



PHYSICIAN-REVIEWED
PATIENT EDUCATION

Low Testosterone

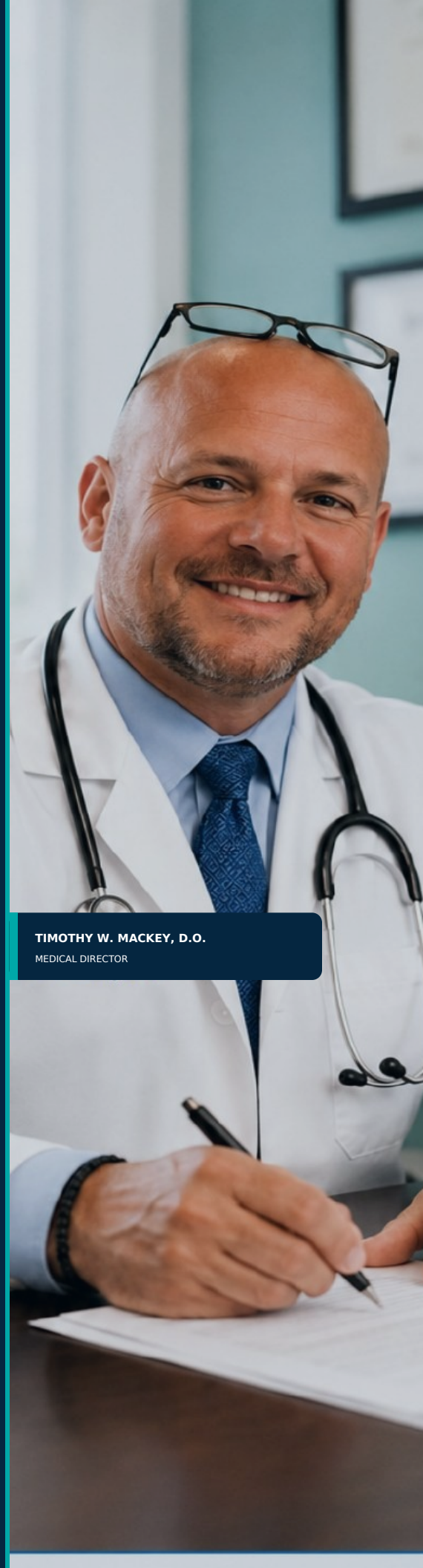
& Testosterone Replacement Therapy

Understanding symptoms, diagnosis, treatment, fertility,
and long-term health.

TIMOTHY W. MACKEY, D.O.

Medical Director
NovaGenix Health & Wellness

PATIENT EDUCATION SERIES | VOLUME 1 | 2026



TIMOTHY W. MACKEY, D.O.
MEDICAL DIRECTOR

FRONT MATTER

Publication Information & Use

The Complete Guide to Low Testosterone and Testosterone Replacement Therapy

NOVAGENIX PATIENT EDUCATION SERIES | VOLUME 1

ABOUT THIS EDITION

This handbook helps adults understand low testosterone, appropriate evaluation, treatment options, safety monitoring, fertility considerations, and long-term health. It is educational and does not replace an individualized medical evaluation.

CLINICAL REVIEW

Clinically reviewed and approved by Timothy W. Mackey, D.O., Medical Director of NovaGenix Health & Wellness. Last clinically reviewed: July 27, 2026.

HOW TO USE THIS GUIDE

Read in order or move directly to the topic that matters most. Bring prior laboratory results, medications, health history, and fertility goals to your consultation.

DIGITAL NAVIGATION

This edition is designed as a downloadable PDF and companion to the NovaGenix online TRT cornerstone resource.

● IMPORTANT NOTICE

Treatment decisions require symptoms, appropriate laboratory testing, medical history, assessment when indicated, and ongoing physician monitoring. This guide does not diagnose low testosterone or determine candidacy. Do not start, stop, or change prescription medication without individualized medical guidance.

FRONT MATTER

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FRONT MATTER

A Letter from Dr. Mackey

Questions about testosterone often begin with a symptom - less energy, a lower sex drive, changes in strength or body composition, difficulty concentrating, or simply the feeling that something is no longer right.



Low testosterone is not diagnosed from a symptom checklist or a single laboratory result.

TIMOTHY W. MACKEY, D.O.

My goal is to help each patient understand the complete picture: what the laboratory results mean, whether treatment is appropriate, what realistic improvement may look like, and how ongoing follow-up protects long-term health.

This handbook was created to make the science easier to understand and the medical process less intimidating. Use it to prepare questions and participate confidently in decisions about your health.

After my time serving in the military, I came to appreciate the true value of dedication, teamwork, and putting others first. Those principles continue to guide how we practice medicine at NovaGenix. Healthcare is rarely the work of one person - it is a team effort, and our entire team is committed to putting patients first every step of the way.

Yours in health,

T. Mackey

TIMOTHY W. MACKEY, D.O.

MEDICAL DIRECTOR, NOVAGENIX HEALTH & WELLNESS

PHYSICIAN-LED CARE BEGINS WITH LISTENING

Personalized evaluation. Clear answers. Long-term partnership.

CHAPTER 1 | REVIEWED JULY 27, 2026

1 Testosterone and Aging

WHY IT MATTERS

Testosterone naturally peaks in early adulthood and gradually declines with age, typically by about 1-2% per year after age 30. This decline is a normal part of aging, not a disease in itself.

Laboratory reference ranges describe what is statistically common at a given age, not necessarily what is optimal for a given individual. A testosterone level that falls within a broad reference range can still be accompanied by meaningful symptoms.

Because of this, age-related decline alone does not determine whether treatment is appropriate. Symptoms, laboratory values, and overall health should be considered together.

KEY POINTS

- Testosterone decline with age is normal, but its impact varies widely between individuals.
- A broad laboratory reference range is not the same as an optimal range for a given patient.
- Treatment decisions should combine symptoms, repeat laboratory testing, and clinical evaluation - not age or a single number alone.

CLINICAL PEARL

Two men of the same age can have very different testosterone levels and very different symptoms. Age-based charts are educational context, not a diagnosis.

PATIENT TIP

Do not assume low energy or reduced drive is just getting older. Ask for a morning testosterone test so you have data, not just an assumption, to work from.

[CONTINUE EXPLORING THIS TOPIC >](#)

DID YOU KNOW?

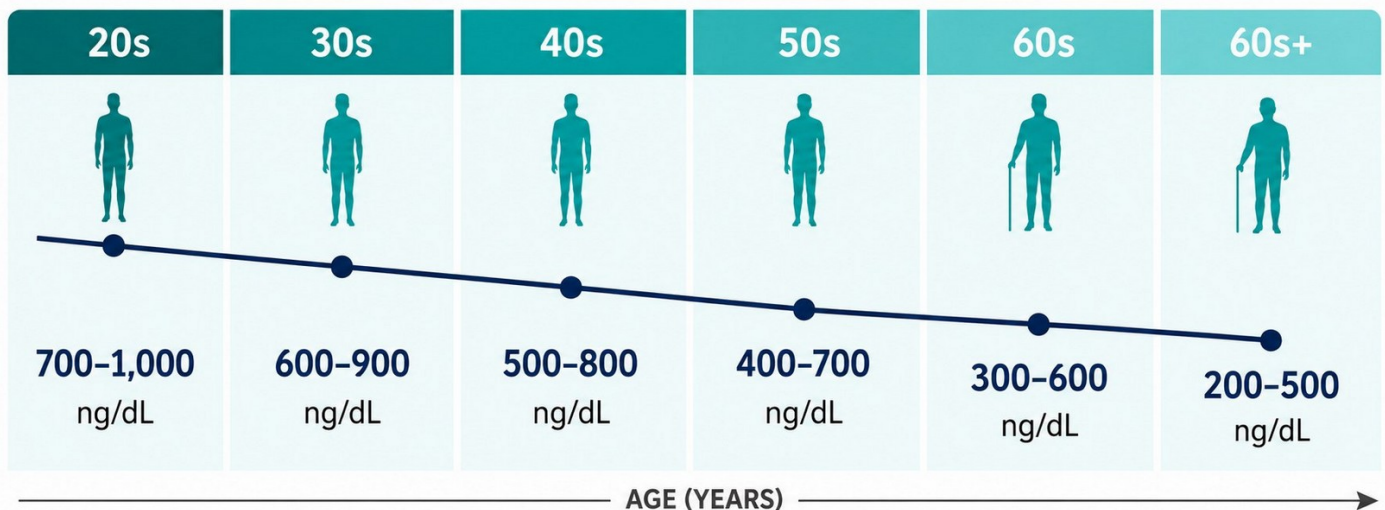
Getting older does not automatically mean you need testosterone therapy. Treatment decisions should be based on symptoms, laboratory testing, and a comprehensive medical evaluation - not age alone.

CHAPTER 1 | VISUAL GUIDE

Testosterone and Aging

Age-Related Testosterone Levels in Men

Testosterone levels vary widely between individuals and may decline with age.*



*Ranges are approximate total testosterone levels and may vary based on laboratory reference ranges.

DID YOU KNOW?

By age 45, nearly 40% of men have clinically low testosterone - though many mistake symptoms such as chronic fatigue, brain fog, and muscle loss for just getting older.

2 Understanding Low Testosterone

WHY IT MATTERS

Testosterone is the principal androgen in men, supporting sexual function, muscle and bone health, red blood cell production, mood, and energy.

When testosterone production declines below what the body needs - a condition often called hypogonadism, or low T - the cause may involve the testes themselves, or the pituitary and hypothalamic signals that direct them, along with contributing factors such as age, obesity, sleep disorders, medications, or injury.

Symptoms such as reduced sexual desire, fatigue, changes in strength or body composition, mood changes, and difficulty concentrating can occur for many reasons. Symptoms alone do not establish a diagnosis.

KEY POINTS

- Low testosterone can affect sexual health, energy, body composition, mood, and bone health.
- Symptoms overlap with many other health conditions.
- A proper evaluation looks at symptoms, laboratory testing, health history, and possible underlying causes.

CLINICAL PEARL

A low testosterone number should never be interpreted without symptoms, medical context, and repeat testing.

PATIENT TIP

Keep a short symptom timeline and bring any previous laboratory results to your consultation.

CONTINUE EXPLORING THIS TOPIC >

DID YOU KNOW?

Optimal testosterone increases androgen receptor density in muscle, signaling your body to burn fat for fuel while preserving lean tissue.

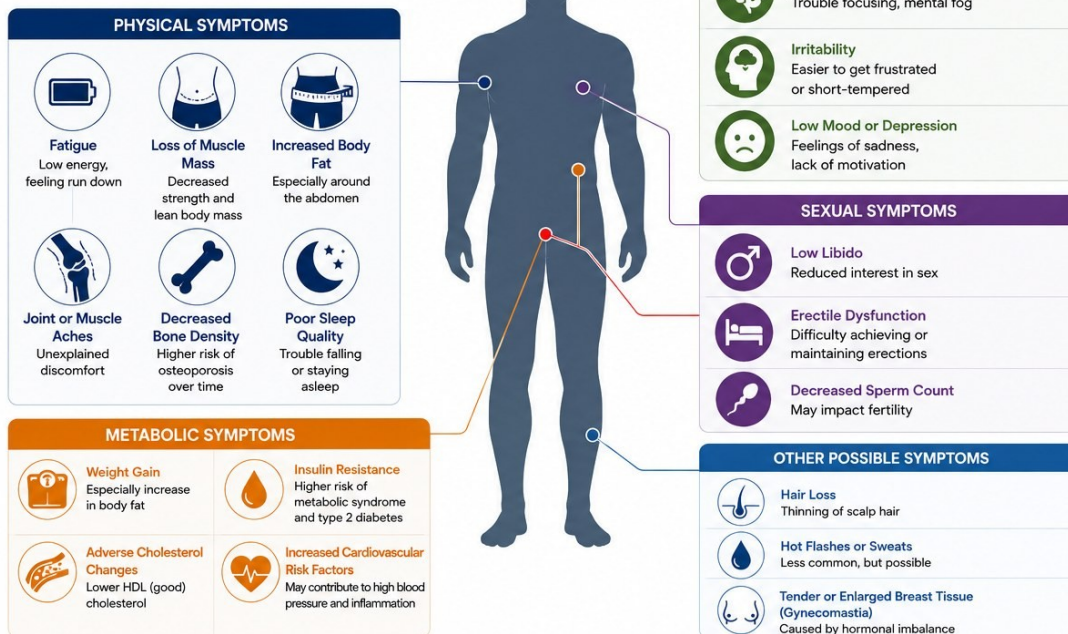
CHAPTER 2 | VISUAL GUIDE

Signs and Symptoms of Low Testosterone

FIGURE 3 SIGNS AND SYMPTOMS OF LOW TESTOSTERONE

How Low Testosterone Can Affect Your Body and Quality of Life

Testosterone influences nearly every system in the male body. When levels are low, you may experience a wide range of physical, mental, and sexual symptoms that can impact daily life and overall well-being.



IMPORTANT TO KNOW

 Symptoms vary from person to person. You may not experience all of these.

 These symptoms can be caused by many factors, not just low testosterone.

 The only way to know your levels is through blood testing and a medical evaluation.

WHEN TO SEEK HELP

 If you are experiencing several of these symptoms and they are affecting your quality of life, talk to a healthcare professional.

You don't have to live this way.



KEY POINT: Low testosterone can affect physical health, mental well-being, and sexual function. Early recognition and proper evaluation are the first steps toward feeling like yourself again.



This information is for educational purposes only and is not a substitute for professional medical advice, diagnosis, or treatment.

DID YOU KNOW?

Belly fat contains an enzyme called aromatase that converts testosterone into estrogen. Lower testosterone may contribute to a cycle involving body fat and hormone balance.

CHAPTER 2 | VISUAL GUIDE

How Your Body Produces Testosterone

HOW YOUR BODY PRODUCES TESTOSTERONE

Understanding the Hypothalamic–Pituitary–Gonadal (HPG) Axis

Testosterone production is controlled by a sophisticated communication system between your brain and testes. This system works through a feedback loop to maintain healthy hormone levels and optimize your health.

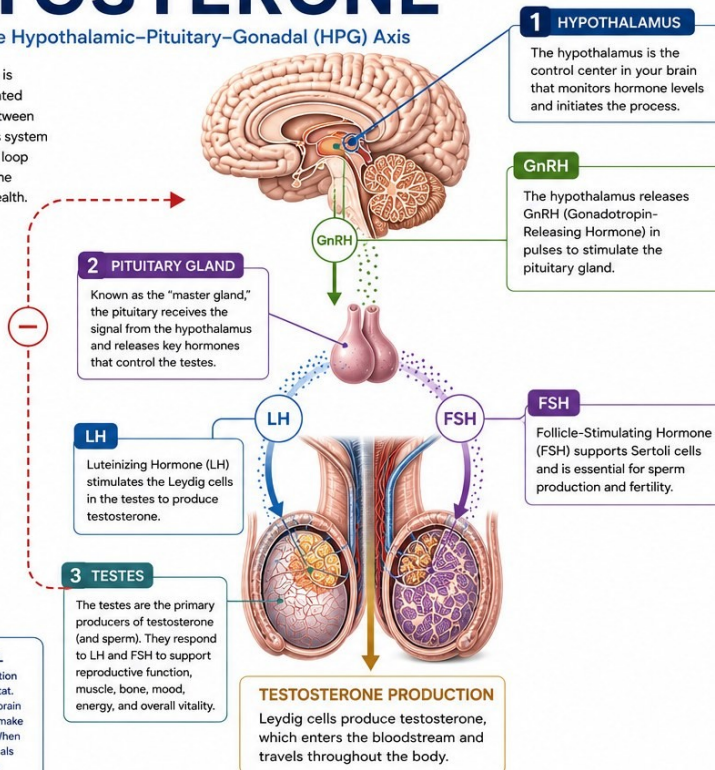
NEGATIVE FEEDBACK LOOP

When testosterone levels rise, the hypothalamus and pituitary reduce GnRH, LH, and FSH signals to decrease testosterone production and maintain balance.

CLINICAL PEARL

Testosterone production works like a thermostat. When levels fall, the brain signals the testes to make more testosterone. When levels rise, those signals decrease to maintain balance.

This illustration is for educational purposes only and is not a substitute for professional medical advice, diagnosis, or treatment. Always consult your physician regarding your individual health.



WHAT TESTOSTERONE DOES

Testosterone affects nearly every system in the male body.



LIBIDO & SEXUAL HEALTH

Supports healthy sex drive, erectile function, and overall sexual satisfaction.



ENERGY & VITALITY

Promotes energy, reduces fatigue, and improves overall sense of well-being.



MOOD & COGNITION

Supports mood stability, mental clarity, focus, and memory.



MUSCLE MASS & STRENGTH

Essential for muscle protein synthesis, strength, and physical performance.



BONE DENSITY

Helps maintain strong bones and reduces risk of osteoporosis.



RED BLOOD CELL PRODUCTION

Stimulates erythropoiesis, which supports oxygen transport and endurance.



BRAIN & NERVOUS SYSTEM

Supports neural health, confidence, motivation, and overall brain function.



METABOLISM & BODY COMPOSITION

Supports healthy metabolism, reduces body fat, and helps maintain a lean body composition.

DID YOU KNOW?

The hypothalamus releases GnRH in pulses, not a steady stream. This pulsatile pattern supports normal pituitary signaling.

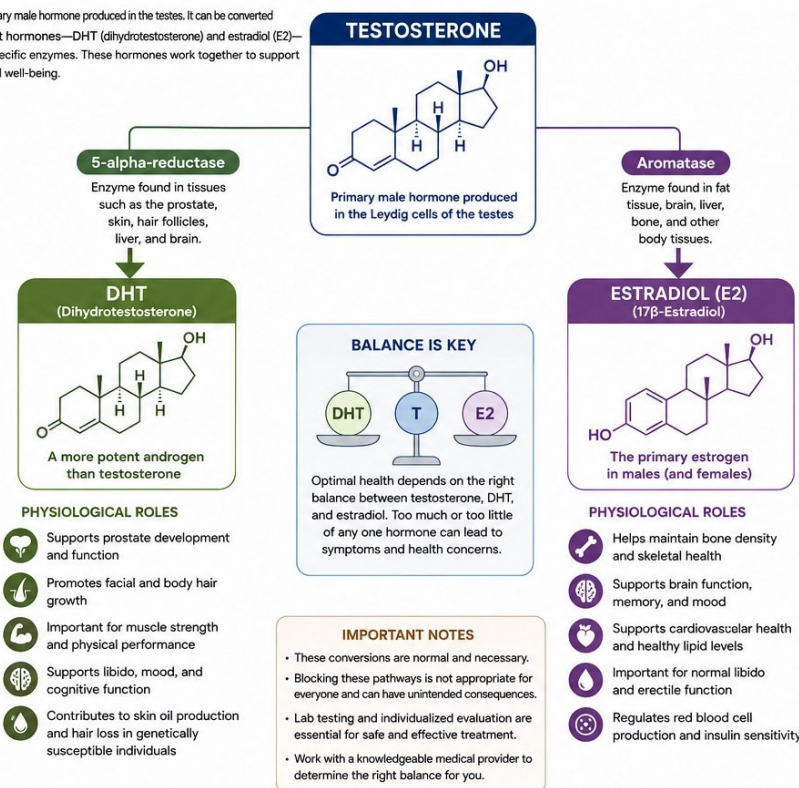
CHAPTER 2 | VISUAL GUIDE

Testosterone Conversion: DHT and Estradiol

FIGURE 2 TESTOSTERONE CONVERSION: DHT AND ESTRADIOL

How Testosterone Is Converted and How Each Hormone Works in the Body

Testosterone is the primary male hormone produced in the testes. It can be converted into two other important hormones—DHT (dihydrotestosterone) and estradiol (E2)—through the actions of specific enzymes. These hormones work together to support health, vitality, and overall well-being.



WHERE THESE HORMONES WORK



DHT

Acts locally (paracrine) in specific tissues where it is needed most. Does not circulate in high levels in the bloodstream.



ESTRADIOL (E2)

Circulates in the bloodstream and binds to estrogen receptors throughout the body.



DYNAMIC INTERACTION

These hormones interact with many other systems and are influenced by age, body composition, diet, sleep, stress, and overall health.



CLINICAL IMPLICATION

Symptoms are not always caused by low testosterone alone. Imbalances in DHT or estradiol can also contribute to how you feel. Comprehensive evaluation is essential.



This illustration is for educational purposes only and is not a substitute for professional medical advice, diagnosis, or treatment.

DID YOU KNOW?

The same testosterone molecule can become different hormones depending on which enzyme reaches it: 5-alpha-reductase makes DHT, while aromatase makes estradiol.

3 How Diagnosis Works

WHY IT MATTERS

Guidelines require compatible symptoms or signs plus consistently low testosterone measured correctly.

The American Urological Association uses total testosterone below 300 ng/dL as a reasonable diagnostic cutoff, interpreted with symptoms and confirmed on two separate early-morning tests.

Free testosterone may help when total testosterone is near the lower limit or SHBG is altered. LH and FSH help distinguish testicular from pituitary or hypothalamic causes.

KEY POINTS

- Diagnosis requires symptoms or signs and consistently low laboratory values.
- One low test is not enough.
- Additional tests are selected according to the clinical picture.

CLINICAL PEARL

Morning timing, repeat testing, and accurate laboratory methods matter because testosterone levels naturally fluctuate.

PATIENT TIP

Avoid testing during acute illness when possible, and tell your physician about supplements or medications that may affect results.

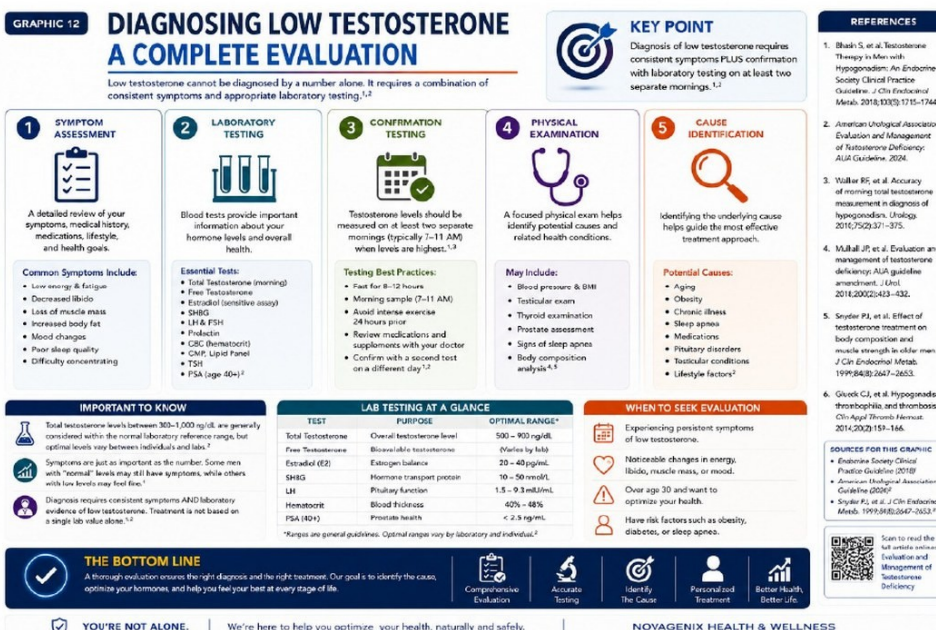
CONTINUE EXPLORING THIS TOPIC >

DID YOU KNOW?

Testosterone peaks after REM sleep. A 3 PM draw can read 20-30% lower than morning - why guidelines require early testing.

VISUAL COMPANION

Diagnostic Pathway



Graphic 12 - Diagnosing Low Testosterone

VISUAL COMPANION

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CONTINUE EXPLORING THIS TOPIC

The diagnostic pathway from symptoms to a confirmed treatment plan

[READ THE PHYSICIAN-REVIEWED GUIDE ->](#)

PHYSICIAN PERSPECTIVE

From Evaluation to a Personal Plan



PHYSICIAN PERSPECTIVE

From Evaluation to a Personal Plan

A thoughtful consultation connects symptoms, medical history, laboratory findings, fertility goals, and safety considerations before treatment is discussed.

- 01 LISTEN**
Symptoms, history, goals
- 02 TEST**
Accurate laboratory data
- 03 INTERPRET**
Context, risks, priorities
- 04 PERSONALIZE**
A monitored care plan

"The laboratory number matters, but it only becomes meaningful when interpreted in the context of the person."

DID YOU KNOW?

A personalized treatment plan considers your symptoms, laboratory results, health history, and goals. Hormone therapy is not one-size-fits-all.

4 Treatment Options

WHY IT MATTERS

The formulation should match the diagnosis, goals, health history, preferences, and ability to follow the plan safely.

Testosterone may be delivered by injection, topical formulations, or oral testosterone undecanoate. Each option has practical advantages, limitations, dosing considerations, and monitoring needs.

The best plan is not the newest or most convenient option for everyone. It is the option a patient can follow consistently and safely under physician supervision.

KEY POINTS

- There is no single best formulation for every patient.
- Follow the prescription label and physician instructions exactly.
- Formulation choice should reflect goals, health profile, convenience, and monitoring.

CLINICAL PEARL

Treatment selection is individualized. A formulation that works well for one patient may be inappropriate for another.

PATIENT TIP

Ask how each option is administered, how often it is used, what monitoring it requires, and what happens if your needs change.

CONTINUE EXPLORING THIS TOPIC >

DID YOU KNOW?

Your baseline laboratory results act like a before snapshot. They help your healthcare provider monitor progress and identify changes throughout treatment.

VISUAL COMPANION

Treatment Options

GRAPHIC 13

TESTOSTERONE TREATMENT OPTIONS FINDING THE RIGHT FIT FOR YOU

Testosterone Replacement Therapy (TRT) is not a "one-size-fits-all" approach. Multiple delivery methods are available, each with unique benefits, considerations, and appropriate uses.^{1,2}

COMMON TESTOSTERONE DELIVERY METHODS

INJECTABLES (IM)	LONG-ACTING INJECTABLES (IM)	TOPICAL GELS	NASAL GEL	BUCCAL TABLETS	ORAL TESTOSTERONE UNDECANOATE (TU)
Testosterone cypionate or enanthate injected into muscle.	Testosterone undecanoate injection given less frequently.	Applied daily to shoulders, upper arms, or abdomen.	Applied to inside of nostrils 2-3 times per day.	Placed against upper gum twice daily to absorb.	Advanced oral capsule (to be "spooned") taken twice daily.
PROS: • Cost-effective • Proven track record • Dosing flexibility	PROS: • Less frequent dosing • Stable testosterone levels • Convenient	PROS: • Easy daily application • Steady absorption • Non-invasive option	PROS: • Avoids first-pass liver metabolism • Non-invasive option • Steady absorption	PROS: • Avoids injections • Convenient dosing • Steady testosterone levels ^{3,4}	PROS: • Needle-free • Convenient oral dosing • Stable testosterone levels ^{3,4}
CONSIDERATIONS: • Requires injections • Pains and bruising • More frequent dosing (weekly/biweekly) ^{1,2}	CONSIDERATIONS: • Higher cost • Requires in-office administration • Injection-site discomfort ¹	CONSIDERATIONS: • Risk of irritation • Daily application required • Skin irritation possible ^{1,2}	CONSIDERATIONS: • Multiple daily dosing • Nasal irritation • Less convenient ^{1,2}	CONSIDERATIONS: • Gum irritation possible • Twice daily dosing • Taste/vomiting issues ^{1,2}	CONSIDERATIONS: • Must be taken with food • Twice daily dosing • Higher cost ^{3,4}

IMPORTANT: All TRT options require ongoing monitoring of testosterone levels, symptoms, and potential side effects. Your physician will help determine the best option and adjust dosing as needed.^{1,2,3}

CHOOSING THE RIGHT METHOD: FACTORS TO CONSIDER^{2,3}

- LIFESTYLE & PREFERENCE:** Do you prefer daily convenience, weekly injections, or less frequent dosing?
- COST & INSURANCE:** What is your budget? What does your insurance cover (if applicable)?
- MEDICAL HISTORY:** Do you have liver concerns, sleep apnea, or other health conditions?
- SYMPTOM SEVERITY:** How severe are your symptoms? What are your treatment goals?
- COMPLIANCE:** Which option are you most likely to use consistently?
- LAB STABILITY:** Do you want the most stable levels possible?

POTENTIAL SIDE EFFECTS OF TRT^{1,2}

- Elevated hematocrit (thickened blood)
- Sleep apnea (worsening)
- Axes or oily skin
- Breast tenderness or enlargement
- Changes in cholesterol
- Prostate changes (monitor PSA)

Regular monitoring helps manage risks and optimize safety.

THE BOTTOM LINE

Multiple testosterone delivery methods are available, each with unique advantages. Work with your physician to find the option that best fits your lifestyle, goals, and medical needs—and helps you feel your best.

PERSONALIZED APPROACH | **REGULAR MONITORING** | **BALANCE BENEFITS & RISKS** | **BETTER HEALTH. BETTER LIFE.**

YOU'RE NOT ALONE. | We're here to help you optimize your health, naturally and safely. | **NOVAGENIX HEALTH & WELLNESS**

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- American Urological Association Guideline (2024)²
- Hackett G, et al. BP 2024³
- FDA Prescribing Information (2024)⁴
- Muhlet JF, et al. *J Urol*. 2018⁵
- Kymron® Prescribing Information (2024)⁶

Scan to read the full article online: Testosterone Treatment Options: Choosing What's Right for You

Graphic 13 - Testosterone Treatment Options

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CONTINUE EXPLORING THIS TOPIC

Evidence-based testosterone treatment options

[READ THE PHYSICIAN-REVIEWED GUIDE ->](#)

DEEPER INSIGHT

Comparing TRT Delivery Methods

OPTION	HOW IT WORKS	POTENTIAL ADVANTAGES	CONSIDERATIONS	TYPICAL USE
Injectable testosterone	Delivered into muscle or under the skin.	Flexible dosing; reliable; widely used.	Requires injection training and monitoring.	Weekly or physician-directed
Topical gel or cream	Applied to product-specific skin sites.	Needle-free; daily routine.	Skin-transfer precautions; daily adherence.	Daily
Oral testosterone undecanoate	Absorbed through the intestinal lymphatic system.	No injections; convenient for selected patients.	Product-specific food and blood-pressure considerations.	Usually twice daily
Adjunctive options	May support natural production or fertility goals in selected cases.	Can align with fertility preservation.	Not primary TRT for every patient.	Individualized

DID YOU KNOW?

Injectable formulations remain the most established option for TRT, offering flexible dosing that can be adjusted based on lab results, and are generally the most cost-efficient path to consistent, physician-monitored testosterone levels.

[VIEW TREATMENT OPTIONS ONLINE >](#)

DID YOU KNOW?

The brain contains androgen receptors in areas involved in focus and memory. Brain fog, fatigue, and mood changes can appear before visible physical changes.

5 Starting Treatment Safely

WHY IT MATTERS

A safe start depends on appropriate candidacy screening, clear instructions, baseline measurements, and a follow-up plan.

Before treatment, the physician reviews cardiovascular history, sleep apnea risk, fertility goals, blood pressure, blood counts, prostate health when appropriate, medications, and potential contraindications.

Patients should understand administration technique, storage, missed-dose instructions, adverse effects, and when to contact the clinic.

KEY POINTS

- Baseline safety information guides treatment and future comparisons.
- Use only the prescribed dose and formulation.
- Know which symptoms require prompt medical attention.

CLINICAL PEARL

More testosterone is not automatically better. Treatment aims for clinical benefit with safe, physiologic replacement and careful follow-up.

PATIENT TIP

Keep the medication label, clinic instructions, and emergency contact information together in one location.

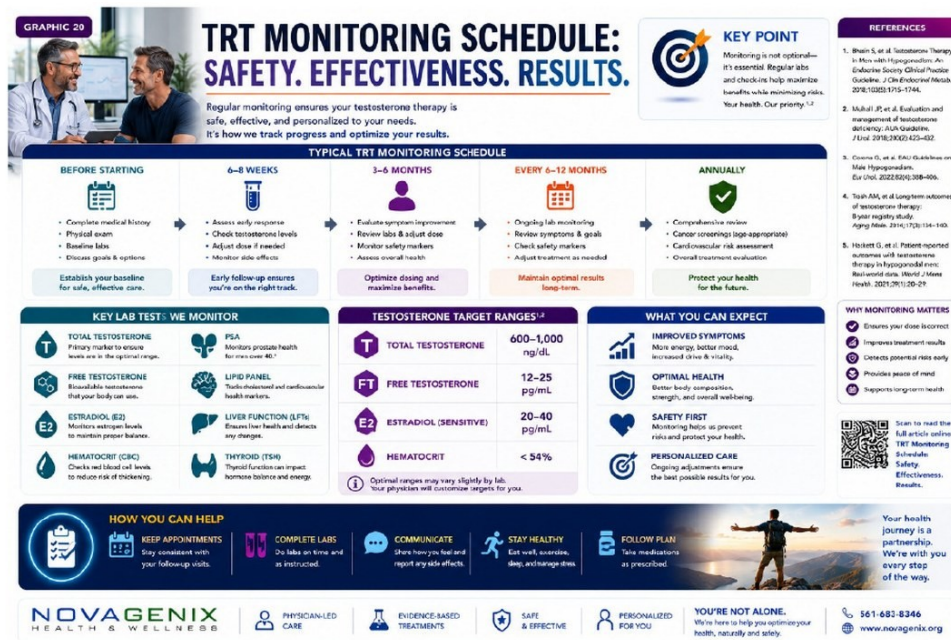
CONTINUE EXPLORING THIS TOPIC >

DID YOU KNOW?

Safe treatment begins with appropriate screening, individualized dosing, and a clear plan for ongoing follow-up.

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Starting Treatment Safely



Graphic 20 - TRT Monitoring Schedule

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CONTINUE EXPLORING THIS TOPIC

Starting treatment safely and understanding early follow-up

[READ THE PHYSICIAN-REVIEWED GUIDE ->](#)

6 Monitoring and Long-Term Safety

WHY IT MATTERS

Monitoring is part of treatment, not an optional extra.

Follow-up evaluates symptoms, adverse effects, adherence, blood pressure, testosterone levels, and laboratory markers such as CBC and hematocrit. Prostate monitoring is individualized according to age, risk, symptoms, and shared decision-making.

Treatment may be adjusted, paused, or stopped when benefits are insufficient, risks increase, laboratory abnormalities develop, or patient goals change.

The 2023 TRAVERSE trial found no increase in major adverse cardiovascular events compared with placebo in the studied population, while atrial fibrillation, acute kidney injury, and pulmonary embolism occurred more often in the testosterone group. These findings reinforce the need for individualized risk assessment and ongoing monitoring.

KEY POINTS

- Follow-up protects both effectiveness and safety.
- Hematocrit requires attention because testosterone can increase red blood cell production.
- Blood pressure, symptoms, and treatment response should be reviewed over time.

CLINICAL PEARL

A hematocrit at or above 54% generally requires intervention, evaluation, and treatment adjustment according to the clinical situation.

PATIENT TIP

Track appointments and laboratory dates rather than waiting until medication is nearly finished.

CONTINUE EXPLORING THIS TOPIC >

DID YOU KNOW?

The FDA-mandated TRAVERSE trial (2023), with over 5,200 men, found no increased cardiovascular risk versus placebo in the studied population.

VISUAL COMPANION

Monitoring and Long-Term Safety



Graphic 19 - What Results Can You Expect?

VISUAL COMPANION

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CONTINUE EXPLORING THIS TOPIC

How monitoring protects long-term health during TRT

[READ THE PHYSICIAN-REVIEWED GUIDE ->](#)

PHYSICIAN PERSPECTIVE

Monitoring Is Part of Treatment

PHYSICIAN PERSPECTIVE
Monitoring Is Part of Treatment



Follow-up is where a treatment plan becomes truly individualized. Symptoms, blood pressure, laboratory values, adverse effects, and patient goals should all be reviewed over time.

01 REVIEW

Symptoms, benefits, and side effects

02 MEASURE

Blood pressure and appropriate laboratory markers

03 ADJUST

Dose, schedule, or treatment plan when needed

Consistent monitoring helps protect safety while keeping treatment aligned with the patient's goals.

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WHY FOLLOW-UP MATTERS

Follow-up links symptoms, blood pressure, laboratory values, adverse effects, and treatment response. The goal is not simply to raise a number - it is to manage care safely over time.

54%

HEMATOCRIT THRESHOLD

CLINICAL SAFETY MARKER

A hematocrit level at or above 54% generally requires clinical evaluation and possible treatment adjustment.

EXPLORE TRT MONITORING >

CHAPTER 7 | REVIEWED JULY 27, 2026

7 Fertility Considerations

WHY IT MATTERS

Exogenous testosterone can suppress sperm production and should be discussed before treatment begins.

Testosterone therapy suppresses pituitary LH and FSH signaling, which can reduce intratesticular testosterone and sperm production. Recovery after stopping treatment varies and may take time.

Men who may want children should discuss fertility goals before starting TRT. Depending on the diagnosis and clinical situation, a physician may discuss semen analysis, sperm banking, hCG, or selective use of medications that stimulate endogenous signaling.

KEY POINTS

- TRT can significantly reduce sperm production.
- Fertility goals should be documented before treatment.
- Fertility-preserving strategies require individualized physician management.

CLINICAL PEARL

A normal testosterone level while using TRT does not mean sperm production is preserved. These are separate biological outcomes.

PATIENT TIP

Mention future fertility even when pregnancy is not an immediate goal. It can affect the initial treatment strategy.

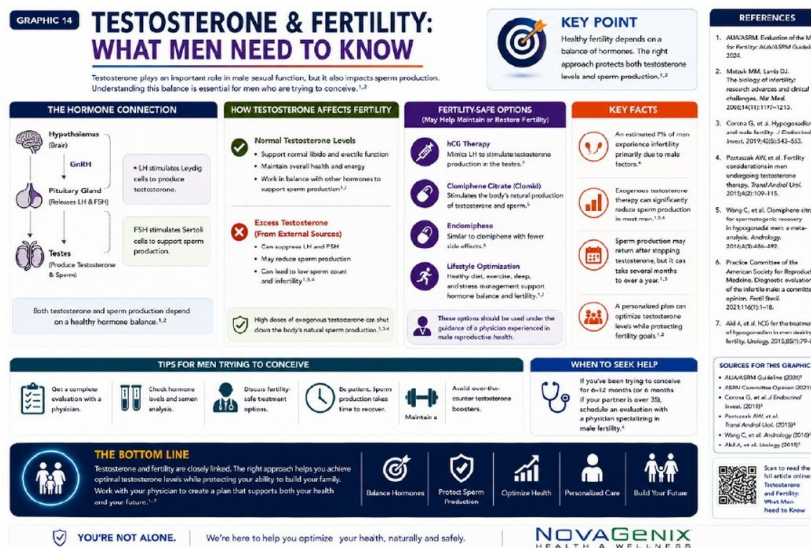
[CONTINUE EXPLORING THIS TOPIC >](#)

DID YOU KNOW?

External testosterone signals the hypothalamus to stop LH/FSH release - pausing natural sperm production.

VISUAL COMPANION

TRT and Fertility



Graphic 14 - Testosterone and Fertility

VISUAL COMPANION

19 CONTINUE EXPLORING THIS TOPIC

TRT, fertility, and physician-managed options

READ THE PHYSICIAN-REVIEWED GUIDE ->



Dr. Mackey and his team were absolutely phenomenal! He is so knowledgeable and passionate about what he does. He helped with my fertility issues and my wife and I were able to conceive in 2.5 months. 10/10 recommend this practice!

VINCE A. | GOOGLE REVIEW

Shared with permission. Individual results vary. This reflects one patient's experience, not a guarantee.

8 Traveling with Testosterone

WHY IT MATTERS

Medication planning helps prevent missed doses, damaged supplies, and avoidable travel problems.

Keep testosterone in its original labeled packaging and carry a copy of the prescription or supporting documentation. Follow product-specific temperature and storage instructions.

For air travel, place medication and essential supplies in carry-on baggage when permitted. Review destination laws and airline or security requirements in advance, especially for international travel.

KEY POINTS

- Use original pharmacy-labeled packaging.
- Protect medication from extreme heat, freezing, and direct sunlight.
- Plan sharps storage and disposal before departure.

CLINICAL PEARL

Travel rules and medication laws can vary by destination. The prescribing clinic cannot guarantee entry requirements outside its jurisdiction.

PATIENT TIP

Carry more documentation than you expect to need and allow time to resolve pharmacy or security questions before departure.

CONTINUE EXPLORING THIS TOPIC >

DID YOU KNOW?

Plan medication storage, documentation, supplies, and destination requirements before you travel.

CHAPTER 8 COMPANION

Traveling with Testosterone - Practical Checklist

1

Keep original labels

Carry medication in the original pharmacy-labeled packaging and bring a copy of the prescription.

2

Use carry-on storage

Keep essential medication and supplies with you when permitted rather than in checked luggage.

3

Protect temperature

Follow product-specific storage instructions and avoid heat, freezing, and direct sunlight.

4

Plan for screening

Pack needles and supplies together and allow extra time for airport or security questions.

5

Check destination rules

International medication and customs laws vary. Verify requirements before departure.

6

Prepare for sharps

Bring a suitable container and identify safe disposal options at your destination.

7

Plan time-zone dosing

Ask your clinician how to handle schedule changes, missed doses, or long travel days.

8

Carry backup information

Keep clinic and pharmacy contact details available in case medication is lost or delayed.

[READ THE TRAVEL GUIDE >](#)

CHAPTER 9 | REVIEWED JULY 27, 2026

9 Questions to Ask Your Physician

WHY IT MATTERS

Good questions help patients understand why a treatment is recommended, what alternatives exist, and how progress will be evaluated.

A clear discussion should cover the diagnosis, treatment options, expected timeline, fertility, monitoring, adverse effects, costs, and what happens if treatment is ineffective or no longer desired.

WHAT TO ASK - AND WHAT A GOOD ANSWER SOUNDS LIKE

ASK

Why do you believe I do or do not meet diagnostic criteria?

LOOK FOR

Specific symptoms discussed alongside lab values - not a number viewed in isolation.

ASK

Which option best fits my goals, health history, and preferences?

LOOK FOR

More than one delivery method discussed, with real tradeoffs - not a single default answer.

ASK

How will we monitor benefits, risks, blood pressure, and laboratory changes?

LOOK FOR

A concrete schedule naming baseline testing, early follow-up, ongoing labs, and clinical review.

CLINICAL PEARL

Shared decision-making is strongest when the patient understands both the expected benefits and the reasons treatment may need to change.

PATIENT TIP

Write down your top five questions before the appointment and bring a current medication and supplement list.

VISUAL COMPANION

Frequently Asked Questions

How long before I feel better?



Many men notice improved energy, mood, and libido within 3-6 weeks. Full benefits usually develop over 3-6 months.

Can I drink alcohol?



Moderate alcohol is generally okay, but excess can lower testosterone and negatively impact sleep, recovery, and liver function.

Will TRT affect my fertility?



TRT can reduce sperm production. A physician may discuss fertility-preserving or fertility-restoring strategies according to the clinical situation.

Should I exercise while on TRT?



Resistance training and proper nutrition support body composition and long-term health.

Will I lose my hair?



TRT does not cause hair loss. If you are genetically prone to male pattern baldness, it may progress at its natural rate.

How often do I need labs?



Typically every 3-6 months at the start, then every 6-12 months once stable, as directed by your physician.

Do I have to inject forever?



Not always. Multiple delivery options may include injectables, gels, topical creams, nasal, buccal, and oral medications.

Can I donate blood?



Blood donation should not be used as a substitute for medical management. Discuss elevated hematocrit with your treating physician.

Can I travel or fly while on TRT?



Yes. Keep medications in original containers and carry physician documentation if needed.

HAVE ANOTHER QUESTION?

Speak with NovaGenix for physician-reviewed guidance at your next consultation.

10 Symptom & Appointment

SYMPTOMS TO DISCUSS

- ☐ Changes in sexual desire or erections
- ☐ Fatigue or reduced vitality
- ☐ Changes in strength, muscle, or body fat
- ☐ Mood, concentration, or sleep concerns
- ☐ Hot flashes or night sweats
- ☐ Changes in body hair or breast tissue

BRING TO YOUR VISIT

- ☐ Previous hormone and laboratory results
- ☐ Medication and supplement list
- ☐ Medical, surgical, and family history
- ☐ Fertility goals and prior evaluation
- ☐ Photo ID and insurance information
- ☐ List of other treating physicians

QUESTIONS TO ASK

- ☐ When should I repeat laboratory testing?
- ☐ Which symptoms or side effects require a call?
- ☐ How will blood pressure and hematocrit be followed?
- ☐ What is the plan if treatment is ineffective?
- ☐ What are the risks and how will they be monitored?
- ☐ How soon might I notice changes?

BEFORE YOUR VISIT

Write down your top three concerns. Bring current medications and supplements. Gather prior laboratory reports. Note fertility goals and treatment questions.



Prepare with confidence

Bring organized information so your consultation can focus on the questions and decisions that matter most.

COMPLETE SECURE PATIENT INTAKE >

APPENDIX A

Patient Medical Dictionary

TERM	DEFINITION
5-Alpha Reductase	The enzyme that converts testosterone to dihydrotestosterone (DHT).
A1C and Fasting Glucose	Tests used to assess blood sugar regulation and diabetes risk.
AAS	Anabolic-androgenic steroids, a broad drug category distinct from medically supervised physiologic testosterone replacement.
ADAM Questionnaire	A symptom-screening questionnaire sometimes used during evaluation; it does not diagnose low testosterone.
Albumin	A blood protein that loosely binds testosterone and may be used when estimating free testosterone.
Andropause	An informal term for age-related testosterone decline; it is not equivalent to menopause.
Aromatase	An enzyme that converts testosterone and other androgens into estrogens.
Aromatase Inhibitor	A medicine that reduces conversion of testosterone to estrogen; examples include anastrozole.
Aromatization	Conversion of testosterone into estrogen by the aromatase enzyme.
Azoospermia	Complete absence of sperm in the ejaculate.
Bioavailable Testosterone	The fraction of testosterone that is free or loosely bound and available to tissues.
Bioidentical Hormone	A hormone with the same molecular structure as a hormone naturally produced by the body.
CBC	Complete blood count; includes red blood cells, hemoglobin, hematocrit, white cells, and platelets.
CMP	Comprehensive metabolic panel; evaluates liver, kidney, electrolyte, and metabolic markers.
Compounding Pharmacy	A pharmacy that prepares customized medications under applicable state and federal requirements.
Contraindication	A condition or circumstance in which a treatment should not be used.
DHT	Dihydrotestosterone, a potent androgen formed from testosterone by 5-alpha reductase.
Endogenous	A hormone produced naturally within the body.
Erythrocytosis	An increase in red blood cell mass that can occur during testosterone therapy.

APPENDIX A

Patient Medical Dictionary - Continued

TERM	DEFINITION
Estradiol (E2)	The primary form of estrogen measured in men; levels may change during TRT.
Exogenous	A hormone or medication introduced from outside the body.
FDA-Approved vs. Compounded	FDA-approved products undergo agency review; compounded medications are prepared by a licensed pharmacy for specific patient needs.
Fertility Preservation	Steps such as sperm banking considered before treatment when future biological fertility matters.
Free Testosterone	The small fraction of testosterone not tightly bound to proteins and more readily available to tissues.
FSH	Follicle-stimulating hormone, a pituitary hormone involved in sperm production.
Gynecomastia	Development or enlargement of glandular breast tissue in males.
hCG	Human chorionic gonadotropin; acts similarly to LH and may be used in selected fertility-related plans.
Hematocrit	The percentage of blood volume made up of red blood cells.
Hemoglobin	The oxygen-carrying protein inside red blood cells.
HPG Axis	The hypothalamic-pituitary-gonadal signaling system that regulates testosterone and sperm production.
Hypogonadism	Reduced testicular function resulting in low testosterone, impaired sperm production, or both.
Injection-Site Rotation	Alternating injection locations to reduce irritation and tissue changes.
Insulin Syringe	A fine-gauge syringe sometimes used for physician-directed subcutaneous injections.
Intramuscular (IM)	An injection delivered into muscle tissue.
Klinefelter Syndrome	A chromosomal condition, commonly 47,XXY, that can cause primary hypogonadism.
LH	Luteinizing hormone, a pituitary hormone that signals the testes to produce testosterone.
Libido	Sexual desire or interest.
Lipid Panel	A cholesterol and triglyceride test used to assess cardiovascular and metabolic health.

APPENDIX A

Patient Medical Dictionary - Continued

TERM	DEFINITION
Low-T	A common lay term for testosterone deficiency or hypogonadism.
Nasal Gel	Intranasal testosterone administered multiple times per day.
Negative Feedback	The process by which external testosterone reduces the brain signals LH and FSH.
Off-Label Use	Prescribing an approved medication for a use, dose, route, or population not listed in its FDA-approved labeling.
Oligospermia	A sperm concentration below the reference range.
Oral Testosterone Undecanoate	Oral testosterone products absorbed through lymphatic pathways; product-specific food and blood-pressure instructions may apply.
PDE5 Inhibitor	A medication such as tadalafil or sildenafil that improves penile blood flow and erectile function.
Peak	The highest medication or hormone level after a dose.
Pellets	Testosterone implants placed under the skin for extended release. NovaGenix does not offer pellet therapy.
Physiologic Dosing	Dosing intended to restore hormone levels to an appropriate clinical range.
Polycythemia	An abnormal increase in red blood cells; the term is sometimes used broadly when discussing elevated hematocrit.
Priapism	A prolonged, often painful erection requiring urgent medical evaluation.
PSA	Prostate-specific antigen, a blood marker used as part of individualized prostate evaluation.
Semen Analysis	A laboratory assessment of sperm count, movement, morphology, and other fertility measures.
SERM	Selective estrogen receptor modulator, including clomiphene or enclomiphene, used in selected clinical situations.
Shared Decision-Making	A process in which clinician and patient make decisions using evidence, risks, benefits, and patient preferences.
SHBG	Sex hormone-binding globulin, a protein that binds testosterone and influences measured or calculated free testosterone.
Sleep Apnea	A sleep-related breathing disorder that can contribute to symptoms and may require evaluation during TRT.
Split Dosing	Dividing a total weekly dose into smaller, more frequent doses when clinically appropriate.

APPENDIX A

Patient Medical Dictionary - Continued

TERM	DEFINITION
Steady State	The point at which medication levels stabilize after consistent dosing.
Subcutaneous (SubQ)	An injection delivered into the fatty layer beneath the skin.
Supraphysiologic Dosing	Dosing that produces levels above the normal physiologic range and is associated with greater risk.
Telehealth TRT	Evaluation and follow-up delivered partly through telemedicine where legally and clinically appropriate.
Testicular Atrophy	A reduction in testicular size that may occur with certain conditions or suppression from exogenous testosterone.
Testosterone Cypionate	A commonly prescribed injectable testosterone ester with an approximately 7- to 8-day half-life.
Testosterone Enanthate	An injectable testosterone ester similar to cypionate; also available in an autoinjector formulation.
Testosterone Propionate	A short-acting testosterone ester that generally requires more frequent dosing.
Testosterone Undecanoate	A long-chain testosterone ester available in certain injectable and oral products.
Titration	Adjusting a dose based on symptoms, laboratory results, safety, and treatment goals.
Topical Gel or Cream	Testosterone applied to the skin daily; requires attention to transfer precautions and consistent use.
Total Testosterone	The total amount of testosterone in blood, including bound and unbound fractions.
TRAVERSE	A large cardiovascular safety trial involving men with hypogonadism and cardiovascular risk.
Trough	The lowest medication or hormone level before the next scheduled dose.
TRT	Testosterone replacement therapy.
Varicocele	Enlarged veins in the scrotum that may affect testicular function and fertility.

APPENDIX B

Clinical Sources & Review Status

CLINICAL GUIDELINES

American Urological Association: Evaluation and Management of Testosterone Deficiency. Endocrine Society Clinical Practice Guideline: Testosterone Therapy in Men With Hypogonadism.

CARDIOVASCULAR SAFETY

Lincoff AM, et al. Cardiovascular Safety of Testosterone-Replacement Therapy. New England Journal of Medicine. 2023.

FDA INFORMATION

Current FDA-approved prescribing information and safety communications vary by product and may change over time. Patients should follow the instructions supplied with their medication and discuss product-specific risks, food requirements, blood-pressure considerations, and contraindications with the prescribing physician.

FERTILITY

Clinical literature on exogenous testosterone suppression of gonadotropins and spermatogenesis, with individualized specialist management when fertility is a priority.

REVIEW STATUS

Physician reviewed and approved. Last clinically reviewed: July 27, 2026. Future editions should be re-reviewed whenever substantive clinical guidance changes.

PHYSICIAN PROFILE

Timothy W. Mackey, D.O.



Listening first.

Treating the whole patient.

Dr. Timothy W. Mackey serves as Medical Director of NovaGenix Health & Wellness and provides physician-led oversight of patient evaluation, treatment planning, and long-term monitoring. His approach emphasizes listening first, interpreting laboratory results in the context of the whole patient, and explaining both the potential benefits and limitations of treatment in clear language.

Within this patient education series, Dr. Mackey clinically reviewed the discussion of low testosterone, diagnostic testing, testosterone treatment options, fertility considerations, treatment safety, and ongoing follow-up. The purpose of this review is to help patients prepare for a more informed conversation with their own treating physician.

PHYSICIAN-LED CARE

A laboratory number is only one part of the evaluation.

Symptoms, medical history, medications, fertility goals, cardiovascular risk, sleep health, blood pressure, and appropriate monitoring all matter when deciding whether treatment is reasonable.

CLINICAL REVIEW STATUS

Clinically reviewed and approved by Timothy W. Mackey, D.O. Last clinically reviewed: July 27, 2026. Substantive clinical revisions should undergo renewed physician review before publication.

ABOUT NOVAGENIX

NovaGenix Health & Wellness

NovaGenix Health & Wellness is a physician-led health and wellness practice based in Jupiter, Florida. The practice provides individualized evaluation and medically supervised care for adults seeking guidance about hormone health, testosterone therapy, women's hormone care, medical weight management, peptide therapy, regenerative medicine, and healthy-aging goals.

The NovaGenix care model is built around education, appropriate laboratory testing, candidacy screening, individualized treatment planning, and ongoing monitoring. Treatment is never determined by a symptom checklist or a single laboratory result, and not every patient is a candidate for every service.

CONTACT INFORMATION

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4.9 ★★★★★

RATED 4.9 OUT OF 5

FROM 68 GOOGLE REVIEWS

Preparing for a consultation

Bring prior laboratory results, a current medication and supplement list, relevant medical history, and any fertility goals or treatment questions. NovaGenix will contact prospective patients to determine appropriate next steps and scheduling.

[REQUEST A CONSULTATION >](#)

PUBLICATION INFORMATION

Medical Disclaimer, Copyright & Use

MEDICAL DISCLAIMER

This handbook is provided for general educational purposes only. It does not diagnose any medical condition, establish a physician-patient relationship, replace an individualized medical evaluation, or constitute medical advice. Symptoms associated with low testosterone can have many causes. Treatment decisions require appropriate history, examination when indicated, laboratory testing, assessment of risks and alternatives, and ongoing physician supervision.

Do not begin, stop, change, share, or combine prescription medication based on this publication. Seek prompt medical care for severe or rapidly worsening symptoms, chest pain, difficulty breathing, signs of a blood clot or stroke, a serious allergic reaction, or any other urgent concern. Medication laws and travel requirements vary by jurisdiction.

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KNOWLEDGE SUPPORTS BETTER DECISIONS

Prepare for an informed conversation.

Use this guide to discuss symptoms, testing, treatment options, fertility goals, and long-term monitoring with a qualified medical professional.

[LEARN MORE ABOUT TESTOSTERONE THERAPY AT NOVAGENIX >](#)