

Recommended Lab Tests Before Starting and While on TRT

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Testosterone Replacement Therapy (TRT) has changed the lives of many men around the world. Like any therapy, it can have great benefits if properly managed but negative side effects if not monitored. This article will briefly and simply review the different TRT tests that most physicians use to monitor your progress while minimizing potential side effects.

Testosterone Replacement Monitoring Targets and Their Management

(Consult your Physician before any treatment, cessation or dose changes)

Total Testosterone \geq 500 ng/dL for improvement in hypogonadism symptoms	If low or hypogonadal symptoms are not improved, increase testosterone dosage. High T levels (over 1500 ng/dL) with high hematocrit, low HDL and/or side effects may require dosage reduction.
Free Testosterone \geq 2% of total T	If low, test for sex hormone binding globulin. Higher TRT dose may increase free T by decreasing SHBG. Low SHBG may be present in diabetes.
Hematocrit \leq 53%	If high, donate blood or ask doctor for therapeutic phlebotomy order. If low, investigate anemia or stop donating blood more than every 3 months.
PSA \leq 4ng/mL	If high, talk to your doctor about potential prostatic infection or a referral to a urologist. TRT is contraindicated if PSA is 4 ng/mL or greater.
Estradiol (Sensitive Test) = 20-50 (Debate) pg/mL	Most men on TRT do not need to use an aromatase inhibitor like anastrozole (Arimidex). Some physicians prescribe low dose anastrozole for what they consider high estradiol. If low, higher testosterone dose and/or cessation of AI may be required. The lab range was derived from men with heart disease and low testosterone, so there is still debate on what the range should be for men on TRT since 0.3 to 0.4 % of testosterone aromatizes to estradiol, so men with high T due to TRT will have higher estradiol. No upper range value has been determined for men on TRT. Studies have shown that for gynecomastia to occur, high estradiol in the presence of low T and high IGF-1 may be required
Blood pressure \leq 135/85 mmHg	If high, weight loss, exercise, T dose reduction and/or blood pressure medications may be needed. If too low, blood pressure medication dose needs to be reduced, electrolytes checked or hypoglycemia excluded.
Estimated Glomerular Filtration Rate (eGFR) (kidney function) \geq 60 mL/min/1.73 m ²	If low, good hydration, use of blood pressure medications, and/or stopping offending oral supplements may improve eGFR. Exercise, high protein intake and higher muscle mass can also increase creatinine and decrease eGFR. Use Cystatin C in obese and very muscular patients.
Liver enzymes \leq 1.2 x top value of reference range	If high, stopping oral supplements can help. AST and ALT can increase with exercise but this is not clinically relevant. If high AST and ALT, test GGT and bilirubin to ensure no liver toxicity is present.
TSH \leq 2.5 U/mL	If high, test for other thyroid tests like free T3, free T4 and antibodies to detect hypothyroidism.
Free T3 \geq 3.7 pg/mL	If low, hypothyroidism may be present. See comment on TSH. If high ($>$ 5 pg/mL), explore hyperthyroidism
Ferritin 55-270 ng/mL & Iron 55-160 micrograms/dL	If low, reduce frequency of blood donations or phlebotomies and supplement with iron until it is back to normal. If high, donate blood or get therapeutic phlebotomy
HDL \geq 40 mg/dL	The most difficult parameter to manage. Higher TRT doses decrease HDL. Niacin may help increase HDL but may cause flushing.
Prolactin (\leq 30 nd/dL)	Test if Total Testosterone is below 150 ng/dL before TRT to detect potential pituitary adenoma or other issues. High levels ($>$ 30 ng/dL) may cause sexual dysfunction and galactorrhea in men (milk production)



How to Know if You Need TRT

The first thing doctors actually measure before you get on testosterone replacement is your total and free testosterone blood levels to [find out if you have low testosterone](#). They will also ask you a few questions to see if you have low testosterone or hypogonadal symptoms. They include low sex drive, erectile dysfunction, fatigue, low mood, and issues with cognitive capacity and function. So, testosterone replacement therapy includes anything to increase testosterone levels with either injections or creams, gels, pellets, oral, nasal, and other TRT options.

Follow Up Lab Tests After Starting TRT

Once you get on testosterone replacement, your doctor will have you come back either at week six or eight to run another blood test to see if your dosage needs to be adjusted and/or you may require other medications to monitor or to modulate or change levels like estradiol, hematocrit, etc. The first one obviously is testosterone total and free. You come back at week six or eight, and your total testosterone is not over 500 nanograms per deciliter, your doctor will probably choose to increase your dosage or your frequency of injections in the case of injections. [Free testosterone](#) is usually around 2% of total or higher. If you have lower than 2%, your doctor will probably focus on any issues related to high sex hormone binding globulin (SHBG), which is a protein that binds to testosterone and does not free it up for action.

Avoiding or Lowering High Hematocrit on TRT

Hematocrit is the proportion of red blood cells in the blood. Testosterone tends to increase red blood cells. Some men don't have that issue, but most men at least have a two to a three-point increase in hematocrit after starting TRT. Hematocrit increases a lot more in men on TRT who have sleep apnea and in smokers since these two can cause oxygen starvation. [High hematocrit](#) can increase the viscosity of the blood and may cause cardiovascular issues. So, the magic number to go for is a hematocrit of 53 or below. When you're getting close to 53, you have to basically donate blood or go for what we call a therapeutic phlebotomy to bring down the red blood cell amount in the blood. And that's very important because as hematocrit goes up, your blood becomes more and more viscous, and your cardiovascular system gets compromised. It's also very important not to let it go too high because above 52, most blood centers would not accept you as a donor, so you would have to require a special prescription for a therapeutic phlebotomy from your doctor for the blood centers to take your blood and dispose of it later. Keep in mind that donating more frequently than every three months may decrease your ferritin and iron stores considerably, which can cause fatigue and other issues. Here are some [hematocrit lab panels](#), or you can buy them as part of the [CBC panel](#).

Avoiding Low Ferritin and Iron

When your hematocrit is over 53, and you donate blood frequently than every three months, you can deplete your iron stores which makes you tired, depressed, and with no libido. Blood donations should not be happening that frequently because you'll lose iron. Some doctors will test your iron and your ferritin, and if you have low levels, they will put you on an iron supplement. Discounted Labs sells a [blood donation panel](#) that is designed to inform you if you can safely donate blood.

Monitoring the PSA Test on Testosterone

High [PSA](#), prostate-specific antigen, is the only contraindication for testosterone replacement therapy if it is 4 or above. Obviously, physicians get very concerned that a man with higher PSA may have prostatic cancer, although it could be caused by an infection of your prostate (prostatitis) that could be easily treatable with an antibiotic. So, all [high PSA tests do not mean you have cancer](#), but it could mean that you could have a treatable prostatic infection. Your doctor may prescribe antibiotics and retest your PSA after your antibiotic cycle is finished. He or she may need to refer you to a urologist if your high PSA test does not come down. But if you do have a PSA of four or higher, you are not going to be allowed to use testosterone replacement

unless your doctor can actually prove that it's an infection that will eventually be treated so that your PSA can come down.

Monitoring Estradiol Test on Testosterone

Estradiol (E2) is a very important hormone for men. We need it because estradiol is actually linked to bone health, cognitive functioning, cardiovascular health, even sex drive, and decreased fat mass. Having very low estradiol of under 20 pg/mL is actually not good for you since it can decrease bone density and cause other issues. Having very high estradiol in relation to your testosterone blood level may also have some consequences. Several studies have different opinions and conclusions on what high estradiol means. About 0.3 to 0.4% of testosterone gets converted into estradiol by the aromatase enzyme. So obviously, the body increases the amount of estradiol as your testosterone goes up. There's nothing wrong with that. Estradiol balances testosterone to keep a better lipid (cholesterol) profile and to keep healthy sperm counts, just to name a few benefits. But what level of [estradiol in men](#) is too high?

For example, if you have a testosterone level after you start TRT of 700 nanograms per deciliter, obviously, your estradiol is going to be higher than when before you started TRT. Is that cause for concern? Most men on testosterone replacement therapy do not need to take medications to lower estradiol. Estrogen blocker medications like anastrozole (Arimidex) are being overprescribed by many TRT clinics. Men with a history of [gynecomastia](#) or breast enlargement may have issues with gynecomastia again if your estradiol's over 50 pg/ml, but in most studies where men with gynecomastia were followed, a lot of those men had low testosterone while they had high estradiol. A large study in adolescent boys showed that most of the ones with gynecomastia also had high IGF-1. Some studies have shown that the ratio of testosterone to estradiol is really the important factor to monitor, with ratios over 12 being needed for healthy sperm production in men. But the management of estradiol in men is a very controversial topic as there is not a lot of agreement in the field. Some doctors insist on keeping an E2 level of 20 to 40 picograms per milliliter no matter how high testosterone levels reach.

We have learned in the past three years that the old immunoassay-based estradiol test tends to overestimate estradiol in men. Two studies have shown that the real estradiol value is better tested with a liquid chromatography-mass spectrometry [sensitive estradiol](#) assay. So, make sure that if your doctor is going to check your estradiol, you're using the right LC/MS E2 test. Discounted Labs offers several [lab panels that contain sensitive estradiol](#).

Another concern of high estradiol is that some men feel that water retention is an issue, although that has not been proven by any studies. Most men with TRT-related water retention assume that their estradiol is high but fail to get it tested.

Avoiding High Blood Pressure and Water Retention on TRT

Some men on testosterone replacement therapy tend to have increased blood pressure related to water retention. There are some central nervous system effects that increase blood pressure and heart rate. These men can gain considerable weight during the first weeks of TRT. Most lose most of that weight after a few weeks of therapy. Some studies have shown that testosterone may decrease sodium excretion by the kidneys, which makes the body retain water to keep that sodium diluted. Ways to improve blood pressure are to lose weight, take a blood pressure medication, exercise, and decrease excessive sodium intake. Many men assume that their estradiol is high when they experience water retention. That assumption has not proven to be correct.

Monitoring Kidney Function

The estimated glomerular filtration rate, or eGFR, is a way to measure your kidney function. It's part of what we call a CMP blood test panel, and we are aiming at an eGFR over 60. Anything below that is indicative of a slowdown in the way your kidneys are filtering toxins from your body. TRT does not really cause a decrease in eGFR. However, a lot of men taking creatine, exercising heavily, or eating very high protein intake tend to probably have artificial increases in creatine that decrease eGFR. You can Google [eGFR formula](#) and see how that's calculated.

Avoiding High Liver Enzymes

Current testosterone replacement therapy options have not been shown to increase liver enzymes; only the old oral forms of TRT used to cause that problem. However, doctors obviously follow it up. A very important distinction to make is that men that are exercising heavily with weights at the gym may have an artificial [increase in AST and ALT](#) that has nothing to do with toxicity to the liver.

Monitoring Thyroid Tests

TSH, thyroid stimulating hormone, is also something else that most doctors follow up, although some actually do not. Low thyroid function (hypothyroidism or high TSH) may have the same symptoms as low testosterone. TRT medical guidelines groups around the world recommend different schedules for monitoring men on TRT, and a few of them agree with each other. Rarely do any guidelines mention thyroid function monitoring in men on TRT. TSH levels above 2.5 may indicate that you have hypothyroidism. If you have high TSH, doctors usually tend to use a [comprehensive thyroid panel](#) that includes free T3 and free T4, along with antibodies, to see if you have an autoimmune disease like Hashimoto's that may be inducing hypothyroidism.

Maintaining Good HDL Levels on TRT

High-density lipoprotein or HDL is another one of the variables most affected by testosterone replacement, especially at higher doses. When I say higher doses, anybody using 200 milligrams of testosterone replacement per week — cypionate or enanthate — tend to have a lowering of HDL. Low HDL has been shown to cause cardiovascular issues, so your doctor will always follow your lipids. Testosterone replacement has not really been shown to increase LDL, and there are some studies that show that TRT improves triglyceride blood levels because testosterone tends to improve the way the body metabolizes carbohydrates. There's very little we can do to increase HDL besides aerobic exercise, losing weight, decreasing TRT dose, and taking a supplement. Niacin supplementation is one of the ways to increase HDL, but some people get flushing of the skin and face. Last but not least, the use of anastrozole, an estradiol blocker, can also decrease HDL since estradiol is known to protect HDL levels.

Prolactin in Men with Low Testosterone: The Forgotten Hormone

Prolactin is not a hormone that is usually measured at TRT baseline or even at follow-up unless you have severe erectile dysfunction, even with good levels of testosterone. Men that have low testosterone at baseline, and I mean low testosterone, very low — under 150 nanograms per deciliter — are probably the best candidates to get a [prolactin test](#). It is a hormone that women and men produce – obviously, women that are lactating produce it at higher concentrations in their bodies because it helps lactation. It also has some other benefits; otherwise, men would not have it. Prolactin has some immune-enhancing benefits and some cardiovascular benefits that are starting to show up in studies.

So, prolactin is not an evil hormone, but it can, at higher concentrations, cause erectile dysfunction. The reason for high prolactin could be a benign tumor called pituitary adenoma (diagnosed by MRI), which can be producing a lot of pituitary output for prolactin, and that could actually impair your testosterone replacement therapy benefits. So, it's a hormone that is hardly looked at unless you are a man that has very low testosterone blood levels at baseline or do not respond well (unresponsive erectile dysfunction) after eight weeks or ten weeks of testosterone replacement therapy and/or you are having high prolactin symptoms, like lactation. That's actually a very rare symptom that actually occurs in men with pituitary adenomas.

Where to Buy Your Own TRT Tests:

DiscountedLabs.com provides very low-cost blood testing in most US states. You don't need to see a doctor because the company has in-house physicians that provide a prescription. After ordering your lab test online, you receive an email with the lab request form that you take to the closest lab near you. Once you go to a lab and get your blood drawn, you receive an email with your results within five to seven business days, depending on the blood test. For more information, visit DiscountedLabs.com

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