

## 7 - STEP I - TESTING

**Excerpted from the book Quantitative Medicine**

### QUANTIFYING YOUR HEALTH

**H**ealth is measured with scans and blood tests. Unless there is a problem, scans would be done infrequently: every couple of years. Blood tests, though, should be done more frequently, some quarterly. There are five categories of blood tests to be considered:

- Tests done only once.
- Tests done in response to a specific symptom.
- Tests done annually.
- Test done twice a year.
- Tests done quarterly.

This may mean, initially, that quite a few tests should be done. There may be some expense involved depending on a variety of factors. Quantitative Medicine is not completely covered by most insurance. More on that later. The test list will evolve. Before diving in, consult [QuantitativeMedicine.net](#) for the latest list (and pricing). Enter “Blood Test Panels” in the search box. The availability and usefulness of the various tests are moving targets. Several important tests are no longer available. The reasons for this are unknown, but almost surely financial. We hope they return, along with some useful new ones. Good health depends on good testing.

## Tests Done Only Once

These tests tend to indicate things you either do or do not have, but if you have them, you are basically stuck with them. So why bother? These particular tests mean certain risks. For instance, high Lp(a), a cholesterol variant, significantly increases the risk of heart disease. It's genetic and around 10% of the population has it. There is currently no cure, but having it doesn't mean you are condemned to get heart disease, You are predisposed to it though. By adopting lifestyle practices that reduce heart disease risk, you can effectively counteract high Lp(a).

You might already have had these tests. If so, there is no need to repeat them. Here is the list of do-once tests:

- **Lp(a).** Already mentioned, Lp(a) is a lipoprotein (cholesterol) variant that increases heart risk. About 10% of the population is at risk. See the “Is Your Lp(a) High?” section in [chapter 9](#) for details.
- **APO-E4.** Apolipoproteins are a family of proteins that coat LDL, HDL, and chylomicron particles in order to make them water soluble. The APO-E4 subtype is a strong risk factor for Alzheimer's. See “Do You Have the APO-E4 Variant?” in [chapter 9](#) for details. Again, the best way to fight it, indeed, the only way, is through heart-healthy practices, and knowledge of its presence provides strong motivation. Normally this test is ordered after it is too late. Caught early, the risk can be substantially reduced.
- **TTG and Gliadin Antibodies - Gluten Intolerance.** Gluten intolerance is a severe reaction to gluten, found primarily in wheat. In the extreme, it is called celiac disease. Some cannot digest wheat at all. The solution is simple though: cut out wheat and other glutes. See “Are You Gluten Intolerant?” in [chapter 9](#) for details.

Though pricey (~\$200 for the lot), these tests need not be repeated.

If either APO-E4 is present or Lp(a) is high, a serious lifelong discipline will be needed comprising a strict diet and strenuous exercise program. It's bad luck to have these, but by acting now, the consequences can be avoided. A strict diet and strenuous exercise program, if begun early, will prevent just about every other degenerative disease too.

## Tests Done Once and in Response to a Specific Symptom

Some tests should be done once and also if a problem is suspected:

- **MTHFR.** A persistently high level of homocysteine, a frequently measured blood marker, could indicate an MTHFR deficiency. See “Do You Have MTHFR Deficiency?” in [chapter 8](#) for details.
- **H. pylori** is a stomach bacteria and a nasty one. It causes stomach cancer, ulcers, and other serious problems. It is fairly common in the west, but endemic in much of the developing world. It should be treated with antibiotics. It is a tough bacteria, and several courses of antibiotics could be needed. Normal practice is to treat it when a symptom develops. It’s better to be preemptive. H. pylori should be tested once, and retested again after any trips to countries having a strong prevalence. Re-test for this if living in Asia, visiting, or experiencing chronic stomach distress.

We are about to dive into the tests that should be done on a periodic basis. There is one test that should be done annually, and a couple of tests to be done bi-annually, and then a panel of quarterly tests. It is these quarterly numbers that run the show.

### Tests Done Annually

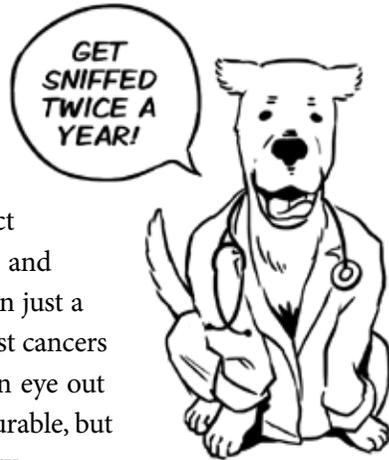
**Thyroid.** Test Thyroid Stimulating Hormone annually. The test is called TSH and could indicate thyroid problems if too high. In such cases, energy levels will be low, and exercise will have less benefit. The standard “too high” level is 4 uIU/ml (or mIU/L), but the warning bells should chime at anything above 2.5. For men, a doctor should be seen if this is the case and total testosterone is below 350/dl. For women, T3 and T4 should be measured, and a doctor seen if they are low. We cannot give a precise number here, because different labs use different tests for this one. So here “low” should be taken to mean low according to the lab report. The cure for a weak thyroid is levothyroxine, a very inexpensive prescription medicine.

### Test Tumor Markers Twice a Year

There are many tests available that could indicate cancer, and indicate it at a stage early enough for effective treatment. These are PSA, for the prostate, and

CA-125 for ovarian cancer. If CA-125 is above 20 u/ml, see your gynecologist. For PSA, trend is important, meaning more than one measurement is needed. If PSA rises more than 0.6 ng/ml in a 12 month period or less, see a urologist. If PSA is over 3, a urologist should also be consulted.

By the time you read this book, these tumor markers may be out of date. There is an enormous amount of work going on in this area. A fair amount of it is trying to come up with a machine that can match a dog's cancer sniffing ability. (Some trained dogs can reliably detect several cancers better than any machine and with an astonishing degree of accuracy.) In just a few years, it may be possible to detect most cancers at early, curable stages. Be sure to keep an eye out for these. Caught early, most cancers are curable, but caught late can be an entirely different story.



### **The All Important Quarterly Tests**

There are about a dozen or so key blood markers that strongly determine your health, and if not in the ideal range, strongly indicate which areas need to be changed. All these markers should, ideally, be measured quarterly. This is not that expensive, probably under \$250, and certainly worth the money. The sicker you are, the more insurance will pay, but it's hard to get a dime out of them for prevention, but prevention is the cornerstone of Quantitative Medicine. There is detail on how to get these tests, how to figure out which ones insurance will pay for, how to avoid overcharging, and how the insurance companies dictate medical care in the "GETTING THE TESTS AT A REASONABLE PRICE" section, later in this [chapter](#).

Sixteen or so tests is a lot to become expert on, so we have sorted them into five groups that specifically relate to degenerative diseases.

- Sugar/Starch Management Group—how well you can metabolize sugar?
- Lipid Management Group—HDL and triglycerides.
- Stress Management Group—is external or internal stress affecting your health?

- Anabolic Management Group—is your exercise level getting you into a healthy anabolic state?
- Organs, Iron, and Bones.

Each group has two or three measurement numbers in it, which often tend to move in concert.

If you “fix” all these numbers, your risk of degenerative disease will decline. If you *really* fix them, substitute “plummet” for “decline.” Here is an example where one size really does fit all. The various diseases may look different, but their root causes are all the same.

However, beware: “fixing” the numbers with supplements, as opposed to lifestyle changes, WILL NOT WORK, and usually backfires. Niacin is a perfect example. It raises HDL, the “good” cholesterol, but shortens lives, not the direction we want to head. However, HDL when raised by lifestyle change, increases longevity, and reduces both heart disease and cancer.

Many people are taking all sorts of supplements, and there are innumerable books on the topic. Over-the-counter supplements are basically drugs, and ought to be viewed that way. We would suggest you stop taking them all if embarking on the Quantitative Medicine program. Other than vitamin D, and in some cases B-12, we know of no case where supplements are beneficial, and frequently, they are harmful.

Your numbers may not need fixing. They may all be OK. You would then already be at low risk and could count yourself very lucky indeed, or maybe you have been taking very good care of yourself or maybe you are a hunter-gatherer. Otherwise, with just reasonable luck, you may have a single main issue. It could be sugar or stress management or something else. When you focus on this issue, you are performing this experiment: Will making this lifestyle change fix that number? Suppose you succeed. You have “proved” the lifestyle change did what you hypothesized. Doesn’t mean it will work for anybody else, but that doesn’t matter. The experiment you are performing is all about you.

Results vary. People vary. To our knowledge, no one has ever gotten worse using the Quantitative Medicine methodologies contained in this



book. Without exception, everyone has gotten better and many considerably so. We are talking about a couple of thousand people here. Many reversed degenerative diseases, and will keep them reversed. No other medical interventions have anything like this level of success.

Avoid the trap of deciding that you will simply do every lifestyle change suggested, so no need to bother with the tests. Be honest. Without that gun at your head, you won't keep it up long term. Take the tests, see specifically what is going on, and determine the lifestyle modifications that will tend to drive the numbers to their ideal zones. You can win. It just takes work. We won't belabor this point, but bear in mind that in things related to health, it is invariably better to ask the hard questions up front, by actual testing, than to make assumptions based on gut feel, or worse, wishful thinking. The reality always contains surprises, both positive and negative.

Here is a summary. This test lists may change. For the most up-to-date ones, and other info, go to the website, [QuantitativeMedicine.net](http://QuantitativeMedicine.net), and search for "Blood Test Panels." There may be new, improved tests, or price breakthroughs.

### Medical Testing

#### **Blood tests**

It is said that it is best not to know how laws and sausages are made. This might well apply to blood tests. In most cases, it is a multi-step process, and they measure something that is related to something else, that is related to something else, etc., and that is finally related to the item of interest. For example, total cholesterol is extracted from the blood using one chemical which produces two forms of cholesterol which are then combined using a second chemical, and that reacts with a third chemical, which produces a purple colored result, the shade of which is interpreted as the total cholesterol. At least this is one way to do it. The various commercial labs *do not say* how they make the measurement. Seems odd, but it's true.

LDL cholesterol and VLDL aren't measured at all. They assume that 20% of circulating triglycerides are tied up in VLDL, and then manufacture the VLDL number by multiplying triglycerides by 0.2. LDL is computed by subtracting VLDL and HDL total cholesterol.

Several of the tests are standardized and verified by the FDA to match across different labs. This would include HDL, total cholesterol, glucose, triglycerides, TSH, cortisol, ALT, bilirubin, AST, and creatinine. This is a nice start. Other tests might vary from lab to lab. With the exception of Lp(a), they do not seem to vary much. Even so, it is a good idea to stick with the same lab, as a trend in results is likely to be more reliable.

The most inaccurate test is Lp(a). Lp(a) is a risk factor for heart disease. It is an LDL particle with an additional protein string attached. The cholesterol content of Lp(a) is included in the LDL measurement. Lp(a) should therefore never be higher than LDL, but in reality, the measurements often indicate that it is, a logically impossible situation.

We hope that the future brings better, cheaper, and more accurate measurement. We follow this very closely. Before a blood test, it would be good idea to consult the [QuantitativeMedicine.net](http://QuantitativeMedicine.net) web site for the latest information. Search for "blood test panel."

**Test Once:**

- Lp(a) - an LDL variant that greatly increases cardio risk
- APO-E4 - a risk factor for Alzheimer's
- TTG and Gliadin antibodies - gluten intolerance

**Test Once and When Necessary**

- MTHFR - possible cause of elevated homocysteine
- H. pylori - presence of a dangerous stomach bacteria

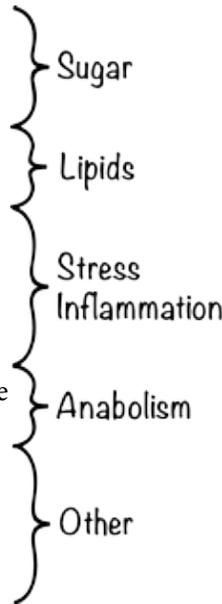
**Test Annually**

- TSH - indicator of thyroid function

**Test Every Six Months**

- PSA (men) - indicator for prostate cancer
- CA-125 (women) - indicator for ovarian cancer

**Test Quarterly**

- A1C
  - Fasting glucose
  - Insulin
  - Triglycerides
  - HDL
  - Cortisol
  - C-Reactive Protein (CRP)
  - Homocysteine
  - Total Testosterone
  - IGF-1
  - Creatinine
  - Liver: AST, ALT, GGT, bilirubin
  - Ferritin
- 

**SIXTEEN TESTS AND FIVE CATEGORIES**

## UNDERSTANDING THE FIVE CATEGORIES

The five categories, built around 16 different quarterly test numbers, are shown above. These drive your health and are the numbers we are going to work with. Changing these numbers will change your health. You will soon be an expert, but before we dive into their meanings, and how they affect health, we should offer a couple of caveats. First, everyone is different. Basing health improvement decisions on these numbers works well for 80% to 90% of us. For some, it may not work. It won't be dangerous, but the desired result may simply not occur, or may occur very slowly. Second, other things have to be in a functioning state. For example, if your liver is not working well, the Quantitative Medicine program will be less effective. This applies equally to other organ functions. However, waiting for a thyroid, liver, or kidney to come into line is no reason to delay the process. The Quantitative Medicine lifestyle and protocols will speed up those recoveries as well.

### The Sugar Management Group

This includes fasting glucose, A1C (average glucose), and insulin. These should be measured quarterly. Why insulin? The body secretes insulin in order to clear out excess blood glucose. Although triglycerides officially belong to the lipid group, we will have them make a guest appearance. Triglycerides tend to be created out of excess sugar in general, and excess fructose in particular. Read all about sugar in the STEP 2 - PUTTING IT TOGETHER chapter coming up.

How serious is the need to manage sugar? In most of our ancient past we only got sugar from fruit and occasionally honey, and those only a few months of the year. Only in the 20th century did sugar become something that could be separately manufactured and added to other food. And added it is! The health impact of this is hard to overstate. Suffice to say that if sugar had been discovered in the last 20 years or so, it would almost certainly be a banned



substance along with heroin, cocaine, crack, and the like. It is implicated in many of the degenerative diseases, particularly heart disease, cancer, adult onset diabetes, and Alzheimer's. Without sugar and starch, these diseases probably wouldn't be occurring, or would at least be far less pervasive.

## **The Lipid Management Group**

Lipids (fats) of interest here are HDL, triglycerides, and Lp(a). Lp(a) need be measured only once. HDL and triglycerides are measured quarterly.

Usually, it is cheaper to get a lipid panel, which will also include total cholesterol, LDL cholesterol and VLDL. The drug tests usually just "compute" VLDL (20% of triglycerides) and LDL (total-HDL-VLDL).

LDL particle size varies. A predominance of larger ones is called Pattern A, and is a major key to heart health. Pattern B means that primarily smaller LDL particles are present, and this is undesirable.

The principle cause of atherosclerosis is the leakage of circulating junk that occurs during arterial cell wall replacement. The larger LDL sizes tend not to leak through, while the smaller ones definitely do. For this reason, the larger Pattern A sizes mean a much lower risk of heart disease.

We would propose to have the pattern or the size measured, but at this time, the test isn't standardized, and different methods yield different results, though they are similar.

We can estimate pattern type using the triglyceride measurement. Low triglycerides = large particle size = Pattern A. High triglycerides = small particle size = Pattern B. At some triglyceride threshold, people will flip from Pattern B to Pattern A and will stay there as long as they stay below this threshold. Unfortunately, this threshold varies from person to person. Almost everyone will flip to Pattern A if they can reduce and maintain their triglycerides to a level lower than 100 mg/dl. Many will achieve Pattern A with triglyceride levels as high as 150, but reducing triglycerides isn't difficult, so there is no reason not to aim for a lower number, 100 say, or even 75.

Smoking and trans fats cause particle sizes to shrink. Fortunately trans fats have largely disappeared from the Western diet. (Naturally occurring trans fats—palm oil for instance—are no problem.) Exercise will cause an increase in particle size. Diet has a greater affect, with excess sugar or starch being strongly implicated. High triglycerides cause small particle size.

You can, if you wish, get a test for LDL pattern type. The Gold Standard for this test was a method called Gradient Gel Electrophoresis (GGE). The company that developed and performed this test was acquired by Quest, and the test has disappeared. Three other tests are out there which will perform a Pattern A/Pattern B analysis: Ion Mobility, NMR, and VAP. We prefer them in that order. If your triglycerides are below 100 mg/dl, you are highly likely to be Pattern A, and it is a near certainty if triglycerides are below 75.

High Lipoprotein(a), also designated Lp(a), is a special condition that significantly increases the risk of heart disease. This can be ameliorated by a serious lifetime discipline. See the “Is Your Lp(a)High” section in [chapter 9](#).

## The Stress Group

Stress may have many causes. There could be internal physiological stress. If ideal homeostatic reference points are not being met, this will typically happen. The damage that results will produce inflammation, which indicates that the body, more specifically the immune system, is battling something.

To most people, though, stress means the psychological sort. Our modern civilization itself seems, for many, to be a direct cause. In any case, chronic stress, psychological or physiological, is a formula for cancer and other diseases. Dealing with the stress is every bit as important as exercise or optimizing a diet.

The body reacts in surprisingly similar ways to these two sorts of stress. One common denominator is inflammation and you will often hear that inflammation is bad. Actually, it is the cause of the inflammation that is bad. Inflammation, though damaging in and of itself, is the lesser of two evils. The cause would do more damage if the body did not combat it. Atherosclerosis is a good example. Inflammation is the body's attempt to stabilize stuck oxidized rancid LDL particles. The immune system will try to remove them in



various ways, and failing that, will attempt to wall them off. If it didn't do this, the oxidized material would be likely to eat through the arteries or poison us in some way.

Continuous stressful situations lead to elevation of several blood markers. In particular, we look at, cortisol, homocysteine, and C-Reactive Protein (CRP). These should be measured quarterly.

### **The Anabolic Group**

IGF-1 stands for Insulin-like Growth Factor-1. It got this odd name because it resembles the insulin molecule, and not because it behaves like insulin. It's produced by a different organ (the liver) and has different functions. Specifically, it accelerates cell turnover and growth. Its normal level in childhood is around 100 ng/ml. With the onset of puberty it soars to 1000 or more, attesting to its potency. Most readers will have had some experience with this. IGF-1 then drops to around 200 in adulthood, gradually declining to maybe 100 in old age. If you are exercising, your body will raise your IGF-1 level. This signals cells to repair, grow, and divide. This is anabolism, the building of new body parts.

Testosterone has a life track similar to IGF-1 and has anabolic properties in both men and women. Testosterone levels increase with exercise, but whereas IGF-1 turns on repair and building in specific areas that need it, testosterone is more broad brush, up-regulating anabolism and muscle building throughout. Women produce less testosterone than men, but use it far more wisely. You probably knew that.

IGF-1 and testosterone should be measured quarterly.

### **Kidneys and Microvascular Health**

Microvascular health is just what it sounds like: the health of your tiniest blood vessels. These are the capillaries, of course, and eventually all the arteries branch down to them. They are hardly larger than the various blood cells and biochemicals flowing through them, but they are very numerous. Most of your 50 trillion cells must reside close to a capillary to get their necessary nourishment. Unravel the capillaries and lay them end-to-end, and they go twice around the earth. That's quite a lot of capillary.

Capillaries clog easily. This does not carry the life-threatening specter of a major clogged heart artery (heart attack) or brain artery (stroke), and

indeed, if a few capillaries clog, usually no big deal. But what if a lot of them clog in a specific region? That would cause that region to start to die. Where would this be likely to occur? Generally the extremities: the toes, the fingers, the eyes, the brain, and the kidneys. In the worst cases, this means amputations, blindness, loss of cerebral function, and so on. Not a pleasant picture.

Even though microvascular health issues may lack the drama of heart attacks or strokes, they are perhaps just as important, and unsurprisingly, they respond to the same lifestyle modifications as the big arteries: Anaerobic exercise will significantly improve microvascular function.

We would like to measure this. Microvascular health would not show up on a scan, but there is an interesting blood number we can use: creatinine. Creatinine is naturally produced bodily junk and one of the kidney's tasks is to get rid of it. Now the kidneys are very complicated, but one major part is an elaborate strainer, constructed by a huge network of tiny blood vessels. This is a handy microvascular proving ground. If the tiny blood vessels are clear, the kidneys will work well, and creatinine will be removed. If the microvascular health of the kidneys is poor, creatinine levels will rise.

Now the microvascular health of the kidneys is going to be very similar to the microvascular health everywhere else. So this one measurement is going to give us the big picture—microvascularly speaking. A creatinine level at or above about 1.2 mg/dl is bad. This indicates serious microvascular disease. Often the lab reports will indicate a normal range of 0.7 to 1.2. Ignore that. Anything over 1.0 is a red flag. However, high creatinine levels are reversible. With appropriate exercise, the level can be moved from the danger zone, 1.2, to a very healthy level, 0.9 or even lower. Measure creatinine quarterly.

The kidneys also have several hormonal functions. They additionally regulate several key circulating electrolyte levels. Kidney function is very key to overall good health.

### **The Liver - the Body's Swiss Army Knife**

While the kidney or pancreas may have half a dozen functions in their repertoire, the liver has at least 500. Besides having first dibs on just about everything you eat or drink, it is responsible for all production of VLDL and HDL. It manages an intermediate storage facility for glucose and

runs an alchemy operation on the side where it can perform the following transformations: sugar into fat; protein into sugar; even fat into sugar.

Not surprisingly, the liver is an organ you cannot do without: it is just too complicated. If there are any disruptions to the liver, numbers throughout the body tend to go haywire. (If your liver numbers are bad, you should ignore other numbers, fix the liver problem, and retest.)

The liver numbers are AST, ALT, bilirubin, and GGT. They should be within the normal ranges, which will be indicated on the test results. The three main things that affect liver function are hepatitis, fatty liver disease, and excess alcohol. Acetaminophen can damage the liver too. The liver is otherwise a very robust organ, constantly regenerating itself. Make sure your liver numbers are in their normal ranges. Liver health is crucial. Measure quarterly.

## **Controlling The Price of the Blood tests**

The simplest method is to not live in America. Then you can just get the tests and be done with it. The cost will likely be under \$100, and of course, they may be paid for by the national health coverage anyway.

However, things are not so sanguine in the United States of America. With one major exception the “list” price for blood tests is absurdly high. See the chart a few pages along for some example list pricing. Your doctor may be unaware that much lower pricing is available to you, and available via several different routes, and may be worried that things are going to spiral out of control, cost-wise. However, you are never going to have to pay those outrageous list prices. Below, we explain exactly how to avoid it.

In any case, you can always ask your insurance company what they will pay for directly. However, since our sort of testing is not something they are usually handling, this may be somewhat futile. Or unreliable.

For those tests that the doc thinks can't be justified, plan to pay cash. The doc can write a separate requisition for cash tests.

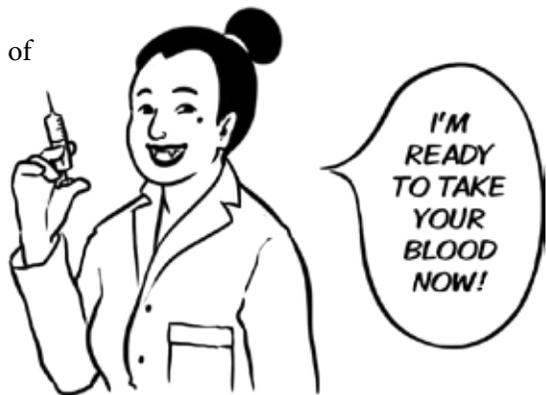
There are two effective ways to deal with the test-price issue, both reasonably economical, and a third way, just now becoming available, that is yet a further cost improvement.

**Method 1: Explore your inner Persian carpet merchant.** Walk in, say: “no insurance, what's the cash price.” You don't need real cash, you can still pay with a credit card. They will probably quote you a quite good

price, but they may quote list price. Insist on the cash discount. They all have one, but some of them make you ask for it. However, you will have consulted the [QuantitativeMedicine.net](http://QuantitativeMedicine.net) website in advance, and will know that the tests can be gotten for some certain price, so unless they quote lower, negotiate. Tell them to contact the mother ship and get a lower price, the Medicare price, or the Medicaid price. Some lower price. Wheedle and whine. This nearly always works. The staff in the draw center is usually sympathetic. Print the material from the website and show them lower prices. They are still making plenty of money, so have no mercy.

**Method 2. Get your own tests.** This is easy, legal (in most states), safe, and completely identical to the tests your doctor would request. If you have any misgivings, discuss them with your doctor. Listed on the web site are “retail outlets” for two major nationwide blood draw centers. There are dozens of such outfits. They will take your money on-line, email you a prescription signed by some mysterious doctor, and instruct you to proceed to the nearest Quest or LabCorp blood draw center. From that point on, it is no different from walking in with your doctor’s prescription, except no more cash changes hands. They will take your blood, do the analysis, which will be exactly and completely the same as the one that would have been ordered by your doctor. In a couple of days, the results will be emailed back to you and only you. These can then be forwarded to your doctor.

Costs here vary, but as of this writing, one of these outfits has 13 of our 16 quarterly tests for a \$141 grand total. The other two tests are available at their arch rival for \$90, so the grand total here, if you paid 100% out of pocket, should never exceed \$231.



That’s three tanks of gas. Now if you just waltz into the blood draw center and let them take some blood, a single test might cost more than that.

**Method 3. Local Labs.** While Quest and LabCorp are nation wide,

there are numerous regional labs. Theranos, for instance, is a startup, and the grand plan is that they will offer blood draw and analysis services in 8,200 Walgreen's all across the U.S. Their prices are quite low, and it would be a great benefit for the Quantitative Medicine approach should they succeed. The Theranos requisition is interesting in that it lists the actual prices you will pay, an absolute first for the American blood testing industry. For our 16 quarterly tests, the Theranos cost is only \$94.57.

There are other regional labs, and they might have competitive prices. Your doctor should be well aware of them.

There are also other start-ups with various proprietary technologies that may revolutionize testing in other ways. Some are specializing in early detection of cancer.

The approval process for new test methods can be onerous, sometimes taking years, and we further expect the established providers to become very defensive.

In any case, both you and your doctor should go over the blood test results. Best if you review them together, but don't become overly concerned if some of them are not in their normal ranges. This usually isn't serious and can usually be fixed.

## **About Panels**

The blood test companies love batch testing. Their machines are set up for it. For instance, the "comprehensive metabolic" panel, costing between \$10 and \$30, includes glucose, creatinine, AST, and ALT, four of our 16 tests. Likewise, a lipid panel, costing about the same, will provide triglycerides and HDL. Panels often represent a significant savings.

## **Insurance Co-Pay and Deductibles**

Many types of insurance will have co-pays, where you pay part of the bill, and most policies have a deductible, where you pay 100% until the deductible is reached. Now the cost is relatively well contained here, because the insurance company has negotiated a low rate, and usually a good one. But again—buyer beware. You may be better off paying cash. The price may be lower still. You can inquire on the spot at the blood draw center. Just tell them that you don't think you will hit your deductible, so could

you instead have the cash price. That's usually lower. Of course, if you pay cash, you don't use up your deductible, so you will have to strategize as to which would be best for your case. Medicare has no co-pay or deductible, but there is another pitfall there: ABN.

### **Medicare Recipients: Beware of ABN**

ABN stands for Advance Beneficiary Notice, and is intended to protect Medicare from unnecessary procedures, and the patient, you, from unpleasant surprise charges. However, the charges are still unpleasant, just not a surprise. If the physician wants to order a test for you, but doesn't think Medicare will cover it, he is obliged to have you sign an ABN, which is supposed to include the price you will have to pay. Rules are changing, and there is a lot of confusion. However, if you sign an ABN, and if Medicare doesn't cover the procedure, you will be stuck with blood work charged at the hugely inflated "list price," not the nice low Medicare price.

There is no need to take this risk. Don't sign the ABN, but do get the test. Just tell your physician to remove the test from the requisition that would be submitted to Medicare, and write a separate one for the test(s) that Medicare may not cover. Then follow the procedures outlined in the preceding section.

So just say NO to any ABN that your physician wants you to sign, get him to write a separate requisition, pay cash, and avoid the ABN price trap.

Here are ABN prices from a lab that carelessly put their ABN procedures document on-line. This document has fallen into the wrong hands (ours). The name of the lab has been fictionalized. Excerpts:

<b>Test</b>	<b>ABN Price at "Welcome To My Parlor" Labs</b>	<b>Theranos</b>	<b>Walk in Labs, LabCorp Retail</b>	<b>New Century Labs, Quest Retail</b>
<b>Fasting Glucose</b>	\$44	\$2.70	\$27	\$10
<b>PSA</b>	\$130	\$12.65	\$35	\$17
<b>Triglycerides</b>	\$77	\$3.95	\$27	\$15
<b>Hemoglobin A1C</b>	\$68	\$6.67	\$27	\$14
<b>HDL Cholesterol</b>	\$87	\$5.63	Included with triglycerides	Included with triglycerides

## SCANS

Blood tests, though valuable, have their limits. The other major technology available to take a non-invasive look inside is the full-body scan. The scan will measure several important things that blood tests cannot. We advise that one be done periodically, perhaps every five years if there are no problems. There are several sorts of scans, but the one of interest here is the CT (Computed Tomography) or “cat” scan. The CT with the lowest exposure is called EBT (Electron Beam Tomography). The exposure is very moderate and will not likely be a problem. All these machine work by rapidly spinning an x-ray around you. The EBT accomplishes this by moving the x-ray beam electronically, which is inherently much faster than moving it mechanically, as is done in a normal “cat” scan.

If the scanner is an EBT machine, they will say so. Otherwise it is the mechanical type, the “normal” cat or CT scan, and is designated by the number of “slices,” the range being 4, 8, 16, 64, 256, and 320. This refers to the number of x-ray sensors the machine has. From the manufacturer’s point of view, each sensor depicts a “slice” of you. More slices means it’s over quicker and hence less exposure. The exposure from a 256 or 320 slice machine is on par with the EBT and is thus quite low.

We need to mention that both the CT and EBT machines are X-ray measurements and excess exposure to x-rays increases your risk of cancer.

However, the increase in cancer risk with the recommended machines is well under 1%, likely closer to a tenth of that. Such risks are hard to measure and are more than offset by the life saving information that you will be obtaining. Further, if you follow the protocols given in this book, you will be decreasing your cancer risk between 50% and 100%, which completely swamps any tenth percent increase.

Try to find an EBT machine or one of the newer 256 or 320 slice machines. If the scan center is offering any of these, they will usually advertise it. Otherwise, ask, or assume it’s 64 slice or less. Since insurance doesn’t typically pay, the scan industry tends to have reasonably competitive pricing. We know what you are thinking: reasonably competitive pricing couldn’t exist in American medicine. But it does. They even have sales and specials. At least one outfit offers a couple’s deal. How romantic.

We recommend a full-body scan with a virtual colonoscopy, even if you are under 50. If you have any reason to suspect you may have a heart problem, have ever smoked or been exposed to second-hand smoke, or are over 50, we strongly recommend it. This is the most complete scan, though lesser scans are also useful. A complete scan will reveal the presence or absence of several life-threatening problems, and most importantly, will provide enough advance notice about these potential problems to take an early and effective action.

The full-body scan will reveal these:

- Amount of heart calcium—the best non-invasive measurement of atherosclerosis.
- Bone density—how far are you from osteoporosis?
- Colon problems—any early signs of colon cancer.
- Thoracic or abdominal aneurisms—these can be fatal and ~4% of people over 65 have one.
- Cancers or pre-cancerous condition in various organs—includes lungs, liver, gall bladder, spleen, kidneys, adrenal glands, etc.

It is good to know precisely what is going on. This allows a more directed health strategy. Here is some detail about the items in the above list.

**Heart Calcium.** Calcification is one of the body's (many) defenses against arterial plaque. It is just what it sounds like. The plaque is turned into stone. As such, it is stable and won't break loose and cause a clot, heart attack, or a stroke. However, it can restrict blood flow and reduces the flexibility of the various arteries. Men over 50 and women over 60 usually have some heart calcium. It is not a threat. However, the heart calcium will double every two to four years unless measures are taken. With the exercise and dietary program you will be developing, the increase can be vastly slowed down, even reversed. We will warn you that some very firmly entrenched medical dogma clearly states that this is impossible; that there is nothing you can do to even slow the heart calcium increase. You will be proving this wrong, as have several hundred other people that undertook the Quantitative Medicine approach.

**Bone Density.** The amount of calcium and other minerals in your bones. Calcium gives them strength. A typical 40-year-old will have a

bone density of 175 mg/cc. These are strong bones, hard to break and quick to heal if they do. With age, there is about a 2% loss per year. This adds up. By seventy, other things being equal, the density will have sagged to around 105, with is the “fracture threshold.” This is as serious as it sounds. The bones can no longer support the weight of their owner and start to crush in on themselves. This is osteoporosis. Calcium supplementation will slow it, but calcium supplementation significantly increases heart attack risk—not a good trade-off. Dynamic, load-bearing exercise, though, can actually reverse osteoporosis.

**Colon Cancer.** The virtual colonoscopy will turn up possible cancerous or pre-cancerous conditions in the colon. Colon cancer is not rare and is the most common fatal cancer among non-smokers. Caught early, it’s usually curable. Caught late, it’s usually fatal. People under 50 seldom die from colon cancer, and because of this, many doctors will not advise a colonoscopy. However, a study has shown that 20% of people between 40 and 50 have some sort of abnormality in their colon. Now, these people probably won’t develop cancer until they are over 50, and if they do, it will likely be caught by a colonoscopy then, or so the medical reasoning goes. We find this foolhardy. If you know there is something there (and if you are in your 40’s, there’s a 1 in 5 chance there is), you should keep a close eye on it. Lifestyle modifications may make it go away. If it doesn’t and treatment is needed, it can be done early and safely. With better screening, deaths from colon cancer could be substantially reduced.

**Thoracic or Abdominal Aneurism.** An aneurism is a weak spot in an artery wall that then balloons out. This alone will cause a lot of damage if it happens in the brain. However, in the chest (thoracic) or gut (abdominal), it will probably go unnoticed. But if this “balloon” pops, it can be fatal. About 4% of people over 65 have an aneurism, and are therefore at risk. The scan will detect these. Aneurism should be treated. Treatment is usually surgical and very effective.

**Cancers or pre-cancerous conditions in various organs.** The “full-body scan” starts at your neck and stops at your nether regions. Though not literally “full-body,” such a scan looks at every organ except your brain. It can reveal cancer or



potentially cancerous areas as well as other items, such as gallstones or kidney stones, generalized infections, or inflammations. It gives you a very nice, thorough, and reassuring picture.

So to further answer the original question: “Should you get a scan?” we would respond: definitely. In the absence of problems, get another one every five years. If there is any likelihood you are prone to cancer, consider getting a scan annually. If there are problems, the frequency of the scans will be driven by the doctors treating them. If there are one or two specific things of interest, it allows you to focus. For instance, to treat low bone density, dynamic, load-bearing exercise would be appropriate.

*Key Points*

**7 - STEP I - Testing**

- We recommend you start with our standard lists.
- There are many measurements. We group them into sugar management, lipid management, stress management, anabolism, and other.
- Measurements that are out of the “normal” range should be addressed by your doctor. Most cases are no cause for concern.
- You will probably have to pay for some of your tests.
- There are many ways to avoid the overpricing endemic to the blood draw industry.
- A scan is recommended, but wait till you have access to a newer scan machine.

