

Understanding Lab Reports

(Part 1)

Website: [Healthy Christian Living - Living by the Blueprint](#)

BIBLE:

Leviticus 17:11 – “...The life of the flesh is in the blood...”

In the lab work results sheet, you will have the following ranges:

- **Low range** (out of normal limits)
- **Normal range** (within normal limits)(WNL)
- **High range** (out of normal limits)

***Many times, the lab work results sheet will be highlighted red in the areas that are out of normal range.

***Just because you are within range does not mean your range is the healthiest. These ranges are used for references.

***The way these ranges are gotten is by getting an average on the value of your “average American”. So, it is safe to say that your “average range” is not conducive to health in many cases.

CHEMISTRY PANEL & COMPLETE BLOOD COUNT (CBC)

Item Catalog Number: LC381822

THE CHEMISTRY AND CBC BLOOD TEST IS A COMPREHENSIVE METABOLIC EVALUATION INCLUDING THE FOLLOWING TESTS:

- Albumin
- Albumin/Globulin Ratio
- Alkaline Phosphatase: Evaluation of liver and bone diseases
- ALT (SGPT): Evaluates liver function
- AST (SGOT): Evaluates liver function
- Bilirubin: Evaluates kidney and liver function
- BUN (blood urea nitrogen): Measures liver and kidney function
- BUN/Creatinine Ratio: For diagnosis of impaired renal(kidney) function
- Calcium
- Chloride
- Creatinine: A test used to measure kidney function
- Estimated glomerular filtration rate (eGFR)(dealing with the kidneys)
- Fasting Glucose (blood sugar)
- Globulin
- Iron (serum)
- LDH (lactic dehydrogenase)
- Lipid Profile: Evaluates the risk for developing atherosclerosis (arterial plaque) and coronary heart disease.
- Phosphorus
- Potassium
- Sodium
- Total Protein
- Uric acid

TOTAL CHOLESTEROL

Triglycerides
HDL Cholesterol

Cholesterol
Total Cholesterol/HDL Ratio

COMPLETE BLOOD COUNT (CBC):

- Differential count
- Hematocrit
- Hemoglobin
- Mean corpuscular hemoglobin concentration(MCHC)
- Mean corpuscular hemoglobin(MCH)
- Platelet count
- Red blood cell count
- Red blood cell distribution
- Red blood cell indices
- White blood cell count(WBC)

NORMAL RANGES:

- **Albumin:** 3.9 to 5.0 g/dL
- **Alkaline phosphatase:** 44 to 147 IU/L
- **ALT (alanine transaminase):** 8 to 37 IU/L
- **AST (aspartate aminotransferase):** 10 to 34 IU/L
- **BUN (blood urea nitrogen):** 7 to 20 mg/dL
- **Calcium - serum:** 8.5 to 10.9 mg/dL
- **Serum chloride:** 101 to 111 mmol/L
- **CO₂ (carbon dioxide):** 20 to 29 mmol/L
- **Creatinine:** 0.8 to 1.4 mg/dL **
- **Direct bilirubin:** 0.0 to 0.3 mg/dL
- **Gamma-GT (gamma-glutamyl transpeptidase):** 0 to 51 IU/L
- **Glucose test:** 100 mg/dL
- **LDH (lactate dehydrogenase):** 105 to 333 IU/L
- **Phosphorus - serum:** 2.4 to 4.1 mg/dL
- **Potassium test:** 3.7 to 5.2 mEq/L
- **Serum sodium:** 136 to 144 mEq/L
- **Total bilirubin:** 0.2 to 1.9 mg/dL
- **Total cholesterol:** 100 to 240 mg/dL
- **Total protein:** 6.3 to 7.9 g/dL
- **Uric acid:** 4.1 to 8.8 mg/dL

#1: LIPID PANEL = BLOOD FATS:

- **Two Types:**

1. Cholesterol

2. The Triglyceride Component

***The higher the fat content, the more likely they are to cause artery disease...

***Let's look at the "triglycerides"

Normal = <150

***If you inherit genes for the production of fats, these values may run higher than normal.

Or if you are taking in an excess of certain fats or triglycerides. Your triglycerides will tend to be high.

If you are taking in sugar, etc., it will be converted over to triglycerides.

CHOLESTEROL

Mostly comes from **animal fats**.

It's best to < 150. -- This can be done by changing diet and lifestyle.

LDL = Low Density Lipoprotein

This should be <90

Labs say <130

For Optimal Health should be <70

HDL = High Density Lipoprotein

For men.... >40

Women.... >50

For Optimal Health in both...>75

***Very high levels of HDL can be harmful

***Low levels are mostly due to overweight and lack of exercise

#2: METABOLIC PANEL (or Comprehensive Metabolic Panel):

This gives you a screen of certain substances found in the blood

a. GLUCOSE (BSL)

It is usually for fasting

Normal = 66-99

>99 = impaired glucose handling...

100-125 = pre-diabetic

>126 = Diabetes

b. BUN (Blood Urea Nitrogen)

c. CREATININE

Normal ration is 10:1

10 for BUN

1 for Creatinine

***These 2 are often looked at as representatives of kidney function.

*****Both are substances found in the blood, result from a breakdown of certain proteins.**

The kidney normally filters these, but if there is a problem with the function of the kidneys, or a shrunken vascular volume d/t taking diuretic medication, the filtration won't work as well, so those levels will rise
These 2 are to look at the function of the kidneys...

d. EGFR (estimated glomerular filtration)

Ranges...

A normal eGFR is 60 or more

A low eGFR number may suggest kidney disease.

Use this scale to see what your eGFR may mean.

***The glomerulus in the kidney is just the collection of capillaries where the blood is brought and the filtration takes place where there is an exchange of blood substances that are going to be removed, it comes in contact with the Renal (kidney) tubule.

There is an exchange so those substances that are going to be excreted from the blood will be passed over into the kidney tubule (the nephron) and be excreted in the urine.

The glomerulus are capillary tangles where all of this is taking place. And if the filtration rate in the glomerulus is low, kidney function is usually impaired.

You might be able to find normal BUN and Creatinine in early stages of Kidney Disease, but the glomerular filtration may be impaired.

THEY HAVE 2 DIFFERENT RANGES:

African American & Non-African American

#3: Serum Electrolytes (Blood Electrolyte)

a. Sodium:

Sodium is the major positive ion (**cation**) in fluid outside of cells. The chemical notation for sodium is Na⁺. When combined with chloride, the resulting substance is table salt. Excess sodium (such as that obtained from dietary sources) is excreted in the **urine**. Sodium regulates the total amount of water in the body and the transmission of sodium into and out of individual cells also plays a role in critical body functions. Many processes in the body, especially in the **brain**, nervous system, and muscles, require electrical signals for communication. The movement of sodium is critical in generation of these electrical signals. Too much or too little sodium therefore can cause cells to malfunction, and extremes in the blood sodium levels (too much or too little) can be fatal.

Increased Sodium (hypernatremia) in the blood occurs whenever there is excess sodium in relation to water. There are numerous causes of hypernatremia; these may include kidney disease, too little water intake, and loss of water due to **diarrhea** and/or **vomiting**.

A decreased concentration of sodium (**hyponatremia**) occurs whenever there is a relative increase in the amount of body water relative to sodium. This happens with some diseases of the liver and kidney, in patients with **congestive heart failure**, in **burn victims**, and in numerous other conditions.

A Normal blood sodium level is 135 - 145 milliEquivalents/liter (mEq/L),
or in international units
135 - 145 millimoles/liter (mmol/L).

b. Potassium

Potassium is the major positive ion (cation) found inside of cells. The chemical notation for potassium is K⁺. The proper level of potassium is essential for normal cell function. Among the many functions of potassium in the body are regulation of the heartbeat and the function of the muscles.

A seriously abnormal increase in potassium (**hyperkalemia**) or decrease in potassium (**hypokalemia**) can profoundly affect the nervous system and increases the chance of **irregular heartbeats** (arrhythmias), which, when extreme, can be fatal.

Increased potassium is known as hyperkalemia. Potassium is normally excreted by the kidneys, so disorders that decrease the function of the kidneys can result in hyperkalemia. Certain medications may also predispose an individual to hyperkalemia.

Hypokalemia, or decreased potassium, can arise due to kidney diseases; excessive loss due to heavy sweating, **vomiting**, or **diarrhea**, eating disorders, certain medications (such as diuretics), or other causes.

The normal blood potassium level is 3.5 - 5.0 milliEquivalents/liter (mEq/L)

or in international units 3.5 - 5.0 millimoles/liter (mmol/L).

Q: WHAT IS THE #1 SOURCE OF POTASSIUM IN PLANT FOOD?

A: BLACK STRAP MOLASSES

c. Magnesium:

Levels should be 1.3 to 2.1 milliequivalents per liter

MAGNESIUM: WHAT IS IT?

- **Magnesium is the fourth most abundant mineral in the body and is essential to good health.**
- **Approximately 50% of total body magnesium is found in bone.** The other half is found predominantly inside cells of body tissues and organs.
- Only 1% of magnesium is found in blood, but the body works very hard to keep blood levels of magnesium constant.
- **For a proper magnesium test, a person should have an Exatest done.**

This measures the magnesium in the tissue and not the blood, seeing that only 1% is found in the blood.

A blood test is an inaccurate test.

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Magnesium is needed for more than 300 biochemical reactions in the body.

- It helps maintain normal muscle and nerve function, keeps heart rhythm steady, supports a healthy immune system, and keeps bones strong.
- Magnesium also helps regulate blood sugar levels, promotes normal blood pressure, and is known to be involved in energy metabolism and protein synthesis.
- There is an increased interest in the role of magnesium in preventing and managing disorders such as hypertension, cardiovascular disease, and diabetes. Dietary magnesium is absorbed in the small intestines. Magnesium is excreted through the kidneys.
- Eating a wide variety of legumes, nuts, whole grains, and vegetables will help you meet your daily dietary need for magnesium. Selected food sources of magnesium are listed in Table 1.

d. Calcium:

- **Calcium is the most abundant mineral in the human body.**

The serum level of calcium is closely regulated with a normal total calcium of 2.2-2.6 mmol/L (9-10.5 mg/dL) and a normal ionized calcium of 1.1-1.4 mmol/L (4.5-5.6 mg/dL).

The amount of total calcium varies with the level of **serum albumin**, a protein to which calcium is bound.

- **Vitamin D** is an important co-factor in the **intestinal absorption** of calcium. Proper levels of magnesium are very important as well

#4: Serum Proteins: (I do not have the readings for this.)

#5: Total Bilirubin... Bilirubin is a yellowish pigment found in bile, a fluid produced by the liver.

- **Alkaline Phosphatase**
- **AST**
- **ALT**

***These reflect the Liver. The total bilirubin should be: 0.3 to 1.9 mg/dL ...

WHAT ABNORMAL RESULTS MEAN

Jaundice is a yellowing of the skin and the white part of the eye, which occurs when bilirubin builds up in the blood at a level greater than approximately 2.5 mg/dl. Jaundice occurs because red blood cells are being broken down too fast for the liver to process. This might happen due to liver disease or bile duct blockage.

- **May be elevated in some who are in the fasting state**
- Referred to as YoBare Syndrome, pronounced Gilbert
- A sluggish enzyme system in the liver for conjugating break down products of Red Blood Cells
- If all the other tests are normal, we're not too concerned about that.
- But if there is an elevation of the Alkaline Phosphatase Enzyme, AST or ALT, that is more reflective of some problems that have affected the Liver.
- In Hepatitis, you will get a rise in the AST and ALT.
- They usually go up very high, and sometimes the Alkaline Phosphatase may go up a bit..
If you get obstruction for any reason of the bile ducts, the Alkaline Phosphatase will go very high...

#6: U/A = Urinalysis:

***Give you a color of the urine and whether it is turbid, cloudy or clear and will give you a specific gravity

The normal where the urine is neither concentrated nor diluted = 1.010...

Concentrated Urine = >1.010 Diluted Urine = <1.010

***Most people who are drinking a fair amount of water, your urine should be clear/pale/very diluted
(Signs of lack of water = lower back pain; concentrated urine...color ranging from med light yellow to tea color or dark brown)

#7. PH

- **Normal = 7.35-7.45**
- The higher the #, the more alkaline
- The body will adjust and keep the blood PH almost to tenths of a point without about 7.4.
- It does it by changing the PH of the urine and how much a person is exhaling the Carbon Dioxide in the breath.
- *****The acidity or alkalinity of blood. A pH of 7 is neutral.**
- The lower the pH, the more acidic the blood.
- A variety of factors affect blood pH including what is ingested, vomiting, diarrhea, lung function, endocrine function, kidney function, and urinary tract infection.
- The normal blood pH is tightly regulated between 7.35 and 7.45

***When they do a U/A, they dip a stick into the urine and compare it to a color chart.

***You may get your Diagnostic test strips from **PH Ion**.

***Want a clean catch in a midstream...This will get the most reliable test results.

Understanding Lab Reports - Part 1

(Questions)

1. The life of the flesh is in the _____
2. What does WNL on a lab report sheet stand for? _____
3. What does CBC stand for? _____
4. What tests does the Chemistry Panel (Chem Panel) include?

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____

5. What tests does the CBC (complete blood count) include?

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

6. What are the Normal Ranges (according to the hospital) of the following?

Albumin _____

Alkaline phosphatase _____

ALT _____
AST _____
BUN _____
Calcium Serum _____
Serum Chloride _____
CO2 _____
Creatinine _____
Direct Bilirubin _____
Gamma-GT _____
Glucose test _____
LDH _____
Phosphorus serum _____
Potassium test _____
Serum sodium _____
Total Bilirubin _____
Total Cholesterol _____
Total Protein _____
Uric Acid _____

7. What does Lipid mean? _____
8. How many types of Blood Fats are there? _____
9. What is a truly health triglyceride? < _____
10. Will the triglycerides be high if a person is taking in an excess of fat whether animal or plant? YES or NO
11. What unhealthy food converts into triglycerides? _____
12. The cholesterol levels should be < _____

13. Name 2 ways a person can lower their cholesterol:
 1. _____
 2. _____

14. What does LDL stand for? _____
15. The LDL should be < _____
16. What levels do the labs say are okay? < _____
17. What does HDL stand for? _____
18. For men it should be > _____
19. For women, it should be > _____
20. For optimal health in both men and women, it should be > _____

21. Name two main reasons why the HDL is low.
 1. _____
 2. _____

22. Can very high levels of HDL be harmful? YES or NO
23. If someone's Fasting Blood Sugar is >99, what does that mean? _____
24. what does 100-125 = ? _____ - _____
25. >126 = _____
26. What does BUN stand for? _____
27. What is the normal ratio for BUN and Creatinine? ___ to ___ ratio
28. What are these two tests often representatives of? _____

29. What does EGFR stand for? _____
30. A normal eGFR is ___ or more
31. A low number might suggest what? _____
32. Is it possible to find normal BUN and Creatinine in early stages of Kidney Disease? YES or NO
33. Will the glomerular filtration rate be impaired during early stages of Kidney Disease? YES or NO

34. What are the two different ranges that eGFR have?

1. _____
2. _____

35. List the six Serum Electrolytes and what their normal levels should be

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

36. What is the name of high Sodium? _____

37. What is the name of low Sodium? _____

38. What is the name of high Potassium? _____

39. What is the name of low Potassium? _____

40. What is the #1 source of Potassium in the diet? _____

41. What is the 4th most abundant mineral in the body that is essential for good health? _____

42. Where is approximately 50% of magnesium found? The _____

43. How much magnesium is found in the blood? ___%

44. What kind of test is a great test to get done in order to get a proper magnesium test done?

45. What is the most abundant mineral found in the body? _____

46. What mineral is for the muscles? _____

47. What mineral is for the bones? _____

48. Is Vitamin D an important co-factor for proper calcium absorption? YES or NO

49. If the Vitamin D is <30, will calcium be able to do what it should? YES or NO

50. What do the tests ALT and AST reflect? The L _____

51. What do abnormal results mean? _____

52. Can the Liver tests be elevated in persons who are fasting? YES or NO

53. Will you get a rise in the AST and ALT in Hepatitis? YES or NO

54. What does U/A stand for? _____

55. List some of the signs of a lack of water:

1. _____
2. _____
3. _____

56. When they do a U/A, they dip a _____ into the urine and compare it to a _____ chart..

57. What kind of catch do you want during midstream? A _____ catch