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The Simple Guide To Understanding Your Complete Blood Count

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THE SIMPLE GUIDE TO

understanding your CBC.

You have just finished your complete blood count and now you're left scratching your head. What does it mean? It's an enigma and it's like that because the end user (yourself) was never in mind for understanding when it was created.

The complete blood count (CBC) is the world's most ordered test. It allows Doctors to determine where things maybe going wrong or right. Like looking at the different parts of a computer like the RAM, to help figure out what's going on.

You might get a CBC as part of your yearly check-up. Your doctor might also order it to:

Check for anemia or leukemia
See if you have another health issue or to explain symptoms like weakness, fever, bruising, or feeling tired
Keep an eye on a blood condition you already have
See how medications or treatments like chemotherapy are affecting your blood
The reference ranges – AKA "the normal" ranges – those have been around for decades and vary depending on the country and/or lab. This is a concern since every person is an individual with a unique set of environmental, lifestyle, genetic and societal factors.

The other problem we see and will cover later is the historical tracking of blood work. You'll notice the last two bullet points above require tracking. Most of the time you lose our blood work, forget were it was done, or the doctor doesn't look at all of our blood test results historically.

Use lab me to automatically do this for you, from the comfort of your own home. **You can order an at-home complete blood count test by clicking here**. We are the first company in the USA to offer a complete blood count that you can do easily from home and with the same accuracy as going to any hospital or external lab.

In this article we are going to look at all those annoying abbreviations. I will attempt to do this in a simple way that makes sense.

The Players Of A Complete Blood Count

The suspects in this line up are as follows. Real name followed by abbreviation:

1. White blood count (WBC)
2. Red blood cell count (RBC)
3. Hematocrit (Hct)
4. Hemoglobin (Hb or Hgb)
5. Red blood cell indices:(mean corpuscular volume [MCV], mean corpuscular hemoglobin (MCH), and mean corpuscular hemoglobin concentration [MCHC]
   So now you know the abbreviations – let's look at what each player actually represents within your complete blood count.

White Blood Count (WBC)

In your body you have five different types of white blood cells. The WBC is looking at the total count of them. Consider it like an index of the white blood cells in your complete blood count.

It generally will give further evidence to the body having an infection, asthma or even cancer. There are many medications that can affect this number as well.

Drugs that may produce low numbers include

Antimetabolites
Barbiturates
Antibiotics
Anticonvulsants
Antithyroid drugs
Arsenicals
Antineoplastics
Cardiovascular drugs
Diuretics
Analgesics and anti-inflammatory drugs
Heavy metal intoxication

The numbers that should cause worry are:

A WBC of less than 500 and the patient is at risk for a fatal infection.
A WBC over 30,000 indicates massive infection or a serious disease such as leukemia.

Now there are a few things that can also mask a high blood cell count. One of them being corticosteroids. These drugs can lower the WBC thus making it look normal. If you are using them, you need to inform your doctor to find out the best plan of action for getting a proper reading.

Quick Summary of WBC

So the normal ranges is between 4,500 to 10,000. Simply put anything above suggests a massive infection or leukemia. Anything below suggest that you are risk for an infection.

Red Blood Count (RBC)

These little guys carry oxygen around the body. They also carry carbon dioxide to the lungs. Think of them as a delivery service.

Now, higher than normal numbers with these guys suggest you:

live at higher altitudes
do endurance training
are a smoker
There is one disease that can cause high RBC's. It is called, Polycythemia Vera and it is a disease of unknown origin that results in an abnormal increase in red blood cells.

Drugs that raise your RBCs are:

Gentamicin
Methyldopa
Erythropoietin (commonly used in doping for endurance sports like cycling)
Why are my RBCs low?

A lower than normal RBC can result from a number of causes, including:

Massive RBC loss, such as acute hemorrhage
Abnormal destruction of red blood cells
Lack of substances needed for RBC production
Chemotherapy or radiation side effects from treatment of bone marrow malignancies such as leukemia can result in bone marrow suppression.
The term "anemia" is a general term that refers to a decrease in red blood cells. Anemia can occur from either a decrease in the number of red blood cells, a decrease in the hemoglobin content, or both.

Quick Summary Of RBCs

When reviewing your complete blood count, the normal range for men is 5 million to 6 million cells/mcL; for women it is 4 million to 5 million cells/mcL. Anything more is from high altitudes, smoking, heavy endurance training or Polycythemia Vera.

Anything below is anemia that can be due to various factors that need to be ruled out by your healthcare professional.

Learn More: Anemia Simplified (Short 1 min video).

Hematocrit (Hct)

In your blood you have a liquid that serves as the carrier of all these little cellular machines (e.g. RBCs and WBC). That carrier liquid is called plasma. When we look at the percentage of RBCs in the plasma we get our hematocrit.

Another way to look at it is, hematocrit is how much of your blood is made up of red blood cells (RBC).

Fun fact, If the RBC and the hemoglobin are both normal, it is possible to estimate the hematocrit as being approximately three times the hemoglobin. For example, a person whose hematocrit is 30% would have a hemoglobin of approximately 10 gm.

Hematocrit: critical low and high values:

A hematocrit of less than 15% can result in cardiac failure
A hematocrit of over 60% may result in spontaneous blood clotting
Quick Summary Of Hematocrit

A low score on the range scale may be a sign that you have too little iron, the mineral that helps produce red blood cells.

A high score could mean you're dehydrated or have another condition. The normal range for men is between 41% and 50%. For women the range is between 36% and 44%.

Hemoglobin

This molecule is like a box that holds the oxygen. So if you remember our little delivery guys, the red blood cells (RBCs)? Well, they use these "boxes" to hold the oxygen from point A to B. Let's have a look at the role they play in your complete blood count.

Learn More: Oxygen curves and hemoglobin video (1 min long)

So what can decrease it?

Blood loss
Bone marrow suppression
Thalassemia
Sickle Cell Anemia
What about a normal RBC but lowered hemoglobin? It happens, most notably in people with iron deficient anemia. Women need iron more than men as well due to menstrual flow. Pregnancy also requires the body to need more iron.

Getting your hemoglobin tested regularly during pregnancy is important. Low iron level can lead to anemia and place unwanted stress both on the mother and baby.

Interesting Fact: During the last trimester of pregnancy, a condition known as "physiological anemia of pregnancy" occurs. This normal drop in hemoglobin values results from an increase in the plasma volume.

Critical Values

Hemoglobin: critical low and high values

A hemoglobin value under 5 g/dl may cause heart failure
A hemoglobin value over 20 g/dl may cause clogging of capillaries
Increased levels of hemoglobin are found in any condition in which the number of circulating red blood cells rises above normal.

Examples of conditions associated with increases in hemoglobin are

Polycythemia vera
Severe burns
Chronic obstructive pulmonary disease
Congestive heart failure.
Summary Of Hemoglobin

This is the protein in your blood that holds the oxygen. The normal range for men is 14 to 17 grams per

deciliter (gm/dL); for women it's 12 to 15 gm/dL

Erythrocyte Index

When a patient has a lower than normal hemoglobin, it is important to determine whether red blood cells are of normal size and if they have a normal concentration of hemoglobin. These measurements, are known as Erythrocyte Indices. They also, provide important information about various types of anemias.

This clever little index is made up of three key players:

For this I am breaking it down by their general measure, the name, the abbreviation.

Size: Mean Corpuscular Volume (MCV)
Amount: Mean Corpuscular Hemoglobin (MCH)
Space Taken Up: Mean Corpuscular Hemoglobin Concentration (MCHC)
The MCV is the size of the red blood cell (RBC). While the MCH is the amount of hemoglobin in one RBC. Lastly, the MCHC is the amount of the cell occupied by the hemoglobin.

Think of it like this: The RBC is your cloud storage. The MCV is how much space you have. The MCH is the amount of data in that space and the MCHC the percentage of space taken up.

An MCHC of less than 32% or an MCH under 27 %. indicates that the red blood cells are deficient in hemoglobin concentration. This situation is most often seen with iron deficiency anemia.

So What's It Telling Us?

If your MCV is high it could indicate that you have low vitamin B12 or folate levels. If your red blood cells are smaller, you could have a type of anemia.

Anemias can be classified using erythrocyte indices in the following way:

MCV, MCH and MCHC normal — normocytic, normochromic anemia — most often caused by acute blood loss.
Decreased MCV, MCH, and MCHC — microcytic, hypochromic anemia — most often caused by iron deficiency. You can test your iron and more from home here.
Increased MCV, variable MCH and MCHC — macrocytic anemia — most often caused by Vitamin B12 deficiency (due to pernicious anemia) and folic acid deficiency.
Abnormal erythrocyte indexes are helpful to classify types of anemia. However, diagnosis must be based on the patient's history, physical examination, and other diagnostic procedures.

Quick Summary Of The Erythrocyte Index

A normal-range MCV score is 80 to 98 in men and 96-108 for women.

MCV:
MCV values are higher in newborns and infants
Men: 80-98 fl (femtoliters)
Women: 96-108 fl
Normal range for MCH is 17-31 pg (picograms)
Normal range for MCHC is 32-36%

Wrapping It Up

The complete blood count has been around for a while and it's the bread and butter of all blood tests. It can quickly give insight into what's happening with a patient.

Patients who have a keen interest in their own healthcare frequently want to know what they can do to change their WBCs, RBCs, and platelets. Unlike "good" and "bad" cholesterol, cell populations are not generally affected by lifestyle changes unless the patient has an underlying deficiency (such as vitamin B12 or folate deficiency or iron deficiency). There is no way that a patient can directly raise the number of his WBCs or change the size or shape of his RBCs. Addressing any underlying diseases or conditions and following a healthy lifestyle will help optimize your body's cell production and your body will take care of the rest.

Technologies like Lab Me you can now instantly track and store your blood work, while doing it from home. All you need to do is order the test online and it will arrive to you in 3-5 days. You will be provided detailed written and video instructions on how to perform the test. After your specimen is collected, you mail back using the pre-paid FedEx envelope. The lab will process your sample within 72 hours or less.

The report is then sent to your dashboard for easy visual understanding and tracking overtime so that you can have a clearer picture of how things are changing in your body.

Learn More: How Machine Learning Works. SImply. (5 min)

In addition, we use artificial intelligence to look for patterns or anomalies to help spot disease early or help forecast future problems. Your blood work is something to be reviewed over time however Doctors are too pressed for time and there wasn't a simple storage solution until now,.

Lab me will work over time to benchmark your normal values as well. Get started today with your at-home complete blood count today.

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