



Complex Child E-Magazine

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Interpreting Your Child's Lab Results

When you get a list of labs back from your doctor or hospital, your eye is drawn immediately to the starred or highlighted results that came back abnormal. Knowing that any of your child's results have come back abnormal can be disconcerting. Much of the time, however, there is no need to worry. But how do you know when abnormal results indicate a little problem, a big problem, or not a problem at all?

Reference Ranges

The first thing you need to do is look at the reference ranges that are given along with the results. Each lab has its own equipment that is calibrated uniquely, and results vary depending on the lab. While most tests have similar reference ranges from lab to lab, there are some, such as the test for Lipase, that use different testing systems with very different reference ranges. Results from one lab may not be equivalent to results at another lab.

The Slightly High or Low Result

In many cases, the abnormal result is ever so slightly high or low. Since reference ranges usually represent two standard deviations above or below the average mean value in healthy people, it is still normal for about five percent of the population to be ever so slightly higher or lower than the reference range. Keeping this in mind, a slightly low or high result is rarely concerning. Tests may also be slightly off due to illness, food or drink consumed, or many other factors. Many doctors will advise repeating the tests at a later time to see if the value has normalized, remains the same, or is trending upward or downward.

Large Versus Small Reference Ranges

Some tests have wide reference ranges, while others have very small ones. If a test is done for blood pH from a vein, for example, the normal reference range is tiny, usually only about one tenth (such as from 7.31-7.41). Common tests such as Sodium, Potassium, Creatinine, Albumin, Bilirubin, and Hemoglobin all have small reference ranges. Other tests may have very wide reference ranges, such as Alkaline Phosphatase or Cholesterol. If a test has a very wide reference range and is slightly abnormal, this is not as concerning as if a test with a very small reference range comes back slightly abnormal.

In addition, there are specific pediatric reference ranges for most tests, so if the test was performed at an adult hospital or by an adult lab, the reference ranges may not even be

appropriate. Hemoglobin, for example, is a test that varies significantly by age and gender. It is always best to talk to your doctor to determine if the results are truly normal or abnormal.

Common Tests and Abnormalities

The CBC

The most common blood test done is the CBC, or Complete Blood Count. This test looks at the different components of blood and may be useful in diagnosing infection or anemia, among other conditions. This test contains the following subtests.

TEST	WHAT IT IS
White Blood Cell Count	The number of white cells in blood
Differential	The raw number and percentages of the different types of white blood cells in blood
Monocytes	Early responders in infection
Lymphocytes	Defend against viruses
Neutrophils/Bands/Segs	Defend against bacterial or fungal infection
Eosinophils	Defend against allergic or parasitic infections
Basophils	Defend against allergic and inflammatory responses
Red Blood Cell Count	The number of red blood cells in blood
Hemoglobin	The oxygen-carrying proteins in blood
Hematocrit	Percentage of red blood cells in the blood
MCV [Mean Corpuscular Volume]	Average size of red blood cells
MCH [Mean Corpuscular Hemoglobin]	Average amount of hemoglobin inside red blood cells
MCHC [Mean Corpuscular Hemoglobin Concentration]	How concentrated hemoglobin is within red blood cells
RBC [Red Blood Cell] Distribution Width	The variation in size of red blood cells
Platelet Count	The number of platelets in blood
Mean Platelet Volume	Average size of platelets

In general, the important tests to track are the White Blood Cell Count, Red Blood Cell Count, Hemoglobin, and Platelets. A slightly elevated White Count is probably not particularly significant, since it can be caused by a simple virus, while a very high white count is very significant. Any marked reduction in the Hemoglobin, which may indicate iron deficiency, and the Platelet Count, which can be significant when it drops into double digits, should be taken seriously.

The majority of the other tests provide descriptive information that may help your doctor isolate the specific cause of a given problem. For example, if the White Count is high, looking at the differential, which lists how many of each type of white blood cells are

present, may be able to help your doctor to determine if you have a simple virus (elevated Lymphocytes) or something more serious. Similarly, looking at the MCV, MCH, or MCHC may help your doctor diagnose what type of anemia a child has.

Metabolic Panels or Profiles

Another common test is the Basic or Comprehensive Metabolic Profile/Panel (BMP or CMP), which in the past was called a Chem 7 or Chemistry Panel. These tests look at organ function, such as in the kidney and liver, as well as check the amount of sugar, protein, and electrolytes such as sodium or potassium in your blood. The subtests of the CMP are listed below. The BMP contains only the first eight tests.

TEST	WHAT IT IS
Glucose	Measures the amount of sugar in the blood; useful for diagnosing diabetes and other conditions
Calcium	Measures the amount of calcium in the blood, which can be an indicator of kidney disease or thyroid dysfunction
Electrolytes	
Sodium	Measures one of the electrolytes from salt [sodium chloride] in the blood; useful for diagnosing dehydration, kidney problems, and other issues
Potassium	Measures the amount of potassium in the blood, and may signal dehydration, kidney problems, and other issues
CO2 (Carbon Dioxide or Bicarbonate)	Measures the acid-base balance in the blood, which may signal a respiratory or metabolic problem
Chloride	Measures the other electrolyte from salt [sodium chloride] in the blood and can be useful for diagnosing dehydration or acid-base imbalances
Kidney Function Tests	
BUN	Measures the amount of urea nitrogen in the blood to determine how well the kidneys are functioning
Creatinine	Measures the breakdown product of creatine in the blood, to determine if the kidneys are excreting it appropriately
Protein Tests	
Albumin	Measures the most common protein in the

	blood and may signal liver, kidney, nutritional, or inflammatory problems
Total Protein	Measures all protein in the blood to screen for liver, kidney, and nutritional problems
Liver Tests	
ALP (Alkaline Phosphatase)	Measures a liver enzyme and may show problems with liver function or the bones
ALT (Alanine Amino Transferase)	Measures a liver enzyme and may show problems with liver function
AST (Aspartate Amino Transferase)	Measures a liver enzyme and may show problems with liver function
Bilirubin	Tests for the yellow pigment in bile, and high results may indicate liver, gall bladder, or other problems

It is very common for the Glucose and Creatinine to come back abnormal on these tests. If the child has not fasted prior to the test or the blood simply sat in the tube for awhile before testing, the Glucose may come back abnormal. A low Glucose is more often than not a result of the blood sitting in the tube too long. A high Glucose in a child who has just eaten is likely a result of the meal. If there is any doubt, the Glucose should be rechecked using a fingerstick and Glucose meter.

A low Creatinine is very common in children and usually signals that the kidneys are working well. It is very rare for a low Creatinine to be significant.

During even a mild illness, it is not uncommon for liver function tests (ALP, ALT, AST) to be slightly elevated. The albumin may be slightly decreased as well. Raised liver function tests are usually not significant unless they are repeatedly raised and are significantly elevated.

Changes in electrolytes, especially if they affect more than one of the tests or are markedly increased or decreased, are always significant and should be investigated. If the Sodium, Potassium, CO₂, or Calcium is extremely high or low or is marked as “critical,” it should be investigated immediately.

Don't Panic!

Much of the time, an abnormal result, or even multiple abnormal results, are not particularly significant. Remember to look at your child's current state of health and not just the numbers on the paper. You probably don't need to worry too much about a healthy child who has a few abnormal numbers. Don't panic until you have spoken with your child's doctor and discussed the results.