of Tennessee

Policy

Reimbursement Policy

Thyroid Disease Testing

I. Policy Description

Thyroid hormones are necessary for both prenatal and postnatal development, as well as metabolic activity in adults.[1]

Thyroid disease includes conditions which cause hypothyroidism, hyperthyroidism, goiter, thyroiditis (which can present as either hypo- or hyperthyroidism), and thyroid tumors.[2]

Thyroid function tests are used in a variety of clinical settings to assess thyroid function, monitor treatment, and screen asymptomatic populations for subclinical or otherwise undiagnosed thyroid dysfunction.[3]

Terms such as male and female are used when necessary to refer to sex assigned at birth.

II. Indications and/or Limitations of Coverage

Application of coverage criteria is dependent upon an individual's benefit coverage at the time of the request. Specifications pertaining to Medicare and Medicaid can be found in the "Applicable State and Federal Regulations" section of this policy document.

1) Thyroid function testing **MEETS COVERAGE CRITERIA** in the following situations:

   a) For individuals with signs and symptoms consistent with hypothyroidism (see Note 1):

      i) Thyroid stimulating hormone (TSH) testing to confirm or rule out primary hypothyroidism.

      ii) Free T4 (fT4) testing as a follow up to abnormal TSH finding.

      iii) TSH and fT4 testing in cases of suspected secondary hypothyroidism.

      iv) For individuals being treated for primary hypothyroidism, monitoring with TSH and fT4 testing every 6 weeks upon dosage change and annually in stable individuals.

      v) For individuals being treated for secondary hypothyroidism, monitoring with fT4 testing every 6 weeks upon dosage change and annually in stable individuals.

BlueCross BlueShield of Tennessee, Inc., Independent Licensee of the Blue Cross Blue Shield Association.

Reimbursement Policy

b) For individuals with signs and symptoms consistent with hyperthyroidism (see Note 2):

   i) TSH testing to confirm or rule out overt hyperthyroidism.

   ii) fT4 testing as a follow up to abnormal TSH findings.

   iii) Total T3 (TT3) or free T3 (fT3) testing to confirm a diagnosis of hyperthyroidism.

   iv) fT4 testing to distinguish between overt and subclinical hyperthyroidism.

   v) Monitoring individuals after treatment for hyperthyroidism:

      (a) In patients being treated for hyperthyroidism, repeat testing of TSH and fT4 should occur every 8 weeks.

      (b) Annual monitoring after first year even if asymptomatic for risk of relapse or late-onset hypothyroidism.

c) For asymptomatic individuals who have been prescribed drugs that can interfere with thyroid function and thus who are at an increased risk for thyroid disease, TSH testing at the following intervals:

   i) Annually.

   ii) When dosage or medication changes.

   iii) If symptoms consistent with thyroid dysfunction develop.

d) TSH testing for individuals capable of becoming pregnant who

have experienced two or more pregnancy losses.

e) TSH testing for individuals with a thyroid nodule.

f) One-time TSH screening:

   i) For asymptomatic individuals at high risk for thyroid disease due to:

      (a) Personal or family history of thyroid dysfunction.

      (b) Personal or family history of type 1 diabetes or other autoimmune disease.

   ii) For individuals with disease or neoplasm of the thyroid or other endocrine glands.

   iii) For individuals with chronic or acute urticaria.

BlueCross BlueShield of Tennessee, Inc., Independent Licensee of the Blue Cross Blue Shield Association.

iv) For pediatric individuals diagnosed with short stature.

v) For pediatric individuals with a clinical finding of failure-to-thrive.

g) TSH testing once every 3 months, with reflex fT4 and fT3 when TSH is abnormal, for individuals undergoing immune reconstitution therapy (IRT):

i) Individuals with active relapsing remitting multiple sclerosis (MS) undergoing therapy with alemtuzumab (Lemtrada).

ii) Individuals with HIV undergoing highly active antiretroviral therapy (HAART).

iii) Individuals following allogeneic bone marrow transplantation (BMT) or hematopoietic stem cell transplantation (HSCT).

h) For individuals with hypothalamic-pituitary disease, monitoring of TSH and fT4:

i) Biannually for individuals less than 18 years of age.

ii) Annually for individuals 18 years of age or older.

i) Annual screening of TSH and fT4 for individuals diagnosed with primary mitochondrial disease.

2) For individuals who are pregnant or who are postpartum and who have symptoms of thyroid dysfunction (see Note 1 and Note 2), TSH and fT4 testing (once every 4 weeks) **MEETS COVERAGE CRITERIA** (see Note 3).

3) For individuals who are pregnant or who are postpartum and who have been diagnosed with hyperthyroidism, total T4 (TT4), antithyroglobulin antibody (Tg-Ab), thyrotropin receptor antibodies (TRAb), and antithyroid peroxidase antibody (TPOAb) **MEETS COVERAGE CRITERIA** (see Note 3).

4) For individuals with hypothyroidism or hyperthyroidism, testing once every three years for thyroid antibodies (i.e., Tg-Ab, TPOAb, TRAB, thyroid-stimulating immunoglobulins [TSI]) **MEETS COVERAGE CRITERIA**.

5) For individuals with thyroid cancer, testing for serum thyroglobulin and/or Tg-Ab levels for the detection of tumor recurrence, post-surgical evaluation, surveillance, and maintenance for differentiated thyroid carcinomas **MEETS COVERAGE CRITERIA**.

6) For the evaluation of the cause of hyperthyroidism or hypothyroidism, testing for thyrotropin-releasing hormone (TRH) or thyroxine-binding globulin (TBG) **DOES NOT MEET COVERAGE CRITERIA**.

Reimbursement Policy

7) For all other situations not mentioned above, testing of reverse T3, T3 uptake, and TT4 **DOES NOT MEET COVERAGE CRITERIA**.

8) For the assessment of hypothyroidism, measurement of TT3 and/or fT3 **DOES NOT MEET COVERAGE CRITERIA**.

9) To assess levothyroxine dose in hypothyroid patients, measurement of total or fT3 level **DOES NOT MEET COVERAGE CRITERIA**.

10) For asymptomatic nonpregnant individuals, testing for thyroid dysfunction during a general exam without abnormal findings **DOES NOT MEET COVERAGE CRITERIA**.

NOTES:

Note 1: Signs and symptoms of hypothyroidism include:

- Fatigue
- Increased sensitivity to cold
- Constipation
- Dry skin
- Unexplained weight gain
- Puffy face
- Hoarseness
- Muscle weakness
- Elevated blood cholesterol level
- Muscle aches, tenderness, and stiffness
- Pain, stiffness or swelling in your joints
- Heavier than normal or irregular menstrual periods
- Thinning hair

- Slowed heart rate
- Depression
- Impaired memory

Note 2: Hyperthyroidism can mimic other health problems, which may make it difficult for doctors to diagnose. It can also cause a wide variety of signs and symptoms, including:

- Sudden weight loss, even when your appetite and the amount and type of food you eat remain the same or even increase
- Rapid heartbeat (tachycardia) — commonly more than 100 beats a minute — irregular heartbeat (arrhythmia) or pounding of your heart (palpitations)
- Increased appetite
- Nervousness, anxiety, and irritability
- Tremor — usually a fine trembling in your hands and fingers
- Sweating
- Changes in menstrual patterns
- Increased sensitivity to heat
- Changes in bowel patterns, especially more frequent bowel movements
- An enlarged thyroid gland (goiter), which may appear as a swelling at the base of your neck
- Fatigue, muscle weakness
- Difficulty sleeping
- Skin thinning
- Fine, brittle hair

Note 3: Due to significant changes in thyroid physiology during pregnancy, measurement of hormone levels should only be performed at labs that have trimester-specific normal ranges for

their assay(s). While fT4 is the preferred test, TT4 may be useful if the TSH and fT4 results are discordant or when trimester-specific normal ranges for fT4 are unavailable.

III. Applicable State and Federal Regulations

DISCLAIMER: If there is a conflict between this Policy and any relevant, applicable government policy for a particular member [e.g., Local Coverage Determinations (LCDs) or National Coverage Determinations (NCDs) for Medicare and/or state coverage for Medicaid], then the government policy will be used to make the determination. For the most up-to-date Medicare policies and coverage, please visit the Medicare search website:https://www.cms.gov/medicare-coverage-database/search.aspx. For the most up-to-date Medicaid policies and coverage, visit the applicable state Medicaid website.

Food and Drug Administration (FDA)

Many labs have developed specific tests that they must validate and perform in house. These laboratory-developed tests (LDTs) are regulated by the Centers for Medicare and Medicaid (CMS) as high-complexity tests under the Clinical Laboratory Improvement Amendments of 1988 (CLIA '88). LDTs are not approved or cleared by the U. S. Food and Drug Administration; however, FDA clearance or approval is not currently required for clinical use.

IV. Applicable CPT/HCPCS Procedure Codes

CPT	Code Description
80438	Thyrotropin-releasing hormone (TRH) stimulation panel; 1 hour This panel must include the following: Thyroid stimulating hormone (TSH) (84443 x 3)
80439	Thyrotropin-releasing hormone (TRH) stimulation panel; 2 hour This panel must include the following: Thyroid stimulating hormone (TSH) (84443 x 4)
83519	Immunoassay for analyte other than infectious agent antibody or infectious agent antigen; quantitative, by radioimmunoassay (eg, RIA)
83520	Immunoassay for analyte other than infectious agent antibody or infectious agent antigen; quantitative, not otherwise specified
84432	Thyroglobulin
84436	Thyroxine; total
*84439	Thyroxine; free

Reimbursement Policy

CPT	Code Description
	***Excludes enforcement for minor age (0-17) for procedure code 84439.**
84442	Thyroxine-binding globulin (TBG)
84443	Thyroid stimulating hormone (TSH)
84445	Thyroid stimulating immune globulins (TSI)
84479	Thyroid hormone (T3 or T4) uptake or thyroid hormone binding ratio (THBR)
84480	Triiodothyronine T3; total (TT-3)
84481	Triiodothyronine T3; free
84482	Triiodothyronine T3; reverse
86376	Microsomal antibodies (eg, thyroid or liver-kidney), each
86800	Thyroglobulin antibody

Current Procedural Terminology© American Medical Association. All Rights reserved.

Procedure codes appearing in Medical Policy documents are included only as a general reference tool for each policy. They may not be all-inclusive.

V. Evidence-based Scientific References

1. Brent G. Thyroid hormone action. Updated May 28, 2024. https://www.uptodate.com/contents/thyroid-hormone-action

2. Rugge JB, Bougatsos C, Chou R. Screening and treatment of thyroid dysfunction: an evidence review for the U.S. Preventive Services Task Force. *Annals of internal medicine*. Jan 06 2015;162(1):35-45. doi:10.7326/m14-1456

3. Ross DS. Laboratory assessment of thyroid function. Updated January 2, 2025. https://www.uptodate.com/contents/laboratory-assessment-of-thyroid-function

4. AACE. All About the Thyroid. https://www.aace.com/disease-and-conditions/thyroid/all-about-thyroid

5. Ross DS. Thyroid hormone synthesis and physiology. UpToDate. Updated January 9, 2024. https://www.uptodate.com/contents/thyroid-hormone-synthesis-and-physiology

6. Ross DS. Diagnosis of and screening for hypothyroidism in nonpregnant adults. Updated July 15, 2024. https://www.uptodate.com/contents/diagnosis-of-and-screening-for-hypothyroidism-in-nonpregnant-adults

7. Richmond EJ, Rogol AD. Causes of short stature. Updated April 2, 2024. https://www.uptodate.com/contents/causes-of-short-stature

8. Alexander EK, Pearce EN, Brent GA, et al. 2017 Guidelines of the American Thyroid Association for the Diagnosis and Management of Thyroid Disease During Pregnancy and the Postpartum. *Thyroid : official journal of the American Thyroid Association*. Mar 2017;27(3):315-389. doi:10.1089/thy.2016.0457

9. Ross DS. Diagnosis of hyperthyroidism Updated October 10, 2024. https://www.uptodate.com/contents/diagnosis-of-hyperthyroidism

10. Haymart MR, Repplinger DJ, Leverson GE, et al. Higher serum thyroid stimulating hormone level in thyroid nodule patients is associated with greater risks of differentiated thyroid cancer and advanced tumor stage. *J Clin Endocrinol Metab*. Mar 2008;93(3):809-14. doi:10.1210/jc.2007-2215

11. AlSaedi AH, Almalki DS, ElKady RM. Approach to Thyroid Nodules: Diagnosis and Treatment. *Cureus*. Jan 2024;16(1):e52232. doi:10.7759/cureus.52232

12. Hoang J. Thyroid nodules and evaluation of thyroid cancer risk. *Australasian Journal of Ultrasound in Medicine*. 2010;13(4):33-36. doi:10.1002/j.2205-0140.2010.tb00177.x

13. AAFP. Thyroid Nodules: Advances in Evaluation and Management. 2020. https://www.aafp.org/pubs/afp/issues/2020/0901/p298.pdf

14. Bomeli SR, Lebeau SO, Ferris RL. Evaluation of a Thyroid Nodule. *Otolaryngologic Clinics of North America*. 2010;43(2):229-238. doi:10.1016/j.otc.2010.01.002

15. ATA. Thyroiditis. 2025. https://www.thyroid.org/thyroiditis/

16. Ross DS. Overview of thryoid disease and pregnancy. UpToDate. 2022. Updated July 29, 2024. https://www.uptodate.com/contents/overview-of-thyroid-disease-and-pregnancy

17. Luewan S, Chakkabut P, Tongsong T. Outcomes of pregnancy complicated with hyperthyroidism: a cohort study. *Archives of gynecology and obstetrics*. Feb 2011;283(2):243-7. doi:10.1007/s00404-010-1362-z

18. Leung AM, Brent GA. The Influence of Thyroid Hormone on Growth Hormone Secretion and Action. *Growth Hormone Deficiency: Physiology and Clinical Management*. 2016:29-46. doi:10.1007/978-3-319-28038-7_4

19. Thomas K. Thyroid Function Testing. Updated October 3, 2022. https://www.testing.com/thyroid-function-testing/

20. EverlyWell. Check your thyroid from the comfort of home. https://www.everlywell.com/products/thyroid-test/

21. LetsGetChecked. Home Thyroid Testing. https://www.letsgetchecked.com/home-thyroid-test/

22. Paloma Health. Complete Thyroid Blood Test Kit. https://www.palomahealth.com/home-thyroid-blood-test-kit

23. myLABBOX. At Home Thyroid Health Screening Test. Accessed January 3, 2023, https://www.mylabbox.com/product/at-home-thyroid-health-screening-test/

24. TellmeGEN. Thyroid Function. https://www.tellmegen.com/en/results/dna-traits-test/thyroid-function-tsh-levels

25. Hogan MB, Shepherd MW. Common variable immunodeficiency in children. Updated July 16. 2024. https://www.uptodate.com/contents/common-variable-immunodeficiency-in-children

26. Kazerouni F, Amirrasouli H. Performance characteristics of three automated immunoassays for thyroid hormones. *Caspian journal of internal medicine*. Spring 2012;3(2):400-104.

27. Masika LS, Zhao Z, Soldin SJ. Is measurement of TT3 by immunoassay reliable at low concentrations? A comparison of the Roche Cobas 6000 vs. LC-MSMS. *Clinical biochemistry*. Aug 2016;49(12):846-9. doi:10.1016/j.clinbiochem.2016.02.004

28. Gomes-Lima C, Burman KD. Reverse T3 or perverse T3? Still puzzling after 40 years. *Cleveland Clinic journal of medicine*. Jun 2018;85(6):450-455. doi:10.3949/ccjm.85a.17079

29. Burmeister LA. Reverse T3 Does Not Reliably Differentiate Hypothyroid Sick Syndrome from Euthyroid Sick Syndrome. *Thyroid : official journal of the American Thyroid Association*. 1995/12/01 1995;5(6):435-441. doi:10.1089/thy.1995.5.435

30. Koike E, Noguchi S, Yamashita H, et al. Ultrasonographic Characteristics of Thyroid Nodules: Prediction of Malignancy. *Archives of Surgery*. 2001;136(3):334-337. doi:10.1001/archsurg.136.3.334

31. Li D, Radulescu A, Shrestha RT, et al. Association of Biotin Ingestion With Performance of Hormone and Nonhormone Assays in Healthy Adults. *Jama*. Sep 26 2017;318(12):1150-1160. doi:10.1001/jama.2017.13705

32. Livingston M, Birch K, Guy M, Kane J, Heald AH. No role for tri-iodothyronine (T3) testing in the assessment of levothyroxine (T4) over-replacement in hypothyroid patients. *British journal of biomedical science*. 2015;72(4):160-3.

33. Yazici P, Mihmanli M, Bozkurt E, Ozturk FY, Uludag M. Which is the best predictor of thyroid cancer: thyrotropin, thyroglobulin or their ratio? *Hormones (Athens, Greece)*. Apr 2016;15(2):256-263. doi:10.14310/horm.2002.1677

34. Gholve C, Kumarasamy J, Kulkarni S, Rajan MGR. In-House Solid-Phase Radioassay for the Detection of Anti-thyroglobulin Autoantibodies in Patients with Differentiated Thyroid Cancer. *Indian journal of clinical biochemistry : IJCB*. Mar 2017;32(1):39-44. doi:10.1007/s12291-016-0568-7

35. Biktagirova EM, Sattarova LI, Vagapova GR, et al. [Biochemical and immunological markers of autoimmune thyroiditis]. *Biomeditsinskaia khimiia*. May 2016;62(4):458-65. Biokhimicheskie i immunologicheskie markery khronicheskogo limfotsitarnogo tireoidita. doi:10.18097/pbmc20166204458

36. Diana T, Krause J, Olivo PD, et al. Prevalence and clinical relevance of thyroid stimulating hormone receptor-blocking antibodies in autoimmune thyroid disease. *Clinical and experimental immunology*. Sep 2017;189(3):304-309. doi:10.1111/cei.12980

37. Kluesner JK, Beckman DJ, Tate JM, et al. Analysis of current thyroid function test ordering practices. *Journal of evaluation in clinical practice*. Apr 2018;24(2):347-352. doi:10.1111/jep.12846

38. Jin HY. Prevalence of subclinical hypothyroidism in obese children or adolescents and association between thyroid hormone and the components of metabolic syndrome. *Journal of paediatrics and child health*. Sep 2018;54(9):975-980. doi:10.1111/jpc.13926

39. Muraresku CC, McCormick EM, Falk MJ. Mitochondrial Disease: Advances in clinical diagnosis, management, therapeutic development, and preventative strategies. *Curr Genet Med Rep*. Jun 2018;6(2):62-72. doi:10.1007/s40142-018-0138-9

40. Sarkar D. Recurrent pregnancy loss in patients with thyroid dysfunction. *Indian J Endocrinol Metab*. Dec 2012;16(Suppl 2):S350-1. doi:10.4103/2230-8210.104088

41. Korevaar TIM, Derakhshan A, Taylor PN, et al. Association of Thyroid Function Test Abnormalities and Thyroid Autoimmunity With Preterm Birth: A Systematic Review and Meta-analysis. *Jama*. Aug 20 2019;322(7):632-641. doi:10.1001/jama.2019.10931

42. Kiel S, Ittermann T, Völzke H, Chenot J-F, Angelow A. Frequency of thyroid function tests and examinations in participants of a population-based study. *BMC Health Services Research*. 2020/01/30 2020;20(1):70. doi:10.1186/s12913-020-4910-7

43. Degrandi R, Prodam F, Genoni G, et al. The Prevalence of Thyroid Autoimmunity in Children with Developmental Dyslexia. *Biomed Res Int*. 2021;2021:7656843. doi:10.1155/2021/7656843

44. Wang JJ, Zhuang ZH, Shao CL, et al. Assessment of causal association between thyroid function and lipid metabolism: a Mendelian randomization study. *Chin Med J (Engl)*. Apr 13 2021;134(9):1064-1069. doi:10.1097/CM9.0000000000001505

45. Toloza FJK, Derakhshan A, Männistö T, et al. Association between maternal thyroid function and risk of gestational hypertension and pre-eclampsia: a systematic review and individual-participant data meta-analysis. *Lancet Diabetes Endocrinol*. Apr 2022;10(4):243-252. doi:10.1016/s2213-8587(22)00007-9

46. USPSTF. Thyroid Cancer: Screening. https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/thyroid-cancer-screening

47. ACOG. Thyroid Disease in Pregnancy: ACOG Practice Bulletin, Number 223. *Obstet Gynecol*. Jun 2020;135(6):e261-e274. doi:10.1097/aog.0000000000003893

48. Garber JR, Cobin RH, Gharib H, et al. Clinical practice guidelines for hypothyroidism in adults: cosponsored by the American Association of Clinical Endocrinologists and the American Thyroid Association. *Endocrine practice : official journal of the American College of Endocrinology and the American Association of Clinical Endocrinologists*. Nov-Dec 2012;18(6):988-1028. doi:10.4158/ep12280.gl

49. Stagnaro-Green A, Abalovich M, Alexander E, et al. Guidelines of the American Thyroid Association for the diagnosis and management of thyroid disease during pregnancy and postpartum. *Thyroid : official journal of the American Thyroid Association*. Oct 2011;21(10):1081-125. doi:10.1089/thy.2011.0087

50. Jonklaas J, Bianco AC, Bauer AJ, et al. Guidelines for the treatment of hypothyroidism: prepared by the american thyroid association task force on thyroid hormone replacement.

Thyroid : official journal of the American Thyroid Association. Dec 1 2014;24(12):1670-751. doi:10.1089/thy.2014.0028

51. Ross DS, Burch HB, Cooper DS, et al. 2016 American Thyroid Association Guidelines for Diagnosis and Management of Hyperthyroidism and Other Causes of Thyrotoxicosis. *Thyroid : official journal of the American Thyroid Association*. Oct 2016;26(10):1343-1421. doi:10.1089/thy.2016.0229

52. Kravets I. Hyperthyroidism: Diagnosis and Treatment. *American family physician*. Mar 1 2016;93(5):363-70.

53. Gaitonde DY, Rowley KD, Sweeney LB. Hypothyroidism: An Update. https://www.aafp.org/afp/2012/0801/p244.html

54. Donangelo I, Suh SY. Subclinical Hyperthyroidism: When to Consider Treatment. *American family physician*. Jun 1 2017;95(11):710-716.

55. Wilson SA, Stem LA, Bruehlman RD. Hypothyroidism: Diagnosis and Treatment. *American family physician*. May 15 2021;103(10):605-613.

56. AAFP. Thyroid Dysfunction Screening. https://www.aafp.org/family-physician/patient-care/clinical-recommendations/all-clinical-recommendations/thyroid-dysfunction.html

57. Homan GJ. Failure to Thrive: A Practical Guide. *American family physician*. Aug 15 2016;94(4):295-9.

58. ASRM. Subclinical hypothyroidism in the infertile female population: a guideline. https://www.asrm.org/globalassets/_asrm/practice-guidance/practice-guidelines/pdf/subclinical_hypothyroidism_in_the_infertile_female_population.pdf

59. Croker EE, McGrath SA, Rowe CW. Thyroid disease: Using diagnostic tools effectively. *Aust J Gen Pract*. Jan-Feb 2021;50(1-2):16-21. doi:10.31128/ajgp-10-20-5693

60. Li YH, Marren A. Recurrent pregnancy loss: A summary of international evidence-based guidelines and practice. *Aust J Gen Pract*. Jul 2018;47(7):432-436. doi:10.31128/AJGP-01-18-4459

61. Bernstein JA, Lang DM, Khan DA, et al. The diagnosis and management of acute and chronic urticaria: 2014 update. *The Journal of allergy and clinical immunology*. May 2014;133(5):1270-7. doi:10.1016/j.jaci.2014.02.036

62. ASCP. Thirty Five Things Physicians and Patients Should Question. ABIM Foundation. Updated September 1, 2020. https://www.ascp.org/content/docs/default-source/get-involved-pdfs/istp_choosingwisely/ascp-35-things-list_2020_final.pdf

63. Endocrine Society. RECOMMENDATIONS The Endocrine Society of Australia. https://www.choosingwisely.org.au/recommendations/esa5

64. Muller I, Moran C, Lecumberri B, et al. 2019 European Thyroid Association Guidelines on the Management of Thyroid Dysfunction following Immune Reconstitution Therapy. *European Thyroid Journal*. 2019;8(4):173-185. doi:10.1159/000500881

65. Poppe K, Bisschop P, Fugazzola L, Minziori G, Unuane D, Weghofer A. 2021 European Thyroid Association Guideline on Thyroid Disorders prior to and during Assisted Reproduction. *European Thyroid Journal*. 01 Feb. 2021 2021;9(6):281-295. doi:10.1159/000512790

66. Kahaly GJ, Bartalena L, Hegedus L, Leenhardt L, Poppe K, Pearce SH. 2018 European Thyroid Association Guideline for the Management of Graves' Hyperthyroidism. *Eur Thyroid J*. Aug 2018;7(4):167-186. doi:10.1159/000490384

67. Mooij CF, Cheetham TD, Verburg FA, et al. 2022 European Thyroid Association Guideline for the management of pediatric Graves' disease. *Eur Thyroid J*. Jan 1 2022;11(1)doi:10.1530/ETJ-21-0073

68. Durante C, Hegedüs L, Czarniecka A, et al. 2023 European Thyroid Association Clinical Practice Guidelines for thyroid nodule management. *Eur Thyroid J*. Oct 1 2023;12(5)doi:10.1530/etj-23-0067

69. NICE. Thyroid disease: assessment and management. 2023. https://www.nice.org.uk/guidance/ng145

70. Society for Maternal-Fetal Medicine. Choosing Wisely: Eighteen Things Physicians and Patients Should Question. 2022. https://publications.smfm.org/publications/460-choosing-wisely-eighteen-things-physicians-and-patients-should/

71. Parikh S, Goldstein A, Karaa A, et al. Patient care standards for primary mitochondrial disease: a consensus statement from the Mitochondrial Medicine Society. *Genet Med*. Dec 2017;19(12)doi:10.1038/gim.2017.107