

## WHAT IS THE DIFFERENTIAL BLOOD COUNT?

There are five different types of white cells that make up the differential blood count. White blood cells (leukocytes) come in several shapes and sizes and can be identified by the laboratory instrument known as a hematology analyzer or under a microscope.

- **Neutrophils** - The most populous of the circulating white cells, they are also the most short lived in circulation. After production and release by the marrow, they only circulate for about eight hours before proceeding to the tissues where they live for about a week. A high neutrophil count is seen in infection, some cancers, arthritis and sometimes when the body is under stress (for example, after surgery, trauma, or a heart attack).

- **Lymphocytes** - If the neutrophils and monocytes are the brutes, the lymphocytes are the brains. The functions of lymphocytes are diverse and complex. After neutrophils, lymphocytes are the most numerous of the circulating white cells. A low lymphocyte count may be seen in AIDS.

- **Monocytes** - Monocytes and neutrophils share the same stem cell. They are produced by the marrow, circulate for five to eight days and then enter the tissues where they are mysteriously transformed into histiocytes. A high monocyte count usually indicate an infection, often one cause by bacteria.

- **Eosinophils** - These cells are traditionally grouped with the neutrophils and basophils. A high eosinophil count often indicates allergies, skin diseases, or parasitic infections.

- **Basophils** - The basophils are the least numerous of the white cells. They are easily recognized by their large, purple granules. In active allergic reactions, blood basophils decrease in number.

## WHAT IS ANEMIA?

Anemia is defined as a decreased amount of red blood cells and hemoglobin in the blood. Symptoms include fatigue, lightheadedness, shortness of breath, and headaches.

People diagnosed with anemia should consult their health care professional to determine if iron supplements are necessary. In some cases, too much iron can affect the liver and cause irreversible damage.

Several factors may cause anemia. Effective treatment can be initiated when the cause of anemia has been determined. The results of your RBC, hemoglobin, hematocrit, and indices will help classify the type of anemia present. Additional tests may be required to determine the exact cause of anemia.

## YOUR SCREENING RESULTS

Screening results that fall **OUTSIDE** the MHSC Reference Range (range of expected screening values) are separated from the rest of the report to highlight them. They are printed with the letters H (high) or L (low) on the report. The Reference Range for each test is listed on the right side of your CBC.

IT IS NOT POSSIBLE TO DIAGNOSE OR TREAT ANY DISEASE OR HEALTH PROBLEM WITH THIS BLOOD SCREEN ALONE. It can help you learn more about your body and detect potential problems in early stages when treatment or changes in personal health habits can be most effective.

# WELLNESS CBC EXPLAINED

How to read the results of a Complete Blood Count (CBC)



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The provided information is used by health care professionals to detect any potential problems and helps make you more aware of your health.

If, after reading this pamphlet, you still have questions concerning your blood chemistry results, please call your personal health care professional.

## WHAT IS A COMPLETE BLOOD COUNT (CBC) AND WHY IS THE TEST ORDERED?

The CBC is used to present a general picture to overall health. It is also used to help diagnose diseases when people are not feeling well and to monitor treatment of many disease states such as anemia or leukemia. In the CBC test, the different types of cells are counted and examined by a machine. The seven components of a CBC are:

- **White Blood Cell Count (WBC)**
- **Red Blood Cell Count (RBC)**
- **Hemoglobin Concentration (HGB)**
- **Hematocrit Value (HCT)**
- **Indices**
- **Platelet Count**
- **WBC Differential**

The following descriptions will help you better understand your laboratory test results. If you have any questions regarding the test results, please contact your health care professional.

## WHITE BLOOD COUNT (WBC)

White blood cells are your body's protectors. White blood cells are larger than red blood cells, but there are fewer of them.

When you have an infection, an increased number of white blood cells are sent from the bone marrow to attack the bacteria or virus that is causing the infection. An increased number of white blood cells may occur with mild infections, appendicitis, pregnancy, leukemia, hemorrhage and hemolysis. Strenuous exercise, emotional

distress and anxiety can also cause an increase in WBC.

A low white blood cell count makes it harder for your body to fight off an infection. People with a low WBC are more likely to catch colds or other infectious diseases. Low WBC counts may be seen in overwhelming infections like mumps, lupus, cirrhosis of the liver and cancer. In addition, radiation therapy and certain types of drug therapy tend to lower the WBC.

## RED BLOOD COUNT (RBC)

Red blood cells are the most common type of cell in the blood. Your body contains millions upon millions of these disc-shaped cells. Red blood cells are produced by the bone marrow continuously in healthy adults. The cells contain hemoglobin which carries oxygen and carbon dioxide throughout the body.

The RBC determines if the number of red blood cells in your body is low (called anemia) or high (called polycythemia).

Common causes of an abnormal RBC include iron deficiency anemia due to chronic blood loss (i.e. menstruation, small amounts of bleeding due to colon cancer), acute blood loss (i.e. acute bleeding ulcer, trauma), and hereditary disorders (i.e. sickle cell anemia). Polycythemia is relatively uncommon.

## HEMOGLOBIN CONCENTRATION (HGB)

Red blood cells contain hemoglobin, the molecules that carry oxygen and carbon dioxide in the blood. Measuring hemoglobin gives an exact picture of the ability of the blood to carry oxygen. The oxygen is used by the cells to produce energy. The blood also brings carbon dioxide, the waste product of this energy production process, back to your lungs, where it is exhaled.

People with low hemoglobin levels have anemia and usually have a low red blood cell count and a low hematocrit. Signs and symptoms of anemia (paleness, shortness of breath, fatigue) will start to show when the hemoglobin is too low.

Hemoglobin increases with altitude adaptation. In general, females have lower red blood counts and hemoglobin values than men.

## HEMATOCRIT (HCT)

The purpose of this test is to determine the ratio of plasma (clear liquid part of the blood) to red cells in the blood or, in short, hematocrit measures how much of your blood is made of red cells.

Hematocrit measurement is useful in identifying anemia, the presence of liver disease, and red cell production within the circulatory system.

Hematocrit increases with altitude training or dehydration. Women generally have lower hematocrit values than men.

## WHAT ARE INDICES?

Indices are values which measure hemoglobin, hematocrit and platelet components found in red blood cells. These five indices include:

- **MCV (Mean Cell Volume)**: Measures the average size of red blood cells.
- **MCH (Mean Cell Hemoglobin)**: Reflects the average weight of hemoglobin found in the red blood cell.
- **MCHC (Mean Cell Hemoglobin Concentration)**: Reflects the average amount of hemoglobin in the red blood cell.
- **RDW (Red Cell Distribution Width)**: RDW is a histogram (visual), which reflects the distribution of the size of the red blood cell population.
- **MPV (Mean Platelet Volume)**: Reflects the average volume of platelet.

## PLATELETS

Platelets are the smallest type of cell found in the blood. Platelets help stop bleeding after an injury by gathering around the injury site, plugging the hole in the bleeding vessel and helping the blood to clot more quickly. Platelet counts are often done if you are prone to bruising or if you are about to have surgery. The platelet count may change with bleeding disorders, heart disease, diabetes, inflammatory disorders, and anemias.