

Testosterone replacement therapy for hypogonadism: A primer for primary care

By Julian L. Gallegos, PhD, MBA, FNP-BC, CNL, CMHE, FAUNA



Downloaded from <https://journals.lww.com/tnpj> by BMDM5ePHKav1zEoum1tQIN4a+kLNEZgbsmH4XmU1CvW-X11AW
nYQpIIOrHD3BD0QdRyTtVSF14Cf3vC1y0abgQZXdwnfkZBYvws on 07/27/2024

Supersize/iStockPhotos

ABSTRACT

Testosterone replacement therapy (TRT) is a crucial intervention for men diagnosed with hypogonadism, a condition characterized by inadequate testosterone production. As primary care NPs play an essential role in managing patients with hypogonadism, they must comprehensively understand TRT. This article serves as a primer for primary care NPs, based on current guidelines, to provide evidence-based care for men with hypogonadism. It offers an overview of the etiology, clinical presentation, diagnostic criteria, and treatment options for hypogonadism, focusing on using TRT appropriately in primary care settings.

Keywords: andrology, men's health, testosterone replacement therapy, testosterone therapy

Hypogonadism in males is a complex medical condition marked by low testosterone levels that affects a significant number of men worldwide.¹ The prevalence of hypogonadism is approximately 25.3% among men ages 40 to 70 years.² The Hypogonadism in Males Study found a prevalence of hypogonadism in men ages 45 and older presenting to primary care of 38.7%.³ Testosterone, the primary male sex hormone, is crucial for developing male characteristics and maintaining various physiological processes throughout life. Multiple factors, including congenital abnormalities, testicular damage, chronic illness, and aging-related hormonal changes, can cause hypogonadism.

It is important for primary care NPs to recognize the signs and symptoms of hypogonadism during routine patient assessments. Hypogonadism can lead to various symptoms, some of which can significantly impact a man's quality of life. These symptoms may include fatigue, decreased libido, erectile dysfunction, decreased muscle mass and strength, mood disturbances, and cognitive changes.¹ However, it is key to note that some of these symptoms are nonspecific and may be caused by other medical conditions, necessitating a comprehensive diagnostic approach.

In this article, the terms “men” and “male” are used to refer to cisgender individuals assigned male at birth. Considerations for evaluation and management of hypogonadism in the pediatric population are outside of the scope of this article.

ETIOLOGY AND PATHOPHYSIOLOGY

Understanding the etiology and pathophysiology of hypogonadism is necessary for delivering effective care. Hypogonadism is characterized by reduced or absent secretion of sex hormones, leading to deficient gonadal function. This can stem from disruption of the hypothalamic-pituitary-gonadal axis, which is crucial for regulation of sex hormones, by way of dysfunction within the gonads or alterations in the gonadotropin receptors, resulting in decreased levels of sex hormones such as testosterone and estradiol.^{4,5} Diseases of the hypothalamus and pituitary gland can also disrupt this axis by affecting the secretion of gonadotropins necessary for gonadal function.⁶

Primary hypogonadism

Primary hypogonadism originates from issues within the gonads themselves and is marked by low testosterone levels despite high levels of gonadotropins, such as follicle-stimulating hormone (FSH) and luteinizing hormone (LH). Primary hypogonadism could arise from a congenital disorder, infection, or gonad damage.^{4,7} Congenital disorders such as Klinefelter syndrome or cryptorchidism can impair testicular development and testosterone production (*Table 1*).^{4,8} Acquired causes of primary hypogonadism include testicular trauma, infection, radiation, chemotherapy, and hemochromatosis.^{8,9} Age-related changes can also lead to primary hypogonadism.

Secondary hypogonadism

On the other hand, secondary hypogonadism occurs due to dysfunction at the hypothalamus or pituitary gland level, leading to inadequate secretion of gonadotropins and subsequent decreased stimulation of the gonads and low testosterone production. Factors contributing to secondary hypogonadism can include genetic mutations, tumors (such as pituitary tumors), systemic diseases (such as infiltrative diseases), head trauma, certain genetic disorders, obesity, and normal aging.^{5,8-10}

CLINICAL PRESENTATION AND DIAGNOSIS

The clinical presentation of hypogonadism can vary widely and may overlap with other medical conditions, making accurate diagnosis challenging. Patients with hypogonadism may present with symptoms that can be categorized into sexual, physical, and psychological domains. Sexual symptoms may include reduced libido, erectile dysfunction, and infertility.⁹ Physical

symptoms may involve fatigue, loss of body hair, decreased muscle mass and bone density, and increased body fat. Psychological symptoms include mood disturbances, irritability, and reduced cognitive function.

Providers can use the Androgen Deficiency in the Aging Male (ADAM) questionnaire, a validated and reliable tool for assessing symptoms of testosterone deficiency designed for use in men ages 40 years and older.⁹ Tools such as the ADAM questionnaire cannot diagnose testosterone deficiency but can raise suspicion for the condition.

Following any screening, NPs are expected to adopt a systematic approach to diagnosing and managing hormonal imbalances that impact their patients, in adherence with comprehensive guidelines from the American Urological Association (AUA). This process begins with an exhaustive clinical evaluation that carefully examines a presenting patient's symptoms. Such initial assessments are needed for establishing a baseline understanding of the patient's condition, which is essential for formulating an effective treatment strategy. This evaluative stage is not merely the first step but rather the gateway to a nuanced therapeutic protocol that considers the hormonal status of each patient, as recommended by the AUA's evidence-based practice guidelines.^{11,12}

To begin, the NP should collect a detailed medical history delving into comorbidities, medications, and lifestyle factors that could contribute to hormonal disruptions. Special attention should be given to

any history of testicular trauma, surgery, or radiation therapy that might have resulted in change contributing to disruptions or imbalances.⁸ Blood tests should be conducted to assess hormone levels quantitatively.

The cornerstone of this diagnosis is the accurate measurement of serum total testosterone using a reliable assay. According to AUA guidelines, total testosterone level measurements of less than 300 ng/dL on two separate occasions strongly indicate hypogonadism.¹² It is important to perform the test in the morning, at which time testosterone levels peak. It may be necessary to repeat the test on different days to confirm persistently low testosterone levels, as hormone levels can fluctuate. Of note, for men who work night shifts, testosterone level measurement requires careful consideration of their adjusted circadian rhythms.¹³ Testosterone levels should be assessed soon after individuals in this population wake, rather than in the early morning.¹³

In addition to testosterone, healthcare providers should measure serum LH and FSH levels. Elevated LH and FSH levels with low total testosterone typically indicate primary hypogonadism.^{11,14} Conversely, low or inappropriately normal LH and FSH levels with low total testosterone may suggest secondary hypogonadism.

Furthermore, men ages 45 years and older should have a baseline prostate-specific antigen (PSA) test; it should be less than 4 ng/mL to initiate replacement

TABLE 1. Primary hypogonadism vs. secondary hypogonadism

	Primary hypogonadism (testicular failure)	Secondary hypogonadism (hypothalamic-pituitary failure)
Pathophysiology	<p>The problem lies in the testes, which cannot produce sufficient testosterone.</p> <p>Testes are unresponsive to gonadotropin signals.</p> <p>Dysfunction leads to high gonadotropin levels due to lack of negative feedback.</p>	<p>The problem is in the hypothalamus or pituitary gland, not the testes.</p> <p>There is inadequate secretion of gonadotropins (LH and FSH).</p> <p>Dysfunction leads to low or normal gonadotropin levels due to impaired stimulation of the testes.</p>
Causes	<ul style="list-style-type: none"> • Klinefelter syndrome • Undescended testicles • Orchitis (testicular inflammation) • Testicular trauma or surgery • Chemotherapy • Radiation therapy • Autoimmune disorders • Aging • Genetic disorders affecting testosterone synthesis 	<ul style="list-style-type: none"> • Pituitary tumors or diseases • Hypothalamic dysfunction or tumors • Genetic conditions affecting gonadotropin release • Radiation therapy, especially to the brain • Severe systemic illnesses • Chronic opioid or steroid use • Eating disorders, malnutrition • Extreme physical or psychological stress • Aging

Abbreviations: FSH, follicle-stimulating hormone; LH, luteinizing hormone.

therapy. If elevated above 4 ng/mL, the patient should be referred to urology for further evaluation.

Throughout this process, NPs should bear in mind that it is critical to distinguish between primary and secondary hypogonadism by obtaining a thorough medical history, conducting a physical exam, and assessing hormone levels.^{8,9} Identifying the specific cause of hypogonadism guides treatment decisions and further investigations, if necessary. In cases of primary hypogonadism, for example, the size and function of the testicles should be assessed, and genetic testing may be considered, to uncover underlying causes.¹¹ Structural abnormalities within the pituitary gland may be examined for secondary hypogonadism using MRI or additional tests to rule out other endocrine disorders.¹¹ Throughout this diagnostic journey, NPs must be diligent in excluding other potential causes of secondary hypogonadism, such as pituitary tumors, head trauma, radiation exposure, or systemic illnesses that could disrupt the hormonal balance.⁸

The diagnosis of hypogonadism is a highly individualized process, with each step taken carefully to ensure a thorough understanding of the patient's health and the factors contributing to their hormonal imbalances. In complex cases or in cases in which the diagnosis remains uncertain, the expertise of specialists who are well versed in male reproductive health such as endocrinologists or urologists may be sought for further evaluation and management. Consulting with healthcare professionals who follow current clinical guidelines is crucial for accurate diagnosis and tailored patient care.

INDICATIONS FOR TESTOSTERONE REPLACEMENT THERAPY

Initiating testosterone replacement therapy (TRT) in men with hypogonadism requires careful consideration of clinical symptoms and hormone levels. AUA guidelines provide specific indications for TRT, emphasizing the importance of balancing the potential benefits with the potential risks. Indications for TRT include low serum total testosterone levels (typically below 300 ng/dL) and consistent signs and symptoms of hypogonadism.^{11,12} Symptoms that significantly impact a patient's quality of life, such as sexual dysfunction and reduced vitality, should also be considered when initiating TRT.

Not all men with hypogonadism are suitable candidates for TRT. Contraindications may include a

history of prostate cancer, severe lower urinary tract symptoms, and elevated hematocrit levels.^{11,15} Careful consideration must also be given to TRT initiation in the older male. Cardiovascular risks, which include concern for cardiovascular events such as myocardial infarction in those with history of the condition as well as for possible progression of existing atherosclerosis, need to be considered in older men; however, the AUA notes that current evidence does not definitively demonstrate that TRT increases the risk of cardiovascular events.¹² In terms of atherosclerotic changes specifically, some studies suggest that testosterone treatment has no worsening effect.¹⁶ Regardless, alternative treatment options or further consultation with urologists or endocrinologists may be warranted.

Before initiating TRT, discussing potential benefits and risks with the patient is essential, as is obtaining informed consent.^{8,15} Informed consent should include a thorough discussion of the expected outcomes, potential adverse reactions, and the need for regular monitoring during TRT. More information is provided below in "RISKS AND BENEFITS OF TRT."

TRT OPTIONS

TRT can be administered through various modalities, each with advantages and disadvantages.^{6,11,17} I.M. or subcutaneous injections are a traditional and cost-effective method for TRT. Injections provide a relatively stable release of testosterone and can be administered every 1 to 2 weeks, with the ideal timing between injections being weekly rather than biweekly to help ensure consistent testosterone levels.^{6,18} Weekly administration reduces deep troughs between injections that can cause some men to experience mild hypogonadism symptoms amid doses. A key advantage of I.M. or subcutaneous testosterone administration is the ability to maintain consistent testosterone levels during treatment. Disadvantages include having to self-inject weekly, with occasional soreness and injection site pain. Furthermore, a slight risk of secondary erythrocytosis exists with injection therapy, and this administration mode also requires a consistent review of the patient's hemoglobin and hematocrit, which some individuals may find burdensome.⁶

A novel TRT method is the use of transdermal patches, applied daily to the skin, which allow for a continuous release of testosterone.^{6,18} Patches provide testosterone levels that are more aligned with natural physiologic patterns compared with injections.

However, some patients may experience skin irritation or adherence issues with patches. An advantage of transdermal patches is their conferral of less risk in terms of increased hemoglobin and hematocrit. If discontinued, a quick reversal to a regular circadian testosterone pattern occurs in the individual.⁶

Topical testosterone gels are another popular option for TRT. They are applied to the skin daily and offer flexibility in dosing. Gels are well tolerated by most patients, but care should be taken to avoid inadvertent transfer to others, particularly women and children.^{6,18} The main advantage of testosterone gels is their ease of use and application; however, a disadvantage of gels is that their application is frequently done improperly, with individuals not waiting for the gel to dry adequately before putting on clothing, thereby often underdosing. Improper use leads to inconsistent levels of testosterone within the body.

A more invasive method of TRT administration is the subcutaneous insertion of testosterone pellets, which are a form of long-acting therapy. Pellets can

provide a sustained release of testosterone for several months, offering patients an option with a lower frequency of administration.¹⁸ However, pellet insertion requires a minor surgical procedure, which may be undesirable for some patients and inadvisable for others.⁶

Current guidelines do not recommend one specific TRT modality over another, as the choice should be individualized based on patient preferences, lifestyle, and cost considerations. NPs should consider individual patient preferences and convenience when selecting the most appropriate TRT option.

MONITORING AND MANAGING TRT

Close monitoring of patients undergoing TRT is essential to ensure safety and efficacy. AUA guidelines recommend regular follow-up visits and lab assessments to evaluate the patient's response to TRT and to detect any adverse reactions (*Table 2*).^{6,11,12} During TRT, the standard of care is to monitor serum testosterone levels to ensure that they remain within the therapeutic range and do not exceed the upper limit, as elevated levels

TABLE 2. Monitoring during TRT

Monitoring parameter	Timing of assessment	Rationale
Serum testosterone levels (total and free)	Baseline	Establishes the patient's baseline testosterone level
	3 to 6 months after initiation	Evaluates the effectiveness of TRT and determines whether adjustments to the dosage may be necessary
	Annually (after baseline and 3- to 6-month mark assessments)	Evaluates continued therapy
Hematocrit	Baseline	TRT can stimulate red blood cell production, leading to polycythemia (elevated hematocrit)
	3 to 6 months after initiation	Evaluates for risk of polycythemia; if elevated to $\geq 54\%$, consider discontinuing TRT or lowering the dosage
	Annually (after baseline and 3- to 6-month mark assessments)	Regular monitoring can help prevent potential complications associated with increased hematocrit levels
Prostate-specific antigen (PSA)	Baseline	Assesses prostate health, assesses eligibility for TRT, and enables monitoring for changes during TRT
	3 to 6 months after initiation	Urology referral and TRT cessation required if suddenly significantly increased
	Per standard guidelines based on individual patient characteristics or risk factors (after baseline and 3- to 6-month mark assessments)	Further evaluation is required if elevated
Symptom assessment	Regularly	Evaluates patient response to TRT and assesses for improvements in symptoms and overall well-being
	During follow-up visits	Addresses any concerns or adverse reactions reported by the patient during the treatment period

can increase the risk of adverse reactions. Periodic assessment of hematocrit levels is also essential, as TRT can increase red blood cell production (polycythemia).

Furthermore, PSA levels should be monitored regularly, especially in older patients and those with a family history of prostate cancer.⁶ Although AUA guidelines do not recommend routine prostate biopsies before initiating TRT, NPs should be vigilant in assessing prostate health throughout treatment. In case of adverse reactions or suboptimal therapeutic response, NPs should consider adjusting the TRT regimen or exploring other contributing factors. For instance, optimizing lifestyle factors such as diet, exercise, and sleep can complement the effects of TRT.

RISKS AND BENEFITS OF TRT

The decision to start TRT involves weighing its potential benefits, such as improved mood, energy, libido, bone density, and muscle mass, against the potential risks, including cardiovascular events and potential impact on prostate health.^{6,11} The association between TRT and cardiovascular risks is still under investigation.^{12,15}

Adverse reactions such as acne, mood swings, fluid retention, and gynecomastia are possible but generally manageable. Before treatment, NPs should discuss TRT's risks and benefits thoroughly with patients, considering their medical history and therapy objectives. Ongoing monitoring during TRT is crucial to ensure patient safety and treatment effectiveness. When considering TRT, it is essential to tailor the approach to the patient, accounting for their unique needs and risks. TRT can offer significant benefits, including increased muscle mass, bone density, and vitality, particularly in older men; however, caution is necessary, especially for those with cardiovascular disease or other comorbidities, due to potential risks.¹⁹

Furthermore, fertility concerns are paramount in men currently attempting to or planning to conceive, as TRT may impair sperm production and lead to infertility.²⁰ In such cases, alternative treatments, potentially entailing use of selective estrogen receptor modulators or gonadotropin therapy, should be considered to manage hypogonadism while simultaneously preserving fertility.²⁰

Patients with a history of prostate cancer require careful evaluation before initiating TRT, as it can stimulate prostate cancer cell growth. Regular prostate health assessments are advised, and collaboration with specialists is needed.^{6,19}

NONPHARMACOLOGIC INTERVENTIONS

In addition to TRT, certain lifestyle modifications can complement the effects of therapy and improve overall health outcomes for patients with hypogonadism. Encouraging patients to engage in regular physical exercise can help to enhance their mood, improve their body composition, and increase their muscle strength.¹² Furthermore, exercise can positively influence testosterone levels, making it a valuable adjunct to TRT.

Weight management is crucial for men with hypogonadism, particularly those who are overweight or obese. Weight loss and maintaining a healthy body mass index can help to optimize hormone levels, as excess body fat is associated with lower testosterone levels in particular.¹²

Adequate sleep is likewise crucial for hormone regulation and overall well-being. Encouraging patients to establish healthy sleep habits and address any sleep disturbances can positively impact their hormonal balance and overall health.¹²

NPs should educate their patients about the importance of these lifestyle modifications and support their implementation. A holistic approach to patient care, including addressing lifestyle factors alongside TRT, can improve patient health outcomes and satisfaction.

CONCLUSION

Managing hypogonadism with TRT is a critical aspect of primary care for men with this condition. A comprehensive understanding of AUA guidelines can assist NPs in making informed decisions about initiating and monitoring TRT. By following evidence-based guidelines, primary care NPs can optimize patient care and improve quality of life for men with this condition. Primary care NP education on the latest best practices and collaboration with other healthcare providers, such as urologists and endocrinologists, are essential to provide the best possible care for these patients. Regular follow-up visits and close monitoring of hormone levels and potential adverse reactions are necessary to ensure patient safety and treatment efficacy.

As frontline healthcare providers, primary care NPs are vital in recognizing and managing hypogonadism to improve patients' overall health and well-being. By staying informed about the latest research and guidelines, NPs can offer evidence-based care and optimize outcomes for men with hypogonadism. Through a comprehensive approach that includes appropriate

use of TRT, lifestyle modifications, and ongoing patient support, primary care NPs can significantly improve the lives of their patients with hypogonadism. **NP**

REFERENCES

1. Dobs AS, Campbell KJ. An individualized approach to managing testosterone therapy in the primary care setting. *Int J Gen Med*. 2022;15:7719-7733. doi:10.2147/IJGM.S364189.
2. Araujo AB, O'Donnell AB, Brambilla DJ, et al. Prevalence and incidence of androgen deficiency in middle-aged and older men: estimates from the Massachusetts Male Aging Study. *J Clin Endocrinol Metab*. 2004;89(12):5920-5926. doi:10.1210/jc.2003-03179.
3. Mulligan T, Frick MF, Zuraw QC, et al. Prevalence of hypogonadism in males aged at least 45 years: the HIM study. *Int J Clin Pract*. 2006;60:762-769.
4. Sharma A, Jayasena CN, Dhillon WS. Regulation of the hypothalamic-pituitary-testicular axis: pathophysiology of hypogonadism. *Endocrinol Metab Clin North Am*. 2022;51(1):29-45.
5. Tsampoukas G, Pang KH, Papatsoris A, Moussa M, Miah S. Testosterone replacement therapy in the aged male: monitoring patients' quality of life utilizing scoring systems. *Int J Gen Med*. 2022;15:7123-7130.
6. McCullough AR, Khan M. Testosterone replacement options. *Urol Clin North Am*. 2022;49(4):679-693. doi:10.1016/j.ucl.2022.07.010.
7. Khodamoradi K, Khosravizadeh Z, Parmar M, Kuchakulla M, Ramasamy R, Arora H. Exogenous testosterone replacement therapy versus raising endogenous testosterone levels: current and future prospects. *F S Rev*. 2021;2(1):32-42.
8. Kumar P, Kumar N, Thakur DS, Patidar A. Male hypogonadism: symptoms and treatment. *J Adv Pharm Technol Res*. 2010;1(3):297-301. doi:10.4103/0110-5558.72420.
9. Emmelot-Vonk MH, Verhaar HJJ, Nakhai-Pour HR, Grobbee DE, van der Schouw YT. Low testosterone concentrations and the symptoms of testosterone deficiency according to the Androgen Deficiency in Ageing Males (ADAM) and Ageing Males' Symptoms rating scale (AMS) questionnaires. *Clin Endocrinol*. 2011;74(4):488-494. doi:10.1111/J.1365-2265.2010.03954.X.
10. Viswanathan V, Eugster EA. Etiology and treatment of hypogonadism in adolescents. *Pediatr Clin North Am*. 2011;58(5):1181-1200. doi:10.1016/j.pcl.2011.07.009.
11. Medscape. Hypogonadism: practice essentials, background, ... <https://emedicine.medscape.com/article/922038-overview>.
12. Mulhall JP, Trost LW, Brannigan RE, et al. Evaluation and management of testosterone deficiency: AUA guideline. *J Urol*. 2018;200(2):423-432.
13. Crawford ED, Poage W, Nyhuis A, et al. Measurement of testosterone: how important is a morning blood draw? *Curr Med Res Opin*. 2015;31(10):1911-1914.
14. Ramos L, Patel AS, Ramasamy R. Testosterone replacement therapy for physician assistants and nurse practitioners. *Transl Androl Urol*. 2018;7(Suppl 1):S63-S71. doi:10.21037/tau.2017.12.09.
15. Barbonetti A, D'Andrea S, Francavilla S. Testosterone replacement therapy. *J Androl*. 2020;8(6):1551-1566. doi:10.1111/ANDR.12774.
16. Basaria S, Harman SM, Travison TG, et al. Effects of testosterone administration for 3 years on subclinical atherosclerosis progression in older men with low or low-normal testosterone levels: a randomized clinical trial. *JAMA*. 2015;314(6):570-581.
17. Matsumoto AM. Diagnosis and evaluation of hypogonadism. *Endocrinol Metab Clin*. 2022;51(1):47-62.
18. Wang C, Swerdloff RS. Testosterone replacement therapy in hypogonadal men. *Endocrinol Metab Clin North Am*. 2022;51(1):77-98.
19. Santos HO, Cadegiani FA, Forbes SC. Nonpharmacological interventions for the management of testosterone and sperm parameters: a scoping review. *Clin Ther*. 2022;44(8):1129-1149.
20. Hayes FJ. Monitoring of testosterone replacement therapy to optimize the benefit-to-risk ratio. *Endocrinol Metab Clin North Am*. 2022;51(1):99-108. doi:10.1016/j.ecl.2021.11.013.

Julian L. Gallegos is director of the DNP program, interim assistant head of graduate programs, and a clinical associate professor in the School of Nursing, College of Health and Human Sciences at Purdue University in West Lafayette, Ind. Dr. Gallegos is also an adjunct clinical assistant professor of family medicine at Indiana University School of Medicine in West Lafayette, Ind.

The author and planners have disclosed no potential conflicts of interest, financial or otherwise.

DOI:10.1097/01.NPR.0000000000000210

For more than 506 additional continuing education articles related to Advanced Practice Nursing topics, go to NursingCenter.com/CE.

Testosterone replacement therapy for hypogonadism: A primer for primary care

TEST INSTRUCTIONS

- Read the article. The test for this CE activity is to be taken online at www.nursingcenter.com/CE/NP. Tests can no longer be mailed or faxed.
- You'll need to create (it's free!) and log in to your personal CE Planner account before taking online tests. Your planner will keep track of all your Lippincott Professional Development online CE activities for you.
- There's only one correct answer for each question. A passing score for this test is 8 correct answers. If you pass, you can print your certificate of earned contact hours and access the answer key. If you fail, you have the option of taking the test again at no additional cost.
- For questions, contact Lippincott Professional Development: 1-800-787-8985.
- Registration deadline is September 5, 2025.

Lippincott
NursingCenter®



PROVIDER ACCREDITATION

Lippincott Professional Development will award 2.0 contact hours and 0.5 pharmacology contact hour for this continuing nursing education activity.

Lippincott Professional Development is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation.

This activity is also provider approved by the California Board of Registered Nursing, Provider Number CEP 11749 for 2.0 contact hours. Lippincott Professional Development is also an approved provider of continuing nursing education by the District of Columbia, Georgia, West Virginia, New Mexico, South Carolina, and Florida, CE Broker #50-1223. Your certificate is valid in all states.

Payment: The registration fee for this test is \$21.95.