



Perinatal HIV Exposure Management (for Breastfeeding and Non- Breastfeeding Newborns)

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What is a Clinical Pathway?

An evidence-based guideline that decreases unnecessary variation and helps promote safe, effective, and consistent patient care.

Objectives of Pathway

- Create a standardized protocol that aligns with national recommendations to prevent or treat HIV in infants exposed to HIV-infected mothers
- Establish a standardized approach for counseling women living with HIV to support them in their decision about choice of infant feeding (mother's own milk, donor milk or formula)
- Create a standardized protocol that aligns with national recommendations to prevent HIV transmission to infants with mothers living with HIV who choose to breastmilk feed their infants

Why is Pathway Necessary?

- Guidelines from the NIH and CDC for (1) HIV perinatal transmission and (2) women living with HIV who wish to breastmilk feeding their infants can be confusing
 - Integrate both within one algorithm
- Streamline pediatric ID outpatient care following discharge from the hospital

- Where will this pathway be used?
 - NICU
 - Well baby nursery
 - Inpatient units if exposed infant is admitted
 - Outpatient pediatric ID office

- HIV & Breastfeeding Pre-ART:
 - Breastfeeding transmission was ~15-20% in the first 2 years of infant life¹
 - > 1 month of age 0.6% - 0.9% per month²
-  Guideline was updated in 6/2026:
 - Due to lack of evidence that mixed feeding with formula increases transmission in ART suppressed mothers, **mixed feeding is no longer discouraged**

Benefits of Breastfeeding

Children who are breastfed experience improved dental health and neurodevelopmental outcomes. They have decreased risk of:

- Otitis media
- Diarrhea
- Respiratory tract infection
- Necrotizing enterocolitis
- SIDS
- Atopic dermatitis
- Asthma
- Celiac Disease
- Crohn's Disease and ulcerative colitis
- Late-onset sepsis in preterm infants
- Type 1 and type 2 diabetes
- Leukemia
- Childhood overweight and obesity

Maternal Benefits

There are also maternal health benefits to breastfeeding such as decreased risk of the following:

- Decreased excessive menstrual blood loss
- Breast, ovarian, endometrial and thyroid cancers
- Hypertension
- Type 2 diabetes
- Rheumatoid Arthritis

Other Influences:

Cultural

- Abstaining from breastfeeding as a means of disclosure

Economic

- Expense of formula
- Access to safe and clean water sources

					
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Target	Shipt	Amazon.com	Amazon.com	Walmart	CVS Pharmacy

Literature Review

- Increased maternal ART adherence was associated with lower breast milk and plasma viral loads
- Higher breast milk and plasma viral loads were associated with increased breast milk transmission



⁴BAN Study

High Income Countries-Case Series



- No transmissions:
 - Toronto – 3 infants. Triple therapy through breastfeeding which ranged 9-15 weeks⁵
 - US – 10 infants breastfed 1-18 months. Triple through 4-6 weeks followed by NVP through 6 weeks post breastfeeding⁶
 - US- 8 infants breastfed 2 weeks-6 months. Mixed prophylaxis: AZT, NVP, AZT + NVP, AZT, NVP, + 3TC up to 6 weeks. Maternal viral loads 40 copies/mL or less⁷
 - Italy- 13 infants breastfed for mean of 5.4 months. AZT for 4 weeks⁸
 - Germany- 30 infants⁹
 - 25 with optimal viral suppression
 - 50-70 copies/mL
 - AZT 2-8 weeks. 5 infants received no prophylaxis
- Of note, the approaches to infant prophylaxis ranged from 4 weeks of zidovudine (ZDV) to three-drug ARV regimens for the duration of breastfeeding

Infant Feeding for Individuals With HIV in the United States¹⁰

Panel's Recommendations

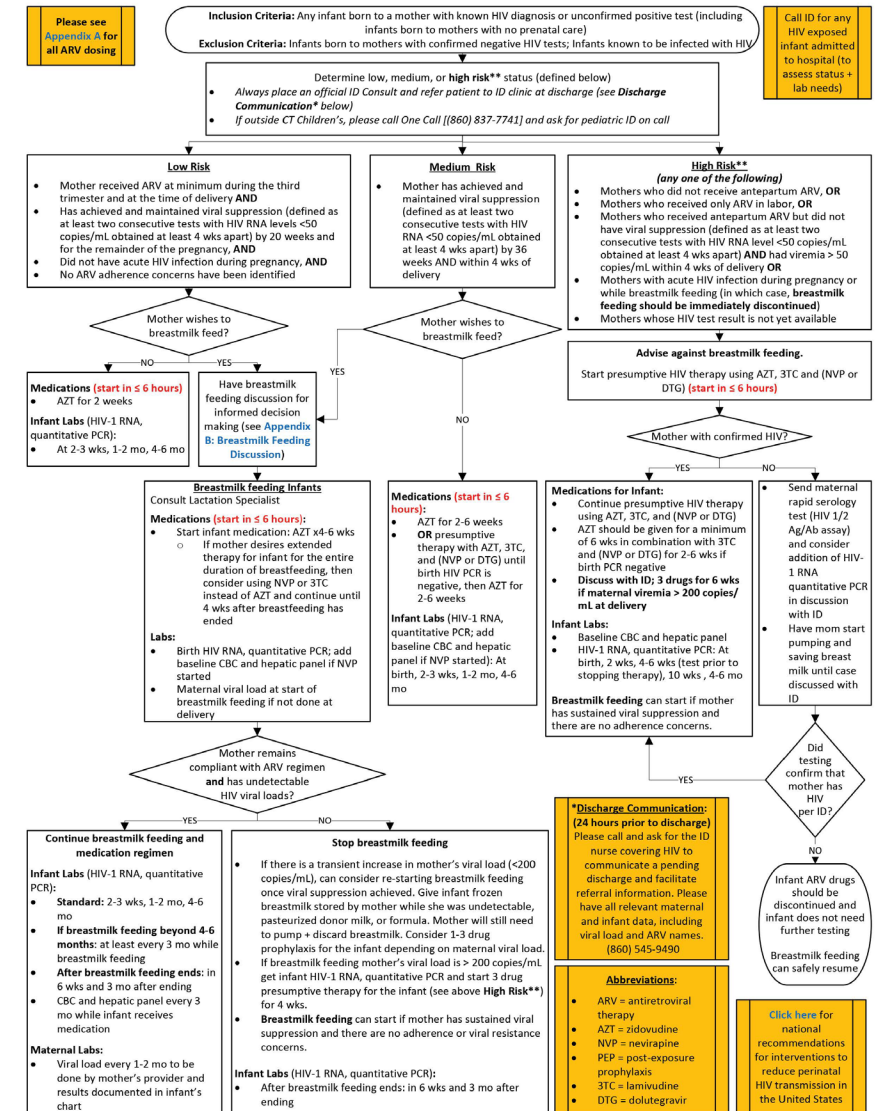
- 
- A yellow five-pointed star with a black outline, containing the word "NEW" in black capital letters.
- When there is potential for perinatal HIV transmission, evidence-based, patient-centered counseling should be provided to support shared decision-making about infant feeding. Counseling about infant feeding should begin prior to conception or as early as possible in pregnancy; information about and plans for infant feeding should be reviewed throughout pregnancy and again after delivery **(AIII)**. During counseling, inform patients that—
 - Replacement feeding with properly prepared formula or pasteurized donor human milk from a milk bank eliminates the risk of postnatal HIV transmission to the infant through breastfeeding.
 - Achieving and maintaining viral suppression (i.e., <50 copies/ml) through antiretroviral therapy (ART) during pregnancy and postpartum decreases breastfeeding transmission risk to less than 1%, but not zero.

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This is the Perinatal HIV Exposure Management (for Breastfeeding and Non-Breastfeeding Newborns) Clinical Pathway.

We will be reviewing each component in the following slides.



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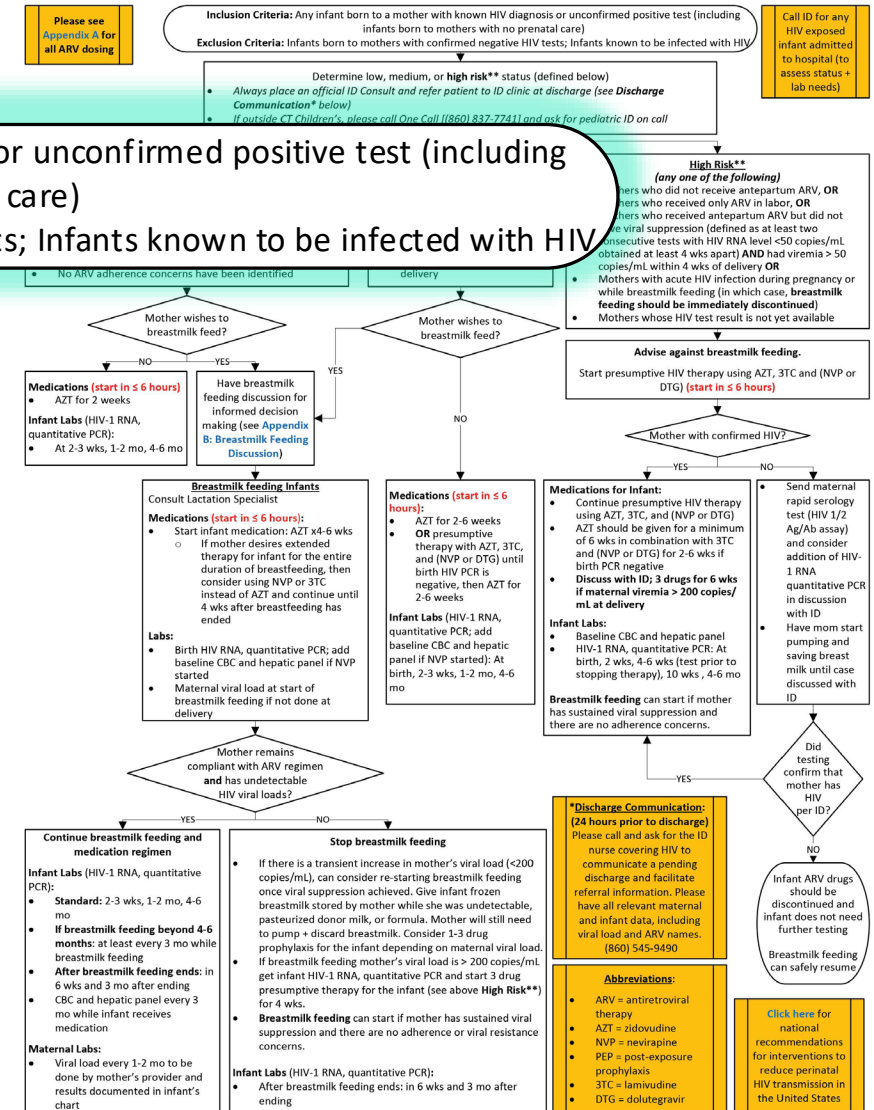
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Inclusion Criteria: Any infant born to a mother with known HIV diagnosis or unconfirmed positive test (including infants born to mothers with no prenatal care)
Exclusion Criteria: Infants born to mothers with confirmed negative HIV tests; Infants known to be infected with HIV

This clinical pathway pertains to any infant born to a mother with known or unconfirmed HIV diagnosis



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Determine low, medium, or **high risk**** status (defined below)

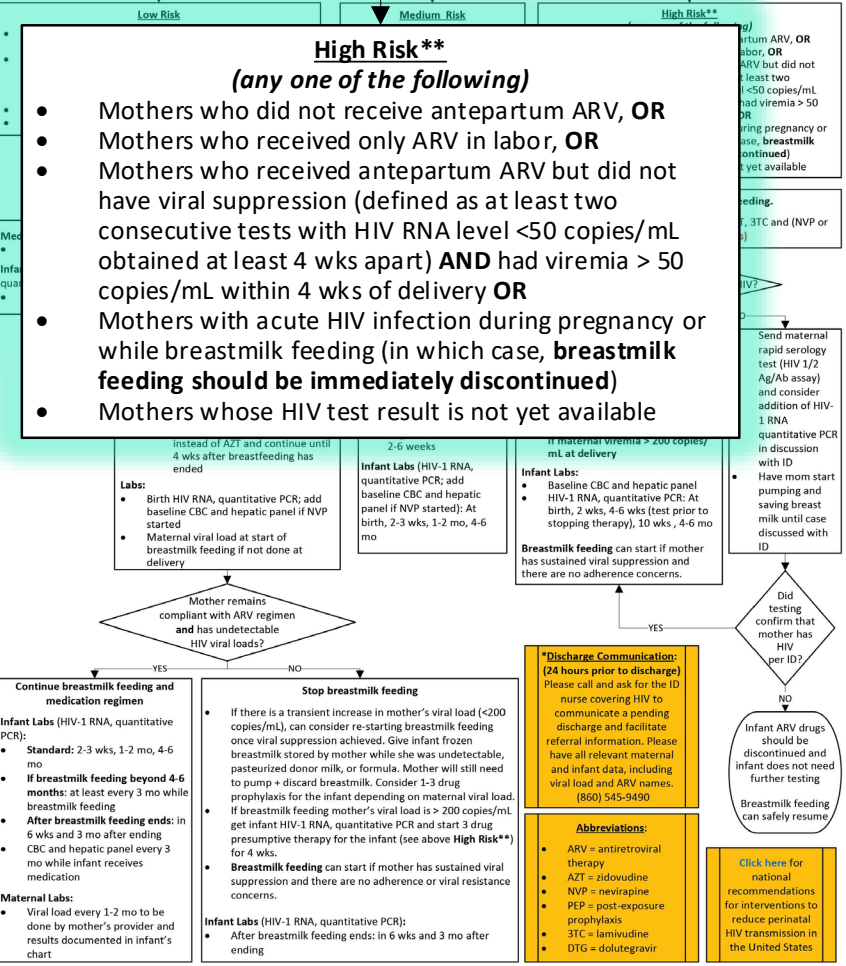
- Always place an official ID Consult and refer patient to ID clinic at discharge (see **Discharge Communication*** below)
- If outside CT Children's, please call One Call [(860) 837-7741] and ask for pediatric ID on call

Low Risk

- Mother received ARV at minimum during the third trimester and at the time of delivery **AND**
- Has achieved and maintained viral suppression (defined as at least two consecutive tests with HIV RNA levels <50 copies/mL obtained at least 4 wks apart) by 20 weeks and for the remainder of the pregnancy, **AND**
- Did not have acute HIV infection during pregnancy, **AND**
- No ARV adherence concerns have been identified

Medium Risk

- Mother has achieved and maintained viral suppression (defined as at least two consecutive tests with HIV RNA <50 copies/mL obtained at least 4 wks apart) by 36 weeks **AND** within 4 wks of delivery



- The first step in management is to determine the infant's risk status, which is based on mother receiving ARV, achieving/maintaining target viral suppression, and other specific criteria.
- **ALWAYS** consult Pediatric ID during the newborn hospital admission **AND** send an outpatient ID referral

- “Low Risk” and “Medium Risk” infants may breastmilk feed if desired by mother
- Providers MUST have a discussion with the mother about the risks and benefits of breastmilk feeding to facilitate informed decision making
- Appendix B outlines the key points of this discussion

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Appendix B: Informed Discussion for Caregivers Living with HIV and Breastmilk Feeding

There are multiple feeding options for infant feeding for those who are born to mother's living with HIV. These include formula feeding, banked donor human milk, and breast "chest" feeding. Based on worldwide data and endorsed by the NIH, the known risk of breastmilk feeding with HIV is not zero but estimated to be < 1%. This risk increases if maternal viral load is not suppressed.

Why parents should consider breastmilk feeding:

Infant Benefits:

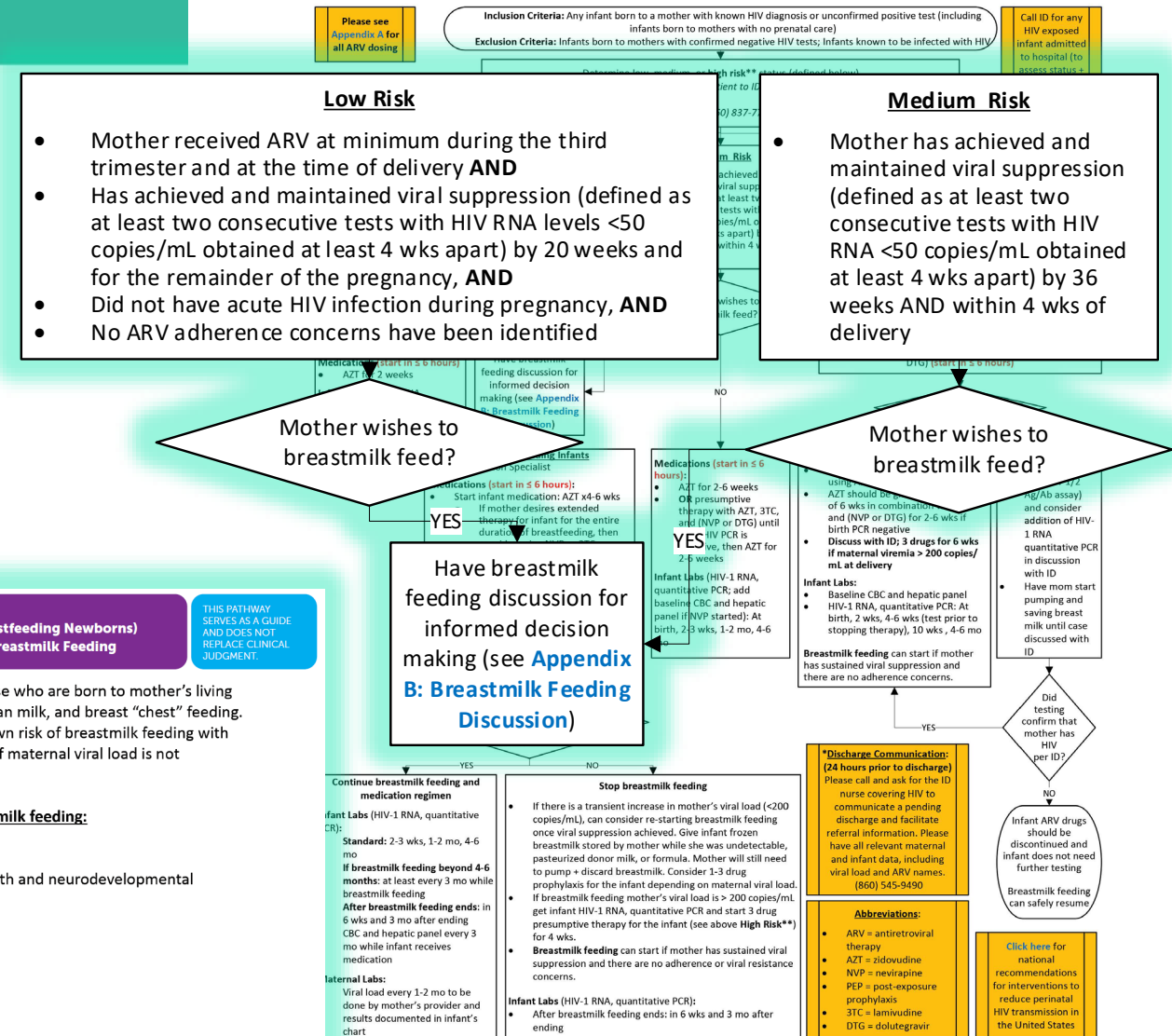
Children who are breastfed experience improved dental health and neurodevelopmental outcomes.

They also have decreased risk of:

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Children who are breastfed experience improved dental health and neurodevelopmental outcomes.

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- Type 1 and type 2 diabetes
- Leukemia
- Childhood overweight and obesity

Maternal Benefits:

- Decreased risk of breast, ovarian, endometrial, and thyroid cancers
- Decreased risk of hypertension
- Decreased risk of type 2 diabetes
- Decreased risk of rheumatoid arthritis

Maternal ART compliance is important in breastmilk feeding to help keep baby safe. The infant can be infected through breastmilk feeding because the HIV virus can be in the breastmilk if someone does not take their HIV medication. The baby can receive medication up to 4-6 weeks or longer to help keep this from happening. Maternal viral load testing every 1-2 months is important. If there is detectable maternal virus, then the mother needs to stop breastfeeding and call for further instructions. Infants will also continue to be tested according to a set schedule during this time as well, but at least every 3 months.



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When someone is breastmilk feeding, mixed feeding with formula was previously avoided but is now considered safe. As with any infant who is exclusively breastmilk feeding, formula can be considered if:

- The infant is losing weight
- The breastmilk supply is not yet established
- There is not enough stored breast milk

When should solid foods be introduced?

Solid foods should be introduced at 6 months of age when breastmilk feeding with HIV.

It is important to stop breastfeeding if a mother has mastitis (swollen, red, and tender breasts) or open sores/bleeding from the breast. It is important to pump during this time and discard the breastmilk and call your infant's ID provider or pediatrician to help with further instructions. Stored frozen breastmilk, or formula (if needed), can be safely given at this time.

References can be accessed at:

www.aap.org/en/patient-care/breastfeeding/breastfeeding-overview/

<https://clinicalinfo.hiv.gov/en/guidelines/perinatal/infant-feeding-individuals-hiv-united-states>



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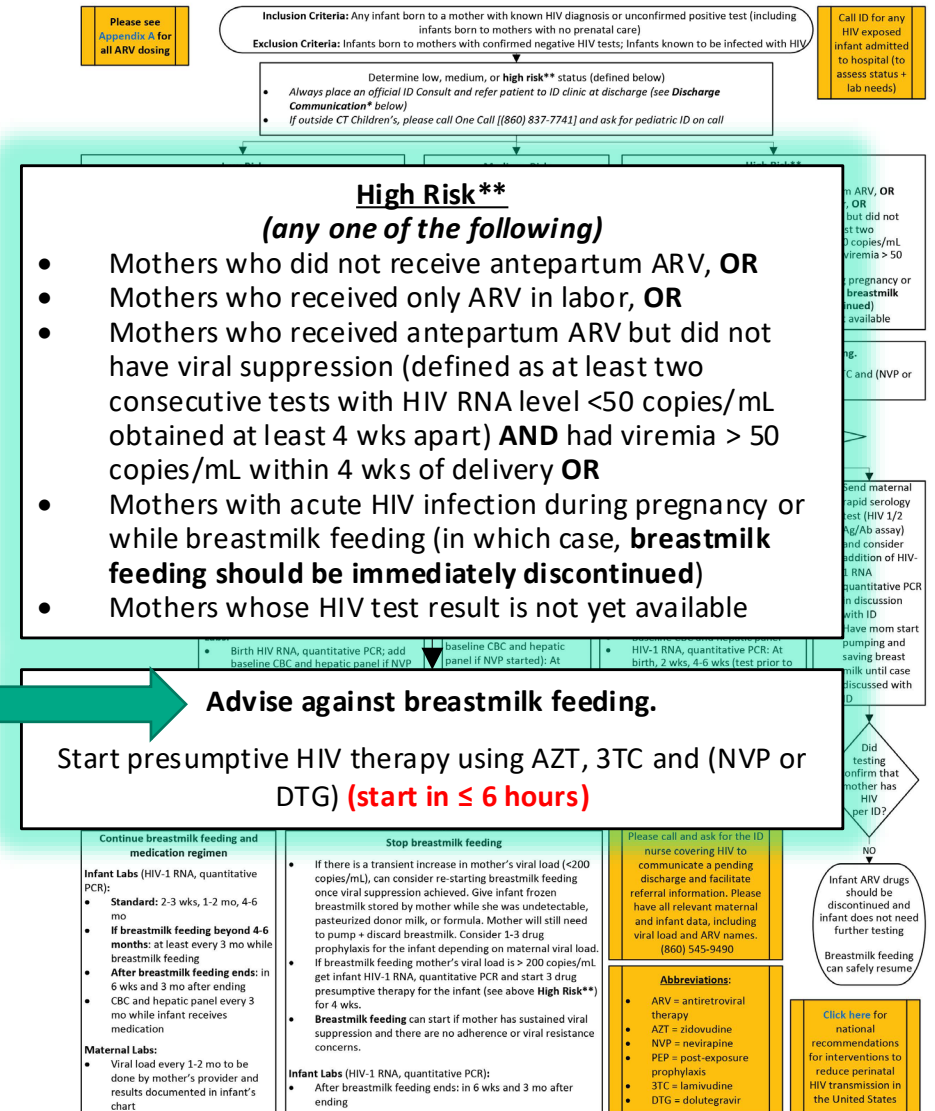
NEW

Mixed breastmilk and formula feeding was previously discouraged. It is now considered safe to mix breastmilk and formula.

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- It is inadvisable for “high-risk” infants to breastmilk feed



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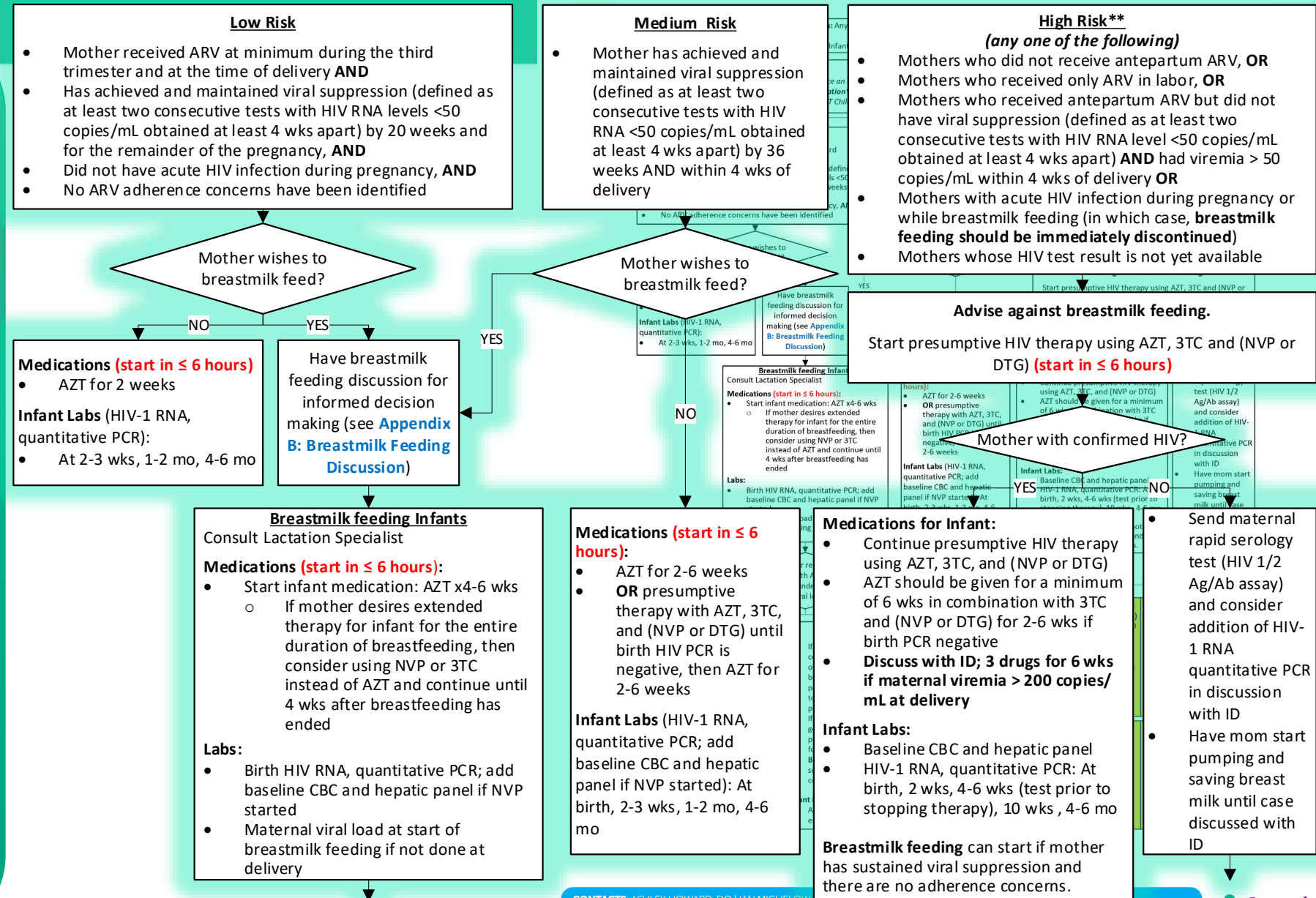
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- **ARV prophylaxis** should be given for BOTH breastmilk feeding and non-breastmilk feeding infant.
- It is imperative to start ARV medications in **≤ 6 hours** from birth
- **Infant labs** must be followed at specific intervals
- **Maternal labs** must be followed at specific intervals for breastmilk feeding infants to determine continued safety of breastmilk feeding

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Dosing for treatment or prophylaxis is based on infant's gestational age at birth and postnatal age. For dosing below the recommended ages shown here, or if confirmed to be HIV positive, please consult ID.

Infant Antiretroviral Dosing for Presumptive HIV

Treatment options for presumptive HIV: AZT, 3TC, and (NVP or DTG)

Drug Name	Gestational Age; Current Age; (Weight)	Dose
AZT	≥35 weeks; birth to ≤6 weeks	4 mg/kg/dose PO BID
NVP	≥37 weeks; birth to 6 weeks (see dosing below for >6 wk old)	6 mg/kg/dose PO BID
3TC	≥32 weeks; birth to < 4 weeks (see dosing below for ≥ 4 wk old)	2 mg/kg/dose PO BID
3TC	≥ 32 weeks; ≥ 4 weeks to ≤ 6 weeks (see dosing below for >6 wk old)	4 mg/kg/dose PO BID
DTG	≥37 weeks; birth to <2 weeks; (and ≥2 kg)	5 mg dispersible tab PO q48hr
DTG	≥37 weeks; ≥2 weeks to <4 weeks; (and ≥2 kg)	5 mg dispersible tab PO daily
DTG	≥37 weeks; ≥4 weeks to ≤6 weeks; (and ≥2 to <6 kg)	5 mg dispersible tab PO daily
DTG	≥37 weeks; ≥4 weeks to ≤6 weeks; (and 6 to <10 kg)	15 mg dispersible tab PO daily

Prophylaxis for Infants who are Breastmilk Feeding

Prophylaxis options at birth: AZT or NVP (or 3TC)

- AZT option:** at birth, if mother chooses to breastmilk feed for *up to 6 weeks*, use AZT for 4-6 weeks (dosing above)
- NVP (or 3TC) option:** at birth, if mother chooses to breastmilk feed for *>6 weeks*, start NVP and continue while breastmilk feeding through 4 weeks after cessation of breastmilk feeding
 - 3TC** can be used as an alternative (e.g., concern for maternal NVP-resistant virus or infant cannot tolerate NVP). 3TC should be started *after completion of initial AZT* (see option 1 above), and continued for 4 weeks after cessation of breastmilk feeding.

NVP dosing for Extended Breastfeeding Prophylaxis

Drug Name	Gestational Age; Current Age; (Weight)	Dose (10 mg/mL oral syrup)
NVP	≥36 weeks; birth to 6 weeks; (and 2 to <3 kg)	10 mg (1 mL) PO once daily
NVP	≥36 weeks; birth to 6 weeks; (and ≥3 kg)	15 mg (1.5 mL) PO once daily
NVP	≥36 weeks; 6 weeks to <6 months	20 mg (2 mL) PO once daily
NVP	≥36 weeks; 6 months to <9 months	30 mg (3 mL) PO once daily
NVP	≥36 weeks; 9 months to <18 months	40 mg (4 mL) PO once daily

For further dosing information including preterm infants and mothers while breastmilk feeding:
<https://clinicalinfo.hiv.gov/en/guidelines/pediatric-arv/management-infants-utero-intrapartum-breastfeeding-hiv-exposure?view=full>



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Appendix A provides easy access to ARV dosing.
2026 update: the appendix has been modified for clarity.

Non-Breastmilk Feeding Low and Medium Risk

Low Risk:

- Infants should be started on AZT x2 weeks

Medium Risk:

- Infant should be started on AZT x2-6 weeks.
- Alternatively, presumptive therapy can be started until the birth HIV PCR is negative, and then switched to AZT

Low Risk

Medications (start in ≤ 6 hours)

- AZT for 2 weeks

Infant Labs (HIV-1 RNA, quantitative PCR):

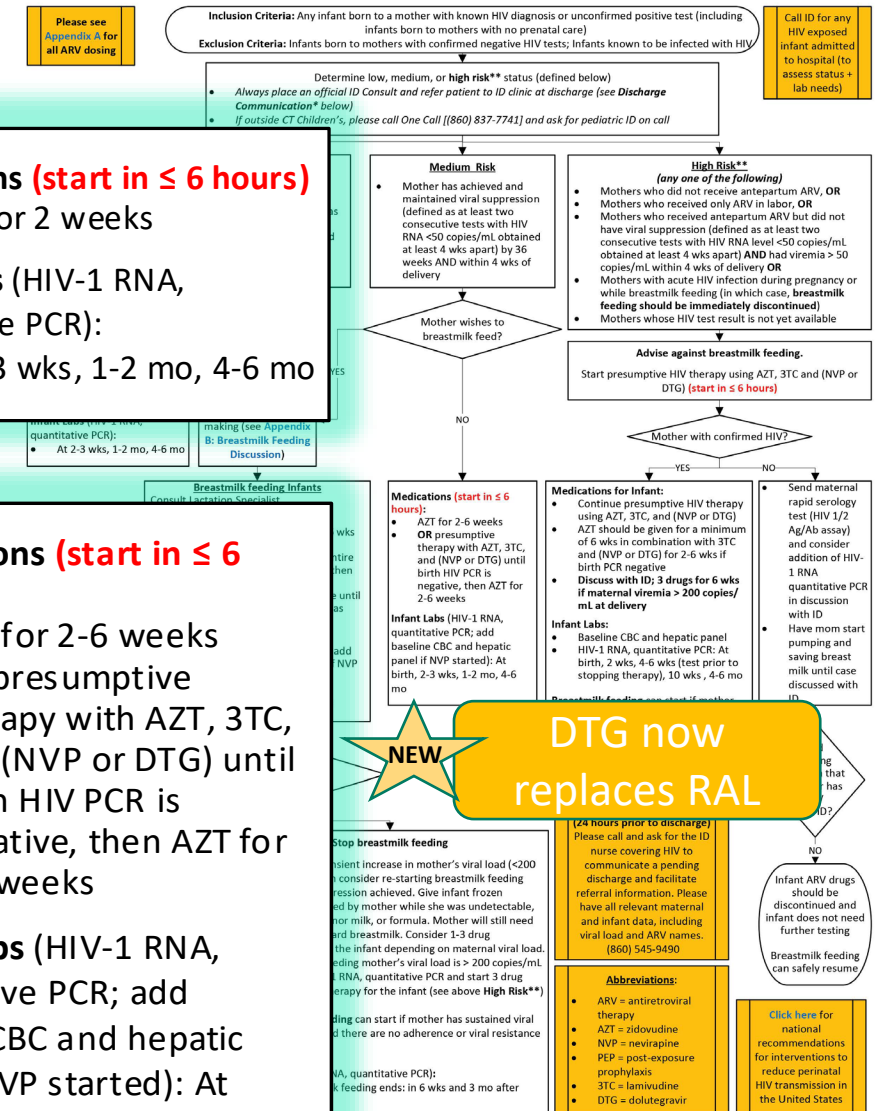
- At 2-3 wks, 1-2 mo, 4-6 mo

Medium Risk

Medications (start in ≤ 6 hours):

- AZT for 2-6 weeks
- OR presumptive therapy with AZT, 3TC, and (NVP or DTG) until birth HIV PCR is negative, then AZT for 2-6 weeks

Infant Labs (HIV-1 RNA, quantitative PCR; add baseline CBC and hepatic panel if NVP started): At birth, 2-3 wks, 1-2 mo, 4-6 mo



Breastmilk Feeding Low and Medium Risk

- If breastmilk feeding, infants should be started on AZT x4-6 weeks
 - If the mother wishes to extend therapy for the entire duration of breastfeeding, options have been given which should continue until 4 weeks after breastfeeding has ended
- Labs should be routinely followed.
- Breastmilk feeding should stop if there is any concern for transmission.

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Breastmilk feeding Infants

Consult Lactation Specialist

Medications (start in ≤ 6 hours):

- Start infant medication: AZT x4-6 wks
 - If mother desires extended therapy for infant for the entire duration of breastfeeding, then consider using NVP or 3TC instead of AZT and continue until 4 wks after breastfeeding has ended

Labs:

- Birth HIV RNA, quantitative PCR; add baseline CBC and hepatic panel if NVP started
- Maternal viral load at start of breastmilk feeding if not done at delivery

Breastmilk feeding Newborns)

Criteria: Any infant born to a mother with known HIV diagnosis or unconfirmed positive test (including infants born to mothers with no prenatal care)
Infants born to mothers with confirmed negative HIV tests; Infants known to be infected with HIV

Call ID for any HIV exposed infant admitted to hospital (to assess status + lab needs)

Determine low, medium, or high risk** status (defined below)
Place on official ID Consult and refer patient to ID clinic at discharge (see Discharge Medication* below)
If CT Children's, please call One Call [(860) 837-7741] and ask for pediatric ID on call

- Low Risk** (defined as levels <50 copies/mL at 4-6 weeks and 36 weeks AND no other risk factors)
- Medium Risk**
- Mother has achieved and maintained viral suppression (defined as at least two consecutive tests with HIV RNA <50 copies/mL obtained at least 4 wks apart) by 36 weeks AND within 4 wks of delivery
- High Risk** (any one of the following)**
- Mothers who did not receive antepartum ARV, OR
 - Mothers who received only ARV in labor, OR
 - Mothers who received antepartum ARV but did not have viral suppression (defined as at least two consecutive tests with HIV RNA level <50 copies/mL obtained at least 4 wks apart) AND had viremia > 50 copies/mL within 4 wks of delivery OR
 - Mothers with acute HIV infection during pregnancy or while breastmilk feeding (in which case, breastmilk feeding should be immediately discontinued)
 - Mothers whose HIV test result is not yet available

Advise against breastmilk feeding.
Start presumptive HIV therapy using AZT, 3TC and (NVP or DTG) (start in ≤ 6 hours)

Mother with confirmed HIV?

YES NO Good/best interest

Mother remains compliant with ARV regimen and has undetectable HIV viral loads?

YES NO

Continue breastmilk feeding and medication regimen

Infant Labs (HIV-1 RNA, quantitative PCR):

- Standard:** 2-3 wks, 1-2 mo, 4-6 mo
- If breastmilk feeding beyond 4-6 months:** at least every 3 mo while breastmilk feeding
- After breastmilk feeding ends:** in 6 wks and 3 mo after ending
- CBC and hepatic panel every 3 mo while infant receives medication

Maternal Labs:

- Viral load every 1-2 mo to be done by mother's provider and results documented in infant's chart

Stop breastmilk feeding

- If there is a transient increase in mother's viral load (<200 copies/mL), can consider re-starting breastmilk feeding once viral suppression achieved. Give infant frozen breastmilk stored by mother while she was undetectable, pasteurized donor milk, or formula. Mother will still need to pump + discard breastmilk. Consider 1-3 drug prophylaxis for the infant depending on maternal viral load.
- If breastmilk feeding mother's viral load is > 200 copies/mL get infant HIV-1 RNA, quantitative PCR and start 3 drug presumptive therapy for the infant (see above **High Risk****) for 4 wks.
- Breastmilk feeding** can start if mother has sustained viral suppression and there are no adherence or viral resistance concerns.

Infant Labs (HIV-1 RNA, quantitative PCR):

- After breastmilk feeding ends: in 6 wks and 3 mo after ending

Breastmilk feeding can start if mother has sustained viral suppression and no adherence concerns

Did testing confirm that mother has HIV per ID?

YES NO

Infant ARV drugs should be discontinued and infant does not need further testing

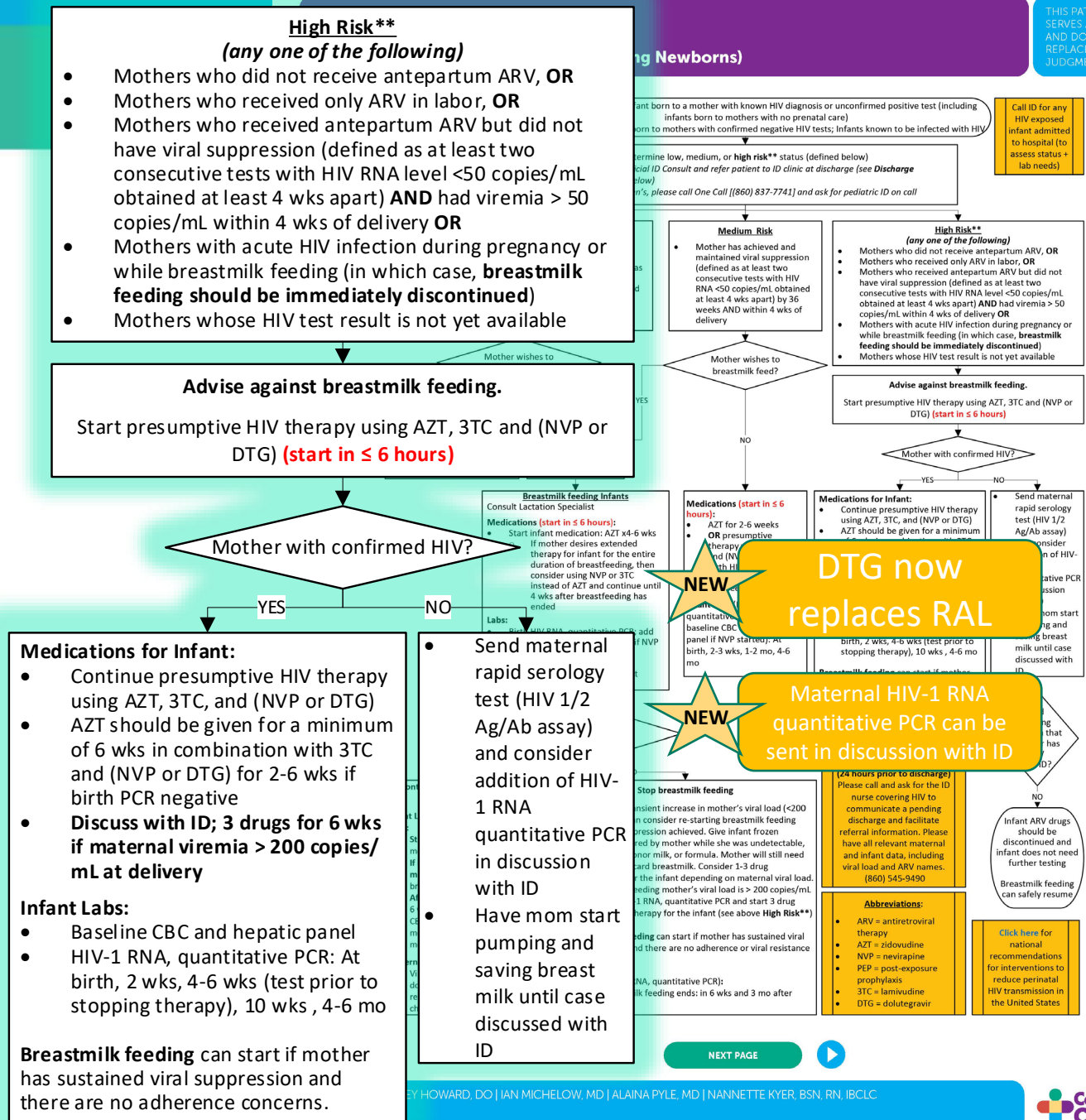
Breastmilk feeding can safely resume

Click here for national recommendations for interventions to reduce perinatal

Infant lab intervals have been updated

High Risk

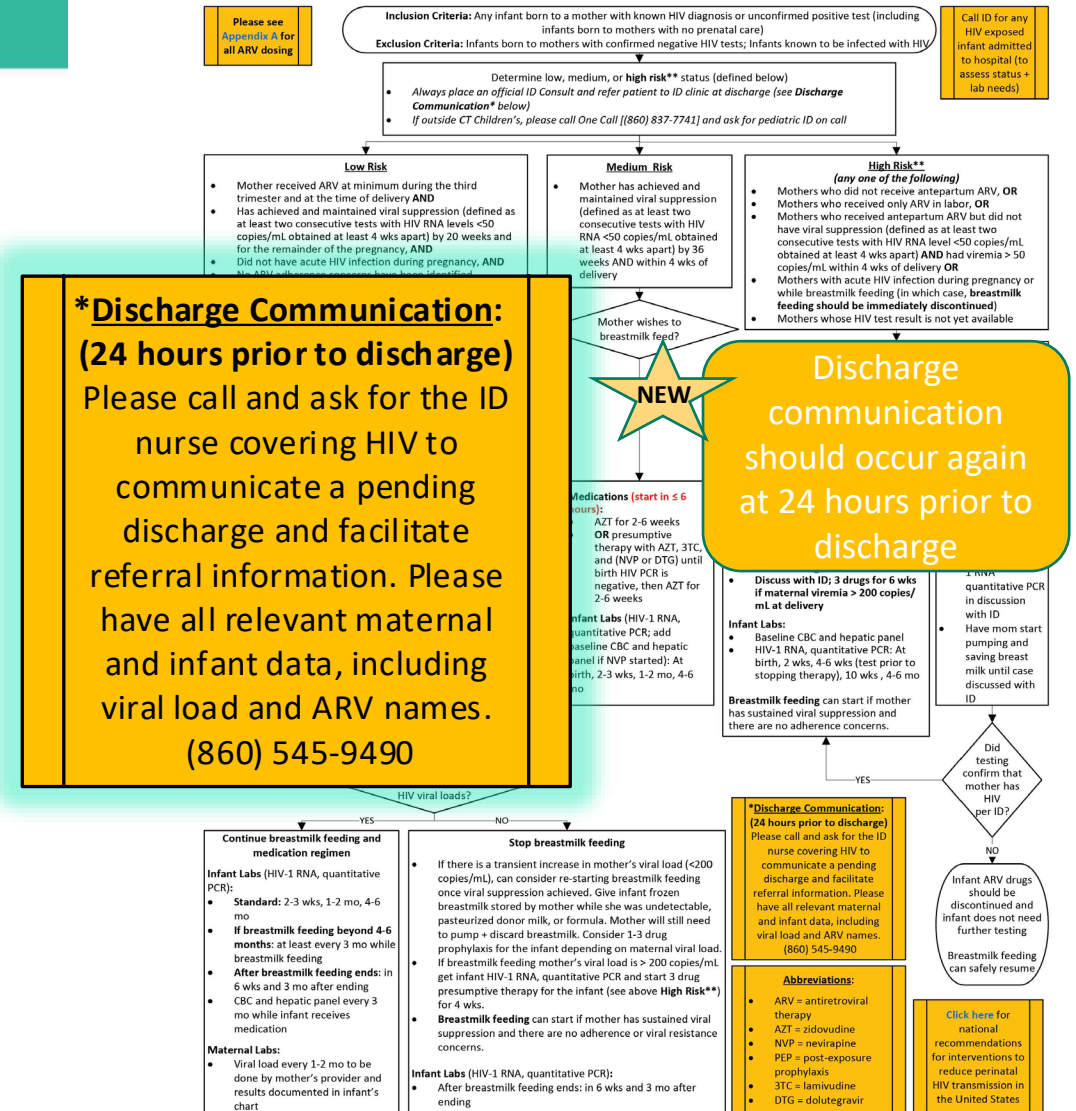
- Breastmilk should **not** be given for infants in the High Risk category
- Presumptive therapy should be started on the infant
- Labs should be sent at regular intervals
- Breastmilk feeding can be started if the mother has sustained viral suppression and there are no adherence concerns



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- Communication with Pediatric Infectious Diseases is paramount throughout the hospitalization and at the time of hospital discharge.
- Please contact the ID nurse for any pending discharges – this will assist in planning follow up care.



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Review of Key Points

- Infants do not all receive the same perinatal HIV medications and are stratified by risk based on maternal factors
 - Antiviral medication for infants should be started within 6 hours of birth
- Exclusive breastmilk feeding for infants born to women living with HIV is now supported if the parent is medication compliant and virally suppressed
 - Infants still need antiviral medication after birth
-  • **Mixed feeding with formula, when needed, is no longer thought to pose a transmission risk**
- Pediatric ID **should always** be involved in decision making and long-term care for HIV perinatally exposed infants

Quality Metrics

- Number of infants who are eligible for the pathway
- Number of eligible infants who are determined to be at low, medium or high risk of acquiring HIV
- Number of eligible infants who get HIV testing at birth
- Number of mothers living with HIV who choose to breastmilk feed (exclusive vs mixed feeding)
- Number of prenatal consults performed by nursery providers and ID to provide counseling for breastmilk feeding

Pathway Contacts

- Ashley Howard, DO, Pediatric Infectious Diseases
- Ian Michelow, MD, Pediatric Infectious Diseases
- Alaina Pyle, MD, Neonatology
- Nannette Kyer, BSN, RN, IBCLC

References



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- ⁹ Weiss F, von Both U, Rack-Hoch A, et al. Brief report: HIV-positive and breastfeeding in high-income settings: 5-year experience from a perinatal center in Germany. *J Acquir Immune Defic Syndr*. 2022;91(4):364-367.
- ¹⁰ <https://clinicalinfo.hiv.gov/en/guidelines/perinatal/preventing-transmission-infant-feeding#:~:text=In%20the%20case%20of%20a,temporarily%20or%20discontinued%20and%20replacement>
- ¹¹ Powell AM, Knott-Grasso MA, Anderson J, et al. Infant feeding for people living with HIV in high resource settings: a multi-disciplinary approach with best practices to maximise risk reduction. *Lancet Reg Health Am*. 2023 May 29;22:100509. doi: 10.1016/j.lana.2023.100509.

Thank You!



About Connecticut Children's Pathways Program

Clinical pathways guide the management of patients to optimize consistent use of evidence-based practice. Clinical pathways have been shown to improve guideline adherence and quality outcomes, while decreasing length of stay and cost. Here at Connecticut Children's, our Clinical Pathways Program aims to deliver evidence-based, high value care to the greatest number of children in a diversity of patient settings. These pathways serve as a guide for providers and do not replace clinical judgment.