

Total Testosterone (TT)

MDL Test Number: 622

Methodology: Immunoassay

CPT Codes: 84403 x 1



Specimen Collection Platform:

Serum in Serum Separator Tube (SST)

Turnaround Time:

24 - 72 hours

Stability:

Room temperature

Test Additions*:

30 days to add tests

Specimen Collection:



1. Immediately after blood collection, invert the tube(s) gently 5 times to ensure mixing of clot activator.



2. Allow the tube to rest upright for at least 30 minutes after collection to ensure proper clotting.



3. Centrifuge for at least 15 minutes at 2200-2500 RPM within one hour of collection.



4. Do not remove the stopper or pour off serum.



What is Total Testosterone?

Testosterone is an androgen, a hormone best known for its role in male development but active in women as well. In women, it comes from the ovaries and the adrenal glands (small glands that sit on top of the kidneys), and about half of the daily supply is made by converting other hormones into testosterone elsewhere in the body. Levels in women are much lower than in men. In men, the testes make most of it, following signals from the pituitary gland (a small gland at the base of the brain).

The word "total" matters here. Most testosterone does not travel through the blood on its own, it rides attached to proteins, mainly one called sex hormone-binding globulin (SHBG). Only a small share floats free and is immediately available for the body to use. This test measures everything added together: the hormone attached to proteins plus the free hormone. That total is the right starting point for most patients, but when protein levels are unusual, a provider may also order a free or bioavailable testosterone test to see the active portion on its own.

Why test for Total Testosterone?

In women, a provider may order this test to look into signs of too much testosterone. Common reasons include:

- **Unwanted hair growth in a male pattern (hirsutism), stubborn acne, or thinning hair at the scalp**
- **Periods that are irregular, infrequent, or have stopped**
- **Evaluating polycystic ovary syndrome (PCOS), also called polyendocrine metabolic ovarian syndrome (PMOS)**
- **Evaluating difficulty getting pregnant**, since high testosterone can interfere with the release of an egg
- **Rarer causes, such as a hormone-producing tumor of the ovary or adrenal gland, or an inherited adrenal condition**

In men, the test is used mainly to look into low testosterone, a condition called hypogonadism:

- **Symptoms** such as low energy, reduced sex drive, or loss of muscle; sorting out whether the cause lies in the testes or in the pituitary gland that signals them; difficulty fathering a child; and monitoring testosterone replacement therapy



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Special Instructions:

- **Collect in the morning:** Testosterone follows a daily rhythm. It peaks in the early morning and falls as the day goes on, so the time of the blood draw changes the result. Collect the sample between 6:00 and 10:00 a.m. A low or borderline result should be confirmed with a second morning sample before any conclusions are drawn.
- **Hormonal contraceptives:** Combined birth control pills, patches, and rings lower testosterone production and raise the protein that carries testosterone in the blood. A result drawn while a patient is using one of these can be misleadingly low. When the test is being used to evaluate excess testosterone, the ordering provider may want the patient off hormonal contraception for about three months before the draw.
- **When low levels are expected:** This test is an immunoassay designed to measure testosterone across both the female and the male range. Its lowest reportable value is 20 ng/dL; results below that point are reported as less than 20 ng/dL. Because levels in women sit near the low end of the measuring range, small differences between two results may not be meaningful.
- **Tube type:** Use a serum separator tube (SST). Lavender-top (EDTA) tubes cannot be used for this test at all, and green-top sodium heparin tubes make results read falsely low.
- **Comparing results over time:** Different laboratories and different instruments can produce somewhat different testosterone numbers from the same sample. When results are being tracked over time, use the same test at the same laboratory each time so the comparison is meaningful.
- **Free or bioavailable testosterone:** If a patient has clear symptoms but the total result comes back normal or borderline, the protein that carries testosterone may be the reason. Adding a free or bioavailable testosterone test, along with SHBG, can help clarify the picture.

Limitations:

Every laboratory test has limits. For total testosterone, the main ones are:

- This test is an immunoassay, and its lowest reportable value is 20 ng/dL. Testosterone levels in women fall in the lower part of the measuring range, so results in the female range carry more measurement variation than results in the male range, and small changes should not be over-interpreted.
- A normal result does not always rule out a testosterone problem. About one in four women with clear physical signs of excess testosterone still have a total testosterone within the normal female range, so the number must always be weighed against what the provider observes.
- A small number of patients carry natural antibodies in their blood — often people who work closely with animals or who have received certain antibody-based treatments — that can interfere with the test and produce an unexpected result.
- The sample itself can affect the result. EDTA tubes cannot be used, sodium heparin lowers the reading, a high level of bilirubin (a substance the liver processes) can raise it, and a high level of triglycerides in the blood can interfere.
- A testosterone result is one piece of a larger picture. It is meant to be read together with the patient's symptoms, medical history, and other test results — never on its own.

Reference Range(s):

Testosterone is measured in nanograms per deciliter (ng/dL). Expected levels differ greatly between women and men, and in men, they shift somewhat with age:

Adult female:

- **Premenopausal:** ≤73 ng/dL
- **Postmenopausal:** ≤43 ng/dL
- **Adult male:** 160–726 ng/dL (20–49 years); 129–767 ng/dL (50 years and older)

A result outside these ranges is not automatically a problem, and a result inside them does not rule one out. Only the ordering provider can interpret what a given number means for a given patient. Patients should always go by the reference range printed on their own laboratory report.

Analyte	Disorder	Expected Value*
Testosterone	PCOS / PMOS	↑
Testosterone	Idiopathic hirsutism	N
Testosterone	Nonclassic congenital adrenal hyperplasia	↑
Testosterone	Androgen-secreting ovarian or adrenal tumor	↑↑
Testosterone	Male hypogonadism	↓

*N – Normal Range, ↑ – Increased, ↑↑ – Markedly Increased, ↓ – Decreased.

What are some references that discuss the medical necessity of testing Testosterone?

1. Teede HJ, et al. Recommendations from the 2023 International Evidence-based Guideline for the Assessment and Management of Polycystic Ovary Syndrome. *J Clin Endocrinol Metab*, **108**, 2447–2469 (2023).
2. Martin KA, et al. Evaluation and treatment of hirsutism in premenopausal women: an Endocrine Society clinical practice guideline. *J Clin Endocrinol Metab*, **103**, 1233–1257 (2018).
3. Bhasin S, et al. Testosterone therapy in men with hypogonadism: an Endocrine Society clinical practice guideline. *J Clin Endocrinol Metab*, **103**, 1715–1744 (2018).
4. Bulun SE, Babayev E. Physiology and pathology of the female reproductive axis. In *Williams Textbook of Endocrinology* 15th edn (eds Melmed, S. et al.) Ch. 15 (Elsevier, Philadelphia, 2025).
5. Davis SR, et al. Global consensus position statement on the use of testosterone therapy for women. *J Clin Endocrinol Metab*, **104**, 4660–4666 (2019).



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