

Testosterone Replacement Therapy

A high-level educational book for patients who want more than a brochure: how low testosterone is diagnosed, what major guidelines actually say, how formulations differ, what fertility changes mean, and how physician-led monitoring is supposed to work.

Jupiter & Palm Beach County, FL

Physician-led · Timothy Mackey, D.O.

4.9 rating · BBB A+

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How to use this book

This is a library document, not a prescription. It is written so a motivated patient can read it cover to cover, or jump to one chapter, then follow the linked NovaGenix pages, guideline documents, and original research.

Two audiences are intended at once. First: men considering evaluation for testosterone deficiency, and the partners who help them decide. Second: the public web, where a carefully sourced educational resource can support NovaGenix's topical authority on testosterone replacement therapy, male hypogonadism, and related care in South Florida.

Reading path. Chapters 1–6 explain the diagnosis. Chapters 7–11 explain treatment and trade-offs. Chapter 12 describes how NovaGenix structures care. The library sections at the end are the living bibliography: clinic pages, scholarly sources, research institutes, and a short comparison list of other practices.

About NovaGenix

[NovaGenix](#) is a physician-led clinic in Jupiter, Florida, directed by Timothy Mackey, D.O. The practice evaluates men and women for hormone optimization and also offers medical weight-loss and regenerative services. Care is available in person and, for eligible Florida patients, by telehealth.

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- Meet the physician: [Dr. Timothy Mackey](#)
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1. What testosterone replacement therapy is — and is not

Testosterone replacement therapy (TRT) is prescription testosterone used to treat men with *hypogonadism*: compatible symptoms or signs plus consistently low testosterone confirmed by appropriate laboratory testing. It is a monitored medical therapy. It is not a vitamin, a gym supplement, a guaranteed fat-loss drug, or a performance-enhancement protocol.

The distinction matters because the internet collapses several different things into the phrase “TRT”: FDA-approved products used for documented deficiency; compounded custom preparations; off-label “optimization” regimens; and over-the-counter “boosters” that have not been shown to treat true hypogonadism.

NovaGenix position in one sentence. Evaluation starts with history, examination, and labs — not a questionnaire that automatically produces a prescription. See the clinic’s core page: [Testosterone Replacement Therapy for Men](#).

Useful companion reading on the clinic site:

- [TRT FAQ](#)
- [14 questions men should ask before starting](#)
- [Do testosterone boosters work?](#)
- [What type of doctor prescribes testosterone?](#)

2. How testosterone works in men

Testosterone is produced mainly in the testicular Leydig cells under control of luteinizing hormone (LH). Follicle-stimulating hormone (FSH) supports spermatogenesis in the Sertoli cells. The brain’s hypothalamus releases GnRH in pulses; the pituitary answers with LH and FSH; the testes answer with

testosterone and sperm. Circulating testosterone then feeds back on the hypothalamus and pituitary. That loop is the hypothalamic–pituitary–gonadal (HPG) axis.

Most circulating testosterone is bound to sex hormone–binding globulin (SHBG) or albumin. Free testosterone is the unbound fraction. When SHBG is high or low — obesity, aging, thyroid disease, liver disease, certain medications — total testosterone can mislead. That is why guidelines allow free-testosterone measurement or calculation when total testosterone is near the cutoff or SHBG is likely altered.

Testosterone influences sexual desire, erectile physiology in some men, muscle protein synthesis, bone remodeling, red-blood-cell production, fat distribution, and aspects of mood and energy. Those effects are real. They are also not exclusive: sleep apnea, depression, obesity, thyroid disease, alcohol, opioids, and overtraining can mimic “low T” without a primary hormone problem.

Clinic depth:

- [LH, FSH, hCG, and enclomiphene](#)
- [Testosterone levels by age and the 300 ng/dL cutoff](#)
- [Blood tests before TRT](#)

3. Symptoms and signs that raise the question of low testosterone

No single symptom proves hypogonadism. The pattern that should prompt testing is more useful than any one complaint.

More specific clues

- Reduced sexual desire
- Fewer spontaneous erections
- Gynecomastia or reduced body hair in some men
- Very small testes, infertility, or known testicular injury
- Unexplained anemia
- Loss of bone density

Common but nonspecific clues

- Fatigue
- Low mood or irritability
- Reduced muscle mass or gym performance
- Increased central fat
- Poor sleep or “brain fog”
- Erectile difficulty (often multifactorial)

Erectile dysfunction is a special case. Testosterone has a clearer relationship to desire than to the hydraulics of erection. Many men with ED have normal testosterone; many men with low testosterone still need standard ED treatment after levels are corrected. NovaGenix discusses that overlap here: [Erectile dysfunction treatment](#) and [low sex drive in men](#).

Further clinic reading: [Signs, symptoms, and TRT](#).

4. How hypogonadism is diagnosed

Major U.S. guidelines agree on the architecture even when they differ on wording.

1. Symptoms or signs consistent with testosterone deficiency.
2. Low morning total testosterone, confirmed on a second early-morning sample.
3. Investigation of the cause when deficiency is confirmed (primary vs. secondary; reversible contributors).
4. A shared decision about treatment that includes fertility, prostate, hematocrit, sleep apnea, and cardiovascular context.

The American Urological Association uses total testosterone below **300 ng/dL** as a reasonable cutoff supporting diagnosis — not as a standalone treatment trigger. The Endocrine Society emphasizes unequivocally and consistently low concentrations using an accurate assay, preferably fasting morning samples, with free testosterone when SHBG is likely altered.

Element	Why it matters
Timing	Testosterone is highest in the morning in most men. Afternoon draws can under-read.
Repeat testing	Illness, poor sleep, and day-to-day variation can produce one misleadingly low value.

Element	Why it matters
Free T / SHBG	Useful when total T is borderline or binding proteins are abnormal.
LH and FSH	Help separate testicular failure (high gonadotropins) from hypothalamic/pituitary problems (low or inappropriately normal gonadotropins).
Prolactin, iron studies, pituitary imaging	Selected when the pattern suggests secondary hypogonadism or another endocrine disease.
PSA, CBC/hematocrit, CMP	Safety baseline before considering treatment.

NovaGenix laboratory pathway: [low-testosterone testing](#), [which labs to start with](#), and [testing in Palm Beach County](#).

A number is not a diagnosis. A single result below 300 ng/dL does not automatically mean a man should start testosterone. Neither does a “normal” total testosterone automatically exclude a problem if free testosterone is low and symptoms are compatible. That is clinical work, not a lab printout.

5. Causes and contributing factors

Primary hypogonadism originates in the testes: Klinefelter syndrome, orchitis, chemotherapy or radiation, trauma, torsion, cryptorchidism, or age-related testicular failure.

Secondary (hypogonadotropic) hypogonadism originates in the hypothalamus or pituitary: pituitary tumors, infiltrative disease, head trauma, opioid use, anabolic-steroid suppression, some systemic illnesses, and functional suppression from obesity, sleep apnea, and severe energy deficit.

Obesity and low testosterone travel in both directions. Excess adiposity can lower testosterone through aromatization, inflammatory signaling, and SHBG changes. Low testosterone can favor fat gain and lean-mass loss. Treating only one side of that loop is usually incomplete.

Common reversible contributors worth naming out loud before anyone reaches for a vial:

- Untreated obstructive sleep apnea

- Obesity and poorly controlled type 2 diabetes
- Opioids, high-dose glucocorticoids, and some psychiatric medications
- Excessive alcohol
- Acute illness
- Overtraining plus under-eating

Clinic reading: [Hidden factors behind low T](#), [subclinical hypogonadism](#), and [why physicians do not always prescribe](#).

6. Who may — and may not — be a candidate

A reasonable candidate has compatible symptoms, confirmed low testosterone, an understood (or at least investigated) cause, and no absolute contraindication, and he has been told what treatment can and cannot do.

Conditions that commonly pause or prevent treatment until they are addressed:

- Desire for near-term fertility (exogenous testosterone is the wrong first tool)
- Known or suspected prostate or breast cancer until appropriately evaluated
- Baseline hematocrit above about 50% until the cause is explained (AUA)
- Untreated severe obstructive sleep apnea
- Uncontrolled heart failure or a very recent major cardiovascular event, depending on clinical judgment
- A PSA or prostate examination that needs urologic review first

Age by itself is not a diagnosis. “Low T of aging” is common language; guidelines still require symptoms plus confirmed biochemistry, and they still require a risk–benefit conversation. FDA labeling around age-related hypogonadism has evolved after TRAVERSE and subsequent reviews; that is not the same as a blank check to treat every older man with a tired afternoon.

7. Treatment options and formulations

No route is universally best. The better choice is the one a specific patient can use correctly, absorb reliably, afford, and monitor.

Route	Typical use	Advantages	Trade-offs
Intramuscular or subcutaneous injection (cypionate, enanthate)	Most common medical TRT	Predictable delivery; no skin-transfer risk	Needles; peaks/troughs if dosed infrequently; hematocrit may rise more in some men
Topical gel or cream	Daily administration	No injection; relatively steady daily exposure when absorption is good	Variable absorption; transfer risk to partners and children; daily adherence
Oral testosterone undecanoate (Jatenzo, Kyzatrex, Tlando)	Selected men who prefer pills	No needle; no skin transfer	Twice-daily with food for some products; blood-pressure and hematocrit monitoring still required
Nasal gel, patch, pellet	Product-specific	Alternative delivery for selected patients	NovaGenix does not currently offer pellets, patches, nasal, or buccal products

Clinic comparisons and how-to pages:

- [Cream vs. injection](#)
- [How to inject safely \(IM vs SubQ\)](#)
- [Where to apply gels and creams](#)
- [Cypionate vs. enanthate](#)
- [Oral TRT \(Kyzatrex, Jatenzo\)](#)
- [What “a normal dose” actually means](#)
- [Brand vs. compounded testosterone](#)

There is no universal internet protocol. Frequency depends on the ester, the route, the target range, symptoms, hematocrit, and estradiol. Dose-chasing “bodybuilder troughs” is not medical TRT.

8. Fertility, testicular volume, hCG, and SERMs

Exogenous testosterone suppresses GnRH, LH, and FSH. Intratesticular testosterone falls. Sperm production can fall sharply — sometimes to azoospermia. Testicular volume may decrease. This can

happen with injections, gels, or oral products. Switching the route does not reliably protect fertility.

TRT is *not* reliable contraception. Pregnancy can still occur. Men who do not want a pregnancy still need contraception. Men who do want children need a fertility plan *before* the first dose.

The 2024 AUA/ASRM male infertility guideline is direct: clinicians should not prescribe exogenous testosterone to men interested in current or future fertility. Evidence is too limited to recommend adding hCG or a SERM as a dependable way to preserve sperm production while a man stays on testosterone.

Tools that are not the same as TRT

- **hCG** acts at the LH receptor in the testis. It has a clearer role in selected hypogonadotropic hypogonadism and is the more physiologically direct adjunct when a clinician is trying to maintain testicular stimulation. It does not guarantee fertility.
- **Clomiphene / enclomiphene** are SERMs that can raise LH, FSH, and endogenous testosterone in men whose axis can still respond. Trials of enclomiphene have shown testosterone increases with better preservation of sperm concentrations than testosterone gel in studied populations. They are alternatives for selected secondary hypogonadism, not a universal “TRT substitute.”
- **Gonadorelin** is GnRH. The strongest evidence is for true pulsatile dosing in hypothalamic hypogonadism — not occasional injections as a routine TRT add-on.

NovaGenix fertility cluster:

- [TRT and fertility](#)
- [hCG therapy](#)
- [hCG for men on TRT](#)
- [hCG vs. gonadorelin](#)
- [hCG vs. Clomid](#)
- [Enclomiphene vs. Clomid](#)
- [Will testes shrink on TRT?](#)
- [Does TRT cause infertility?](#)
- [Coming off TRT](#)

9. Benefits the evidence actually supports

In men with confirmed symptomatic hypogonadism, testosterone therapy has the most consistent support for:

- Sexual desire and some sexual-function outcomes
- Increases in lean mass and reductions in fat mass (not dramatic scale-weight loss)
- Improvements in anemia when testosterone deficiency is contributing
- Bone-mineral-density gains with longer treatment in studied populations
- Some improvement in depressive symptoms in selected men

Evidence is weaker or more mixed for energy, cognition, athletic performance, and “anti-aging.” Individual response varies. Symptoms that do not move after levels are appropriately replaced deserve a second look at sleep, mood, thyroid, medications, and expectations — not an automatic dose increase.

Clinic pages that stay inside those limits:

- [Testosterone, body fat, and muscle](#)
- [Muscle growth and fat loss — evidence and limits](#)
- [Long-term therapy: benefits and risks](#)

10. Risks, monitoring, TRAVERSE, and the FDA label

What must be watched

- **Hematocrit / hemoglobin.** Testosterone stimulates red-cell production. AUA: measure before treatment; withhold if baseline hematocrit is above 50% until explained; intervene at on-treatment hematocrit of 54% or higher. First-line response is usually dose or formulation adjustment, not unsupervised blood donation. Clinic guide: [High hematocrit on TRT](#).
- **Blood pressure.** Required post-market ambulatory blood-pressure studies led FDA in 2025 to add class-wide blood-pressure warnings even as it removed the cardiovascular boxed warning. Clinic guide: [TRT and blood pressure](#).
- **Prostate / PSA.** Current evidence has not shown that appropriate TRT causes prostate cancer. Testosterone can still raise PSA modestly and can affect prostate tissue. Baseline assessment and follow-up remain part of adult care. Clinic guides: [Does TRT cause prostate cancer?](#) and [TRT and cancer risk](#).
- **Fertility and testicular volume** — Chapter 8.

- **Acne, edema, breast symptoms, sleep-apnea worsening, mood changes.** All are reasons to reassess rather than to “push through.”

TRAVERSE, in plain language

TRAVERSE (Lincoff et al., *New England Journal of Medicine*, 2023) randomized 5,246 men aged 45–80 with hypogonadism and established cardiovascular disease or high cardiovascular risk to testosterone gel or placebo. Mean treatment duration was about 22 months; mean follow-up about 33 months. Major adverse cardiac events occurred in 7.0% of the testosterone group and 7.3% of the placebo group (hazard ratio 0.96), meeting noninferiority for heart attack, stroke, and cardiovascular death.

That is reassurance for the question the trial was built to answer. It is not proof that testosterone prevents heart disease. The testosterone arm had more atrial fibrillation, more pulmonary embolism, more acute kidney injury, and — in related TRAVERSE analyses — signals that still require clinical judgment (including fracture findings discussed in later publications). Men with prior clots, uncontrolled blood pressure, or untreated sleep apnea are not “cleared” by a headline.

In February 2025, FDA recommended removing boxed-warning language about increased major adverse cardiovascular outcomes from testosterone labels, adding TRAVERSE results to labeling, and adding blood-pressure warnings based on ABPM studies. Later FDA communications in 2026 also addressed limitation-of-use language for age-related hypogonadism. Labels change; the need for diagnosis and monitoring does not.

Primary sources:

- [Lincoff AM, et al. Cardiovascular Safety of Testosterone-Replacement Therapy. NEJM 2023.](#)
- [FDA class-wide labeling changes \(Feb 28, 2025\)](#)
- [FDA testosterone information page](#)
- [American College of Cardiology journal scan of TRAVERSE](#)

11. Body composition, weight, and why TRT is not a diet drug

Men with testosterone deficiency often carry more fat and less lean mass. Appropriate TRT can improve that composition. It does not reliably produce large scale-weight loss, it is not FDA-approved as an obesity medication, and it should not be started because someone wants to lose a belt size.

A randomized trial of testosterone plus a structured low-calorie diet in men with obesity and low-to-low-normal testosterone found more fat loss and better lean-mass preservation than diet plus placebo.

That is a useful body-composition finding. It is not a mandate to put every man seeking weight loss on testosterone.

When weight is the primary problem, nutrition, activity, sleep, and — when appropriate — GLP-1–based medical weight loss deserve their own evaluation. NovaGenix treats those as related but separate clinical questions.

12. How physician-led TRT is structured at NovaGenix

1. Secure intake review (not automatic online booking).
2. Consultation covering symptoms, history, medications, prior treatment, lifestyle, and fertility goals.
3. Laboratory orders or review of recent accredited-lab results. A standard male hormone panel through Labcorp is offered; outside labs can often be used if they are recent and complete.
4. Physician evaluation by Dr. Mackey. Evaluation does not guarantee a prescription.
5. Referral out when needed: urology, fertility, sleep medicine, primary care.
6. If treatment is appropriate: discussion of formulation (injectable, topical, oral testosterone undecanoate including Kyzatrex; hCG; enclomiphene or clomiphene when indicated), risks, monitoring, and program logistics including medication delivery.
7. Follow-up on symptoms, testosterone levels timed to the formulation, CBC/hematocrit, blood pressure, PSA when appropriate, estradiol when appropriate, and metabolic markers.

NovaGenix does not offer testosterone pellets, patches, nasal gel, or buccal products. It does not perform semen analysis or sleep studies in-house, but it reviews outside results and refers when those tests are needed. The practice is self-pay.

Florida telehealth is available for eligible patients: [Online TRT in Florida](#).

13. Questions every man should ask any TRT clinician

1. What exact diagnostic criteria are you using, and will you confirm a second morning testosterone?
2. Have we looked for reversible causes — sleep apnea, opioids, obesity, pituitary disease?
3. What are my fertility goals for the next two to five years, and does that change the plan?
4. Which formulation, and why that one for me?

5. What on-treatment testosterone range are we targeting, and when will labs be drawn relative to the last dose?
6. What happens if my hematocrit rises above 54%?
7. How will blood pressure and PSA be followed?
8. What symptoms should make me call before the next scheduled visit?
9. If we stop, what does recovery look like — hormones, sperm, symptoms?
10. Who is actually responsible for monitoring me after the first prescription?

Expanded version: [14 questions before starting TRT](#).

NovaGenix library — pages and posts on this topic

Use this section as the internal-link map for the TRT cluster. Every URL below lives on novagenix.org and is relevant to testosterone, hypogonadism, or closely related male hormone care.

Service and program pages

Core clinical pages

[NovaGenix home](#)

[TRT for men](#)

[Low-testosterone test](#)

[hCG therapy](#)

[TRT and fertility](#)

[Online TRT in Florida](#)

[Low sex drive](#)

[Erectile dysfunction](#)

Practice

[Dr. Timothy Mackey](#)

[Contact / consult](#)

[Blog index](#)

[Medical disclaimer](#)

[Privacy policy](#)

[Patient intake form](#)

Educational posts (TRT cluster)

- [TRT FAQ](#)
- [Questions men should ask before starting](#)
- [Typical testosterone levels and cutoffs](#)
- [Required blood tests](#)
- [Who can prescribe testosterone](#)
- [Why doctors do not always prescribe](#)
- [Causes of low testosterone](#)
- [Signs and symptoms](#)
- [Subclinical hypogonadism](#)
- [Cream vs. injection](#)
- [Injection technique](#)
- [Gel and cream application sites](#)
- [Cypionate vs. enanthate](#)
- [Oral testosterone](#)
- [Dosing](#)
- [Brand vs. compounded](#)
- [Hematocrit](#)
- [Blood pressure](#)
- [Prostate cancer evidence](#)
- [TRT and cancer](#)
- [Long-term safety](#)
- [Stopping TRT](#)
- [Testicular volume](#)
- [Infertility risk](#)
- [hCG overview](#)
- [hCG vs. gonadorelin](#)
- [hCG vs. Clomid](#)
- [Enclomiphene vs. Clomid](#)
- [LH, FSH, hCG, enclomiphene](#)
- [Fat and muscle](#)

- [Muscle growth and fat loss](#)
- [OTC boosters](#)
- [Foods and lifestyle](#)
- [Sports fandom and short-term T changes](#)

Guidelines, landmark trials, and scholarly articles

These are the sources a serious educational page should sit next to. Prefer the original documents over secondary blogs.

Society guidelines

- [AUA. Evaluation and Management of Testosterone Deficiency \(2018\)](#). PubMed: [29601923](#). Summary: [Guideline Central](#).
- [Bhasin S, et al. Endocrine Society Clinical Practice Guideline: Testosterone Therapy in Men With Hypogonadism. JCEM 2018.](#)
- [AUA/ASRM Male Infertility Guideline \(2024\)](#) — exogenous testosterone should not be prescribed to men seeking current or future fertility.
- [Fifth International Consultation on Sexual Medicine \(ICSM 2024\) recommendations on male hypogonadism](#)
- [British Society for Sexual Medicine guidelines on adult male testosterone deficiency](#)
- [Comparison of AUA and Endocrine Society testosterone guidelines \(Int J Impot Res 2022\)](#).

Pivotal research

- [TRAVERSE: Lincoff AM, et al. NEJM 2023;389:107-117](#). ClinicalTrials.gov [NCT03518034](#).
- [Nature Reviews Cardiology highlight of TRAVERSE](#)
- [Testosterone therapy for functional hypogonadism in middle-aged and elderly males \(Hormones, 2024\)](#)
- Snyder PJ, et al. Testosterone Trials (The T Trials). *NEJM* 2016 and subsequent domain papers — foundational efficacy data in older men with low testosterone.
- Grossmann M, et al. and related metabolic literature on obesity, diabetes, and the bidirectional relationship with testosterone.

Regulatory

- [FDA: class-wide labeling changes after TRAVERSE and ABPM studies \(2025\)](#)
- [FDA testosterone information for patients and providers](#)

Research institutes and public-education destinations

Academic and government

[NIH / NIDDK urologic health](#)

[MedlinePlus: hypogonadism](#)

[Endotext \(free endocrine textbook\)](#)

[Endocrine Society](#)

[American Urological Association](#)

[American Society for Reproductive Medicine](#)

[CDC National Center for Health Statistics](#)

Health-system explainers (non-NovaGenix)

[Mayo Clinic: male hypogonadism](#)

[Cleveland Clinic: low testosterone](#)

[UCLA Urology](#)

[Johns Hopkins: low testosterone](#)

[Harvard Health men's health](#)

[Boston University Sexual Medicine](#)

TRT near you in Palm Beach County

[Low-T clinic, West Palm Beach](#)

[TRT in Palm Beach Gardens](#)

[TRT in Stuart, FL](#)

[TRT in Lake Worth](#)

[TRT in Vero Beach](#)

Cost, access and next steps

[What TRT costs](#)

[Online TRT in Florida](#)

[About NovaGenix](#)

[All NovaGenix articles](#)

[Peptide therapy — overview](#)

Other clinics and national TRT brands — for comparison, not endorsement

Authority content should acknowledge that patients comparison-shop. These organizations are not affiliated with NovaGenix. Listing them is for orientation: different models (brick-and-mortar specialty, national telehealth, academic men's health) answer the same search queries.

Florida and regional specialty

[The Florida Institute for Reproductive Sciences / related fertility context](#)

[Independent Palm Beach urology practices \(search locally\).](#)

Local urology and endocrinology groups remain appropriate second opinions for prostate disease, pituitary disease, and fertility.

National consumer TRT / telehealth brands

[Hone Health](#)

[Marion Gluck Clinic \(UK hormone clinic; contrast model\)](#)

[Defy Medical](#)

[Revive RX / similar compounding-adjacent models](#)

Compare physician involvement, lab standards, fertility counseling, and monitoring — not slogans.

A clinic that will ship testosterone after a quiz, without two morning labs, fertility counseling, and a monitoring plan, is not practicing the medicine described in AUA or Endocrine Society guidelines — regardless of marketing quality.

Frequently asked questions

▼ Is TRT a lifetime commitment?

Not automatically. If the original cause was reversible, stopping may be reasonable. If the testes or the HPG axis cannot sustain adequate testosterone, symptoms and labs often return toward baseline after discontinuation. Recovery of sperm, of serum testosterone, and of how a man feels are three different clocks. See [Coming off TRT](#).

▼ Will TRT make me sterile?

It can suppress sperm production substantially. It is not reliable contraception and it is not always permanent. Men who want children should say so before the first prescription. Guideline default: do not start exogenous testosterone if current or future fertility matters; consider alternatives such as hCG or a SERM in selected secondary hypogonadism, or sperm banking after a fertility evaluation.

▼ Does TRT cause prostate cancer?

Available evidence has not established that appropriate TRT causes prostate cancer. AUA language is that patients should be informed of the absence of evidence linking testosterone therapy to the development of prostate cancer, while men with a history of prostate cancer need an individualized discussion because the risk–benefit ratio is less precisely known. PSA still belongs in adult monitoring.

▼ Did TRAVERSE make testosterone “heart-safe” for everyone?

No. It showed noninferiority for major adverse cardiac events in a defined high-risk hypogonadal population using gel for a limited follow-up. Atrial fibrillation and pulmonary embolism were more common with testosterone. Blood-pressure warnings were added class-wide. Individual risk still has to be assessed.

▼ Can I start based on symptoms alone?

No. Fatigue and low libido have a long differential diagnosis. Guidelines require confirmed biochemistry.

▼ Are over-the-counter boosters a reasonable first step?

Usually no, if the question is true hypogonadism. Correcting a documented deficiency (sleep, weight, vitamin D in some men) is rational. Proprietary “T booster” blends have a weak evidence record. See [NovaGenix on boosters](#).

▼ Does NovaGenix accept insurance?

No. Care is self-pay. Program details and payment options are discussed during consultation: [contact the clinic](#).

Glossary

- **Hypogonadism** — clinically low testosterone with compatible symptoms or signs.
- **Primary vs. secondary** — testicular origin vs. hypothalamic/pituitary origin.
- **SHBG** — sex hormone-binding globulin; changes free vs. total testosterone.
- **Erythrocytosis** — too many red cells; watched via hematocrit on TRT.
- **SERM** — selective estrogen receptor modulator (clomiphene, enclomiphene).
- **hCG** — human chorionic gonadotropin; LH-receptor agonist used in selected men.
- **TRAVERSE** — large cardiovascular-safety RCT of testosterone gel vs. placebo.

Medical disclaimer

This educational book is for general information. It is not medical advice, a diagnosis, or a promise of outcome. Testosterone products are prescription medications. Decisions belong to a licensed clinician who has examined the patient and the labs. If you have an emergency, call 911.

Full clinic disclaimer: novagenix.org/medical-disclaimer.

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Subsequent planned volumes: Women's Hormone Replacement Therapy · Medical Weight Loss · Regenerative Medicine · Peptides.

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