

**Leukopenia and Neutropenia During Childhood:
Diagnostic Guidelines for Referring Physicians**

These guidelines were developed to assist primary care physicians and others with interpretation of the white blood cell (WBC) count in infants and children. It will focus on leukopenia, a reduced total WBC count, and neutropenia, a reduced absolute neutrophil count (ANC).

Although there is no indication for WBC count screening of normal children, abnormalities in WBC count may be encountered when performing blood counts for other purposes.

The two most important measures for the physician to assess are the total WBC count and the absolute neutrophil count (ANC). The normal values of WBC count and ANC in children of various ages are surprisingly not well characterized. Thus, the normal ranges reported by laboratories are often estimates and/or based primarily on adult values. This often leads to misinterpretation with children erroneously reported as having abnormal values. The table below summarizes the lower limit of normal of WBC count and ANC in normal children.

Table 1		
Leukopenia and Neutropenia During Infancy and Early Childhood		
	Cells per mm³	
	<u>WBC Count</u>	<u>ANC</u>
Normal	> 4,500	> 1,000
<u>Mild</u> Leukopenia or Neutropenia	3,000 – 4,500	500 – 1,000
<u>Moderate</u> Leukopenia or Neutropenia	1,500 – 3,000	200 – 500
<u>Severe</u> Leukopenia or Neutropenia	< 1,500	< 200

Note: Normal infants between 6 and 24 mo of age and African-Americans of all ages often have lower total WBC and neutrophil counts than older children or Caucasians.

Although leukopenia (reduced WBC count) and neutropenia (reduced ANC) may predispose to infection, quite low values (below 200 per mm³) are necessary before the infection risk is clinically significant. Mild or moderate reductions are usually not associated with an increased infection risk, although they can sometimes be a marker of serious disease (see below).

Diagnosis and Management of Moderate or Severe Leukopenia or Neutropenia:

Marked decreases in WBC count or ANC (below 200/mm³) usually require prompt telephone consultation with, and often referral to, a pediatric hematologist. This is particularly true if the child shows other signs of hematologic disease (bruising, pallor, hepatosplenomegaly, etc.) or abnormalities of other cell lines (e.g., anemia or thrombocytopenia). Please call 214-456-2978 during working hours and 214-456-7000

during evenings and weekends (and ask for hematologist on call to be paged) for such consultations.

Diagnosis and Management of Mild/Moderate Leukopenia or Neutropenia:

Mild or even moderate leukopenia and/or neutropenia is commonly encountered in normal children, especially if they have or have recently recovered from a viral infection. Also, mild leukopenia or neutropenia may be a result of a child's race, secondary to certain commonly-used drugs, or represent a statistical outlier. The causes of mild leukopenia/neutropenia are indicated in Table 2. Leukopenia and/or neutropenia are commonly seen in absolutely healthy African-American children. This has been called "ethnic pseudoneutropenia" and is of no clinical significance. It is not associated with an increased risk of infection. A number of drugs cause modest reduction in the WBC count. These include many anticonvulsants and psychotropic drugs used to treat depression or similar conditions. Mild leukopenia and/or neutropenia usually does not require dose reductions, although continued monitoring of the blood count is necessary.

<u>Common</u>	<u>Uncommon</u>
Viral infection	Congenital
Drug exposure	Autoimmune
Race (especially African-American)	Chronic benign neutropenia
Statistical	Autoimmune disorders such as systemic lupus erythematosus

Conclusion

Mild leukopenia/neutropenia without other evidence of disease usually does not require hematologic consultation. If mild reduction in the WBC count is found to occur repeatedly in otherwise well children, further blood counts should be performed annually for several years. If the "abnormality" is persistent and the patient remains well, no further testing is necessary.

Any questions that arise about leukopenia or neutropenia can be directed to a member of our hematology staff by calling 214-456-2978.

Prepared by:
George R. Buchanan, M.D.
Center for Cancer and Blood Disorders
Children's Medical Center Dallas
Revised: June 2008