<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>
<tbody>
<tr>
<td><strong>Anemia</strong></td>
<td>ZDV</td>
<td>Onset:</td>
<td></td>
<td>Newborns Exposed to HIV:</td>
<td>Newborns Exposed to HIV:</td>
<td>Newborns Exposed to HIV:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Variable, weeks to months</td>
<td></td>
<td>• Premature birth</td>
<td>• Obtain CBC at birth.</td>
<td>• Anemia rarely requires intervention unless Hgb is &lt;7.0 g/dL or it is associated with symptoms.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Presentation</td>
<td></td>
<td>• In utero exposure to ZDV-containing regimens</td>
<td>• Consider repeat CBC at 4 weeks for neonates who are at higher risk (e.g., those born prematurely or known to have low birth Hgb) and if ZDV is continued beyond 4 weeks.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Most Commonly:</td>
<td></td>
<td>• Advanced maternal HIV</td>
<td>Children with HIV Taking ARVs:</td>
<td>Children with HIV Taking ARVs:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Asymptomatic or mild fatigue</td>
<td></td>
<td>• Neonatal blood loss</td>
<td>• Underlying hemoglobinopathy (e.g., sickle cell disease, G6PD deficiency)</td>
<td>• Avoid ZDV in children with severe anemia when alternative agents are available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pallor</td>
<td></td>
<td>• Combination ARV prophylaxis, particularly with ZDV plus 3TC</td>
<td>• Myelosuppressive drugs (e.g., TMP-SMX, rifabutin)</td>
<td>• Obtain CBC as part of routine care (see Clinical and Laboratory Monitoring section).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Tachypnea</td>
<td></td>
<td>Children with HIV Taking ARVs:</td>
<td>• Iron deficiency</td>
<td>For persistent severe anemia thought to be associated with ARVs (typically macrocytic anemia), switch to a regimen that does not contain ZDV.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rarely:</td>
<td></td>
<td>Children with HIV Taking ARVs:</td>
<td>• Advanced or poorly controlled HIV disease</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Congestive heart failure</td>
<td></td>
<td>Newborns Exposed to HIV:</td>
<td>• Malnutrition</td>
<td></td>
</tr>
<tr>
<td><strong>Macrocytosis</strong></td>
<td>ZDV</td>
<td>Onset:</td>
<td>&gt;90% to 95%, all ages</td>
<td>None</td>
<td>None required—detected if CBC obtained as part of routine care (see Clinical and Laboratory Monitoring section).</td>
<td>None required</td>
</tr>
</tbody>
</table>
### Table 15d. Antiretroviral-Therapy-Associated Adverse Effects and Management Recommendations—Hematologic Effects  
(Updated May 22, 2018; last reviewed May 22, 2018)  
(page 2 of 2)

<table>
<thead>
<tr>
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<th>Onset/Clinical Manifestations</th>
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<th>Management</th>
</tr>
</thead>
</table>
| Neutropenia*    | ZDV             | Onset:                       | Newborns Exposed to HIV:  
• Variable  
Presentation:  
• Asymptomatic | Newborns Exposed to HIV:  
• In utero exposure to ARVs  
• Combination ARV prophylaxis, particularly with ZDV plus 3TC  
Children with HIV Taking ARVs:  
• Advanced or poorly controlled HIV infection  
• Myelosuppressive drugs (e.g., TMP-SMX, ganciclovir, hydroxyurea, rifabutin)  
Children with HIV Taking ARVs:  
• Obtain CBC as part of routine care. | Children with HIV Taking ARVs:  
• Obtain CBC as part of routine care.  
• No established threshold for intervention; some experts would consider using an alternative NRTI for prophylaxis if ANC reaches <500 cells/mm³.  
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 Taking ARVs:  
• Discontinue non-ARV marrow-toxic drugs, if feasible.  
• Treat coexisting OIs and malignancies.  
• For persistent severe neutropenia thought to be associated with ARVs, change to a regimen that does not contain ZDV. |

*a HIV infection itself, OIs, and medications used to prevent OIs, such as TMP-SMX, may all contribute to anemia, neutropenia, and thrombocytopenia.

### 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

### References


