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What Does All That Laboratory Work Mean?

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Now that you have a comprehensive health plan for your life (see Parts 1-IV in the previous editions of *The Examiner*), let's move on to how you measure your health in the laboratory. What do all of those numbers mean? And, this question brings up an important issue. Many people are promoting various measurements of your body. Some of these either have no meaning or the meaning is unclear. For instance, you can send off a sample of your hair and get it analyzed. The only problem is that no one knows what those numbers mean.

It is as Albert Einstein said, "All things cannot be measured and all things that can be measured are not worth measuring." The things we measure are worth measuring and we do know what the numbers mean, but we want you to know what they mean, also.

As I begin a physical exam on my patient, I review the Health Maintenance screen in SETMA's electronic medical record. The Health Maintenance lists and tracks basic screening tools necessary to prevent illness, or detect a disease before it has a chance to take hold and do serious damage. This is your "health report card" and it is very helpful. I also review this when I am closing out a visit for illness as a way to nudge the patient into scheduling a physical examination. The following are a few things a healthcare provider thinks about when he/she is looking at lab work for screening and monitoring.

One of the first things we commonly measure is a complete blood count (CBC). This becomes an important measurement in the chronically anemic patient. We try to measure it twice a year on the stable, yet chronically anemic patient. Of course, we may measure it more frequently if the patient has symptoms, or if we begin new or additional treatment for the anemia. If your red cell counts are low, your provider will work hard to find out the source of the anemia. The CBC also tells us some things about your immune system and your ability to clot your blood. Some clues to vitamin deficiency can be seen in the CBC. The size and shape of your red blood cells, as indicated by certain numbers can suggest to us the cause of your anemia, and can also suggest whether your anemia is acute or chronic.

Your blood chemistry is the next test we look at. We call it a comprehensive metabolic profile (CMP). If you are on multiple medicines that may affect the kidney or liver we will probably look at this twice a year, if you are on a stable regime. The sodium, potassium, chloride, and carbon dioxide, and blood urea nitrogen measurements help us determine how well you are hydrated, i.e., do you have adequate fluid balance in your body and do you have proper concentrations of electrolytes in your body.

For a human being, the most valuable minerals are not gold and silver. Sodium and potassium must be in balance for proper functioning, so that makes them very valuable. All muscles, including your heart, depend on these “electrolytes” and their flow in and out of cell membranes produce movement, sensation and conduct electricity. That is why we call them electrolytes. We particularly watch the potassium when you are placed on supplement of this electrolyte. This becomes important to monitor when the patient is on large doses of diuretics (fluid pills). Be cautious in using “lite salt” as it contains very high amounts of potassium.

The blood glucose (sugar) is also measured. This is a screen for diabetes. If your blood sugar is 110 to 125, when fasting, you have “impaired fasting glucose”. To further evaluation your glucose levels and your insulin response (see our recent discussions of insulin in *The Examiner*), we may order a glucose tolerance test. From a more practical perspective, we may have you go out to a fast food restaurant and eat a high carbohydrate meal. You come back to us two hours later for a blood sugar finger stick. We have found many people who are diabetic by using this strategy. We find many who have blood sugar well over 140 and many a good deal higher. If at any time (fasting or not) your blood sugar reaches 200 you are considered to be diabetic. If the fasting blood sugar is 126 or higher on two separate occasions then you are also considered diabetic.

Another major measure in the CMP that we pay close attention to is creatinine. Creatinine is a waste product of muscle metabolism and is cleared from your blood by the kidneys. If your kidneys are working well there should be very little of this in your bloodstream. The creatinine goes up as kidney function deteriorates. It is a very important measurement for our hypertensive patients and those with diabetes, as those two conditions can harm the kidney function. Also, many of the medications to treat these conditions can affect the kidney. This is so important that a 5mm of mercury decrease in your diastolic (the lower number) blood pressure results in a 37% decrease in kidney damage.

Liver enzymes are also a part of the CMP. Liver enzymes are the naturally occurring proteins in your liver cells. When these enzyme levels go up, it means you have damage to your liver cells. Any elevation of the ALT enzyme will usually prompt us to look at a hepatitis profile. Enzymes can also elevate with obesity (fatty liver), excessive alcohol intake, and the use of statin (cholesterol lowering) drugs. If you are on statin drugs, we will measure the liver enzymes six weeks after you first begin the medications and repeat them six weeks later. After you are on a stable dose of medication we will look at them twice a year.

Remember, drugs must be processed through the liver and/or kidneys. If you are on medications daily, it is important to look at the functions of those organs. We can do this with the CMP. If there are abnormal measurements of significance, this will prompt us to look further or change our treatment plan.

If you have the diagnosis of diabetes, you will have your glycohemoglobin measured every 3 months until it reaches a desirable level of control. This is a “look back” test that tells us your average blood sugar for the past three months. We like this reading to be 6.5 or less. Of course, it is also important for those with diabetes to bring us blood sugar diaries. We pay special attention to the after meal or “post-prandial” blood sugars. This is a good index of dietary management and can be used as an educational tool for the patient because they will discover which foods elevate their blood sugars. The post-prandial blood sugar is especially relevant to our Type 2 diabetics, remembering that 90% of the people who have diabetes have Type 2.

Lipid profiles become very important because they help us project your risk for cardiovascular disease. (see The Examiner, January 3, 2002) It consists of four measurements. The total cholesterol should be under 200. This measure is not as important as it once was because the other measurements help us design our treatment. The HDL should be at least 35 in men and 45 in women. Of course, we like it as high as we can get it because it is the “highly desirable” cholesterol that protects our blood vessels. The LDL should be less than 130 in the general population. If you have an unfortunate genetic background, diabetes, hypertension or known cardiovascular disease, we want it less than 100. The triglycerides should be less than 160 for the general population and closer to 100 for those with risk factors. As your triglycerides approach 500, we begin to get very concerned that your pancreas will become inflamed. We treat the abnormal cholesterol profile very aggressively in high risk populations. High levels of LDL in particular make plaques (yes, you have them) unstable and an unstable plaque can set the stage for a heart attack or stroke.

The next item to cover in the laboratory area is the urinalysis. This lab can tell us whether or not you have a urinary tract infection. It also lets us know if you have blood in the urine. We will treat and monitor both of these conditions carefully. It also lets us know about hydration.

Finally, if you are over 40 we will send stool cards home with you to check occult blood in the stool. This is a simple screen for colon cancer. Patients complain, telling me, “There is not any blood in my bowel movements!” I tell them these cards check for hidden blood because I know they have the good sense to come see me if they can actually see the blood. Turn these in, any clinician can tell you about the colon cancers we found early and the lives that were saved by early detection.

These are just some of the things we monitor on our patients. These yield a lot more information than what I’ve discussed here. I highlighted the most common things we look for in the results. Discuss and understand your lab work with your provider.

Remember it is your life and your health.