<table>
<thead>
<tr>
<th>Adverse Effects</th>
<th>Associated ARVs</th>
<th>Onset/ Clinical Manifestations</th>
<th>Estimated Frequency</th>
<th>Risk Factors</th>
<th>Prevention/ Monitoring</th>
<th>Management</th>
</tr>
</thead>
</table>
| Anemia*         | ZDV             | Onset:  
• Variable, weeks to months  
Presentation  
Most Commonly:  
• Asymptomatic  
• Mild fatigue  
• Pallor  
• Tachypnea  
Rarely:  
• Congestive heart failure  
Newborns Exposed to HIV:  
• Severe anemia is uncommon but may be seen coincident with physiologic Hgb nadir.  
Children with HIV Who Are Taking ARV Drugs:  
• Anemia is two to three times more common with ZDV-containing regimens compared to all other regimens.  
Children with HIV Who Are Taking ARV Drugs:  
• Underlying hemoglobinopathy (e.g., sickle cell disease, G6PD deficiency)  
• Myelosuppressive drugs (e.g., TMP-SMX, rifabutin)  
• Iron deficiency  
• Advanced or poorly controlled HIV disease  
• OIs of the bone marrow  
• Malnutrition | Newborns Exposed to HIV:  
• Premature birth  
• In utero exposure to ZDV-containing regimens  
• Advanced maternal HIV  
• Neonatal blood loss  
• Combination ARV prophylaxis or empiric HIV therapy, particularly with ZDV plus 3TC | Newborns Exposed to HIV:  
• Obtain CBC at birth.  
• Consider repeating CBC at 4 weeks for neonates who are at higher risk (e.g., those born prematurely or who are known to have low birth Hgb) and for neonates who receive ZDV beyond 4 weeks.  
Children with HIV Who Are Taking ARV Drugs:  
• Avoid ZDV in children with severe anemia when alternative agents are available.  
• Obtain CBC as part of routine care (see Clinical and Laboratory Monitoring of Pediatric HIV Infection).  
| Newborns Exposed to HIV:  
• Anemia rarely requires intervention unless Hgb is <7.0 g/dL or is associated with symptoms.  
• ZDV administration can be limited to 4 weeks in low-risk neonates (see Antiretroviral Management of Newborns with Perinatal HIV Exposure or Perinatal HIV).  
Children with HIV Who Are Taking ARV Drugs:  
• Discontinue non-ARV, marrow-toxic drugs, if feasible.  
• Treat coexisting iron deficiency, OIs, and malignancies.  
• For persistent, severe anemia that is thought to be associated with ARV drugs (typically macrocytic anemia), switch to a regimen that does not contain ZDV. |
| Macrocytosis    | ZDV             | Onset:  
• Within days to weeks of starting therapy  
Presentation:  
• Asymptomatic but MCV is often >100 fl  
• Sometimes associated with anemia | All Ages:  
• >90% to 95% | None | No monitoring required—macrocytosis can be detected if CBC is obtained as part of routine care (see Clinical and Laboratory Monitoring of Pediatric HIV Infection). | No management required. |
### Key to Acronyms

- **3TC** = lamivudine
- **ANC** = absolute neutrophil count
- **ARV** = antiretroviral
- **CBC** = complete blood count
- **dL** = deciliter
- **fL** = femtoliter
- **G6PD** = glucose-6-phosphate dehydrogenase
- **Hgb** = hemoglobin
- **MCV** = mean cell volume
- **NRTI** = nucleoside reverse transcriptase inhibitor
- **OI** = opportunistic infection
- **TMP-SMX** = trimethoprim-sulfamethoxazole
- **ZDV** = zidovudine

### Table 15d. Antiretroviral Therapy-Associated Adverse Effects and Management Recommendations—Hematologic Effects

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| Neutropenia<sup>a</sup> | ZDV | Onset:  
  • Variable  
  Presentation:  
  • Asymptomatic | Newborns Exposed to HIV:  
  • Rare  
  Children with HIV Who Are Taking ARV Drugs:  
  • 2% to 4% of children on ARV drugs  
  • Highest rates occur in children on ZDV-containing regimens | Newborns Exposed to HIV:  
  • *In utero* exposure to ARV drugs  
  • Combination ARV prophylaxis, particularly with ZDV plus 3TC  
  Children with HIV Who Are Taking ARV Drugs:  
  • Advanced or poorly controlled HIV infection  
  • Myelosuppressive drugs (e.g., TMP-SMX, ganciclovir, hydroxyurea, rifabutin) | Children with HIV Who Are Taking ARV Drugs:  
  • Obtain CBC as part of routine care.  
  | Newborns Exposed to HIV:  
  • No established threshold for intervention; some experts would consider using an alternative NRTI for prophylaxis if ANC reaches <500 cells/mm<sup>3</sup>.  
  ZDV administration can be limited to 4 weeks in low-risk neonates (see Antiretroviral Management of Newborns with Perinatal HIV Exposure or Perinatal HIV).  
  Children with HIV Who Are Taking ARV Drugs:  
  • Discontinue non-ARV, marrow-toxic drugs, if feasible.  
  • Treat coexisting OIs and malignancies.  
  • For persistent, severe neutropenia that is thought to be associated with ARV drugs, change to a regimen that does not contain ZDV.  

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<sup>a</sup> HIV infection itself, OIs, and medications used to prevent OIs (e.g., TMP-SMX) may all contribute to anemia and neutropenia.

### References


*Guidelines for the Use of Antiretroviral Agents in Pediatric HIV Infection*


