerable difficulties implementing them on a large scale;
- In high prevalence countries there is an increased risk of transmission during late pregnancy and breastfeeding due to undetected seroconversion (low re-testing of HIV negative women during the third trimester and breastfeeding period).

This document is an updated version of MSF's PMTCT protocol (April 2017). It reviews current recommendations to reduce HIV transmission from the infected mother to her child, as well as the clinical management of HIV-exposed infants, including early infant diagnosis (EID). Prevention of HIV infection, family planning and management of unwanted pregnancies in HIV-infected women are also part of a PMTCT strategy but are not addressed in this document.

This document provides practical guidelines for MSF field teams and should be used alongside national guidelines where they exist. It does not, therefore, list all the possible alternatives available; it provides the MSF preferred choices considering:

- The types of contexts where MSF works,
- The need to avoid complex protocols.

For more information, refer to the *WHO's Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection: recommendations for a public health approach*, 2016<sup>2</sup> updated in 2018<sup>3</sup> and 2019<sup>4</sup>.

# Table of content

<b>Introduction</b> .....	3
<b>Abbreviations and acronyms</b> .....	6
<b>1. HIV testing, clinical staging and ART preparation</b> .....	7
1.1 HIV testing in pregnant women .....	7
1.2 Clinical staging and measure of CD4 (if available) .....	8
1.3 ART preparation and counselling sessions.....	8
<b>2. PMTCT ARV protocols: HIV-1</b> .....	10
2.1 ART for newly diagnosed HIV-infected pregnant women .....	10
2.2 Pregnant or BF women already on ART for more than 6 months.....	10
2.3 Monitoring toxicity .....	11
2.4 Prophylaxis for HIV-exposed infants whose mothers are identified as HIV-positive during pregnancy, delivery or BF .....	12
2.4.1 <i>Summarized algorithm for infant prophylaxis</i> .....	12
2.4.2 <i>Low-risk HIV-exposed infants</i> .....	13
2.4.3. <i>High-risk HIV-exposed infants</i> .....	13
2.4.4 <i>Prophylaxis for breastfed infants whose mothers are newly identified             with HIV infection during post-partum</i> .....	14
2.5 CTX prophylaxis for HIV-exposed infants .....	16
<b>3. Specific cases</b> .....	17
3.1 Special considerations during labour and delivery .....	17
3.2 PMTCT ARV protocol: HIV-2 or HIV-1 & 2 co-infection.....	17
<b>4. Prevention of hepatitis</b> .....	18
4.1 Prevention of hepatitis B (HBV) transmission in HIV co-infected pregnant women ....	18
4.2 Prevention of hepatitis C (HCV) transmission in HIV co-infected pregnant women ....	18
<b>5. Follow-up of HIV-exposed infants</b> .....	19
5.1 Early diagnosis of HIV infection in neonates and infants < 18 months .....	19
5.2 Algorithm for EID .....	21
5.3 Clinical follow up.....	22
<b>Appendices</b>	
1 HIV testing of pregnant women.....	27
2. Testing at birth.....	30
3. Summary table: use of age-based HIV testing in children .....	31
4. Algorithm for projects where HIV NAAT results are delayed (DBS) .....	32
5. Implementation of EID in countries with high ARV exposure.....	34
6. SOPs for collection, storage and transportation of DBS samples.....	36
7. Patient support, education and counselling (PSEC) in PMTCT services .....	38
<b>References</b> .....	42

## Abbreviations and acronyms

3TC	Lamivudine
ABC	Abacavir
ANC	Antenatal care
ART	Antiretroviral therapy
ARV	Antiretroviral
ATV/r	Atazanavir/ritonavir
AZT	Zidovudine
BF	Breastfeeding
CTX	Cotrimoxazole
DBS	Dried blood spot
DNA	Desoxyribonucleic acid
DTG	Dolutegravir
EAC	Enhanced adherence counselling
EFV	Efavirenz
EID	Early infant diagnosis
EPI	Expanded program on immunization
FTC	Emtricitabine
FDC	Fixed dose combination
HBV	Hepatitis B virus
HCV	Hepatitis C virus
LPV/r	Lopinavir/ritonavir
MCH	Mother and child health
NAAT	Nucleic acid amplification test
NNRTI	Non-nucleoside reverse transcriptase inhibitors
NVP	Nevirapine
PBFW	Pregnant and breastfeeding women
PCR	Polymerase chain reaction
PI	Protease inhibitor
PMTCT	Prevention of mother-to-child transmission (of HIV)
POC	Point of care
PNC	Postnatal care
PSEC	Patient support education and counselling
RDT	Rapid diagnostic test
SP	Sulfadoxine-pyrimethamine
TB	Tuberculosis
TDF	Tenofovir
VL	Viral load

# 1. HIV testing, clinical staging and ART preparation

## 1.1 HIV testing in pregnant women

See [Appendix 1](#) for a description of the testing procedures.

All pregnant women of unknown HIV status should be offered HIV testing at their first ANC visit. Women who initially test negative and seroconvert during pregnancy or breastfeeding (BF) are at especially high risk of transmitting the virus to their infant (see [Section 3.1](#)). Hence women who test negative early in pregnancy should be retested in the third trimester, at delivery and regularly (e.g. every 6 months) throughout the BF period, especially in high-prevalence settings. Attendance at expanded programs on immunization (EPI), under 5 clinics and inpatient/outpatient departments (IPD/OPD) are opportunities to test women who have not attended ANC and re-test women who previously tested negative.

Pregnant women usually enter PMTCT services either through an HIV program, or through ANC services. In general, women who attend ANC visits are informed that they can take an HIV test while they wait for their consultation. Often, this is the first time they hear of HIV. Information and counselling are essential to encourage women to accept testing, to enrol in a PMTCT program and to adhere to treatment.

### **Pre-test information: the opt out<sup>a</sup> strategy**

This information can be provided in an individual or group session (no more than 12-15 people at a time), in the waiting room. The explanation should not last more than 20 minutes. If done in a group, ensure that everybody can hear.

- Provide information on HIV/AIDS, modes of transmission and prevention;
- Explain the risk of HIV transmission to the child if the pregnant woman is HIV positive (30–40% without PMTCT; less than 5% with PMTCT);
- Explain possible ways to prevent MTCT of HIV;
- Explain the testing procedure;
- Explain that the test result will remain confidential;
- Explain they can refuse the test, but if they change their mind, they can take it during a later visit.

### **Individual testing procedure**

- Repeat she can choose to refuse the test (opt out);
- Address any fears related to testing. Insist on the benefits for the woman's own health and in terms of protecting her child from becoming infected.

### **Individual post-test session**

The post-test session is crucial. It is meant to encourage and support a woman with HIV infection to accept her status and the PMTCT intervention that will benefit both her health and that of her future infant.

<sup>a</sup> Opt out means that the test will be done unless the mother specifically refuses. This information is given during the talk.



If the woman has tested negative:

- Explain the meaning of a negative HIV test and the importance of remaining HIV negative;
- Re-discuss methods of prevention (already explained in the pre-test information);
- Discuss risky behaviours and the need for protection particularly during pregnancy and post-partum<sup>b</sup>;
- Encourage the woman to return to take a test in 3 months or before delivery;
- Encourage her to bring her partner for testing;
- Give condoms now and at each ANC visit.

If the woman has tested positive:

- Explain the positive result and provide emotional support;
- Explain that she has a good chance of staying healthy and well for a long time, and that her child has a good chance of being HIV negative if she continues to come to the clinic and to follow the advice given;
- Explain the risk of HIV transmission to the child if there is no intervention;
- Explain the PMTCT intervention, focusing on ART for her own health, prophylaxis for her child and delivery in a medical environment (hospital or health centre);
- Explain the importance of regular follow-up, before and after birth;
- If she has other children, discuss their health and the possibility of testing them;
- Encourage her to bring her partner for testing.

## 1.2 Clinical staging and measure of CD4 (if available)

- HIV positive pregnant women should have their clinical status assessed, including screening for tuberculosis (TB), as soon as possible after the HIV diagnosis or at the first contact with ANC services for women who know their status already.
- The main objective is to start ART as soon as possible, usually at the first visit.
- Cotrimoxazole (CTX) prophylaxis should be started the same day, regardless of WHO clinical stage or CD4 count. A pregnant woman receiving CTX does not need to receive intermittent preventive treatment of malaria (sulfadoxine/pyrimethamine) as CTX also provides protection against malaria.
- If available, the baseline CD4 count remains useful in order to provide urgent and specific care to those presenting with advanced immunosuppression.

### Starting ART early

- Allows enough time for the mother to reach an undetectable viral load (VL) before the high-risk period of MTCT (late pregnancy, labour, delivery and immediate post-partum) and therefore significantly reduces the risk of transmission.
- Decreases the mortality also in HIV-exposed but uninfected infants by its impact on the survival of the mother.

## 1.3 ART preparation and counselling sessions

Before ART is started, the pregnant woman should be retested prior to initiation (see [Appendix 1](#)). This retest should be carried out on a new sample and ideally performed by a different operator. However, if no other operator is available this should not delay the initiation of ART<sup>3</sup>. The pregnant woman must to be counselled (see [Appendix 7](#)). For additional information, refer to the MSF guide [Patient support, Education and Counselling guideline for adults living with HIV and/or TB, 2018](#).

---

<sup>b</sup> HIV MTCT rates are very high if HIV infection occurs during pregnancy or post-partum.

**This process must be started as soon as the HIV status of the mother is known and must be “fast-tracked”, aiming for initiation on the same day as diagnosis. Starting an intervention in HIV-infected pregnant women should be considered an ‘emergency’, especially for those who present in the 3<sup>rd</sup> trimester.**

Depending on the context, patient education/counselling sessions are carried out by either ANC nurses/midwives or by counsellors. Even though women generally arrive late in their pregnancy, it is still advisable to try to have at least 2-3 sessions with HIV-infected women before delivery. After delivery, sessions should take place at least at M1, M3, M6 and M12, or more often if required.

## 2. PMTCT ARV protocols: HIV-1

### 2.1 ART for newly diagnosed HIV-infected pregnant women

ART should be initiated as soon as possible in all HIV-infected pregnant and BF women, regardless of WHO clinical stage or CD4 count and continued lifelong. The ART regimen should be chosen considering the preferred first-line regimen for adults and adolescents contained in national protocols.

- The current regimen of choice for all pregnant or BF women is the same as for any adult: a fixed-dose combination (FDC) of tenofovir/lamivudine/dolutegravir (TDF/3TC/DTG), one tablet once daily. This is also the regimen of choice for pregnant/BF women with TB (with an additional dose of DTG 50 mg 12 hours after the FDC);
- Ideally creatinine clearance should be checked prior to initiation of TDF. If less than 50 mL/min then zidovudine/lamivudine (AZT/3TC) should be used (if Hb  $\geq$  8 g/dL) or abacavir/lamivudine (ABC/3TC) (if Hb < 8 g/dL). Access to creatinine monitoring is however not essential and should not delay ART initiation;
- In the event of adverse reactions to DTG, it can be substituted by efavirenz (EFV)
  - contraindicated if history of psychiatric disorders – or by a protease inhibitor (PI), preferably darunavir/ritonavir or atazanavir/ritonavir (ATV/r) or lopinavir/ritonavir (LPV/r).

**Table 1** - Recommended first-line regimen in adults including pregnant and breastfeeding women (PBFW)<sup>4</sup>

First-line ART	Preferred first-line regimen	Alternative first-line regimen
Adults and PBFW	TDF/3TC/DTG	TDF/3TC (or FTC) + EFV 400 or 600 mg
Special circumstances	Regimens containing AZT, ABC or boosted PIs	

### 2.2 Pregnant or BF women already on ART for more than 6 months

If possible, use point of care (POC) VL testing for rapid availability of results.

#### If VL testing is available:

- For women on ART for  $\geq$  6 months, obtain a VL as soon as pregnancy is confirmed regardless of when prior VL was done, then every 6 months until end of BF.
- If VL is > 1000 copies/mL infants are at high risk of acquiring HIV:
  - Look for and address modifiable reasons of treatment failure;
  - Provide enhanced adherence counselling (EAC);
  - Switch to 2<sup>nd</sup> line ART<sup>a</sup> if non-DTG-based 1<sup>st</sup> line (see box next page);

a WHO guidelines recommend regimen switch after 2 viral loads > 1000 copies/mL 2 to 3 months apart. However, WHO recognizes that these guidelines are not designed for pregnant and BF women. Several national guidelines have opted for varied recommendations. MSF recommends an approach that favors rapid viral suppression in the greatest number of pregnant women to minimize MTCT. This approach may need to be adapted according to national guidelines and availability of drugs.

- Continue counselling after switch;
- Prescribe enhanced infant prophylaxis;
- Ensure active follow up of mother and infant.

*Note on switch to 2<sup>nd</sup> line ART:* the 2<sup>nd</sup> line regimen will depend on national guidelines and availability of drugs. DTG leads to faster viral suppression, is very robust, has few adverse effects, and exists in FDC. 2<sup>nd</sup> line should contain DTG if available and the woman is not on a DTG-containing 1<sup>st</sup> line regimen. PIs, especially LPV/r, have more adverse effects and a higher tablet burden. For patients who have been switched to a PI-based 2<sup>nd</sup> line, especially LPV/r, consider replacing the PI by DTG as soon as it becomes available and after checking that the VL is < 1000 copies/mL. For the moment, MSF does not recommend switching to 2<sup>nd</sup> line for women who are on a DTG-based 1<sup>st</sup> line regimen. Guidelines on treatment failure of DTG-based 1<sup>st</sup> line regimens are in development.

- If VL < 1000 copies/mL continue with the same ARV regimen.

#### **If VL testing is unavailable:**

- Assess and address adherence;
- Look for clinical and immunological signs of treatment failure (new opportunistic infection, stage 3 or 4 after 6 months of effective ART, CD4 count < 250 cells/mm<sup>3</sup> following clinical failure or persistent CD4 levels < 100 cells/mm<sup>3</sup>);
- In case of treatment failure:
  - Look for and address modifiable reasons of treatment failure;
  - Provide EAC;
  - Switch to 2<sup>nd</sup> line ART if non-DTG-based 1<sup>st</sup> line;
  - Continue counselling after switch to 2<sup>nd</sup> line;
  - Prescribe enhanced infant prophylaxis;
  - Ensure active follow up of mother and infant.

## **2.3 Monitoring toxicity**

Lack of biological monitoring should not be a barrier to treatment.

**Table 2** - Drug toxicities

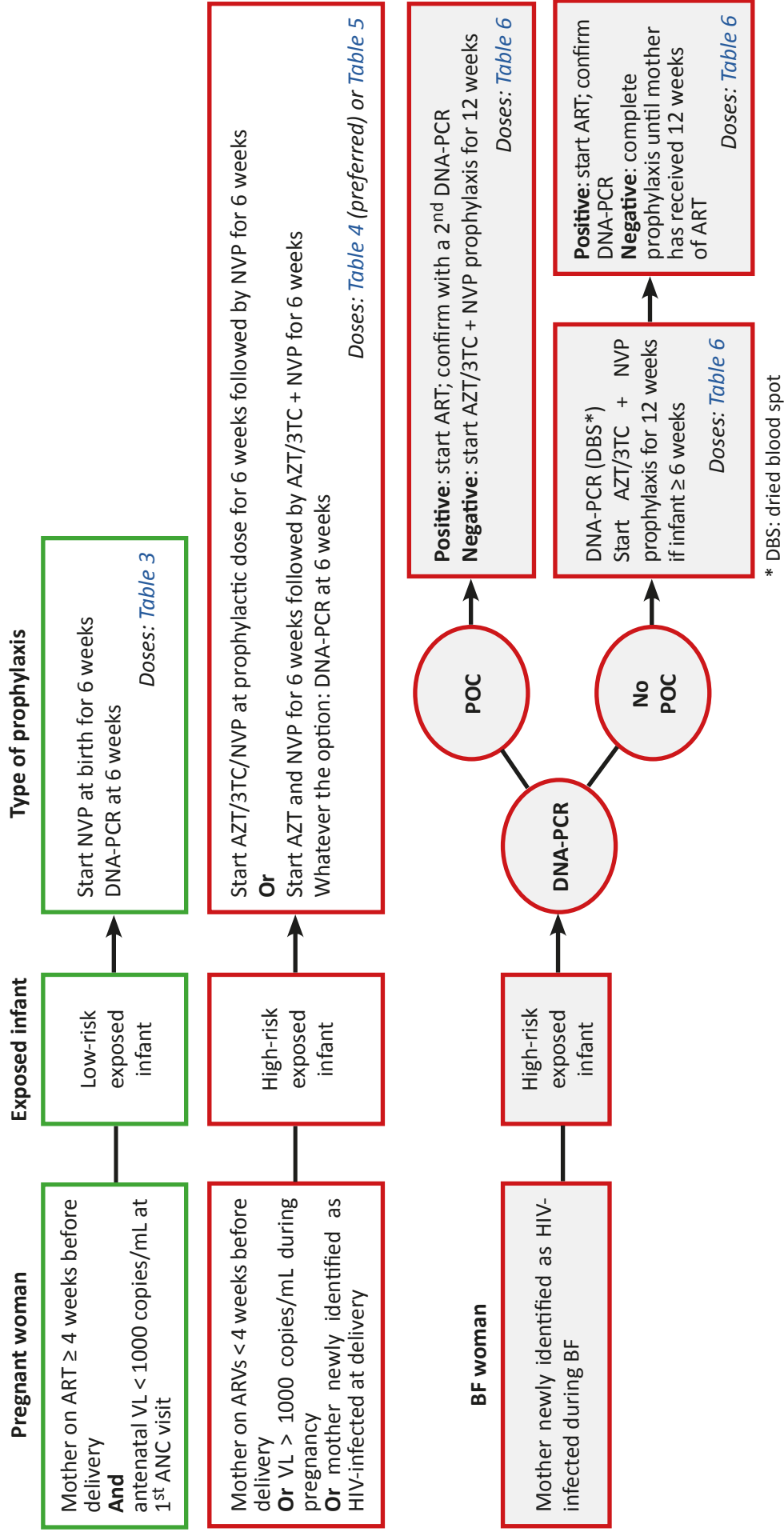
Mother's regimen	Monitoring toxicity
Containing TDF	Creatinine clearance if available <sup>b</sup>
Containing AZT	Haemoglobin if available
Containing EFV or ATV/r or DTG	No biological monitoring

For more details on adverse effects, refer to [MSF HIV/TB clinical guide for primary care](#), SAMU, 2018.<sup>5</sup>

<sup>b</sup> If creatinine clearance < 50 mL/min, choose preferably another ARV.

## 2.4 Prophylaxis for HIV-exposed infants whose mothers are identified as HIV-positive during pregnancy, delivery or BF

### 2.4.1 Summarized algorithm for infant prophylaxis



**Start ARV prophylaxis as soon as possible after birth.**

### 2.4.2 Low-risk HIV-exposed infants

- Mother has been on successful ART for more than 4 weeks prior to delivery.
- Treatment success is best defined by maternal VL < 1000 copies/mL during the last 6 months of pregnancy, at delivery and during BF.

Start **NVP** syrup once daily as soon as possible after birth for 6 weeks.

**Table 3** - Daily ARV prophylaxis for low-risk infants

Birth weight	NVP (10 mg/mL)
< 2 kg and ≥ 35 weeks gestation	2 mg/kg x 1
2 to < 2,5 kg	10 mg x 1
≥ 2.5 kg	15 mg x 1

### 2.4.3. High-risk HIV-exposed infants

High-risk infants include infants whose mothers:

- Have received less than 4 weeks of ART at the time of delivery, or
- On ART but with a documented antenatal VL > 1000 copies/mL at delivery, or
- With incident HIV infection during pregnancy or BF<sup>c</sup>, or
- Were first identified as HIV-positive at delivery, or
- Were first identified during the BF period with or without a negative HIV test during pregnancy (see [Table 6](#)).

#### Simplified ARV prophylaxis regimen for high-risk infants

From birth to 6 weeks, give one quarter of **AZT/3TC/NVP** FDC dispersible tablet two times daily. Teach the parents or caregiver how to use a cutter to obtain 4 equal parts.

At 6 weeks, switch to AZT 60 mg/3TC 30 mg dispersible tablet: 1 tab two times daily **plus** NVP 50 mg dispersible tablet: ½ tab once daily for 6 weeks, **or** NVP alone.

**Table 4** - Simplified ARV prophylaxis for high-risk neonates and infants<sup>d</sup>

Age	Simplified prophylaxis for high-risk infants: daily doses	
Birth to 6 weeks	AZT 60 mg/3TC 30 mg/NVP 50 mg: ¼ tab x 2	–
> 6 to 12 weeks	AZT 60 mg/3TC 30 mg: 1 tab x 2	<b>Plus</b> NVP 50 mg: ½ tab x 1
	<b>Or NVP alone</b>	

<sup>c</sup> Defined as a new HIV diagnosis in a pregnant or BF woman with a previous negative test during pregnancy.

<sup>d</sup> This simplified prophylactic regimen has not been formerly evaluated yet but has been discussed with WHO experts who recognize the importance of simplicity for success.

**Standard WHO recommended (2016) ARV prophylaxis regimen for high risk infants<sup>e</sup>**

Where available, give NVP and AZT combined regimen from birth to 12 weeks. Adjust dose according to birth weight for low birth weight (LBW) neonates receiving ARV prophylaxis at or around birth.

**Table 5** - WHO recommended standard ARV prophylaxis for high-risk neonates and infants

Birth weight or age	NVP 10 mg/mL syrup or 50 mg tablet	AZT 10 mg/mL syrup or 60 mg tablet
< 2 kg and ≥ 35 weeks gestation <sup>f</sup>	2 mg/kg* x 1	4 mg/kg* x 2
≥ 2 to < 2.5 kg	1 mL syrup x 1	1 mL syrup x 2
≥ 2,5 kg Birth to 6 weeks	1.5 mL syrup x 1	1.5 mL syrup x 2
> 6 to 12 weeks	½ tab or 2 mL syrup x 1	1 tab x 2
<b>Or NVP alone</b>		

\* For LBW neonates, the dose is expressed in mg/kg in order to be very precise (less than 1 mL).

- If this is too complicated for the mother, choose the simplified prophylaxis dose above (see [Table 4](#)).
- If appropriate formulations are not available, give NVP alone from birth to 12 weeks.

**For the mother:** start ART as soon as possible. If HIV infection is confirmed during labour, administer first dose of ARV and continue treatment for life. Ensure proper counselling is done after delivery.

**For the infant:** start CTX in all HIV-exposed infants at least 4 weeks of age and continue until HIV infection has been excluded (see [Table 7](#)).

**2.4.4 Prophylaxis for breastfed infants whose mothers are newly identified with HIV infection during post-partum**

HIV-infected women may present for the first time with a BF infant, having not been through any PMTCT intervention. Such infants are at high risk of infection. The infant should be tested with an age appropriate HIV test (virological test<sup>g</sup> if < 18 months; rapid testing algorithm if > 18 months) and considered as a “high-risk infant”.

- **The mother** should start ART without delay and provided with counselling support.

<sup>e</sup> To be used if prescribed in national recommendations.

<sup>f</sup> Note: very preterm neonates will need further reduced doses.

<sup>g</sup> Nucleic acid amplification test (NAAT) through POC or DNA-PCR through DBS.

– **The infant:**

- If the infant virological test is available, the same day (POC):
  - Result is positive, start ART treatment without delay according to weight with ABC (or AZT)/3TC + LPV/r<sup>h</sup>. Collect immediately a 2<sup>nd</sup> sample for confirmation.
  - Result is negative, start enhanced prophylaxis **according to age (NVP) and weight (AZT)** (See [Table 6](#)) until the mother has received 12 weeks of ART. Perform a DNA-PCR at the end of prophylaxis.
- If the infant virological test result is delayed, e.g. if using dried blood spot (DBS), start enhanced prophylaxis with AZT/3TC + NVP while waiting for the result of DNA-PCR (see [Table 6](#)).
  - If the DNA-PCR result is negative, continue enhanced prophylaxis according to age (NVP) and weight (AZT) (see [Table 6](#)) until the mother has received 12 weeks of ART. Perform a new DNA PCR at the end of prophylaxis.
  - If the DNA-PCR result is positive, stop prophylaxis. Start ART with ABC (or AZT)/3TC + LPV/r. Confirm PCR positive result with another DNA-PCR through DBS.

**Table 6** - Prophylactic doses for infants ≥ 12 weeks of age

AZT prophylactic doses		
Weight	AZT 60 mg/3TC 30 mg dispersible tablet	AZT syrup 10 mg/mL
6 - 9.9 kg	1.5 tab x 2	9 mL x 2
10 - 13.9 kg	2 tab x 2	12 mL x 2
14 - 19.9 kg	2.5 tab x 2	15 mL x 2

**PLUS**

NVP prophylactic doses	
Age	NVP 50 mg dispersible tab (or 10 mg/mL syrup)
<b>12 weeks to 6 months</b>	20 mg x 1 (½ tab x 1 or 2 mL syrup x 1)
<b>&gt; 6 to 9 months</b>	30 mg x 1 (½ tab x 1 or 3 mL syrup x 1)
<b>&gt; 9 months until end of BF</b>	40 mg x 1 (1 tab x 1 or 4 mL syrup x 1)

*Note:* for the sake of simplicity, tablet doses are rounded off.

At any time, if the infant is sick and HIV infection is suspected, presumptive ART should to be started. See [Section 5.3](#).

If appropriate formulations are not available, give NVP alone for 12 weeks.

<sup>h</sup> LPV/r syrup should not be given if neonate < 2 weeks old or after the infant has reached 42 weeks of virtual gestation. LPV/r oral pellets (in a capsule) are preferred in infants > 3 kg and age 3 months. Lop/r granules (sachet) can be given from 2 weeks onward.



## 2.5 CTX prophylaxis for HIV-exposed infants

All HIV-exposed infants at least 4 weeks of age should receive CTX prophylaxis and continue until HIV infection has been excluded.

**Table 7** - CTX prophylaxis doses and formulations

Simplified cotrimoxazole prophylaxis			
Weight	Oral suspension 200/40 mg per 5 mL, x 1	Dispersible tablets 100/20 mg x 1	Scored tablets 400/80 mg x 1
3 - 5.9 kg	2.5 mL	1	–
6 - 9.9 kg	5 mL	2	½ (crushed)
10 - 13.9 kg	5 mL	2	½ (crushed)
14 - 19.9 kg	10 mL	4	1

## 3. Specific cases

### 3.1 Special considerations during labour and delivery

Universal precautions (safe needle handling and storage, protective clothes etc.) should always be implemented in all maternity wards, for all patients, regardless of their HIV status.

#### During labour

- Use a partograph to monitor progress of labour as recommended for all deliveries. Prolonged labour must particularly be avoided in HIV-infected women as the risk of transmission increases with the length of time.
- Limit the number of vaginal examinations, as lesions and infections in the birth canal will increase the risk of transmission.
- Limit time between rupture of membranes and delivery. For every additional hour of ruptured membranes, the risk of HIV transmission to the infant increases by 2%.
- Avoid artificial rupture of membranes.
- Induce labour according to protocol when spontaneous rupture occurs, to ensure rapid progress of labour. If the induction fails, proceed with c-section.<sup>6</sup>

#### During delivery

- Avoid invasive procedures during delivery (vacuum extraction, forceps and episiotomy) to limit the risk of HIV transmission. However, if these measures are necessary to save the life of the mother or the infant, they should be performed.

#### Neonate care

- As standard precautions are to be applied to any woman and neonate in the maternity ward, there are no special measures for HIV exposed infants.

### 3.2 PMTCT ARV protocol: HIV-2 or HIV-1 & 2 co-infection<sup>a</sup>

The risk of MTCT of HIV-2 (1-3%) is far less than of HIV-1.

**HIV-2 is intrinsically resistant to NNRTIs. Use a DTG or PI based regimen (ATV/r or LPV/r).**

Do not use NNRTI for the infant, even as prophylaxis, use AZT syrup (birth weight < 2.5 kg, 10 mg two times daily; birth weight ≥ 2.5 kg, 15 mg two times daily).

<sup>a</sup> GeneXpert cannot be used for EID in HIV-2 infection.

## 4. Prevention of hepatitis

### 4.1 Prevention of hepatitis B (HBV) transmission in HIV co-infected pregnant women

High maternal HBV viraemia and HBe Ag positive status<sup>a</sup> are correlated with a higher risk of HBV transmission. In HIV-HBV co-infected patients, the current recommended 1<sup>st</sup> line ART regimen (TDF/3TC/DTG) treats and prevents transmission of both diseases<sup>b</sup>.

#### Recommendations for screening

All pregnant women presenting to PMTCT programs should receive HBs Ag testing at their first visit.

#### Prevention of MTCT in women with positive HBs Ag result

##### 1. *Mother's treatment*

- It has been shown that co-treatment of HBV and HIV with an ART regimen containing TDF/3TC is highly successful in preventing transmission of both viruses to the infant. Choose an ART regimen containing TDF/3TC (or FTC).<sup>7</sup>
- • When changing to a 2<sup>nd</sup> or 3<sup>rd</sup> line, keep at least TDF (+/- 3TC [or FTC]) in addition to the new ART regimen regardless of previous exposure and HIV resistance to TDF<sup>c</sup>.

##### 2. *HBV vaccination for neonates*

- Provide the first dose of hepatitis B vaccine (monovalent) at birth or within the first 24 hours. Use the adult monovalent vaccine at ½ dose (0.5 mL, 5-10 micrograms) or HepB paediatric vaccine.
- Ensure that the infant receives the other doses through the EPI (DPT-Hib-HepB pentavalent vaccine).

##### 3. *Prevention of HBV infection in HBs Ag negative women* (if status known)

- Women with negative HBs Ag status and who have not been vaccinated in the past (see immunization card) should be vaccinated at Day 0, M1, M6.

### 4.2 Prevention of hepatitis C (HCV) transmission in HIV co-infected pregnant women

Pregnant women co-infected with HIV-HCV have a 5 to 20% risk of transmitting the HCV virus to their infants. At the moment there are no data about the use of HCV drugs in pregnancy and BF. No recommendations are yet available. Where access to diagnosis (HCV RDT and HCV VL) is available, treatment using new direct-acting antiviral drugs may be offered after BF in order to prevent transmission in future pregnancies.

---

a Without treatment, nor immunization, risk of HBV transmission is estimated at 70-90% in HBe Ag positive and 10-40% in HBe Ag negative mothers.

b HBV drugs in this regimen are TDF and 3TC.

c Stopping HBV treatment can lead to a severe flare of hepatitis.

## 5. Follow-up of HIV-exposed infants

The key principles for establishing whether HIV-exposed neonates and/or infants younger than 18 months are infected with HIV are based on WHO recommendations<sup>3,8</sup>:

- Assess HIV exposure by antibody testing the biological mother whenever possible;
- Perform NAAT (PCR) test for any HIV-exposed infant following the infant testing algorithm (Section 5.2) and/or in infants presenting with clinical symptoms of HIV infection, irrespective of previous NAAT results;
- At 9 months, perform NAAT for all HIV-exposed infants;
- In the event of a positive NAAT result, ensure that confirmatory testing is carried out on a 2<sup>nd</sup> blood sample;
- In the event of indeterminate test results ensure testing is repeated immediately and prioritised for rapid resolution;
- Ensure regular clinical follow-up for all HIV-exposed infants until final diagnosis.

### 5.1 Early diagnosis of HIV infection in neonates and infants < 18 months

Neonates and infants can be infected with HIV during pregnancy, delivery or post-partum through BF. Neonates infected *in utero* usually already have a detectable HIV viral load when tested at birth. In contrast, neonates infected during or around delivery usually have an undetectable HIV viral load when tested at birth because it takes approximately 1-2 weeks following infection for the virus to be detectable.

For neonates and infants under 18 months of age, serological antibody detection assays are not suitable to determine child HIV status because passive transfer of maternal antibodies may lead to a false positive result. Thus, virological assays, such as NAAT or HIV DNA (DNA-PCR) are recommended for EID in infants < 18 months of age. For children ≥ 18 months, an antibody detection test can be used because the maternal antibodies have been cleared from the infant's blood. Use the adult algorithm.

A NAAT is a molecular technique used to detect a specific pathogen (virus or bacterium) in a sample of blood or other tissue or body fluid. NAAT is the recommended method for detection of HIV infection in neonates and children < 18 months. The DNA-PCR is a NAAT test. See [Appendix 5](#).

If NAAT testing is not immediately available (e.g. using DBS), serological testing using rapid diagnostic tests (RDTs) can be considered in infants aged 9-18 months only to temporarily rule-out infection. See [Appendix 3](#) and [Appendix 4](#). Clinical follow up must be done and the final status will be assessed at 18 months or 12 weeks after end of BF, whichever is later.

POC devices for EID are now available and are a very practical option. Results are available within 2 hours.

If HIV NAAT cannot be performed in the project, the samples must to be sent to an external laboratory using DBS. See [Appendix 6](#).

**According to WHO guidelines, MSF recommends:**

## HIV infant diagnosis by NAAT using DBS or POC

Early testing is recommended for the diagnosis of HIV-infected infants as soon as possible in order to initiate them on ART and reduce early mortality.

Initial testing (NAAT1) is usually recommended at the first immunization visit (usually 4-6 weeks) or as soon as possible thereafter.

- 4-6 weeks is indicative. Week 6 is convenient because this is also the date of the first DPT-Hib-HepB. But never turn away a mother because she comes earlier or later to test her infant.

**Interpretation of result** (See [Table 8](#))

- If **NAAT1** is **NEGATIVE**: report the result as "HIV-negative". There is no need to confirm a negative result with a second NAAT, unless the first test was done at or around birth.
- If **NAAT1** is **POSITIVE**: **start ART as soon as possible** and immediately collect a second sample for confirmation (NAAT2).

A positive HIV result obtained from virological testing of a neonate or child younger than 18 months should always be confirmed by a second virological test, taken at the time when the first result is given.

- Confirmation of the initial positive result is recommended 1) because of the risk of false positive results due to sample mislabelling or mix-up, laboratory or cross-sample contamination and an observed trend of low detection of HIV among both mothers and infants 2) because of increased exposure to maternal ARV treatment and enhanced ARV infant prophylaxis. The confirmation test should be performed in the same laboratory as the first test. This allows follow-up on the consistency of the results and investigation of discordant results.
  - Data should be collected including at least: age of infant, results of NAAT1 and NAAT2 and dates of blood collection.
- If NAAT2 is also POSITIVE: report final result as "HIV-positive".
  - If NAAT2 is negative: this is a discordant result. Collect a 3<sup>rd</sup> sample for another test before stopping ART and refer to your HIV advisor or laboratory advisor.

**Table 8** - Interpretation of results

NAAT1 result	NAAT2 result	Final Result
Negative	Not applicable	NEGATIVE
Positive	Positive	POSITIVE
Positive	Negative	Collect a 3 <sup>rd</sup> sample before stopping ART. Refer to laboratory or HIV advisor.

**Some countries are starting to use DBS at birth** (earlier case finding for perinatal infection and to possibly reduce early lost to follow up). Refer to national protocols and [Appendix 2](#)

Where birth testing with the subsequent repeats is not feasible for all exposed infants, priority should be given to infants classified as high risk or where no PMTCT was provided to the mother.

**CAUTION:**

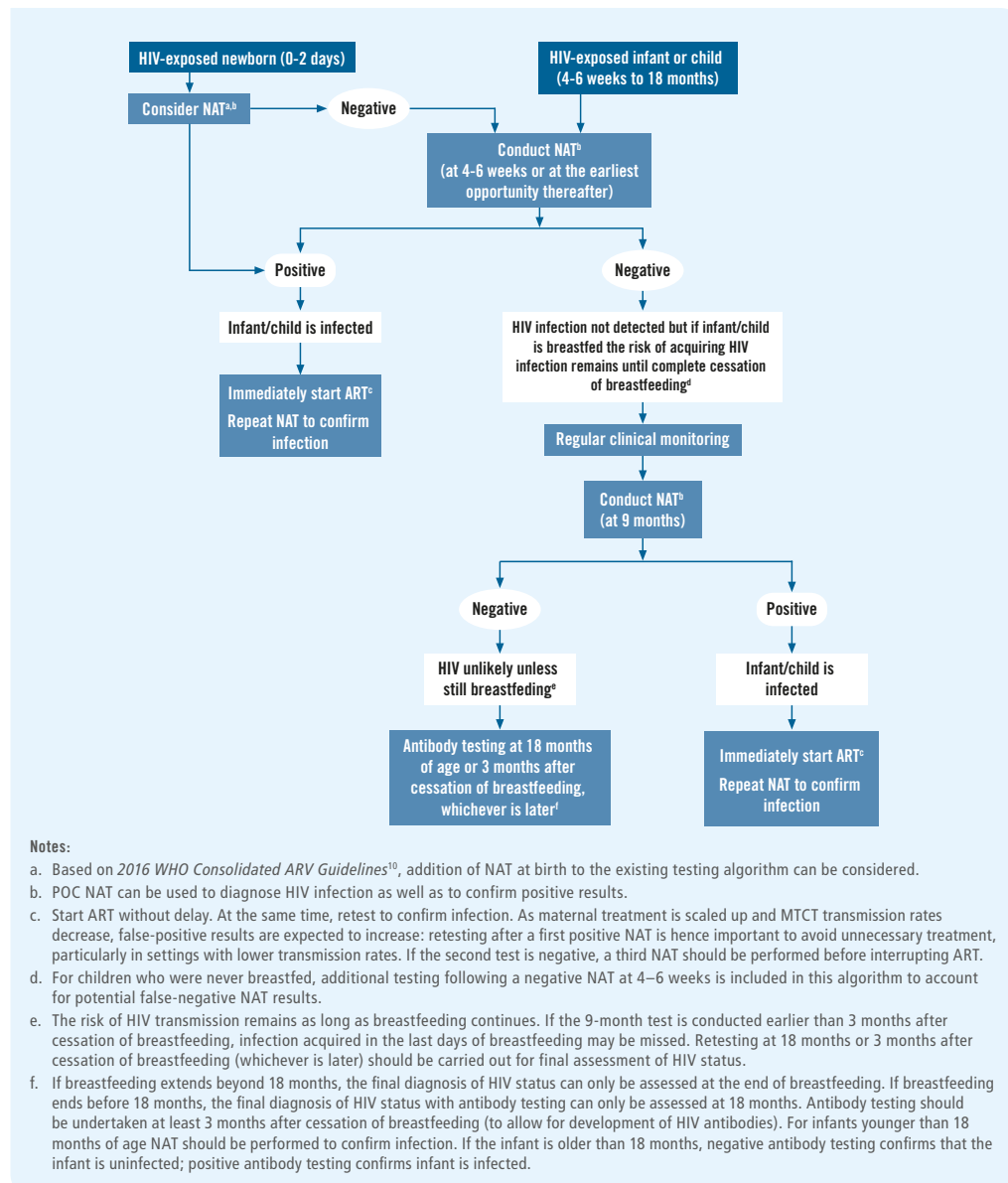
If initial testing was done at/or around birth and was HIV negative, a second test must be performed at 4-6 weeks (to detect intra-partum and early post-partum transmission).

## 5.2 Algorithm for EID<sup>9</sup>

### Annex 3: Simplified EID algorithm

The key principles for establishing whether HIV-exposed infants and children younger than 18 months are infected with HIV in low- and middle-income countries are as follows:

- Assess HIV exposure status by antibody testing the mother.
- Perform NAT test for any HIV exposed child that presents outside of national infant testing algorithm with clinical symptoms irrespective of previous NAT results
- At 9 months perform NAT for HIV-exposed infants, symptomatic and asymptomatic, and even where previous NAT results have been negative.
- Ensure that indeterminate test results are repeat tested immediately and given priority for rapid resolution.
- Ensure that confirmatory testing is undertaken following any positive result.
- Ensure regular follow-up for all HIV-exposed infants until final diagnosis, including providing co-trimoxazole prophylaxis and clinical and nutritional assessment.



*Note:*

See [Appendix 5](#) for further reading on implementation of EID in countries with high ARV exposure.

### 5.3 Clinical follow up

HIV-exposed children should be followed until HIV infection can be ruled out or confirmed, usually until they are 18-24 months old. During the first year, consultations should match the EPI calendar. From 6 weeks to 6 months, 1 consultation/month is needed. Thereafter, a 3-monthly schedule should be offered. Ensure that the child health record, including immunization (usually provided by the MoH), is filled out at each visit. Always assess the mother and child's care together as a family. Encourage testing of the partner and other siblings.

#### At each consultation

- Check age and weight. Plot on the WHO growth chart. If outside of normal percentiles, measure height and calculate BMI. If the growth curve is flattening or crossing lower centiles, further investigations are required;
- Check clinical status, neurodevelopment and head circumference;
- Look for signs of TB and potential TB contacts. Ensure isoniazid prophylaxis if mother is on TB treatment;
- Give advice on nutrition (BF should be exclusive for 6 months, then complementary food should be added and can be continued following local recommendations until 24 months). In some projects, supplementation can be given<sup>a</sup>;
- Prevent and treat mother's breast problems (mastitis, cracked nipples, abscess and herpes) and thrush in infants, conditions that are known to increase transmission;
- Check all appropriate immunisations have been given for age and verify the infant has a mosquito net.

#### Specificities for HIV-exposed infants

- Prescribe ARV prophylaxis according to risk assessment;
- Adapt the dose according to age of the child for ARVs and according to weight for CTX (see [Table 7](#));
- Start CTX in infants from 4 weeks of age and continue until proven HIV negative;
- Perform HIV testing according to the EID algorithm;
- Take history and examine for signs suggestive of HIV infection. If found, test the infant and discuss if presumptive treatment should be started.

#### For both mother and infant/child

- Assess adherence to treatment and prophylaxis at each consultation (check attendance to appointments). If any problem arises, refer to the MSF guide [Patient support, Education and Counselling guideline for adults living with HIV and/or TB, 2018](#).

#### Additional information

- At any age, if the infant/child has a positive HIV rapid diagnostic test (RDT) and has clinical signs of HIV infection, start ART. Collect a DBS prior to starting ART for NAAT testing to confirm HIV diagnosis. In all cases, the first positive test should be confirmed with a 2<sup>nd</sup> NAAT test before 18 months of age;

---

<sup>a</sup> Such as plumpy Doz/BP 100.

- A negative NAAT < 18 months old will require an RDT when the child is ≥ 18 months old or 12 weeks after the end of BF whichever is later (to confirm absence of infection and for final evaluation of status of the child);
- Infants > 9 months and well but RDT positive need prompt NAAT to confirm infection;
- Infant > 9 months and RDT negative, HIV is unlikely unless still BF. Continue clinical monitoring. Final status will be given with RDT when the child is ≥ 18 months old or 12 weeks after end of BF whichever is later.

*Note:* management should be cautious in infants who start ART treatment early without a NAAT result and that need to be retested (RDT) at 18 months to confirm HIV status :

- If negative serology, consider seroreversion and perform NAAT.
- If DNA-PCR negative discuss with HIV advisor since standard NAAT may be falsely negative in some infants who start ART early. WHO guidance on when and how to interrupt ART in these cases is available.<sup>3</sup>

**A presumptive clinical diagnosis of severe HIV disease can be made if:**

The infant < 18 months old is confirmed as HIV antibody positive (RDT)<sup>b</sup>

**And**

The infant is symptomatic with 2 or more of the following:

- Oral thrush
- Severe pneumonia
- Severe sepsis

**Or**

**Other supportive factors to consider:**

- Recent HIV-related maternal death or advanced HIV disease in the mother
- Infant CD4 < 20%

The diagnosis of an opportunistic infection can be made.

Do not delay ART initiation in infants/children with clinical signs of HIV infection, even if rapid virological testing is not available.

<sup>b</sup> HIV infection in infants < 18 months can only be confirmed by a virological test.





# Appendices

1. HIV testing of pregnant women.....	27
2. Testing at birth.....	30
3. Summary table: use of age-based HIV testing in children .....	31
4. Algorithm for projects where HIV NAAT results are delayed (DBS) .....	32
5. Implementation of EID in countries with high ARV exposure.....	34
6. SOPs for collection, storage and transportation of DBS samples.....	36
7. Patient support, education and counselling (PSEC) in PMTCT services .....	38



## Appendix 1. HIV testing of pregnant women<sup>a</sup>

MSF recommends following the WHO recommendations on HIV testing contained in [Consolidated guidelines on HIV testing services](#), WHO, 2015.<sup>8</sup> These testing strategies for diagnosis take into account the HIV prevalence of the setting where the tests are used. Three positive RDT tests are needed to confirm positive HIV status in low prevalence settings (< 5%), whereas 2 positive RDT tests are needed in high prevalence settings ( $\geq$  5%). This means that there may be different testing strategies in use in one country or even within one testing facility (e.g. the ANC clinic may have an HIV prevalence of 2%, thus should use the testing strategy for low prevalence settings but the HIV testing centre at the TB clinic may have a prevalence of 10% and should therefore use the testing strategy for high prevalence settings). If the prevalence is unknown or if it is too complex to have 2 different algorithms within one testing facility, it is recommended to use the low prevalence testing strategy.

In both high and low prevalence settings, three different serological assays (A1, A2, A3) may be required to establish the diagnosis of HIV infection. A1 should be the most sensitive assay available and A2 (and A3) have the highest specificity.

MSF recommends using Determine<sup>®</sup> as A1, STAT-PAK<sup>®</sup> as A2 and SD Bioline<sup>®</sup> or Uni-Gold<sup>®</sup> as A3.<sup>10</sup>

WHO recommends that all individuals that are diagnosed HIV-positive should be retested prior to starting ART to verify their HIV-positive status. When same day initiation is being performed, the repeat testing should be best performed by a different operator using a different sample. Follow national recommendations<sup>b</sup>. In all events, ensure frequent procedural quality control, above all when testing is performed by lay workers<sup>c</sup>. Contact laboratory advisors at headquarters for advices on quality control procedures.

### Serological testing strategy for HIV diagnosis in high prevalence settings ( $\geq$ 5%)

In accordance with WHO guidelines, in high prevalence settings ( $\geq$  5%) MSF recommends that two sequential reactive test results are needed to provide confirmed HIV positive diagnosis.

- For individuals with discrepant test results where A1 is reactive, A2 is non-reactive and A3 is reactive, the results should be considered inconclusive and the patient should be asked to return in 14 days for retesting.
- For individuals with discrepant test results where A1 is reactive, A2 is non-reactive and A3 is non-reactive, the final result should be considered HIV negative.

a See [Laboratory manual](#), MSF, 2016

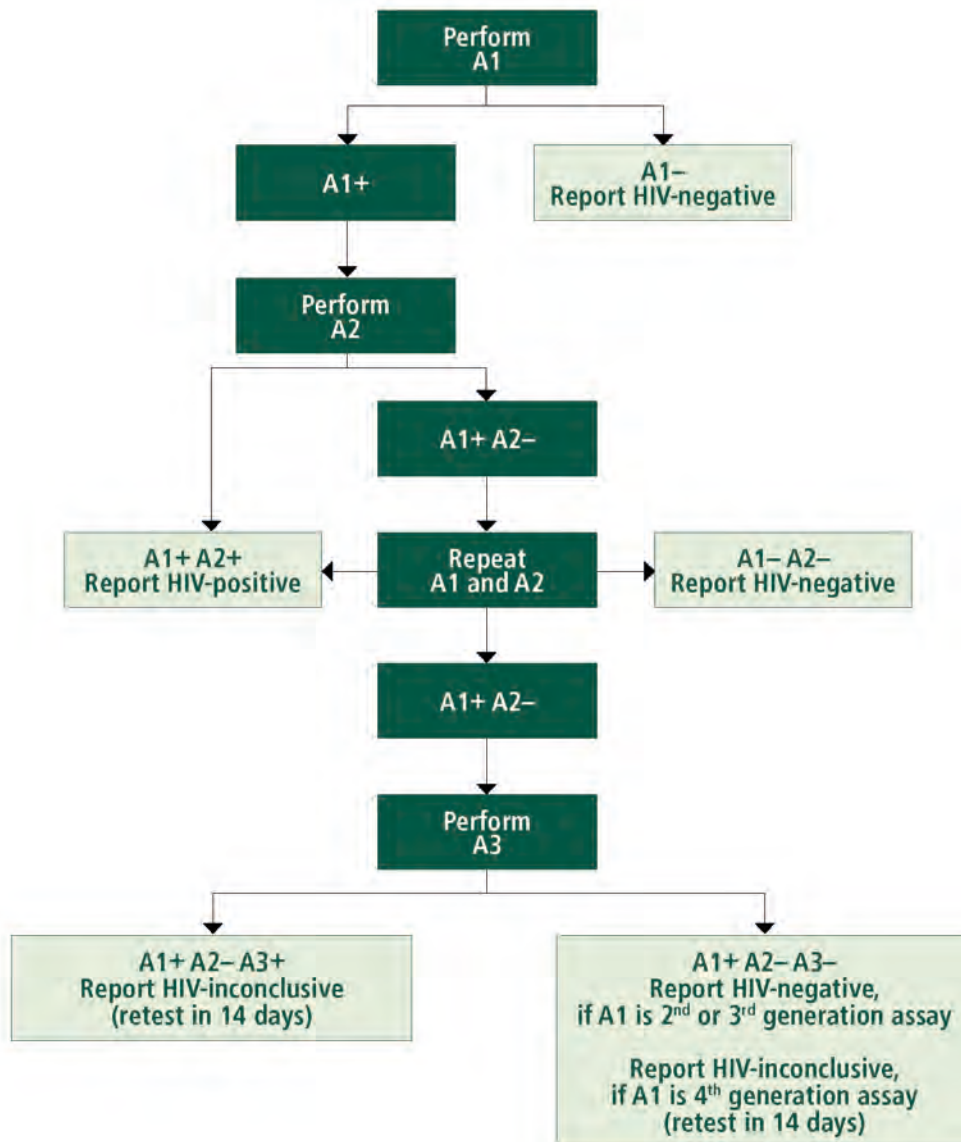
b Many countries do not apply this recommendation yet.

c Many errors can occur: incorrect blood volume, incorrect reading-time, wrong buffer, etc.

The testing strategy for high prevalence settings is described in **Figure 1**.

*Important:* For individuals with A1+, then A2-, then A3+, using the reactive test result from the third assay as a tiebreaker to rule in HIV infection and issue an HIV-positive diagnosis is not recommended; It over-selects for false-positive results and, therefore, leads to greater potential for misdiagnosis of HIV infection.

**Figure 1** - Serological testing strategy for HIV diagnosis in high prevalence settings ( $\geq 5\%$ )<sup>8</sup>



## Serological testing strategy for HIV diagnosis in low prevalence settings (< 5%)

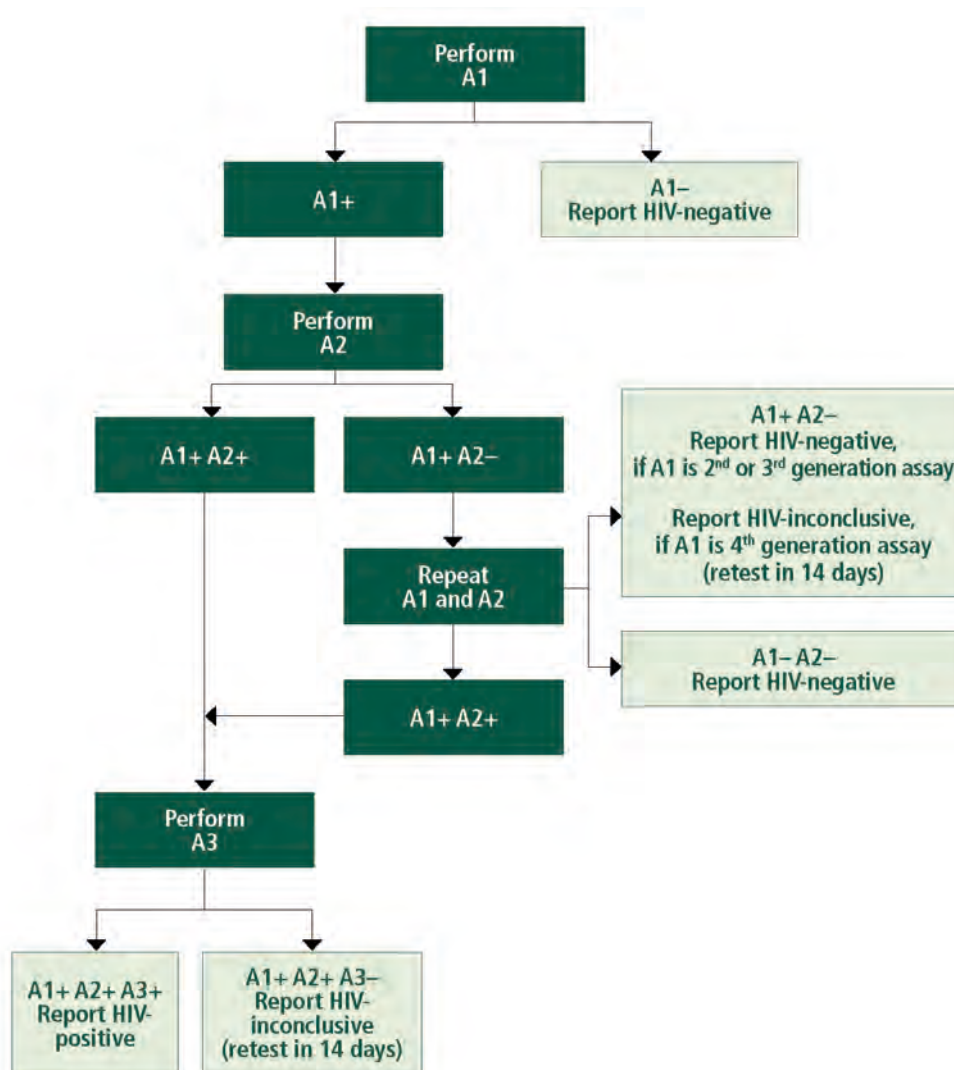
In accordance with WHO guidelines, in low prevalence settings (< 5%) MSF recommends three sequential reactive tests to provide confirmed HIV positive diagnosis.

- For individuals where A1 is reactive and A2 is non-reactive, the final result should be considered HIV negative.
- For individuals where A1 is reactive, A2 is reactive and A3 is non-reactive, the result should be considered inconclusive and the patient should be asked to return in 14 days for retesting.

The testing strategy for low prevalence settings is described in **Figure 2**.

*Important:* in a low prevalence population, the positive predictive value based on two test results is too low to provide an HIV diagnosis. Therefore, for samples that are reactive on the first and the second assays (A1+; A2+), a third separate and distinct assay (A3) should be used to confirm the results and issue an HIV-positive diagnosis.

**Figure 2** - Serological testing strategy for HIV diagnosis in low prevalence settings (< 5%)<sup>8</sup>



## Appendix 2. Testing at birth

In settings where the risk of transmission is low (< 5% at 6 weeks) as result of good PMTCT coverage, adding birth testing may be considered as up to 70% of the residual perinatal transmissions (intrauterine and intrapartum) are expected to occur in utero. **Where resources are limited, priority should be given to high risk infants.** However, as the positive predictive value of any test is lower in settings where the prevalence of HIV in the population being tested is low, the proportion of false positive results will be relatively high. It will therefore be critical to ensure retesting of any positive result, as recommended for all positive results, by a NAAT test. ART should be initiated without the result of the 2<sup>nd</sup> test because of the high risk of mortality with in utero infection; if the 2<sup>nd</sup> test is negative, a 3<sup>rd</sup> NAAT should be performed before stopping ART.

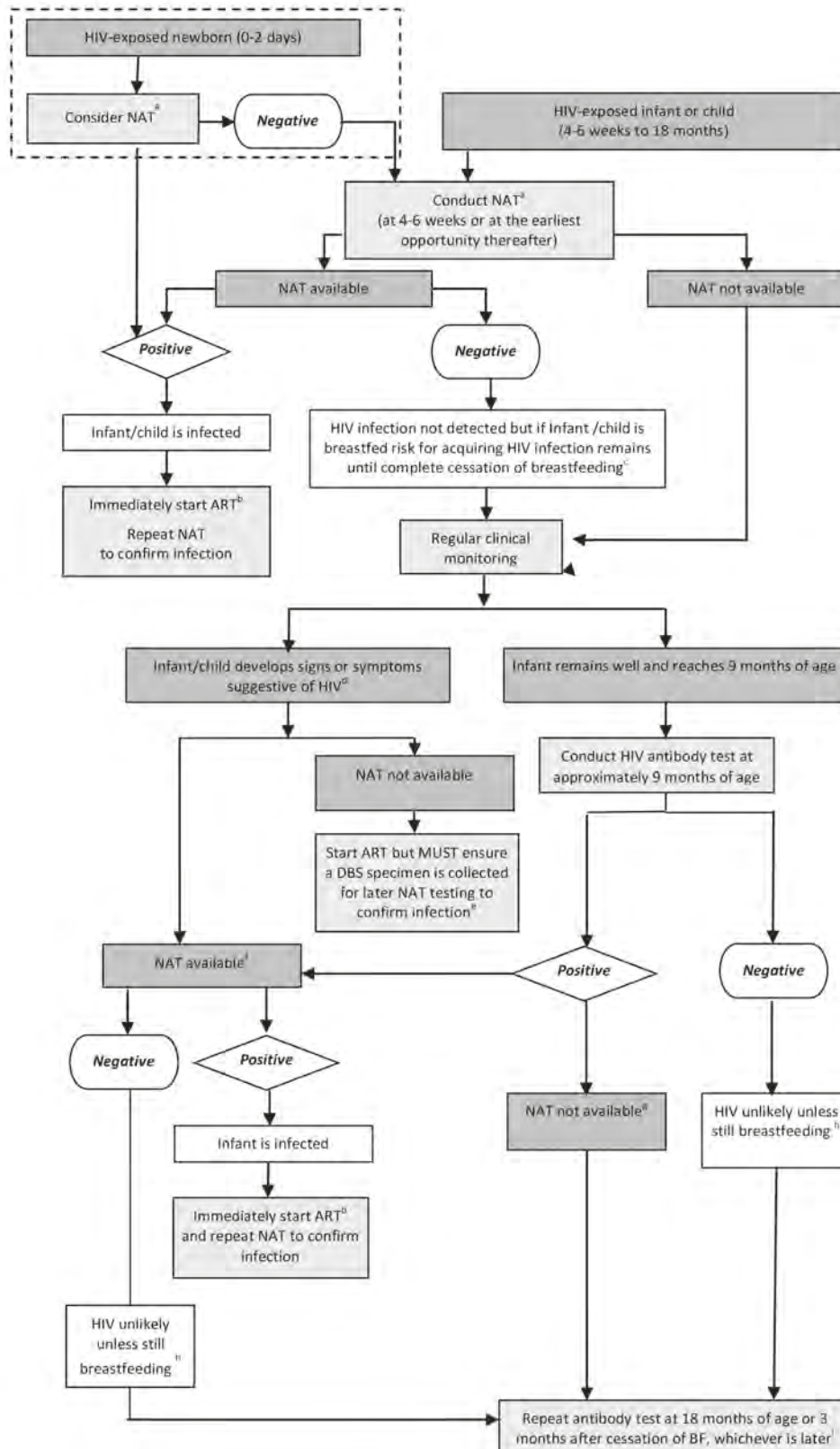
In settings where the risk of transmission is high ( $\geq$  5% at 6 weeks) as a result of poor coverage of PMTCT programs, the proportion of children with in utero infection is lower. The negative predictive value of the test is low. It is therefore critical to ensure retention in the testing cascade and actively track infants who test NAAT negative at birth.

## Appendix 3. Summary table: use of age-based HIV testing in children

Age group	HIV-exposed infant
<b>0 - 9 months</b>	RDT cannot truly determine HIV infection. Use NAAT. If NAAT is unavailable, treat upon HIV symptoms in infants with a positive HIV RDT, until true diagnosis according to age can be obtained.
<b>&gt; 9 - 18 months</b>	Recommended test = NAAT. RDT can be useful to rule out HIV infection. Infants with positive RDT need NAAT to confirm infection. Infants with negative RDT and who BF are still at risk of getting HIV so need NAAT at the end of BF. If NAAT is unavailable, treat upon HIV symptoms in infants with a positive HIV RDT, until true diagnosis according to age can be obtained.
<b>&gt; 18 months</b>	RDT after 18 months or 12 weeks after end of BF, whichever is later, for final status.



## Appendix 4. Algorithm for projects where HIV NAAT results are delayed (DBS)<sup>2</sup>



## Important notes

- <sup>a</sup> Based on these revised Guidelines addition of NAT at birth to the existing testing algorithm can be considered. POC NAT can be used to diagnose HIV infection at birth, but positive results should be confirmed using laboratory-based NAT assays, because of limited experience with POC assays close to birth.
- <sup>b</sup> Start ART, without delay. At the same time, retest to confirm infection. As maternal treatment is scaled up and MTCT transmission rates decrease, false-positive results are expected to increase and re-testing after a first positive NAT is important to avoid unnecessarily treatment, particularly in settings with lower transmission rates. If the second test is negative, a third NAT should be done before interrupting ART.
- <sup>c</sup> For children who were never breastfed additional testing following a negative NAT at 4-6 weeks is included in this algorithm to account for potential false-negative NAT results.
- <sup>d</sup> Signs and symptoms suggestive of HIV (oral thrush, recurrent or severe bacterial infections such as pneumonia or sepsis, FTT/wasting or AIDS indicator condition <http://www.who.int/hiv/pub/paediatric/infants2010/en/>).
- <sup>e</sup> If infant presents with signs and symptoms of HIV disease (see footnote d above) but NAT is unavailable, consider starting ART, especially if an antibody test is conducted and result positive at 9 months or later. A DBS specimen must be collected prior to starting treatment for later NAT testing to confirm HIV diagnosis, because subsequent diagnostic testing while already on ART might be difficult to interpret.
- <sup>f</sup> If infant presents with signs and symptoms of HIV disease (see footnote d above) consider starting ART while waiting for NAT result. However, another DBS specimen should be collected prior to starting treatment for later NAT testing to confirm HIV diagnosis.
- <sup>g</sup> Regular and periodic monitoring should be ensured while waiting for NAT to be available or for antibody testing to be conducted at 18 months. If infant presents with signs and symptoms of HIV disease should be managed as described previously (see footnote e).
- <sup>h</sup> The risk of HIV transmission remains as long as breastfeeding continues. If the 9 months antibody testing is conducted earlier than 3 months after cessation of breastfeeding, infections acquired in the last days of breastfeeding may be missed so retesting at 18 months should be ensured for final assessment of HIV status.
- <sup>i</sup> If breastfeeding beyond 18 months, final diagnosis of HIV status can only be assessed at the end of breastfeeding. If breastfeeding ends before 18 months, final diagnosis of HIV status with antibody testing can only be assessed at 18 months. Antibody testing should be undertaken at least 3 months after cessation of breastfeeding (to allow for development of HIV antibodies). For infants < 18 months of age positive antibody testing requires NAT to confirm infection. If infant is > 18 months, negative antibody testing confirms infant is uninfected; positive antibody testing confirms infant is infected

## Additional information

- Children remain at risk of HIV infection as long as they are breastfed. All HIV NAAT negative children must be re-tested using antibody-based tests (e.g. RDT) to confirm the final status after 18 months and/or 12 weeks after end of BF, unless child was never breastfed.
- In projects which do not have the capacity to do so, earlier discharge between 12-15 months may be considered if a negative antibody HIV test is obtained and the baby has not breastfed during the past 12 weeks.

## Keep in mind that:

- The likelihood of a false positive result decreases when clear clinical signs of HIV infection are present.
- The likelihood of a false negative result increases when there are clear clinical signs of an HIV infection.
- If a child tested negative once but has new signs compatible with HIV disease, testing must be repeated (and treatment started according to MSF SAMU guidelines).
- The likelihood of a false positive increases with a well-functioning PMTCT program (as HIV prevalence in infants decreases, predictive positive value of the test decreases as well and false positive results increase), see [Appendix 5](#).

Contact the HIV advisor or lab advisor in the event of discordant results and record results.

## Appendix 5. Implementation of EID in countries with high ARV exposure

### Use of NAAT for diagnosing infection

Changes in transmission dynamics in countries with high ART coverage, including in PBFW, have complicated the use of RDT for determining infection status in infants. Substantial drug exposure for infants with implementation of the treat all policy for mothers and enhanced postnatal prophylaxis of HIV-exposed infants have resulted in viral load reduction and delayed antibody development in HIV-infected infants. The occurrence of maternal infection in late pregnancy or during the BF period may be responsible for a lack of passive HIV antibody transfer to the HIV exposed infant. Therefore, an increased rate of false negative RDT has been observed.

**All this favours using NAAT to diagnose infection in infants < 18 months, rather than RDT.**

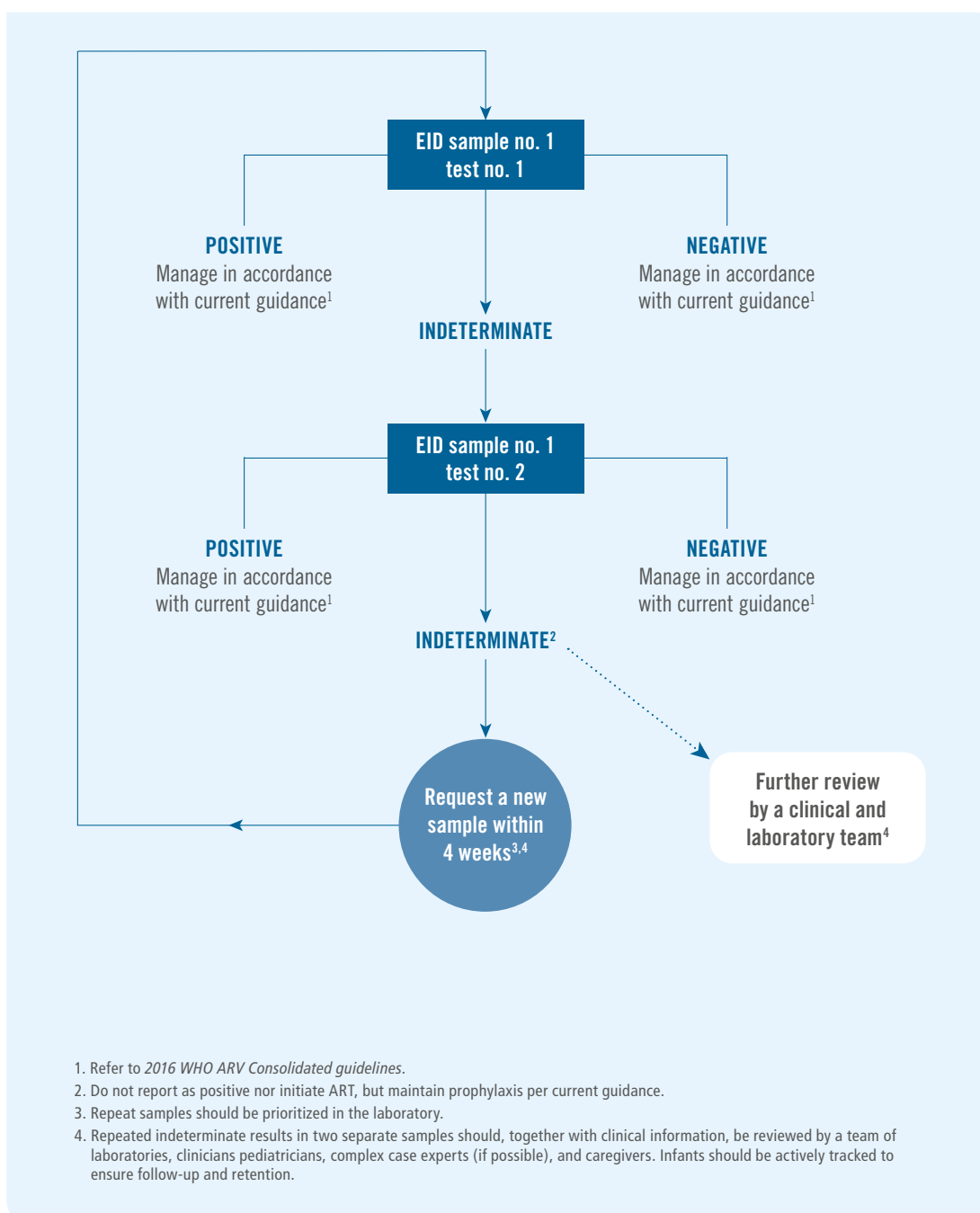
**Confirmatory testing of NAAT is also critical** because of the risk of false positive results due to sample mislabelling, laboratory or cross sample contamination and an observed trend of low detection of HIV among both mothers and infants because of increased exposure to maternal treatment and enhanced infant prophylaxis. All this also leads to an increase of false positive results with NAAT testing, particularly in settings where the PMTCT rate is less than 5%.

**Therefore, WHO also recommends the use of indeterminate range for NAAT.**

To reduce the risk of false positive results with low level viraemia in the infant sample, WHO recommends that national/regional laboratories using EID-DNA on DBS define their indeterminate range according to the instrument used. No RNA threshold level for a true positive has yet been established. Contact national laboratory authorities.

All indeterminate tests will need re-testing at the laboratory on the same samples, if and when available. If the same sample cannot be retested, then a new sample should be requested and tested as quickly as possible.

In the event of two indeterminate results, a new sample should be requested. If again indeterminate, contact your laboratory referent advisor.

**Figure 3** - Implementation of EID in countries with high ARV exposure<sup>9</sup>

Where indeterminate range is not yet in place:

- Ensure regular clinical follow-up for all HIV-exposed infants until final diagnosis.
- Particular attention should be given to HIV confirmation through serological testing at 18 months and/or 12 weeks after end of BF, whichever is later to allow for development of HIV antibodies. If the infant is older than 18 months, negative antibody testing confirms that the infant is non-infected; positive antibody testing confirms that the infant is infected.

Where POC-EID is used:

- The confirmatory test can be done by an immediate new POC-EID sample, mainly to exclude cross contamination.

## Appendix 6. SOPs for collection, storage and transportation of DBS samples

DBS are clinical samples collected by applying a few drops of blood onto absorbent sample collection (filter) paper. The blood can saturate the paper thoroughly and then air-dried. DBS cards [e.g. 903 protein saver card from Whatman, ref. code: 10531018 (MSF code: ELABPAPF903)] can be sent to laboratories where the samples are analysed. Once in the laboratory, a small disc of saturated paper from the DBS card is punched out to elute the blood/plasma from the filter paper, which is used for testing.

*Caution:* there is a high risk of cross contamination from capillary blood sampling to laboratory testing if proper procedures are not followed.

### 1. Required material

- Blood collection material incl. powder-free gloves
- Sample collection card: e.g. Protein Saver™ 903® Card Whatman or Munktell
- Drying rack
- Low gas permeable zip-lock bag
- Desiccant bags
- Humidity card: Tropack Indicator B/1
- Rip-resistant envelope

*Important:* for DBS collection in infants use the specific HEEL LANCET for infants (MSF code: ELABLANC2H-) as this lancet creates a higher blood flow than regular lancets.

### 2. Method: collection and storage of DBS

- a. Wear non-sterile powder-free gloves.
- b. Label card with appropriate identification and date of collection. Take care to not touch the circles.
- c. Clean and disinfect the puncture site (e.g. heel) thoroughly.
- d. Then prick the site with a lancet and let blood drop (ideally freely dropping), onto the circles of the DBS card. The blood is allowed to thoroughly saturate the paper and completely fill at least three circles on the blood collection card. Alternatively, transfer 50 microliters of whole blood onto each circle, using a pipette.
- e. Filter paper with blood spots needs to be air-dried horizontally for several hours (minimum 3 hours, maximum overnight) on a drying rack. Do not allow different filter paper cards to come into contact with each other, especially while wet. Keep the DBS cards away from direct sunlight and protect from dust and insects.
- f. Complete patient information in the appropriate laboratory register (identification number, age, date of blood collection).

- g. Once dried, samples are stored in low gas-permeability zip-lock plastic bags with desiccant to absorb humidity, along with a humidity card indicator. The cards can be kept at ambient temperature, even in tropical climates.
- h. The DBS cards should be checked for humidity regularly (e.g. weekly) and if the humidity indicator reaches 30%, the indicator and the desiccant should be replaced.

### **3. Transportation**

International regulations do not consider DBS as infectious materials (exemption from UN 3373 and UN 2814 shipment regulations). They can be shipped by regular mail services at room temperature.

Place zip-lock bags containing DBS in a rip-resistant envelope with the necessary documents: laboratory test request forms and list of enclosed DBS.

## Appendix 7. Patient support, education and counselling (PSEC) in PMTCT services

For full guidance and access to counselling flipcharts, please refer to MSF document.<sup>11</sup>

### Counselling for ART initiation in pregnant and breast-feeding women

Pregnant and breast-feeding mothers will all be offered ART initiation (TDF/3TC/DTG) on the same day they test positive. Therefore, the content of the counselling session has to be prioritized. Review:

- Motivation for taking medication – to keep the infant negative and in the longer term to keep herself healthy and to care for the infant.
- How to take the medication: once daily, at the same time every day, what tools will be used to remind her.

At subsequent sessions ongoing counselling and assessment of HIV knowledge must be further developed. In addition, the woman must be counselled on planning a safe delivery, on ARV prophylaxis that her infant will need, on testing her infant and on feeding advice<sup>a</sup>.

If the woman has concerns about lifelong treatment these should be further discussed during follow up sessions but for now encourage her that the immediate motivation is to keep her infant negative. In addition, a baseline CD4 will be taken (needed to assess for late presenter treatment and to monitor treatment response if viral load not available). This will also guide further discussions. In future sessions it can also be explained that continuing on ART not only will keep her healthy **but will also protect any future pregnancy much earlier**.

**Lack of disclosure** is a very common reason why pregnant or BF women do not take their medication. Start to discuss options for how she might disclose her status to her partner, but do not insist on it during the first session. This difficult topic will be discussed in more depth during further sessions.

### Rapid initiation counselling session

1. Give emotional support after post-test counselling.
  - Ask how they feel about their positive test result.
2. Explain ways of transmission of HIV.
  - Explain the 3 modes of HIV transmission from mother to child: during pregnancy 17%, at delivery 50%, during BF 33%.
  - Explain the possibility of limiting the risk of transmission from mother to child with correct ART follow-up that will give high chances their infant will be HIV negative.
3. Give ART/PMTCT education in a nutshell.

Finding out you are HIV positive is a lot to deal with today, but it is important that we already speak for a moment about the health of your infant. You could have an HIV negative infant if you take the right precautions:

---

<sup>a</sup> Exclusive BF during the first 6 months, then introduce complementary feeding.

- Start ART as soon as possible.  
HIV has no cure but there is a treatment to control HIV in your body. All pregnant women should start this treatment as soon as possible as this gives a high chance of preventing the transmission of the virus from you to your infant. We suggest you start taking the treatment today, but it is up to you to decide if you feel ready for this.
- Deliver in a health facility.  
It is safest to go to a health facility for delivery and inform the staff you are HIV positive; then the staff will be able to take all the necessary precautions to protect your infant during delivery.
- Correct feeding of the infant.  
After delivery, it is important to only give breast milk for the first 6 months. After 6 months other foods can be introduced, while continuing BF until at least 12 months of age.
- Correct treatment of the infant.  
The infant will be given different protective syrups or dispersible tablets starting immediately after birth and until you stop BF.

Through these 4 actions you will protect your infant and the chances of him or her becoming infected are very small. Today we will focus on how to take the treatment for you and your infant correctly and we will cover other topics at later sessions. We will make a plan together to enable you to take the medication for you and your infant correctly.

4. Make a plan with the patient on how to take ARVs. Cover the following aspects:
  - Check and explore the motivation to start ART.
  - What would be the best timing for you to take your drugs taking into account your daily habits?
  - What tools will you use to remind you to take your drugs (alarm, school etc.)?
  - Where will you store your drugs?
  - Where will you keep extra doses in case you are out of the house?
  - How will you manage missed doses?
  - What will you do in case of side effects (DTG: insomnia, EFV: dizziness, confusion etc.)?
  - What are your travel plans in the coming months?
5. Make a plan for disclosure and testing of partner.  
Discuss strategies to get their partner to come for testing (invitation letter from the clinic, communication with partner, retest both partners together) and how she may be able to disclose her status.
6. Ask if they have any questions and explain they are going to be booked for a second session at week 2 on ART.
7. Aim where possible to link the woman with a community health worker or PMTCT “champion” who can support them in the community.
8. Ask their consent that if they miss an appointment they will be called or be traced.



## Counselling follow up for pregnant and breastfeeding women

Counselling follow-up should be at month 1, 3, 6 and 12 as for normal ART follow up. In addition to assessment of adherence, topics related to their stage of PMTCT should be incorporated into the counselling content: **planning a facility-based delivery; how to deliver ARV prophylaxis to the infant; NAAT; CTX use; infant feeding advice**. There are also some key “transition points” in the journey of PMTCT where key messages should be emphasized.

- Planning where the woman will deliver or if she will be travelling away from the facility where has initiated her ART. Consideration of cultural practices must be discussed and if needed extended drug supplies given or referral to another ART site.
- Exclusive BF for 6 months is the recommended infant feeding option. When the woman is seen post-delivery, it is very important to explain that the medication she is taking is making **her breast milk safe**. The chances of transmitting HIV to her infant if she takes the medication daily are very, very low. So, her motivation for taking the medicine is still to keep her infant negative and to keep herself healthy.
- Family planning options should be discussed.<sup>12</sup>
- She should be reassured that the **medication she is taking is not harmful** to the infant.
- During the subsequent sessions further discussion about lifelong treatment can be developed. When she is about to stop BF is an important stage as prior to this she has the additional motivation for taking treatment of keeping the infant negative. Now the treatment is for her own health. She should also understand that continuing ART **will protect any future pregnancy**.

### Follow-up counselling content example

- **Assess adherence**
  - How are you doing after starting treatment?
  - What has changed in your daily life since you started ARVs?
  - What problems have you encountered (doses missed, side effects, disclosure issues)?  
*Develop an individual plan together with the patient on how she can overcome these problems.*
  - Are you experiencing any side effects? (*mention that most of them will go away with time. Stress the importance of not stopping the treatment in case of side effects, but always seek medical care and advice.*)
  - What time do you take the ARVs? Why should ARVs be taken every 24 hrs?
  - What reminder tools do you use?
- Give basic HIV and ART education and see what the woman remembers. Recap as needed.
- Give PMTCT specific education.
- Making a **delivery plan**:  
One of the key moments where transmission of the virus can occur is during delivery. This is why it is best to deliver at a health facility. If you inform the health staff about your status, they will know how to handle the delivery so that the risk of transmission to the infant is as low as possible. Preparing well for delivery means:
  - Knowing which hospital or health centre you will go to;
  - Knowing how you will tell the medical staff you are HIV positive;
  - Identifying beforehand someone who will take you there;

- Knowing how you will reach the hospital (transport);
- Preparing enough of your own medication to take with you;
- Making arrangements for your absence from home (e.g. who will care for your other children while you are in the maternity).

If you cannot deliver at your regular health facility:

- If you have to travel and stay at a different house, you need to prepare enough medication for yourself and the infant: discuss this with the clinician so they can give you a transfer letter and enough drugs.
  - Identify a treatment site near where you will be, for the delivery, ART drug refill and for check-up and drugs for your infant.
- Explain about exclusive BF in first six months and then introduction of complementary feeding.
- Explain about **treatment for the infant**:
- Immediately after birth, the infant will need to take a protective syrup for 6 (or 12) weeks, called Nevirapine – NVP (+/- zidovudine - AZT) and/or dispersible tabs, this together with the medication you are taking, will protect the infant from becoming HIV positive.
  - 4 to 6 weeks later we need to add another syrup, which the infant will take until HIV infection is ruled out. This syrup is called cotrimoxazole (CTX) and will protect him or her from other infections.
  - We will show you how to administer this syrup to the infant. As with your own treatment, it is important to give this syrup every day without skipping a day.
  - Demonstrate how to administer the syrup with a syringe.
- **Testing of the infant**:
- The chance of your infant becoming infected will be very small if you take the right precautions, but it's still possible. It is important to know as soon as possible if the infant is HIV positive, so that s/he can start to take the treatment. This treatment will keep her/him strong.
  - We will propose an HIV test for your infant a few times during the period of BF. The first test is usually done 6 weeks after birth but may be offered earlier (according to local protocols). We will send blood for analysis, and either that day (POC) or after a few weeks (DBS) you will receive the results. As during BF the infant can still get infected, it is only after you have stopped BF that we will take a final and conclusive test.
- Assess **disclosure and testing of partner**:
- Discuss whether she has been able to disclose her status to her partner and also to get her partner to come for testing (invitation letter from the clinic, communication with partner, retest both partners together).

Ask the women if they have any questions and explain they are going to be booked for a next session at month 2.

## References

1. UNAIDS report 2019, Start Free, Stay free, AIDS free.  
[https://www.unaids.org/sites/default/files/media\\_asset/20190722\\_UNAIDS\\_SFSFAF\\_2019\\_en.pdf](https://www.unaids.org/sites/default/files/media_asset/20190722_UNAIDS_SFSFAF_2019_en.pdf)
2. WHO. Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection, recommendations for a public health approach, June 2016.  
<https://apps.who.int/iris/handle/10665/208825>
3. WHO. Updated recommendations on first line and second line antiretroviral regimens and post-exposure prophylaxis and recommendations on early infant diagnosis of HIV. Interim Guidance, December 2018.  
<https://www.who.int/hiv/pub/guidelines/ARV2018update/en/>
4. WHO. Update of recommendations on first- and second-line ARV regimens, July 2019.  
<https://apps.who.int/iris/bitstream/handle/10665/325892/WHO-CDS-HIV-19.15-eng.pdf?ua=1>
5. SAMU. MSF HIV/TB clinical guide for primary care, 2018.  
<https://samumsf.org/en/resources/msf-hivtb-clinical-guide-2018>
6. MSF. Essential obstetric and newborn care, 2019.  
<https://medicalguidelines.msf.org/viewport/ONC/english/essential-obstetric-and-newborn-care-51415817.html>
7. Tran T. Tran. Hepatitis B in pregnancy. *Clinical Infectious Diseases*, 2016;62 (suppl 4).
8. WHO. Consolidated guidelines on HIV testing services, July 2015.  
[http://apps.who.int/iris/bitstream/10665/179870/1/9789241508926\\_eng.pdf?ua=1&ua=1](http://apps.who.int/iris/bitstream/10665/179870/1/9789241508926_eng.pdf?ua=1&ua=1)
9. WHO. HIV diagnosis and ARV use in HIV-exposed infants: a programmatic update, July 2018  
<https://apps.who.int/iris/bitstream/handle/10665/273155/WHO-CDS-HIV-18.17-eng.pdf?ua=1>
10. MSF policy on HIV testing and monitoring; Laboratory working group, July 2017.
11. MSF. Patient support, Education and Counselling guideline for adults living with HIV and/or TB, 2018.  
<https://msfintl.sharepoint.com/sites/msfintlcommunities/IGP/International%20internal%20guidelines/Forms/AllItems.aspx>
12. WHO. Providing contraceptive services in the context of HIV treatment programmes, July 2019.  
<https://apps.who.int/iris/bitstream/handle/10665/325859/WHO-CDS-HIV-19.19-eng.pdf?ua=1>

**Belgium**

Médecins Sans Frontières/Artsen Zonder Grenzen  
46 Rue de l'Arbre Bénit, 1050 Brussels  
Tel.: +32 (0)2 474 74 74  
Fax: +32 (0)2 474 75 75  
E-mail: [info@brussels.msf.org](mailto:info@brussels.msf.org)

**France**

Médecins Sans Frontières  
14-34 avenue Jean Jaurès, 75019 Paris  
Tel.: +33 (0)1 40 21 29 29  
Fax: +33 (0)1 48 06 68 68  
E-mail: [office@paris.msf.org](mailto:office@paris.msf.org)

**Netherlands**

Artsen Zonder Grenzen  
Naritaweg 10, 1043 BX Amsterdam  
Tel.: +31 (0)20 52 08 700  
Fax: +31 (0)20 62 05 170  
E-mail: [office@amsterdam.msf.org](mailto:office@amsterdam.msf.org)

**Spain**

Medicos Sin Fronteras  
Calle Zamora 54, 08005 Barcelona  
Tel.: +34 933 046 100  
Fax: +34 933 046 102  
E-mail: [oficina@barcelona.msf.org](mailto:oficina@barcelona.msf.org)

**Switzerland**

Médecins Sans Frontières  
78 rue de Lausanne - Case postale 116 - 1211 Geneva 27  
Tel.: +41 (0)22 849 84 84  
Fax: +41 (0)22 849 84 88  
E-mail: [office-gva@geneva.msf.org](mailto:office-gva@geneva.msf.org)

